Be Future Ready

IT Planet®

6

C<>deBot

Windows 10 with Office 2016

Davinder Singh Minhas

This book belongs to:

Name .....

Class ..... Section ..... Roll No. .....

School .....

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PREFACE

Technology is one of the biggest catalysts in transforming and improving education process while playing a vital role in the progress of a country. As we know, the world is changing at a fast pace and so is the technology. Hence, it is imperative for us to make our students match this pace, and also to help them inculcate futuristic skills and mindset.

To make students ready to face the uncertain challenges and to stay tuned with the unprecedented journey of technology, **National Education Policy 2020** has suggested certain skills that should be learnt by them. These skills will help them in becoming successful, innovative, adaptable, and productive human beings in the various fields such as **Digital Literacy**, **Coding**, **Computational Thinking** and **Artificial Intelligence** in the rapidly changing tech-savvy world.

Envisaging the same vision of National Education Policy 2020, we have created **CodeBot**, a comprehensive, exhaustive computer series for classes 1 to 8. This series is based on the latest software packages and operating system such as **Microsoft Office 2016** and **Windows 10**.

This series contains **five** sections:

- **Digital Literacy:** This section would discern students the use of computer technology in day-to-day life. It would also help them comprehend the computer subject as a tool, which can be **integrated** with other subjects.
- **Computational Thinking:** To inculcate the skills of problem-solving among the students, we have introduced Computational Thinking from class 1 to 5. It consists of interesting and engaging activities on Patterns, Decomposition, Abstraction, Algorithm, etc.
- **Coding Junction:** Having children learn coding at an early age helps them organize their thinking and express their ideas to create programs using the computer. It empowers them not only to use technology, but also to create it. Keeping this in mind, we have introduced interactive fun-based coding for all levels such as **Scratch Jr** and **Scratch** from class 2 to 5; **Python** with gamification and GUI-based coding and **MIT App Inventor** from class 6 to 8.
- **Artificial Intelligence (AI):** Knowledge of Artificial intelligence is becoming more and more important as the students have to be AI-ready for the present and future. Therefore, we have introduced AI from class 1 onwards in a fun and engaging manner.
- **Cyber Zone:** This section covers Internet literacy and throws light on issues such as **cybercrimes** and **cyber security**, thereby encouraging students to be good digital citizens.

To produce a visually appealing and easy to understand book, we have artfully combined the latest technologies, pictures, drawings and texts in this series. Most of the topics in this series show a **step-by-step pedagogy** which simplifies the complex computer concepts. The terms and examples described in this series are those which every student will encounter while using computers.

To make the chapters exciting, **topic-relevant projects** have been added that encourage the students to try out for themselves, and to instill in them the confidence before they embark on making their own project using a particular software. Each project in the chapter presents practical problems and their complete solution in an easy-to-understand approach.

In a Nutshell section summarizes the whole chapter and the **Self-Evaluation** section examines the students and their understanding of chapter-wise computer concepts. **Exercises** and **Activities** have been included at the end of every chapter to assess the level of understanding of students.

We welcome constructive suggestions and feedback to make this series more comprehensive, relevant, updated and useful both for the teachers and the learners. You may mail us at editor@pmpublishers.in.

AUTHOR

CONTENTS

1 Computer and Its Components

OBJECTIVES

After completing this chapter, you will be able to:

- Understand about how computer works.
- Identify various input, output, storage and processing devices and their uses.

Introduction to Computer

A computer is an **electronic machine** that works according to the instructions given by you. It accepts data (input), manipulates the data according to specified rules (process), produces results (output), and saves (storage) the results for future use.

Today, computer has become an integral part of our lives. Most of our daily activities either involve the use of computer or depend upon the information derived from computer.

Computer

HOW DOES A COMPUTER WORK?

A computer works very fast and accurate. A computer does four main jobs. It **inputs** data, **processes** it, displays the **output** as information, and finally **stores** it.

INPUT: Any data or instruction entered into a computer is known as input. An **input device** helps you to enter data and give commands to computer. Keyboard, mouse, and scanner are examples of input devices.

PROCESS: The **processor**, also called **CPU (Central Processing Unit)**, is the main chip in the computer which is used to process data. Processing means treating the data according to the instructions and changing it in the form of information.

For example, if you want to add two numbers 4 and 7, then enter these numbers and give instructions to the computer through the input device. The computer will process this and give the result 11 as information.

OUTPUT: A computer is fed with a lot of data to be processed and organized. The data that has been processed into a useful form is called output. It is the result we get through **output devices**. These devices display information on screen, create printed copies, or generate sound. The examples of output devices are monitor, printer, and speakers.

STORE: The computer **stores** the data and information on a **storage device** for future use. The computer uses information stored on the storage device to perform tasks. Popular examples of storage devices are hard disk, CD-ROM/DVD-ROM, and pen drive.

Now, Let us discuss the various Input, Output, Process and Storage Devices.

Input Devices

Any hardware component that allows you to enter data, instructions, and commands into a computer is called an **input device**. The different input devices are:

KEYBOARD

A **keyboard** is an **input device** that contains keys. You press its keys to type information and enter instructions for the computer to follow. Desktop computer keyboards typically have 101 to 105 keys. These keyboards are often attached via a cable to a USB port on the system unit.

Keyboard

Types of Keyboard

Wireless Keyboard: A wireless keyboard is a battery-powered device that transmits data to the system unit using wireless technology. These keyboards do not have any wire connecting the keyboard to the system unit.

Compact Keyboard: Laptop computers, some handheld computers, and mobile devices often use a compact keyboard, which is smaller than a standard keyboard, and usually does not include the numeric keypad. These keyboards are either built on the top of the system unit or are permanently attached with hinges.

Virtual Keyboard: A virtual keyboard is a software component that allows a user to enter text. Some devices like smartphones and tablets have on-screen or virtual keyboards instead of a physical keyboard.

Braille Keyboard: It is a type of keyboard which is designed for the blind or visually impaired people to input information in a computer. It is characterized by a series of raised dots on each key in a braille cell.

MOUSE

A **mouse** is a **pointing device** that fits comfortably under the palm of your hand. You can use the mouse to select or move items on the screen, as well as to provide instructions for the computer to follow. The top of a mouse has **two buttons** and a **scroll wheel**. The bottom of a mouse is flat and contains a mechanism that detects its movement.

Mouse

Types of Mouse

Mechanical Mouse: A mechanical mouse has a rubber ball on its underside. As the user moves the mouse around on the desktop, the ball rolls with these movements. This detects the mouse movement in any direction.

Optical Mouse: An optical mouse uses a red light emitting diode (LED) and an optical sensor in place of a ball or roller. Movement is detected by sensing changes in the reflected light.

Wireless Mouse: A wireless mouse is a battery-powered device that transmits data through wireless technology, such as radio waves or infrared light waves.

Air Mouse: An air mouse is a new type of motion-sensing mouse that, in addition to the typical buttons, allows you to control objects by moving the mouse in predetermined directions through the air.

Touch Mouse: A touch mouse is a touch-sensitive mouse that recognizes touch gestures. You press a location on a touch mouse to simulate a click, sweep your thumb on the mouse to scroll pages, or slide multiple fingers across the mouse to zoom.

TOUCHPAD

A **touchpad** is a flat, pressure-sensitive surface that is used in notebook computers. You can move the pointer on the screen by moving your finger along the surface of the pad. On some touchpads, you can also tap the pad surface to use mouse operations, such as clicking. Some touchpads also recognize touch gestures, such as swipe, pinch, and stretch motions.

Touchpad

Joystick

JOYSTICK

A **joystick** is a **pointing device** which is used to control the actions in a computer game. It has a vertical lever mounted on a base. You move the lever in different directions to control the actions in a game.

GRAPHIC TABLET

Graphic tablet, also called **Digitizer**, is an **input device** which has a special pen (stylus) to write on it. It is used to draw images on the computer as well as give instructions to the computer.

Graphic Tablet

Touch Screens

TOUCH SCREEN

A **touch screen** is a screen that you can touch with your finger to input information. Your finger acts as the pointing device. Tablet PCs, Smartphones, and ATMs use touch screen to input instructions.

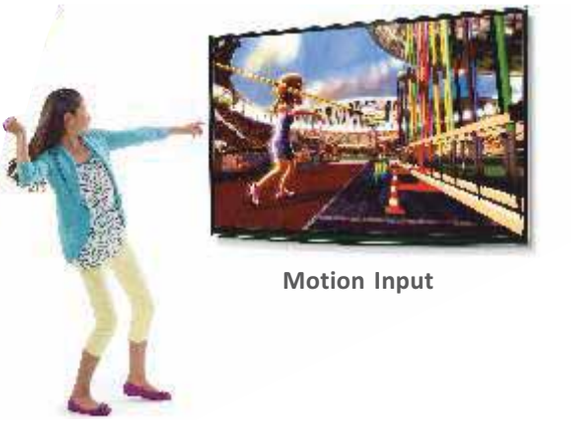
Update Your Knowledge

You usually interact with a touch screen using gestures. A **gesture** is a motion you make on a touch screen with the tip of one or more fingers of your hand.

Gesture	Description	Common Uses
Tap	Quickly touch and release one finger one time.	Activates a link or presses a button
Double-tap	Quickly touch and release one finger two times.	Runs a program or app, or zooms in
Press and hold	Press and hold one finger to cause an action to occur, or until an action occurs.	Displays a shortcut menu
Drag or slide	Press and hold one finger on an object, and then move the finger to the new location.	Moves an item around the screen
Swipe	Press and hold one finger, and then move the finger horizontally or vertically on the screen.	Scrolls
Stretch	Move two fingers apart.	Zooms in
Pinch	Move two fingers closer.	Zooms out

MOTION INPUT

Motion input lets the user guide on-screen elements using air gestures. **Air gestures** involve moving your body or a handheld input device through the air. With motion input, a device containing a camera detects your gesture and then converts it to a digital signal that is sent to a computer or game device. For example, gamers stretch their arm back and then throw the Javelin in the forward direction.



Motion Input

Digital Camera

DIGITAL CAMERA

A **digital camera**, also called **digicam**, is an electronic **input device** used to capture and store photographs electronically in the computer.

MICROPHONE

Microphone is a **voice input device** used to send voice into the computer. You can use the microphone for instant messaging that supports voice conversations and to record your voice.

Microphone

Flatbed Scanner

Handheld Scanner

SCANNER

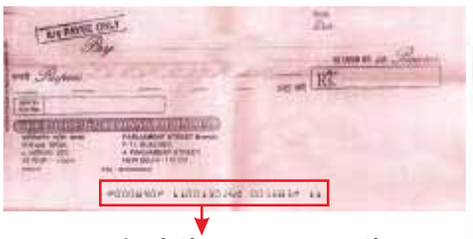
A **scanner** is an **input device** used to send images and text directly into a computer. You can scan images such as photographs, drawings, and logos into a computer. Commonly used scanners are:

- **Flatbed Scanner:** This scanner works similar to a photocopy machine except that it creates a file in computer memory instead of a paper copy.
- **Handheld Scanner:** It is a portable device that can be held in one hand. It is dragged or held over the object to be scanned. It is mostly used in shopping stores.

BARCODE READER

Most products you buy in the market have barcodes on them. A **barcode** is a set of lines of different thickness that gives digital information about the product like its price, manufacturing date, etc. **Barcode reader**, also called a **barcode scanner**, is used to input data from barcodes.

Barcode Reader



Magnetized Characters on a Cheque

MICR Reader

MAGNETIC INK CHARACTER RECOGNITION READER (MICR READER)

MICR reader is an **input device** used to read and identify magnetized characters printed on a document such as a bank cheque.

Output Devices

An **output device** is any hardware component that can convey information to a user. The different output devices are:

MONITOR

Monitor is an **output device** that looks like a TV screen. It displays the work done by you or the information you get after **processing**. Information on monitor exists electronically and is displayed for a temporary period of time. For this reason, information on the monitor is also referred to as **soft copy**. Monitor is also known as **screen**, **display** and **visual display unit (VDU)**.


Monitor

PRINTER

Printer is an **output device** that gives you the output on a physical medium such as on paper called **printouts**. The information we get as a printout on a paper is called **hard copy**. Printers can be classified into two categories: Impact and Non-Impact Printers. Printers that have direct contact between printer head and paper are known as **Impact Printers**, and printers that do not have direct contact between printer head and paper are known as **Non-Impact Printers**.

Types of Printers

Laser Printer: This printer is a **non-impact** printer that uses laser technology to print text or images on paper. It gives the best quality output and is expensive. The speed of this printer is measured in **ppm** (pages per minute).


Laser Printer


Inkjet Printer

Inkjet Printer: This printer is a **non-impact** printer that outputs text and images by spraying ink on the paper. Inkjet printers produce the text and graphics in both black-and-white, and color. The speed of this printer is measured in **lpm** (lines per minute).

Dot Matrix Printer: This printer is an **impact** printer that contains movable print head with pins that strike the ribbon, placing dots on the paper. These printers are less expensive, slow in working, and are very noisy. The speed of this printer is measured in **cps** (characters per second).


Dot Matrix Printer


Speakers

SPEAKERS

The **speakers** are **output devices** that produce music, speech, or other sounds that your computer generates or processes.

DATA PROJECTOR

A **data projector** is an **output device** that projects the data, being displayed on a computer screen, on a larger screen so that the audience can see the data clearly.


Data Projector


Smartboard

SMARTBOARD

A **smartboard** is an **output device** that displays the images on a connected computer screen, usually via a data projector. Notes written on it can be saved directly on the computer. These are generally used in classrooms as a teaching tool and to enhance the delivery of presentations. Smartboard can be hung on a wall or mounted on a stand.

Storage Devices

The **storage devices** enable you to store data and information. They can hold data, instructions, and information for future use. The different storage devices are:

HARD DISK DRIVE

The **hard drive**, also called the **hard disk drive (HDD)** or the **hard disk**, is the main permanent storage device of your computer. The hard drive sits inside the computer case, and stores your programs and documents. It is a disk pack that consists of many inflexible, circular platters that use magnetic particles to store data, instructions, and information. Most current hard drives have storage capacities from 500 GB to 8 TB, and even more.

Hard Disk Drive

OPTICAL DISC

An **optical disc** is a type of storage media that consists of a flat, round, portable disc made of metal, plastic and lacquer that is written and read by a laser. Some optical disc formats are **read only**; it means users cannot write (save) on the media. Others are **read/write**, which allow users to save data on the disc just as they save it on a hard disk. Nearly every personal computer today has some type of optical disc drive installed in its system unit.

Optical Disc

Compact Disc

A **Compact Disc (CD)** is a flat, round, portable, metal storage medium that is usually 4.75 inches in diameter, and less than one-twentieth of an inch thick. Two basic types of compact discs designed for use with computers are CD-ROM and DVD-ROM.

CD

- A **CD-ROM**, which is an abbreviation for **Compact Disc-Read Only Memory**, is a compact disc that may contain text, graphics and video as well as sound. A CD-ROM can hold up to 700 MB of data, instructions, or information. CD-ROM drive is used to read data from CD-ROM.
- A **DVD-ROM**, also known as **Digital Versatile Disc-Read Only Memory** or **Digital Video Disc-Read Only Memory**, is very similar to CD-ROM but can store much more data. A DVD can hold from 4 GB to 7.5 GB of data. DVD-ROM drive is used to read data from DVD-ROM.

Recordable CD (CD-R) and DVD (DVD-R)

A **CD-R** and **DVD-R** are multi-session compact discs on which you can record your data such as text, graphics, and audio. With a CD-R or DVD-R, you can write on one part of the disc at a time and on the other part later. You can write on each part only for once, and you cannot erase the disc contents.

Re-writable CD (CD-RW) and DVD (DVD-RW)

A **CD-RW** and **DVD-RW** are **erasable discs** that allow you to write multiple times. These discs act like a hard disk, allowing you to write and rewrite data and information on them multiple times. To write on these discs, you must have a CD/DVD-RW software and a CD/DVD-RW drive.

Blu-ray Disc

Blu-ray is a new DVD format, which has a higher capacity and better quality than a standard DVD. A Blu-ray Disc-ROM (BD-ROM) has storage capacity of 100 GB. **Blu-ray Disc (BD) drives** and **players** are used to play or run Blu-ray discs.

FLASH DRIVE

Flash drives, also known as **pen drives**, are one of the newest forms of computer storage devices that are plugged in a **USB (Universal Serial Bus) port** on a computer. Pen drive is portable and lightweight. It has a storage capacity ranging from 512 MB to 100 GB and can transfer data at a high speed.

Flash Drive

Memory Card

MEMORY CARD

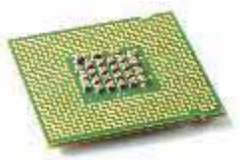
A **memory card** is a removable storage device, usually no bigger than 1.5 inches in height or width, that you insert in or remove from a dedicated slot in a computer, laptop, mobile device, or card reader/writer.

Processing Device

A **processing device** or **processor** is the main chip in the computer which is used to process data. **Processing** means treating the data according to the instructions and changing it in the form of information. Let us study about processor.

PROCESSOR

The **Processor** or **Central Processing Unit (CPU)** is the processing device of a computer. It is also known as the **brain of the computer**. It performs all the calculations and processes data into information. It receives the **input** from **input devices**, **processes** them and sends the processed result to the **output devices**. CPU consists of three units:



CPU

ALU: The **Arithmetic Logic Unit (ALU)** is a component of the processor which performs arithmetic, comparison, and logical operations.

- **Arithmetic operations** include basic calculations such as addition, subtraction, multiplication, and division.
- **Comparison operations** involve comparing one data item with another. For example— greater than, equal to, or less than.
- **Logical operations** use conditions along with logical operators such as AND, OR, and NOT.

Control Unit: The **Control Unit (CU)** controls all the functions of a computer. It checks the results given by ALU. It also checks what to do and when to do.

Memory Unit: **Memory Unit** holds the data that needs to be processed as well as the data that has already been processed by CPU.

CPU MANUFACTURERS

The biggest manufacturer of CPU is **Intel**, which makes the Pentium and Celeron processors. The other CPU maker is **AMD**, which manufactures the Sempron and Athlon chips. Macintosh computers used to make **PowerPC** chips in association with **IBM** and **Motorola**.

MULTI-CORE PROCESSOR

Most processor chip manufacturers now offer **multi-core processors**. A processor core contains the circuitry necessary to execute instructions. The operating system views each processor core as a separate processor. A **dual-core processor** is a chip that contains two separate processor cores. A **quad-core processor** is a chip with four separate processor cores.

Self-Evaluation

CHECKLIST

After reading the chapter, I know these points:

	Agree	Disagree
I know that a computer is an electronic device that accepts data, processes it, produces the result, and stores it for future use.	☐	☐
I know that input devices are used to enter data and instructions into a computer.	☐	☐
I know that output devices are used to convey information to a user.	☐	☐
I know that the storage devices are used to store data for future use.	☐	☐
I know that processing means treating the data according to the instructions and changing it in the form of information.	☐	☐

Exercises

A. Tick [✓] the correct answer.

1. A scanner is an ..... device.
   a. input ☐ b. output ☐ c. processing ☐
2. Treating data according to the instructions and changing it into information is called:
   a. output ☐ b. processing ☐ c. input ☐
3. CD-ROM and DVD-ROM are the examples of ..... device.
   a. storage ☐ b. input ☐ c. output ☐
4. The hardware components that convey information to the user are called ..... device.
   a. processing ☐ b. output ☐ c. input ☐
5. ALU, CU, and MU are the parts of ..... .
   a. monitor ☐ b. pen drive ☐ c. CPU ☐

B. Write 'T' for True and 'F' for False statements.

1. A keyboard has two buttons on the top of it. ☐
2. Joystick is mainly used to play games on a computer. ☐
3. The output or result we get on a paper is called soft copy. ☐
4. We should move two fingers apart to zoom in the touch screen. ☐
5. The speed of Inkjet printer is measured in lines per second. ☐

C. Fill in the blanks.

1. ..... is any data or instruction entered into the computer.
2. Data that has been processed into a useful form is called ..... .
3. ..... printers have direct contact between printer head and paper.
4. Hard drives have storage capacities from ..... to ..... .
5. The height and width of a memory card is usually no bigger than ..... .

D. Write the full form of the following.

1. VDU .....
2. ALU .....
3. PPM .....
4. CPU .....
5. CU .....
6. LPM .....

E. Define the following.

1. Barcode Reader: .....
.....
2. MICR: .....
.....
3. Digicam: .....
.....
4. Pen Drive: .....
.....

F. Differentiate between the following.

1. Mechanical Mouse .....
.....
.....

Optical Mouse .....
.....
.....

2. Impact Printer .....
.....
.....

Non-impact Printer .....
.....
.....

3. Recordable CD .....
.....
.....

Re-writable CD .....
.....
.....

G. Answer in 1-2 sentences.

1. What is a virtual keyboard?
.....
.....
2. What is motion input?
.....
.....
3. Why should you prefer Laser printer over Dot Matrix printer?
.....
.....

H. Answer briefly.

1. How does a computer work?

.....

.....

.....

2. What is the use of storage devices?

.....

.....

.....

3. What is CPU? Name its units.

.....

.....

.....

I. Application-based Question

You went to a shopping centre with your family. On the billing counter, there was a computer system. Which input and output devices you saw at the billing counter?

.....

Group Discussion

Discuss the various Input, Output, Storage, and Processing devices.

Online Link

To learn more about working of computer and its components, visit the website:

https://www.slideshare.net/hrsraj1997/ppt-on-input-output-devices

Activity Section

Lab Activity

Make a presentation on computer devices using relevant pictures.

Now, follow these instructions:

a. Create a folder named **'Lab Activity'** and a sub-folder named **'Images'** in any drive.

b. Make a presentation consisting of five slides which include Introduction Slide, Input Devices, Output Devices, Storage Devices and Processing Devices.

c. You can search for pictures using the Google search engine and save the pictures in the 'Images' sub-folder.

d. Apply different slide transition and animation effects on the slides.

e. Save the presentation as **'Computer Devices'** in the main folder **'Lab Activity'**.

f. Run the presentation.

Skill Formation

This activity enhances the information-searching, organizational, and presentation skills of the students.

Discover More

QR CODE

What is a QR code?

A **QR code** (**quick response code**) is a type of 2D barcode that is used to provide easy access to the information through a smartphone. It was initially used for the automotive industry in Japan to track vehicles during the production process. Today, QR code is often used in banking, publications and advertisements to obtain information. It directs users to a website, suggests them to download a file or an app, or to make a payment. Nowadays, QR code is mainly used for making online payments, e.g. **Paytm**.

Scanning a QR Code

When you see a QR code that you want to scan, you should use an app capable of reading QR codes. The following steps guide you through the process of scanning a QR code.

1. Download and install an app that can read QR codes.
2. When you see a QR code you want to scan, run the app on your mobile device or computer.
3. Select the option to scan the QR code.
4. Hold the device still and point its camera towards the QR code to scan it.
5. Once your device scans the QR code, it will display the associated information. If the QR code represents a web address, the app will run in a browser and navigate to that address.

Generating a QR Code

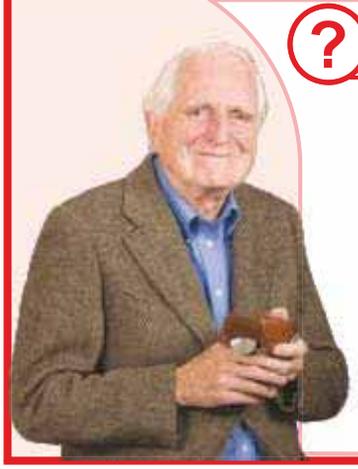
You can generate a QR code to make it easier for others to navigate to a particular website or access the information provided by you. The following steps describe how to generate a QR code.

1. Use a search engine to locate a website that contains a QR code generator and open it.
2. Enter the information, such as a web address, phone number, words, or short information, that you want the QR code to contain, and then click the button to generate the QR code.
3. Copy the generated QR code image and then paste it in the desired location.

You should scan the QR code to make sure it displays the correct information.

Technology Trailblazers

Douglas Engelbart



? INVENTION: MOUSE

YEAR: 1964

The mouse that we all use mostly on desktop computer was developed by **Douglas Engelbart**. Douglas Engelbart conceived the idea of the **mouse** in 1950 to help humans work more efficiently. Fourteen years later in 1964, he developed the first prototype with the goal of making it easier for people to move a cursor around a computer screen.

The first computer mouse, constructed in 1964, was made out of wood.

In **1974**, engineers at **Xerox** refined Engelbart's prototype and showed the redesigned product to Apple's Steve Jobs, who applied the concept to his graphical Macintosh computer.

2 Computer Memory

OBJECTIVES

After completing this chapter, you will be able to:

- Understand computer memory and its units.
- Understand the types of computer memory.
- Understand the layers and use of cache memory.

Computer Memory

Memory plays a very important role in a computer. It is the basic unit where data and instructions are stored temporarily. Memory usually consists of one or more **chips** on the motherboard, or you can say it consists of electronic components that store instructions waiting to be executed by the processor, data needed by those instructions, and the results of processing the data.

A computer system is also equipped with some additional memory devices which are generally used to store programs, applications, data, and information permanently. Before studying about different types of memory, let us study about memory units in computer.

Memory Units

Just like solids are measured in **grams (g)** or **kilograms (kg)** and liquids are measured in **litres (l)** or **millilitres (ml)**, similarly the computer memory is measured in **bits** or **bytes**.

A computer processes and stores data and instructions in the form of two digits, 0 and 1. These digits are called the **binary digits** or **bits**. A **bit** is the smallest unit of information that a computer can process and store. A group of **4 bits** is known as **nibble,** and a group of **8 bits** is called **byte**. A **byte** is the minimum space required to store a character.

The table given below shows the units of memory and their equivalents.

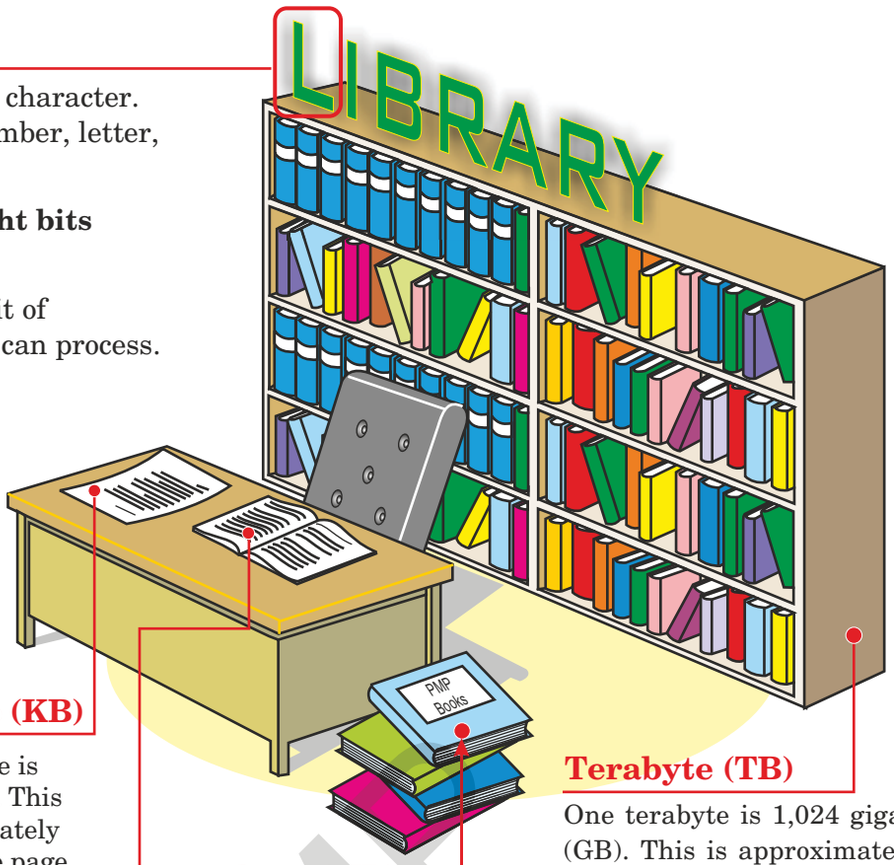
1 Byte (B)	=	1 character
1 Kilobyte (KB)	=	1024 Bytes (about 1 thousand characters)
1 Megabyte (MB)	=	1024 Kilobytes (about 1 million characters)
1 Gigabyte (GB)	=	1024 Megabytes (about 1 billion characters)
1 Terabyte (TB)	=	1024 Gigabytes (about 1 trillion characters)
1 Petabyte (PB)	=	1024 Terabytes (about 1 quadrillion characters)
1 Exabyte (EB)	=	1024 Petabytes (about 1 quintillion characters)
1 Zettabyte (ZB)	=	1024 Exabytes (about 1 sextillion characters)
1 Yottabyte (YB)	=	1024 Zettabytes (about 1 septillion characters)
1 Brontobyte (BB)	=	1024 Yottabytes (about 1 octillion characters)

Byte (B)

One byte is equal to one character. A character can be a number, letter, or symbol.

One byte consists of **eight bits (binary digits)**.

A **bit** is the smallest unit of information a computer can process.



Petabyte (PB)

One **petabyte** is 1,024 terabytes (TB). This is approximately equal to a room full of books.

Kilobyte (KB)

One kilobyte is 1,024 bytes. This is approximately equal to one page of text of a book.

Terabyte (TB)

One terabyte is 1,024 gigabytes (GB). This is approximately equal to an entire book stand.

Megabyte (MB)

One megabyte is 1,024 kilobytes (KB). This is approximately equal to one book.

Gigabyte (GB)

One gigabyte is 1,024 megabytes (MB). This is approximately equal to a bunch of books.

Basically, the computer memory is divided into two types—**Primary Memory** and **Secondary Memory**.

Primary Memory

Primary memory is often known as the **working memory** or the **main memory** of a computer system. Primary memory is of two types—**volatile** and **non-volatile**. When the computer power is turned off, **volatile** memory loses its contents. **Non-volatile memory (NVM)**, in contrast, does not lose its contents when the computer is turned off.

RAM and **ROM** are two major types of primary memory. They are made up of semiconductor material. A computer cannot run without primary memory.

Update Your Knowledge

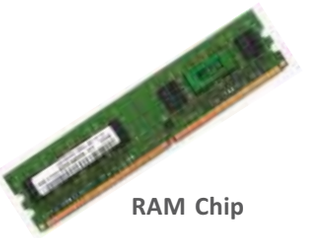
A **byte** (character) is the basic storage unit in memory. When an application instructions and data are transferred to memory from storage devices, the instructions and data exist as bytes. Each byte resides temporarily in a location in memory that has an address.

Do You Know?

Memory is like a carpenter's workshop. The raw materials are stored in another room (the **hard drive**) and the carpenter (**CPU**) brings them into the workshop (**memory**) when they are needed. When the carpenter has completed the work, the finished piece is moved from the workshop (**memory**) back to the room (**storage**).

RAM (Random Access Memory)

RAM, also called **main memory**, consists of memory chips that can be read from and written to by the processor and other devices. When you turn on a computer, certain operating system files are loaded into RAM from a storage device such as a hard disk. These files remain in RAM as long as the computer is on. When additional applications and data are requested, they are also loaded into RAM from the storage device.



RAM Chip

The processor (CPU) interprets and executes a program or application instructions while the program or application is in RAM. During this time, the contents of RAM may change. RAM can accommodate multiple programs and applications simultaneously.

RAM is a **volatile memory**. It loses its contents as soon as the computer is turned off. For this reason, you must save the work you may need in the future. **Saving** is the process of copying items from RAM to the hard disk.

Types of RAM

Three common types of RAM chips are: Dynamic, Static, and Magnetoresistive RAM.

Dynamic RAM (DRAM) is inexpensive and the most popular type of main memory used in computers. Many variants of DRAM chips exist, most of which are faster than the basic DRAM.

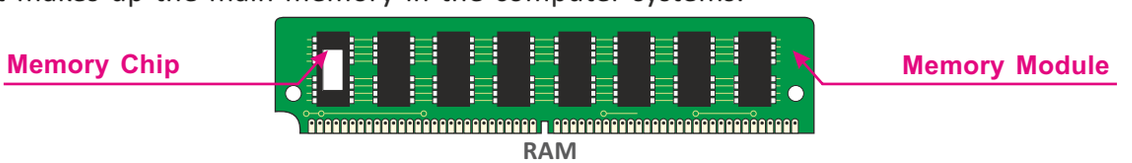
- **SDRAM (Synchronous DRAM):** It is faster and more reliable than DRAM.
- **DDR SDRAM (Double Data Rate SDRAM):** It is faster than SDRAM and transfers data twice, instead of once, for each clock cycle.
- **DDR2:** It is the second generation of DDR with faster speed.
- **DDR3:** It is the third generation of DDR which is designed for computers with multi-core processors. It is faster than DDR2.
- **DDR4:** It is the fourth generation of DDR which is even faster than DDR3.
- **RDRAM (Rambus DRAM):** It is much faster than SDRAM.

Static RAM (SRAM) is efficient and fast, but is very expensive. SRAM is used in small amounts as cache memory in a computer. Cache memory improves the performance of a computer by storing the data which the computer frequently uses.

Magnetoresistive RAM (MRAM) is a newer type of RAM which stores data using magnetic charges instead of electrical charges. Its manufacturers claim that it has greater storage capacity, consumes less power, and has faster access time than other RAMs. MRAM retains its contents even after the computer is switched off, which could prevent loss of data for users.

Memory Module

A memory module is a **circuit board** that holds memory chips. RAM is a type of memory chip that makes up the main memory in the computer systems.



RAM

Two types of memory modules are SIMMs and DIMMs. A **Single In-Line Memory Module (SIMM**) has pins on opposite sides of the circuit board that connect together to form a single set of contacts. With a **Dual In-Line Memory Module (DIMM)**, the pins on opposite sides of the circuit board do not connect and, thus, form two sets of contacts.

ROM (Read Only Memory)

ROM refers to memory chips used for storing data that can be read only. The data on ROM chips cannot be modified, hence, the name read only memory. ROM is **non-volatile**. Its contents are not lost even when the computer is switched off.

ROM chips contain data, instructions, or information that are recorded permanently. For example, ROM contains the **basic input/output system (BIOS)**, which is a sequence of instructions the computer follows to load the operating system and other files when you first turn on the computer. Many other devices also contain ROM chips. For example, ROM chips in many printers contain data for fonts.

Manufacturers of ROM chips often record the data, instructions, or information on the chips when they manufacture them.

Some of the variations of the ROM chips are —

ROM Chip

1. A **Programmable Read-Only Memory (PROM)** chip is a blank ROM chip on which you can place items permanently. Programmers use microcode instructions to program a PROM chip.
2. An **Erasable Programmable ROM (EPROM)** is another type of ROM, the contents of which are erased by ultraviolet light and then it can be reprogrammed.
3. An **Electrically EPROM (EEPROM)** is another variation of the PROM chip, which allows a programmer to erase the microcode with an electric signal and can be reprogrammed.

Cache Memory

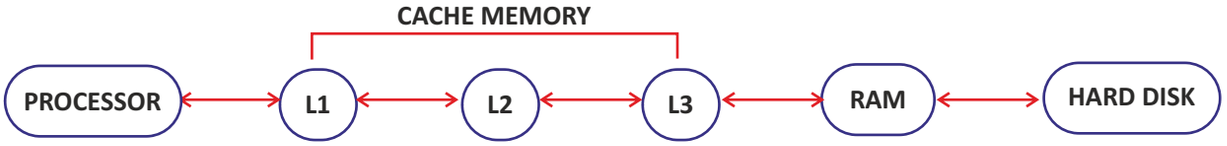
Cache is a temporary storage area for instructions and data that enhances the CPU speed. Most of the today's computers improve their processing time with **cache memory**. Cache improves the processing speed of the computer because it stores frequently used instructions and data. Cache is built directly in the processor chip. Most modern computers have three types or layers of cache memory: Level 1, Level 2, and Level 3.

L1 cache is built directly on the processor chip. It usually has a very small capacity.

L2 cache is slightly slower than L1 cache but has a much larger capacity.

L3 cache is a cache on the motherboard that is separate from the processor chip.

When the processor needs an instruction or data, it first searches cache in the order: L1 cache, then L2 cache, and then L3 cache. If it does not locate the item in any cache, then it searches **RAM**. If the instruction or data is not found in RAM, then it searches it in a storage device such as hard disk.



Secondary Memory

Secondary memory is used to store data for a long time. It operates at a slower rate than primary memory. This memory is **permanent** in nature, i.e. data stored is not lost even when the computer is switched off. So, it is known as **non-volatile memory**. It is also known as **backup memory**. The main example of secondary memory is hard disk.

Self-Evaluation

CHECKLIST

After reading the chapter, I know these points:

	Agree	Disagree
I know that memory is the basic storage place for data, instructions, and information.	☐	☐
I know that computer memory is measured in bits and bytes.	☐	☐
I know that Primary and Secondary are two types of memory.	☐	☐
I know that the primary memory can be divided into two types: RAM and ROM.	☐	☐
I know that cache is a temporary storage area that enhances the speed of CPU.	☐	☐
I know that secondary memory is used to store data permanently.	☐	☐

Exercises

A. Tick [✓] the correct answer.

1. Primary memory is also known as ..... memory.
   a. backup ☐ b. main ☐ c. basic ☐
2. What is the nature of ROM?
   a. Volatile ☐ b. Non-Volatile ☐ c. Both a. & b. ☐
3. The type of ROM that erases its contents by ultraviolet light is ..... .
   a. EPROM ☐ b. EEPROM ☐ c. PROM ☐
4. A temporary storage area for instructions that enhances the CPU speed is ..... .
   a. cache ☐ b. cash ☐ c. catch ☐
5. Which of the following is a secondary memory?
   a. RAM ☐ b. ROM ☐ c. Hard disk ☐

B. Write 'T' for True and 'F' for False statements.

1. RAM is used to store data permanently. ☐
2. SRAM is efficient and fast, but is very expensive. ☐
3. A memory module is a circuit board that holds memory chips. ☐
4. EEPROM uses ultraviolet light to erase its contents. ☐
5. Cache cannot improve the processing speed of the CPU. ☐

C. Fill in the blanks.

1. The computer memory is measured in ..... or ..... .
2. A group of four bits is known as ..... .
3. ..... is the process of copying items from RAM to hard disk.
4. A newer type of RAM which stores data using magnetic charges is ..... .
5. A DIMM has ..... on opposite sides of the circuit board that do not connect.

D. Differentiate between the following.

	Primary Memory	Secondary Memory
1.	.....	.....
	.....	.....
	.....	.....
2.	RAM	ROM
	.....	.....
	.....	.....
	.....	.....

E. Answer in 1-2 sentences.

1. Write a short note on memory units.

   .....

   .....

2. What do you mean by memory modules?

   .....

   .....

3. Write the different variations of ROM chips.

   .....

   .....

F. Answer briefly.

1. How will you classify memory?

   .....

   .....

   .....

   .....

2. Explain the purpose of cache memory in the computer.

   .....

   .....

   .....

G. Application-based Question

Your father wants to buy a computer for his office work in which multiple files/apps need to be opened simultaneously. For this purpose, what would you suggest him? Give reason.

.....

Group Discussion

Divide the students into two groups and discuss the topic– 'Primary Memory and Secondary Memory'.

Online Link

To learn more about working of computer memory, visit the website:

https://www.geeksforgeeks.org/memory-hierarchy-design-and-its-characteristics/

Activity Section

Lab Activity

Open MS Word and create a document on memory units.

Now, follow these instructions:

a. Create a new sub-folder named **'Memory'** in the **'Lab Activity'** folder.
b. Create a document on various memory units in tabular form.
c. Apply different formatting options on the table.
d. Save the document as 'Memory Unit' in the sub-folder 'Memory'.
e. Print the document and submit it to your teacher.

Skill Formation

This activity enhances the organizational and data management skills of the students.

Discover More

SSD – Fastest Drive

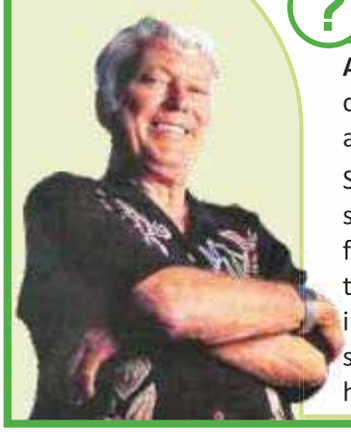
An **SSD (solid-state drive)** is a flash memory storage device that contains its own processor to manage its storage. This drive consists entirely of electronic components, such as integrated circuits, and contains no moving parts like platters. The lack of moving parts makes SSD more durable and shock resistant than other types of media, such as magnetic hard disks or optical discs. SSDs are used in all types of computers, including servers, desktops, laptops, tablets, and a variety of mobile devices.

SSDs have several advantages over traditional (magnetic) hard disks. These are:

- Faster access time (can be more than 100 times faster)
- Faster transfer rate
- More durable and lighterweight
- Less power consumption (leads to longer battery life)
- Longer life (more than 10 times longer)
- Defragmentation is not required

Technology Trailblazers

Alan F. Shugart



Founder: Seagate | **YEAR: 1979**

Alan Shugart is regarded as the father of the disk drive industry. After completing his bachelor's degree in engineering physics in 1951, he landed a job at IBM and developed the first removable hard disk drive.

Shugart then left IBM, became vice-president of Memorex, and then started Shugart Associates and began developing **floppy disks**. In 1979, he founded **Seagate Technology** partnering with a friend. Seagate has been at the forefront of the digital storage world since it developed the first 5.25-inch hard disk for the personal computer in 1980. Today, Seagate has the storage solutions for practically every digital need and is the world's largest hard disk manufacturer.

3 Excel – Creating Worksheet

OBJECTIVES

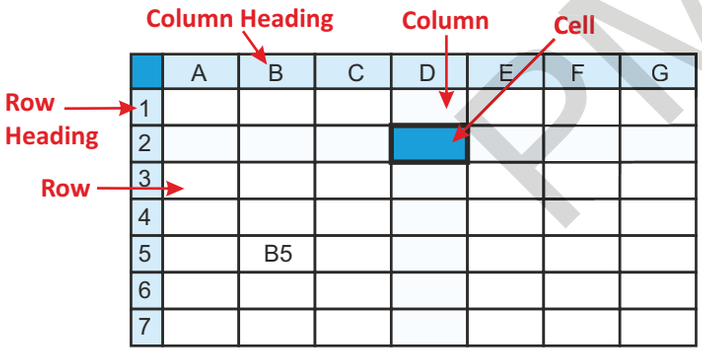
After completing this chapter, you will be able to:

- Understand the uses and features of Excel.
- Create and save a worksheet.
- Apply text formatting and conditional formatting.

Microsoft Excel

Microsoft Excel is a powerful **spreadsheet program** that allows you to organize and maintain data, complete calculations and represent data in graphs.

Excel allows you to organize data in rows and columns. These rows and columns are collectively called **worksheet**. For years, people used manual methods, such as those performed with pencil and paper to organize data in rows and columns. The data in an electronic worksheet is organized in the same manner as it is done in a manual worksheet. Like Word software, Microsoft Excel has some basic features to help you create, edit, and format worksheets.



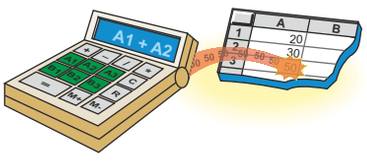
A spreadsheet file is called a **workbook**, which is like a notebook having many individual worksheets. On each worksheet, data is organized vertically in columns and horizontally in rows. Each worksheet of Excel 2016 typically has **16384 columns** and **1048576 rows**.

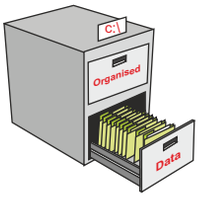
A **letter** identifies each column, and a **number** identifies each row. The column letters begin with **A** and end with **XFD**; row numbers begin with **1** and end with **1048576**. Only a small fraction of these columns and rows is displayed on the screen at a time. To view the different parts of a worksheet, you can use the scroll bar to display it on your screen.

