COMPUTER OPERATOR AND PROGRAMMING ASSISTANT

NSQF LEVEL - 3

Volume II of II

TRADE PRACTICAL

SECTOR: IT & ITES

(As per revised syllabus July 2022 - 1200 hrs)

Directorate General of Training

DIRECTORATE GENERAL OF TRAINING
MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP
GOVERNMENT OF INDIA

NATIONAL INSTRUCTIONAL MEDIA INSTITUTE, CHENNAI

Post Box No. 3142, CTI Campus, Guindy, Chennai - 600 032

Sector : **IT & ITES**

Duration : **1 Year**

Trade : **COPA - Volume II of II Trade Practical - NSQF Level - 3 (Revised 2022)**

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FOREWORD

The Government of India has set an ambitious target of imparting skills to 30 crores people, one out of every four Indians, by 2020 to help them secure jobs as part of the National Skills Development Policy. Industrial Training Institutes (ITIs) play a vital role in this process especially in terms of providing skilled manpower. Keeping this in mind, and for providing the current industry relevant skill training to Trainees, ITI syllabus has been recently updated with the help of Mentor Councils comprising various stakeholder's viz. Industries, Entrepreneurs, Academicians and representatives from ITIs.

The National Instructional Media Institute (NIMI), Chennai has now come up with instructional material to suit the revised curriculum for **COPA Volume II of II Trade Practical NSQF Level - 3 (Revised 2022) in IT & ITES Sector.** The NSQF Level - 3 (Revised 2022) Trade Practical will help the trainees to get an international equivalency standard where their skill proficiency and competency will be duly recognized across the globe and this will also increase the scope of recognition of prior learning. NSQF Level - 3 (Revised 2022) trainees will also get the opportunities to promote life long learning and skill development. I have no doubt that NSQF Level - 3 (Revised 2022) the trainers and trainees of ITIs, and all stakeholders will derive maximum benefits from these IMPs and that NIMI's effort will go a long way in improving the quality of Vocational training in the country.

The Executive Director & Staff of NIMI and members of Media Development Committee deserve appreciation for their contribution in bringing out this publication.

Jai Hind

Addl. Secretary/Director General (Training)
Ministry of Skill Development & Entrepreneurship,
Government of India.

New Delhi - 110 001

PREFACE

The National Instructional Media Institute (NIMI) was established in 1986 at Chennai by then Directorate General of Employment and Training (D.G.E & T), Ministry of Labour and Employment, (now under Ministry of Skill Development and Entrepreneurship) Government of India, with technical assistance from the Govt. of the Federal Republic of Germany. The prime objective of this institute is to develop and provide instructional materials for various trades as per the prescribed syllabi (NSQF LEVEL - 4) under the Craftsman and Apprenticeship Training Schemes.

The instructional materials are created keeping in mind, the main objective of Vocational Training under NCVT/NAC in India, which is to help an individual to master skills to do a job. The instructional materials are generated in the form of Instructional Media Packages (IMPs). An IMP consists of Theory book, Practical book, Test and Assignment book, Instructor Guide, Audio Visual Aid (Wall charts and Transparencies) and other support materials.

The trade practical book consists of series of exercises to be completed by the trainees in the workshop. These exercises are designed to ensure that all the skills in the prescribed syllabus are covered. The trade theory book provides related theoretical knowledge required to enable the trainee to do a job. The test and assignments will enable the instructor to give assignments for the evaluation of the performance of a trainee. The wall charts and transparencies are unique, as they not only help the instructor to effectively present a topic but also help him to assess the trainee's understanding. The instructor guide enables the instructor to plan his schedule of instruction, plan the raw material requirements, day to day lessons and demonstrations.

In order to perform the skills in a productive manner instructional videos are embedded in QR code of the exercise in this instructional material so as to integrate the skill learning with the procedural practical steps given in the exercise. The instructional videos will improve the quality of standard on practical training and will motivate the trainees to focus and perform the skill seamlessly.

IMPs also deals with the complex skills required to be developed for effective team work. Necessary care has also been taken to include important skill areas of allied trades as prescribed in the syllabus.

The availability of a complete Instructional Media Package in an institute helps both the trainer and management to impart effective training.

The IMPs are the outcome of collective efforts of the staff members of NIMI and the members of the Media Development Committees specially drawn from Public and Private sector industries, various training institutes under the Directorate General of Training (DGT), Government and Private ITIs.

NIMI would like to take this opportunity to convey sincere thanks to the Directors of Employment & Training of various State Governments, Training Departments of Industries both in the Public and Private sectors, Officers of DGT and DGT field institutes, proof readers, individual media developers and coordinators, but for whose active support NIMI would not have been able to bring out this materials.

Chennai - 600 032 **EXECUTIVE DIRECTOR**

ACKNOWLEDGEMENT

National Instructional Media Institute (NIMI) sincerely acknowledges with thanks for the co-operation and contribution extended by the following Media Developers and their sponsoring organisations to bring out this Instructional Material **(Trade Practical)** for the trade of **COPA Volume II of II** (NSQF LEVEL - 3) (Revised 2022) under **IT & ITES** Sector for ITIs.

MEDIA DEVELOPMENT COMMITTEE MEMBERS

Shri. E. Agilan	_	Junior Training Officer, Govt ITI, Perumbakkam, Chennai - 131.
Shri. Sarbojit Neogi	_	Vocational Instructor (COPA), IT- Nodal Officer, NSTI for women, Kolkata - 700091.
Smt. M. Banumathy	_	Assistant Training Officer, Govt ITI, Ambattur.
Smt. V. Revathi	_	Assistant Training Officer, Govt ITI, Coimbatore.

NIMI CO-ORDINATORS

Shri.Nirmalya Nath	-	Deputy Director, NIMI- Chennai - 32.
Shri.G. Michael Johny	_	Manager, NIMI, Chennai - 32.

NIMI records its appreciation for the Data Entry, CAD, DTP operators for their excellent and devoted services in the process of development of this Instructional Material.

NIMI also acknowledges with thanks the invaluable efforts rendered by all other NIMI staff who have contributed towards the development of this Instructional Material.

NIMI is also grateful to everyone who has directly or indirectly helped in developing this Instructional Material.

INTRODUCTION

TRADE PRACTICAL

The trade practical manual is intented to be used in workshop . It consists of a series of practical exercises to be completed by the trainees during the course of the **COPA Vol II of II** Trade supplemented and supported by instructions/ informations to assist in performing the exercises. These exercises are designed to ensure that all the skills in compliance with NSQF LEVEL - 3 (Revised 2022)

Module 30 - Set-up & Configure a Computer Network
Module 31 - Create Simple Static Web Pages using HTML Tags
Module 32 - JavaScript Embed JavaScript in HTML Pages
Module 33 - Data Visualization or Analysis using Excel
Module 34 - Browse E-Commerce Sites to Identify Products & Services
Module 35 - Protect Information, Computers and Networks from Viruses, Spyware and other Malicious Code
Module 36 - Cloud Computing
Module 37 - Develop an application and perform the Application Development Life Cycle
Module 38 to 42 - Elective Module I Programming in Python
Module 38 to 42 - Elective Module II Programming in JAVA

The skill training in the shop floor is planned through a series of practical exercises centred around some practical project. However, there are few instances where the individual exercise does not form a part of project.

While developing the practical manual a sincere effort was made to prepare each exercise which will be easy to understand and carry out even by below average trainee. However the development team accept that there is a scope for further improvement. NIMI, looks forward to the suggestions from the experienced training faculty for improving the manual.

TRADE THEORY

The manual of trade theory consists of theoretical information for the course of the **COPA** Trade. The contents are sequenced according to the practical exercise contained in the manual on Trade practical. Attempt has been made to relate the theortical aspects with the skill covered in each exercise to the extent possible. This co-relation is maintained to help the trainees to develop the perceptional capabilities for performing the skills.

The Trade theory has to be taught and learnt along with the corresponding exercise contained in the manual on trade practical. The indicating about the corresponding practical exercise are given in every sheet of this manual.

It will be preferable to teach/learn the trade theory connected to each exercise atleast one class before performing the related skills in the shop floor. The trade theory is to be treated as an integrated part of each exercise.

The material is not the purpose of self learning and should be considered as supplementary to class room instruction.

CONTENTS

LEARNING / ASSESSABLE OUTCOME

On completion of this book you shall be able to

S.No.	Learning Outcome	Ref. Ex.No.
6	Install, setup/configure, troubleshoot, and secure computer network including Internet. (Mapped NOS: SSC/N3022)	1.30.101 - 1.30.112
7	Develop web pages using HTML and CSS. (Mapped NOS: SSC/N0503, SSC/N0501)	1.31.113 - 1.31.114
8	Develop web pages using JavaScript. (Mapped NOS: SSC/N0503, SSC/N0501)	1.32.115 - 1.32.121
9	Create workbooks with advanced formulas, macros, charts, pivot tables and demonstrate ability to use Power tools. (NOS: SSC/N9402)	1.33.122 - 1.33.129
10	Browse, select, and transact using E- commerce websites (NOS: SSC/N9403)	1.34.130 - 1.34.137
11	Secure information from Internet by using cyber security concept. (NOS: SSC/N9404)	1.35.138 - 1.35.139
12	Explain Cloud concepts &services and Describe Application Development Life Cycle. (NOS: SSC/N9405)	1.36.140 - 1.37.145
13	Write programs using Python language. (NOS: SSC/N9406)	1.38.01 - 1.42.11
14	Writing programs using JAVA. (SSC/N9407)	1.38.01 - 1.42.30

View network connections

Objectives: At the end of this exercise you shall be able to
- **view the status of Network connection available on your computer.**

Requirements

Tools/Equipment/Machines

- A Working PC with Windows 10 OS - 1 No.
- Network Connectivity (Wired / Wireless) - 1 No.
- Network Switch - 1 No.

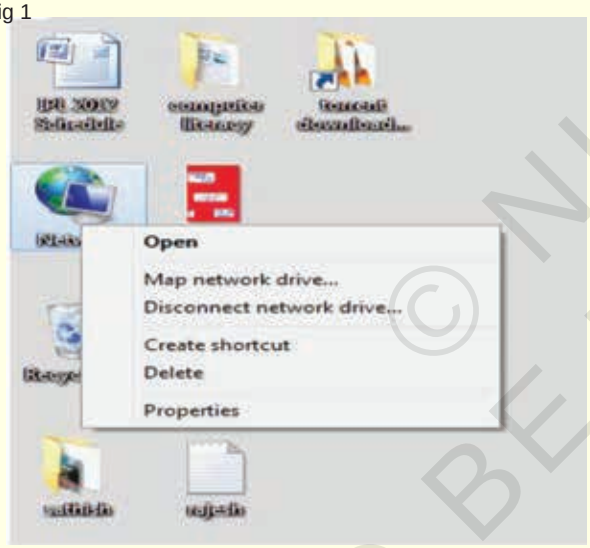
PROCEDURE

TASK 1: **View and change the IP address of your computer**

1 Choose the network icon and right click from the desktop.

Note : A menu displayed on the screen as on Fig 1.

Fig 1



2 Choose “Properties”

Note: A “View your basic network information and setup connection” window appears as on Fig 2.

3 Click “Change adapter setting” option as shown in Fig 2.

Note : A menu gets displayed on the screen

4 Here you could identify the available Network Connections (Wired – Ethernet / Wireless – WiFi) then Choose any “Local area connection” and right click it. (Fig 3)

5 Click **“ Status”** – where you could see the status of Network Connection (Connected / Disconnected) and other details (Fig 3)

6 Click **“ Details”** to get the IP address of the Network Connection. (Fig 4 & 5)

Fig 2

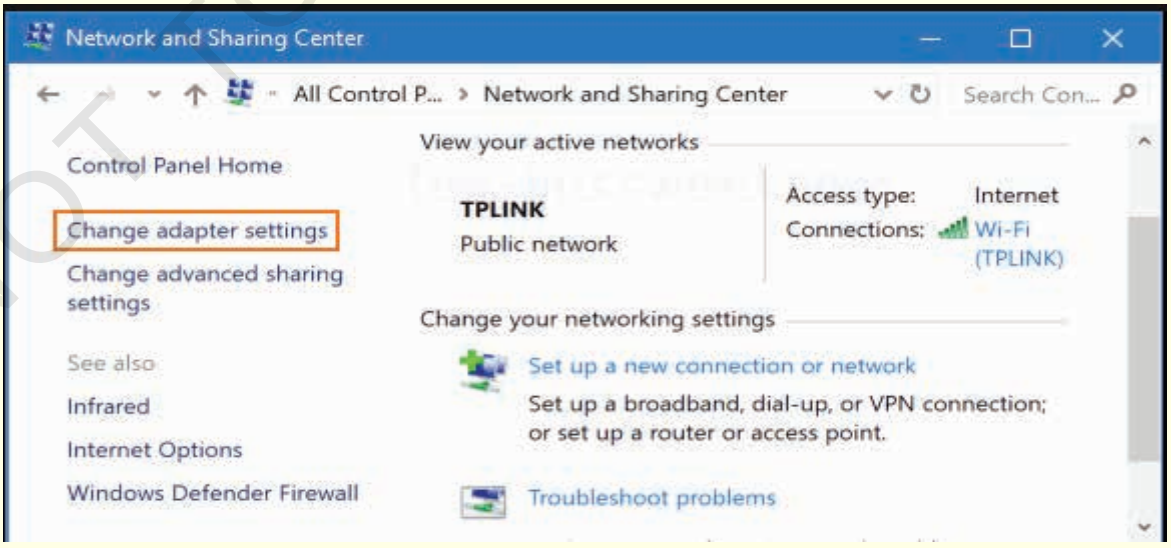


Fig 3

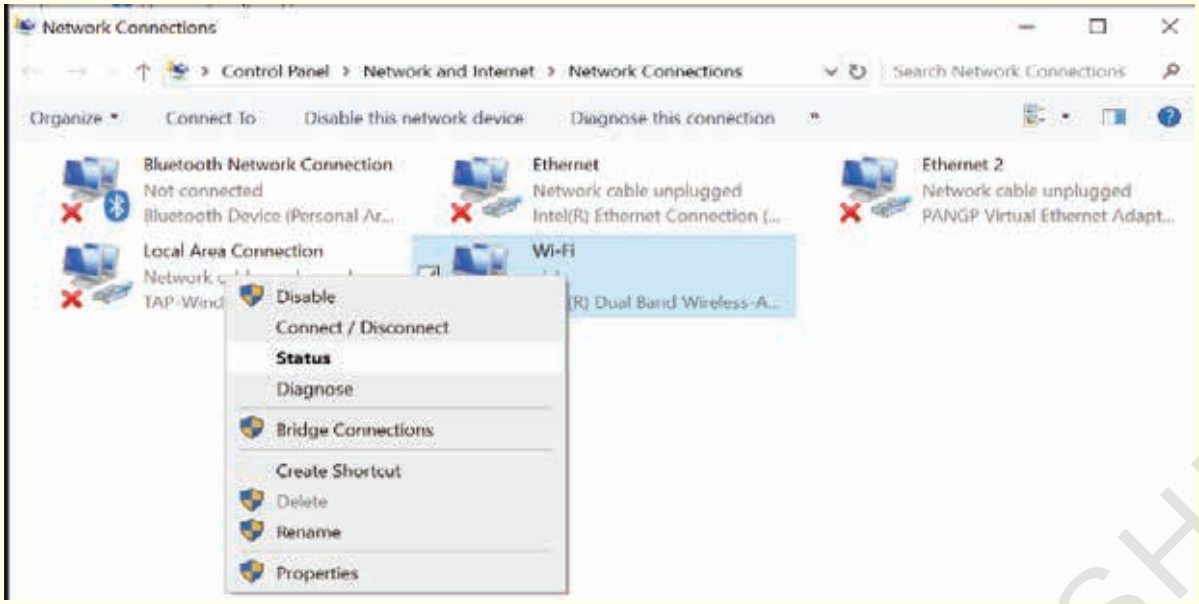


Fig 4

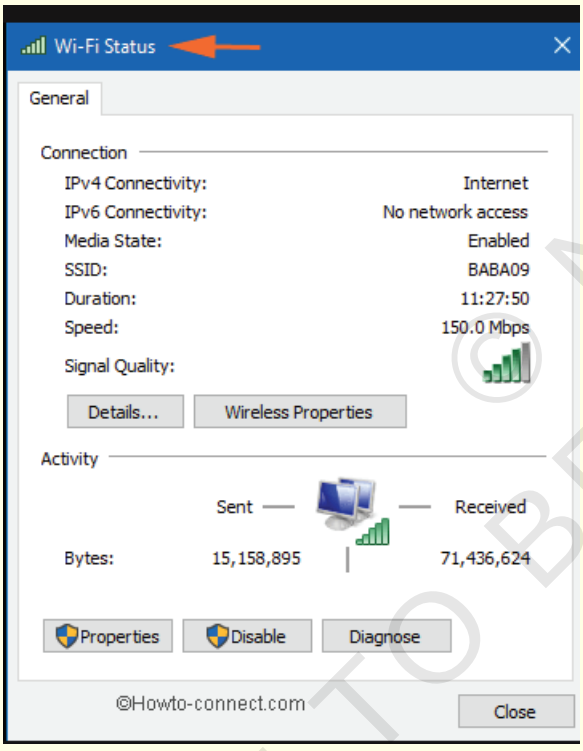
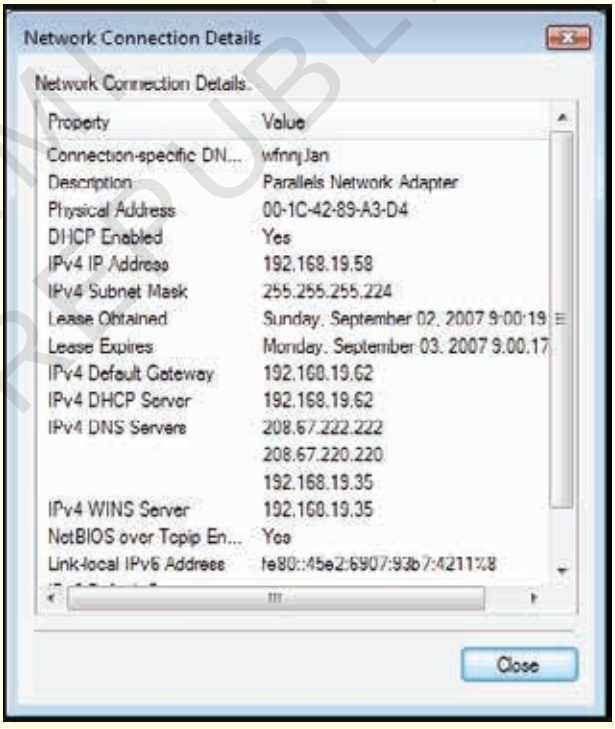


Fig 5



Connect a computer to a network and share Devices i.e. Printers, files, folders and drives

Objectives: At the end of this exercise you shall be able to
- **share the printer, folder and drives with the network**
- **share the specific files or folders in local network**
- **how to connect Shared Printer or Folders**

Requirements

Tools/Equipment/Machines

- A Working PC with Windows 10 OS - 1 No.
- Network Connectivity (Wired / Wireless) - 1 No.
- Network Switch - 1 No.
- Network Printer - 1 No.

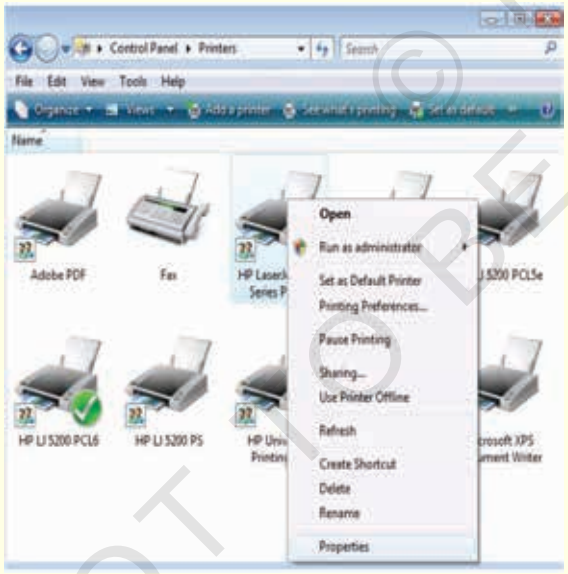
PROCEDURE

TASK 1: **Share the printer, folder and drives with the network**

1 Share the printer panel as follows :

Start ⟶ Control panel ⟶ Hardware and Sound ⟶ Devices and Printers.

Note : There you will see a list with all external devices installed on your PC as in Fig 1.

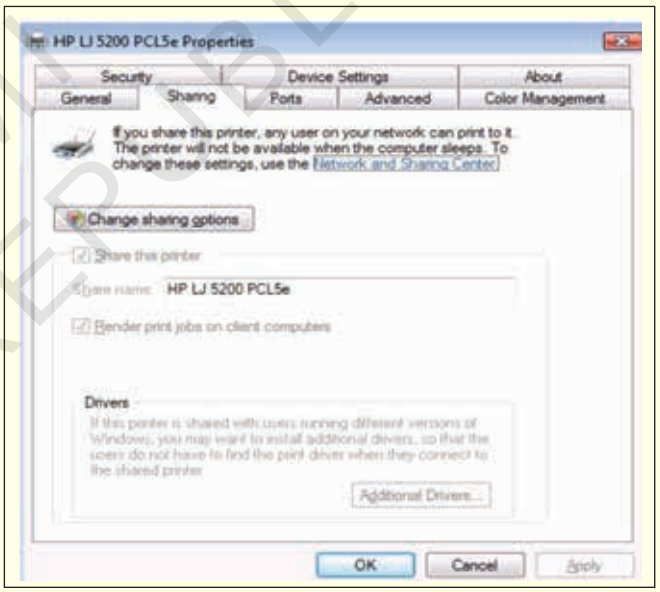


2 Select the printer you want to share, right click on it and select Printer properties.

Note : Now you will see a window with all the printer properties. Depending on the model of your printer, and its drivers, you can see different sets of options.

3 Click on the Sharing tab.

Note : There, you will have some options similar to the Fig 2.



4 Select any check box that says 'Share this printer'.

Note : Then, you can edit the printer share name which, in most cases, is by default completed by Windows with the name of your printer model. If you want to change it, type the name you want to use.

Note : "Render all print jobs on the client computers" can help keep performance levels up on the computer where the printer is plugged in, especially when big printing jobs are ordered. When this option is checked, all the print jobs are rendered on the computers which order the print job, not on the computer on which the printer is plugged.

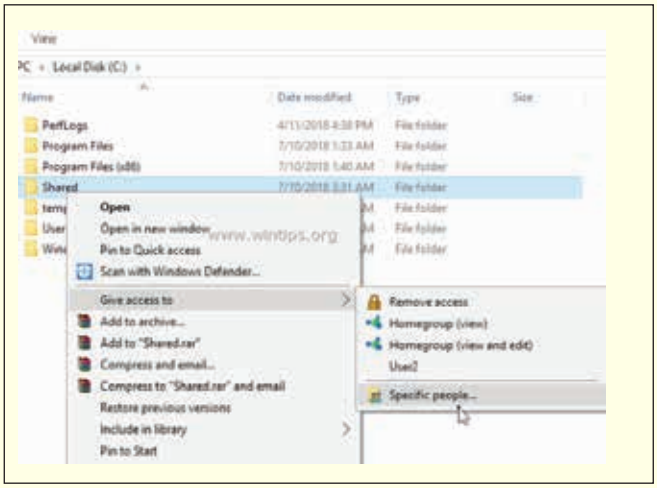
5 Click on OK

Note : Now the printer will be shared with the computers on your network.

TASK 2 : **Share the specific files or folders in local network**

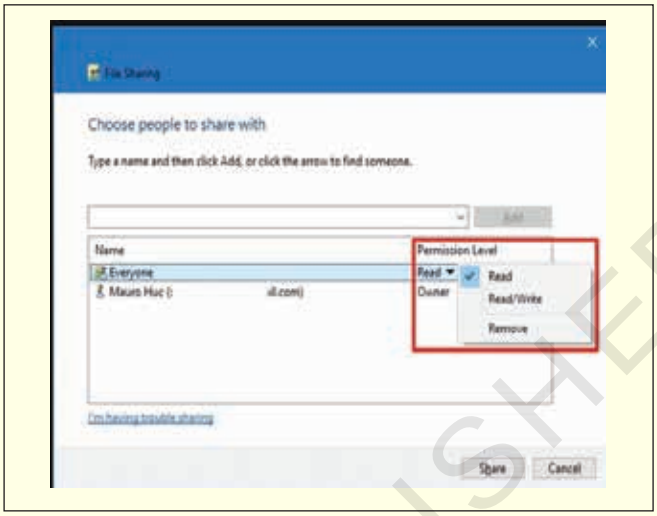
1 In windows, search for and open File Explore.

2 Browse to the folder or file you want to share.



3 Right-click on the file/folder which you want to share then Choose Give Access to Or Right-click the foldeí, and select the Properties option. Click on the Sharing tab and choose the Share button.

4 In the file sharing window select the user accounts (Everyone) with whom you want to share file with Permission of (Read / Read Write) and click on Share button.



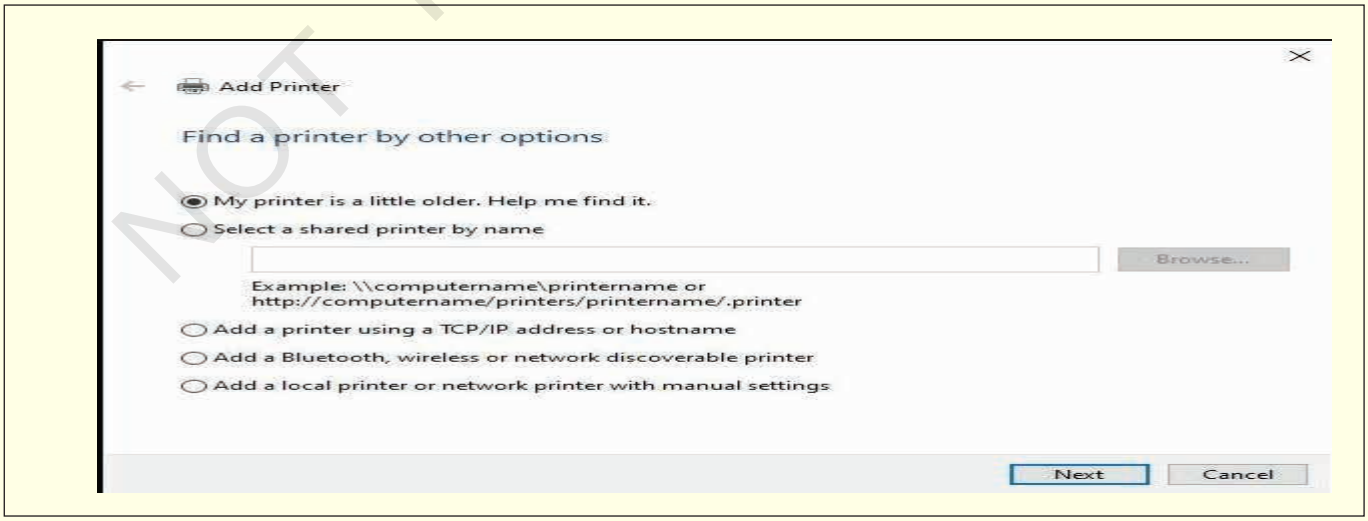
5 Confirm the folder's network path that other users need to access the network's content and click the Done button.

TASK 3 : **How to connect Shared Printer**

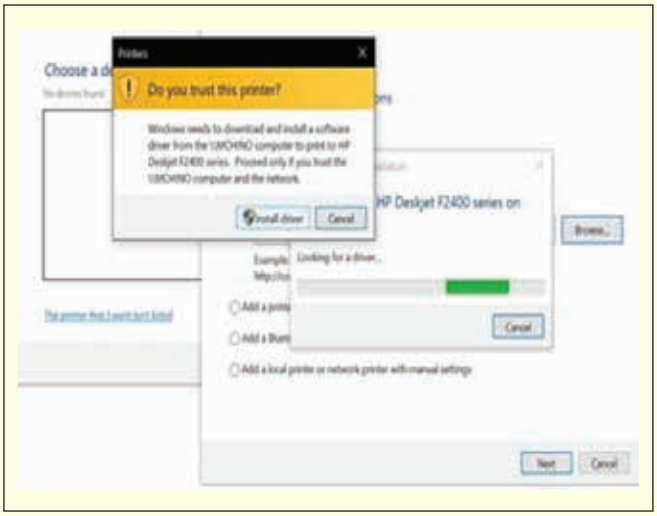
After setting up your shared printer, you can connect to it multiple ways. This method is from within Devices and Printer.

Open control panel ⟶ Devices & Printers

1 Click the Add Printer button, then click the link, The printer that I want isn't listed. Choose the Select a shared printer by name radio box, browse to the printer on your network, and click open.

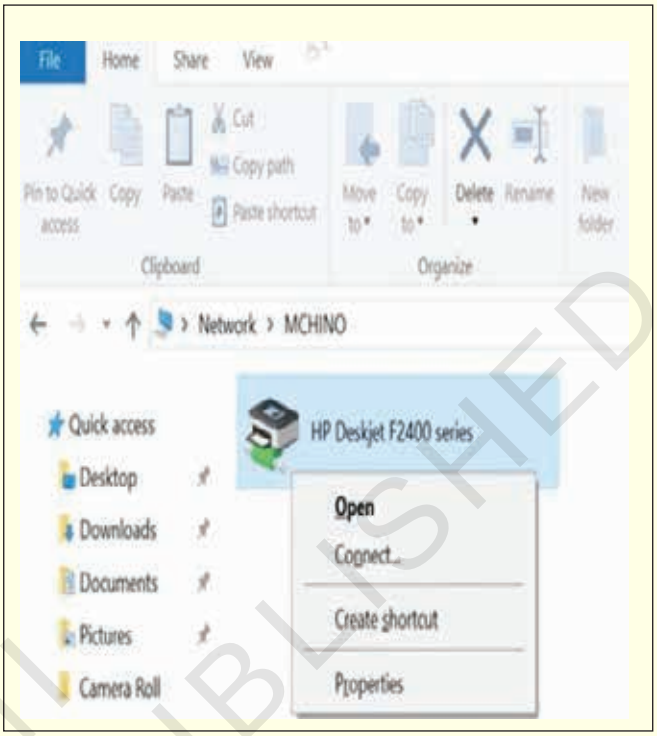


2 You will be prompted to install the driver. Click Next to complete the installation of the printer.



3 The printer will now show up in Devices and printers as a local device.

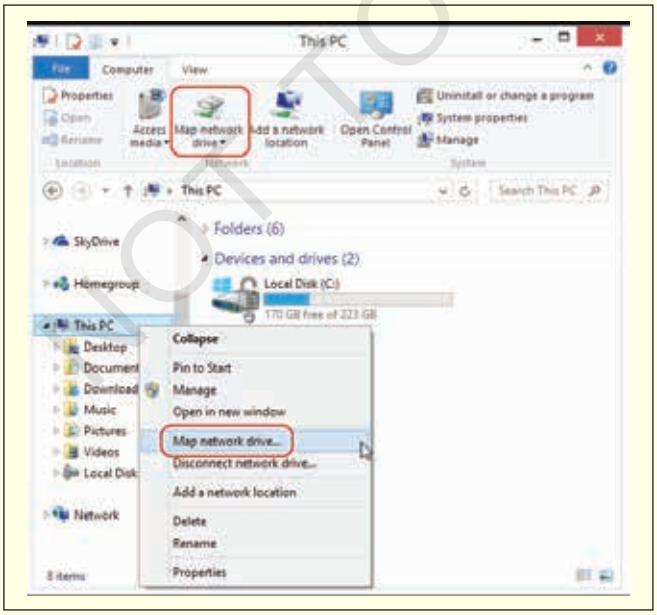
4 Another way you can connect to a shared network printer is from within File Explorer. Open the Network folder, browse the shared printer's computer, right-click it, then click Connect



TASK 4 : **How to connect Shared Folders**

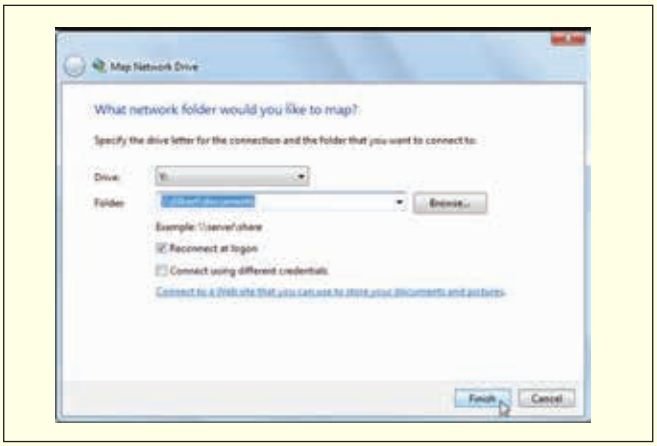
1 Open File Explorer from the taskbar or the Start menu, or press the Windows logo key + E.

2 Select This PC from the left pane. Then, on the Computer tab, select Map network drive.



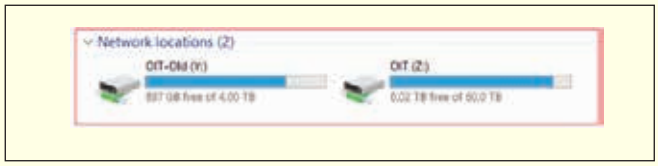
3 In the Drive list, select a drive letter. (Any available letter will do.)

4 In the Folder box, type the path of the folder or computer, or select Browse to find the folder or computer. To connect every time you sign in to your PC, select Reconnect at sign-in.

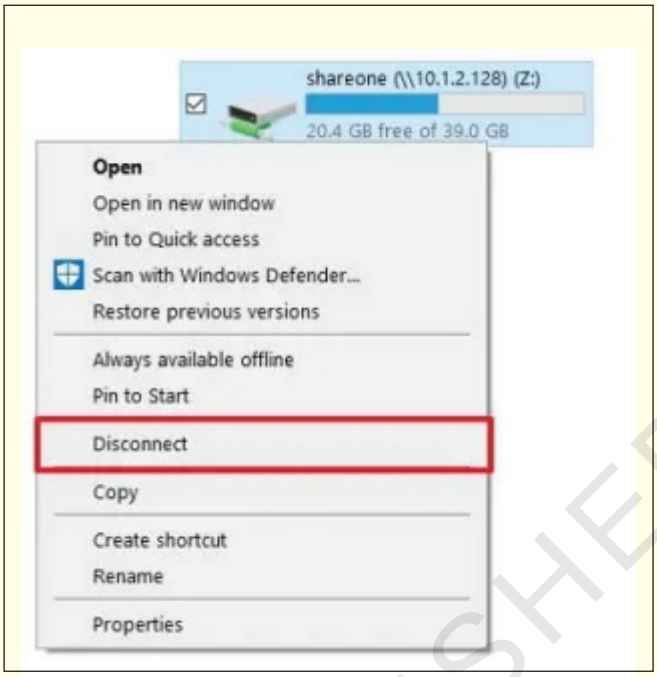


5 Select Finish.

6 Connected Shared Folder available in This PC as Network Drive in Network Locations



7 To disconnect shared folder, just right-click the drive in File Explorer and choose “Disconnect.”



Work with various Network devices, connectors and cables. Create straight and cross cable and punch a UTP cable in the patch socket and test the connectivity

Objectives: At the end of this exercise you shall be able to
- **identify various network devices, cables and connectors used in networking**
- **create straight and cross cable and punch a UTP cable in the patch socket**
- **testing the cable connectivity with the LAN tester**
- **create workgroup and check the network connections**
- **create a home group on a local network**

Requirements

Materials/components

- UTP cable (CAT6 /6e) - as reqd.
- RJ45 jack - as reqd.
- Thin coaxial cable RG48 - as reqd.
- BNC connector - 1 No.
- T connector - 1 No.
- Terminator - 1 No.

Tools/Equipment/Instruments

- All the Available Network Devices - 1 No.
- Crimping Tool - 1 No.
- Cable Cutter - 1 No.

PROCEDURE

TASK 1: **: Identify Network Devices / cables and connectors**

1 Identify a labelled component referring to Table 1 and record the details in the Record sheet.

2 Get the work checked by your instructor.

Record sheet - Table 1

Network Devices	No.of Ports Available	Name the Ports
Hub		
Switch		
Modem		
Firewall		
Gateway		
Board Band Modem		
Fiber Modem		

Record sheet - Table 2

Cable/ connector	Label	Brief application
UTP cable No.of pins color code Printed mark		
Coaxial cable		
RJ 45 connector No.of pins		
T connector		
Terminator Resistance between inner and outer core		

TASK 2 : **Create straight and cross cable and punch a UTP cable in the patch socket**

Note to instructor : Instructor must arrange the required length of cross cable, the tool for crimping and two computer for making connection as shown in Fig 1.

Fig 1

1 Use crimping tool (as shown in Fig 2) to cut through a cable and strip the cable jacket/insulation using cable stripper/ crimping.

Fig 2

Note : Crimp tools have two blades. One designed to cut the cable and other to strip the jacket. While stripping the cable care should be taken not to cut the internal wires. Remove the jacket insulation about an inch. When the jacket insulation removed you will find eight wires twisted in to four pair (for CAT 5 cable as in Fig 3) and a separator inside the CAT 6 cable as shown in Fig 3a.

Fig 3a

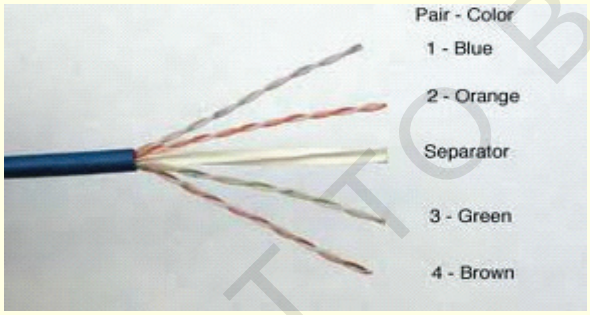
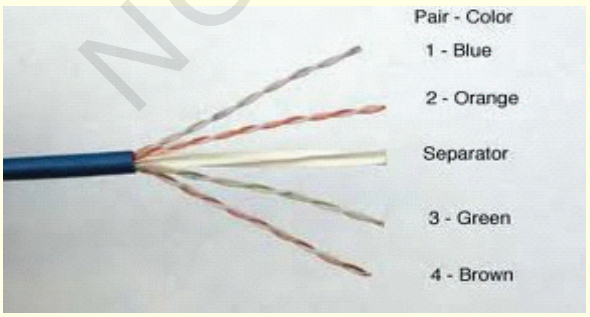


Fig 3a



2 Cut the separator off and untwist the wires back to within one-eighth inch of the jacket

3 Arrange the wires from left to right in the order they are to be crimped. The normal crimping order for cross cable is shown in Fig 4 & Fig 4a

Fig 4

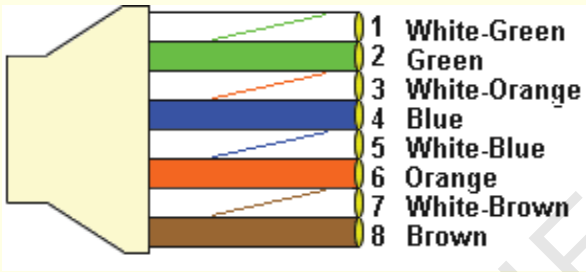
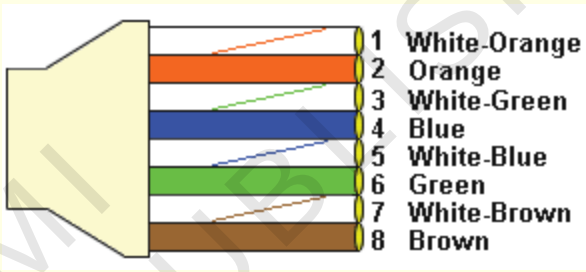


Fig 4a



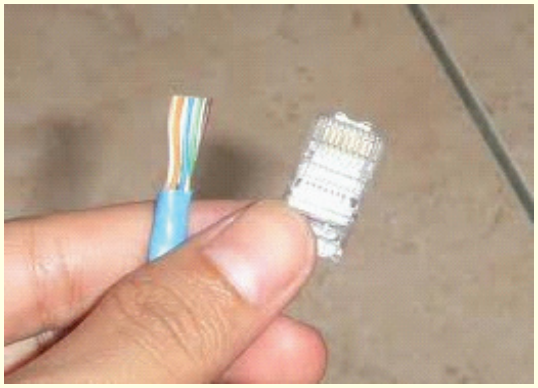
Note : The color code wiring order is different for both ends in cross cable

- Cross over cable
- One end (Fig 4)
- Other end (Fig 4a)

4 Grasp the wires firmly between your fingers and flatten them to remove the curliness.

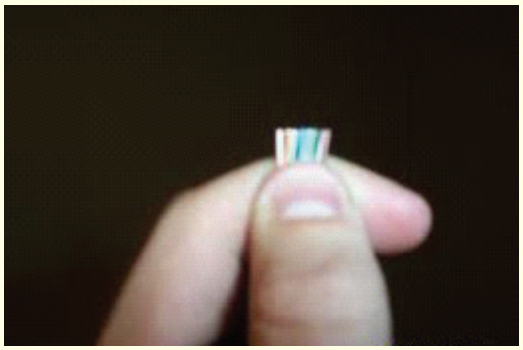
Note : The wires must lay flat and together aligned as closely as possible in order. When finished the cable should look like as shown in Fig 5

Fig 5



5 Cut a few mm while holding them firmly, so they are all of the same length as shown in Fig 6.

Fig 6



6 Slide the RJ45 connector on to the wires making sure the wires stay lined up.

Note : Try to make each wire fits in the slot of the connector and make each wire reach the end of its slot. The cable jacket/insulation should reach just beyond the end of the crimp point as shown in Fig 7.

Fig 7

7 Verify all the wires are in the correct order, and insert the connector in to the crimping tool and press to crimp as shown in Fig 8.

Fig 8

Note : Now half of the work done. The cable should look like as shown in the Fig 9 .The process must be repeated for the other end of the cable. However the color code wiring order changes for cross cable as shown in Fig 10.

Fig 9

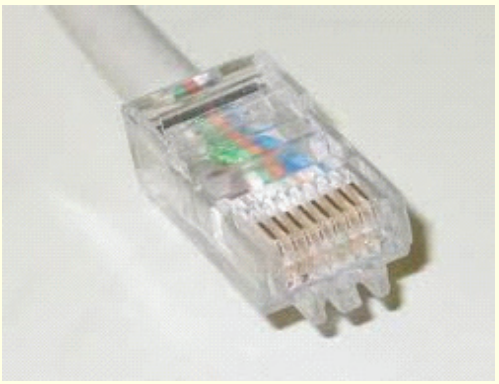
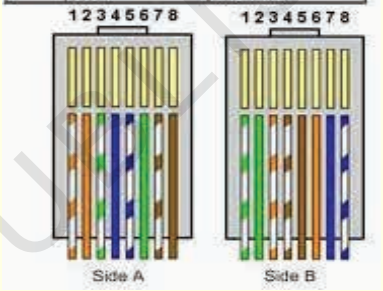


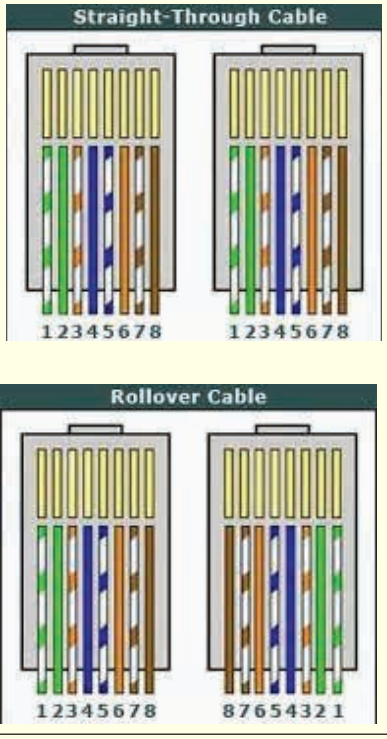
Fig 10

Pin ID	side A	side B
1	Orange-white	green-white
2	Orange	green
3	green-white	orange-white
4	blue	brown-white
5	blue-white	Brown
6	green	orange
7	brown-white	Blue
8	brown	blue-white



Note : Similarly straight through cable and roll over cable can be prepared with the help of the instructor. The color code wiring order is shown in Fig 11.

Fig 11



1 Green White
2 Green
3 Orange White
4 Blue
5 Blue White
6 Orange
7 Brown White
8 Brown

Note : Cross over cable is used to connect be- tween two hosts(PC's). Straight-through cable is used in a network when connecting a host to a switch. A rollover cable is used in a net- working environment where a outer/ switch is to be configured from a computer. One end is wired one way but on the other it is reversed. You would typically use one end into a serial port on a PC and the other into the console port of the switch/router.

TASK 3 : **Testing the cable with the LAN tester**

1 Insert one end of the cross cable (prepared in Task 1)in to one socket and other end in another plugged in socket of the LAN tester as shown in Fig 12.

Fig 12

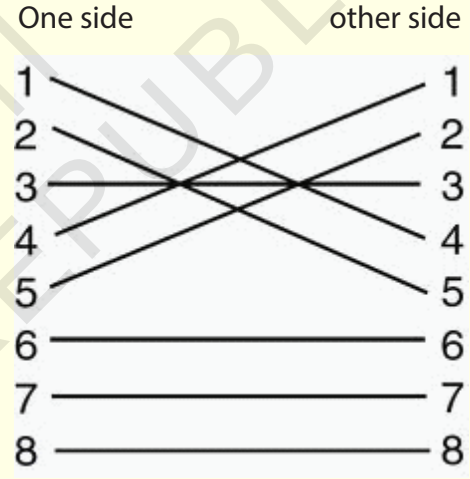
Note : Check for the batteries loaded in cable tester.

2 Switch 'ON' the LAN tester.

3 Note the order in which LED's glowing in both the panelof the LAN tester should correspond to the order shownin Fig 13.

If the LED's doesn't glow , then there is a break in the cable.

Fig 13



Practice IP Addressing and Subnet masking for IPV4/ IPV6 and pinging to test networks

Objectives: At the end of this exercise you shall be able to
- **configure IPV4/IPV6 address and subnet mask**
- **ping to test network.**

Requirements

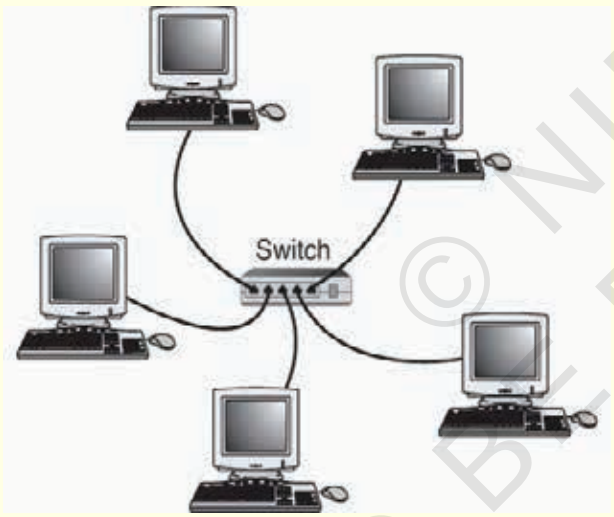
Tools/Equipment/Machines

- A Working PC with Windows 10 OS - 1 No.
- Network Connectivity (Wired / Wireless) - 1 No.
- Network Switch - 1 No.

PROCEDURE

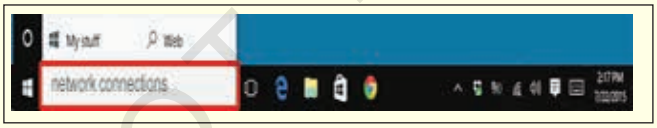
TASK 1: **Assign different classes of IPv4 addressing**

1 Connect PCs with switch using RJ45 cable as shown Fig 1.

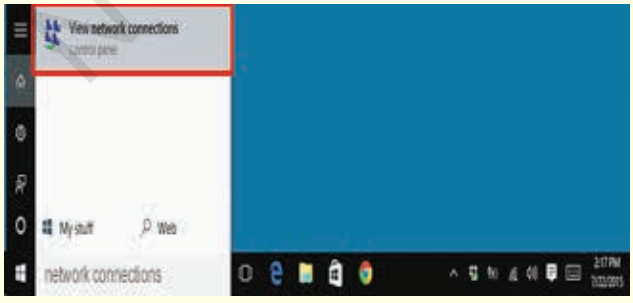


2 Power on the PCs and network switch.

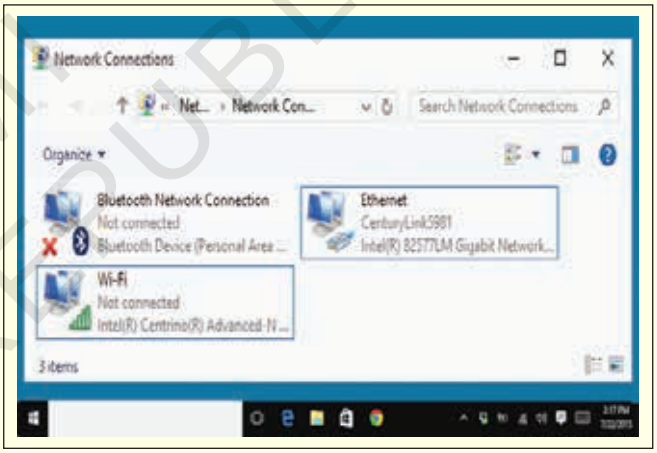
3 Type network connections in the search in PC1. (Fig 2)



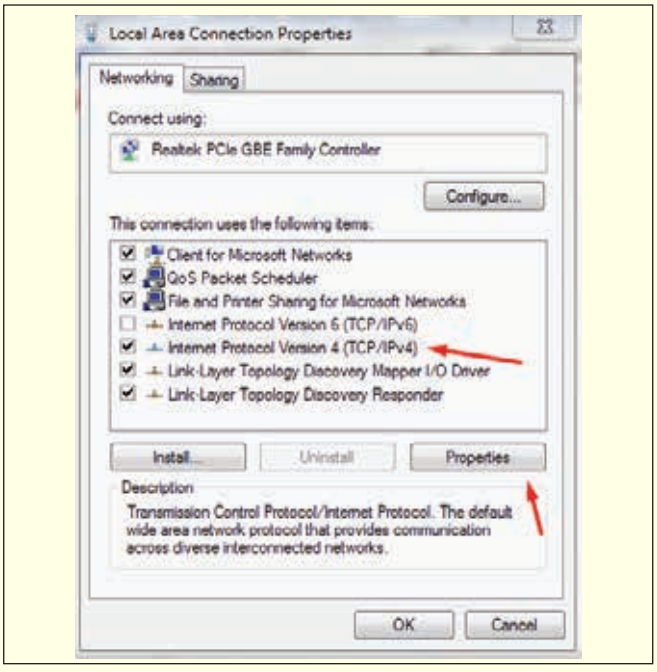
4 Select “View network connections”. (Fig 3)



5 Right click on Ethernet and select properties. (Fig 4)



6 Select Internet protocol version 4 (TCP/IPv4) and click properties as shown Fig 5.

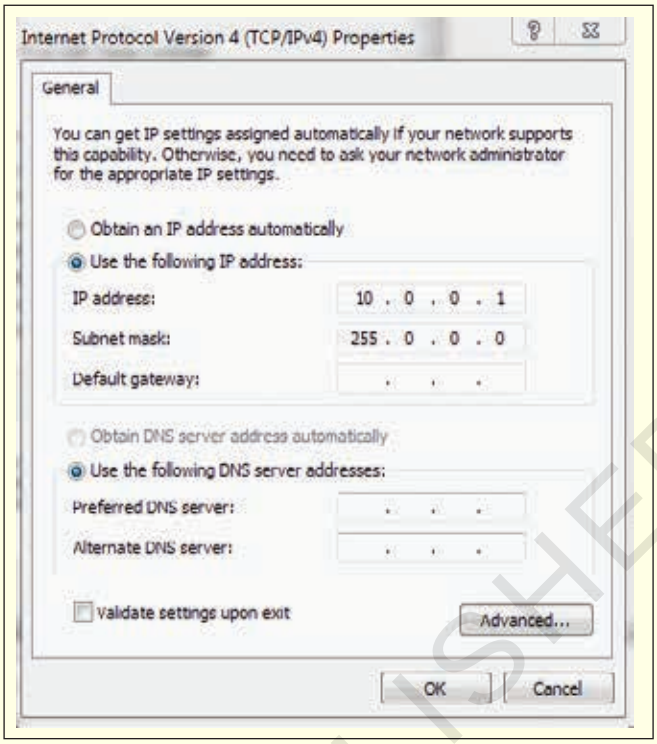


7 Select use the following IP address and assign IPV4

For example : Class A IP address - 10.0.0.1 and subnet mask 255.0.0.0 (Fig 6)

8 Assign IP address to other PCs 10.0.0.2, 10.0.0.3 and 10.0.0.4 etc.

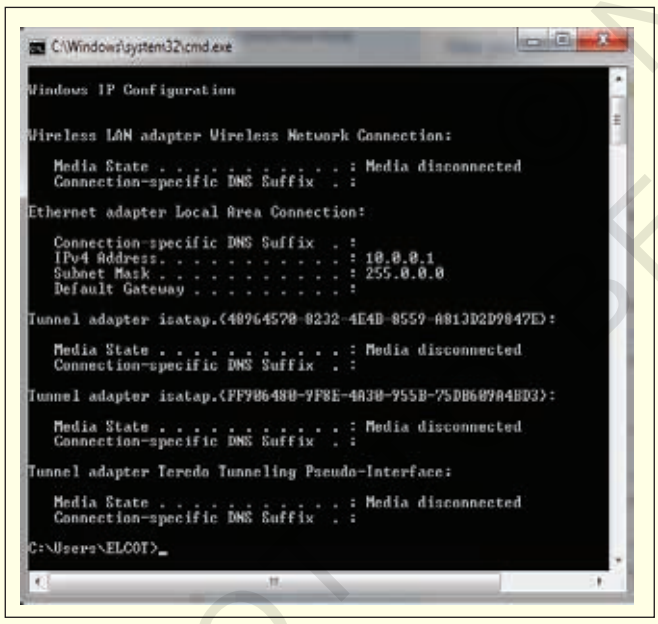
9 Assign the same subnet mask to all PCs.



TASK 2: **Test connectivity between computers**

1 For testing connectivity between computers using basic network commands.

2 Open command prompt and Check IP configuration using the command ipconfig. (Fig 7)



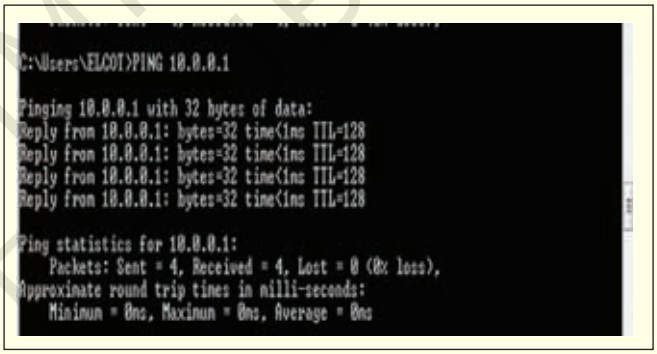
3 Note the systems IP configuration.

4 Then check connectivity between system using ping command

5 First self test to ping own IP.

Ex: ping 10.0.01 and note the result. (Fig 8)

6 Check the connectivity to other systems using their IP address and note the result.



7 Change IP address and subnet mask of a**ll PCs to class-B.**

8 Example: **172.16.0.1 to 172.16.0.2 and so on etc. with** subnet mask 255.255.0.0 to all PCs.

9 Repeat the steps 2 to 6 to test the network.

10 Change IP address and subnet mask of **all PCs to class-C.**

11 Example: **192.168.0.1 to 192.168.0.2 and so on etc. with** subnet mask 255.255.255.0 to all PCs.

12 Repeat the steps 2 and 6 to test the network.

13 Change the IP address of PC1 to class B and keep all other systems in Class A.

14 Check the connectivity from PC1 to other system using Ping command.

15 Note the result.

16 Repeat the steps 13 to 15 by changing IP addresses to different classes.

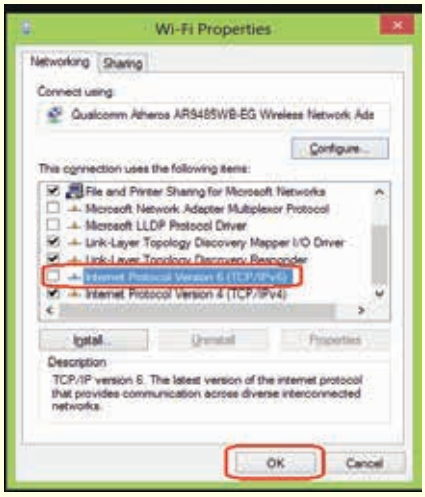
TASK 3: **Configure IPV6 Address and Test**

1 Open Control Panel and Navigate Network and Internet → Network Connections

2 Select “View network connections”.

3 Right click on Ethernet and select properties.

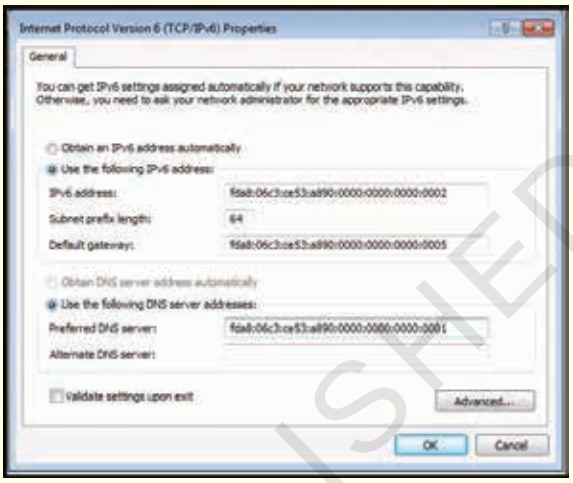
4 Select Internet protocol version 6 (TCP/IPv6) and click properties as shown Fig 9.



5 Select Obtain an IPV6 Address Automatically as assign from DCHP or Use the following IPV6 address as Static assign Manually.

6 Assign IP address to all PCs 2001:DB8:ABCD:12::1, 2001:DB8:ABCD:12::2 and 2001:DB8:ABCD:12::3 etc.

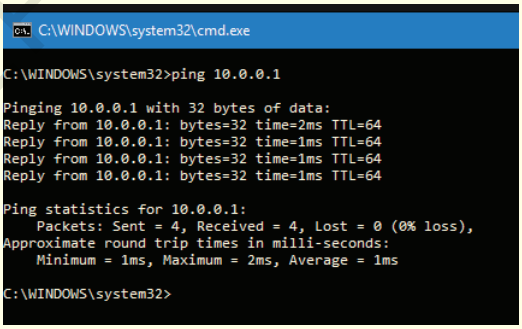
7 Subnet Prefix Length: 64 and assign the same to all PCs.



8 Click OK to save Static IPV6 Address.

9 To check the connectivity, use the PING command in CMD Prompt.

Ping 2001:DB8:ABCD:12::1



Configuring HUB & switch

Objectives: At the end of this exercise you shall be able to
- **install and configure HUB and switch.**

Requirements

Tools/Equipment/Machines

- Switch Rack - 1 No.
- Patch Panel - 1 No.
- Network Switch / Hub - 1 No.
- UTP Cat6 / 6e Cable - as reqd.
- Krone Punching Tool - 1 No.

PROCEDURE

TASK 1: **Configure hub and switch**

1 Select the HUB / Switch.

2 Select Switch Rack.

3 Fit the HUB/ Switch in the Switch rack by screws.

4 Insert all the LAN cables into the Switch rack.

5 Punch the LAN cables in patch panel ports by Punching tools according to color code

6 Connect all the connected ports of Patch Panel to the HUB/ Switch ports by patch cables.

7 Connect the power source of HUB/ Switch.

8 Now it is ready to use.







Setup and configure wired and wireless LAN in a Computer Lab within at least three computers

Objectives: At the end of this exercise you shall be able to
- **setup wired Ethernet network**
- **setup wireless network for LAN.**

Requirements

Tools/Equipment/Machines

- A Working PC with Windows 10 OS - 1 No.
- MS Office 2019 / Latest - 1 No.

PROCEDURE

TASK 1: **Setup wired Ethernet Network**

1 Make sure that all computers are plugged into a powered electrical outlet and turned on.

2 Make sure that the router, hub or switch is plugged into a powered electrical outlet and turned on.

Most routers, hubs, and switches have Power lights that indicate they are working.

3 Make sure that your Ethernet RJ45 Jack Patch cable is plugged into the Ethernet Port on your computer.

4 Make sure that the other end is plugged into a router, hub or switch.

5 Make sure that all computers on your network have the same workgroup or Domain name.

6 Make sure that all computers are assigned IP address by DHCP or Static.

7 Make sure that all computers have unique IP addresses with same subnet mask.

8 Check the connectivity using PING command.

9 If connectivity established then all set to Work.

For home networks, IP addresses should be 192.168.N.N where N is a number you assign between 0 and 254. The first N should be the same for all computers on your network and the second N should be different for all computers on your network.

The computer does not recognize an add-in Ethernet card

1 Shut down and restart your computer.

2 Make sure that you have installed the required software.

3 Reset the card

— — — — — —

TASK 2: **Setup Wireless Network**

1 Make sure that all computers are plugged into a powered electrical outlet and turned on.

2 Make sure that the Wifi router or Access Point is plugged into a powered electrical outlet and turned on.

Most Wifi routers and Access Points have Power lights that indicate they are working.

3 Make sure that Wifi router or Access Point has configured SSID name with Secure Encrypted Password.

4 Make sure that Wifi is ON or enabled in your computer.

5 Make sure that your computer successfully connected to same SSID with Encrypted Password

6 Make sure that all computers on your network have the same workgroup or Domain name.

7 Make sure that all computers are assigned IP address by DHCP or Static.

8 Make sure that all computers have unique IP addresses with same subnet mask.

9 Check the connectivity using PING command.

10 If connectivity established then all set to Work.

For more details refer Ex.no. 1. 4.19 Task 2.

— — — — — —

Use patch panel & I/O Box for wired LAN and installing & configuring Internet connection in a single PC and in a LAN

Objectives: At the end of this exercise you shall be able to
- **how to Install and Configure Networking Using Patch Panel**
- **how to Terminate and Install Cat5e / Cat6 cable in IO Box.**

Requirements

Tools/Equipment/Machines

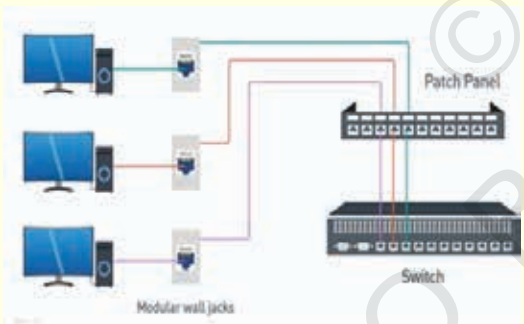
• Any size Mountable rack	- 1 No.	• UTP Cable Cutter	- 1 No.
• Patching Panel 24 Port	- 1 No.	• Lan tester	- 1 No.
• Cat6 / Cat 6e UTP cable	- as reqd.	• IO Port	- 1 No.
• 24 Port L2 Switch	- 1 No.	• IO Back Panel	- 1 No.
• Patch Cable	- as reqd.	• IO front Panel	- 1 No.
• Punching Tool	- 1 No.		

PROCEDURE

TASK 1: **How to Install and Configure Networking Using Patch Panel**

1 Determine where the patch panel and switch should be installed

Evaluate the operating environment, a place where the equipment and components can be maintained well and accessed easily. Unobstructed airflow and vents are crucial.



2 Build or purchase pre-terminated patch cords

Determine patch cord lengths as well as the quantity needed for the installation. If improper lengths are chosen, cables with excessive slack will not only increase material and installation cost but also hinder cable management.

3 Map out the ports

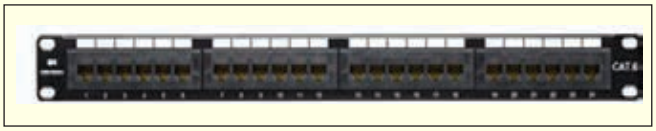
Determine which switch port is connecting to which patch panel port, by doing this can reduce installation time.

4 Mount the patch panel and switch

Ensure the server rack accommodates the size of your components (EIA standard 19” width is most common).

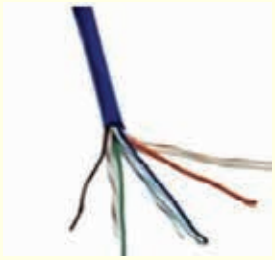
- Choose the size of wall mounting Rack or Stand Rack to fix the Patch Panel

- Fix patch panel into Rack using screw at right and left sides.



- Examine the 110-style punch down connectors on the back of the Cat6e patch panel.
- Remove the outer jacket from the end of each cable.

- Spread out the cable wires.

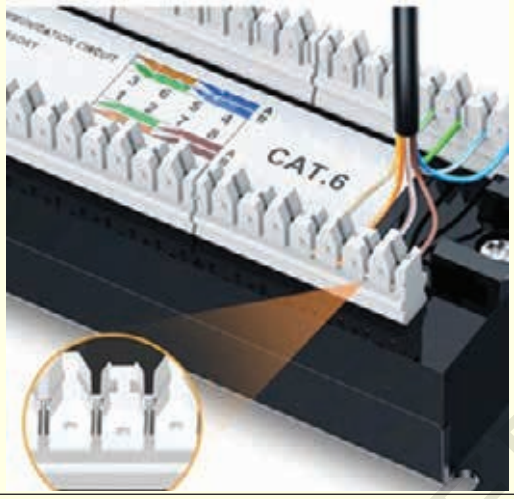


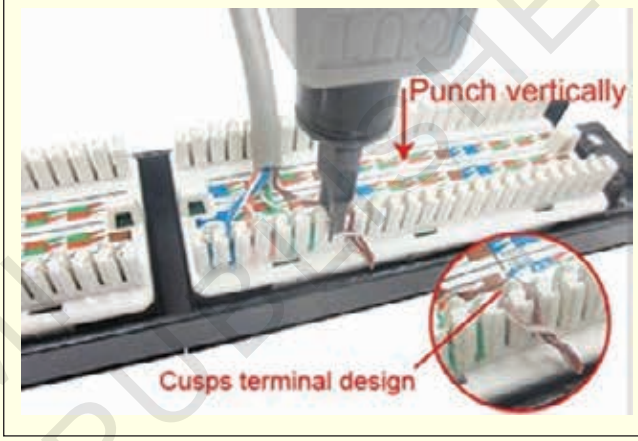
- Set the wires into the patch panel connectors. There are two color patterns T568A and T568B. Make sure to terminate both sides of the cable on the same pattern used, Preparable T568B.
- Begin terminating each wire using Punching Tool

5 Connect the patch panel to the switch

With the prepared patch cords, follow the port mapping created in step 3 and patch the cables.

6 Install cable management





Using horizontal and vertical cable management and cable ties to organize cables can help make future changes and upgrades easy.

7 Label cable

Tag both ends of each cable the same; this can assist in troubleshooting your end-to-end connectivity between the patch panel and the switch.

TASK 2: **How to Terminate and Install Cat5e / Cat6 cable in IO Box**

Step 1

Insert the cable into the stripping tool to the required strip length. Strip off only as much cable jacket needed to properly terminate the pairs (1 to 1.5 inches should be sufficient to terminate pairs).

Holding the cable near the tool, rotate the tool around the cable several times. Slightly bend the outer jacket and manually remove the cut piece or slide the cut outer jacket with the stripper.

Step 2

Bend each pair in one direction to expose the ripcord, binder, or cross-web filler on the cable.

Remove the ripcord, binder, or cross-web filler if they are present on the cable, leaving only the twisted pairs of wire.

Step 3

Preserve the wire pair twists as close as possible to the point of termination. When connecting jacks and plugs, do not untwist the cable more than 0.5 inches for Cat5e, Cat6, and Cat6a cable.

Terminate all four pairs in the T568B wiring scheme for example.

Step 4

Make sure the punch-down tool is straight before punching down on the connector.

Make sure the cut-side of the tool is facing outward. Inspect the connector to verify that the wires are fully engaged in the IDC terminals and they are cut properly.

Place a dust cover on the jack for protection.

Ready to insert into a wall plate or keystone jack patch panel

Step 5

Mount the IO Back panel on wall and Fix the Punched IO Krone into Face plate then screw face into wall mounted back panel.

Set up a proxy server/ DHCP Server with firewall

Objectives: At the end of this exercise you shall be able to
- **setup a proxy server**
- **configure a DHCP server with Sophos Firewall.**

Requirements

Tools/Equipment/Machines

- A Working PC with Windows 10 OS - 1 No.
- MS Office 2019 / Latest - 1 No.

PROCEDURE

TASK 1: **Setup a proxy server**

Setup Proxy Server in Windows 10

To set a proxy using an automatic configuration script, follow these steps:

1 Open settings.

2 Click network & internet.

3 Click proxy.

4 In the automatic proxy setup section, set the use setup script switch to ON.

5 Enter the script address as it was given to you; then click save.

6 Close Settings.

7 Setting up an automatic proxy configuration script.

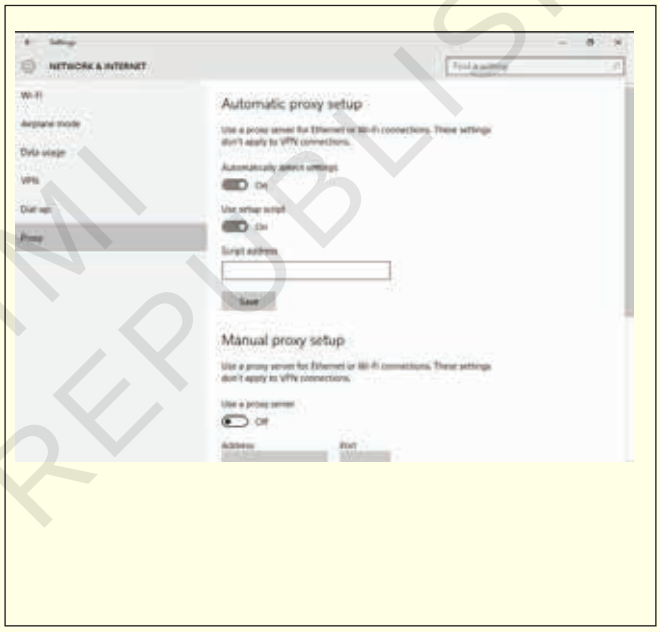
Set up a proxy manually (Fig 1)

8 Open Settings.

9 Click Network & Internet.

The list of network- and Internet-related settings appears.

10 Click Proxy.



The list of available proxy settings appears.

11 In the Manual Proxy Setup section, set the Use a Proxy Server switch to On.

12 In the Address field, type the IP address. 13 In the Port field, type the port.

14 Click Save; then close the Settings window.

— — — — — —

TASK 2: **Configure a DHCP server with Sophos Firewall**

When you configure Sophos Firewall as the DHCP server, it provides IP addresses and network parameters, such as the default gateway, subnet mask, DNS servers, and WINS servers to DHCP clients.

Introduction

In this scenario, we configure Sophos Firewall as the DHCP server to lease IP addresses to clients within the server's subnet. Do as follows:

- Specify the DHCP server settings.
- Add static IP addresses if required.
- Start the DHCP server if required.
- Check the IP addresses leased by the server.

Specify the DHCP server settings

Configure Sophos Firewall as the DHCP server to lease dynamic IP addresses directly to endpoint devices and a static IP address to a test server within the server's network.

1 Go to Network > DHCP.

2 Under Server, click Add.

3 The following settings are an example. You must specify your network's settings

Name	Setting
Interface	Port2 - 192.168.1.1 Interface on which Sophos Firewall listens to DHCP requests.
Dynamic IP lease	192.168.1.2 to 192.168.1.25
Static IP MAC mapping	**Hostname**: TestServer **MAC address**: 2C:0E:3D:9C:CB:E4 **IP address**: 192.168.1.26
Gateway	Interface IP address as the gateway for the clients.
Use device's DNS settings	DNS servers for the clients to contact.

4 Click Save.

Here's an example:

Start the DHCP server

1 Go to System services > Services.

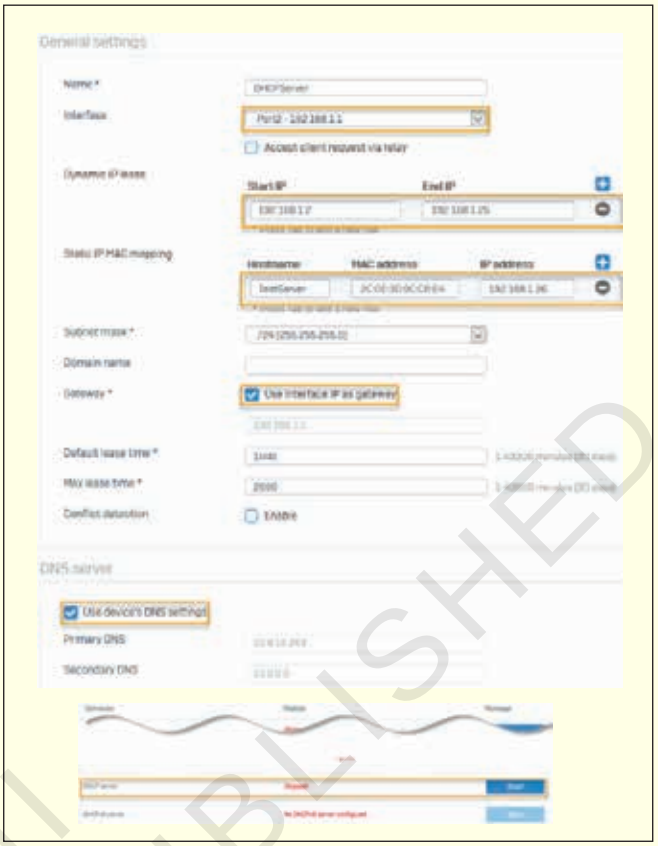
2 For DHCP server, click Start if required.

Here's an example:

Manage leased IP addresses

You can see the start and end times for IP addresses leased by the DHCP server. You can also see the client's MAC address and hostname.

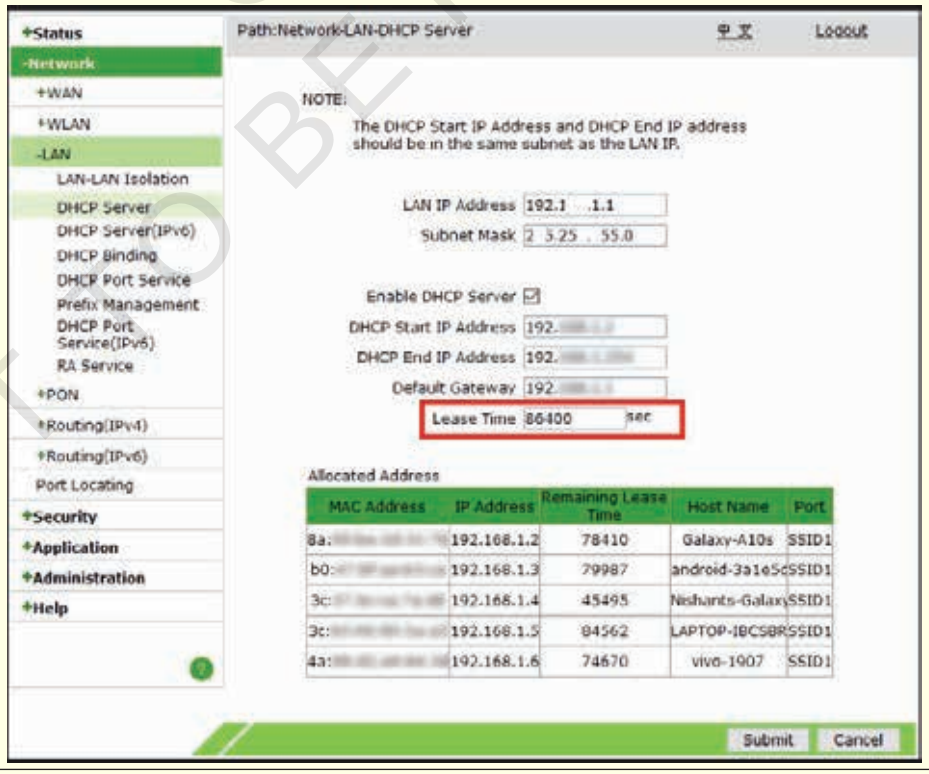
1 To see the list of leased IP addresses, go to Network > DHCP.



2 See the listed IP address ranges under IPv4 lease and IPv6 lease.

Here's an example:

Note : All the DSC broad band routers has DHCP option to enable. The Same configuration can be performed.



Setting up video conferencing using open-source software

Objectives: At the end of this exercise you shall be able to
- **set Video Conferencing using Skype.**

Requirements

Tools/Equipment/Machines

- A Working PC with Windows 10 OS - 1 No.
- Skype Software - 1 No.
- Web Camera - 1 No.
- Microphone or Headset - 1 No.
- Internet Connection - 1 No.

PROCEDURE

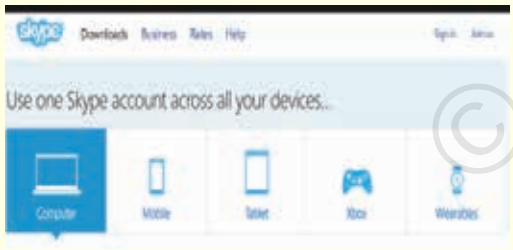
NOTE: Instructor should connect Web Cam and Microphone before starting this Practical to the Computer with good Graphic Adapter and high speed internet connection.

TASK 1: **Set Video Conferencing using Skype**

1 Open Skype.com

2 Select Download Skype .

3 Select device e.g. Computer where you want to install it.(refer Fig 1)



4 After download install it.

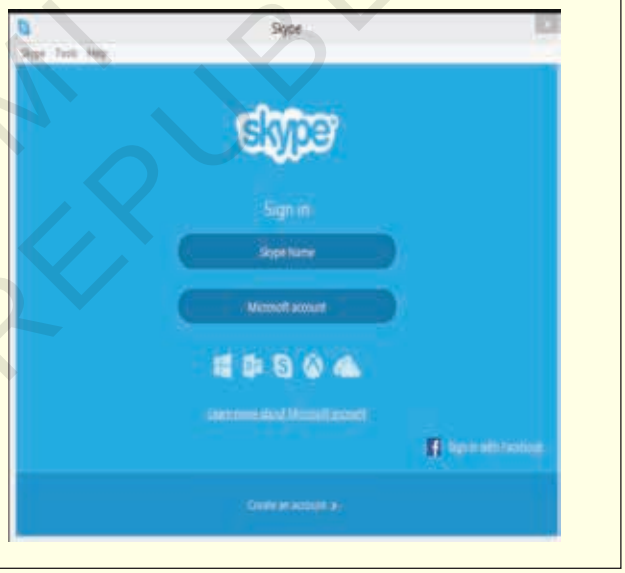
5 Now run it. (Fig 2)

6 Sign in to your account/ create your account.

7 If creating account fill up the form and submit.

8 Now log in to skype.

9 Add contacts by selecting “Add a Contact” from the upper right of your contacts list and entering a Skype username.



10 Select an online contact from your contact list 11 Select “Video Call” to initiate a video call.

12 Click the “+” sign then click “Add people” to add more Skype contacts to the video conference.

— — — — — —

Use various tools (by open source /free) for network troubleshooting, maintenance and security for both Wired and Wireless

Objectives: At the end of this exercise you shall be able to
- **explain the network troubleshooting tools.**

Requirements

Tools/Equipment/Machines

- A Working PC with Windows 10 OS - 1 No.
- Network Monitor software - 1 No.
- Internet connection - 1 No.

PROCEDURE

Network Troubleshooting Tools

1 Download Free 3 device Network Monitor software from below link: https://www.manageengine.com/network-monitoring/download-free.html

2. Install the software - ManageEngine_OpManager_Free_64bit.exe

ManageEngine OpManager - a powerful network troubleshooting software with in-built workflow automation

Here are some the network troubleshooting tools available in OpManager:

1 Ping (ICMP/ SNMP/ Proxy)

2 Tracert/ Traceroute

3 Browse

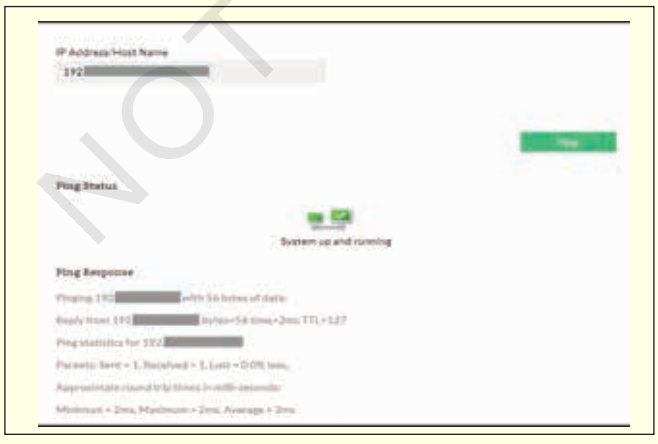
4 Telnet/ SSH

5 Remote Desktop

6 Terminal

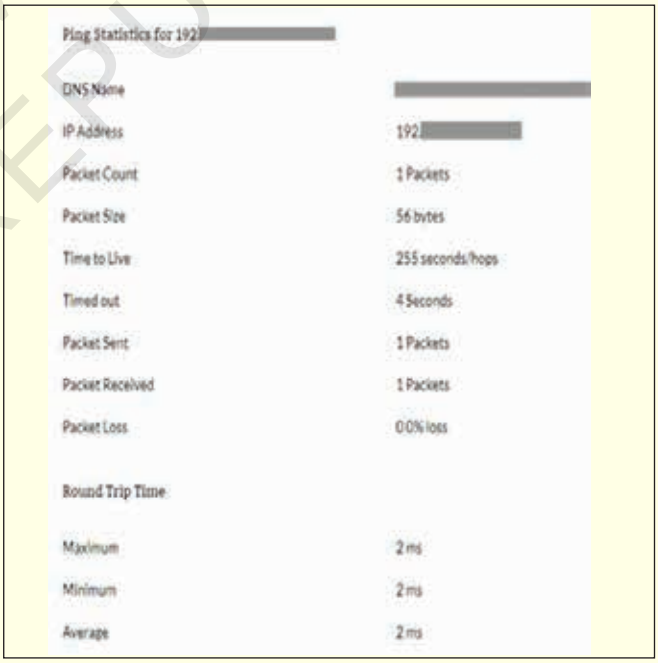
1 Ping Tools

The ICMP ping tool is a basic network troubleshooting tool that lets you assess if a device is reachable on the network. It reports on errors such as packet loss, round-trip-time, etc.



The usual ping requests are based on the ICMP echo request protocol. There are other variations of ping requests such as SNMP ping and proxy ping.

SNMP ping: It is used to check if the simple network management protocol (SNMP) is enabled in a network device. If SNMP is enabled, the device responds with a set of basic information such as DNS name, system name, location, system type, system description, etc.



Proxy ping: This is used to ping a destination device behind a proxy. Basically, the pinging device sends an SNMP SET command to the proxy router to send an ICMP echo request to the destination device. The response is collected by the proxy device. This response is fetched using the SNMP GET command. This ping also requires SNMP to be enabled in the proxy device with the write community string enabled.

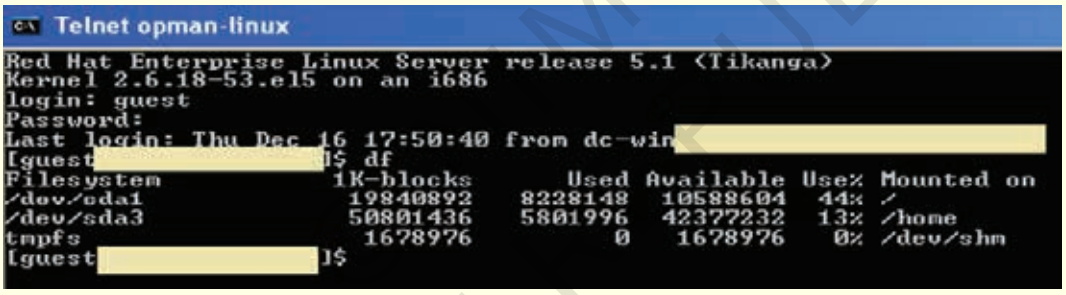
These ping commands are useful to diagnose IP problems and network connectivity issues that could be due to faulty interfaces, LAN issues, unavailable ports, configuration issues, etc., and are mostly used in combination with the traceroute network troubleshooting utility.

2 **Tracert / Trace Route :** Tracert (Windows) or traceroute (Linux) is a network diagnostic and troubleshooting tool to view the route and measure transit delays of data packets in a network. It displays the number of hops between the source and destination devices based on the hop limit concept, modifying the Time To Live (TTL) values.

A traceroute tool is useful to identify response delays (high latency), routing loops and points of failure or packet loss in a network.

3 **Browse :** Browse allows you to connect to the built-in GUI of most network devices using a 'http/ https' request. This allows you to access the device settings or configuration to troubleshoot network issues with ease.

4 **Telnet/ SSH :** Telnet or Secure Shell (SSH) utility allows you to troubleshoot issues by establishing a CLI session with Linux/Unix devices.



It is a simple yet effective network troubleshooting tool that enables you to act on any alert by executing CLI commands to remediate L1/L2 network problems.

5 **Remote Desktop :** The remote desktop utility allows you authenticate and access the desktop environment of any remote Windows devices in the network, from OpManager's user interface (UI). This allows for quick network troubleshooting like in the case of Telnet/ SSH for Linux/Unix based devices.

6 **Terminal :** The terminal allows you to establish a secure and encrypted connection with the remote device to execute various commands, diagnose and troubleshoot network problems.

In the terminal, a network administrator can manually execute all supported commands, widely interpreted as basic network troubleshooting tools, such as ping, tracert/ trace route, ipconfig/ ifconfig, netstat, nslookup, pathping/MTR, route, etc., to analyze and troubleshoot network problems. Apart from troubleshooting issues, it is important to perform network optimization.

Set up Internet access & communication

Objectives: At the end of this exercise you shall be able to
- **set-up internet connectivity**
- **set-up digital communication**

Requirements

Tools/Equipment/Machines

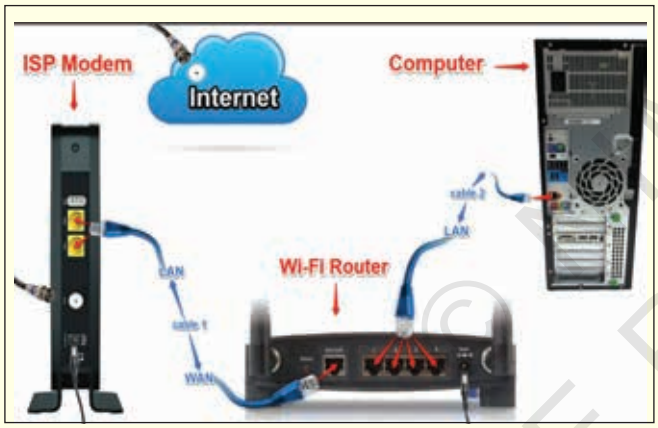
- A Working PC with Windows 10 OS - 1 No.
- Network Connectivity (Wired / Wireless) - 1 No.
- FTTH Router / DSL Modem - 1 No.
- Patch Cable - 1 No.

PROCEDURE

TASK 1: **Set-up internet connectivity**

Connect a wireless router

To create your own Wi-Fi network, you'll need a wireless router.



1 Connect it to your existing Internet modem.

2 Connect an Ethernet cable from your modem to the wireless router (there is usually a short Ethernet cable included with your wireless router for this purpose).

3 Plug in the power cable for the wireless router.

4 Wait at least 30 to 60 seconds, and make sure the lights on your router are working correctly.

Configure your router

Next, you'll need to use your computer to configure your router's default settings.

1 Using your web browser, enter the router's default IP address into the address bar, then press Enter. Your router's has the most common addresses include 192.168.0.1, 192.168.1.1, and 192.168.2.1.

2 The router's sign-in page will appear. most routers use a standard user name and password combination, such as **admin** and **password**.

3 Choose router's settings and select the Network Setting, then enter a SSIB network name.

4 Select Network Password setting, and choose an Encryption option. Recommend WPA2, which is generally considered to be the most secure.

5 Enter your desired password. Make sure to use a strong password to help ensure no one else can access your network.

6 Locate and select the Save button to save your settings.

Connect!

That's it! Now you're ready to connect to your Wi-Fi network and make sure it's working.

1 Locate your computer's network settings, and search for nearby Wi-Fi networks.

2 Select your network, and enter your password.

3 If the connection is successful, open your web browser and try navigating to a webpage like www.google.com. If the page loads, it means your Wi-Fi connection is working correctly.

— — — — — —

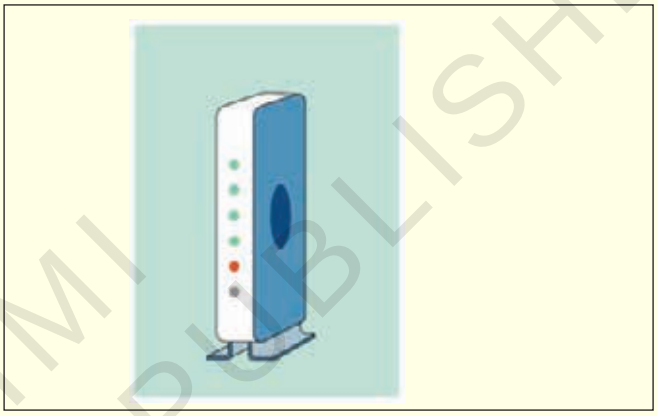
TASK 2: **Set-up digital communication**

Types of Internet service : The type of Internet service you choose will largely depend on which Internet service providers (ISPs) serve your area, along with the types of service they offer. Here are some common types of Internet service.

- Dial-up: Dial-up Internet uses your phone line
- DSL: DSL service uses a broadband connection, which makes it much faster than dial-up
- Cable: Cable service connects to the Internet via cable TV
- Satellite: A satellite connection uses broadband but does not require cable or phone lines; it connects to the Internet through satellites orbiting the Earth.
- 3G and 4G: 3G and 4G service is most commonly used with mobile phones, and it connects wirelessly through your ISP's network.

Hardware needed

Modem : The type of Internet access you choose will determine the type of modem you need. Dial-up access uses a telephone modem, DSL service uses a DSL modem, cable access uses a cable modem, and satellite service uses a satellite adapter.



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Use the Internet

Objectives: At the end of this exercise you shall be able to
- **browse a website through web browser, e-mail, social media**
- **use the phone for online activities.**

Requirements

Tools/Equipment/Machines

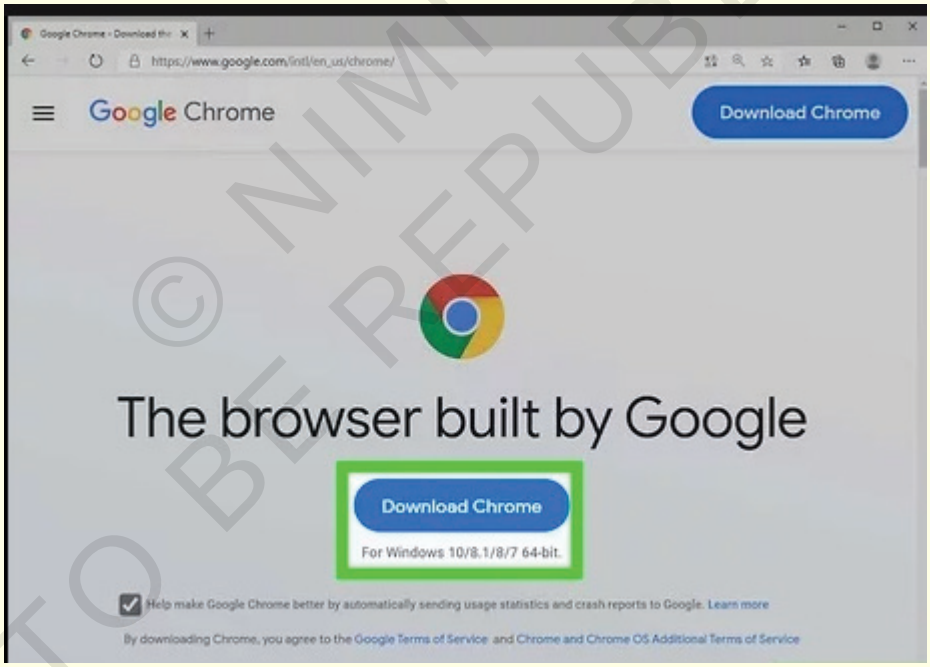
- A Working PC with Windows 10 OS - 1 No.
- Network Connectivity (Wired / Wireless) - 1 No.
- Internet Connection - 1 No.

PROCEDURE

TASK 1: **Browse a website through Web browser**

First way to open

1 Choose edge or chrome browser and open it.



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TASK 2 : **Use an Email Account**

1 Choose any browser and Click to open it.

2 Click “Gmail” on the “Google” home page.

Note:Create your own personal email accout at any of free Email accout service. (Ex.Gmail, yahoo, Outlook, hotmail etc..)

3 Click “CREATE AN ACCOUNT“

4 Type your name details in first and last name box.

5 Choose your username as you will keep secure.

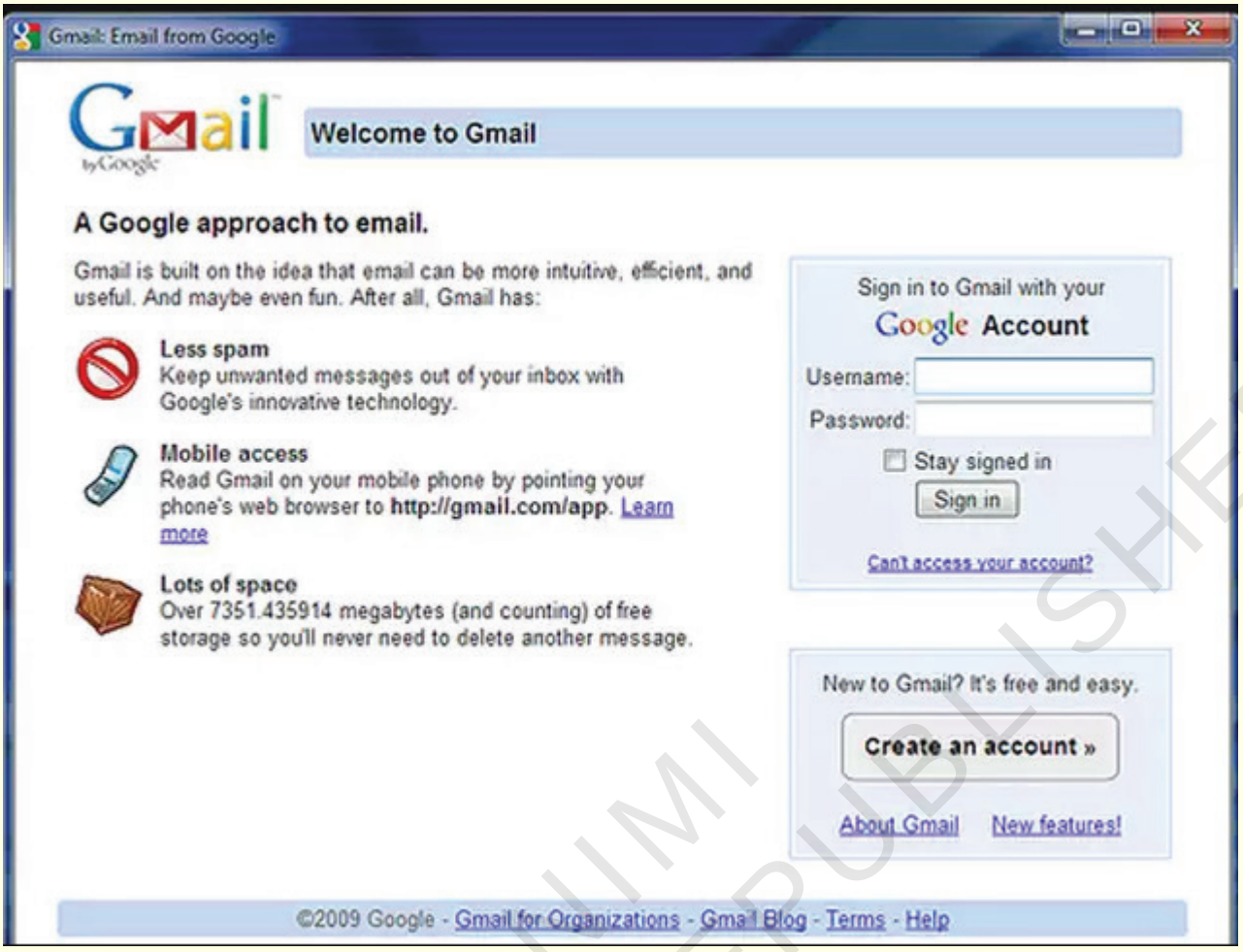
6 Password and retype the same in “confirm your password”

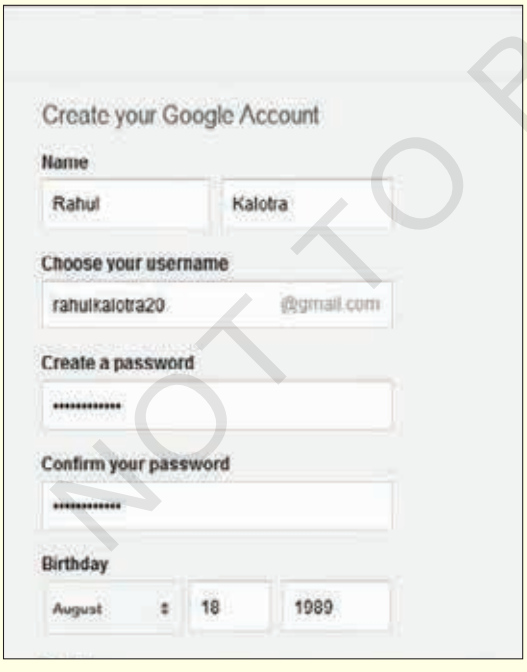
Note : While typing the password the password box has to denote strong.

7 Choose personal details in mobile number in mobile number, and alternative email id if you have.

8 Type the given quote “Prove your not an robot” box

9 Select the location as “India”

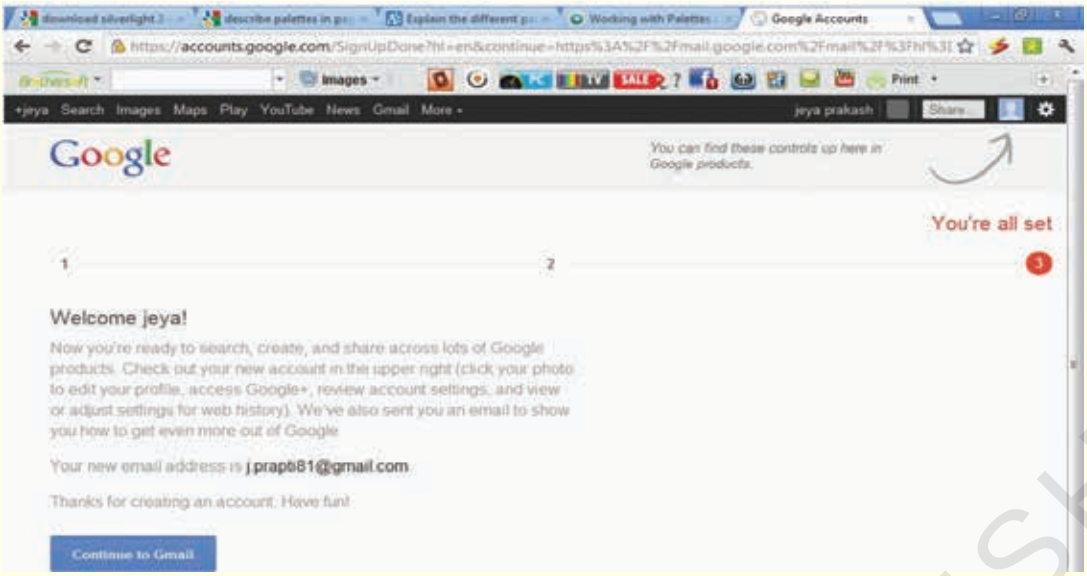




10 Click a the box “I agree to Google” and About personalization box” as shown in Fig 5.

11 Click “Next Step”

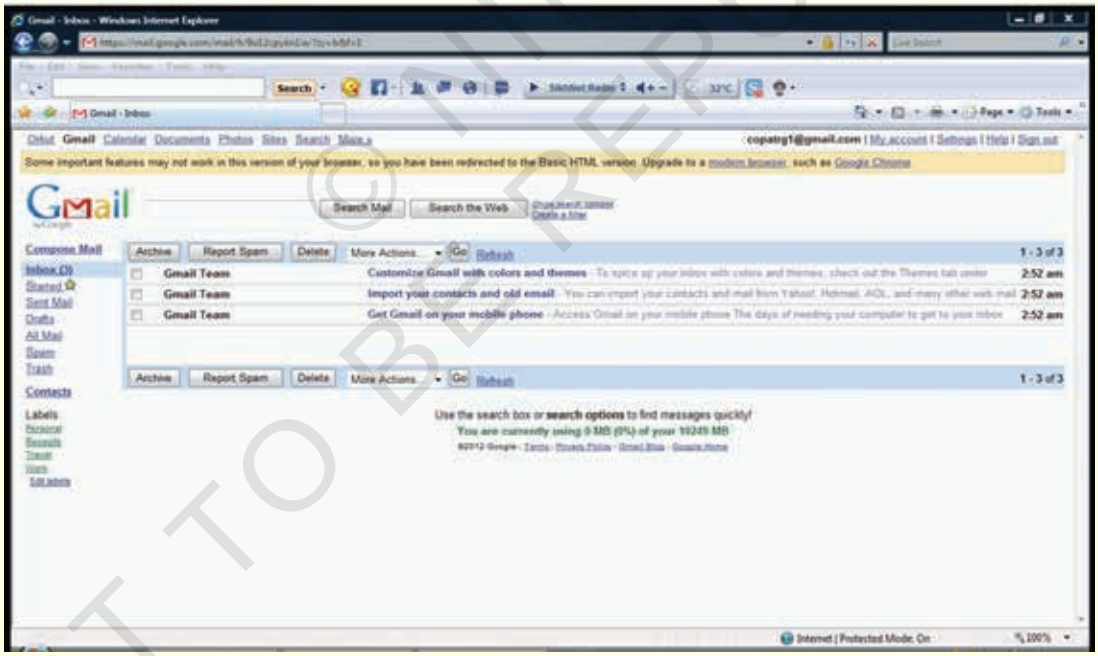
Note: Account create successfully!.



12 Click “ Continue to Gmail”

Note : A new Gmail account mail window appears on the screen with three mails of Google team appears.

Try to compose Email and sent to others and also receive from others.



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TASK 3: **Use social network sites**

1 Open Brower.
2 Enter address www.facebook.com
3 Enter your gmail Id and Password to login.
4 In case no login Id , Fill the form and Sign Up.
5 Add friends.
6 Send friend request.
7 Click ok.
8 Now post some message with a picture.
9 Open friends list.
10 Select some friend from the list by clicking.
11 Post something in friends facebook.
12 Click logout.

TASK 4: **Use the phone for online activities**

Install Chrome

1 On your Android phone or tablet, go to PlayStore and Search Google Chrome.

2 Tap Install.

3 Tap Accept.

4 To start browsing, go to the Home or All Apps page. Tap the Chrome app .

Uninstall and reinstall Chrome to fix most problems with your search engine, pop-ups, or Chrome updates.

Setup Gmail for mobile devices

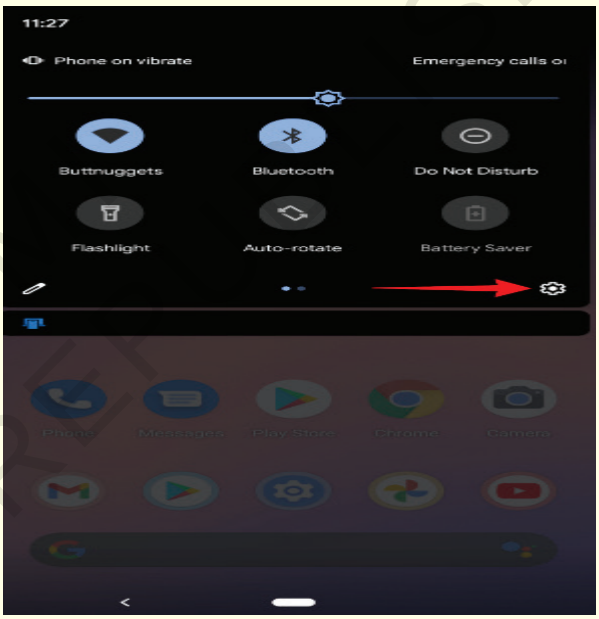
If you have a mobile device, there are two main ways to access your Gmail account:

- **Option 1:** The native email app on your device
- **Option 2:** The official Gmail mobile app, available for iOS and Android.

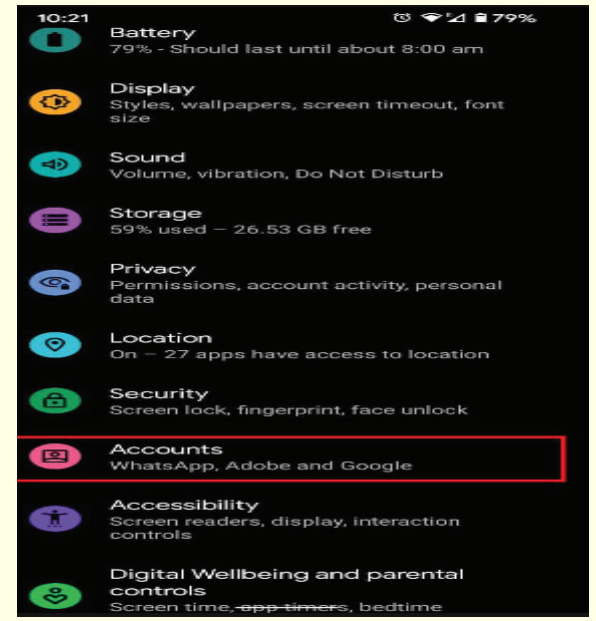
To set up Gmail with the native email app:

Stock Android 11

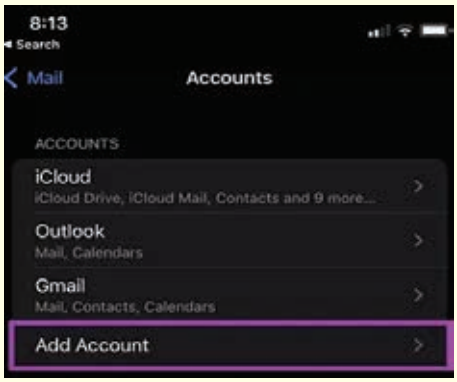
Step 1: Drag a finger down from the top to fully expand the Notification Shade, and then tap the Cog icon. This opens the Android settings panel.



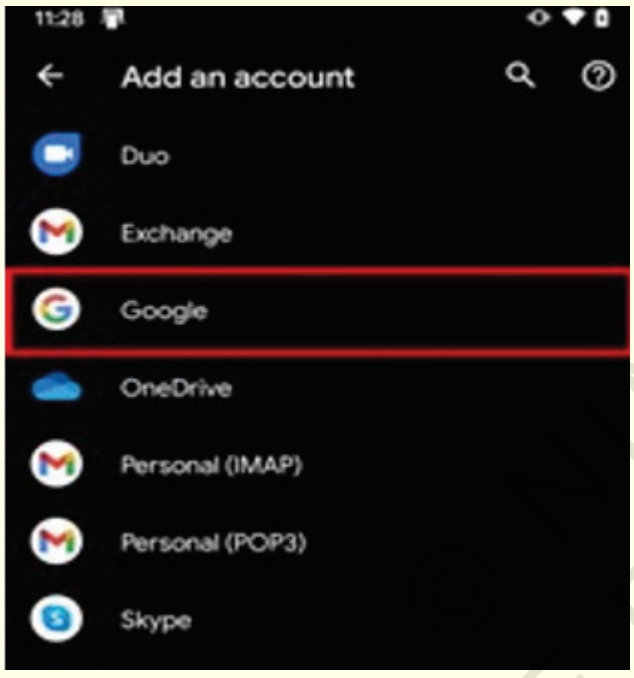
Step 2: Scroll down and tap Accounts.



Step 3: Tap Add Account on the following screen.



Step 4: Tap Google.

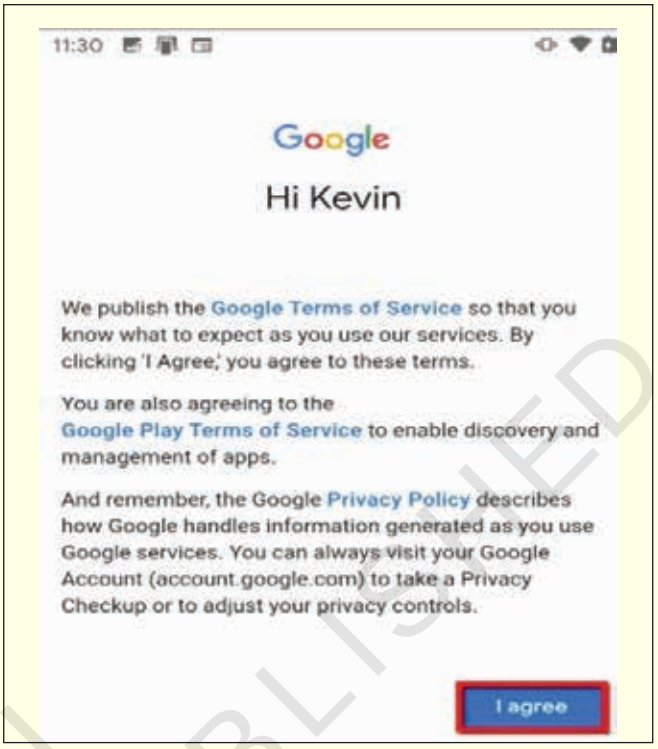


Step 5: Verify your identity by using your face, finger, or PIN.

Step 6: Enter your Google account address and then tap Next.

Step 7: Enter your Google account password and then tap Next.

Step 8: Tap I Agree on the Google Terms of Service screen.



Step 9: If prompted, add a credit card for purchases or tap No Thanks.

Once finished, you will be returned to Accounts in Settings. If you want to see the accounts that you have added or want to delete any, just tap Google.

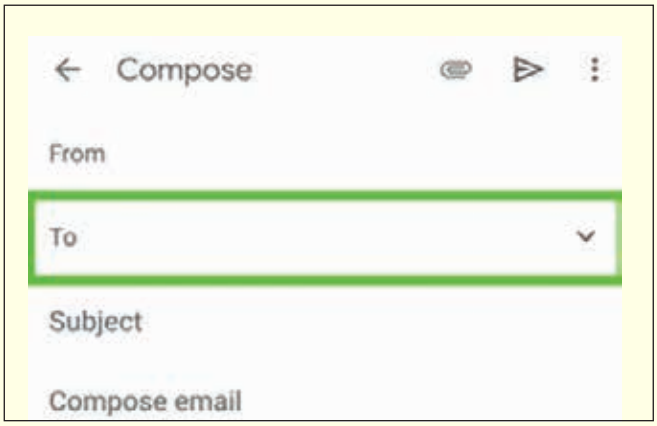
Write an email

1 On your Android phone or tablet, open the Gmail app .

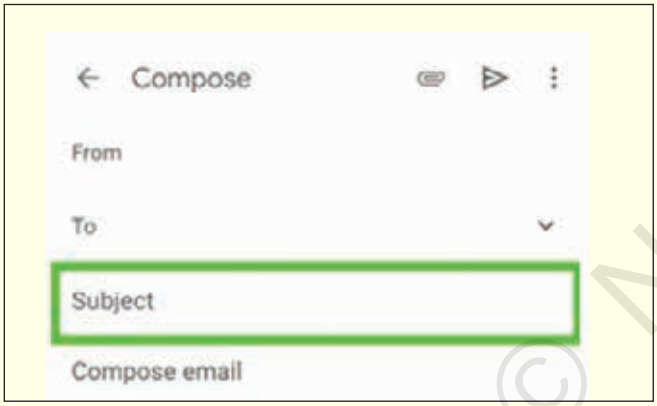
2 At the bottom right, tap Compose.

3 In the “To” field, add recipients. You can also add recipients:

- In the “Cc” and “Bcc” fields.
- When you compose a message, with a “+ sign” or “@mention” and the contact’s name in the text field.



4 Add a subject.



5 Write your message.

6 At the top of the page, tap Send ➤ .

Tip: To add formatting, like bolding or changing the text color, select the text you want to format, then tap .

Personal Email Account Setup:

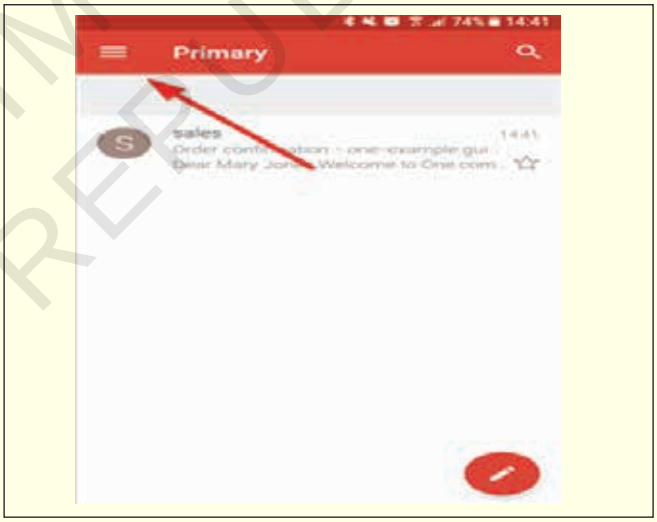
Step 1 - Open the Gmail app

Open the Gmail app on your Android device.