The intersection of a column and a row is called **cell**. A cell is the basic unit of a worksheet in which you enter data. Cell is identified by the column and row in which it is located. For example, the intersection of **column B** and **row 5** is referred to as **cell B5**, which is called **cell address**. Cells may contain three types of data: **labels (text)**, **values (numbers)**, and **formulas (expression)**.

USES OF EXCEL

Manipulating Numbers: Microsoft Excel is best known for manipulating numeric data. You can use Excel to perform any kind of mathematical calculation like quickly tallying your marks in exams, calculating averages of your total marks, etc.





Organize Data: You can also use Microsoft Excel for organizing data. The row and column format of an Excel spreadsheet is perfect for entering many types of data you need to track. After entering the data, you can perform various sorting operations to control how the data is listed.

Store Data as Workbook: In Excel, you can store data which you enter in it as a file called **workbook**. Excel 2016 workbook is stored using the **.xlsx** file extension. Within each workbook, you can store numerous individual worksheets to hold your data.

Share Data: Excel allows you to share your data with other users. You can import data from other sources and export data into other file formats. To share your data with others, you can also save your data as a **PDF** or **HTML** file.

FEATURES OF EXCEL

Edit and Format Data: Excel allows you to efficiently enter, edit, and format data in a worksheet. You can quickly enter a series of numbers, find and replace data, or check data for spelling errors. You can also make your data stand apart in a worksheet by adding borders or changing the font, color, style, or alignment of the data.

Use Formulas and Functions: Formulas and functions allow you to perform calculations and analyze data in a worksheet. Common calculations include finding the sum, average, or total number of values in a list. As you work, Excel checks your formulas for problems and can help you correct common errors in your formulas.

Print Worksheets: You can produce a hard copy of a worksheet you have created. Before printing, you can see on your screen how the worksheet will look when printed. Excel also allows you to adjust the margins or change the size of printed data.

Create Charts and Objects: Excel helps you to create colorful charts from worksheet data to visually display the data. You can also add objects such as AutoShapes and SmartArt to enhance the appearance of your worksheet, and illustrate important concepts.

Starting Excel

Windows must run to start Excel.

1. Click on the **Start** icon *(or press ⊞)*. The Start menu will appear.

A list of all the installed Apps appears on the left of the start menu.

2. Scroll down the list and click on **Excel 2016**.

The Excel opens and displays its Start screen.

3. Click on **Blank workbook**.

An empty workbook titled **Book1** is displayed in the Excel window.

Project: Annual Progress Report

Start

Progress Report							
Roll No.	Name	English	Hindi	Maths	Science	Computer	Total
1	Rahul Sharma	70	55	60	65	80	330
2	Sanjay Kapoor	80	60	70	80	60	350
3	Tarun Soni	75	80	90	70	80	395
4	Pinki Ahuja	65	50	60	55	60	290
5	Manoj Kumar	80	60	90	50	60	340
6	Rajesh Singh	80	80	70	60	70	360
7	Reema Soni	70	60	50	70	60	310
8	Dilip Verma	75	65	70	65	80	355
9	Alok Srivastava	80	55	80	65	90	370
10	Kavita Binjola	55	70	60	80	70	335
						Average	343.5
						Max	395
						Min	290

This project deals with creating worksheet by organizing data in rows and columns, editing and formatting it, and finally using formula and function in it. Let us make the project by using various features of Excel.

Subject Integration

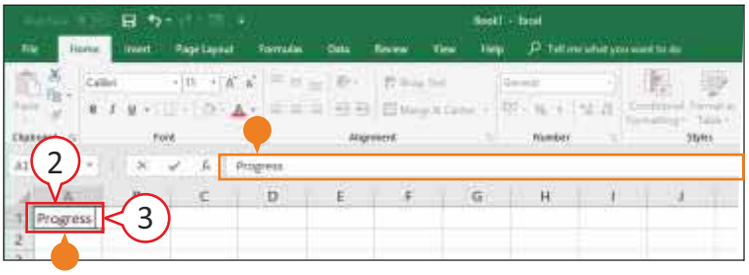
Mathematics

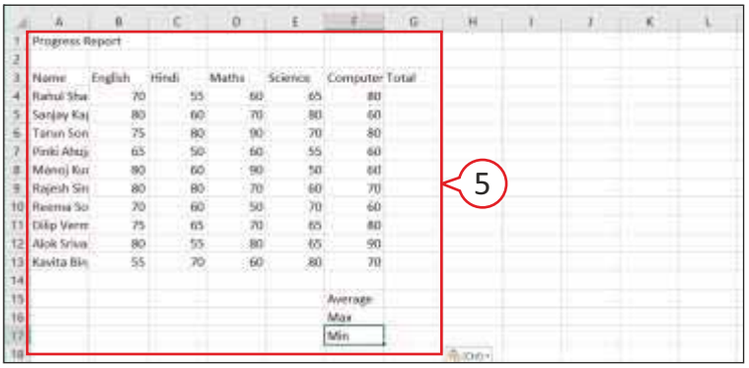
This integration will make the students learn to convert data into meaningful information using formulas.

Creating Worksheet

ENTERING DATA

Entering data is the first step in creating a worksheet. You can enter data in the form of numbers or text. The simplest method is to click on a cell and begin typing. Once you press **Enter** key or click on a different cell, the data is entered into the cell. Excel automatically **left-aligns** the text data and **right-aligns** the numbers in a cell.





1. Open a blank worksheet.
2. Click on the cell where you want to enter data.
3. Type the data.
   - The data you type appears in the **active cell** and in the **Formula bar**.
4. Press **Enter** key to enter the data and move down one cell.

To enter the data and move one cell in any direction, press **Arrow** keys from keyboard.

5. Repeat steps **2** to **4** until you finish entering all your data.

SAVING A WORKBOOK

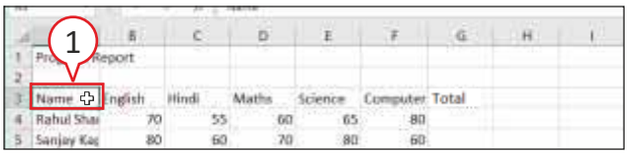
While working in Excel, you must save your workbook to reuse it or share it with others. Saved file can be used on other computers also. By default, Excel workbooks are saved in the Excel file format which uses the **.xlsx** file extension.

Note: *Steps for saving the Excel file are same as saving an MS Word file.*

SELECTING CELLS

You have to select cells in Excel to perform tasks like editing, calculating and formatting. The easiest way to select a cell (make it active) is to move the mouse pointer to the cell and click on it. You can also select a cell in a worksheet using the **Arrow** keys (on the keyboard). An Arrow key selects the cell adjacent to the active cell in the direction of the arrow on the key. A cell is selected (active) when a **dark border** surrounds it, and the active **cell reference** displays it in the **Name box** on the left side of the Formula bar. Selected cells are highlighted on your screen. Selected group of cells is also called a **Range**.

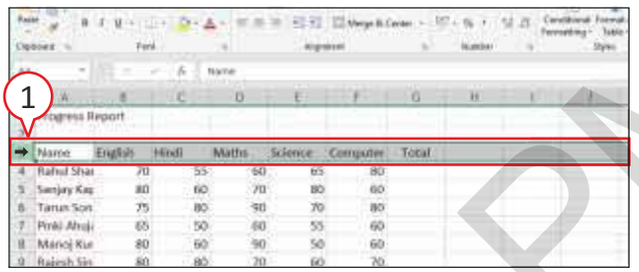
To Select a Cell



1. Click on the cell you want to select.

The cell becomes the active cell and displays a dark border.

To Select a Row Range

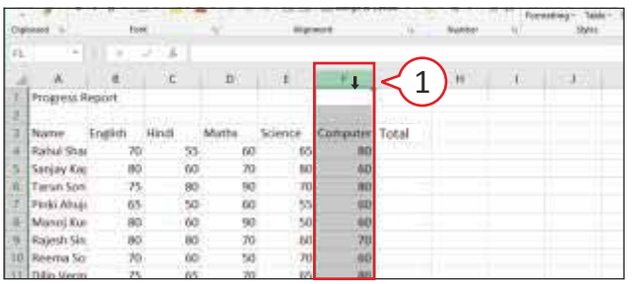


1. Click on the number of the row or row heading you want to select. (*or press Shift+Space*)

The mouse pointer changes its shape to (➞).

To select multiple rows, place your mouse pointer (➞) over the number of the first row you want to select. Then drag the mouse pointer (➞) until you highlight all the rows you want to select.

To Select a Column Range

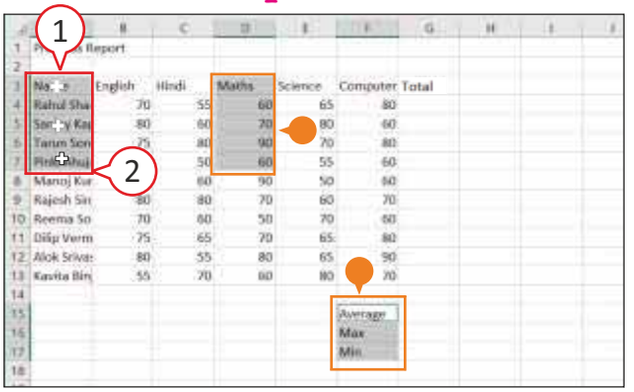


1. Click on the letter of the column or column heading you want to select.
(*or press Ctrl+Space*)

The mouse pointer changes its shape to (⬇).

To select multiple columns, position the mouse pointer (⬇) over the letter of the first column you want to select. Then, drag the pointer (⬇) until you highlight all the columns you want to select.

To Select a Group of Cells



1. Place your mouse pointer (✥) over the first cell you want to select.
2. Drag the mouse (✥) until you highlight all the cells you want to select.

- To select multiple groups of cells, press and hold down the **Ctrl** key as you repeat steps **1** and **2** for each group of cells you want to select.

EDITING DATA IN THE WORKSHEET

In a spreadsheet program like Excel, **editing** means the process of making changes to any data or cells in the worksheet. You can edit the data in your worksheet to correct a mistake or update the data. For example, you might want to change the numeric values you entered or add additional text to a cell.

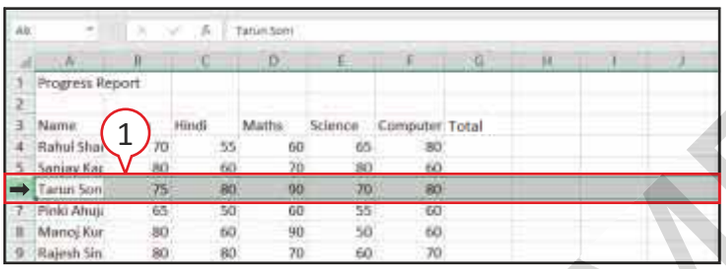
1. **Double-click** on the cell containing the data you want to edit. (*or press F2)*

A flashing insertion point appears in the cell.

2. Press the **Arrow** keys from the keyboard to move the insertion point from where you want to remove or add characters.
3. To remove the character to the left of the flashing insertion point, press the **Backspace** key.
4. To add the data where the insertion point flashes on the screen, type the data.
5. When you finish making changes to the data, press the **Enter** key.

DELETING DATA

You can delete Excel data that you no longer need. You can delete the data from a single cell or from several cells at once.



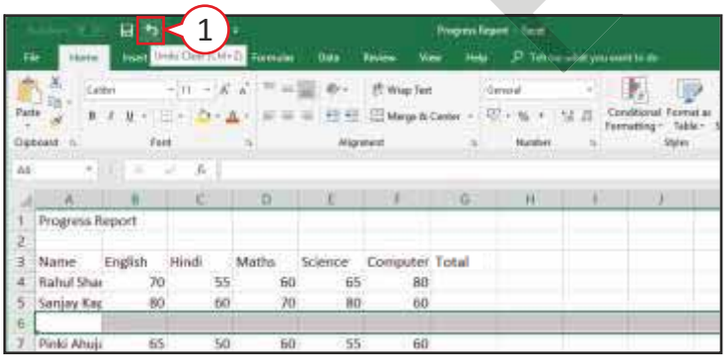
1. Select the cells containing the data you want to delete.
2. Press the **Delete** key.

The data in the selected cells disappears.

To deselect cells, click on any other cell.

UNDOING CHANGES

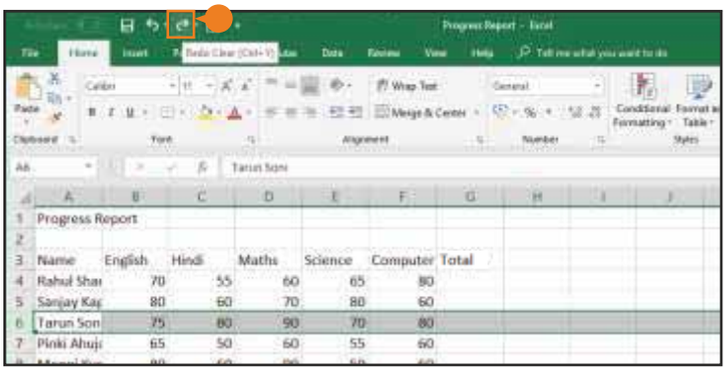
Excel remembers the last change you made to the worksheet. If you do not want to make these changes, you can cancel them using the Undo feature.



1. Click on **Undo** ( ) button to undo the last change you have made to the worksheet *(or press Ctrl+Z)*.

Excel cancels the last change you made to the worksheet.

You can repeat step **1** to cancel previous changes that you have made.



- To reverse the results of using the Undo feature, click on **Redo** ( ) button *(or press Ctrl+Y)*.

MOVING AND COPYING DATA

In Excel, you can use the Cut, Copy, and Paste commands to copy or move data, and share data among other MS-Office programs. For example, you might need to cut a row of labels and paste them into another worksheet, or copy a formula from one cell to another cell in the same worksheet. You can also drag and drop data to move and copy it within a worksheet.

Moving data allows you to re-organize data in your worksheet. When you move data, the data disappears from its original location.

Copying data allows you to repeat data in your worksheet without having to retype it. When you copy data, it appears in both the original and the new locations.

1. Select the cell or cells containing data you want to move or copy.
2. Click on **Home** tab.
3. Click on one of the following buttons from the toolbar:

   Cut text ( ) *(or press Ctrl+X)* **Copy text ( )** *(or press Ctrl+C)*

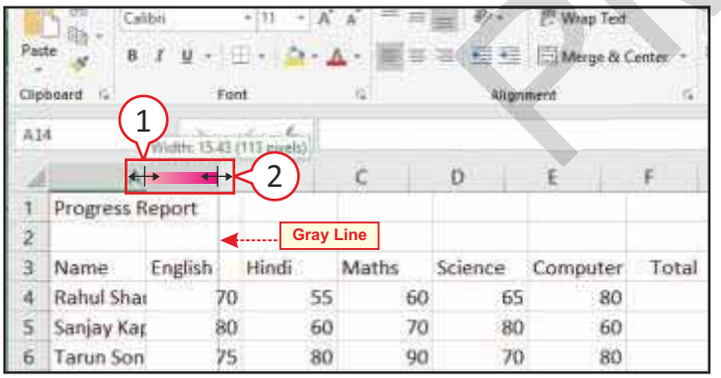
*The data will be copied or moved according to your selection in **step 3**.*

4. Click on the cell where you want to paste the data.
5. Click on **Paste** ( ) button to place data in new location*(or press Ctrl+V)*.

Data appears in the new location.

CHANGING COLUMN WIDTH

You may want to adjust the width of the columns for accommodating the data properly. This is especially useful if data displayed in the cells is too broad to be completely viewed within the standard column width. The default column width of a cell is approx **8.43** (measured in characters).



1. To change the width of a column, place mouse over the right edge of the column heading.

The mouse pointer changes to (↔).

2. Drag the column edge until the gray line displays the column width you want.

The column will display the new width.

You can also change the height of the rows, besides adjusting the width of the columns, in your worksheet. It has many uses and enhances the look of your worksheets. The default row height is approx **15.00** (measured in points).

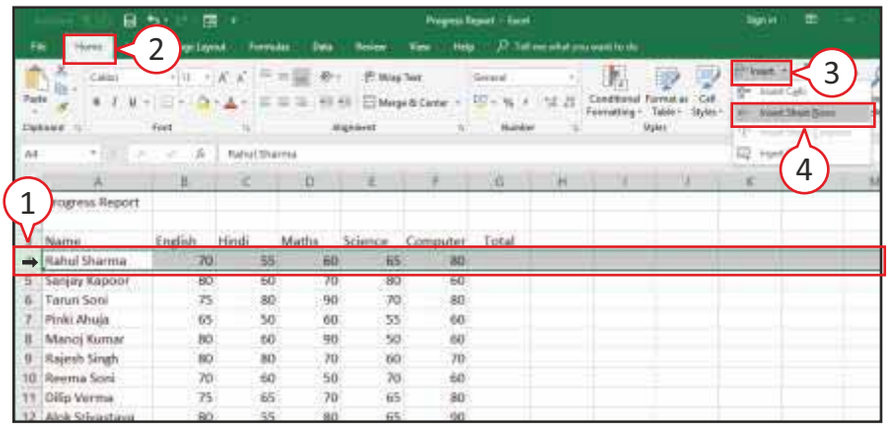
AutoFit feature

AutoFit feature is used to automatically adjust the column width to fit the widest item in a column and row height to fit the tallest item in a row.

- Click any cell in the column/row, click on **Home**, click **Format**, and then click on **AutoFit Column Width/Row height**.
- Alternatively, you can also double-click the right border of column or the bottom edge of row heading to quickly activate the AutoFit command.

INSERTING A ROW

You can insert rows in your worksheet to add more data.

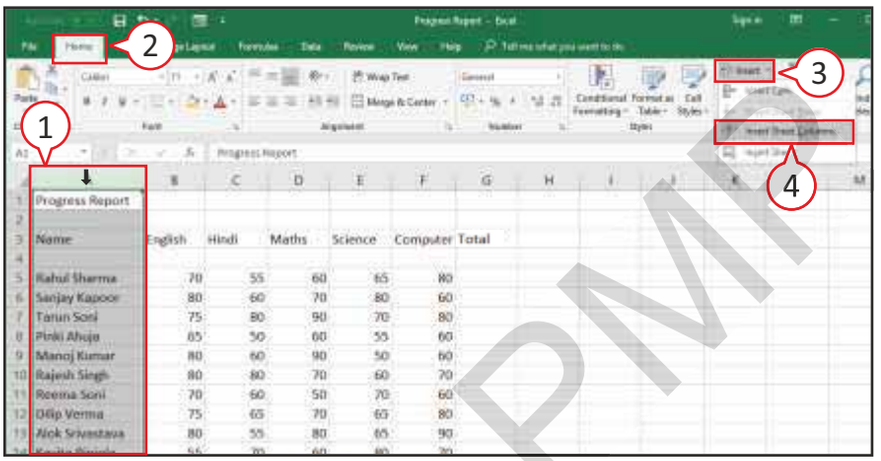


1. Select the row where you want to insert a new row.
2. Click on **Home** tab.
3. Click on the down arrow of the **Insert**.
4. Click on **Insert Sheet Rows**. (*or press Alt+I+R*)

The new row will appear, and all the rows that follow shift downwards.

INSERTING A COLUMN

You can add a column to your worksheet to insert additional data.



1. Select the column where you want to insert a new column.
2. Click on **Home** tab.
3. Click on the down arrow of the **Insert**.
4. Click on **Insert Sheet Columns**. (*or press Control+Shift+*)

The new column appears, and all the columns that follow shift to the right.

DELETING ROW AND COLUMN

You can remove columns or rows that you no longer need in your worksheet. When you delete an entire column or row, Excel deletes all the existing data within the selected cells. Excel also moves over the other columns and rows to fill the space left after deletion.

Deleting a Column

1. Select the column that you want to delete.
2. Click on the **Home** tab, then click on the down arrow of **Delete**.
3. Click on **Delete Sheet Columns**.

Excel will delete the column.

Deleting a Row

1. Select the row that you want to delete.
2. Click on **Home** tab, then click on the down arrow of **Delete**.
3. Click on **Delete Sheet Rows**.

Excel will delete the row.

INSERTING AND DELETING CELLS

You can insert cells if you want to add the data in the middle of existing data in the worksheet. The surrounding cells move to make room for the new cells.

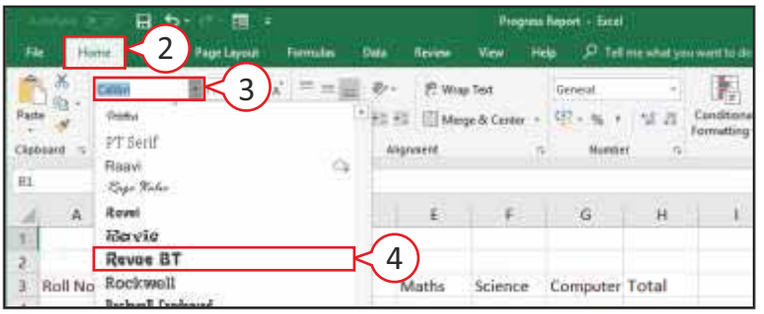
You can also remove the cells that you no longer need from the worksheet. The surrounding cells move to fill the empty space left after deletion.

Formatting Worksheet

Formatting is a very important feature in Excel. Formatting displays the worksheets in an attractive and more legible outlook. You can make your worksheets more presentable by applying one or several of Excel formatting features.

CHANGING THE FONT OF DATA

You can change the font of data to enhance the readability and appearance of your worksheet.



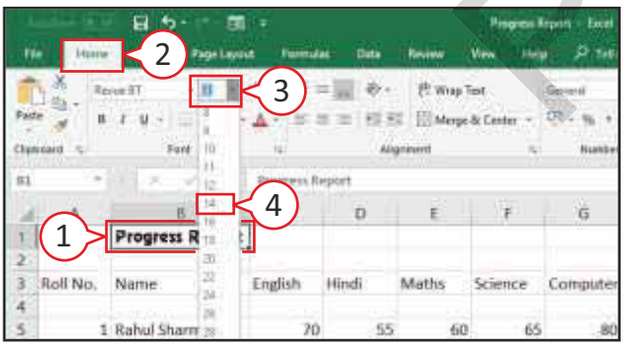
1. Select the cells containing data you want to change to a different font (not shown).
2. Click on **Home** tab.
3. Click on the down arrow of **Font** to display a list of the available fonts.
4. Click on the font you want to apply.

- Excel immediately applies the font.

To deselect cells, click on any other cell.

CHANGING THE FONT SIZE OF DATA

You can increase or decrease the size of data in your worksheet.

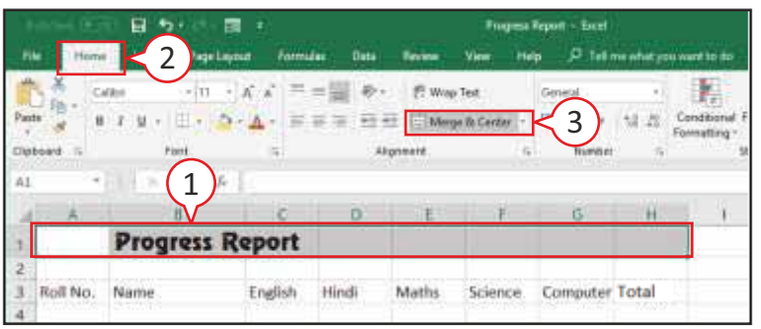


1. Select the cells containing data you want to change to a different font size.
2. Click on **Home** tab.
3. Click on the down arrow of **Font size** to display a list of the available sizes.
4. Click on the font size you want to apply.

Excel immediately applies the new size.

CENTERING DATA ACROSS COLUMNS

You can center data across several columns in your worksheet. This is useful for centering titles over your data. You can use the **Merge and Center** command to quickly create a merged cell to hold the title text.

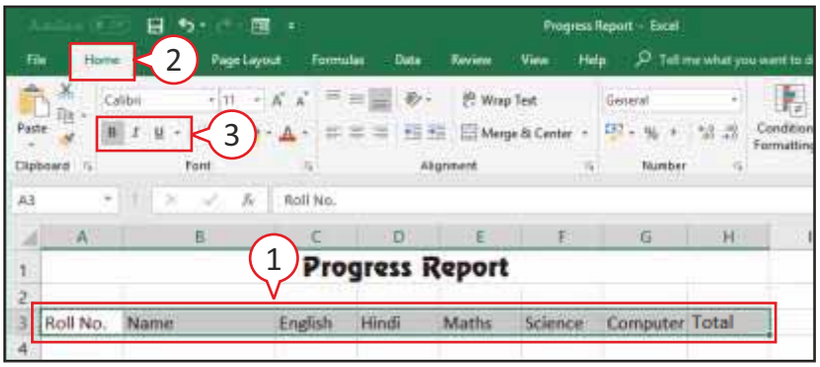


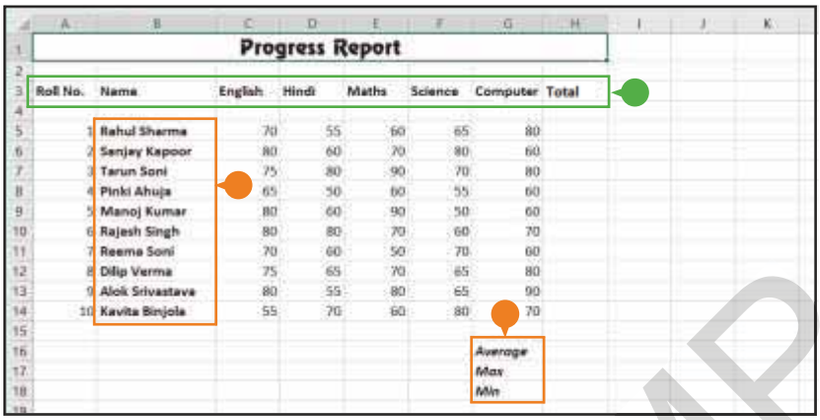
1. Select the cells you want to center the data across the column.
2. Click on **Home** tab.
3. Click on **Merge & Center** ( ) button to center data across the columns.

Excel merges the cells and centers data across the columns.

BOLD, ITALIC AND UNDERLINED DATA

You can make the text bold, italic, and even underline it to emphasize data in your worksheet.





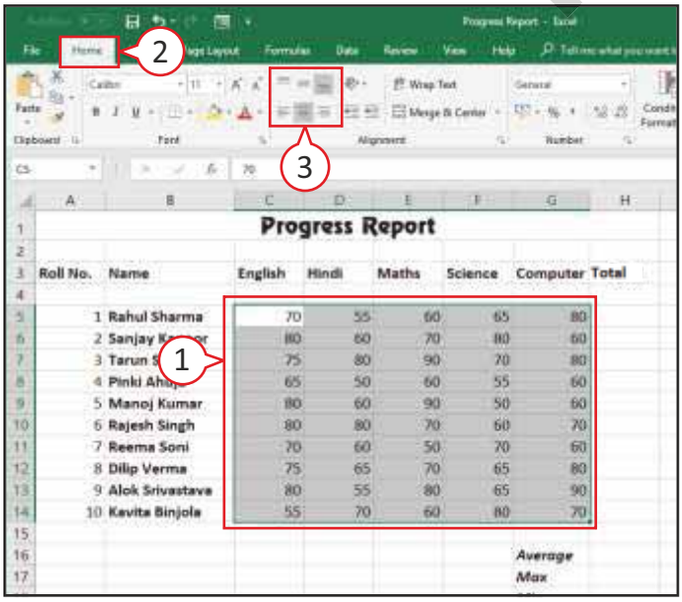
1. Select the cells containing data you want to make bold, italic or underlined.
2. Click on **Home** tab.
3. Click on one of the following buttons.
   - (B) **Bold** *(Ctrl+B)*
   - (I) *Italic* *(Ctrl+I)*
   - (U) Underline *(Ctrl+U)*

- The data appears in the style (Bold) you selected.
- By using the same steps, you can apply bold and/or italic style to the other data in the worksheet as per the project.

You can remove bold, italic or underline style by repeating the steps **1** to **3**.

CHANGING THE ALIGNMENT OF DATA

Alignment means the way in which the data is set within the boundary of a cell. By default, Excel automatically aligns text data to the **left** and number data to the **right**. Data is also aligned vertically to settle at the bottom of the cell. You can change **horizontal** and **vertical** alignments to improve the appearance of your worksheet data.



1. Select the cells containing the data you want to align differently.
2. Click on **Home** tab in the Ribbon.
3. Click on one of the following buttons.

   To align horizontally:

   - ( ) Align Left (*Alt+H* then *A+L*)
   - ( ) Center (*Alt+H* then *A+C*)
   - ( ) Align Right (*Alt+H* then *A+R*)

   To align vertically:

   - ( ) Top Align (*Alt+H* then *A+T*)
   - ( ) Middle Align (*Alt+H* then *A+M*)
   - ( ) Bottom Align (*Alt+H* then *A+B*)

The data will appear in the new alignment.

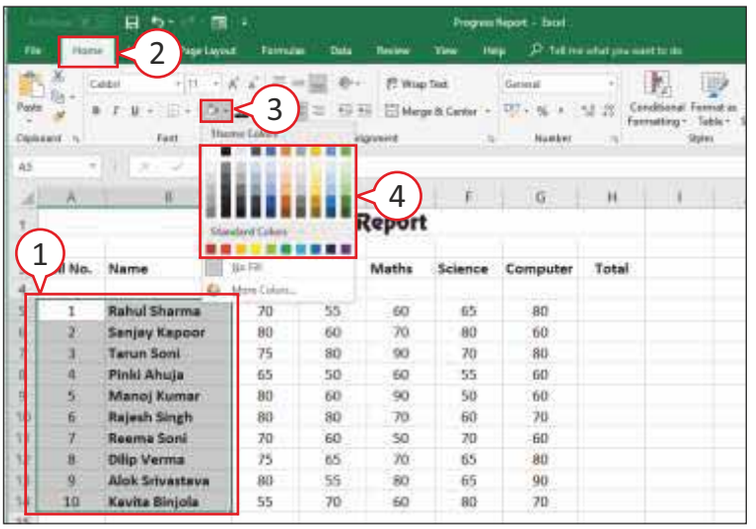
In this example, data is Center aligned.

By using the same steps, you can apply **center** alignment to the text and the numbering in the first column in the worksheet as per the project.

Note: *You can see the effect of vertical alignment only after you increase the size of row.*

CHANGING THE COLOR OF CELLS

You can add background color to cells to make them stand apart in your worksheet.



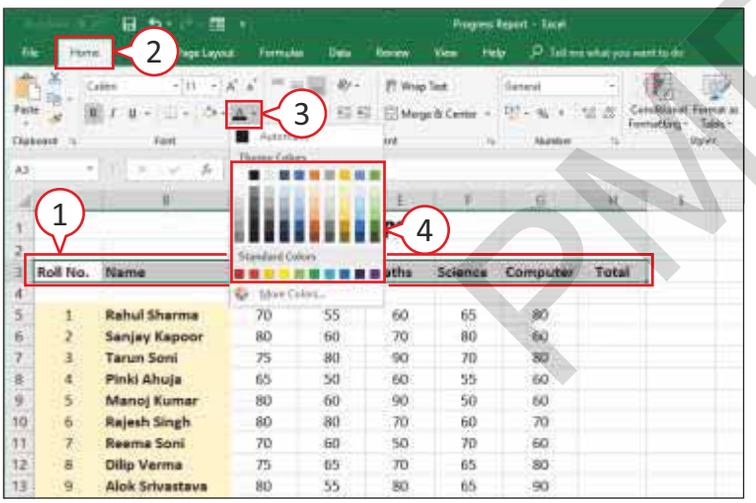
1. Select the cells you want to change to a different color.
2. Click on **Home** tab.
3. Click on down arrow button of **Fill Color** to display the available colors. (*or press Alt+H+*H)
4. Click on the color you want to apply.

The cells immediately appear in the color you selected.

To remove color from cells, repeat steps **1** to **4**, selecting **No Fill** in step **4**.

CHANGING THE FONT COLOR OF DATA

You can change the font color of data in your worksheet to draw attention towards headings or important information.



1. Select the cells containing data you want to change to a different color.
2. Click on **Home** tab.
3. Click on down arrow button of **Font Color** to display the available colors. (*or press Alt+H+F+C*)
4. Click on the color you want to apply.

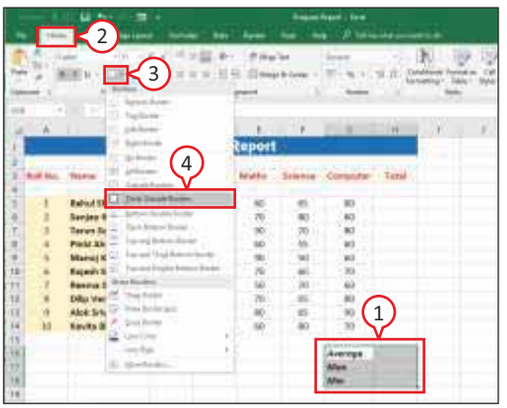
The data immediately appears in the color you selected.

To return data to its original color, repeat steps **1** to **4**, selecting **Automatic** in step **4**.

Note: *By using the same steps of changing color of cells and changing color of data, you can change the color of data and cell in the first row in the worksheet as per the project.*

ADDING BORDER

You can add borders to your worksheet cells. It will separate the data from surrounding cells.

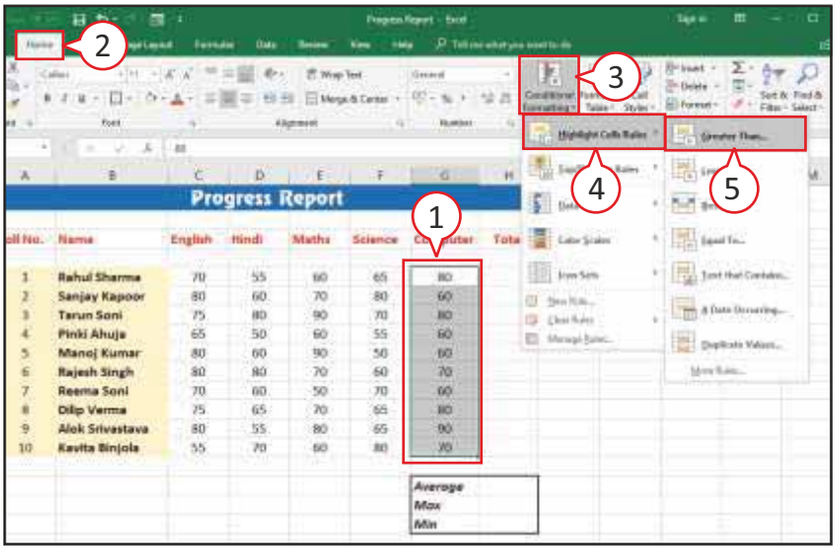


1. Select the cells that you want to format.
2. Click on **Home** tab.
3. Click on the down arrow of **Borders**. (*or press Alt+H+*B)
4. Click on any border style.

- Excel immediately assigns border to the cell or cells.

APPLYING CONDITIONAL FORMATTING

You can use Excel **conditional formatting** feature to assign certain formatting only when the value of the cell meets the specified condition.

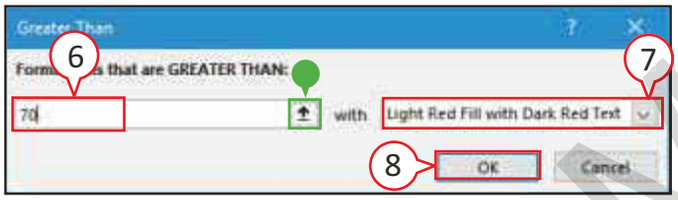


1. Select the cells to which you want to apply conditional formatting.
2. Click on the **Home** tab.
3. Click on **Conditional Formatting**.
4. Click on **Highlight Cells Rules**.

You can also apply other rules from this menu, depending on what conditions you wish to highlight.

5. Select the criteria you want to highlight the cells.

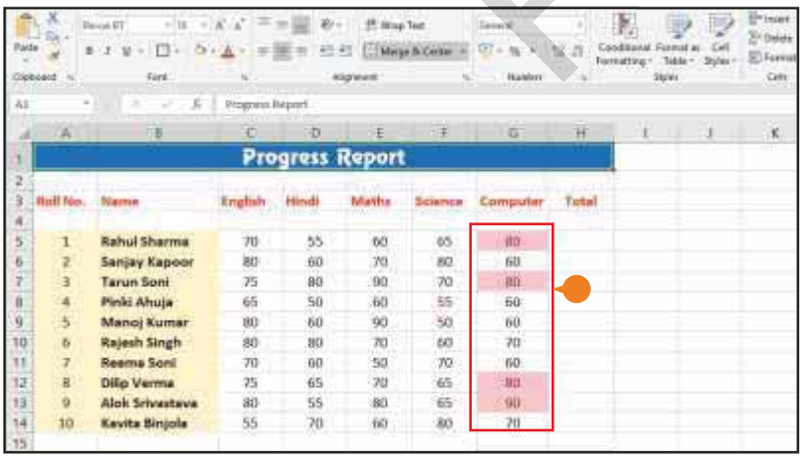
The associated dialog box opens, such as **Greater Than**.



6. Enter a value (70) or text for the condition here.

- If you need to select a cell or range, click here to minimize the dialog box and view more of the worksheet.

7. Click on down arrow, and choose a format to apply.
8. Click on **OK**.



- If the cell values meet the condition, Excel applies the conditional formatting.

In this example, Excel applies the formatting to those marks which are greater than 70 in Computer subject.

Removing Conditional Formatting

1. Select the cells from where you want to remove the conditional formatting.
2. Click on the **Home** tab.
3. Click on **Conditional Formatting**.
4. Choose **Clear Rules**.
5. Click on **Clear Rules from Selected Cells** from the side menu.

The conditional formatting will be removed.

Self-Evaluation

After reading the chapter, I know these points:

	CHECKLIST	
	Agree	Disagree
⊙ I know that Excel is a spreadsheet program that allows us to organize data, perform calculation, insert graphs and develop reports.	☐	☐
⊙ I know that Excel worksheet has 1048576 rows and 16384 columns.	☐	☐
⊙ I know that Active cell has a dark border around it where we enter data.	☐	☐
⊙ I know that formatting makes worksheet more presentable by changing font type, font size, font color, and alignment.	☐	☐
⊙ I know that conditional formatting is used to assign certain formatting only when the value of the cell meets the specified condition.	☐	☐

Exercises

A. Tick [✓] the correct answer.

1. The collection of rows and columns is called ..... .
   a. workbook ☐ b. worksheet ☐ c. document ☐
2. You can also select a cell in a worksheet using the ..... keys.
   a. Ctrl ☐ b. Alt ☐ c. Arrow ☐
3. The number of columns in a single worksheet is ..... .
   a. 16384 ☐ b. 16385 ☐ c. 16358 ☐
4. You can make a worksheet look more attractive and legible by ..... .
   a. editing ☐ b. formatting ☐ c. correcting ☐
5. ..... means the way in which data is settled within the boundary of a cell.
   a. Editing ☐ b. Underlining ☐ c. Alignment ☐
6. The ..... formatting is used to format the data according to specified condition.
   a. mixed ☐ b. conditional ☐ c. reference ☐

B. Write 'T' for True and 'F' for False statements.

1. Cells may contain four types of data. ☐
2. You cannot save worksheet data as a PDF and HTML file. ☐
3. You cannot cancel the last change that you made to the worksheet. ☐
4. You can change the font of numbers in Excel. ☐
5. Excel automatically left-aligns the text in a cell and right-aligns the number. ☐
6. Border separates the data from surrounding cells. ☐

C. Fill in the blanks.

1. There are ..... rows and ..... columns in a single worksheet.
2. A ..... identifies each column and a ..... identifies each row.
3. By using ..... feature, one can revert the last changes.
4. ..... command is used to quickly create a merged cell to hold the title text.
5. ..... can be added to the cells for separating the data from surrounding cells.

D. Differentiate between the following.

1. Workbook

.....

.....

.....

Worksheet

.....

.....

.....

2. Moving Data

.....

.....

.....

Copying Data

.....

.....

.....

E. Answer in 1-2 sentences.

1. What is the use of Microsoft Excel?

.....

.....

2. What is the default row height and column width in Excel?

.....

.....

3. Why do we need to select cells in Excel?

.....

.....

4. What is the need of formatting in Excel?

.....

.....

5. What is the use of border?

.....

.....

F. Answer briefly.

1. What are the features of Excel?

.....

.....

.....

2. What is the use of alignment? Name the different alignment buttons.

.....

.....

.....

3. What is the use of conditional formatting? Write the steps to remove conditional formatting.

.....

.....

.....

G. Application-based Question

Your teacher asked you to create a table of students in Excel, who are good at various sport activities in the school. While making the table, you have forgotten to add an important row in the table. Now you want to insert the row, without disturbing the whole table. By which option will you do so?

.....

Group Discussion

Divide the students into two groups and discuss the topic – 'Difference between Spreadsheet and Word Processor'.

Online Link

To learn more about creating worksheet in Excel, visit the website:

https://spreadsheeto.com/how-to-use-excel/#opening

Activity Section

Lab Activity

A. Open Excel and create the following worksheet.

	STATE	AREA (km^2)	DENSITY
1	Uttar Pradesh	240,928	828/km^2
2	Maharashtra	307,713	365/km^2
3	Bihar	94,163	1,102/km^2
4	Rajasthan	342,239	201/km^2
5	Gujarat	196,024	308/km^2
6	Punjab	50,362	551/km^2
7	Haryana	44,212	573/km^2
8	Uttarakhand	53,483	189/km^2

Subject Integration

Social Science

This integration will make the students understand about the area and population density of some states of India.

Now, follow these instructions:

a. Choose proper font size and style for the title.
b. Center align the AREA and DENSITY.
c. Change the heading color to green.
d. Change the font style of states to bold and italic.
e. Change the color of AREA cells to yellow and Density cells to blue.
f. Apply a border to the table.
g. Save the workbook as **'Indian States'** in the **'Lab Activity'** folder.

B. Open Excel and create the following worksheet.

Roll Number	Name	Age	Admn. No.	Class	Date of Admn.
1	Ravina	12	1045	VI	27/08/2004
2	Priya	12	1240	VI	11/12/2006
3	Sonia	13	1499	VI	09/08/2007
4	Puneet	15	1500	VI	13/10/2006
5	Pawan	11	2121	VI	15/06/2005
6	Sunil	12	1090	VI	23/04/2007
7	Rajesh	12	1289	VI	12/12/2008
8	Manish	13	3211	VI	10/10/2005
9	Gaurav	12	1234	VI	04/03/2003
10	Akash	14	1267	VI	10/08/2002

Now, follow these instructions:

a. Select row 1 by clicking the row header.
b. In the Home tab, click on Format and then Row Height. A Row Height dialog box appears.
c. Make the Height 25 and click on OK button. Notice the change of row height of row 1.
d. Select column B by clicking the column header.
e. In the Home tab, click on Format and then Column Width.
f. In the Column Width dialog box, make the Width 15 and click on OK button. Notice the change.
g. Insert two blank rows between 'Gaurav' and 'Akash'. Store the following two records in them:

10	Rajender	13	4678	VI	03/05/2009
11	Manya	12	5467	VI	10/08/2009

h. Now, select the last row by clicking the row header.
i. In the Home tab, click on Delete and then Delete Cells.
j. Save the workbook as **'Students Detail'** in **'Lab Activity'** folder.

Skill Formation

These activities enhance the data management skills of the students.

Technology Trailblazers

Azim Hashim Premji

? Founder Chairman: Wipro

Azim Hashim Premji is an Indian business tycoon. Born as the son of a successful businessman, Azim Premji had a privileged childhood. After completing his schooling, he went to the Stanford University to study engineering. Over the years, he has gained recognition not just as a successful businessman, but also earned much respect for the high ethical standards maintained in his company.