Step 2 - Go to Settings

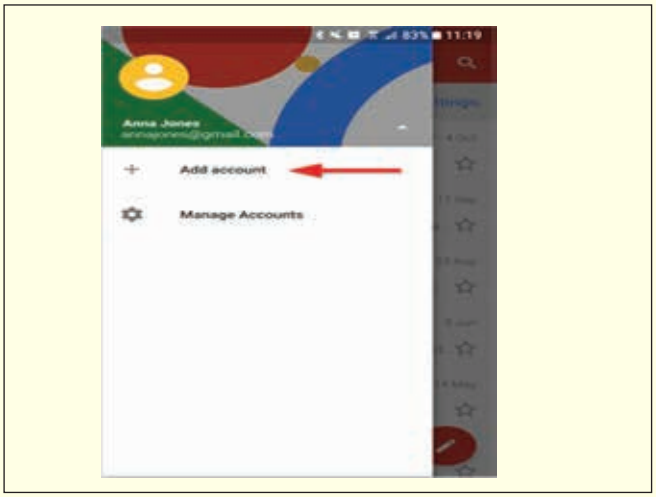
1 Click the menu in the top left corner to open Settings.

2 Tap Settings at the bottom of the menu that opens.



Step 3 - Click Add account

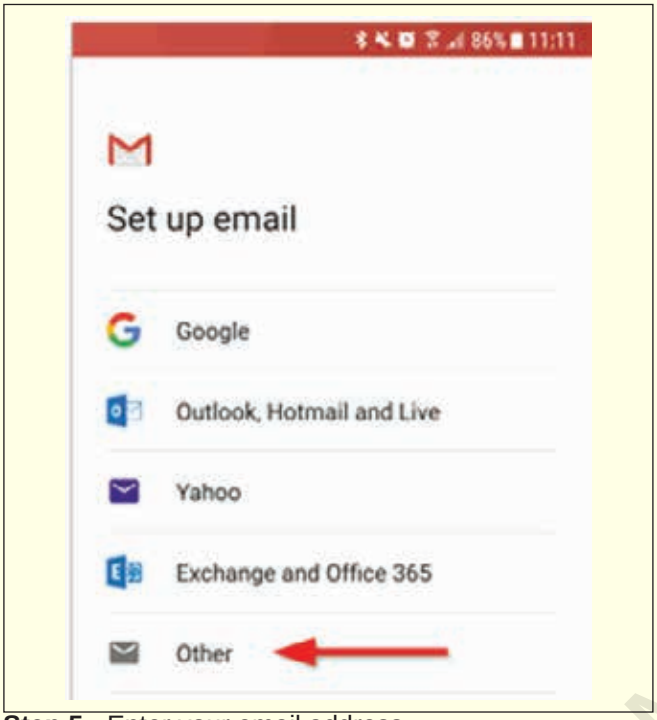
Click Add account to start setup.



Step 4 - Click Other

Select Other as the account you want to set up.

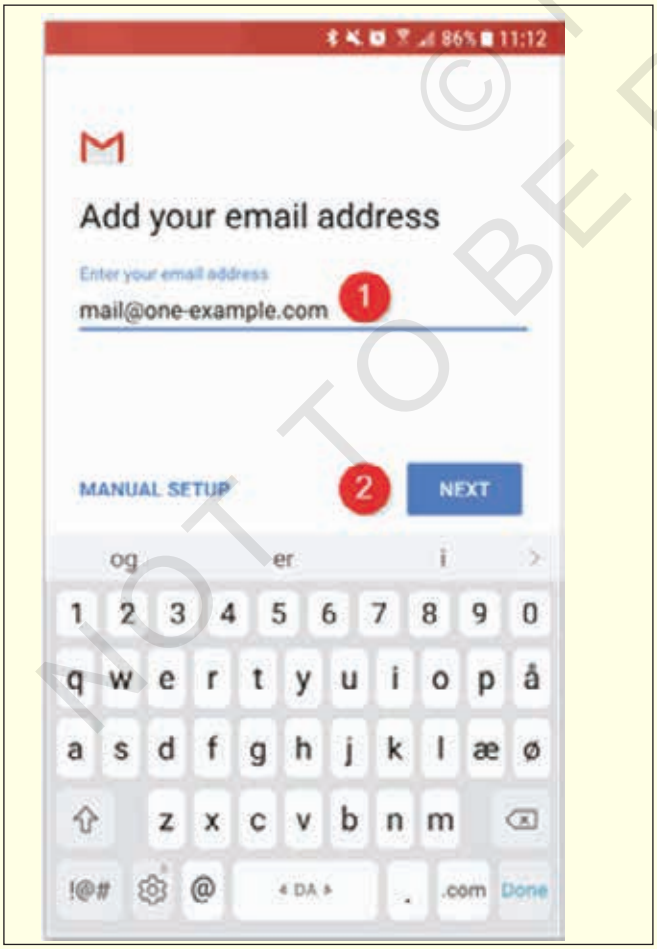
Tip: If you want to set up your email with Mobile Sync, choose Exchange instead.



Step 5 - Enter your email address

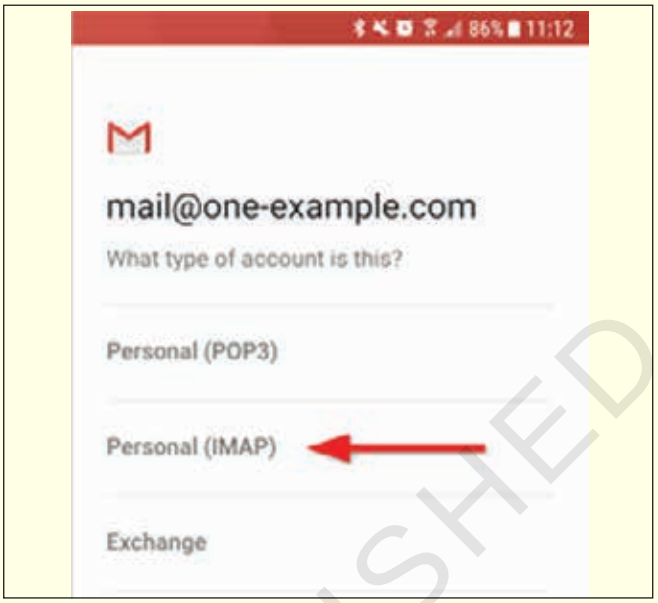
1 Type in the email address you want to set up.

2 Click Next.



Step 6 - Select IMAP

Select IMAP as the account type.



Step 7 - Enter your password

1 Type in your email password, the one you use to log in to Webmail.

2 Click Next.

Step 8 - Enter imap.one.com for incoming server

1 Type in imap.one.com as the incoming server.

2 Click Next.

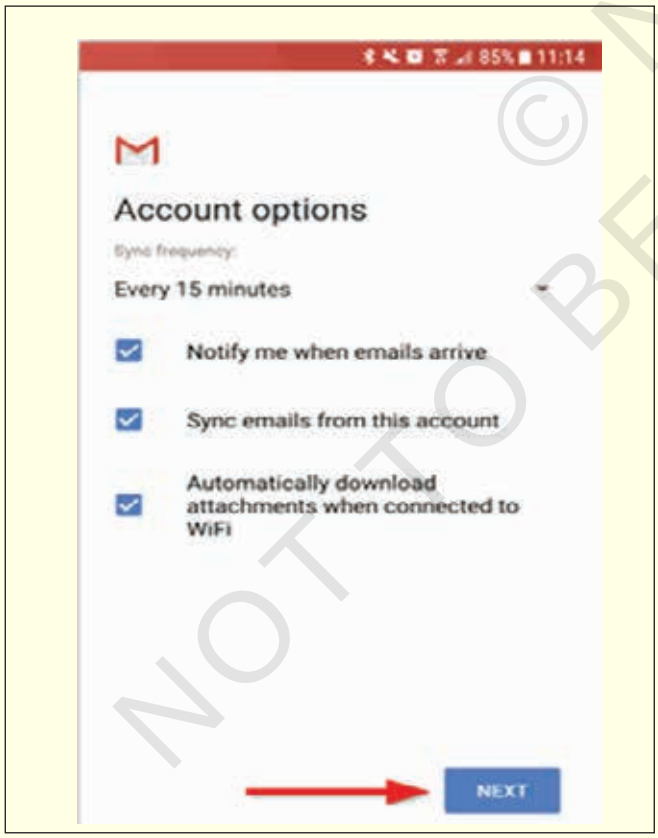
Step 9 - Enter send.one.com for outgoing server

1 Type in send.one.com as the outgoing server.

2 Click Next.

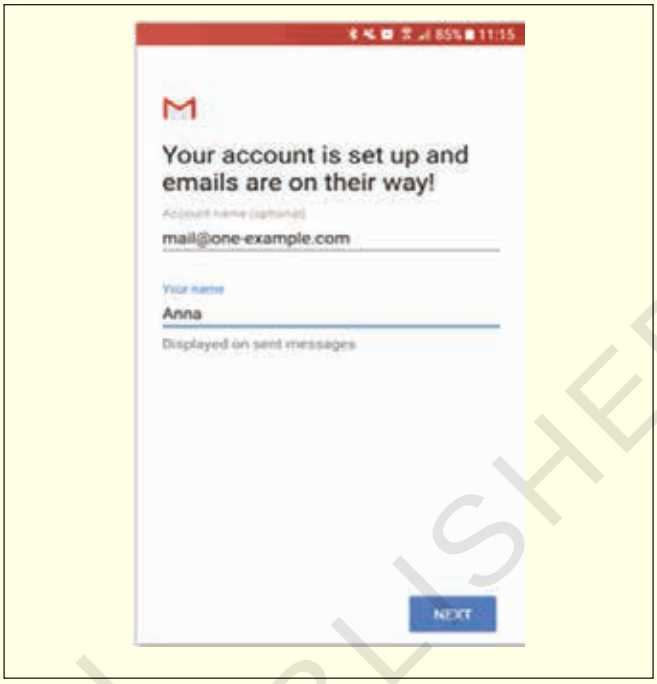
Step 10 - Select account options

Here you set how often Gmail should look for new emails, when you get notifications and more. Uncheck any options you don't want and click Next to continue.



Step 11 - Done!

Your account is now set up and ready to go!



COPA - Create Simple Static Web Pages using HTML Tags

Practice HTML

Objectives: At the end of this exercise you shall be able to
- **display a text message using HTML program.**

Requirements

Tools/Equipment/Machines

- A Working PC with windows OS - 1 No.
- Notepad - 1 No.
- Browser - 1 No.

PROCEDURE

TASK 1: **Display text message using HTML program**

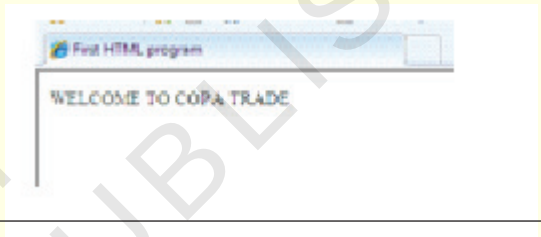
1 Type the following program in a Notepad file.

```
<html>
<head>
<title>First HTML program</title>
</head>
<body>
WELCOME TO COPA TRADE
</body>
</html>
```

2 Save it as

3 Open the browser 'Internet Explorer' and open the file

4 The output will be as follows. (Fig 1)



- If correct output is not displayed, do the following
- Press Ctrl G to open the console window to view the errors in the HTML program.
- Note the errors
- Open program in Notepad to correct the errors and save it.
- Go to browser and press F5 to refresh the page or open the saved filed in browser.

5 Get the output verified by the instructor.

TASK 2: **Design simple web page with text, paragraph and line break and using HTML Tags**

Program

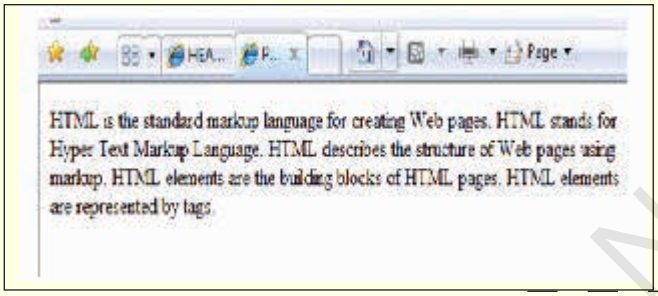
```
<HTML>
<HEAD>
<TITLE> HEADING TAGS </TITLE>
</HEAD>
<BODY>
<h1>This is heading 1</h1>
<h2>This is heading 2</h2>
<h3>This is heading 3</h3>
<h4>This is heading 4</h4>
<h5>This is heading 5</h5>
<h6>This is heading 6</h6>
</BODY>
</HTML>
```

Output

Program

```
<HTML>
<HEAD>
<TITLE> PARAGRAPH TAG </TITLE>
</HEAD>
<BODY>
<P>
HTML is the standard markup language for creating Web pages.
HTML stands for Hyper Text Markup Language. HTML describes the structure of Web pages using markup.
HTML elements are the building blocks of HTML pages.
HTML elements are represented by tags.
</P>
</BODY>
</HTML>
```

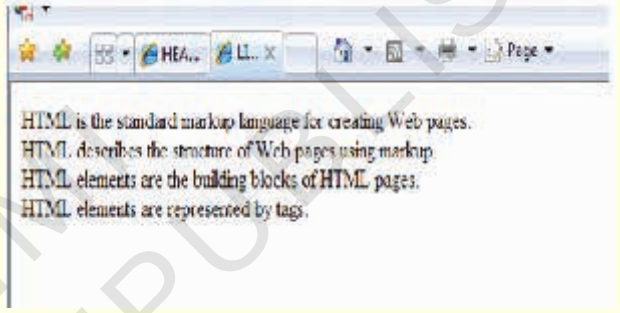
Output



Program

```
<HTML>
<HEAD>
<TITLE> LINE BREAK </TITLE>
</HEAD>
<BODY>
<P>
HTML is the standard markup language for
creating Web pages.<br>HTML describes the structure of Web pages using markup.<br>HTML elements are the building blocks of HTML pages.<br> HTML elements are represented by tags.
</P>
</BODY>
</HTML>
```

Output

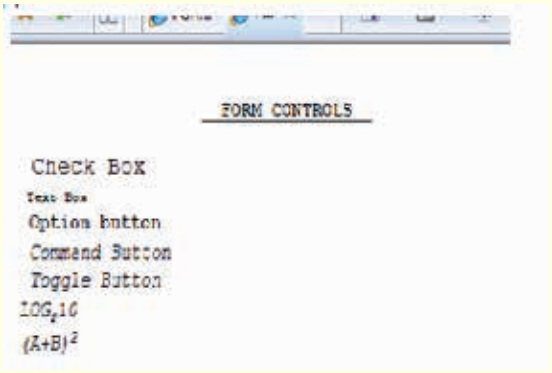


TASK 3: **Format text, change ground colour and inset pictures in web page**

Program

```
HTML>
<HEAD>
<TITLE> FORMATTING TEXT</TITLE>
</HEAD>
<BODY>
<PRE>
<CENTER> <U> <B> FORM CONTROLS </ B> </ U> </CENTER>
<BIG> Check Box </BIG>
<SMALL> Text Box</SMALL>
<STRONG> Option button </STRONG>
<I> Command Button <I>
<EM> Toggle Button <EM> LOG<SUB>2</SUB>10 (A+B)<SUP>2</SUP>
</PRE>
</BODY>
</HTML>
```

Output



Note

** - center text**
<u> - underline text
<b> - Bold text
** - Important text**
<i> - Italic text
** - Emphasized text**
<big> - <big text>
<small> - Small text
<sub> - Subscript text
<sup> - Superscript text

Program

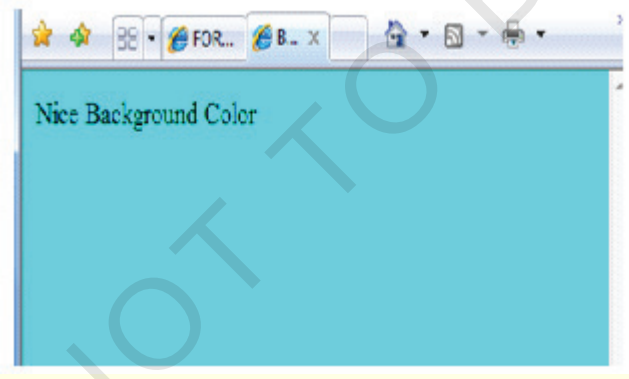
```
<HTML>
<HEAD>
<TITLE> FONTTAG</TITLE>
</HEAD>
<BODY>
<FONT COLOR=”BLUE” SIZE=”20” FACE = “ALGERIAN”>
World Wide Web
</FONT>
</BODY>
</HTML>
```

Output

Program

```
<HTML>
<HEAD>
<TITLE> BACKGROUND TAG </TITLE>
</HEAD>
<BODY BGCOLOR = “AQUA”>
<BIG> Nice Background Color </BIG>
</BODY>
</HTML>
```

Output



Program

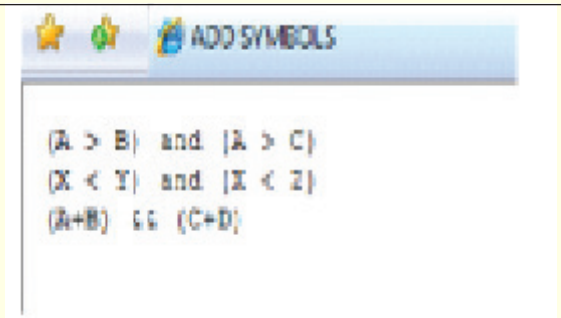
```
<HTML>
<HEAD>
<TITLE> INSERT IMAGE </TITLE>
</HEAD>
<BODY>
<IMG SRC=”C:\Users\Public\Documents\iti-logo-1.JPG” ALT = “ITI SYMBOL”>
</BODY>
</HTML>
```

Output

Program

```
<HTML>
<HEAD>
<TITLE> ADD SYMBOLS </TITLE>
</HEAD>
<BODY>
<PRE>
(A &gt B) and (A &gt C) (X &lt Y) and (X &lt Z) (A+B) &AMP&AMP (C+D)
</PRE>
</BODY>
</HTML>
```

Output

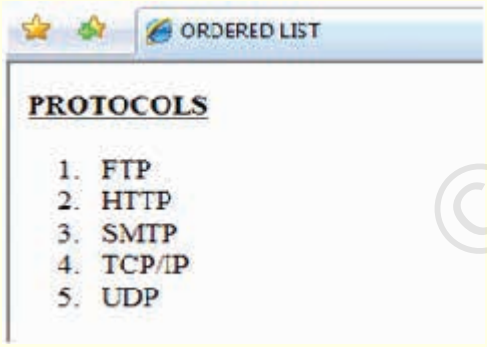


TASK 4: **Design simple webpage with tables and lists**

Program

```
HTML>
<HEAD>
<TITLE> ORDERED LIST </TITLE>
</HEAD>
<BODY>
<B><U> PROTOCOLS </U></B>
<OL TYPE = “1”>
<LI> FTP </LI>
<LI> HTTP </LI>
<LI> SMTP </LI>
<LI> TCP/IP </LI>
<LI> UDP </LI>
</OL>
</BODY>
</HTML>
```

Output



Note: The type attribute of the <OL> tag, defines the type of the list item marker:

type=”A” - The list items will be numbered with A,B,C,…

type=”a” - The list items will be numbered with a,b,c,…

type=”I” - The list items will be numbered with I,II,III,IV,…

type=”i” - The list items will be numbered with i,ii,iii,iv,….

Program

```
<HTML>
<HEAD>
<TITLE> UNORDERED LIST </TITLE>
</HEAD>
<BODY>
<B><U> CABLES USED FOR NETWORKING </
U></ B>
<UL TYPE = “square”>
<LI> Sheilded Twisted Pair Cable </LI>
<LI> Unsheilded Twisted Pair Cable </LI>
<LI> Fibre Optic Cable </LI>
</UL>
</BODY>
</HTML>
```

Output

Note: The type attribute of the <UL> tag, defines the type of the list item marker:

type=”disc”- Sets the list item marker to a bullet (default)

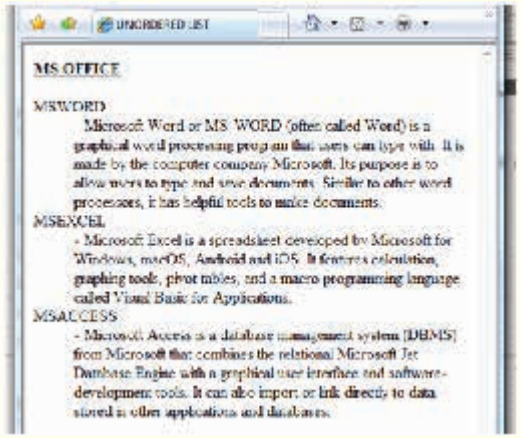
type=”circle “ - Sets the list item marker to a circle

Program

```
<HTML>
<HEAD>
<TITLE> DESCRIPTION LIST </TITLE>
</HEAD>
<BODY>
<B><U> MS OFFICE </U></B>
<dl>
<dt>MSWORD</dt>
<dd>- Microsoft Word or MS-WORD (often called Word) is a graphical word processing program that users can type with. It is made by the computer company Microsoft. Its purpose is to allow users to type and save documents. Similar to other word processors, it has helpful tools to make documents.<dd>
<dt>MSEXCEL</dt>
<dd>- Microsoft Excel is a spreadsheet developed by Microsoft for Windows, macOS, Android and iOS. It features calculation, graphing tools, pivot tables, and a macro programming language called Visual Basic for Applications.</dd>
<dt>MSACCESS</dt>
```

```
<dd>- Microsoft Access is a database management system (DBMS) from Microsoft that combines the relational Microsoft Jet Database Engine with a graphical user interface and software-development tools. It can also import or link directly to data stored in other applications and databases.</dd>
</dl>
</BODY>
</HTML>
```

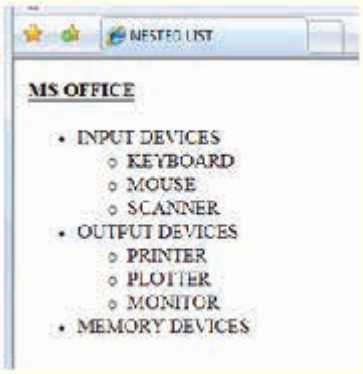
Output



Program

```
<HTML>
<HEAD>
<TITLE> NESTED LIST </TITLE>
</HEAD>
<BODY>
<B><U> MS OFFICE </U></B>
<ul>
<li>INPUT DEVICES
<ul>
<li>KEYBOARD</li>
<li>MOUSE</li>
<li>SCANNER</li>
</ul>
<li>OUTPUT DEVICES
<ul>
<li>PRINTER</li>
<li>PLOTTER</li>
<li>MONITOR</li>
</ul>
<li>MEMORY DEVICES</li>
</ul>
</BODY>
</HTML>
```

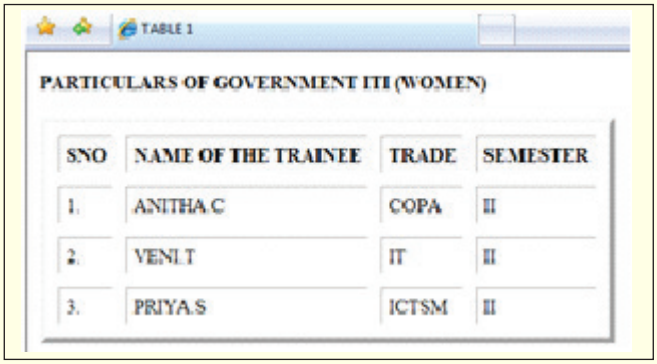
Output



Program

```
<HTML>
<HEAD>
<TITLE> TABLE 1 </TITLE>
</HEAD>
<BODY>
<B> PARTICULARS OF GOVERNMENT ITI (WOMEN) </B> <BR> <BR>
<table BORDER=”5” CELLPADDING=”5” CELLSPACING=”10”>
<tr>
<th>SNO</th>
<th>NAME OF THE TRAINEE</th>
<th>TRADE</th>
<th>SEMESTER</th>
</tr>
<tr>
<td>1.</td>
<td>ANITHA.C</td>
<td>COPA</td>
<td>II</td>
</tr>
<tr>
<td>2.</td>
<td>VENI.T</td>
<td>IT</td>
<td>II</td>
</tr>
<tr>
<td>3.</td>
<td>PRIYA.S</td>
<td>ICTSM</td>
<td>II</td>
</tr>
</table>
</BODY>
</HTML>
```

Output

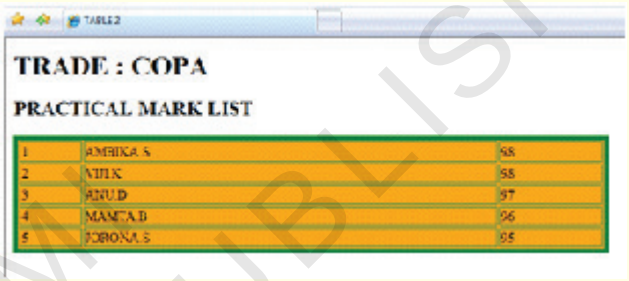


Program

```
<HTML>
<HEAD>
<TITLE> TABLE 2 </TITLE>
</HEAD>
<BODY>
<H1> TRADE : COPA </H1>
<H2> PRACTICAL MARK LIST </H2>
<TABLE BORDER="5" BORDERCOLOR="GREEN" BGCOLOR="ORANGE" WIDTH="50%">
<tr> <td>1</td> <td>AMBIKA.S</td> <td>98< td> </tr>
<tr> <td>2</td> <td>VIJI.K</td> <td>98</td>
</tr>
<tr> <td>3</td> <td>ANU.D</td> <td>97</td>
</tr>
<tr> <td>4</td> <td>MAMTA.B</td> <td>96</ td> </tr>
<tr> <td>5</td> <td>JORONA.S</td> <td>95</ td> </tr>
</TABLE>
</BODY>
</HTML>
```

Output

Note: Table's border colour in set to Green and background colour is set to orange.



TASK 5: **Use Marquees, hyperlinks and mail to link in designing webpages**

Program

```
<HTML>
<HEAD>
<TITLE>MARQUEE TAG</TITLE>
</HEAD>
<BODY>
<H1> <FONT TYPE="broadway">
<MARQUEE>
NATIONALINSTRUCTIONALMEDIAINSTITUTE, CHENNAI
</MARQUEE>
</H1> </FONT>
</BODY>
</HTML>
```

Output

The output will be "NATIONAL INSTRUCTIONAL MEDIA INSTITUTE, CHENNAI" which is scrolling towards left.

Program

```
<HTML>
<HEAD>
<TITLE> MARQUEE WITHATTRIBUTES-1 </ TITLE>
</HEAD>
<BODY>
<FONT SIZE=”25” COLOR=”Blue”>
<MARQUEE BEHAVIOR=”scroll” DIRECTION = “right” SCROLLAMOUNT=”40”>
Directorate General of Employment & Training (DGE&T)
</MARQUEE>
</FONT>
</BODY>
</HTML>
```

Output

1 The output will be “Directorate General of Employment & Training (DGE&T)” which starts faster scrolling towards right.TASK 3: **Set the BGCOLOR and WIDTH attributes to <MARQUEE> tag.**

Program

```
<HTML>
<HEAD>
<TITLE> MARQUEE WITHATTRIBUTES-2 </ TITLE>
</HEAD>
<BODY>
<FONT SIZE=”25”>
<MARQUEE BEHAVIOR=”alternate” BGCOLOR = “yellow” WIDTH = “70%”>
National Council for Vocational Training (NCVT)
</MARQUEE>
</FONT>
</BODY>
</HTML>
```

Output

1 The output will be “National Council for Vocational Training (NCVT)” which starts scrolling towards left and bounces back and forth in 70% screen width with yellow background color.

Program

```
<HTML>
<HEAD>
<TITLE> MARQUEE WITHATTRIBUTES-3 </ TITLE>
</HEAD>
<BODY>
<FONT SIZE=”40”>
<MARQUEE DIRECTION = “UP” HEIGHT=”100%” SCROLLAMOUNT = “40%” LOOP=”-1”>
The Ministry of Labour and Employment
</MARQUEE>
</FONT>
</BODY>
```

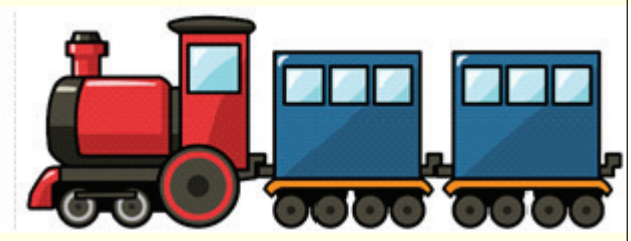
Output

1 The output will be “The Ministry of Labour and Employment “which starts scrolling towards up 3 times (Loop).

Program

```
<HTML>
<HEAD>
<TITLE> MARQUEE IMAGE </TITLE>
</HEAD>
<BODY>
<MARQUEE BEHAVIOUR=”slide” SCROLLAMOUNT=”20%”>
<IMG SRC=”TRAIN.PNG” alt=”TRAIN”>
</MARQUEE>
</FONT>
</BODY>
```

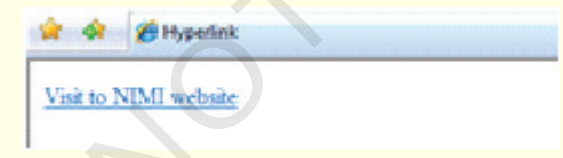
Output



Program

```
<HTML>
<HEAD>
<TITLE> Hyperlink </TITLE>
</HEAD>
<BODY>
<!— link to Home page of NIMI website —>
<A Href=”http://nimi.gov.in/”> Visit to NIMI website
</a>
</BODY>
</HTML>
```

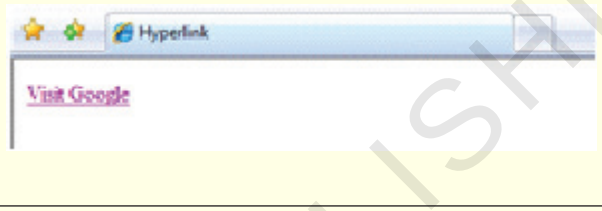
Output



Program

```
<HTML>
<HEAD>
<TITLE> Hyperlink </TITLE>
</HEAD>
<BODY>
<!— Opens the link in new window —>
<a href=”https://www.google.co.in/” TARGET = “_blank”>Visit Google</a>
</BODY>
</HTML>
```

Output



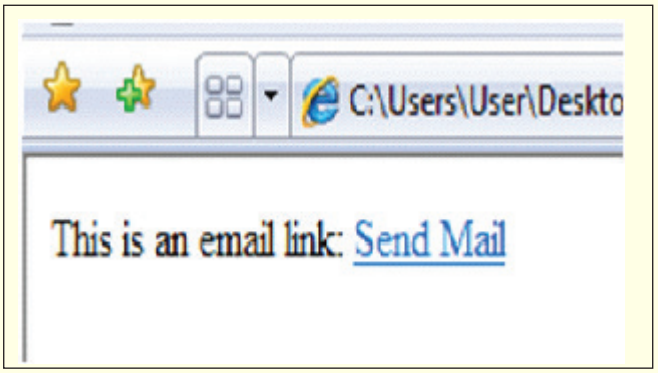
Program

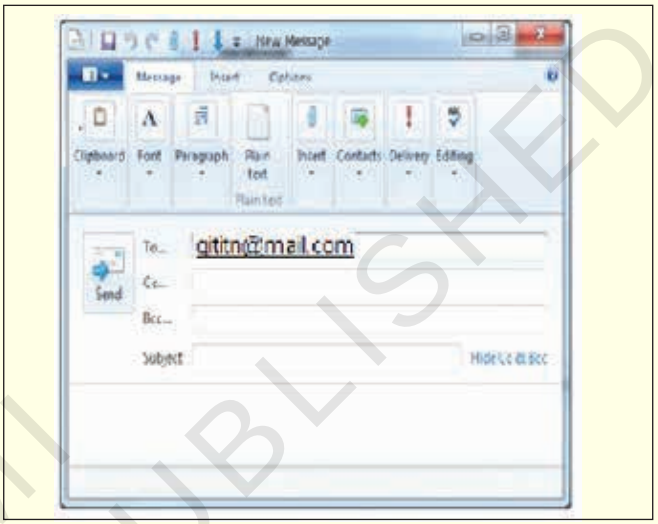
```
<HTML>
<HEAD>
<TITLE> Hyperlink </TITLE>
</HEAD>
<BODY>
<p> An image as a link:</p>
< a h r e f = ” h t t p s : / / e n . w i k i p e d i a . o r g / w i k i / Brihadeeswarar_Temple#/media”>
<img src = “Brihadeswara_Temple_Landscape.jpg” height=100” width=”100”>
</a>
</BODY>
</HTML>
```

Output

Program

```
<html>
<head>
<title> Mail to Link </title>
</head>
<body>
<p>
This is an email link:
<ahref="mailto:gititn@mail.com"target="_top">Send Mail</a>
</p>
</body>
</html>
```





Output

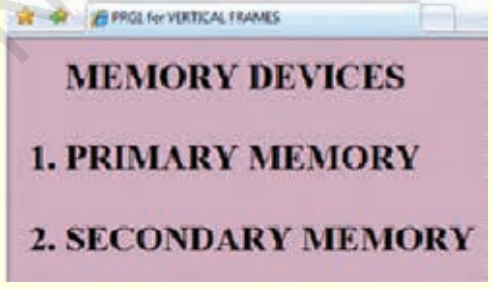
1 Mail to link is a type of HTML link that activates the default mail client on the computer for sending an e- mail. The web browser requires a default e-mail client software installed on his computer in order to activate the e-mail client. If you have Microsoft Outlook, as your default mail client, pressing the Send Mail link opens a new mail window.

TASK 6: **Create frames, and add style and Design Layout**

1 Type the following program in Notepad file and save it as PRG1.HTML

```
<HTML>
<HEAD>
<TITLE> PRG1 for VERTICAL FRAMES </TITLE>
</HEAD>
<BODY BGCOLOR = “CCAABB”>
<H1>
<OL> MEMORY DEVICES
<BR><BR>
<LI>PRIMARY MEMORY</LI>
<BR><BR>
<LI>SECONDARY MEMORY</LI>
</OL>
</BODY>
</HTML>
```

2 The output will be as follows. (Fig 1)



3 Type the following program in Notepad file and save it as PRG2.HTML

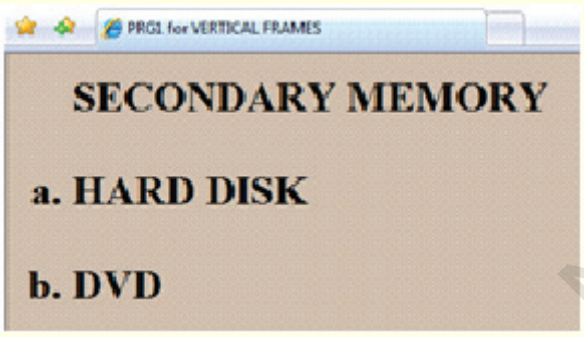
```
<HTML>
<HEAD>
<TITLE> PRG2 for VERTICAL FRAMES </TITLE>
</HEAD>
<BODY BGCOLOR = “AABBCC”>
<H1>
<OL TYPE = “A”> PRIMARY MEMORY
<BR><BR>
<LI>RANDOM ACCESS MEMORY</LI>
<BR><BR>
<LI>READ ONLY MEMORY</LI>
</OL>
</BODY>
</HTML>
```

3 The output will be as follows. (Fig 2)

4 Type the following program in Notepad file and save it as PRG3.HTML

```
<HTML>
<HEAD>
<TITLE> PRG3 for VERTICAL FRAMES </TITLE>
</HEAD>
<BODY BGCOLOR = “CCBBAA”>
<H1>
<OL TYPE=”a”> SECONDARY MEMORY
<BR><BR>
<LI>HARD DISK</LI>
<BR><BR>
<LI>DVD</LI>
</OL>
</BODY>
</HTML>
```

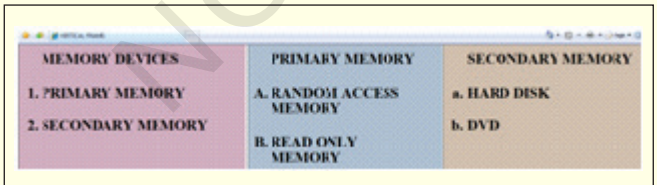
Output



5 Type the following program to create VERTICAL FRAMESET in Notepad file and save it as VERFRAME.HTML

```
<HTML>
<HEAD>
<TITLE> VERTICAL FRAMES </TITLE>
</HEAD>
<frameset cols=”35%,30%,*”>
<frame src=”PRG1.html”>
<frame src=”PRG2.html”>
<frame src=”PRG3.html”>
</frameset>
</HTML>
```

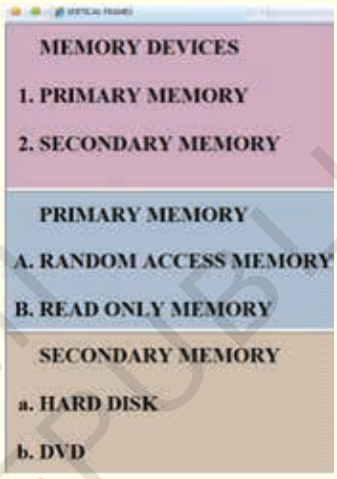
Output



1 Type the following program in a Notepad file and save it as HORFRAME.HTML

```
<HTML>
<HEAD>
<TITLE> HORIZONTAL FRAMES </TITLE>
</HEAD>
<frameset ROWS=”35%,30%,*”>
<frame src=”PRG1.html”>
<frame src=”PRG2.html”>
<frame src=”PRG3.html”>
</frameset>
</HTML>
```

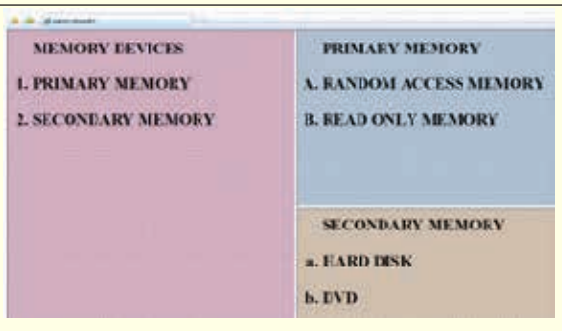
Output



1 Type the following program in a Notepad file and save it as MIXFRAME.HTML

```
<HTML>
<HEAD>
<TITLE> MIXED FRAMES </TITLE>
</HEAD>
<frameset COLS=”40%,*”>
<frame src=”PRG1.html”>
<frameset ROWS=”50%,*”>
<frame src=”PRG2.html”> frame src=”PRG3.html”>
</frameset>
</HTML>
```

Output



1 Type the following program in a Notepad file and save it as STYLE.HTML

```
<HTML>
<HEAD>
<TITLE> STYLE </TITLE>
</HEAD>
<body style="background-color:yellow;">
<h1 style="font-size:300%;text- align:center;color:indigo;">ROUTER</h1>
<p style="color:blue;font-family:comic sans MS;">
A ROUTER IS A DEVICE THAT FORWARDS DATA PACKETS ALONG NETWORKS. A ROUTER IS CONNECTED TO
ATLEAST TWO NETWORKS, COMMONLY TWO LANS OR WANS OR A
LAN AND ITS ISP'S NETWORK. ROUTERS ARE LOCATED AT
GATEWAYS, THE PLACES WHERE TWO OR MORE NETWORKS CONNECT.
</p>
</body> </HTML>
```

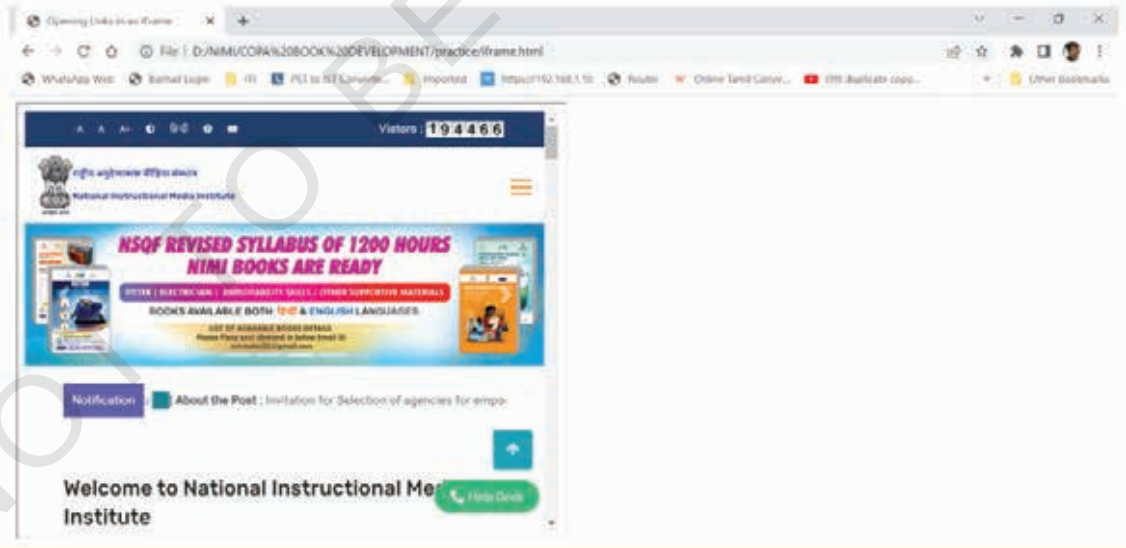
Output

TASK 7: **Display a webpage within a webpage using iframes**

Program

```
<html>
<head>
  <title>Opening Links in an iFrame</title>
   <style>
        iframe {
                width: 50%;
                height: 500px;
                }
   </style>
</head>
<body>
        <iframe src="https://nimi.gov.in/index.html" name="myFrame"></iframe>
</body>
</html>
```

Output:

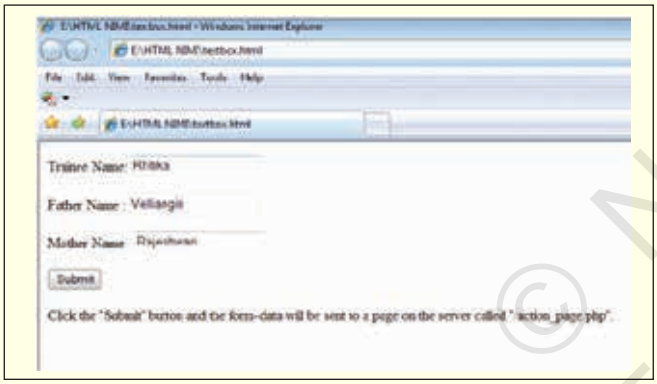


TASK 8: **Insert textbox, check box and combo box in webpage**

Program

```
<!DOCTYPE html>
<html>
<body>
<form action="/action_page.php">
Trainee Name: <input type="text" name="Trainee Name" value="Rhitika"><br><br>
Father Name : <input type="text" name="Father Name" value="Velliangiri"><br><br>
Mother Name : <input type="text" name="Mother Name" value="Rajeshwari"><br><br>
<input type="submit" value="Submit">
</form>
<p><b>Click the "Submit" button and the form-data will be sent to a page on the server called "/action_page.php".</b></p>
</body>
</html>
```

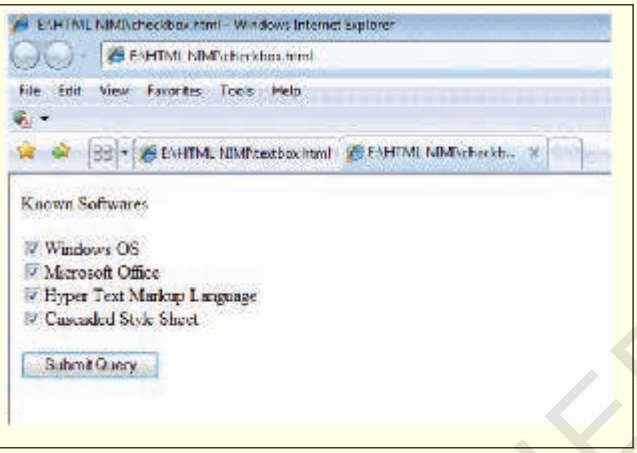
Output



Program

```
<!DOCTYPE html>
<html>
<body>
<form action="/action_page.php">
<p> Known Softwares </p>
<input type="checkbox" name="software1" value="windows">Windows OS
<br>
<input type="checkbox" name="software2" value="msoffice">Microsoft Office
<br>
<input type="checkbox" name="software3" value="html">Hyper Text Markup Language
<br>
<input type="checkbox" name="software4" value="css">Cascaded Style Sheet
<br>
<br>
<input type="submit">
</form>
</body>
</html>
```

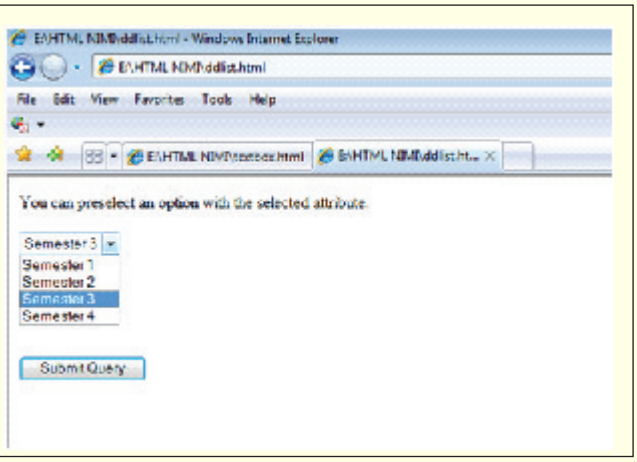
Output



Program

```
<!DOCTYPE html>
<html>
<body>
<p>You can preselect an option with the selected attribute.</p>
<form action="/action_page.php">
<select name="semester">
<option value="s1">Semester 1</option>
<option value="s2">Semester 2</option>
<option value="s3" selected>Semester 3</ option>
<option value="s4">Semester 4</option>
</select>
<br><br><br><br><br><br>
<input type="submit">
</form>
</body>
</html>
```

Output

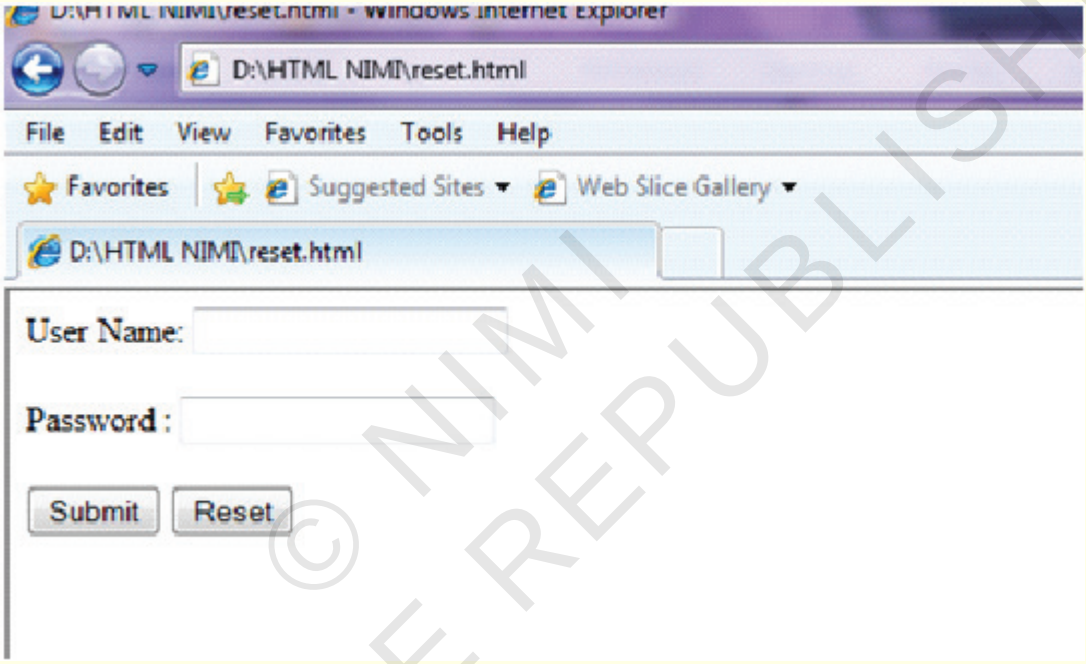


TASK 9 : **Insert Submit and Reset buttons in Web page**.

1 Type the following program in Notepad file and save it as RESET.HTML

```
<!DOCTYPE html>
<html>
<body>
<form action="/action_page.php" method="get"> User Name: <input type="text" name="userid"><br><br>
Password : <input type="password" name="psw"><br><br>
<button type="submit" value="Submit">Submit</button>
<button type="reset" value="Reset">Reset</button>
</form>
</body>
</html>
```

Output

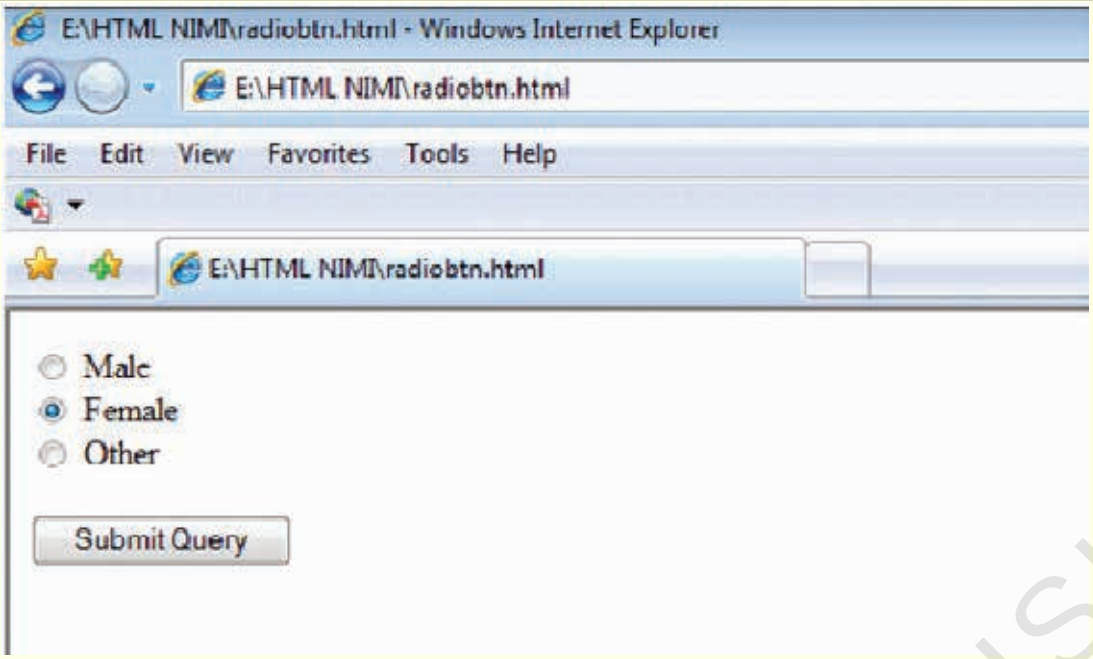


TASK 10 : **Insert Radio button in Web page**.

1 Type the following program in Notepad file and save it as RADIOBTN.HTML

```
<!DOCTYPE html>
<html>
<body>
<form action="/action_page.php">
<input type="radio" name="gender" value="male" > Male<br>
<input type="radio" name="gender" value="female" checked> Female<br>
<input type="radio" name="gender" value="other"> Other<br><br>
<input type="submit">
</form>
</body>
</html>
```

Output



— — — — — —

TASK 11: **Design a webpage adding flash file, audio and video files**

1 Type the following program in Notepad file and save it as FLASH.HTML

```
<!DOCTYPE html>
<html>
<body>
<object width="300" height="300" data="panda.swf">
</object>
</body>
</html>
```

Note: As SWF file is an animation created with Adobe Flash that can be played by Flash Player or with a web browser that has the Flash plug in installed. It may contain text, vector and raster graphics and interactive content written in Ac- tion Script.

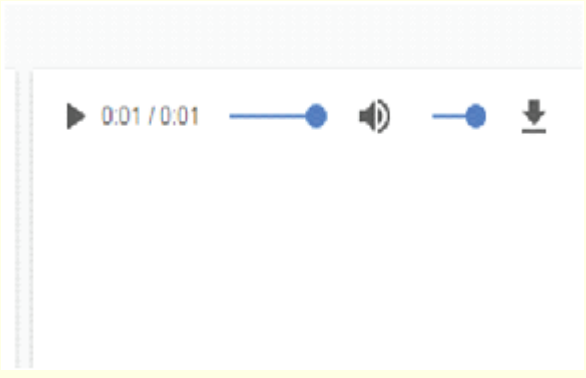
Output

Program

1 Type the following program in Notepad file and save it as AUDIO.HTML

```
<!DOCTYPE html>
<html>
<body>
<audio controls>
<source src="horse.ogg" type="audio/ogg">
<source src="horse.mp3" type="audio/mpeg">
Your browser does not support the audio element.
</audio>
</body>
</html>
```

Output



Program

```
<!DOCTYPE html>
<html>
<body>
<video width=”320” height=”240” controls>
<source src=”C:\Users\mdc5\Downloads\Beautiful Nature.mp4” type=”video/mp4”>
<source src=”movie.ogg” type=”video/ogg”> Your browser does not support the video tag.
</video>
</body>
</html>
```

Output

Note: Currently, there are 3 supported video formats for the <video> element: MP4, WebM, and Ogg:

- **MP4 = MPEG 4 files with H264 video codec and AAC audio codec**
- **WebM = WebM files with VP8 video codec and Vorbis audio codec**
- **Ogg = Ogg files with Theora video codec and Vorbis audio codec**

Element	Chrome	IE	Firefox	Safari	Opera
<video>	4.0	9.0	10.5	4.0	10.5

— — — — — —

TASK 12: **Design webpage with forms and form controls using HTML Tags**

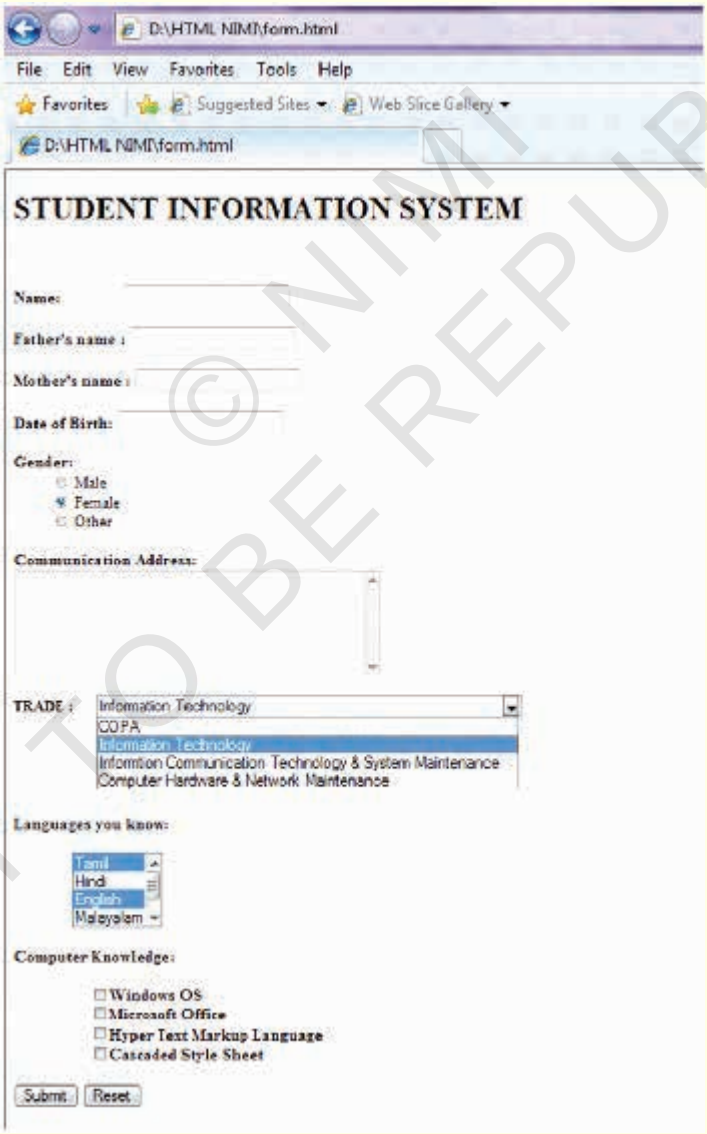
Program

```
<!DOCTYPE html>
<html>
<body>
<form action=”/action_page.php”>
<h1> STUDENT INFORMATION SYSTEM</H1>
<br><br>
<b>Name:</b>       <input type=”text” name=”name”><br><br>
<b>Father’s name :</b> <input type=”text” name=”fname”><br><br>
<b>Mother’s name :</b> <input type=”text” name=”mname”><br><br>
<b>Date of Birth:</b>
<input type=”date” name=”bday”><br><br>
<b>Gender:</b> <br>
    <input type=”radio” name=”gender” value=”male” > Male <br>     <input type=”radio” name=”gender” value=”female” checked> Female<br>
    <input type=”radio” name=”gender” value=”other”> Other<br><br>
<b>Communication Address:<br>
<textarea rows=”6” cols=”50”>
</textarea><br><br>
<b>TRADE :</b>  
<select name=”trade”>
<option value=”t1”>COPA</option>
<option value=”t2” selected>Information Technology</option>
<option value=”t3”>Informtion Communication Technology & System Maintenance</option>
<option value=”t4”>Computer Hardware & Network Maintenance</option>
</select>
<br><br><br><br><br><br>
<b>Languages you know:</b><BR><br>     
<SELECT NAME=”language” MULTIPLE>
<OPTION VALUE=”tamil”SELECTED>Tamil
<OPTION VALUE=”hindi”>Hindi
<OPTION VALUE=”english” SELECTED>English
<OPTION VALUE=”malayalam”>Malayalam
<OPTION VALUE=”kannada”>Kannada
</SELECT>
```

```
<br><br>
<b>Computer Knowledge:</b><br><br>        
<input type="checkbox" name="software1" value="windows">Windows OS
<br>
       
<input type="checkbox" name="software2" value="msoffice">Microsoft Office
<br>
       
<input type="checkbox" name="software3" value="html">Hyper Text Markup Language
<br>
       
<input type="checkbox" name="software4" value="css">Cascaded Style Sheet
<br>
<br>
<input type="submit" value="Submit">
<input type="reset">
</form>
</body>
</html>
```

Note: - adds a single space   - adds two spaces   - adds four spaces

Output



Create simple static web pages using CSS

Objectives: At the end of this exercise you shall be able to
- **display a text message using HTML program**
- **display a paragraph using HTML program.**

Requirements

Tools/Equipment/Machines

- A Working PC with windows OS - 1 No.

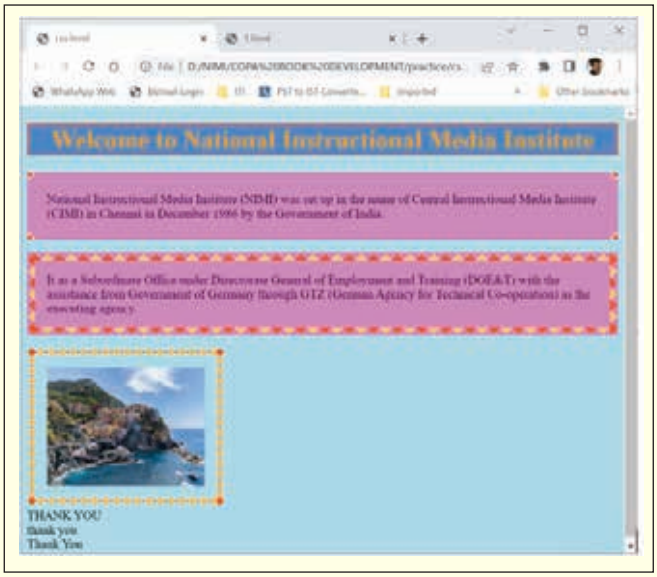
PROCEDURE

TASK 1: **CSS syntax, Adding colors, fonts, backgrounds, images borders, text alignment, text transformation, Lists etc**

Program:

```
<!DOCTYPE html>
<html>
<head>
    <!-- Style of h1 selector for color, text-align, background and border -->
    <!-- Style of p selector for Paragraph -->
    <!-- Style of body selector for body -->
    <!-- Style of bordering selector for border image -->
    <!-- Style of div selector for text-transform -->
  <style>
   h1    {color: Orange;
          text-align: center;
          background-color:DodgerBlue;
          border: 2px solid Tomato;}
   p {background-color:Violet}
   body{  background-color: lightblue;}
   #borderimg1 {
   border: 10px solid transparent;
          padding: 15px;
   border-image: url(border.png) 50 round;}
   #borderimg2 {
          border: 10px solid transparent;
          padding: 15px;
   border-image: url(border.png) 20% round;}
   #borderimg3 {
          border: 10px solid transparent;
          padding: 15px;
          border-image: url(border.png) 30% round; }
     div.a {  text-transform: uppercase;}
     div.b {  text-transform: lowercase;}
     div.c {  text-transform: capitalize;}
    </style>
</head>
<body>
    <h1>Welcome to National Instructional Media Institute</h1>
    <p id="borderimg1"> National Instructional Media Institute (NIMI) was set up in the name of Central Instructional Media Institute (CIMI) in Chennai in December 1986 by the Government of India.</p>
    <p id="borderimg2"> It as a Subordinate Office under Directorate General of Employment and Training (DGE&T) with the assistance from Government of Germany through GTZ (German Agency for Technical Co-operation) as the executing agency. </p>
    <img id="borderimg3" src="1.jpg" alt="Mountains" width="300" height="200">
    <div class="a">Thank You </div>
    <div class="b">Thank You </div>
    <div class="c">Thank You </div>
</body>
</html>
```

Output:



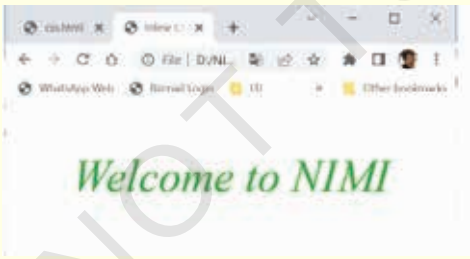
TASK 2: **3 types of CSS**

Inline CSS

Inline CSS contains the CSS property in the body section attached with element is known as inline CSS

```
<!DOCTYPE html>
<html>
  <head>
    <title>Inline CSS</title>
  </head>
  <body>
    <p style = “color:#009900; font-size:50px;
          font-style:italic; text-align:center;”>
       Welcome to NIMI
    </p>
  </body>
</html>
```

Output:

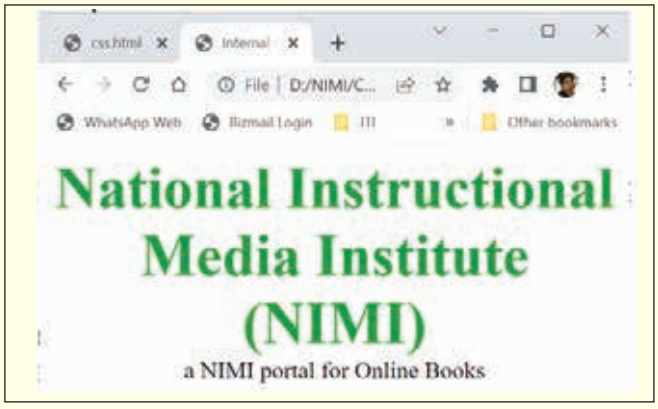


Internal or Embedded CSS

This can be used when a single HTML document must be styled uniquely. The CSS rule set should be within the HTML file in the head section.

```
<!DOCTYPE html>
<html>
   <head>
        <title>Internal CSS</title>
        <style>
                .a {
                        text-align:center;
                  }
                .b{
                        color:#009900;
                        font-size:50px;
                        font-weight:bold;
                  }
                .c {
                        font-style:bold;
                        font-size:20px;
                  }
        </style>
   </head>
   <body>
        <div class = “a”>
<div class =”b”>National Instructional Media Institute
   (NIMI) </div>
                <div class =”c”>
                        a NIMI portal for Online Books
                </div>
        </div>
   </body>
</html>
```

Output:



External CSS

External CSS contains separate CSS file which contains only style property with the help of tag attributes. CSS property written in a separate file with .css extension and should be linked to the HTML document using link tag. This means that for each element, style can be set only once and that will be applied across web pages.

Example: The file given below contains CSS property. This file save with .css extension. For Ex: sty.css

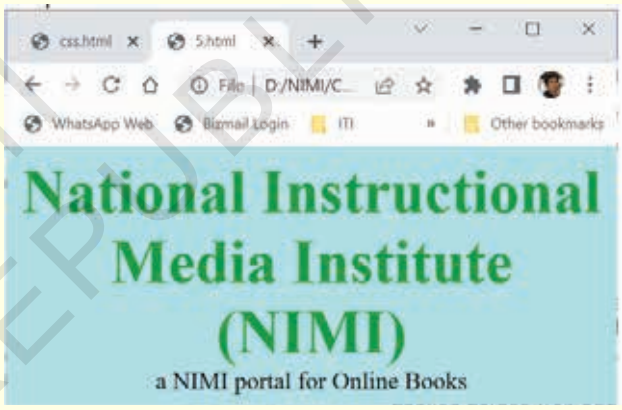
```
body {  background-color:powderblue;}
.a {    text-align:center;   }
.b {
   color:#009900;
   font-size:50px;
   font-weight:bold;}
#c {
   font-style:bold;
   font-size:20px;}
```

- link tag is used to link the external style sheet with the html webpage.
- href attribute is used to specify the location of the external style sheet file.

Main Program

```
<!DOCTYPE html>
<html>
   <head>
        <link rel=”stylesheet” href=”sty.css”/>
   </head>
   <body>
        <div class = “a”>
             <div class =”b”>National Instructional
   Media Institute (NIMI)</div>
             <div id =”c”>
                  a NIMI portal for Online Books
             </div>
        </div>
   </body>
</html>
```

Output:



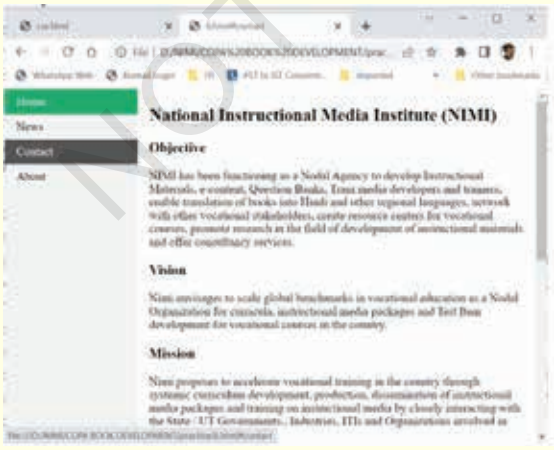
TASK 3: **Adding a Navigation Bars(vertical/horizontal bars)**

Vertical Bar Menu:

```
<!DOCTYPE html>
<html>
<head>
<style>
body {
margin: 0;
}
ul {
list-style-type: none;
margin: 0;
padding: 0;
width: 25%;
background-color: #f1f1f1;
position: fixed;
height: 100%;
  overflow: auto;
}
li a {
  display: block;
  color: #000;
  padding: 8px 16px;
  text-decoration: none;
}
li a.active {
  background-color: #04AA6D;
  color: white;
}
li a:hover:not(.active) {
  background-color: #555;
  color: white;
}
```

```
</style>
</head>
<body>
<ul>
 <li><a class=”active” href=”#home”>Home</a></li>
 <li><a href=”#news”>News</a></li>
 <li><a href=”#contact”>Contact</a></li>
 <li><a href=”#about”>About</a></li>
</ul>
   <div style=”margin-left:25%;padding:1px 16px;height:1000px;”>
  <h2>National Instructional Media Institute (NIMI)</h2>
 <h3>Objective</h3>
 <p>NIMI has been functioning as a Nodal Agency to develop Instructional Materials, e-content, Question Banks, Train media developers and trainers, enable translation of books into Hindi and other regional languages, network with other vocational stakeholders, create resource centers for vocational courses, promote research in the field of development of instructional materials and offer consultancy services.</p>
 <h3>Vision</h3>
  <p>Nimi envisages to scale global benchmarks in vocational education as a Nodal
        Organization for curricula, instructional media packages and Test Item development for vocational courses in the country.</p>
 <h3>Mission</h3>
 <p>Nimi proposes to accelerate vocational training in the country through systemic
   curriculum development, production, dissemination of instructional media packages and training on instructional media by closely interacting with the State / UT Governments., Industries, ITIs and Organizations involved in Vocational Training.</p>
</div>
</body>
</html>
```

Output:

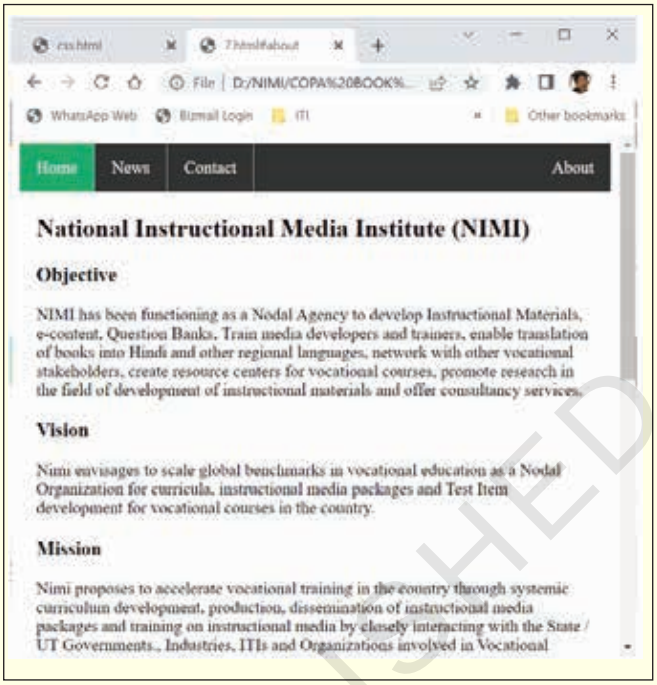


horizontal bar Menu:

```
   <!DOCTYPE html>
   <html>
   <head>
   <style>
   ul {
    list-style-type: none;
    margin: 0;
   padding: 0;
   overflow: hidden;
   background-color: #333;
   }
   li {
float: left;
     border-right:1px solid #bbb;
   }
   li:last-child {
         border-right: none;
   }
   li a {
   display: block;
   color: white;
   text-align: center;
   padding: 14px 16px;
   text-decoration: none;
   }
   li a:hover:not(.active) {
   background-color: #111;
   }
   .active {
   background-color: #04AA6D;
   }
   </style>
   </head>
   <body>
   <ul>
 <li><a class=”active” href=”#home”>Home</a></li>
 <li><a href=”#news”>News</a></li>
 <li><a href=”#contact”>Contact</a></li>
  <li style=”float:right”><a href=”#about”>About</a></li>
   </ul>
<div style=”margin-left:0%;padding:1px 16px;height:1000px;”>
  <h2>National Instructional Media Institute (NIMI)</h2>
 <h3>Objective</h3>
 <p>NIMI has been functioning as a Nodal Agency to develop Instructional Materials, e-content, Question Banks, Train media developers and trainers, enable translation of books into Hindi
```

```
and other regional languages, network with other vocational stakeholders, create resource centers for vocational courses, promote research in the field of development of instructional materials and offer consultancy services.</p>
<h3>Vision</h3>
<p>Nimi envisages to scale global benchmarks in vocational education as a Nodal
Organization for curricula, instructional media packages and Test Item development for vocational courses in the country.</p>
<h3>Mission</h3>
<p>Nimi proposes to accelerate vocational training in the country through systemic
curriculum development, production, dissemination of instructional media packages and training on instructional media by closely interacting with the State / UT Governments., Industries, ITIs and Organizations involved in
Vocational Training.</p>
</div>
</body>
</html>
```

Output:



— — — — — —

TASK 4: **CSS drop downs & Forms**

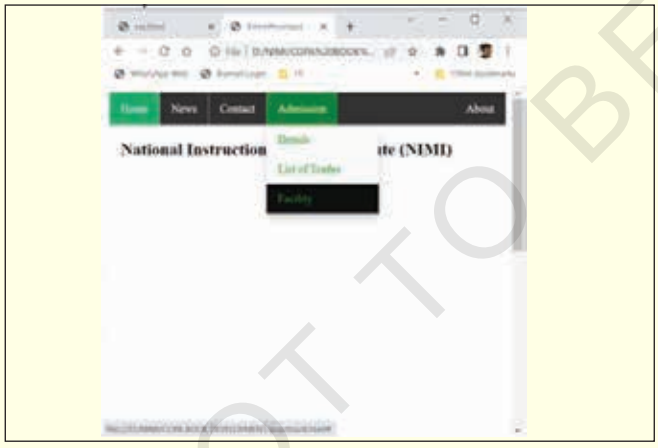
From the Task3 adding drop Downs

Program:

```
<!DOCTYPE html>
<html>
<head>
<style>
ul {
list-style-type: none;
margin: 0;
padding: 0;
overflow: hidden;
background-color: #333;
}
li {
float: left;
border-right:1px solid #bbb;
}
li:last-child {
border-right: none;
}
li a {
display: block;
color: white;
text-align: center;
padding: 14px 16px;
text-decoration: none;
}
li a:hover:not(.active) {
background-color: #111;
}
.active {
background-color: #04AA6D;
}
li a:hover, .dropdown:hover .dropbtn {
background-color: green;
}
li.dropdown {
display: inline-block;
}
.dropdown-content {
display: none;
position: absolute;
background-color: #f9f9f9;
min-width: 160px;
box-shadow: 0px 8px 16px 0px rgba(0,0,0,0.2);
z-index: 1;
}
.dropdown-content a {
color: green;
padding: 12px 16px;
text-decoration: none;
display: black;
text-align: left;
}
```

```
.dropdown-content a:hover {background-color: #f1f1f1;
}
.dropdown:hover .dropdown-content {
 display: block;
}
</style>
</head>
<body>
<ul>
 <li><a class=”active” href=”#home”>Home</a></li>
 <li><a href=”#news”>News</a></li>
 <li><a href=”#contact”>Contact</a></li>
  <li style=”float:right”><a href=”#about”>About</a></
   li>
 <li class=”dropdown”>
                          <a href=”javascript:void(0)”
   class=”dropbtn”>Admission</a>
  <div class=”dropdown-content”>
    <a href=”#”>Details</a>
    <a href=”#”>List of Trades</a>
    <a href=”#”>Facility</a>
</ul>
   <divstyle=”margin-left:0%;padding:1px
   16px;height:1000px;”>
  <h2>National Instructional Media Institute (NIMI)</
   h2>
</div>
</body>
</html>
```

Output:



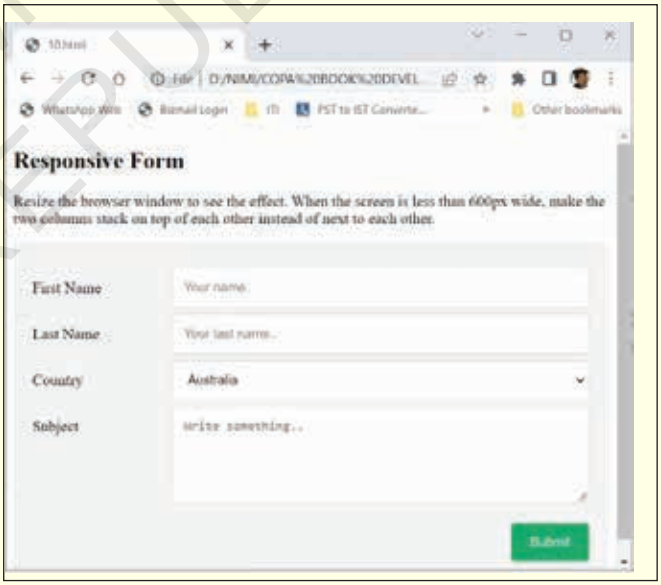
CSS Form:

Program:

```
<!DOCTYPE html>
<html>
<head>
<style>
* {
  box-sizing: border-box;
}
input[type=text], select, textarea {
  width: 100%;
  padding: 12px;
  border: 1px solid #ccc;
  border-radius: 4px;
  resize: vertical;
}
label {
  padding: 12px 12px 12px 0;
  display: inline-block;
}
input[type=submit] {
  background-color: #04AA6D;
  color: white;
  padding: 12px 20px;
  border: none;
  border-radius: 4px;
  cursor: pointer;
  float: right;
}
input[type=submit]:hover {
  background-color: #45a049;
}
.container {
  border-radius: 5px;
  background-color: #f2f2f2;
  padding: 20px;
}
.col-25 {
  float: left;
  width: 25%;
  margin-top: 6px;
}
.col-75 {
  float: left;
  width: 75%;
  margin-top: 6px;
}
/* Clear floats after the columns */
.row:after {
  content: “”;
  display: table;
  clear: both;
}
/* Responsive layout - when the screen is less than
    600px wide, make the two columns stack on top of
    each other instead of next to each other */
@media screen and (max-width: 600px) {
  .col-25, .col-75, input[type=submit] {
    width: 100%;
```

```
  margin-top: 0;
 }
}
</style>
</head>
<body>
<h2>Responsive Form</h2>
   <p>Resize the browser window to see the effect. When the screen is less than 600px wide, make the two columns stack on top of each other instead of next to each other.</p>
<div class="container">
 <form action="/action_page.php">
 <div class="row">
  <div class="col-25">
   <label for="fname">First Name</label>
  </div>
  <div class="col-75">
      <input type="text" id="fname" name="firstname" placeholder="Your name..">
  </div>
 </div>
 <div class="row">
  <div class="col-25">
   <label for="lname">Last Name</label>
  </div>
  <div class="col-75">
      <input type="text" id="lname" name="lastname" placeholder="Your last name..">
  </div>
 </div>
 <div class="row">
  <div class="col-25">
   <label for="country">Country</label>
  </div>
  <div class="col-75">
   <select id="country" name="country">
    <option value="australia">Australia</option>
    <option value="canada">Canada</option>
    <option value="usa">USA</option>
   </select>
  </div>
 </div>
 <div class="row">
  <div class="col-25">
   <label for="subject">Subject</label>
  </div>
  <div class="col-75">
      <textarea id="subject" name="subject" placeholder="Write something.." style="height:100px"></textarea>
  </div>
 </div>
 <br>
 <div class="row">
  <input type="submit" value="Submit">
 </div>
 </form>
</div>
</body>
</html>
```

Output:



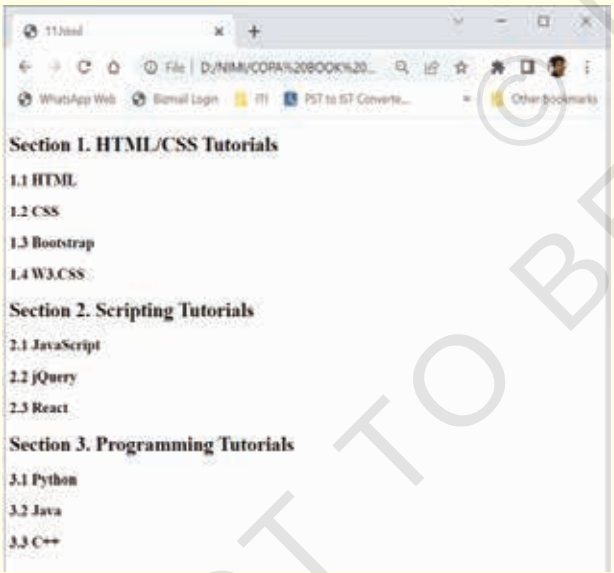
TASK 5: **CSS counters and website layout, Multiple backgrounds & Putting the stylesheet in a separate file**

CSS counters

```
<!DOCTYPE html>
<html>
<head>
<style>
body {
 counter-reset: section;
}
h1 {
 counter-reset: subsection;
}
h1::before {
 counter-increment: section;
 content: "Section " counter(section) ". ";
```

```
  }
  h2::before {
counter-increment: subsection;
content: counter(section) "." counter(subsection) " ";
  }
  </style>
  </head>
  <body>
  <h1>HTML/CSS Tutorials</h1>
  <h2>HTML</h2>
  <h2>CSS</h2>
  <h2>Bootstrap</h2>
  <h2>W3.CSS</h2>
  <h1>Scripting Tutorials</h1>
  <h2>JavaScript</h2>
  <h2>jQuery</h2>
  <h2>React</h2>
  <h1>Programming Tutorials</h1>
  <h2>Python</h2>
  <h2>Java</h2>
  <h2>C++</h2>
  </body>
  </html>
```

Output:



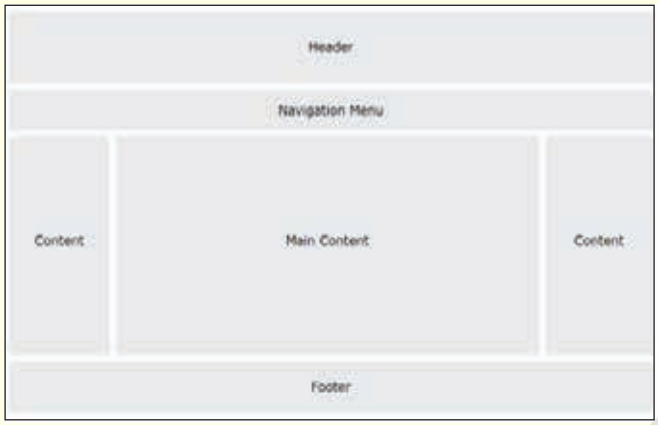
CSS website layout

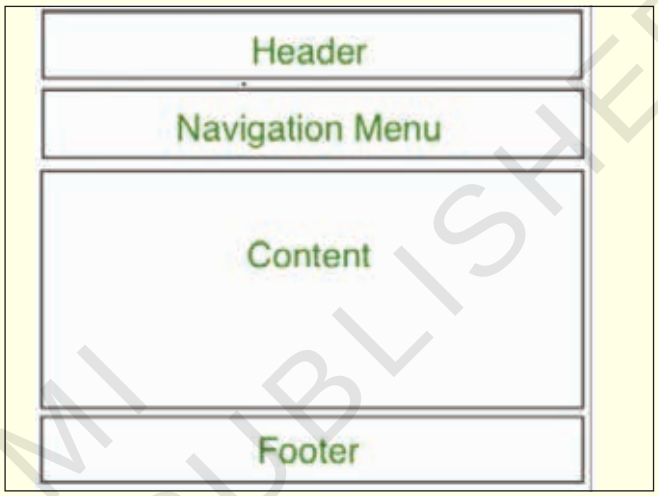
A website is often divided into headers, menus, content and a footer:

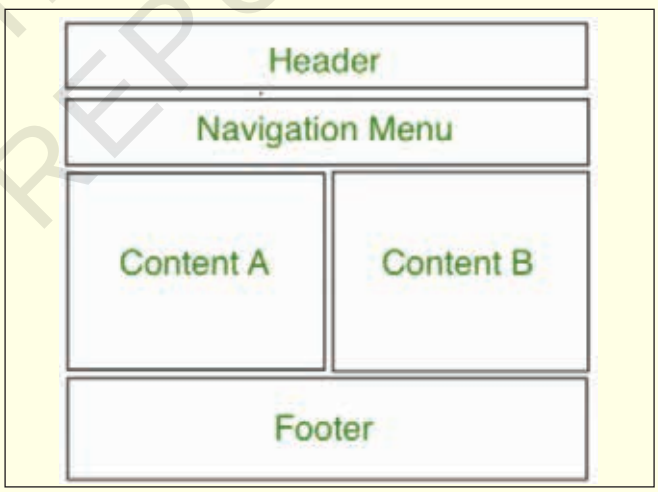
Content Section: The content section is the main body of the website. The user can divide content section in n-column layout.

The most common layouts are:

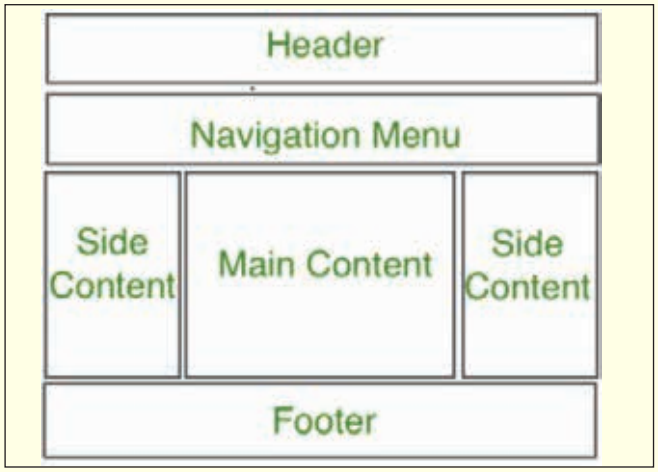
- 1-Column Layout: It is mostly used for mobile layout.
- 2-Column Layout: This website layout is mostly used for tablets or laptops.







- 3-Column Layout: This website layout is mostly used for desktops.



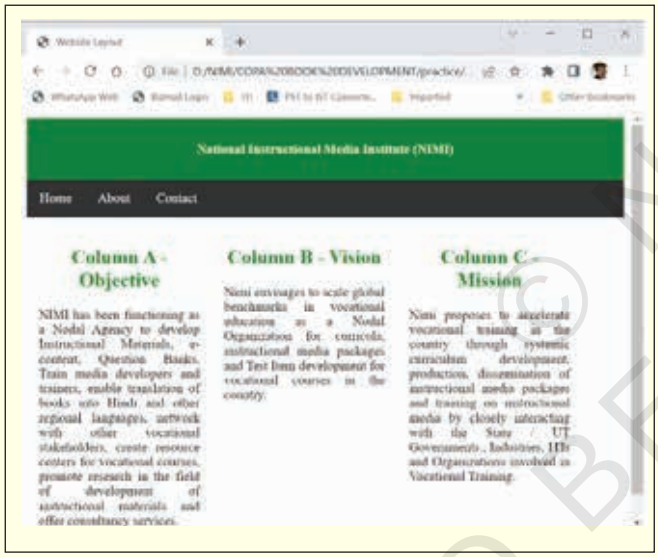
The user can also create a responsive layout where the layout will get changed as per screen size. Consider the below example where if width of screen is more than 600px then there will be 3-column layout and if width of screen is between 400px to 600px then there will be 2-column layout and if screen size less than 400px then 1-column layout will display.

Program:

```
<!DOCTYPE html>
<html>
  <head>
    <title>
      Website Layout
    </title>
    <style>
      * {
        box-sizing: border-box;
      }

      /* CSS property for header section */
      .header {
        background-color: green;
        padding: 15px;
        text-align: center;
      }

      /* CSS property for navigation menu */
      .nav_menu {
        overflow: hidden;
        background-color: #333;
      }
      .nav_menu a {
        float: left;
        display: block;
        color: white;
        text-align: center;
        padding: 14px 16px;
        text-decoration: none;
      }
      .nav_menu a:hover {
        background-color: white;
        color: green;
      }
      /* CSS property for content section */
      .columnA, .columnB, .columnC {
        float: left;
        width: 31%;
        padding: 15px;
        text-align:justify;
      }
      h2 {
        color:green;
        text-align:center;
      }
      /* Media query to set website layout
      according to screen size */
      @media screen and (max-width:600px)
{
        .columnA, .columnB, .columnC
{
          width: 50%;
        }
      }
    @media screen and (max-width:400px) {
      .columnA, .columnB, .columnC {
        width: 100%;
      }
      }
    </style>
</head>
<body>
    <!-- header of website layout -->
    <div class = “header”>
      <h2 style = “color:white;font-
size:100%”>
        National Instructional Media
Institute (NIMI)
      </h2>
    </div>
    <!-- navigation menu of website layout -->
    <div class = “nav_menu”>
      <a href = “#”>Home</a>
      <a href = “#”>About</a>
      <a href = “#”>Contact</a>
    </div>
    <!-- Content section of website layout -->
    <div class = “row”>

      <div class = “columnA”>
        <h2>Column A - Objective</
h2>
<p>NIMI has been functioning as a Nodal Agency to develop Instructional Materials, e-content, Question Banks, Train media developers and trainers, enable translation of books into Hindi and other regional languages, network with other vocational stakeholders, create resource centers for vocational courses, promote research in the field of development of instructional materials and offer consultancy services.</p>
      </div>
      <div class = “columnB”>
```

```
                <h2>Column B - Vision</h2>
                <p>Nimi envisages to scale global benchmarks in vocational education as a Nodal Organization for curricula, instructional media packages and Test Item development for vocational courses in the country.</p>
            </div>
            <div class = “columnC”>
                <h2>Column C - Mission</h2>
    <p>Nimi proposes to accelerate vocational training in the country through systemic curriculum development, production, dissemination of instructional media packages and training on instructional media by closely interacting with the State / UT Governments., Industries, ITIs and Organizations involved in Vocational Training.</p>
            </div>
        </div>
    </body>
</html>
```

Output:



Multiple backgrounds & Putting the stylesheet in a separate file

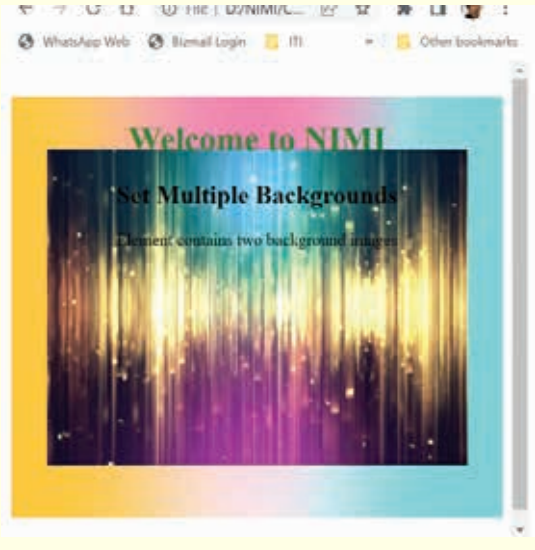
Multiple Background CSS properties created as separate file: Save the file as stys.css

```
body {
        text-align:center;
    }
    h1 {
        color: green;
    }
    #GFG {
        background-image:
        url(3.jpg),
        url(2.jpg);
        background-position: center, center;
        background-repeat: no-repeat, no-repeat;
        background-size: 400px 300px, 500px 400px;
        padding:25px;
        height:400px;
    }
```

Main Program:

```
<!DOCTYPE html>
<html>
<head>
    <link rel=”stylesheet” href=”stys.css”/>
</head>
<body>
    <div id = “GFG”>
        <h1>Welcome to NIMI</h1>
        <h2>Set Multiple Backgrounds</h2>
        <p>
        Element contains two background images
        </p>
    </div>
</body>
</html>
```

Output:



TASK 6: **CSS Animations & CSS Buttons**

CSS Animations

Example1:

```
<!DOCTYPE html>
<html>
<head>
   <style>
   #a {
         animation-name: color;
         animation-duration: 10s;
         padding-top: 30px;
         padding-bottom: 30px;
         font-family: Times New Roman;
         }
   #a1{
         animation-name: text;
         animation-duration: 5s;
         animation-iteration-count: infinite;
   }
   #b {
         font-size: 40px;
         text-align: center;
         font-weight: bold;
         color: #090;
         padding-bottom: 5px;
   }
   #c {
         font-size: 17px;
         font-weight: bold;
         text-align: center;
   }
   @keyframes color {
         0% {
                  background-color: red;
         }
         50% {
                  background-color: orange;
         }
         100% {
                  background-color: green;
         }
   }

   @keyframes text {
         from {
         margin-top: 400px;
         }
         to {
         margin-top: 0px;
         }
   </style>
</head>

<body>
   <div id="a1">
         <div id="a">
         <div id="b">Welcome to NIMI</div>
         <div id="c">a NIMI portal for Online Books</
   div>
         </div>
   </div>
</body>
</html>
```

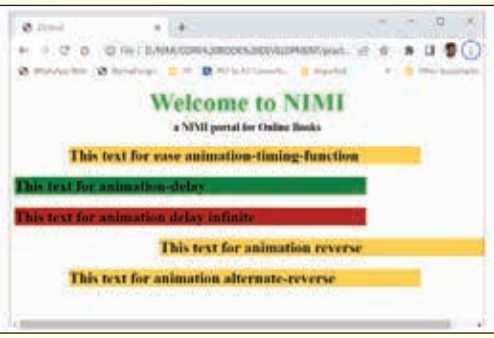
Output:

Example 2

```
<!DOCTYPE html>
<html>
<head>
   <style>
   .a {
         font-size: 40px;
         text-align: center;
         font-weight: bold;
         color: #090;
         padding-bottom: 5px;
         font-family: Times New Roman;
   }
   .b {
         font-size: 17px;
         font-weight: bold;
         text-align: center;
         font-family: Times New Roman;
   }
   h2 {
         width: 550px;
         animation-name: text;
         animation-duration: 4s;
         animation-iteration-count: infinite;
```

```
        background-color: rgb(255, 210, 85);
    }
    #one {
        animation-timing-function: ease;
    }
    #two {
        animation-name: color;
        animation-duration: 10s;
    }
    #three {
        animation-name: color;
        animation-duration: 2s;
        animation-iteration-count: infinite;
    }
    #four {
        animation-direction: reverse;
    }
    #five {
         animation-direction: alternate-reverse;
    }
    @keyframes text {
        from {
                margin-left: 100%;
        }
        to {
                margin-left: 0%;
        }
    }
    @keyframes color {
        from {
         background-color: red;
        }
        to {
        background-color: green;
        }
    </style>
</head>
<body>
    <div class="a">Welcome to NIMI</div>
    <div class="b">a NIMI portal for Online Books</div>
    <h2 id="one">This text for ease animation-timing-
    function</h2>
    <h2 id="two">This text for animation-delay</h2>
    <h2 id="three">This text for animation delay infinite</
    h2>
    <h2 id="four">This text for animation reverse</h2>
    <h2 id="five">This text for animation alternate-
    reverse</h2>
</body>
</html>
```

Output:



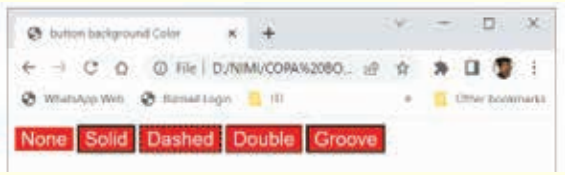
CSS Buttons

Example1:

```
<!DOCTYPE html>
<html>
<head>
    <title> button background Color </title>
    <style>
    .button {
        background-color: red;
        color: white;
        text-align: center;
        font-size: 20px;
    }
    .b1 {
        /* Set border property */
        border: none;
    }
    .b2 {
        /* Set border property */
        border: 2px black solid;
    }
    .b3 {
        /* Set border property */
        border: 2px black dashed;
    }
    .b4 {
        /* Set border property */
        border: 2px black double;
    }
    .b5 {
        /* Set border property */
        border: 2px black groove;
    }
    </style>
</head>
<body>
    <button class="button b1">None</button>
    <button class="button b2">Solid</button>
    <button class="button b3">Dashed</button>
```

```
    <button class="button b4">Double</button>
    <button class="button b5">Groove</button>
</body>
</html>
```

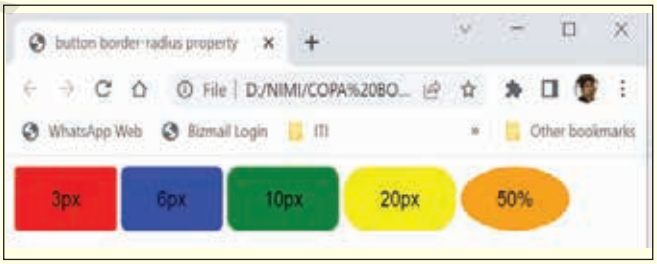
Output:



Example 2:

```
<!DOCTYPE html>
<html>
<head>
    <title> button border-radius property </title>
    <style>
    .b {
        padding: 15px 32px;
        border: none;
        font-size: 16px;
    }

    .b1 {
        background-color: red;
        border-radius: 3px;
    }

    .b2 {
        background-color: blue;
        border-radius: 6px;
    }

    .b3 {
        background-color: green;
        border-radius: 10px;
    }

    .b4 {
        background-color: yellow;
        border-radius: 20px;
    }

    .b5 {
        background-color: orange;
        border-radius: 50%;
    }
    </style>
</head>

<body>
    <button class="b b1">3px </button>
    <button class="b b2">6px</button>
    <button class="b b3">10px</button>
    <button class="b b4">20px</button>
    <button class="b b5">50%</button>
</body>
</html>
```

Output:



Practicing the JavaScript in creating dynamic HTML pages

Objectives: At the end of this exercise you shall be able to
- **create javascript code in the <Head > section of HTML page**
- **create javascript code in the <Body > section of HTML page**
- **create javascript code in the <Head > and <Body> section of HTML page**
- **create and run sample JavaScript code.**

PROCEDURE

TASK 1 : **Create Javasscript code in the <Head > section of HTML page**

Note to instructor : To run JavaScript, any modern browser should be installed as all modern browser can run JavaScript by default.

1 Open Notepad.

2 Type the following code.

```
<html>
<head>
<script>
function myFunction() {
document.write("hello");
document.write(" world");
}
</script>
</head>
<body>
<h1>My Web Page</h1>
<button type="button" onclick="myFunction()">Try it</button>
</body>
</html>
```

3 Click Save.

4 Type filename as page1.html.

5 Select file type as All Files.

6 Select destination in Desktop or any other location. Click Save.

7 Close Notepad.

8 Now go to the file destination.

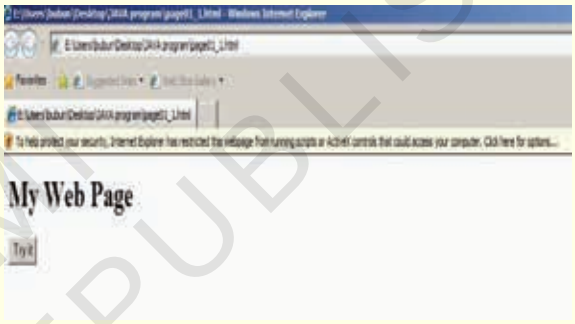
9 Double Click it to run.

10 Browser can show you a warning. (Fig 1)

11 If warning is shown, click yellow warning bar.

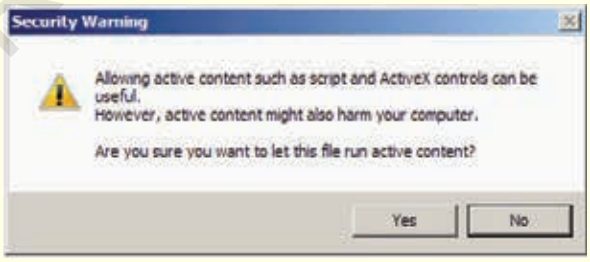
12 Select Allow Blocked Content.

Fig 1



13 A security warning can be shown (Fig 2).

Fig 2

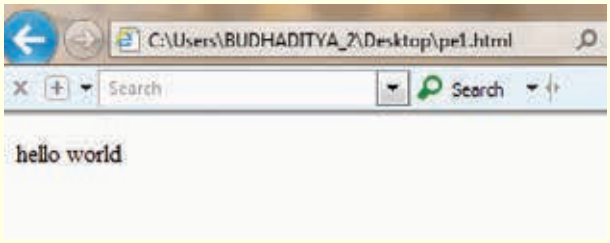


14 Click yes.

15 Now click "Try it" to run the javascript code in the page.

16 Hello World would be shown as output. (Fig 3).

Fig 3



TASK 2 : **Create Javasscript code in the <Body > section of HTML page**

1 Write and save following code and save with access.html.

```
<html>
<body>
<p id="p1">Hello World!</p>
<script>
document.getElementById("p1").innerHTML = "New text!";
</script>
</body>
</html>
```

2 Run it by double clicking this file name.

3 It will show the following output.

New text!

— — — — — — — —

TASK 3: **Create JavaScript code in the <Head> and <Body> section of an HTML page.**

1 Create and run the following JavaScript code.

```
<!DOCTYPE html>
<head>
<title> Script in head and body section </title>
<script type = “text/javascript”>
document.writeln(“Good Morning”);
</script>
</head>
<body>
<script type = “text/javascript”>
alert(“Good Evening”);
</script>
</body>
</html>
```

2 Run the code and check the output.

— — — — — — — —

TASK 4: **Create and run sample JavaScript code.**

1 Create and run the following JavaScript code.

```
<!DOCTYPE html>
<html>
<body>
<h1 id="header">Old Header</h1>
<script>
var element = document.getElementById("header");
element.innerHTML = "New Header";
</script>
</body>
</html>
```

2 Create and run the following JavaScript code.

```
<!DOCTYPE html>
<html>
<body>
<img id="myImage" src="smiley.gif">
<script>
document.getElementById("myImage").src= "landscape.jpg";
</script>
</body>
</html>
```

3 Change the Value of an Attribute

To change the value of an HTML attribute, use this syntax:

document.getElementById(id).**attribute=new value**

— — — — — — — —

Embed JavaScript in HTML to Display Information in Web pages

Objectives: At the end of this exercise you shall be able to
- **use external javascript files in HTML**
- **display information with javascript.**

PROCEDURE

TASK 1 : **Using external JavaScript files in HTML**

1 Open Notepad.

2 Type the following code.

```
function myFunction() {
document.write("hello");
document.write(" world");
}
```

3 Click Save.

4 Type filename as myscript.js.

5 Select file type as All Files.

6 Select destination in Desktop or any other location. Click Save.

7 Close Notepad.

8 Open Notepad again.

9 Type the following code. (Fig 2)

```
<html>
<head>
<script type="text/javascript" src=" myscript.js"> </script>
</head>
<body>
<h1>My Web Page</h1>
<button type="button" onclick="myFunction()">Try it</button>
</body>
</html>
```

10 Click Save.

11 Type filename as js2102.html

12 Select file type as All Files.

13 Select destination in Desktop or any other location. Click Save.

14 Close Notepad.

15 Now go to the file destination.

16 Double Click it to run.

17 See the output as shown in Fig 1 & Fig 2.

Fig 1

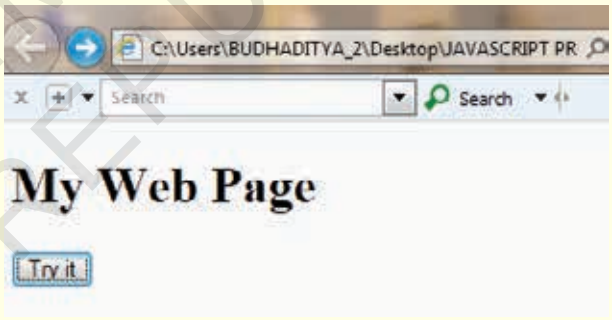
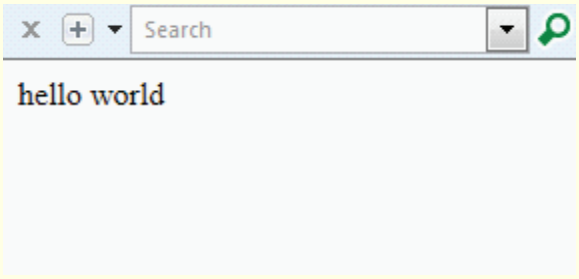


Fig 2

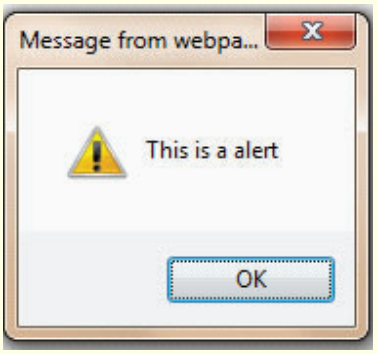


TASK 2 : **Display information with JavaScript**

1 Write the code and save it with jc21021.html.

```
<html>
<head>
<title>A Web page</title>
<script type="text/javascript">
function anotherAlert(textAlert) {
alert(textAlert);
}
anotherAlert("This is a alert");
</script>
<body>
<h1>Web Page with Alert</h1>
</body>
</html>
```

Fig 3



2 Run the code and see the output.(Fig 3)

— — — — — — — —

Use error handling techniques in JavaScript

Objectives: At the end of this exercise you shall be able to
- **use try-catch in JavaScript**
- **use finally in JavaScript**
- **use throw in JavaScript**
- **use onerror() method in JavaScript.**

PROCEDURE

TASK 1: **Use try-catch in javascript**

1 Open Notepad

2 Type the following code

```
<html>
<head>
<script type="text/javascript">
 function myFunc()
{
var a = 100;
try {
alert("Value of variable a is : " + a );
 }
catch ( e ) {
alert("Error: " + e.description );
}
}
</script>
</head>
<body>
<p>Click the following to see the result:</p>
<form>
<input type="button" value="Click Me"
onclick="myFunc();" />
</form>
</body>
</html>
```

3 Click Save

4 Type filename as ErrorHandling1.html

5 Select file type as All Files.

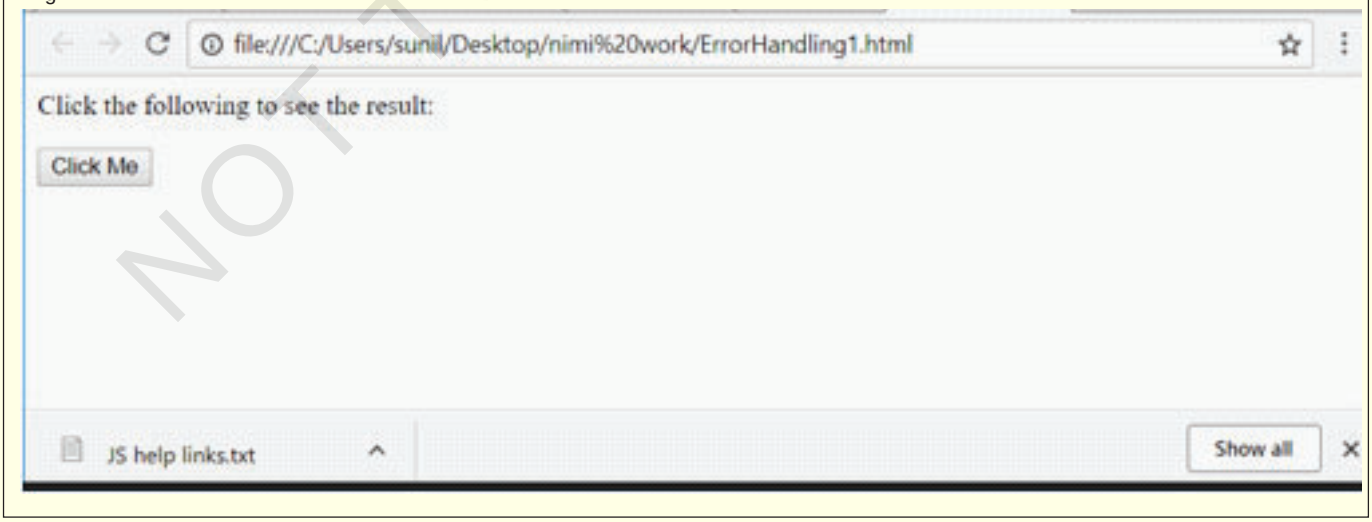
6 Select desktop or any other location. Click Save

7 Close Notepad

8 Now run the html file to see the result(fig-1)

9 Click the Click Me button(fig-2)

Fig 1



TASK 2: **Use finally in javascript**

1 Open Notepad

2 Type the following code

```
<html>
<head>
<script type="text/javascript">
function myFunc()
{
var a = 100;
try {
alert("Value of variable a is : " + a );
}
 catch ( e ) {
alert("Error: " + e.description );
}
finally {
alert("Finally block will always execute!" );
}
}
</script>
</head>
<body>
<p>Click the following to see the result:</p>
<form>
<input type="button" value="Click Me"
onclick="myFunc();" />
</form>
</body>
 </html>
```

3 Click Save

4 Type filename as ErrorHandling2.html

5 Select file type as All Files.

6 Select desktop or any other location. Click Save

7 Close Notepad

8 Now run the html file to see the result (Fig-3)

9 Click on Click Me button (Fig-4)

Fig 3

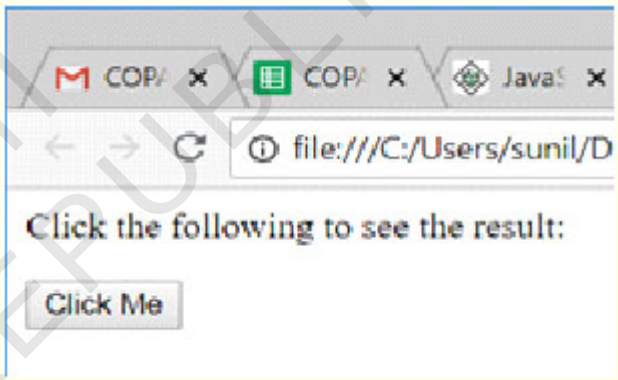
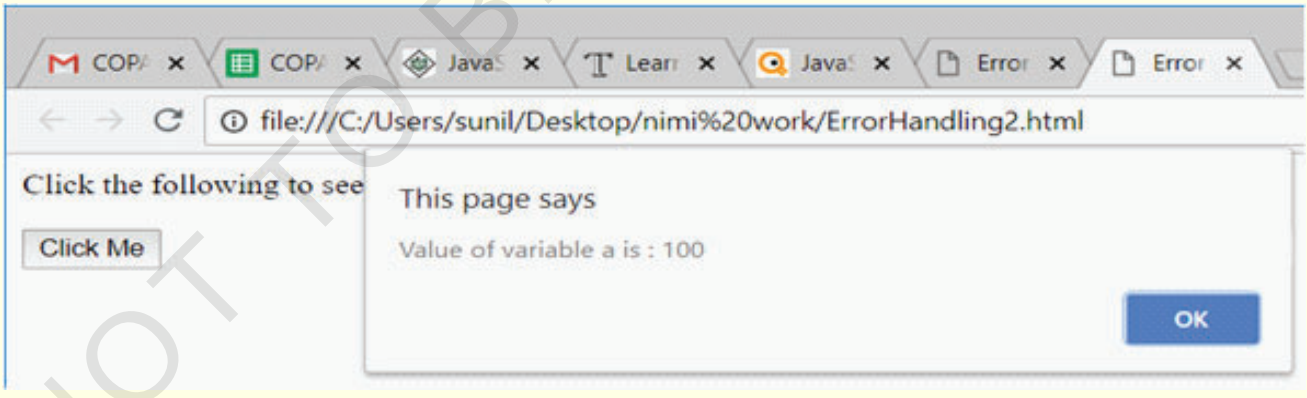


Fig 4



— — — — — — — —

TASK 3: Use throw in javascript

1 Open Notepad

2 Type the following code

```
<html>
<head>
<script type=”text/javascript”>
 function myFunc()
{
var a = 100;
var b = 0;
try{
if ( b == 0 )
{
throw( “Divide by zero error.” );
}
else
{
 var c = a / b;
}
}
catch ( e ) {
alert(“Error: “ + e );
}
}
```

```
</script>
</head>
<body>
<p>Click the following to see the result:</p>
<form>
<input type=”button” value=”Click Me”
onclick=”myFunc();” />
</form>
</body>
</html>
```

3 Click Save

4 Type filename as ErrorHandling3.html

5 Select file type as All Files.

6 Select desktop or any other location. Click Save

7 Close Notepad

8 Now run the html file to see the result (Fig-5)

9 Click the Click Me button (Fig-6)

Fig 5

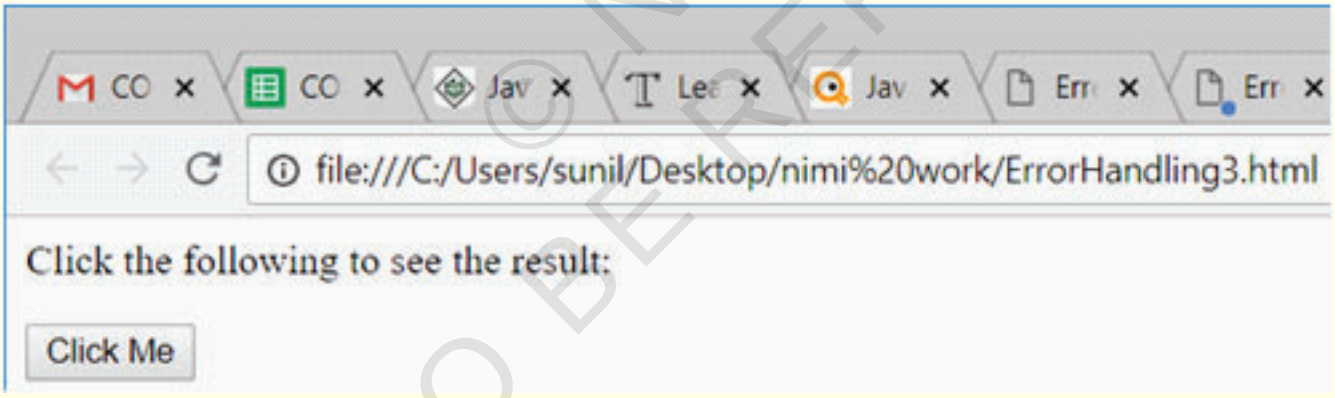
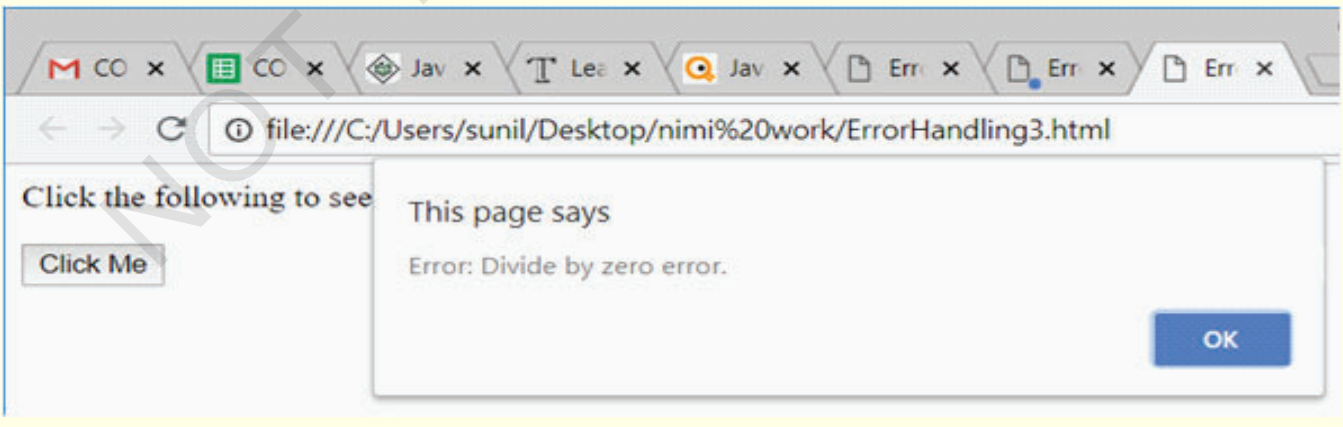


Fig 6



TASK 4: **Use onerror() Method in javascript**

1 Open Notepad

2 Type the following code

```
<html>
 <head>
 <script type="text/javascript">
  window.onerror = function () {
alert("An error occurred.");
}
</script>
</head>
 <body>
<p>Click the following to see the result:</p>
<form>
<input type="button" value="Click Me"
onclick="myFunc();" />
</form>
</body>
</html>
```

3 Click Save

4 Type filename as ErrorHandling4.html

5 Select file type as All Files.

6 Select desktop or any other location. Click Save

7 Close Notepad

8 Now run the html file to see the result (Fig-7)

9 Click the Click Me button (Fig-8)

Fig 7

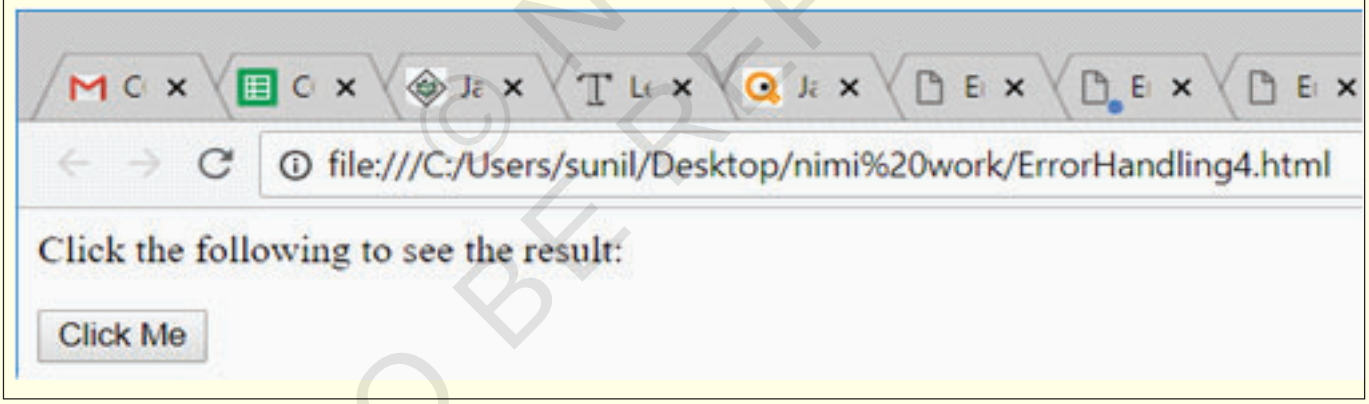
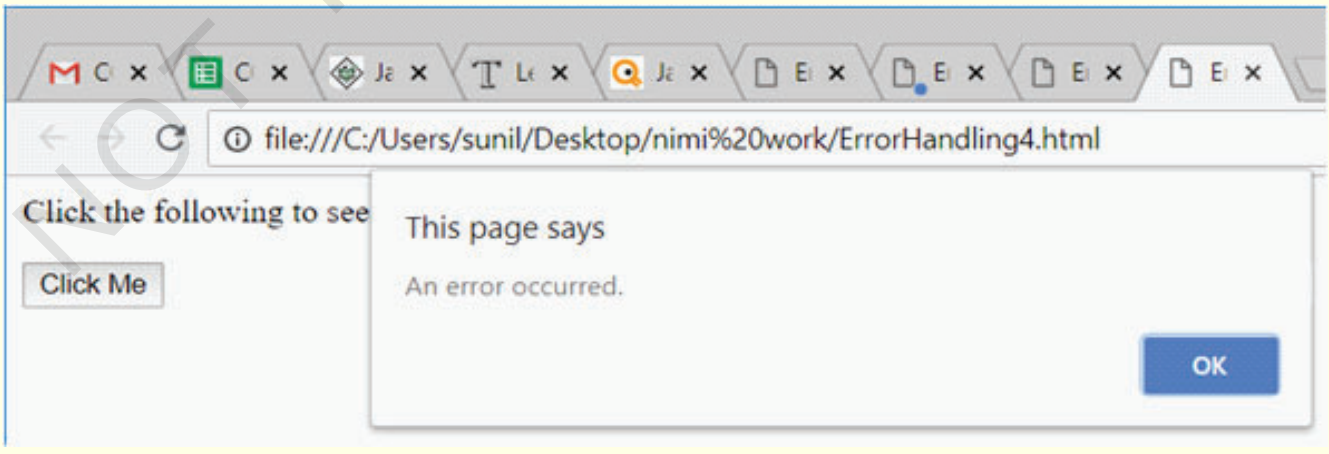


Fig 8



Use objects and classes in JavaScript

Objectives: At the end of this exercise you shall be able to
- **display add two numbers using function**
- **take input using prompt function**
- **take confirmation using confirm method**
- **using global variable.**

PROCEDURE

TASK 1 : **Display add two numbers using function**

1 Open Notepad.

2 Type the following code.

```
<html>
<head>
<title>Adder</title>
<script>
var a=4;
var b=6;
var c=add(a,b);
alert(c);
function add(a,b) {
return a+b;
}
</script>
</head>
<body>
</body>
</html>
```

3 Click Save.

4 Type filename as add1.html

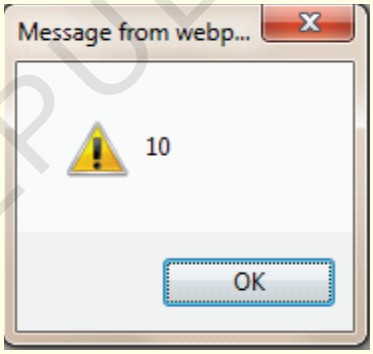
5 Select file type as All Files.