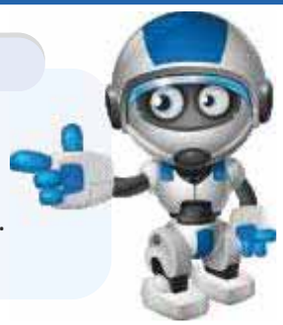
He is the founder chairman of **Wipro Limited**, a multinational IT Consulting and System Integration services company which is currently one of the largest IT service companies in the world. Premji led Wipro through decades of expansion and diversification to make it one of India's largest publicly traded companies.

4 Excel – Functions and Charts

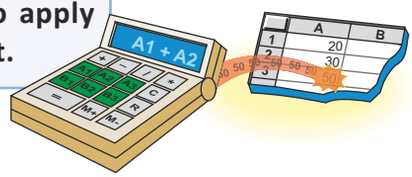
OBJECTIVES

After completing this chapter, you will be able to:

- Understand formula and function.
- Understand cell reference and its types.
- Learn about creating different types of Excel charts.
- Insert Sparklines to cells.



Hello Friends! In your previous chapter, you learnt how to create and format a worksheet. Now in this chapter, you will learn how to apply formula and function for carrying out calculations in the project.



Introduction to Formula

Microsoft Excel is a powerful spreadsheet program that allows you to organize data and do calculations. Constants and Formulas are two ways of entering data in Excel. The values which are directly entered in the cells are called **constant values**. Numbers, names, data, currency, etc. are the examples of constant value.

A **Formula** is a sequence of values, cell references, names of functions or operators (+, -, *, /, etc.) that produces a new value from existing values. In other words, Formula is used to calculate numerical information and display the resulting value in a cell. You can use formulas to perform all kinds of calculations in your Excel data. Formula is also called **expression**.

FORMULA IN EXCEL

In mathematics, when you write a formula, you write down the values and the operators, followed by an equal to sign (=), such as **2 + 2 =**.

But in Excel, formulas begin with an equal to sign (=), such as **= 2 + 2**. Excel immediately recognizes any subsequent data as a formula when it begins with an equal to sign (=).

CELL REFERENCING

Every cell in a worksheet has a unique address, also called **cell reference**. By default, cells are identified by a specific column letter and row number, so cell **A5** identifies the fifth cell down in column A. While entering formulas, use cell references instead of actual data wherever possible. For example, enter the formula =A1 + A2 instead of =10 + 20.

When you use cell references and you change a number used in a formula, Excel will automatically redo the calculation for you.

CELL RANGE

A group of related cells in a worksheet is called a **cell range**. Cell ranges are identified by their anchor points, the upper left corner and the lower right corner of the range. The range reference includes both anchor points separated by a **colon**. Range names must start with a **letter**, and can include uppercase and lowercase letters. You cannot add space in range names. For example, the range name A1:B3 includes cells A1, A2, A3, B1, B2, and B3.

OPERATORS

Operators are symbols which are used to indicate a type of calculation. A formula can contain one or more operators.

Arithmetic Operators

You can use arithmetic operators to perform mathematical calculations.

Operator	Description
+	Addition (A1+B1)
-	Subtraction (A1-B1)
*	Multiplication (A1*B1)
/	Division (A1/B1)
%	Percent (A1%)
^	Exponentiation (A1^B1)

Comparison Operators

You can use comparison operators to compare two values, to return a value of TRUE or FALSE.

Operator	Description
=	Equal to (A1=B1)
>	Greater than (A1>B1)
<	Less than (A1<B1)
>=	Greater than or equal to (A1>=B1)
<=	Less than or equal to (A1<=B1)
<>	Not equal to (A1<>B1)

Reference Operators

The reference operators combine two cell ranges to create a single joint reference.

Operator	Name	Description
:	Colon	Range operator produces a range from two cell references, e.g. C5:D5
	Space	Intersection operator produces a range, i.e. the intersection of two ranges, e.g. D1:E5 B2:E7
,	Comma	Union operator combines multiple references into one reference, e.g. SUM(B5:B15, D5:D15)

Logical Operators

Logical operators are used to compare two or more relational expressions. These operators also give a single value as result: **True** or **False**.

Logical Operator		
NOT	AND	OR

ORDER OF CALCULATION

When a formula contains more than one operator, Excel performs the calculations in a specific order according to precedence. The order in which Excel performs operations in formulas is called **order of calculation**. You can use **parentheses ()** to change the order in which Excel performs calculations. Excel performs the calculation inside the parentheses first.

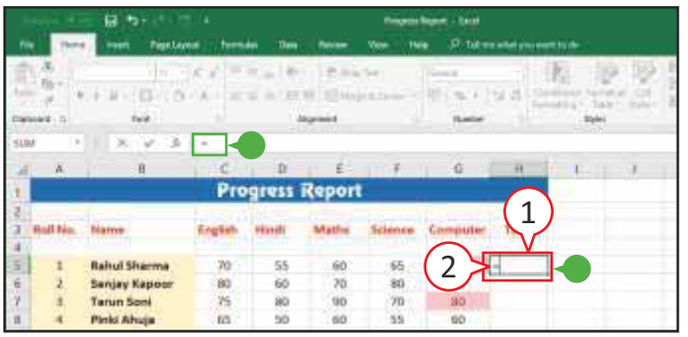
For example, if you want to determine the average of values in A3, B3, and C3 and you enter the equation =A3+B3+C3/3, you will receive the wrong answer. This is because Excel divides the value in cell C3 by 3 first, and then adds that result to A3+B3. Following operator precedence, division takes precedence over addition. The correct way to determine the average formula is =(A3+B3+C3)/3. Enclosing the values in parentheses, Excel adds the cell values first before dividing the sum by 3.

1	Percent (%)
2	Exponentiation (^)
3	Multiplication (*) and Division (/)
4	Addition (+) and Subtraction (-)
5	Comparison operators

Order of Calculation

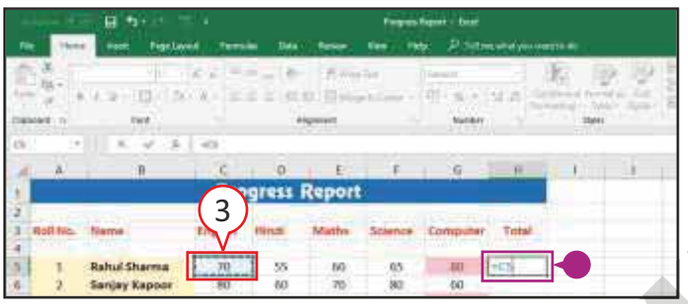
Creating a Formula

You can type a formula in any cell in your worksheet. A formula helps you to calculate and analyze the data in your worksheet. All formulas begin with an equal to sign (=) in Excel.



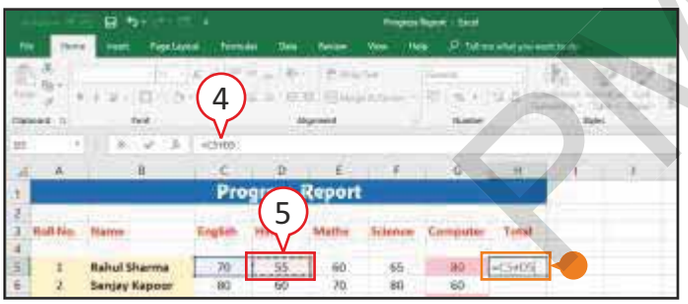
1. Click on the cell where you want to enter a formula.
2. Type an **equal to sign (=)** to begin the formula.

- Excel will display the formula in the **Formula bar** and in the **active cell**.



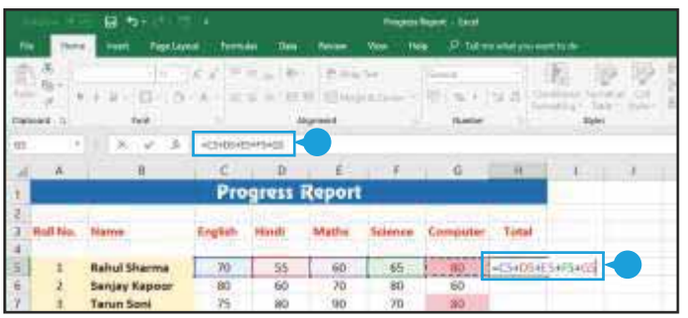
3. Click on the first cell you want to refer in the formula.

- Excel inserts the cell reference into the formula.



4. Type an operator **(+)** for the formula.
5. Click on the next cell you want to refer in the formula.

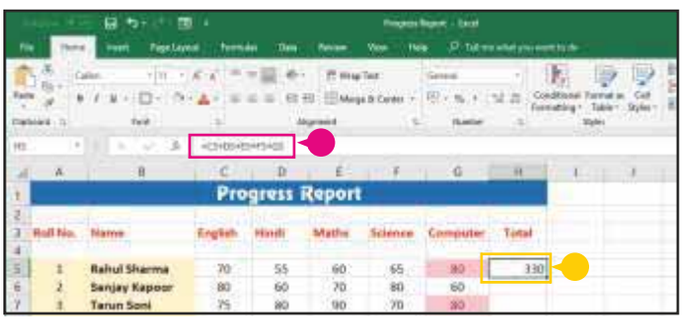
- Excel inserts the next cell reference into the formula.



6. Repeat steps **4** and **5** to enter all the data in the formula.

- Excel inserts the cell reference into the **Formula bar** and in the **active cell**.

7. Press **Enter** key to get the formula.



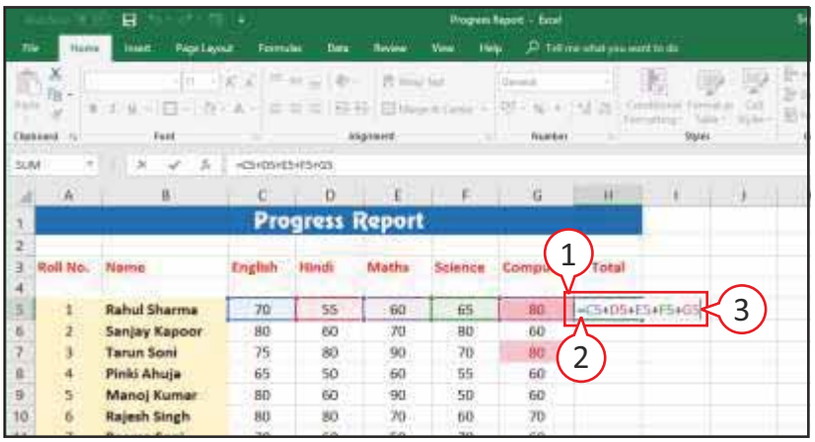
- The formula result appears in the active cell.

  To view the formula, simply click the cell.

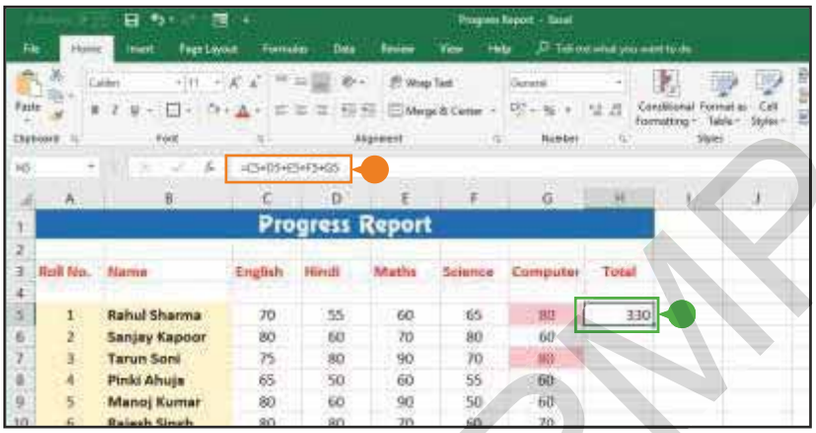
- The Formula bar displays the formula assigned to the active cell.

ENTERING A FORMULA

In the previous section, you have created the whole formula by selecting the data in various steps. But you can also enter the whole formula into any cell by typing in your worksheet.



1. Click on the cell where you want to enter a formula.
2. Type an **equal to sign** (=) to begin the formula.
3. Type the formula and then press the **Enter** key.

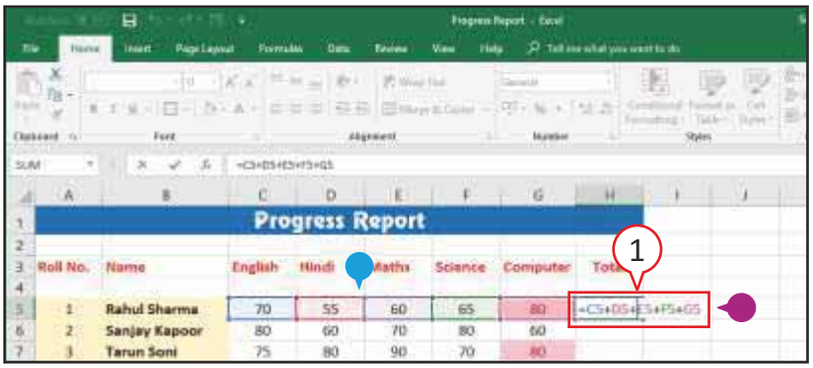


- The formula result appears in the cell.

  To view the formula, simply click the cell.
- The Formula bar displays the formula assigned to the active cell.

EDITING A FORMULA

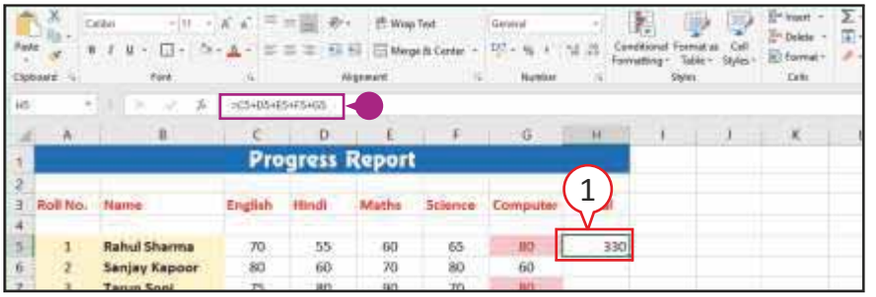
You can edit the formula any time by following these steps.



1. Double-click on the cell containing the formula you want to change. (*or press F2*)
- The formula appears in the cell.
- Excel outlines each cell used in the formula with a different color.
2. Press the **Arrow** key to move the insertion point to where you want to remove or add characters.
3. To add data where the insertion point flashes on your screen, type the data. To delete the data where insertion point flashes, use **Backspace** or **Delete** key.
4. When you finish making changes to the formula, press the **Enter** key.

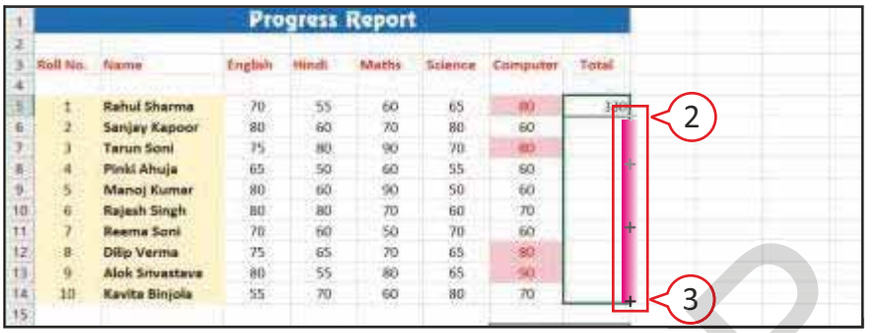
COPYING A FORMULA

If you want to use the same formula in your worksheet several times, you can save your time by copying the formula. **AutoFill** feature in Excel quickly copies formulas across rows or columns in your worksheet.



1. Click on the cell containing formula you want to copy.

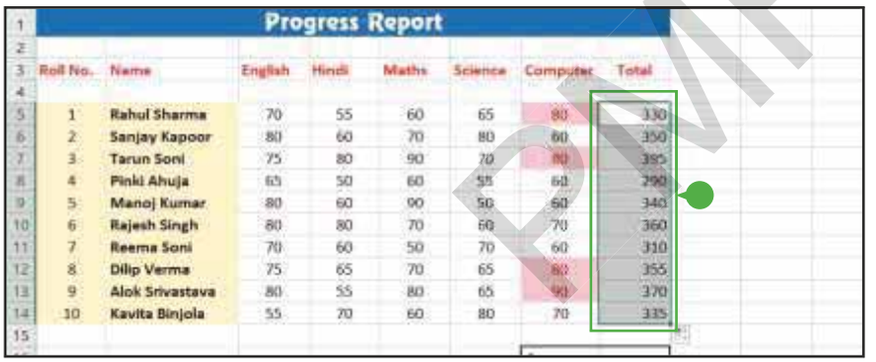
- The Formula bar displays the formula for the cell.



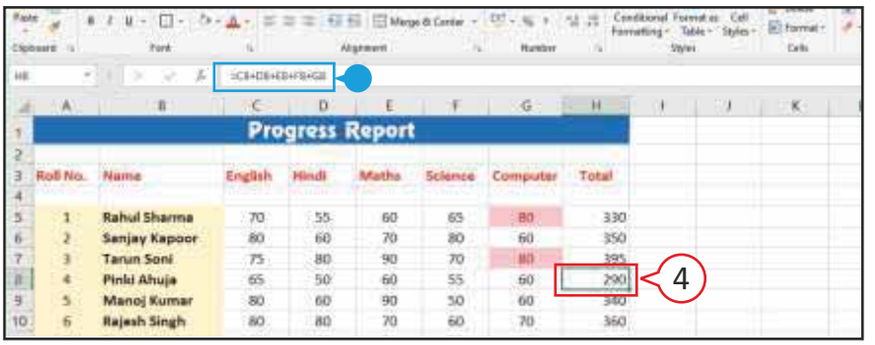
2. Position the mouse pointer (✚) over the bottom right corner of the cell.

   (✚) changes to (+).

3. Drag the mouse pointer (+) over the cells you want to copy the formula.



- The result of the formulas appear.



4. To view one of the new formulas, click a cell that received a copy of the formula.

- The Formula bar displays the formula with new cell references.

Update Your Knowledge

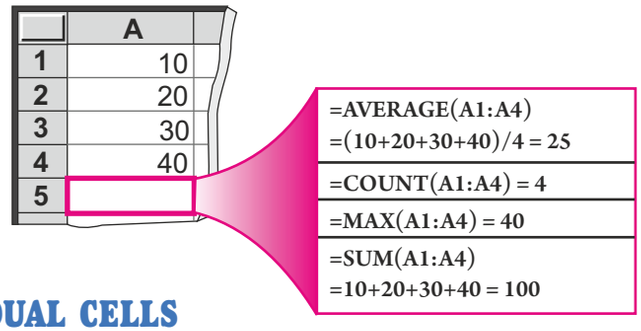
When you activate the **AutoFill handle** of a cell, Excel displays the **AutoFill Options** smart tag. You can click the tag to view additional options to apply to the data.

For example, you can copy cell contents or formatting. You can choose to ignore the tag and continue working with your worksheet data. The smart tag disappears when you move on to another task.

Functions in Excel

A **function** is a built-in formula that you can use to perform a calculation on the data in your worksheet. It can perform a series of operations on a specified range of values. Excel offers many functions that you can use to perform mathematical calculations on your worksheet data. Examples of commonly used functions include AVERAGE, COUNT, MAX and SUM.

Each function in Excel has a name. For example, the function that sums data is called **SUM**, and the function for averaging values is **AVERAGE**.



SPECIFY INDIVIDUAL CELLS

When a comma (,) separates cell references in a function, Excel uses each cell to perform the calculation. For example, =SUM(A1,A2,A3) is the same as the formula =A1+A2+A3.

SPECIFY A GROUP OF CELLS

When a colon (:) separates cell references in a function, Excel uses the specified cells and all cells between them to perform a calculation. For example, =SUM(A1:A3) is the same as the formula =A1+A2+A3.

ARGUMENTS

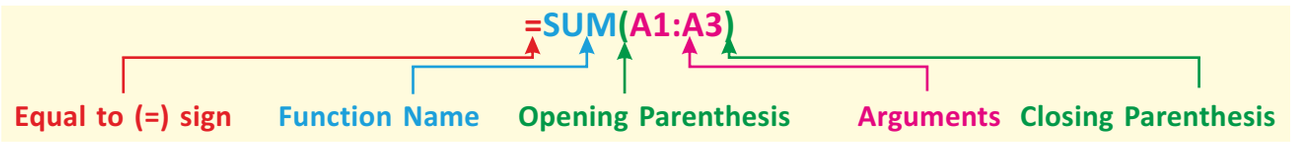
Functions use **arguments** which are the specific values used in a particular order to perform calculations.

For example, A1:A3 are arguments.

STRUCTURE OF A FUNCTION

Function in Excel always begins with equal to sign (=), followed by the **Function name**. Function name is followed by **opening parenthesis** then **arguments** separated by **comma** or **colon** and their **Closing parenthesis**.

Rule to Create a Function



Difference between Formula and Function

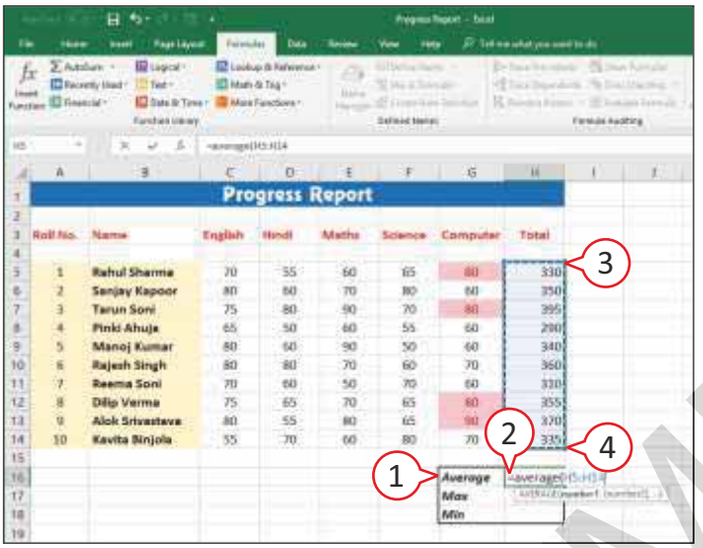
- A **formula** is a statement written by the user to be calculated. Formulas can be as simple or as complex as the user wants. A formula can contain values or references to cells. All formulas must start by an equal to sign(=).
- **Functions** are ready-made formulas that perform a series of operations on a specified range of values. Functions used to add values or to calculate the current time are built into Excel. Equal to sign (=) is automatically included into Excel when you apply Function.

USING AVERAGE, MAX AND MIN FUNCTIONS

Suppose you want to calculate the average, highest, and lowest marks in all subjects scored by different students from the range H5:H14, you can use the functions like Average, Max, and Min. All functions begin with an equal to sign (=) and include the arguments in parentheses () after the function name. For example, in the function =AVERAGE(H5:H14), the function name is AVERAGE and the argument is the range H5:H14.

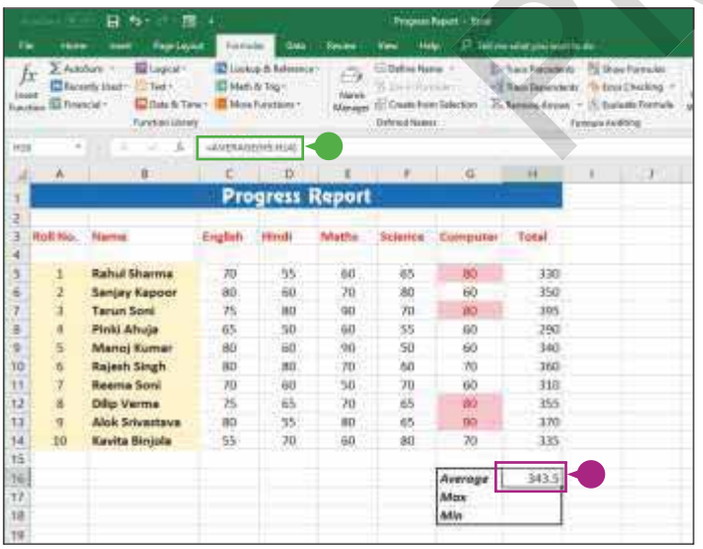
Determining the Average of Total Marks

The **AVERAGE** function sums the numbers within the specified range and then divides the sum by the total number of non-zero cells in that range.



1. Select the cell where you want the average (H16).
2. Type **=average(** in that cell.
3. Click on the **first cell (H5)**, the first endpoint of the range for calculating average.
4. Drag upto the **last cell (H14)**, the second endpoint of the range, for calculating average.

A marquee surrounds the range H5:H14. When you click cell H5, Excel appends cell H5 to the left parentheses in the Formula bar and surrounds cell H5 with a marquee. When you begin dragging, Excel appends to the argument with a colon (:) and the cell reference of the cell where the mouse pointer is located.



5. Press **Enter** key from the keyboard.

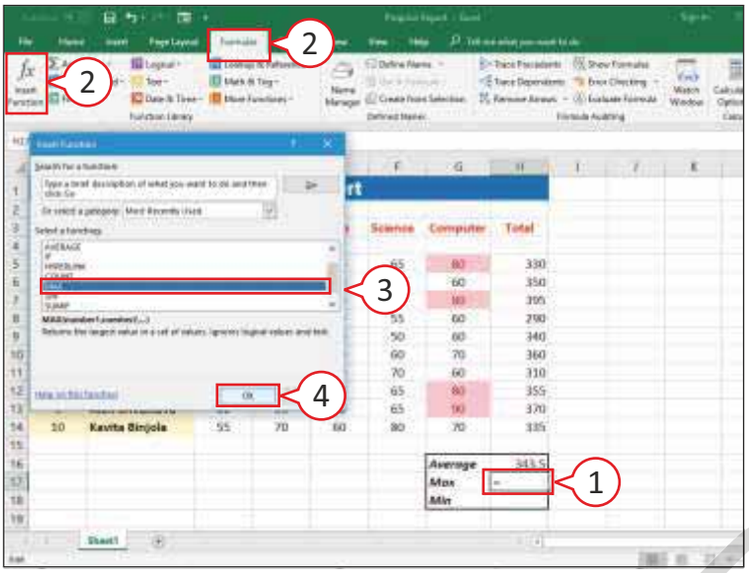
- Excel computes the average of ten numbers in the range H5:H14 and displays the result, 343.5, in cell **H16**. Thus, the average of total marks of all the students is **343.5**.
- Formula bar shows the AVERAGE formula.

Update Your Knowledge

As you type the equal to sign (=) followed by the characters in the name of a function, Excel displays the **Formula AutoComplete** list. This list contains those functions that alphabetically match the letters you have typed. If you type **=av**, Excel displays all the functions that begin with the letters **av**.

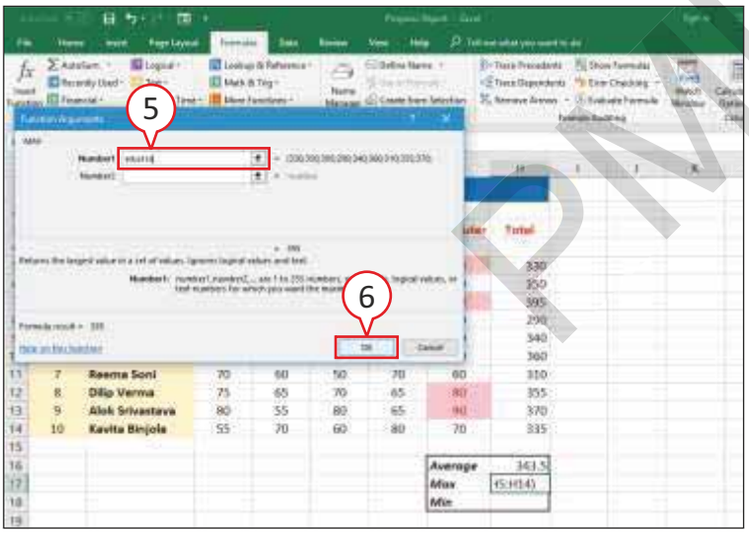
Determining Highest Marks using Insert Function Box

MAX function in Excel is used to display the highest value in a range. You can enter MAX function using the keyboard and Point mode as described in the previous steps. An alternative method to enter the function is by using the Insert function box on the Formula bar or Formulas tab, as shown in the following steps:



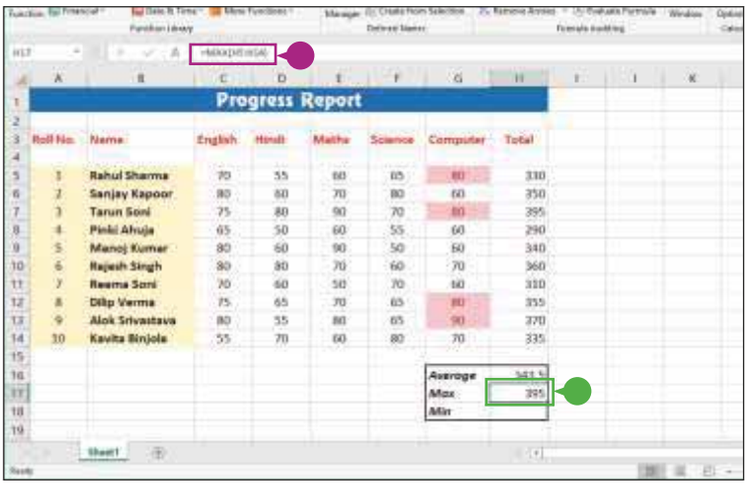
1. Select the cell where you want the **Highest marks** (H17) .
2. Click on **Insert Function** button from the **Formulas** tab *(or press Shift+F3)*.
3. When the **Insert Function** dialog box is displayed, click on **MAX** function in the **Select a function** box.
4. Click on **OK** button.

The **Function Arguments** dialog box gets displayed.



5. Type the range of numbers **(H5:H14)** in the **Number1** box as shown.
6. Click on **OK** button.

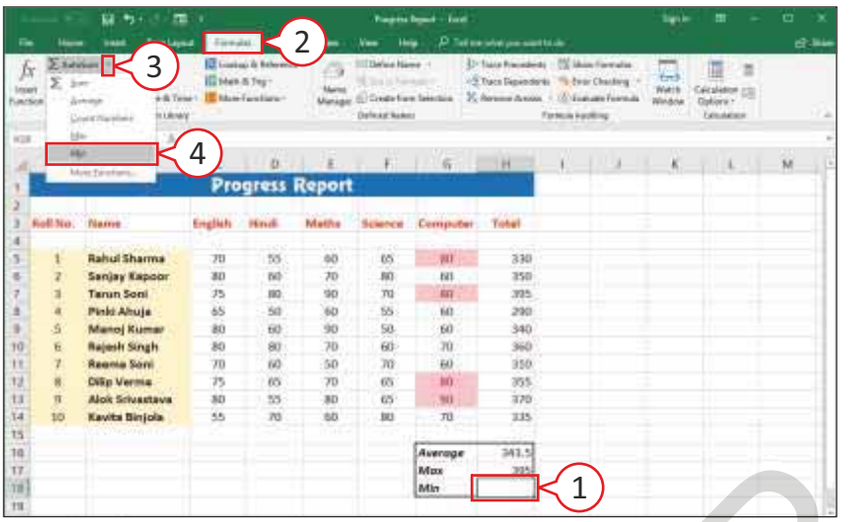
The Function Arguments dialog box displays the range H5:H14 as entered in the Number1 box. The complete MAX function is displayed in the Formula bar, and the result gets displayed in the cell H17.



- Excel determines the highest value in the range H5:H14, which is **395** (value in the cell H7), and it is displayed in the cell **H17**.
- Formula bar shows the MAX formula.

Determining Lowest Marks using AutoSum Menu

MIN function in Excel is used to display the lowest value in a range. You can calculate the MIN function and store it in cell **H18** so as to determine the lowest marks in the range **H5:H14**. You can enter the MIN function using either of the methods mentioned earlier for determining the average of range of numbers and the highest number. An alternative method is **AutoSum** menu. Follow the steps to enter the MIN Function using AutoSum menu.

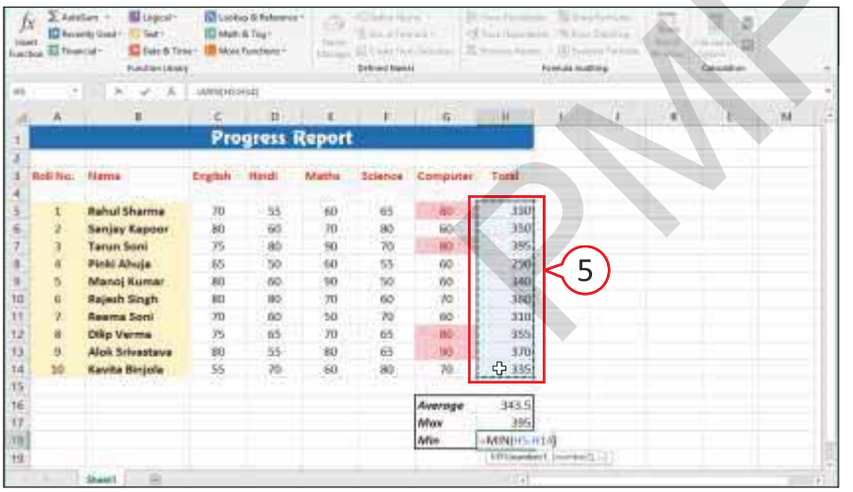


1. Select the cell where you want to display the **Lowest marks** (H18).
2. Click on **Formulas** tab.
3. Click on the down arrow of **AutoSum** button.

The **AutoSum** menu is displayed.

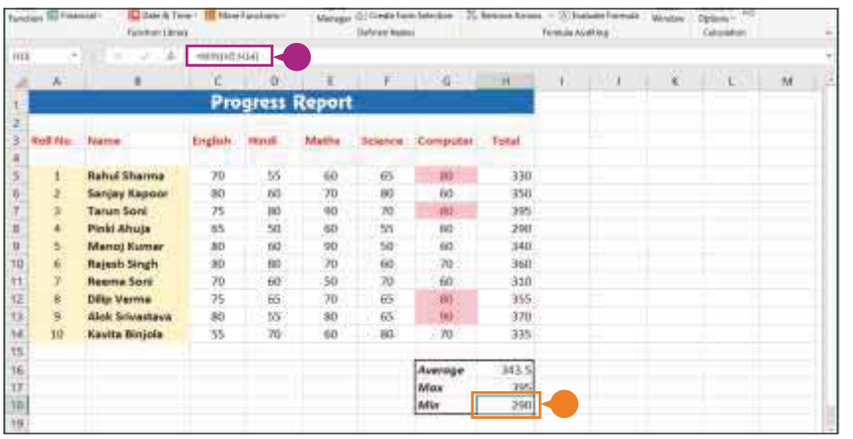
4. Click on **Min** button in the AutoSum menu.

AutoSum immediately attempts to apply the function to the adjacent cells.



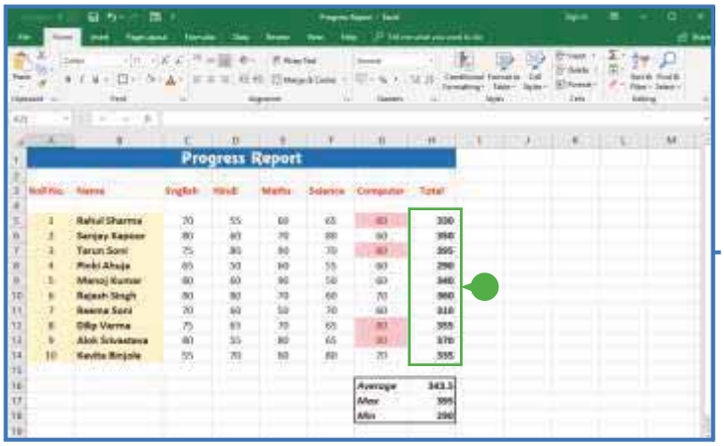
5. If you want another range of cells instead of cells selected by **AutoSum**, click on the first cell **H5** and then drag through the last cell **H14**.

The function in the Formula bar and in cell H18 displays the new range, H5:H14.



6. Press the **Enter** key.

- Excel determines the lowest value in the range H5:H14, which is **290** (value in the cell H8), and displays it in cell **H18**.
- Formula bar shows the MIN formula.



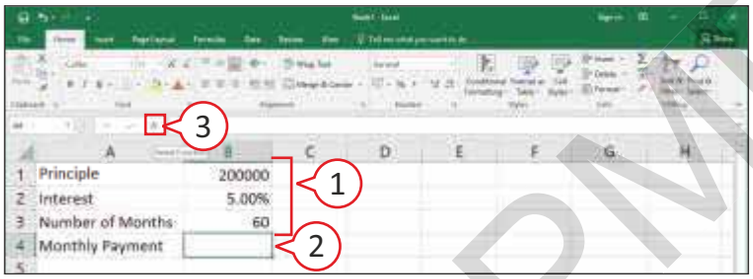
- You can now apply Bold style to the numbers in **range H5:H14** as per the project.

Your project of Progress Report is ready.

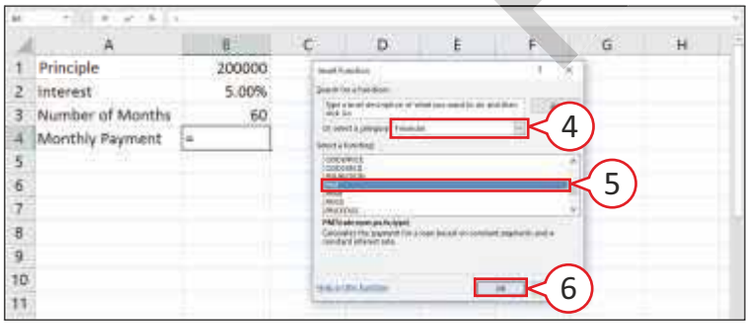
CALCULATING LOAN TERMS

When buying a car or a home and taking a loan from a bank, you can use **Payment (PMT) function** of Excel to calculate the payment for a loan based on constant payments and a constant interest rate. It enables you to compare loan terms and make an objective decision based on certain factors, such as the amount of the monthly payment or installment.

Calculation of the monthly payment of a loan of 200000 with 5% of interest and for 60 months (5 years) is given below.

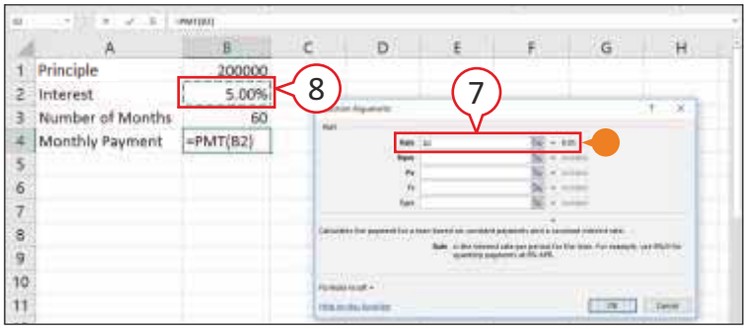


1. Type the principle amount (the loan amount or present value), interest rate, and number of months.
2. Click on the cell where you want the result.
3. Click on **Insert Function** button. (*or press Shift+F3*)



The **Insert Function** dialog box appears.

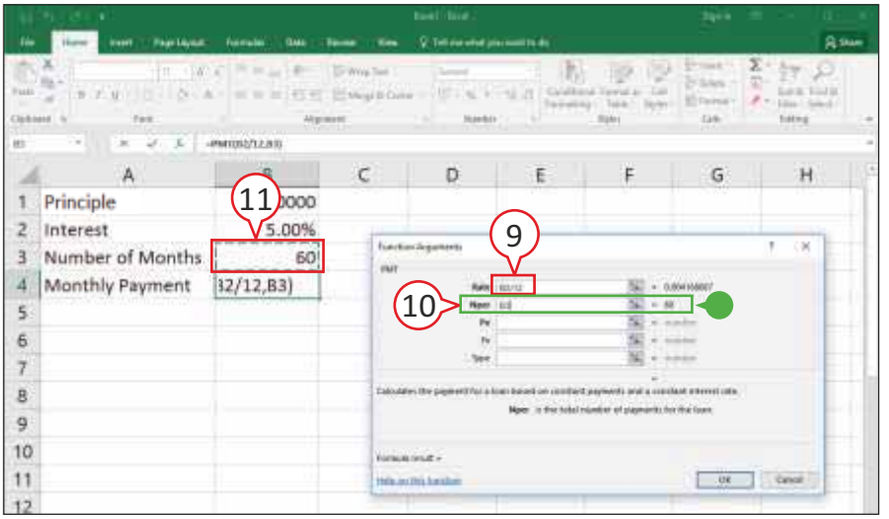
4. Click on the down arrow and select **Financial**.
5. Use the scroll bar and click on **PMT**.
6. Click on **OK**.



The PMT **Function Arguments** dialog box appears.

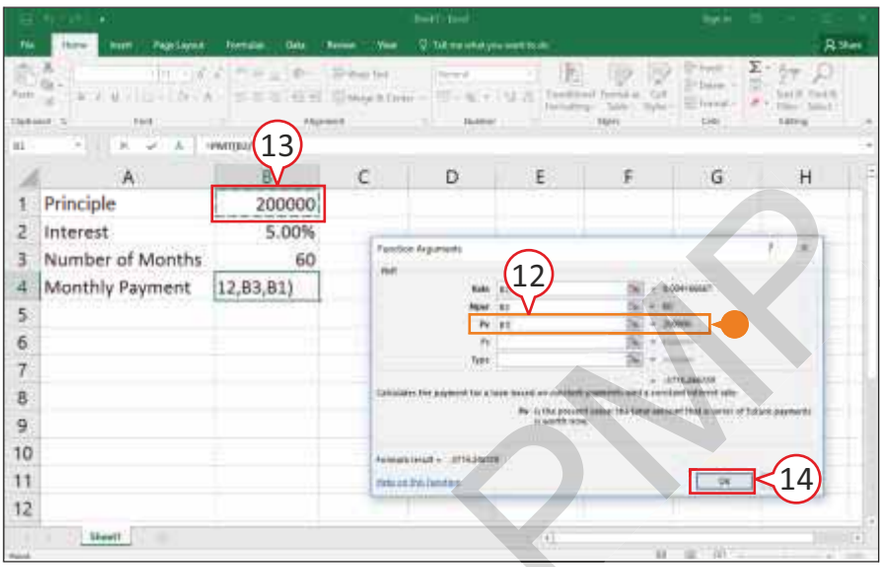
7. Click on the **Rate** box to make it active.
8. Click on the cell (B2) with the interest rate.

- The cell reference for the interest rate appears in this area.



9. Divide the interest rate by the number of periods per year, for example, type **/12**.
10. Click on **Nper** (Number of period) box to make it active.
11. Click on the cell with the number of periods or months.

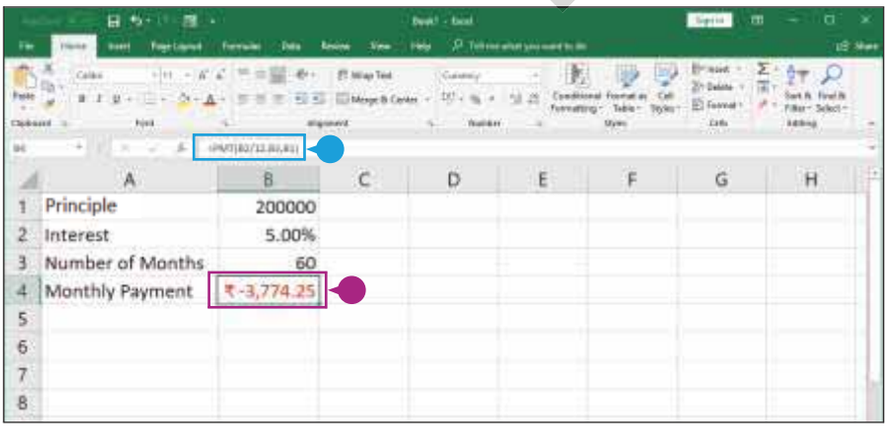
- The cell reference for the number of periods appears in this area.