6 Select destination in Desktop or any other location. Click Save.

7 Close Notepad.

8 Now run the html file to see the result. (See Fig 1)

Fig 1



TASK 2: **Take input using prompt function**

1 Open Notepad.

2 Type the following code.

```
<html>
<head>
<title>Prompt</title>
<script>
var a=prompt("Enter a Number:");
var b=prompt("Enter another Number:");
var ch=+prompt("1->Add 2->Sub 3->Mul 4->Div Enter Choice:");
var r=0,fl=0;
switch(ch) {
case 1:
r=add(a,b);
break;
case 2:
r=sub(a,b);
break;
case 3:
r=mul(a,b);
break;
case 4:
r=div(a,b);
break;
```

```
default:
fl=1;
}
if(fl)
document.write("Invalid choice");
else
document.write("Result is "+r);
function add(a,b) {
return a+b;
}
function sub(a,b) {
return a-b;
}
function mul(a,b) {
return a*b;
}
function div(a,b) {
return a/b;
}
</script>
</head>
<body>
</body>
</html>
```

3 Click Save.

4 Type filename as calcul1.html

5 Select file type as All Files.

6 Select destination in Desktop or any other location. Click Save.

7 Close Notepad.

8 Now run the html file to see the result. (Fig 2 to Fig 5)

Fig 2

Fig 3

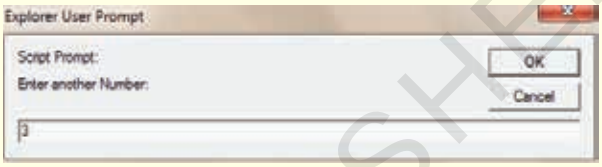


Fig 4

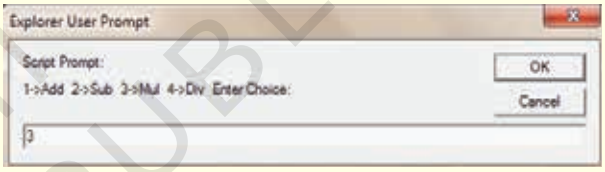
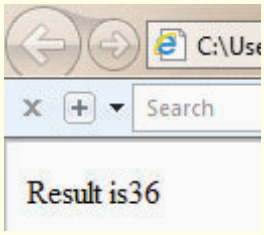


Fig 5



TASK 3 : **Take confirmation using confirm method**

1 Open Notepad.

2 Type the following code.

```
<html>
<head>
<title>Confirm</title>
<script>
var a=confirm("Want to play a game?");
if(a)
document.write("We will play a game now!");
else
document.write("May be next time");
</script>
</head>
<body>
</body>
</html>
```

3 Click Save.

4 Type filename as conf1.html

5 Select file type as All Files.

6 Select destination in Desktop or any other location. Click Save.

7 Close Notepad.

8 Now run the html file to see the result. (Fig 6 to Fig 8)

If Ok is selected.

If cancel is selected

Fig 6

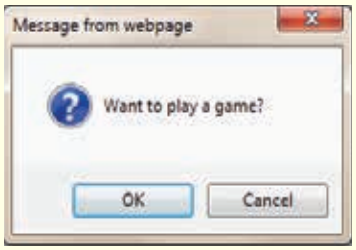


Fig 7

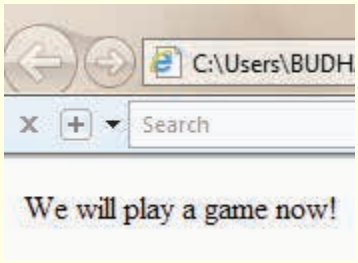
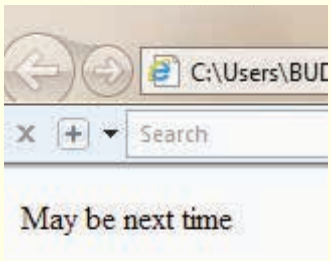


Fig 8



TASK 4 : **Using global variable**

1 Open Notepad.

2 Type the following code.

```
<html>
<body>
<script>
function m()
{
window.value=100;//declaring global variable by window object
}
function n(){
alert(value);//accessing global variable from other function
}
m();
n();
</script>
</body>
</html>
```

3 Click Save.

4 Type filename as vari1.html

5 Select file type as All Files.

6 Select destination in Desktop or any other location. Click Save.

7 Close Notepad.

8 Now run the html file to see the result. (Fig 9)

Fig 9

Describe Animation and Multimedia using JavaScript

Objectives: At the end of this exercise you shall be able to
- **manual Animation**
- **automated Animation**
- **rollover with a Mouse Event.**

PROCEDURE

TASK 1 : **Manual Animation**

1 Open notepad.

2 Type the following code

```
<html>
  <head>
    <title>JavaScript Animation</title>
    <script type = "text/javascript">
      <!--
        var imgObj = null;

        function init() {
          imgObj = document.getElementById('myImage');
          imgObj.style.position= 'relative';
          imgObj.style.left = '0px';
        }
        function moveRight() {
          imgObj.style.left = parseInt(imgObj.style.left) + 10 + 'px';
        }

        window.onload = init;
      //-->
    </script>
  </head>

  <body>
    <form>
      <img id = "myImage" src = "/images/html.gif" />
      <p>Click button below to move the image to right</p>
      <input type = "button" value = "Click Me" onclick = "moveRight();" />
    </form>
  </body>
</html>
```

3 Click save

4 Type filename as animation1.html

5 Select file type as all files

6 Select destination in desktop or other location. Click save

7 Close Notepad

8 Now run the html file to see the result (see Fig 1)

Output

Fig 1

TASK 2: **Automated Animation**

1 Open notepad.

2 Type the following code

```
<html>
  <head>
    <title>JavaScript Animation</title>
    <script type = "text/javascript">
      <!--
        var imgObj = null;
        var animate ;

        function init() {
          imgObj = document.getElementById('myImage');
          imgObj.style.position= 'relative';
          imgObj.style.left = '0px';
        }
        function moveRight() {
          imgObj.style.left = parseInt(imgObj.style.left) + 10 + 'px';
          animate = setTimeout(moveRight,20);    // call moveRight in 20msec
        }
        function stop() {
          clearTimeout(animate);
          imgObj.style.left = '0px';
        }

        window.onload = init;
      //-->
    </script>
  </head>

  <body>
    <form>
      <img id = "myImage" src = "/images/html.gif" />
      <p>Click the buttons below to handle animation</p>
      <input type = "button" value = "Start" onclick = "moveRight();" />
      <input type = "button" value = "Stop" onclick = "stop();" />
    </form>
  </body>

</html>
```

3 Click save

4 Type filename as animation2.html

5 Select file type as all files

6 Select destination in desktop or other location. Click save

7 Close Notepad

8 Now run the html file to see the result (see Fig 2)

Output

Fig 2

TASK 3: **Rollover with a Mouse Event**

1 Open notepad.

2 Type the following code

```
<html>

  <head>
    <title>Rollover with a Mouse Events</title>

    <script type = "text/javascript">
      <!--
        if(document.images) {
          var image1 = new Image();      // Preload an image
          image1.src = "/images/html.gif";
          var image2 = new Image();      // Preload second image
          image2.src = "/images/http.gif";
        }
      //-->
    </script>
  </head>

  <body>
    <p>Move your mouse over the image to see the result</p>

    <a href = "#" onMouseOver = "document.myImage.src = image2.src;"
      onMouseOut = "document.myImage.src = image1.src;">
      <img name = "myImage" src = "/images/html.gif" />
    </a>
  </body>
</html>
```

3 Click save

4 Type filename as animation3.html

5 Select file type as all files

6 Select destination in desktop or other location. Click save

7 Close Notepad

8 Now run the html file to see the result (see Fig:3)

Output

Fig 3

Develop dynamic HTML pages using JavaScript

Objectives: At the end of this exercise you shall be able to
- **learn how to develop dynamic HTML Pages using JavaScript.**

Requirements

Tools/Equipment/Machines

- A working PC with Windows O.S., Text Editor (Notepad) & Browser - 1 No./batch.

PROCEDURE

TASK 1: **HTML Java script**

1 Open Notepad.

2 Type the following code.

```
<HTML>
<head>
<title>
Method of a JavaScript
</title>
</head>
<body>
<script type="text/javascript">
document.write("JavaTpoint");
</script>
</body>
</html>
```

3 Click Save.

4 Type filename as page1.html.

5 Select file type as All Files.

6 Select destination in Desktop or any other location. Click Save.

7 Close Notepad.

8 Now go to the file destination.

9 Double Click it to run.

10 Browser can show you a warning.

11 If warning is shown, click yellow warning bar.

12 Select Allow Blocked Content.

13 A security warning can be shown.

14 Click yes.

15 Now click "Try it" to run the javascript code in the page.

16 Hello World would be shown as output.

Output:

— — — — — — — —

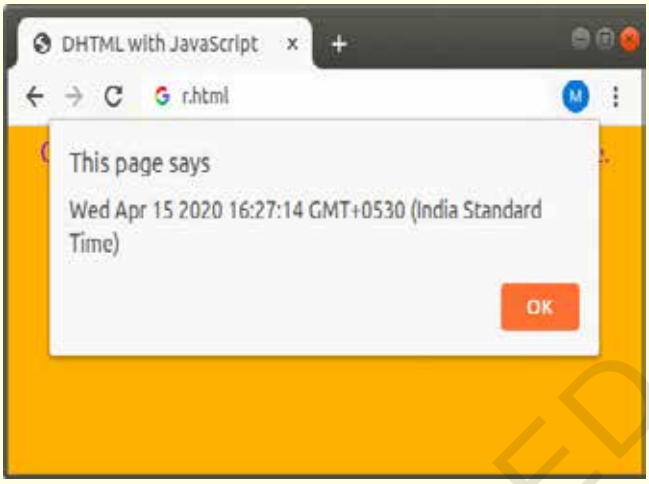
TASK 2: **JavaScript and HTML event**

Ref Steps 1 to 16 - Task 1

```
<html>
<head>
<title>
DHTML with JavaScript
</title>
<script type="text/javascript">
function dateandtime()
{
```

```
alert(Date());
}
</script>
</head>
<body bgcolor="orange">
<font size="4" color="blue">
<center> <p>
Click here # <a href="#" onClick="dateandtime();">
Date and Time </a>
# to check the today's date and time.
</p> </center>
</font>
</body>
</html>
```

Output:

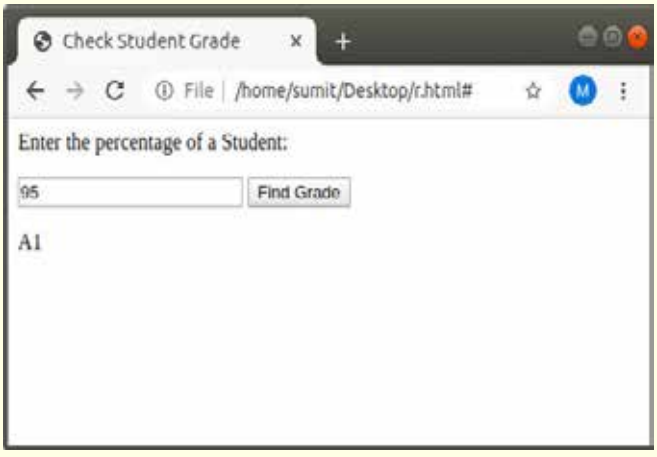


TASK 3: **JavaScript and HTML DOM**

Ref Steps 1 to 16 - Task 1

```
<html>
<head>
<title> Check Student Grade
</title>
</head>

<body>
<p>Enter the percentage of a Student:</p>
<input type="text" id="percentage">
<button type="button" onclick="checkGrade()">
Find Grade
</button>
<p id="demo"></p>
<script type="text/javascript">
function checkGrade() {
var x,p, text;
p = document.getElementById("percentage").value;

x=parseInt(p);



 if (x>90 && x <= 100) {
 document.getElementById("demo").innerHTML =
"A1";
 } else if (x>80 && x <= 90) {
 document.getElementById("demo").innerHTML =
"A2";
 } else if (x>70 && x <= 80) {
 document.getElementById("demo").innerHTML =
"A3";
 }
          }
 </script>
 </body>
 </html>
```

Output:

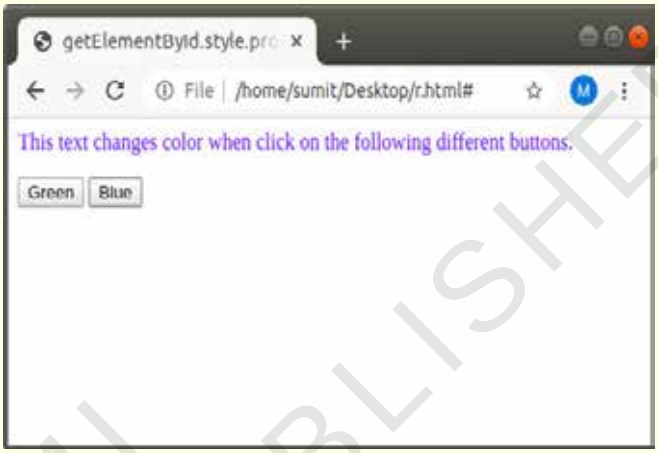


TASK 4: **CSS with JavaScript in DHTML**

Ref Steps 1 to 16 - Task 1

```
<html>
<head>
<title>
getElementById.style.property example
</title>
</head>
<body>
<p id="demo"> This text changes color when click on the following different buttons. </p>
<button onclick="change_Color('green');"> Green </button>
<button onclick="change_Color('blue');"> Blue </button>
<script type="text/javascript">


function change_Color(newColor) {
var element = document.get ElementById ('demo').style.color = newColor;
}
</script>
</body>
</html>
```

Output:



— — — — — — — —

TASK 5: **DHTML CSS**

Ref Steps 1 to 16 - Task 1

```
<html>
<head>
<title>
Changes current HTML element
</title>
</head>
<body>
<center>
<h1 onclick="this.style.color='blue'"> This is a JavaTpoint Site </h1>
<center>
</body>
</html>
```

Output:

— — — — — — — —

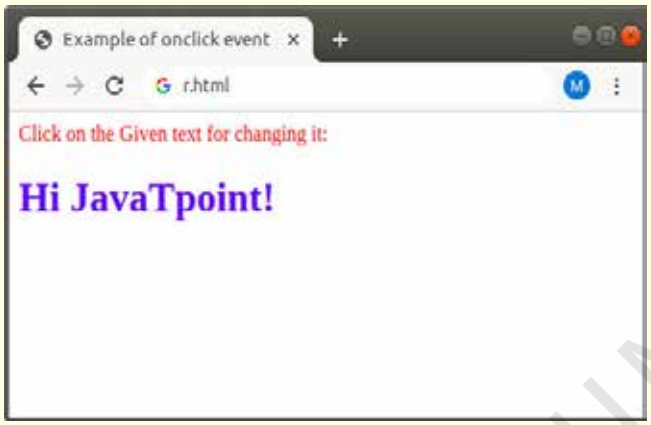
TASK 6: **DHTML Events**

Ref Steps 1 to 16 - Task 1

```
<html>
<head>
<title>
Example of onclick event
</title>
<script type="text/javascript">
function ChangeText(ctext)
{
ctext.innerHTML=" Hi JavaTpoint! ";
}
```

```
</script>
</head>
<body>
<font color="red"> Click on the Given text for changing it: <br>
</font>
<font color="blue">
<h1 onclick="ChangeText(this)"> Hello World! </h1>
</font>
</body>
</html>
```

Output:




```
<html>
<head>
<title>
Example of onsubmit event
</title>
</head>
<body>
<form onsubmit="Submit_Form()">
<label> Enter your name: </label>
<input type="text">
<label> Enter your Roll no: </label>
<input type="Number">
<input type="submit" value="submit">
</form>
<script type="text/javascript">
function Submit_Form()
{
alert(" Your form is submitted");
}
</script>
</body>
</html>
```

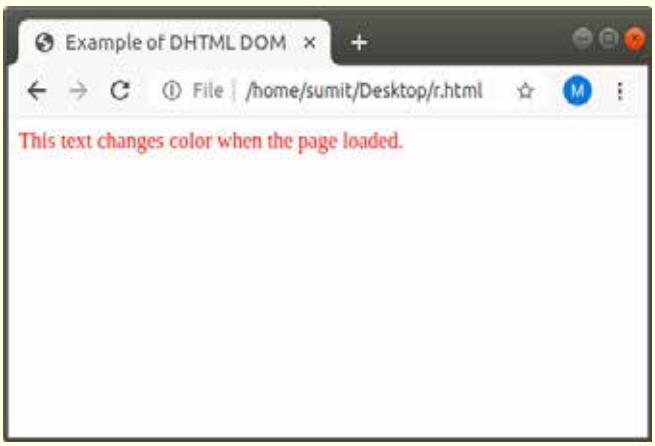
Output:

TASK 7: **DHTML DOM**

Ref Steps 1 to 16 - Task 1

```
<html>
<head>
<title>
Example of DHTML DOM
</title>
</head>
<body>
<font color = "blue">
<p id="demo"> This text changes color when the page loaded. </p>
</font>
<script type="text/javascript">
document.getElementById('demo').style.color = "red";
</script>
</body>
</html>
```

Output:



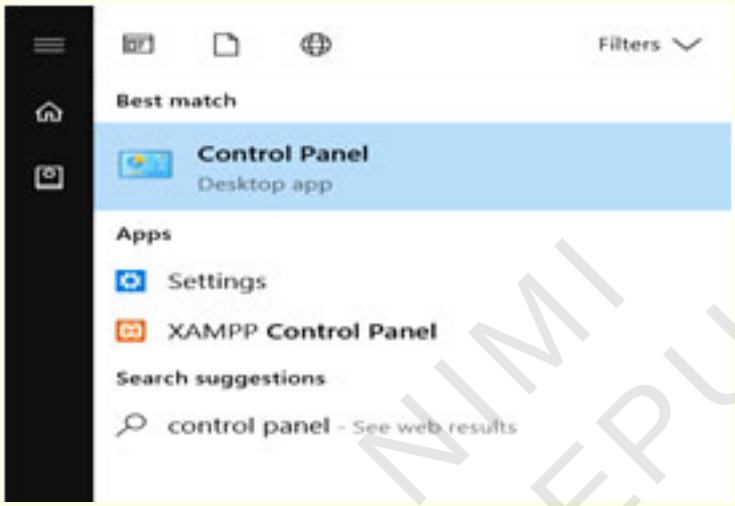
Deploy web project using IIS

Objectives: At the end of this exercise you shall be able to
- **configure IIS in Windows 10 Operating System**
- **publish website on IIS locally**
- **publish Web site in IIS.**

PROCEDURE

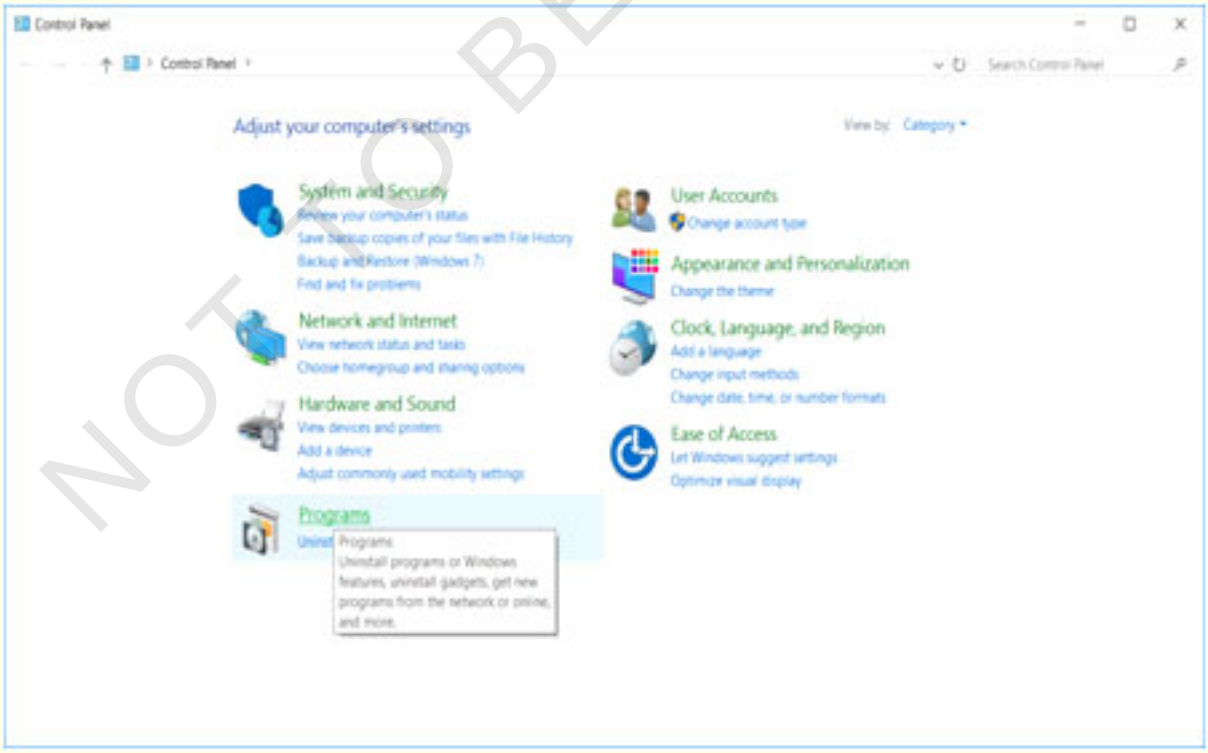
TASK 1 : **Configure IIS in Windows 10 Operating System**

Fig 1



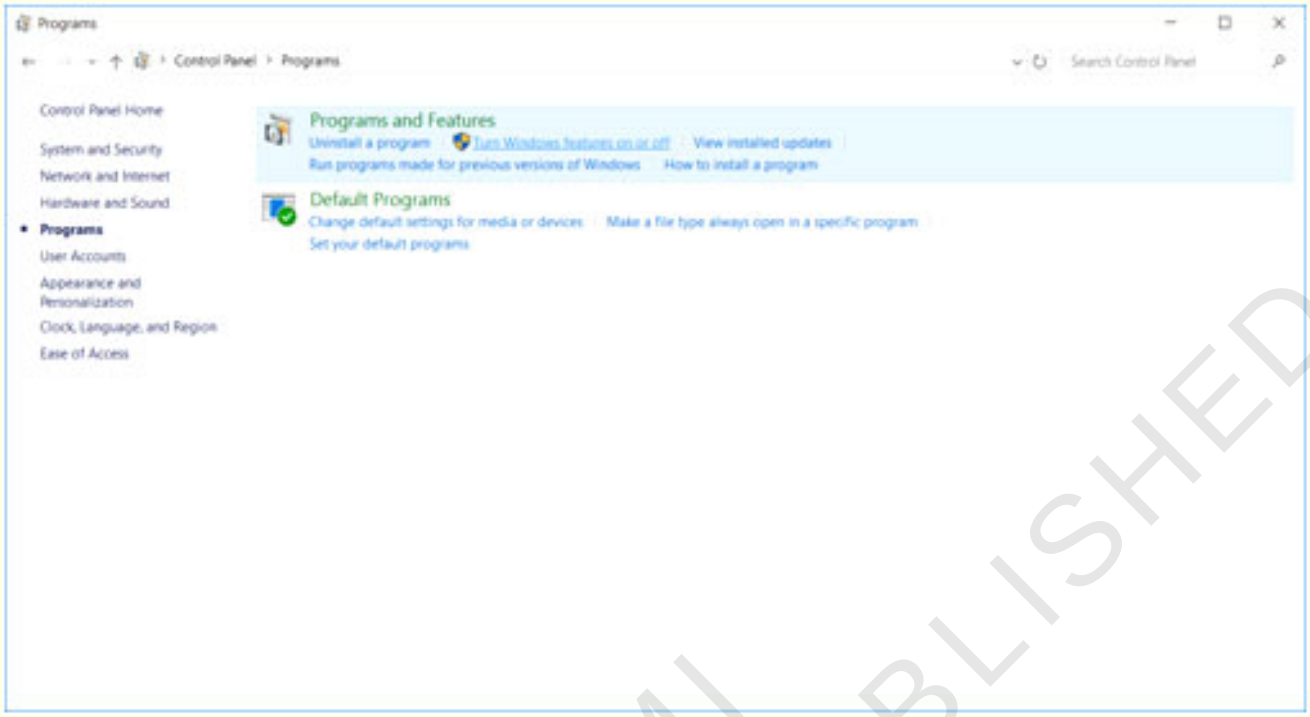
1 Click Programs (Fig 2)

Fig 2



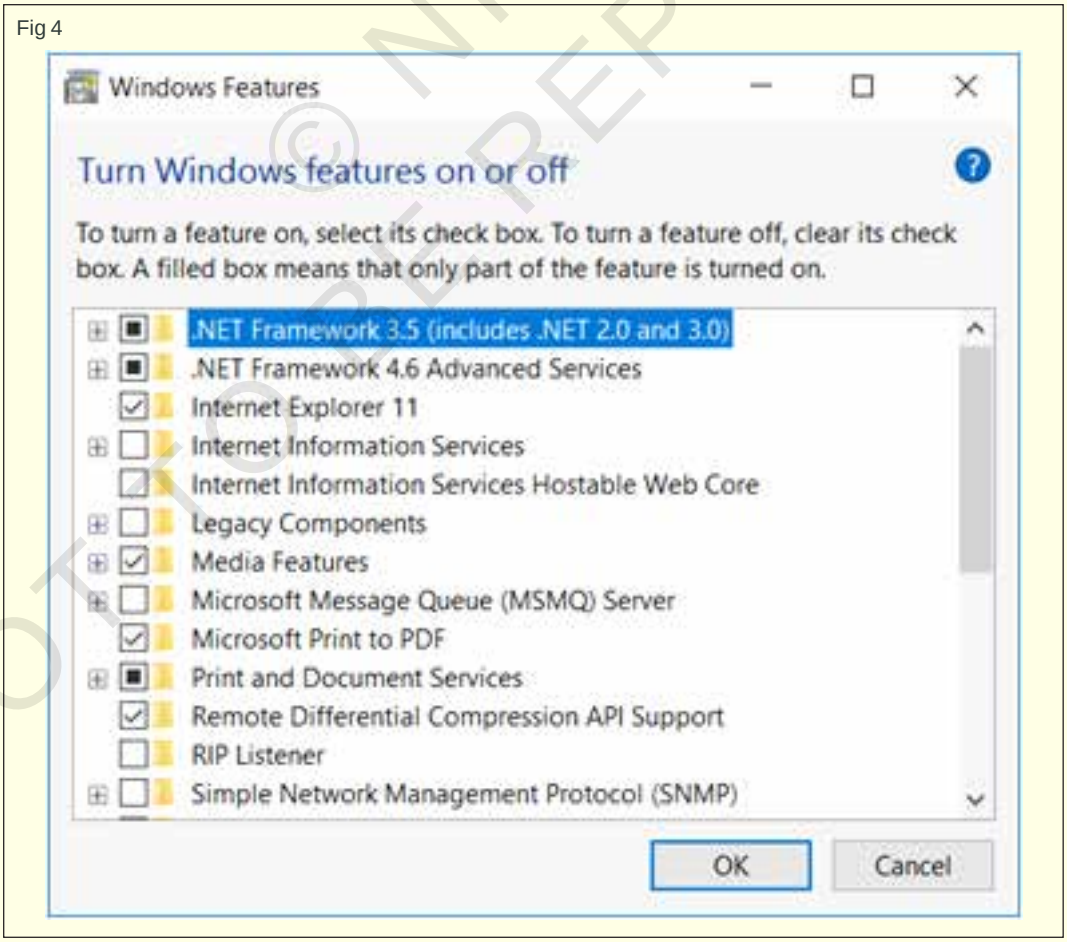
2 Click Turn Window features on or off (Fig 3)

Fig 3



3 Check the Internet Information Services and its related features in the New popup window(Fig 4)

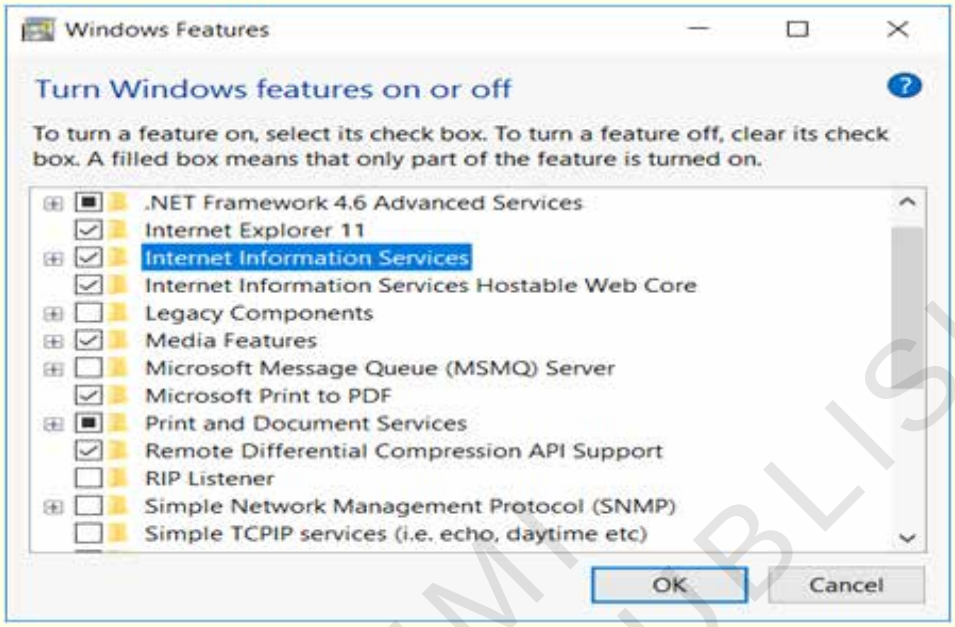
Fig 4



Under Internet Information Services check the following folders:(Fig 5)

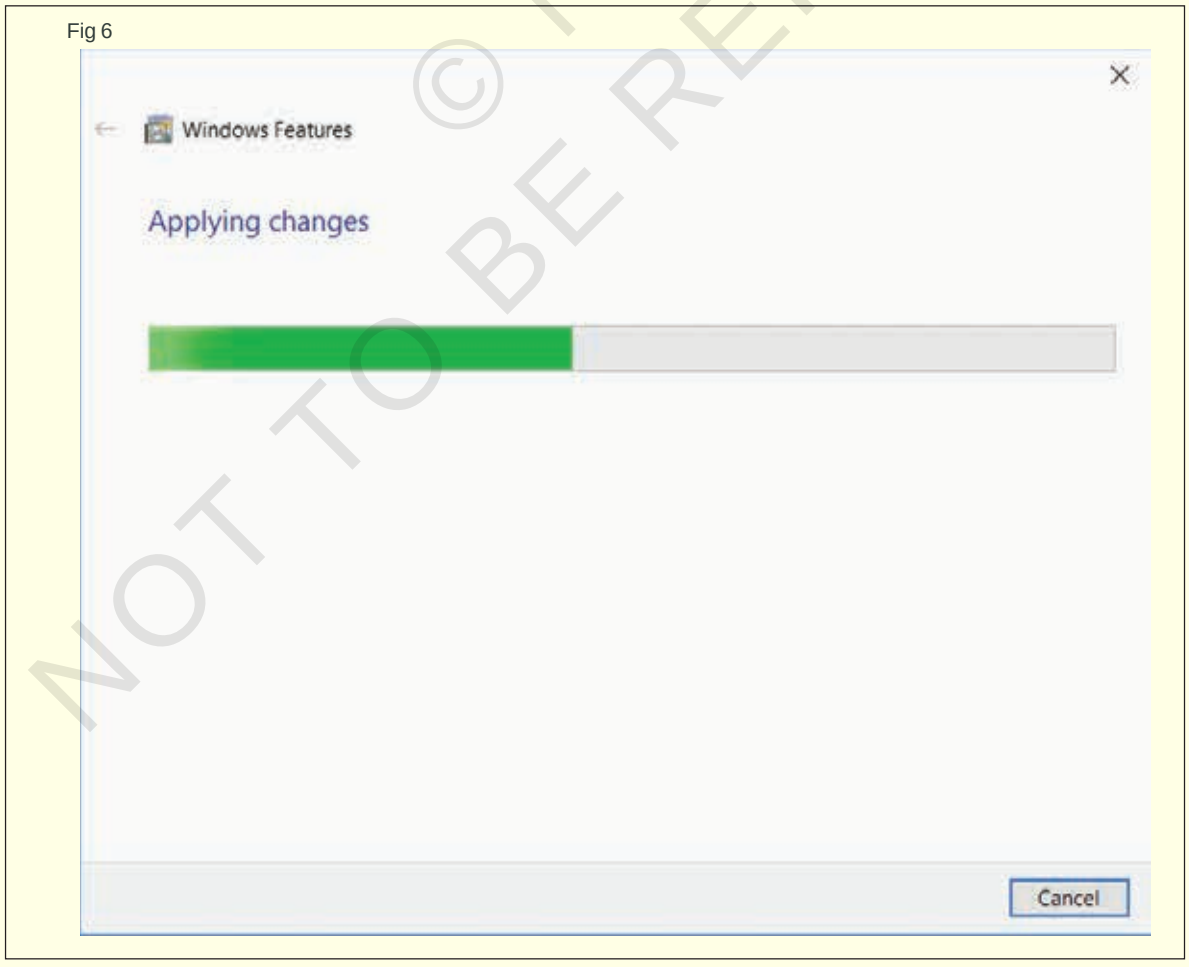
- FTP Server
- Web Management Tools
- World wide web services
- Application development features
- Common HTTP Feature
- Health and Diagnostics
- Perfomance Feature
- Security

Fig 5



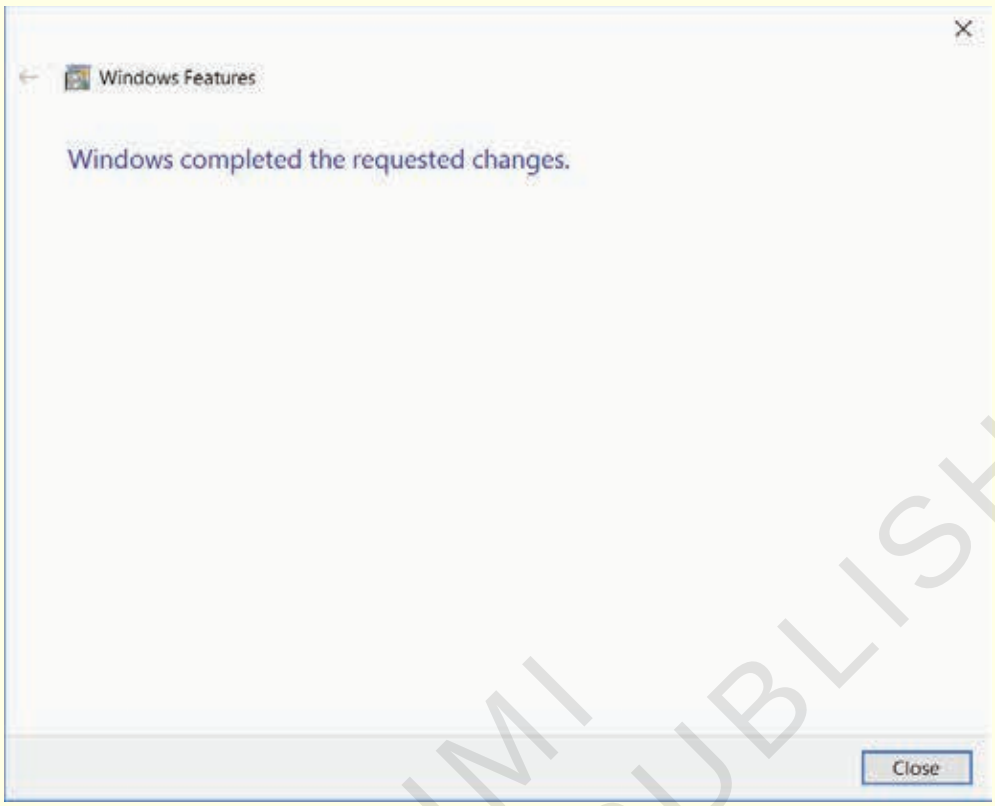
4 Then click OK to complete the installation of new features.

Fig 6



5 Click Close to complete the IIS feature installation.

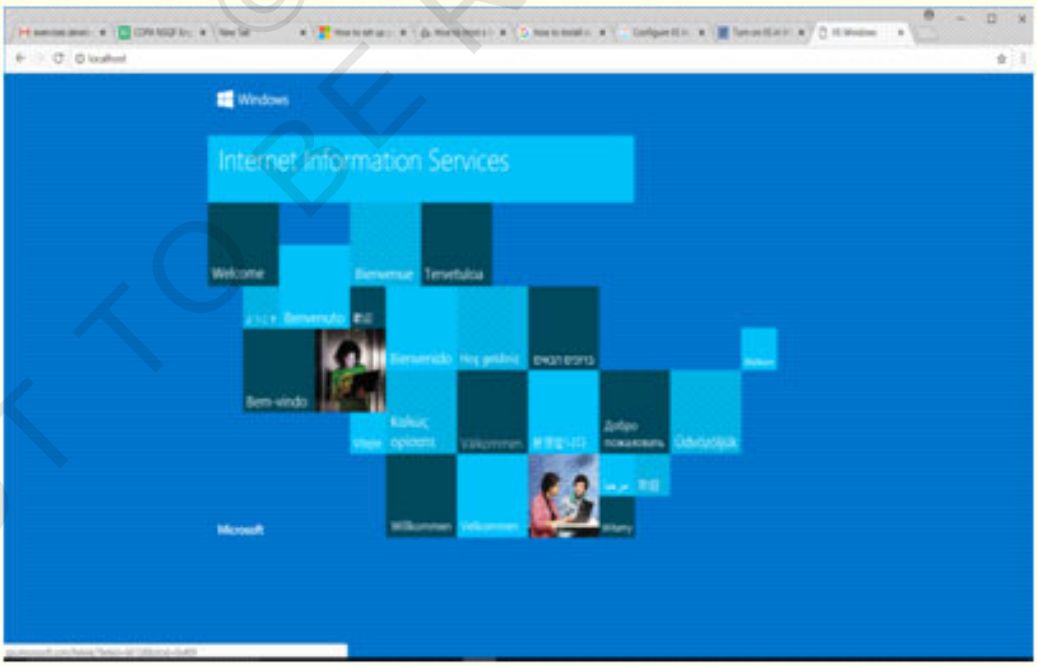
Fig 7



6 Open the browser, type url http://localhost

7 Internet Information Services (IIS) successfully configured (Fig 8)

Fig 8



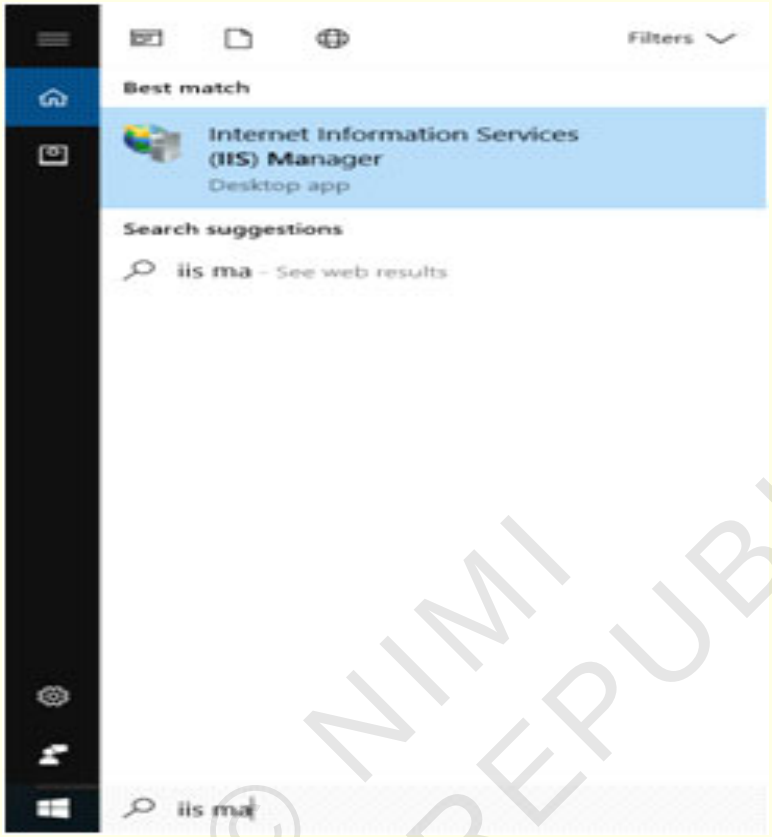
TASK 2 : **Publish website on IIS web server locally**

1 Create a home page for the website using any web page design tool

2 Copy the home page in to inetpub/wwwroot the Web publishing directory of IIS

3 Type the user's computer name or the computer'snumerical IP address followed by the home page name in the browser's address bar to reach user's site.

Fig 9

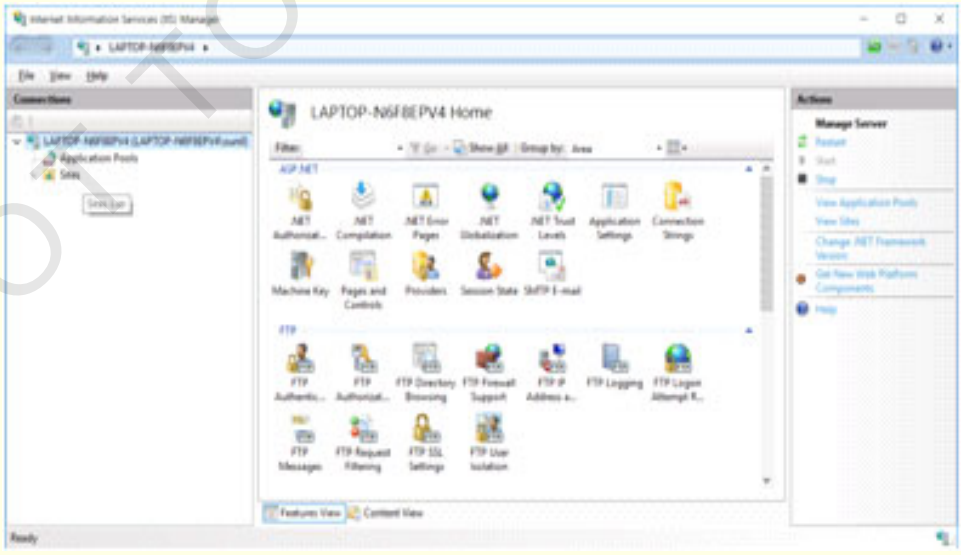


TASK 3 : **Publish a new Web site in IIS**

1 Type IIS Manger in Cortana search

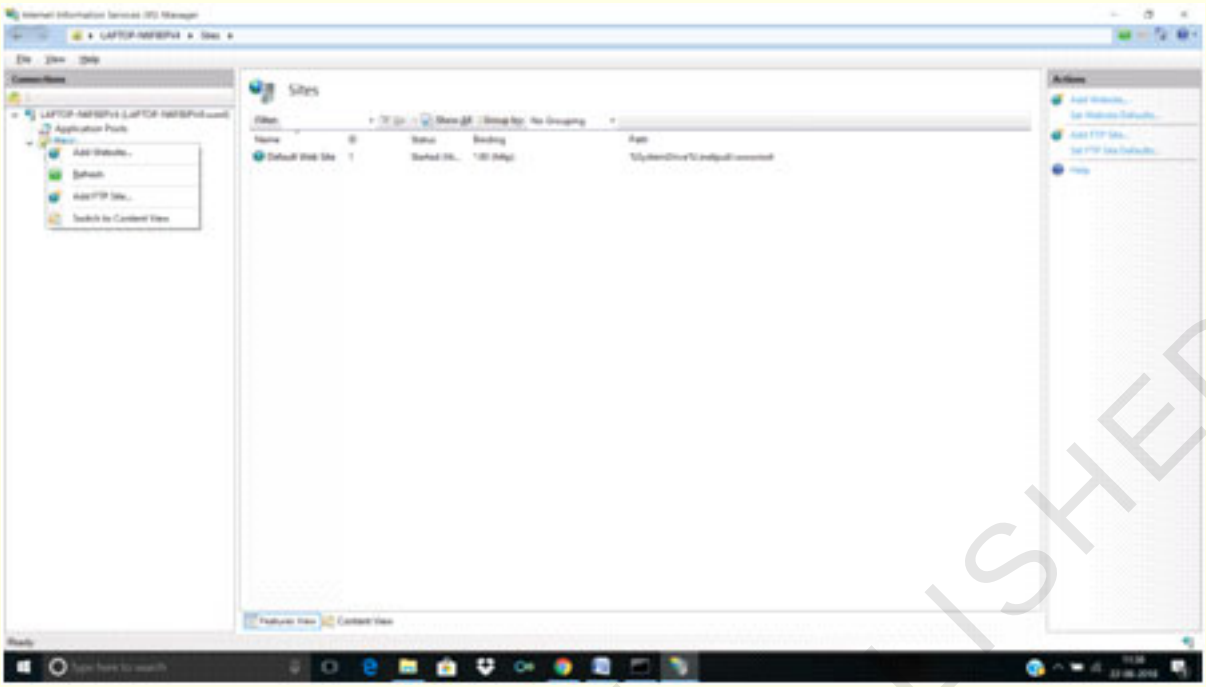
2 Open IIS Manager by clicking on Internet Information Services(IIS) Manager. (Fig,10)

Fig 10



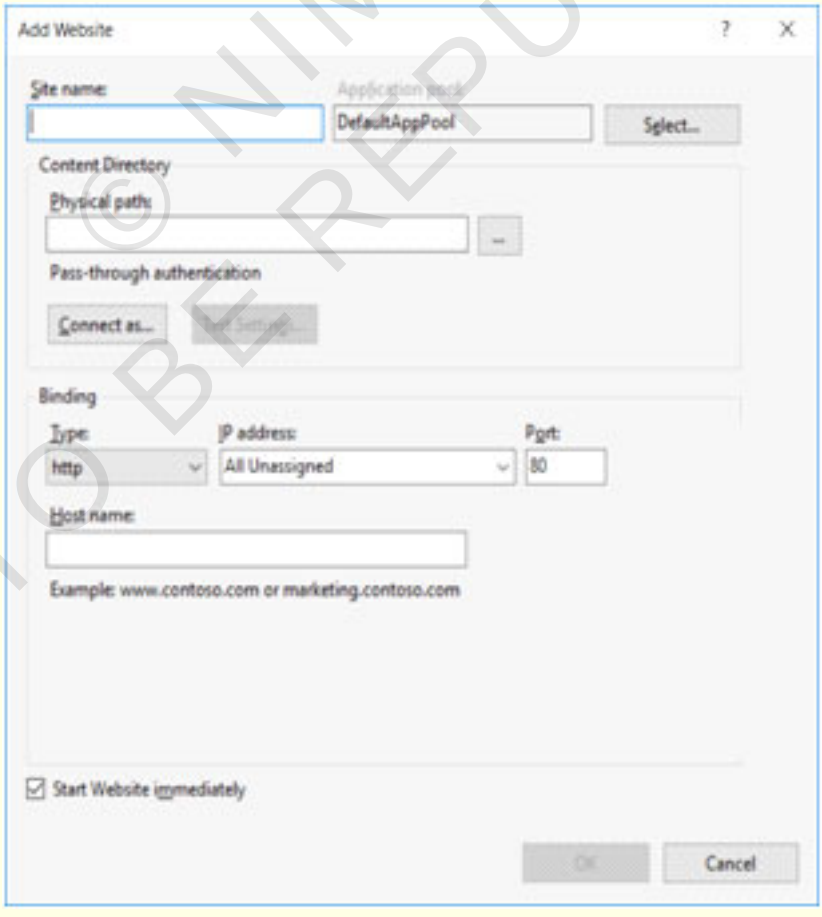
3 Right click on Sites and click on Add Website. (Fig11)

Fig 11



4 Opens Add website dialog. (Fig 12)

Fig 12



5 Fill in required details and select folder where compiled code is located. (Fig 13)

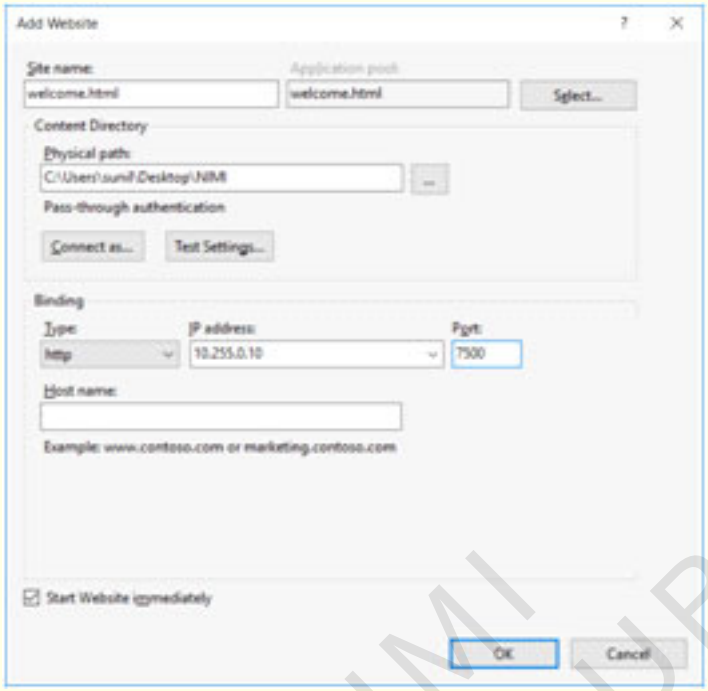
Eg: C:\Nigel\Publish

6 Select required port .(Fig 13)

7 Enter host name details

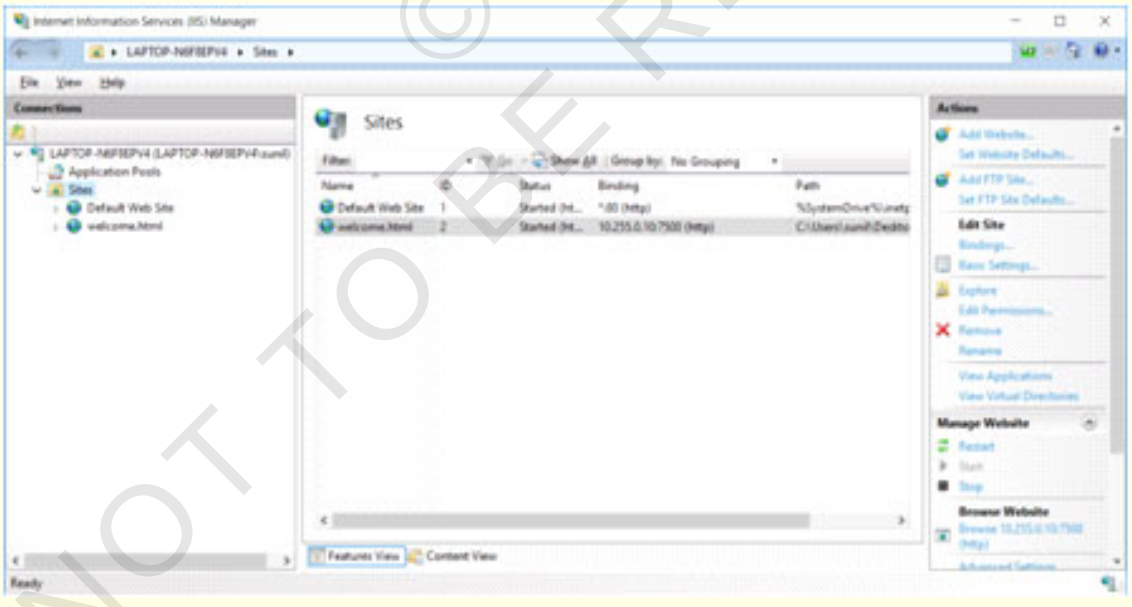
(Do not enter host name details if you are testing or using on LAN).

Fig 13



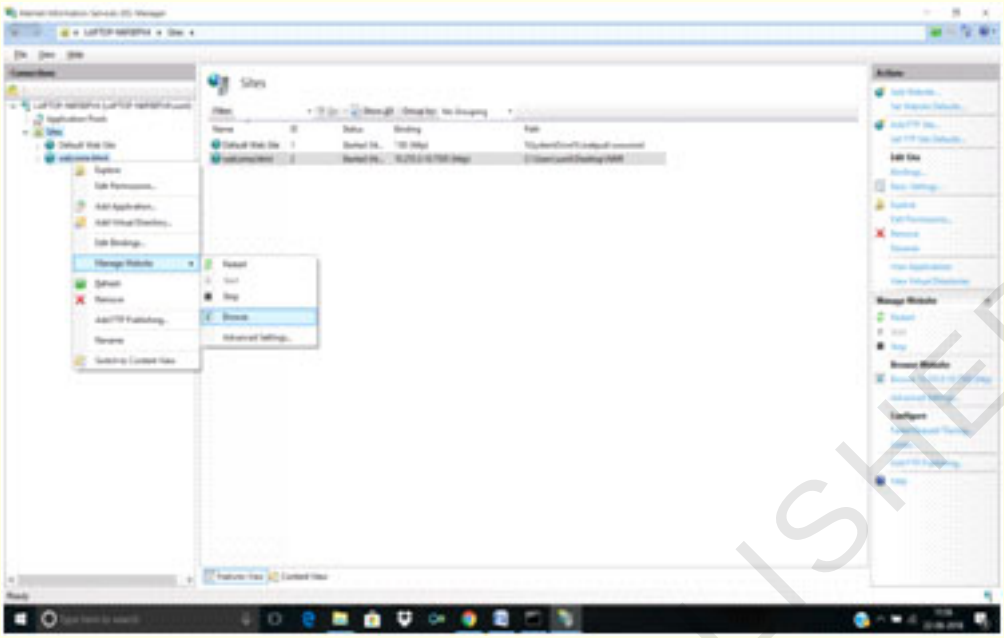
8 Click ok, website gets created and it will show under Sites(Fig 14)

Fig 14



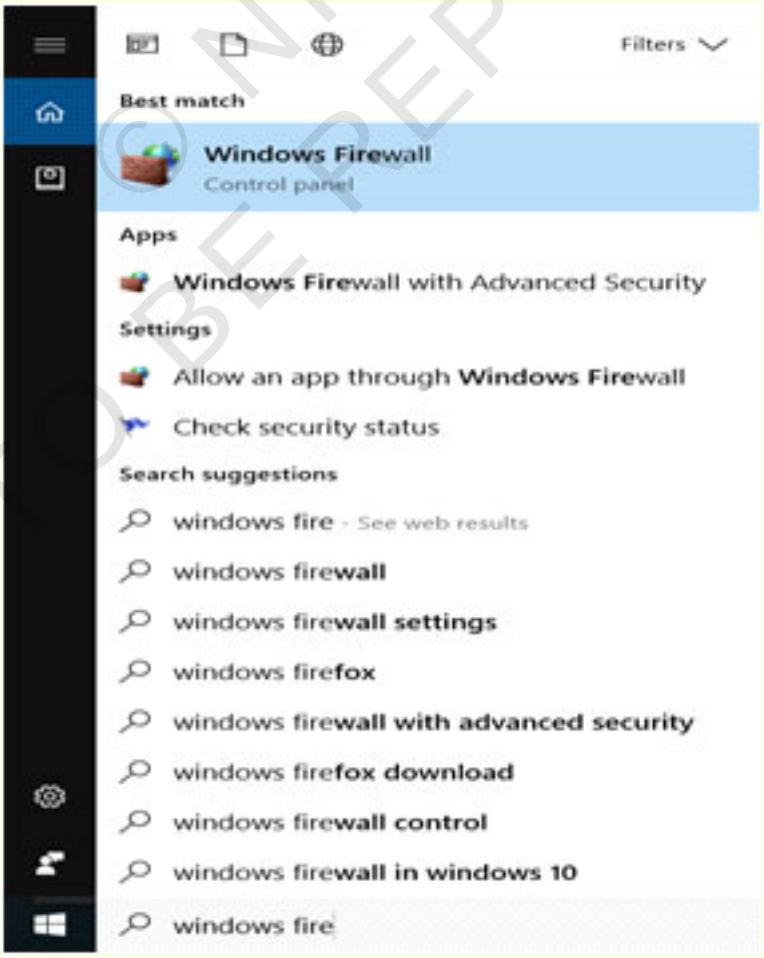
9 Right click on website name then Manage websiteand then click browse. (Fig 15)

Fig 15



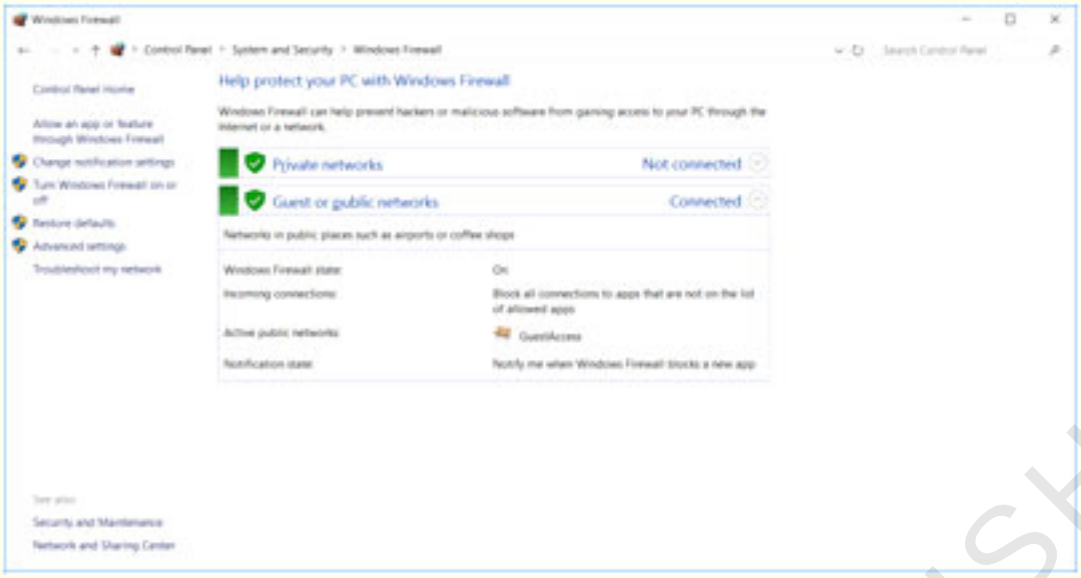
10 Type firewall In Cortana search for change in Firewall Rules.(Fig16)

Fig 16



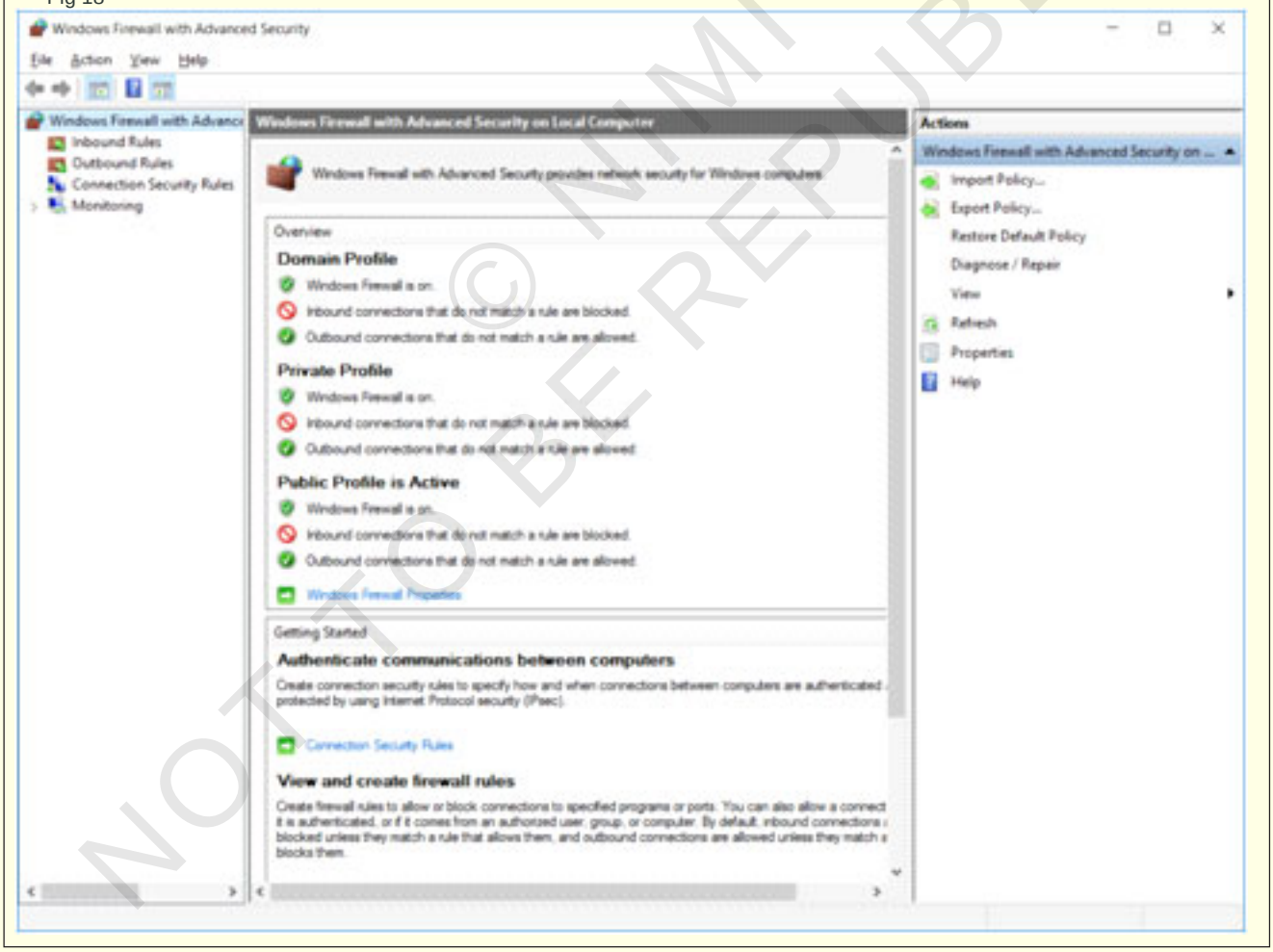
11 Click on Windows firewall (Fig 17)

Fig 17



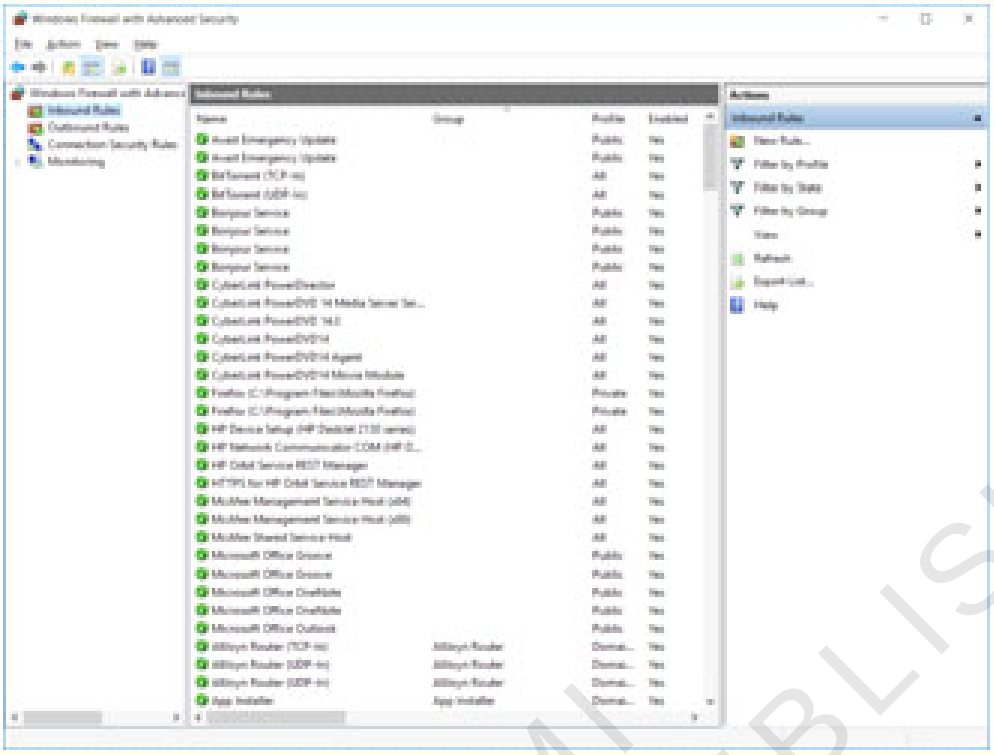
12 Click advanced settings.(Fig 18)

Fig 18



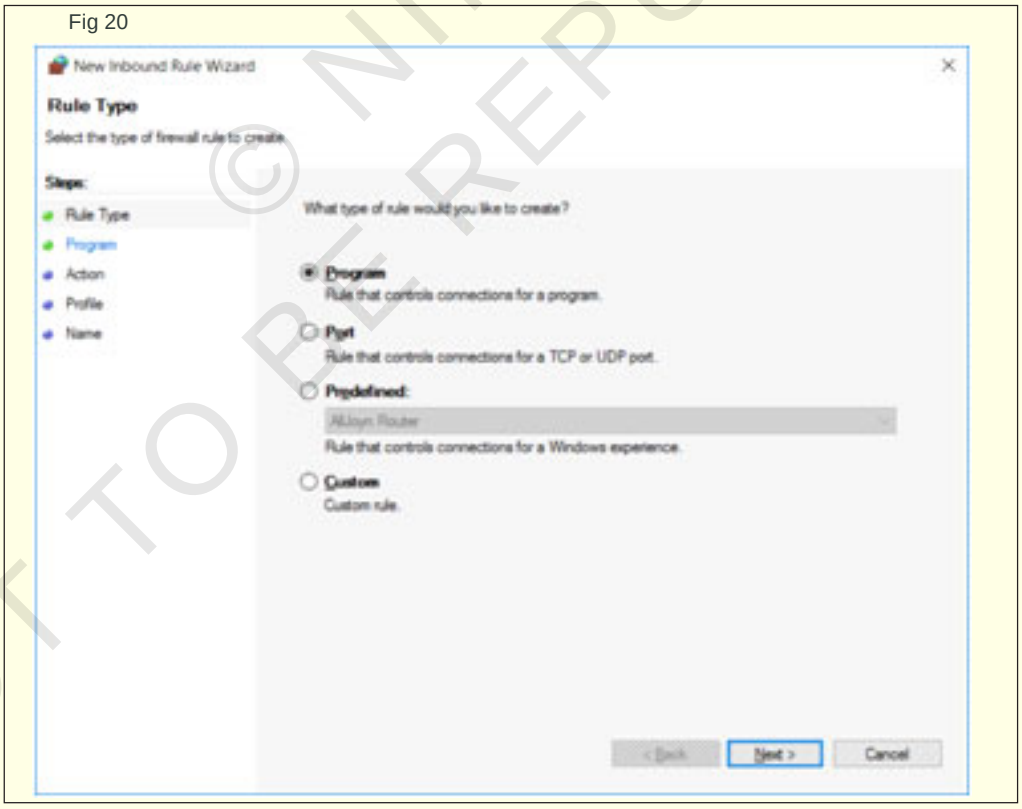
13 Click on Inbound rules on the left. (Fig 19)

Fig 19



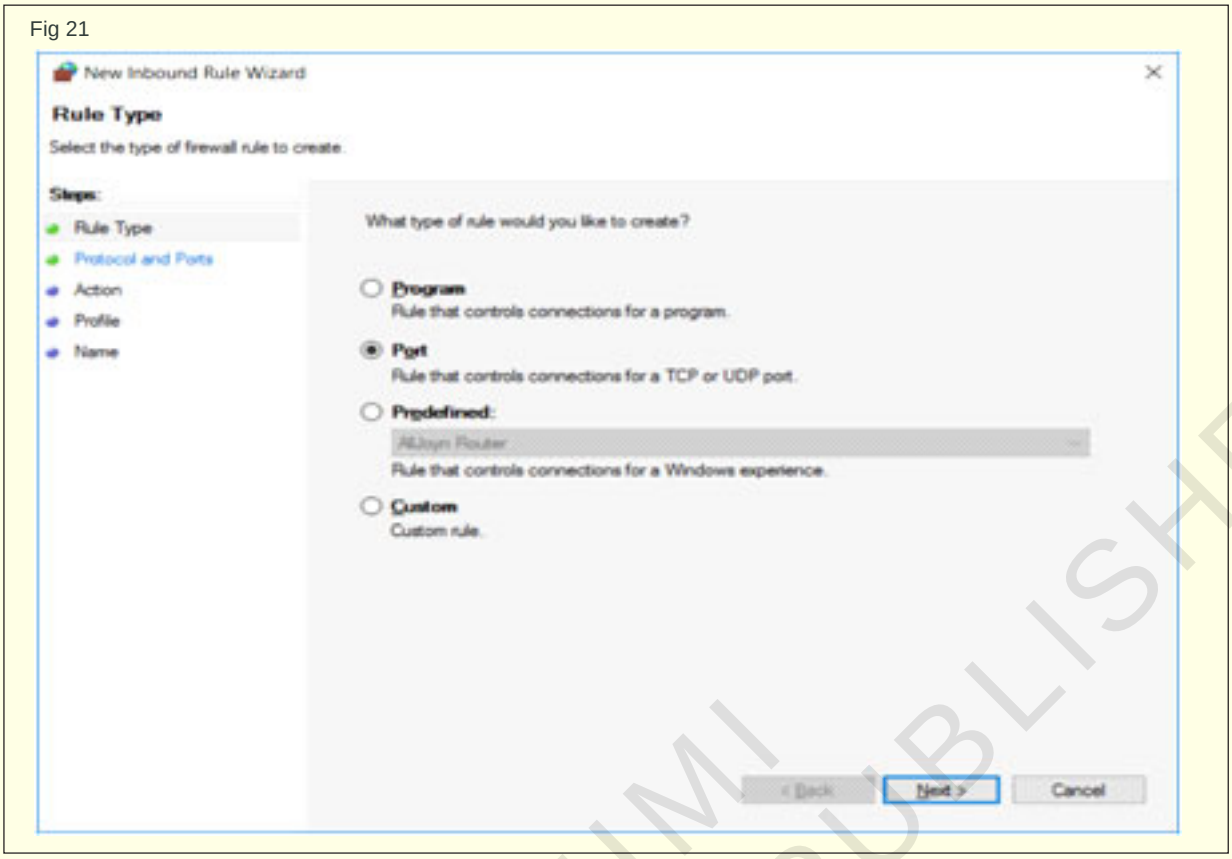
14 Click new Rule in the right side menu.(Fig 20)

Fig 20



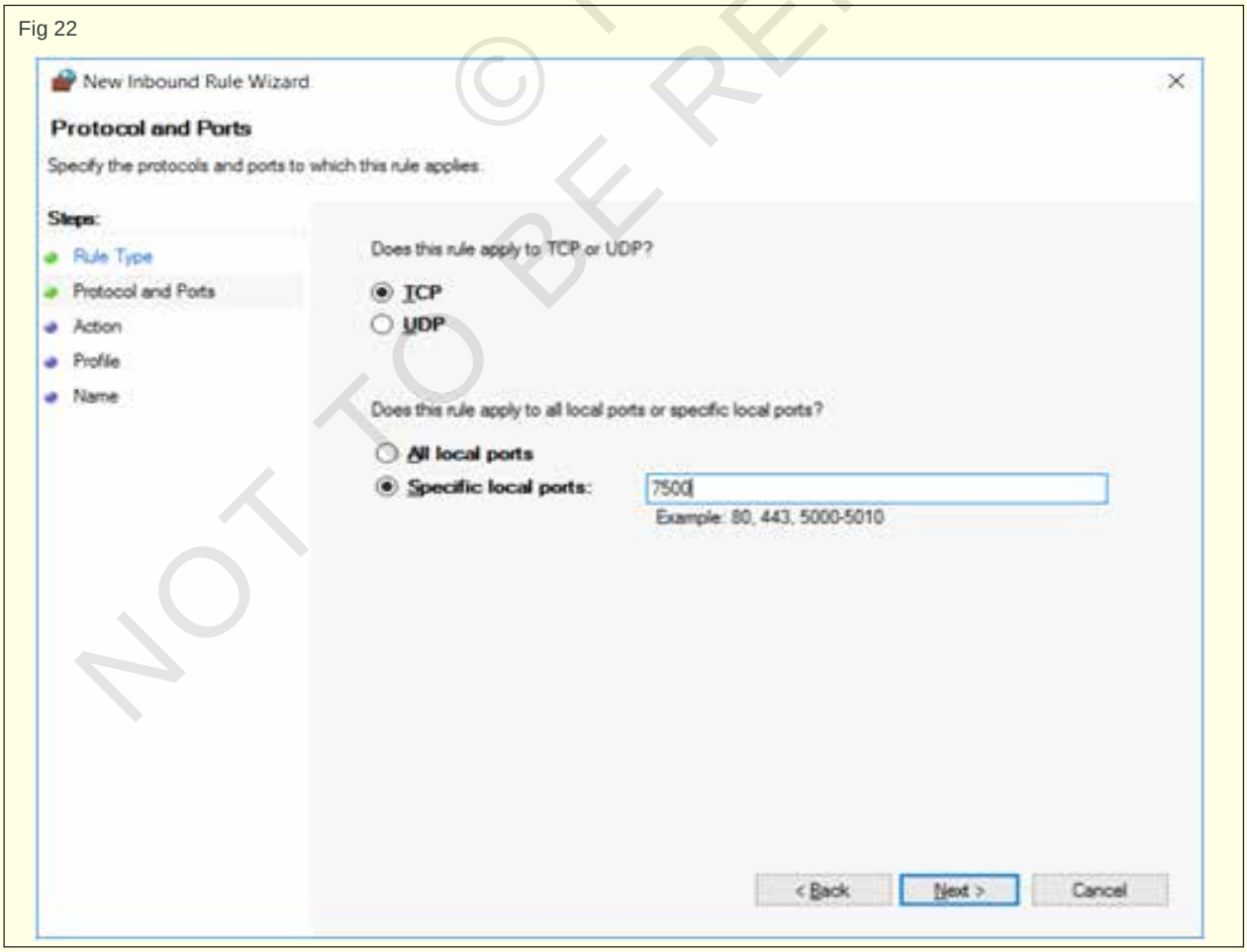
15 Select Port in the New inbound rule wizard and click Next .(Fig 21)

Fig 21



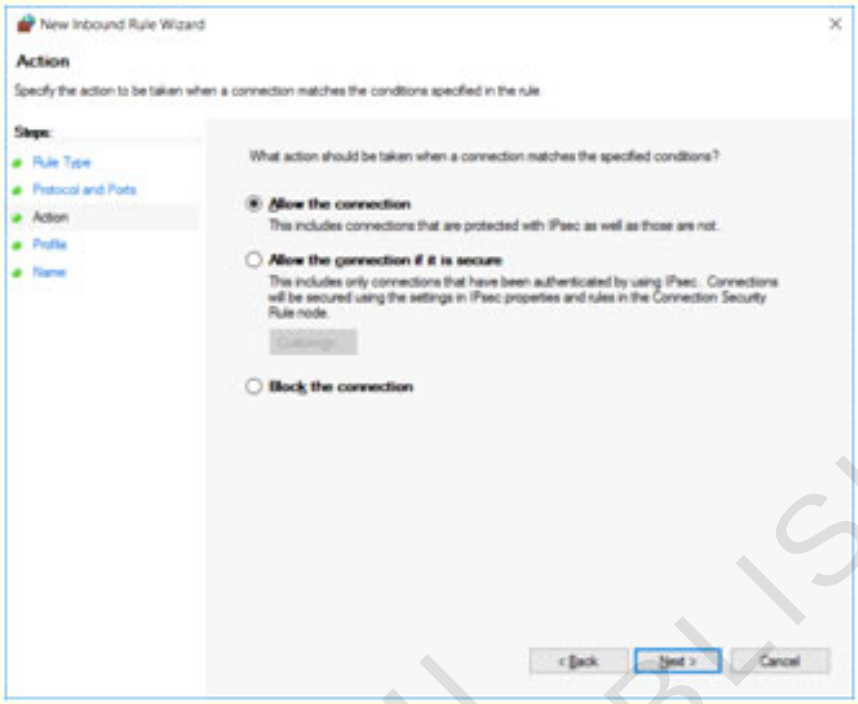
16 Enter port number in specific local ports textbox, Then click Next (Fig 22)

Fig 22



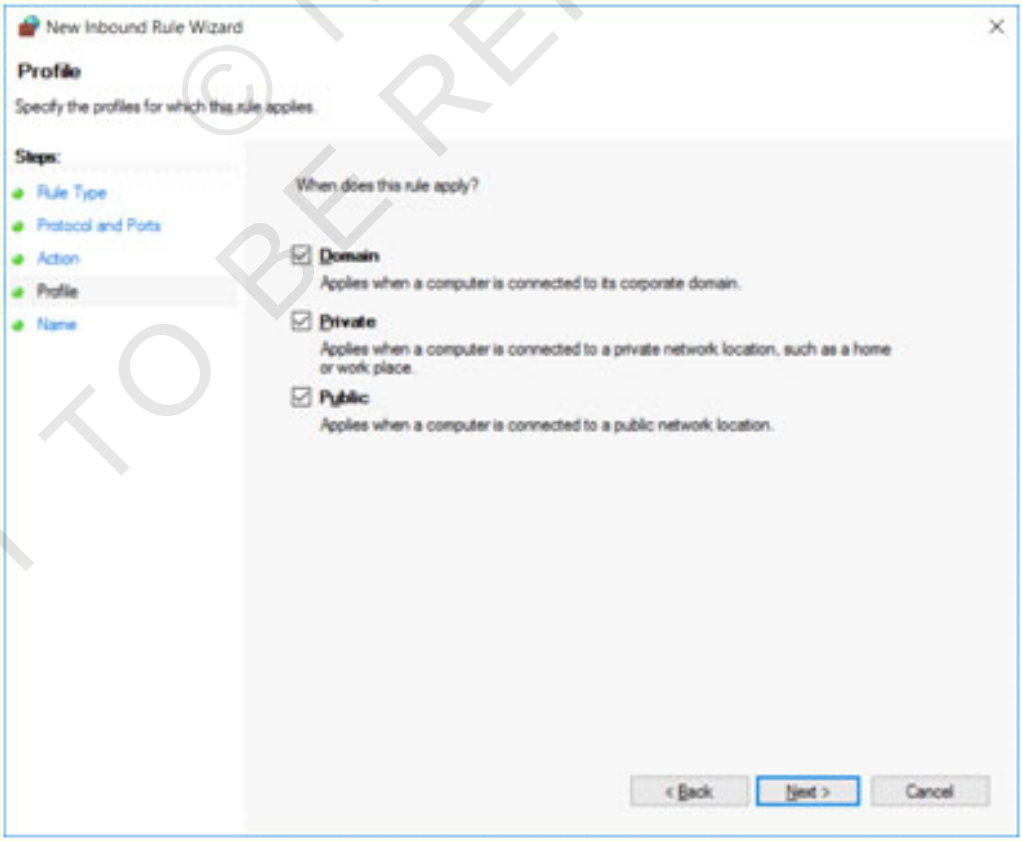
17 Select Allow the connection in the opened Action form and click Next .(Fig 23)

Fig 23



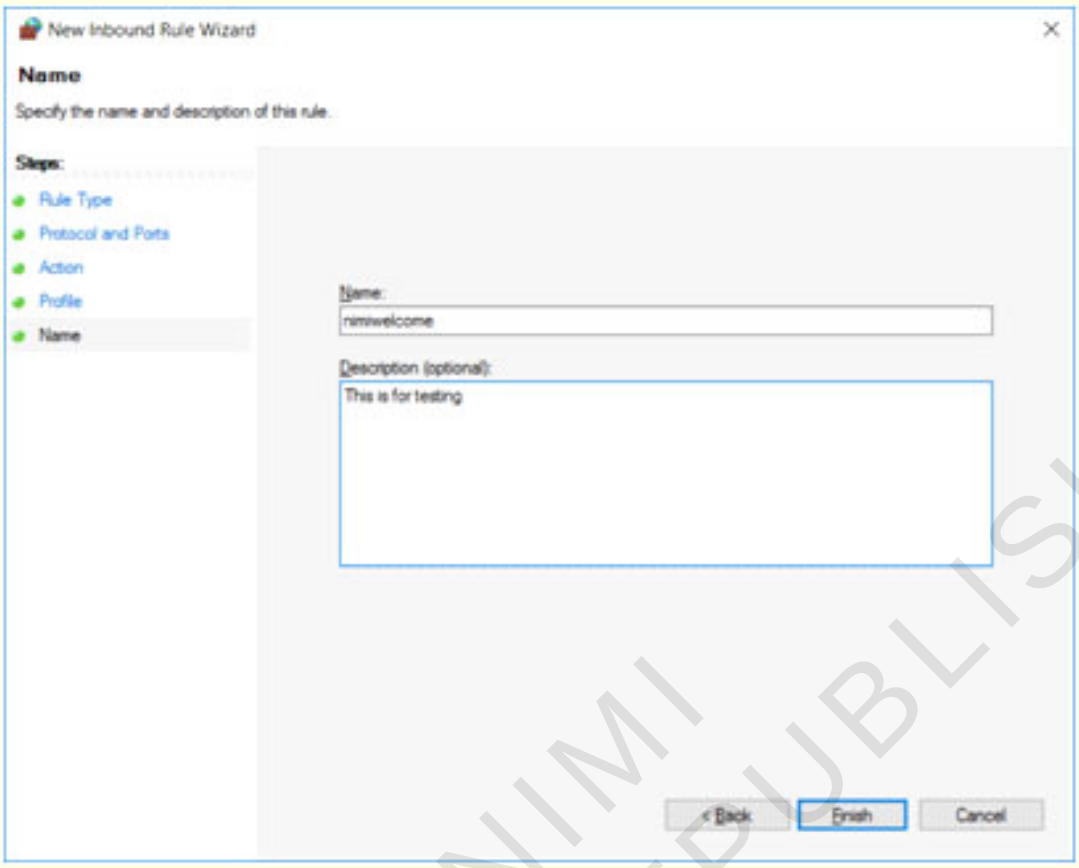
18 Select required ones in the profile form and Click Next. (Fig 24)

Fig 24



19 Give firewall rule Name and Description, Then click finish. (Fig 25)

Fig 25



— — — — — — — —

TASK 3: Publish Content on IIS web server locally

1 Create a home page for the website using any web page design tool

2 Copy the home page in to inetpub/wwwroot the Web publishing directory of IIS

3 Type the user's computer name or the computer's numerical IP address followed by the home pagename in the browser's address bar to reach user's site.

— — — — — — — —

Create and modify simple macros

Objectives: At the end of this exercise you shall be able to
- **state create macro**
- **state modify a macro**

Requirements

Tools/Equipment/Machines

- A working PC with MS-OFFICE - 1 No.

PROCEDURE

TASK 1: **Create a macro**

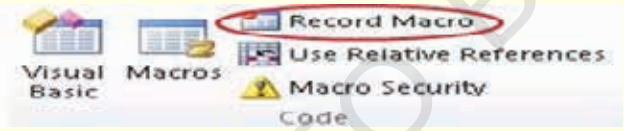
Before you record a macro

Macros and VBA tools can be found on the Developer tab, which is hidden by default, so the first step is to enable it. For more information, see Show the Developer tab.

Record a macro

1 In the Code group on the Developer tab, click Record Macro.

2 Optionally, enter a name for the macro in the Macro name box, enter a shortcut key in the Shortcut key box, and a description in the Description box, and then click OK to start recording.



3 Perform the actions you want to automate, such as entering boilerplate text or filling down a column of data.

4 On the Developer tab, click Stop Recording.

Take a closer look at the macro

You can learn a little about the Visual Basic programming language by editing a macro.

To edit a macro, in the Code group on the Developer tab, click Macros, select the name of the macro, and click Edit. This starts the Visual Basic Editor.

See how the actions that you recorded appear as code. Some of the code will probably be clear to you, and some of it may be a little mysterious.

Experiment with the code, close the Visual Basic Editor, and run your macro again. This time, see if anything different happens!

— — — — — —

TASK 2: **Modify a macro**

1 On the Developer tab, in the Code group, click Macros.

2 In the Macro name box, click the macro that you want to edit.

3 Click Edit. The Visual Basic Editor appears.

Tip: To get help while you are working in the Visual Basic Editor, on the Help menu, click Microsoft Visual Basic Help, or press F1.

— — — — — —

Perform form controls and create simple data entry form with macros

Objectives: At the end of this exercise you shall be able to
- **details form controls**
- **create simple data entry form.**

Requirements

Tools/Equipment/Machines

- A working PC with MS-OFFICE - 1 No.

PROCEDURE

TASK 1: **Form Controls**

In a new worksheet, type the following items in the range H1:H20:

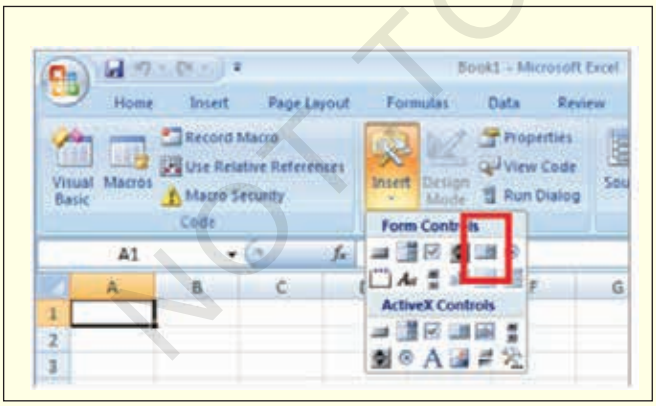
H1 : Roller Skates	H2 : VCR	H3 : Desk
H4 : Mug	H5 : Car	H6 : Washing Machine
H7 : Rocket Launcher	H8 : Bike	H9 : Phone
H10: Candle	H11: Candy	H12: Speakers
H13: Dress	H14: Blanket	H15: Dryer
H16: Guitar	H17: Dryer	H18: Tool Set
H19: VCR	H20: Hard Disk	

1 In cell A1, type the following formula:

=INDEX(H1:H20,G1,0)

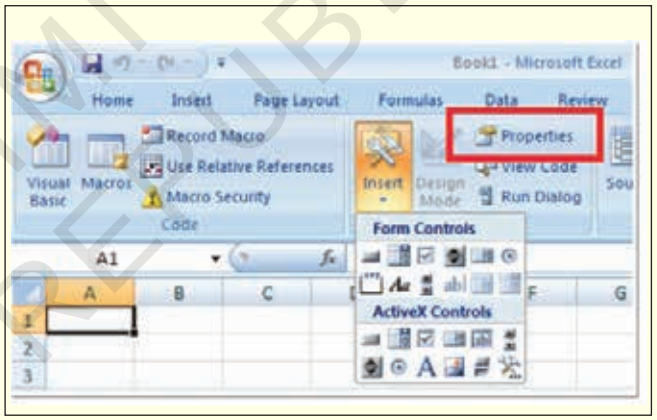
List box example

1 To add a list box in Excel 2007 and later versions, click the Developer tab, click Insert in the Controls group, and then click List Box Form (Control) under Form Controls.



2 To add a list box in Excel 2003 and in earlier versions of Excel, click the List Box button on the Forms toolbar. If the Forms toolbar is not visible, point to Toolbars on the View menu, and then click Forms.

3 Click the worksheet location where you want the upper-left corner of the list box to appear, and then drag the list box to where you want the lower-right corner of the list box to be. In this example, create a list box that covers cells B2:E10.



4 In the Controls group, click Properties.

5 In the Format Object window, type the following information, and then click OK.

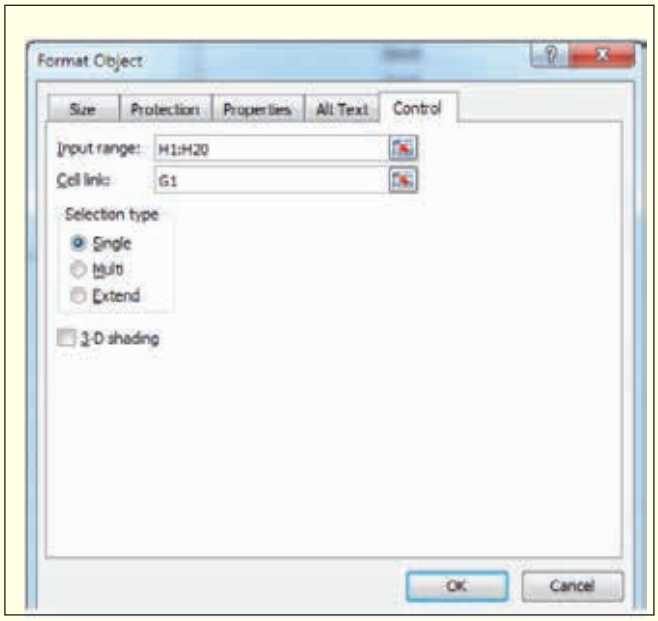
a To specify the range for the list, type H1:H20 in the Input range box.

b To put a number value in cell G1 (depending on which item is selected in the list), type G1 in the Cell link box.

Note: The INDEX() formula uses the value in G1 to return the correct list item.

c Under Selection type, make sure that the Single option is selected.

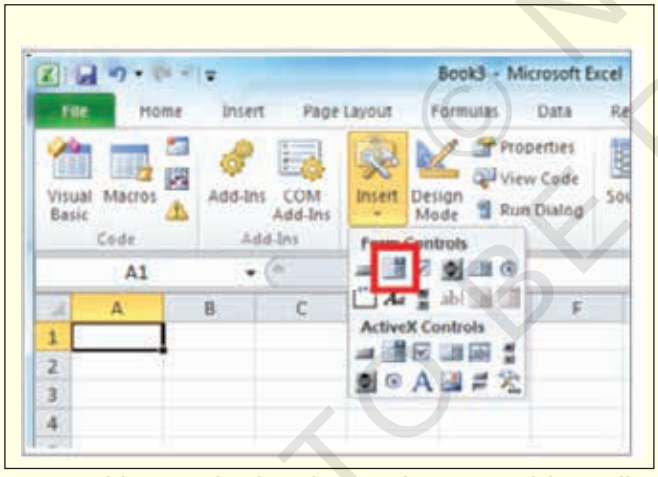
Note: The Multi and Extend options are only useful when you are using a Microsoft Visual Basic for Applications procedure to return the values of the list. Note also that the 3-D shading check box adds a three-dimensional look to the list box.



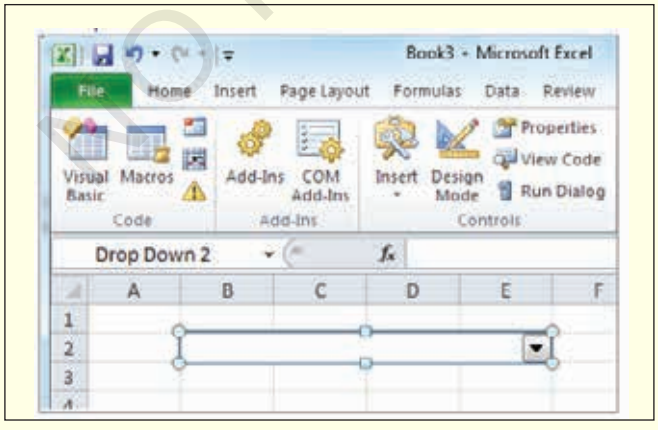
6 The list box should display the list of items. To use the list box, click any cell so that the list box is not selected. If you click an item in the list, cell G1 is updated to a number that indicates the position of the item that is selected in the list. The INDEX formula in cell A1 uses this number to display the item's name.

Combo box example

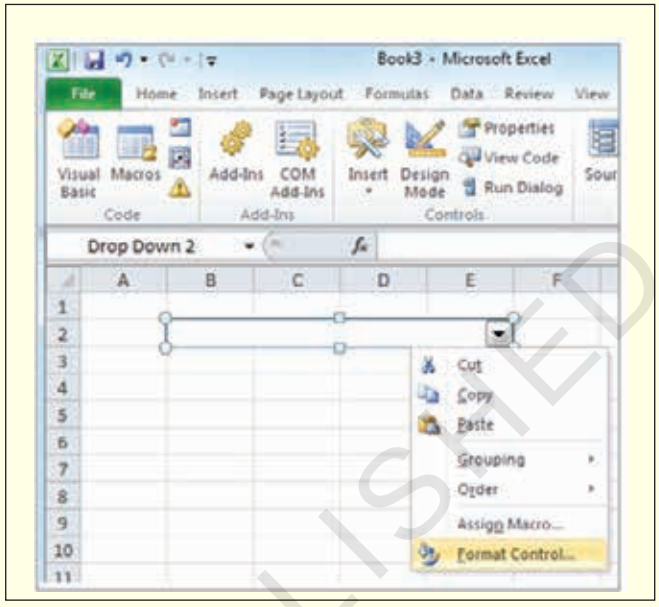
1 To add a combo box in Excel 2007 and later versions, click the Developer tab, click Insert, and then click Combo Box under Form Controls.



2 To add a combo box in Excel 2003 and in earlier versions of Excel, click the Combo Box button on the Forms toolbar.



3 Click the worksheet location where you want the upper-left corner of the combo box to appear, and then drag the combo box to where you want the lower-right corner of the list box to be. In this example, create a combo box that covers cells B2:E2.



4 Right-click the combo box, and then click Format Control.

5 Type the following information, and then click OK:

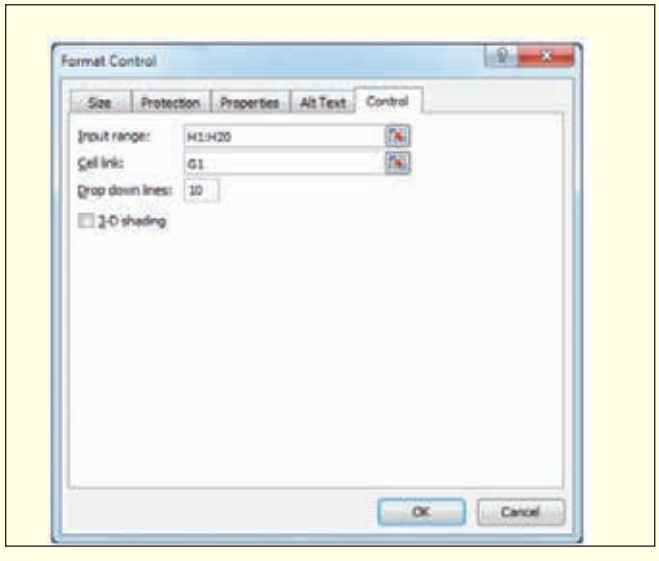
a To specify the range for the list, type H1:H20 in the Input range box.

b To put a number value in cell G1 (depending on which item is selected in the list), type G1 in the Cell link box.

Note: The INDEX formula uses the value in G1 to return the correct list item.

c In the Drop down lines box, type 10. This entry determines how many items will be displayed before you have to use a scroll bar to view the other items.

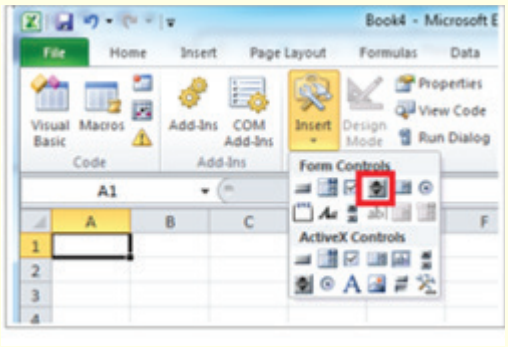
Note: The 3-D shading check box is optional. It adds a three-dimensional look to the drop-down or combo box.



6 The drop-down box or combo box should display the list of items. To use the drop-down box or combo box, click any cell so that the object is not selected. When you click an item in the drop-down box or combo box, cell G1 is updated to a number that indicates the position in the list of the item selected. The INDEX formula in cell A1 uses this number to display the item's name.

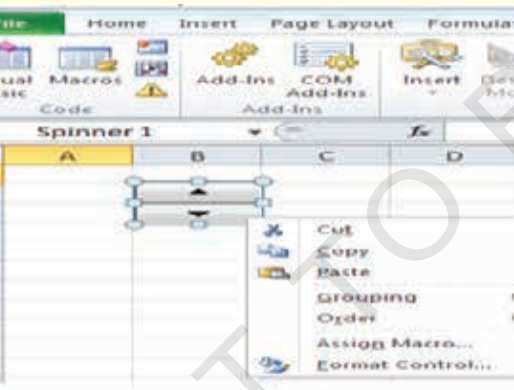
Spin button example

1 To add a spin button in Excel 2007 and later versions, click the Developer tab, click Insert, and then click Spin Button under Form Controls.



To add a spinner in Excel 2003 and in earlier versions of Excel, click the Spinner button on the Forms toolbar.

2 Click the worksheet location where you want the upper-left corner of the spin button to appear, and then drag the spin button to where you want the lower-right corner of the spin button to be. In this example, create a spin button that covers cells B2: B3.



3 Right-click the spin button, and then click Format Control.

4 Type the following information, and then click OK:

a In the Current value box, type 1.

This value initializes the spin button so that the INDEX formula will point to the first item in the list.

b In the Minimum value box, type 1.

This value restricts the top of the spin button to the first item in the list.

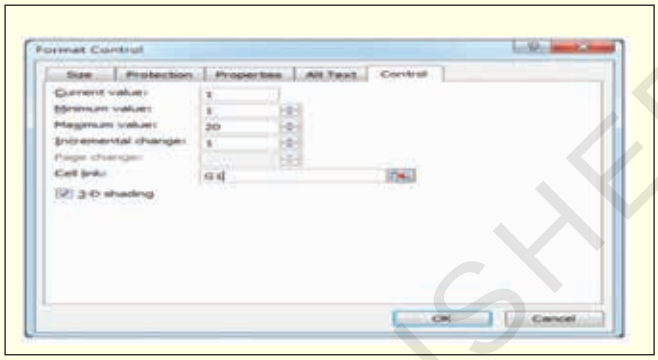
c In the Maximum value box, type 20.

This number specifies the maximum number of entries in the list.

d In the Incremental change box, type 1.

This value controls how much the spin button control increments the current value.

e To put a number value in cell G1 (depending on which item is selected in the list), type G1 in the Cell link box.

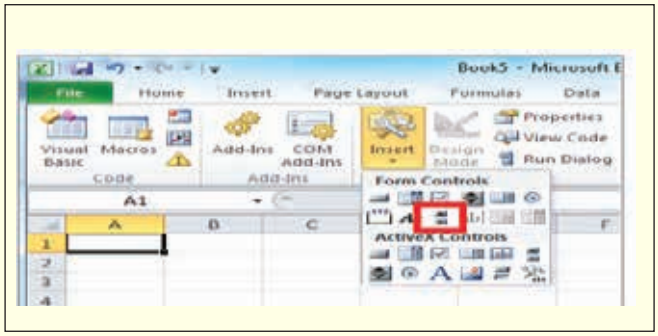


5 Click any cell so that the spin button is not selected. When you click the up control or down control on the spin button, cell G1 is updated to a number that indicates the current value of the spin button plus or minus the incremental change of the spin button. This number then updates the INDEX formula in cell A1 to show the next or previous item.

The spin button value will not change if the current value is 1 and you click the down control, or if the current value is 20 and you click the up control.

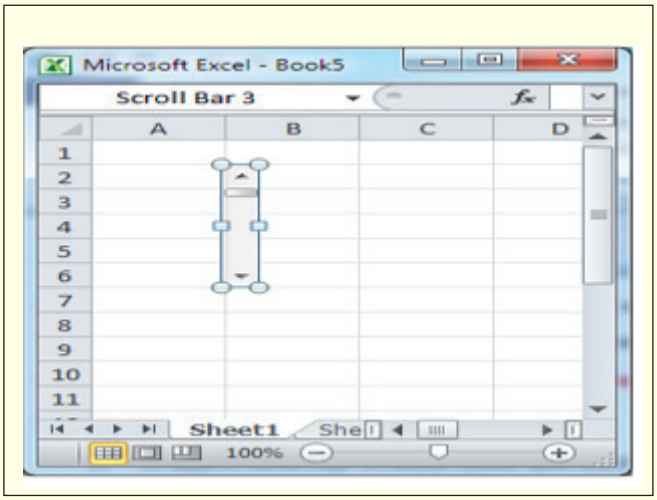
Scroll bar example

1 To add a scroll bar in Excel 2007 and later versions, click the Developer tab, click Insert, and then click Scroll Bar under Form Controls.

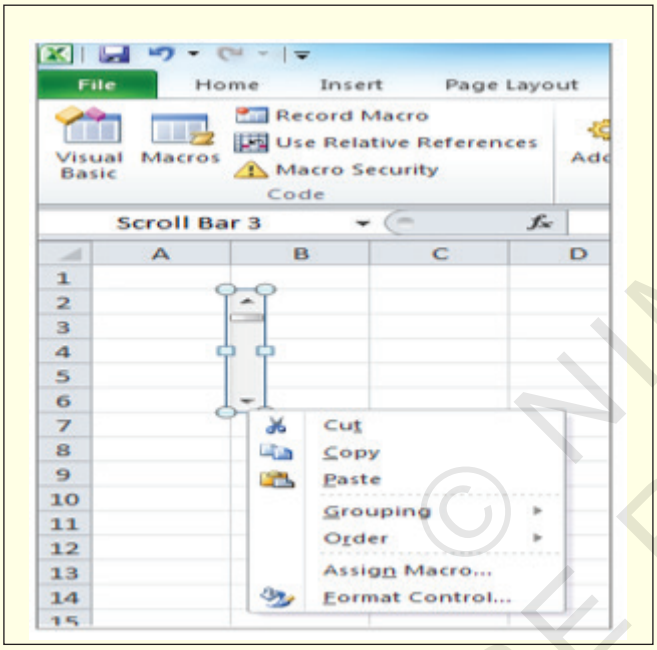


To add a scroll bar in Excel 2003 and in earlier versions of Excel, click the Scroll Bar button on the Forms toolbar.

2 Click the worksheet location where you want the upper-left corner of the scroll bar to appear, and then drag the scroll bar to where you want the lower-right corner of the scroll bar to be. In this example, create a scroll bar that covers cells B2:B6 in height and is about one-fourth of the width of the column.



3 Right-click the scroll bar, and then click Format Control.



4 Type the following information, and then click OK:

a In the Current value box, type 1.

This value initializes the scroll bar so that the INDEX formula will point to the first item in the list.

b In the Minimum value box, type 1.

This value restricts the top of the scroll bar to the first item in the list.

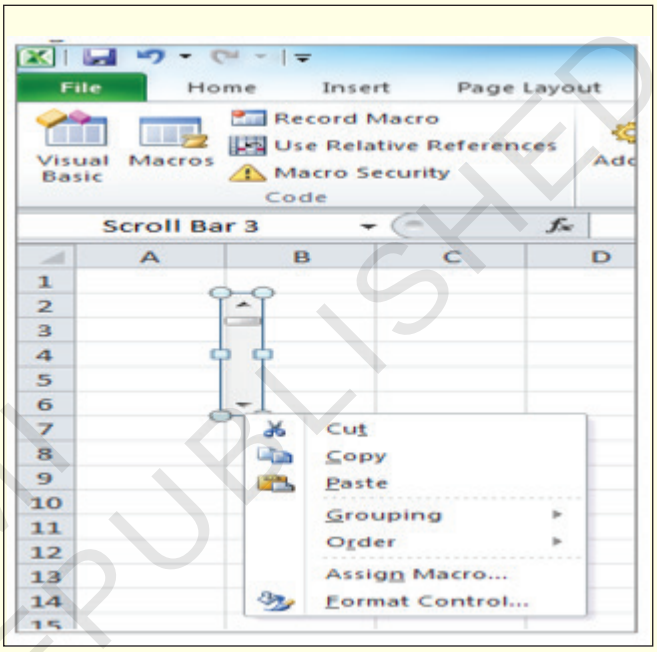
c In the Maximum value box, type 20. This number specifies the maximum number of entries in the list.

d In the Incremental change box, type 1.

This value controls how many numbers the scroll bar control increments the current value.

e In the Page change box, type 5. This value controls how much the current value will be incremented if you click inside the scroll bar on either side of the scroll box).

f To put a number value in cell G1 (depending on which item is selected in the list), type G1 in the Cell link box.

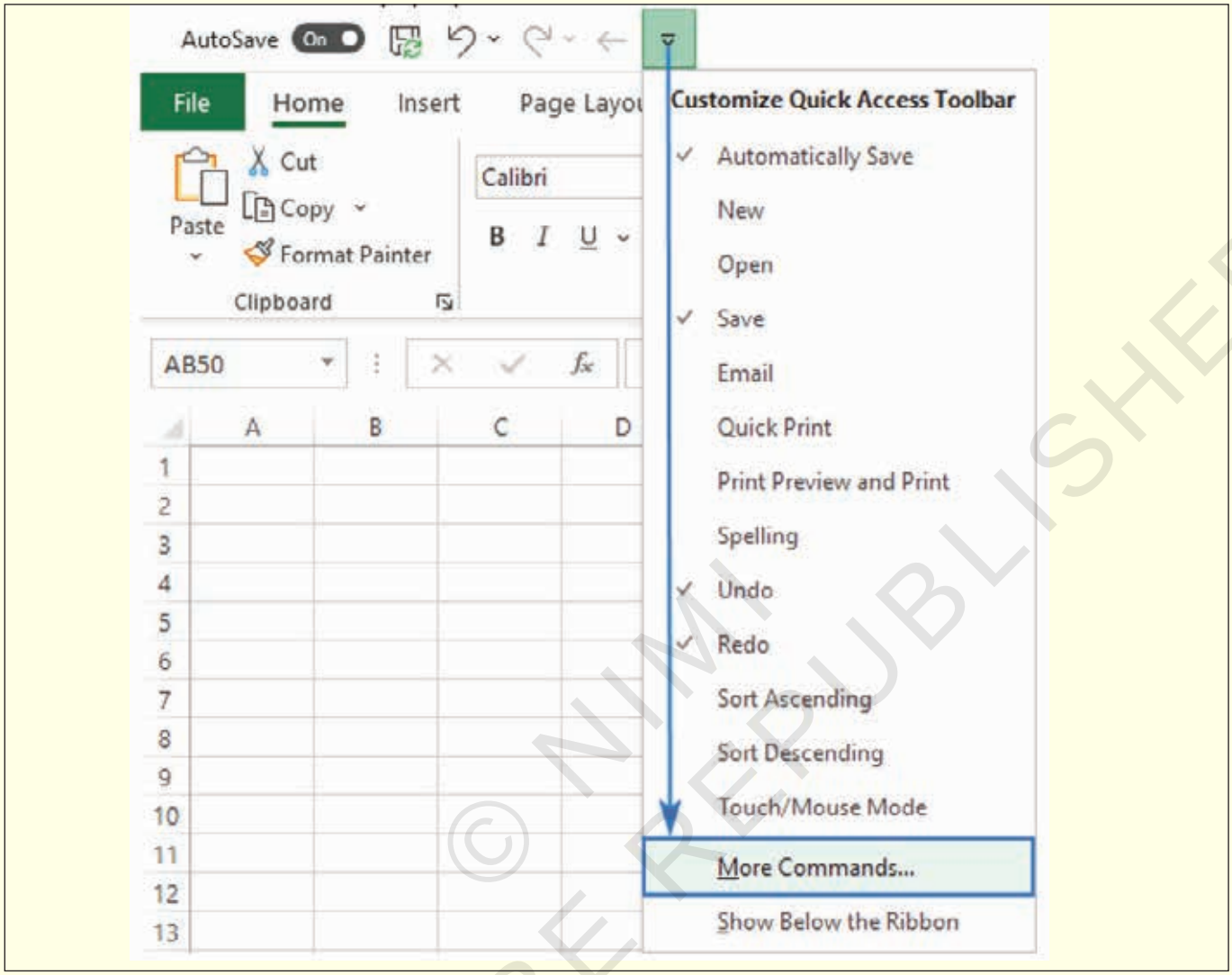


Note: The 3-D shading check box is optional. It adds a three-dimensional look to the scroll bar.

5 Click any cell so that the scroll bar is not selected. When you click the up or down control on the scroll bar, cell G1 is updated to a number that indicates the current value of the scroll bar plus or minus the incremental change of the scroll bar. This number is used in the INDEX formula in cell A1 to show the item next to or before the current item. You can also drag the scroll box to change the value or click in the scroll bar on either side of the scroll box to increment it by 5 (the Page change value). The scroll bar will not change if the current value is 1 and you click the down control, or if the current value is 20 and you click the up control.

TASK 2: **Create simple Data entry form with Macros**

1 Click the small down arrow at the far-right of the QAT, and then choose More Commands in the pop-up menu.



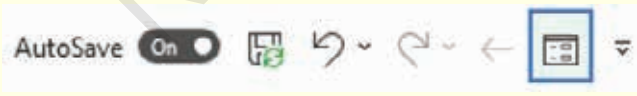
2 In the Excel Options dialog box that opens, under Choose commands from, select All Commands or Commands Not in the Ribbon.

3 Scroll down the list of command on the left until you see Form… and click on it.

4 Click the Add button in the middle to move the Form to the list of QAT commands on the right.

5 Click OK to save the changes and close the dialog.

The Form icon will immediately appear in your Quick Access Tollbar and will be available in all your workbooks.



Believe it or not, you've successfully coped with the main challenge. Once the Form tool is in your Excel, creating a data entry form for any table (a new or existing one) takes just a single button click.

Tip: In a similar fashion, you can place the Form tool on the ribbon. For the detailed instructions, please see **How to add a button to Excel ribbon.**

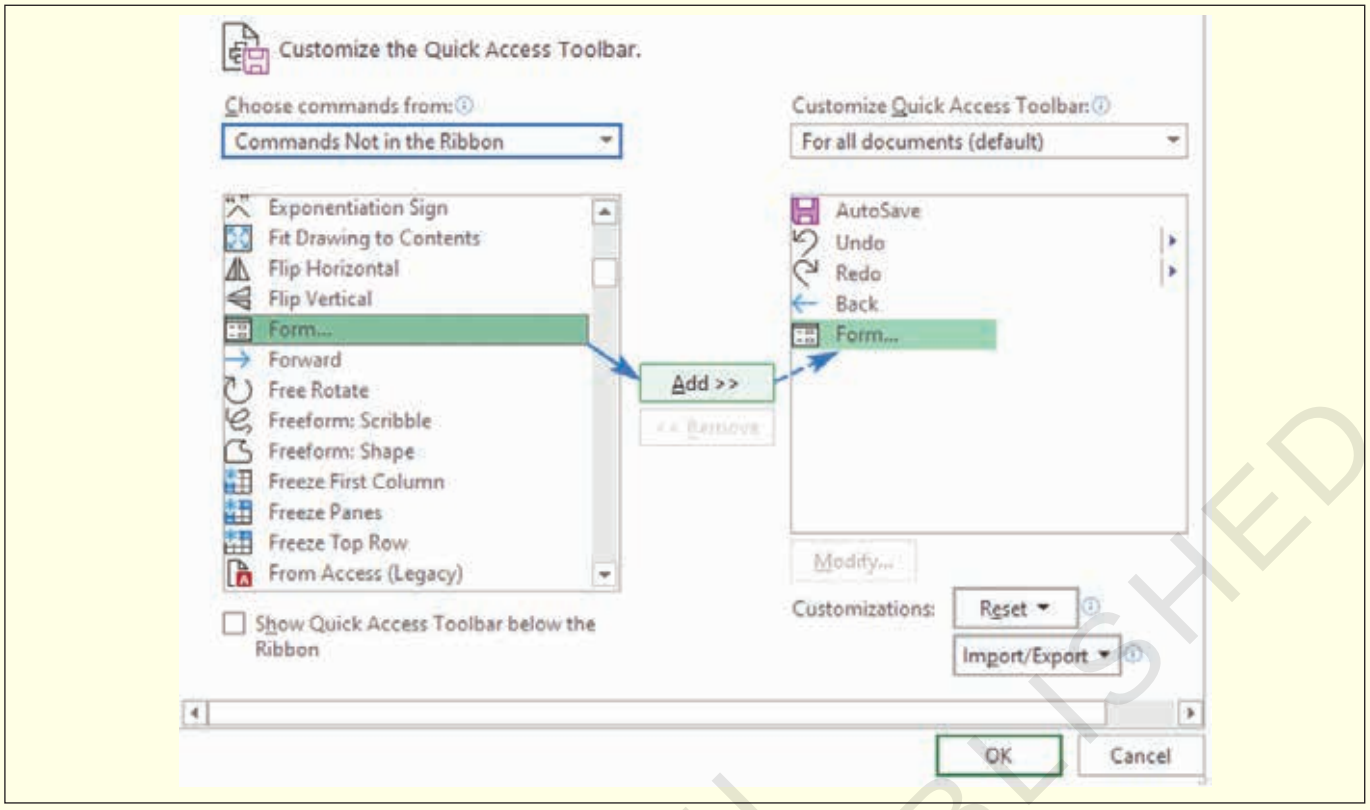
How to make data entry form in Excel

A data entry form is only available for a fully functional Excel table. To get the form, you just need to put your data in a table and the click the Form button. The detailed steps follow below:

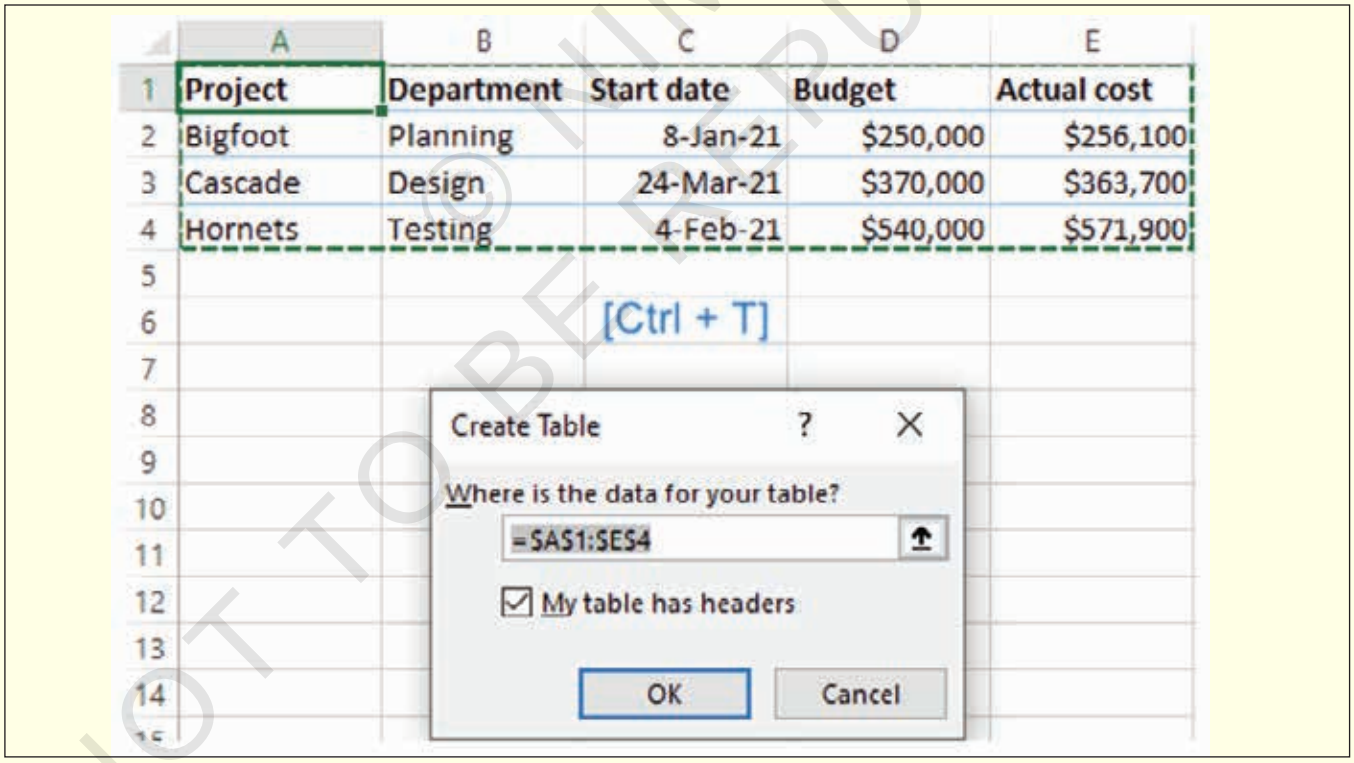
1 In your worksheet, type the column headings in the topmost row as usual. If you want an input form for an existing data set, skip this step.

2 Select any cell in your dataset and click the Ctrl + T keys simultaneously. This will select all the data and convert it to a table.

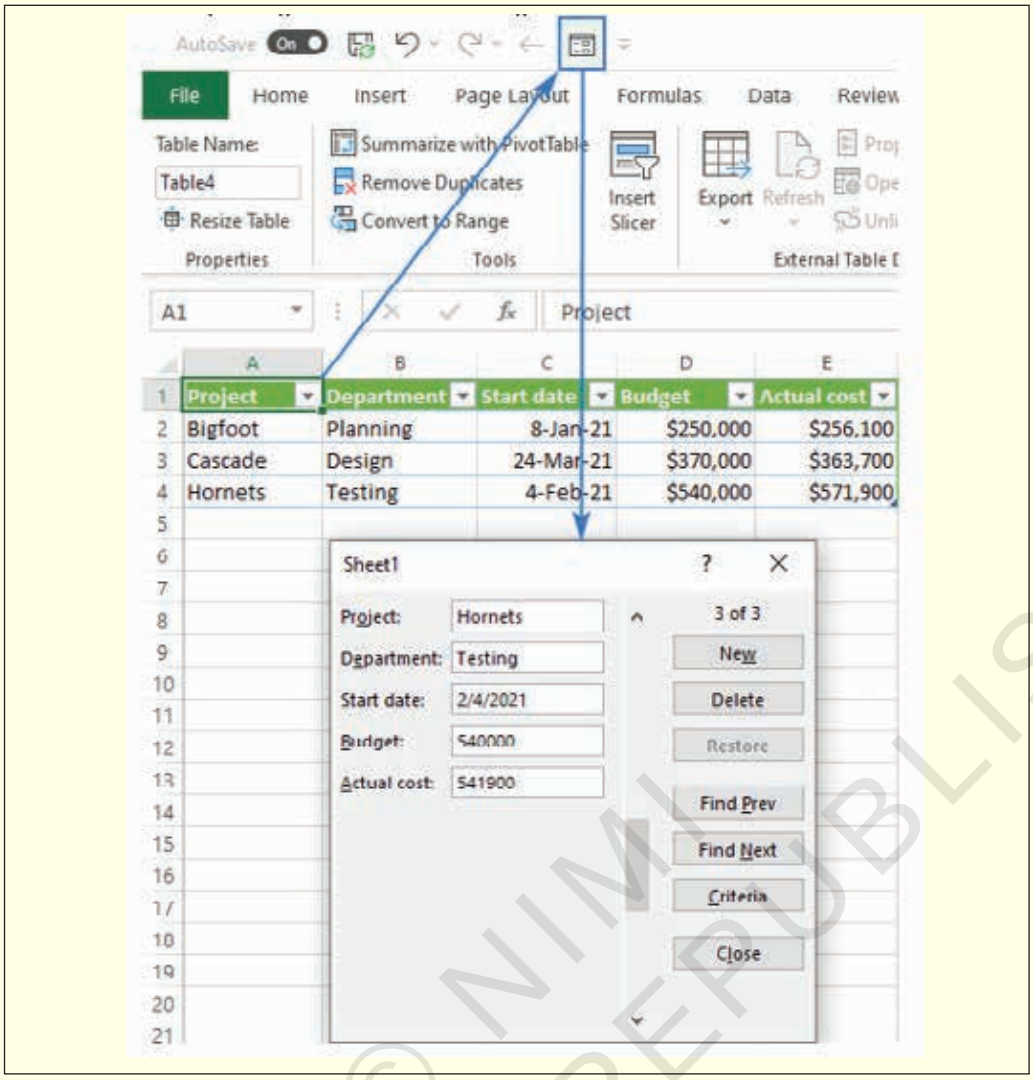
3 Place the cursor anywhere within the table and click the Form button. Done!



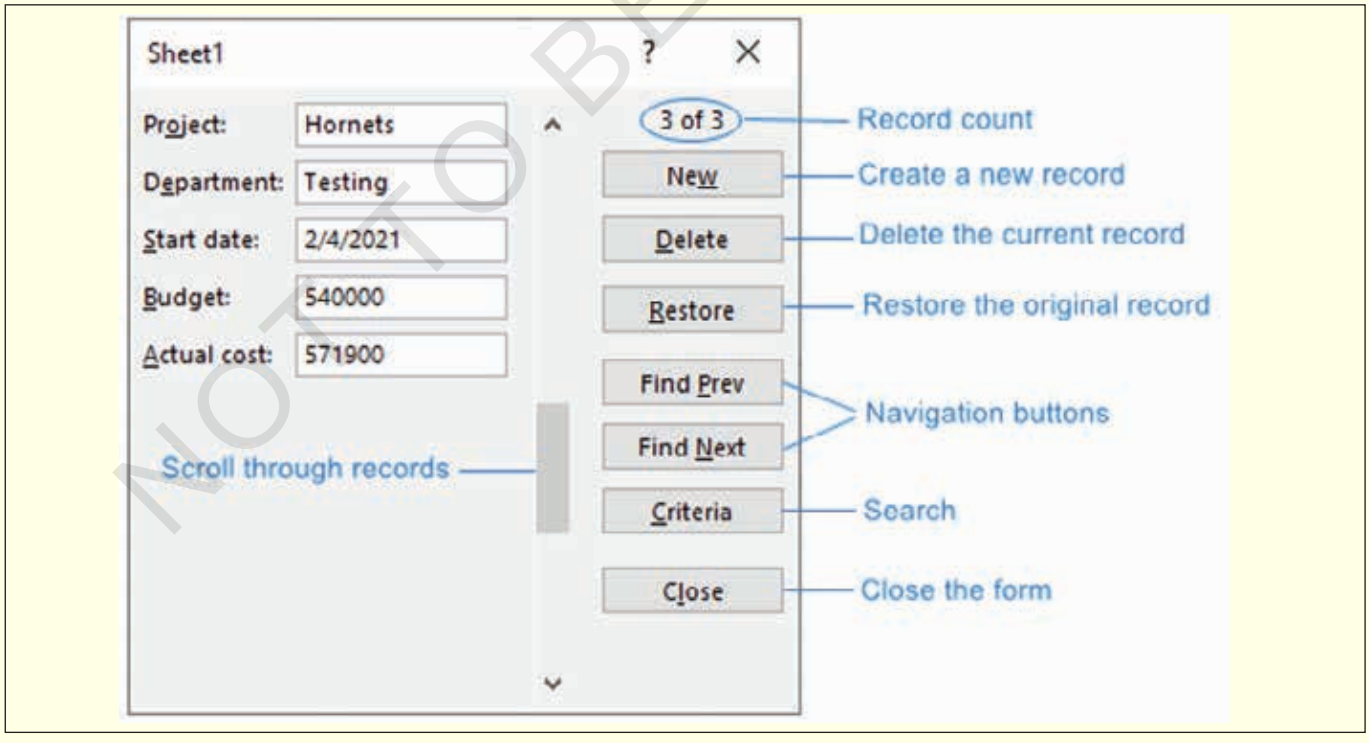
To keep things simple, let's make this small table as an example:



Clicking the Form button automatically creates a data entry form for your table with fields corresponding to the column headings:



As you can see, the Excel input form has a handful of different buttons. Here's a brief explanation of what each button does:



Aside from the buttons, you can use the following keys for navigation:

- Tab - get to the next field.
- Shift + Tab - get to the previous field.
- Enter - save the current record and start a new one.

How to add a new record

To add a new record to your table using the data entry form, perform these steps:

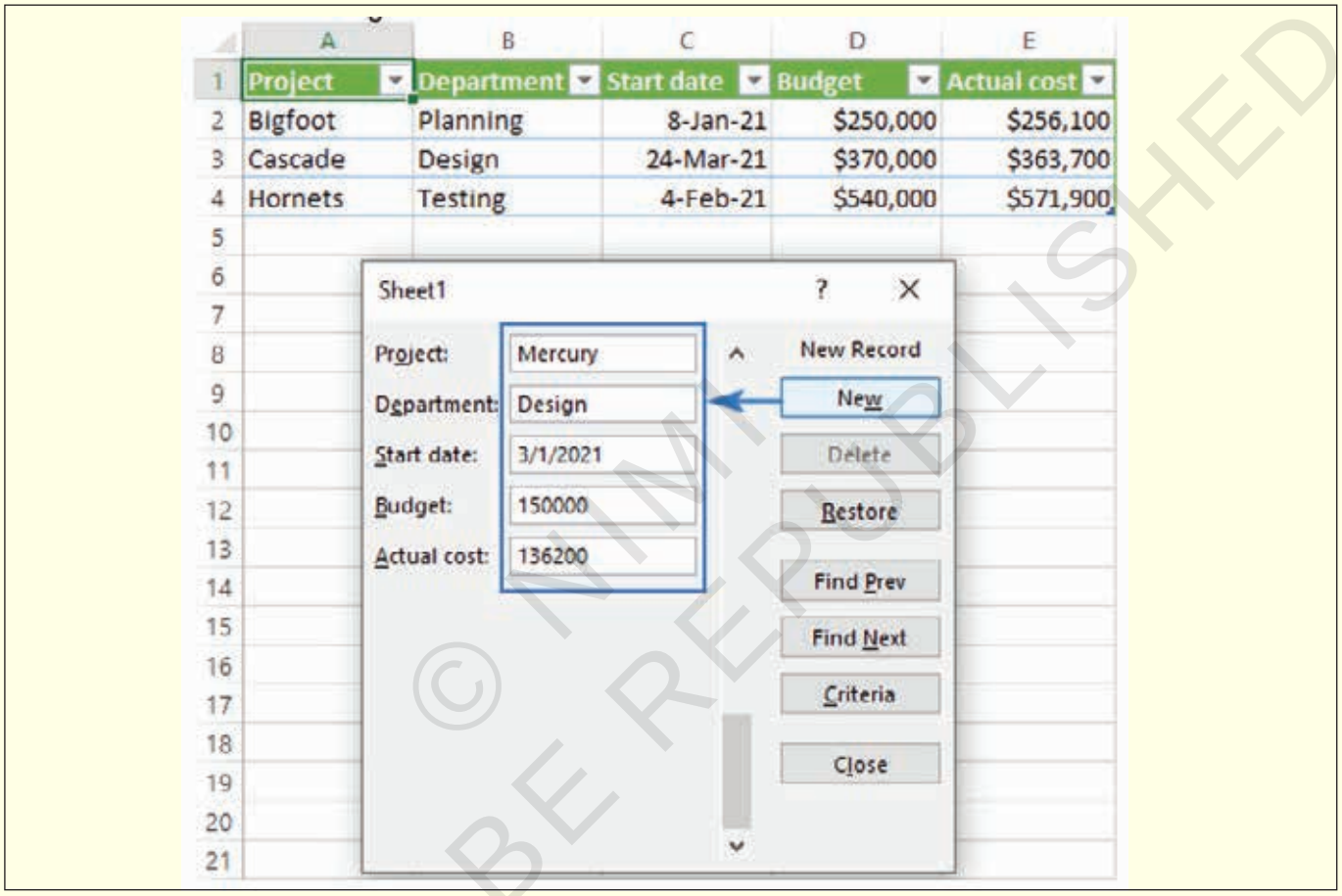
1 Select any cell in your table.

2 Click on the Form button on the Quick Access Toolbar or on the ribbon.

3 In the input form, click the New button.

4 Type the information in the appropriate fields.

5 When done, hit the Enter key or click the New button again. This will add the record to the table and get a blank form for the next record.



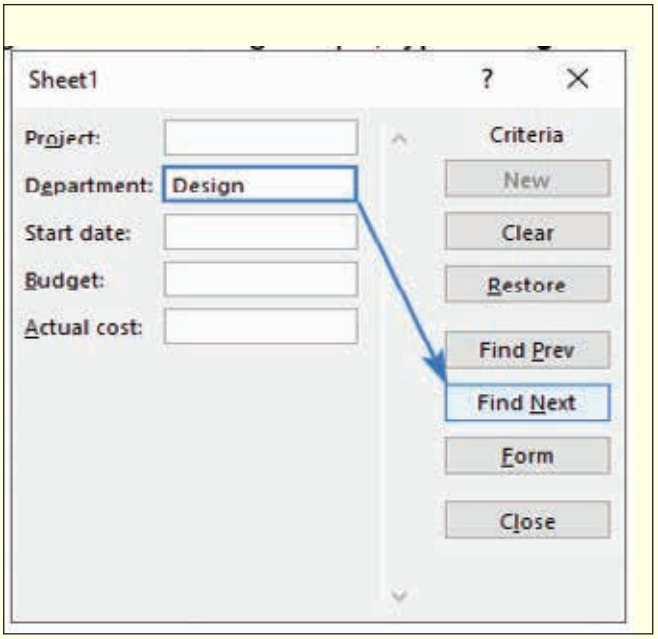
Tip: To quickly enter specific information, you can use the same shortcuts that you use in your worksheets. For example:

- Press Ctrl + ; to insert today's date.
- Press Ctrl + Shift + ; to enter the current time.

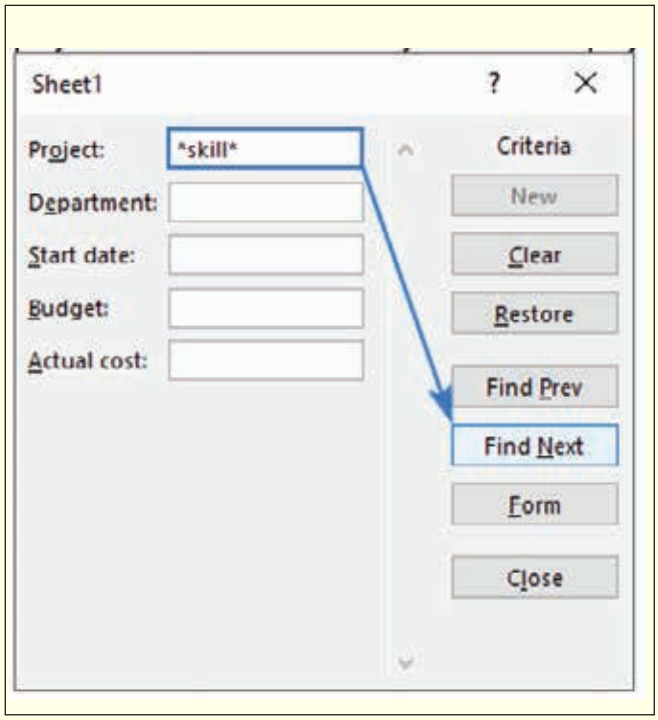
How to search for records

To go through the records one by one, you can use the Find Prev and Find Next buttons or the vertical scroll bar. To find records that meet certain conditions, use the Criteria button.

For example, to locate all the projects assigned to the Design dept., type Design in the Department field, and press Find Next:

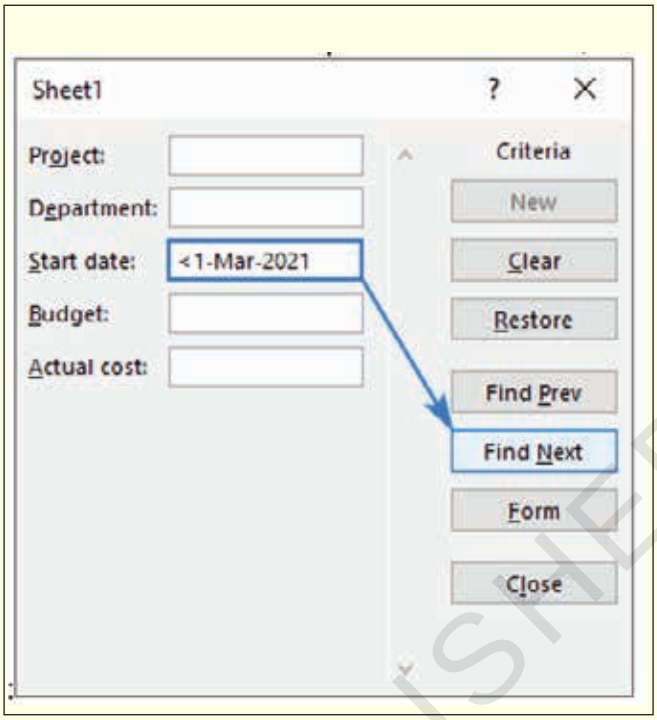


The wildcard characters can help you broaden the search. For instance, to discover the projects that contain “skill” anywhere in the project name, type *skill* in the Project field.



When dealing with numbers and dates, the logical operators such as greater than (>), less than (<), equal to (=), not equal to (<>) and others come in handy. For example, to view the records where the start date is prior to 1-Mar-2021, use “<1-Mar-2021” or “<3/1/2021” for the criteria:

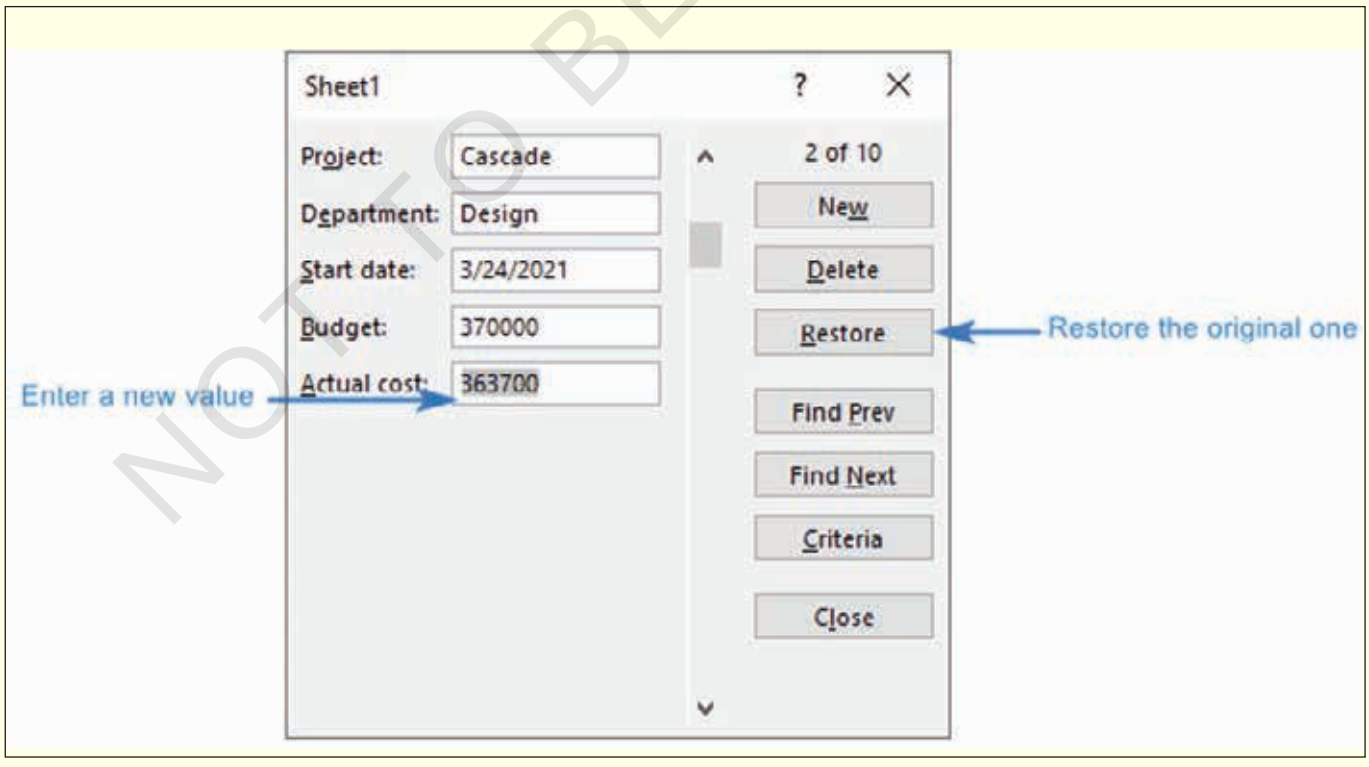
Note: Criteria on a data form are not case sensitive. Say, when searching for the Design dept., “DESIGN” and “design” will also be found.



How to update and restore records

If some entry is outdated or contains wrong information, you can use the Criteria or navigation buttons to get to the record, update the incorrect field, and press Enter to commit the updated data to the table.

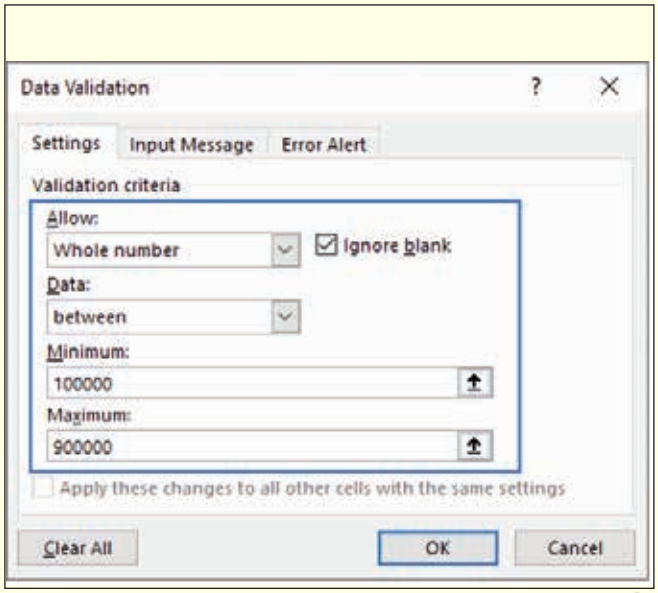
If you made some accidental changes but have not pressed the Enter key yet, you can revert to the original record by clicking the Restore button. If you’ve already hit Enter and the changes were passed over to the table, press **Ctrl + Z** to undo.



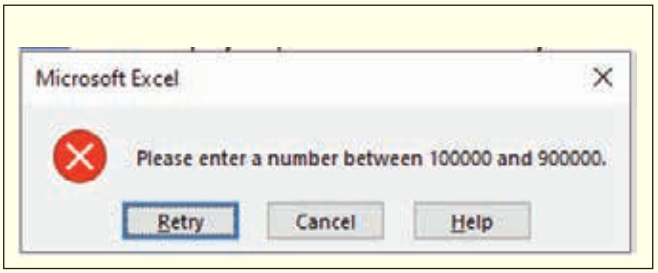
How to use Data Validation with data entry form

To restrict user input to a specific data type, you can set up a data validation rule for one or more columns in your table, and your rules will be automatically carried over to the data entry form.

For example, to limit the Budget to numbers in a given range, we create this rule:

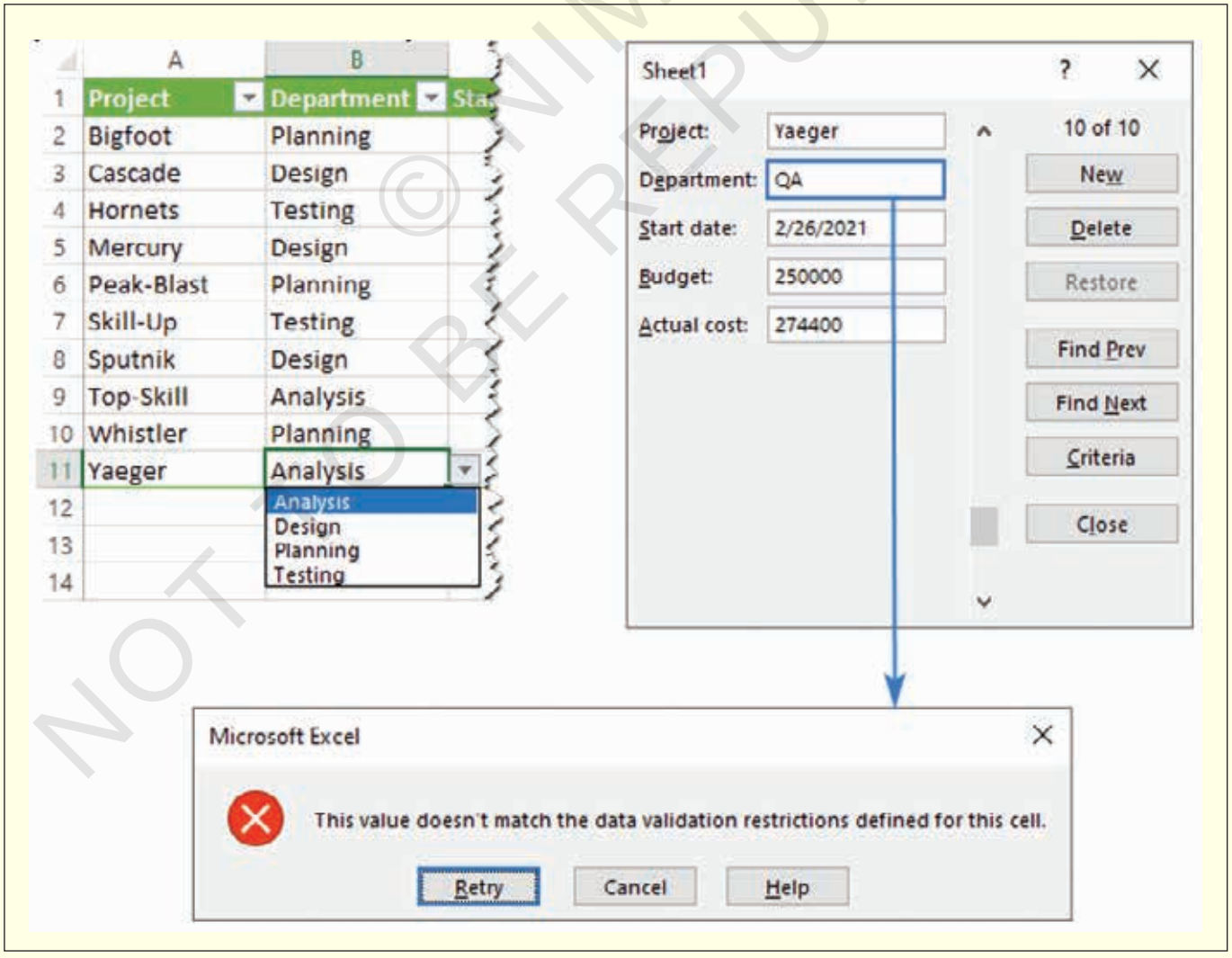


If someone tries to enter a value that does not conform to the rule you've set, an error alert will be displayed (either the standard or your custom one):



Limitation: drop down lists are unavailable on a form

The use of data validation with input forms has one limitation - drop down lists do not appear in data entry fields. But even though a drop-down list does not show up inside the form, its restrictions are still in effect. If you enter a value that is not in the list, the form will reject it just as Data Validation normally would.



Formulas in data entry forms

In case one or more columns in your table are calculated by formulas, you won't be able to alter those formulas using the form because the formula result appears as text, not as an editable field. Although that may sound like another limitation, in fact it is done for a reason. When you change a table formula in one cell, the formulas in all other cells in the same column change automatically. To avoid messing up your data, formula editing on the input form is blocked.

For example, you could use the following formula to find out if the actual cost is under, over or within the budget based on the 5% threshold:

=IF(ABS([@[Actual cost]]/ [@Budget] - 1)<=5%, "Within budget", IF([@[Actual cost]]/ [@Budget]- 1>5%, "Over budget", IF([@[Actual cost]]/ [@Budget]- 1<5%, "Under budget", "")))

If you are using a Microsoft 365 subscription and signed up for Beta Channel (Office Insider), then you could wrap the above formula in the LET function like shown below. This will make your formula more compact, easier-to-understand and faster-to-calculate:

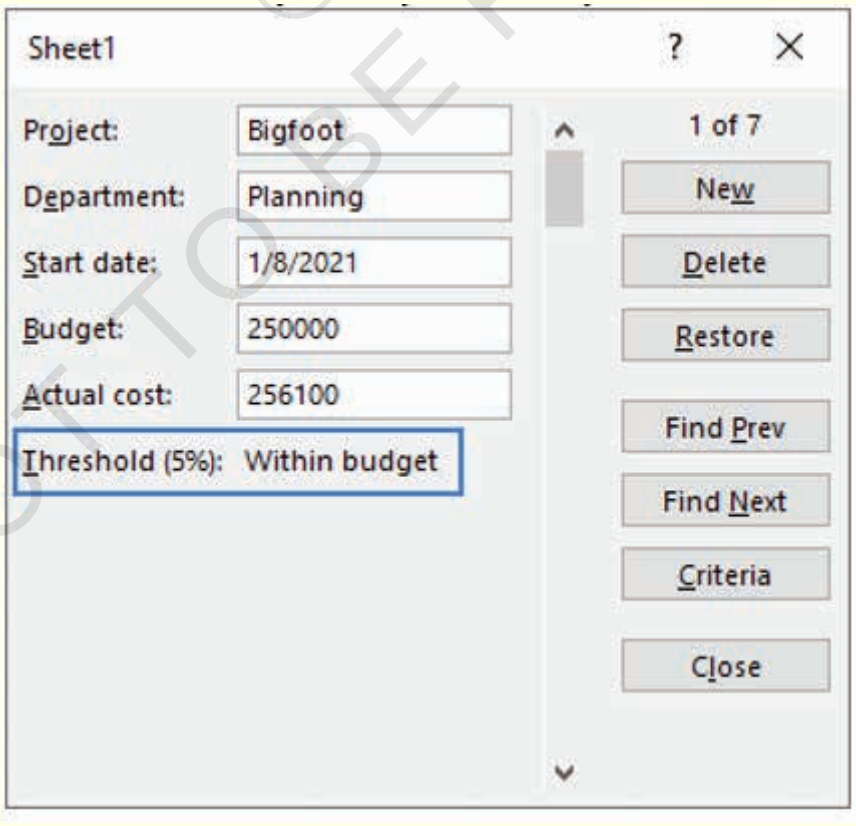
=LET(dif, E2/D2-1, IF(ABS(dif)<=5%, "Within budget", IF(dif>5%, "Over budget", IF(dif<5%, "Under budget", ""))))

F3

```
=IF(ABS([@[Actual cost]]/ [@Budget] - 1) <=5%, "Within budget",
IF([@[Actual cost]]/ [@Budget] - 1 >5%, "Over budget",
IF([@[Actual cost]]/ [@Budget] - 1<5%, "Under budget", "")))
```

	A	B	C	D	E	F
1	Project	Department	Start date	Budget	Actual cost	Threshold (5%)
2	Bigfoot	Planning	8-Jan-21	$250,000	$256,100	Within budget
3	Cascade	Design	24-Mar-21	$370,000	$363,700	Within budget
4	Hornets	Testing	4-Feb-21	$540,000	$571,900	Over budget
5	Mercury	Design	1-Mar-21	$150,000	$136,200	Under budget
6	Peak-Blast	Planning	20-Jan-21	$710,000	$736,400	Within budget
7	Skill-Up	Testing	18-Jan-21	$400,000	$373,500	Under budget
8	Sputnik	Design	20-Jan-21	$530,000	$538,200	Within budget

On the data entry form, you will only see a non-editable calculated result, not the formula:



Look up data by using functions

Objectives: At the end of this exercise you shall be able to
- **state look up data.**

Requirements

Tools/Equipment/Machines

- A working PC with MS-OFFICE - 1 No.

PROCEDURE

Look up data

Use LOOKUP, one of the lookup and reference functions, when you need to look in a single row or column and find a value from the same position in a second row or column.

For example, let's say you know the part number for an auto part, but you don't know the price. You can use the LOOKUP function to return the price in cell H2 when you enter the auto part number in cell H1.

	B	C	D	E	F	G	H
1	**Part Number**	**Part Name**	**Part Price**	**Status**		**Part Number**	
2	A001	water pump	$68.39	In stock		**Part Price**	<enter the LOOKUP forumula here>
3	A002	alternator	$380.73	In stock			
4	A003	air filter	$15.49	In stock			
5	A004	wheel bearing	$35.16	In stock			

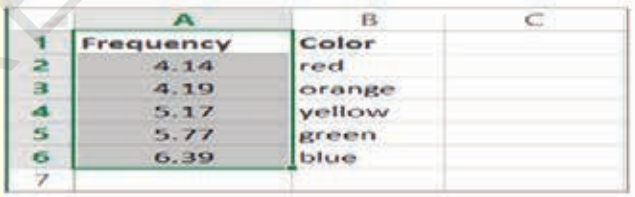
Use the LOOKUP function to search one row or one column. In the above example, we're searching prices in column D.

Tips: Consider one of the newer lookup functions, depending on which version you are using.

- Use VLOOKUP to search one row or column, or to search multiple rows and columns (like a table). It's a much improved version of LOOKUP. Watch this video about how to use VLOOKUP.
- If you are using Microsoft 365, use XLOOKUP - it's not only faster, it also lets you search in any direction (up, down, left, right).

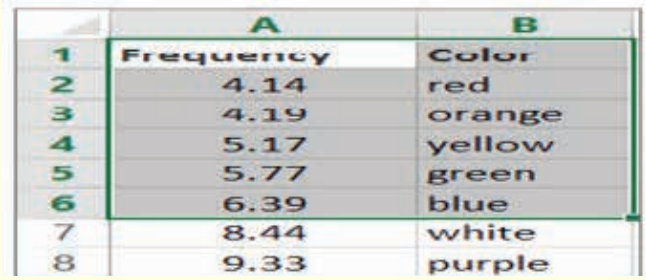
There are two ways to use LOOKUP: Vector form and Array form

- **Vector form:** Use this form of LOOKUP to search one row or one column for a value. Use the vector form when you want to specify the range that contains the values that you want to match. For example, if you want to search for a value in column A, down to row 6.
- **Array form:** We strongly recommend using VLOOKUP or HLOOKUP instead of the array form. Watch this video about using VLOOKUP. The array form is provided for compatibility with other spreadsheet programs, but it's functionality is limited.



	A	B	C
1	Frequency	Color	
2	4.14	red	
3	4.19	orange	
4	5.17	yellow	
5	5.77	green	
6	6.39	blue	
7			

An array is a collection of values in rows and columns (like a table) that you want to search. For example, if you want to search columns A and B, down to row 6. LOOKUP will return the nearest match. To use the array form, your data must be sorted.



	A	B
1	Frequency	Color
2	4.14	red
3	4.19	orange
4	5.17	yellow
5	5.77	green
6	6.39	blue
7	8.44	white
8	9.33	purple

Vector form

The vector form of LOOKUP looks in a one-row or one-column range (known as a vector) for a value and returns a value from the same position in a second one-row or one-column range.

Syntax

LOOKUP(lookup_value, lookup_vector, [result_vector])

The LOOKUP function vector form syntax has the following arguments:

- lookup_value Required. A value that LOOKUP searches for in the first vector. Lookup_value can be a number, text, a logical value, or a name or reference that refers to a value.
- lookup_vector Required. A range that contains only one row or one column. The values in lookup_vector can be text, numbers, or logical values.

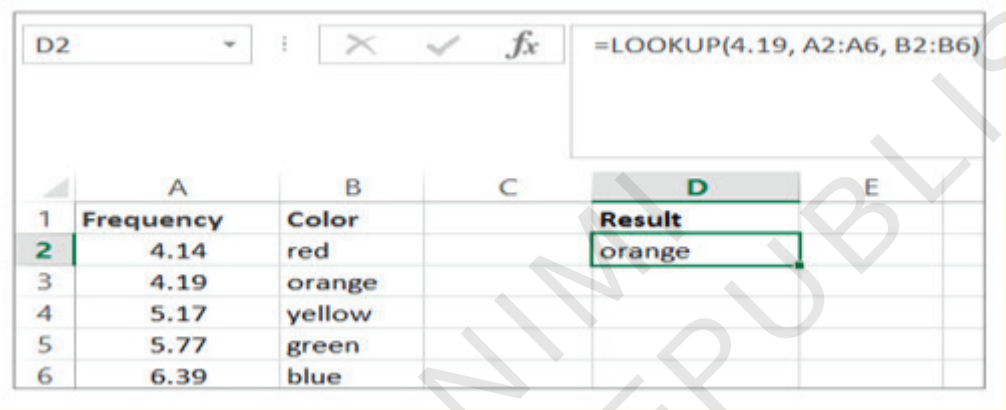
  Important: The values in lookup_vector must be placed in ascending order: ..., -2, -1, 0, 1, 2, ..., A-Z, FALSE, TRUE; otherwise, LOOKUP might not return the correct value. Uppercase and lowercase text are equivalent.
- result_vector Optional. A range that contains only one row or column. The result_vector argument must be the same size as lookup_vector. It has to be the same size.

Remarks

- If the LOOKUP function can't find the lookup_value, the function matches the largest value in lookup_vector that is less than or equal to lookup_value.
- If lookup_value is smaller than the smallest value in lookup_vector, LOOKUP returns the #N/A error value.

Vector examples

You can try out these examples in your own Excel worksheet to learn how the LOOKUP function works. In the first example, you're going to end up with a spreadsheet that looks similar to this one:



Array form

Tip: We strongly recommend using VLOOKUP or HLOOKUP instead of the array form. See this video about VLOOKUP; it provides examples. The array form of LOOKUP is provided for compatibility with other spreadsheet programs, but its functionality is limited.

The array form of LOOKUP looks in the first row or column of an array for the specified value and returns a value from the same position in the last row or column of the array. Use this form of LOOKUP when the values that you want to match are in the first row or column of the array.

Syntax

LOOKUP(lookup_value, array)

The LOOKUP function array form syntax has these arguments:

- lookup_value Required. A value that LOOKUP searches for in an array. The lookup_value argument can be a number, text, a logical value, or a name or reference that refers to a value.
- If LOOKUP can't find the value of lookup_value, it uses the largest value in the array that is less than or equal to lookup_value.
- If the value of lookup_value is smaller than the smallest value in the first row or column (depending on the array dimensions), LOOKUP returns the #N/A error value.
- array Required. A range of cells that contains text, numbers, or logical values that you want to compare with lookup_value.

  The array form of LOOKUP is very similar to the HLOOKUP and VLOOKUP functions. The difference is that HLOOKUP searches for the value of lookup_value in the first row, VLOOKUP searches in the first column, and LOOKUP searches according to the dimensions of array.
- If array covers an area that is wider than it is tall (more columns than rows), LOOKUP searches for the value of lookup_value in the first row.
- If an array is square or is taller than it is wide (more rows than columns), LOOKUP searches in the first column.
- With the HLOOKUP and VLOOKUP functions, you can index down or across, but LOOKUP always selects the last value in the row or column.

  Important: The values in array must be placed in ascending order: ..., -2, -1, 0, 1, 2, ..., A-Z, FALSE, TRUE; otherwise, LOOKUP might not return the correct value. Uppercase and lowercase text are equivalent.

Use advanced date functions

Objectives: At the end of this exercise you shall be able to
- **DATE,DATEIF, DATEVALUE, DAY, DAYS, DAYS360**
- **EDATE , EOMONTH, HOUR,ISOWEEKNUM, MINUTE, MONTH, NETWORKDAYS, NETWORKDAYS.INTL, NOW,SECOND, TIME,TIMEVALUE**
- **TODAY, WEEKDAY, WEEKNUM,WORKDAY, WORKDAY.INTL, YEAR, YEARFRAC.**

Requirements

Tools/Equipment/Machines

- A working PC with MS-OFFICE - 1 No.

PROCEDURE

DATE

The DATE function returns the serial number of a particular date.

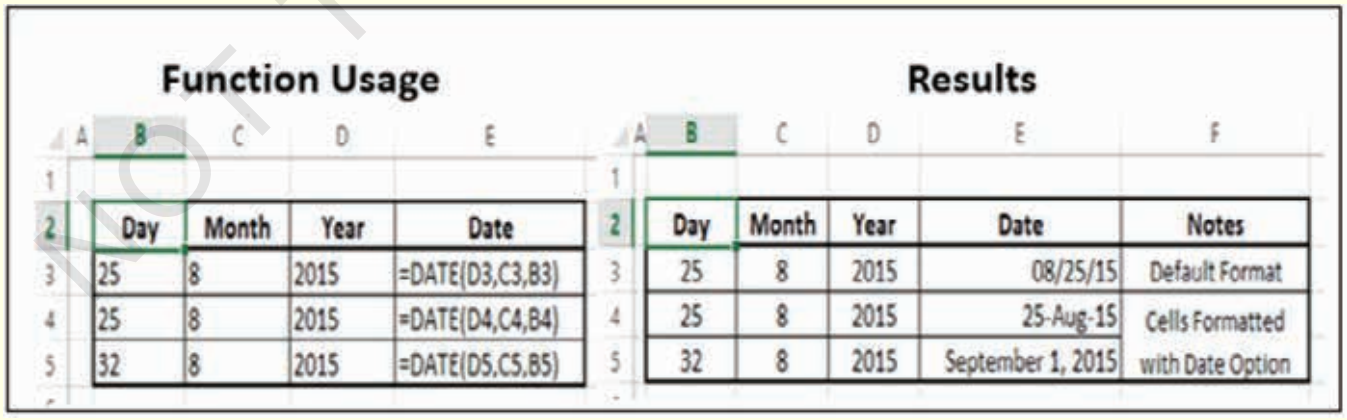
Syntax

DATE (year, month, day)

Arguments

Argument	Description	Required/ Optional
year	The value of the year argument can include one to four digits. Excel interprets the year argument according to the date system your computer is using. By default, Microsoft Excel for Windows uses the 1900 date system. See Notes below.	Required
month	A positive or negative integer representing the month of the year from 1 to 12 (January to December). See Notes below.	Required
day	A positive or negative integer representing the day of the month from 1 to 31. See Notes below.	Required

Example



Day	Month	Year	Date
25	8	2015	=DATE(D3,C3,B3)
25	8	2015	=DATE(D4,C4,B4)
32	8	2015	=DATE(D5,C5,B5)

Day	Month	Year	Date	Notes
25	8	2015	08/25/15	Default Format
25	8	2015	25-Aug-15	Cells Formatted
32	8	2015	September 1, 2015	with Date Option

DATEIF

The DATEDIF function calculates the number of days, months, or years between two dates. This function is provided for compatibility with Lotus 1-2-3.

Syntax

DATEDIF (start_date,end_date,unit)

Arguments

Argument	Description	Required/ Optional
Start_date	A date that represents the first, or starting, date of the period. Dates may be entered as text strings within quotation marks (E.g. “2001/1/30”), as serial numbers (E.g. 36921, which represents January 30, 2001, if you are using the 1900 date system), or as the results of other formulas or functions (E.g. DATEVALUE (“2001/1/30”)).	Required
End_date	A date that represents the last, or ending, date of the period.	Required
Unit	The type of information that you want returned. Look at the Unit Table given below.	Required

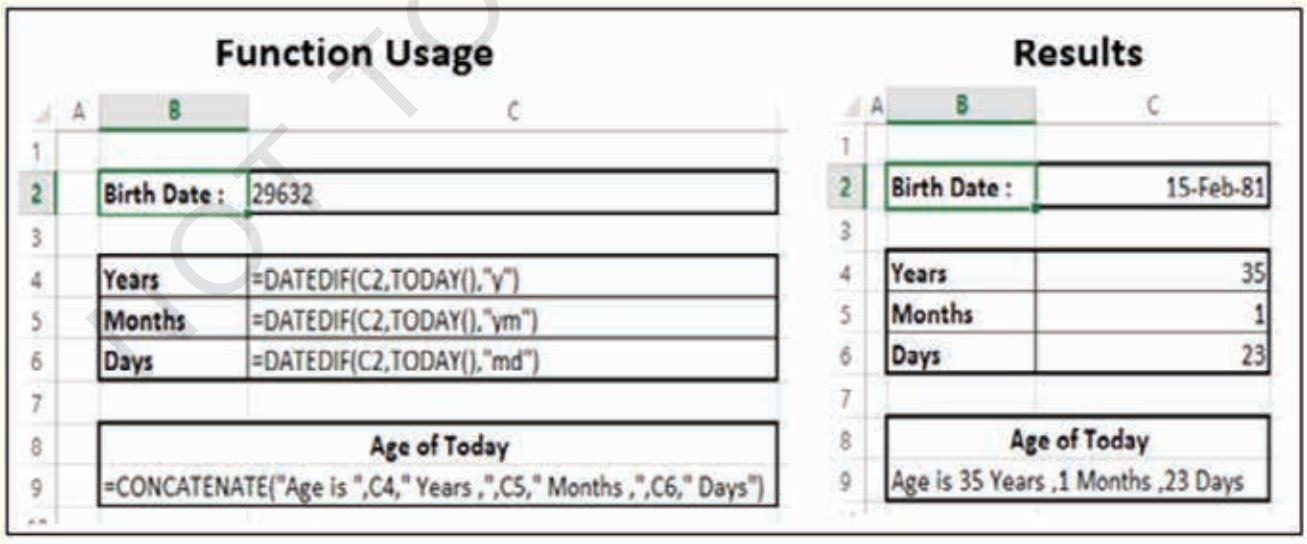
Unit Table

Unit	Returns
“Y”	The number of complete years in the period.
“M”	The number of complete months in the period.
“D”	The number of days in the period.
“MD”	The difference between the days in start_date and end_date. The months and years of the dates are ignored.
“YM”	The difference between the months in start_date and end_date. The days and years of the dates are ignored
“YD”	The difference between the days of start_date and end_date. The years of the dates are ignored.

Notes

- Excel stores dates as sequential serial numbers so that they can be used in calculations. January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,447 days after January 1, 1900
- The DATEDIF function is useful in formulas where you need to calculate age.

Example



DATEVALUE

The DATEVALUE function converts a date in the form of text to a serial number (Excel's date-time code).

The DATEVALUE function converts a date that is stored as text to a serial number that Excel recognizes as a date. For example,

=DATEVALUE ("1/1/2008")

returns 39448, the serial number of the date 1/1/2008.

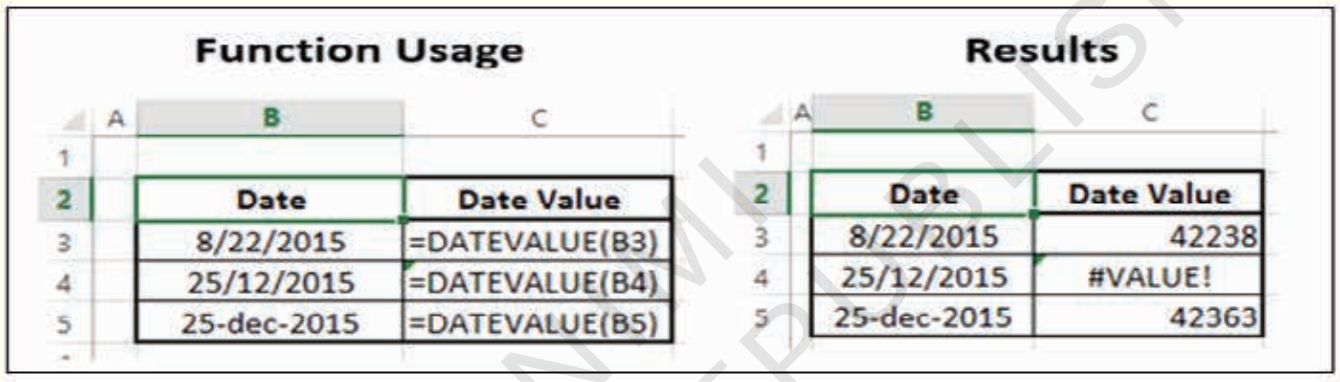
Syntax

DATEVALUE (date_text)

Arguments

Argument	Description	Required/ Optional
date_text	Text that represents a date in an Excel date format, or a reference to a cell that contains text that represents a date in an Excel date format. For example, "1/30/2008" or "30-Jan-2008" are text strings within quotation marks that represent dates. See Notes below.	Required

Example



DAY

The DAY function returns the day of a date, represented by a serial number. The day is given as an integer ranging from 1 to 31.

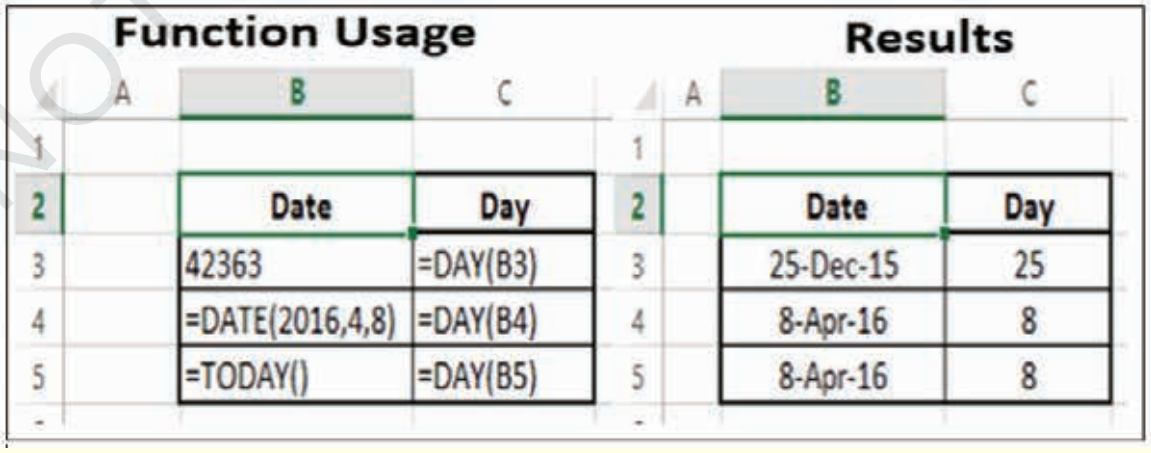
Syntax

DAY (serial number)

Arguments

Argument	Description	Required/ Optional
serial number	The date of the day you are trying to find. Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE (2008,5,23) for the 23rd day of May 2008. Problems can occur if dates are entered as text.	Required

Example



DAYS

The DAYS function returns the number of days between two dates.

Syntax

DAYS (end_date, start_date)

Arguments

Argument	Description	Required/ Optional
End_date	Start_date and End_date are the two dates between which you want to know the number of days.	Required
Start_date	Start_date and End_date are the two dates between which you want to know the number of days.	Required

Example

Function Usage

	A	B	C	D
1				
2		Start Date	End Date	Result
3		42370	42430	=DAYS(C3,B3)
4		42430	42370	=DAYS(C4,B4)
5		42370		=DAYS(C5,B5)
6			42370	=DAYS(C6,B6)
7		1 1 2016	42430	=DAYS(C7,B7)

Results

	A	B	C	D
1				
2		Start Date	End Date	Result
3		1/1/2016	3/1/2016	60
4		3/1/2016	1/1/2016	-60
5		1/1/2016		-42370
6			1/1/2016	42370
7		1 1 2016	3/1/2016	#VALUE!

DAYS360

The function DAYS360 returns the number of days between two dates based on a 360-day year (twelve 30-day months), which is used in accounting calculations.

Syntax

DAYS360 (start_date,end_date,[method])

Arguments

Argument	Description	Required/ Optional
Start_date	The two dates between which you want to know the number of days.	Required
end_date	If start_date occurs after end_date, the DAYS360 Function returns a negative number. Dates should be entered by using the DATE Function, or derived from the results of other formulas or functions. Problems can occur if dates are entered as text.	Required
Method	A logical value that specifies whether to use the U.S. or European method in the calculation. Look at the Method Table below.	Optional

Method Table

Method	Defined
FALSE or omitted	U.S. (NASD) method. If the starting date is the last day of a month, it becomes equal to the 30th day of the same month. If the ending date is the last day of a month and the starting date is earlier than the 30th day of a month, the ending date becomes equal to the 1st day of the next month; otherwise, the ending date becomes equal to the 30th day of the same month.
TRUE	European method. Starting dates and ending dates that occur on the 31st day of a month become equal to the 30th day of the same month.

Example

Function Usage

	A	B	C	D
1				
2		StartDate	EndDate	Days Between
3		42370	42374	=DAYS360(B3,C3,FALSE)
4		42370	42374	=DAYS360(B4,C4,TRUE)
5		42374	42370	=DAYS360(B5,C5,TRUE)
6		42370	42401	=DAYS360(B6,C6,FALSE)
7		42370	42401	=DAYS360(B7,C7,TRUE)
8		42370	=DATE(2016,3,31)	=DAYS360(B8,C8,FALSE)
9		42370	=DATE(2016,3,31)	=DAYS360(B9,C9,TRUE)
10		42095	=DATE(2016,3,31)	=DAYS360(B10,C10,FALSE)
11		42095	=DATE(2016,3,31)	=DAYS360(B11,C11,TRUE)

Results

	A	B	C	D
1				
2		StartDate	EndDate	Days Between
3		1-Jan-16	5-Jan-16	4
4		1-Jan-16	5-Jan-16	4
5		5-Jan-16	1-Jan-16	-4
6		1-Jan-16	1-Feb-16	30
7		1-Jan-16	1-Feb-16	30
8		1-Jan-16	31-Mar-16	90
9		1-Jan-16	31-Mar-16	89
10		1-Apr-15	31-Mar-16	360
11		1-Apr-15	31-Mar-16	359

EDATE

The EDATE function returns the serial number that represents the date that is the indicated number of months before or after a specified date (the start_date).

Use EDATE to calculate maturity dates or due dates that fall on the same day of the month as the date of issue.

Syntax

EDATE (start_date, months)

Arguments

Argument	Description	Required/ Optional
Start_date	A date that represents the start date. Dates should be entered by using the DATE function, or as results of other formulas or functions. Problems can occur if dates are entered as text.	Required
Months	The number of months before or after start_date. A positive value for months yields a future date; a negative value yields a past date.	Required

Example

Function Usage

	A	B	C	D
1				
2		Start Date	Months	End Date
3		42370	3	=EDATE(B3,C3)
4		42371	3	=EDATE(B4,C4)
5		42371	-3	=EDATE(B5,C5)

Results

	A	B	C	D
1				
2		Start Date	Months	End Date
3		1-Jan-16	3	1-Apr-16
4		2-Jan-16	3	2-Apr-16
5		2-Jan-16	-3	2-Oct-15

EMONTH

The EOMONTH function returns the serial number for the last day of the month that is the indicated number of months before or after start_date.

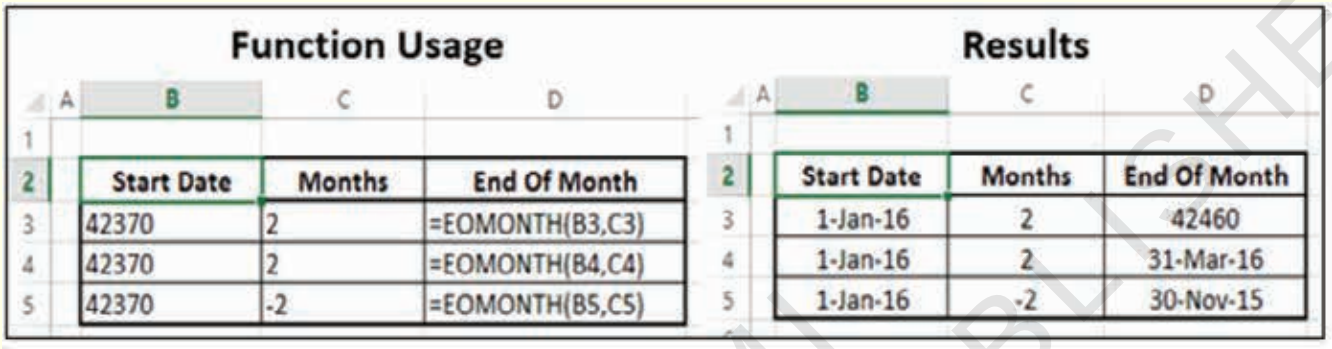
Syntax

EOMONTH (start_date, months)

Arguments

Argument	Description	Required/ Optional
Start_date	A date that represents the starting date. Dates should be entered by using the DATE function, or as results of other formulas or functions. Problems can occur if dates are entered as text.	Required
Months	The number of months before or after start_date. A positive value for months yields a future date. A negative value yields a past date.	Required

Example



Function Usage

	A	B	C	D
1				
2		Start Date	Months	End Of Month
3		42370	2	=EOMONTH(B3,C3)
4		42370	2	=EOMONTH(B4,C4)
5		42370	-2	=EOMONTH(B5,C5)

Results

	A	B	C	D
1				
2		Start Date	Months	End Of Month
3		1-Jan-16	2	42460
4		1-Jan-16	2	31-Mar-16
5		1-Jan-16	-2	30-Nov-15

HOUR

The HOUR function returns the hour of a time value. The hour is given as an integer, ranging from 0 (12:00 A.M.) to 23 (11:00 P.M.).

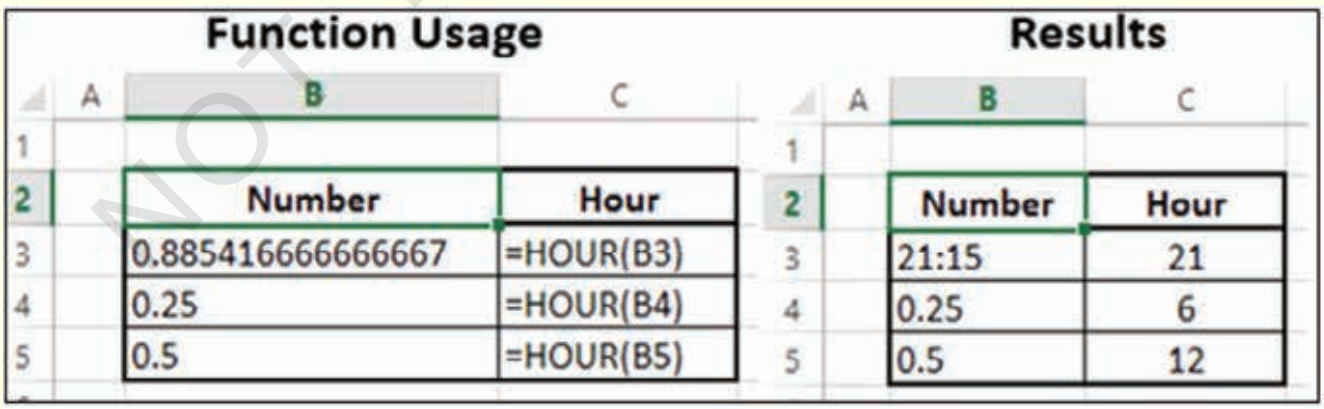
Syntax

HOUR (serial_number)

Arguments

Argument	Description	Required/ Optional
Serial_number	The time that contains the hour, you want to find. Times can be entered • as text strings within quotation marks (E.g. “6:45 PM”) • as decimal numbers (E.g. 0.78125, which represents 6:45 PM) • as results of other formulas or functions (E.g. TIME VALUE(“6:45 PM”))	Required

Example



Function Usage

	A	B	C
1			
2		Number	Hour
3		0.885416666666667	=HOUR(B3)
4		0.25	=HOUR(B4)
5		0.5	=HOUR(B5)

Results

	A	B	C
1			
2		Number	Hour
3		21:15	21
4		0.25	6
5		0.5	12

ISOWEEKNUM

The ISOWEEKNUM function returns number of the ISO week number of the year for a given date.

Syntax

ISOWEEKNUM (date)

Arguments

Argument	Description	Required/ Optional
Date	Date is the date-time code used by Excel for date and time calculation.	Required

Example

Function Usage

	A	B	C
1			
2		Date	ISOWEEKNUM
3		42005	=ISOWEEKNUM(B3)
4		42370	=ISOWEEKNUM(B4)
5		42431	=ISOWEEKNUM(B5)
6		42463	=ISOWEEKNUM(B6)
7			

Results

	A	B	C
1			
2		Date	ISOWEEKNUM
3		1/1/2015	1
4		1/1/2016	53
5		3/2/2016	9
6		4/3/2016	13

MINUTE

The MINUTE function returns the minutes of a time value. The minute is given as an integer, ranging from 0 to 59.

Syntax

MINUTE (serial_number)

Arguments

Argument	Description	Required/ Optional
Serial_number	The time that contains the minute, you want to find. Times can be entered • as text strings within quotation marks (E.g. “6:45 PM”) • as decimal numbers (E.g. 0.78125, which represents 6:45 PM) • as results of other formulas or functions (E.g. TIMEVALUE (“6:45 PM”))	Required

Example

Function Usage

	A	B	C
1			
2		Number	Minute
3		0.885416666666667	=MINUTE(B3)
4		0.78125	=MINUTE(B4)
5		0.525	=MINUTE(B5)
6		0.677083333333333	=MINUTE(B6)
7		4:75:00 PM	=MINUTE(B7)

Results

	A	B	C
1			
2		Number	Minute
3		21:15	15
4		0.78125	45
5		0.525	36
6		4:15:00 PM	15
7		4:75:00 PM	#VALUE!

MONTH

The MONTH function returns the month of a date represented by a serial number. The month is given as an integer, ranging from 1 (January) to 12 (December).

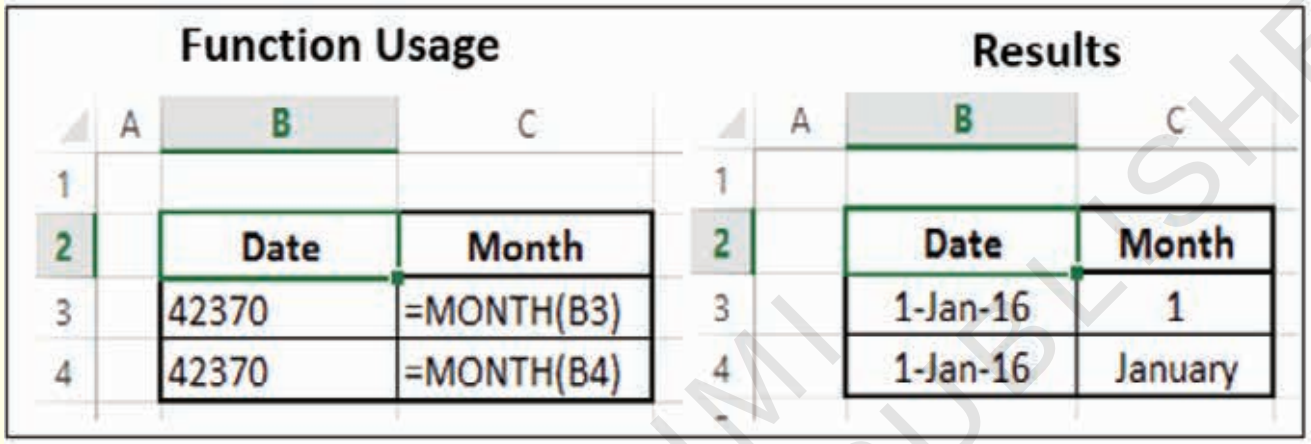
Syntax

MONTH (serial_number)

Arguments

Argument	Description	Required/ Optional
Serial_number	The date of the month you are trying to find. Dates should be entered by using the DATE Function, or as results of other formulas or functions. Problems can occur if dates are entered as text.	Required

Example



NETWORKDAYS

The NETWORKDAYS function returns the number of whole working days between start_date and end_ date. Working days exclude weekends and any dates identified in holidays.

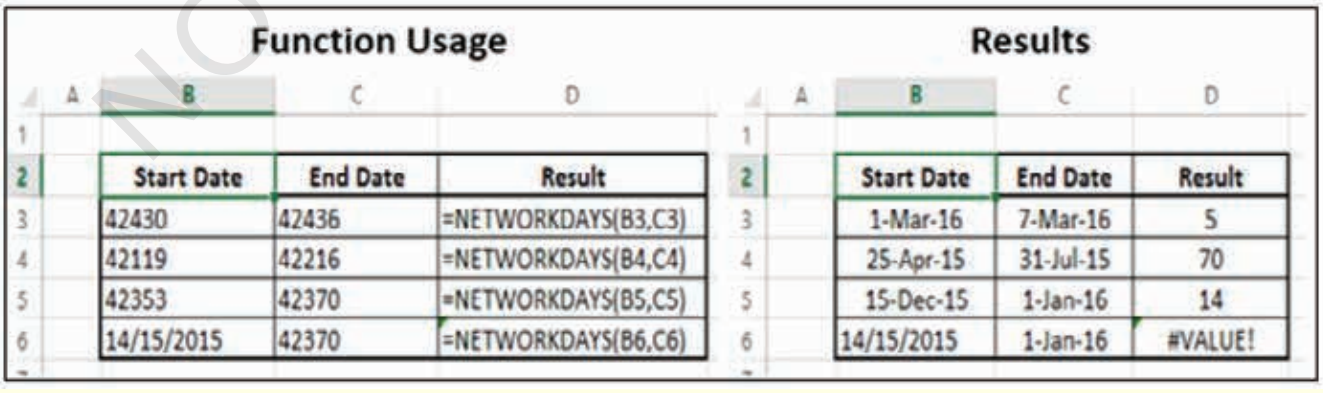
Syntax

NETWORKDAYS (start_date, end_date, [holidays])

Arguments

Argument	Description	Required/ Optional
Start_date	A date that represents the start date.	Required
End_date	A date that represents the end date.	Required
Holidays	An optional range of one or more dates to exclude from the working calendar, such as state and federal holidays and floating holidays. The list can be either a range of cells that contains the dates or an array constant of the serial numbers that represent the dates.	Optional

Example



NETWORKDAY.INTL

The NETWORKDAY.INTL function returns the number of whole workdays between two dates using parameters to indicate which and how many days are weekend days. Weekend days and any days that are specified as holidays are not considered as workdays.

Syntax

NETWORKDAYS.INTL (start_date, end_date, [weekend], [holidays])

Arguments

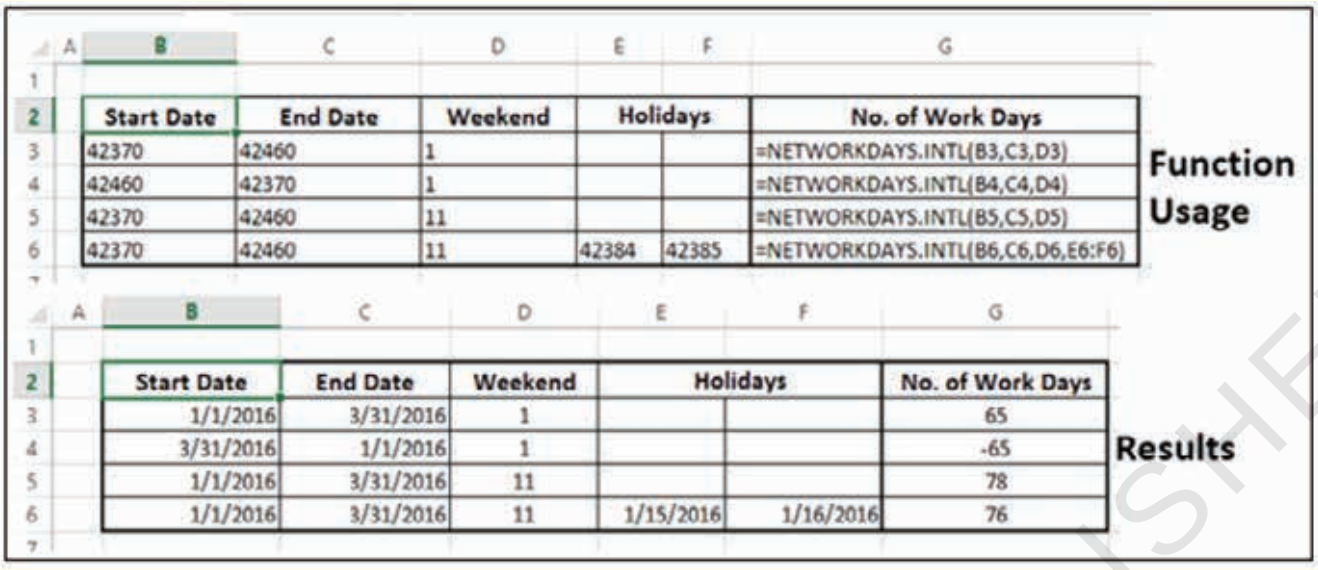
Argument	Description	Required/ Optional
Start_date	The dates for which the difference is to be computed.	Required
End_date	The start_date can be earlier than, the same as, or later than the end_date.	Required
Weekend	Indicates the days of the week that are weekend days and are not included in the number of whole working days between start_date and end_date. Weekend is a weekend number or string that specifies when weekends occur. Look at Weekend Number - Weekend Days Table given below.	Optional
Holidays	An optional set of one or more dates that are to be excluded from the working day calendar. Holidays shall be • a range of cells that contain the dates • an array constant of the serial values that represent those dates The ordering of dates or serial values in holidays can be arbitrary.	Optional

Weekend Number - Weekend Days Table

Weekend Number	Weekend Days
1 or omitted	Saturday, Sunday
2	Sunday, Monday
3	Monday, Tuesday
4	Tuesday, Wednesday
5	Wednesday, Thursday
6	Thursday, Friday
7	Friday, Saturday
11	Sunday only
12	Monday only
13	Tuesday only
14	Wednesday only
15	Thursday only
16	Friday only
17	Saturday only

Weekend string values are seven characters long and each character in the string represents a day of the week, starting with Monday. 1 represents a non-workday and 0 represents a workday. Only the characters 1 and 0 are permitted in the string. Using 1111111 will always return 0.

Example



Start Date	End Date	Weekend	Holidays		No. of Work Days
42370	42460	1			=NETWORKDAYS.INTL(B3,C3,D3)
42460	42370	1			=NETWORKDAYS.INTL(B4,C4,D4)
42370	42460	11			=NETWORKDAYS.INTL(B5,C5,D5)
42370	42460	11	42384	42385	=NETWORKDAYS.INTL(B6,C6,D6,E6:F6)

Function Usage

Start Date	End Date	Weekend	Holidays		No. of Work Days
1/1/2016	3/31/2016	1			65
3/31/2016	1/1/2016	1			-65
1/1/2016	3/31/2016	11			78
1/1/2016	3/31/2016	11	1/15/2016	1/16/2016	76

Results

NOW

The NOW function returns the serial number of the current date and time.

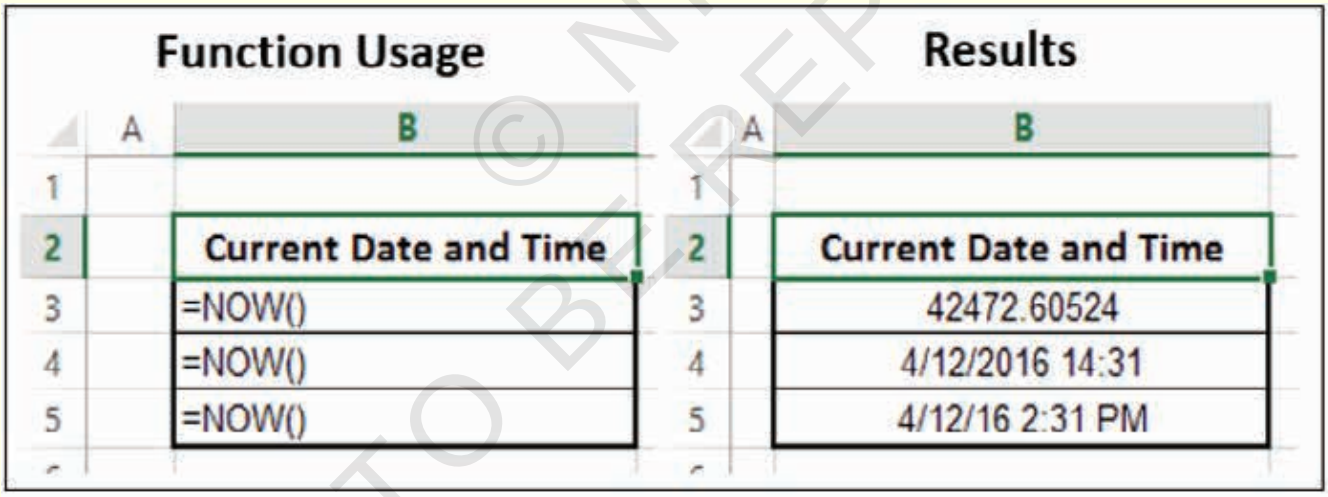
Syntax

NOW ()

Arguments

The NOW function syntax has no arguments.

Example



Function Usage

Current Date and Time
=NOW()
=NOW()
=NOW()

Results

Current Date and Time
42472.60524
4/12/2016 14:31
4/12/16 2:31 PM

SECOND

The SECOND function returns the seconds of a time value. The second is given as an integer in the range 0 (zero) to 59.

Syntax

SECOND (serial_number)

Arguments

Argument	Description	Required/ Optional
Serial_number	The time that contains the seconds, you want to find. Times can be entered as − • Text strings within quotation marks (E.g. “6:45 PM”) • Decimal numbers (E.g. 0.78125, which represents 6:45 PM) • Results of other formulas or functions (E.g. TIMEVALUE “6:45 PM”))	Required

Example

Function Usage

	A	B	C
1			
2		Number	Second
3		=NOW()	=SECOND(B3)
4		0.5	=SECOND(B4)
5		0.5	=SECOND(B5)
6		0.51	=SECOND(B6)
7		2.51	=SECOND(B7)

Results

	A	B	C
1			
2		Number	Second
3		13/Apr/16 05:24:08	8
4		12:00:00 PM	0
5		0.50	0
6		0.51	24
7		2.51	24

TIME

The TIME function returns the decimal number for a particular time. If the cell format was General before the Function was entered, the result is formatted as a date.

The decimal number returned by TIME is a value ranging from 0 (zero) to 0.99988426, representing the times from 0:00:00 (12:00:00 AM) to 23:59:59 (11:59:59 P.M.)

Syntax

TIME (hour, minute, second)

Arguments

Argument	Description	Required/ Optional
Hour	A number from 0 (zero) to 32767 representing the hour. Any value greater than 23 will be divided by 24 and the remainder will be treated as the hour value.	Required
Minute	A number from 0 to 32767 representing the minute. Any value greater than 59 will be converted to hours and minutes.	Required
Second	A number from 0 to 32767 representing the second. Any value greater than 59 will be converted to hours, minutes, and seconds.	Required

Example

Function Usage

	A	B	C	D	E
1					
2		Hour	Minute	Second	Time
3		14	30	59	=TIME(B3,C3,D3)
4		14	30	59	=TIME(B4,C4,D4)
5		14	30	59	=TIME(B5,C5,D5)
6		25	5	0	=TIME(B6,C6,D6)
7		25	5		=TIME(B7,C7,D7)
8		25	-5		=TIME(B8,C8,D8)
9		-25	-5		=TIME(B9,C9,D9)
10		-25	Five		=TIME(B10,C10,D10)

Results

	Hour	Minute	Second	Time
1				
2	Hour	Minute	Second	Time
3	14	30	59	14:30:59
4	14	30	59	2:30:59 PM
5	14	30	59	0.60485
6	25	5	0	1:05:00 AM
7	25	5		1:05:00 AM
8	25	-5		12:55:00 AM
9	-25	-5		#NUM!
10	-25	Five		#VALUE!

TIMEVALUE

The TIMEVALUE function returns the decimal number of the time represented by a text string.

The decimal number is a value ranging from 0 (zero) to 0.99988426, representing the times from 0:00:00 (12:00:00 AM) to 23:59:59 (11:59:59 P.M.).

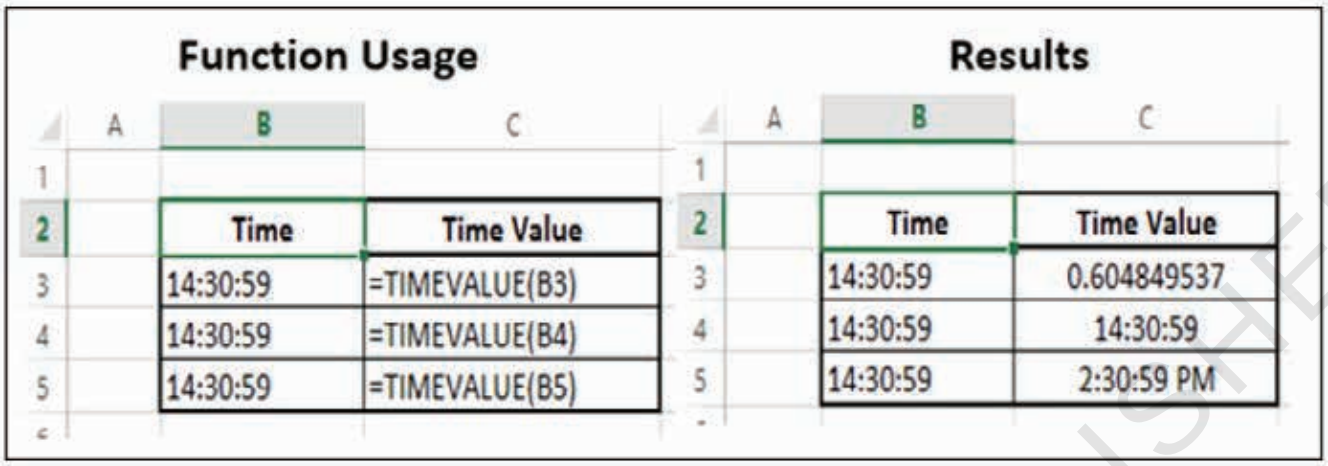
Syntax

TIMEVALUE (time_text)

Arguments

Argument	Description	Required/ Optional
Time_text	A text string that represents a time in any one of the Microsoft Excel time formats.	Required

Example



TODAY

The TODAY function returns the serial number of the current date. The serial number is the date-time code used by Excel for date and time calculations. If the cell format was General before the function was entered, Excel changes the cell format to Date. If you want to view the serial number, you must change the cell format to General or Number.

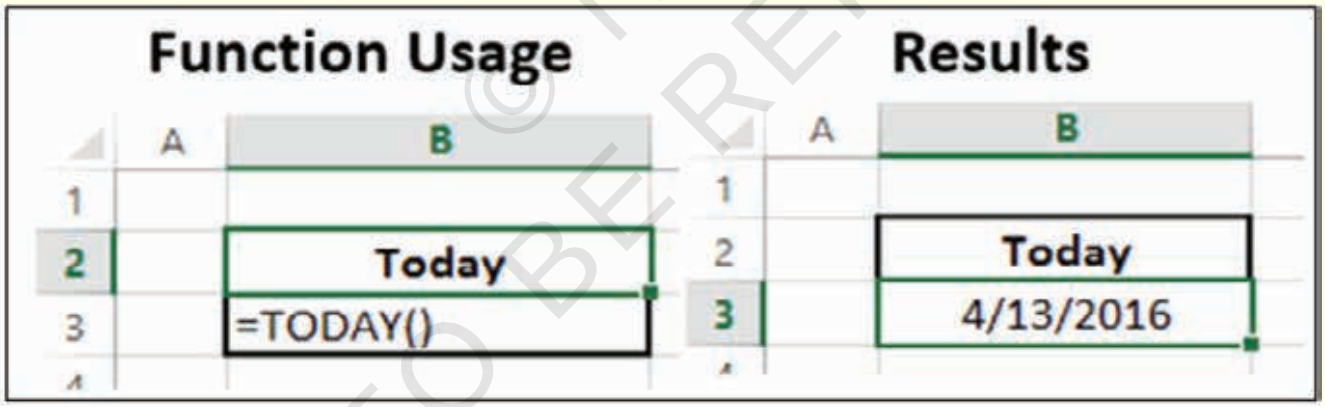
Syntax

TODAY ()

Arguments

The TODAY Function syntax has no arguments.

Example



WEEKDAY

The WEEKDAY function returns the day of the week corresponding to a date. The day is given as an integer, ranging from 1 (Sunday) to 7 (Saturday), by default

Syntax

WEEKDAY (serial_number, [return_type])

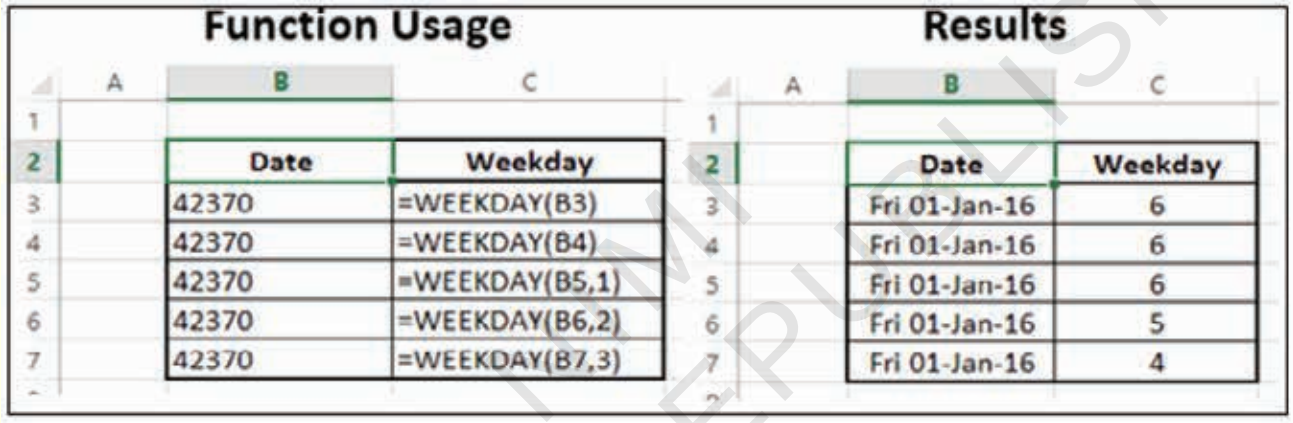
Arguments

Argument	Description	Required/ Optional
Serial_number	A sequential number that represents the date of the day you are trying to find. Dates should be entered by using the DATE function, or as results of other formulas or functions.	Required
Return_type	A number that determines the type of return value. Look at the Return Type Table given below.	Optional

Return Type Table

Return_type	Number Returned
1 or omitted	Numbers 1 (Sunday) through 7 (Saturday). Behaves like previous versions of Microsoft Excel.
2	Numbers 1 (Monday) through 7 (Sunday).
3	Numbers 0 (Monday) through 6 (Sunday).
11	Numbers 1 (Monday) through 7 (Sunday).
12	Numbers 1 (Tuesday) through 7 (Monday).
13	Numbers 1 (Wednesday) through 7 (Tuesday).
14	Numbers 1 (Thursday) through 7 (Wednesday).
15	Numbers 1 (Friday) through 7 (Thursday).
16	Numbers 1 (Saturday) through 7 (Friday).
17	Numbers 1 (Sunday) through 7 (Saturday).

Example



WEEKNUM

The WEEKNUM function returns the week number of a specific date. The number represents where the week falls numerically within a year.

There are two systems used for this Function −

- **System 1 −** The week containing January 1 is the first week of the year, and is numbered week 1.
- **System 2 −** The week containing the first Thursday of the year is the first week of the year, and is numbered as week 1. This system is the methodology specified in ISO 8601, which is commonly known as the European week numbering system.

Syntax

WEEKNUM (serial_number, [return_type])

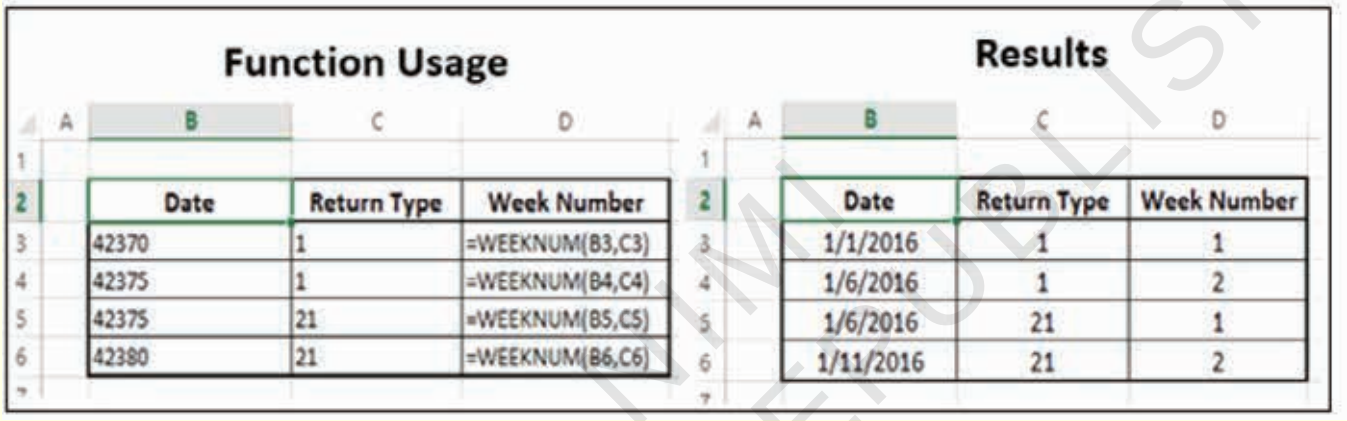
Arguments

Argument	Description	Required/ Optional
Serial_number	A date within the week. Dates should be entered by using the DATE function, or as results of other formulas or functions. Problems can occur if dates are entered as text.	Required
Return_type	A number that determines on which day the week begins. The default is 1. Look at the Week_beginning Day Table given below.	Optional

Week_beginning Day Table

Return_type	Week begins on	System
1 or omitted	Sunday	1
2	Monday	1
11	Monday	1
12	Tuesday	1
13	Wednesday	1
14	Thursday	1
15	Friday	1
16	Saturday	1
17	Sunday	1
21	Monday	2

Example



WORKDAY

The WORKDAY function returns a number that represents a date that is the indicated number of working days before or after a date (the starting date). Working days exclude weekends and any dates identified as holidays.

Use WORKDAY to exclude weekends or holidays when you calculate invoice due dates, expected delivery times, or the number of days of work performed.

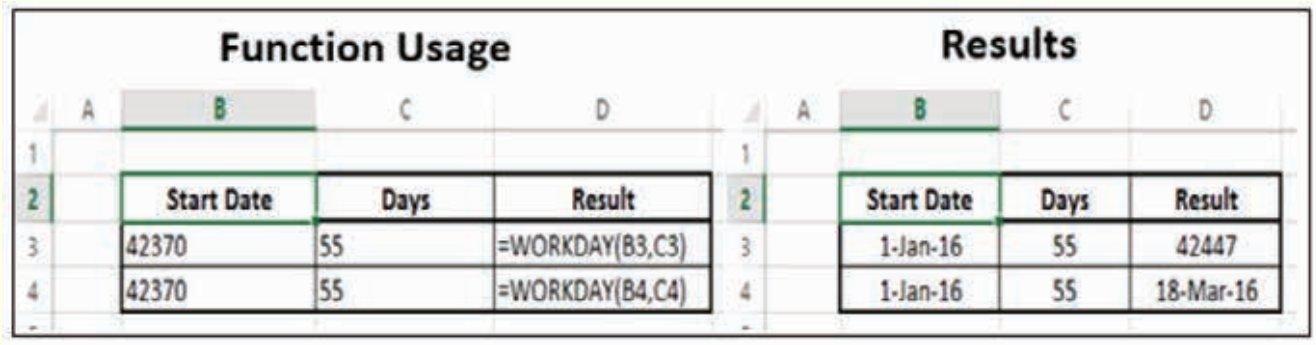
Syntax

WORKDAY (start_date, days, [holidays])

Arguments

Argument	Description	Required/ Optional
Start_date	A date that represents the start date.	Required
Days	The number of nonweekend and nonholiday days before or after start_date. A positive value for days yields a future date. A negative value yields a past date.	Required
Holidays	An optional list of one or more dates to exclude from the working calendar, such as state and federal holidays and floating holidays. The list can be either a range of cells that contain the dates or an array constant of the serial numbers that represent the dates.	Optional

Example



Function Usage

	A	B	C	D
1				
2		Start Date	Days	Result
3		42370	55	=WORKDAY(B3,C3)
4		42370	55	=WORKDAY(B4,C4)

Results

	A	B	C	D
1				
2		Start Date	Days	Result
3		1-Jan-16	55	42447
4		1-Jan-16	55	18-Mar-16

WORKDAY.INTL

The WORKDAY.INTL function returns the serial number of the date before or after a specified number of workdays with custom weekend parameters. Weekend parameters indicate which and how many days are weekend days. Weekend days and any days that are specified as holidays are not considered as workdays.

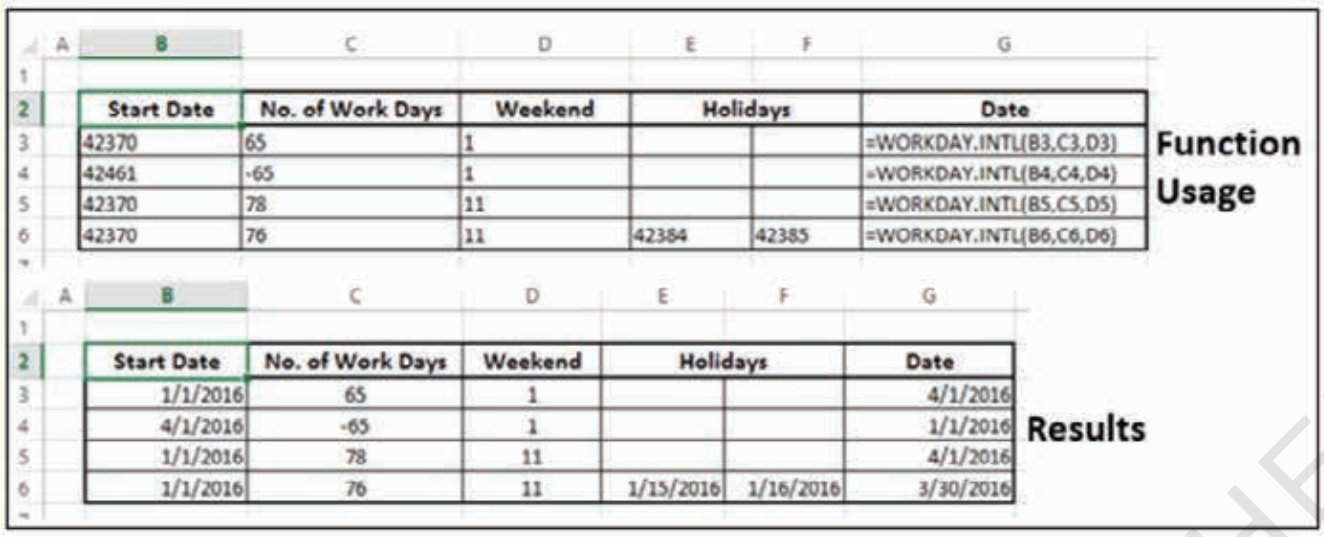
Syntax

WORKDAY.INTL (start_date, days, [weekend], [holidays])

Arguments

Argument	Description	Required/ Optional
Start_date	The start date, truncated to integer.	Required
Days	The number of workdays before or after the start_date. • A positive value yields a future date • A negative value yields a past date • A zero value yields the start_date Day-offset is truncated to an integer.	Required
Weekend	Indicates the days of the week that are weekend days and are not considered working days. Weekend is a weekend number or string that specifies when weekends occur. Look at Weekend-Number-Days Table given below. Weekend string values are seven characters long and each character in the string represents a day of the week, starting with Monday. 1 represents a non-workday and 0 represents a workday. Only the characters 1 and 0 are permitted in the string.	Optional
Holidays	An optional set of one or more dates that are to be excluded from the working day calendar. Holidays shall be a range of cells that contain the dates, or an array constant of the serial values that represent those dates. The ordering of dates or serial values in holidays can be arbitrary.	Optional

Example



Function Usage

	A	B	C	D	E	F	G
1							
2		Start Date	No. of Work Days	Weekend	Holidays		Date
3		42370	65	1			=WORKDAY.INTL(B3,C3,D3)
4		42461	-65	1			=WORKDAY.INTL(B4,C4,D4)
5		42370	78	11			=WORKDAY.INTL(B5,C5,D5)
6		42370	76	11	42384	42385	=WORKDAY.INTL(B6,C6,D6)

Results

	A	B	C	D	E	F	G
1							
2		Start Date	No. of Work Days	Weekend	Holidays		Date
3		1/1/2016	65	1			4/1/2016
4		4/1/2016	-65	1			1/1/2016
5		1/1/2016	78	11			4/1/2016
6		1/1/2016	76	11	1/15/2016	1/16/2016	3/30/2016

YEAR

The YEAR function returns the year corresponding to a date. The year is returned as an integer in the range 1900-9999.

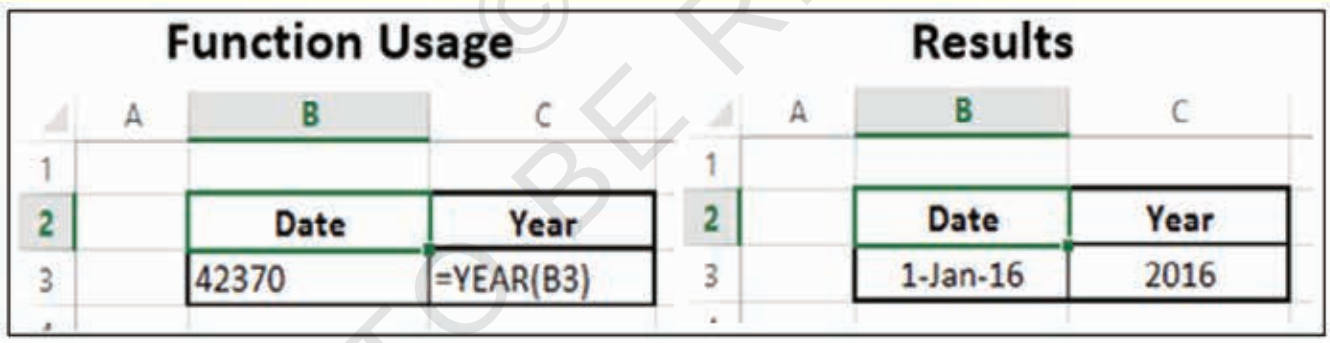
Syntax

YEAR (serial_number)

Arguments

Argument	Description	Required/ Optional
Serial_number	The date of the year you want to find. Dates should be entered by using the DATE function, or as results of other formulas or functions. Problems can occur if dates are entered as text.	Required

Example



Function Usage

	A	B	C
1			
2		Date	Year
3		42370	=YEAR(B3)

Results

	A	B	C
1			
2		Date	Year
3		1-Jan-16	2016

YEARFRAC

The YEARFRAC function calculates the fraction of the year represented by the number of whole days between two dates (the start_date and the end_date).

Use the YEARFRAC worksheet function to identify the proportion of a whole year's benefits or obligations to assign to a specific term.

Syntax

YEARFRAC (start_date, end_date, [basis])

Arguments

Argument	Description	Required/ Optional
Start_date	A date that represents the start date.	Required
End_date	A date that represents the end date.	Required
Basis	The type of day count basis to use. Look at the Day Count Basis Table given below.	Optional

Day Count Basis Table

Basis	Day Count Basis
0 or omitted	US (NASD) 30/360
1	Actual/actual
2	Actual/360
3	Actual/365
4	European 30/360

Example

Function Usage

	A	B	C	D
1				
2		Start Date	End Date	Fraction
3		42370	42461	=YEARFRAC(B3,C3)
4		42005	42369	=YEARFRAC(B4,C4)
5		42370	42460	=YEARFRAC(B5,C5)

Results

	A	B	C	D
1				
2		Start Date	End Date	Fraction
3		1-Jan-16	1-Apr-16	0.25
4		1-Jan-15	31-Dec-15	1
5		1-Jan-16	31-Mar-16	0.25

Create and modify advanced charts

Objectives: At the end of this exercise you shall be able to
- **state create a chart**
- **state modify a chart.**

Requirements

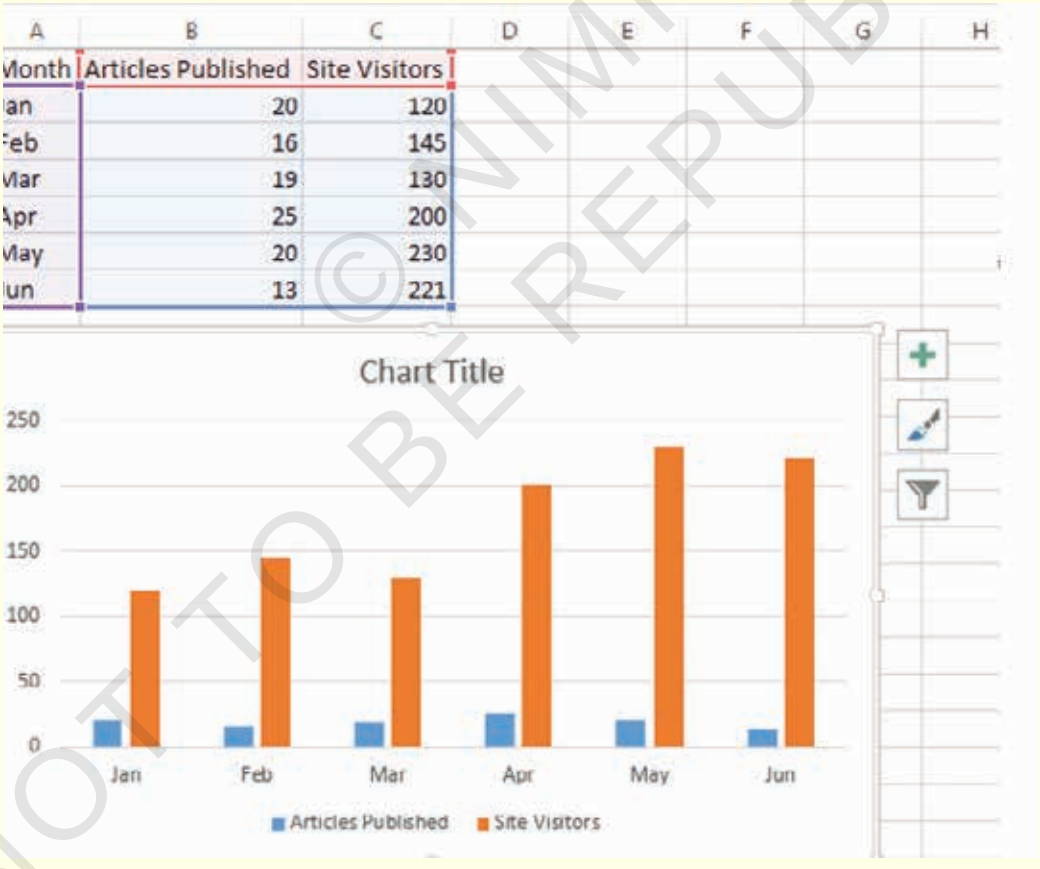
Tools/Equipment/Machines

- A working PC with MS-OFFICE - 1 No.

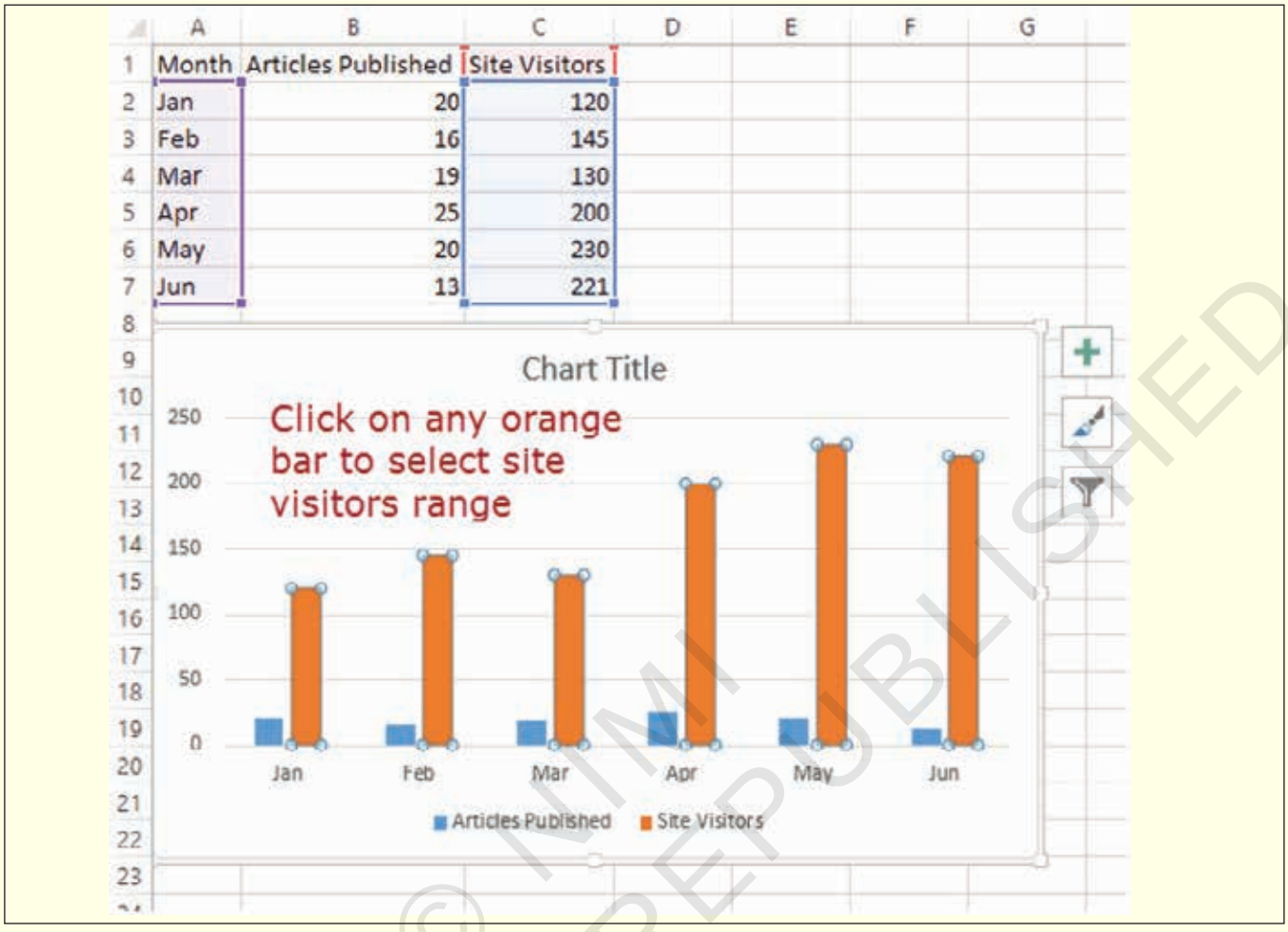
PROCEDURE

TASK 1: **Create a new chart in Excel**

- Enter the data shown below Fig 1.
- Create a basic column chart as shown below. If you do not know how to create a basic chart, then read the article on charts.

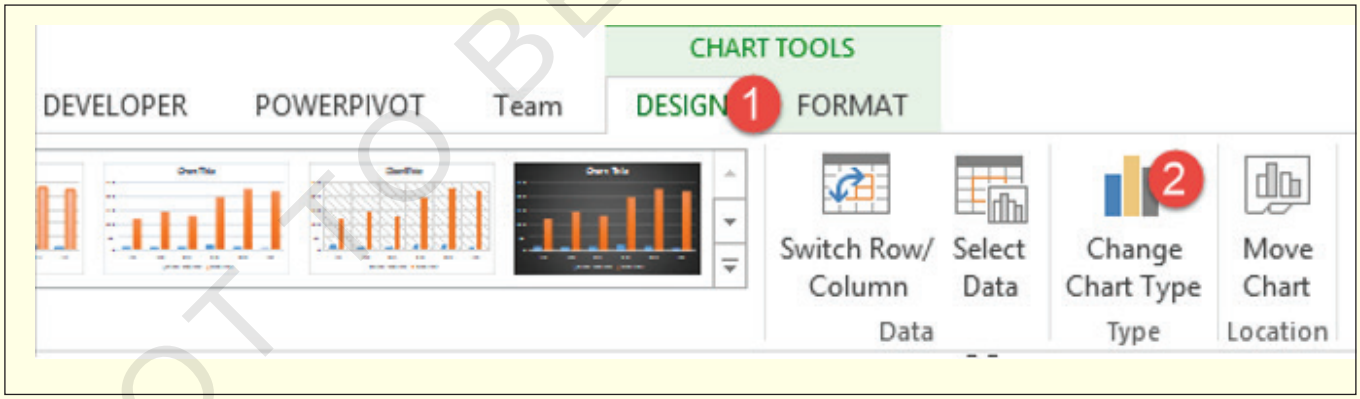


Step 2: Now, it's time for our charts and complex graphs in Excel to take beyond the basics. Select the orange bars representing traffic.