12. Click on **Pv** (Present value) box to make it active.
13. Click in the cell with the principle.

- The cell reference for the principal appears in this area.

14. Click on **OK**.



- The result appears in this cell.
- Formula bar shows the formula of calculation.

- Excel considers the value returned by the PMT function to be a **debit** and therefore, returns a **negative** number as the monthly payment. To display the monthly payment as a positive number, begin the function with a **negative sign**.
- You do not need to specify a value for every function argument. Some function arguments are required to obtain a result, but others are optional. In the PMT function, for example, the **Rate**, **Nper** and **Pv** arguments are required, but the **Fv** and **Type** arguments are optional.

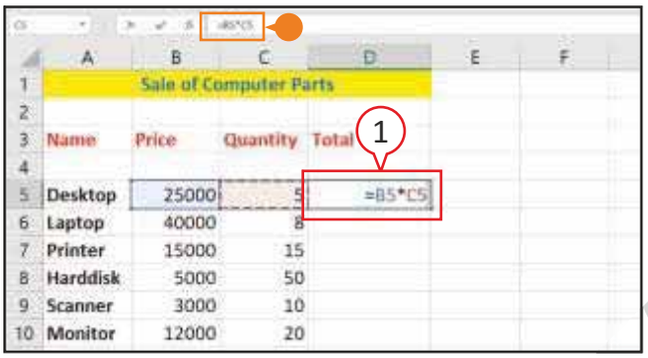
Cell Reference

Every cell in a worksheet has a unique address, called **cell reference**, which is identified by a specific column letter and row number of that cell. When you use cell references in a formula and you change any number used in it, Excel will automatically redo the calculation for you. There are three types of cell references: **Relative**, **Absolute** and **Mixed**.

RELATIVE REFERENCE

While copying the formulas, Excel modifies the cell references. Excel uses a technique called **relative cell referencing**. The formula using the relative cell reference adjusts the cell reference as it copies to the destination area.

For example, **C5** is a relative cell reference. A formula using the relative cell reference C5 instructs Excel to adjust the cell reference as it copies it to the destination area.



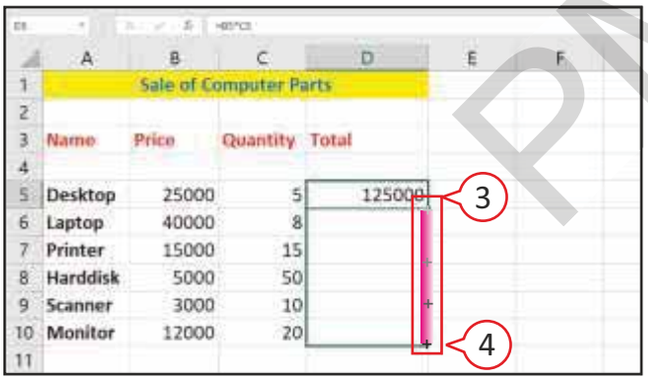
1. Type the formula (=B5*C5) you want to copy to other cells.

In this example, we have used **relative cell reference**.

- The Formula bar also displays the formula.

2. Press the **Enter** key.

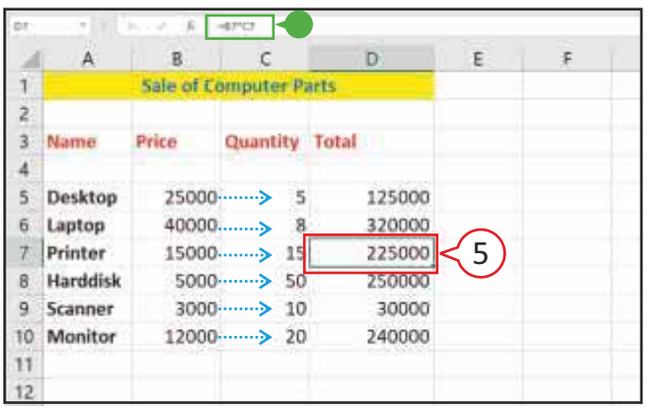
The result of the calculation appears in the cell.



3. Position the mouse (✚) over the bottom right corner of the cell.

(✚) changes to (+).

4. Drag the mouse (+) over the cells you want to copy the formula.



The result of the formulas appears.

5. To view one of the new formulas, click a cell that received a copy of the formula.

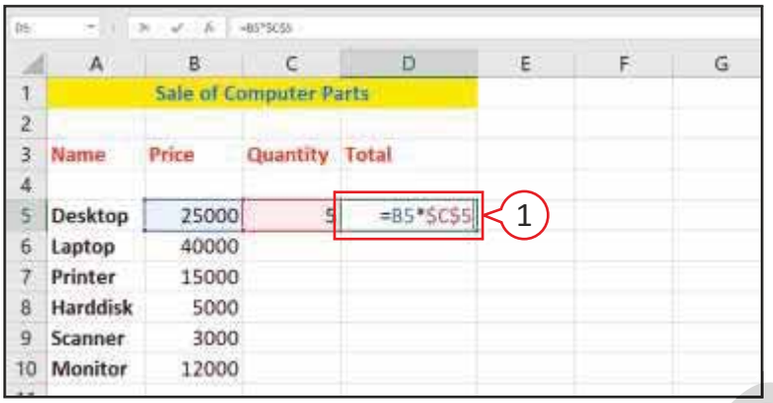
- The Formula bar displays the formula with relative cell references.

In the above example, formula will be copied to the selected cells with relative reference, and value will be calculated accordingly.

ABSOLUTE REFERENCE

While copying formulas, if Excel does not change cell references and makes it constant, at that time, Excel uses **absolute cell referencing**. To specify an absolute cell reference in a formula, enter a **dollar sign ($)** before any column letter and row number that you want to keep constant in formulas you plan to copy.

For example, **C5** is an absolute cell reference. A formula using the absolute cell reference C5 instructs Excel to keep the cell reference C5 constant (absolute) in the formula as it copies it to the destination area.



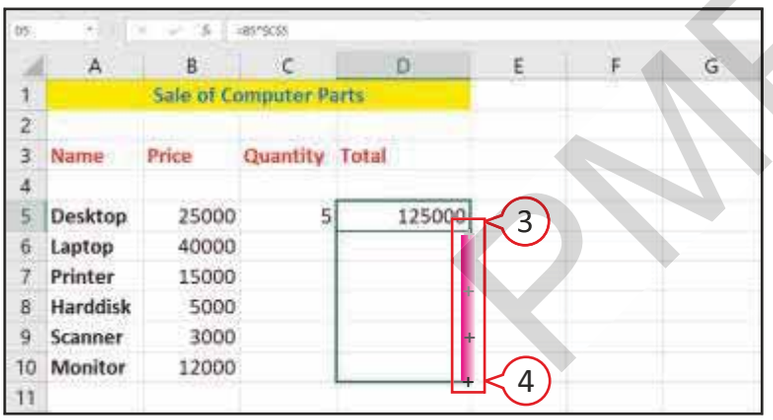
1. Type the formula (=B5*C5) you want to copy to other cells.

In this example, we have used **absolute cell reference**.

The Formula bar also displays the formula.

2. Press the **Enter** key.

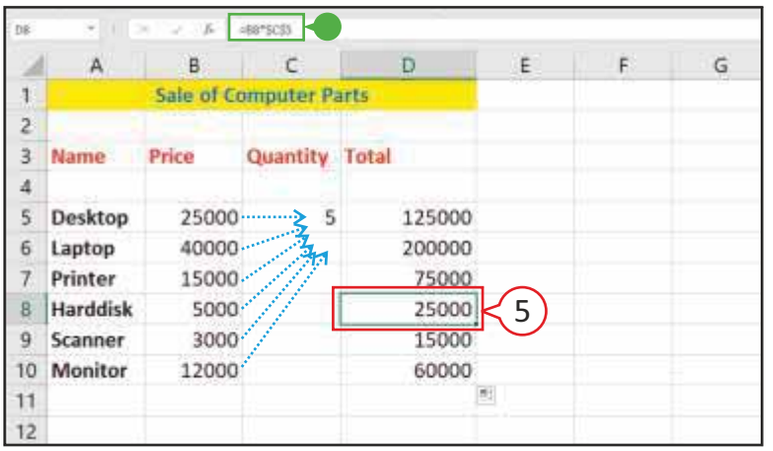
The result of the calculation appears in the cell.



3. Position the mouse (✥) over the bottom right corner of the cell.

(✥) changes to (**+**).

4. Drag the mouse (**+**) over the cells you want to copy the formula.



The result of the formulas appears.

5. To view one of the new formulas, click a cell that received a copy of the formula.

- The Formula bar displays the formula with absolute cell references.

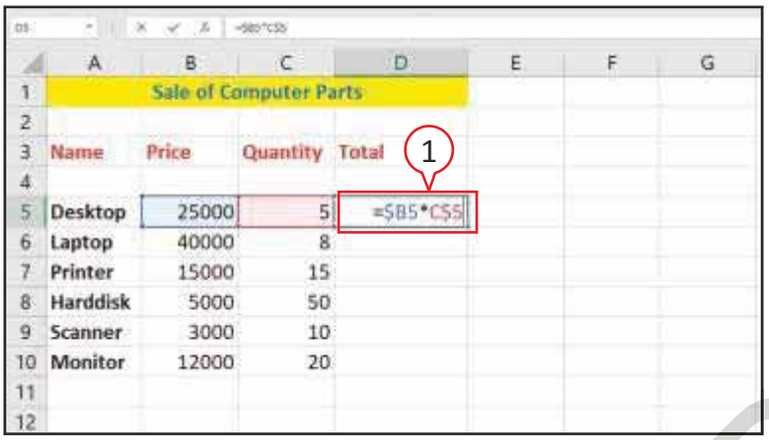
The formula using the absolute cell reference keeps the cell reference **C5** constant (absolute) in the formula as it copies it to the destination area. In the above example, the first cell reference of each cell is changed, but the second cell reference of each cell is constant.

MIXED REFERENCE

A cell reference with only one dollar sign ($) before either the column or the row is called a **mixed cell reference**. It can be either **C$5** or **$C5**.

When it shows **C$5**, the column reference changes when you copy this cell to another column because it is **relative**. The row reference does not change because it is **absolute**.

When it shows **$C5**, the column reference does not change because it is **absolute**. The row reference changes when you copy this cell reference to another row because it is **relative**.



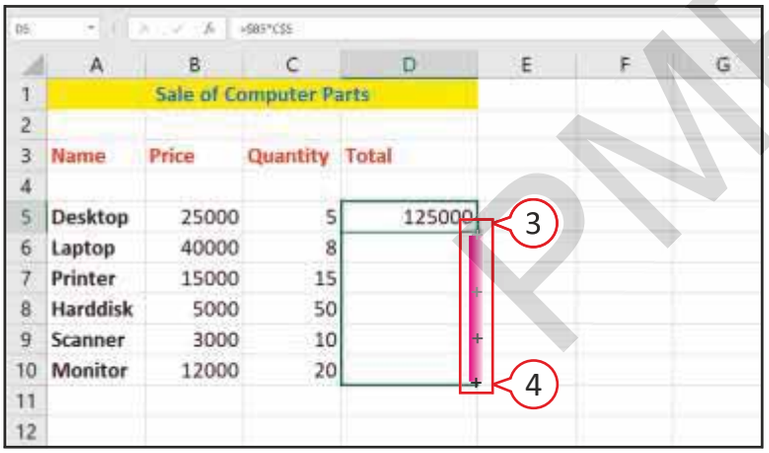
1. Type the formula (=$B5*C$5) you want to copy to other cells.

In this example, we have used **mixed cell reference**, where column will remain constant in first reference and row will remain constant in second reference.

The Formula bar also displays the formula.

2. Press the **Enter** key.

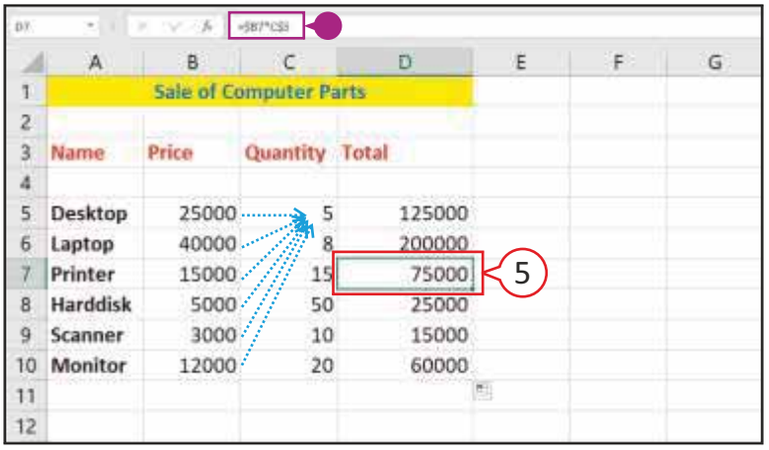
The result of the calculation appears in the cell.



3. Position the mouse (✛) over the bottom right corner of the cell.

   (✛) changes to (+).

4. Drag the mouse (+) over the cells you want to copy the formula.



The result of the formulas appears.

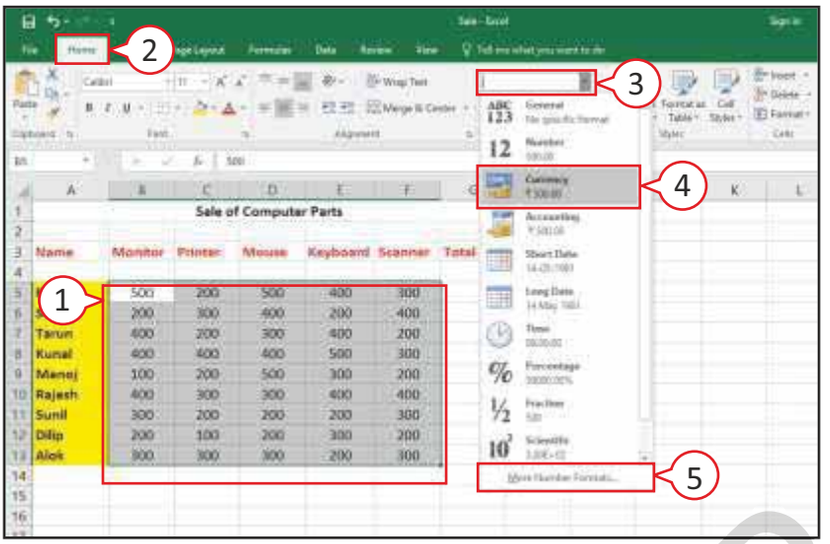
5. To view one of the new formulas, click a cell that received a copy of the formula.

- The Formula bar displays the formula with mixed cell references.

In the above example of **mixed** cell reference, column letter will remain constant in first reference, and row number will remain constant in second reference.

Changing Number Formats

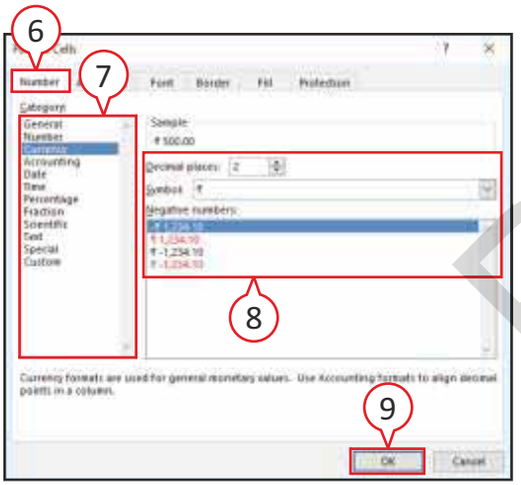
Number formats are the formats for displaying numerical data. You can use number formatting to control the appearance of numerical data. Excel offers 12 different number styles to choose from. For example, if you have a column of prices, you can apply currency formatting to the data.



1. Select the cell or range you want to format.
2. Click on the **Home** tab.
3. Click on the down arrow of **Number Format**.

The Number gallery opens.

4. Click on any number category from the gallery, and skip the steps **5** to **9**.
5. Click on **More Number Formats** if you don't see the category you want for your cell or range.

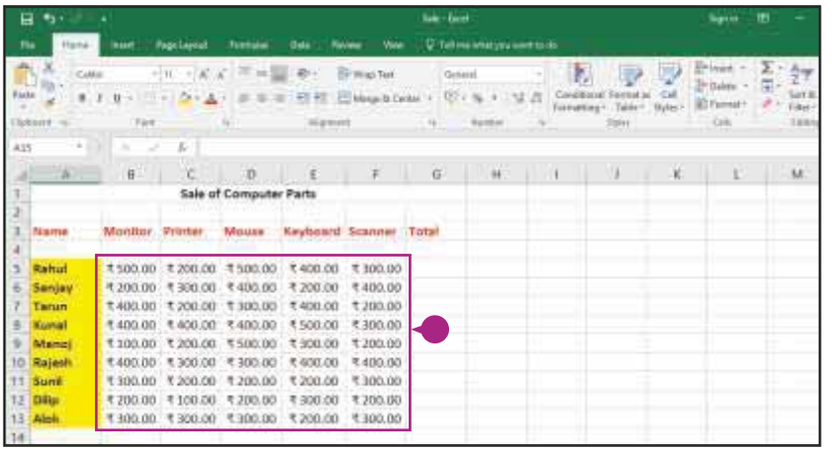


The **Format Cells** dialog box will open. You can use this dialog box to control properties, such as the display of negative numbers, the currency symbol used, and how date and time appear.

6. Click on the **Number** tab.
7. Click on any number **Category**.
8. Use the controls that Excel displays to customize the number format.

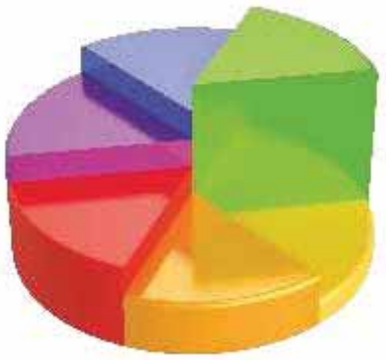
The controls you see vary, depending on the number format you chose in step **7**.

9. Click on **OK**.



- Excel applies the number formatting to the numerical data in the cell or range.

Charts in Excel



Charts are graphical representations of the data. Excel offers a wide selection of charts, which help you to display your data in a pictorial way. There are over a dozen chart types, each with several sub-types, provided by Excel.

Charts help us make instant decisions based on the comparison of numbers. They also help us analyze and evaluate the worksheet conveniently. As compared to simple presentations, charts are more attractive and appealing.

ADVANTAGES OF CHARTS

1. Charts display a lot of information in an easy to understand format.
2. Data and information can be presented in an attractive manner with the help of a chart.
3. A chart is more impressive and informative as compared to a simple data statement.

COMPONENTS OF CHART

The main components of a chart are given below.

X-axis: The X-axis is horizontal axis of the chart, and it is also known as category axis.

Y-axis: The Y-axis is vertical axis of the chart, and it is also known as value axis. The value of each data series is plotted on this axis.

Data Series: It is a group of data from which a chart is derived.

Data Object: Charts are made up of a variety of elements called data objects.

Chart Area: It is the area where chart components are enclosed.

Plot Area: It is the area of the chart where the actual chart is plotted.

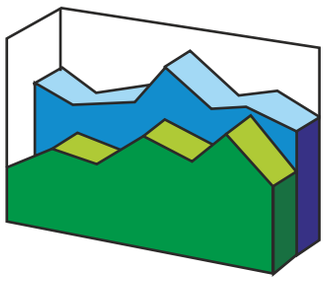
Chart Title: It is the text at the top of the chart that tells what the chart represents.

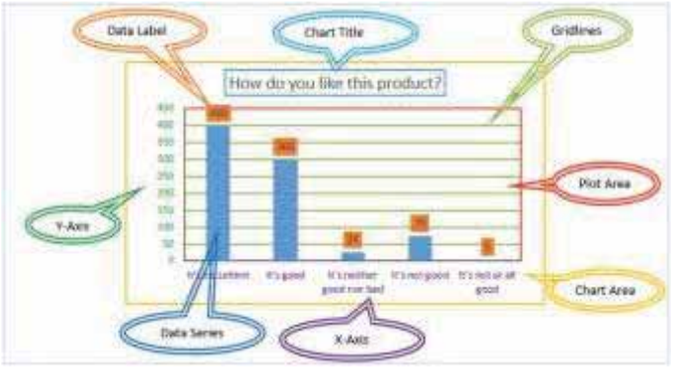
Axis Title: These are the titles given to the two axes, i.e. x-axis and y-axis, of the chart.

Gridlines: The gridlines are the horizontal and vertical lines on the plot area which are inserted in a chart to enhance its readability.

Legend: A legend is to the right of the plot area, and it identifies each data series. Each series can be uniquely identified by assigning a unique color or pattern to it.

Data Label: This is a text or label that provides additional information on data points.



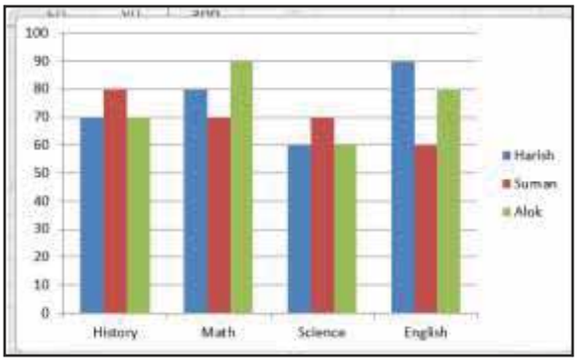


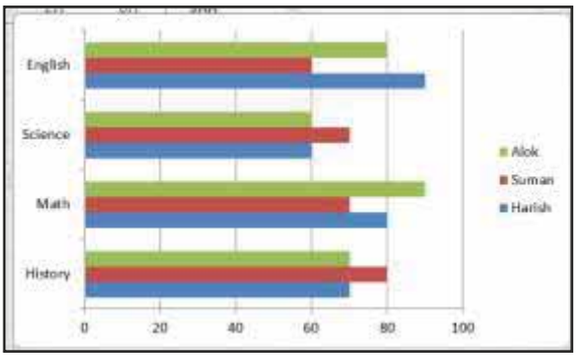
Types of Charts

Excel provides different kinds of charts from pie charts to bar charts and many more. Let us study about them one-by-one.

COLUMN CHART

This chart displays the data in the form of vertical bars. This type of chart easily represents change over time because it is easy to compare column lengths. It is also called as vertical bar chart. In a column chart, categories are typically organized along with the horizontal axis and values along with the vertical axis.



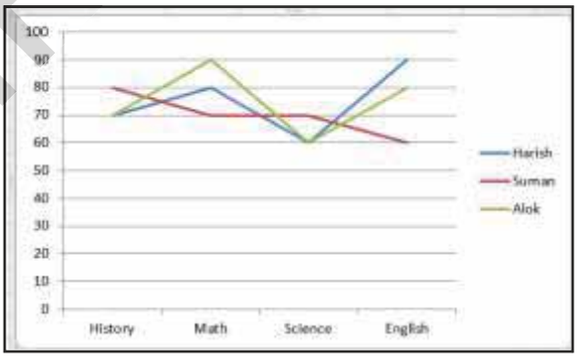


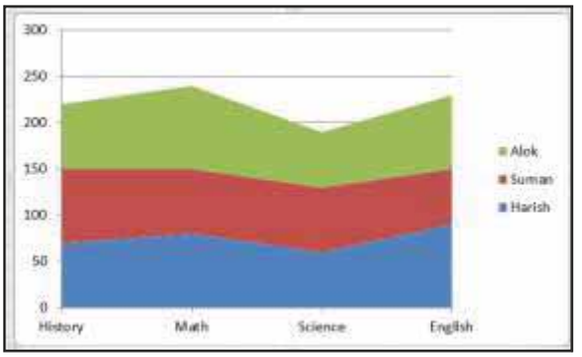
BAR CHART

Bar chart can be represented in a tabular format as well as in the pattern of columns. This chart shows data changes over a period of time and comparisons with some specific or individual items.

LINE CHART

Line chart displays continuous data over the time, set against a common scale and is, therefore, ideal for showing trends in data at equal intervals. In a line chart, the category of data is distributed evenly along the horizontal axis and all value data along the vertical axis.



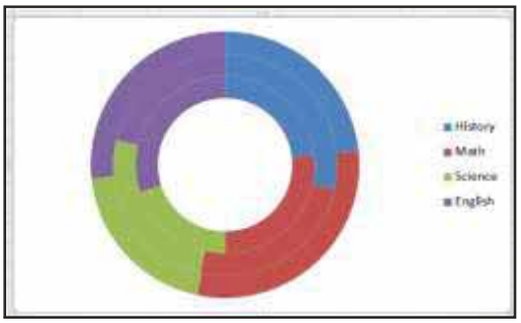


AREA CHART

It displays the magnitude of change over time. It also shows the relationship of parts to a whole by displaying the sum of a plotted value.

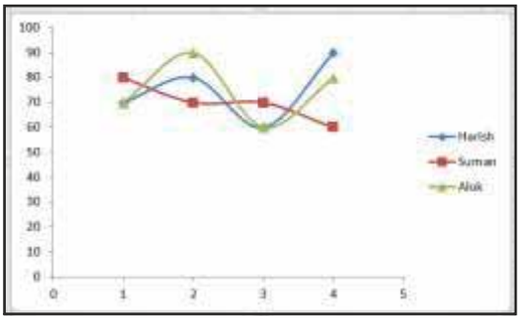
PIE CHART

This chart has a shape of round pie cut into slices. It displays the contribution of each value to a total value (represented by overall pie). Data series is shown in the form of comparative size of things. The data points in a pie chart are displayed as a percentage of the whole pie.



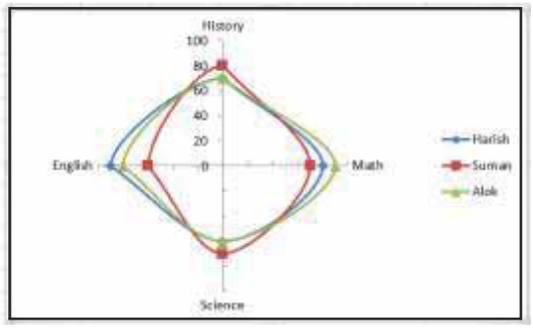
DOUGHNUT CHART

It consists of more than one data series. In this chart, each ring represents one data series. It shows the relationship of parts to a whole.



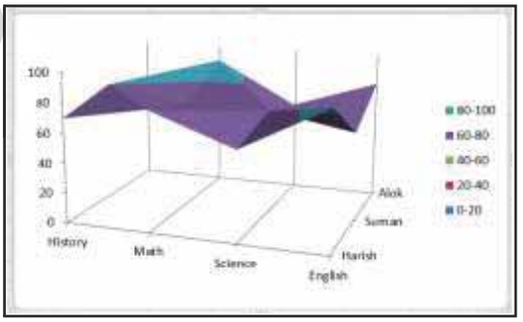
SCATTER CHART

The scatter chart and the line chart are almost similar, but the scatter chart is displayed with a scribble in line whereas the line chart uses a connected line to display data.



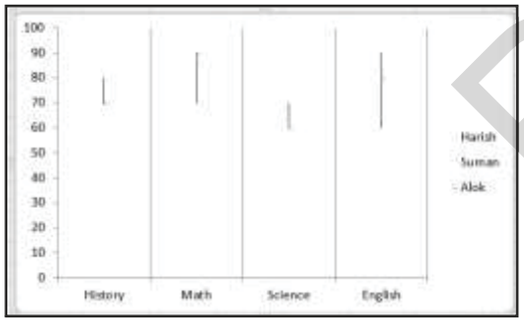
RADAR CHART

A radar chart plots data in concentric irregular circles. Each data series has its own value arising from the centre point. Lines connect all values in the same series.



3D SURFACE CHART

It shows the three dimensional view of data. A topographic map is an example of this type of chart.



STOCK CHART

This type of chart is ideal for tracking the stock market activity.

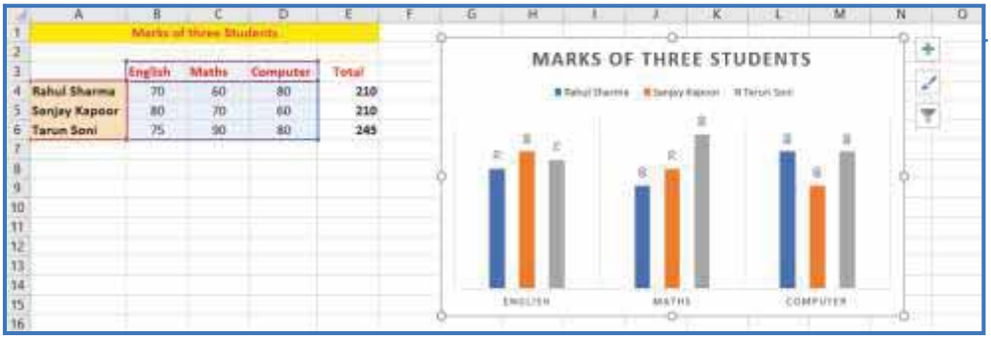
Subject Integration

Mathematics

This integration will make the students learn about the role of charts in data visualization.

Project: Chart of Students' Marks

Start

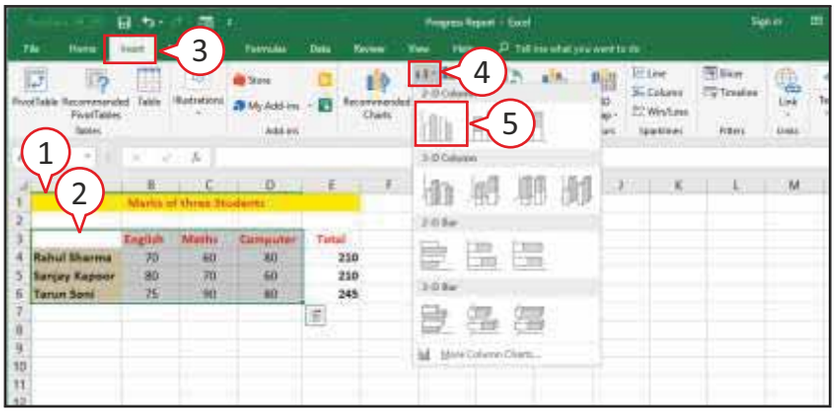


This project deals with creating a chart and changing its layout. Let us create the chart by using various features of Excel.

Creating a Chart

A chart is a graphical representation of data. You can create a chart to compare data, and view patterns and trends easily. After creating a chart, you can use Chart Tools on the Ribbon to fine-tune the chart to display and explain the data.

1. Enter and format the data as shown in the project by using the various features of Excel.

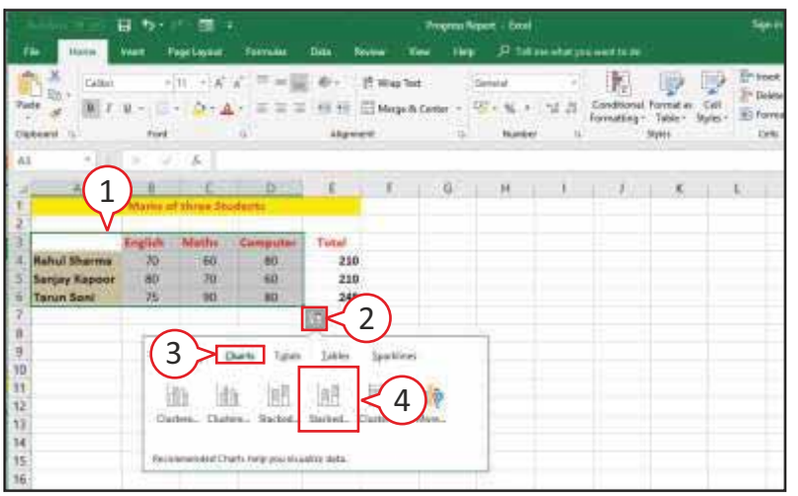


2. Select the range of data that you want on chart.
3. Click on **Insert** tab.
4. Click on a chart type from the **Charts** group.
5. Click on a chart style.

In this example, we have selected **Column Chart** type.

- Excel immediately creates a chart and places it on the worksheet.
- Excel displays two chart tabs **(Design** and **Format)** for working with the chart.
- If you want to move the chart to its own sheet, click on **Move Chart Location** on the **Design** tab and choose **New Sheet**.

QUICK WAY TO INSERT CHART



1. Select the range of data that you want on chart.
2. Click on **Quick Analysis Smart tag** [ ].
3. Click on **Charts** tab.

Excel displays the chart types recommended for your data.

4. Click the chart type you want to use.

Excel inserts the chart.

MOVING AND RESIZING A CHART

You can move and resize chart on your worksheet to make the chart easier to read.

Moving a Chart

1. Click on an empty area of the chart.

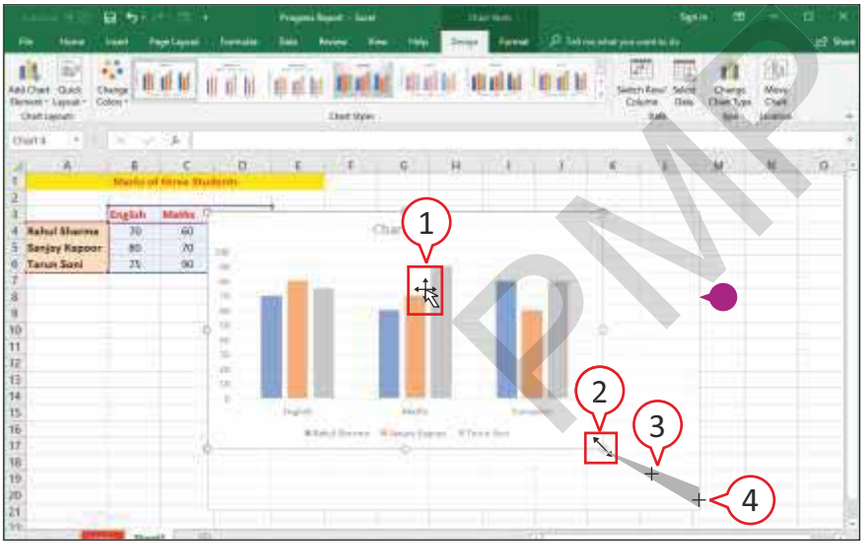
Excel selects the chart and surrounds it with border and handles.

The mouse pointer changes to [ ].

2. Click and drag the chart to the location you want.
3. Release the mouse button.

Excel moves the chart.

Resizing a Chart



1. Click on an empty area of the chart.

Excel selects the chart and surrounds it with handles.

2. Move mouse over the handle of the chart.

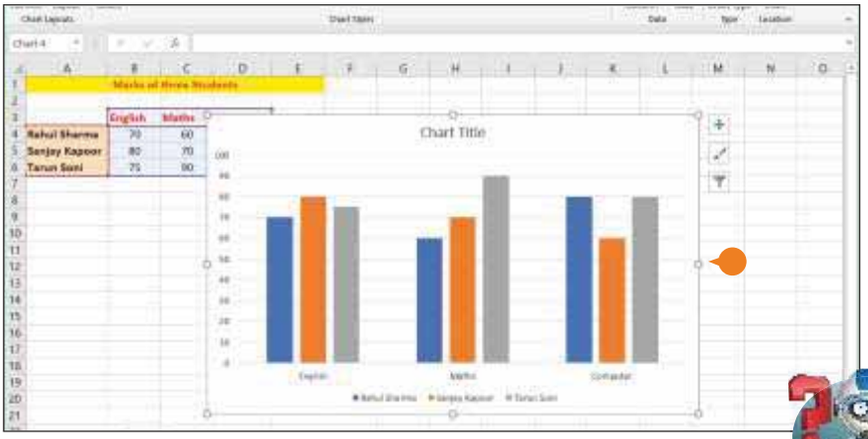
The mouse pointer changes to [ ].

3. Click on a handle and drag it to resize the chart.

- A shaded border represents the chart as you resize it on the worksheet.

4. Release the mouse button.

- Excel resizes the chart.

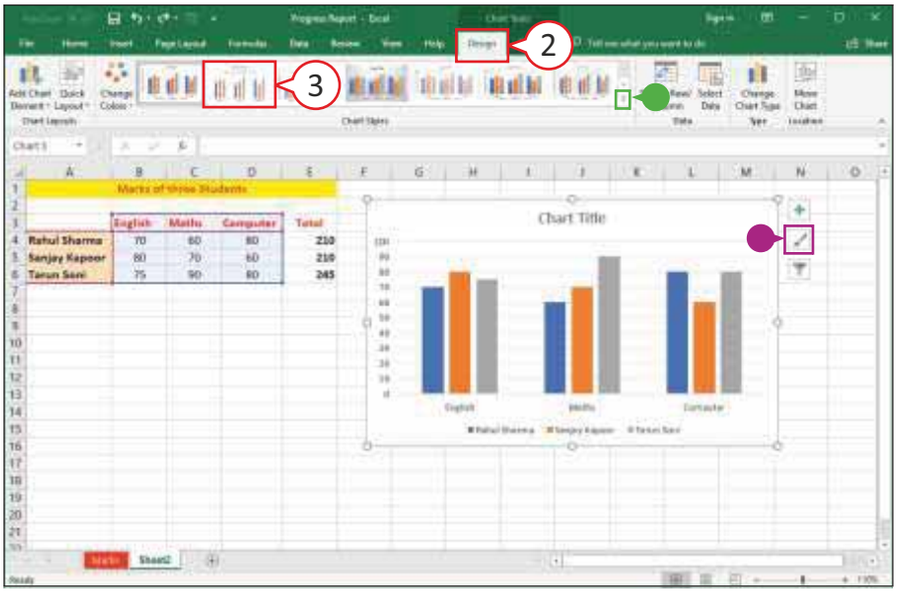


Do You Know?

Alt+F1 is a keyboard shortcut to create default chart of selected range.

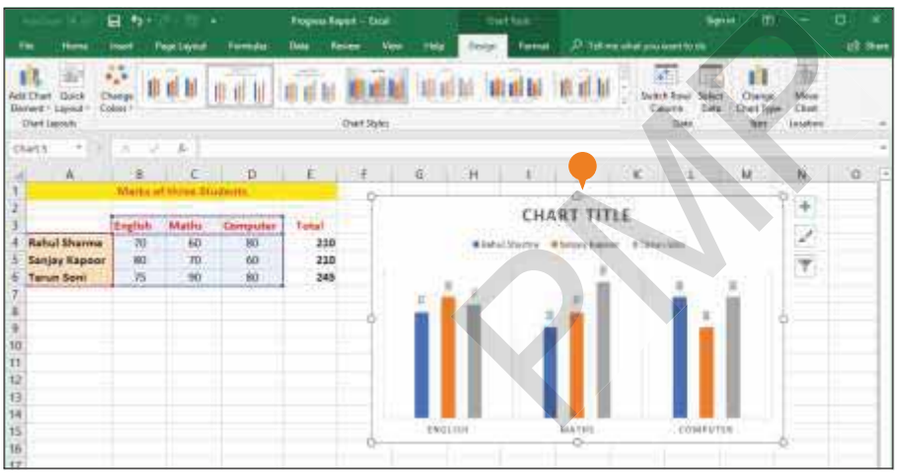
CHANGING THE STYLE OF CHART

You can change the chart style to change the appearance of a chart.



1. Click on an empty area of the chart.
2. Click on **Design** tab.
3. Click on a new chart style from the **Chart Styles** group.

- You can click on the down arrow of **More** button to view the full palette of styles.
- You can also click on **Chart Style** button to change the style of the chart.



- Excel applies new style to the existing chart.

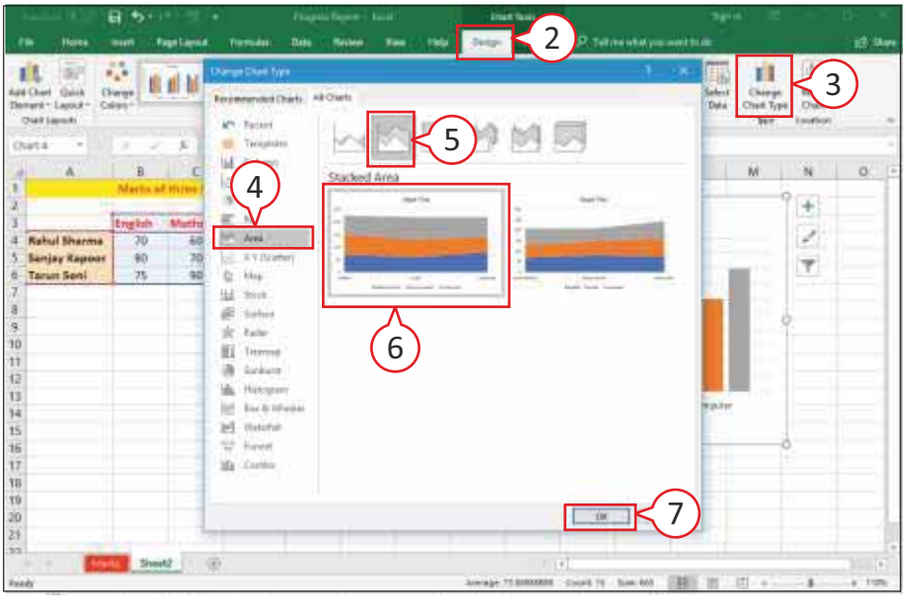
Add Chart Title

- Type the title in the chart title.

Your project is now ready.

CHANGING THE TYPE OF CHART

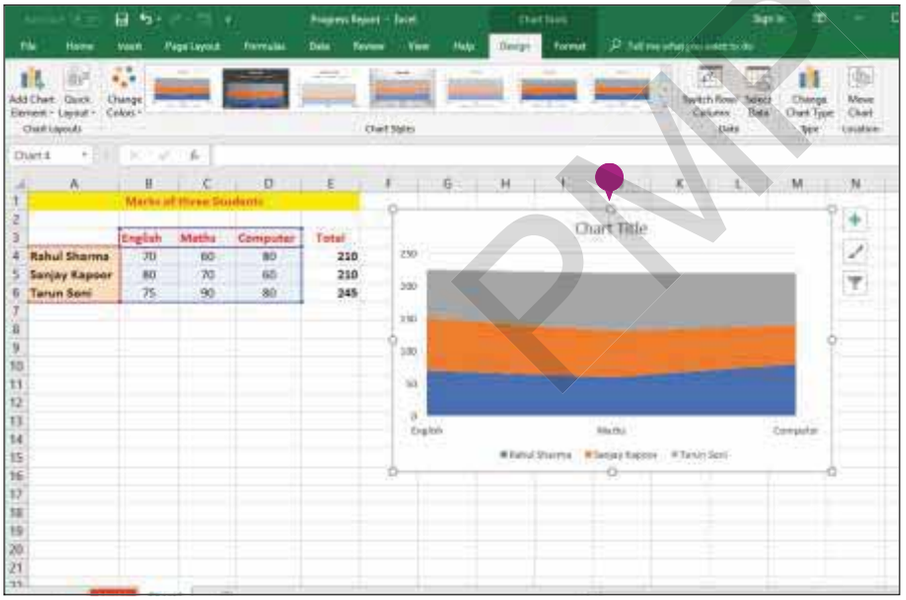
You can change the chart type to present your data more effectively after creating a chart.



1. Click on an empty area of the chart. (*not shown*)
2. Click on **Design** tab.
3. Click on **Change Chart Type** button.

The **Change Chart Type** dialog box appears.

4. Click on the desired chart type.
5. Click on the desired chart style.
6. Click the configuration you want to use.
7. Click on **OK**.