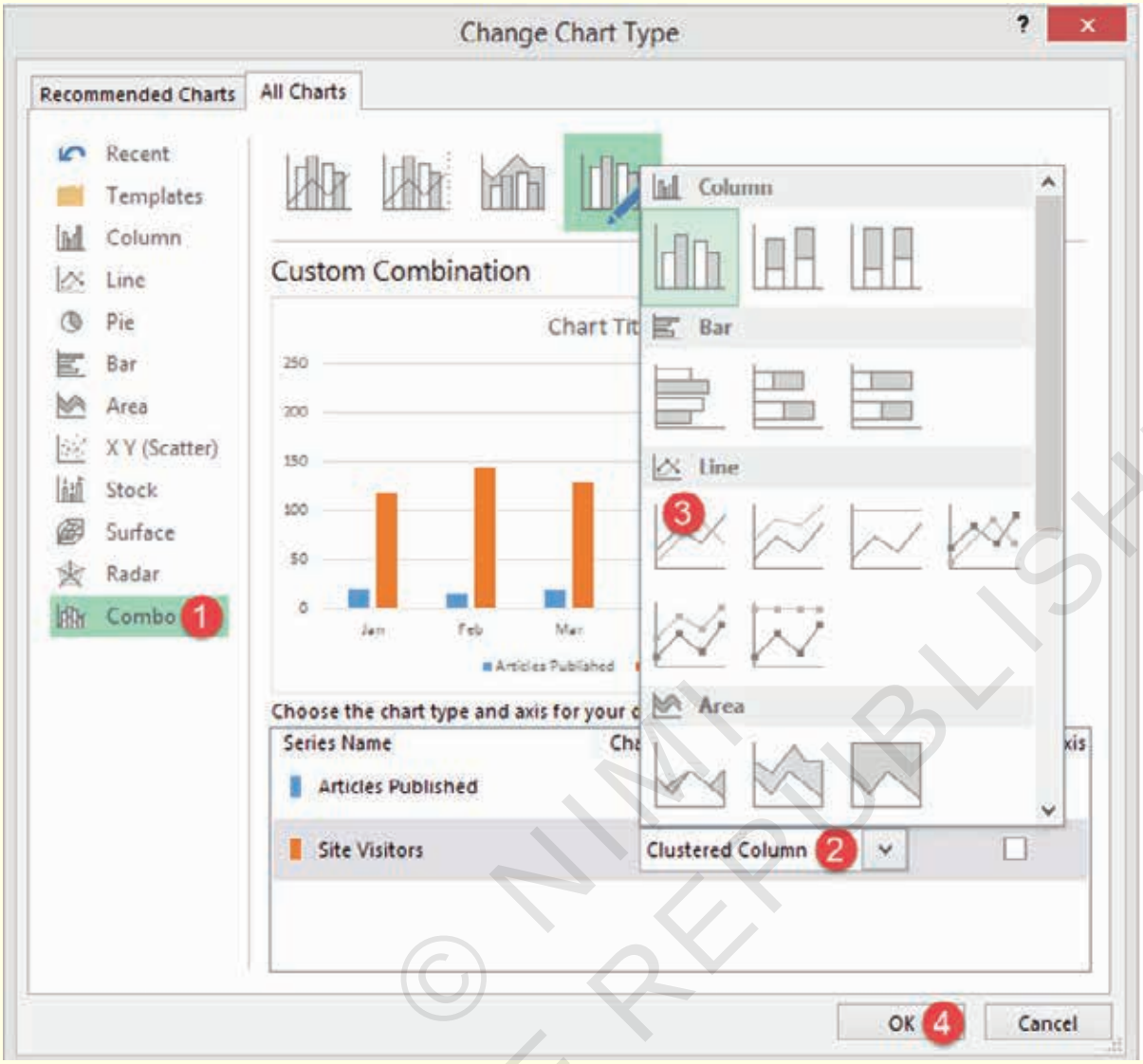


TASK 2: **Modify a chart**

Step 1: Click on change chart type as shown below



- You will get the following dialog window



Step 2: Select Combo and,

1 Click on the clustered column

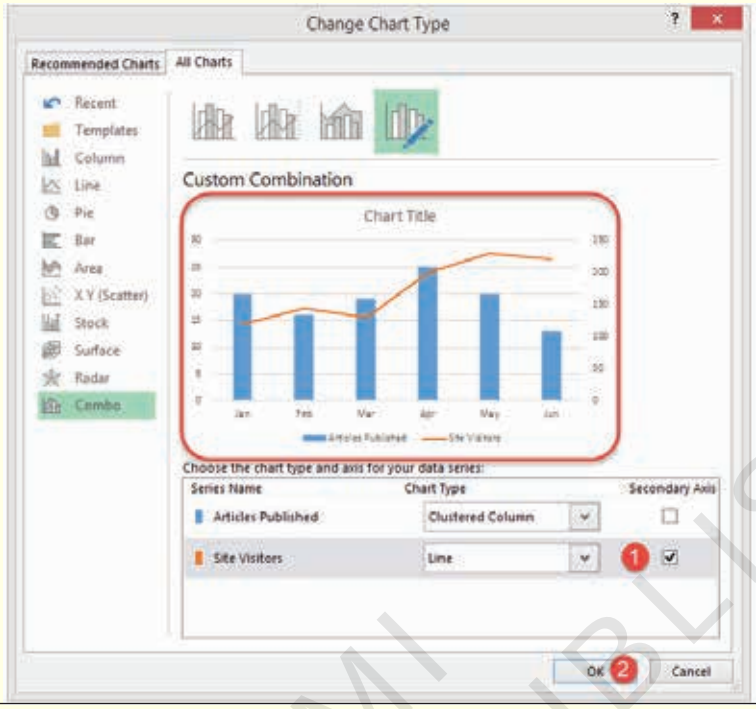
2 Select Line chart

3 Click on OK button

Congratulations, you just created a creative Excel chart with two types of charts in it.

Let's now add a secondary axis to our chart to make it look more presentable.

- Select the chart
- Click on Design under chart tools and select change chart type



1 Click on Secondary Axis check box under Site Visitors

2 Click on OK button

Let's now edit the chart, primary and secondary axis titles as shown below.

1 Go to Add chart elements

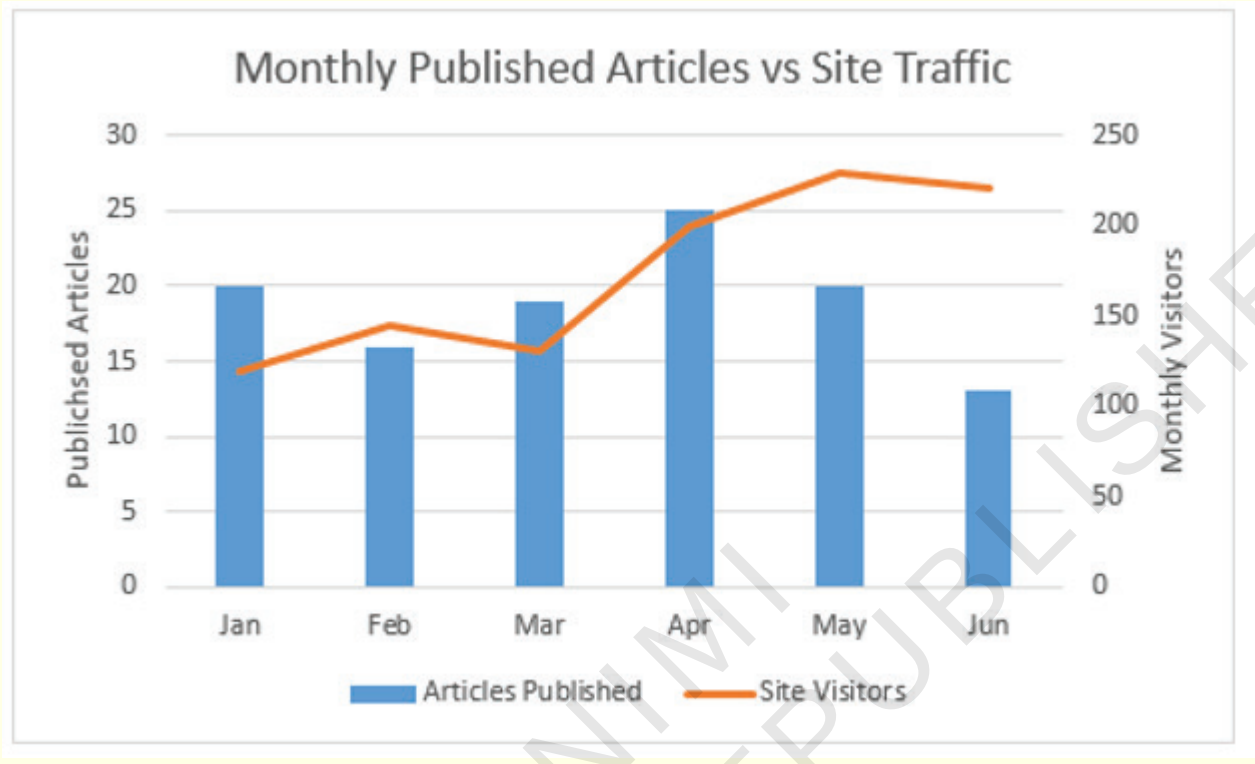
2 Click on Axis titles

3 Select primary verticals

4 Double click on the chart title and edit the title

Write Monthly Published Articles vs Site Traffic. Your complete chart should now look as follows

As you can see from the above complete chart, we have consolidated two data sets and visualized them in such a way that it easily shows the effect of one data set onto the other using Excel graphs.



Create and modify PivotTables

Objectives: At the end of this exercise you shall be able to
- **create and modify pivot table.**

Requirements

Tools/Equipment/Machines

- A working PC with MS-OFFICE - 1 No.

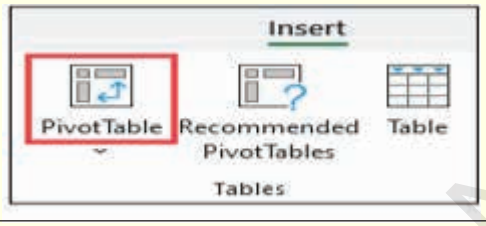
PROCEDURE

TASK 1: **Create a pivot table**

1 Select the cells you want to create a PivotTable from.

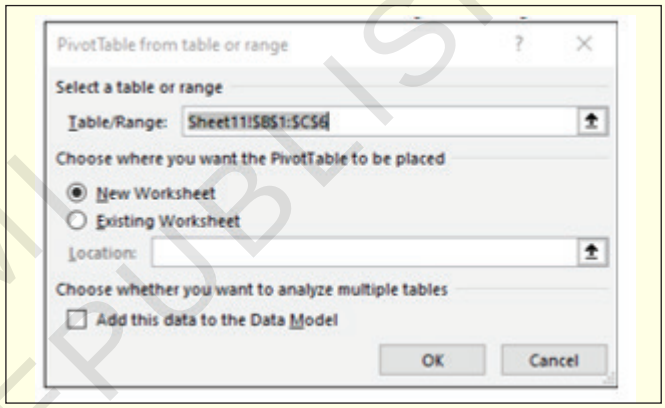
Note: Your data should be organized in columns with a single header row.

2 Select Insert > PivotTable.



3 This will create a PivotTable based on an existing table or range.

Note: Selecting Add this data to the Data Model will add the table or range being used for this PivotTable into the workbook's Data Model. Learn more.

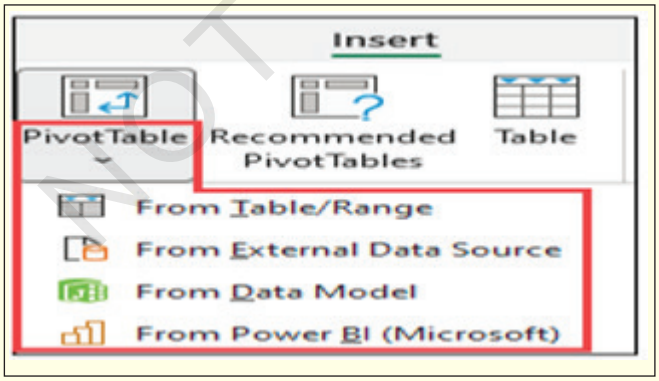


4 Choose where you want the PivotTable report to be placed. Select New Worksheet to place the PivotTable in a new worksheet or Existing Worksheet and select where you want the new PivotTable to appear.

5 Click OK.

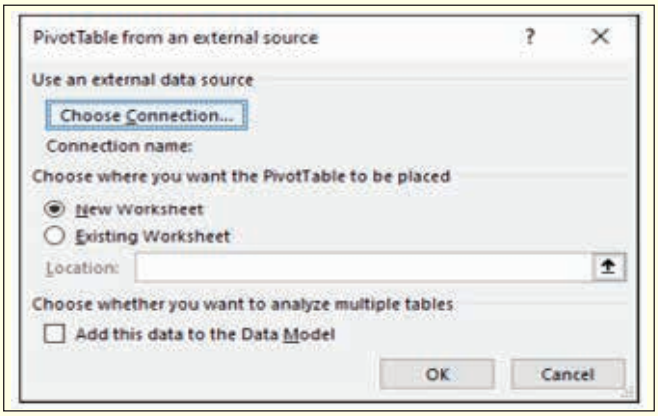
TASK 2: **PivotTables from other sources**

By clicking the down arrow on the button, you can select from other possible sources for your PivotTable. In addition to using an existing table or range, there are three other sources you can select from to populate your PivotTable.



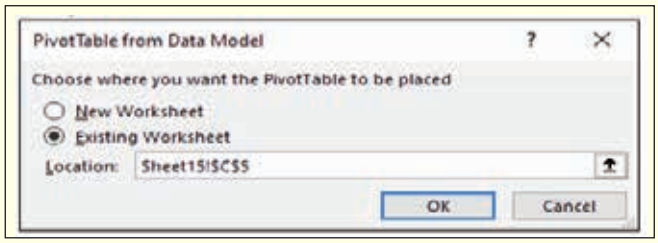
Note: Depending on your organization's IT settings you might see your organization's name included in the button. For example, "From Power BI (Microsoft)"

Get from External Data Source



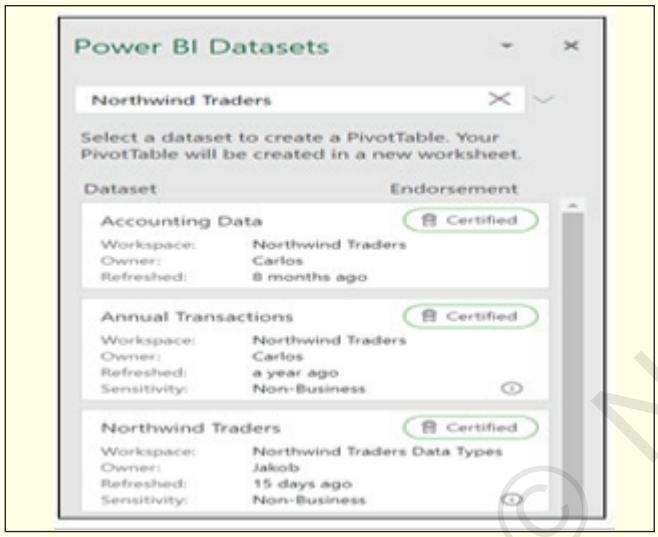
Get from Data Model

Use this option if your workbook contains a Data Model, and you want to create a PivotTable from multiple Tables, enhance the PivotTable with custom measures, or are working with very large datasets.



Get from Power BI

Use this option if your organization uses Power BI and you want to discover and connect to endorsed cloud datasets you have access to.



Building out your PivotTable

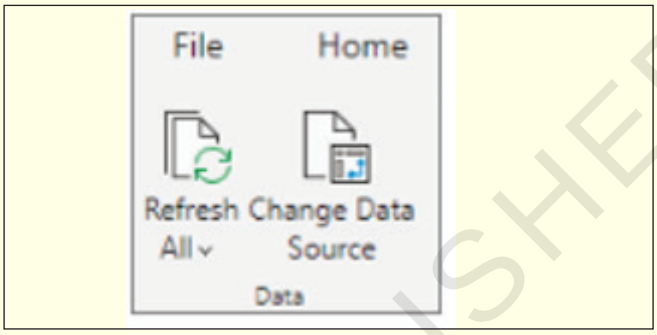
1 To add a field to your PivotTable, select the field name checkbox in the PivotTables Fields pane.

Note: Selected fields are added to their default areas: non-numeric fields are added to Rows, date and time hierarchies are added to Columns, and numeric fields are added to Values.

2 To move a field from one area to another, drag the field to the target area.

Refreshing PivotTables

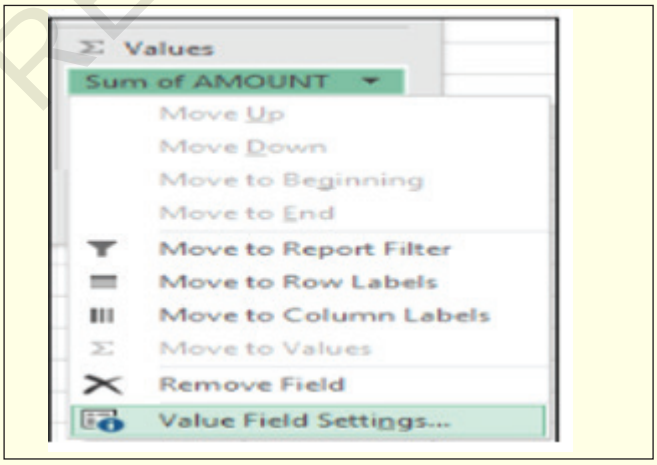
If you add new data to your PivotTable data source, any PivotTables that were built on that data source need to be refreshed. To refresh just one PivotTable you can right-click anywhere in the PivotTable range, then select Refresh. If you have multiple PivotTables, first select any cell in any PivotTable, then on the Ribbon go to PivotTable Analyze > click the arrow under the Refresh button and select Refresh All.



Working with PivotTable Values

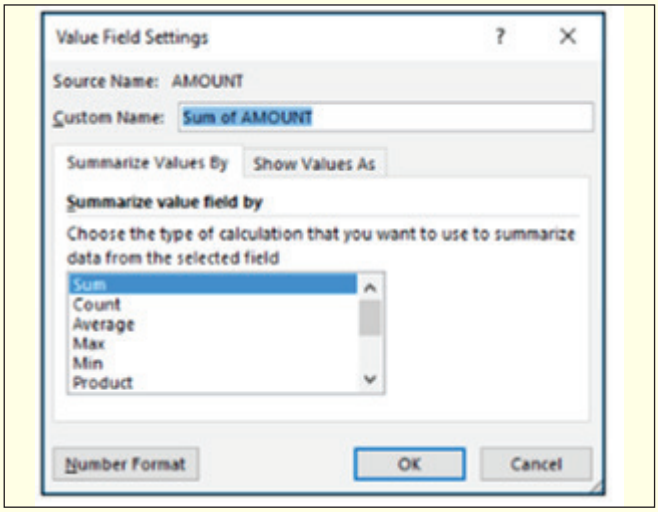
Summarize Values By

By default, PivotTable fields that are placed in the Values area will be displayed as a SUM. If Excel interprets your data as text, it will be displayed as a COUNT. This is why it's so important to make sure you don't mix data types for value fields. You can change the default calculation by first clicking on the arrow to the right of the field name, then select the Value Field Settings option.



Next, change the calculation in the Summarize Values By section. Note that when you change the calculation method, Excel will automatically append it in the Custom Name section, like "Sum of FieldName", but you can change it. If you click the Number Format button, you can change the number format for the entire field.

Tip: Since the changing the calculation in the Summarize Values By section will change the PivotTable field name, it's best not to rename your PivotTable fields until you're done setting up your PivotTable. One trick is to use Find & Replace (Ctrl+H) >Find what > "Sum of", then Replace with > leave blank to replace everything at once instead of manually retyping.



Show Values As

Instead of using a calculation to summarize the data, you can also display it as a percentage of a field. In the following example, we changed our household expense amounts to display as a % of Grand Total instead of the sum of the values.

Once you've opened the Value Field Setting dialog, you can make your selections from the Show Values As tab.

Display a value as both a calculation and percentage

Simply drag the item into the Values section twice, then set the Summarize Values By and Show Values As options for each one.

AMOUNT	MONTH			
CATEGORY	January	February	March	Grand Total
Entertainment	5.10%	6.38%	6.13%	17.61%
Grocery	12.00%	12.25%	13.27%	37.52%
Household	8.93%	11.49%	10.21%	30.63%
Transportation	3.78%	5.87%	4.59%	14.24%
Grand Total	29.81%	35.99%	34.20%	100.00%

AMOUNT	MONTH			
CATEGORY	January	February	March	Grand Total
Entertainment	5.10%	6.38%	6.13%	17.61%
Grocery	12.00%	12.25%	13.27%	37.52%
Household	8.93%	11.49%	10.21%	30.63%
Transportation	3.78%	5.87%	4.59%	14.24%
Grand Total	29.81%	35.99%	34.20%	100.00%

Create a Power Query, Power Query Function. Invoking the Power Query function and combining queries. Organize the workbook queries

Objectives: At the end of this exercise you shall be able to
- **learn Create a Power Query, Power Query Function. Invoking the Power Query function and combining queries. Organize the workbook queries**
- **use Power BI for simple data visualizations.**

Requirements

Tools/Equipment/Machines

- A working PC with MS-OFFICE - 1 No.

PROCEDURE

The Complete Guide to Power Query

What is Power Query?

Power Query is a business intelligence tool available in Excel that allows you to import data from many different sources and then clean, transform and reshape your data as needed.

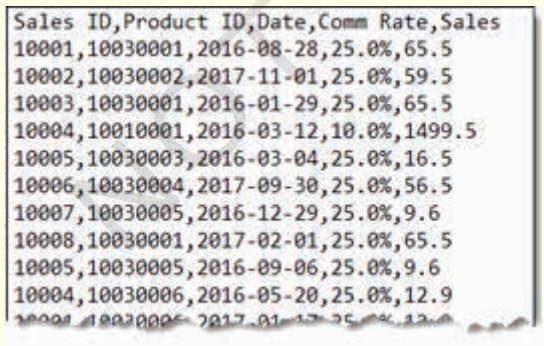
It allows you to set up a query once and then reuse it with a simple refresh. It's also pretty powerful. Power Query can import and clean millions of rows into the data model for analysis after. The user interface is intuitive and well laid out so it's really easy to pick up. It's an incredibly short learning curve when compared to other Excel tools like formulas or VBA.

The best part about it, is you don't need to learn or use any code to do any of it. The power query editor records all your transformations step by step and converts them into the M code for you, similar to how the Macro recorder with VBA.

If you want to edit or write your own M code, you certainly can, but you definitely don't need to.

Get the data used in this post to follow along.

What Can Power Query Do?



```
Sales ID,Product ID,Date,Comm Rate,Sales
10001,10030001,2016-08-28,25.0%,65.5
10002,10030002,2017-11-01,25.0%,59.5
10003,10030001,2016-01-29,25.0%,65.5
10004,10010001,2016-03-12,10.0%,1499.5
10005,10030003,2016-03-04,25.0%,16.5
10006,10030004,2017-09-30,25.0%,56.5
10007,10030005,2016-12-29,25.0%,9.6
10008,10030001,2017-02-01,25.0%,65.5
10005,10030005,2016-09-06,25.0%,9.6
10004,10030006,2016-05-20,25.0%,12.9
```

Imagine you get a sales report in a text file from your system on a monthly basis that looks like this.

Every month you need to go to the folder where the file is uploaded and open the file and copy the contents into Excel.

You then use the text to column feature to split out the data into new columns.

The system only outputs the sales person's ID, so you need to add a new column to the data and use a VLOOKUP to get the salesperson associated with each ID. Then you need to summarize the sales by salesperson and calculate the commission to pay out.

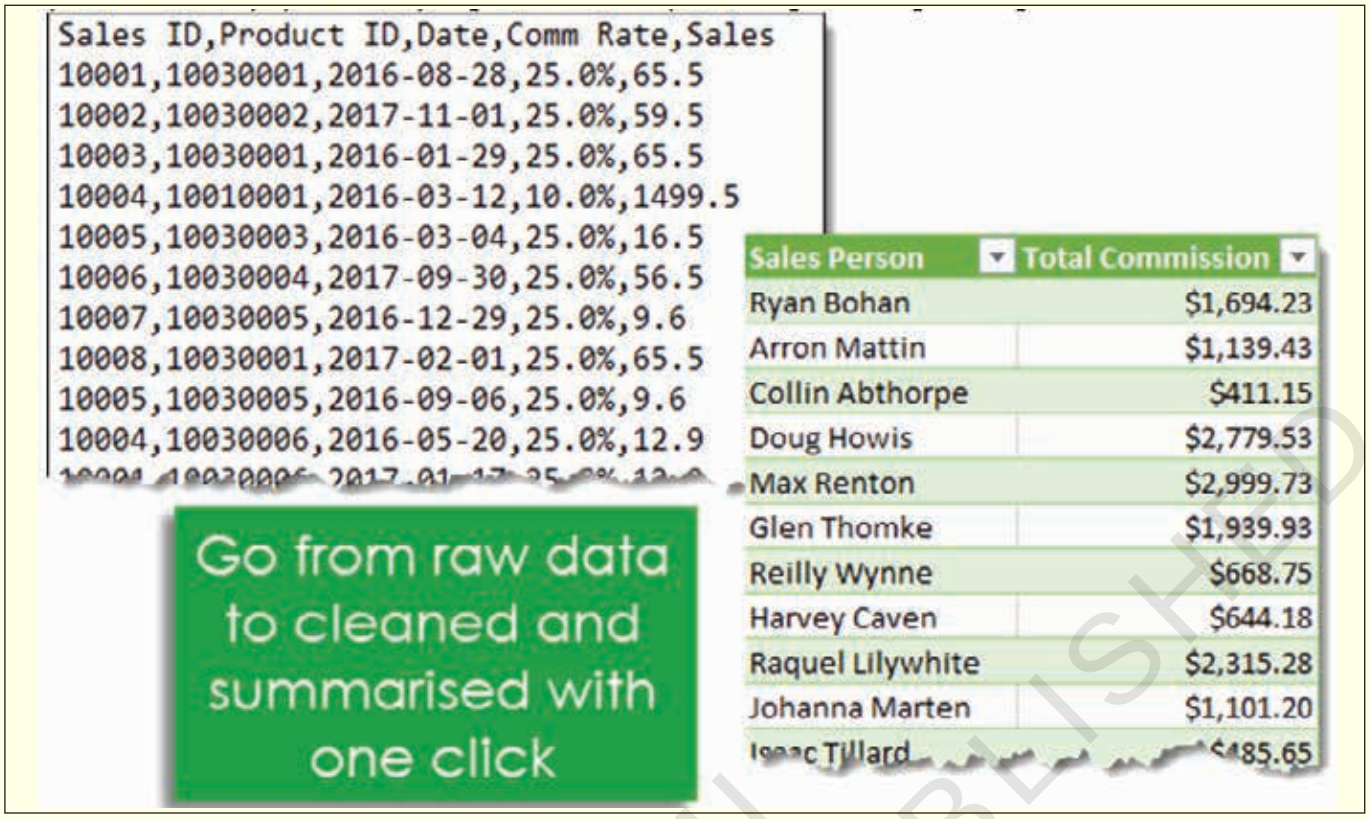
You also need to link the product ID to the product category but only the first 4 digits of the product code relate to the product category. You create another column using the LEFT function to get the first 4 digits of the product code, then use a VLOOKUP on this to get the product category. Now you can summarize the data by category.

Maybe it only takes an hour a month to do, but it's pretty mindless work that's not enjoyable and takes away from time you can actually spend analyzing the data and producing meaningful insight.

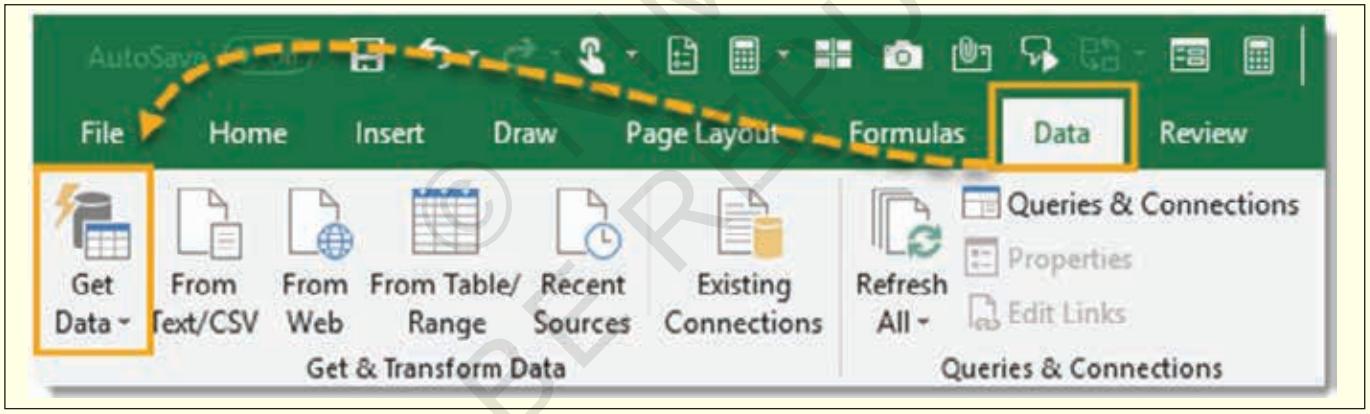
With Power Query, this can all be automated down to a click of the refresh button on a monthly basis. All you need to do is build the query once and reuse it, saving an hour of work each and every month!

Where is Power Query?

Power Query is available as an add-in to download and install for Excel 2010 and 2013 and will appear as a new tab in the ribbon labelled Power Query. In 2016 it was renamed to Get & Transform and appears in the Data tab without the need to install any add-in.



Importing Your Data with Power Query

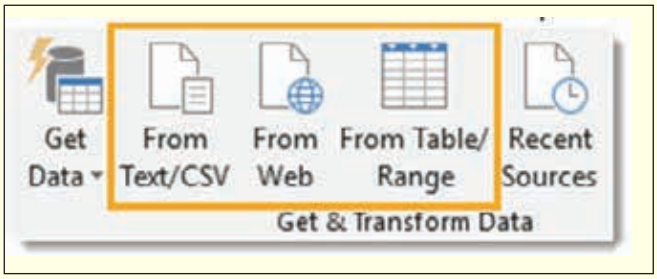


Importing your data with Power Query is simple. Excel provides many common data connections that are accessible from the Data tab and can be found from the Get Data command.

- Get data from a single file such as an Excel workbook, Text or CSV file, XML and JSON files. You can also import multiple files from within a given folder.
- Get data from various databases such as SQL Server, Microsoft Access, Analysis Services, SQL Server Analysis Server, Oracle, IBM DB2, MySQL, PostgreSQL, Sybase, Teradata and SAP HANA databases.
- Get data from Microsoft Azure
- Get data from online services like Sharepoint, Microsoft Exchange, Dynamics 365, Facebook and Salesforce.
- Get data from other sources like a table or range inside the current workbook, from the web, a Microsoft Query, Hadoop, OData feed, ODBC and OLEDB.
- We can merge two queries together similar to joining two queries in SQL.
- We can append a query to another query similar to a union of two queries in SQL.

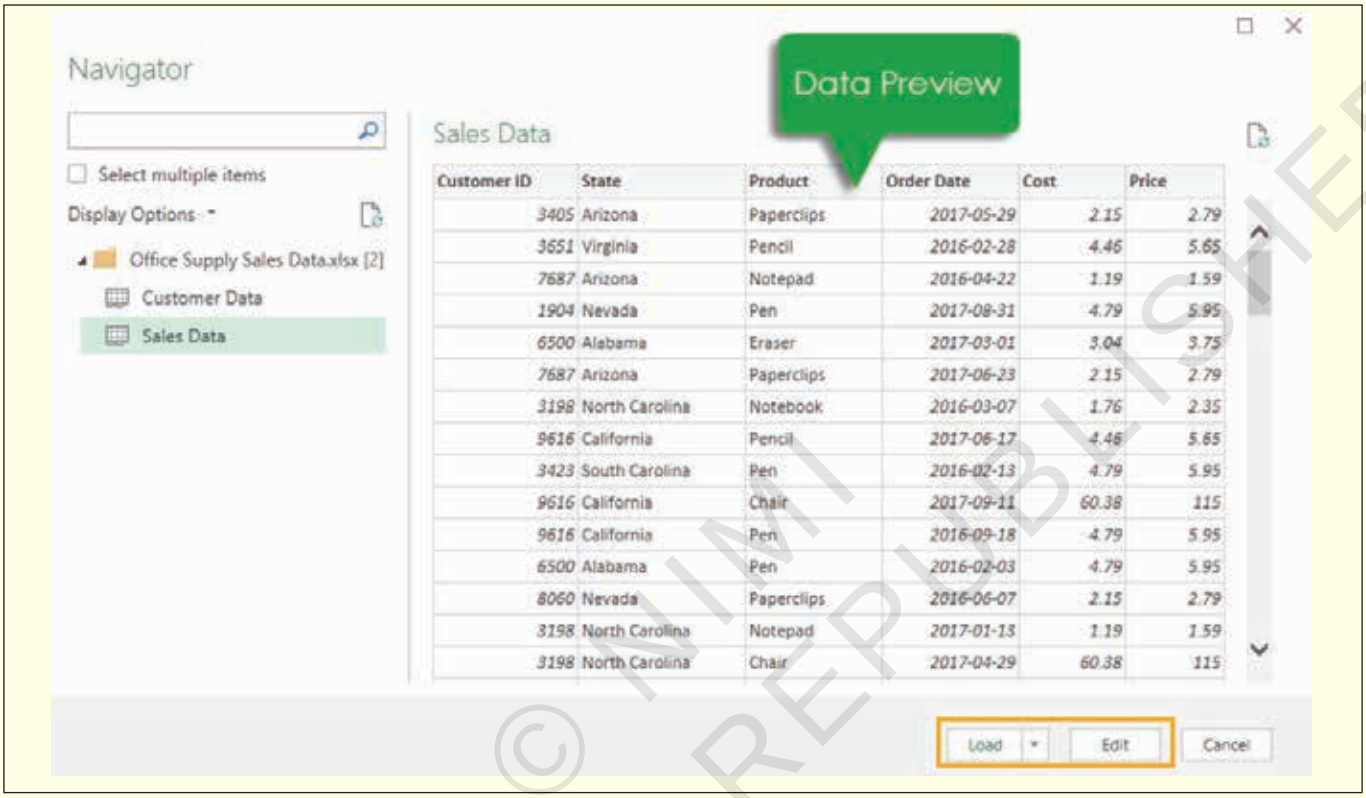
Note: The available data connection options will depend on your version of Excel.

There are a couple of the more common query types available in the top level of the ribbon commands found in the Get & Transform section of the Data tab. From here we can easily access the From Text/CSV, From Web and From Table/Range queries. These are just duplicated outside of the Get Data command for convenience of use, since you'll likely be using these more frequently.



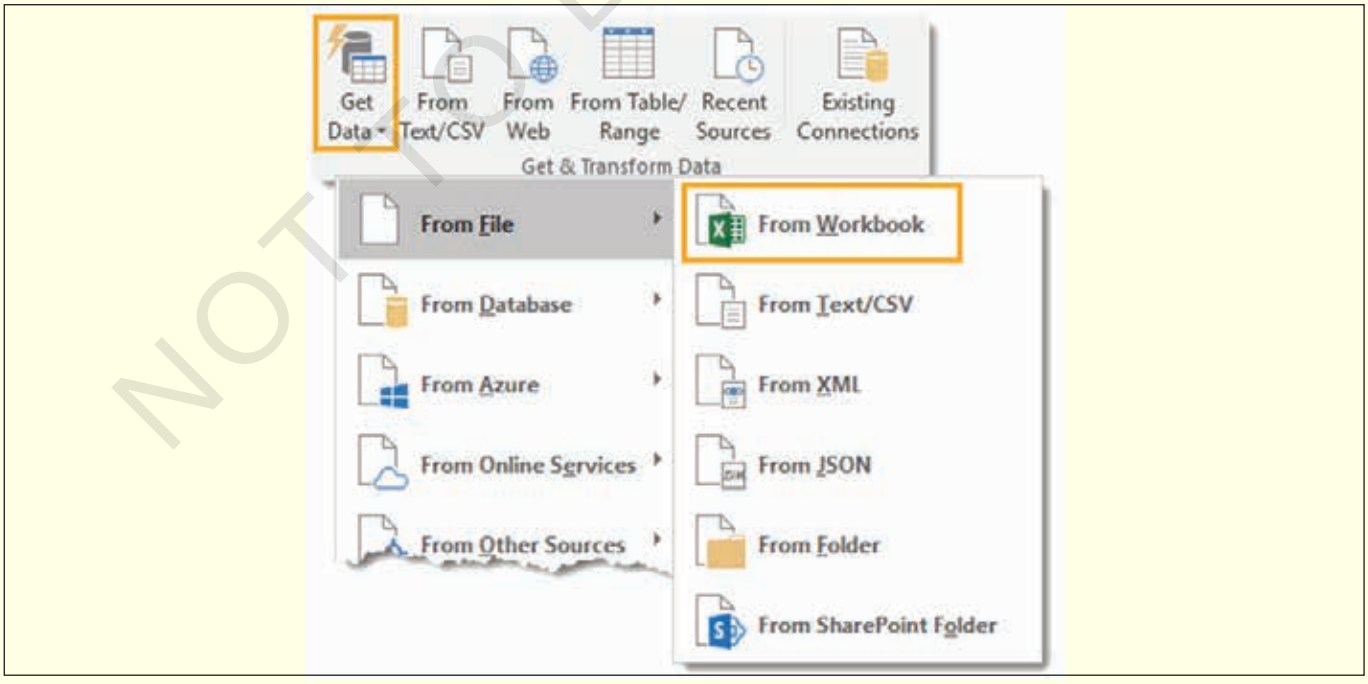
Depending on which type of data connection you choose, Excel will guide you through the connection set up and there might be several options to select during the process.

At the end of the setup process, you will come to the data preview window. You can view a preview of the data here to make sure it's what you're expecting. You can then load the data as is by pressing the Load button, or you can proceed to the query editor to apply any data transformation steps by pressing the Edit button.



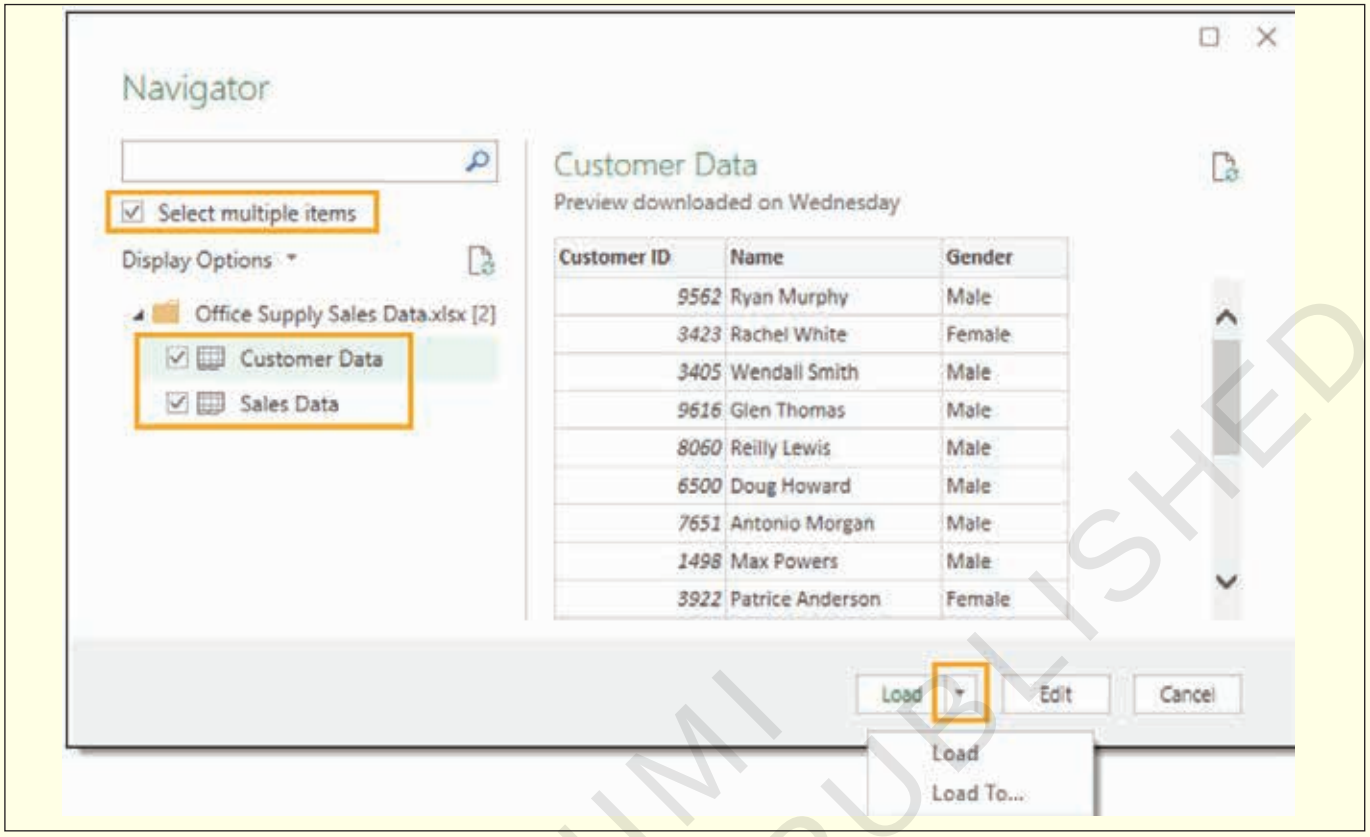
A Simple Example of Importing Data in an Excel File

Let's take a look at importing some data from an Excel workbook in action. We're going to import an Excel file called Office Supply Sales Data.xlsx. It contains sales data on one sheet called Sales Data and customer data on another sheet called Customer Data. Both sheets of data start in cell A1 and the first row of the data contains column headers.



Go to the Data tab and select the Get Data command in the Get & Transform Data section. Then go to From File and choose From Workbook.

This will open a file picker menu where you can navigate to the file you want to import. Select the file and press the Import button.



After selecting the file you want to import, the data preview Navigator window will open. This will give you a list of all the objects available to import from the workbook. Check the box to Select multiple items since we will be importing data from two different sheets. Now we can check both the Customer Data and Sales Data.

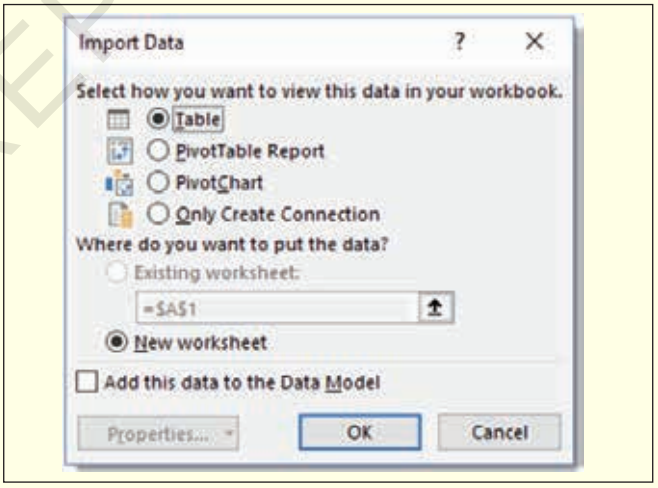
When you click on either of the objects in the workbook, you can see a preview of the data for it on the right hand side of the navigator window. This is great for a sense check to make sure you've got the correct file.

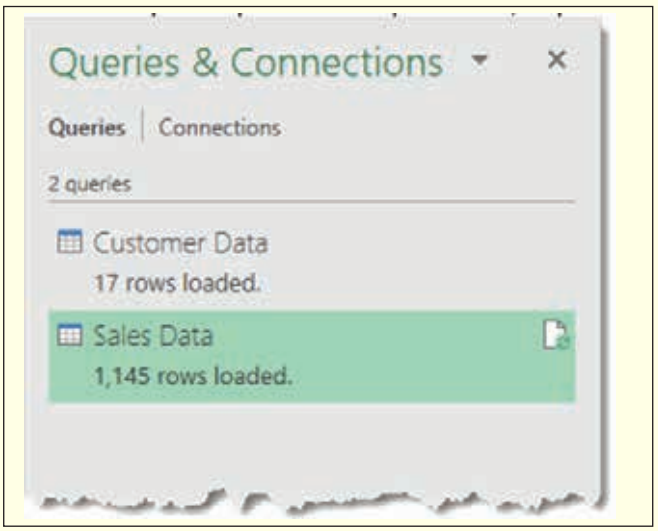
When you're satisfied that you've got everything you need from the workbook, you can either press the Edit or Load buttons. The edit button will take you to the query editor where you can transform your data before loading it. Pressing the load button will load the data into tables in new sheets in the workbook.

In this simple example, we will bypass the editor and go straight to loading the data into Excel. Press the small arrow next to the Load button to access the Load To options. This will give you a few more loading options.

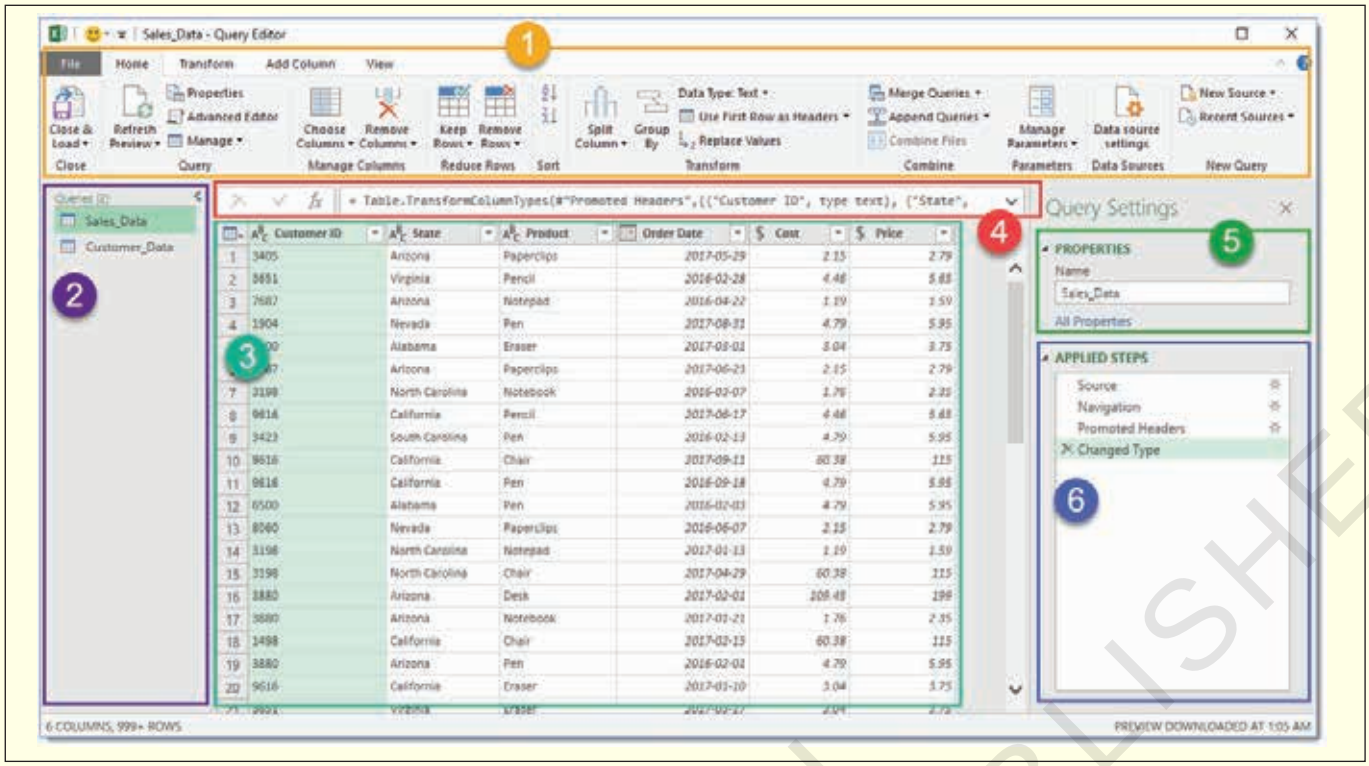
We will choose to load the data into a table in a new sheet, but there are several other options. You can also load the data directly into a pivot table or pivot chart, or you can avoid loading the data and just create a connection to the data.

Now the tables are loaded into new sheets in Excel and we also have two queries which can quickly be refreshed if the data in the original workbook is ever updated.





The Query Editor



After going through the guide to connecting your data and selecting the Edit option, you will be presented with the query editor. This is where any data transformation steps will be created or edited. There are 6 main area in the editor to become familiar with.

1 **The Ribbon –** The user interface for the editor is quite similar to Excel and uses a visual ribbon style command center. It organizes data transformation commands and other power query options into 5 main tabs.

2 **Query List –** This area lists all the queries in the current workbook. You can navigate to any query from this area to begin editing it.

3 **Data Preview –** This area is where you will see a preview of the data with all the transformation steps currently applied. You can also access a lot of the transformation commands here either from the filter icons in the column headings or with a right click on the column heading.

4 **Formula Bar –** This is where you can see and edit the M code of the current transformation step. Each transformation you make on your data is recorded and appears as a step in the applied steps area.

5 **Properties –** This is where you can name your query. When you close and load the query to an Excel table, power query will create a table with the same name as its source query if the table name isn't already taken. The query name is also how the M code will reference this query if we need to query it in another query.

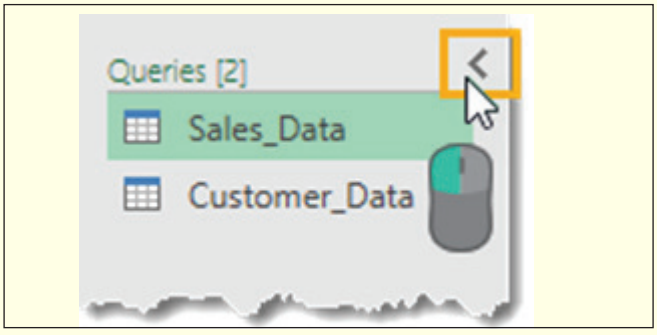
6 **Applied Steps –** This area is a chronological list of all the transformation steps that have been applied to the data. You can move through the steps here and view the changes in the data preview area. You can also delete, modify or reorder any steps in the query here.

The Query List

The Query List has other abilities other than just listing out all the current workbook's queries.

One of the primary functions of the query list is navigation. There's no need to exit the query editor to switch which query you're working on. You can left click on any query to switch. The query you're currently on will be highlighted in a light green colour.

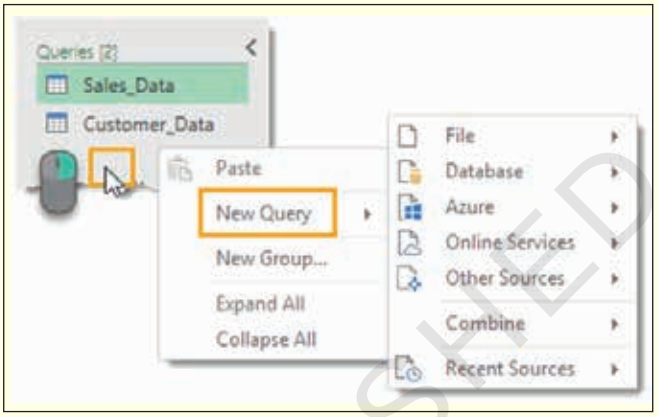
When you do eventually exit the editor with the close and load button, changes in all the queries you edited will be saved.



You can hide the query list to create more room for the data preview. Left click on the small arrow in the upper right corner to toggle the list between hidden and visible.

If you right click on any query in the list, there are a variety of options available.

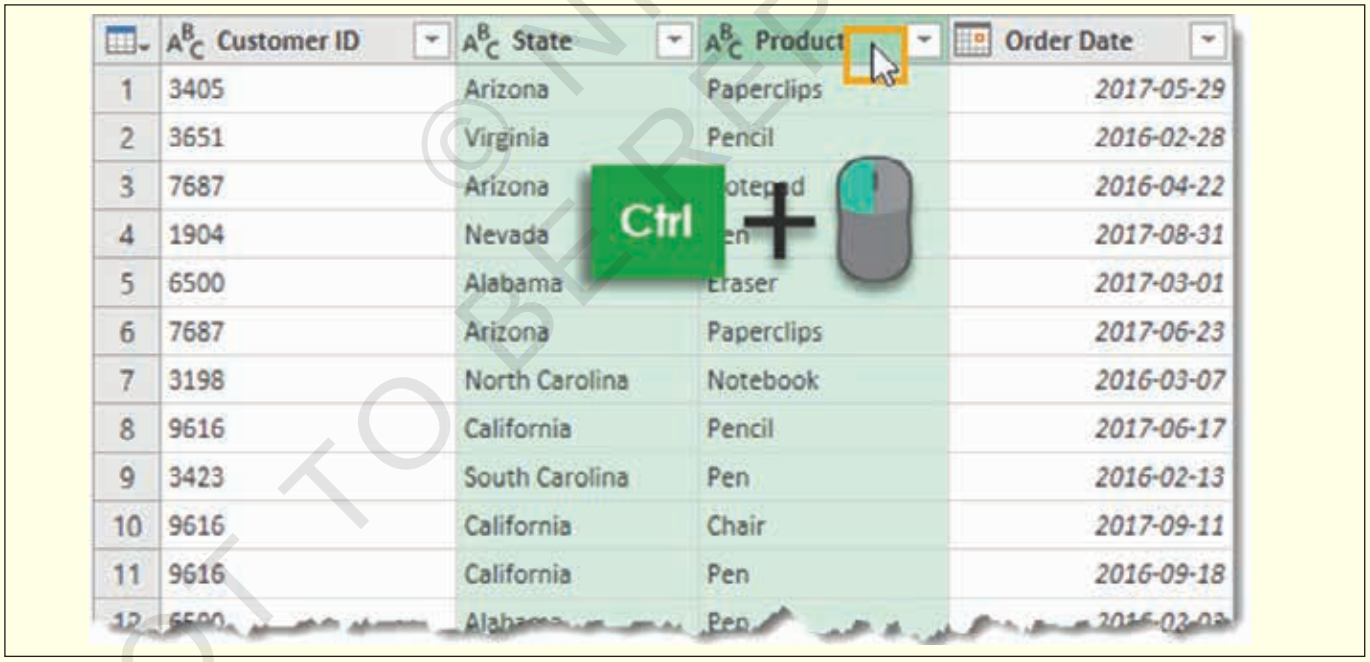
- **Copy and Paste –** Copy and paste a query to make another copy of it.
- **Delete –** Delete the query. If you accidentally delete a query, there's no undo button, but you can exit the query editor without saving via close and load to restore your query.
- **Rename –** Rename your query. This is the same as renaming it from the properties section on the left hand side of the editor.
- **Duplicate –** Make another copy of the query. This is the same as copy and paste but turns the process into one step.
- **Move To Group –** Place your queries into a folder like structure to keep them organised when the list gets large.
- **Move Up and Move Down –** Rearrange the order your queries appear in the list or within the folder groups to add to your organisational efforts. This can also be done by dragging and dropping the query to a new location.
- **Create Function –** Turn your query into a query function. They allow you to pass a parameter to the query and return results based on the parameter passed.
- **Convert To Parameter –** Allows you to convert parameters to queries or queries to parameters.
- **Advanced Editor –** Open the advanced editor to edit the M code for the query.
- **Properties –** Allows you to change the query name, add a description text and enable Fast Data Load option for the query.



If you right click any empty area in the query list, you can create a new query.

The Data Preview

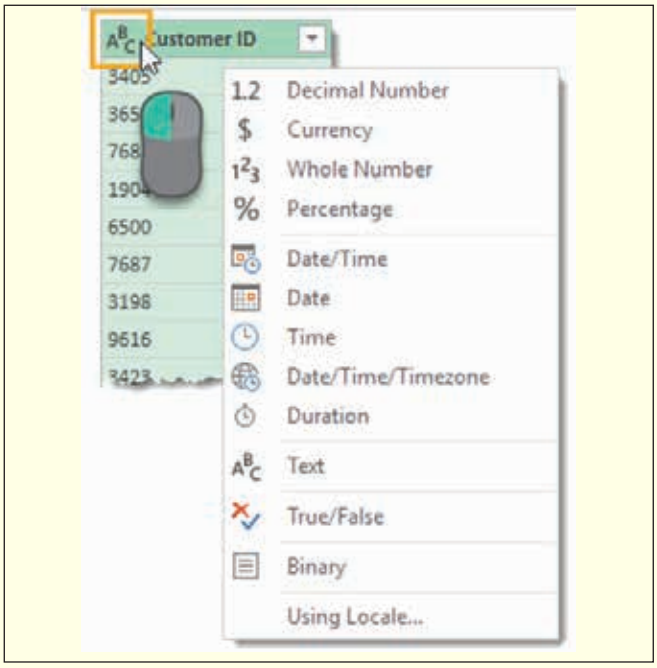
The main job of the data preview area is to apply transformation steps to your data and show a preview of these steps you're applying.



In the data preview area, you can select columns with a few different methods. A column will be highlighted in a light green colour when it's selected.

- Select a single column with a left click on the column heading.
- Select multiple adjacent columns with a left click on the first column heading, then hold Shift and left click on the last column heading.
- Select multiple non-adjacent columns by holding Ctrl then left click on any column headings you want to select.

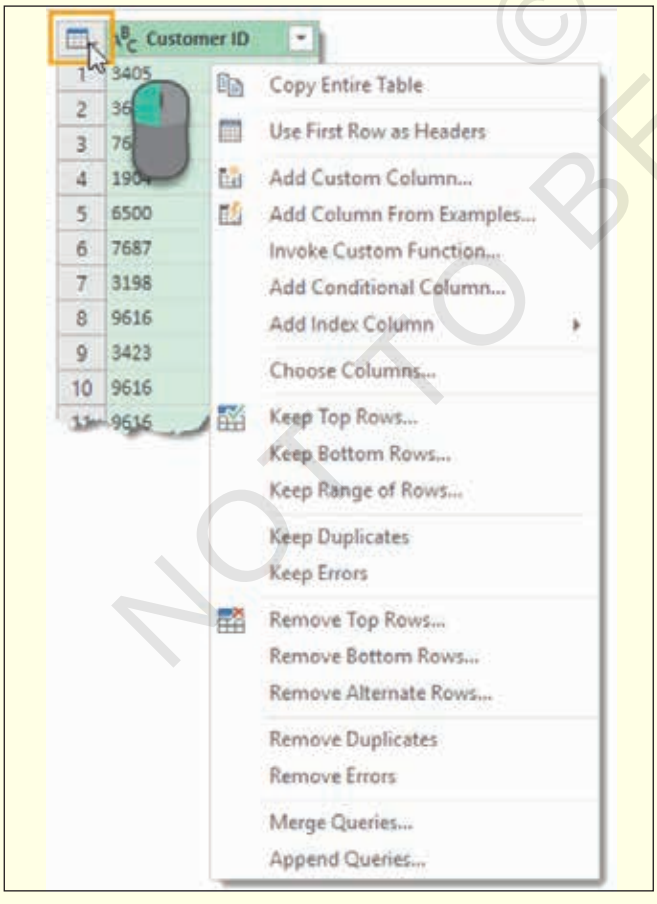
You can then apply any relevant data transformation steps on selected columns from the ribbon or certain steps can be accessed with a right click on the column heading. Commands that are not available to your selected column or columns will appear grayed out in the ribbon.



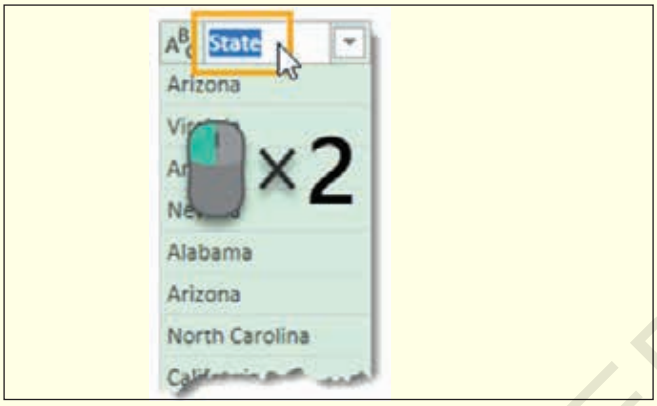
Each column has a data type icon on the left hand of the column heading. You can left click on it to change the data type of the column.

You can choose from decimal numbers, currency, whole numbers, percentages, date and time, dates, times, timezone, duration, text, Boolean, and binary.

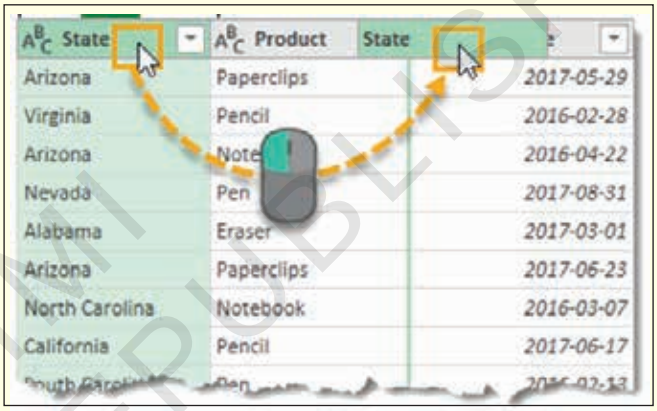
Using the Locale option allows you to set the data type format using the convention from different locations. For example, if you wanted to display the date in the American m/d/yyyy format instead of the usual dd/mm/yyyy then you could select United States as the locale.



There's a small table icon in the top left hand corner of the data preview, you can right click or left click this to access various actions that affect the whole table.



Renaming any column heading is really easy. Double left click on any column heading then type your new name and press Enter when you're done.



You can change around the order of any of the columns with a left click and drag action. The green border between two columns will become the new location of the dragged column when you release the left click.

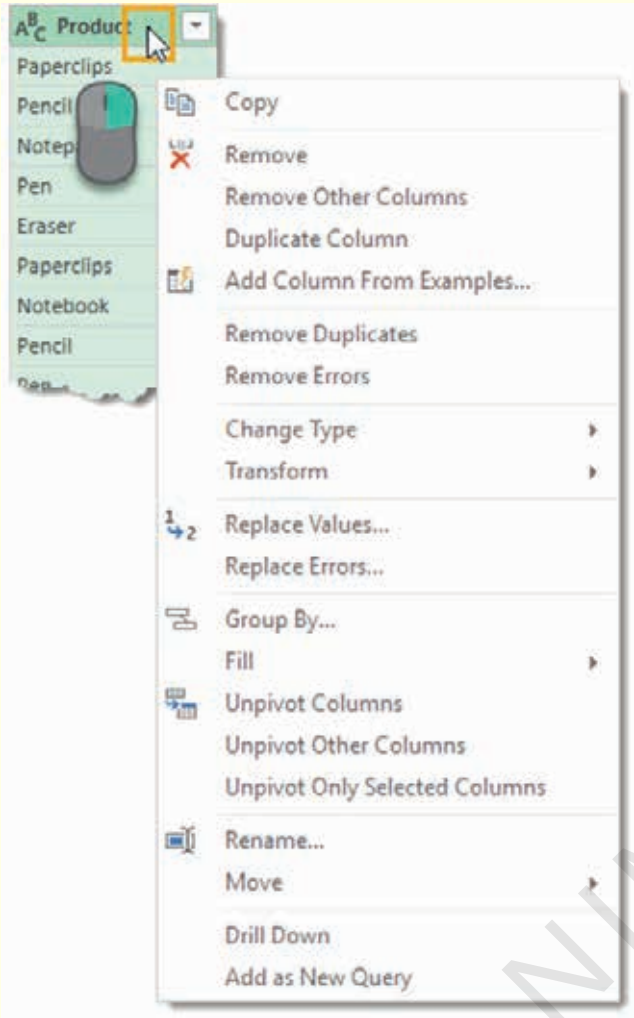
Each column also has a filter toggle on right hand side. Left click on this to sort and filter your data. This filter menu is very similar to the filters found in a regular spreadsheet and will work the same way.

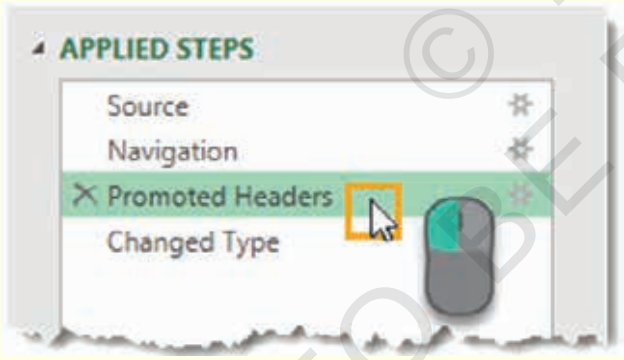
The list of items shown is based on a sample of the data so may not contain all available items in the data. You can load more by clicking on the Load more text in blue.

Many transformations found in the ribbon menu are also accessible from the data preview area using a right click on the column heading. Some of the action you select from this right click menu will replace the current column. If you want to create a new column based, use a command from the Add Column tab instead.

The Applied Steps

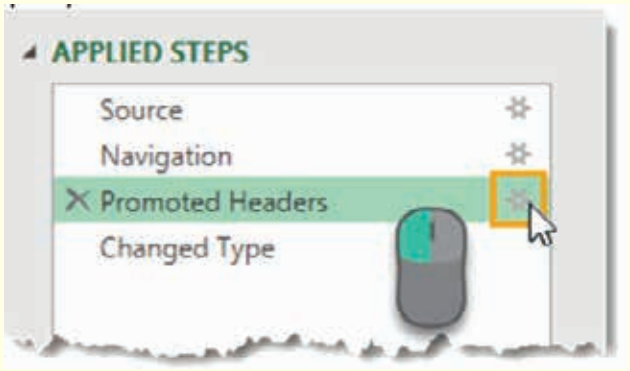
Any transformation you make to your data will appear as a step in the Applied Steps area. It also allows you to navigate through your query. Left click on any step and the data preview will update to show all transformations up to and including that step.





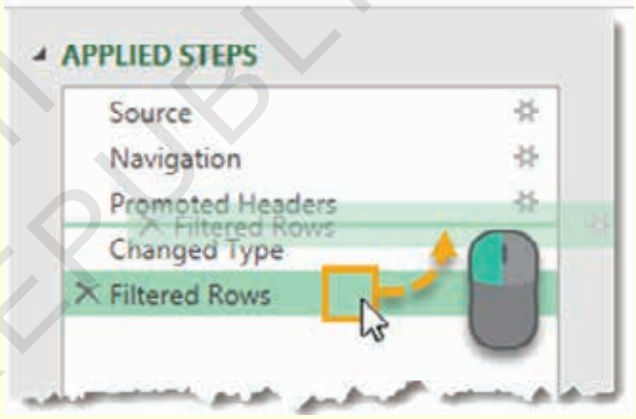
You can insert new steps into the query at any point by selecting the previous step and then creating the transformation in the data preview. Power Query will then ask if you want to insert this new step. Careful though, as this may break the following steps that refer to something you changed.

You can delete any steps that were applied using the X on the left hand side of the step name in the Applied Steps area. Caution is needed though, as if any of the following steps depend on the step you're trying delete, you will break your query. This is where Delete Until End from the right click menu can be handy.



A lot of transformation steps available in power query will have various user input parameters and other setting associated with them. If you apply a filter on the product column to show all items not starting with Pen, you might later decide you need to change this filter step to show all items not equal to Pen. You can make these edits from the Applied Step area.

Some of the steps will have a small gear icon on the right hand side. This allows you to edit the inputs and settings of that step.



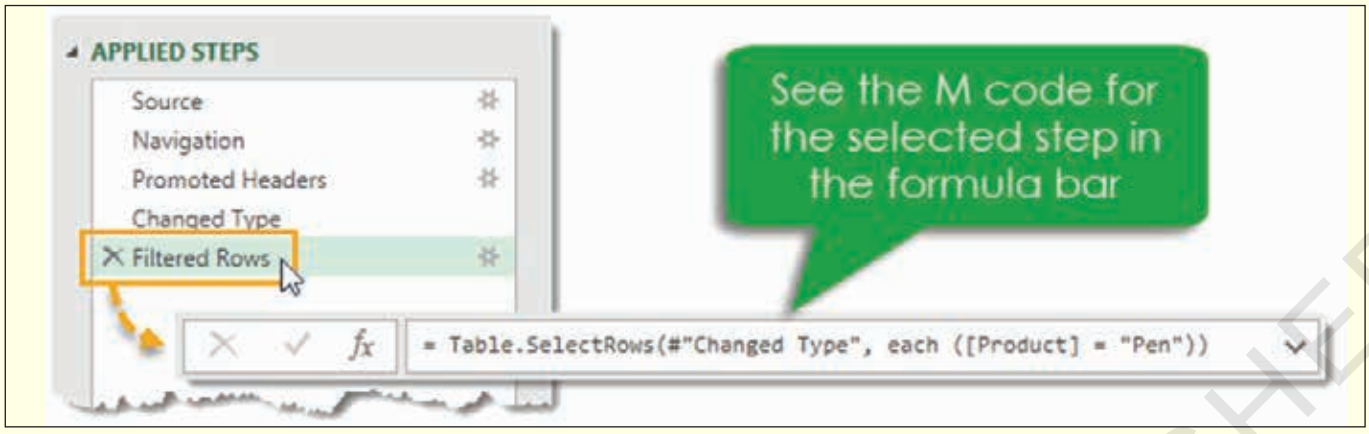
You can rearrange the order the steps are performed in your query. Just left click on any step and drag it to a new location. A green line between steps will indicate the new location. This is another one you'll need to be careful with as a lot of steps will depend on previous steps, and changing ordering can create errors because of this.

Right click on any step to access a menu of options.

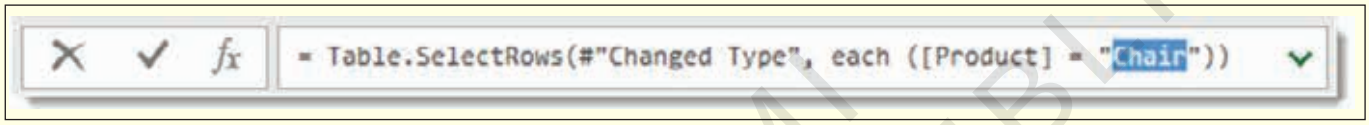
- **Edit Settings –** This allows you to edit the settings of the step similar to using the gear icon on the right hand side of the step.
- **Rename –** This allows you to rename the steps label. Instead of the displaying the generic name like "Filtered Rows", you could have this display something like "Filtered Product Rows on Pens" so you can easily identify what the step is doing.
- **Delete –** This deletes the current step similar to the X on the left hand side of the step.
- **Delete Until End –** This allows you to delete the current step plus all steps up until the end. Since steps can depend on previous steps, deleting all steps after a step is a good way to avoid any errors.

- Insert Step After – This allows you to insert a new step after the current step.
- Move Up and Move Down – This allows you to rearrange the query steps similar to the dragging and dropping method.
- Extract Previous – This can be a really useful option. It allows you to create a new copy of the query up to the selected step.

The Formula Bar

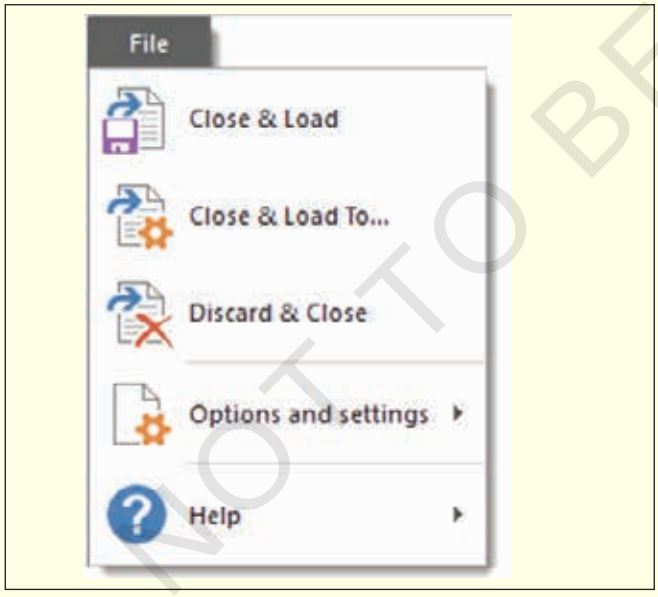


When you click on different steps of the transformation process in the Applied Steps area, the formula bar updates to show the M code that was created for that step. If the M code generated is longer than the formula bar, you can expand the formula bar using the arrow toggle on the right hand side.



You can edit the M code for a step directly from the formula bar without the need to open the advanced editor. In this example, we've changed our filter from "Pen" to "Chair" by typing in the formula bar and then pressing Enter or using the check mark on the left to confirm the change. Press Esc or use the X on the left to discard any changes.

The File Tab



The File tab contains various options for saving any changes made to your queries as well as power query options and settings.

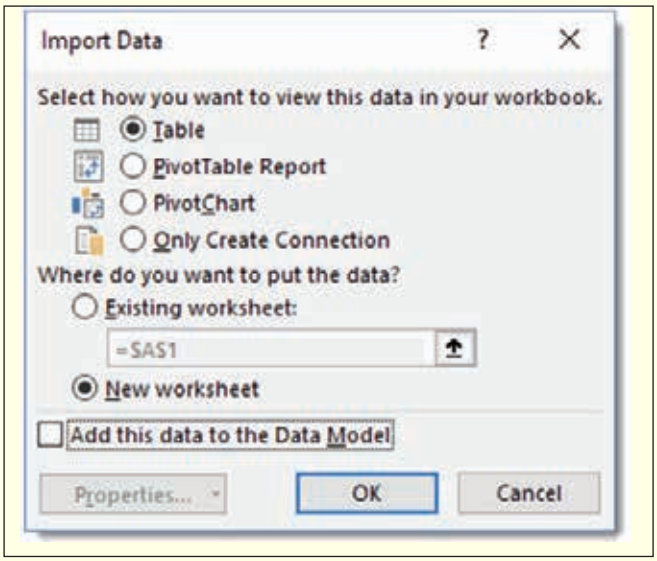
- **Close & Load –** This will save your queries and load your current query into an Excel table in the workbook.
- **Close & Load To –** This will open the Import Data menu with various data loading options to choose from.
- **Discard & Close –** This will discard any changes you made to the queries during your session in the editor and close the editor.

Note, you will still need to save the workbook in the regular way to keep any changes to queries if you close the workbook.

Close & Load and Close & Load To commands are also available from the Home tab.

Data Loading Options

When you use the Close & Load To option to exit the editor, this will open the Import Data menu.

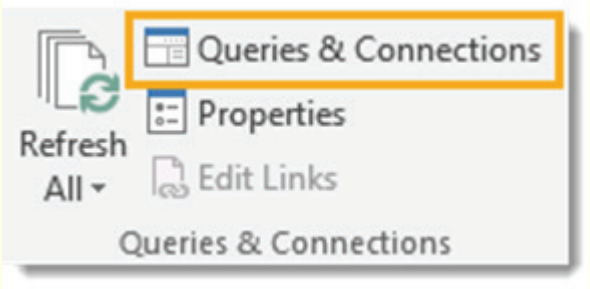


You can choose to load the query to a table, pivot table, pivot chart or only create a connection for the query. The connection only option will mean there is no data output to the workbook, but you can still use this query in other queries. This is a good option if the query is an intermediate step in a data transformation process.

You'll also be able to select the location to load to in your workbook if you selected either a table, pivot table or pivot chart in the previous section. You can choose a cell in an existing worksheet or load it to a new sheet that Excel will create for you automatically.

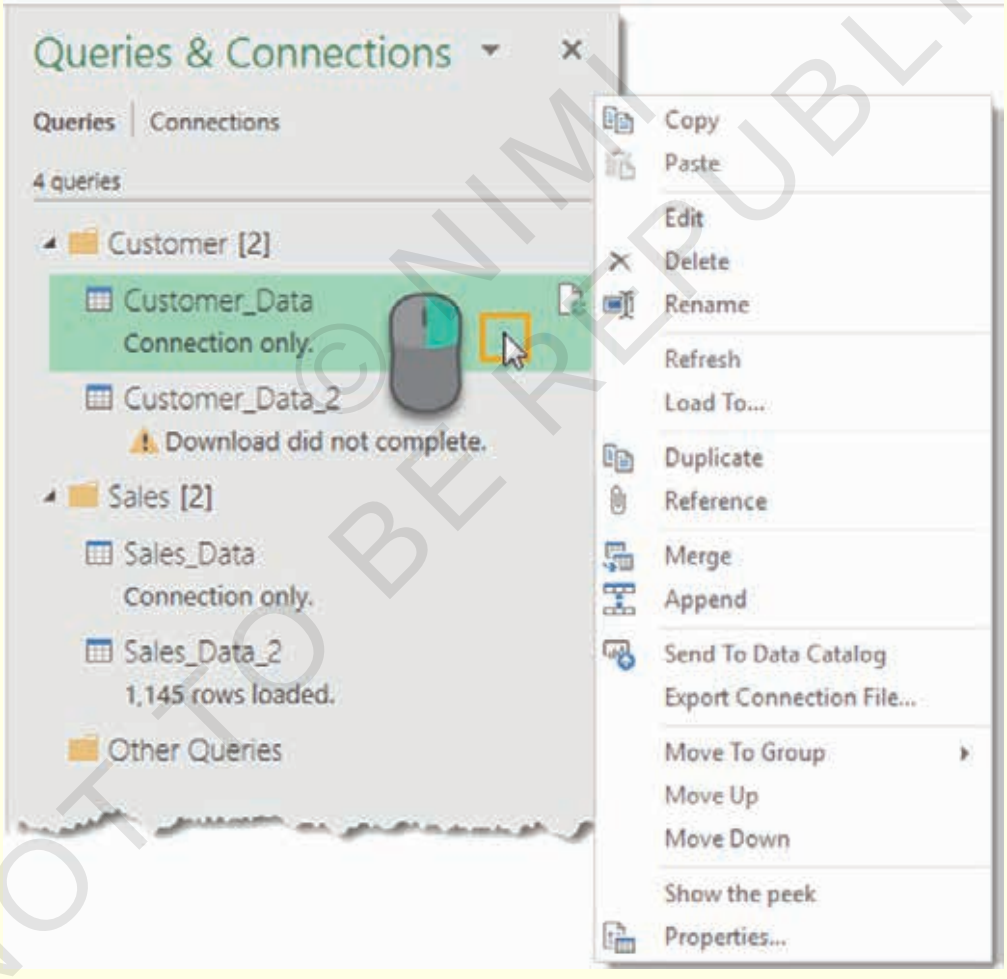
The other option you get is the Add this data to the Data Model. This will allow you to use the data output in Power Pivot and use other Data Model functionality like building relationships between tables. The Data Model Excel's new efficient way of storing and using large amounts of data.

The Queries & Connections Window



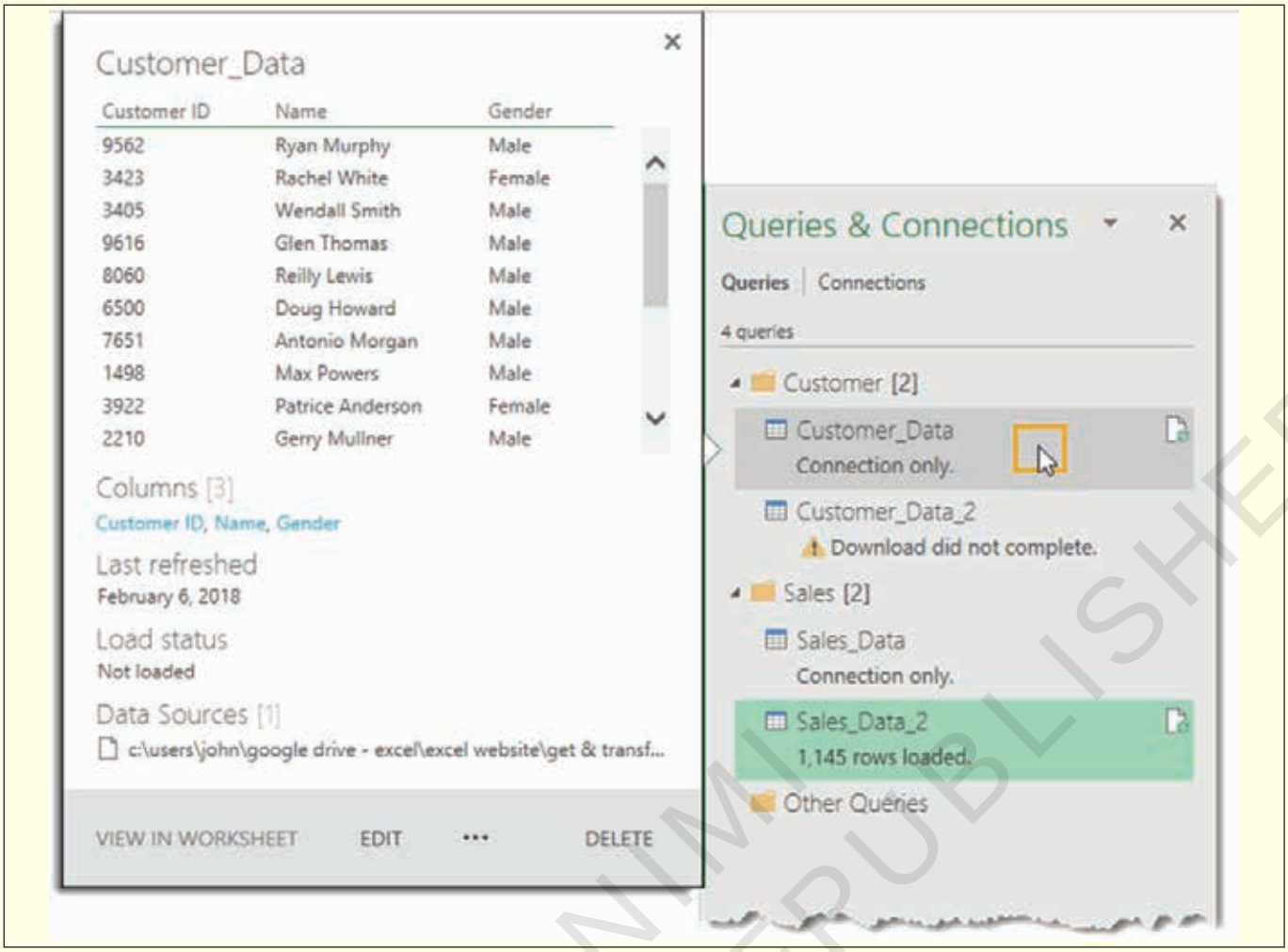
When you're working outside of the power query editor, you can see and interact with all the queries in the workbook through the Queries & Connections window. To open this, go to the Data tab in the regular Excel ribbon, then press the Queries & Connections command button found in the Queries & Connections section.

When opened it will be docked to the right hand side of the workbook. You can undock it by left clicking on the title and dragging it. You can drag it to the left hand side and dock it there or leave it floating. You can also resize the window by left clicking and dragging the edges.



This is very similar to the query list in the editor and you can perform a lot of the same actions with a right click on any query.

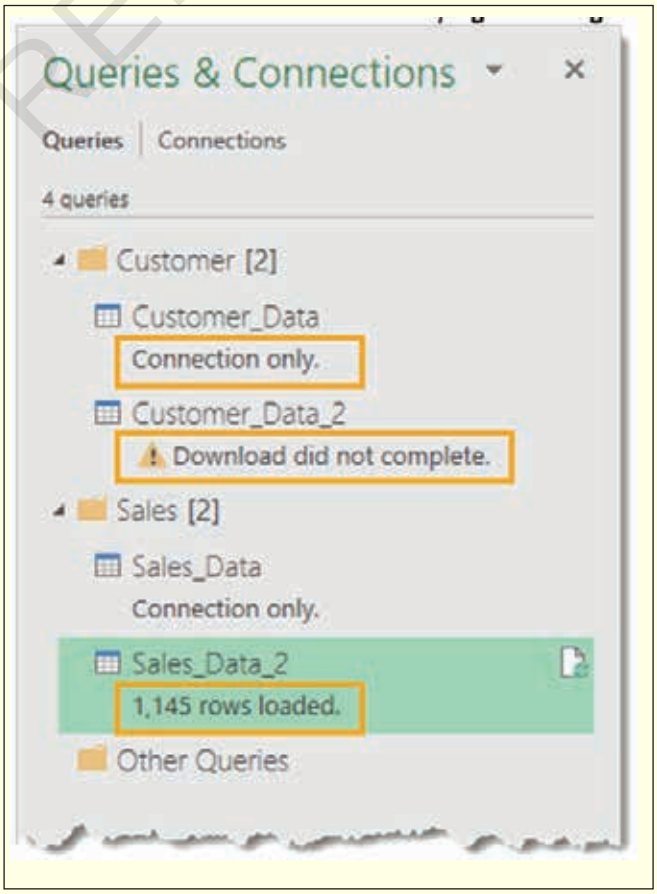
One option worth noting that's not in the query list right click menu, is the Load To option. This will allow you to change the loading option for any query, so you can change any Connection only queries to load to an Excel table in the workbook.



Another thing worth noting is when you hover over a query with the mouse cursor, Excel will generate a Peek Data Preview. This will show you some basic information about the query.

- **Data Preview –** This is a live preview of the data similar to when first setting up a query.
- **Columns –** This will give you a list of all the columns contained in the final results of the query along with a count of how many columns there are. Clicking on any of them will highlight the column in the data preview.
- **Last Refreshed –** This will tell you when the data was last refreshed.
- **Load Status –** This displays whether the data is loaded to a table, pivot table, pivot chart or is a connection only.
- **Data Sources –** This will show you the source of the data along with a count of the number of files if you're it's a from folder query.
- **View in Worksheet –** Clicking on this will take you to the output table if the query is loaded to a table, pivot table or pivot chart.

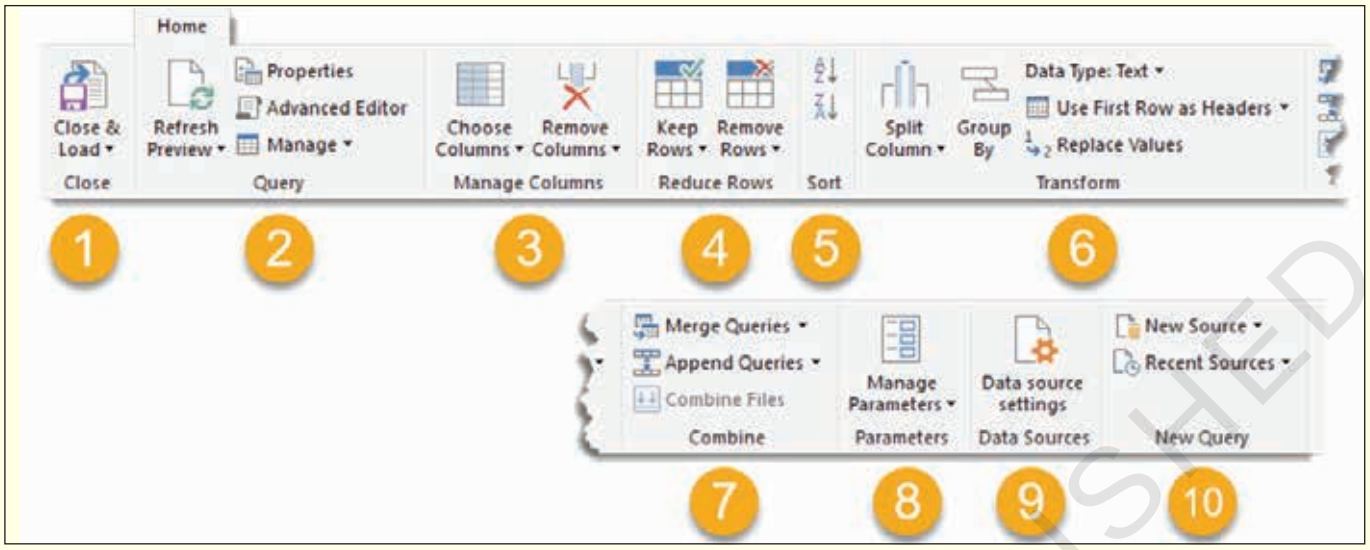
You can also access this Peek view by right clicking on the query and selecting Show the peek.



There are also some useful messages displayed in the Queries & Connections window for each query. It will show you if the query is a connection only, if there were any errors when the query last ran, or how many rows loaded.

The Home Tab

The Home tab contains all the actions, transformations, and settings that will affect the whole table.



1 **Close –** You can access the Close & Load and Close & Load To options from here. These are also available in the File tab menu.

2 **Query –** You can refresh the data preview for the current query or all query connections. You can also open the properties settings and the advanced editor for the current query and there are options under the Manage button to delete, duplicate or reference the current query.

3 **Manage Columns –** You can navigate to specific columns and choose to keep or remove columns.

4 Reduce Rows – You can manage the rows of data from this section. There are lots of options to either keep certain rows or remove certain rows. Keep or remove the top N rows, the bottom N rows, a particular range of rows, alternating rows, duplicate rows or rows with errors. One option only available for removing rows is to remove blank rows.

5 **Sort –** You can sort any column in either ascending or descending order.

6 **Transform –** This section contains a mix of useful transformation options.

- **Split Columns –** This allows you to split the data in a column based on a delimiter or character length.
- **Group By –** This allows you to group and summarize your data similar to a Group By in SQL.
- **Data Type –** This allows you to change the data type of any column.
- **Use First Row as Headers –** This allows you to promote the first row of data to column headings or demote the column headings to a row of data.
- **Replace Values –** This allows you to find and replace any value from a column.

7 **Combine –** This sections contains all the commands for joining your query to with other queries. You can merge, append queries or combine files when working with a from folder query.

8 **Parameters –** Power Query allows you to create parameters for your queries. For example when setting up a from folder query, you may want the folder path to be a parameter as so you can easily change the location. You can create and manage existing parameters from this section.

9 **Data Sources –** This section contains the data source settings including permissions management for any data sources that require passwords to access.

10 **New Query –** You can create new queries from new data sources or previously used data sources from this section.

Use Power BI for simple data visualizations

Objectives: At the end of this exercise you shall be able to
- **details power BI for simple data visualizations.**

Requirements

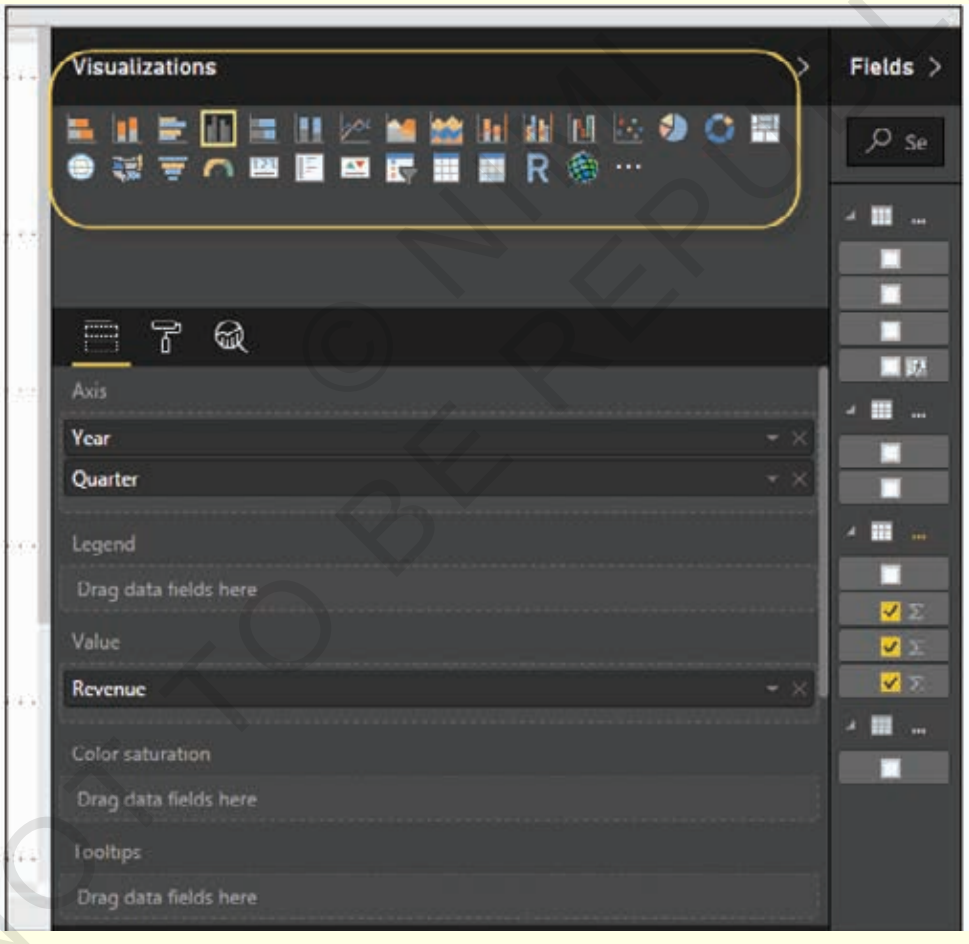
Tools/Equipment/Machines

- A working PC with MS-OFFICE - 1 No.

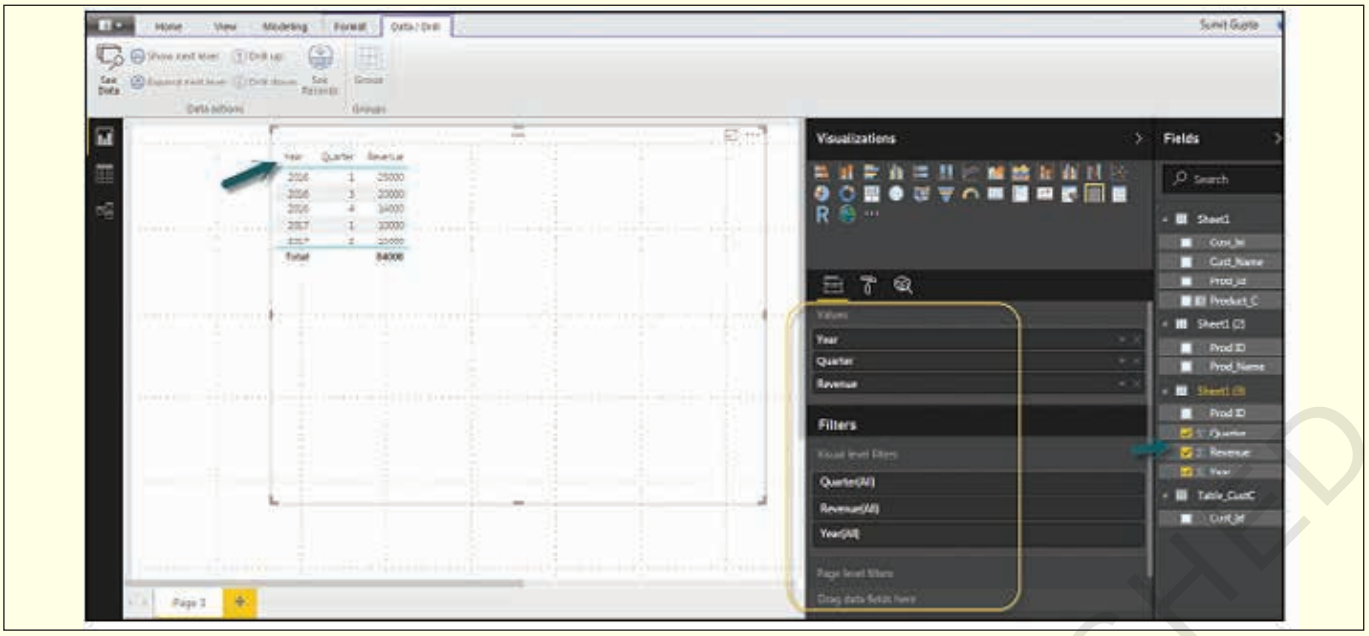
PROCEDURE

Use power BI for simple data visualizations

Visualizations are used to effectively present your data and are the basic building blocks of any Business Intelligence tool. Power BI contains various default data visualization components that include simple bar charts to pie charts to maps, and also complex models such as waterfalls, funnels, gauges, and many other components.



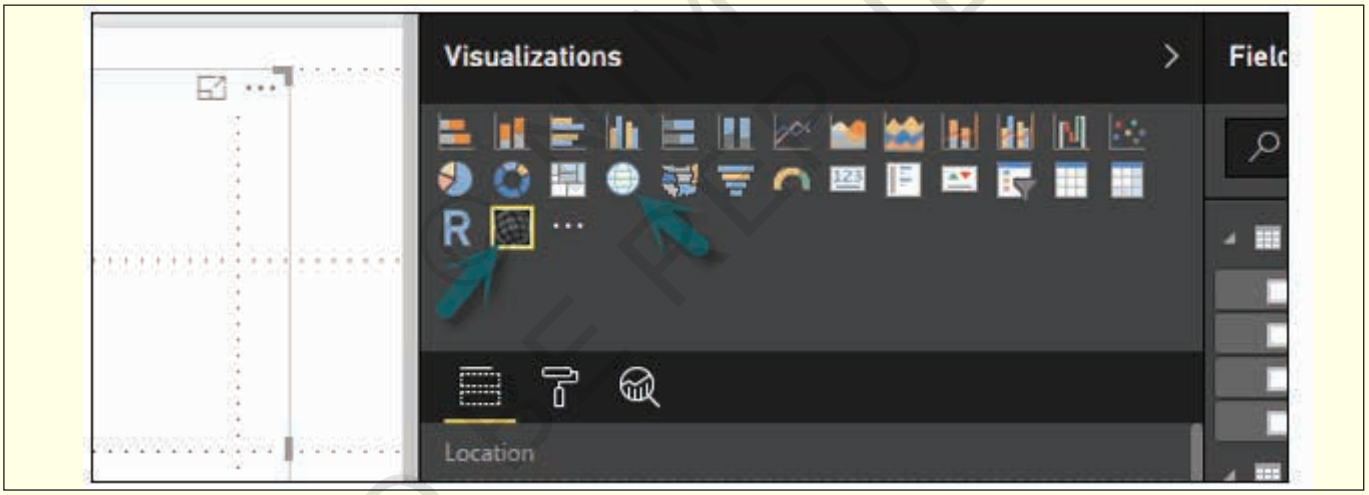
In Power BI, you can create visualization in two ways. First is by adding from the right side pane to Report Canvas. By default, it is the table type visualization, which is selected in Power BI. Another way is to drag the fields from right side bar to the axis and value axis under Visualization. You can add multiple fields to each axis as per the requirement.



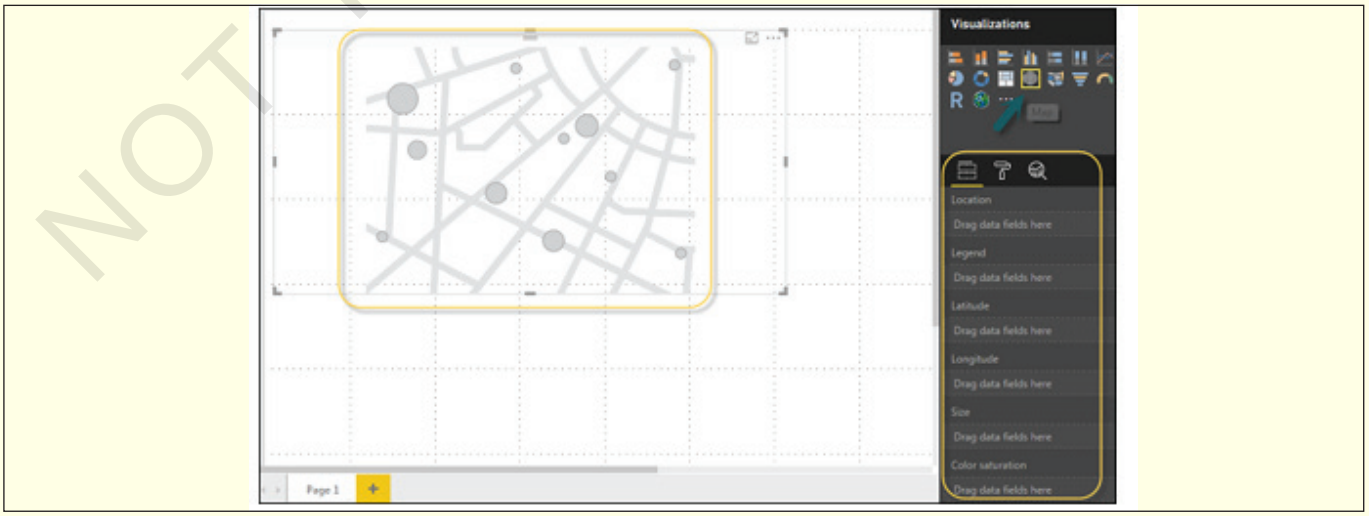
In Power BI, it is also possible to move your visualization on the reporting canvas by clicking and then dragging it. You can also switch between different type of charts and visualizations from the Visualization pane. Power BI attempts to convert your selected fields to the new visual type as closely as possible.

Creating Map Visualizations

In Power BI, we have two types of map visualization - bubble maps and shape maps. If you want to create a bubble map, select the map option from the visualization pane.

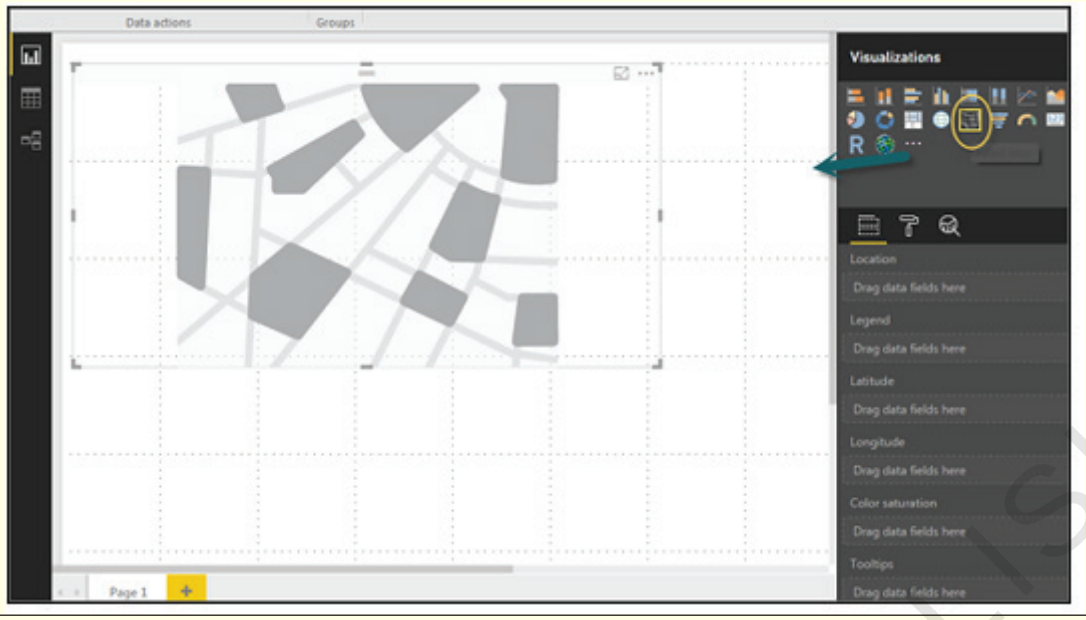


To use a bubble map, drag the map from Visualizations to the Report Canvas. To display values, you have to add any location object to the axis.



In the value fields, you can see that it accepts values axis such as City and State and or you can also add longitude and latitude values. To change the bubble size, you need to add a field to the value axis.

You can also use a filled map in data visualization, just by dragging the filled map to the Report Canvas.

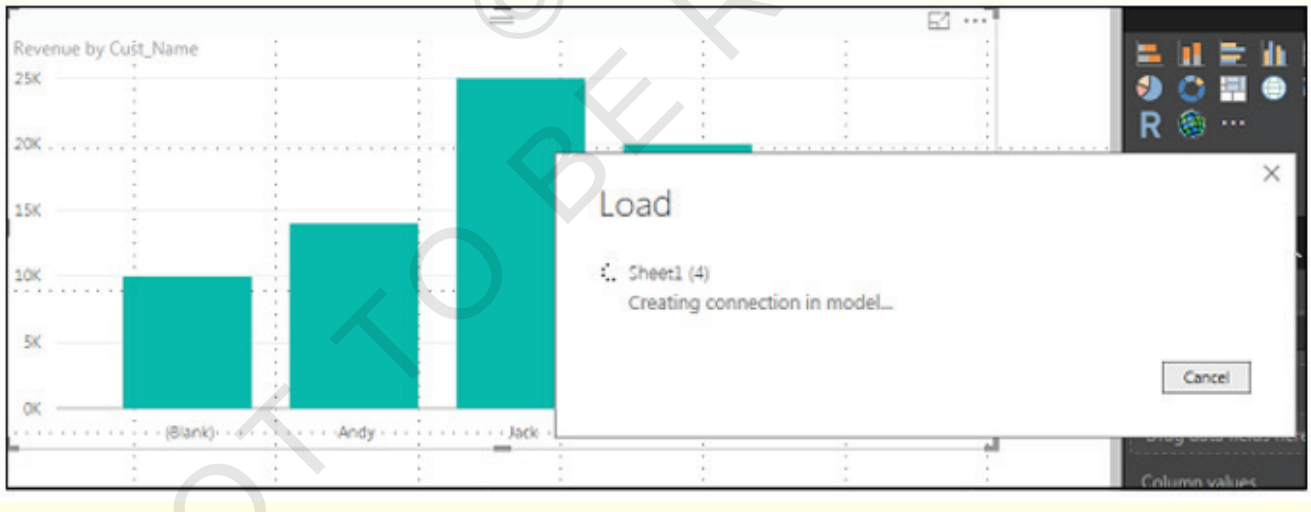


Note – If you see a warning symbol on top of your map visualization, it means that you need to add more locations to your map chart.

Using Combination Charts

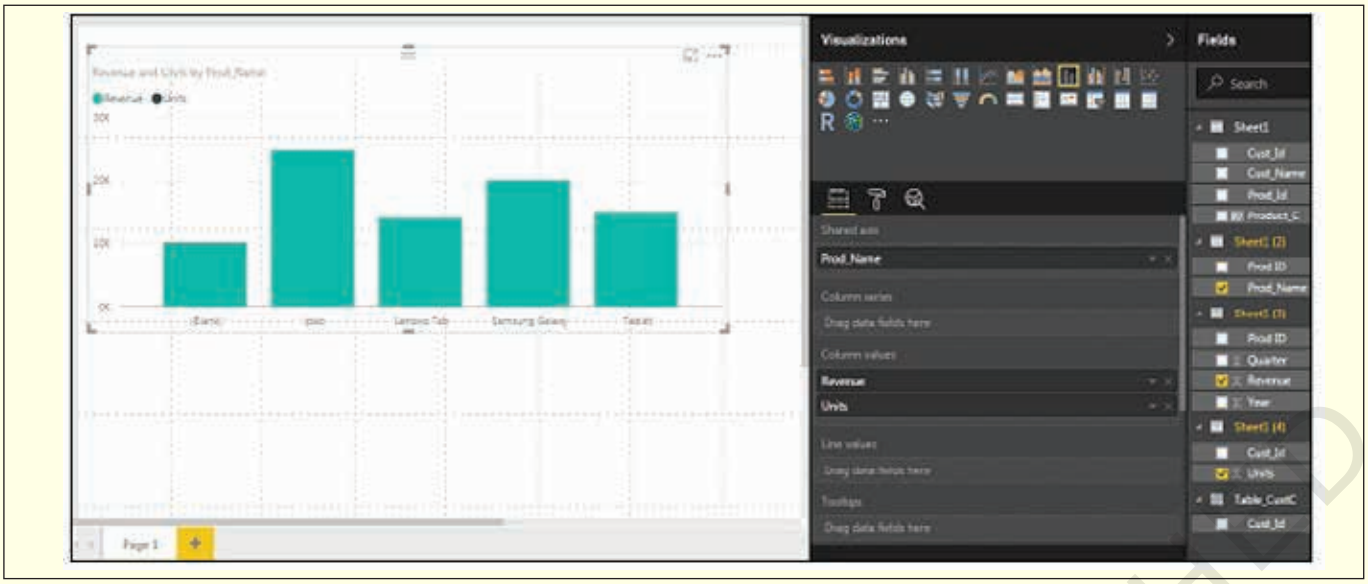
In data visualization, it is also required to plot multiple measures in a single chart. Power BI supports various combination chart types to plot measure values. Let us say you want to plot revenue and unit_solds in one chart. Combination charts are the most suitable option for these kind of requirement.

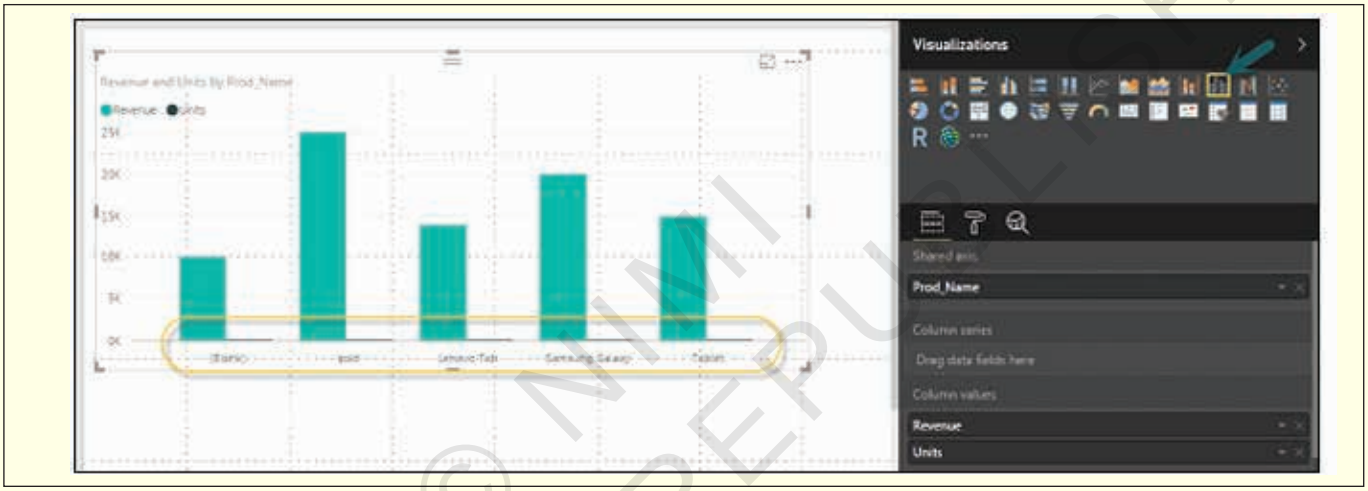
One of the most common Combination chart in Power BI is Line and Stacked column charts. Let us say we have a revenue field and we have added a new data source that contains customer-wise unit quantity and we want to plot this in our visualization.



Once you add a data source, it will be added to the list of fields on the right side. You can add units to the column axis as shown in the following screenshot.

You have other type of combine chart that you can use in Power BI - Line and Clustered Column.