- Excel changes the chart to the chart type you selected.

In this example, we have changed Column chart to Area chart.

Update Your Knowledge

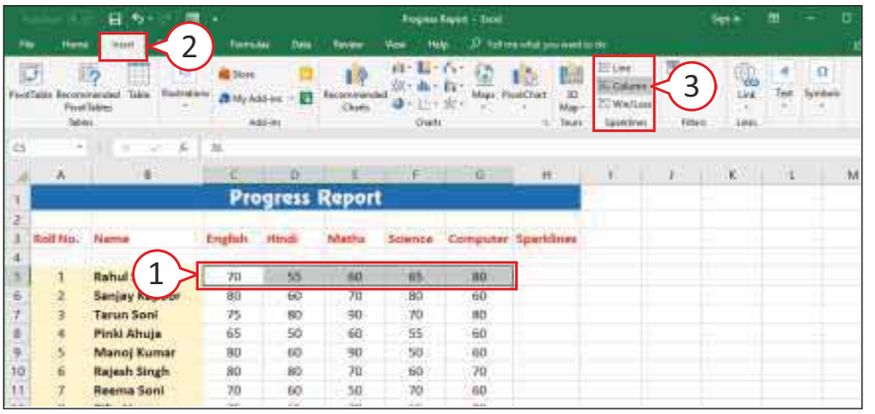
You can customize any chart you create in Excel by making changes to the format of the chart text, change the chart type, replot the data and do much more. You can angle text, change text color, or adjust the colors and patterns of the bars and lines displayed in a chart. You can also add new chart elements, such as **callouts**, **labels**, and **titles**.

Update Your Knowledge

- Press and hold **SHIFT** key while dragging any of the corner selection handles of a selected chart to resize the chart proportionately.
- You can also right-click a chart, and click **Change Chart Type** to bring the dialog box.

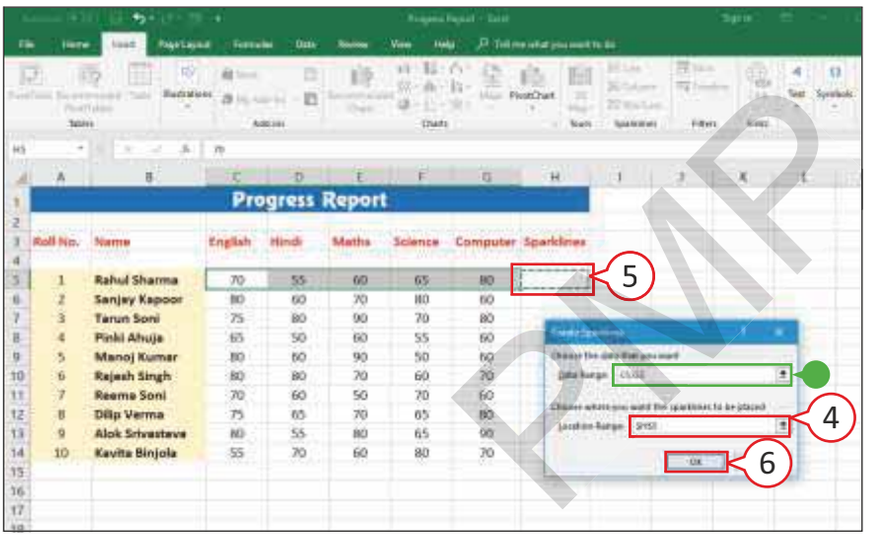
Inserting Sparklines

In Excel, **Sparklines** are tiny, word-sized charts that can appear in a cell. Excel includes three types of Sparkline charts: **Line**, **Column**, and **Win/Loss**. You can add Sparklines to multiple rows or columns at once.



1. Select the row or column of data for which you want the Sparkline to appear.
2. Click on the **Insert** tab.
3. Click on **Column** inside the **Sparklines** group.

Create Sparklines dialog box will appear.

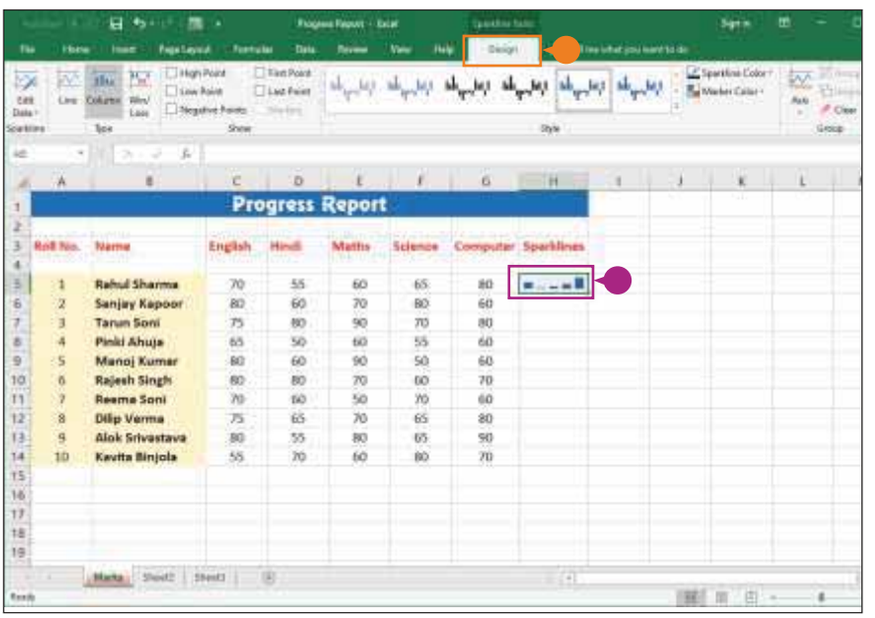


- **Data Range** appears here.

4. Click inside the **Location Range** box to make it active.
5. Click the cell where you want the Sparklines to appear.

Location Range box displays the address of that cell which you have selected in step 5. In this cell, Sparkline will appear.

6. Click on **OK**.



- Sparklines appear in the selected cell.

With proper use of Sparklines, data analysis is quicker and more direct to the point.

- The **Design** tools appear on the **Sparkline Tools** tab.

You can edit or format the Sparklines using these tools.

Activity Tip

Make the Sparklines for the remaining values.

Self-Evaluation

CHECKLIST

After reading the chapter, I know these points:

	Agree	Disagree
I know that Formula is a sequence of values, cell reference or operators.	☐	☐
I know that Excel performs operations in Formulas called order of calculation.	☐	☐
I know that Function is a built-in formula which is used to perform a calculation.	☐	☐
I know that a cell in a worksheet has a unique address, called cell reference.	☐	☐
I know that Number format is used to control the appearance of numeric data.	☐	☐
I know that a chart is a graphical representation of data that we enter into Excel.	☐	☐
I know that Sparklines are tiny, word-sized charts that can appear in a cell.	☐	☐

Exercises

A. Tick (✓) the correct answer.

1. ..... is a sequence of values, cell reference and operators to do calculation.
   a. Reference ☐ b. Formula ☐ c. Value ☐
2. A range name must start with a ..... .
   a. number ☐ b. letter ☐ c. symbol ☐
3. ..... are specific values used in particular order to perform calculations in functions.
   a. arguments ☐ b. number ☐ c. digit ☐
4. ..... is the central area within the chart area where actual chart is plotted.
   a. Legend ☐ b. Data Series ☐ c. Plot Area ☐
5. Text at the top of the chart is called ..... .
   a. Axis Title ☐ b. Chart Title ☐ c. Value Axis ☐
6. ..... chart has the shape of round pie cut into pieces or slices.
   a. Scatter ☐ b. Pie ☐ c. Bar ☐

B. Write 'T' for True and 'F' for False statements.

1. Operators specify the type of calculation we want to perform. ☐
2. Formula bar shows the formula we are using in active cell. ☐
3. A formula is a ready-made operation to perform a calculation. ☐
4. Data series is a caption which identifies the category of axis. ☐
5. The horizontal and vertical lines on the plot area are gridlines. ☐
6. Area chart shows the correlation between two value sets. ☐

C. Fill in the blanks.

1. ..... and ..... are two ways of entering data in the Excel.
2. Excel recognizes any data as a ..... when it begins with an equal to sign (=).
3. ..... is used to change the order in which Excel performs calculations.

4. A formula using the ..... cell reference keeps the cell reference constant.
5. Charts are made up of a variety of elements, also called data ..... .
6. ..... are tiny, word-sized charts that can appear in a cell.

D. Differentiate between the following.

1. Formula

.....

.....

.....

Function

.....

.....

.....

2. Absolute Referencing

.....

.....

.....

Relative Referencing

.....

.....

.....

E. Answer in 1-2 sentences.

1. What are operators?

.....

.....

2. Name any four functions of Excel.

.....

.....

3. What do you understand by cell reference?

.....

.....

4. What are Sparklines in a chart?

.....

.....

F. Answer briefly.

1. Explain order of calculation in Excel.

.....

.....

.....

2. Write the steps to edit a formula.

.....

.....

.....

3. Explain the structure of a function.

.....

.....

.....

4. What is chart? Write its advantages in Excel.

.....

.....

.....

G. Application-based Question

Drishti's father wants to buy a house for ₹25,00,000. He wants to get a loan of ₹15,00,000 from a bank and wishes to pay ₹70,000 as monthly installment to clear the loan. If the bank charges 9% as the rate of interest, in how many months will Drishti's father clear the loan amount?

.....

Group Discussion

Divide the students into three groups and discuss the topic– 'Difference between Absolute Reference, Relative Reference and Mixed Reference'.

Online Link

To learn more about creating charts in Excel, visit the website:

https://edu.gcfglobal.org/en/excel/charts/1/

Activity Section

Lab Activity

A. Open Excel and create the following worksheet.

	A	B	C	D	E
1	PLANET DEPARTMENTAL STORE				
2	MONTHLY SALES				
3					
4	S. No.	Items	Quantity (kg)	Rate (Per Kg)	Total
5	1	Rice	25	₹ 40	
6	2	Dal	30	₹ 55	
7	3	Ghee	50	₹ 220	
8	4	Rajma	35	₹ 45	
9	5	Salt	10	₹ 15	
10	6	Tea	45	₹ 70	
11	Grand Total				

Subject Integration

Mathematics

This integration will make the students learn about data handling using formulas and functions.

Now, follow these instructions:

a. Merge and center the cells of Row 1 and 2 and fill color.
b. Find out the total by using formula '=C5*D5' in cell E5.
c. Copy the formula to the rest of the cells.
d. Change the font to 'Tahoma' (or similar font).
e. Change the first line in the title size to 14 and make it bold and underline.
f. Change the second line in the title size to 12 and shade row 3 blue.
g. Center the labels in row 4. Make them bold and centered.
h. Select cells C10 to E10 and insert a bottom border.
i. Calculate the Grand Total in cells C11 and E11 by using the AutoSum feature.
j. Place a thick black border around the table.
k. Save the workbook as **'Monthly Sales'** in **'Lab Activity'** folder.

B. Open Excel and create a worksheet showing the medal tally in Tokyo Olympics 2020.

S.No.	Country	Gold	Silver	Bronze	Total
1	United States of America	39	41	33	
2	People's Republic of China	38	32	18	
3	Japan	27	14	17	
4	Great Britain	22	21	22	
5	ROC	20	28	23	
6	Australia	17	7	22	
7	Netherlands	10	12	14	
8	France	10	12	11	
9	Germany	10	11	16	
10	Italy	10	10	20	
11	Canada	7	6	11	
12	Brazil	7	6	8	
13	New Zealand	7	6	7	
14	Cuba	7	3	5	
15	Hungary	6	7	7	
16	Republic of Korea	6	4	10	
17	Poland	4	5	5	
18	Czech Republic	4	4	3	
19	Kenya	4	4	2	
20	Norway	4	2	2	

Now, follow the given steps:

a. Use the AutoFill feature to generate the S.No. column.
b. Calculate the total medals won by different countries.
c. Create one pie chart on the first ten countries and another pie chart on the next ten countries in the medal tally.
d. Save the workbook as **'Olympics'** in **'Lab Activity'** folder.

Subject Integration

General Knowledge

This integration will make the students aware of the medal tally of top twenty countries in Tokyo Olympics.

Technology Trailblazers

Stephen William Hawking

? Theoretical Physicist and Cosmologist

Stephen William Hawking was an English theoretical physicist, cosmologist, author, and Director of Research at the Centre for Theoretical Cosmology within the University of Cambridge. He is known for his research work related to the study of black holes.

Hawking suffered from a rare and life-threatening condition of Amyotrophic Lateral Sclerosis, a condition he suffered all his adult life. The illness started when he was 21 while pursuing his PhD from Cambridge University. For a major part of his later life, he was almost completely paralyzed and communicated through a speech generating device. Not succumbing to the despair of the disease, Hawking devoted all his life to his work and research.

5 Adobe Animate – Introduction

OBJECTIVES

After completing this chapter, you will be able to:

- Learn about Adobe Animate and its features.
- Understand the components of Adobe Animate window.
- Setup a new Animate stage.
- Learn how to run and save Animate file.
- Learn the uses of different drawing tools of Animate.

Adobe Animate

Adobe Animate, formerly known as **Adobe Flash Professional**, is a multimedia authoring and computer animation program developed by **Adobe Systems**. Most of the features and functions of Adobe Animate are similar to Adobe Flash Professional.

Animate is specifically designed to create vector graphics, animations, games, and web page components. Animate is also used to make videos over the Internet. In Animate, you can insert an image and add animations to it. When you run that animation, it is called playing a movie.

FEATURES OF ADOBE ANIMATE

Illustrations and Other Artwork: Animate has many drawing tools that allow you to create vector graphics. Vector graphics are composed of lines, curves, and polygons. Conversely, bitmaps are made up of pixels. The main benefit of using vector graphics in Animate projects is that they are smaller in size, and can be downloaded at a very fast speed over the Internet.

Symbols and Instances: Symbols are objects in Animate that you can re-use. These objects can be graphics, buttons, movie clips, sounds, and videos. Copies of symbols that are used in an Animate movie are called **instances**.

Animation: There are many ways to animate in Adobe Animate. You can create animations by using frame-by-frame or motion tweening method.

Layers: Layers are the keys to work with graphic objects and animation. You can draw, erase, add, or remove instances on one layer without affecting another layer. You can also hide layers (make them invisible) and lock layers (make them un-editable).

PLAYBACK PLATFORM

The Playback Platform is the technology that your final or published files use to play.

Adobe Animate has flexibility with output formats and ensures that your content can be viewed anywhere and on any device without the need for plug-ins. Regardless of the playback environment, all document types are saved as **FLA** or **XFL** (Animate) files.

Starting Adobe Animate

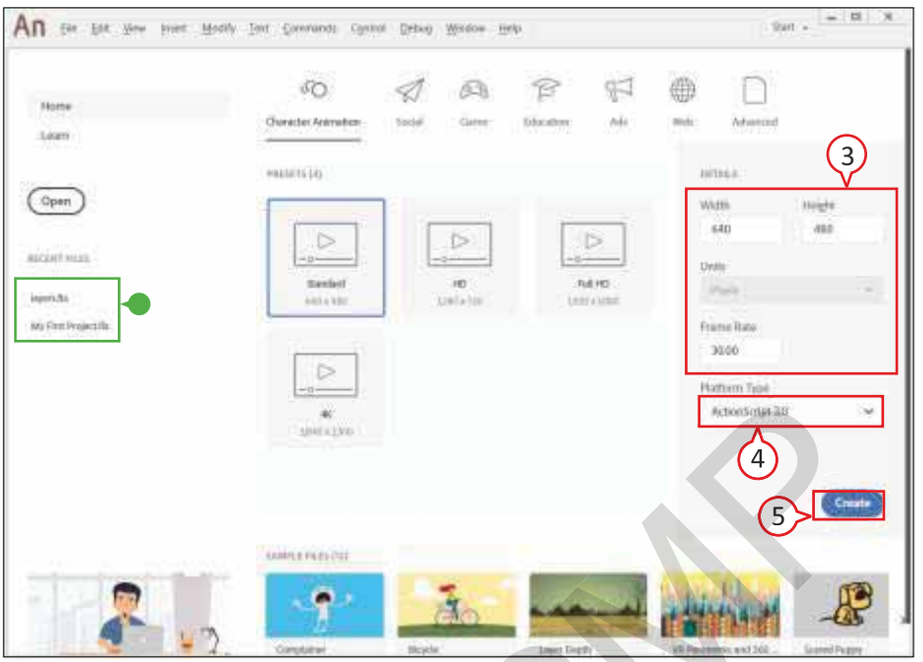
Like any other program, you can start Animate using the Start icon.

1. Click on **Start** icon to open Start menu *(or press ⊞)*.

A list of all installed Apps appears on the left of Start menu.

2. Scroll down and click on **Adobe Animate.**

Adobe Animate opens the welcome screen in front of you.



- Animate gives you quick access to your recent files. You can open any recently used file by clicking on it.

3. Type in the desired dimensions (Width and Height) and **Frame Rate**.
4. Click on the **Platform Type** you want to create.

In this example, we have selected **ActionScript 3.0** that targets the Flash Player. ActionScript 3.0 is the latest version of Animate scripting language.

5. Click on **Create**.

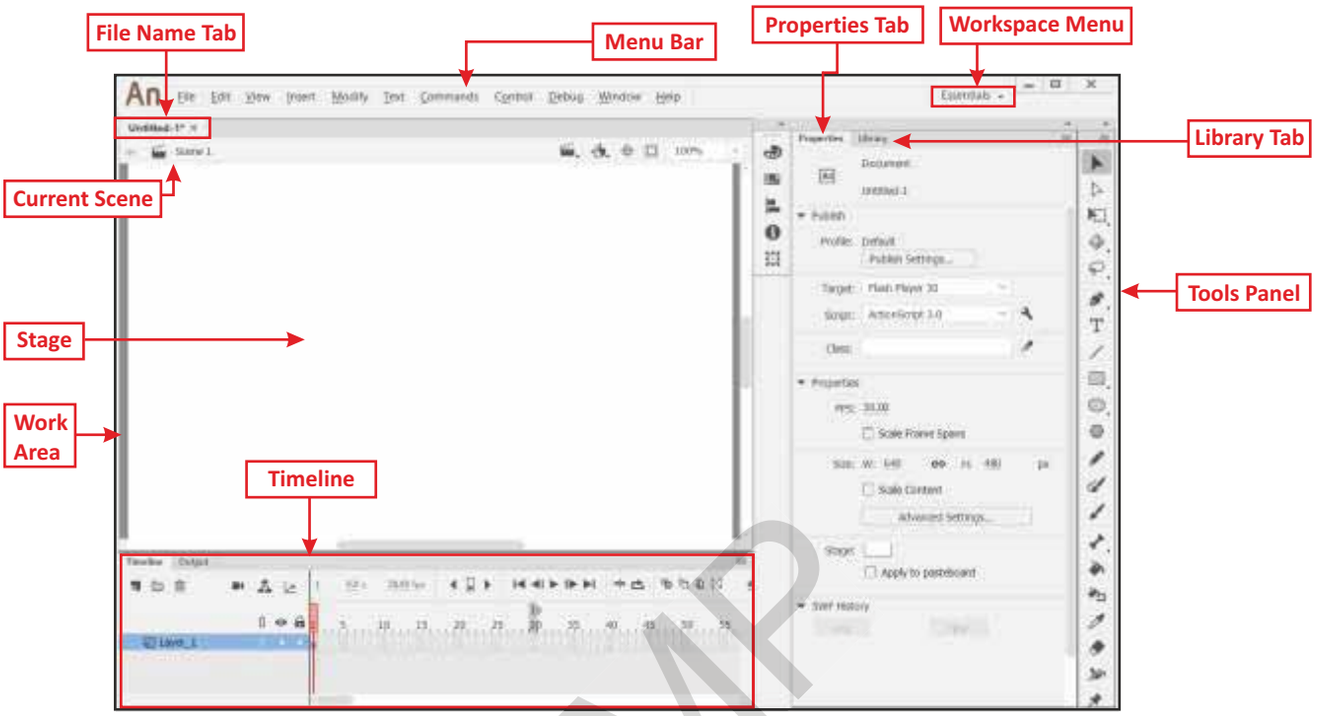
A blank document appears in the Animate with the specified dimensions.

Different Platform Types

- **HTML5 Canvas** document type is used to create animated assets that playback in a modern browser using HTML5 and JavaScript.
- **ActionScript 3.0** is a document type that targets the Flash Player.
- **AIR for Android** and **AIR for iOS** are documents configured for playback as apps on an Android or an Apple mobile device.
- **AIR for Desktop** are documents for playback as stand-alone programs on Windows or Mac desktop computers.

Components of Adobe Animate Window

The Animate program window has a number of components with which you must familiarize yourself before working on graphics and movies.



Menu Bar: Menu bar is a toolbar that displays the Animate menu options.

File Name Tab: This tab shows the name of current file. If two or more files are open, you can switch from one file to the other by clicking its tab.

Tools Panel: It has basic tools for creating and working with vector graphics.

Current Scene: It shows the name of the scene on which you are currently working.

Stage: The big white rectangle in the middle of your screen is called the **Stage**. It is the area where you place text, images, and video while creating Animate document.

Work Area: The area surrounding the stage is called **Work Area**.

Properties Tab: It is used to view and edit properties of the current object.

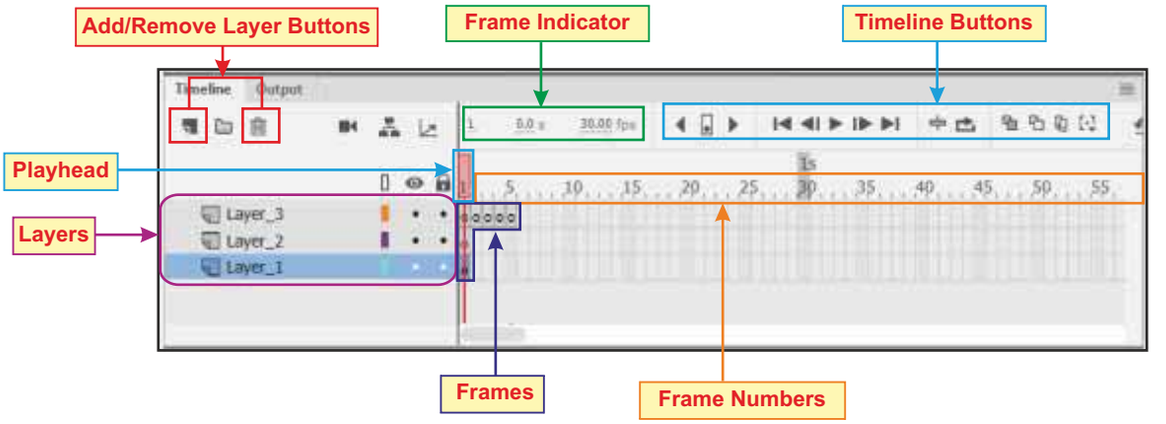
Library Tab: It is used to organize and select symbols to add to your movie.

Workspace Menu: It allows you to switch between workspaces and to create new ones.

Timeline: It is used to design the timing for the sequence of the movie. In this part, frames are highlighted and you can choose them to play the movie.

COMPONENTS OF ANIMATE TIMELINE

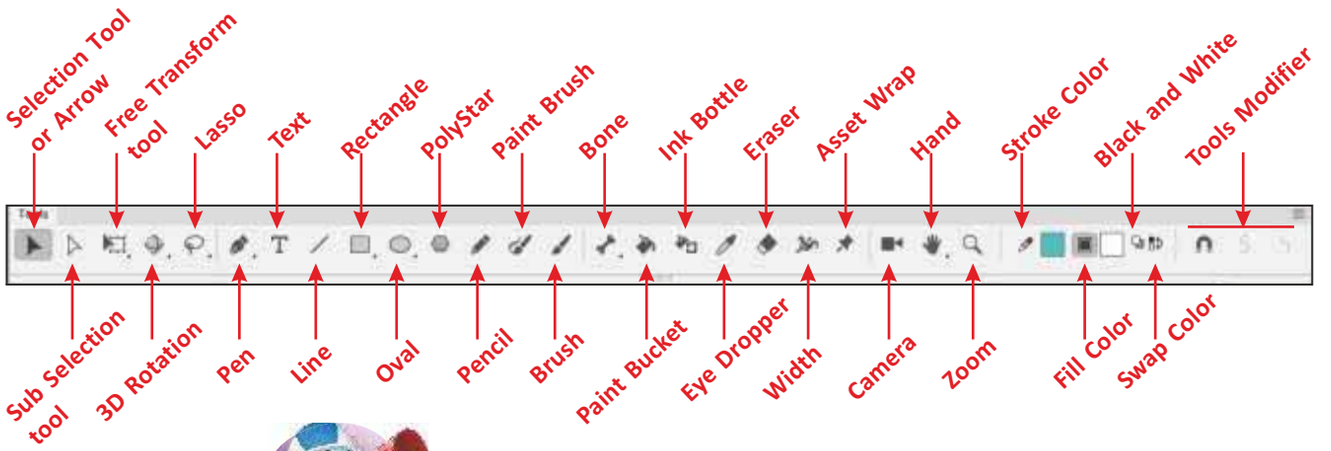
The Animate timeline is located below the Stage. It contains frames, layers, and scenes that make up a movie. You can use the timeline to organize and control your movies. Layers are a representation of depth in workspace, while frames are a representation of time. Frames can be used for building an animation over time.



- **Layers:** Layers are used to organize the artwork in your Animate document. You can have numerous layers stacked on top of one another. Newer layers are listed first. Each layer can contain a different image that appears on the Stage, and you can draw and edit objects on one layer without affecting the objects on another layer.
- **Add/Remove Layer Buttons:** Above the layers, there are buttons for adding and deleting layers.
- **Frames:** Frames are the little rectangles on the timeline. They enable you to control what appears in animation sequence. Length of time in an animation is divided into frames.
- **Frame Indicator:** Animate indicates the selected frame number, the current frame rate (how many frames play per second), and the time that has elapsed so far in the movie.
- **Frame Numbers:** Frames appear in a chronological order in the timeline, and each frame has a number.
- **Playhead:** The Playhead, also called the Current Frame Indicator, marks the current frame displayed on the Stage.
- **Timeline Buttons:** These buttons contain play/stop, start and end, loop on/off, and onion skin which are used for controlling frames, layers, and movies.

UNDERSTANDING THE DRAWING TOOLS IN TOOLS PANEL

The **Tools Panel** is packed with tools that you can use to create and work with graphic objects.



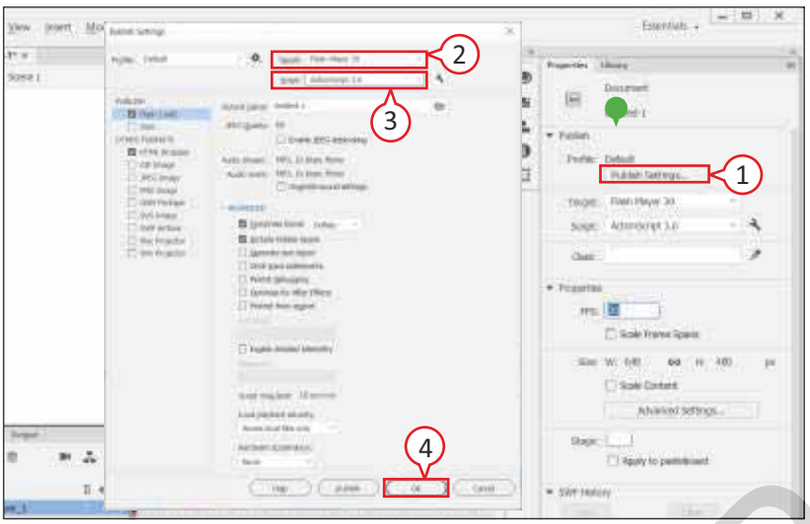
Update Your Knowledge

By default, the Tools Panel appears on the far-right side of the Animate program window, but you can even drag it to far left side of the window.

Setting up a New Animate Stage

When you first open a new document in Animate, it is a good idea to set up your stage size, frame rate, background color, and ActionScript version first. **Stage** is the on-screen area where you can view the contents of a frame and draw graphic objects.

CHANGING TARGET AND ACTIONSCRIPT



- **Publish** panel of the document appears in the Properties tab.

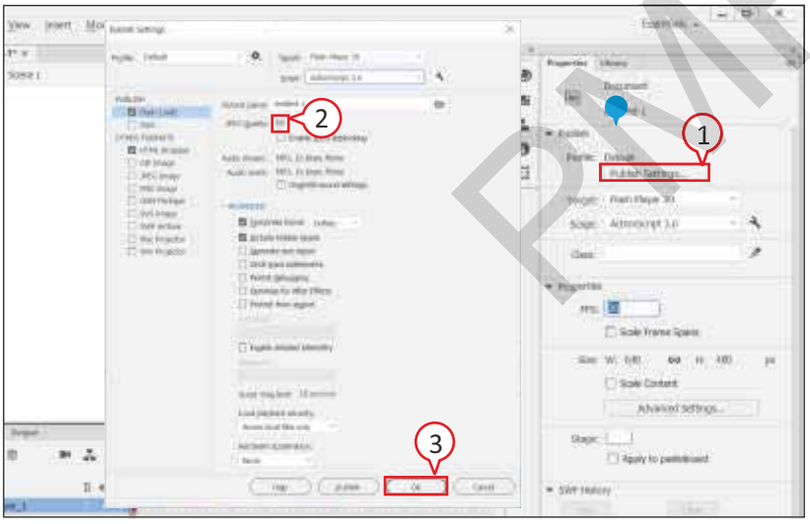
1. Click on **Publish Settings**.

The **Publish Settings** dialog box appears.

2. Select any player from **Target** list box.
3. Select **ActionScript 3.0** from **Script** list box.
4. Click on **OK**.

Your Publish settings are stored in your Animate document.

CHANGING JPEG IMAGE QUALITY



- **Publish** panel of the document appears in the Properties tab.

1. Click on **Publish Settings**.

The **Publish Settings** dialog box appears.

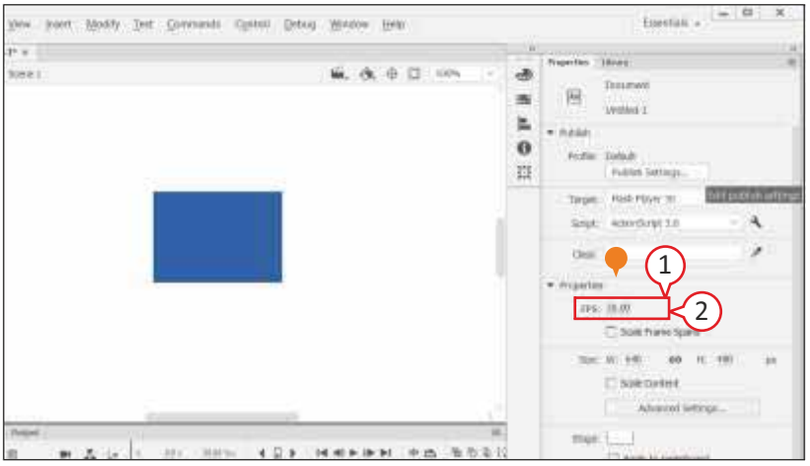
2. Click and drag the slider to set your default JPEG quality.

You can always increase or decrease the JPEG quality for better image fidelity or smaller file sizes, respectively.

3. Click on **OK**.

Your Publish settings are stored in your Animate document.

CHANGING THE FRAME RATE



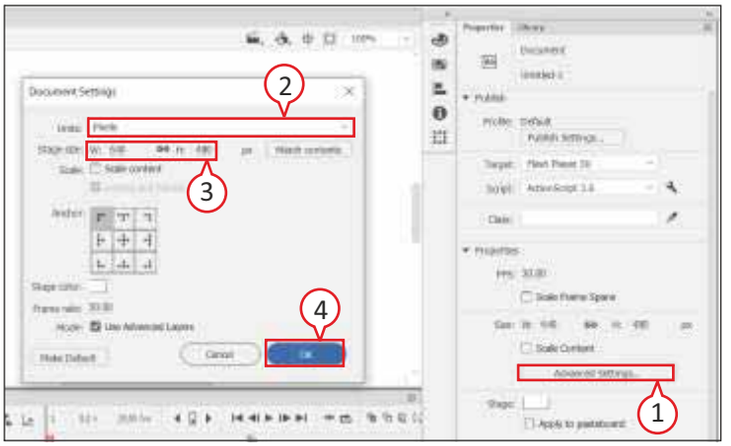
- **Properties** panel of the document appears below the Publish settings.

If **Properties** tab does not appear, open it by clicking on **Window** and then **Properties**.

1. Click the number in the **FPS (frames per second)** field.
2. Type a new frame rate in the **FPS** field.

This example shows a frame rate of 30.

CHANGING THE STAGE SIZE



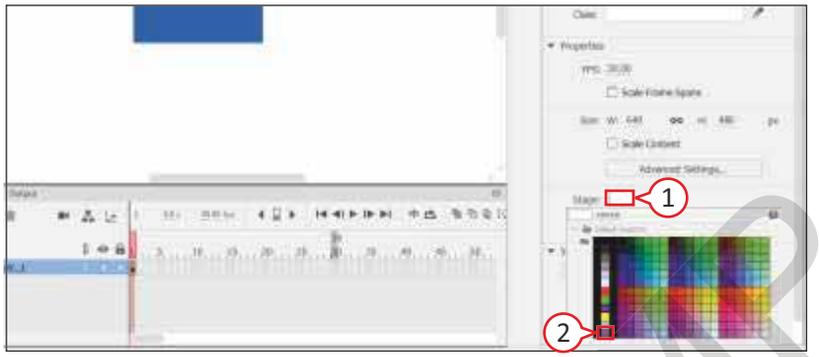
1. Click on **Advance Settings** in the **Properties** pane.

The **Document Settings** dialog box appears.

2. Select the measuring unit (e.g., Pixels) from the **Units** list box.
3. Type the **width** and **height** dimensions of **Stage size** you want for your Animate movie.
4. Click on **OK**.

Your Animate movie is now set to your desired dimensions.

CHANGING THE BACKGROUND COLOR



1. Click on the white box of **Stage**.

A set of color Swatches appears.

2. Click on any one of the colors to select a new background color.

Your background color changes to the color you have selected.

Testing an Animate Movie

You can test your Animate movie at any time during design and development. Previewing your animation in the development phase helps check whether everything is going right or not.

TEST USING TEST COMMAND

1. Click on **Control** in the Menu bar.
2. Click on **Test**. You can also press **Ctrl + Enter** keys. *Your Animate movie plays in a test window.*

TEST WITH PUBLISH PREVIEW

1. Click on **Control** in the Menu bar.
2. Click on **Test Movie**, and then click the format you want to test.

Your Animate movie plays in the selected format.

Saving The Animate File

As you create movies in Animate, you need to save them in order to see them again. The default extension for an Animate file is **.fla**. Animate does not save your work periodically, so it is essential to save early and often—every time you make a significant change.

1. Click on **File** menu. The File menu appears.
2. Click on **Save** to save the file *(or press Ctrl + S)*. The **Save As** dialog box appears.
3. Choose the destination where you want to save the file using the **Save In** list box.
4. In the **File name** text box, type a file name for your file.
5. Click on **Save**. *The file will be saved for future use.*

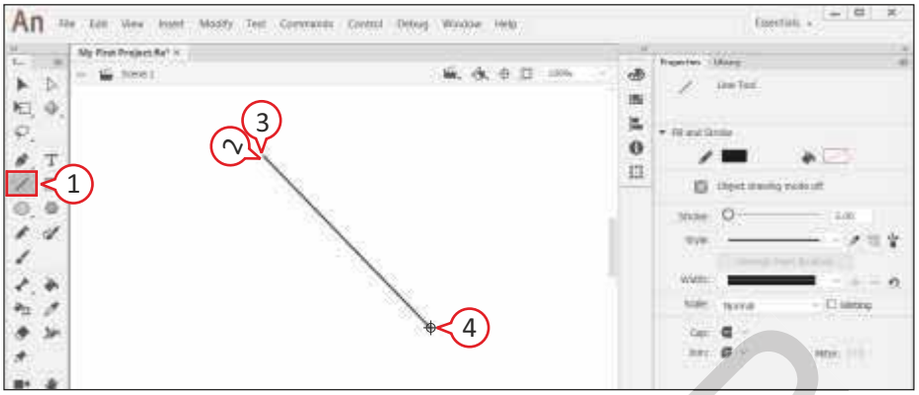
Drawing Tools in Adobe Animate

Animate has many drawing tools in the Tools Panel. These tools are used to create illustrations, buttons, and user interfaces.

DRAWING LINE SEGMENT

You can draw all sorts of shapes and figures using **Line** tool. The easiest way to draw straight lines is to use Line tool. To draw a freeform line, use the **Pencil** tool. In Animate, lines are called **strokes** and can connect with other lines to create a shape or figure.

Draw Straight Line

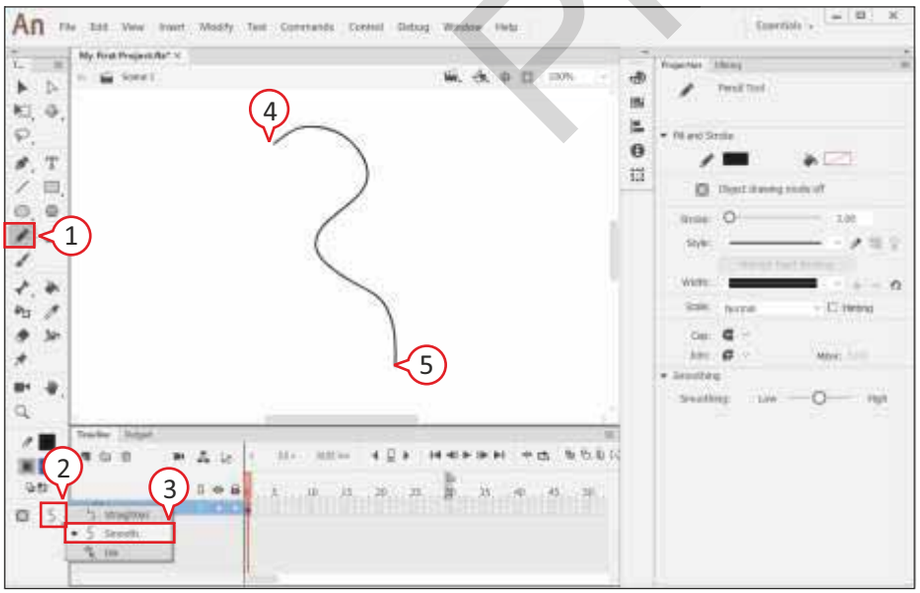


The line appears according to your specification.

1. Click on **Line** tool *(or press N).*
2. Position the mouse pointer on the Stage area until mouse pointer changes to **+**.
3. Click and drag to draw a line of desired length.
4. Release the mouse button.

It can be difficult to draw a perfect straight line on Stage. So, to draw straight line, hold the **Shift** key down while dragging the Line tool across the Stage.

Draw Freeform Line



1. Click on **Pencil** tool *(or press Shift+Y).*
2. Click on **Pencil Mode.**
3. Click on Pencil Mode modifier and choose any one mode:

   straighten 

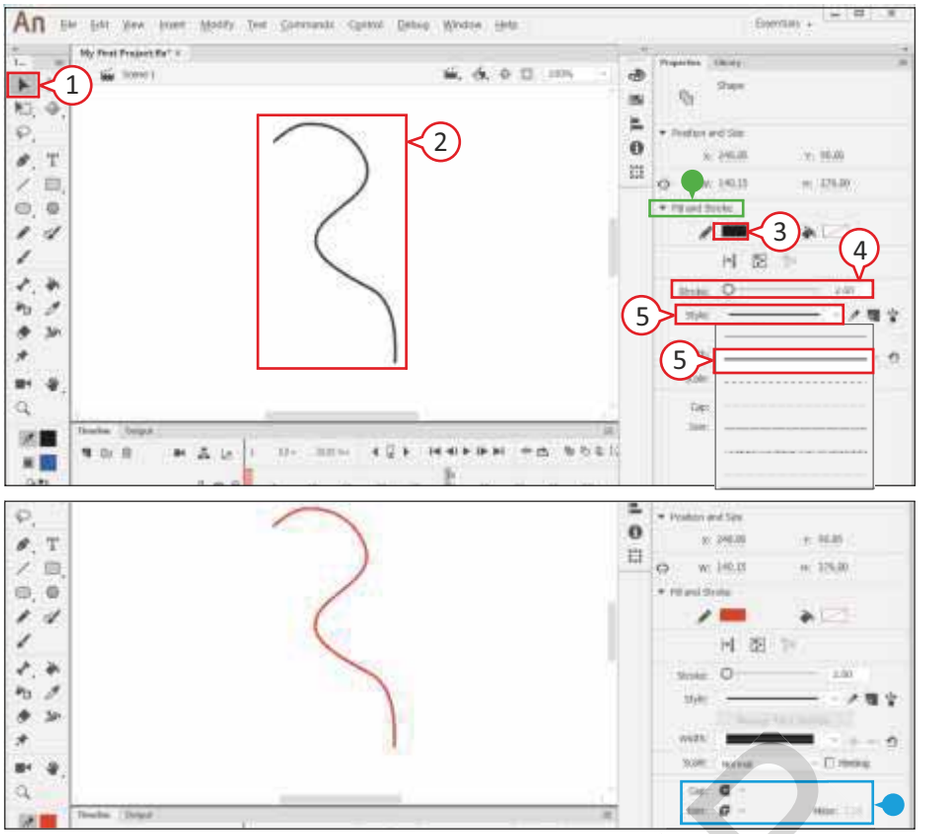
   smooth 

   ink 
4. Click and drag the mouse on the Stage to draw the line.
5. Release the mouse button.

The line appears to your specification.

FORMATTING LINE SEGMENT

You can format line segments by controlling line thickness, style, and color using the formatting controls in the panel window. By default, the lines we draw on Stage are **1-point** thick and are **solid black**.



1. Click on **Selection** tool *(or press V)*.
2. Select the line segment you want to format.

- **Fill and Stroke** of Shapes appears in the Properties tab.

3. Click on **Color** button, and select the color.
4. To change the thickness of line, type the value of **Stroke**.
5. To change the line style, click on the down arrow and select a style.

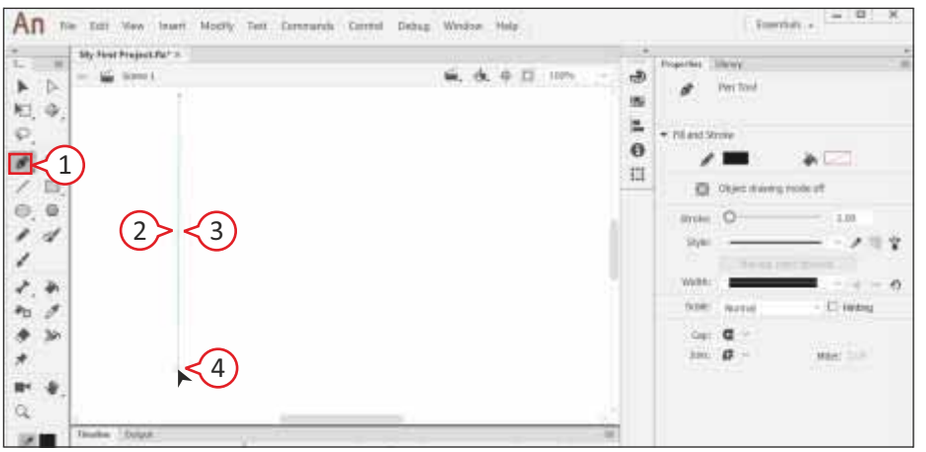
The line changes to your specification.

Cap, Join, and Miter Properties to Edit Line Segment

The **Cap** style refers to the shape of the ends of your line segment. If you draw thick lines, you will notice the ends either becomes semicircle or square. It allows you to control which type of line ends you get. The **Join** property allows you to adjust how multiple lines are connected, rounded, square, or mitered junctions. **Mitered** junctions create an angle opposite to the angle that the lines are connected.

DRAWING CURVE WITH PEN TOOL

The Pen tool uses Bezier curves to create its paths, which you can scale to any size or shape without losing detail. By clicking, you draw lines or paths to create anchor points and then dragging to adjust the curves of your line.



1. Click on the **Pen** tool *(or press P)*.
2. Position the mouse pointer over the Stage.

Mouse pointer changes to .

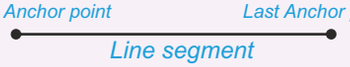
3. Click and start dragging to create your first anchor point.

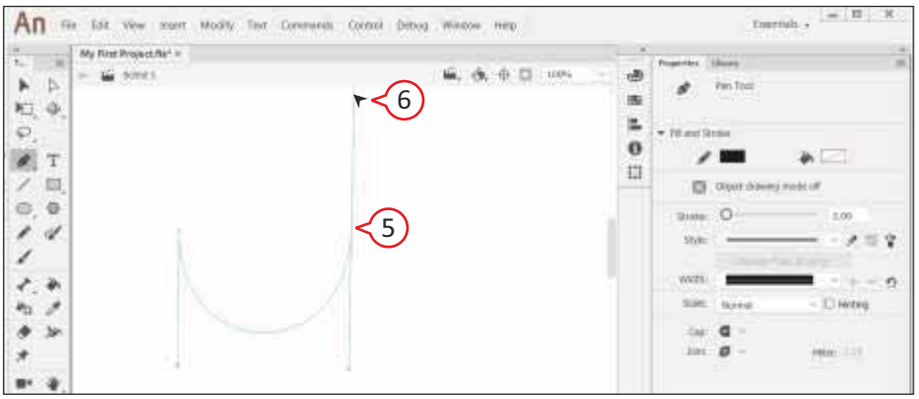
An anchor point with control handles appears.

4. Stop dragging, and release the mouse button.

Update Your Knowledge

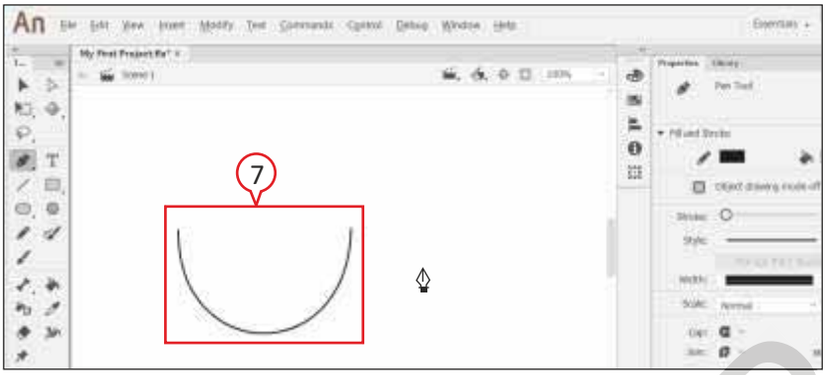
When you draw a line, your line is a path. A path is made up of a series of points, called **anchor points**, and line segments between these points.





5. Position the mouse pointer a short distance away.
6. Click and drag the mouse pointer in the opposite direction of step **3**.

A curve appears between the two anchor points.



7. Release the mouse button.

The final curve appears on the stage.

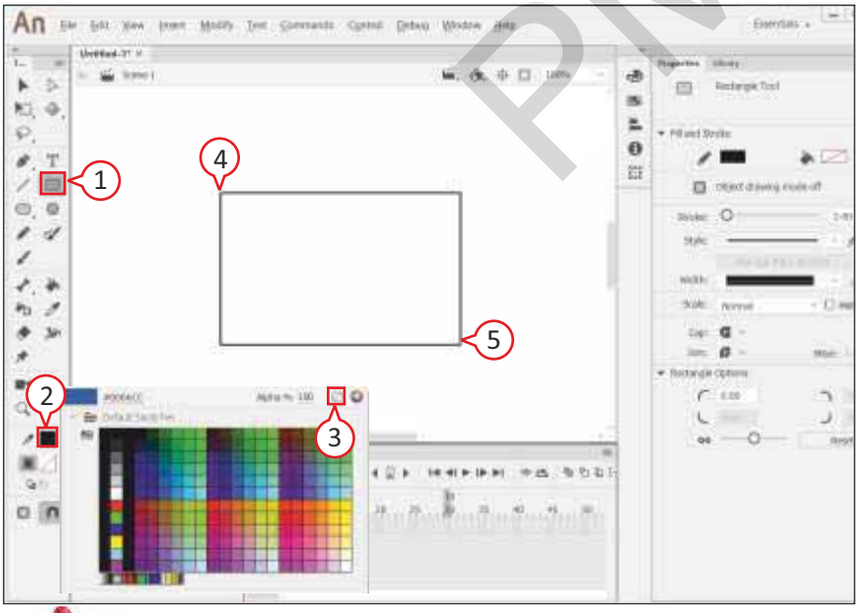
To continue drawing curves, repeat steps **5** to **7**.

To start a new line, press **Esc** key and click a blank area on the stage. Then repeat steps **1** to **7.**

DRAWING RECTANGLES AND OVALS

You can draw simple shapes like rectangle and oval in Animate, and then fill them with a color or use them as part of a drawing.

Draw an Empty (Unfilled) Rectangle



1. Click on **Rectangle** tool *(or press R)*.
2. Click on **Fill Color**.
3. Click on **No Color**.

You can also click on **Fill Color** in the **Properties inspector**, and select the **No Color** option.

4. Click and drag on the Stage area to draw your rectangle.
5. Release the mouse button.

The **Fill and Stroke** options are similar to the Line tool and are adjusted the same way.

The rectangle appears according to the desired specification.

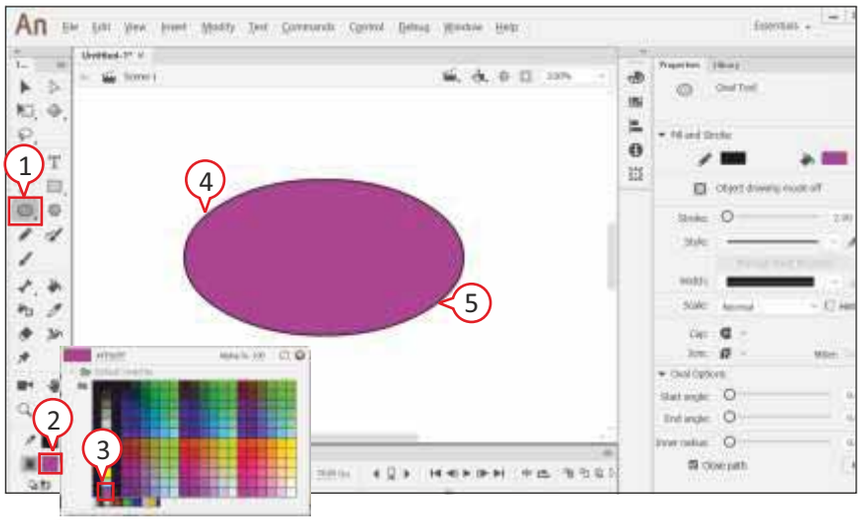
Various Rectangle Options

Click and hold **Rectangle** tool in the Tools Panel, and select **Rectangle Primitive Tool** [▣]. Click and drag on the stage to draw your rectangle. **Rectangle Option** appears in the Properties settings. Click and drag the slider control to the **right** to designate how much curve you want for the corners, or drag the slider to the **left** to create inverted corners.

Rounded corners

Inverted corners

Draw an Oval with Filled Color



1. Click on **Oval** tool *(or press O)*.
2. Click on **Fill Color**.
3. Select the color from the Swatches.

You can also click on the **Fill Color** button in the **Properties inspector** and select the **Color**.

4. Click and drag on the Stage area to draw your oval.
5. Release the mouse button.

The oval appears according to your desired specification.

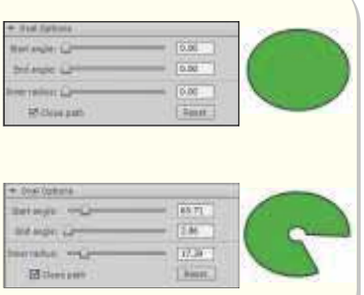
Various Oval Options

Click and hold **Oval** tool and select **Oval Primitive Tool [ ]**. Click and drag on the stage to draw your oval. **Oval Option** appears in the Properties settings.

By clicking and dragging the **Start Angle/End Angle** slider control, you can easily modify the shape of ovals and circles into pie slices, half circles, and other creative shapes.

By clicking and dragging the **Inner radius** slider, you can adjust the size of the inner radius. You can enter values from 0 to 99 representing the percentage of fill that is removed.

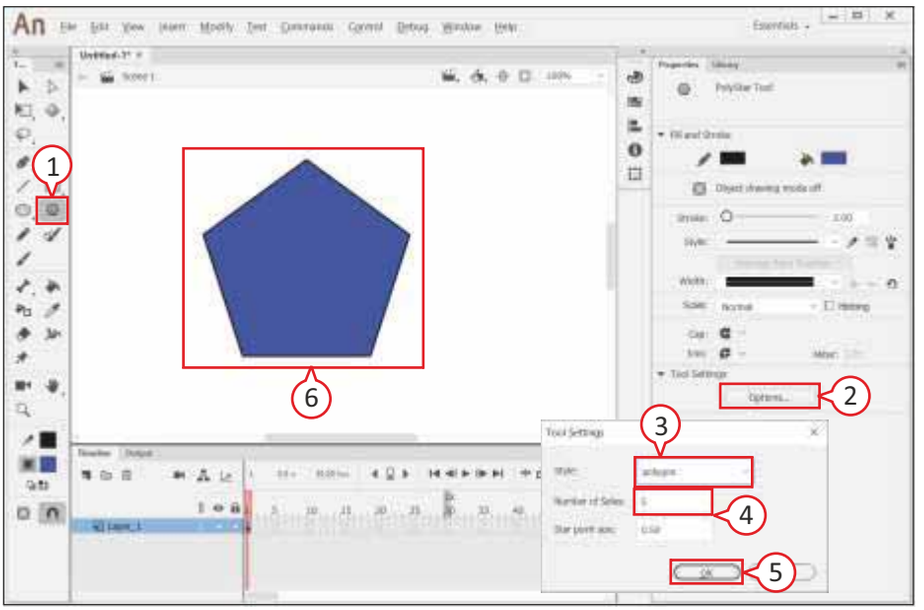
Close Path is selected by default which means that the oval is closed. If you specify an open path, no fill is applied to the resulting shape; only the stroke is drawn.



DRAWING POLYGON AND STAR

You can draw simple shapes like polygon and star in Animate as part of a drawing.

Draw a Polygon



The polygon appears according to your desired specification.

1. Click on **Polystar** tool.

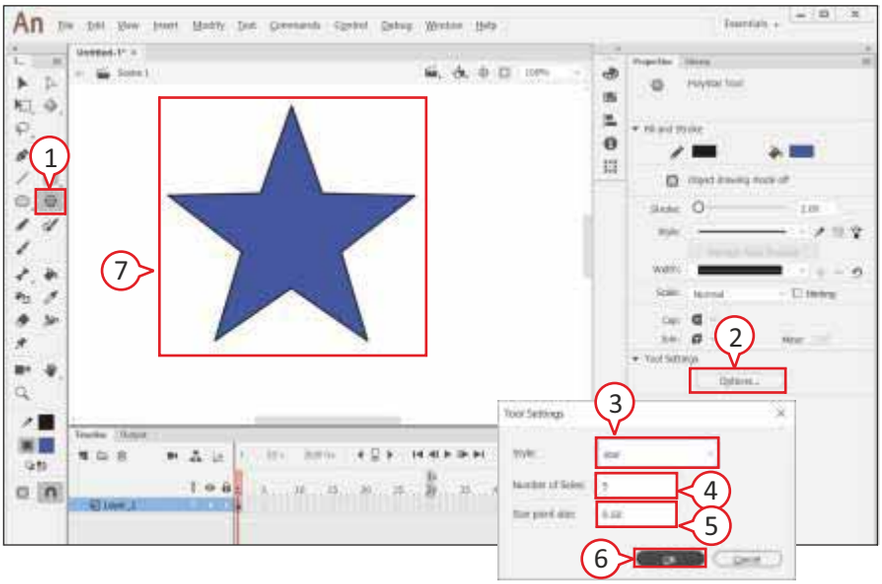
The **Fill and Stroke** options are similar to the Line tool and are adjusted the same way.

2. Click on **Options** in the **Tool Settings**.

Tool Settings dialog box appears.

3. Select **polygon** from the **Style** drop-down menu.
4. Enter the **Number of Sides** from 3 through 32.
5. Click on **OK**.
6. Click and drag on the Stage area to draw your Polygon shape.

Draw a Star



1. Click on **Polystar** tool.

The **Fill and Stroke** options are similar to the Line tool and are adjusted the same way.

2. Click on **Options** in the **Tool Settings**.

Tool Settings dialog box appears.

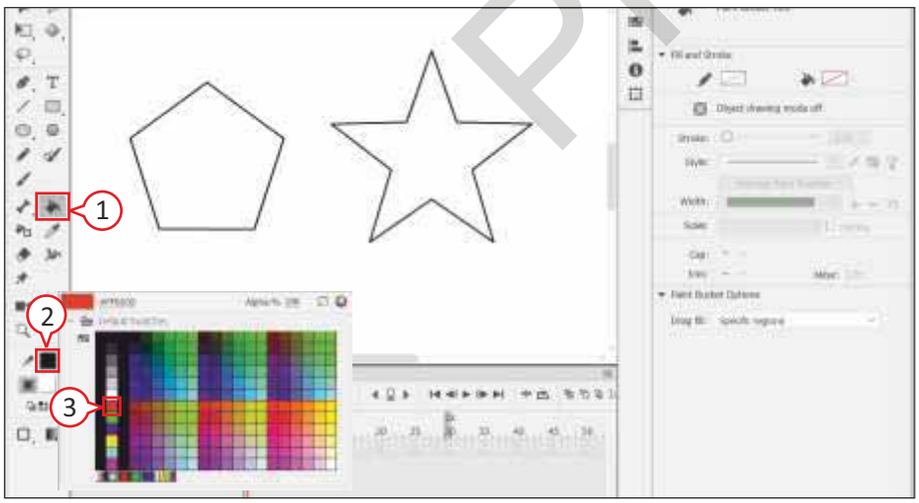
3. Select **star** from the **Style** drop-down menu.
4. Enter the **Number of Sides** from 3 through 32.
5. In **Star point size**, enter a number from 0 through 1 to specify the depth of the star points. A number closer to 0 creates deeper points.
6. Click on **OK**.
7. Click and drag on the Stage area to draw the Star shape.

The star appears according to your desired specification.

FILLING SHAPES WITH THE PAINT BUCKET TOOL

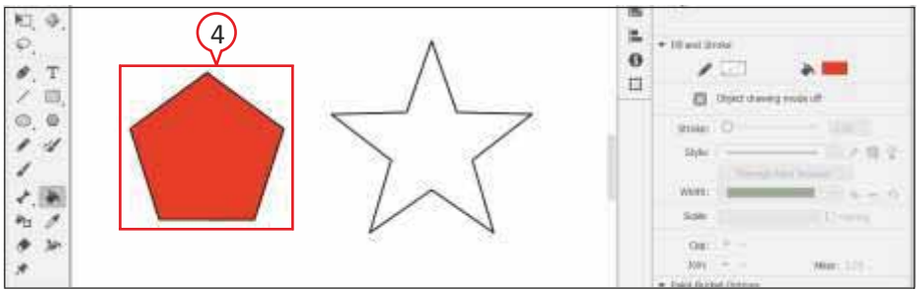
You can use the **Paint Bucket** tool to quickly fill in objects. You can fill objects with a color, a gradient effect, or even a picture.

Add Fill Color



1. Click on **Paint Bucket** tool *(or press K)*.
2. Click on **Fill Color**.
3. Select the color from the Swatches.

You can also click on the **Fill Color** in the **Properties inspector**, and select the **Color**.



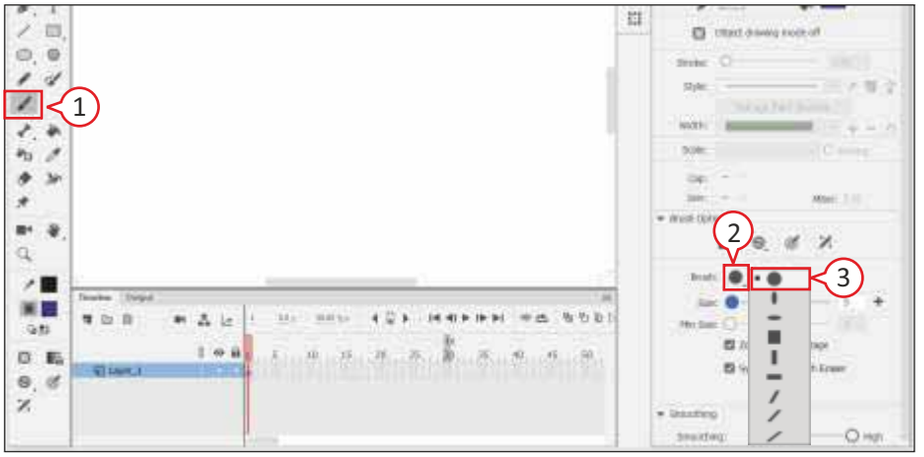
4. Click inside the shape you want to fill.

Animate fills your shape with the selected color.

DRAWING OBJECTS WITH THE BRUSH TOOL

You can use the **Brush** tool to draw with brush strokes, much like a paintbrush. You can also control the size and shape of the brush as well as how the brush stroke appears on the Stage.

Brush Shape



1. Click on the **Brush** tool in the Tools Panel *(or press B)*.
2. Click on the **Brush** shape option.

A list of brush shapes opens.

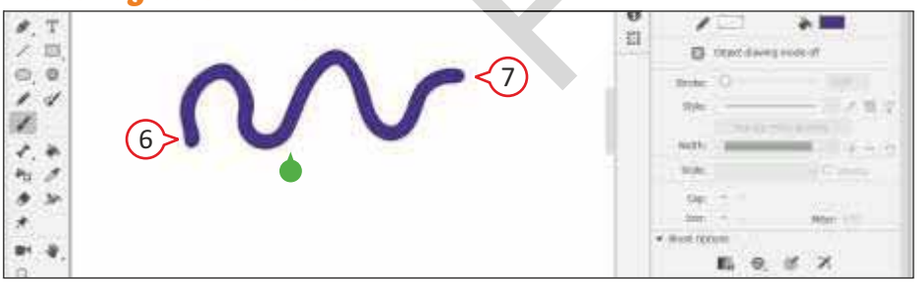
3. Choose a brush shape by clicking on it.

Brush Size

4. Click on the **Brush** tool in the Tools Panel *(or press B)*.
5. Click and drag the slider of **Size** to choose a brush size.

You can also type the width of the brush.

Drawing with Brush



6. After selecting the brush size and shape, position the mouse pointer over the Stage.
7. Click and drag the pointer on Stage to begin drawing.

- *The shape appears according to your desired specification.*

Different Brush Options

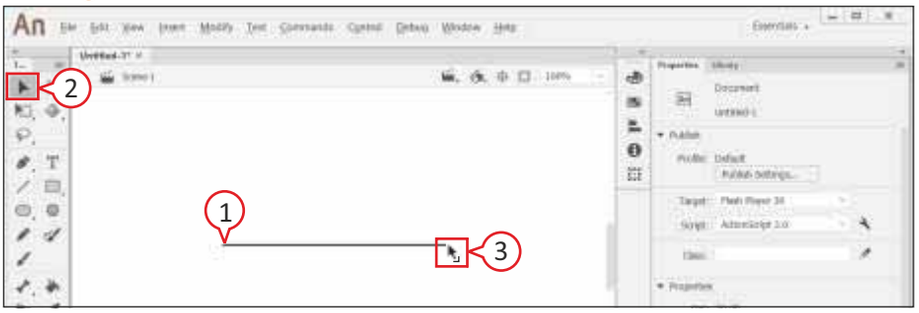
You can choose from five brush modes by clicking the Brush Mode menu on the Tools panel.

- **Paint Normal** ( ) paints your literal brush strokes anywhere on the Stage over white space, strokes, and fills.
- **Paint Fills** ( ) paints white space and fills, but does not paint over strokes.
- **Paint Behind** ( ) paints on white space, but does not paint on top of any lines or fills on the same layer.
- **Paint Selection** ( ) paints only inside the selection.
- **Paint Inside** ( ) paints over the first fill that you click on and nowhere else.

EDITING LINE SEGMENT

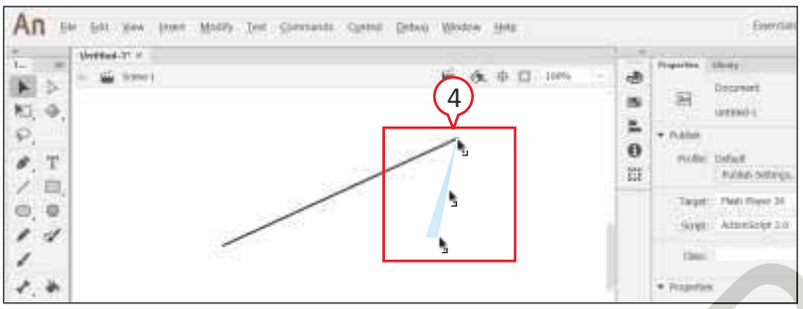
You can change a line by adjusting its length or replacing its curve. For instance, you may wish to extend the length of the line, make the curve of the line narrow, etc.

Change the Size of Line



1. Draw a line.
2. Click on **Selection** tool *(or press V)*.
3. Position the mouse pointer over the end of the line.

Note: *Do not click the line to select it.*



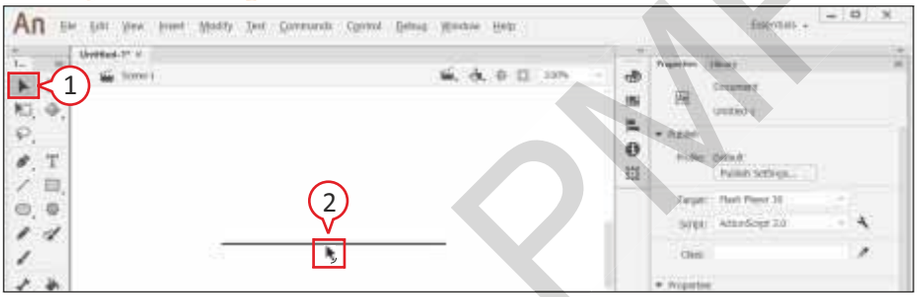
4. Click and drag the end of the line to shorten or lengthen the segment.

As you drag the corner pointer in any direction, you can change the angle of the line.

5. Release the mouse button.

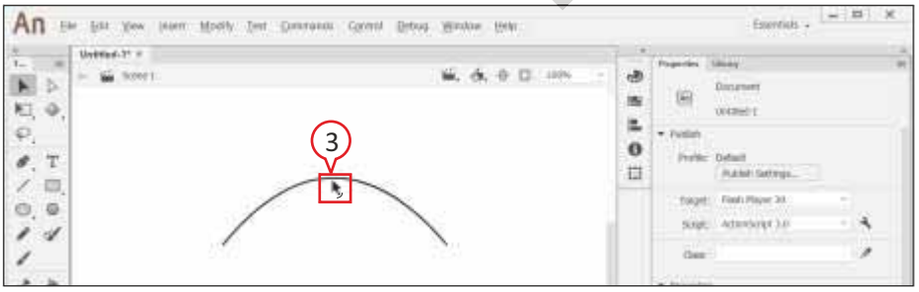
The line is resized.

Change the Shape of Line



1. Click on **Selection** tool *(or press V)*.
2. Position the mouse pointer over the part of line you want to curve.

Note: *Do not click the line to select it.*

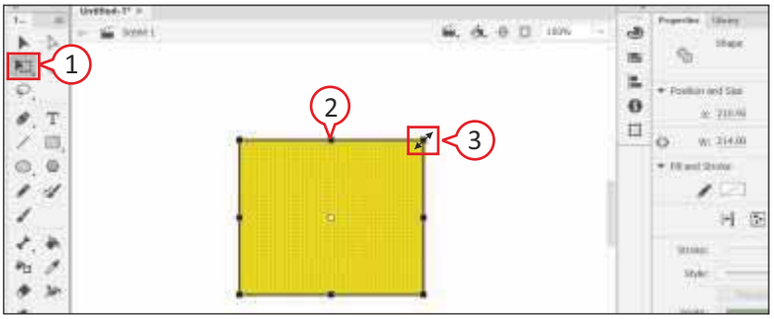


3. Click and drag the line in any direction to add or reshape the curve.
4. Release the mouse button.

The reshaped line appears.

RESIZING OBJECTS

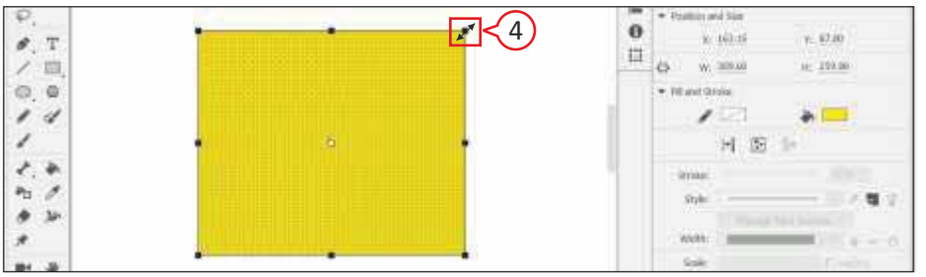
You can resize objects to make them smaller or larger than their original size. While resizing the object, dimensions are resized without changing the basic shape.



1. Click on **Free Transform** tool *(or press Q)*.
2. Select the object you want to resize by clicking on it.

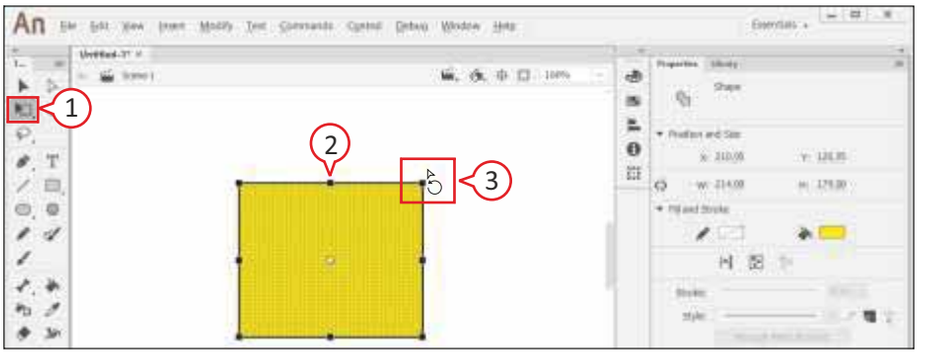
The object gets surrounded with resize handles.

3. Move your mouse pointer to one of the corners of the object.



4. Click and drag the corner of the object, and release the mouse button when you get the desired size.

Rotate Objects

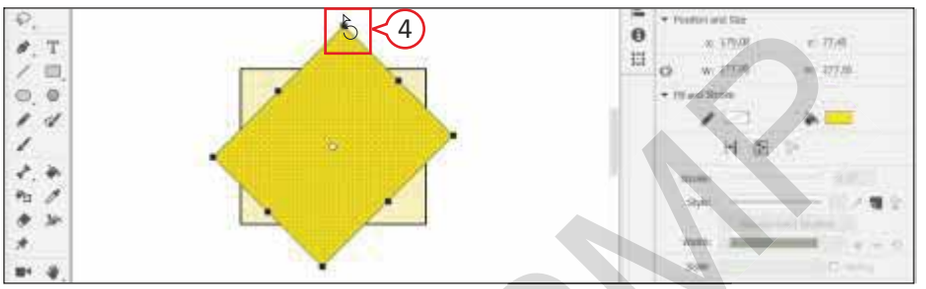


1. Click on **Free Transform** tool *(or press Q)*.
2. Select the object.

The object gets surrounded with resize handles.

3. Move your mouse pointer just outside the corner of the object.

Mouse pointer changes to [ ].

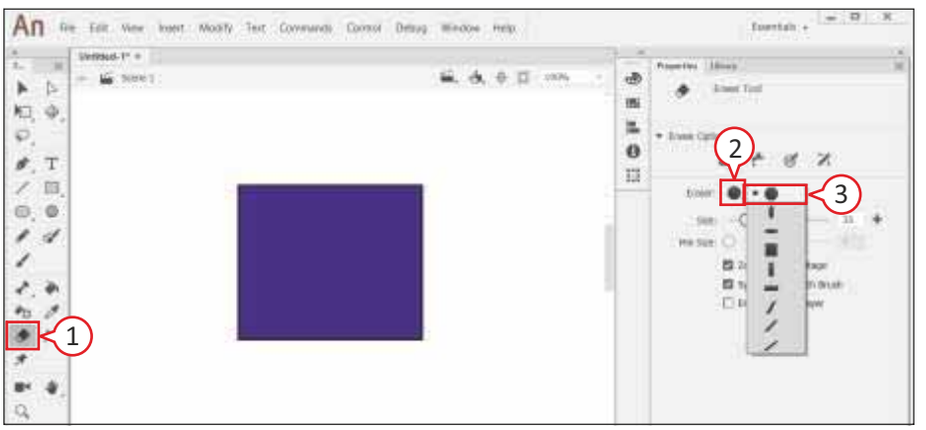


4. Click and drag to rotate.

The object appears rotated.

USING ERASER TOOL

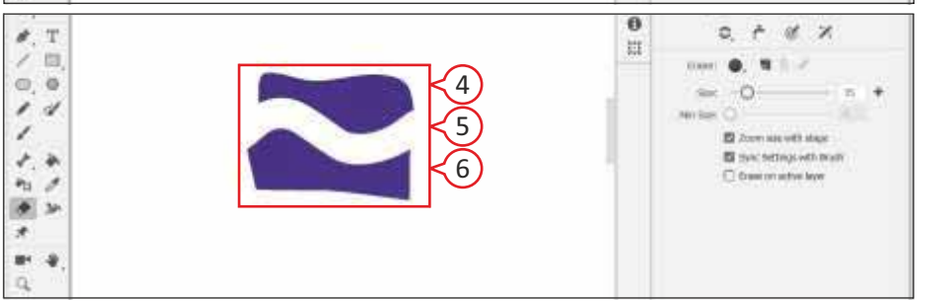
You can use the **Eraser** tool to erase unwanted parts of object or drawing. It can also be used to create new shapes within an object. Eraser tool contains many modifiers that you can use to control how the tool works.



1. Click on **Eraser** tool *(or press E)*.
2. Click on the **Eraser** shape option.

A list of Eraser shapes opens.

3. Choose an Eraser shape by clicking on it.



4. Position the mouse pointer over the object.
5. Click and drag to begin erasing.
6. Release the mouse button when erasing is finished.

An eraser path marks everywhere you drag it over the object.

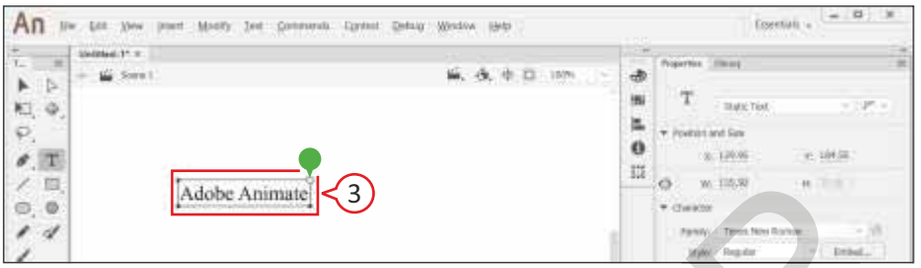
ADDING TEXT USING TEXT TOOL

Using text tool, you can add text to a movie or a drawing. There are two types of text you can add to your drawing: **Label Text** and **Block Text**. The difference between these two is that when you type text into a label text box, text does not wrap. The width of the text box keeps expanding as you type characters. With a block text box, you specify a width and when the text you are typing reaches the end of the block, it wraps to start a new line.

Add Label Text Box

1. Click on **Text** tool *(or press T)*.
2. Move your mouse pointer on Stage, and click on it.

A text box appears on the Stage.

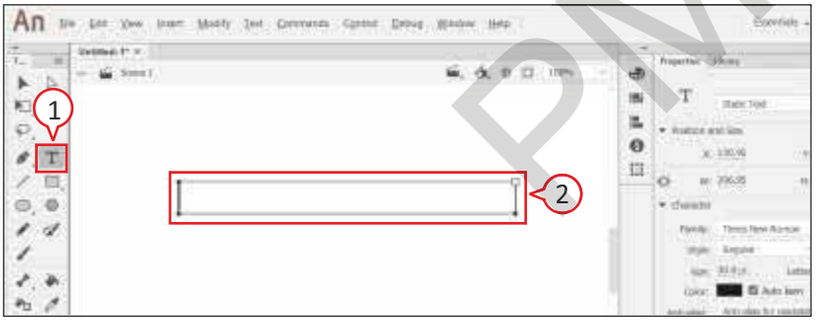


3. Type the text you want to appear on Stage.

- A **circle** in the upper-right corner of the text box indicates that it is a Text Label.

To edit the text, double-click on the text box.

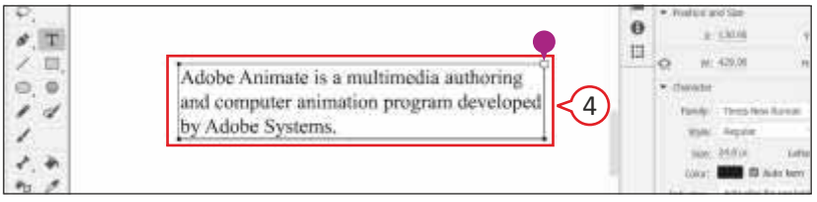
Add Block Text Box



1. Click on **Text** tool *(or press T)*.
2. Move your mouse pointer over the Stage, then click and drag from left to right on the Stage.

A box appears on the Stage showing you how wide your text box will be.

3. Release the mouse.



4. Type the text you want to appear on Stage.

- A **square** in the upper-right corner of the text box indicates that it is a Block Text box.

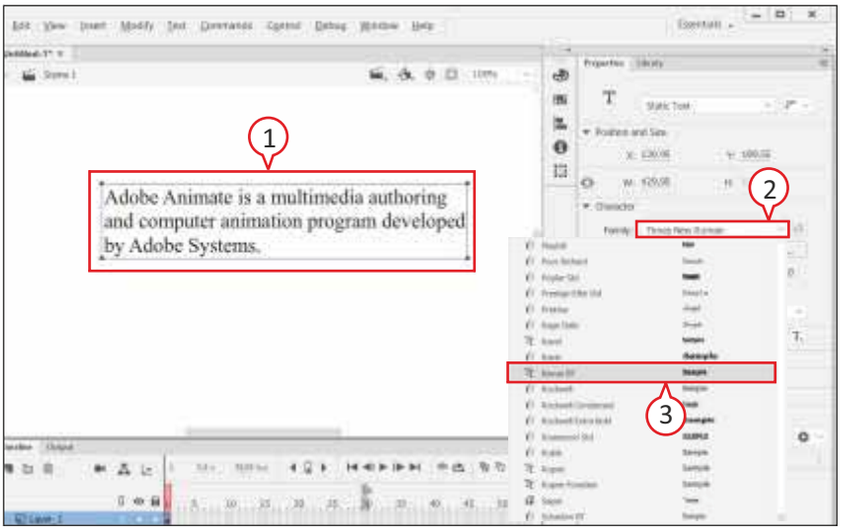
Turning a Label Text into a Block Text Box, or Vice Versa

Select the text box by clicking on it with the **Text** tool or double-clicking with the **Selection** tool. To switch from **Label Text** to **Block Text** box, click and drag any corner of the text box to your desired width. To switch from **Block Text** to **Label Text**, simply double-click the square in the upper-right corner of the text box. Your text box automatically resizes and becomes Label Text box.

FORMATTING TEXT USING TEXT TOOL

You can use the **Properties inspector** to format your text. This includes options for changing font style, font size, font color, font spacing and more.

Change Font and Style



1. Select the text you want to format.

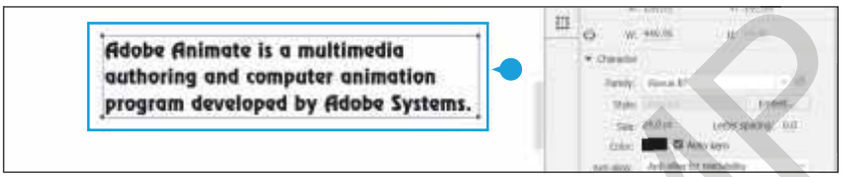
To change the entire text box, you can select it with the **Selection** tool. To format only some of the characters, select them with the **Text** tool.

*The **Character** panel of text appears in the **Properties** tab.*

2. Click on **Family** drop-down list.

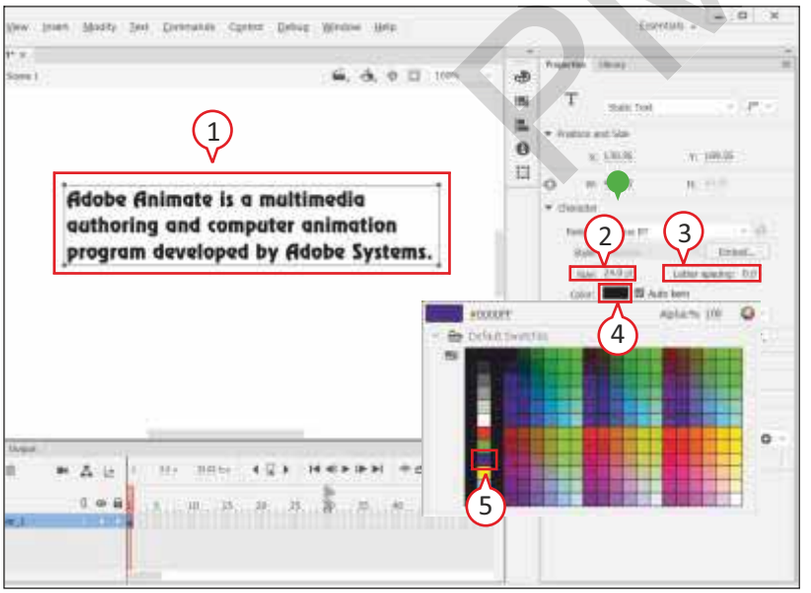
A list of fonts appears.

3. Click on the desired font.



- Your font changes on the Stage as soon as you choose a font family or style.

Change Font Size, Space and Color



1. Select the text you want to format.

- The **Character** panel of text appears in the **Properties** tab.

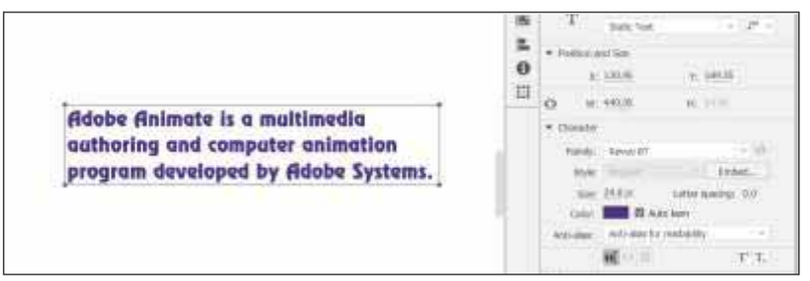
2. Click and drag on the blue number next to **Size**.

Drag to the left to decrease the point size; drag to the right to make the text larger.

3. Click and drag the blue number next to **Letter spacing**.

Drag to the left to make the characters closer together; drag to the right to space them farther apart.

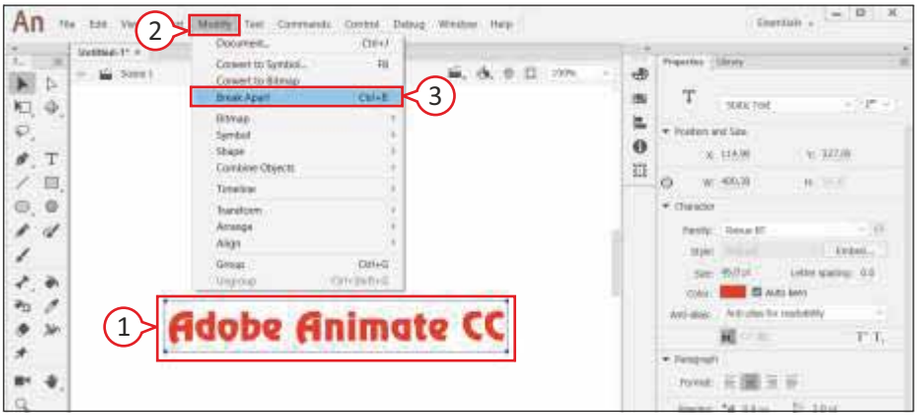
4. Click the color Swatch next to **Color**.
5. Click on color for your text.



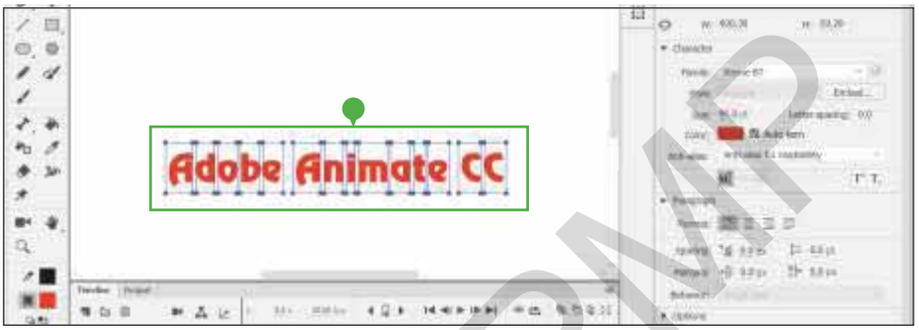
Your text changes on the Stage as soon as you choose a size, space, and color.

CONVERTING TEXT INTO GRAPHICS

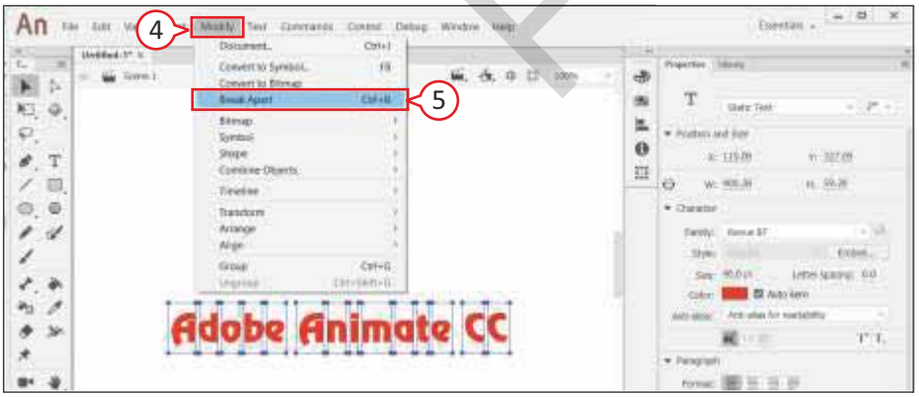
You can convert your text into graphics by using the **Break Apart** command. After converting, you can use this graphic in animation. Animate uses two stages of breaking apart. The **first time** you use the Break Apart command, your text is split into editable, single character blocks. The **second time**, your text becomes filled shapes. After that you can no longer edit it with the Text tool, change the font, or modify the formatting.