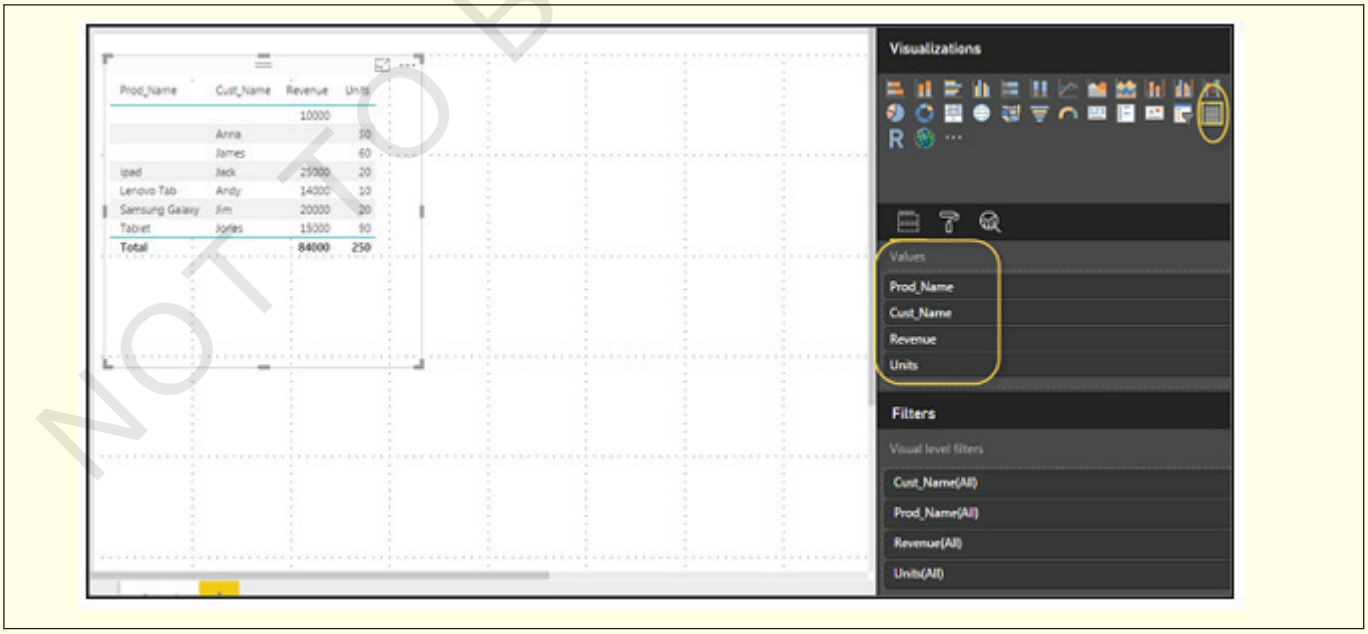




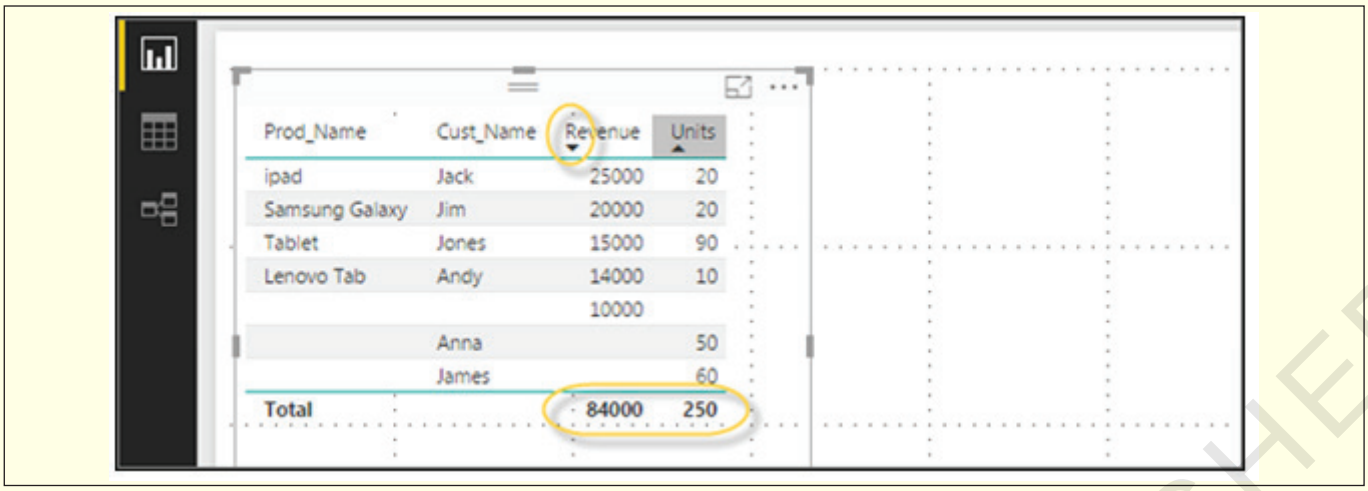
Using Tables

In Power BI, when you add a dataset to your visualization, it adds a table chart to the Report canvas. You can drag the fields that you want to add to the report. You can also select the checkbox in front of each field to add those to the Report area.

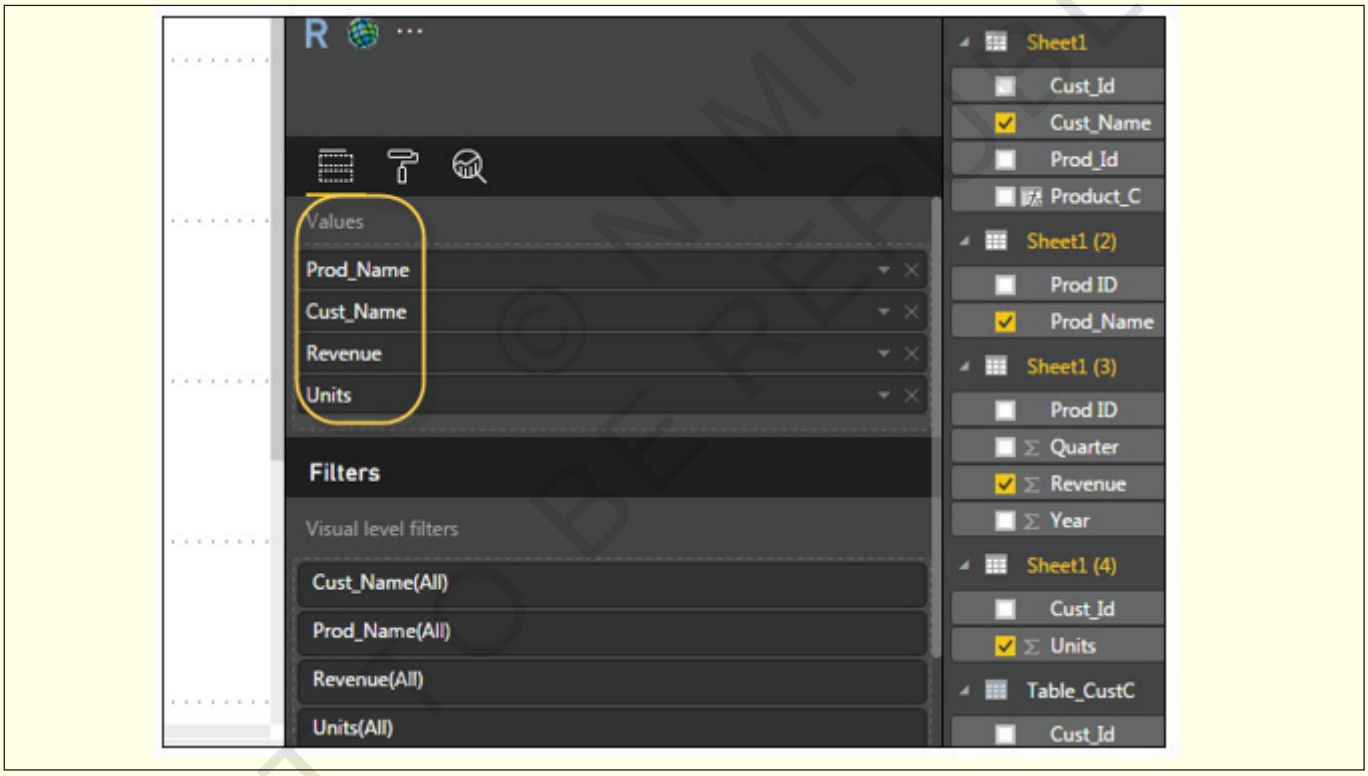
With the numerical values in a table, you can see a sum of values at the bottom.



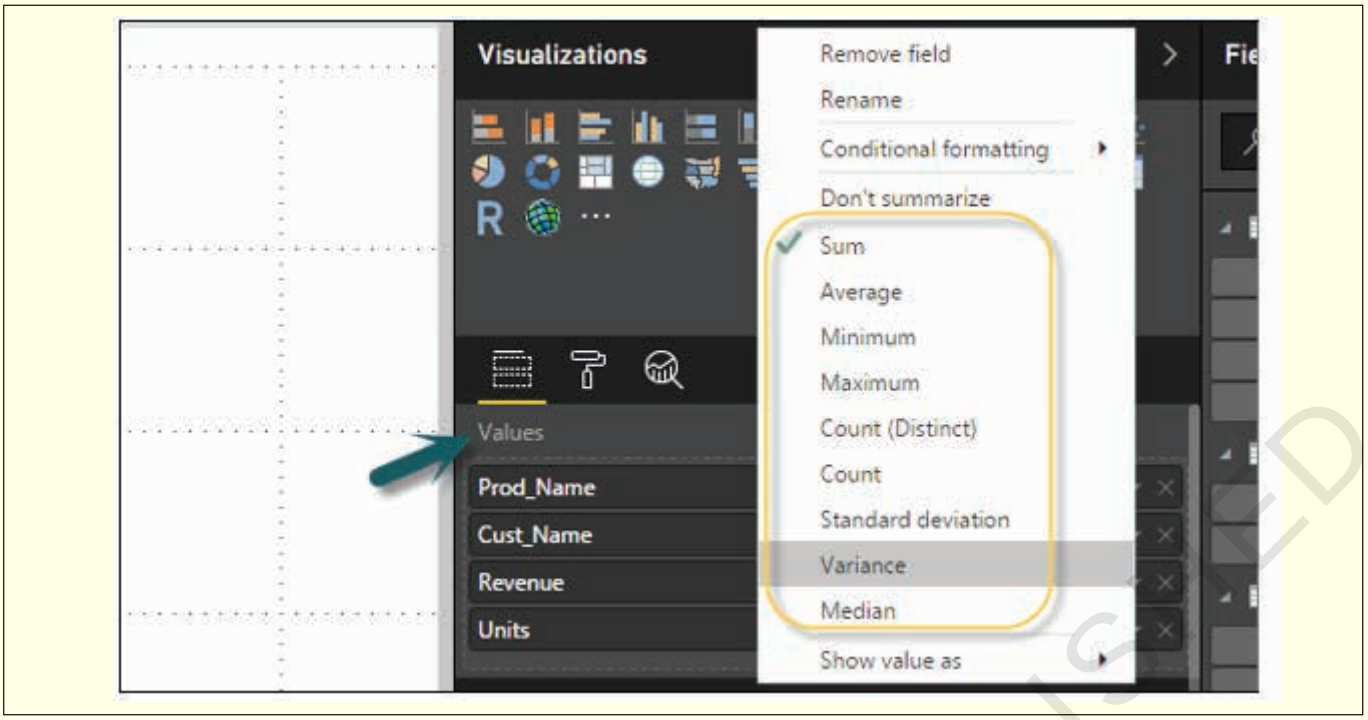
You can also perform a sort in the table using an arrow key at the top of the column. To perform ascending/ descending sort, just click the arrow mark, and the values in the column will be sorted.



The order of the columns in a table is determined by the order in the value bucket on the right side. If you want to change the order, you can delete any column and add the other one.



You can also undo summarize or apply different aggregate function on numerical values in the table. To change the aggregation type, click the arrow in the value bucket in front of the measure and you will see a list of formulas that can be used.



Another table type in Power BI is the matrix table that provides a lot of features such as auto sizing, column tables, and setting colors, etc.

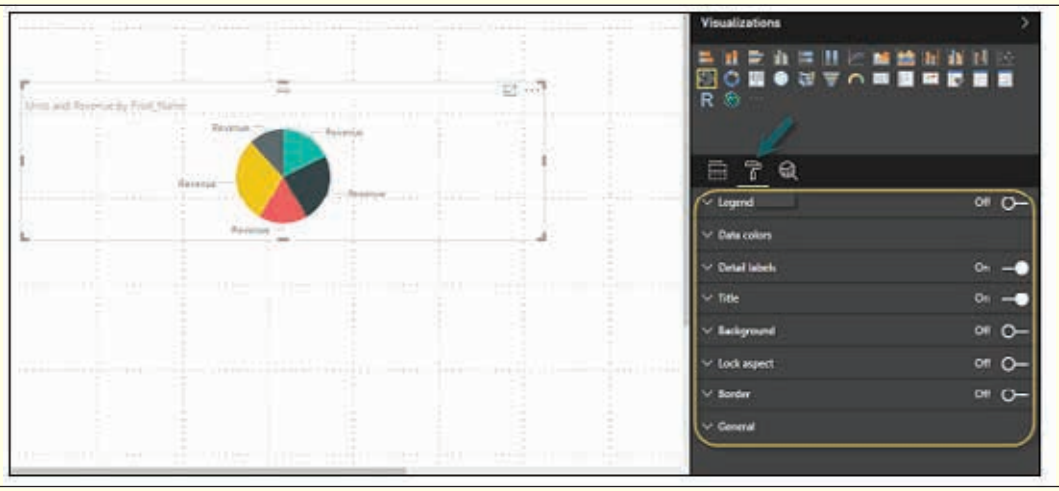
Prod_Name	Units	Revenue
Tablet	90	15000
Samsung Gal...	20	20000
Lenovo Tab	10	14000
ipad	20	25000
	110	10000
Total	**250**	**84000**

Modify Colors in Charts

In Power BI, you can also modify the colors in the chart. When you select any visualization, it has an option to change the color. Following options are available under the Format tab −

- Legend
- Data Colors
- Detail Label
- Title
- Background
- Lock Aspect
- Border
- General

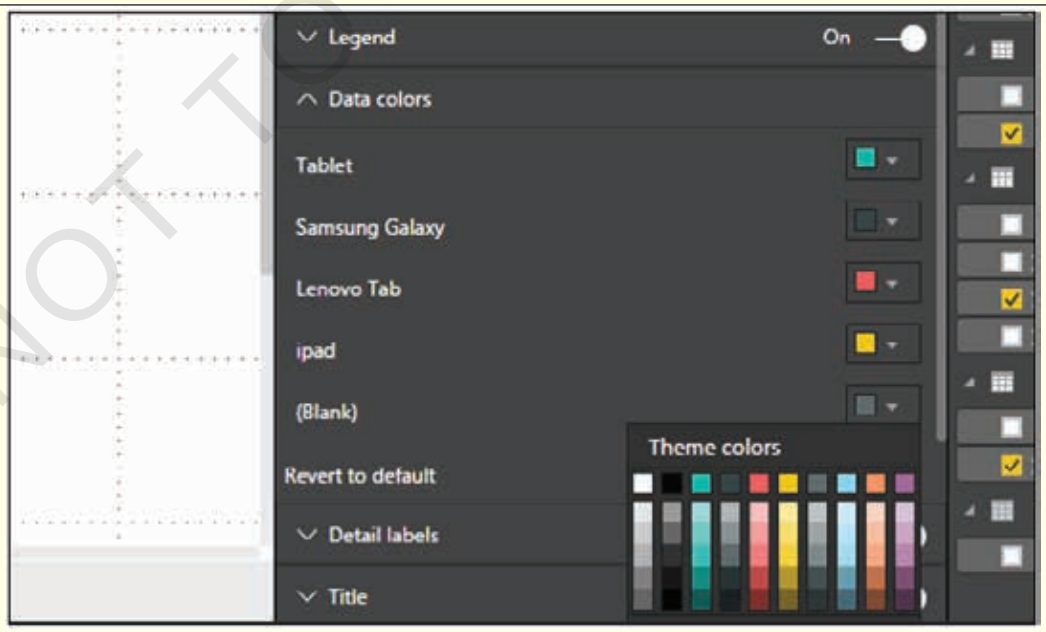
To open these options, go to the Format tab as shown in the following screenshot. Once you click, you can see all the options available.



When you expand the Legend field, you have an option where you want to display the legend. You can select −

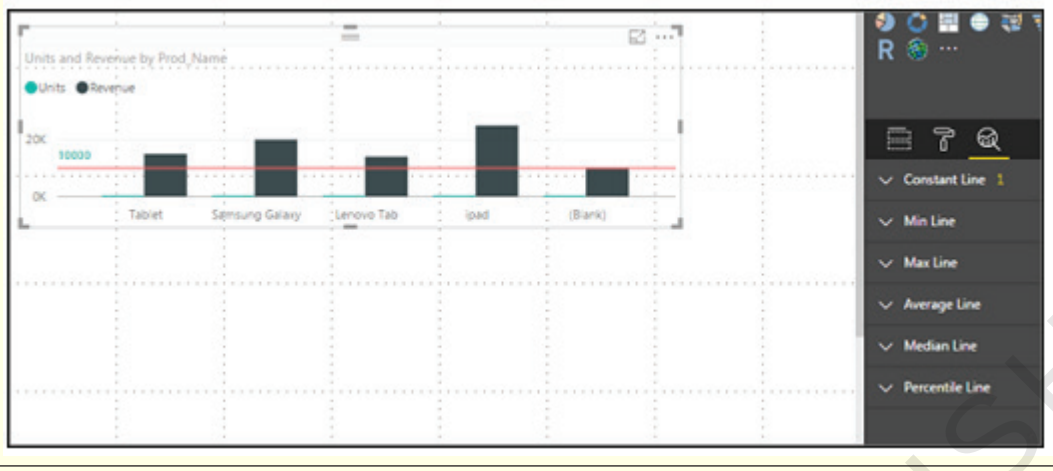
- Position
- Title
- Legend Name
- Color
- Text Size
- Font Family

Similarly, you have data colors. In case, you want to change the color of any data field, you can use this option. It shows all objects and their corresponding colors in the chart.

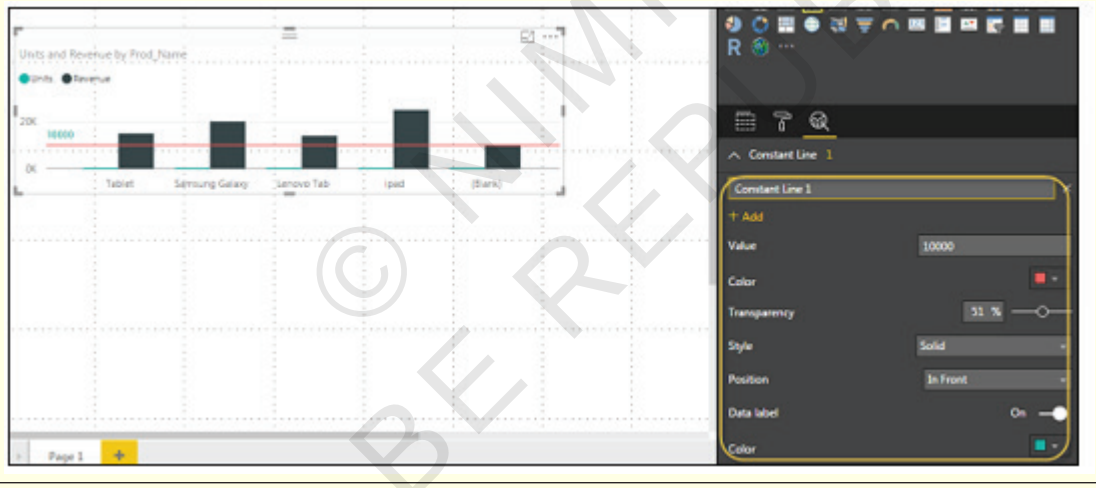


You also have Analytics feature in the tool, where you can draw lines as per requirement in data visualization. You have the following line types in data visualization −

- Constant Line
- Min Line
- Max Line
- Average Line
- Median Line
- Percentile Line



You can opt for a dashed, dotted, or a solid line. You can select Transparency level, color, and position of the line. You can also switch on/off data label for this line.

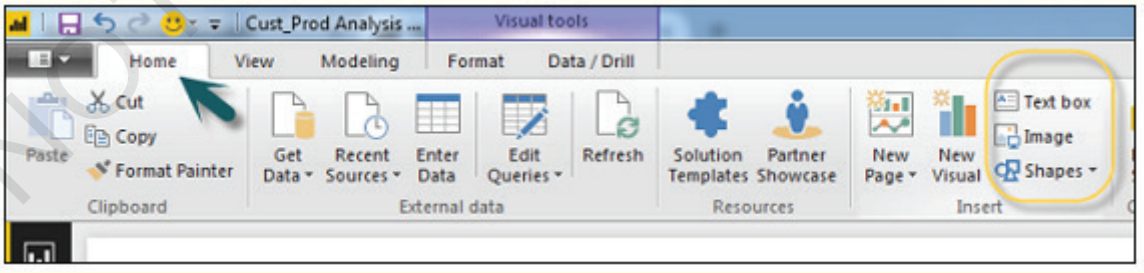


Adding Shapes, Images and Text box

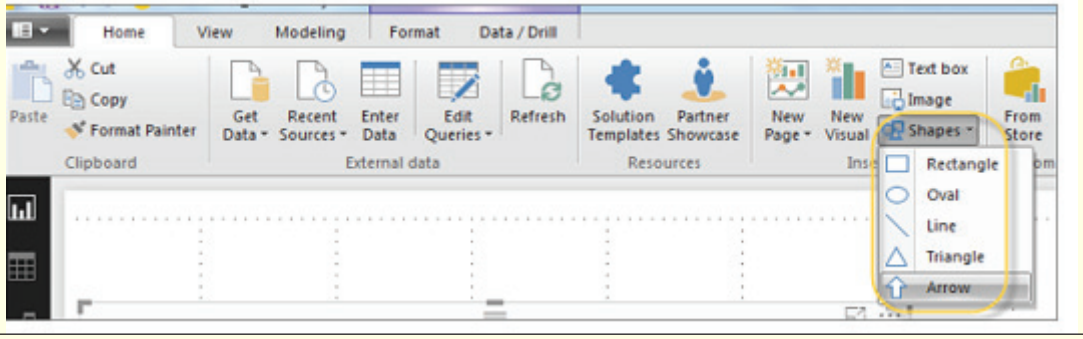
Sometimes it is required that you need to add static text, images, or shapes to your visualization. In case you want to add header/footer or any static signatures, messages to data visualization this option can be used.

You can also add URLs in the text box and Power BI uses those link to make it live.

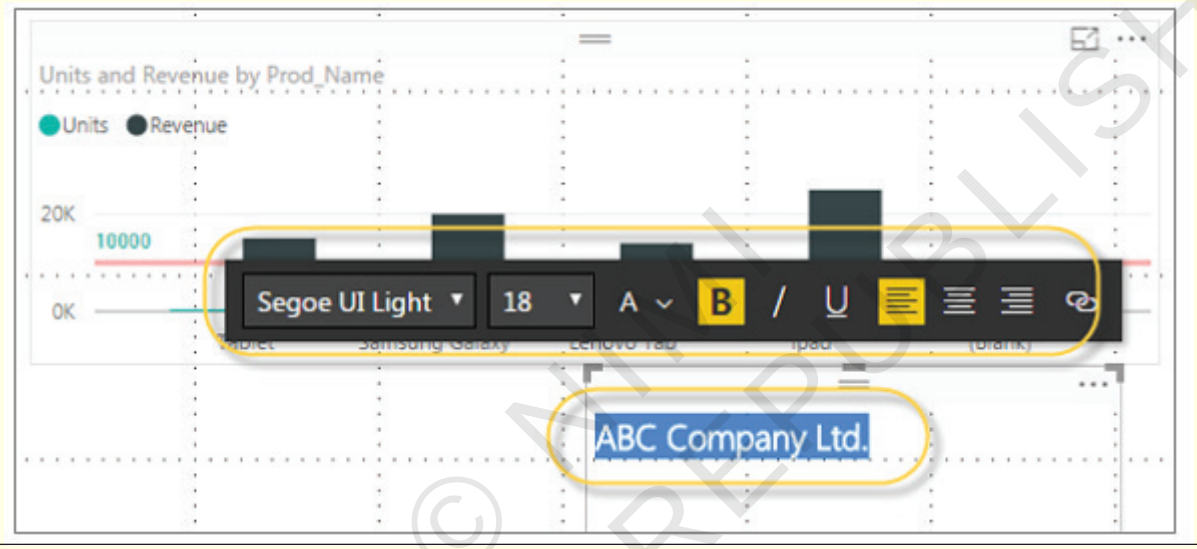
To add shapes, images and text box, navigate to the Home tab and at the top you will find an option to add images.



You can insert different shapes in data visualization. To see the available shapes, click the arrow next to the Shapes button.

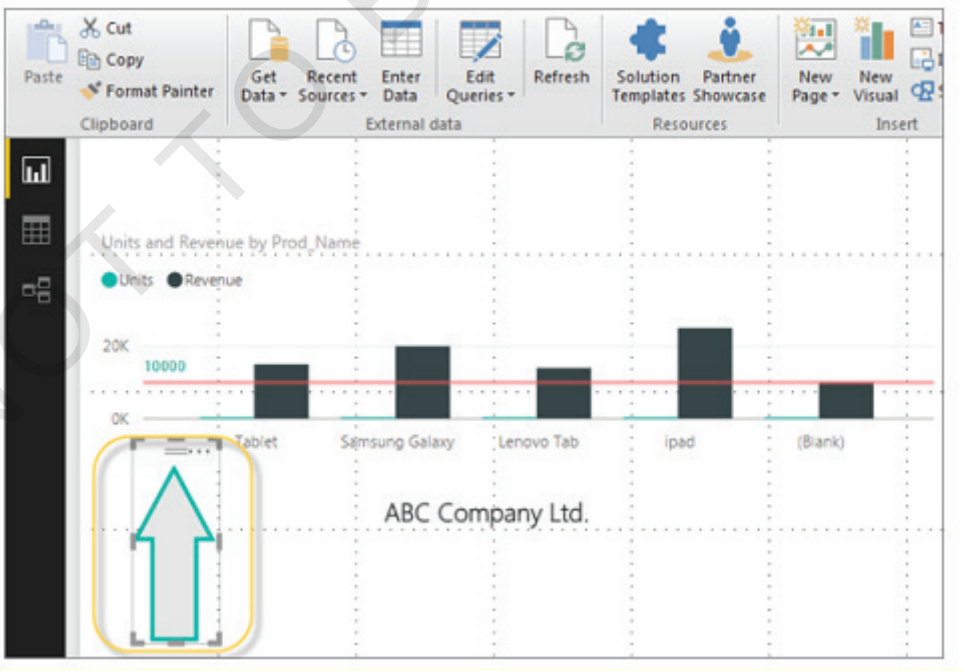


When you click on the text box, it adds a text box in your Report canvas. You can enter any text in the text box and use the rich text editor to make formatting changes.



Similarly, images can be added to data visualization to add logos or other images to data visualization. When you click the Image option, it asks for a path to pass the image file.

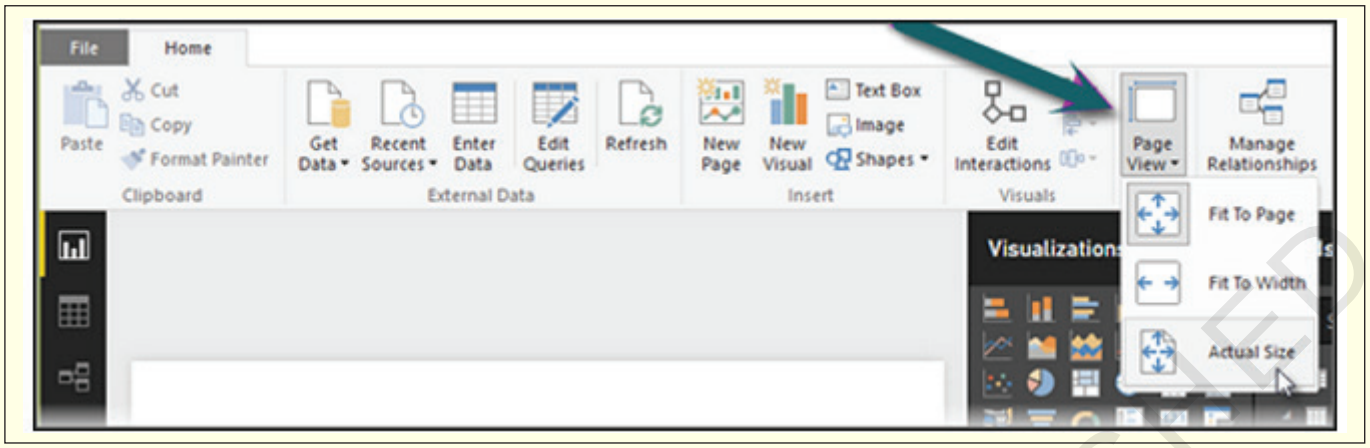
You can add shapes by selecting any shape from the dropdown list. You can also resize it using different options.



Styling Reports

In Power BI, you have flexible options to adjust the page layout and formatting such as orientation and page size of your report. Navigate to Page View menu from the Home tab and the following options are provided.

- Fit to Page
- Fit to Width
- Actual Size



By default, the page size in a report is 16:9; however, it is also possible to change the page size of the report. To change the page size, navigate to the Visualization pane and select Paint brush.

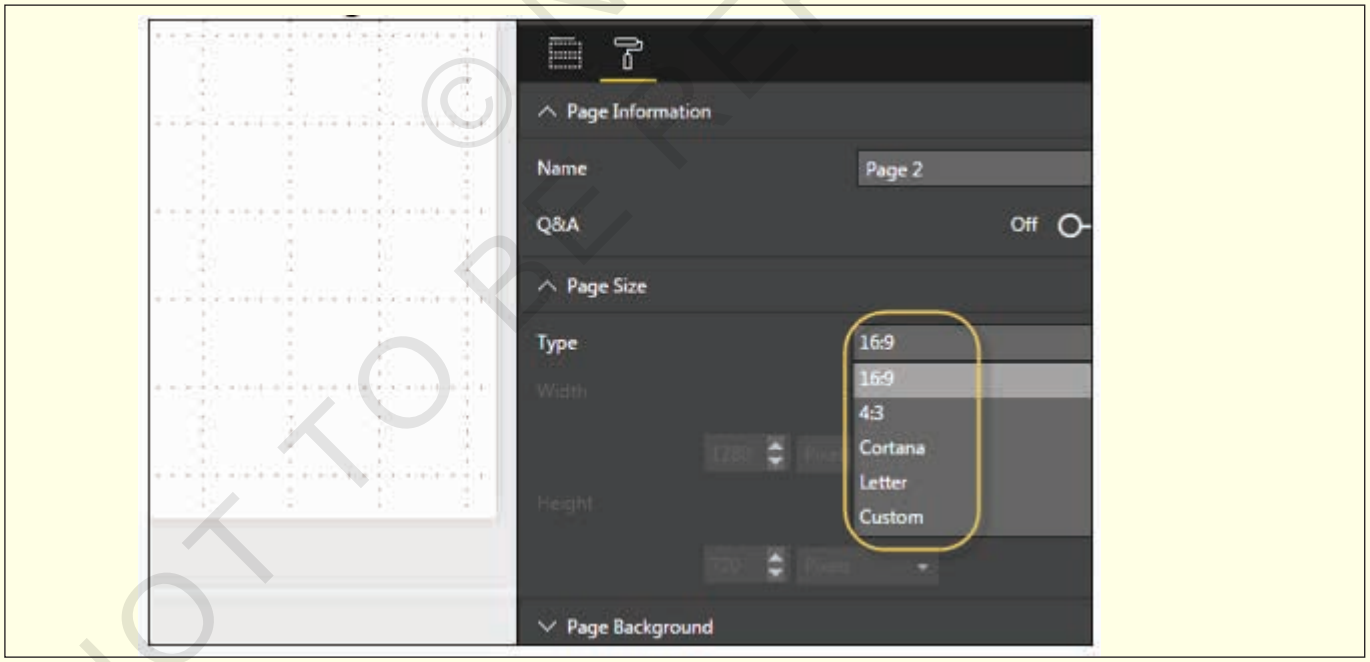
Note – To change page size, no visualization should be added to the Report canvas. You have the following options available under Page layout −

- Page Information
- Page Size
- Page Background

Under Page Information, you have Name and Q&A.

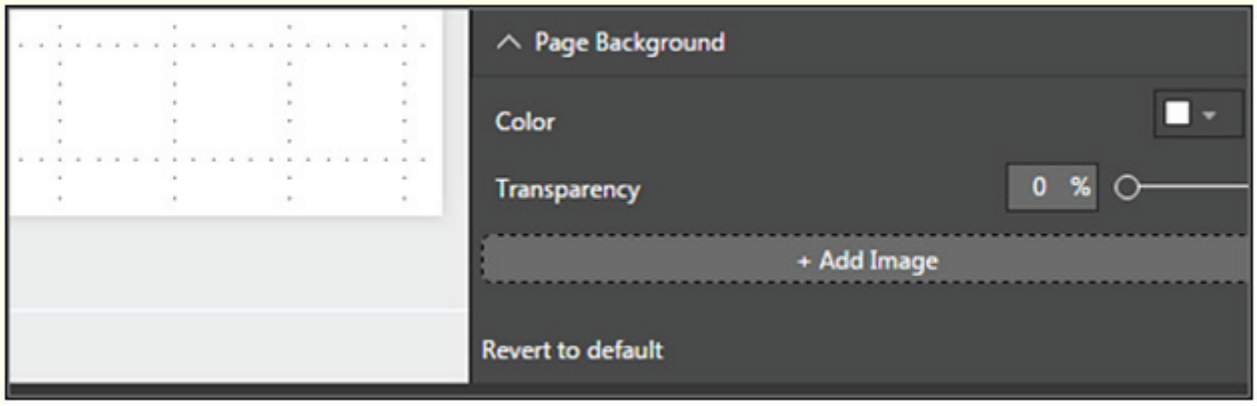
Under Page Size, you can select from the following options −

- Type
- Width
- Height



Under Page Background, you can select from the following options:

- Color
- Transparency
- Add Image



Duplicating Reports

In some scenarios, you may want to use the same layout and visuals for different pages. Power BI provides an option to create a copy of the page. When you use Duplicate Page option, a new page is added with similar layout and visuals.

To duplicate a page, right-click the Page and select Duplicate Page option. This will create a copy of the same page with the name - Duplicate of Page1.

Now, if you want to rename an existing page or delete a page, you can use other options as shown in the above screenshot.

For those who are new to dashboards, it would be ideal to get an understanding of the dashboards first. In this chapter, you will get to know the definition of dashboard, how it got its name, how they became popular in IT, key metrics, benefits of dashboards, types of dashboards, dashboard data and formats and live data on dashboards.

In information technology, a dashboard is an easy to read, often single page, real-time user interface, showing a graphical presentation of the current status (snapshot) and historical trends of an organization's or department's key performance indicators to enable instantaneous and informed.

Decisions to be made at a glance

Dashboards take their name from automobile dashboards. Under the hood of your vehicle, there may be hundreds of processes that impact the performance of your vehicle. Your dashboard summarizes these events using visualizations so that you have the peace of mind to concentrate on safely operating your vehicle. In a similar way, business dashboards are used to view and/or monitor the organization's performance with ease.

The idea of digital dashboards emerged from the study of decision support systems in the 1970s. Business dashboards were first developed in the 1980s, but due to the problems with data refreshing and handling, they were put on the shelf. In the 1990s, the information age quickened pace and data warehousing, and online analytical processing (OLAP) allowed dashboards to function adequately. However, the use of dashboards did not become popular until the rise of key performance indicators (KPIs), and the introduction of Robert S. Kaplan and David P. Norton's Balanced Scorecard. Today, the use of dashboards forms an important part of decision making.

In today's business environment, the tendency is towards Big Data. Managing and extracting real value from all that data is the key for modern business success. A well-designed dashboard is a remarkable information management tool.

Demonstrate E-Commerce sites

Objectives: At the end of this exercise you shall be able to
- **demonstrate the e-commerce sites.**

PROCEDURE

Browser the following e-Commerce sites to identify products & services in different sectors

1 Product Buying & Selling
- https://www.amazon.in/
- https://www.flipkart.com/
- https://www.olx.in/
- https://www.cars24.com/

2 Transports
- https://www.irctc.co.in/nget/train-search
- https://www.uber.com/in/en/ride/
- https://www.olacabs.com/

3 Entertainment
- https://in.bookmyshow.com/
- https://www.ticketnew.com/

4 Food
- https://www.swiggy.com/
- https://www.zomato.com/

5 Travel and Tourism
- https://www.makemytrip.com/
- https://www.cleartrip.com/

6 Real Estate
- https://www.99acres.com/
- https://www.nobroker.in/

7 Job
- https://www.naukri.com/
- https://www.linkedin.com/

8 Banking
- https://www.axisbank.com/
- https://www.icicibank.com/

9 Pharmacy
- https://www.1mg.com/
- https://pharmeasy.in/

10 Local Information Search
- https://www.justdial.com/
- https://www.whitepages.com/

11 Education
- https://byjus.com/
- https://unacademy.com/

Sl.No.	Name of the site	Purpose of the site

List features of e-commerce sites

Objectives : At the end of this exercise you shall be able to
- **browse and observe features of ebay**
- **browse and observe Amazon website**
- **browse and listout the Flipkart**
- **browse and listout the OLX**
- **browse and listout QuickR**
- **compare websites and features on the following table basis by tick marks.**

PROCEDURE

TASK 1 : **Browse and observe features of ebay**

1 Open web browser for accessing web page.

2 Type in the address bar as “http://www.ebay.in” as in Fig 1

Fig 1

3 Note down the features listed in the following table from the main window.

Items	Placement	On Click
Name of the Site / Logo		
Products Catalogue		
Offers		
User Login		
Seller Login		
Terms & Conditions		

TASK 2 : **Browse features of Amazon**

1 Open web browser for accessing web page.

2 Type in the address bar as “http://www.amazon.in” as in Fig.2

3 Note down the features listed in the following table from the main window.

Fig 2

Items	Placement	On Click
Name of the Site / Logo		
Products Catalogue		
Offers		
User Login		
Seller Login		
Terms & Conditions		

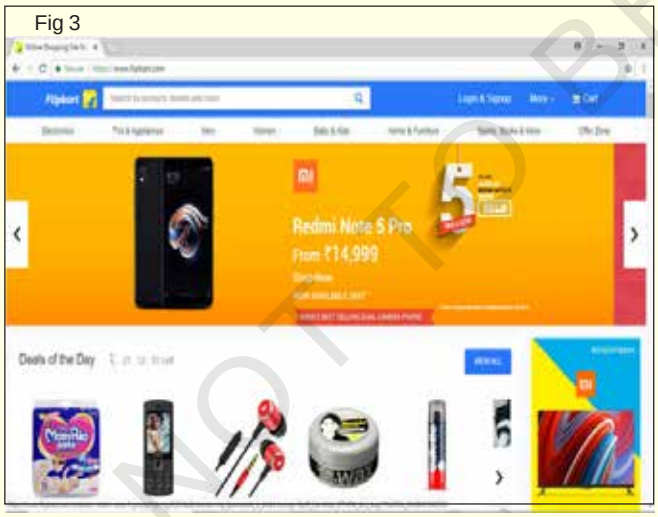
TASK 3 : **Browse features of Flipkart**

1 Open web browser for accessing web page.

2 Type in the address bar as “http://www.flipkart.com” as in Fig.3

3 Note down the features listed in the following table from the main window.

Fig 3



Items	Placement	On Click
Name of the Site / Logo		
Products Catalogue		
Offers		
User Login		
Seller Login		
Terms & Conditions		

— — — — — — — —

TASK 4 : **Browse features of OLX**

1 Open web browser for accessing web page.

2 Type in the address bar as “http://www.olx.in” as in Fig.4

3 Note down the features listed in the following table from the main window.

Fig 4

Items	Placement	On Click
Name of the Site / Logo		
Products Catalogue		
Offers		
User Login		
Seller Login		
Terms & Conditions		

— — — — — — — —

TASK 5 : **Browse features of QuickR**

1 Open web browser for accessing web page.

2 Type in the address bar as “http://www.quickr.com” as in Fig.5

3 Note down the features listed in the following table from the main window.

Fig 5

Items	Placement	On Click
Name of the Site / Logo		
Products Catalogue		
Offers		
User Login		
Seller Login		
Terms & Conditions		

TASK 6 : **Compare websites and features on the following table basis by tick marks**

Sl.No.	Site Name	Buy	Sell	Used Goods	Return\ Refund	COD	Feedback	Offers	Update Email
1	Ebay								
2	Amazon								
3	Flipkart								
4	OLX								
5	QuickR								

Note : This chart compares facilities available for users in various E-Commerce websites, which increases the usability of services of the particular site. More facilities, more visitors, which makes continuous sale over E-Commerce sites.

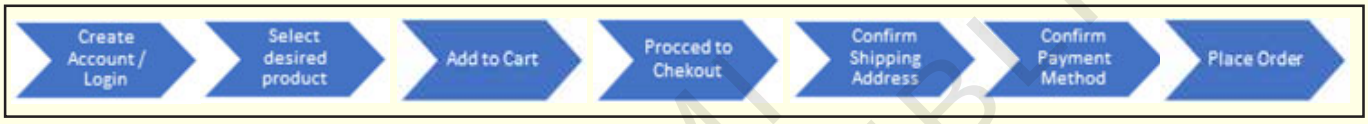
Use e-commerce sites to source an item

Objectives: At the end of this exercise you shall be able to
- **buying a Desired Product on Amazon.**

PROCEDURE

Process of Source an Items from E-Commerce Sites:

1 **Sign in to your E-Commerce Sites account.**
2 **Hover over Departments and click on a category. When you find an item you want, click on it.**
3 **Review the item, and click Add to Cart.**
4 **Click Proceed to Checkout.**
5 **Enter a shipping address and click Continue.**
6 **Choose a payment method and click Continue.**
7 **Click Place Your Order**



TASK 1: **Buying a Desired Product on Amazon**

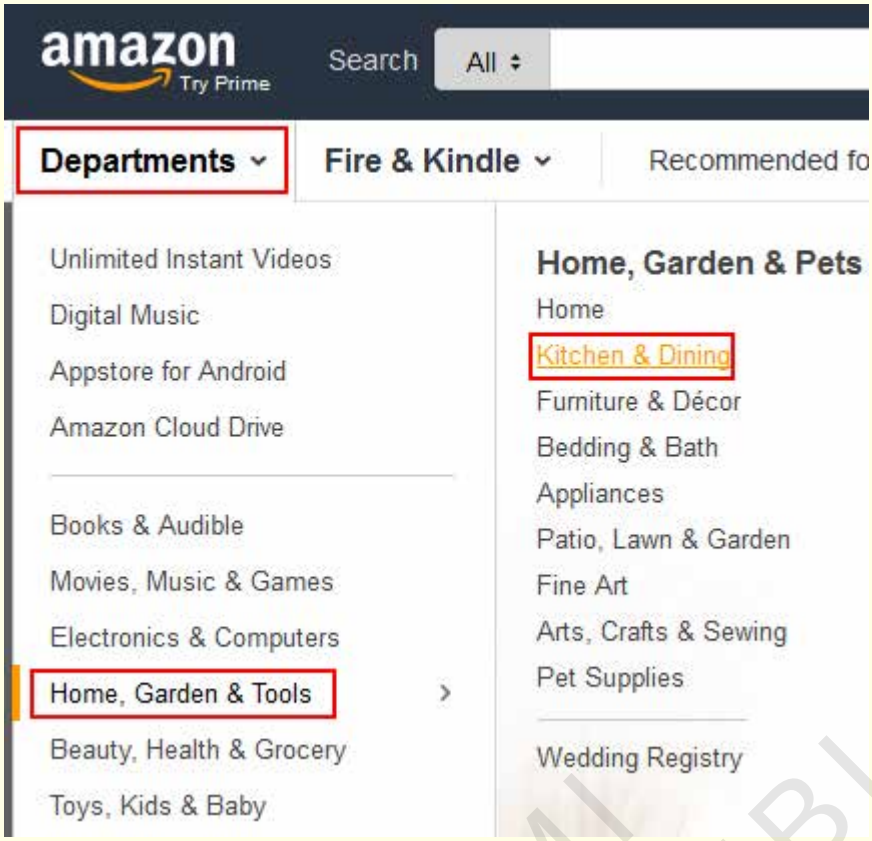
1 Sign into your Amazon account.

Go to www.amazon.com in your web browser and log in. To do this, move your mouse over "Hello, Sign In" and click Sign In. Then click in the boxes highlighted in the right screenshot below and type in your email address and account password, respectively. Finally, click Sign In Using Our Secure Server.

2 Search through departments.

Let's you're looking for a new toaster.

Let's start by moving the mouse over Departments, then Home, Garden, and Tools, and then clicking Kitchen and Dining.

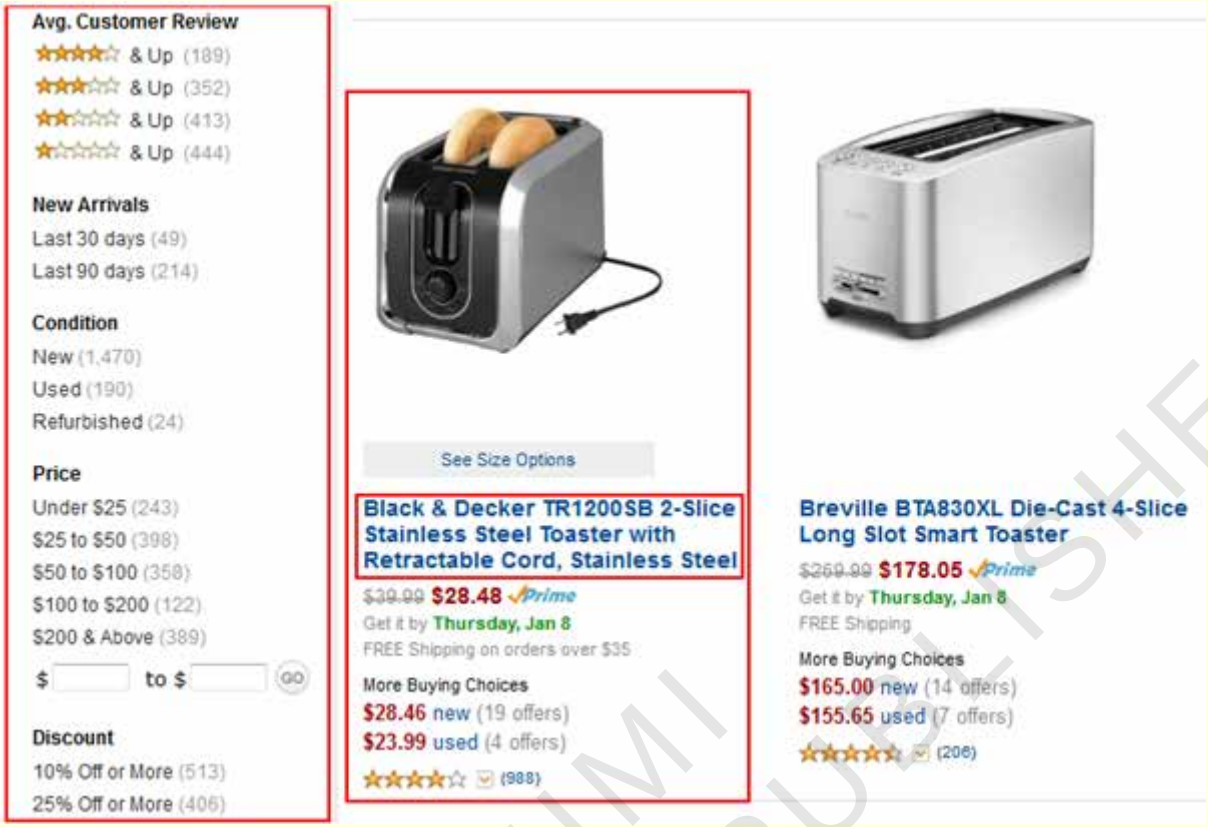


3 Find a specific category.

Now, let's click on Ovens and Toasters, and then click Toasters, just to narrow things down a bit more.

4 View and select an item.

You'll now see a list of toasters available for sale.



Across the left-hand side of the screen, you'll see a series of options that you can click to narrow down your search even more. For example, you can look for a product:

- in a certain colour
- from a certain company or brand
- based on how well it has been reviewed by Amazon customers
- within a certain price range
- based on who is selling it

The product information itself will show you, among other things:

- what the product looks like, and if there are any variations that you can look at
- what the product is called
- its price when you buy it (and if you save anything off retail price)
- when you can expect to get it, or how many are left in stock
- what other customers are saying about the product

When you find a product that you like, click on its name.

5 Add the item to your cart.

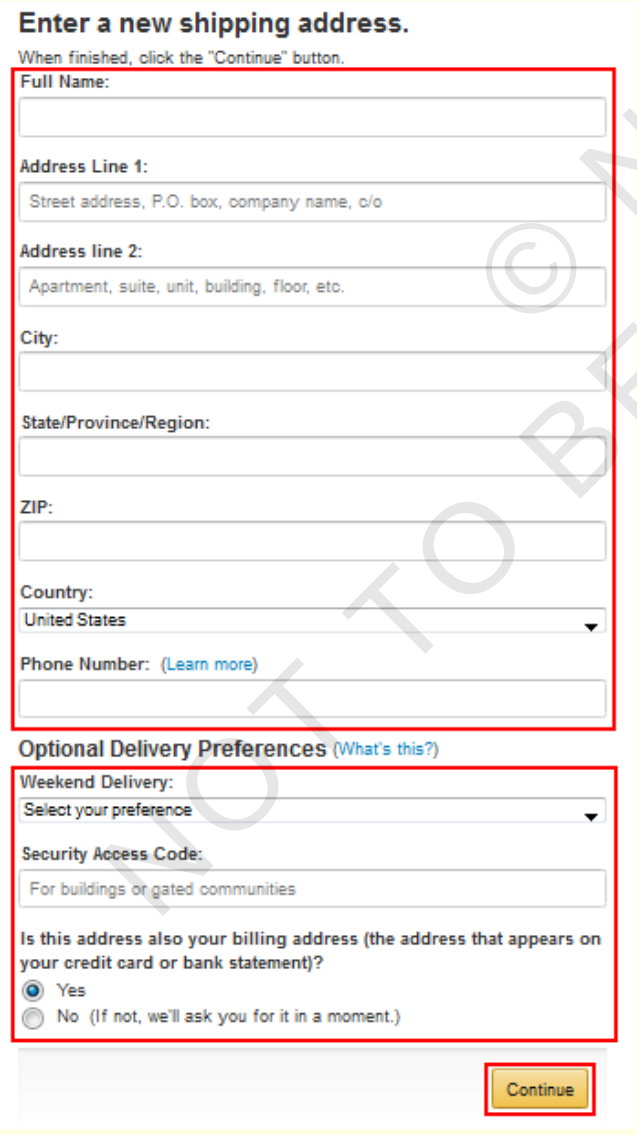
If you've decided that it's what you want, click the drop-down menu marked "QTY" to select how many of this product you want. Then click Add to Cart.

6 Proceed to the Amazon checkout.

If this is the only thing you want to buy, click Proceed to Checkout.

7 Enter a shipping address.

You'll now have to pick an address to send your delivery to. If you don't have one, you'll have to create a new one.



Click in each of the boxes or drop-down menus underneath "Enter A New Shipping Address" and type in or select:

- your full name
- your street address
- your unit address (if you live in an apartment, condo, etc.)
- the city in which you live
- the state, province, or region in which you live
- your mailing code (doesn't have to be a U.S. Z.I.P. code)
- the country in which you live
- your phone number

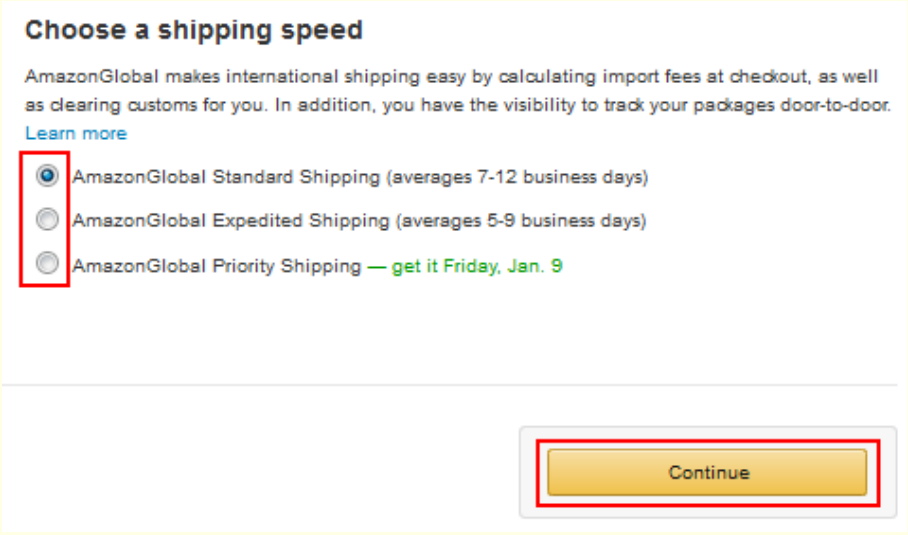
There are additional options underneath "Optional Delivery Preferences", where you can:

- choose whether or not you're available on weekends to receive delivered packages
- provide Amazon with the access code to your apartment complex or gated community (if you're allowed) so a delivery person can get in
- choose whether or not the address your items will be shipped to is the same one that you want your bill to come to

When you've entered all of your information, click Continue to move on.

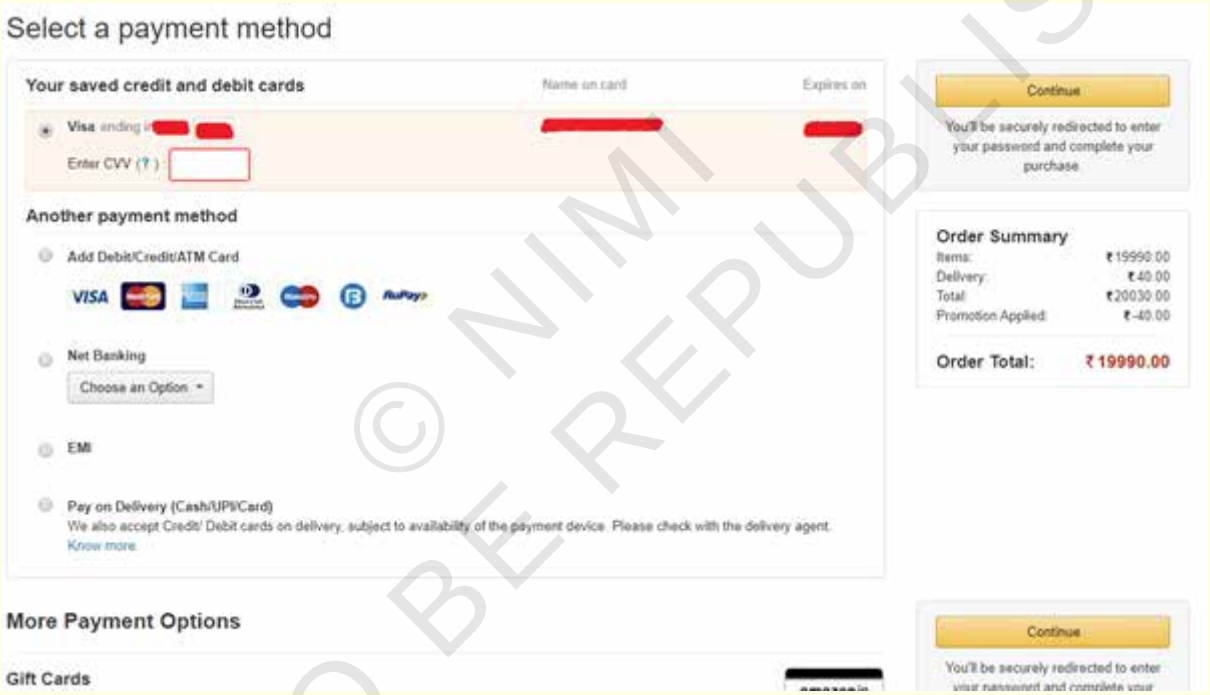
8 View and confirm your order summary.

On the left, you'll see your order summary. On the right, you'll be asked to select what kind of shipping you want (if applicable). Click the button next to the type you want. Usually, the faster the shipping speed, the more it will cost you. When you're done, click Continue.

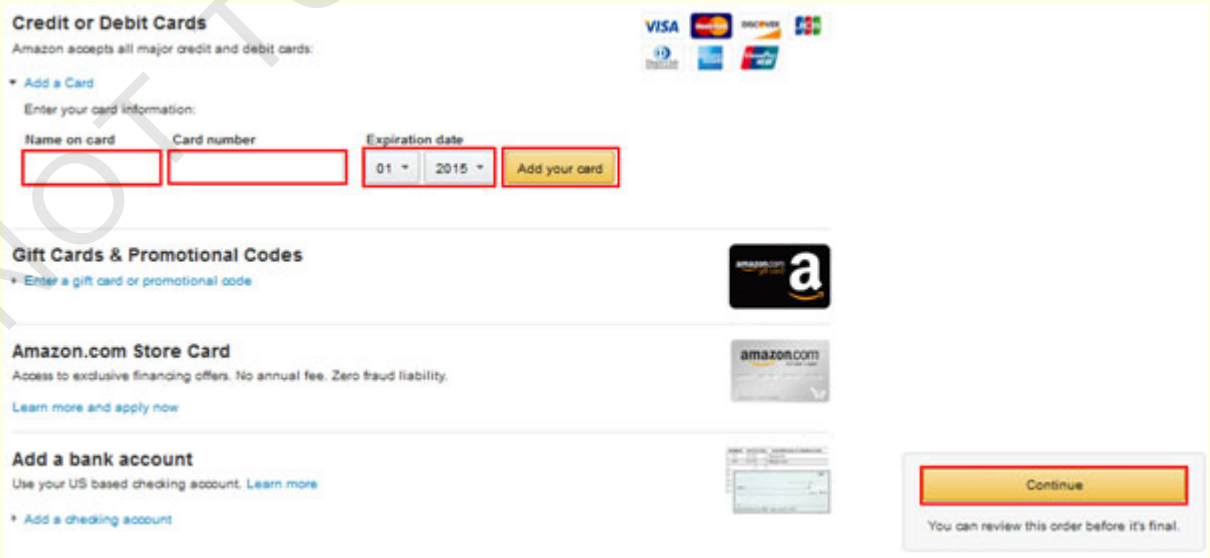


9 Choose a payment method.

You'll now have to select a method of paying for your purchase.



Add Debit / Credit Card:



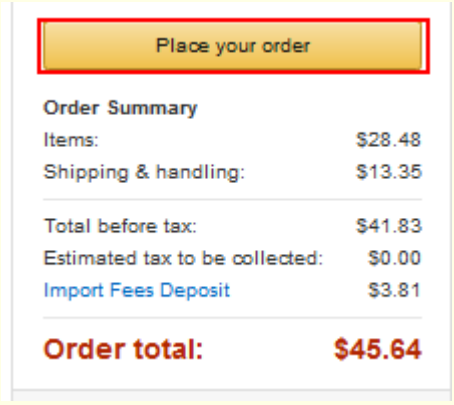
For the purposes of this tutorial, we'll assume that you want to pay by using a credit card. To add a new credit card:

- Scroll down to the section that says "Credit or Debit Cards."
- Click in the box that says "Name on Card" and type in your name as it appears on your credit card.
- Click in the box that says "Card Number" and type in your credit card number (with no spaces).
- Click the two drop-down menus labelled "Expiration Date" to select the month and year that your credit card expires.
- Click Add Your Card to add this credit card as a payment option.

When you're done, this credit card will automatically be selected as a payment option, so you can just click Continue.

10 Confirm and place your order.

On the next screen, you can review your order and make any final changes, including the type of shipping you want. If you're happy with what you have, click Place Your Order.



You'll receive a confirmation receipt via email. Now all that's left to do is to wait for your item to arrive!

Undertake transactions on an e-commerce site

Objectives: At the end of this exercise you shall be able to
- **details the accepted payment methods.**

PROCEDURE

Accepted Payment Methods

Payments on e-commerce site can be made using certain types of credit and debit cards.

As per the new RBI guidelines, from 30th September 2022 onwards, only card networks (VISA/Mastercard etc.) and/or issuing banks can store credit/debit card details. You will not be able to see saved cards starting 1st October 2022 unless you provide consent to Amazon for card tokenization.

The following payment methods are available for you to make payment:

- Pay on delivery
- Credit/Debit card
- Net Banking
- Unified Payment Interface (UPI)
- Easy Monthly Installments (EMI).

The following cards issued in India can be used:

- Credit Cards: Visa, Mastercard, American Express, Diners Club, and RuPay
- Debit Cards: Visa, Mastercard, RuPay, and Maestro

Refer : Ex.1.34.132 Step 9. Use e-commerce sites to source an item for payment method and Option.

— — — — — — — —

Add product to an e-commerce website

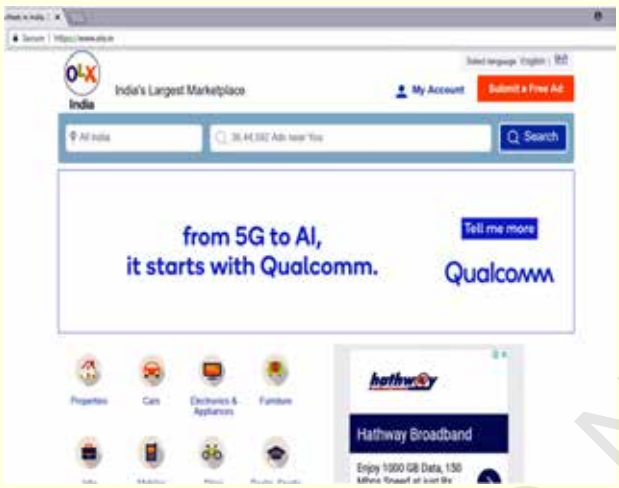
Objectives : At the end of this exercise you shall be able to
• sell a product in OLX.in website.

PROCEDURE

TASK 1 : **Sell a product in OLX.in website**

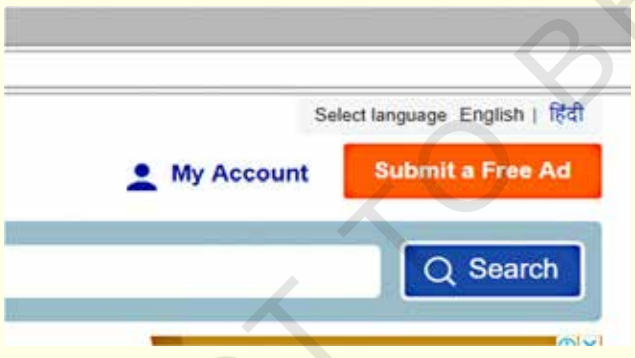
1 Open the website in a browser http://www.olx.in (Fig 1)

Fig 1



2 Click on Submit a free Ad to post a classified advertisement (Fig 2)

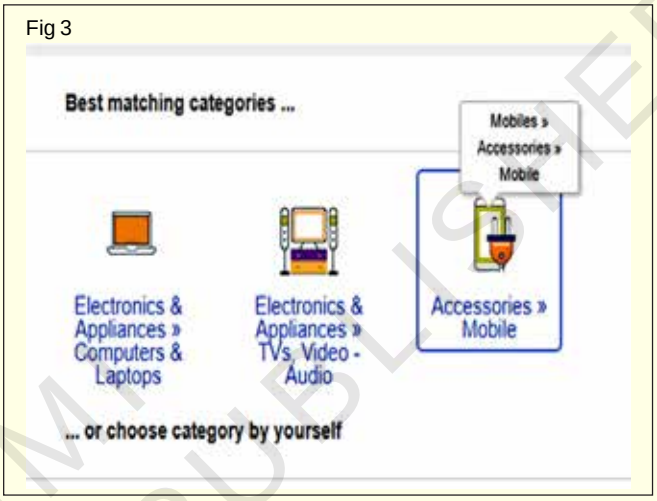
Fig 2



3 Add a title to the ad, say Laptop Headphone and select category, say 'Accessories-Mobile' as in Fig 3.

5 Put price for the product.

Fig 3

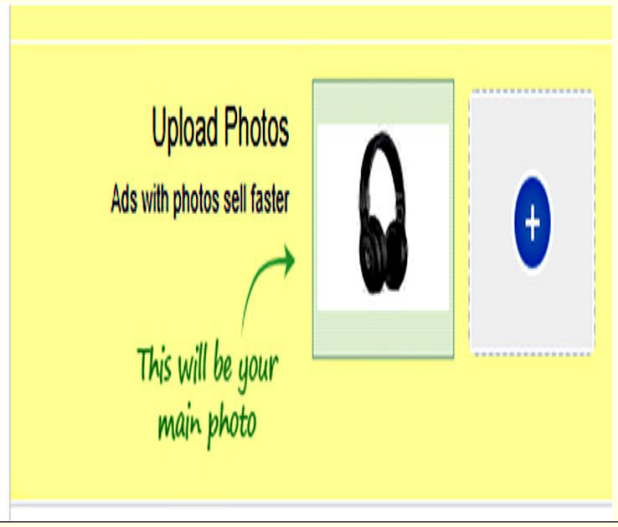


6 Write a description to match the product like 'Best sound quality with rich bass compatible with laptop and mobile' as in Fig 4.

Fig 4

7 Upload view of product photographs (5 views of photos will attract more) (Fig 5).

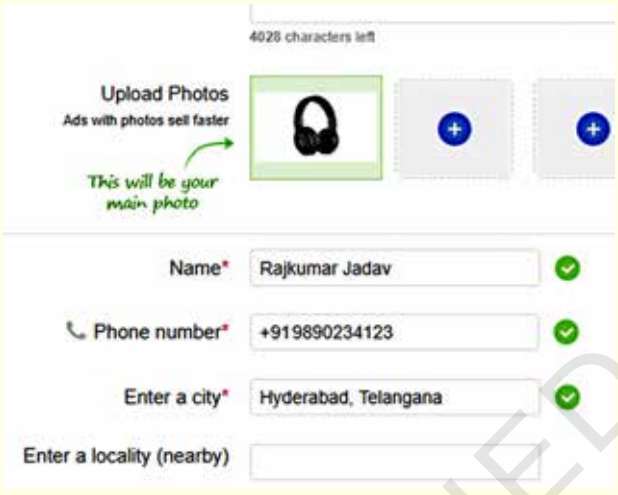
Fig 5



8 Enter seller name, Phone number and City and press Submit to complete. (Fig 6).

9 Re-enter OTP if required to activate the advertisement.

Fig 6



Note : Posted ad will be active upto a standard time frame i.e. 15 days minimum, then renewal may be required.

Practice order & payment processing

Objectives : At the end of this exercise you shall be able to
• login and buy a desired product.

PROCEDURE

TASK 1 : **Login and buy a desired product**

1 Login to the created account as in Fig 1.

Fig 1

2 View the deals in Today's deals tab, it is matches to buy.

3 Enter the item required to buy in the "search" tab at the top of the site as in Fig 2.

Fig 2

4 Select on " Sort by " to get the order of the product list as to price low to high or new & popular, etc.

5 Select the product that matches the requirement. (Fig 3)

Fig 3

6 Click on the product desired to get detailed view of the product as in Fig 4.

Fig 4

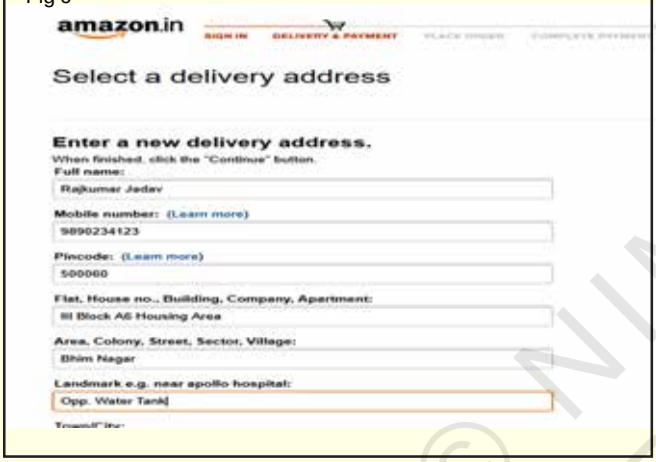
7 Click on "Buy now" to finish selection and purchase or "Add to Cart" to continue for more items to buy. (Assume here, it is Buy Now to complete the order) (Fig 5).

8 Enter the password if asked.

Fig 5

9 Enter details of shipping address on the page. (Fig 6).

Fig 6



10 Select the payment method from available options. (Fig 7)

Note : Use a Debit card which requires an OTP to complete payment or COD if available which allows to pay at the time of delivery

11 Complete the order and get a Track-order to know the current status of order in future.

Fig 7

Identify common security issues

Objectives : At the end of this exercise you shall be able to
- **secure personal information sharing**
- **secure payment operations online.**

PROCEDURE

TASK 1 : **Secure personal information sharing**

The following table ensures for a secure E-commerce practice

a	Never public internet / WiFi for online purchases
b	Never forget to LOGOUT to secure the account associated
c	Never save a Debit Card / Banking details with password or PIN in any website as it can easily be hacked
d	Never use a legible / assumable password
e	Prefer Cash on Delivery option to avoid online payment threats
f	Never share personal / confidential information to Login in any website

— — — — — — — —

TASK 2 : **Secure payments operation online**

The following points make payments online to be secure.

a	Ensure the payment gateway is PCI compliant by clicking the Payment Gateway's Terms and Conditions page
b	Confirm, the payment transactions are encrypted, as encrypted data is securedof transfer time from hacking
c	Use always a transaction that requires a PIN and / or OTP to be received in mobile as without this authentication, the amount will not be transferred
d	Use E-Wallets to pay as there is no need to disclose banking or card details always and the amount in the wallet only is spent securely.

Note: Discus with instructor an list the common security uses.

Sl.No.	Security Uses	Cause

— — — — — — — —

Provide firewall security for internet connection and network system

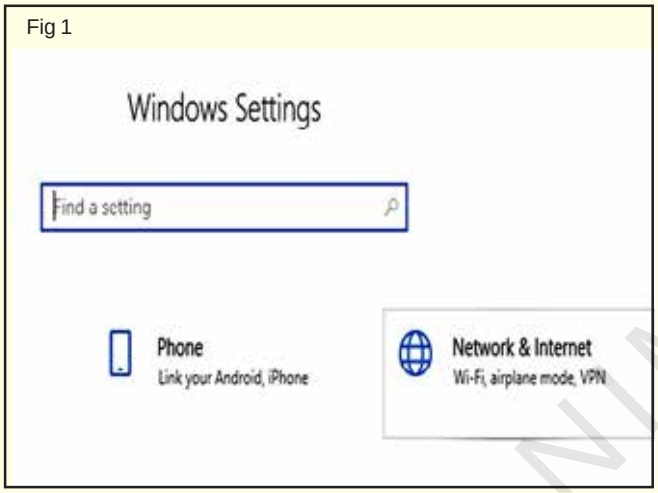
Objectives : At the end of this lesson you shall be able to
- **enable or disable firewall settings of windows 10**
- **protect system using windows defender.**

PROCEDURE

TASK 1 : **Enable or disable firewall settings of windows 10**

1 Access Windows firewall using Win Key → Settings → Network & Internet as in Fig 1.

Fig 1



2 Select Windows firewall in the available options to open Windows - Defender security center as in Fig.2

Fig 2

3 Make sure the "Firewall" is ON state for Domain Network, Private Network and Public Network as in Fig.3

Note : The (active) state defines the current available network.

4 Reset the firewall to default by clicking "Restore firewalls to default" as in Fig 4.

Fig 3

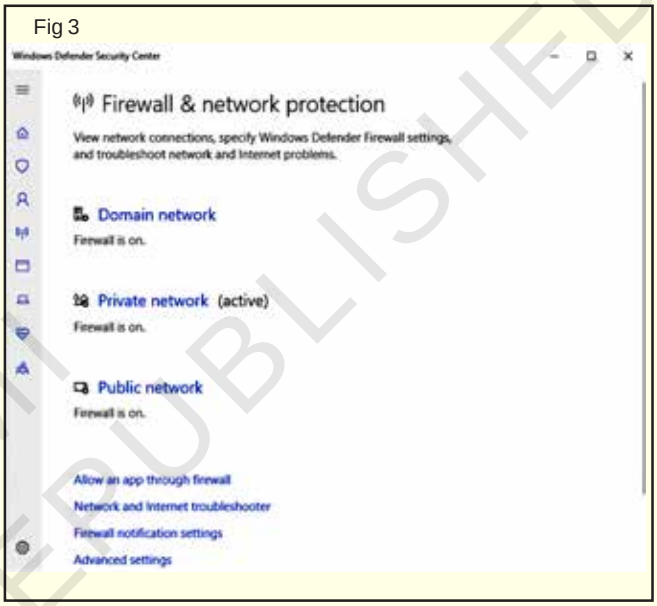
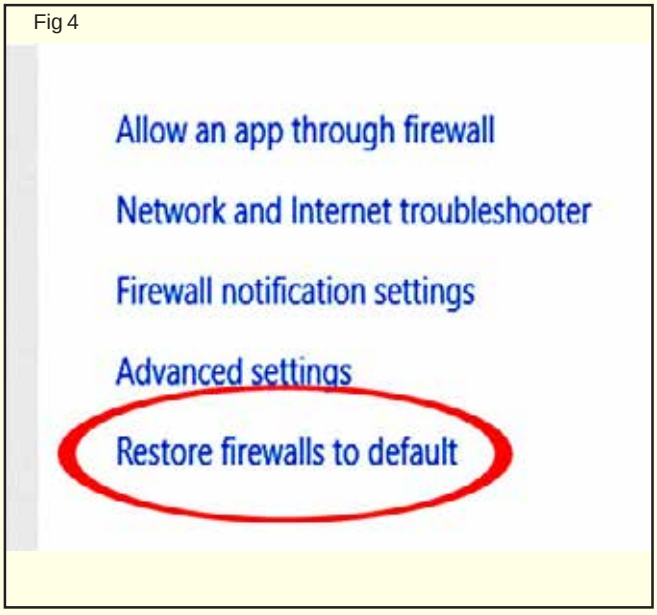


Fig 4



5 Click on any network and in the next window, set Windows Defender firewall status to OFF to disable firewall.

Note : Don't disable firewall unless it is specifically required.

TASK 2 : **Protect system using Windows Defender**

1 Click on the Virus & Threat protection option in the left panel as in Fig 5.

Fig 5

2 Click “Scan Now” on the Threat History to scan files. Alternatively *Run a new advanced scan* runs for cleaning latest threat types as in Fig 6.

3 Run any action that is pending (or) required by settings or updates, to make the protection system up to date as in Fig 7.

Fig 6

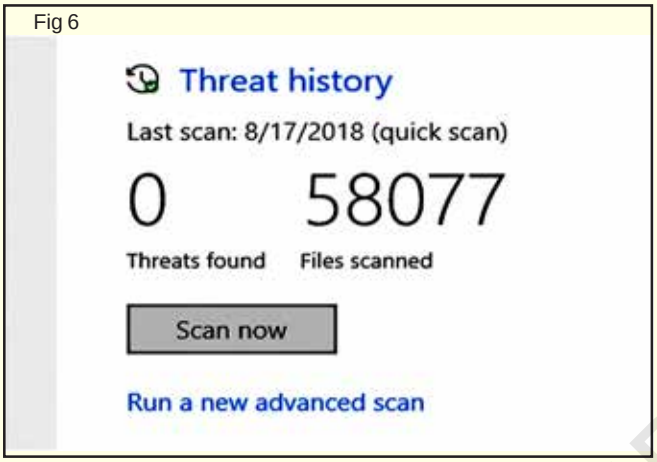


Fig 7

Protect the Computer against various Internet Threats

Objectives : At the end of this lesson you shall be able to
- **identify common internet threats**
- **secure risks protected internet systems.**

TASK 1: I**dentify common internet threats**

Threat Type	Functions
Botnet	Spam mails with virus attachments a robots in net
Hacking	Unauthorized access and steal information from system
Malware	Damage data from system and fake alert of infections
Pharming	Misleading to cloned / illegitimate websites
Phishing	Tricky gather of information from users about Credit Cards
Ransomware	Lock system / drives demand money to remove
Spam	Junk mail to get info directly from users
Spoofing	Sends spam mail and clone a legal site information
Spyware	Steal contact information, username and passwords with Popups
Trojen Horses	Delete files, hack system info and user operations
Worms	Spread unwanted files and dump the memory as well as disk space
Viruses	Delays startup time and make unwanted hidden file execution, hide files /folders

TASK 2 : **Checklist to safeguard systems from threats**

1 Find the methods to protect systems and safe operations from the following table and choose Yes/ No to determine whether the system is protected.

Methods	Protection System	Status
Passwords	Complicated passwords reduce the method of accessing to user info easily	Created | Not Created
Anti-Virus	Software that protect system from threats	Installed | Not Installed
Firewall	Enabling this protects attacks from third party / external systems	Enabled | Not Enabled
Browser settings	Updated browser with protected plug-ins make safe browsing	Installed | Not Installed
OS Updates	Updating the Operating System makes patches to existing less secured modules to be more safe	Updated | Not updated
WiFi Security	Protect personal WiFi with SSID and passwords and avoid public WiFi for safety based transactions	Done | Not Done
Download security	Avoid unwanted downloads and ensure only the relevant files are downloaded. Allow Anti- virus/ Defender to scan for threats in downloaded files	Enabled | Not Enabled

Note : Make all the above tasks completed to protect the system from any type of threats.

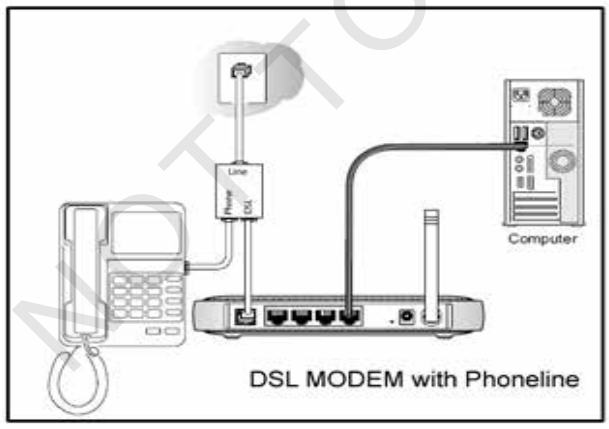
Secure WiFi networks and access controls

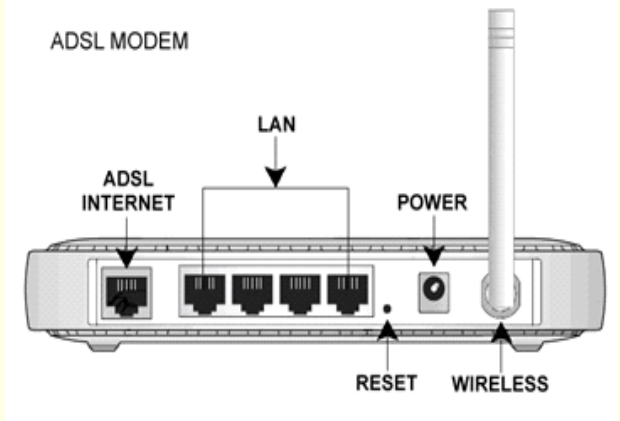
Objectives : At the end of this lesson you shall be able to
- **configure a secure WLAN**
- **filter access using MAC Address**
- **create user accounts with limited rights.**

TASK 1 : **Configure a secure WLAN**

1 Connect the internet port of the router with the incoming internet connector as in Figures 1.

Fig 1





Note : In case of leased line, it will be a RJ45 connector and in case of Broadband / DSL it will be a phoneline.

2 Connect LAN cable with port 1 of the modem and the other end to the LAN connection of the system.

3 Run command prompt and type 'ipconfig' and press Enter, which will bring a list of available options as in Fig 2.

Fig 2

```
Wireless LAN adapter Local Area Connection* 2:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 3:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 13:

   Media State . . . . . . . . . . . : Media disconnected
   Connection-specific DNS Suffix  . :

Wireless LAN adapter Wireless Network Connection:

   Connection-specific DNS Suffix  . :
   Link-local IPv6 Address . . . . . : fe80::f46c:e1f2:fb9:f530%22
   IPv4 Address. . . . . . . . . . . : 10.255.0.16
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : 10.255.0.1
```

4 Find the default gateway (say eg. 192.168.0.1) and access it using internet browser as in Fig 3.

Fig 3

5 Type the username and password provided with modem to login to access the configuration settings of the modem and enter into configuration settings.

6 Click Network tab and in WAN settings, select the IP mode or PPPoE mode suitable to access network and provide the given username and password for accessing (internet) as in Fig 4.

7 Select the list of Bound Ports including wireless ports and Apply.

8 Select WLAN / Wireless tab, set the following items as in Fig 5.

Fig 4

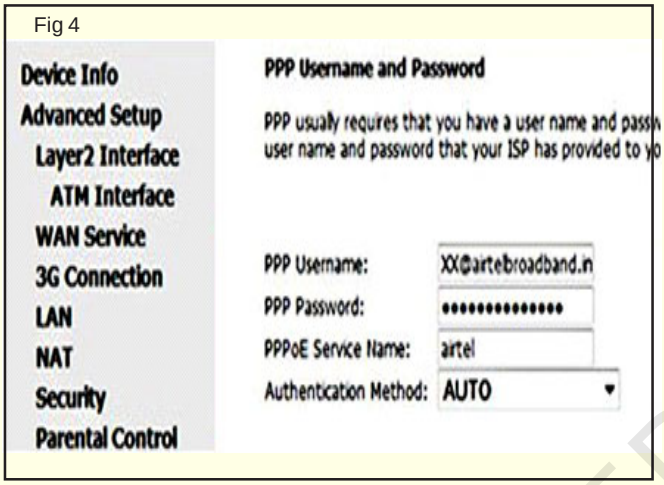
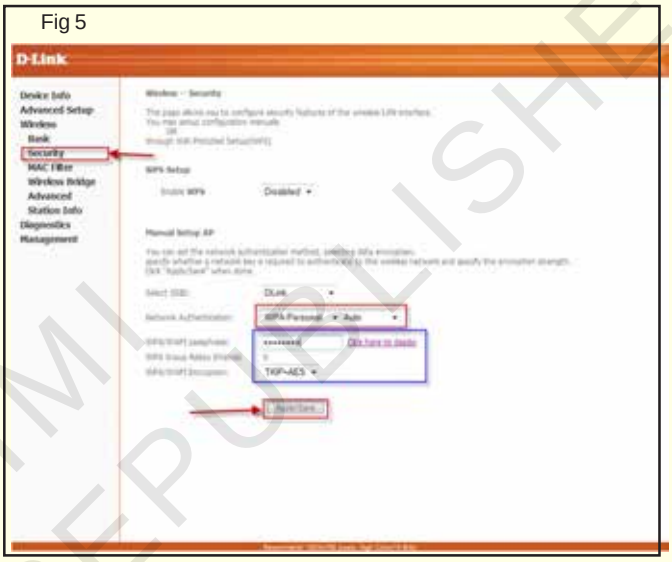


Fig 5



a SSID : <Name of the WiFi network>

Enable it for others to access.

Broadcast is enabled as it should be detected by other devices.

b In WLAN security option select the following :

Encryption Mode	: WPA-PSK; WPA2-PSK
Encryption Mode2	: TKIP-AES
WPA Preferred Key Format	: Password
WPA Pre-shared key	: <set here a password to access WiFi>

Note : The above settings make the WLAN to be accessed using the SSID and upon accessing, password to be provided to connect. Screenshots may vary according to the modem / router using for connecting but settings will be there.

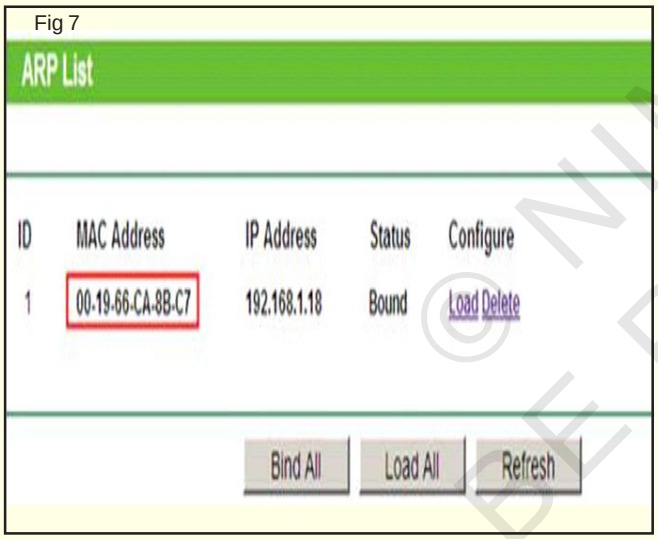
TASK 2 : **Filter access using Mac address**

1 Open the web browser and address in the address bar (default is http://192.168.0.1 or http://192.168.1.1). Press Enter as in Fig 6.

Fig 6

2 Go to IP & MAC Binding->ARP List page, find the MAC address of the all the devices which are connected to the router as in Fig 7.

Fig 7



3 Go to Wireless->Wireless MAC Filtering page, click the Add New button as in Fig 8.

4 Type in the MAC address you want to allow or deny to access the router, and give a description for this item as in Fig 9.

5 Choose Enable and Allow/Deny the Wireless MAC Filtering function about the Filtering Rules as in Fig 10.

Note : Allow enables the accessing of Mac address into this connection and Deny disallows to connect into.

Fig 8

Fig 9

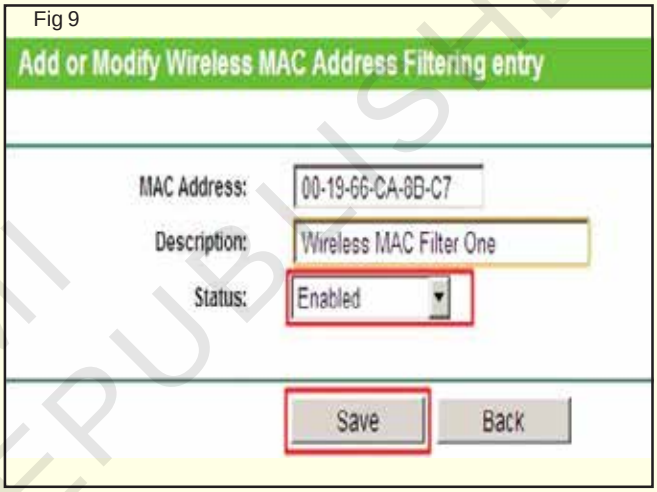
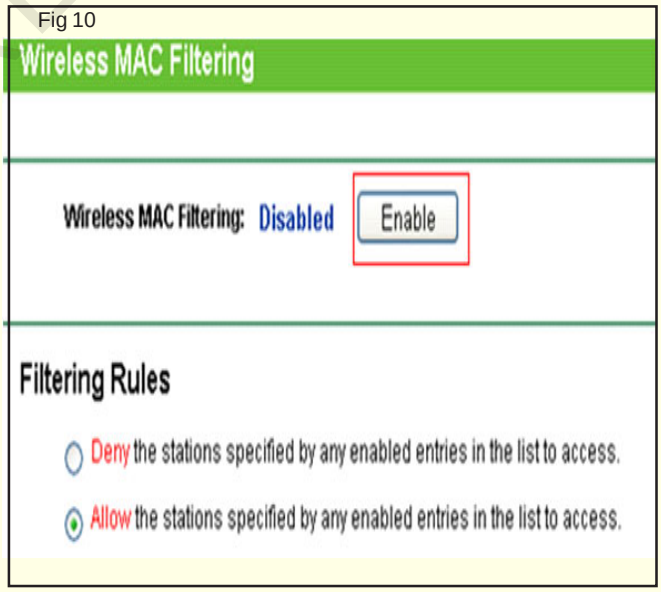


Fig 10



TASK 3 : **Create individual user accounts**

1 Goto Control Panel and select User Accounts as in Fig 11.

Fig 11

2 Click Manage another account option to enter into Users list option as in Fig 12.

Fig 12

3 Click on Add a new user to create a new windows user as in Fig 13.

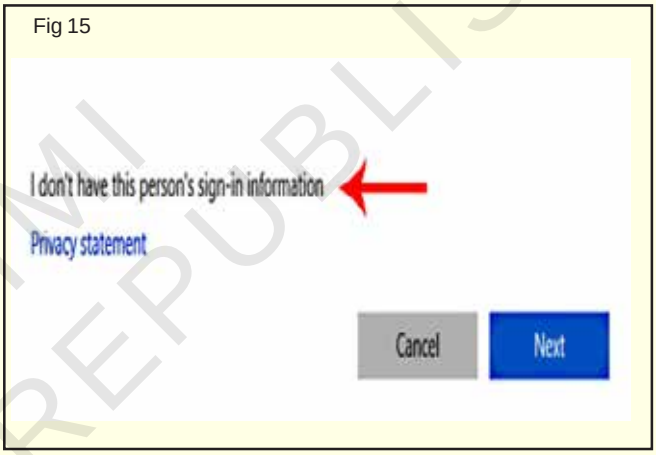
Fig 13

4 Click on Add someone else to the PC to add a new user as in Fig 14.

Fig 14

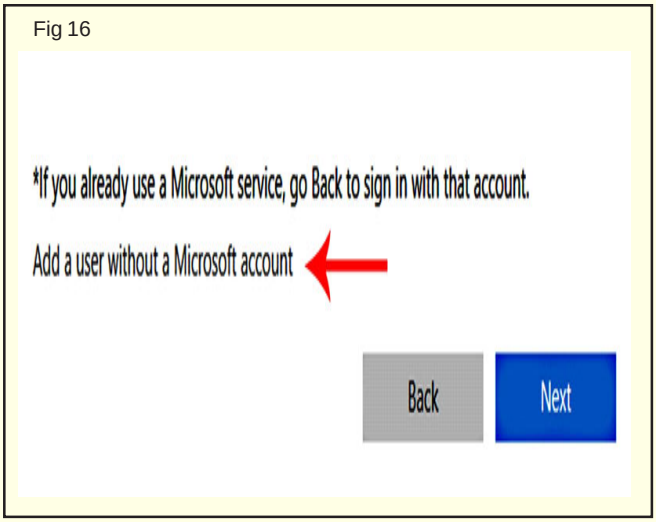
5 Skip the email option in the next window by click as in Fig 15 and click NEXT.

Fig 15



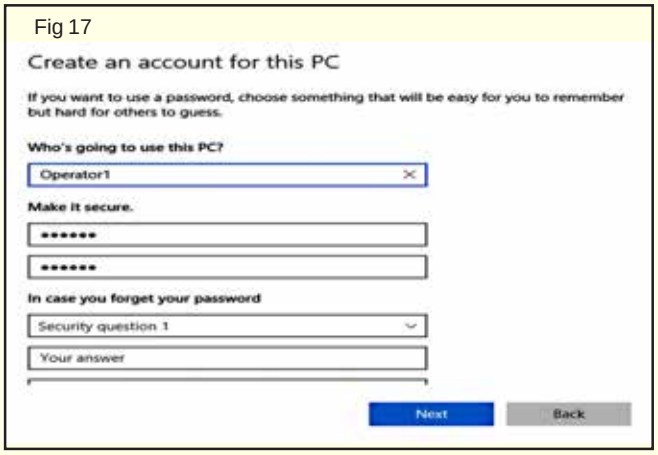
6 Click Add user without Microsoft Account to proceed a custom named user as in Fig 16.

Fig 16



7 Type the username and password with three security questions with answer for creating a new account as in Fig 17.

Fig 17



8 Complete the user creation and the user will be available for login as in Fig 18.

Fig 18

9 Click on the user name to change user type as Local user / Administrator and for adding new users, repeat same steps and get cleared with instructor.

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Make backup copies of important file, data and information

Objectives : At the end of this lesson you shall be able to

- **take backup of files using External hard drive**
- **backup files using Google Drive**
- **make a local restoration point and restore on failure / malfunction.**

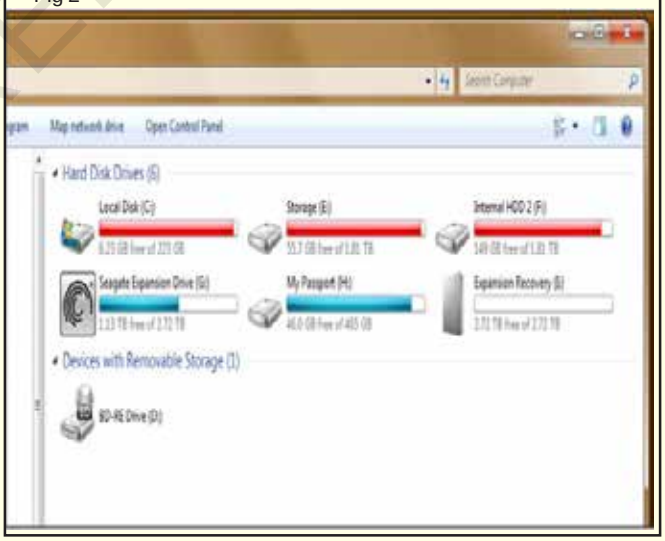
TASK 1 : **Backup of files using external hard drive**

1 Insert USB connector to access the external hard drive as in Fig.1

Fig 1

Note : Usually the plugged hard drive is shown using a new drive letter, auto assigned. Change the name of the drive to 'Backup' so as the it can be easily identified as in Fig 2.

Fig 2



2 Select the files required to be back up, copy them all and paste into the external hard drive as in Fig 3.

Note : In case, the file size is too large, it may take a long time to get pasted (Fig 4). Its better to use USB 3.0 to copy quickly. Also take the backup updated in regular intervals for safety precautions.

Fig 3

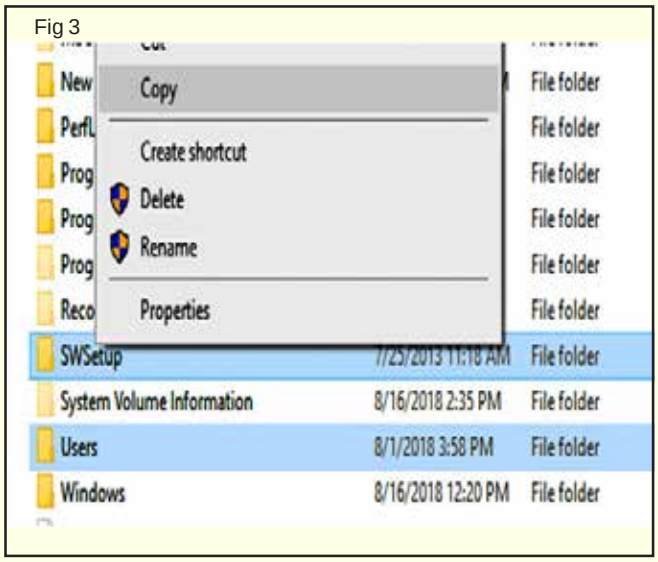
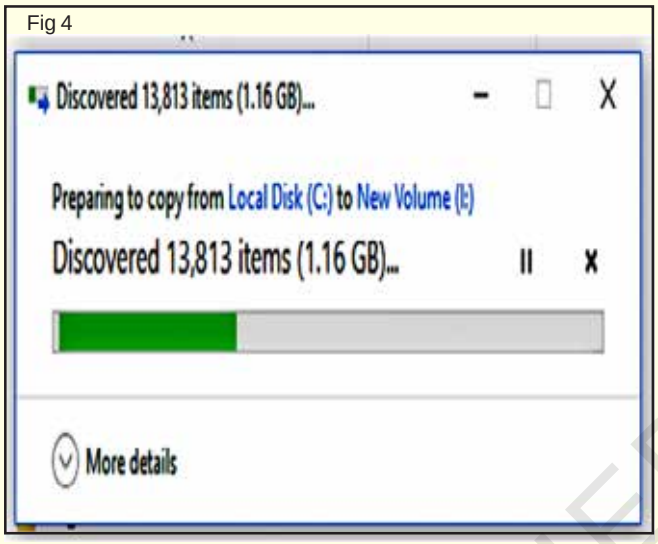


Fig 4



TASK 2 : **Backup files using Google Drive**

1 Download and install Google Drive application from "http://www.google.com/drive/download" as in Fig1.

Fig 1

2 Open the exe file downloaded to install the Google Drive into the system (will take 5 minutes and needs internet to download features) as in Fig 2.

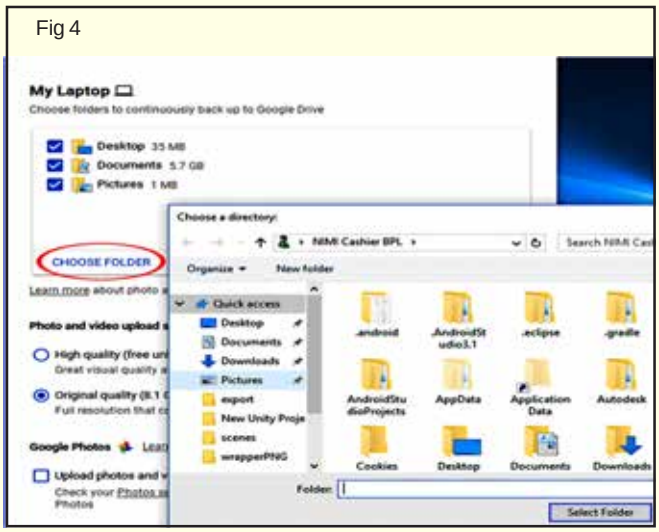
Fig 2

3 Login into Google account which is associated with backup as in Fig 3.

Fig 3

4 Fix the folders to be back up to the system before entering into backup as in Fig 4.

Fig 4

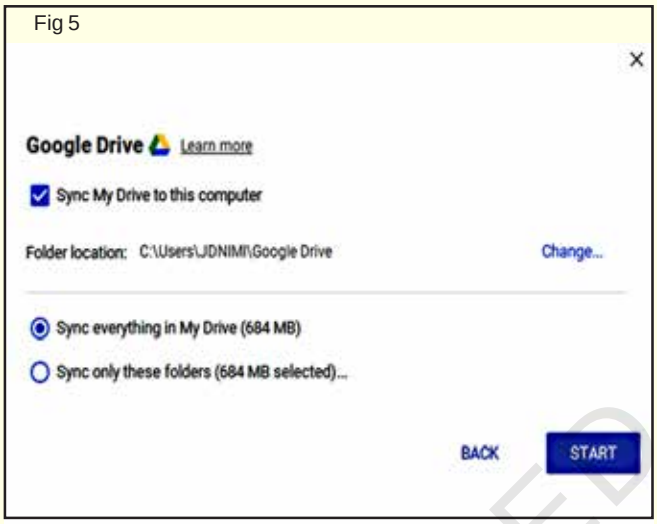


5 Add folders to drive from 'My System/Laptop' and press NEXT to proceed.

6 Press START to start back up into Drive as in Fig 5.

7 Schedule timings like daily, weekly, etc. to set periodical backup.

Fig 5

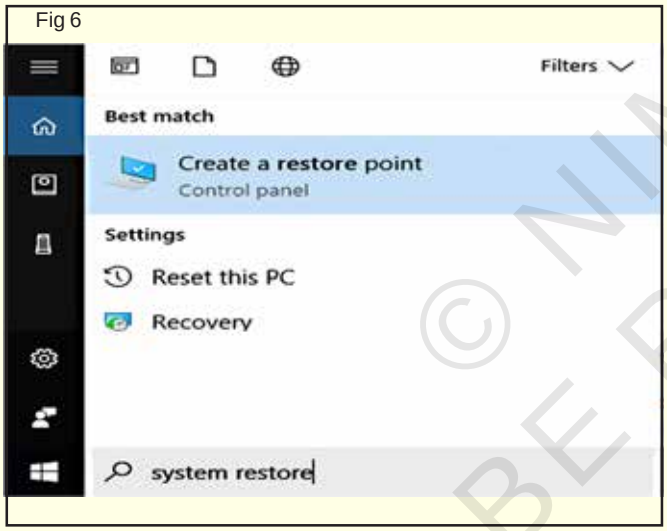


TASK 3 : **Local restoration point for failure recovery**

1 Type 'Restore Point' in Cortana to search for 'Create Restore Point'

2 Select the option to get 'Create a restore point' as in Fig 6.

Fig 6



3 Choose 'Create' option to create a Restore Point manually as in Fig 7.

4 Add description to the points identification, say 'Before Installing Wordpress'

Note : The created restore point makes a backup of applications as it is working and related files ensuring the proper working.

5 Use system restore to restore the system to working of files on the time of backup as in Fig.8

Fig 7

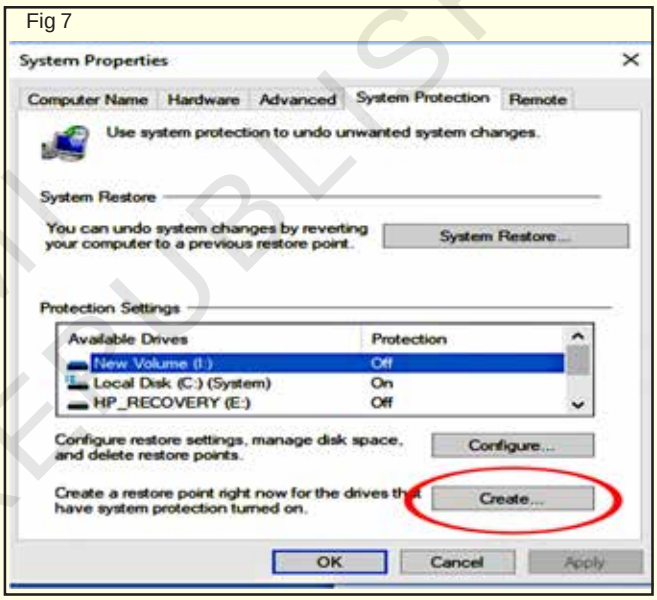
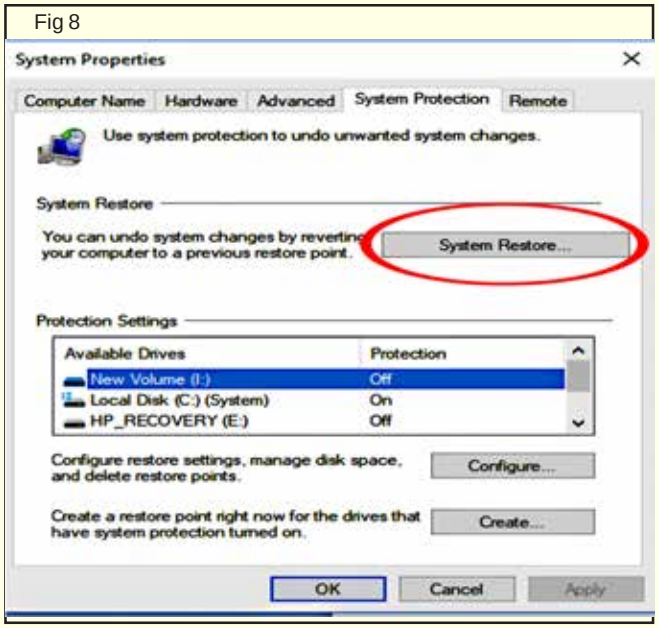


Fig 8



Explain compliance with IT Act

Objectives : At the end of this lesson you shall be able to
- **identify steps for information privacy**
- **identify common cybercrimes and penalties applicable.**

PROCEDURE

TASK 1 : **Identify steps for information privacy**

Sensitive personal data or information (SPDI) processing. The Privacy Rules define SPDI to mean personal information relating to a person's:

- Passwords.
- Financial information, including information relating to bank accounts, credit cards, debit cards, and other payment card information.
- Physical, physiological, or mental health.
- Sexual orientation.
- Medical records and history.
- Biometric information.

List and identifying which of the information is "Sensitive Personal Information" or not.

Note: Discuss with Instructor and get the list of Sensitive Personal information as per IT Act.

S.No	Name of the Information	Type of the Information	Sensitive Status (Yes / No)

TASK 2: **Identify common cybercrimes and penalties applicable**

List of offences and the corresponding penalties as per Information Technology Act, 2000

Section	Offence	Penalty
65	Tampering with computer source documents	Imprisonment up to three years, or/and with fine up to Rs. 200,000
66	Hacking with computer system	Imprisonment up to three years, or/and with fine up to Rs. 500,000
66B	Receiving stolen computer or communication device	Imprisonment up to three years, or/and with fine up to Rs. 100,000
66C	Using password of another person	Imprisonment up to three years, or/and with fine up to Rs. 100,000
66D	Cheating using computer resource	Imprisonment up to three years, or/and with fine up to Rs. 100,000
66E	Publishing private images of others	Imprisonment up to three years, or/and with fine up to Rs. 200,000

66F	Acts of cyberterrorism	Imprisonment up to life.
67	Publishing information which is obscene i n electronic form.	Imprisonment up to five years, or/and with fine up to Rs. 1,000,000
67A	Publishing images containing sexual acts	Imprisonment up to seven years, or/and with fine up to Rs. 1,000,000
67C	Failure to maintain records	Imprisonment up to three years, or/and with fine.
68	Failure/refusal to comply with orders	Imprisonment up to 2 years, or/and with fine up to Rs. 100,000
69	Failure/refusal to decrypt data	Imprisonment up to seven years and possible fine.
70	Securing access or attempting to secure access to a protected system	Imprisonment up to ten years, or/and with fine.
71	Misrepresentation	Imprisonment up to 2 years, or/and with fine up to Rs. 100,000
72	Breach of confidentiality and privacy	Imprisonment up to 2 years, or/and with fine up to Rs. 100,000
72A	Disclosure of information in breach of lawful contract	Imprisonment up to 3 years, or/and with fine up to Rs. 500,000
73	Publishing electronic signature certificate false in certain particulars	Imprisonment up to 2 years, or/and with fine up to Rs. 100,000
74	Publication for fraudulent purpose	Imprisonment up to 2 years, or/and with fine up to Rs. 100,000

Note: Discuss with Instructor and get the list of offences and the corresponding penalties as per Information Technology Act, 2000.

Sl.No	Section	Offence	Penalty

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Practice with IaaS using free cloud services

Objectives: At the end of this exercise you shall be able to
- **create Free cloud service account on microsoft azure**
- **state cancel your subscription**
- **creating azure virtual machines.**

Requirements

Tools/Equipment/Machines

- Desktop / Laptop PC
- OS (Windows / Linux)
- High Speed Internet (Broadband / FTTH).

PROCEDURE

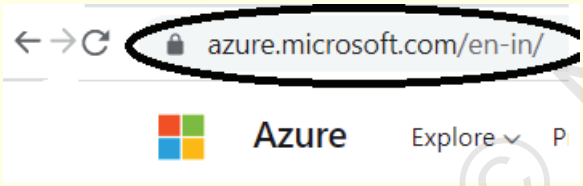
TASK 1: **How to create Free cloud service account on Microsoft Azure**

1 Go to the Azure Home Page. Use the below link on any latest browser.

https://azure.microsoft.com/en-in/

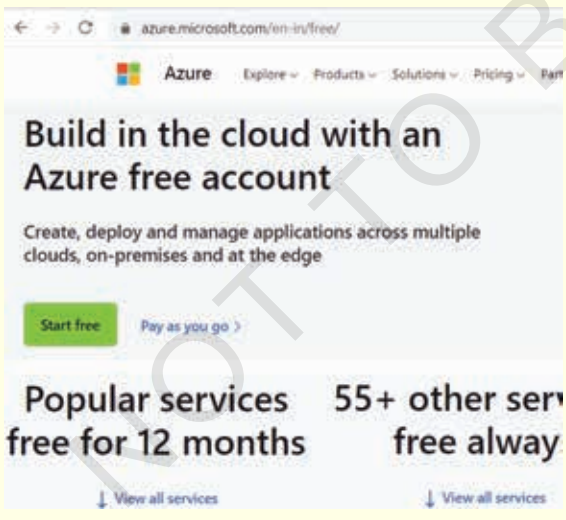
2 Click on Free Azure Account on the top right corner. (Fig 1)

Fig 1



3 Click on **Start Free (Fig 2)**

Fig 2



- Sign-in/Sign-up for a Microsoft account using an email address and password (Fig 3)

4 Choose Create OneNew Microsoft Account if you don't have already

5 Choose Create Account (Fig 4)

Fig 3

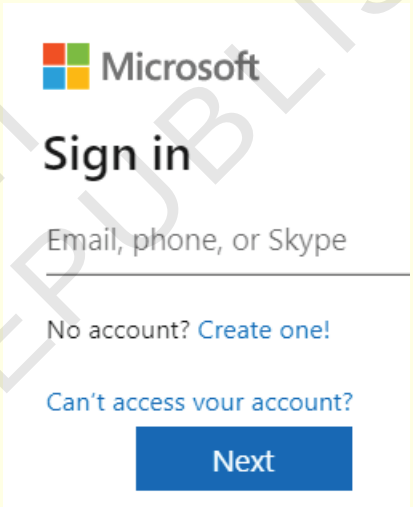
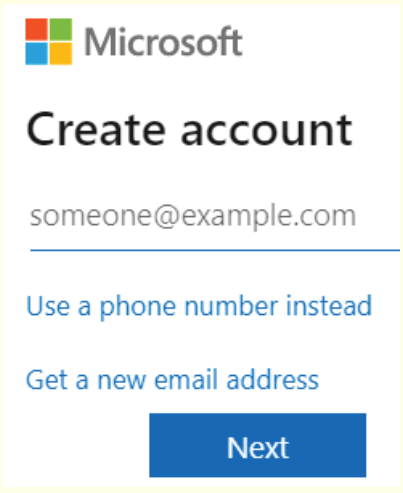


Fig 4



6 We have 3 options to create the Microsoft Account

a Use Existing Email ID like Gmail or any other Mail ID.

b Use Phone Number

c Create New Microsoft (Outlook / Hotmail) Email Address.

7 Here we are creating Microsoft Account using Existing Gmail ID, give your Gmail ID and select Next

8 Create New Password for the account.

9 Enter the verification code received on the email address and click next.

10 Confirm that you are not Robot and Type the captcha you see on your screen and click on next.

Choose appropriate choice proposed.

11 You'll be redirected to the Azure Sign-up page. Enter your Region, Name, Phone number, Email address.

Note: You should use the same email address for Azure sign-up and for the Microsoft account

12 Verify your phone number by clicking Text Me or Call Me and enter the verification code received.

13 Enter the payment details. Make sure you have a Master Card/American Express/ Visa Credit card and international payments should be enabled.

14 Check the Terms and Conditions and click Sign-up.

15 You have successfully created a Microsoft Azure free account now have a lumpsum balance of $200 is equal to Indian Rs.14500.

16 Click on Portal on the top right corner of the screen You'll be redirected to the Azure portal.

17 If you have exhausted your free credit then you have to move to the Pay as you go subscription policy.

18 If you have crossed the limit or time limit then you will get "your subscription is disabled and cannot perform operations until its re-enabled"

19 You can not create multiple Microsoft azure free accounts or after one account expires to another account for free credit using a single Credit card.

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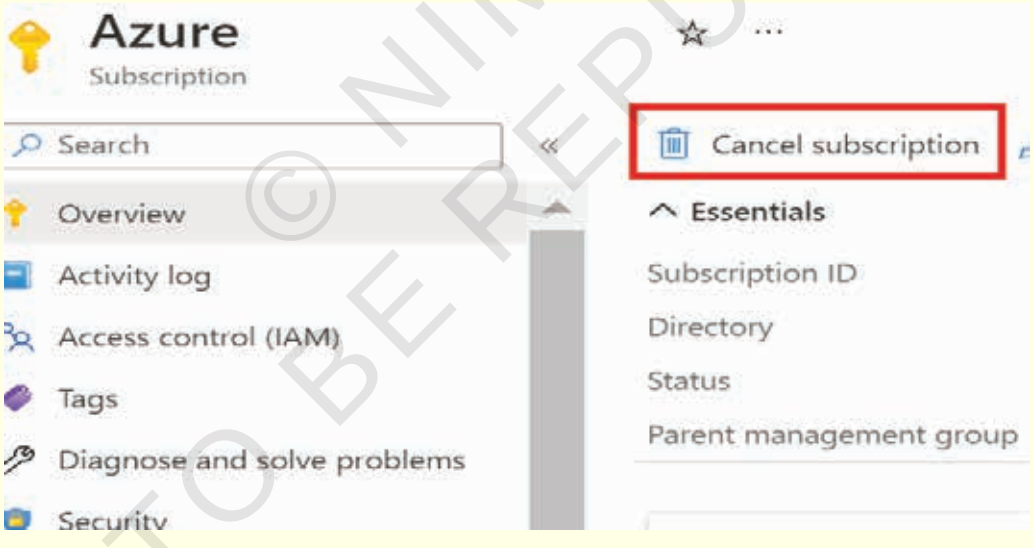
TASK 2 : **Cancel your Subscription**

You will learn how to cancel your subscription if you run out of credit.