1. Select the text you want to break apart.
2. Click on **Modify** menu.
3. Click on **Break Apart** *(or press Ctrl+B)*.



- Animate breaks the text into individual characters.



4. Click on **Modify** again.
5. Click on **Break Apart** again *(or press Ctrl+B)*.

- Animate converts the text into graphics.

  You can use this text as a graphic in animation, but you cannot edit it with the Text tool.

Self-Evaluation

CHECKLIST

After reading the chapter, I know these points:

	Agree	Disagree
I know that Adobe Animate is a multimedia authoring and computer animation program.	☐	☐
I know that user can work with layers, symbols, and instances in Animate.	☐	☐
I know that Tools Panel is packed with tools that we can use to create and work with graphic objects.	☐	☐
I know that we can set up stage size, frame rate, background color, and action script version in our new document.	☐	☐
I know that we can draw simple shapes like rectangle and oval, polygon and star, and then fill them with a color.	☐	☐
I know that we can resize, rotate objects, and can also change the size and shape of line segment.	☐	☐
I know that we can add text using Text tool, and that text can be label text or block text.	☐	☐

Exercises

A. Tick [✓] the correct answer.

1. ..... tab is used to organize and select symbols to add to our movie.
   a. Stage ☐ b. Library ☐ c. Timeline ☐
2. ..... are used to organize the artwork in our Animate document.
   a. Layers ☐ b. Symbols ☐ c. Instances ☐
3. ..... enable us to control what appears in animation sequence.
   a. Frames ☐ b. Work Area ☐ c. Tools panel ☐
4. We can draw all sorts of shapes and figures using ..... tool.
   a. line ☐ b. pencil ☐ c. eraser ☐
5. By default, the lines we draw on Stage are ..... thick, and are solid black.
   a. 1-point ☐ b. 2-point ☐ c. 2.5-point ☐
6. While resizing shape, the object dimensions are resized without changing the ..... .
   a. fixed shape ☐ b. basic shape ☐ c. new shape ☐

B. Write 'T' for True and 'F' for False statements.

1. We can create illustration and other artworks in Adobe Animate. ☐
2. Symbols are the objects in Animate that we cannot re-use. ☐
3. All document types in Adobe Animate are saved as FLA or XFL files. ☐
4. We can format line segments by controlling line thickness, style, and color. ☐
5. Pen tool is used to draw line or path to create anchor points. ☐
6. We cannot convert text into graphics. ☐

C. Fill in the blanks.

1. Adobe Animate uses frame-by-frame or motion tweening methods to create ..... .
2. The area surrounding the stage is called ..... .
3. We can ..... our animate movies at any time during design and development.
4. To draw straight line, hold the ..... key down while dragging the Line tool.
5. ..... tool is used to quickly fill in objects.
6. There are two types of text we can add to our drawing: ..... and ..... .

D. Answer in 1-2 sentences.

1. What do you mean by Adobe Animate?

   .....

   .....

2. What do you understand by Stage?

   .....

   .....

3. What is the need of converting text into graphics?

   .....

   .....

E. Answer briefly.

1. What are the main features of Adobe Animate?

   .....

   .....

   .....

2. What are the components of Adobe Animate window?

   .....

   .....

   .....

3. How will you test an Animate movie? Explain.

   .....

   .....

   .....

F. Application-based Question

Rahul has to draw a scene of the night sky in Animate, in which he has to draw moon and stars. He has found oval shape for moon but he is unable to find star shape. Help him to complete his drawing.

.....

Group Discussion

Divide the students into two groups and discuss the topic — 'Various Tools of Adobe Animate'.

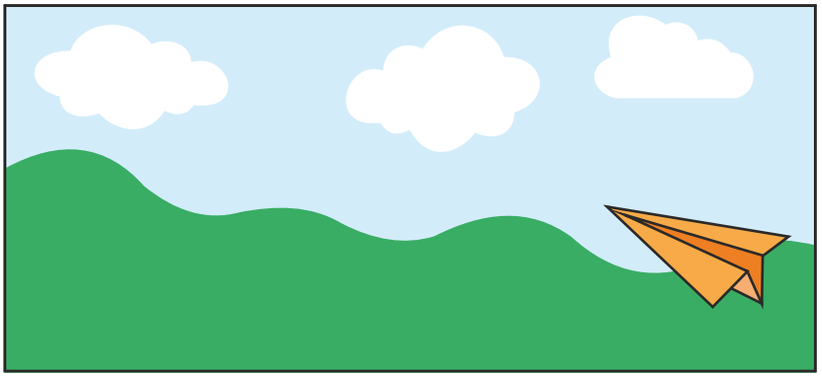
Online Link

To learn more about working of Adobe Animate, visit the website:
https://conceptartempire.com/adobe-animate-tutorials/

Activity Section

Lab Activity

Draw the following image in Animate by using various tools.



Subject Integration

Art

This integration will make the students learn about drawing composition skills.

Follow the instructions given below:

a. Draw an image which includes sky, clouds, grassland and a paper plane by using various tools of Animate and color it.

b. Save the image as **'Sky'** in **'Lab Activity'** folder.

Discover More

Animation Software

Synfig Studio

Synfig Studio is a time-based multimedia authoring tool that falls in the category of open source. It is available free of cost on the Internet and can be downloaded from **www.synfig.org**. Synfig is a 2D vector animation software released in 2005 by Robert Quattlebaum. It was designed to produce rich quality animation with less resources. It is available to work on various platforms such as Windows, Linux and Mac OS.

Technology Trailblazers

Walt Disney

Founder: Disney | **YEAR: 1923**

Walter Elias Disney was an American entrepreneur, animator, writer, voice actor and film producer. A pioneer of the American animation industry, he introduced several developments in the production of cartoons and is known as the creator of Disneyland.

Walt Disney was born on December 5, 1901, in Hermosa, Illinois. He and his brother Roy co-founded Walt Disney Productions in 1923, which became one of the best-known motion-picture production companies in the world. Disney was an innovative animator and created the cartoon character, Mickey Mouse. He won 22 Academy Awards during his lifetime, and was the founder of theme parks, Disneyland and Walt Disney World.

Worksheet-I

Chapters 1 - 5

A. Tick [✓] the correct answer.

1. The storage capacity of a single DVD-ROM disk is ..... .
   a. 700 MB ☐ b. 4 GB ☐ c. 9 GB ☐
2. Which of the following is a secondary memory?
   a. Hard disk ☐ b. ROM ☐ c. RAM ☐
3. A newer type of RAM which stores data using magnetic charges is ..... .
   a. SRAM ☐ b. MRAM ☐ c. DRAM ☐
4. The unique address of a cell in Excel worksheet is called ..... .
   a. cell range ☐ b. cell reference ☐ c. cell value ☐
5. ..... operator is used to compare two or more relational expressions.
   a. Comparison ☐ b. Arithmetic ☐ c. Logical ☐
6. The graphical representation of data is called a ..... .
   a. formula ☐ b. chart ☐ c. column ☐
7. In Adobe Animate, the area surrounding the stage is called ..... .
   a. work area ☐ b. current scene ☐ c. timeline ☐
8. ..... tab is used to organize and select symbols to add to the movie.
   a. Library ☐ b. Stage ☐ c. Timeline ☐

B. Write 'T' for True and 'F' for False statements.

1. The monitor is also called Visual Display Unit. ☐
2. ROM is called the secondary memory of the computer. ☐
3. Cache memory holds data permanently in the computer. ☐
4. We can change the font of numbers in Excel. ☐
5. Column chart displays columns of various lengths to show the value of data series. ☐
6. Symbols are the objects in Animate that we cannot re-use. ☐
7. Pen tool is used to draw line or path by clicking to create anchor point. ☐
8. We cannot convert text into graphics. ☐

C. Complete the following.

1. 1 byte = ... characters
2. 1 KB = ... bytes
3. 1 TB = 1024 .....
4. 1 MB = ... KB

D. Define the following.

1. Joystick
2. Processor
3. Dynamic RAM
4. Cache Memory
5. Workbook
6. Range
7. Layers
8. Frames

E. Fill in the blanks.

1. The information printed on paper is known as ..... .
2. The height and width of a memory card is usually no bigger than ..... .
3. There are two categories of memory in the computer: ..... and ..... .
4. ..... and ..... are two ways of entering data in the Excel.
5. A formula always begins with an ..... sign.
6. ..... is the built-in formula which is used to perform a calculation.
7. Adobe Animate uses frame-by-frame or motion tweening methods to create ..... .
8. There are two types of text we can add to our drawing: ..... and ..... .

F. Differentiate between the following.

1. Flatbed Scanner and Handheld Scanner
2. DRAM and SRAM
3. Absolute Referencing and Relative Referencing
4. Scatter Chart and Line Chart
5. Brush Tool and Pen Tool

G. Answer the following questions.

1. How does a Smartboard work as output device?
2. What do you mean by optical disc? Explain its types.
3. How many memory units are used in a computer? Explain.
4. What is the purpose of Magnetoresistive RAM?
5. Explain about different variations of ROM.
6. What is the use of Sparklines in a chart?
7. What do you understand by order of calculation? Explain with example.
8. What is absolute reference? Explain it with an example.
9. What are the advantages of using charts in Excel?
10. Name different components of a chart.
11. What are the main features of Adobe Animate?
12. What is the use of Tools panel in Adobe Animate?

6 Google Apps

OBJECTIVES

After completing this chapter, you will be able to:

- Identify various types of Google Apps.
- Understand Android OS and its types.
- Understand various Google devices and their uses.

Introduction to Google

Google (www.google.com) is an American public corporation, specializing in Internet-related services and products. Google began as a research project in January 1996 by **Larry Page** and **Sergey Brin**, two Ph.D. students at Stanford University. As per the project, one could zoom in close enough to read the license plates on cars on streets or roads.

Larry Page and Sergey Brin

Today, Google is mainly used as a search engine, and this probably remains one of the most visible aspects of Google on the web. But Google is much more than a search engine. It has developed a number of web-based applications that are collectively known as **Google Apps** (short for Applications).

GOOGLE APPS

There are many applications of Google— **Google Search**, **Google Account**, **Gmail**, **Google Docs**, etc. All the applications and services of Google are collectively called Google Apps.

Gmail is the product of Google Apps, which is used to send and receive e-mails. To gain access to all the Google services, you must set up a **Gmail Account**. Gmail is your point of entry to Google Apps. You can use any Google App by using Gmail User ID and Password.

CLOUD COMPUTING

Cloud computing means storing and accessing data and programs over the Internet, rather than in the hard drive of your computer.

Google Apps are completely based of cloud computing. Once you are using Google Apps, you will enjoy the ability to access your files and software from anywhere you have access to the web and cloud computing.

In **traditional computing**, when you want to start a new application software, you need to install it in your computer before using it. To use an application that is run on the cloud, all that is needed to be done is to login with a username and password, customize it and start using it. For this, you need a web browser and Internet connection.

Surfing and Research

GOOGLE CHROME

Google Chrome is a full-featured web browser software designed by Google. A web browser is a software application that people use in order to view web pages on the Internet. It loads very fast and runs multiple pages.

Google Apps run particularly well in this browser. Chrome is a free, open source browser and can be downloaded online at the web address http://www.google.com/chrome.

GOOGLE MAPS

Google Maps is a web mapping service developed by Google. It enables you to access up-to-date maps just by searching for an address or place of interest (such as an airport, a hotel or a historical site).

While going somewhere, Google Maps provide directions when a user enters a **starting** and **destination** point. It can be accessed using **GPS** (Global Positioning System) which is used to determine the current location of a user, eliminating the need for the user to enter the starting point and enabling the website to recommend nearby places of interest. It shows real-time GPS navigation, traffic, transit, and details about millions of places.

GOOGLE TRANSLATE

Google Translate is a free online language translation service which instantly translates text into other languages.

It supports languages like English, Arabic, Bulgarian, Chinese, Croatian, Czech, Danish, Dutch, French, German, Greek, Hindi, Italian, Japanese, Korean, Norwegian, Polish, Romanian, Russian, Spanish, and Swedish, among others.

The Google Translate app for mobile lets you instantly translate printed text visually. Just open the app, click on the camera and point it at the text you need to translate—a street sign, ingredient list, instruction manual, etc. You will see the text transforming live on your screen into the language you choose.

GOOGLE SEARCH ENGINE

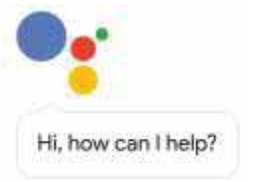
The Internet is a worldwide resource of information. The primary reason why people use the Internet is to search for specific information, including text, pictures, music and video.

Google is well-known for its search engine, which is a major factor of the company's success. It is a fast, relevant and the largest single catalogue of web pages available today. It offers 'images', 'maps' and 'news' and their features for locating photos, geographic directions and news headlines.

GOOGLE ASSISTANT

The **Google Assistant** is a virtual assistant developed by Google that is primarily available on mobile and smart home devices. By using Android device, a user can quickly access Google Assistant by pressing and holding down home button or by simply saying, "Ok Google".

With the Google Assistant, you can make a quick call, send text messages, set reminders, take a selfie, set calendar events, play music, navigate places, get updates on weather information and the latest news.

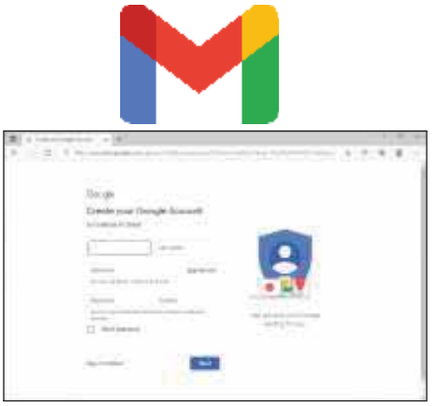


GOOGLE EARTH

Google Earth is an interactive mapping program that covers the vast area of the Earth. Google Earth is generally considered to be remarkably accurate and extremely detailed. Some major cities have such remarkably detailed images on Google Earth that one can zoom in close enough to read even the number plates on cars on a street.

Staying in Touch

GMAIL



Gmail is a web-based e-mail application offered by Google. You can use Gmail to create, send, receive, forward, print and delete email messages. Initially, Gmail service was available for Google employees only. Gmail was offered to the public in 2004 as an invitation-only service. Since then, it has become one of the most popular free e-mail services with a huge storage capacity. Gmail is available as desktop app, web app and mobile app.

GOOGLE BLOGGER

Blogger is a blog-publishing service by Google by which you can publish your ideas, opinions and stories online. With millions of blogs available on the Internet, you can read what others have published.

Blogger consists of a frequently updated collection of entries. Most blogs focus on a particular topic or subject area, although in a majority of blogs, the **'subject'** is the person writing the blog. The entries that appear on a blog are called **posts**, and the act of publishing a blog is called **posting**. A single person who maintains many blogs is known as a **blogger**.

GOOGLE DUO

Google Duo is a high quality video calling app. It is simple and reliable and works on both iOS and Android phones.

Organizing Your Stuff

GOOGLE CALENDAR

Google Calendar is a time-management app created by Google. Using Calendar, you can effectively keep track of all your appointments, receive notifications, set reminders and schedule future repeating events.

User can view Google Calendar in different types of setup like month, week and day view. Most of your events from Gmail like flight schedule, hotel confirmation, concert time, restaurant reservation and more are added to your Calendar automatically.

GOOGLE PHOTOS

Google Photos is a photo sharing and storage app from Google. It is just like your new **photo gallery**. When you click photos or shoot videos from your smartphone, those photos and videos get backed up and organized automatically, so you can find and share them faster and your phone space never gets used.

Working Smartly

GOOGLE DOCS EDITORS

Google Docs Editors is an online Editor Suite, in which you can create, edit and share three types of documents. These include **Document**, **Spreadsheet** and **Presentation**.

- The **Document** component of Google Docs Editors allows you to create full-featured documents by adding text and format it.
- The **Spreadsheet** component of Google Docs Editors allows you to do basic manipulation of spreadsheets, adding charts and using formula.
- The **Presentation** component of Google Docs Editors enables you to create professional looking presentations.

GOOGLE CLASSROOM

Google Classroom is a free educational tool from Google for teachers and students. Teachers can create an online classroom, invite students to the class, create and distribute assignments and even track their progress. In this tool, students and teachers can also have conversations about the assignments.

Schools must register for a free **Google for Education** account to use Classroom. Google Classroom provides many features to teachers and students who have Google Classroom account.

GOOGLE DRIVE

Google Drive is an online storage that provides you 15 GB of free Google online storage, in which you can keep files, folders, backups and everything important. Users can upgrade their free 15 GB account through a paid subscription plan to get additional storage.

Google Drive is used by millions of people to store their files, and those files can be accessed from any smartphone, tablet or computer. Wherever you go, you can access your stored documents.

GOOGLE CHROME OS

Chrome OS (Operating System), introduced by Google, is a Linux-based operating system designed to work primarily with web apps. Apps are available through the Chrome Web Store, and data is stored on Google Drive. A specialized laptop that runs Chrome OS is called a **Chromebook**, and a specialized desktop that runs Chrome OS is called a **Chromebox**.

Watching, Listening and Playing Media

YOUTUBE

YouTube is the most popular video sharing service on the web. This service was created by three former PayPal employees, **Chad Hurley**, **Steve Chen** and **Jawed Karim** in February 2005. In November 2006, YouTube was bought by Google.

Steve Chen, Chad Hurley and Jawed Karim

YouTube offers tens of millions of videos as well as movies, movie trailers, commercials, clips from TV shows and much more. You use the YouTube site to watch video clips. When you click on any clip, YouTube streams the video to your computer or other mobile device.

If you have a digital movie or animation that you would like to share with the world, you can upload the file to YouTube. To upload videos, you need to create a free YouTube account or sign in with your Google account, if you have one.

GOOGLE PLAY

Google Play is a store of apps (applications), songs, books, movies, games and other content for Android-powered smartphones, tablets and other devices. It is a huge virtual store and offers a lot of content to its users, either free of charge or at a cost.

Applications and **games** can be downloaded directly to an Android-based device through Play Store. Google Play offers an **online music** store and has the world's largest **eBook** store with over five million titles. There are thousands of movies and television shows available on Google Play Movies & TV.

GOOGLE ANDROID

Android is an operating system for mobile computing devices. Android is created and maintained by Google. It is widely used on smartphones and tablet computers. Various hardware manufacturers like Asus, Dell, HP, LG, Motorola, Samsung, and Sony use Android as the operating system for their devices. It provides a wide range of features, from sending e-mail and browsing the Internet to making phone calls and taking photos.

Google has released many versions of the Android operating system. Each version had a code name derived from a **sweet food** and was in alphabetical order till now but the latest versions do not follow this format.

For example, the code name for Android version 1.5 is **Cupcake**, 1.6 is **Donut**, 2.0 to 2.1 is **Eclair**, 2.2 is **Froyo**, 2.3 is **Gingerbread**, 3.0 to 3.2 is **Honeycomb**, 4.0 is **Ice Cream Sandwich**, 4.1 to 4.3 is **Jelly Bean**, 4.4 is **KitKat**, 5 to 5.1 is **Lollipop**, 6 is **Marshmallow**, 7.1 is **Nougat**, 8.0 and 8.1 is **Oreo**, 9.0 is **Pie**, version 10 is **Android 10** and version 11 is **Android 11**.

Google Devices

GOOGLE PIXEL

Google Pixel is an Android smartphone designed and marketed by Google. It includes all your favorite Google apps to bring you a fast, seamless, and easy-to-use experience. Similar to Nexus devices, it receives Android updates directly from Google.

All Pixel smartphones include very large storage for all your data, photos and videos. Pixel is the first phone with the built in 'Google Assistant'.

GOOGLE GLASS

Google Glass is a wearable, voice-controlled Android device which looks like a pair of eyeglasses. It enables the user to view information or take photos and videos that are projected to a **miniature screen** in the user's field of vision. User controls the device through voice commands or by touching controls on its frame.

GOOGLE NEST

Google Nest is a voice-activated smart speaker developed by **Google**. Google Nest enables users to speak voice commands to interact with services through **Google Assistant**.

Google Nest can play music and news, perform home automation tasks and answer questions.

Self-Evaluation

After reading the chapter, I know these points:

	CHECKLIST	
	Agree	Disagree
• I know that Google is an American public corporation, specializing in Internet-related services and products.	☐	☐
• I know that Google has developed a number of web-based applications that are collectively known as Google Apps.	☐	☐
• I know that Google Apps are completely based on cloud computing which means storing and accessing data and programs over the Internet.	☐	☐
• I know that Google Maps enables us to display up-to-date maps by searching for an address or place of interest.	☐	☐
• I fully know that Google Docs Editors is an online Editor Suite, in which we can create, edit and share three types of documents.	☐	☐
• I know that Android is an operating system for mobile computing devices created and maintained by Google.	☐	☐
• I know that Google Glass is a wearable, voice-controlled Android device which looks like a pair of eyeglasses.	☐	☐

Exercises

A. Tick [✓] the correct answer.

1. Google Chrome is a full-featured ..... software designed by Google.
   a. web server ☐ b. web browser ☐ c. web page ☐
2. ..... is a free online language translation service which instantly translates text into other languages.
   a. Google Writer ☐ b. Google Reader ☐ c. Google Translate ☐
3. ..... is a blog-publishing service by Google by which we can publish our ideas, opinions and stories online.
   a. Writer ☐ b. Blogger ☐ c. Docs ☐
4. ..... is an interactive mapping program that covers the vast area of the Earth.
   a. Google Pixel ☐ b. Google Glass ☐ c. Google Earth ☐
5. ..... offers tens of millions of videos as well as movies, movie trailers, commercials, clips from TV shows and much more.
   a. YouTube ☐ b. Google Drive ☐ c. Google Assistant ☐
6. ..... is a store for apps, songs, books, movies, games and other contents for Android-powered smartphones and tablets.
   a. Google Play ☐ b. Google Allo ☐ c. Google Docs ☐

B. Write 'T' for True and 'F' for False statements.

1. To gain access to all the Google services, we must set up a Gmail account. ☐
2. Google Drive is used to determine the current location of a user. ☐
3. Google Translate app for mobile lets us instantly translate printed text. ☐
4. We can upload our digital movie or animation to YouTube. ☐
5. Google glass is a high quality video calling app. ☐
6. In Google Nest, photos and videos always have to be backed up and organized manually. ☐

C. Fill in the blanks.

1. Google was founded by ..... and ..... .
2. ..... is a web-based e-mail application offered by Google.
3. ..... is a time management app created by Google.
4. Google ..... is a free educational tool from Google for teachers and students.
5. ..... is an online storage that provides 15 GB of free Google storage.
6. ..... is a voice activated smart speaker.

D. Differentiate between the following.

1. Traditional Computing	Cloud Computing
.....	.....
.....	.....
.....	.....
2. Google Chrome	Google Chrome OS
.....	.....
.....	.....
.....	.....
3. Google Photos	Google Duo
.....	.....
.....	.....
.....	.....

E. Answer in 1-2 sentences.

1. What do you mean by Google Apps?

.....

.....

2. How does Google Maps work?

.....

.....

3. What is the utility of Google Classroom?

.....

.....

4. What is Google Android OS?

.....

.....

5. What is the purpose of Google Glass?

.....

.....

F. Answer briefly.

1. What is Google? Who invented it and when?

.....

.....

.....

2. What is the function of Google Translate app?

.....

.....

.....

3. What do you mean by Google Drive?

.....

.....

.....

G. Application-based Question

Ram went to his friend's home. There he saw a device which looked like a speaker. His friend was asking some questions from that device and getting back answers from it. Ram wants to know the name of that device. Tell him the name of this device.

.....

Group Discussion

Divide the students into two groups and discuss the topic – 'Google Maps App Makes our Navigation Easier'.

Online Link

To learn more about working of Google Apps, visit the website:

https://get.google.com/apptips/apps/#!/all

Activity Section

Lab Activity

Organize Work by Managing Calendar App

Nowadays, most of the people use calendars in computers and mobile devices to keep track of events in their personal and professional lives. In addition, students also use calendars to keep track of their class schedules, datesheet, etc. The following steps guide you through the process of managing your calendar.

Skill Formation

- This activity enhances the organizational and time-management skills of the students.

a. Run the **Google Calendar** app.

b. To add a new appointment, tap or click the **Add** or **Create** button and then enter the title or subject of the appointment, its date, time, location, and other information. Tap or click the **Save** button to save the information to your calendar.

c. Specify **repeating** information for appointments that occur at the same time over multiple occurrences, such as a group that meets every Monday from 09:30 a.m. to 11:30 a.m.

d. View your appointments on a **daily**, **weekly**, or **monthly** calendar by tapping or clicking the appropriate choice in the Calendar app.

e. To edit an appointment, meeting, or event on your calendar, open the item by tapping or clicking it, make the necessary changes and then **Save** the changes.

f. To delete an appointment, meeting, or event on your calendar, open the item by tapping or clicking it, and then tap or click the **Delete** button to delete it.

Calendar app also allows you to share your appointment, meeting, or event with other persons whom you want to make aware about such appointments.

Technology Trailblazers

Sundar Pichai

? **CEO: Google and Alphabet**

Sundar Pichai is a computer engineer and the current CEO of Google and Alphabet Inc. Born in Chennai, India, Pichai was bright and creative from a young age. Having received his education from some of the most prestigious institutions in the world, he worked in engineering and product management at McKinsey & Company before becoming a part of Google.

Pichai had joined Google years ago in 2004 as a product manager and led the innovative efforts for several of Google's products including Google Chrome and Chrome OS which went on to become highly successful. Eventually, he took over the management of other Google products like Gmail and Google Docs, and rose through the ranks rapidly. On 10 August 2015, Sundar Pichai became the CEO of Google. On 3 December 2019, Sundar Pichai also became the CEO of Alphabet Inc.

7 Internet Services and Safety

OBJECTIVES

After completing this chapter, you will be able to:

- Understand about Internet and its uses.
- Understand the ways to connect to the Internet.
- Understand various Internet services.
- Search information on the Internet.
- Learn how to protect from online identity theft.

Internet

Internet

The **Internet**, also called the **Net**, is one of the largest networks that links millions or trillions of computers all over the world. It is a widely used research tool, providing us with access to global information and instant communication.

Today, more than one billion users around the world access a variety of services on the Internet. The **World Wide Web** and **E-mail** are two of the most widely used Internet services.

The Internet offers many facilities at your fingertips. Using Internet, you can send messages to others, meet new friends, do banking, make investments, do shopping, fill prescriptions, file taxes, play games, listen to music, or watch movies. The biggest advantage of the Internet is that you can access it from a computer anywhere: at home, at work place, at school, or at a restaurant.

USES OF INTERNET

You can use Internet for a variety of purposes. Some of these are:

Research: The Internet gives you access to information on any subject of interest. This makes the Internet a valuable research tool.

E-mail (electronic mail): E-mail is the fastest way of sending and receiving messages from one computer to another all over the world.

Entertainment: The Internet offers many different forms of entertainment, such as radio and televison broadcasts, video, and music.

Software Programs: On the Internet, you can find many software programs to be used on your computer, such as word processors, drawing programs, games, accounting programs and many more.

Buy and Sell: You can buy or sell products on the Internet, even while sitting at home.

Chat: The chat feature allows you to exchange typed messages with another person on the Internet.

Social Networking: You can join social networking groups on the Internet to meet people around the world with similar interests.

Online Games: On the Internet, you can play different types of online games.

Ways to Connect to the Internet

There are two ways to connect to the Internet: **Dial-up connection** and **Broadband connection**. Some users connect computers to the Internet via slow-speed dial-up connection because of its lower cost while other users connect via high speed broadband connection.

DIAL-UP CONNECTION

A **dial-up connection** is a slow-speed Internet connection. With dial-up access, you use a computer, a dial-up modem, and a regular telephone line to dial into an ISP (Internet Service Provider). Dial-up access provides an easy and inexpensive way for users to connect to the Internet. Some of the leading ISPs include VSNL, MTNL, BSNL, Airtel, etc.

Dial-up Modems

A **dial-up modem** is a communication device that connects a computer with telephone line to get connected to the Internet. The speed of modem is measured in kbps (kilobits per second).

The word **modem** is derived from a combination of the words, **mo**dulate, to convert a digital signal into an analog signal and; **dem**odulate, to convert an analog signal into a digital signal. Both the sending and receiving ends of a communication channel must have a modem for data transmission to occur. **External modem** and **Internal modem** are the two types of dial-up modems.

An **external modem** is a small box that uses a cable to connect with a computer.

Internal modem is usually in the form of an adapter card that you insert in an expansion slot on a computer motherboard. One end of a standard telephone cord attaches to a port on the modem card, and the other end plugs into a telephone outlet.

Internal Modem

External Modem

BROADBAND CONNECTION

A **broadband connection** is a high-speed technology. With broadband service, your computer is usually connected to the Internet the entire time it is powered on. Through broadband Internet service, you can download web pages quickly, play online games, communicate in real time with others, and do much more. Many homes, schools and business users connect to the Internet via a high-speed broadband Internet service. Broadband Internet service can be **wired** or **wireless**.

Broadband Internet services include the following:

- **Digital Subscriber Line (DSL)** which provides high-speed Internet connection, using regular telephone lines.
- **Fiber to the Premises (FTTP)** which uses fiber-optic cable to provide high-speed Internet access to home and business users.
- **Cable Internet service** which provides high-speed Internet access through the cable television network via a cable modem.

- **Fixed wireless** which provides high-speed Internet connection using a dish-shaped antenna at your house or school or office premises to communicate with a tower via radio signals.
- A **cellular radio network** which offers high-speed Internet connection to devices with built-in compatible technology or computers with wireless modems.
- **Satellite Internet service** which provides high-speed Internet connection via satellite to a satellite dish that communicates with a satellite modem.
- A **Wi-Fi (Wireless Fidelity)** network which uses radio signals to provide high-speed Internet connection to wireless computers and devices.

Wireless Internet Access

Computers, connected to the Internet, work together to transfer data and information around the world using various **wired** and **wireless** transmission media.

The term **wireless** is normally used to refer to any type of electrical or electronic operation which is accomplished without the use of a hard wired connection. Wireless communication is the transfer of information over a distance without the use of electrical conductors or wires. You can use a **wireless modem** to access information on the Internet without using a phone line or any other physical connection.

Wi-Fi is a commonly used wireless network in computer systems which enables connection to the Internet or other devices that have Wi-Fi functionalities. Wi-Fi networks broadcast radio waves that can be picked up by Wi-Fi receivers that are attached to different devices.

Wireless Modem

A **wireless modem**, also known as **dongle**, uses a wireless communication technology (such as cellular radio, satellite, or Wi-Fi) to connect to the Internet. It is a small device that connects to a computer and enables Internet connection when attached.

Hotspot

A **hotspot** is a wireless network that provides Internet connections to mobile computers and devices. Most of the public locations, such as shopping malls, coffee shops, restaurants, airports and hotels have Wi-Fi hotspots. Although most hotspots enable unrestricted or open access, some require a **password** in order to connect to the Internet.

Many users can share and provide wireless Internet connections by creating their own **Wi-Fi hotspot** through a communications device like **router** at home or in office that is connected to a broadband Internet service.

Some users create **mobile hotspots** through mobile broadband Internet service via a **tethered** Internet-capable device.

Tethering transforms a smartphone or Internet-capable device into a portable communications device that shares its Internet access with other computers and devices wirelessly.

Services of the Internet

Internet provides different types of services. Some of the popular services are sharing photos on the web, using web app through cloud storage, social networking, sharing ideas through blogging, virtual meeting through video conferencing, e-commerce, e-banking and searching information on Internet. Let us study about these services one-by-one.

SHARING PHOTOS ON THE WEB

You can share your digital photographs with friends, family, and relatives after signing up with a photo sharing site. This enables you to upload digital photos that can then be viewed, rated, tagged, or commented upon by other people. The most important consideration while deciding which photo sharing site to use is how much storage space you are offered by the site. You can get free account on many photo sharing sites, but for a less storage space. To get more storage space and more features, you can also upgrade to a paid account.

Flickr (www.flickr.com)

Flickr is the most popular photo sharing site. It allows you to edit your photos, organize them into albums, create cards and books, and control the viewing of your photos. A free Flickr account enables you to upload 1TB of photos. You can upgrade to a Pro account, which is a paid account that offers unlimited uploads and storage.

Google Photos, **Imgur**, **Pinterest**, etc. are some example of photo sharing websites.

WEB APPLICATION

A **web app** is an application stored on a web server that you access through a browser. You can interact with web apps directly on a website, sometimes referred to as the host. Web app hosts usually provide storage for your data and information on their servers known as **cloud storage**.

Many web app hosts provide free access to their software while others offer part of their web app free, and charge for access to more comprehensive services. **Google Docs Editors** is an example of web app.

E-BANKING

E-banking or **Electronic Banking** is a service by which a customer can perform banking transactions electronically without visiting the bank personally. In other words, availing the banking services through Internet is called **e-banking**. In Internet banking system, the bank has a centralized database that is web-enabled. You can access your banking information 24 hours a day, seven days a week.

REMOTE SERVICES

TeamViewer and **Anydesk** both allow you to control a desktop remotely by sharing and file transfer between computers. It can connect to any PC; so you can remote control your partner's PC as if you are sitting right in front of them. Both software are compatible with multiple platforms, including Windows, MacOS, Linux, iOS, and Android.

SOCIAL NETWORKING

It is a service on the Internet that enables you to connect with people, who share similar personal or professional interests. On most **social networking** sites, the members are connected to each other as friends, friends of friends and so on. If you are interested in joining a social networking site, you should understand what social networking is all about.

The main purpose of using social networking sites is to keep track of what is going on in the lives of friends, family and colleagues, especially the people whom you do not meet regularly. Some of the famous social networking sites are **Facebook**, **Instagram**, **Twitter**, etc.

LINKEDIN

LinkedIn is the world's largest professional network on the Internet with more than 500 million members worldwide. It was launched on May 5, 2003 by **Reid Hoffman**. LinkedIn connects the world's professionals to give them more exposure and make them more productive and successful. It can be used to find jobs, people, and business opportunities recommended by someone in one's contact network.

BLOGGING

Blogging is an exciting and dynamic medium by which you can publish your ideas, opinions, and stories online. With millions of blogs available on the Internet, you can read what others have published. Blogs are also known as **Weblogs**. There are over 500 million blogs on the web.

A blog is a website that consists of a frequently updated collection of information and entries. Most blogs focus on a particular topic or subject area, although in a majority of blogs, the **'subject'** is the person writing the blog. The entries that appear on a blog are called **posts**, and the act of publishing a blog is called **posting**. A single person who maintains many blogs is known as a **blogger**. Some of the famous blog hosting services are **Blogger** (www.blogger.com), **TypePad** (www.typepad.com), **wix** (www.wix.com), etc.

FILE TRANSFER PROTOCOL (FTP)

FTP (File Transfer Protocol) is an Internet standard that permits file uploading and downloading to and from other computers on the Internet. **Uploading** is the process of transferring files from your computer to a server on the Internet. **Downloading** is the process of transferring files from a server on the Internet to your computer. An **FTP server** is a computer that allows users to upload and/or download files using FTP. Web page developers often use FTP to upload their web pages to a web server. **FileZilla** is an example of FTP services.

VIDEO CONFERENCING

A **video conference** is a live meeting of two or more geographically separated people who use a network or the Internet to transmit audio and video data. For this, all you need is a video conferencing software and multimedia computer along with a microphone, speakers and a video camera attached or built in a computer. As you speak, members of the meeting hear your voice on their speakers. Anything in front of the video camera such as a person's face appears in a window on each participant's screen.

Zoom and **Skype** are examples of video conferencing apps.

E-COMMERCE

Electronic commerce (e-commerce), sometimes called **e-business**, is a financial business transaction that occurs over an electronic network. Anyone with a computer or mobile device connected to Internet and a means to pay (credit card, debit card, etc.) for purchasing goods or services can participate in e-commerce. There are thousands of websites devoted to online shopping. Popular uses of e-commerce by consumers include shopping and auctions, finance, travel, entertainment, and health.

Three types of e-commerce are given below:

- **Business-to-Consumer (B2C)** e-commerce consists of the sale of goods and services to the general public, such as at a shopping website.
- **Consumer-to-Consumer (C2C)** e-commerce occurs when one consumer sells directly to another, such as in an online auction.
- **Business-to-Business (B2B)** e-commerce occurs when businesses provide goods and services to other businesses, such as online advertising, recruiting, credit, sales, market research, technical support, and training.

Amazon, **Flipkart**, and **Alibaba** are the examples of e-commerce websites.

MESSAGE APPS

WhatsApp Messenger is a mobile messaging app available for smartphones and other Internet-enabled devices. WhatsApp uses Internet connection of your device to message and call friends and family. By using WhatsApp, you can send and receive messages, calls, photos, videos, and voice messages. You can enjoy group chats and videos with your contacts and you can easily stay in touch with your friends or family. You can also send and receive WhatsApp messages right from your computer browser through **WhatsApp Web**.

Telegram is an instant messenger app similar to Whatsapp that gives you a simple way to communicate with all of your contacts; its main focus is on security and speed.

Searching Information on Internet

The Internet is a worldwide resource of information. The primary reason why people use the Internet is to search for specific information including text, pictures, music, and videos. People use it as a search tool to locate information.

Two types of search tools are— **search engine** and **subject directories**. A **search engine** is a program that finds websites, web pages, images, videos, news, maps, and other information related to a specific topic. A **subject directory** classifies web pages in an organized set of categories or groups, such as sports or shopping, and related sub-categories.

Some websites offer the functions of both a search engine and a subject directory.

SEARCH ENGINE

A **search engine** is a software program which helps in finding websites, web pages, and Internet files. Search engines are particularly helpful in locating web pages on certain topics or in locating specific pages for which you do not know the exact URL (web address).

Search engines require a word or phrase**,** called **search text**, that describes the information you want to find. Many search engines use a program called **spider** to display a list of all web pages that contain the word or phrase you entered. Also called **crawler** or **bot**, a spider reads pages on websites in order to create a list or index of hits.

Each **hit** in the list has a link that, when clicked, displays an associated website or web page. Most search engines sequence the hits based on how close the words in the search text are to one another, in the titles and descriptions of the hits. Thus, the first few links probably contain more relevant information.

Some web browsers contain an **Instant Search box** that, when filled in, uses a predefined or default search engine to perform searches.

Search Techniques

If you enter a phrase with spaces between the words in the search text, most search engines display results (hits) that include all the words. The following tips identify techniques that you can use to improve your searches:

- Use specific nouns. Put the most important terms first in the search text.
- Use quotation marks to create phrases so that the search engine finds an exact sequence of words.
- List all possible spellings, for example— e-mail, email.
- If the search is not satisfactory with one search engine, try another.

SUBJECT DIRECTORY

A **subject directory** provides categorized list of links, arranged according to the subject. By using this search tool, you can locate a particular topic by clicking links through different levels, moving from the general to the specific. You can continue to select links until you find a web page that interests you.

POPULAR SEARCH ENGINES

Google (www.google.com)

Google is a fast, relevant and the largest single catalogue of web pages available today. It offers images, maps, news and features for locating photos, geographic directions, news headlines and much more.

Bing (www.bing.com)

Bing is a search engine that finds and organizes the answers you need; so, you can make faster, more informed decisions. Bing used to be MSN (Microsoft Network) search until it was updated in 2009.

Yahoo! (www.yahoo.com)

Yahoo Search is the oldest web directory; it is a place where editors organize websites into categories. This search engine helps you find exactly what you are looking for.

Dogpile.com (www.dogpile.com)

Dogpile is a meta search engine, which means that it gets results from multiple search engines and directories, and then presents the combined result to the user. Dogpile currently gets its results from Google, Yahoo, Ask, About, MIVA, LookSmart, and others.

Ask Jeeves (www.askjeeves.com)

Ask Jeeves is also a popular search engine which uses crawler-based technology to provide results to its users.

Lycos (www.lycos.com)

Lycos is one of the oldest (estd. 1994) and widely-known Internet search engines in the world, evolving from one of the first search engines on the web into a comprehensive network of social media websites that foster online communities.

Update Your Knowledge

The primary reason that people use the web is to search for specific information including text, photos, music, and videos. The first step in successful searching is to identify the main idea or concept in the topic about which you are seeking information. Determine any synonyms, alternate spellings, or variant word forms for the topic. Then use a search engine, such as Google, to help you locate the information.

Protecting Yourself from Identity Theft

Internet has changed our lives in many positive ways but it also has a dark side. People rely on Internet to create, store, and manage their critical information. Thus, it is important to take measures to protect or safeguard your information from loss, damage, or misuse.

The fastest growing crime in the online world is identity theft. Now a days, every second, someone's identity is stolen. The term **identity theft** refers to the method by which personal information is stolen and misused by attackers.

With Internet services, cyber criminals are able to access your personal information online. The term **cybercrime** refers to online or Internet-based fraudulent act such as distributing malicious software or committing identity theft.

BE CAREFUL ALL THE TIME, PEOPLE ARE NOT ALWAYS WHO THEY SAY THEY ARE!!

You should practise these techniques to foil attempts to steal your personal data:

1. While entering any confidential information like bank detail, check the web address has a 's' after the 'http'. **S** after http stands for **secure**. Do not enter any confidential information without https in the web browser.
2. Secure your wi-fi connection with a **strong password** so that the cyber criminals can not use your connection for any harmful activity.
3. You should apply **two factor authentication** to all your important online accounts. It is an extra layer of protection used to ensure the security of online accounts beyond just a username and password.
4. You should avoid free, open wi-fi and hotspots. They are insecure and criminals can easily use their flows in order to see your online information and can access your accounts.
5. Avoid checking your email or performing banking activities on public computers. These computers are notorious for running **keyloggers**, which record keystrokes in a hidden file. If you need to use a public computer for critical activities, be certain to **sign out** of any password-protected website and to clear the browser's cache.
6. While playing online games, never use your own name and other personal details.
7. Clear or disable **web cookies** (small text files that web servers store on a computer) in your browser.
8. Install a personal **firewall** (software that protects network resources from outside intrusions) and **antivirus** software and keep them updated.
9. Create a strong password for all your online accounts like e-mail, social networking, etc. Keep your password a secret from everyone even your best friend.
10. Shred all personal or financial documents before you discard them.

CONSIDER THIS

If your identity has been stolen and password has been compromised, change your password immediately.

If you have disclosed your debit or credit card details or OTP (one time password), contact your bank or financial institution. You should also report it to the **cyber safety cell**.

Self-Evaluation

After reading the chapter, I know these points:

	CHECKLIST	
	Agree	Disagree
⊙ I know that Internet is the largest network that connects millions of computers worldwide.	☐	☐
⊙ I know that a dial-up access provides an easy and inexpensive way for users to connect to the Internet.	☐	☐
⊙ I know that broadband Internet service is the fastest way to connect to Internet.	☐	☐
⊙ I know that Flickr is the most popular photo sharing site.	☐	☐
⊙ I know that blog is a site that consists of a frequently updated collection of entries.	☐	☐
⊙ I know that cybercrime refers to online or Internet-based fraudulent act such as distributing malicious software or committing identity theft.	☐	☐

Exercises

A. Tick [✓] the correct answer.

1. The largest network that links millions of computers all over the world is ..... .
   a. ARPANET ☐ b. LAN ☐ c. Internet ☐
2. A/An ..... modem is a small box that uses a cable to connect to the computer.
   a. internal ☐ b. external ☐ c. middle ☐
3. A single person who maintains many blogs is known as a ..... .
   a. blogger ☐ b. user ☐ c. programmer ☐
4. A program that helps in finding websites, web pages, and Internet files is ..... .
   a. e-mail ☐ b. chat ☐ c. search engine ☐
5. A popular search engine that used to be MSN until it was updated in 2009 is ..... .
   a. Bing ☐ b. Yahoo ☐ c. Dogpile ☐

B. Write 'T' for True and 'F' for False statements.

1. Broadband provides a slow and inexpensive way to connect to the Internet. ☐
2. A wireless modem is also known as dongle. ☐
3. Facebook and Instagram are popular social networking sites. ☐
4. YouTube is one of the most popular sites for file transfer on Internet. ☐
5. A hit has a link that when clicked displays an associated website or web page. ☐
6. We should apply two factor authentication to all online accounts. ☐

C. Fill in the blanks.

1. For ..... connection, we use a computer, modem, and a regular telephone line.
2. ..... is the example of video conferencing apps.
3. A ..... reads pages on websites in order to create a list or index of hits.
4. ..... is a financial business transaction that occurs over an electronic network.
5. ..... search engine uses crawler-based technology.