1 To View your subscription from the azure portal accountChoose View remaining credit to try any service, or browse free services included with your account. (Fig 5)

Fig 5



2 Go to Cancel subscription and click on cancel your subscriptions any time. (Fig 6)

3 Now, just confirm the subscription and click for cancellation. (Fig 7)

Fig 6

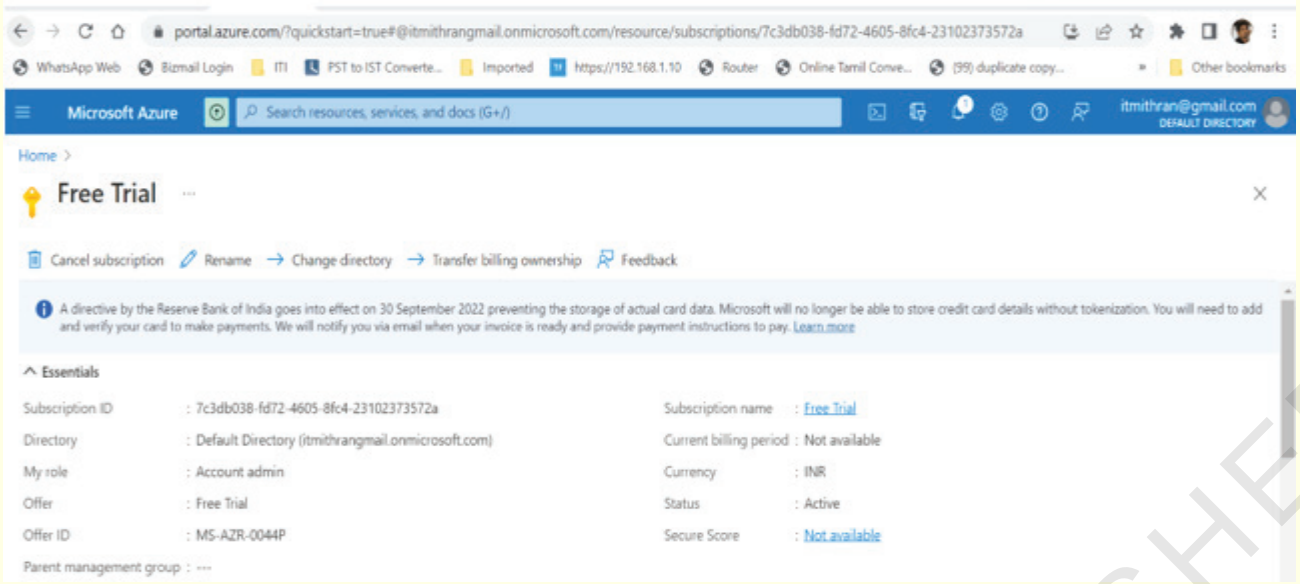
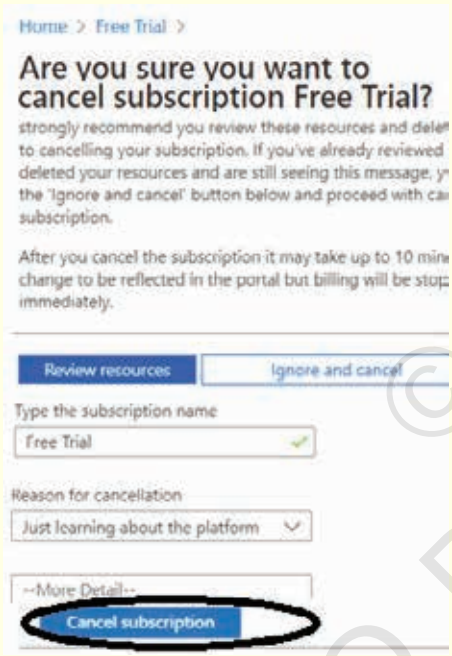


Fig 7

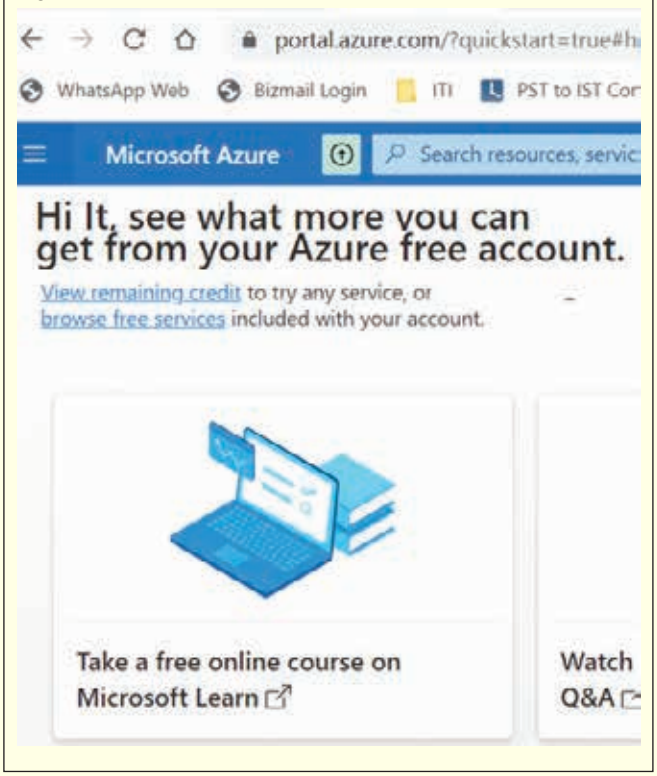


TASK 3 : **Creating Azure Virtual Machines**

1 Login to https://portal.azure.com/#home with free Account.

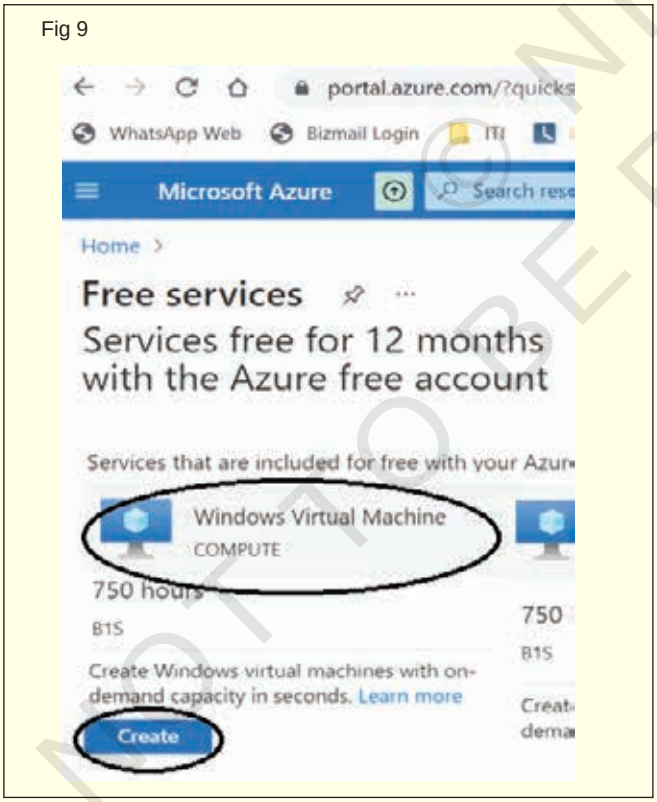
2 Click The Browse free Service on your free Azure Portal (Fig 8)

Fig 8



3 Select the Create option under the Windows Virtual Machine section in order to create a Windows VM. (Fig 9)

Fig 9



4 Next add the following details as per your requirement: (Figs 10 & 11)

- Enter the name of the virtual machine in the Virtual Machine name text box: VMWindows10
- Select the region: Asia Pacific Central India

Fig 10

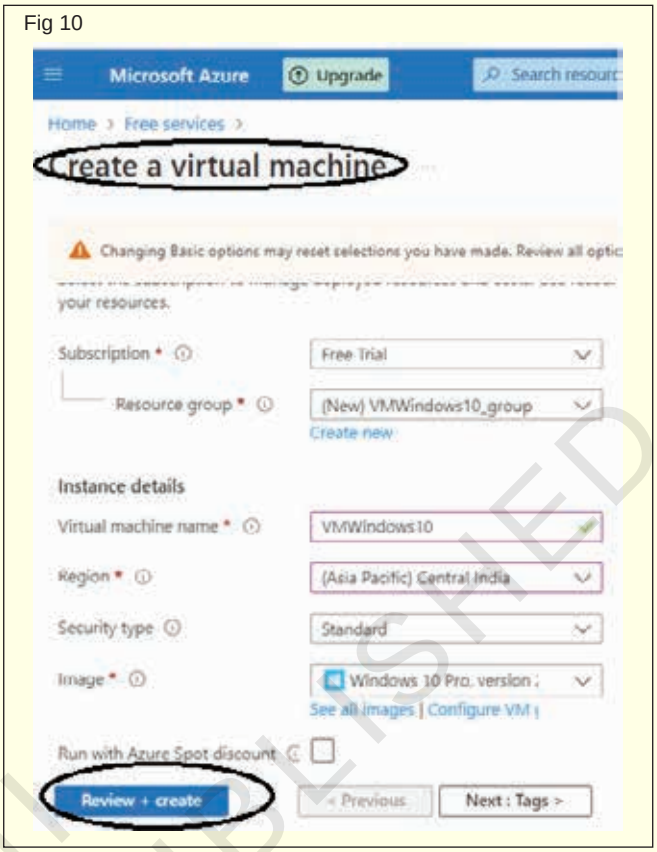


Fig 11

- Security Type: Standard
- Select the image of the Windows Machine you wish to use: Windows10 Pro, Version 21H2 – Gen 1 (Free Service Eligible)
- Select the available size: Standard_B1s-1vcpu, 1GiB Memory (Rs.589/Month) (Free Service Eligible)
- Select the authentication type as per your convenience.
- Administrator Account:

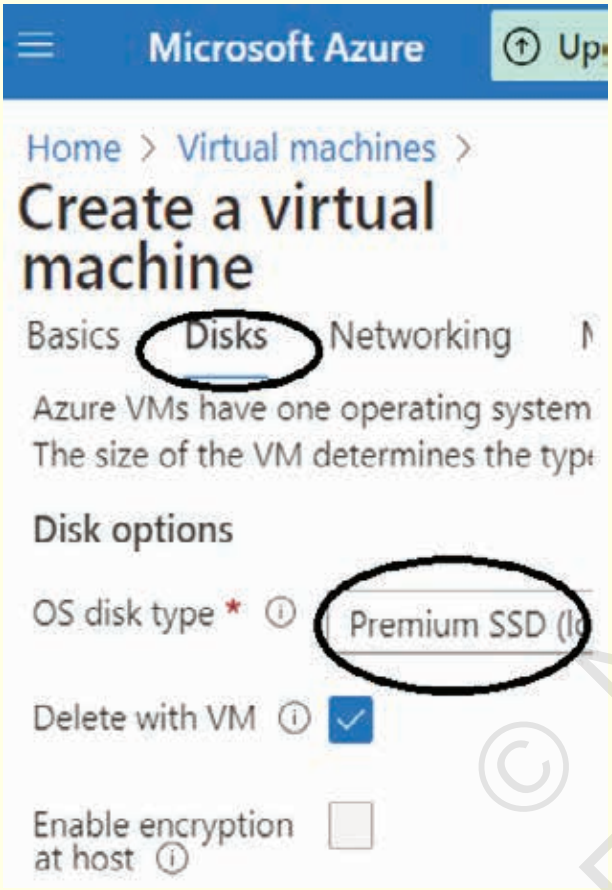
  Username: copaadmin

  Password: Welcome@1234

- Select the allowed ports (SSH {22}, HTTP {80}, HTTPS {443} , RDP {3389})
- Add tags as per your requirement
- Licensing: Select Check Box to agree [I confirm I have an eligible Windows 10/11 license with multi-tenant hosting rights.]

5 Add Disk as required size of creating VM (Fig 12)

Fig 12



6 Select Default setting for Networking (Fig 13)

7 Management, Advanced and Tag are with default settings. (Fig 14)

8 Click on the Review + create button, then click on create to start the deployment. (Fig 15)

9 Deployment InProgress (Fig 16)

10 Deployment Completed (Fig 17)

11 After the deployment is complete, go to the virtual machine section in the newly created virtual machine in order to connect the virtual machine to your local machine. (Fig 18)

12 Note the Public IP Address: 20.207.200.239 (Public IP will be unique for each Virtual Machine) (Fig 19)

13 Next, open the start menu and search “Remote Desktop Connection”, launch the “Remote Desktop Connection” application.

14 Enter the public IP address and username of your Windows Virtual Machine, and click connect.

Fig 13

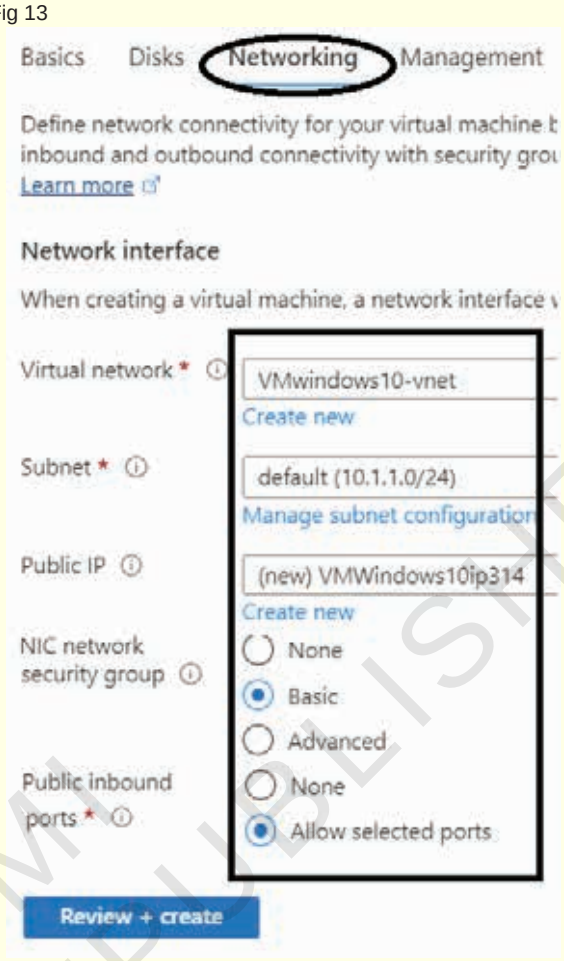


Fig 14

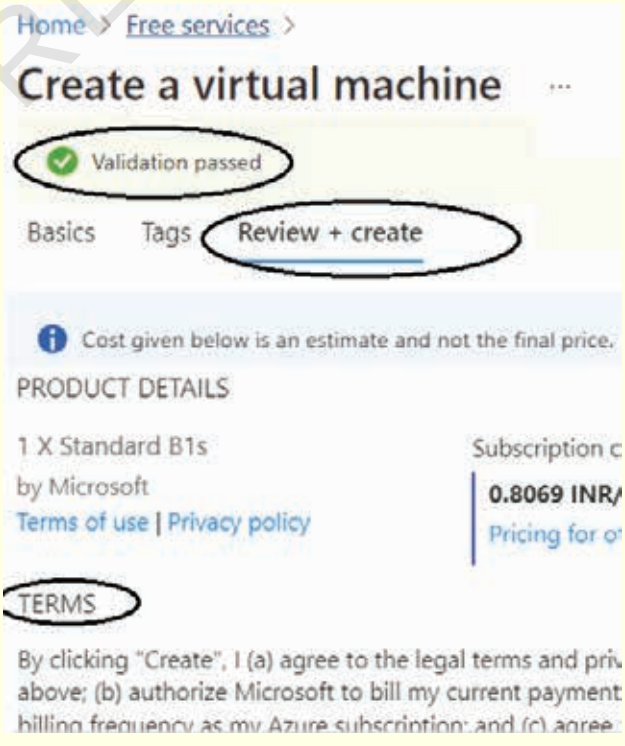


Fig 15

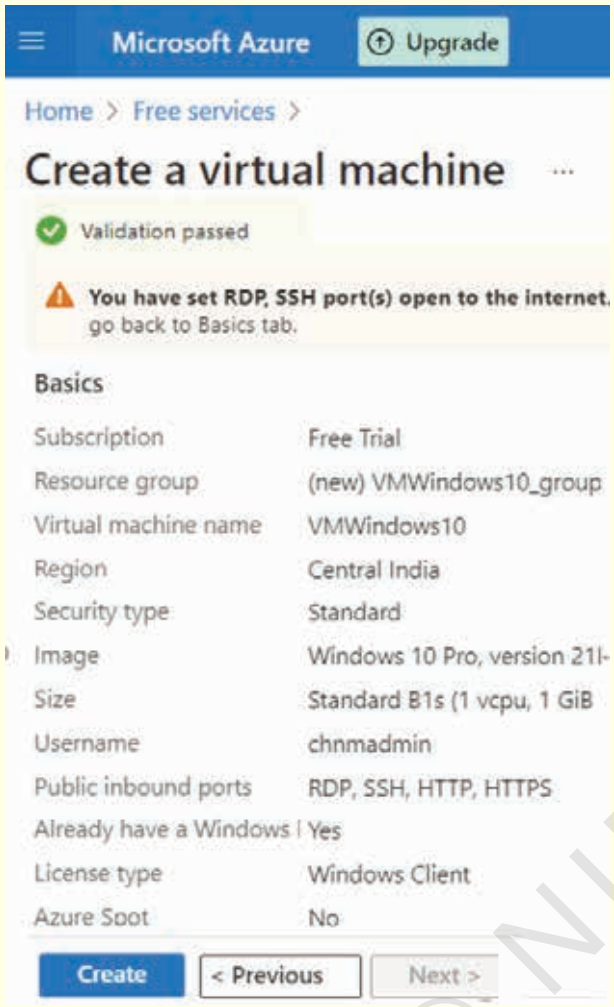


Fig 16

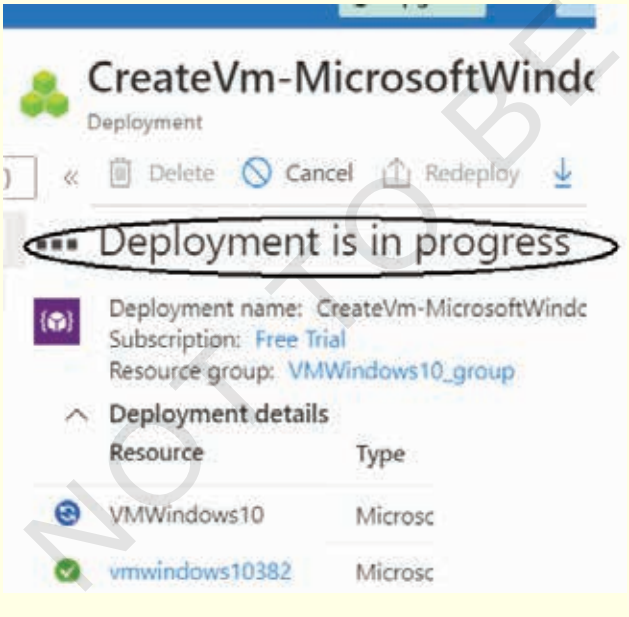


Fig 17

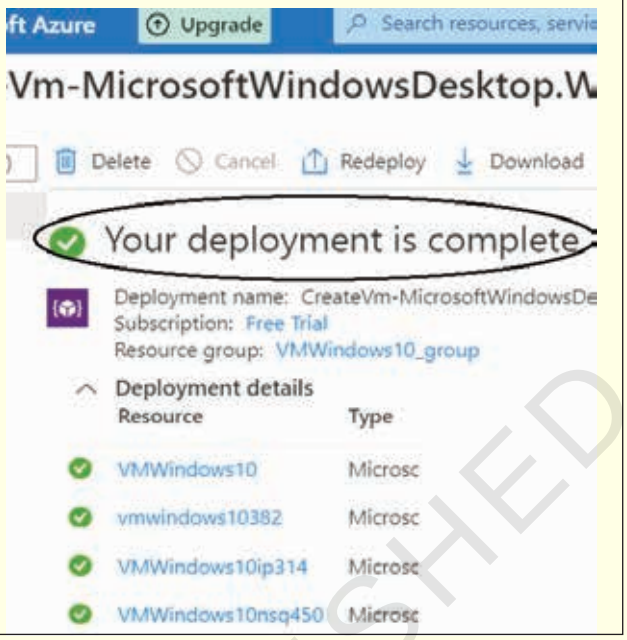


Fig 18

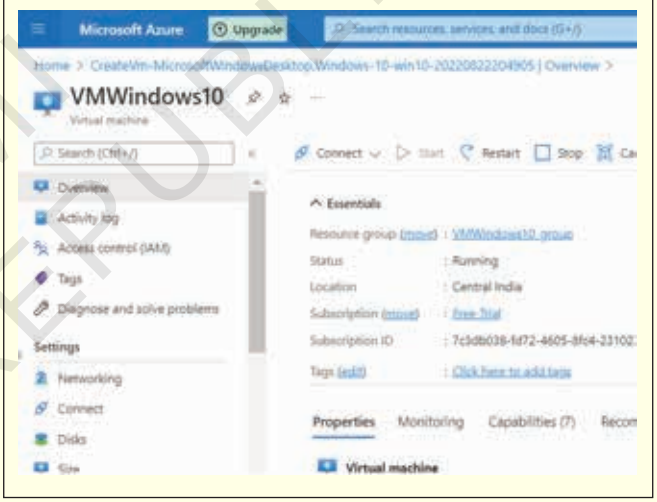
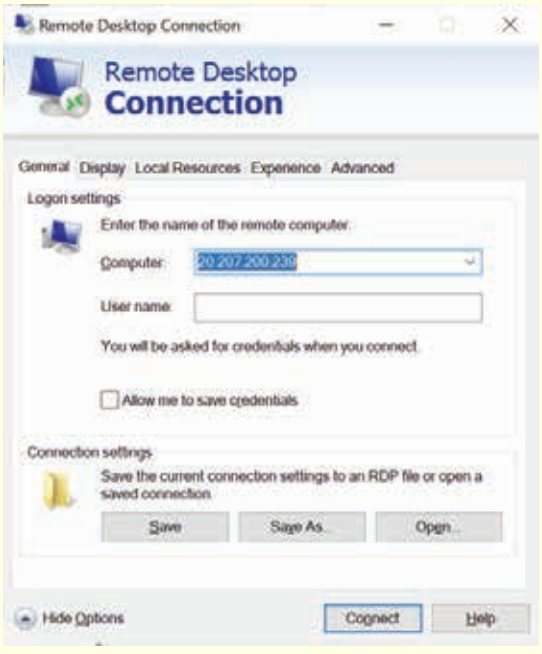
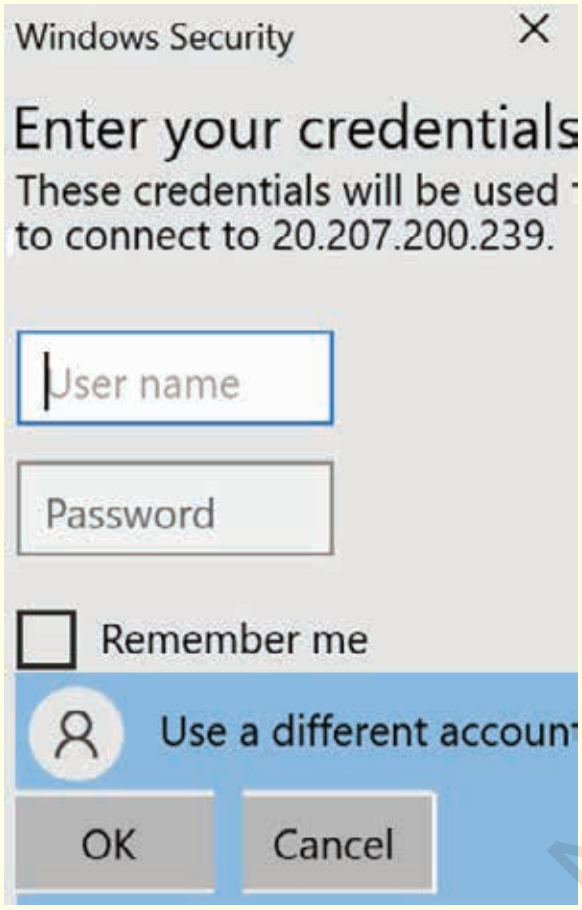


Fig 19



15 Enter the password to access your Windows Virtual Machine (Fig 20)

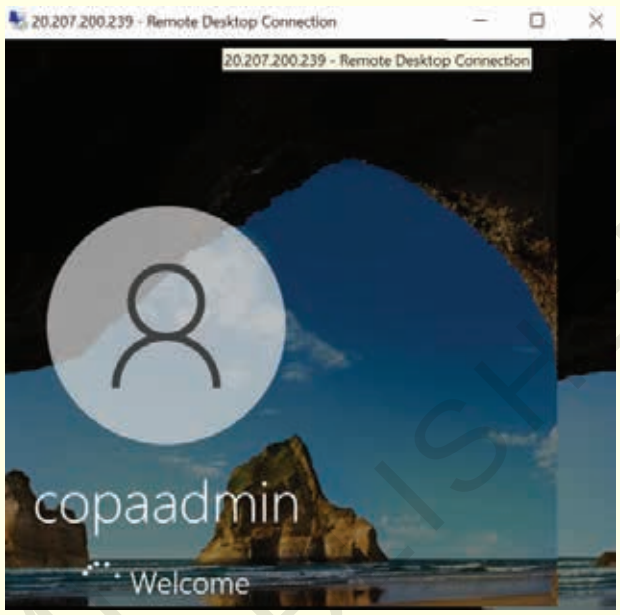
Fig 20



16 Proceed to connect and use your Windows Free Virtual Machine.

17 Booting Virtual Machine (Fig 21)

Fig 21



Practice with PaaS using free cloud services

Objectives: At the end of this exercise you shall be able to
- **practicing with PaaS using free cloud services.**

Requirements

Tools/Equipment/Machines

- Desktop / Laptop PC
- OS (Windows / Linux)
- High Speed Internet (Broadband / FTTH).

PROCEDURE

TASK 1: **Create and configure an Azure Active Directory Domain Services managed domain**

Sign in to the Azure portal

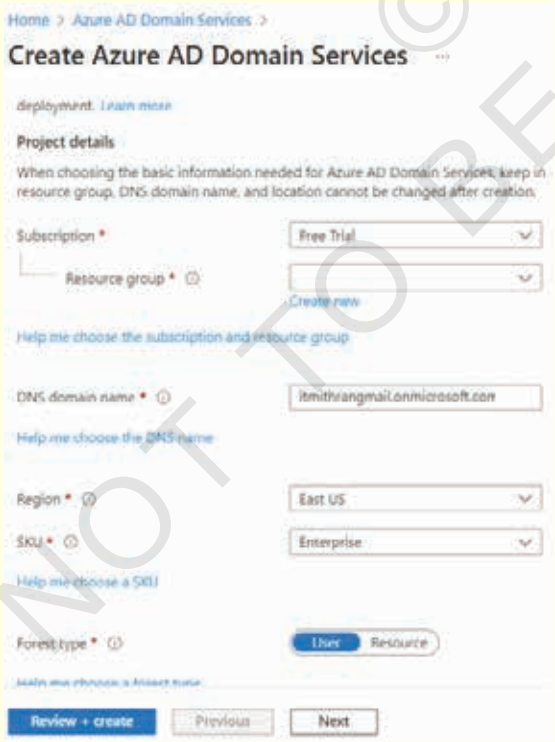
1 Sign in to the Azure portal - create and configure the managed domain using the Azure portal.

2 To get started, first sign in to the Azure portal and Login to https://portal.azure.com/#home with free Account.

Create a managed domain

3 Create a managed domain To launch the **Enable Azure AD Domain Services** wizard, complete the following steps: (Fig 1)

Fig 1



a On the Azure portal menu or from the **Home** page, select **Create a resource.**

b Enter Domain Services into the search bar, then choose Azure AD Domain Services from the search suggestions.

c. On the Azure AD Domain Services page, select **Create.** The **Enable Azure AD Domain Services** wizard is launched.

d Select the Azure **Subscription** in which you would like to create the managed domain.

e Select the **Resource group** to which the managed domain should belong. Choose to **Create new** or select an existing resource group.

4 Complete the fields in the Basics window of the Azure portal to create a managed domain:

5 Enter a DNS domain name for your managed domain, taking into consideration the previous points.

6 Choose the Azure Location in which the managed domain should be created. If you choose a region that supports Azure Availability Zones, the Azure AD DS resources are distributed across zones for additional redundancy.

7 The SKU determines the performance and backup frequency. You can change the SKU after the managed domain has been created if your business demands or requirements change. For more information, see Azure AD DS SKU concepts.

8 A forest is a logical construct used by Active Directory Domain Services to group one or more domains. By default, a managed domain is created as a User forest. This type of forest synchronizes all objects from Azure AD, including any user accounts created in an on-premises AD DS environment.

A Resource forest only synchronizes users and groups created directly in Azure AD. For more information on Resource forests, including why you may use one and how to create forest trusts with on-premises AD DS domains, see Azure AD DS resource forests overview.

9 To quickly create a managed domain, you can select Review + create to accept additional default configuration options. The following defaults are configured when you choose this create option:

- Creates a virtual network named aadds-vnet that uses the IP address range of 10.0.2.0/24.
- Creates a subnet named aadds-subnet using the IP address range of 10.0.2.0/24.
- Synchronizes All users from Azure AD into the managed domain.

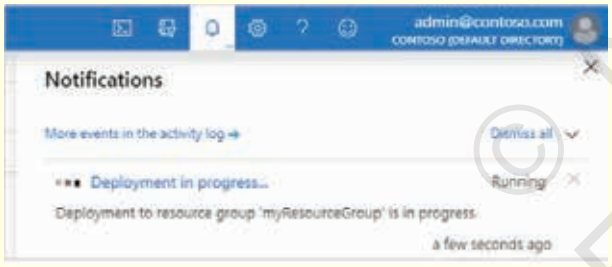
10 Select Review + create to accept these default configuration options.

Deploy the managed domain

11 To create the managed domain, select Create. A note is displayed that certain configuration options such as DNS name or virtual network can't be changed once the Azure AD DS managed has been created. To continue, select OK.

12 The process of provisioning your managed domain can take up to an hour. A notification is displayed in the portal that shows the progress of your Azure AD DS deployment. Select the notification to see detailed progress for the deployment. (Fig 2)

Fig 2



13 The page will load with updates on the deployment process, including the creation of new resources in your directory.

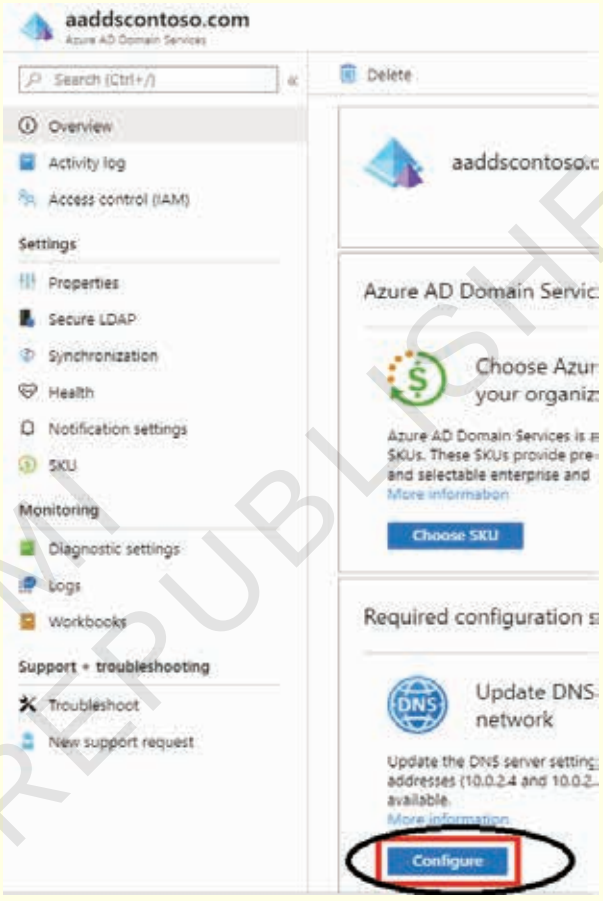
14 Select your resource group, such as myResource-Group, then choose your managed domain from the list of Azure resources, such as aaddscontoso.com. The Overview tab shows that the managed domain is currently Deploying. You can't configure the managed domain until it's fully provisioned.

15 When the managed domain is fully provisioned, the Overview tab shows the domain status as Running.

Update DNS settings for the Azure virtual network

16 The **Overview** tab for your managed domain shows some **Required configuration steps.** The first configuration step is to update DNS server settings for your virtual network. Once the DNS settings are correctly configured, this step is no longer shown. (Fig 3)

Fig 3



17 The addresses listed are the domain controllers for use in the virtual network. In this example, those addresses are 10.0.2.4 and 10.0.2.5. You can later find these IP addresses on the **Properties** tab.

18 To update the DNS server settings for the virtual network, select the Configure button. The DNS settings are automatically configured for your virtual network.

Practice with SaaS using free cloud services

Objectives: At the end of this exercise you shall be able to
- **create a free office 365 account & switch users (sign out).**

Requirements

Tools/Equipment/Machines

- Desktop / Laptop PC
- OS (Windows / Linux)
- High Speed Internet (Broadband / FTTH).

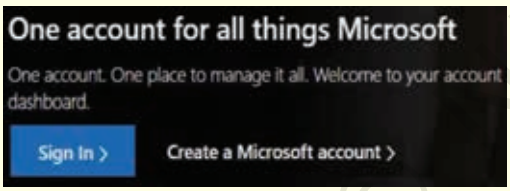
PROCEDURE

TASK 1: **Create a Free Office 365 Account & Switch Users (Sign Out)**

Step 1:

- Go to account.microsoft.com, select Sign in, and then choose Create one!
- If you'd rather create a new email address, choose Create a Microsoft account, choose Next, and then follow the instructions. (Fig 1)

Fig 1



Create a microsoft account:

Step 2: Click **Create one**

Step 3: Enter an email address you want to create and click **Next**

Step 4: Enter a password of your choosing and click **Next.**

step:1-4

Refer Ex-No:01.44.140

This will create your Office365 account. Save the user name and password to sign into Office 365.

To Switch to Another User Account:

Step 1: Click on the user icon in the top right corne.

Step 2: Click on Sign in with a different account (Fig 2).

Step 3: Enter the email address and click Next. (Fig 3)

Step 4: Enter the password and click Sign in. (Fig 4)

Support and Accessing Office 365

Once you've created your account you can access Office 365 by going to https://support.office.com/ and entering your email and password.

Fig 2

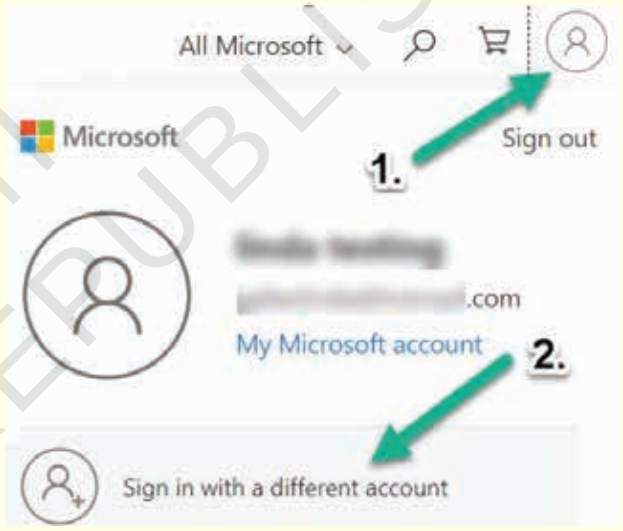
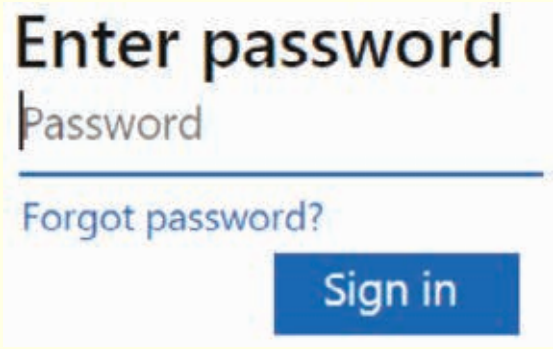


Fig 3

Fig 4



There are various links on the website for support in using Office 365.

1 Click on the Training link for training on the applications. (Fig 5)

2 Click on one of the Office apps links to open that program.

Fig 5

Host a website in a free cloud

Objectives: At the end of this exercise you shall be able to
- **details the host a static website in google cloud with cloud storage.**

Requirements

Tools/Equipment/Machines

- Desktop / Laptop PC
- OS (Windows / Linux)
- High Speed Internet (Broadband / FTTH).

PROCEDURE

TASK 1: **Host a Static Website in Google Cloud with Cloud Storage**

1 **Introduction :** Every small-business owner should have a domain name and website—they are the foundation of your brand and your method to communicate with potential customers.

2 Your domain name and website are one of the primary ways that people find your business, discover what products and services you offer, find your contact details, and even transact business with you (e-commerce transactions).

3 If you're only starting your business now, then you're not expecting very much traffic, so you want to host a simple website. You can do that in Google Cloud, which makes the process very quick, easy, and inexpensive.

What you'll learn

- How to Create a CNAME record
- How to point that CNAME record to Cloud Storage
- How to create a Cloud Storage bucket named like your domain
- How to upload and set permissions on the static files for your website
- How to test your website

Prerequisites

- You need to be the owner/administrator of your domain.
- You need a Google Account.

Complete following steps one by one:

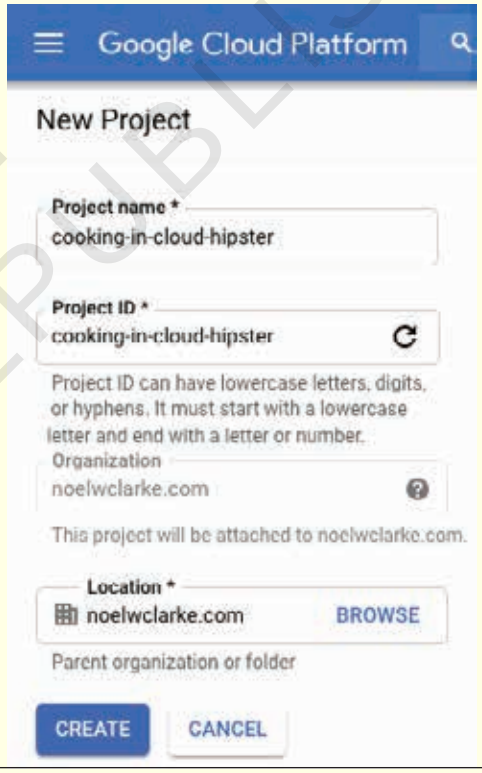
2 Setup

Google Account and new project

1 If you don't already have a Google Account, then you must create one. Sign into Cloud Console and create a new project. (Fig 1)

You can also edit the **Project ID.**

Fig 1



Domain ownership or admin rights

As mentioned in the prerequisites, you'll need a domain that you own or manage.

If you don't have an existing domain, then there are many services through which you can register a new domain, such as Google Domains.

The following tutorial uses the domain www.cookingincloudhipster.com, which is managed through Google Domains and admin.google.com

1 Verify that you own or manage the domain that you will use. Make sure that you are verifying the top-level domain, such as cookingincloudhipster.com, and not a subdomain, such as www.cookingincloudhipster.com.

Note: If you own the domain that you are associating to a bucket, then you might have already performed this step in the past. If you purchased your domain through Google Domains, verification is automatic.

2 Go to Google Search Console. Enter your domain name and press continue. (Fig 2)

3 If you used Google Domains to purchase your domain name, then it will allow for automatic ownership verification. However, if you're using another registrar, then you could have a few more steps. (Fig 3)

Fig 2

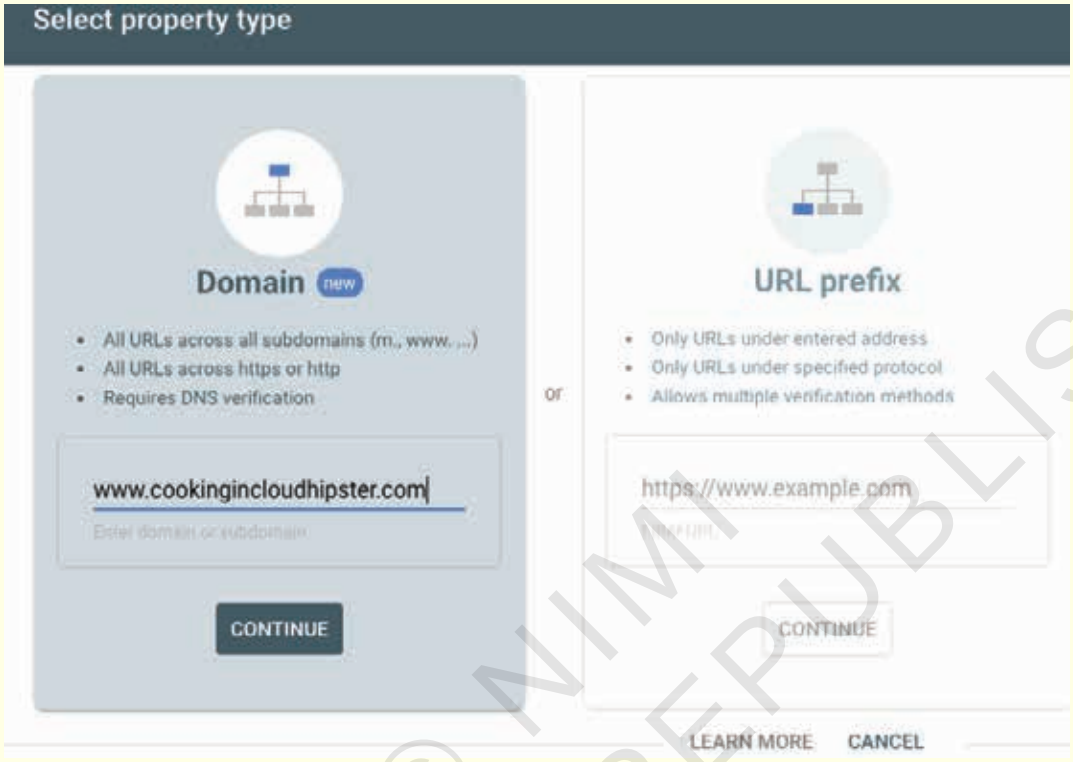
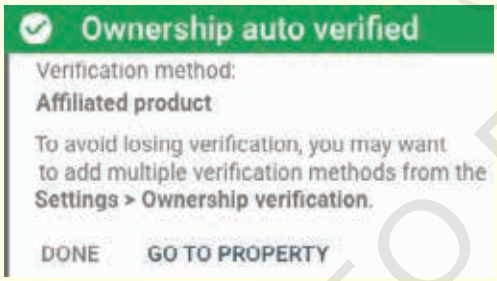


Fig 3



3 Create a CNAME record : On the web, there are numerous systems that are used to make sure that you can get where you need to go. One of those critical systems is Domain Name Services (DNS), which helps with translating human-readable names like www.cookingincloudhipster.com into the numeric IP Address number of the server that is hosting that website.

Within DNS, there is the ability to add RECORDs to the DNS entry to help other services with being correctly configured. Some of the the common ones are MX or Mail eXhange RECORDs, which help email systems work.

In this section, you'll create a CNAME, which is a Canonical Name Record or Alias Record record, so that when someone only enters cookingincloudhipster.com—without the "www"—it will still lead to the right server.

Follow these steps:

1 Go to Google Domains. Click on the "My domains" task. If you need to Sign-in or if you are a first-time user, then use your email address to log in. Find your domain— www.cookingincloudhipster.com. (Fig 4)

2 Click on "Manage," then click "DNS."

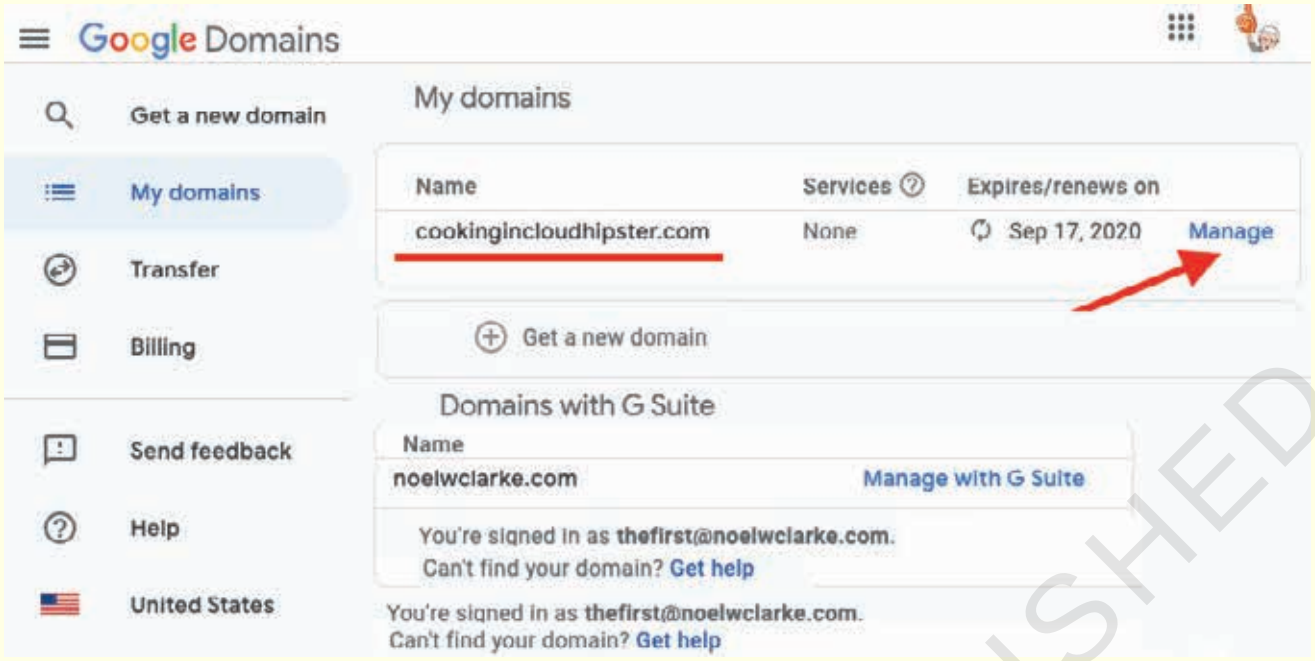
3 DNS Settings screen.

Toward the bottom, look for the "Custom resource records" panel.

4 Add a CNAME record. A CNAME record is a type of DNS record. It directs traffic that requests a URL from your domain to the re sources that you want to serve. In this case, those are objects in your Cloud Storage buckets. For more information, see CNAME redirects.

NAME	TYPE	DATA
www.cookingincloudhipster.com	CNAME	c.storage.googleapis.com

Fig 4



When you're done, it should look like this

4 Create a Cloud Storage Bucket

Next, you'll create a Cloud Storage bucket to hold your static site files.

Follow these steps:

1 Go to the Cloud Console. In the left-hand menu, scroll down to the STORAGE category and click on the Storage task.

2 Click on Create Bucket.

3 With your site name, which is www.cookingincloudhipster.com.

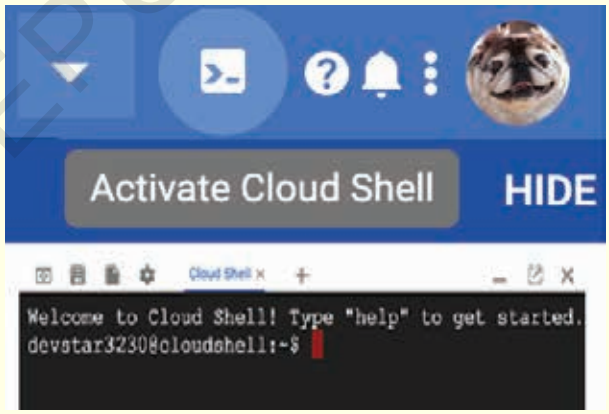
- **Choose where to store your data:** Select Multi-region so that the content is available from more than one cloud region.
- **Choose a default storage class for your data:** Select Standard. For more information, see Storage classes.
- **Choose how to control access to objects:** Set the bucket permissions for the whole bucket and its contents the same. For information, see Access control lists (ACLs).
- Click Create.

So far in this codelab, you have been using the Cloud Console graphical user interface. However, you can also control Google Cloud with Cloud Shell, which provides you with command-line access to your cloud resources directly from your browser.

This Debian-based virtual machine is loaded with all the development tools you'll need. It offers a persistent 5GB home directory and runs in Google Cloud, greatly enhancing network performance and authentication. This means that all you will need for this codelab is a browser (yes, it works on a Chromebook)

1 To activate Cloud Shell from the Cloud Console, simply click Activate Cloud Shell (it should only take a few moments to provision and connect to the environment). (Fig 5)

Fig 5



Once connected to Cloud Shell, you should see that you are already authenticated and that the project is already set to your PROJECT_ID.

gcloud auth list

Command output

Credentialed accounts:

- <myaccount>@<mydomain>.com (active)

Note: The gcloud command-line tool comes preinstalled in Cloud Shell and you'll surely enjoy its support for tab completion. For more information, see gcloud command-line tool overview.

gcloud config list project

Command output

[core]

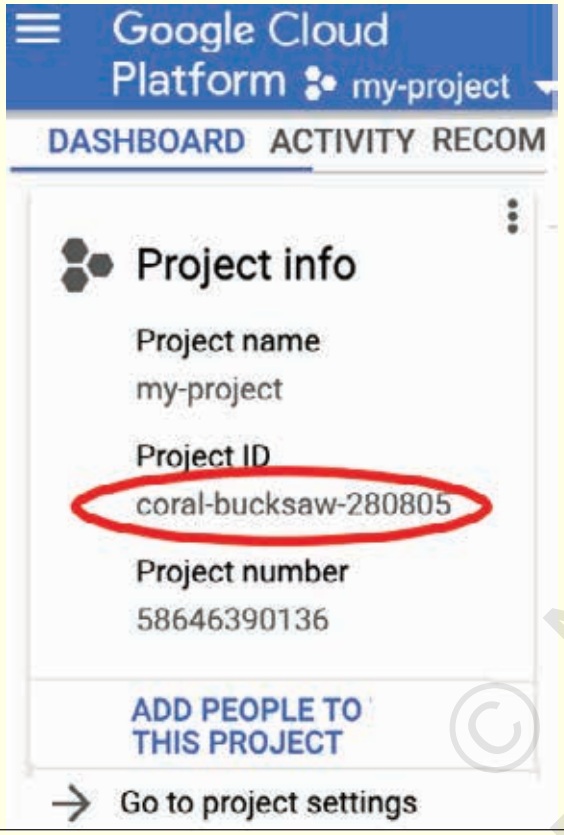
project = <PROJECT_ID>

If, for some reason, the project is not set, simply issue the following command:

gcloud config set project <PROJECT_ID>

Looking for your PROJECT_ID? Check out what ID you used in the setup steps or look it up in the Cloud Console dashboard: (Fig 6)

Fig 6



Cloud Shell also sets some environment variables by default, which may be useful as you run future commands.

echo $GOOGLE_CLOUD_PROJECT

Command output

<PROJECT_ID>

2 Finally, set the default zone and project configuration.

gcloud config set compute/zone us-central1-f

You can choose a variety of different zones. For more information, see Regions & Zones.

Note: When you run gcloud on your own machine, the config settings would've been persisted across sessions. But in Cloud Shell, you will need to set this for every new session or reconnection.

Here's the command-line version of "create bucket."

gsutil mb gs://www.cookingincloudhipster.com

5 Upload your website's files and images

Now, obtain the static files from your website developer or marketing team. If you're doing it yourself, then there are plenty of great tutorials on HTML and CSS. Then, upload the static files into the bucket that you created in one of three ways.

Upload files with the Cloud Console

1 Go to the Cloud Console. In the left-hand menu, click on the STORAGE category, then click Storage.

2 Click on the bucket name, which is www.cookingincloudhipster.com.

3 Under Bucket details, click Upload folder.

4 Upload your website's folders and files.

Upload files by dragging and dropping them

You can also upload files by dragging and dropping them.

Upload files using the gsutil rsync

You can also the gsutil rsync command to copy large numbers of files from your local machine to Cloud Storage. You can use the -R option to recursively copy directory trees. For example, to synchronize a local directory named local-dir with a bucket, use the following:

gsutil rsync -R local-dir gs://www.cookingincloudhipster.com

6 Set access permissions

1 You can either make all files in your bucket publicly accessible or set individual objects to be accessible through your website. Generally, making all files in your bucket accessible is easier and faster.

2 If you choose to control the accessibility of individual files, then you can set the default object ACL for your bucket so that subsequent files uploaded to your bucket are shared by default.

Note: Visitors receive an HTTP 403 response code when requesting the URL for a nonpublic or nonexistent file. See the next section for information about how to add an error page that uses an HTTP 404 response code.

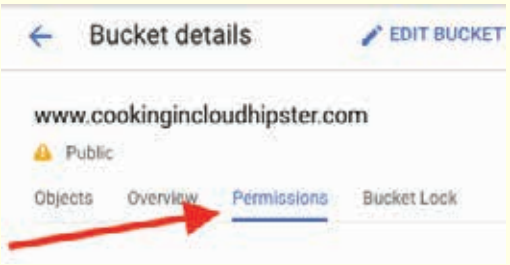
Bucket-level access permissions

1 Apply access permission to the entire bucket as a whole. That is safer and, given that it is a static website, all of the contents likely need to be readable for the site to properly load.

2 If you have some design metadata (or hidden files like .DS_Store, which is used on Macintosh,is a file that stores custom attributes of its containing folder, such as the position of icons or the choice of a background image.) They can be individually hidden or deleted.

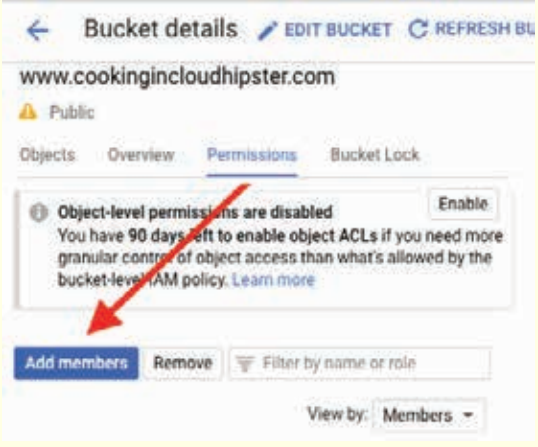
1 Click Bucket details, then click Permissions. (Fig 7)

Fig 7



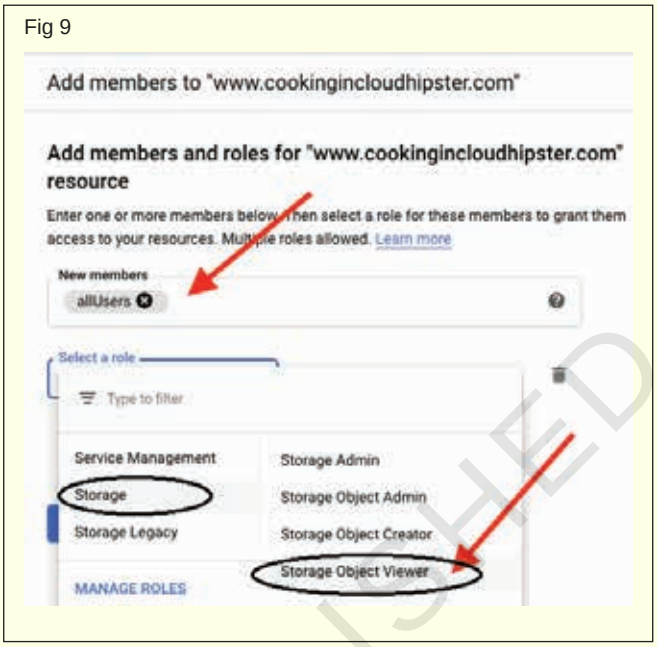
2 Click Add members. (Fig 8)

Fig 8



3 Add allUsers with Storage Object Viewer rights (Fig 9)

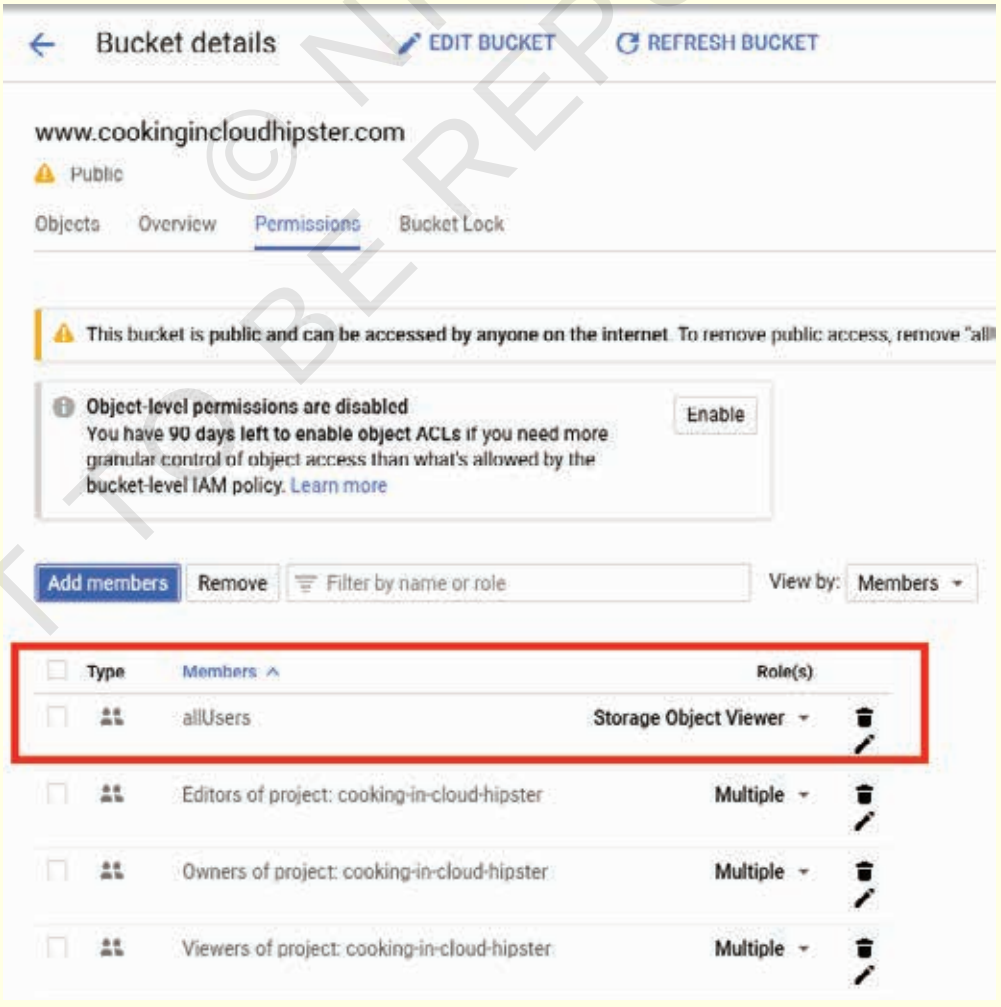
Fig 9



4 Verify that you see the following: (Fig 10)

The files are now visible to the general public. Hooray!

Fig 10



7 Edit website configuration

1 The last step is to assign an index page suffix, which is controlled by the MainPageSuffix property, and a custom error page, which is controlled by the NotFoundPage property.

2 Assigning either is optional, but without an index page, nothing is served when users access your top-level site, in this case— http://www.cookingincloudhipster.com/.

Index pages

1 An index page (also called a webserver directory index) is a file served to visitors when they request a URL that doesn't have an associated file.

2 When you assign a MainPageSuffix, Cloud Storage looks for a file with that name and a prefix that matches the URL that the visitor requested.

3 For example, say you set the MainPageSuffix of your static website to index.html. Additionally, say you have no file named directory in your bucket www.cookingincloudhipster.com.

4 In this situation, if a user requests the URL http://www.cookingincloudhipster.com/directory, Cloud Storage attempts to serve the file www.cookingincloudhipster.com/directory/index.html.

5 If that file also doesn't exist, Cloud Storage returns an error page.

6 The MainPageSuffix also controls the file served when users request the top-level site.

7 Continuing the above example, if a user requests http://www.cookingincloudhipster.com, Cloud Storage attempts to serve the file www.cookingincloudhipster.com/index.html.

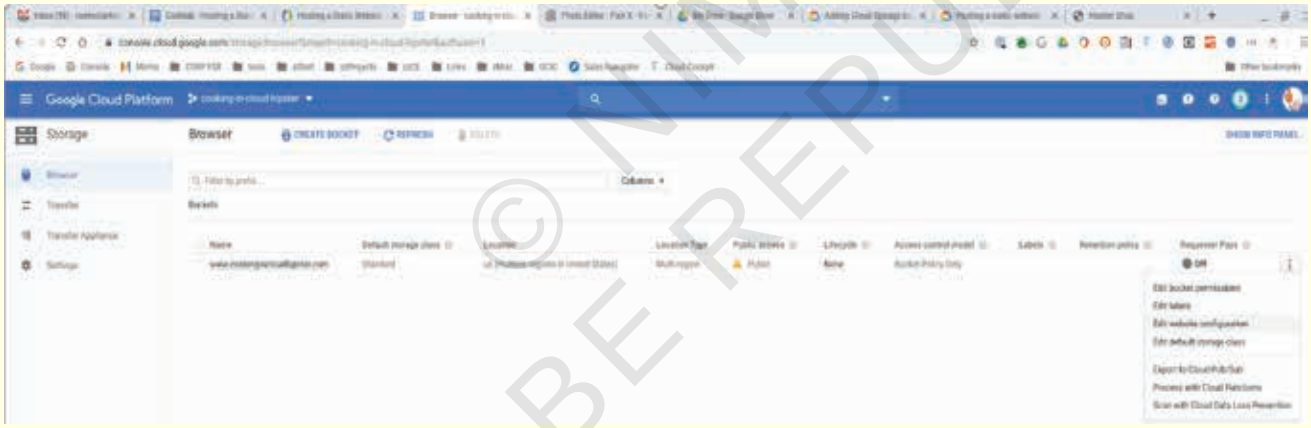
For more information on the cases in which the index page is served, see Website configuration examples.

Error page

1 The error page is the file returned to visitors of your static site who request a URL that does not correspond to an existing file.

2 If you have assigned a MainPageSuffix, then Cloud Storage only returns the error page if there is neither a file with the requested name nor an applicable index page. (Fig 11)

Fig 24



3 When returning an error page, the HTTP response code is 404. The property that controls which file acts as the error page is NotFoundPage. If you don't set NotFoundPage, then users receive a generic error page. (Fig 25)

4 In the following sample, the MainPageSuffix is set to index.html and NotFoundPage is set to 404.html: gsutil web set -m index.html -e 404-Page.html gs://www.example.com

8 Test your website

1 Now, open a browser and go to your website— www.cookingincloudhipster.com. (Fig 26)

2 Confirm that you see the following page and individual product pages:

Fig 25

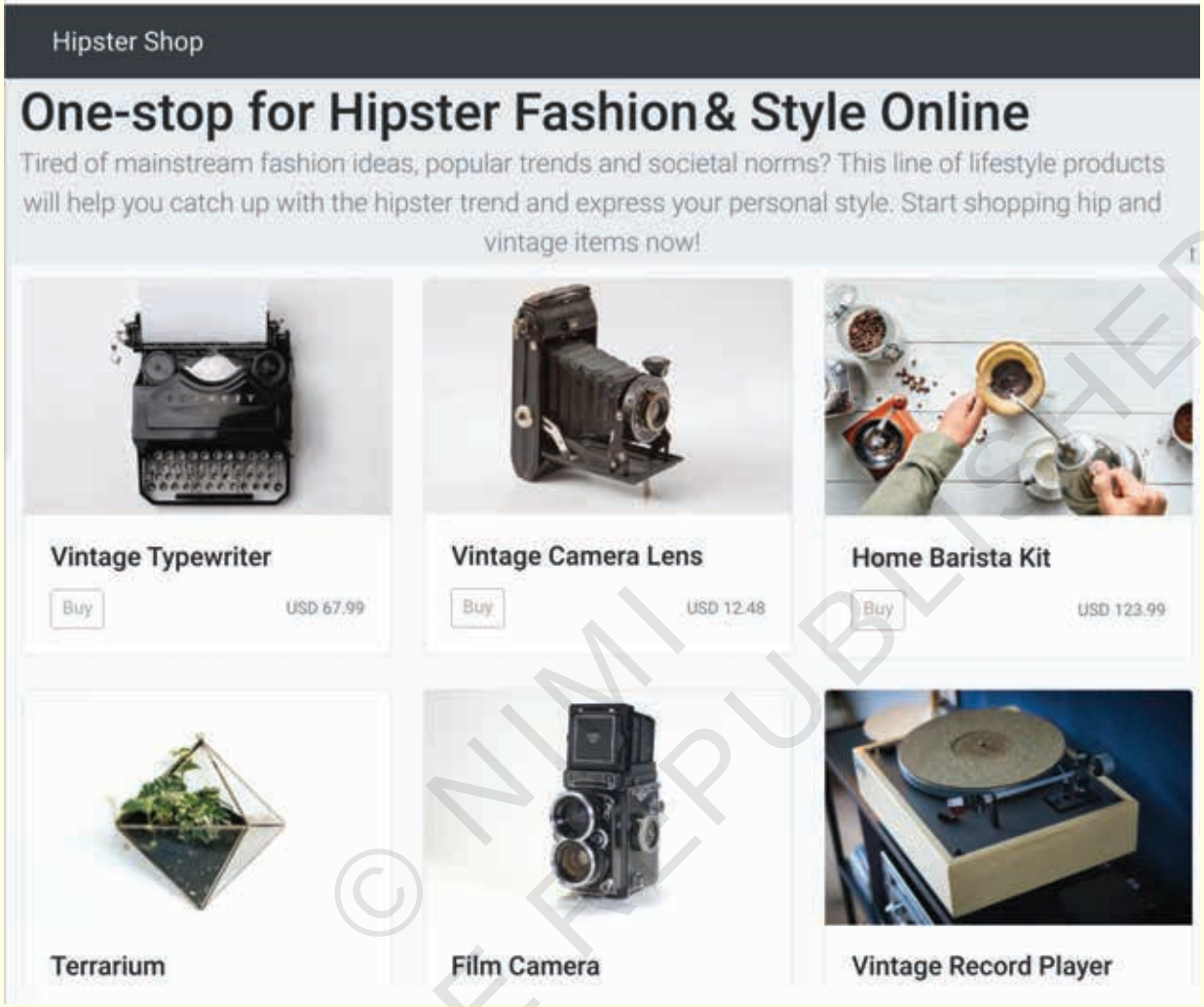
Delete the following Google Cloud resources:

- The Cloud Storage bucket
- The CNAME record

9 Congratulations!

You created a static website and hosted it in Google Cloud!

Fig 26



Identify Phases of the Application Development life Cycle

Objectives: At the end of this exercise you shall be able to
- **identify phases pf the application development life cycle.**

Requirements			
Tools/Equipment/Machines			
• Desktop / Laptop PC	- 1 No.	• OS (Windows / Linux)	- 1 No.

PROCEDURE

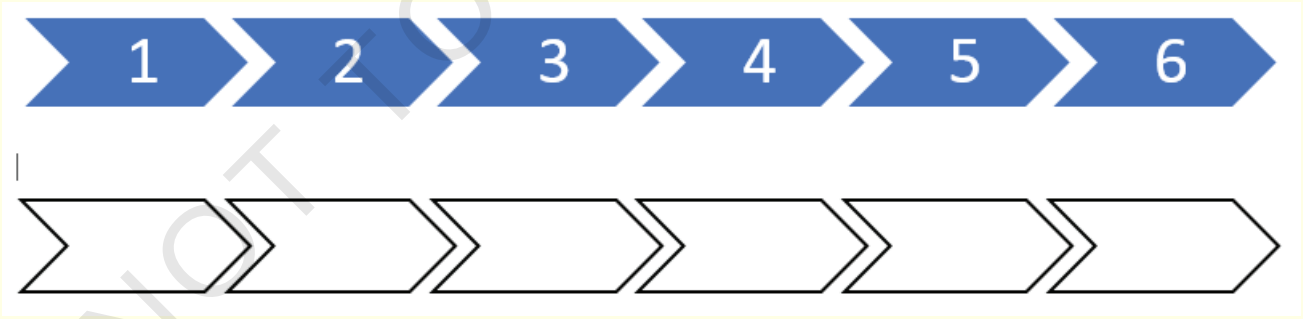
TASK 1: **Identify Phases of the Application Development Life Cycle**

1 Identify Phases of the Application Development Life Cycle (Fig 1)

2 Identify Each Phases and Write Down (Fig 2)

Fig 1

Fig 2



Describe Role in each of the phases of Application Development life Cycle

Objectives: At the end of this exercise you shall be able to
- **descibe roles in each of the phases of application development life cycle.**

Requirements

Tools/Equipment/Machines

• Desktop / Laptop PC	- 1 No.	• OS (Windows / Linux)	- 1 No.

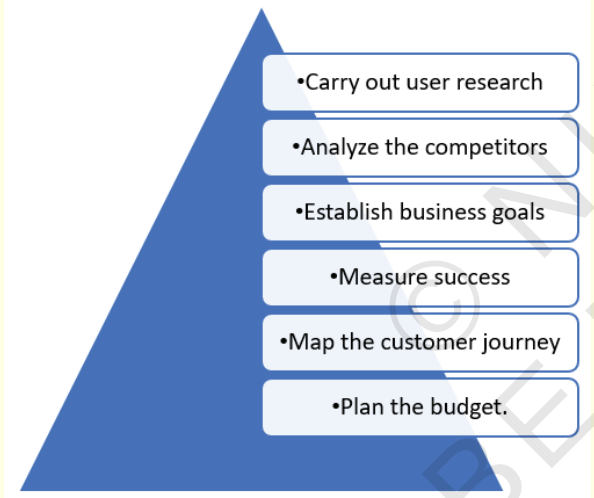
PROCEDURE

TASK 1: **Describe Roles in each of the phases of Application Development Life Cycle**

1 Describe each role and Write on the process chart.

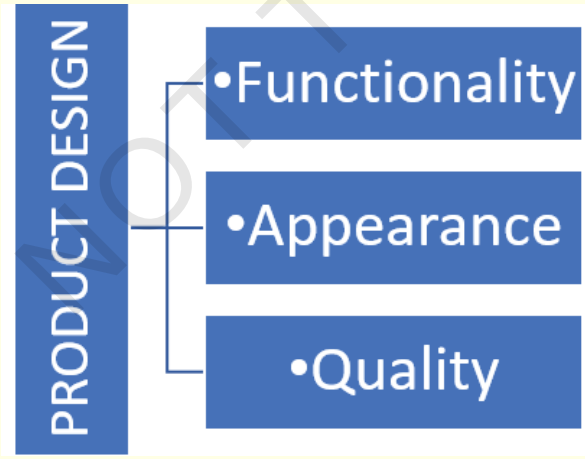
ANALYSIS (Fig 1)

Fig 1



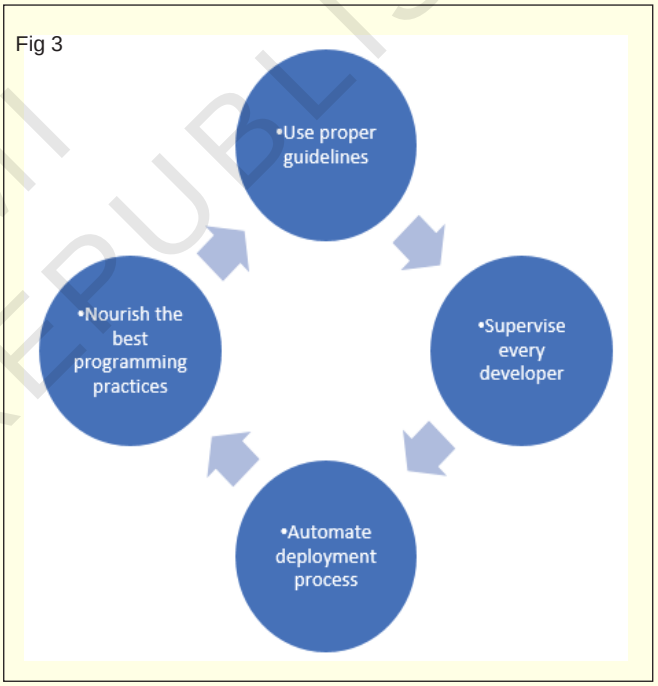
PRODUCT DESIGN (Fig 2)

Fig 2



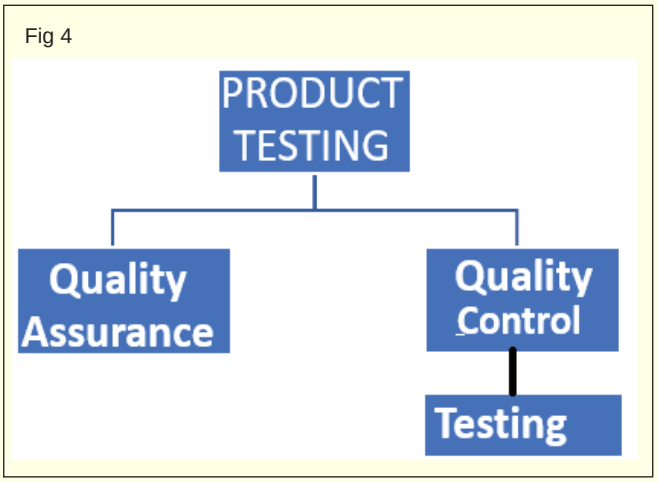
SOFTWARE DEVELOPMENT (Fig 3)

Fig 3



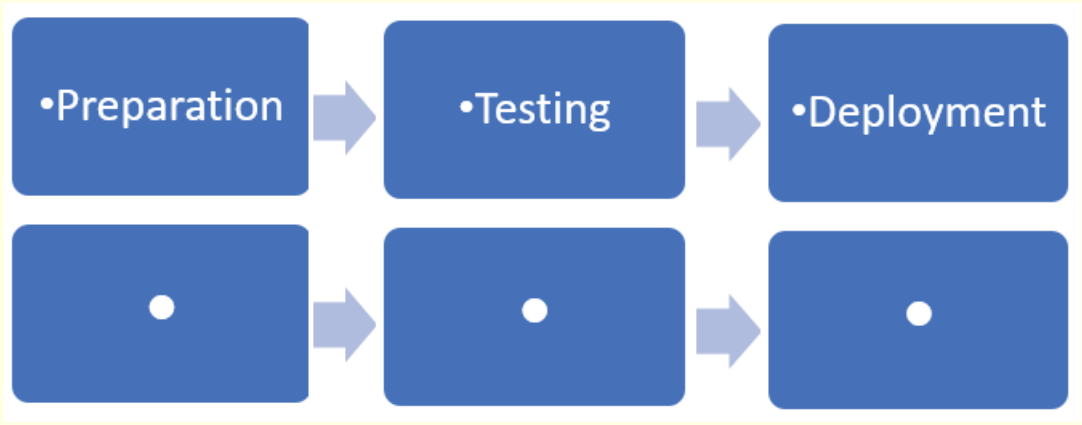
PRODUCT TESTING (Fig 4)

Fig 4



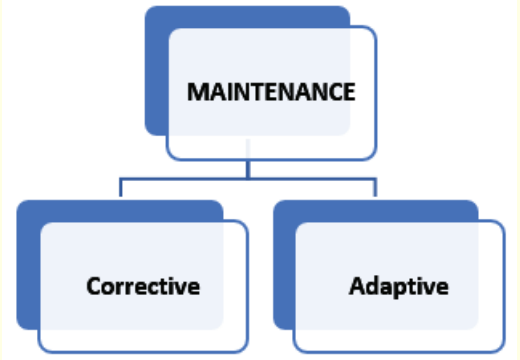
DEPLOYMENT (Fig 5)

Fig 5



MAINTENANCE (Fig 6)

Fig 6



Install, set up the environment & run Python

Objectives: At the end of this exercise you shall be able to
- **install Python**
- **setup or verify environment path**
- **run Python.**

Requirements

Tools/Equipment/Machines

- Desktop/ laptop PC - 1 No.
- Windows OS - 1 No.
- Python Ver 3.10.5 or latest - 1 No.

The version 3.10.5 or Latest of Python IDLE (Integrated Development Learning Environment) is used to develop and run Python code. It can be downloaded from the web resource www.python.org →Downloads

PROCEDURE

TASK 1: **Install Python**

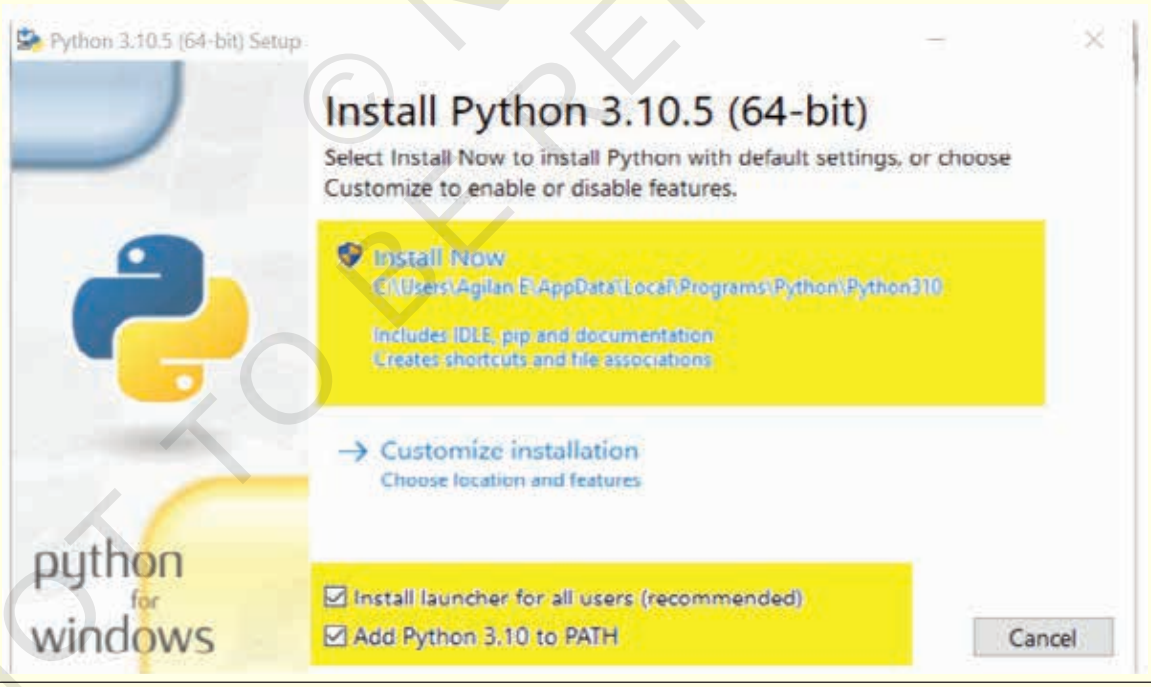
1 Run the Python Installer once downloaded (python-3.10.5-amd64.exe) to start the installation.

2 Make sure you select the Install launcher for all users and Add Python 3.10 to PATH checkboxes. (Fig 1)

Note: older versions of Python that do not support the Add Python to Path checkbox.

3 Choose Install Now with default installation location.

Fig 1



Note: For all recent versions of Python, the recommended installation options include Pip and IDLE. Older versions might not include such additional features.

4 Installation in progress…

5 The next dialog will prompt you to select whether to Disable path length limit.

Choosing this option will allow Python to bypass the 260-character MAX_PATH limit. Effectively, it will enable Python to use long path names.

6 Click Close to Complete the Setup.

TASK 2: **Setup or Verify environment path**

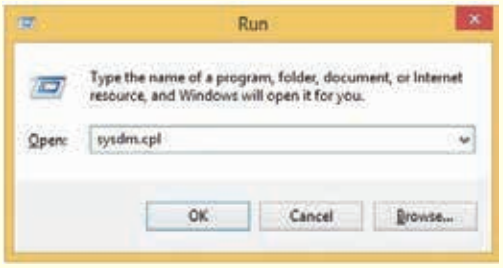
1 Add Python Path to Environment Variables

2 We recommend you go through this step if your version of the Python installer does not include the Add Python to PATH checkbox or if you have not selected that option.

3 Setting up the Python path to system variables alleviates the need for using full paths. It instructs Windows to look through all the PATH folders for “python” and find the install folder that contains the python.exe file.

i Open the Start menu and start the Run app. (Fig 2)

Fig 2



ii Type sysdm.cpl and click OK. This opens the System Properties window.

iii Navigate to the Advanced tab and select Environment Variables.

iv Under User Variables, find and select the Path variable.

v Click Edit.

vi Verify the path of Python installed location are added here, if not Select the New to add the Variable value field path that where python.exe file installed on your computer preceded with a semicolon (;).

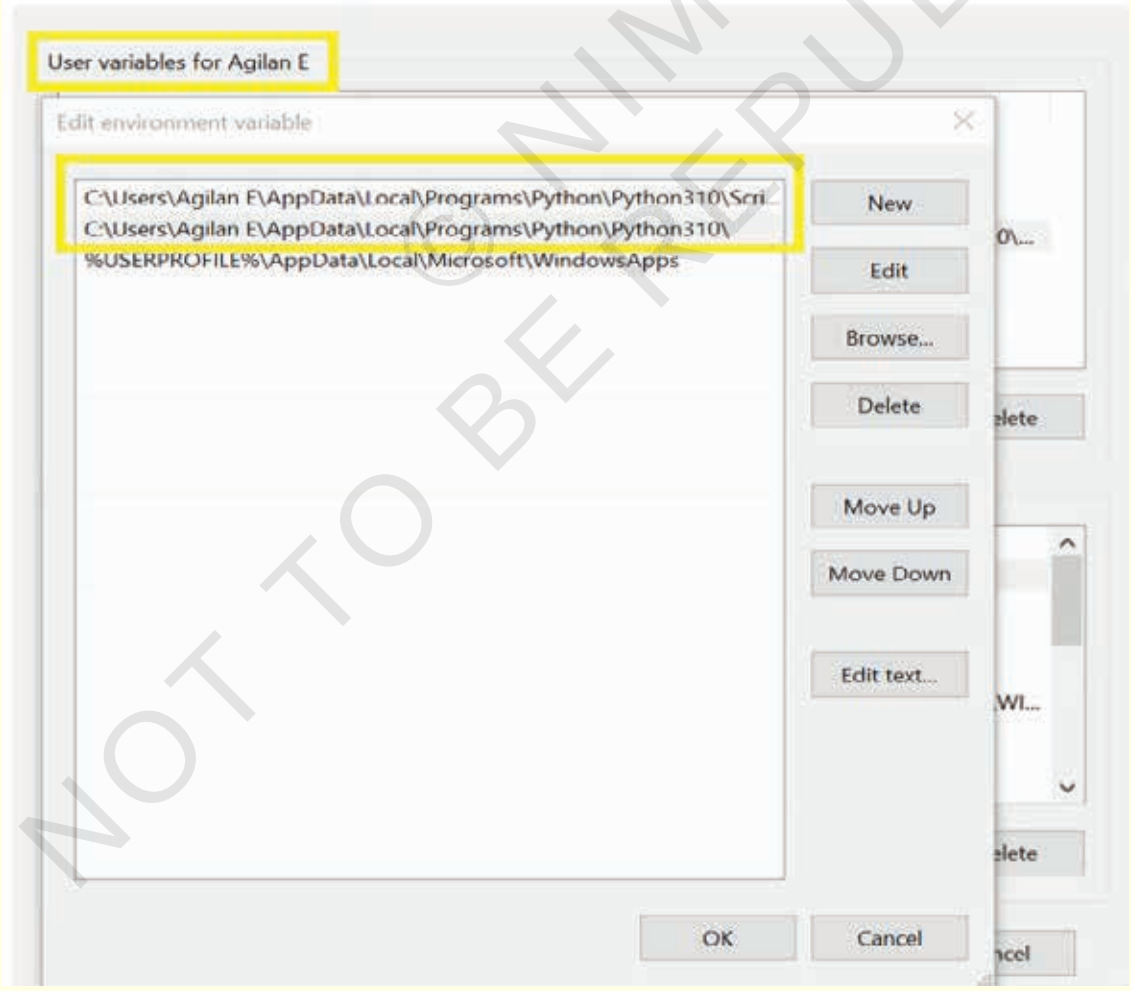
For example, in the image below, we have added “;C:\Python34.” (Fig 3)

vii Click OK and close all windows.

By setting this up, you can execute Python scripts like this: Python script.py

Instead of this: C:/Python34/Python script.py

Fig 3



TASK 3: **Run Python**

1 Invoking Python IDLE

2 The following command can be used to invoke Python IDLE from Window OS.

Start → All Programs → Python 3.x → IDLE (Python 3.x) (Or)

3 Click python Icon on the Desktop if available.

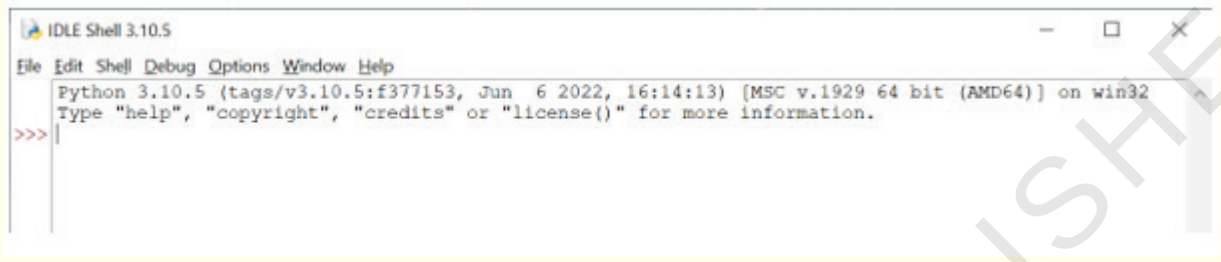
4 Now Python IDLE window appears as shown in the Figure (Fig 4).

Menu Bar Tilte Bar

Python prompt (>>>)

Python IDLE Window : The prompt (>>>) indicates that Interpreter is ready to accept instructions. Therefore, the prompt on screen means IDLE is working in interactive mode.

Fig 4



Use Command Line and IDE to create and execute a python program

Objectives: At the end of this exercise you shall be able to
- **IDE Interactive mode execution**
- **command line script mode execution.**

Requirements

Tools/Equipment/Machines

- Desktop/ laptop PC - 1 No.
- Windows OS - 1 No.
- Python Ver 3.10.5 or latest - 1 No.

In Python, programs can be written in two ways namely Interactive mode and Script mode. The Interactive mode allows us to write codes in Python command prompt (>>>) whereas in script mode programs can be written and stored as separate file with the extension .py and executed. Script mode is used to create and edit python source file.

PROCEDURE

TASK 1: **IDE Interactive mode Execution**

1 Interactive mode Programming

In interactive mode Python code can be directly typed and the interpreter displays the result(s) immediately. The interactive mode can also be used as a simple calculator.

The following command can be used to invoke Python IDLE from Window OS.

Start → All Programs → Python 3.x → IDLE (Python 3.x) (Or)

2 Click python Icon on the Desktop if available.

3 Now Python IDLE window appears as shown in the Fig 1.

Menu Bar Tilte Bar

Python prompt (>>>)

Python IDLE Window

The prompt (>>>) indicates that Interpreter is ready to accept instructions.

Example 1:

>>>print (“Python Programming Language”)

Python Programming Language

>>>x=5

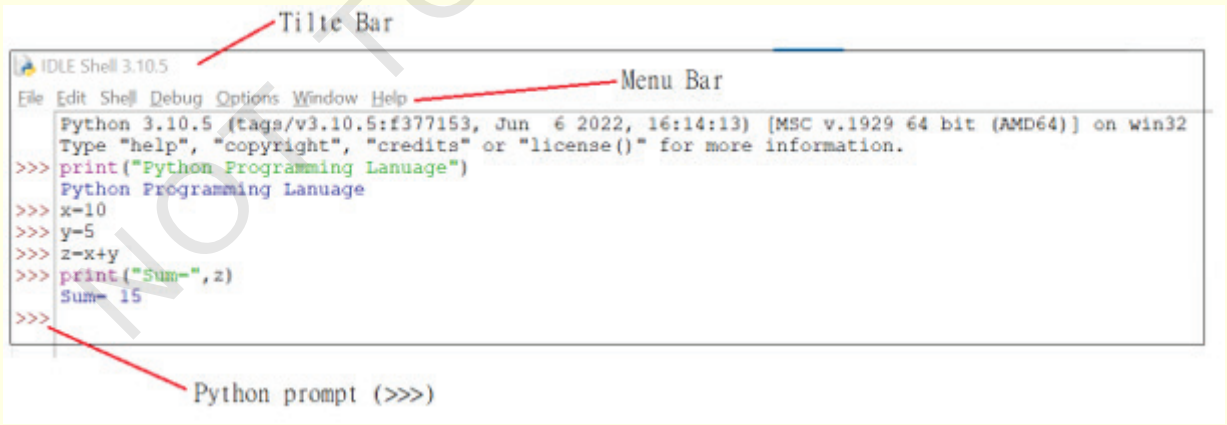
>>>y=10

>>>z=x + y

>>>print (“The Sum”, z)

The Sum = 15

Fig 1



TASK 2: **Command Line Script mode Execution**

Basically, a script is a text file containing the Python statements. Python Scripts are reusable code. Once the script is created, it can be executed again and again without retyping. The Scripts are editable.

Creating Scripts in Python

1 Choose File → New File or press Ctrl + N in Python shell window

2 An untitled blank script text editor will be displayed on screen as shown in Fig 2.

Fig 2

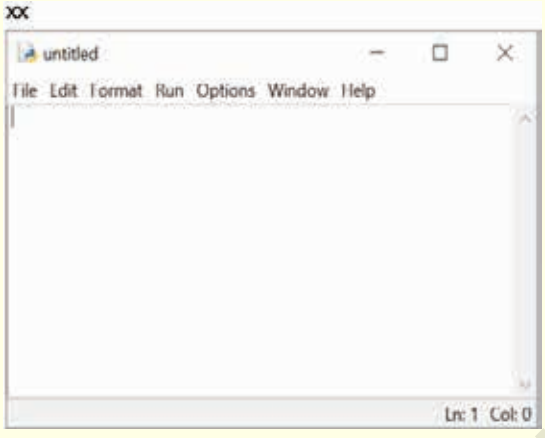


Figure xx. Untitled, blank Python script editor

3 Type the following code in Script editor

```
a =100
b = 350
c = a+b
print (“The Sum=”, c) (Fig 3)
```

Fig 3

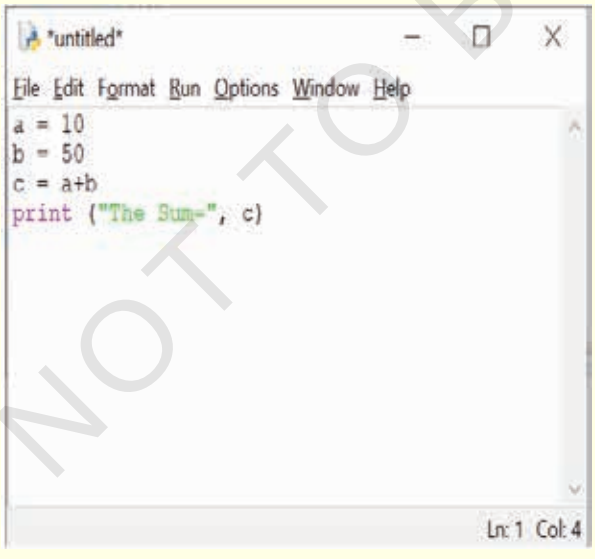


Figure xx– Python Sample code

4 Choose File → Save or Press Ctrl + S

5 Now, Save As dialog box appears on the screen as shown in the Figure xx (Fig 4)

Fig 4

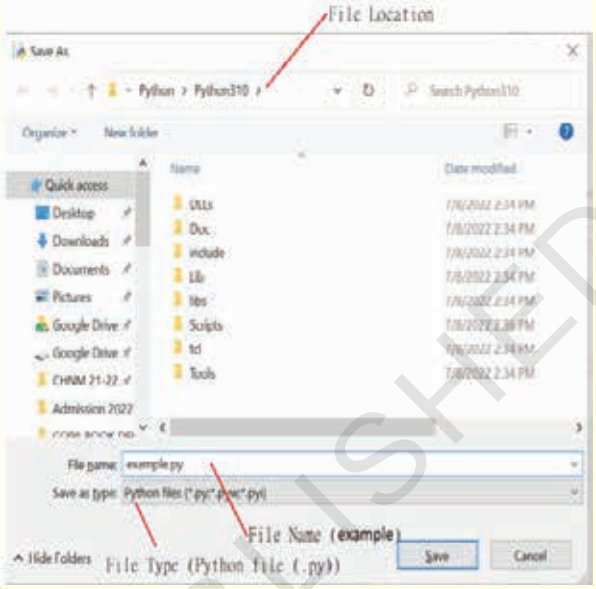


Figure xx – Save As Dialog Box

6 In the Save As dialog box, select the location where you want to save your Python code, and type the file name in File Name box. Python files are by default saved with extension .py. Thus, while creating Python scripts using Python Script editor, no need to specify the file extension.

7 Finally, click Save button to save your Python script.

Executing Python Script

1 Choose Run → Run Module or Press F5

2 If your code has any error, it will be shown in red color in the IDLE window, and Python describes the type of error occurred. To correct the errors, go back to Script editor, make corrections, save the file using Ctrl + S or File → Save and execute it again.

3 For all error free code, the output will appear in the IDLE window of Python as shown in Figure xx (Fig 5)

Figure xx – Python Script Output Window

Executing Python Script by Command Prompt

1 Start Run → using Windows Key + R (Fig 6)

2 Type CMD and Enter

3 Command Prompt will appear then navigate the location where python program saved

4 Execute the Python program using command by “python <filename.py>” then output will appear on the next line as shown in figure. (Fig 7)

Figure xx –Python Script CMD prompt Output Window

Fig 5

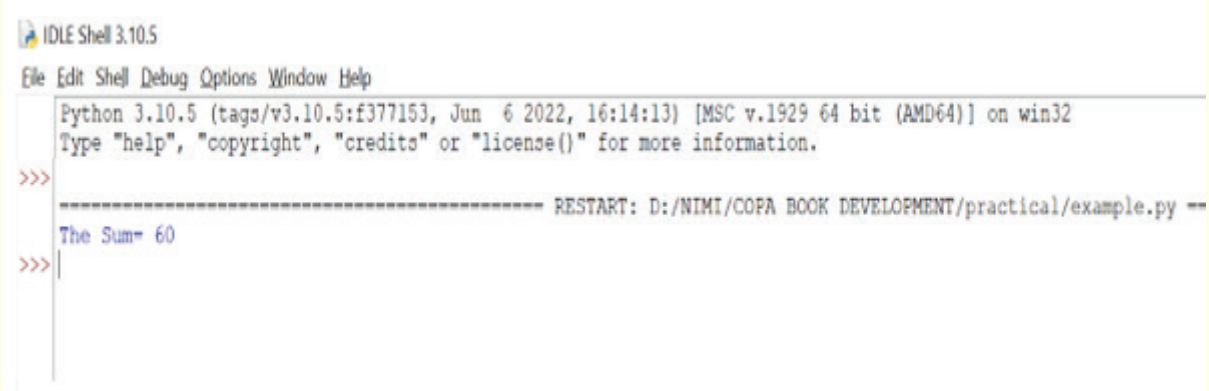


Fig 6

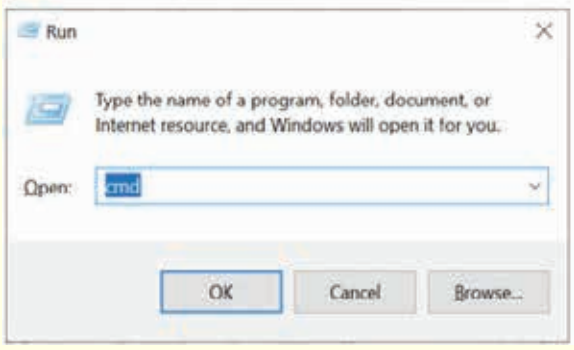
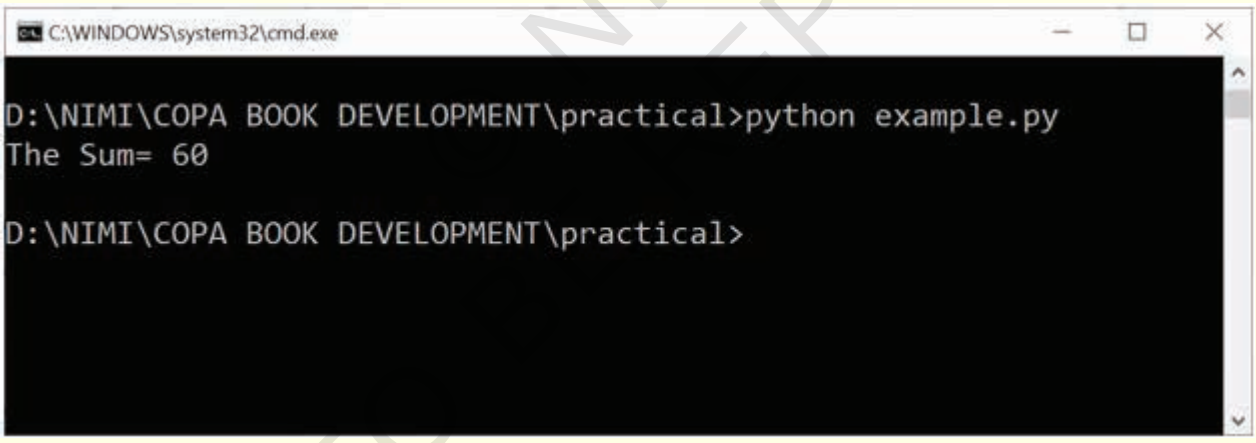


Fig 7



Write and test a python program to demonstrate print statement, comments, different types of variables

Objectives: At the end of this exercise you shall be able to
- **state print statement**
- **state comments**
- **different types of variables.**

Requirements

Tools/Equipment/Machines

- Desktop/ laptop PC - 1 No.
- Windows OS - 1 No.
- Python Ver 3.10.5 or latest - 1 No.

PROCEDURE

TASK 1: **Print statement**

1 Print statement will appear as shown in Fig 1

2 Output (Fig 2)

Fig 1

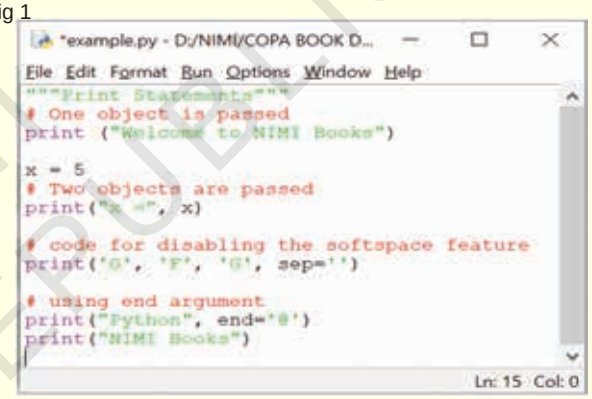


Fig 2

— — — — — —

TASK 2: **Comment statement**

1 Exampe1: Single line Comment (Fig 3)

2 Output 60 (Fig 4)

3 Exampe 2: Multi line Comment (Fig 5)

4 Output 60 (Fig 6)

Fig 3

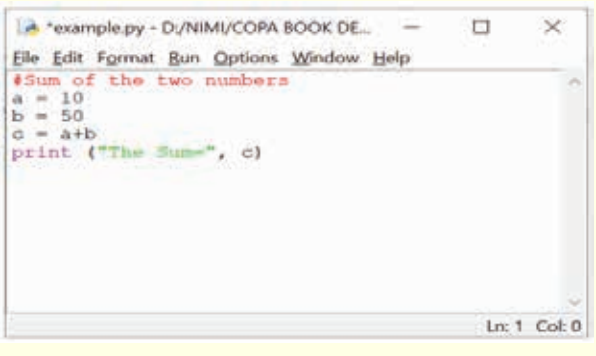


Fig 4

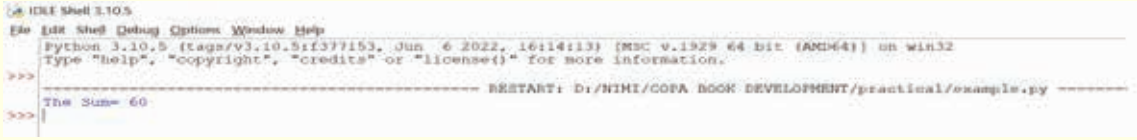


Fig 5

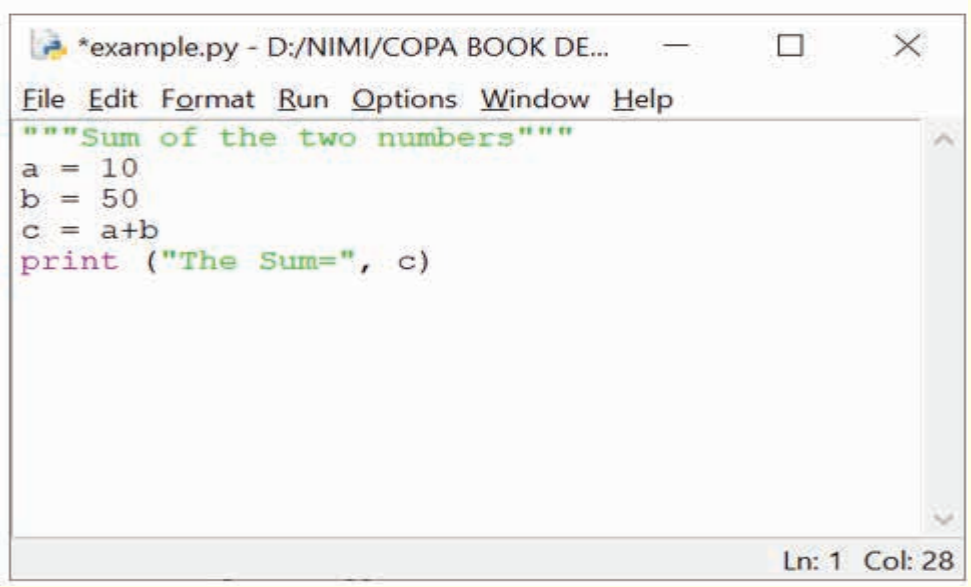
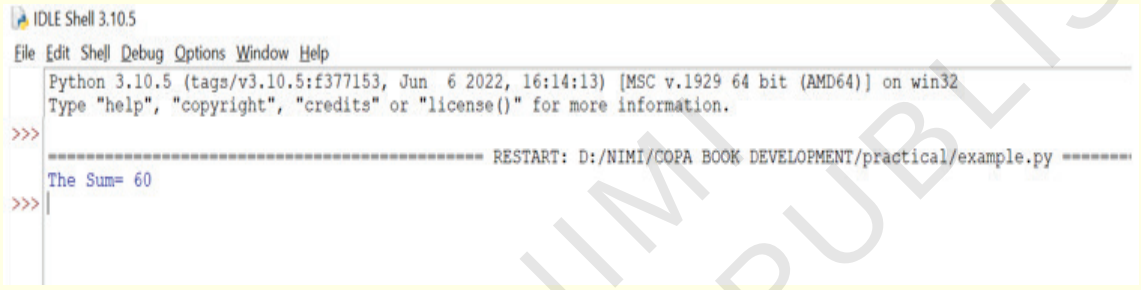


Fig 6



TASK 3: **Different type of Variables**

1 Different types of variables (Figs 7 & 8)

Fig 7

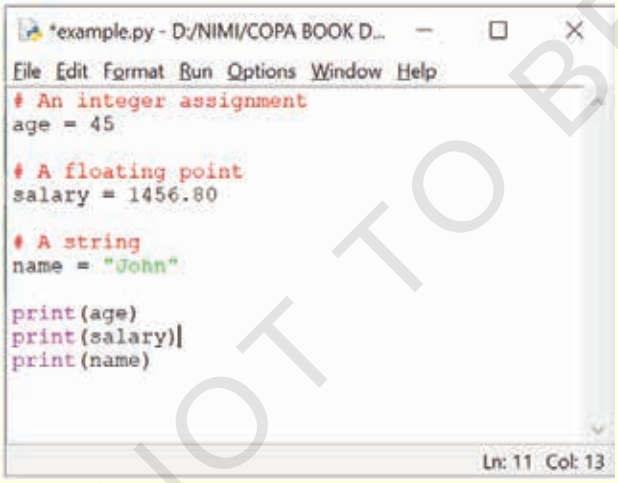
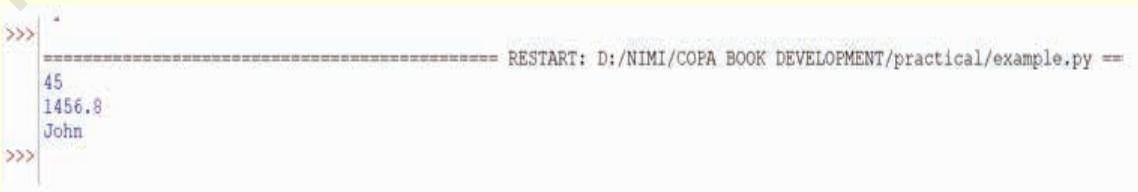


Fig 8



Write and test a python program to perform data and data type operations, string operations, date, input and output, output formatting and operators

Objectives: At the end of this exercise you shall be able to
- **state data type operations**
- **state string operations**
- **state date operations**
- **state input and output**
- **state output formatting**
- **state opeartors in output formatting.**

Requirements

Tools/Equipment/Machines

• Desktop/ laptop PC	- 1 No.	• Python Ver 3.10.5 or latest	- 1 No.
• Windows OS	- 1 No.		

PROCEDURE

TASK 1: **Data type operations**

1 Data type operations is shown in Fig 1&2.

Fig 1

example.py - D:/NIMI/COPA BOOK DEVELOPMENT/practical/ex...

File Edit Format Run Options Window Help

```
x = "Hello World"                          #str
print(type(x))
x = 20                                     #int
print(type(x))
x = 20.5                                   #float
print(type(x))
x = 1j                                     #complex
print(type(x))
x = ["apple", "banana", "cherry"]          #list
print(type(x))
x = ("apple", "banana", "cherry")          #tuple
print(type(x))
x = range(6)                               #range
print(type(x))
x = {"name" : "John", "age" : 36}          #dict
print(type(x))
x = {"apple", "banana", "cherry"}          #set
print(type(x))
x = frozenset({"apple", "banana", "cherry"})    #frozenset
print(type(x))
x = True                                   #bool
print(type(x))
x = b"Hello"                               #bytes
print(type(x))
x = bytearray(5)                           #bytearray
print(type(x))
x = memoryview(bytes(5))                   #memoryview
print(type(x))
x = None                                   #NoneType
print(type(x))
```

Ln: 28 Col: 14

Fig 2

```
>>> ========== RESTART: D:/NIMI/COPA BOOK DEVELOPMENT/practical/example.py ==========
<class 'str'>
<class 'int'>
<class 'float'>
<class 'complex'>
<class 'list'>
<class 'tuple'>
<class 'range'>
<class 'dict'>
<class 'set'>
<class 'frozenset'>
<class 'bool'>
<class 'bytes'>
<class 'bytearray'>
<class 'memoryview'>
<class 'NoneType'>
>>>
```

TASK 2: **String operations**

1 Example 1: Creation of string (Fig 3)

2 Output (Fig 4)

Fig 3

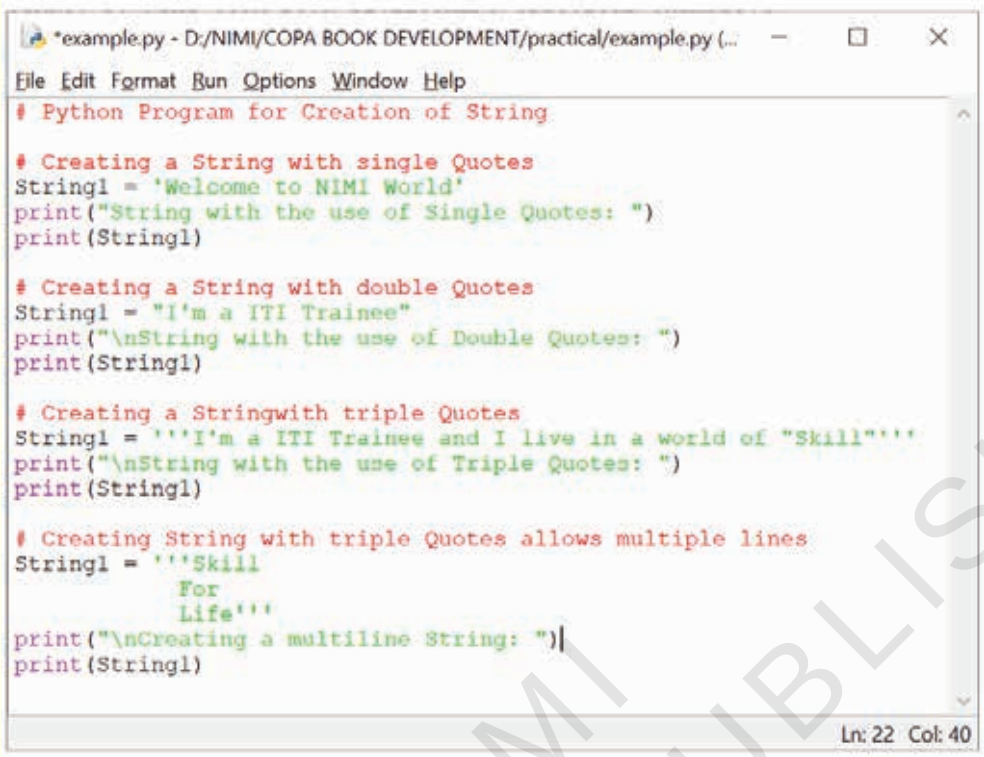


Fig 4

Example2: Accessing characters in Python String

Python Program to Access

characters of String

String1 = “WelcometoNIMI”

print(“Initial String: “)

print(String1)

Printing First character

print(“\nFirst character of String is: “)

print(String1[0])

Printing Last character

print(“\nLast character of String is: “)

print(String1[-1])

Output:

Initial String:

WelcometoNIMI

First character of String is:

W

Last character of String is:

I

Example3: Reversing a String

#Program to reverse a string

gfg = “welcometoNIMI”

print(gfg[::-1])

Output:

IMINotemoclew

Example4: Formatting of Strings

Python Program for

Formatting of Strings

Default order

String1 = “{} {} {}”.format(‘Welcome’, ‘to’, ‘NIMI’)

```
print("Print String in default order: ")
print(String1)
# Positional Formatting
String1 = "{1} {0} {2}".format('Welcome', 'to', 'NIMI')
print("\nPrint String in Positional order: ")
print(String1)
# Keyword Formatting
String1 = "{l} {f} {g}".format(g='NIMI', f='to', l='Welcome')
print("\nPrint String in order of Keywords: ")
print(String1)
```

Output:

```
Print String in default order:
Welcome to NIMI
Print String in Positional order:
to Welcome NIMI
Print String in order of Keywords:
Welcome to NIMI
```

— — — — — —

TASK 3: **Date operations**

Example1:

```
import datetime
x = datetime.datetime.now()
print(x)
```

Output:

```
2022-07-09 16:05:52.588848
```

Example 2:

```
import datetime
x = datetime.datetime.now()
print(x.year)
print(x.strftime("%A"))
```

Output:

```
2022
Saturday
```

Example3:

```
import datetime
x = datetime.datetime(2020, 5, 17)
print(x)
```

Output:

```
2020-05-17 00:00:00
```

— — — — — —

TASK 4: **Input and output operations**

Example for Input:

```
x = int (input("Enter Number 1: "))
y = int (input("Enter Number 2: "))
print ("The sum = ", x+y)
```

Output:

```
Enter Number 1: 5
Enter Number 2: 10
The sum =  15
```

Example for Output:

```
print ("Welcome to Python Programming")
x = 5
y = 6
z = x + y
print (z)
print ("The sum = ", z)
print ("The sum of ", x, " and ", y, " is ", z)
```

Output:

```
Welcome to Python Programming
11
The sum =  11
The sum of  5  and  6  is  11
```

Example for Input and Output:

```
# Python program showing how to multiple input and
    output using split
# taking two inputs at a time
x, y = input("Enter two values: ").split()
print("Number of boys: ", x)
print("Number of girls: ", y)
print()
# taking three inputs at a time
x, y, z = input("Enter three values: ").split()
print("Total number of students: ", x)
print("Number of boys is : ", y)
print("Number of girls is : ", z)
print()
```

```
# taking two inputs at a time
a, b = input("Enter two values: ").split()
    print("First number is {} and second number is {}".
    format(a, b))
print()
# taking multiple inputs at a time
# and type casting using list() function
x = list(map(int, input("Enter multiple values: ").split()))
print("List of students: ", x)
```

output:

```
Enter two values: 10 15
Number of boys:  10
Number of girls:  15
Enter three values: 10 15 20
Total number of students:  10
Number of boys is :  15
Number of girls is :  20
Enter two values: 10 15
First number is 10 and second number is 15
Enter multiple values: 10 15 12 13 15
List of students:  [10, 15, 12, 13, 15]
```

— — — — — —

TASK 5: **Output formatting**

```
# Python program showing use of format() method using format() method
print('Welcome {} to "{}!"'.format('NIMI', 'NIMI'))
# using format() method and referring  a position of the object
print('{0} and {1}'.format('NIMI', 'Portal'))
 print('{1} and {0}'.format('NIMI', 'Portal'))
# the above formatting can also be done by using f-Strings Although, this features work only with python
 print(f"Welcome {'nimi'} for \"{'NIMI'}!\"")
# using format() method and referring  a position of the object
print(f"{'NImi'} and {'Portal'}")
```

Output:

```
Welcome NIMI to "NIMI!"
NIMI and Portal
Portal and NIMI
Welcome nimi for "NIMI!"
NImi and Portal
```

— — — — — —

TASK 6: **Operators in output formatting**

```
# Python program showing how to use
# string modulo operator(%) to print
# fancier output
# print integer and float value
print("Integer : %2d, Float : %5.2f" % (1, 2.0))
# print integer value
print("Integer: %3d, Boys : %2d" % (240, 120))
# print octal value
print("Octal: %7.3o" % (25))
# print exponential value
print("Exponential: %10.3E" % (356.08977))
```

Output:

```
Integer :  1, Float :  2.00
Integer: 240, Boys : 120
Octal:     031
Exponential:  3.561E+02
```

— — — — — —

Determine the sequence of execution based on operator precedence

Objectives: At the end of this exercise you shall be able to
- **state arithmetic operators in Python**
- **state comparison operators**
- **state logical operators**
- **state bitwise operators**
- **state assignment operators**
- **state operator precedence.**

Requirements

Tools/Equipment/Machines

• Desktop/ laptop PC	- 1 No.	• Python Ver 3.10.5 or latest	- 1 No.
• Windows OS	- 1 No.		

PROCEDURE

TASK 1: **Arithmetic operators in Python**

1 Arithmatic opeartions as follows:

```
# Examples of Arithmetic Operator
a = 9
b = 4
# Addition of numbers
add = a + b
# Subtraction of numbers
sub = a - b
# Multiplication of number
mul = a * b
# Division(float) of number
div1 = a / b
# Division(floor) of number
div2 = a // b
# Modulo of both number
mod = a % b
# Power
p = a ** b
# print results
print(add)
print(sub)
print(mul)
print(div1)
print(div2)
print(mod)
print(p)
```

Output:

```
13
5
36
2.25
2
1
6561
```

— — — — — —

TASK 2: **Comparison operators**

1 Comparison opeartors as follows:

```
# Examples of Relational Operators
a = 13
b = 33
# a > b is False
print(a > b)
# a < b is True
print(a < b)
# a == b is False
print(a == b)
# a != b is True
```

```
print(a != b)                    True
# a >= b is False                False
print(a >= b)                    True
# a <= b is True                 False
print(a <= b)                    True
Output:
False
```

— — — — — —

TASK 3: **Logical operators**

```
1  Logical opeartors as follows:
# Examples of Logical Operator
a = True
b = False
# Print a and b is False
print(a and b)
# Print a or b is True
print(a or b)
# Print not a is False
print(not a)
output:
False
True
False
```

— — — — — —

TASK 4: **Bitwise operators**

```
1  Bitwise opeartors as follows:
# Examples of Bitwise operators
a = 10
b = 4
# Print bitwise AND operation
print(a & b)
# Print bitwise OR operation
print(a | b)
# Print bitwise NOT operation
print(~a)
# print bitwise XOR operation
print(a ^ b)
# print bitwise right shift operation
print(a >> 2)
# print bitwise left shift operation
print(a << 2)
Output:
0
14
-11
14
2
40
```

— — — — — —

TASK 5: **Assignment operators**

```
1  Assignment opeartors as follows:
# Examples of Assignment Operators
a = 10
# Assign value
b = a
print(b)
# Add and assign value
b += a
print(b)
# Subtract and assign value
b -= a
print(b)
# multiply and assign
b *= a
print(b)
# bitwise lishift operator
```

```
b <<= a
print(b)
```

Output:

```
10
20
```

```
10
100
102400
```

— — — — — —

TASK 6: **Operator precedence**

1 Operator precedence as follows:

```
# Examples of Operator Precedence
# Precedence of '+' & '*'
expr = 10 + 20 * 30
print(expr)
# Precedence of 'or' & 'and'
name = "Alex"
age = 0
if name == "Alex" or name == "John" and age >= 2:
print("Hello! Welcome.")
else:
print("Good Bye!!")
```

Output:

```
610
Hello! Welcome.
```

— — — — — —

TASK 7: **Operator associativity**

1 Operator associativity as follows:

```
# Examples of Operator Associativity
# Left-right associativity
# 100 / 10 * 10 is calculated as
# (100 / 10) * 10 and not
# as 100 / (10 * 10)
print(100 / 10 * 10)
# Left-right associativity
# 5 - 2 + 3 is calculated as
# (5 - 2) + 3 and not
# as 5 - (2 + 3)
print(5 - 2 + 3)
# left-right associativity
print(5 - (2 + 3))
# right-left associativity
# 2 ** 3 ** 2 is calculated as
# 2 ** (3 ** 2) and not
# as (2 ** 3) ** 2
print(2 ** 3 ** 2)
```

Output

```
100.0
6
0
```

— — — — — —

Construct and analyze code segments that use branching statements

Objectives: At the end of this exercise you shall be able to
- **state if statement**
- **state if-else**
- **state nested-if**
- **state if-elif-else .**

Requirements

Tools/Equipment/Machines

- Desktop/ laptop PC - 1 No.
- Windows OS - 1 No.
- Python Ver 3.10.5 or latest - 1 No.

PROCEDURE

TASK 1: **if statement**

1 if statement as follows:

Example1:

```
i = 10
if (i < 15): print("10 is less than 15")
print("Welcome to If Statement")
```

Output:

```
10 is less than 15
Welcome to If Statement
```

Example 2:

```
i = 10
if (i > 15): print("10 is less than 15")
print("Welcome to If Statement")
```

Output:

```
Welcome to If Statement
```

TASK 2: **if-else**

1 if-else as follows:

Example1:

```
# python program to illustrate If else statement
#!/usr/bin/python
i = 20
if (i > 15):
    print("i is smaller than 15")
    print("I'm in if Block")
else:
    print("i is greater than 15")
    print("I'm in else Block")
print("I'm not in if and else Block")
```

Output:

```
 is smaller than 15
i'm in if Block
i'm not in if and else Block
```

Example2: Check Whether a String is Palindrome or Not (Fig 1)

Fig 1

```
# Program to check if a string is palindrome or not

my_str = 'aIbohPhoBiA'

# make it suitable for caseless comparison
my_str = my_str.casefold()

# reverse the string
rev_str = reversed(my_str)

# check if the string is equal to its reverse
if list(my_str) == list(rev_str):
  print("The string is a palindrome.")
else:
  print("The string is not a palindrome.")
```

Output

```
The string is a palindrome.
```

TASK 3: **nested-if**

1 nested-if as follows:

Example1:

```
# python program to illustrate nested If statement
#!/usr/bin/python
i = 10
if (i == 10):
    # First if statement
    if (i < 15):
        print("i is smaller than 15")
    # Nested - if statement
    # Will only be executed if statement above
    # it is true
    if (i < 12):
        print("i is smaller than 12 too")
    else:
        print("i is greater than 15")
```

Output:

```
i is smaller than 15
i is smaller than 12 too
```

— — — — — —

TASK 4: **if-elif-else**

1 if-elif-else as follows:

Example1:

```
# Python program to illustrate if-elif-else ladder
#!/usr/bin/python
i = 20
if (i == 10):
    print("i is 10")
elif (i == 15):
    print("i is 15")
elif (i == 20):
    print("i is 20")
else:
    print("i is not present")
```

Output:

```
    i is 20
```

Example2: Find the Largest Among Three Numbers

Fig 2

```
# Python program to find the largest number among the three input numbers

# change the values of num1, num2 and num3
# for a different result
num1 = 10
num2 = 14
num3 = 12

# uncomment following lines to take three numbers from user
#num1 = float(input("Enter first number: "))
#num2 = float(input("Enter second number: "))
#num3 = float(input("Enter third number: "))

if (num1 >= num2) and (num1 >= num3):
   largest = num1
elif (num2 >= num1) and (num2 >= num3):
   largest = num2
else:
   largest = num3

print("The largest number is", largest)
```

Output

```
The largest number is 14.0
```

Construct and analyze code segments that perform iteration

Objectives: At the end of this exercise you shall be able to
- **state for loop**
- **state while loop**
- **state while loop with else**
- **state nested loop**
- **state break, continue and pass statement.**

Requirements

Tools/Equipment/Machines

- Desktop/ laptop PC - 1 No.
- Windows OS - 1 No.
- Python Ver 3.10.5 or latest - 1 No.

PROCEDURE

TASK 1: **Demonstration of for loop**

1 Example1: Sum of N numbers (Fig 1)

Fig 1

```
# Program to find the sum of all numbers stored in a list

# List of numbers
numbers = [6, 5, 3, 8, 4, 2, 5, 4, 11]

# variable to store the sum
sum = 0

# iterate over the list
for val in numbers:
    sum = sum+val

print("The sum is", sum)
```

Output: (Fig 2)

Fig 2

```
The sum is 48
```

Example2: Find the Factorial of a Number (Fig 3)

Output : (Fig 4)

Example3: Check Prime Number Using a flag variable (Fig 5)

Example4: Using a for...else statement. (Figs 6&7)

Output (Fig 8)

Fig 3

```
# Python program to find the factorial of a number provided by the user.

# change the value for a different result
num = 7

# To take input from the user
#num = int(input("Enter a number: "))

factorial = 1

# check if the number is negative, positive or zero
if num < 0:
   print("Sorry, factorial does not exist for negative numbers")
elif num == 0:
   print("The factorial of 0 is 1")
else:
   for i in range(1,num + 1):
       factorial = factorial*i
   print("The factorial of",num,"is",factorial)
```

Fig 4

```
The factorial of 7 is 5040
```

Fig 5

```
# Program to check if a number is prime or not

num = 29

# To take input from the user
#num = int(input("Enter a number: "))

# define a flag variable
flag = False
```

Fig 6

```
# prime numbers are greater than 1
if num > 1:
   # check for factors
   for i in range(2, num):
      if (num % i) == 0:
         # if factor is found, set flag to True
         flag = True
         # break out of loop
         break

# check if flag is True
if flag:
   print(num, "is not a prime number")
else:
   print(num, "is a prime number")
```

Fig 7

```
# Program to check if a number is prime or not

num = 407

# To take input from the user
#num = int(input("Enter a number: "))

# prime numbers are greater than 1
if num > 1:
   # check for factors
   for i in range(2,num):
      if (num % i) == 0:
         print(num,"is not a prime number")
         print(i,"times",num//i,"is",num)
         break
   else:
      print(num,"is a prime number")

# if input number is less than
# or equal to 1, it is not prime
else:
   print(num,"is not a prime number")
```

Fig 8

```
407 is not a prime number
11 times 37 is 407
```

TASK 2: **Demonstration while loop**

Example1: Program to Add Natural Numbers (Fig 9)

Fig 9

```
# Program to add natural
# numbers up to
# sum = 1+2+3+...+n

# To take input from the user,
# n = int(input("Enter n: "))

n = 10

# initialize sum and counter
sum = 0
i = 1

while i <= n:
   sum = sum + i
   i = i+1    # update counter

# print the sum
print("The sum is", sum)
```

the output will be: (Fig 10)

Fig 10

```
Enter n: 10
The sum is 55
```

Example2: Find the Sum of Natural Numbers (Fig 11)

Output (Fig 12)

Example3: Print the Fibonacci sequenc e (Fig 13)

Output (Fig 14)

Fig 11

```
# Sum of natural numbers up to num

num = 16

if num < 0:
   print("Enter a positive number")
else:
   sum = 0
   # use while loop to iterate until zero
   while(num > 0):
      sum += num
      num -= 1
   print("The sum is", sum)
```

Fig 12

```
The sum is 136
```

Fig 13

```
# Program to display the Fibonacci sequence up to n-th term

nterms = int(input("How many terms? "))

# first two terms
n1, n2 = 0, 1
count = 0

# check if the number of terms is valid
if nterms <= 0:
   print("Please enter a positive integer")
# if there is only one term, return n1
elif nterms == 1:
   print("Fibonacci sequence upto",nterms,":")
   print(n1)
# generate fibonacci sequence
else:
   print("Fibonacci sequence:")
   while count < nterms:
      print(n1)
      nth = n1 + n2
      # update values
      n1 = n2
      n2 = nth
      count += 1
```

Fig 14

```
How many terms? 7
Fibonacci sequence:
0
1
1
2
3
5
8
```

TASK 3: **While loop with else**

Example : (Fig 15)

Output : (Fig 16)

Fig 15

```
'''Example to illustrate
the use of else statement
with the while loop'''

counter = 0

while counter < 3:
   print("Inside loop")
   counter = counter + 1
else:
   print("Inside else")
```

Fig 16

```
Inside loop
Inside loop
Inside loop
Inside else
```

TASK 4: **Nested loop**

Example : (Fig 17)

Fig 17

```
i=1
while (i<=6):
        for j in range (1,i):
                print (j,end='¥t')
        print (end='¥n')
        i +=1
```

Output : (Fig 18)

Fig 18

```
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
```

TASK 5: **Break , continue and pass statement**

Example : Python break (Fig 19)

Fig 19

```
# Use of break statement inside the loop

for val in "string":
    if val == "i":
        break
    print(val)

print("The end")
```

Output (Fig 20)

Fig 20

```
s
t
r
The end
```

Example2: Python continue (Fig 21)

Fig 21

```
# Program to show the use of continue statement inside loops

for val in "string":
    if val == "i":
        continue
    print(val)

print("The end")
```

Run Code

Output (Fig 22)

Fig 22

```
s
t
r
n
g
The end
```

Example3: pass Statement

a=int (input("Enter any number :"))

if (a==0):

pass

else:

print ("non zero value is accepted")

Output:

Enter any number :3

non zero value is accepted

Document code segments using comments and documentation strings

Objectives: At the end of this exercise you shall be able to
- **state python comments**
- **state pyhton docstrings.**

Requirements

Tools/Equipment/Machines

- Desktop/ laptop PC - 1 No.
- Windows OS - 1 No.
- Python Ver 3.10.5 or latest - 1 No.

PROCEDURE

TASK 1: **Python Comments**

1 Example1: single-line comment (Fig 1)

Fig 1

```
# Program to print "Hello World"
print("Hello World")
```

2 Example2: multi-line strings comment (Fig 2)

Fig 2

```
"I am a single-line comment"

I am a
multi-line comment!
'''

print("Hello World")
```

TASK 2: **Python docstrings**

1 Example1: sing (Fig 3)

Fig 3

```
def square(n):
  '''Takes in a number n, returns the square of n'''
  return n**2

print(square.__doc__)
```

Ouput (Fig 4)

Fig 4

```
Takes in a number n, returns the square of n
```

Example2: Multi-line Docstrings

```
def my_function(arg1):
    """
    Summary line.
    Extended description of function.
    Parameters:
    arg1 (int): Description of arg1
    Returns:
    int: Description of return value
    """
    return arg1
print(my_function.__doc__)
```

Output:

```
Summary line.
Extended description of function.
Parameters:
arg1 (int): Description of arg1
Returns:
int: Description of return value
```

Example 3:Docstrings for Python functions (Fig 5)

Fig 5

```
def add_binary(a, b):
    '''
    Returns the sum of two decimal numbers in binary digits.

        Parameters:
            a (int): A decimal integer
            b (int): Another decimal integer

        Returns:
            binary_sum (str): Binary string of the sum of a and b
    '''
    binary_sum = bin(a+b)[2:]
    return binary_sum


print(add_binary.__doc__)
```

Output (Fig 6)

Fig 6

```
Returns the sum of two decimal numbers in binary digits.

        Parameters:
                a (int): A decimal integer
                b (int): Another decimal integer

        Returns:
                binary_sum (str): Binary string of the sum of a and b
```

Example 4: Docstrings for Python class (Fig 7)

Fig 7

```
class Person:
    """
    A class to represent a person.

    ...

    Attributes
    ----------
    name : str
        first name of the person
```

Output (Figs 8 & 9)

Fig 8

```
    -------
    info(additional=""):
        Prints the person's name and age.
    """

    def __init__(self, name, surname, age):
        """
        Constructs all the necessary attributes for the person object.

        Parameters
        ----------
            name : str
                first name of the person
            surname : str
                family name of the person
            age : int
                age of the person
        """

        self.name = name
        self.surname = surname
        self.age = age

    def info(self, additional=""):
        """
        Prints the person's name and age.

        If the argument 'additional' is passed, then it is appended after the main info.

        Parameters
        ----------
        additional : str, optional
            More info to be displayed (default is None)

        Returns
        -------
        None
        """
```

Fig 9

```
    A class to represent a person.

    ...

    Attributes
    ----------
    name : str
        first name of the person
    surname : str
        family name of the person
    age : int
        age of the person

    Methods
    -------
    info(additional=""):
        Prints the person's name and age
```

Construct and analyze code segments that include list comprehensions, tuple, set and dictionary comprehensions

Objectives: At the end of this exercise you shall be able to
- **state list comprehensions**
- **state tuple in list comprehension**
- **state set comprehensions**
- **state dictionary comprehension.**

Requirements

Tools/Equipment/Machines

- Desktop/ laptop PC - 1 No.
- Windows OS - 1 No.
- Python Ver 3.10.5 or latest - 1 No.

PROCEDURE

TASK 1: **: List comprehensions**

1 Example1: Finding Even Numbers Using List Comprehension

```
#Using List Comprehension
evenno=[n for n in range(1,11) if n%2==0]
print (evenno)
```

Output:

[2, 4, 6, 8, 10]

Example2: Finding square of numbers using List Comprehension

```
#Using List Comprehension
square=[x*x for x in range(1,11)]
print (square)
```

Output:

[1, 4, 9, 16, 25, 36, 49, 64, 81, 100]

Example3: Nested List Comprehension

List of even numbers from 0 to 10. Nested list comprehension will return that expression (list of even numbers from 0 to 10) three times(range(3))

```
#Using List Comprehension
l1=[[n for n in range(10) if n %2==0] for n1 in range(3)]
print (l1)
```

Output:

[[0, 2, 4, 6, 8], [0, 2, 4, 6, 8], [0, 2, 4, 6, 8]]

— — — — — —

TASK 2 **: Tuple in List Comprehension**

1 Example 1: Creating a list of tuples using List Comprehension with two 'for' clause:

```
#Using tuple in List Comprehension
a1=['red','green','blue']
b1=[0,1,2]
a2=[(a,b) for a in a1 for b in b1]
print (a2)
```

Output:

[('red', 0), ('red', 1), ('red', 2), ('green', 0), ('green', 1), ('green', 2), ('blue', 0), ('blue', 1), ('blue', 2)]

Example2: Example tuple comprehension Python

```
#Using tuple Comprehension
tuple1 = (1, 6, 5, 9, 9, 1, 25, 76)
tuple2 = tuple((i for i in tuple1 if i % 5 == 0))
print(tuple2)
```

Output:

(5, 25)

— — — — — —

TASK 3 **: Set Comprehensions**

Example1: How to find even numbers using set Comprehension

```
#Using Set Comprehension
s1={n for n in range(1,11) if n%2==0}
print (s1)
```

Output:

{2, 4, 6, 8, 10}

Example2: How to find the square of numbers using Set Comprehension.

```
#Using Set Comprehension
s1={n*n for n in range(1,11)}
#Sets are unordered.
print (s1)
```

Output:

{64, 1, 4, 36, 100, 9, 16, 49, 81, 25}

— — — — — —

TASK 4 **: Dictionary Comprehension**

Example1: How to find the square of numbers using Dictionary Comprehension.

```
#Using Dictionary Comprehension
d1={n:n*n for n in range(1,11)}
print (d1)
```

Output:

{1: 1, 2: 4, 3: 9, 4: 16, 5: 25, 6: 36, 7: 49, 8: 64, 9: 81, 10: 100}

Example2: How to iterate through two dictionaries using dictionary comprehension.

```
#Using Dictionary Comprehension
d1={'color','shape','fruit'}
d2={'red','circle','apple'}
d3={k:v for (k,v) in zip(d1,d2)}
print (d3)
```

Output:

{'shape': 'circle', 'color': 'red', 'fruit': 'apple'}

— — — — — —

Perform basic operations using built-in modules

Objectives: At the end of this exercise you shall be able to
- **state basic operations using built-in modules.**

Requirements

Tools/Equipment/Machines

- Desktop/ laptop PC - 1 No.
- Windows OS - 1 No.
- Python Ver 3.10.5 or latest - 1 No.

PROCEDURE

TASK 1: **: Basic operations using built in modules**

1 Example1: User Defined Modules

A module is a file containing Python definitions and statements. The file name is the module name with the suffix .py appended. Within a module, the module's name (as a string) is available as the value of the global variable __name__. For instance, use your favorite text editor to create a file called fibo.py in the current directory with the following contents: (Fig 1)

Now enter the Python interpreter and import this module with the following command: (Fig 2)

Fig 1

```
# Fibonacci numbers module

def fib(n):    # write Fibonacci series up to n
    a, b = 0, 1
    while a < n:
        print(a, end=' ')
        a, b = b, a+b
    print()

def fib2(n):   # return Fibonacci series up to n
    result = []
    a, b = 0, 1
    while a < n:
        result.append(a)
        a, b = b, a+b
    return result
```

Fig 2

```
>>> import fibo

>>> fibo.fib(5)
0 1 1 2 3

>>> fibo.fib2(100)
[0, 1, 1, 2, 3]
```

Example 2: importing built-in module math

Now enter the Python interpreter and import this module with the following command:

importing built-in module math

import math

using square root(sqrt) function contained

```
# in math module
print(math.sqrt(25))
# using pi function contained in math module
print(math.pi)
# 2 radians = 114.59 degrees
print(math.degrees(2))
# 60 degrees = 1.04 radians
print(math.radians(60))
# Sine of 2 radians
print(math.sin(2))
# Cosine of 0.5 radians
print(math.cos(0.5))
# Tangent of 0.23 radians
print(math.tan(0.23))
# 1 * 2 * 3 * 4 = 24
print(math.factorial(4))
```

Output:

```
5.0
3.141592653589793
114.59155902616465
1.0471975511965976
0.9092974268256817
0.8775825618903728
0.23414336235146527
24
```

Example3: importing built-in module random

Now enter the Python interpreter and import this module with the following command:

```
# importing built in module random
import random
# printing random integer between 0 and 5
print(random.randint(0, 5))
# print random floating point number between 0 and 1
print(random.random())
# random number between 0 and 100
print(random.random() * 100)
List = [1, 4, True, 800, “python”, 27, “hello”]
# using choice function in random module for choosing
# a random element from a set such as a list
print(random.choice(List))
```

Output:

```
0
0.026096725940513155
26.894824199392342
27
```

Example4: importing built-in module datetime

Now enter the Python interpreter and import this module with the following command:

```
# importing built in module datetime
import datetime
from datetime import date
import time
# Returns the number of seconds since the
# Unix Epoch, January 1st 1970
print(time.time())
# Converts a number of seconds to a date object
print(date.fromtimestamp(454554))
```

Output:

```
1659024623.8910193
1970-01-06
```

Example5: Directories List for Modules

```
# importing sys module
>>import sys
# importing sys.path
>>print(sys.path) (Fig 3)
```

Fig 3

```
['',
'C:\\Python33\\Lib\\idlelib',
'C:\\Windows\\system32\\python33.zip',
'C:\\Python33\\DLLs',
'C:\\Python33\\lib',
'C:\\Python33',
'C:\\Python33\\lib\\site-packages']
```

Example 6.1: importing built-in module OS

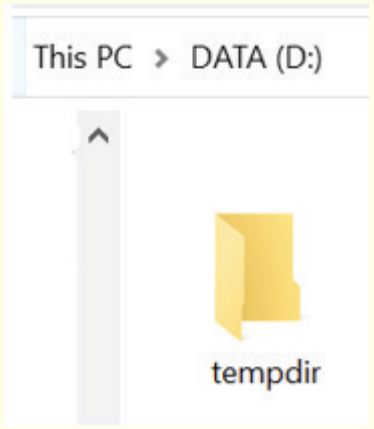
```
import os
os.mkdir(“d:\\tempdir”)
os.chdir(“d:\\tempdir”)
```

os.getcwd()

Output:

Check the created folder on the mentioned location in D Drive or not. (Fig 4)

Fig 4



Example6.2: importing built-in module OS

import os

os.chdir("..")

os.getcwd()

os.rmdir("d:\\tempdir")

Output:

Created folder will be deleted from the mentioned location.

Example6.3: importing built-in module OS

import os

os.listdir("d:")

Output: It will list all the available folder and file on the mentioned drive or location.

['$MfeDeepRem', '$RECYCLE.BIN', '1_5071341518753628456.mkv', 'Angamaly_Diaries_720p.mp4', 'Beast.mkv', 'Belse wedding', 'Binaries', 'CC', 'Garden', 'GOVT ITI', 'I_Am_Legend_(2007)_720p_Tamil.mp4', 'LAPTOP-M1EH6EN', 'MediaID.bin', 'msdia80.dll', 'NIMI', 'Personal_Agilan', 'RRR.mkv', 'Sai Studies', 'Sai UKG School Documents', 'SAIMI Academy', 'Software', 'System Volume Information', 'The_Pursuit_Of_Happyness_(2006)_720p_BDRip_[Tamil_+_Telugu_+.mp4', 'VirtualBox VMs', 'WebADI.xls', 'WINDOWS OS ISO', 'WindowsImageBackup', 'www.TamilBlasters.click - K.G.F Chapter 2 (2022) Tamil - 720p HDRip - x264 - AAC - 1.4GB - HC ESubs.mkv',]

Solve complex computing problems by using built-in modules

Objectives: At the end of this exercise you shall be able to
- **state complex computing problems by using built-in modules .**

Requirements			
Tools/Equipment/Machines			
• Desktop/ laptop PC	- 1 No.	• Python Ver 3.10.5 or latest	- 1 No.
• Windows OS	- 1 No.		

PROCEDURE

TASK 1: **: Complex computing problems by using built-in modules**

Example1: Write a Python program to generate a random color hex, a random alphabetical string, random value between two integers (inclusive) and a random multiple of 7 between 0 and 70

```
import random
import string
print("Generate a random color hex:")
print("#{:06x}".format(random.randint(0, 0xFFFFFF)))
print("\nGenerate a random alphabetical string:")
max_length = 255
s = ""
for i in range(random.randint(1, max_length)):
    s += random.choice(string.ascii_letters)
print(s)
print("Generate a random value between two integers, inclusive:")
print(random.randint(0, 10))
print(random.randint(-7, 7))
print(random.randint(1, 1))
print("Generate a random multiple of 7 between 0 and 70:")
print(random.randint(0, 10) * 7)
```

Output:

```
Generate a random color hex:
#2566f8
Generate a random alphabetical string:
6
-5
1
Generate a random multiple of 7 between 0 and 70:
35
```

Example2: . Python program to find the area of a triangle whose sides are given

```
import math
a = float(input("Enter the length of side a: "))
b = float(input("Enter the length of side b: "))
c = float(input("Enter the length of side c: "))
s = (a+b+c)/2
area = math.sqrt(s*(s-a)*(s-b)*(s-c))
print(" Area of the triangle is: ", area)
```

Output:

```
Enter the length of side a: 10
Enter the length of side b: 15.5
Enter the length of side c: 23.9
 Area of the triangle is:  51.69470379062058
```

Example3: Python program to find the roots of a quadratic equation

```
import math
a = float(input("Enter the first coefficient: "))
b = float(input("Enter the second coefficient: "))
c = float(input("Enter the third coefficient: "))
if (a!=0.0):
    d = (b*b)-(4*a*c)
    if (d==0.0):
        print("The roots are real and equal.")
        r = -b/(2*a)
        print("The roots are ", r,"and", r)
    elif(d>0.0):
```

```
        print("The roots are real and distinct.")
        r1 = (-b+(math.sqrt(d)))/(2*a)
        r2 = (-b-(math.sqrt(d)))/(2*a)
        print("The root1 is: ", r1)
        print("The root2 is: ", r2)
    else:
        print("The roots are imaginary.")
        rp = -b/(2*a)
        ip = math.sqrt(-d)/(2*a)
        print("The root1 is: ", rp, "+ i",ip)
        print("The root2 is: ", rp, "- i",ip)
else:
    print("Not a quadratic equation.")
```

Output:

Enter the first coefficient: 5.5

Enter the second coefficient: 6.5

Enter the third coefficient: 7.8

The roots are imaginary.

The root1 is: -0.5909090909090909 + i 1.033928558684211

The root2 is: -0.5909090909090909 - i 1.033928558684211

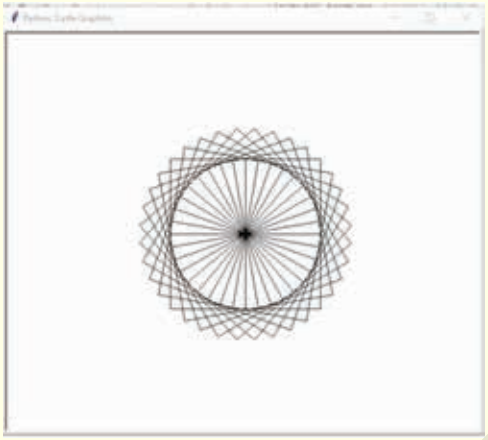
Example4: Python program to draw a circle of squares using Turtle

```
import turtle
x=turtle.Turtle()
def square(angle):
    x.forward(100)
    x.right(angle)
    x.forward(100)
    x.right(angle)
    x.forward(100)
    x.right(angle)
    x.forward(100)
    x.right(angle+10)
for i in range(36):
    square(90)
```

Output: (Fig 1)

Example5: Write a Python program to generate a random integer between 0 and 6 - excluding 6, random integer between 5 and 10 - excluding 10, random integer between 0 and 10, with a step of 3 and random date between two dates.

Fig 1



```
import datetime
print("Generate a random integer between 0 and 6:")
print(random.randrange(5))
print("Generate random integer between 5 and 10, excluding 10:")
print(random.randrange(start=5, stop=10))
print("Generate random integer between 0 and 10, with a step of 3:")
print(random.randrange(start=0, stop=10, step=3))
print("\nRandom date between two dates:")
start_dt = datetime.date(2019, 2, 1)
end_dt = datetime.date(2019, 3, 1)
time_between_dates = end_dt - start_dt
days_between_dates = time_between_dates.days
random_number_of_days = random.randrange(days_between_dates)
random_date = start_dt + datetime.timedelta(days=random_number_of_days)
print(random_date)
```

Output:

Generate a random integer between 0 and 6:

1

Generate random integer between 5 and 10, excluding 10:

6

Generate random integer between 0 and 10, with a step of 3:

0

Random date between two dates:

2019-02-26

Installing JAVA

Objectives: At the end of this exercise you shall be able to

- **learn how to install JAVA and to set the class path, learn and execute different types of data types and operators in java, declaration of variables**
- **review and reply to comments.**

Requirements

Tools /Equipment/ Instruments

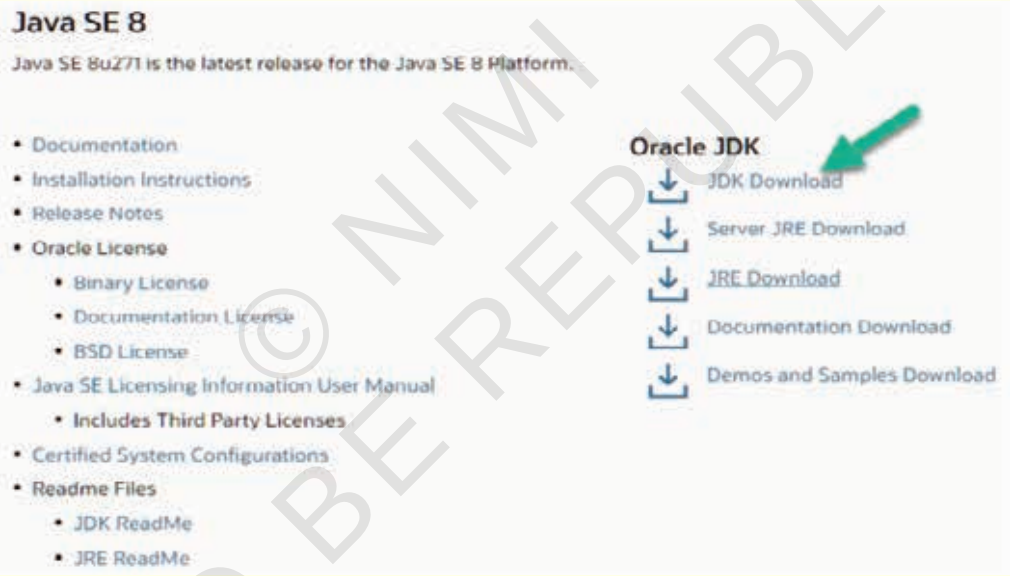
- A working PC, internet connection, Text editor, Browser & Java JDK -1 No. / trainee

PROCEDURE

TASK 1: **Installation of java**

1 open browser, go to link. Click on JDK Download for Java download JDK 8. (Fig 1)

Fig 1

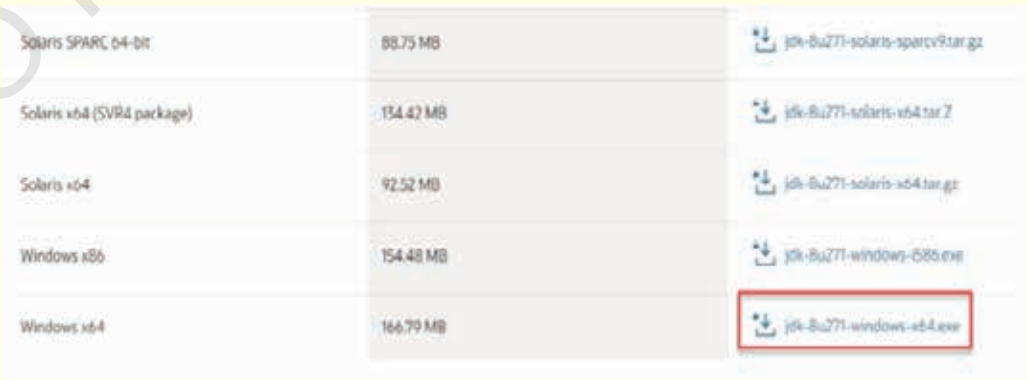


2 Next, (Fig 2)

1 Accept License Agreement

2 Download Java 8 JDK for your version 32 bit or JDK download 64 bit.

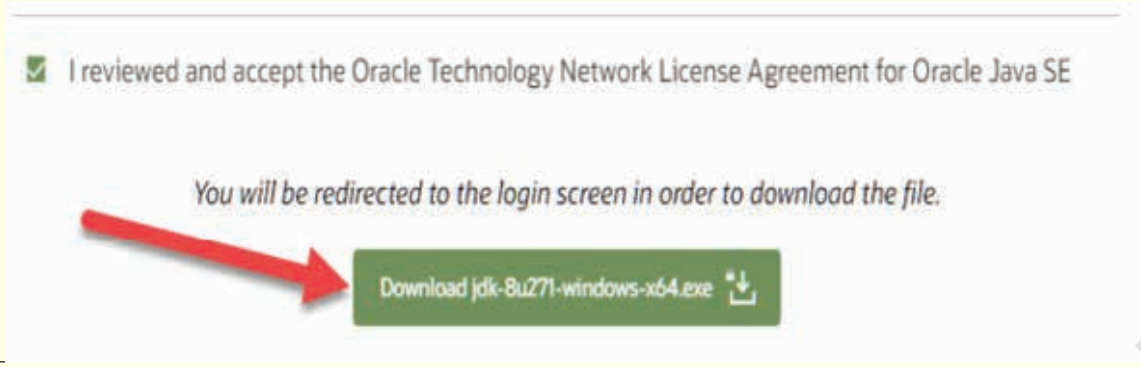
Fig 2



3 Click on download (Fig 3)

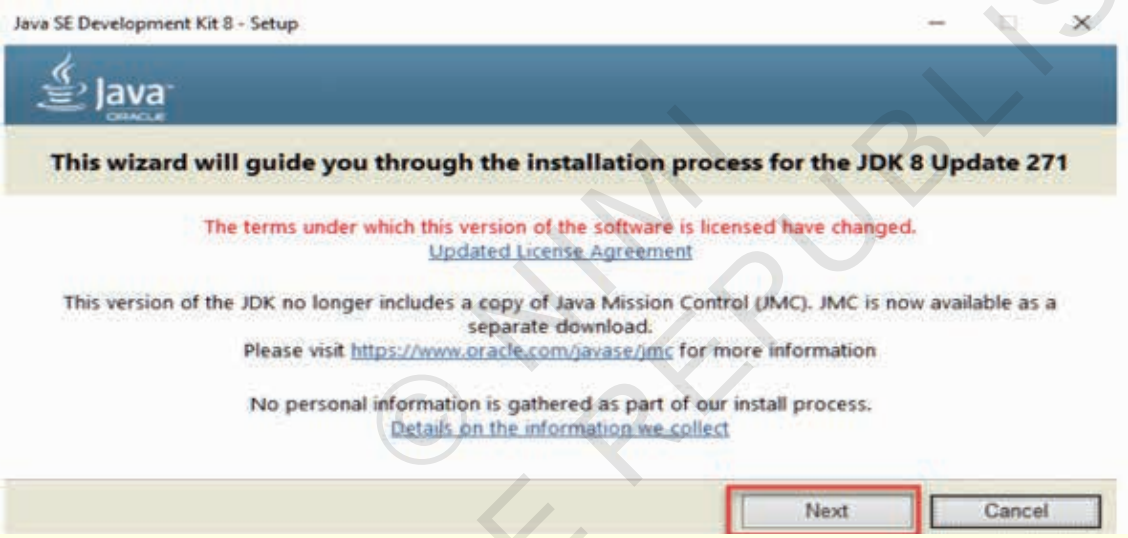
NOTE: When you click on the Installation link the popup will be open. Click on I reviewed and accept the Oracle Technology Network License Agreement for Oracle Java SE development kit and you will be redirectedto the login page. If you don't have an oracle account, you can easily sign up by adding basics details of yours.

Fig 3



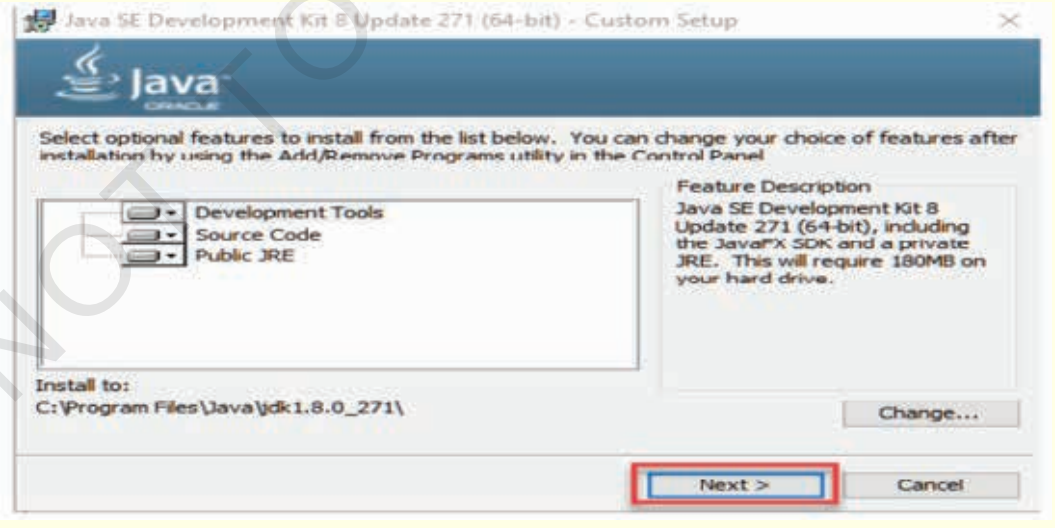
4 Once the Java JDK 8 download is complete, run the exe for install JDK. Click Next (Fig 4)

Fig 4



5 Select the PATH to install Java in Windows… You can leave it Default. Click next. (Fig 5)

Fig 5



6 Once you install Java in windows, click Close.

Setting the Class path

Objectives: At the end of this exercise you shall be able to
- **create setting class path.**

Requirements

Tools /Equipment/ Instruments

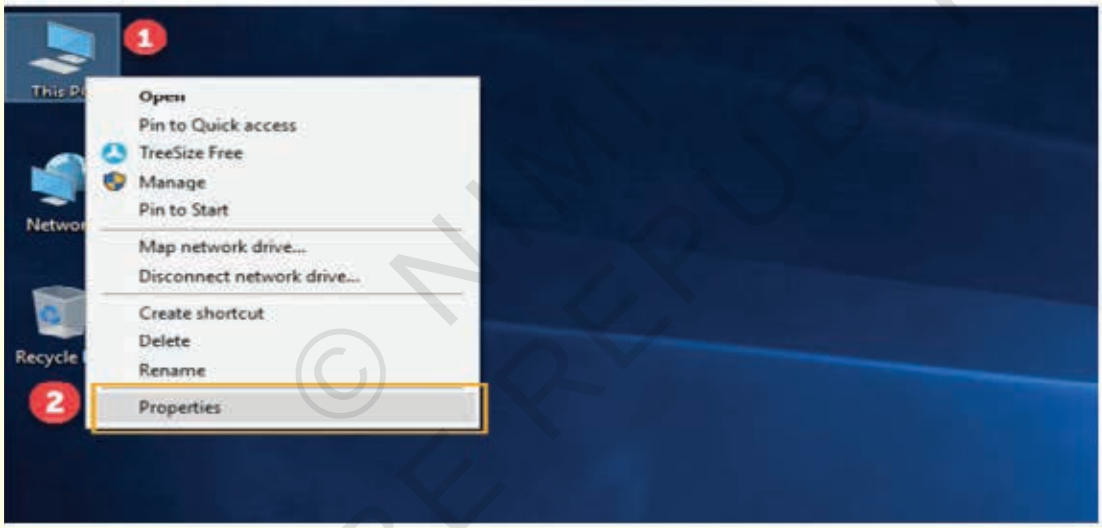
- A working PC, internet connection, Text editor, Browser & Java JDK — 1 No. / trainee

PROCEDURE

TASK 1: **Create setting class path**

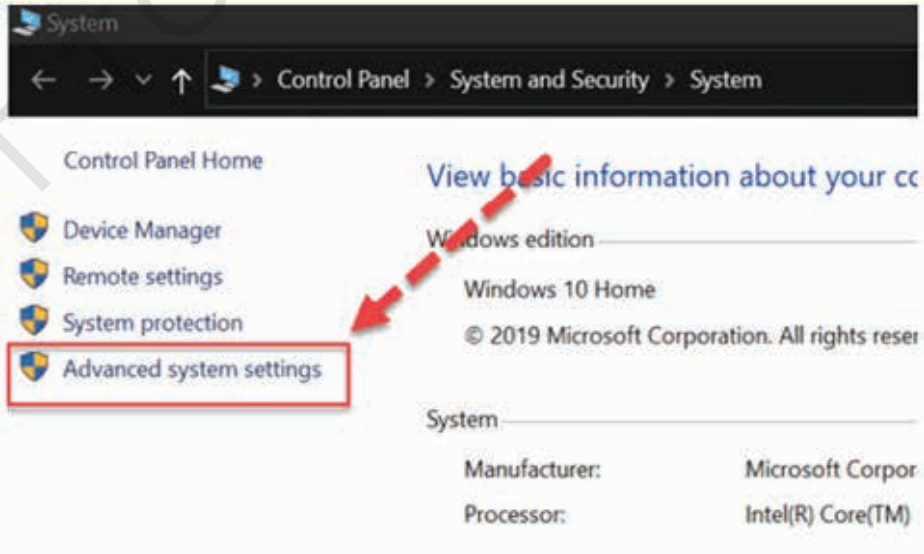
1 Right Click on the My Computer and Select the properties. (Fig 1)

Fig 1



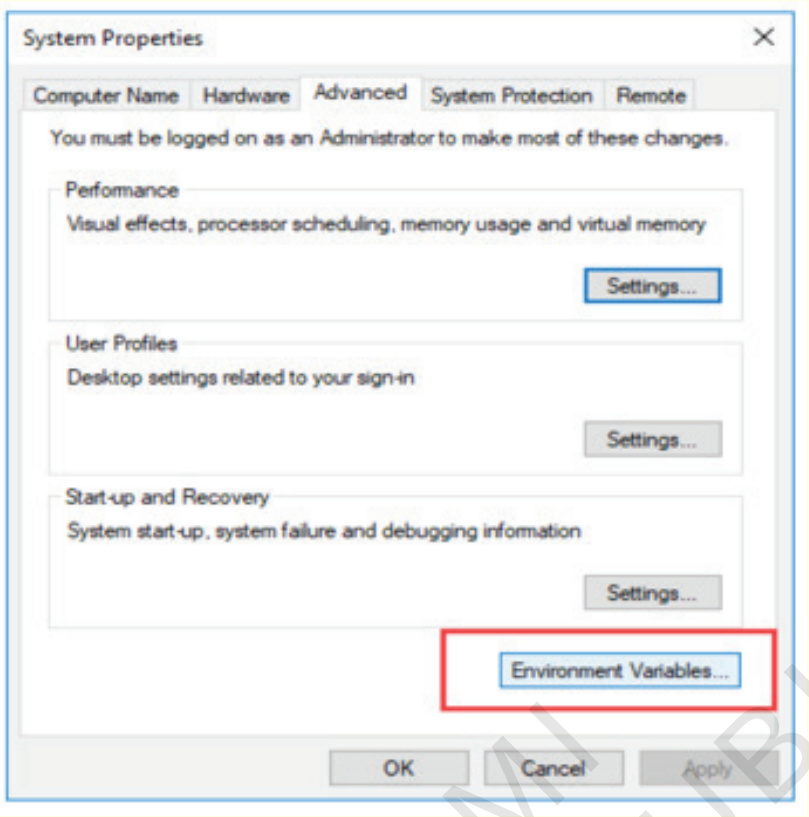
2 Click on advanced system settings. (Fig 2)

Fig 2



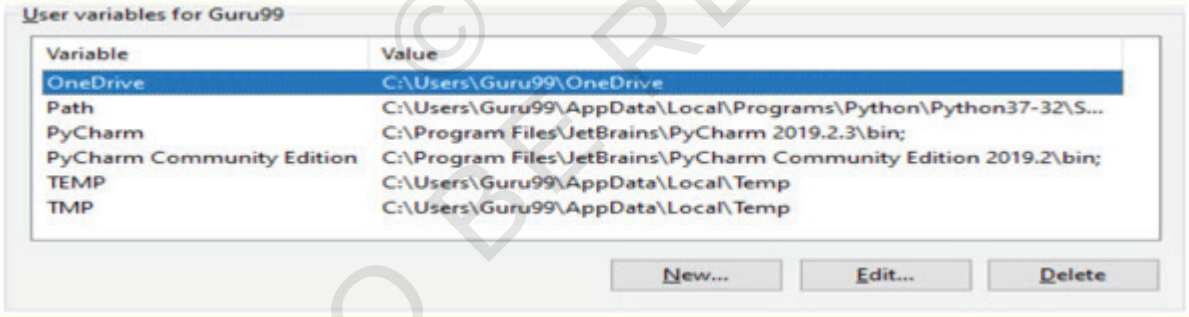
3 Click on Environment Variables to set Java runtime environment. (Fig 3)

Fig 3



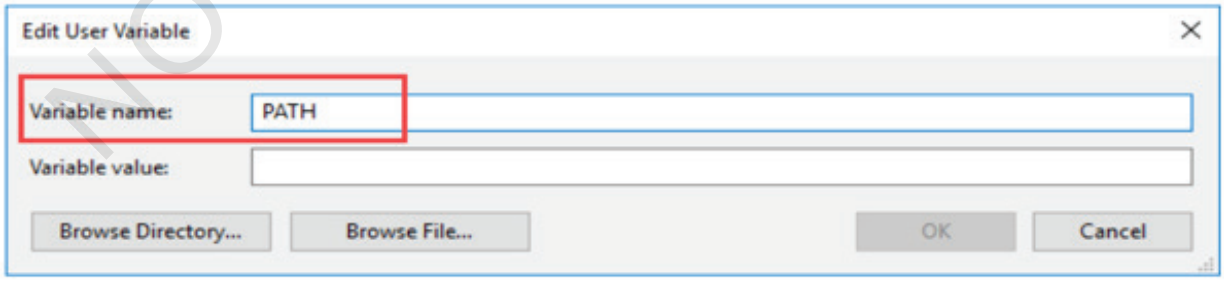
4 Click on new button of user variables. (Fig 4)

Fig 4



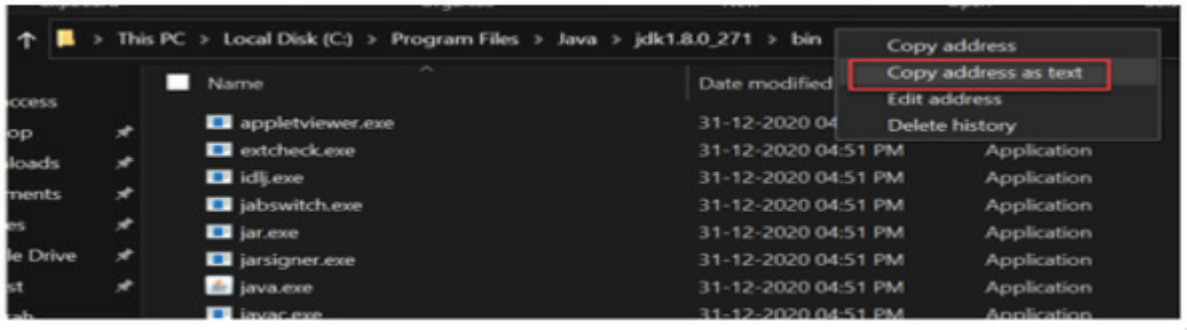
5 Type PATH in the variable name . (Fig 5)

Fig 5



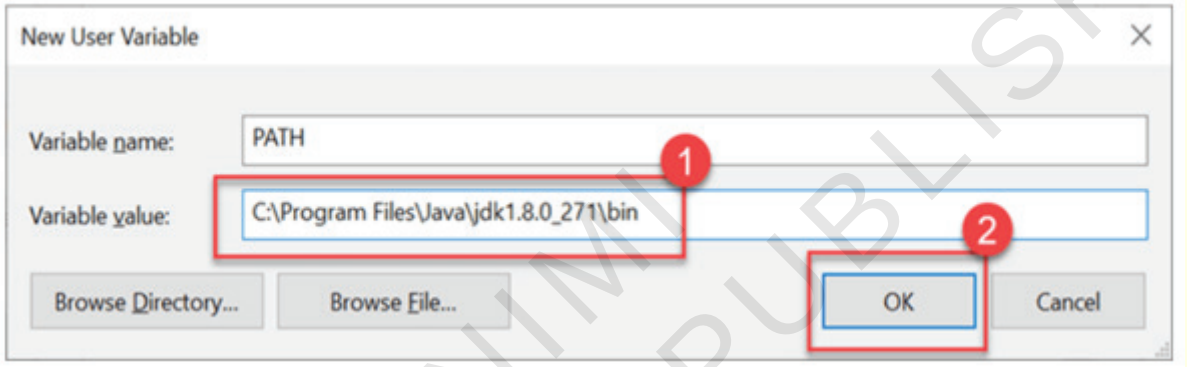
6 Copy the path of bin folder which is installed in JDK folder. (Fig 6)

Fig 6



7 Paste Path of bin folder in Variable value. Click on OK Button. (Fig 7)

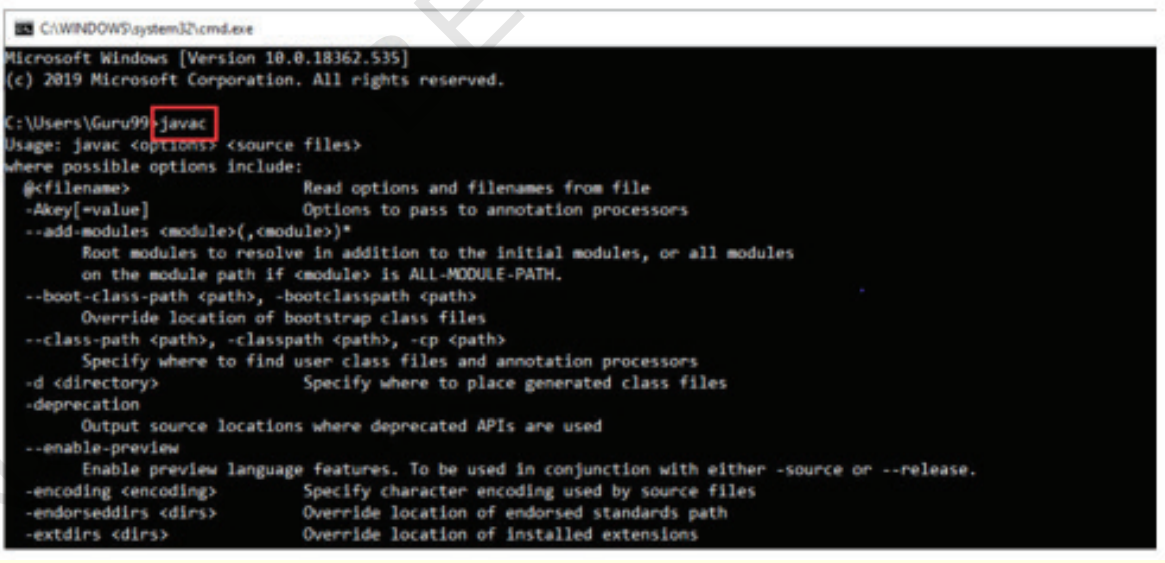
Fig 7



8 Go to command prompt and type javac commands. (Fig 8)

If you see a screen like below, Java is installed.

Fig 8



Writing and Executing a simple JAVA Program to display “Hello”

Objectives: At the end of this exercise you shall be able to
- **write and execute java program**
- **use various data type in Java.**

Requirements

Tools /Equipment/ Instruments

- A working PC, internet connection, Text editor, Browser & Java JDK -1 No. / trainee

PROCEDURE

TASK 1: **Write and execute java program**

Step 1: open text editor

Step 2: write the code

Step 3: Save the file with .java extension

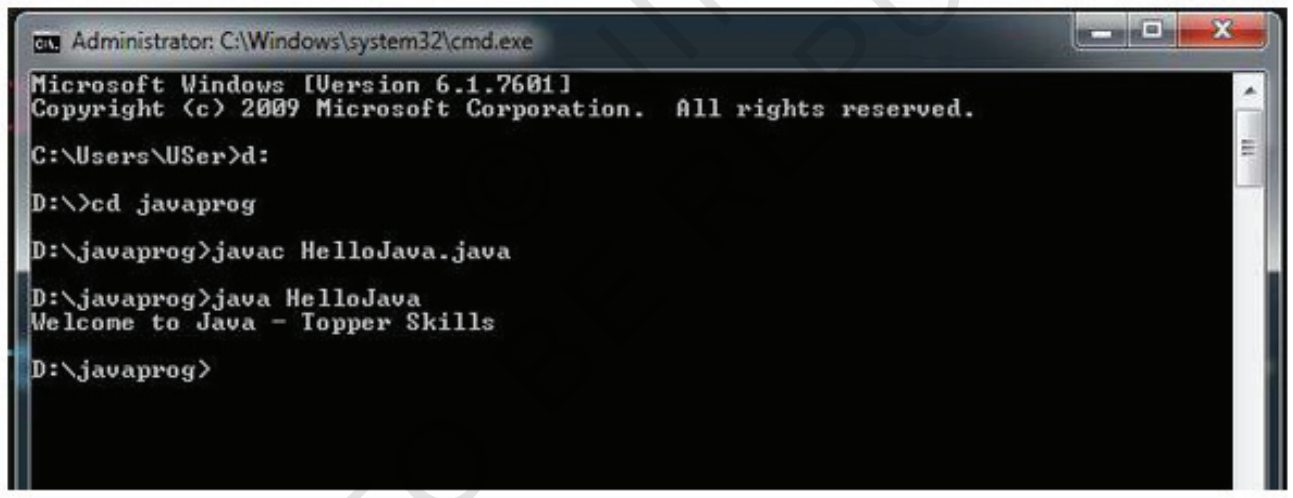
Step 4: open the command prompt

Step 5: change the file path (where your file is existing)

Step 6: give the command javac filename.java (ex: javac Demo.java)

Step 7: give command java classname (ex: java Demo) (Fig 1)

Fig 1



Use of various data types in JAVA

Objectives: At the end of this exercise you shall be able to
- **use of various data types in JAVA.**

Requirements

Tools /Equipment/ Instruments

- A working PC, internet connection, Text editor, Browser & Java JDK - 1 No. / trainee.

PROCEDURE

TASK 1: **Use various data type in Java**

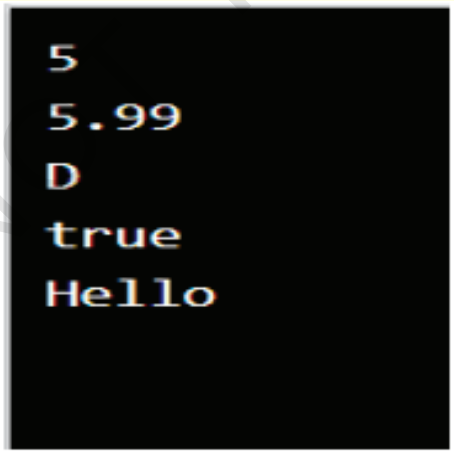
1 Create file

2 Follow the below code and execute

SOURCE CODE

```
public class Main {
       public static void main(String[] args) {
       int myNum = 5;                  // integer (whole number)
       float myFloatNum = 5.99f;       // floating point number
       char myLetter = 'D';            // character
       boolean myBool = true;          // boolean
       String myText = "Hello";        // String
       System.out.println(myNum);
       System.out.println(myFloatNum);
       System.out.println(myLetter);
       System.out.println(myBool);
       System.out.println(myText);
  }
}
```

Fig 1



Use various operators in JAVA

Objectives: At the end of this exercise you shall be able to
- **use various operators in Java.**

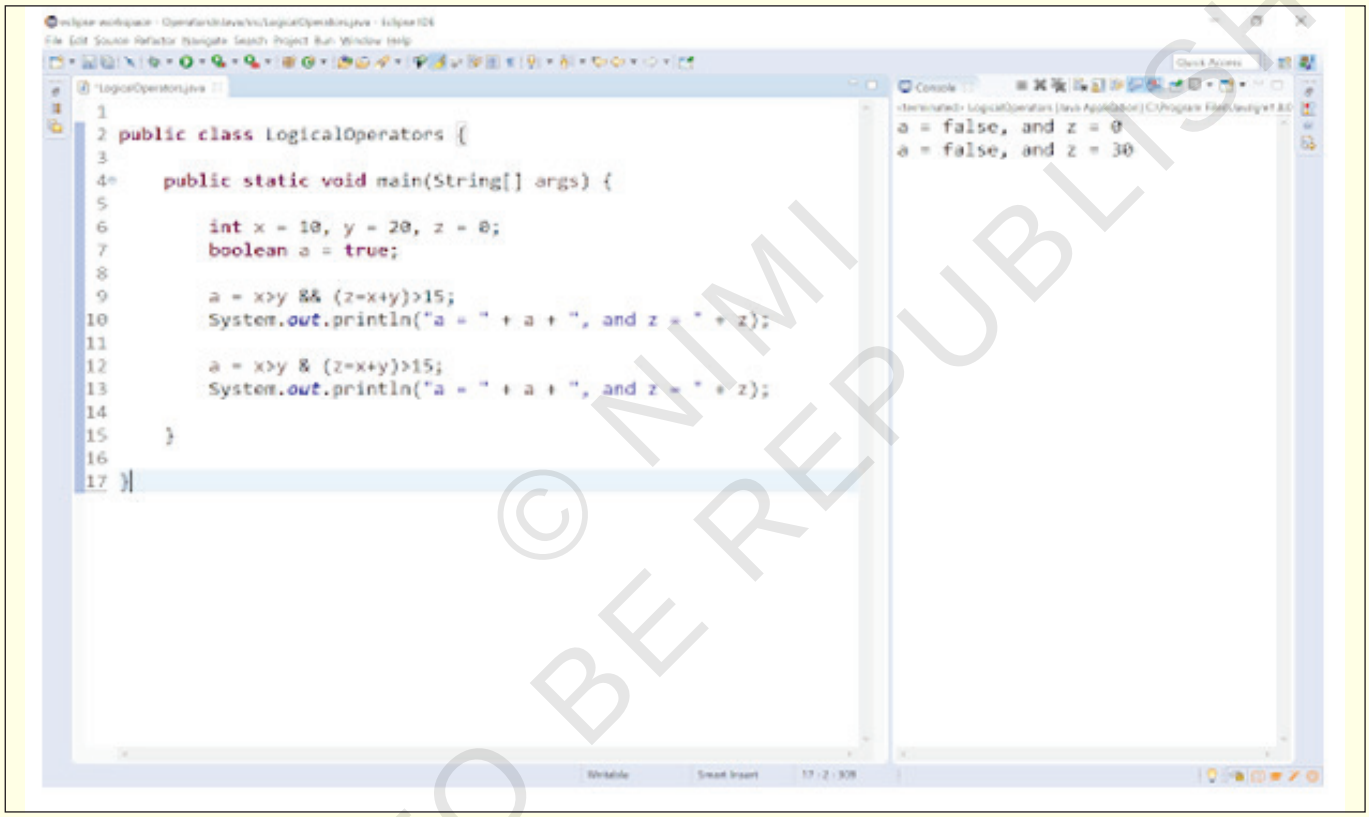
Requirements

Tools /Equipment/ Instruments

- A working PC, internet connection, Text editor, Browser & Java JDK -1 No. / trainee.

PROCEDURE

TASK 1: **Use various operators in Java**



Create and use of local, Instance and class variables

Objectives: At the end of this exercise you shall be able to
- **use various operators in Java.**

Requirements	
Tools /Equipment/ Instruments	
• A working PC, internet connection, Text editor, Browser & Java JDK	-1 No. / trainee.

RelationalOperators.java

```
1  package JavaOperators;
2
3  import java.util.Scanner;
4
5  public class RelationalOperators {
6      private static Scanner sc;
7      public static void main(String[] args) {
8          int a, b;
9          sc = new Scanner(System.in);
10         System.out.println(" Please Enter two integer Value: ");
11         a = sc.nextInt();
12         b = sc.nextInt();
13
14         System.out.println(" Result of a >  b is = " + (a > b));
15         System.out.println(" Result of a >=  b is = " + (a >= b));
16         System.out.println(" Result of a <  b is = " + (a < b));
17         System.out.println(" Result of a <=  b is = " + (a <= b));
18         System.out.println(" Result of a ==  b is = " + (a == b));
19         System.out.println(" Result of a !=  b is = " + (a != b));
20     }
21 }
```

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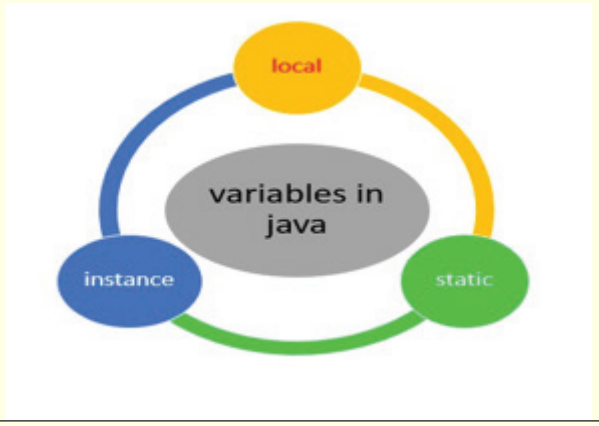
Problems Javadoc Declaration Console

```
<terminated> RelationalOperators [Java Application] C:\Program Files\Java\jre1.8.0_73\bin\javaw.exe (Mar 16, 2016, 5
 Please Enter two integer Value:
15
30
 Result of a >  b is = false
 Result of a >=  b is = false
 Result of a <  b is = true
 Result of a <=  b is = true
 Result of a ==  b is = false
 Result of a !=  b is = true
```

TASK 1: **Variables in Java**



- Declaring (creating) variables

Syntax: - type variableName = value;

SOURCE CODE

```
public class VariableExample{
   int myVariable;
   static int data = 30;
   public static void main(String args[]){
      int a = 100;
      VariableExample obj = new VariableExample();
      System.out.println("Value of instance variable myVariable: "+obj.myVariable);
      System.out.println("Value of static variable data: "+VariableExample.data);
      System.out.println("Value of local variable a: "+a);
   }
}
```

Fig 1

```
Value of instance variable myVariable: 0
Value of static variable data: 30
Value of local variable a: 100
```

Read text from the keyboard using scanner class read text from keyboard using console class

Objectives: At the end of this exercise you shall be able to
- **read text from the keybroard using scanner class.**

Requirements

Tools /Equipment/ Instruments

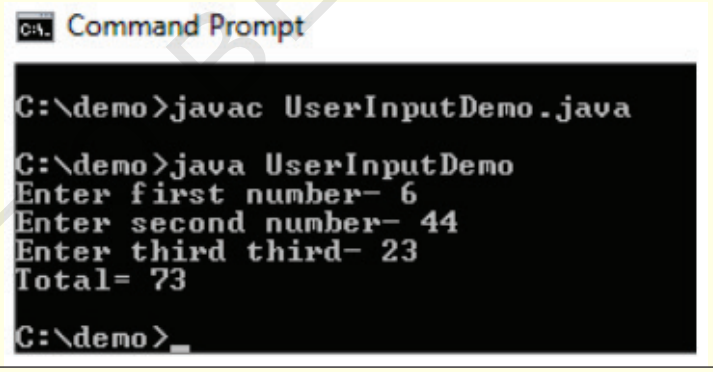
- A working PC, internet connection, Text editor, Browser & Java JDK 1 No.

Follow the below code:-

SOURCE CODE

```
import java.util.*;
class UserInputDemo
{
public static void main(String[] args)
{
Scanner sc= new Scanner(System.in);    //System.in is a standard input stream
System.out.print("Enter first number- ");
int a= sc.nextInt();
System.out.print("Enter second number- ");
int b= sc.nextInt();
System.out.print("Enter third number- ");
int c= sc.nextInt();
int d=a+b+c;
System.out.println("Total= " +d);
}
}
```

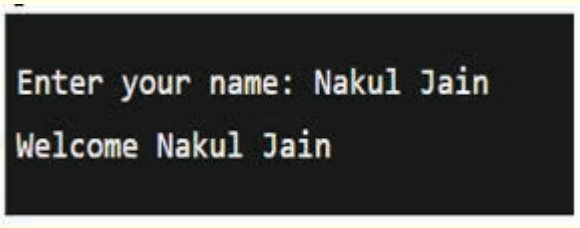
Fig 1



SOURCE CODE

```
import java.io.Console;
class ReadStringTest{
public static void main(String args[]){
Console c=System.console();
System.out.println("Enter your name: ");
String n=c.readLine();
System.out.println("Welcome "+n);
}
```

Fig 2



Use if tge if and if ... else statement

Objectives: At the end of this exercise you shall be able to

- **learn conditional statements like IF, IF .... ELSE, Switch statement; understand difference between BREAK & CONTINUE keywords; Different kind of loops in JAVA like WHILE, DO-WHILE, FOR Loops.**

Requirements

Tools /Equipment/ Instruments

- A working PC, internet connection, Text editor, Browser & Java JDK -1 No. / trainee.

PROCEDURE

TASK 1: **Use the if and if.....else statements, Break and Continue keyword**

If statement

Syntax:

```
if (condition) {
// block of code to be executed if the condition is true
}
```

Fig 1

IfStatement.java

```
1  package ConditionalStatements;
2
3  import java.util.Scanner;
4
5  public class IfStatement {
6      private static Scanner sc;
7
8      public static void main(String[] args) {
9          int Number;
10         sc = new Scanner(System.in);
11         System.out.println(" Please Enter any integer Value: ");
12         Number = sc.nextInt();
13
14         if (Number > 1) {
15             System.out.println("You have entered POSITIVE Number");
16         }
17         System.out.println("This Message is coming from Outside the IF STATEMENT");
18     }
19 }
```

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Problems Javadoc Declaration Console

```
<terminated> IfStatement [Java Application] C:\Program Files\Java\jre1.8.0_73\bin\javaw.exe (Mar 21, 2016, 2:54:23 PM)
 Please Enter any integer Value:
23
You have entered POSITIVE Number
This Message is coming from Outside the IF STATEMENT
```

If…….else statement

Follow the below syntax:

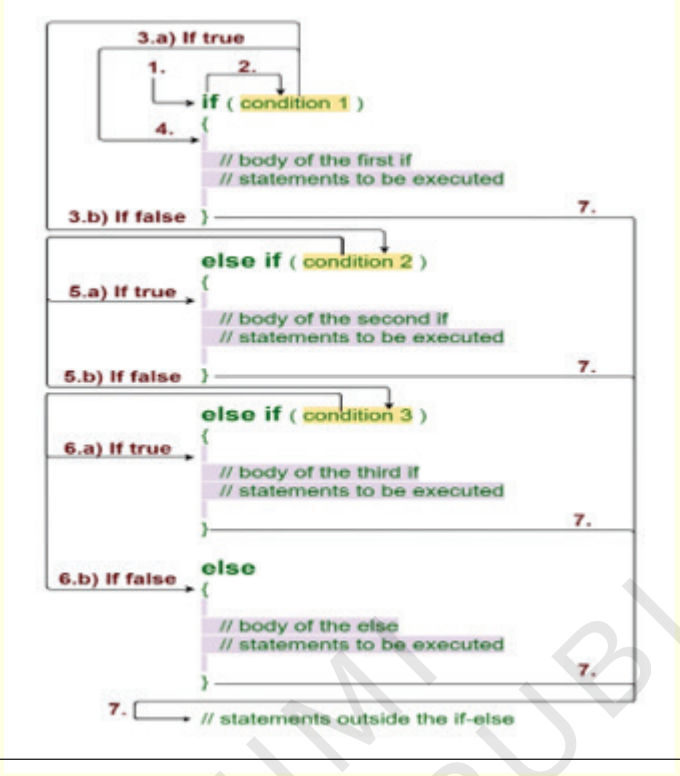
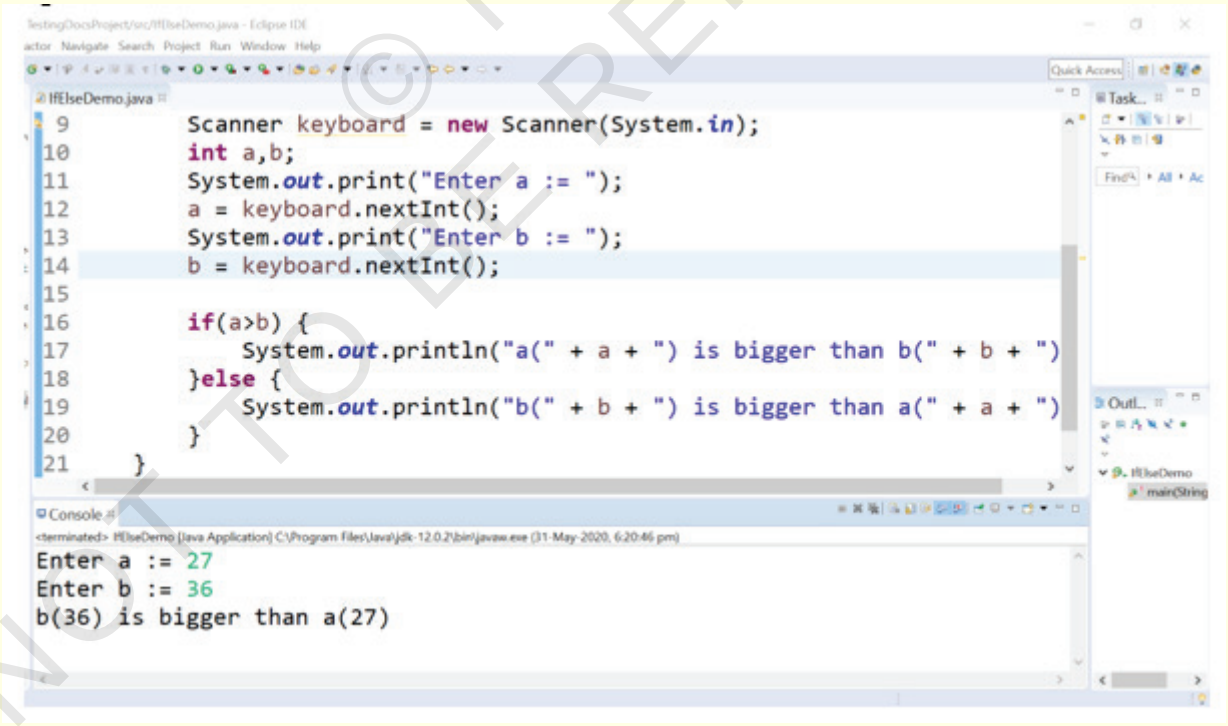


Fig 2



Use of the Switch Statements & Break and continue keywords

Objectives: At the end of this exercise you shall be able to
- **use of the switch statements**
- **use of the break and contine keywords.**

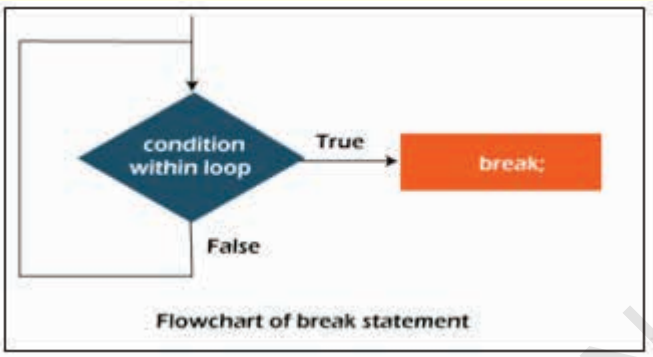
Requirements

Tools /Equipment/ Instruments

- A working PC, internet connection, Text editor, Browser & Java JDK -1 No. / trainee.

Switch statement & Break Keyword

Follow the below syntax:



Flowchart of break statement

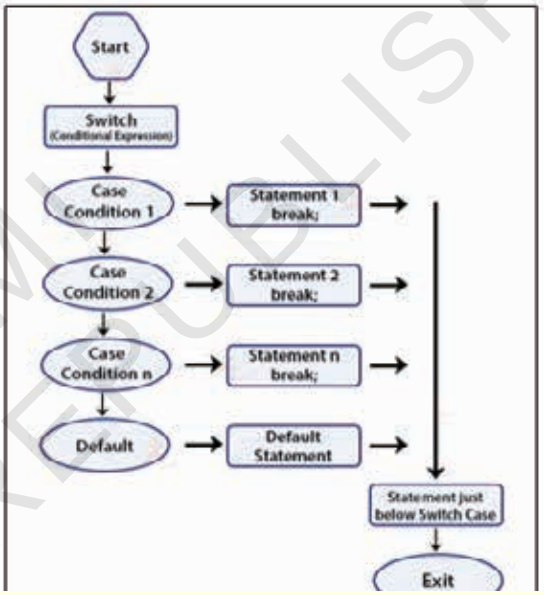


Fig 1

```
SwitchExample.java
1  package com.huongdanjava;
2
3  public class SwitchExample {
4
5      public static void main(String[] args) {
6          int n = 1;
7          switch (n) {
8              case 1:
9                  System.out.println("Khanh");
10                 break;
11             case 2:
12                 System.out.println("Huong Dan Java");
13                 break;
14             case 3:
15                 System.out.println("Lap Trinh Java");
16                 break;
17             default:
18                 break;
19         }
20     }
21
22 }
```

Problems Javadoc Declaration Console

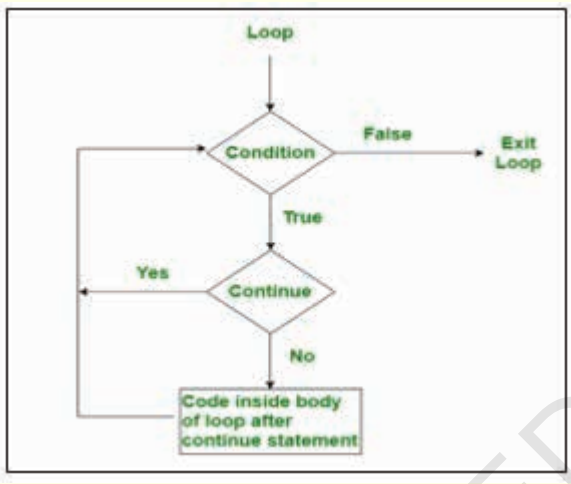
```
<terminated> SwitchExample [Java Application] /Library/Java/JavaVirtualMachines/j
Khanh
```

Continue Keyword

Syntax: -

jump-statement;

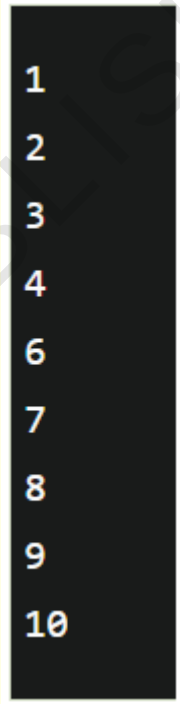
continue



SOURCE CODE

```
//inside the for loop.
public class ContinueExample {
public static void main(String[] args) {
   //for loop
   for(int i=1;i<=10;i++){
         if(i==5){
            //using continue statement
           continue;//it will skip the rest statement
          }
         System.out.println(i);
    }
}
}
```

Fig 2



Use of the Do ... While and while - do loops

Objectives: At the end of this exercise you shall be able to
- **use of the Do ... While and while - do loops.**

Requirements

Tools /Equipment/ Instruments

- A working PC, internet connection, Text editor, Browser & Java JDK -1 No. / trainee.

While loop

Syntax: -

```
while (condition){
//code to be executed
Increment / decrement statement
}
```

Fig 1

```
2
3  public class JavaWhileLoop {
4
5      public static void main(String[] args) {
6
7          int i = 5;
8          while (i <= 10) {
9              System.out.println(i);
10             i++;
11         }
12     }
13 }
14
```

Problems Javadoc Declaration Console

<terminated> JavaWhileLoop [Java Application] /Library/Java/Java

```
5
6
7
8
9
10
```

Do-While loop

Syntax: -

```
do{
//code to be executed / loop body
//update statement
}while (condition);
```

Fig 2

```
3  public class JavaDoWhileLoop {
4
5      public static void main(String[] args) {
6
7          int i = 5;
8          do {
9              System.out.println(i);
10             i++;
11         } while (i <= 10);
12     }
13 }
```

Problems Javadoc Declaration Console

<terminated> JavaDoWhileLoop [Java Application] /Library/Java/

```
5
6
7
8
9
10
```

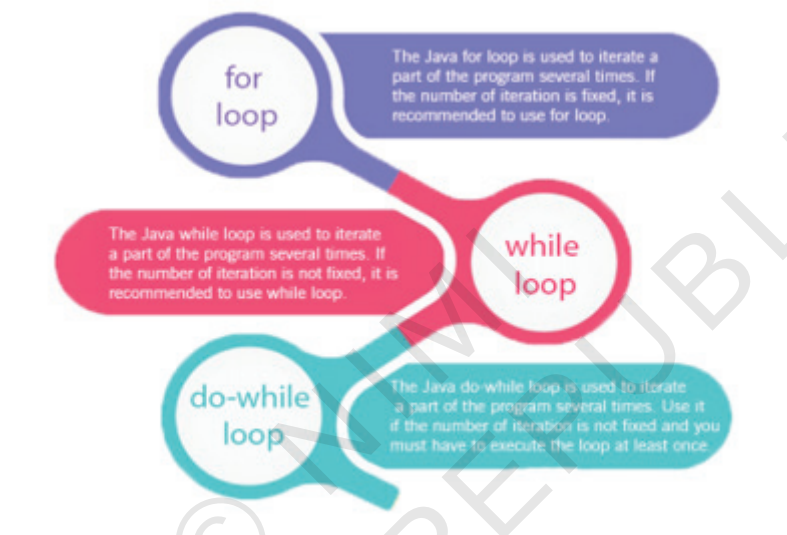
Use of the For Loop

Objectives: At the end of this exercise you shall be able to
- **use of the For Loop in JAVA.**

Requirements	
Tools /Equipment/ Instruments	
• A working PC, internet connection, Text editor, Browser & Java JDK	-1 No. / trainee.

PROCEDURE

TASK 1: **Loops in JAVA**



For loop

Syntax:

for (initialization; condition; increment/decrement) {

//statement or code to be executed

}

Fig 1

```
3  public class JavaForLoop {
4
5      public static void main(String[] args) {
6
7          //print integers 5 to 10
8          for (int i=5; i<=10; i++) {
9              System.out.println("Java for loop example - " + i);
10         }
11     }
12
13 }
```

Problems @ Javadoc Declaration Console Progress Call H

<terminated> JavaForLoop [Java Application] /Library/Java/JavaVirtualMachines/jdk-9.j

```
Java for loop example - 5
Java for loop example - 6
Java for loop example - 7
Java for loop example - 8
Java for loop example - 9
Java for loop example - 10
```

Use of the JAVA Character Class Methods

Objectives: At the end of this exercise you shall be able to
- **use of the JAVA Character Class Methods.**

Requirements

Tools /Equipment/ Instruments

- A working PC, internet connection, Text editor, Browser & Java JDK -1 No. / trainee.

Java Number Class

Java Number class is an abstract class which is placed in java.lang package. It has four abstract methods and two concrete methods. The abstract class Number is the superclass of classes BigDecimal, BigInteger, Byte, Double, Float, Integer, Long, and Short. This class contains a single consructor number().

Number Class Methods

Java Number class provides methods to convert the represented numeric value to byte, double, float, int, long, and short type. The various Java Number methods are as follows-

Flowchart of Break Statement

SN	Modifier & Type	Method	Description
1)	Byte	byteValue()	It converts the given number into a byte type and returns the value of the specified number as a byte.
2)	abstract double	doubleValue()	It returns the value of the specified number as a double equivalent.
3)	abstract float	floatValue()	It returns the float equivalent value of the specified Number object.
4)	abstract int	intValue()	It returns the value of the specified number as an int.
5)	abstract long	longValue()	It returns the value of the specified number object as long equivalent.
6)	short	shortValue()	It returns the value of the specified number as a short type after a primitive conversion.

Java Number byteValue() Method

The byteValue() is a method of Java Number class which automatically converts the given number into a primitive byte type and returns the value of the specified number as a byte.

Syntax:

Following is the declaration of byteValue() method:

1 public byte byteValue()

Parameter:

DataType	Parameter	Description
byte	NA	It returns the value of number object as byte.

Returns:

The byteValue() method returns the numeric value represented by this object after conversion to the primitive byte type.

Compatibility Version:

Java 1.1 and above

Example 1

```
1  public class NumberByteValueExample1 {
2  public static void main(String[] args) {
3  Integer i = 123456;
4  //Convert number value into byte type
5  int Result = i.byteValue();
6  System.out.println("Number as Byte: "+Result);
7  }
8  }
```

Output:

Number as Byte: 64

Example 2

```
1  public class NumberByteValueExample2 {
2  public static void main(String[] args) {
3  Integer i = -123456;
4  Float f = 435f;
5  Double d = 65868.685;
6  //Convert number value into byte type
7  System.out.println("Integer Number as Byte: "+i.
   byteValue());
8  System.out.println("Float Number as Byte: "+f.
   byteValue());
9  System.out.println("Double Number as Byte: "+d.
   byteValue());
10 }
11 }
```

Output:

Integer Number as Byte: -64

Float Number as Byte: -77

Double Number as Byte: 76

Example 3

```
1  import java.io.IOException;
2  import java.util.Scanner;
3  public class NumberByteValueExample3 {
4  public static void main(String[] args)throws
   IOException {
5  Scanner scan = new Scanner(System.in);
6  System.out.print("Enter the Number Value: ");
7  Integer num = scan.nextInt();
8   //Convert number value into byte type
9  System.out.println("Integer Number as Byte: "+num.
   byteValue());
10 scan.close();
11  }
12 }
```

Output:

Enter the Number Value: ABCDEF

Exception in thread "main" java.util.InputMismatchException

at java.base/java.util.Scanner.throwFor(Scanner.java:939)

at java.base/java.util.Scanner.next(Scanner.java:1594)

at java.base/java.util.Scanner.nextInt(Scanner.java:2258)

at java.base/java.util.Scanner.nextInt(Scanner.java:2212)

at myPackage.NumberByteValueExample3.main(NumberByteValueExample3.java:9)

Character class methods in JAVA

Objectives: At the end of this exercise you shall be able to
- **character class methods in JAVA.**

Requirements

Tools /Equipment/ Instruments

- A working PC, internet connection, Text editor, Browser & Java JDK -1 No. / trainee.

PROCEDURE

TASK 1: **Character class methods in Java**

Method	Description
isUpperCase()	Tests if character is uppercase
toUpperCase()	Returns the uppercase equivalent of the argument; no change is made if the argument is not a lowercase letter
isLowerCase()	Tests if character is lowercase
toLowerCase()	Returns the lowercase equivalent of the argument; no change is made if the argument is not an uppercase letter
isDigit()	Returns true if the argument is a digit (0–9) and false otherwise
isLetter()	Returns true if the argument is a letter and false otherwise
isLetterOrDigit()	Returns true if the argument is a letter or digit and false otherwise
isWhitespace()	Returns true if the argument is whitespace and false otherwise; this includes the space, tab, newline, carriage return, and form feed

```
public class Test {

   public static void main(String args[]) {
      //isLetter()........
      System.out.println(Character.isLetter('S'));
      System.out.println(Character.isLetter('9'));
      //isDigit()..........
      System.out.println(Character.isDigit('S'));
      System.out.println(Character.isDigit('9'));
      //isWhitespace()........
      System.out.println(Character.isWhitespace('S'));
      System.out.println(Character.isWhitespace(' '));
      System.out.println(Character.isWhitespace('\n'));
      //isUpperCase()........
      System.out.println(Character.isUpperCase('M'));
      System.out.println(Character.isUpperCase('m'));
      //isLowerCase()..........
      System.out.println(Character.isLowerCase('g'));
      System.out.println(Character.isLowerCase('G'));
      //toUpperCase()..........
      System.out.println(Character.toUpperCase('a'));
      //toLowerCase()..........
      System.out.println(Character.toLowerCase('A'));
   }
}
```

Fig 1

```
true
false
false
true
false
true
true
true
false
true
false
A
a
```

String class methods in JAVA

Objectives: At the end of this exercise you shall be able to
- **string class methods in JAVA.**

Requirements

Tools /Equipment/ Instruments

- A working PC, internet connection, Text editor, Browser & Java JDK -1 No. / trainee.

PROCEDURE

TASK 1: **String class methods in Java**

Follow below example: -

```
public class Test {

   public static void main(String args[]) {
      // create first string
    String first = "Java ";
    System.out.println("First String: " + first);
    // create second
    String second = "Programming";
    System.out.println("Second String: " + second);
    // join two strings
    String joinedString = first.concat(second);
    System.out.println("Joined String: " + joinedString);
    System.out.println("-------------------------------------------------");

    // create 3 strings
    String first1 = "java programming";
    String second1 = "java programming";
    String third1 = "python programming";
    // compare first and second strings
    boolean result1 = first1.equals(second1);
    System.out.println("strings first and second are equal: " + result1);
    // compare first and third strings
    boolean result2 = first1.equals(third1);
    System.out.println("strings first and third are equal: " + result2);
    System.out.println("-------------------------------------------------");

    String str1 = "bat ball";
    // replace b with c
    System.out.println(str1.replace('b', 'c'));
    System.out.println("-------------------------------------------------");

    String text = "Java is a fun programming language";
    // split string from space
    String[] result = text.split(" ");
    System.out.print("result = ");
    for (String str : result) {
      System.out.print(str + ", ");
    }
   }
}
```

Fig 1

```
First String: Java
Second String: Programming
Joined String: Java Programming
-------------------------------------------------
Strings first and second are equal: true
Strings first and third are equal: false
-------------------------------------------------
cat call
-------------------------------------------------
result = Java, is, a, fun, programming, language,
```

Create and use array

Objectives: At the end of this exercise you shall be able to
- **create and use array.**

Requirements

Tools /Equipment/ Instruments

- A working PC, internet connection, Text editor, Browser & Java JDK -1 No. / trainee.

PROCEDURE

TASK 1: **Create and use array**

1 To declare an array, define the variable type with square brackets.

2 use comma to separate inserted value.

SOURCE CODE

```
public class Main {
  public static void main(String[] args) {
    String[] cars = {“Volvo”, “BMW”, “Ford”, “Mazda”};
    System.out.println(cars[0]);
    int[] num = {23,12,9,17};
    System.out.println(num[2]);
  }
}
```

Fig 1

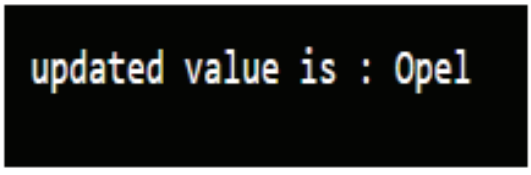
Change an Array Element:

To change the value of a specific element, refer to the index number.

SOURCE CODE

```
public class Main {
  public static void main(String[] args) {
    String[] cars = {“Volvo”, “BMW”, “Ford”, “Mazda”};
    cars[0] = “Opel”;
    System.out.println(“updated value is : “+cars[0]);
  }
}
```

Fig 2

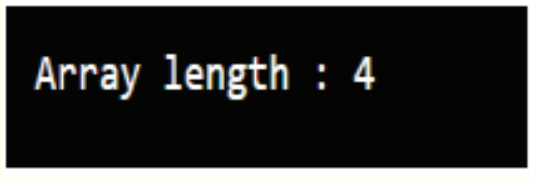


To find out how many elements an array has, use the length property:

SOURCE CODE

```
public class Main {
  public static void main(String[] args) {
    String[] cars = {“Volvo”, “BMW”, “Ford”, “Mazda”};
    System.out.println(“Array length : “+cars.length);
  }
}
```

Fig 3



Loop Through an Array :

1 use for loop

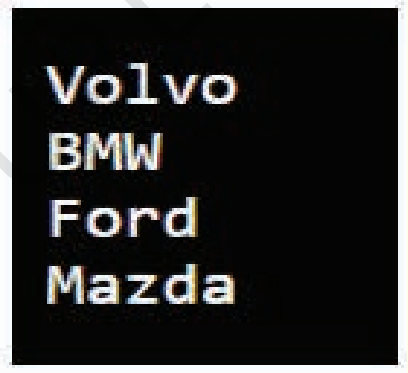
2 use length property

3 follow the below code

SOURCE CODE

```
public class Main {
  public static void main(String[] args) {
    String[] cars = {“Volvo”, “BMW”, “Ford”, “Mazda”};
    for (int i = 0; i < cars.length; i++) {
      System.out.println(cars[i]);
    }
  }
}
```

Fig 4



Create and use of simple classes, objects and methods in JAVA

Objectives: At the end of this exercise you shall be able to
- **create and use of simple classes, objects and methods in JAVA.**

Requirements

Tools /Equipment/ Instruments

- A working PC, internet connection, Text editor, Browser & Java JDK - 1 No.

PROCEDURE

TASK 1: **Create and use simple classes, objects and methods in JAVA**

1 To create class, use “class” keyword.

2 To create object use “new” keyword.

3 To declare method use “access_modifier return_type function_name()” .

SOURCE CODE

```
// Create a Main class
public class Main {

  // Create a fullThrottle() method
  public void fullThrottle() {
    System.out.println(“The car is going as fast as it can!”);
  }

  // Create a speed() method and add a parameter
  public void speed(int maxSpeed) {
    System.out.println(“Max speed is: “ + maxSpeed);
  }

  // Inside main, call the methods on the myCar object
  public static void main(String[] args) {
    Main myCar = new Main();     // Create a myCar object
    myCar.fullThrottle();      // Call the fullThrottle() method
    myCar.speed(200);          // Call the speed() method
  }
}
```

Fig 1

```
The car is going as fast as it can!
Max speed is: 200
```

Passing and returning data and objects to method

Objectives: At the end of this exercise you shall be able to
- **Passing and returning data and objects to method.**

Requirements

Tools /Equipment/ Instruments

- A working PC, internet connection, Text editor, Browser & Java JDK -1 No.

PROCEDURE

TASK 1: **Passing and returning data and objects to method**

1 Follow below code

2 Save that with '.java' extension

3 Compile and run that.

SOURCE CODE

```
public class PassByValue {
   static int k =10;
   static void passPrimitive(int j) {
      System.out.println("the value of passed primitive is " + j);
      j = j + 1;
   }
   static void passReference(EmployeeTest emp) {
      EmployeeTest reference = emp;
      System.out.println("the value of name property of our object is "+ emp.getName());
      reference.setName("Bond");
   }
   public static void main(String[] args) {
      EmployeeTest ref = new EmployeeTest();
      ref.setName("James");
      passPrimitive(k);
      System.out.println("Value of primitive after get passed to method is "+ k);
      passReference(ref);
       System.out.println("Value of property of object after reference get passed to method
is "+          ref.getName());
   }
}
class EmployeeTest {
   String name;
   public String getName() {
      return name;
   }
   public void setName(String name) {
      this.name = name;
   }
}
```

Fig 1

Output

```
the value of passed primitive is 10
Value of primitive after get passed to method is 10
the value of name property of our object is James
Value of property of object after reference get passed to method is Bond
```

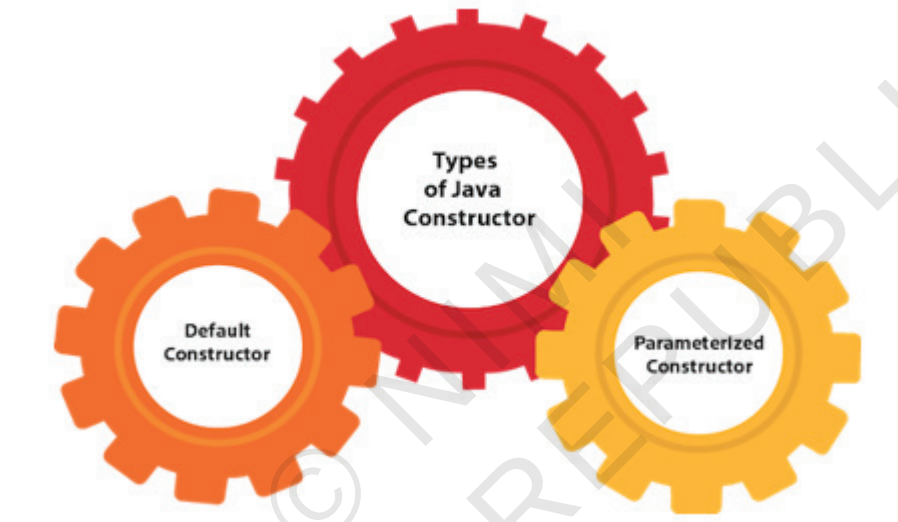
Use constructors in JAVA

Objectives: At the end of this exercise you shall be able to
- **use constructors in JAVA.**

Requirements	
Tools /Equipment/ Instruments	
• A working PC, internet connection, Text editor, Browser & Java JDK	-1 No.

PROCEDURE

TASK 1: **use constructors in Java**




```
public class College {
 College()
 {
    .....
 }
 College(String name, int year)
 {
  this(name);
    .......
 }
 College(String name)
 {
  this();
  .....
 }
public static void main(String [ ] args)
{
  College c=new College("ISM", 1926 );
 }
}
```

Calls default constructor

Calls one argument constructor

Calls two arguments constructor

Fig: Constructor chaining in the same class using this keyword

1 Constructor name must be the same as its class name

2 A Constructor must have no explicit return type

3 A Java constructor cannot be abstract, static, final, and synchronized

NOTE: You can use access modifiers while declaring a constructor. It controls the object creation. In other words, we can have private, protected, public or default constructor in Java.

SOURCE CODE

```
// Java program to illustrate Constructor Chaining
// within same class Using this() keyword
class Temp
{
   // default constructor 1
   // default constructor will call another constructor
   // using this keyword from same class
   Temp()
   {
      // calls constructor 2
      this(5);
      System.out.println("The Default constructor");
   }

   // parameterized constructor 2
   Temp(int x)
   {
      // calls constructor 3
      this(5, 15);
      System.out.println(x);
   }

   // parameterized constructor 3
   Temp(int x, int y)
   {
      System.out.println(x * y);
   }

   public static void main(String args[])
   {
      // invokes default constructor first
      new Temp();
   }
}
```

Fig 1

Output:

```
75
5
The Default constructor
```

Create and use overloaded methods in JAVA

Objectives: At the end of this exercise you shall be able to
- **create and use overloaded methods in JAVA.**

Requirements

Tools /Equipment/ Instruments

- A working PC, internet connection, Text editor, Browser & Java JDK -1 No.

PROCEDURE

TASK 1: **Create and use overloaded methods in Java**

There are two ways to overload the method in java

1 By changing number of arguments

2 By changing the data type

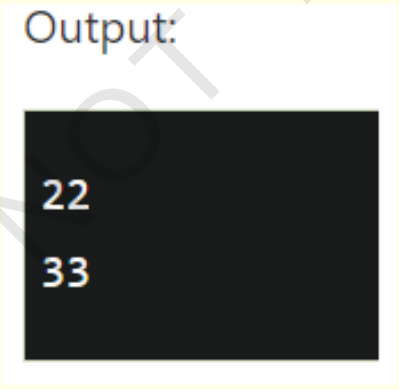
NOTE: In Java, Method Overloading is not possible by changing the return type of the method only.

- **Method Overloading: changing no. of arguments**

SOURCE CODE

```
class Adder{
static int add(int a,int b){return a+b;}
static int add(int a,int b,int c){return
a+b+c;}
}
class TestOverloading1{
public static void main(String[] args){
System.out.println(Adder.add(11,11));
System.out.println(Adder.add(11,11,11));
}
}
```

Fig 1

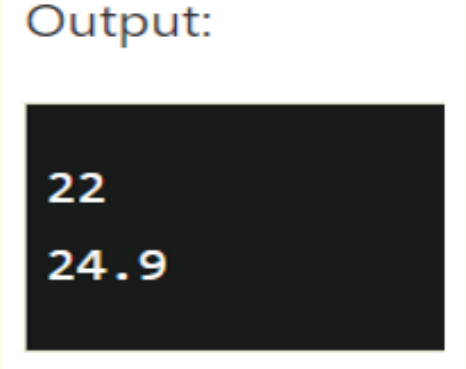


- **Method Overloading: changing data types of arguments**

SOURCE CODE

```
class Adder{
static int add(int a, int b){
 return a+b;
}
static double add(double a, double b){
     return a+b;
}
}
class TestOverloading2{
public static void main(String[] args){
.System.out.println(Adder.add(11,11));
.System.out.println(Adder.
add(12.3,12.6));
.}
}
```

Fig 2



Override methods in JAVA

Objectives: At the end of this exercise you shall be able to
- **create and use of Overriding methods in JAVA.**

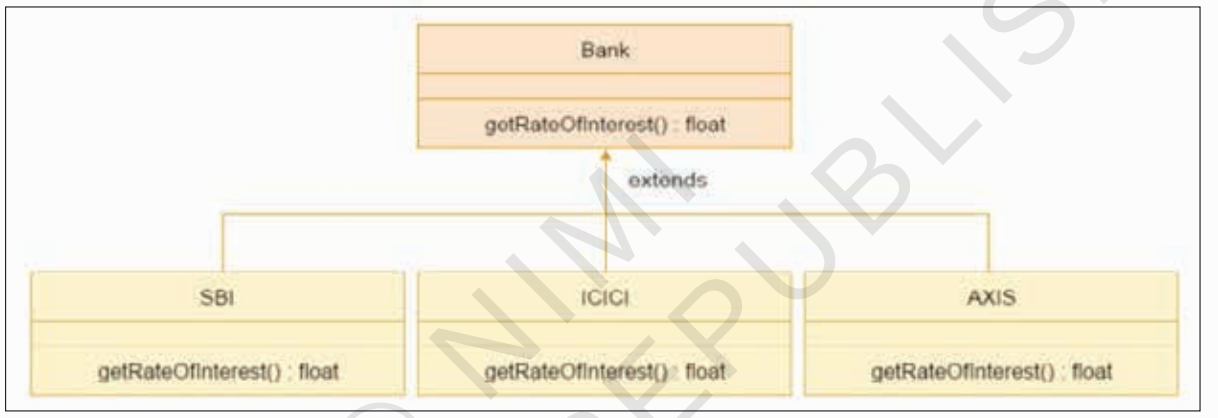
Requirements

Tools /Equipment/ Instruments
- A working PC, internet connection, Text editor, Browser & Java JDK -1 No.

PROCEDURE

TASK 1: **Create and use of Overriding methods in JAVA**

1 The method must have the same name as in the parent class
2 The method must have the same parameter as in the parent class.
3 There must be an IS-A relationship (inheritance).



SOURCE CODE

```
//Java Program to demonstrate the real scenario of Java Method Overriding
   //where three classes are overriding the method of a parent class.
   //Creating a parent class.
   class Bank{
   int getRateOfInterest(){return 0;}
}
   //Creating child classes.
   class SBI extends Bank{
   int getRateOfInterest(){return 8;}
}
class ICICI extends Bank{
int getRateOfInterest(){return 7;}
}
class AXIS extends Bank{
int getRateOfInterest(){return 9;}
}
//Test class to create objects and call the methods
class Test2{
public static void main(String args[]){
SBI s=new SBI();
ICICI i=new ICICI();
AXIS a=new AXIS();
System.out.println("SBI Rate of Interest: "+s.getRateOfInterest());
System.out.println("ICICI Rate of Interest: "+i.getRateOfInterest());
System.out.println("AXIS Rate of Interest: "+a.getRateOfInterest());
}
}
```

Fig 1

```
Output:
SBI Rate of Interest: 8
ICICI Rate of Interest: 7
AXIS Rate of Interest: 9
```

Create and use super class, sub class in JAVA

Objectives: At the end of this exercise you shall be able to
- **create and use super class and sub class.**

Requirements	
Tools /Equipment/ Instruments	
• A working PC, internet connection, Text editor, Browser & Java JDK	-1 No.

PROCEDURE

TASK 1: **Create and use super class and sub class**

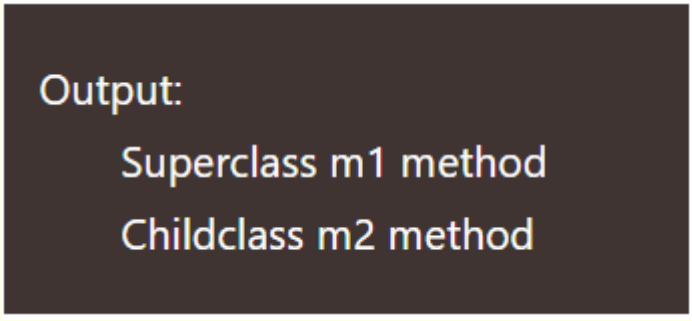
- subclass (child) - the class that inherits from another class
- superclass (parent) - the class being inherited from

To inherit from a class, use the extends keyword.

SOURCE CODE

```
Package inheritance;
public class Parentclass
{
  void m1()
  {
    System.out.println("Superclass m1 method");
  }
}
public class Childclass extends Parentclass
{
  void m2()
  {
     System.out.println("Childclass m2 method");
  }
}
public class Test
{
  public static void main(String[] args)
  {
 // Creating an object of superclass.
   Childclass c = new Childclass(); // Accessing superclass and subclass members using
   subclass object reference variable.
    c.m1();
    c.m2();
   }
 }
```

Fig 1



Virtual methods, abstract class in JAVA

Objectives: At the end of this exercise you shall be able to:

- **create thread and know about some methods of the Thread class and multithreading**
- **handle exceptions. Know about try-catch, "throw" & "finally" keyword, virtual method and abstract class and methods.**

Requirements

Tools/Equipment/Machines

- A working PC, internet connection, Text editor, Browser & Java JDK — 1 No.

PROCEDURE

TASK 1: **Create and use virtual methods**

1 You can override the virtual function with the inheriting class function using the same function name.

2 The virtual function is supposed to be defined in the derived class. You can call it by referring to the derived class's object using the reference or pointer of the base class.

3 A virtual function should have the same name and parameters in the base and derived class.

4 For the virtual function, an IS-A relationship is necessary, which is used to define the class hierarchy in inheritance.

The Virtual function cannot be private, as the private functions cannot be overridden.

5 A virtual function or method also cannot be final, as the final methods also cannot be overridden.

6 Static functions are also cannot be overridden; so, a virtual function should not be static.

7 By default, every non-static method in Java is a virtual function

Let's understand it with some examples:

Parent.Java:

SOURCE CODE

```
class Parent {
void v1() //Declaring function
{
System.out.println("Inside the Parent Class");
}
}
```

Child.java:

SOURCE CODE

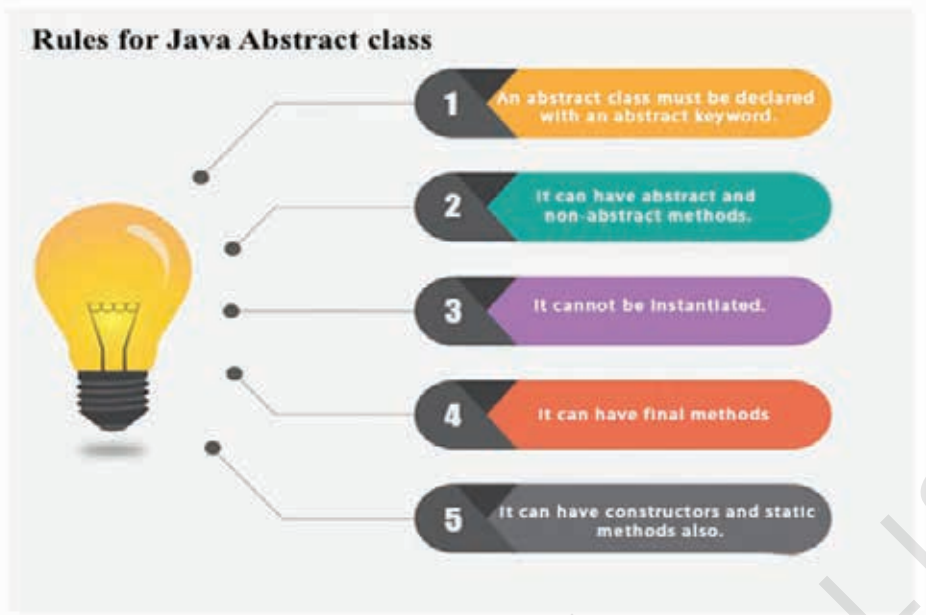
```
public class Child extends Parent{
    void v1() // Overriding function from the Parent class
    {
    System.out.println("Inside the Child Class");
    }
    public static void main(String args[]){
    Parent ob1 = new Child(); //Refering the child class object using the parent class
    ob1.v1();
    }
    }
```

Output:

```
Inside the Child Class
```

TASK 2: **Create abstract class and methods**

1 Create abstract class and methods as follows.



SOURCE CODE

```
abstract class Bike{
  abstract void run();
}
class Honda4 extends Bike{
void run(){System.out.println("running safely");}
public static void main(String args[]){
 Bike obj = new Honda4();
 obj.run();
}
}
```

Compile by: javac Honda4.java

Run by: java Honda4

```
running safely..
```

Create interfaces in JAVA

Objectives: At the end of this exercise you shall be able to:
- **create interfaces in JAVA.**

Requirements

Tools/Equipment/Machines

- A working PC, internet connection, Text editor, Browser & Java JDK -1 No.

PROCEDURE

TASK 1: **Create interfaces in JAVA**

1 To declare an interface use “interface” keyword.

Syntax:

```
interface <interface_name>{
// declare constant fields
// declare methods that abstract
// by default.
}
```

Override method in JAVA

Objectives: At the end of this exercise you shall be able to:
- **override method in JAVA.**

Requirements

Tools/Equipment/Machines

- A working PC, internet connection, Text editor, Browser & Java JDK -1 No.

PROCEDURE

TASK 1: **Override method in JAVA**

There are two ways to overload the method in java

1 By changing number of arguments.

2 By changing the data type.

NOTE: In Java, Method Overloading is not possible by changing the return type of the method only

Fig 1

```
Parent's show()
Child's show()
```

SOURCE CODE

```
// A Simple Java program to demonstrate
// method overriding in java
// Base Class
class Parent {
        void show()
        {
                System.out.println("Parent's show()");
        }
}

// Inherited class
class Child extends Parent {
        // This method overrides show() of Parent
        @Override
        void show()
        {
                System.out.println("Child's show()");
        }
}

// Driver class
class Main {
        public static void main(String[] args)
        {
                // If a Parent type reference refers
                // to a Parent object, then Parent's
                // show is called
                Parent obj1 = new Parent();
                obj1.show();

                // If a Parent type reference refers
                // to a Child object Child's show()
                // is called. This is called RUN TIME
                // POLYMORPHISM.
                Parent obj2 = new Child();
                obj2.show();
        }
}
```

Create and implement interfaces in JAVA

Objectives: At the end of this exercise you shall be able to:
- **create and implement interfaces in Java.**

Requirements

Tools/Equipment/Machines

- A working PC, internet connection, Text editor, Browser & Java JDK — 1 No.

PROCEDURE

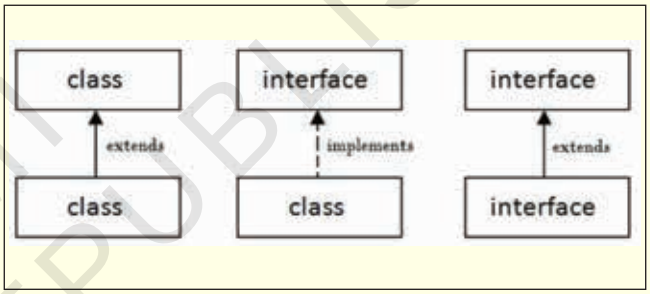
TASK 1: **Create and implement interfaces in JAVA**

1 To implement interface use “implements” keyword.

2 You cannot instantiate an interface.

3 An interface does not contain any constructors.

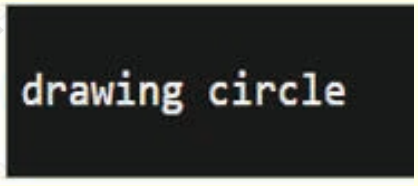
4 All of the methods in an interface are abstract.



SOURCE CODE

```
//Interface declaration: by first user
interface Drawable{
void draw();
}
//Implementation: by second user
class Rectangle implements Drawable{
public void draw(){System.out.println("drawing rectangle");}
}
class Circle implements Drawable{
public void draw(){System.out.println("drawing circle");}
}
//Using interface: by third user
class TestInterface1{
public static void main(String args[]){
Drawable d=new Circle();//In real scenario, object is provided by method e.g. getDrawable()
d.draw();
}}
```

Fig 1



Extend interfaces in Java

Objectives: At the end of this exercise you shall be able to:
- **extend interfaces in Java.**

Requirements

Tools/Equipment/Machines

- A working PC, internet connection, Text editor, Browser & Java JDK -1 No.

PROCEDURE

TASK 1: **Extend interfaces in Java**

1 To extend any interface use “extends” keyword.

SOURCE CODE

```
interface Printable{
void print();
}
interface Showable extends Printable{
void show();
}
class TestInterface4 implements Showable{
public void print(){System.out.println("Hello");}
public void show(){System.out.println("Welcome");}

public static void main(String args[]){
TestInterface4 obj = new TestInterface4();
obj.print();
obj.show();
 }
}
```

Fig 1

Create and use a package in JAVA

Objectives: At the end of this exercise you shall be able to:
- **create and use a package in JAVA.**

Requirements

Tools/Equipment/Machines

- A working PC, internet connection, Text editor, Browser & Java JDK — 1 No.

PROCEDURE

TASK 1: **Create and use a package in JAVA**

1 To create package use “package” keyword

2 Follow below syntax:

package package_name;

Procedure

1. To generate the output from the above program
Command: javac Demo.java

2. This Command Will Give you a Class File
Command: javac -d . Demo.java

3. So This Command Will Create a New Folder Called **data**.
Command: java data.Demo

Note: *In data Demo.java & Demo.class File should be present*

SOURCE CODE (ncj.java)

```
// Name of the package
import data.*;

// Class to which the package belongs
class ncj {

        // main driver method
        public static void main(String arg[])
        {

                // Creating an object of Demo class
                Demo d = new Demo();

                // Calling the functions show() and view()
                // using the object of Demo class
                d.show();
                d.view();
        }
}
```

SOURCE CODE (Demo.java)

```
// Name of package to be created
package data;

// Class to which the above package belongs
public class Demo {

        // Member functions of the class- 'Demo'
        // Method 1 - To show()
        public void show()
        {

                // Print message
                System.out.println("Hi Everyone");
        }

        // Method 2 - To show()
        public void view()
        {

                // Print message
                System.out.println("Hello");
        }
}
```

Procedure

Again the following commands will be used in order to generate the output as first a file ill be created **‘ncj.java’** outside the **data** directory.
Command: javac Demo.java
The Above Command Will Give us a class file that is non-runnable so we do need a command further to make it an executable run file.

Command: java ncj
// To Run This File
Output: Generated on the terminal after the above command Is executed

Fig 1

```
Hi Everyone
Hello
```

Basic troubleshooting tips for Java issues

Objectives: **At the end of this exercise you shall be able to**:
- **download and Install Java**
- **use Java, test Java**
- **remove Old Versions of Java**
- **find Java, always redirected to the java.com download page.**

TASK 1: **Download and Install Java**

1 If you are having problems related to Java, the following tips should help you getting things working.

2 Try the offline installer package (Windows only)

3 The offline installer package will often complete successfully even though the online

4 installer package has encountered a problem. The offline installer package file is large and will take longer to download than the online installer.

- Download the Windows Offline installer

5 Uninstall any non-working Java installations

6 Remove prior installations of Java that are not working before trying to install again.

- Uninstall Java for Windows
- Uninstall Java for Mac

7 Temporarily turn off firewall or antivirus clients

8 Active firewall or antivirus software may prevent Java from installing properly.

9 Remember to turn your firewall or antivirus software back on when you have successfully completed the Java install.

10 Why do I get file corrupt message during Java installation?

11 This message is most commonly seen by Windows XP users. Running a Microsoft utility and trying the offline installer may resolve the issue. See the installshield FAQ for more details.

— — — — —

TASK 2: **Check and verify java configuration and Test JAVA**

1 This application will check for Java versions on your computer.

2 Out-of-date versions of Java on your computer may present a serious security risk. If out-of-date versions are found, this tool will help you remove them.

3 Close applications and other browser windows, and make sure there are no other installations pending, before continuing.

4 UAC (User Account Control) dialogs As removing Java from your computer requires administrative permissions, when the application is started, Windows might trigger a warning requesting permission to run as an administrator.

— — — — —

TASK 3: **Remove old versions of JAVA**

Why should I uninstall older versions of Java from my system?

This article applies to:

1 Platform(s): Windows 10, Windows 7, Windows 8, Windows Vista, Windows XP, Windows 2008 Server, Windows Server 2012

2 Windows Users: Improve the security of your computer by checking for old versions of Java and removing them when you install Java 8 (8u20 and later versions) or by using the Java Uninstall Tool.

3 The latest version of Java is always the recommended version as it contains feature updates, vulnerability fixes and performance improvements to previous versions. You can confirm that you have the latest version with the Java Verification page or manually checking the Java version.

Should I uninstall older versions of Java?

We highly recommend that you uninstall all older versions of Java from your system.

1 Keeping old versions of Java on your system presents a serious security risk.

2 Uninstalling older versions of Java from your system ensures that Java applications will run with the latest security and performance improvements on your system.

How can I remove older versions of Java?

Windows users can safely uninstall older versions of Java:

- when installing Java 8 (8u20 and above) or
- by using the Java uninstall tool or
- by manually uninstalling Java for Windows

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TASK 4: **Always redirected to Java.com when visiting a page with a Java app.**

Install the latest Java version

The continual redirection to java.com was a known issue affecting Java versions 7u25 and older. This issue was fixed with the 7u40 release of Java. To prevent prevent the redirect to java.com, download the latest Java version from http://java.com.

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