D. Differentiate between the following.

Dial-up Connection	Broadband Connection
.....	.....
.....	.....
.....	.....

E. Answer in 1-2 sentences.

1. What do you mean by hotspot?

   .....

   .....

2. What is blogging?

   .....

   .....

3. What is the use of video conferencing?

   .....

   .....

4. What are the various search techniques?

   .....

   .....

F. Answer briefly.

1. What do you understand by Wireless Internet Access?

   .....

   .....

   .....

2. Write any two techniques to protect yourself from identity theft.

   .....

   .....

   .....

G. Application-based Question

Your friend urgently wants to send an e-mail using a laptop. As he does not have an Internet connection, he asks for help. You have a smartphone with Internet connection. How will you help him?

.....

Group Discussion

Divide the students into two groups and discuss the topic – 'Internet is a Boon or Bane for Students'.

Online Link

To learn more about Internet services, visit the website:

https://www.slideshare.net/sahilnagpal79025/services-provided-by-the-internet-46923539

Activity Section

Lab Activity

A. Search Engine

a. Open Google search engine by typing **www.google.co.in** in the address bar of the web browser.

b. Type the keyword **'badminton'** in the search box and press the **Enter** key. You will get many indexed web pages related to the topic **'badminton'**.

c. Navigate the information and create a beautiful presentation of four slides on badminton.

Skill Formation

This activity enhances the information searching and presentation skills of the students.

B. Internet Research

a. Find the name of the founder of BMW. Answer: .....

b. Find the name of the founder of Alibaba. Answer: .....

c. Find the name of the person who invented telephone. Answer: .....

Discover More

SEO (Search Engine Optimization)

When you have a website, most of your visitors can find you using a search engine. The search engine user types his keywords, and the search engine displays the results in thousands from the indexed web pages that are relevant to the user search. Your website may be on the first page or any other page. Optimizing your website for search engines can help bring your website search result on the top rankings in different search engines.

Search Engine Optimization (SEO) refers to methods and techniques that you can apply to increase traffic, rank, or visibility of your website in a search engine results page. When you optimize your website, it has a greater chance of appearing in the search engine top result, which subsequently increases the traffic to your website. The optimization process includes many techniques and methods that are applied to the website itself or other sites that are related to the website content.

Technology Trailblazers

Mark Zuckerberg

CEO: Facebook **YEAR: 2004**

Mark Zuckerberg is famous worldwide for having developed **Facebook**, the most widely used social networking website. At a very young age, he was taught how to write computer programs by his father and tutor, David Newman. In high school, he developed a music player, 'Synapse'. Both Microsoft and AOL had offered him job during his senior year in high school in New Hampshire. He declined their job offers and decided to attend Harvard. In college, he and some of his friends developed several projects. He, however, had instant success launching Facebook from his dorm room in 2004, and the popularity of the website quickly spread worldwide.

8 Cloud Computing

OBJECTIVES

After completing this chapter, you will be able to:

- Understand cloud computing and its advantages.
- Understand various types of cloud computing and its services.
- Learn about Google Drive and its working.

Introduction

Just think, what all things you need if you want to setup an IT company. First, you need an office space, hardware like computers and servers, and software to run the hardware. Then you need round-the-clock electricity for power and cooling system, and IT experts for managing the business. All of these require a lot of capital investment.

If your work increases, you need more space, more computers and servers, more software, more of cooling system and more IT experts. Again lot of capital expense. If your work decreases and you need to shut down your business, all this expenditure will be of no use.

You can eliminate all this heavy expenditure by using cloud computing.

Cloud Computing

Cloud computing is a technology that provides resources and services over the Internet. **Resources** include email messages, schedules, music, photos, videos, games, websites, programs, web apps, servers, storage, and more. **Services** include accessing software and storing files online. Instead of accessing these resources and services locally on your computer, you can access them on the cloud. Many users choose cloud storage instead of storing data locally on a hard drive or other media. **Cloud storage** is an Internet service that provides storage facility to computer users.

Some of these resources and services are free, and some are paid. If you are using paid service, then you pay only for the service that you actually use. As a result, you need not make large investments in equipment or staff to support it.

People choose cloud computing for a variety of reasons:

Accessibility: Data and applications are available worldwide from any computer or device with an Internet connection.

Cost Saving: The expense of buying software and high-end hardware shifts away from the user.

Space Saving: Floor space required for servers and other hardware shifts away from the user.

Scalability: It provides the flexibility to increase or decrease computing requirement as per the need.

With cloud computing, users can access files and use applications from any device that can access the Internet.

ADVANTAGES OF CLOUD COMPUTING

There are many advantages of cloud computing.

- It is probably the most cost-efficient method to use, maintain and upgrade. It eliminates the capital expense of buying hardware and software and other infrastructure.
- It allows users to get large storage capacity for storing data and information.
- It allows users to access files on the Internet from any computer or device that has Internet access.
- Users can allow others to access their files on the Internet such as listening to an audio file, watching a video clip, or viewing a photo instead of sending the file to them via an email message.
- It makes data backup easier and less expensive.
- It allows users to view time-critical data and images immediately while away from the main office or location; for example, doctors can view X-ray images from another hospital, home, office or even while being on vacation.
- It provides up-to-date versions of software, as well as upgrades to servers and computer processing power.

Service Provider

Cloud computing is an Internet technology that provides various services to computer users. There are service providers that provide various types of services for free or charge a fee.

Many organizations like **Amazon Web Services (AWS)**, **Google Cloud Platform**, and **Microsoft Azure** have started implementing cloud services like storage, network, hardware, and software.

If a user does not have enough storage on a personal computer, storage on the cloud can be utilized. The same type of service is provided by **Flickr.com**, which can be used to upload images on its server. The service can be used on a desktop, but the Internet is required when images are to be processed on the desktop. **Google Docs** is used to create documents online. **Google Drive** is used to store your work online. All these services are available on the cloud.

CHARACTERISTICS OF CLOUD COMPUTING

Using cloud computing, an organization can run its applications on a shared data center. To use an application that runs on the cloud, all that needs to be done is to login with a username and a password, customize it, and start using it. That is the power of cloud computing.

ON DEMAND SELF SERVICE: Users are able to get the cloud computing resources for almost any type of workload on demand and without requiring human interaction, mostly done through a web-based self-service portal. This eliminates the traditional need of IT experts to manage these resources. With a cloud app, you just open a browser, log in, and start working.

ELASTICITY: Suppose, you have an e-commerce business and you are running your business with four servers. At the time of Diwali sale, which comes once in a year for a month, your products' demand increases. You need three more servers to cater to your needs. If you purchase three more servers, what will happen after the sale? You need to lock your extra servers for the next year. This proves to be a major blockage of large investment. With cloud computing, companies can scale up the resources as computing need increases and scale down the resources as computing need decreases. This eliminates the need of large investments in the infrastructure.

PAY PER USE: In the cloud computing, your computer resources are measured, and you only pay for the resources that you use.

RESOURCE POOLING: Resource pooling allows cloud providers to pool large-scale IT resources to serve multiple cloud consumers. The cloud enables many users to enter and use data within the particular software hosted in the cloud at the same time, from any location, and at any time. This is an attractive feature for multiple business offices and sales teams that work usually outside the main office.

TYPES OF CLOUD

1. **PRIVATE CLOUD:** A private cloud is a proprietary architecture subscribed to by an organization. It provides hosted services to the users within the organization. This is protected by security to form a barrier against the outside world and to access hosted services from the private cloud.
2. **PUBLIC CLOUD:** A public cloud is not proprietary of any organization. The services provided in these clouds can be accessed by any organization or individual.
3. **HYBRID CLOUD:** In a hybrid cloud, the services are offered to a limited and well-defined number of users. The hybrid cloud allows the Internet to be used as a desktop. It is a combination of private and public cloud.
4. **COMMUNITY CLOUD:** In community cloud, the services are offered to a group of organizations or community with common interests.

SERVICES OF CLOUD COMPUTING

Cloud computing services are based on a **"pay as you go"** model. Consumers and organizations rely on cloud computing services to manage IT infrastructure (infrastructure as a service), provide software applications (software as a service), and create, test, and deploy applications using web-based development tools (platform as a service).

INFRASTRUCTURE AS A SERVICE (IaaS): IaaS provides IT infrastructure like servers, storage, network operating systems over the Internet on 'pay as you go' basis. It is the most flexible cloud computing model and allows companies to scale storage, processing power, or bandwidth, up or down as needed. For example, retailers may need to increase these capabilities to accommodate additional traffic to their websites during shopping seasons. When the season ends, retailers can easily reduce these settings.

SOFTWARE AS A SERVICE (SaaS): SaaS is a method for delivering software applications over the Internet, on demand and typically, on a subscription basis. Users connect to this application over the Internet, usually through a web browser on their phone, tablet or PC.

PLATFORM AS A SERVICE (PaaS): PaaS provides a cloud platform and allows developers to create, test, and run their program, website, web app, etc. without having to purchase the hardware and software.

Google Drive

Google Drive is a **cloud storage** service developed by **Google**. You can store your files online in Google Drive and can access them from anywhere in the whole world. Drive gives you 15 GB of free Google online storage in which you can keep files, folder, backups and everything that is important.

ADVANTAGES OF GOOGLE DRIVE

- You can access your files from everywhere.
- You can edit and make changes to the files.
- You can access your files on a number of devices such as PC, Mac, iPhone, iPad and Android devices.
- You can share your files with anyone.

OPENING GOOGLE DRIVE

To start Google Drive, open Google page in any web browser.

1. In the Google page, click on **Sign in**.

Google account page will appear.

2. Type your **login ID** and the **password.**

- *Password will appear in the form of black dots.*

Your login ID and password are same as that of your Gmail account.

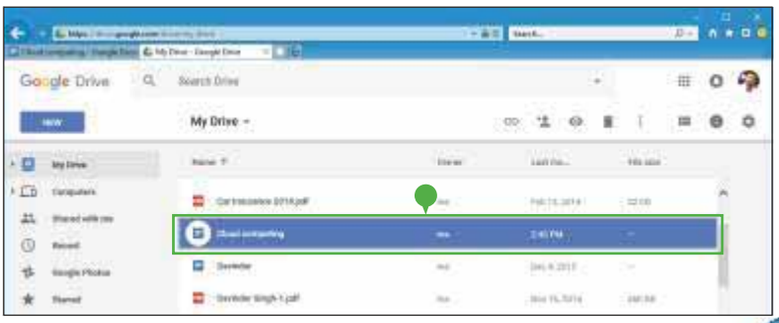
3. Click on **NEXT** button.

Google page appears again with your login details.

4. Click on **Google Apps** icon.

A list of all Google Apps appears.

5. Click on **Drive**.



Google Drive window appears.

- The file you created in Google Docs is stored in here.

You can also **share** this file to others using Google Drive.

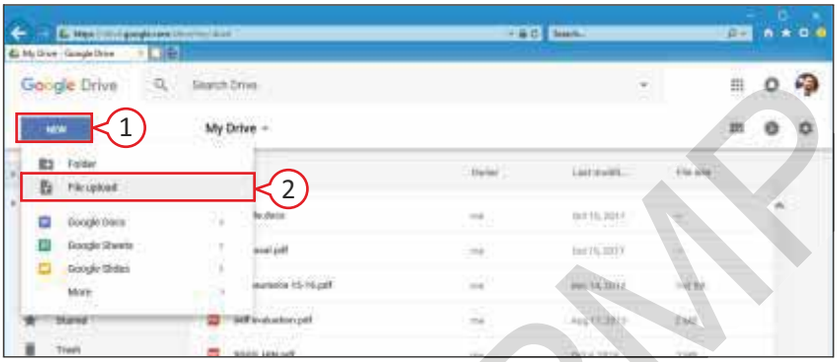
After finishing your work in Google Drive, you must logout from it.

Update Your Knowledge

Google was founded by Larry Page and Sergey Brin in the year 1996.

UPLOADING FILE OR FOLDER

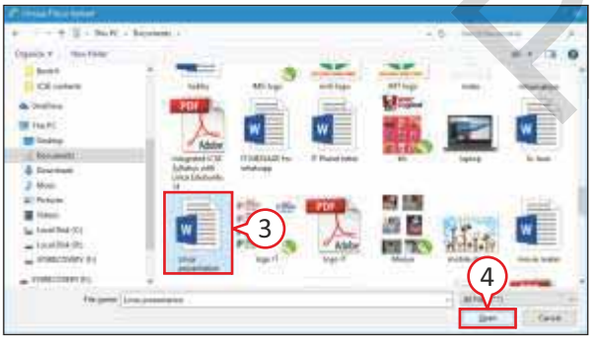
You can easily upload any file or folder from your computer hard drive to Google Drive.



1. Click on **NEW**.

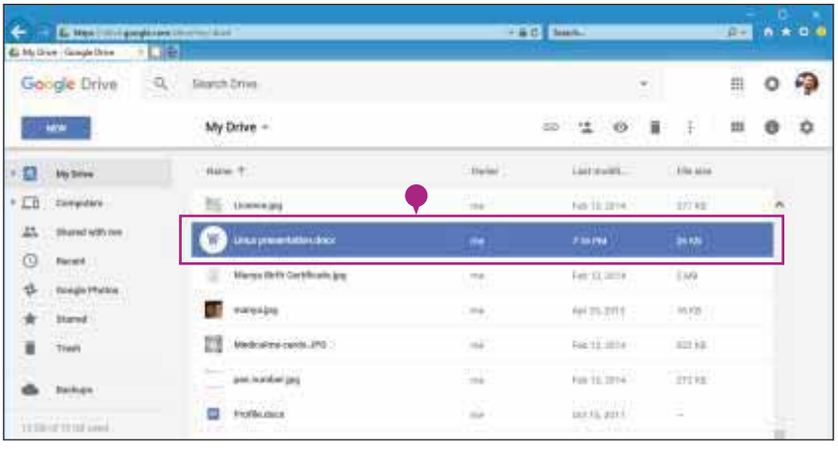
A drop-down menu appears.

2. Click on **File upload**.



Choose File to Upload dialog box appears.

3. Navigate and click on the file you want to upload.
4. Click on **Open**.

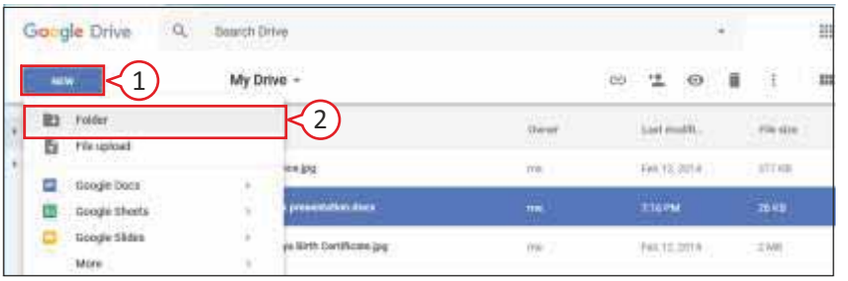


- The selected file is uploaded to Google Drive.

ORGANISING FILE AND FOLDER

Folders help you organize the files in Google Drive. In the folder, the files are easier to locate whenever you need them. Most folders contain files and sub-folders.

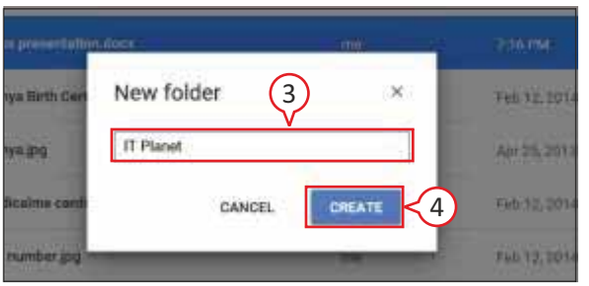
Create a Folder



1. Click on **NEW**.

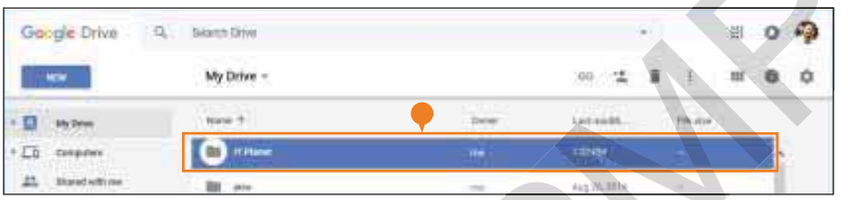
A drop-down menu appears.

2. Click on **Folder** *(or press Shift+F)*.



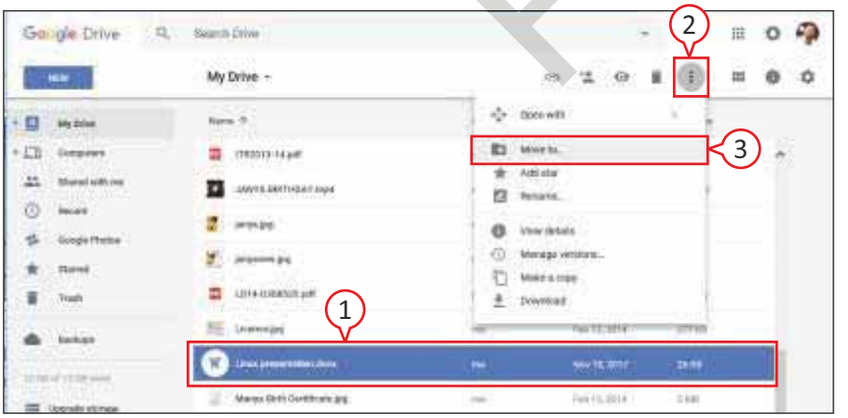
New folder box appears.

3. Type the name of the folder.
4. Click on **CREATE**.



- A new folder is created in Google Drive.

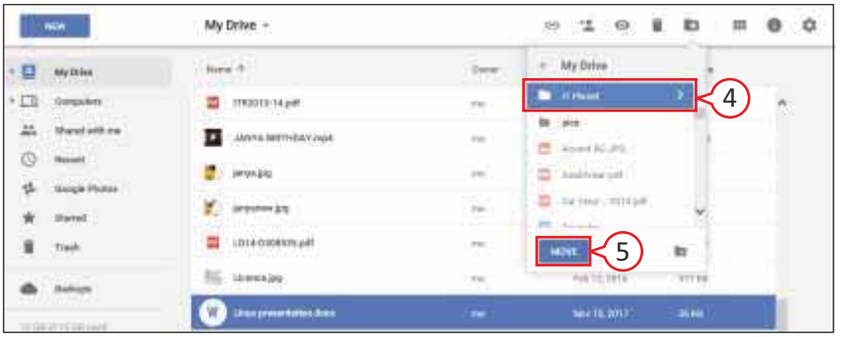
Move a File to Folder



1. Select the file you want to move.
2. Click on **More action** icon.

A drop-down menu appears.

3. Click on **Move to**.



4. Click on the folder in which you want to move the selected file.
5. Click on **MOVE**.

The file will move in the particular folder.

- When you open the folder, you will see that the file is stored in it.

Delete a File

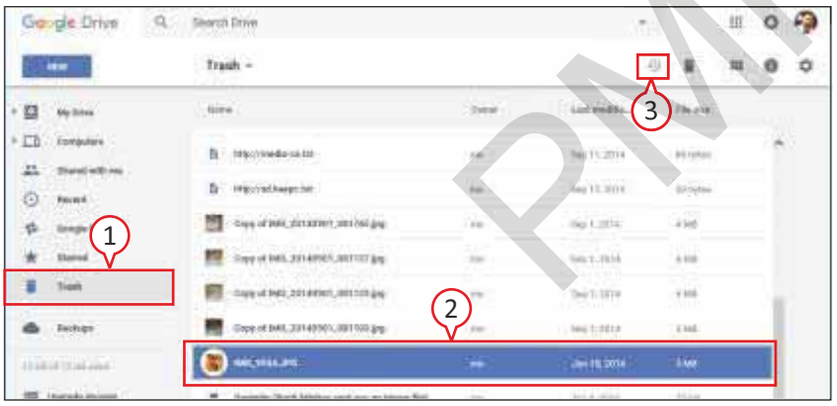
You can delete a file which is no longer needed in Google Drive. Whenever you delete any file, it goes into **Trash** folder. If you want to delete the file permanently, you have to delete it from Trash.

1. Select the file you want to delete.
2. Click on **Remove** *(or press Delete)*.

*The file moves to the **Trash** folder.*

Restore the Deleted File

As you know, the file you delete goes into Trash where it stays for a few days or a few weeks, depending on how often you empty the Trash. You can restore the files which are in Trash to their original location.



1. Click on **Trash**.

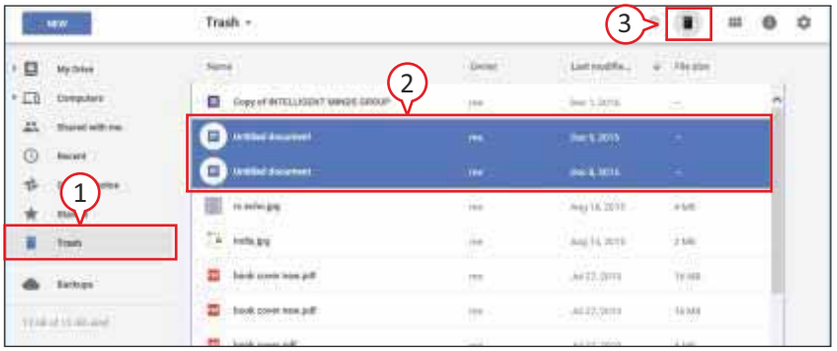
Trash displays all the files you have deleted.

2. Click on the file you want to restore.
3. Click on **Restore from Trash** button.

The file disappears from the Trash and reappears in its original place.

Delete a File Permanently from Google Drive

Whenever you want to remove any file permanently, you have to delete it from the Trash. After deleting the file from Trash, it cannot be restored again.



1. Click on **Trash**.

Trash displays all the files you have deleted.

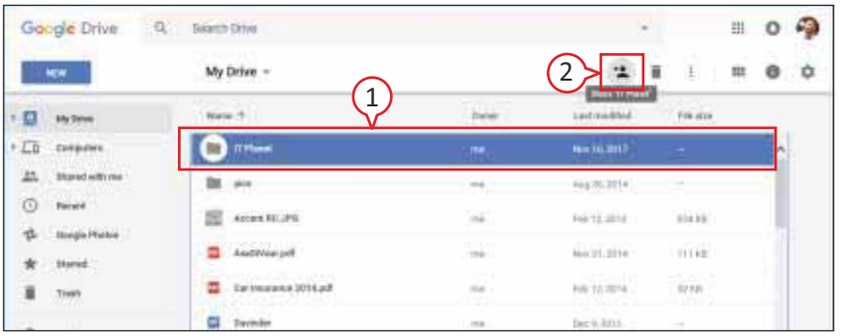
2. Select the files you want to delete forever.
3. Click on **Delete forever** button.

The **Delete forever?** dialog box appears.

4. Click on **DELETE FOREVER** to permanently delete the selected files.

SHARING FILE OR FOLDER

After uploading and organizing the files in Google Drive, you can also share these files or folders with your friends, family, relatives, etc.



1. Select and click the file or folder you want to share.
2. Click on **Share** button.

Share with others dialog box appears.

3. Type the e-mail ID of the receiver.

You can share the file to more people by typing their e-mail IDs.

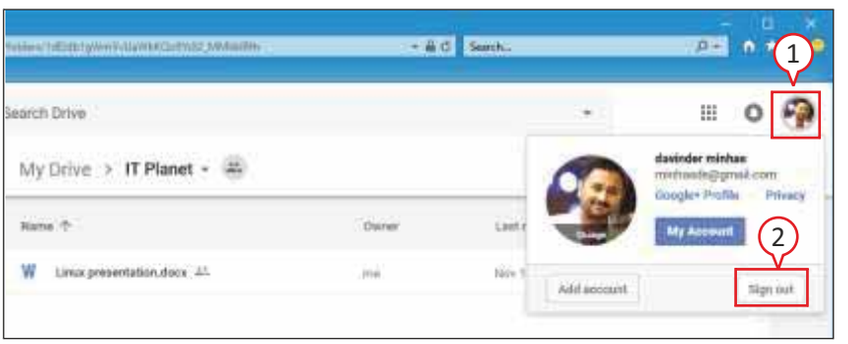
4. Click on **Send**.

Note: *Google updates all its apps frequently, so the icons and options may vary from the given screenshots.*

A pop-up will appear to confirm the process.

SIGNING OUT FROM GOOGLE DRIVE

After finishing your work in Google Drive, you must Sign out from it.



1. Click on **Google Account** icon.

A pop-up window appears.

2. Click on **Sign out** button.

The Google Drive window will close.

Self-Evaluation

After reading the chapter, I know these points:

	CHECKLIST	
	Agree	Disagree
⊙ I know that cloud computing is a technology that provides resources and services over the Internet.	☐	☐
⊙ I know that characteristics of cloud computing are on demand self service, elasticity, pay per use, and resource pooling.	☐	☐
⊙ I know that types of clouds are private cloud, public cloud, hybrid cloud, and community cloud.	☐	☐
⊙ I know that services of cloud computing are infrastructure, software and platform.	☐	☐
⊙ I know that Google Drive is a cloud storage service developed by Google in which we can store our files online and access them anywhere in the whole world.	☐	☐

Exercises

A. Tick [✓] the correct answer.

1. ..... is a technology that provides resources and services over the Internet.
   a. Cloud computing ☐ b. Antivirus ☐ c. Soft computing ☐
2. ..... include accessing software and storing files online.
   a. Resources ☐ b. Services ☐ c. Servers ☐
3. ..... allows cloud providers to pool large-scale IT resources to serve multiple cloud consumers.
   a. Elasticity ☐ b. Service provider ☐ c. Resource pooling ☐
4. ..... gives you 15 GB free online storage.
   a. Facebook ☐ b. YouTube ☐ c. Google Drive ☐

B. Write 'T' for True and 'F' for False statements.

1. SaaS is a method of delivering software over the Internet. ☐
2. In community cloud, the services are offered to a group of organizations. ☐
3. A public cloud is not proprietary of any organization. ☐
4. AWS is not a service provider of cloud computing. ☐
5. You cannot delete a file permanently from Google Drive. ☐

C. Fill in the blanks.

1. ..... cloud offers the services to a limited and well-defined number of users.
2. Cloud computing services are based on a ..... model.
3. In ..... , we can keep files, folders, backups and everything important, online.
4. Whenever we delete any file, it goes into ..... folder.
5. After finishing our work in Google Drive, we must ..... from it.

D. Define the following.

1. IaaS: .....

   .....

2. SaaS: .....

   .....

3. PaaS: .....

   .....

E. Differentiate between the following.

Public Cloud	Private Cloud
.....	.....
.....	.....
.....	.....

F. Answer in 1-2 sentences.

1. What do you mean by cloud computing?

   .....

   .....

2. What are service providers?

   .....

   .....

3. What is Google Drive?

   .....

   .....

G. Answer briefly.

1. Write the reasons for choosing cloud computing.

   .....

   .....

   .....

2. What are the characteristics of cloud computing?

   .....

   .....

   .....

H. Application-based Question

Riya has created a document on 'States of India'. She needs to share this project with her teacher online. Help her to complete the task.

.....

Group Discussion

Divide the students into two groups and discuss the topic– 'Advantages and Disadvantages of Cloud Computing'.

Online Link

To learn more about working of cloud computing, visit the website:

https://data-flair.training/blogs/cloud-computing-tutorial/

Activity Section

Lab Activity

Uploading a Folder on Google Drive and Sharing It

Follow the given instructions:

a. Open web browser, go to drive.google.com and **sign in**.

b. At the top left, click **New** and then **Folder Upload**.

c. Select the **'Lab Activity'** folder that you created in Chapter 1.

d. After uploading, select the folder you want to share.

e. Click on **Share** button. **Share with others** dialog box appears.

f. Type the e-mail ID of your teacher.

g. Click on **Send**.

Skill Formation

- This activity will make students learn to share the information online securely and effectively.

Technology Trailblazers

Jack Ma

Co-founder: Alibaba.com | **YEAR: 1999**

Jack Ma is a self-made billionaire with humble beginnings. He was born in Hangzhou, located in the South-Eastern part of China. Once a poor boy who survived by guiding tourists, Ma left no stone unturned to rise above his humble condition and achieve success. He was one of the few individuals who saw Internet as a business opportunity even at a time when the rest of the world did not believe in his thoughts. The venture based on e-commerce, Alibaba, which he founded in the early 2000s catapulted this entrepreneur to global fame. He is one of the world's greatest living examples of entrepreneurship today.

9 Python – Introduction

OBJECTIVES

After completing this chapter, you will be able to:

- Understand about programming language and Python.
- Understand the role of gamification in coding.
- Understand tokens, lines and indentations and variables.
- Understand input and output function.

Programming Language

A **computer language** is a medium of communication between the user and a computer.

Computer programs are instructions to a computer which tell a computer to perform the tasks necessary to process the data into information. The process of writing instructions (program) is called **programming.** The people who write the programs are called **programmers**.

A **programming language** is a set of words, symbols and codes, that are used to write a computer program. Python is one such programming language.

Introduction to Python

Python is a high-level, structured, open source programming language that supports the development of wide range of applications from simple text processing to world wide web browsers to computer games. Python was created by **Guido van Rossum** and was first released on February 20, 1991. It is named after '**Monty Python's Flying Circus**', a comedy television show.

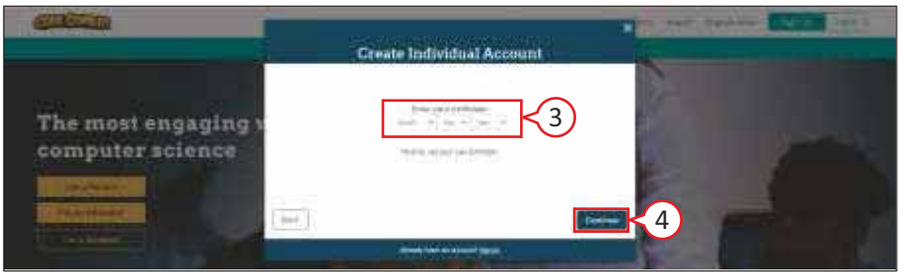
USING CODECOMBAT FOR LEARNING PROGRAMMING

Coding has become a buzzword today. It is arguably the most important skill to learn in the 21st century and needs be to inculcated among students at an early stage. However, there are many challenges in teaching computer programming such as the diversity in students' ability and aptitude levels, and most importantly the difficulty in motivating students to learn computer programming. To overcome all these obstacles, **Gamification** has stepped in. It helps the teachers to teach concepts of programming fundamentals to novice students, in order to generate their interest and motivation.

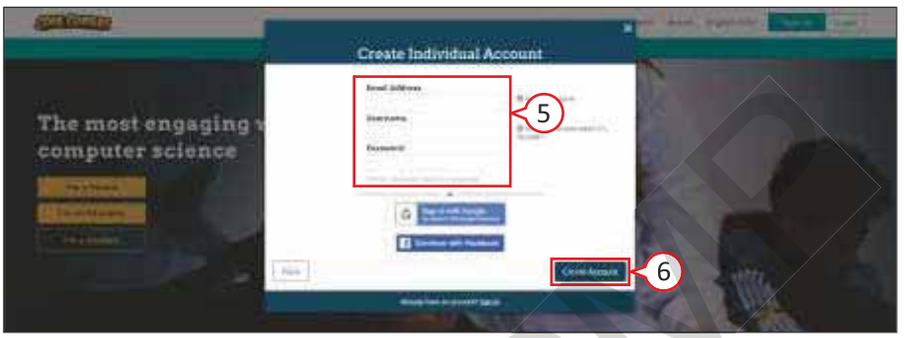
Today, we have plenty of online game portals which motivate and capture the interest of students to learn coding. Here, we are using **CodeCombat** which is a good platform to learn and improve coding skills. For starting CodeCombat, type https://codecombat.com/ in any web browser and press **Enter** key. The following window appears.

1. Click on **Sign Up** button.

2. Click on **Sign up as an Individual**.



3. Enter your date of birth.
4. Click on **Continue**.



5. Enter your **Email Address**, **Username** and **Password**.
6. Click on **Create Account**.

You can now play the game.

7. Click on **PLAY** button to begin the game.

8. Click on the **red flag** below the hopping **yellow arrow**.

After clicking on the flag, a pop-up window appears, containing a description of the game, instructions to be followed and the learning outcomes related to programming which will be achieved through this level.

9. Click on **PLAY** button to proceed.

10. Select your character or hero from the list.
11. Click on **NEXT** button.

Now, you will get an **INVENTORY** screen where you can select the equipment for your hero that would aid in completing the task efficiently for achieving the goal.

12. Click on **Equip**.
13. Click on **Play**.

A window with a set of instructions and procedure to achieve the goal appears.

14. Click on **START LEVEL**.

A game window opens. The screen would be split in two parts: the code is typed on the right side of the screen and on the left side, the character or hero selected by you moves according to your instructions.

15. Type your code here.
    - The codes are based on given methods.
16. Click on **RUN** after typing the codes.

Your selected hero or character moves according to the given codes or instructions on the right side of the screen.

17. Click on **DONE**.

You will get the **Victory** screen.

Congrats!!! You have completed the first level. Now, you can click on **Continue** if you want to play more.

FEATURES OF PYTHON PROGRAMMING

The application of Python is increasing day-by-day due to the following features:

1. It is a high-level programming language which is easy to use and learn.
2. It is an open source language and available free of cost.
3. It runs well on different platforms such as Windows, Linux, and Macintosh. So, it is a portable language.
4. It can be used for Graphical User Interface (GUI) programming.
5. It is easy to understand and write coding in Python as compared to other high-level languages. The syntax seems natural. For example:

```
a = 2
b = 3
sum = a + b
print(sum)
```

   Even if you have never programmed before, you can easily guess that this program adds two numbers and prints it.
6. Python is an **interpreted language** that executes the code line-by-line at a time. This makes the debugging process easier.

DOWNLOADING PYTHON

Python comes in three versions: version 1.0, version 2.0 and version 3.0. Many series are available in these versions. In this chapter, we are using **version 3.8**.

Open a browser and go to the official website https://www.python.org/downloads/ and press **Enter** key. The following page appears in your browser.

1. Click on **Download Python.**

*The setup of Python starts to download on your computer in **Downloads** folder.*

INSTALLING PYTHON

After downloading, next step is to install it in your computer.

1. Open **Downloads** folder and double-click on **Python** program icon.

Installation process starts and **Python Setup** dialog box appears.

2. Click on **Install Now**.

- **Setup Progress** shows the installing process as shown below.

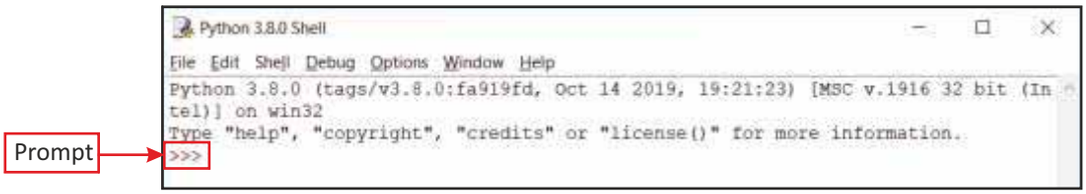
When the installation process finishes, **Setup was successful** appears.

3. Click on **Close** button.

GETTING STARTED WITH PYTHON

Writing Code in Interactive Mode

After installing, when you open Python, you will get this window:

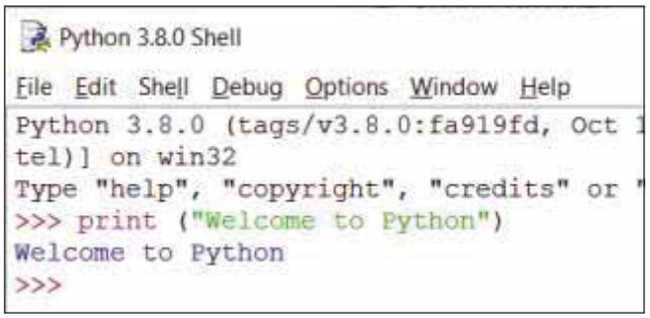


This is the **Python shell**, which is part of Python's integrated development environment. An **I**ntegrated **D**evelopment and **L**earning **E**nvironment (IDLE) is the most popular graphics-based development environment for Python. It is easy to create, edit and debug a program in this environment.

This window is called **Interactive mode**. The Interactive mode screen shows the welcome message with version details and the three greater-than signs (**>>>**) called the **prompt**. This is a **primary prompt** which indicates that interpreter is executing the Python statements. All the statements, expressions or commands are written after the primary prompt in the Interactive mode.

Let us enter a statement "Welcome to Python" at the prompt and press **Enter** key.

```
>>> print("Welcome to Python")
```



Update Your Knowledge

You should always enclose string in single (' ') or double (" ") quotes when you use it with print () function.

The **prompt (>>>)** reappears to tell you that the Python shell is ready to accept more commands.

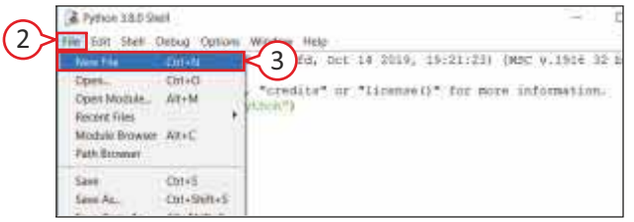
In the above program, the **print()** is a type of Python command called a **function**, and it prints out whatever is inside the quotes to the screen.

Great! You have just created your first Python program.

Writing Code in Script Mode

You do not need to rewrite the same program every time you want to execute it. It might be fine to just rewrite short programs, but large program could contain hundreds of lines of code. For this reason, we should save our program for future use.

The **Interactive mode** is best for small programs and for beginners. But you cannot save the commands in Interactive mode for future use. For saving a program, you need to open and write a program in another python shell, called **Script mode**.

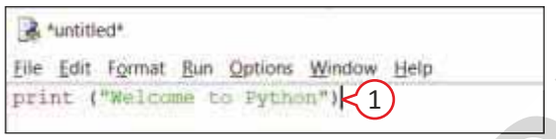


1. Open IDLE (Python GUI).
2. Click on **File** menu.
3. Click on **New File** *(or press Ctrl+N)*.

- An empty window appears, with **untitled** displayed in the Title bar.

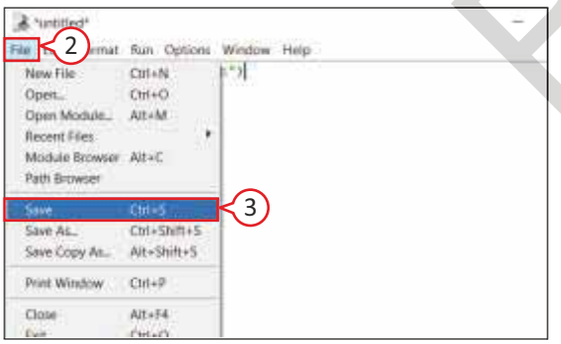
This is another Python shell, which is called Script mode.

Creating, Saving and Running a Program in Script Mode



Let us enter a command "Welcome to Python" in Script mode.

1. Type `print("Welcome to Python")`

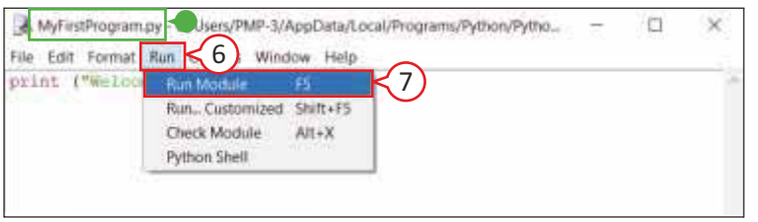


2. Click on **File** menu.
3. Click on **Save** *(or press Ctrl+S)*.

Save As dialog box appears *(not shown).*

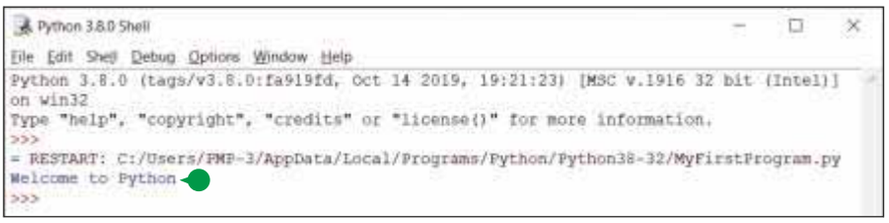
By default, the file gets saved in Python folder in C: drive, but you can change the location.

4. Type the File name (MyFirstProgram). The file extension of Python is **.py**.
5. Click on **Save**. *Python saves the program in the specified location.*



- The new file name appears on the Title bar.

6. Click on **Run** menu.
7. Click on **Run Module** to run the program *(or press F5)*.



- If you have entered the command correctly, your saved file should run like this in Interactive mode.

Now, if you close the shell window but leave the **MyFirstProgram.py** window open and then choose **Run** > **Run Module**, the Python shell reappears, and your program runs again.

After saving and running your program, you can close the program by clicking on **Close** option in **File** menu.

Tokens

A **Token** is a smallest element of a program that is meaningful to the interpreter. Tokens supported in Python include identifiers, delimiter, keywords, literals and operators among others.

IDENTIFIERS

A random name made out of letters, digits and/or underscore (_) to identify a function name, a program name or a memory location (variable or constant) is known as **identifier**. Python is a **case-sensitive language** as it treats lower and upper case letters differently. Following rules must be followed for creating identifiers:

- It must start with a letter A to Z or a to z or an underscore (_) but not with numbers.
- It can be followed by any number of letters, digits (0-9), or underscores.
- It cannot be a reserved word.
- Python does not allow punctuation characters such as @, $ and % within identifiers.
- Multiple words used for creating identifier should be separated by underscore such as **my_ident**.

Here are some examples of valid and invalid identifiers.

Valid identifiers:	**shapeclass**	**shape_1**	**shape_to_db**	**_var**
Invalid identifiers:	**1shape**	**my var**	***varnew**	**my@var**

DELIMITER

A **delimiter** is one or more characters that separate text strings. These are comma (,), semicolon (;), double quotes (“ ”), braces ({ }), etc.

KEYWORDS

Keywords are the **reserved** words in Python and cannot be used as constant, variable or any other identifier names. There are 33 keywords in Python 3.

All the Python keywords contain lowercase letters only except **True**, **False** and **None**.

Some of the keywords are:

True	False	None	and	as
assert	def	class	continue	break
else	finally	elif	del	except
global	for	if	from	import
raise	try	or	return	pass
nonlocal	in	not	is	lambda

LITERALS

The data items that never change their value throughout the program run are called **literals**. Theoretically, literal means any number, text or other any information that represents a value.

Python supports the following literals:

Literals		**Examples**
String literals	::	"hello" , '12345'
Integer literals	::	0, 1, 2, -1, -2
Floating-point literals	::	3.14, 2.05
Boolean literals	::	True or False

OPERATORS

Operators are the special symbols that carry out arithmetic and logical computations. The values operated by the operator are called **operands**. There are many types of operators in Python like Arithmetic, Relational, Logical, Assignments, etc. In this chapter, we will learn about **Arithmetic operators**.

ARITHMETIC OPERATORS

Arithmetic operators are used to perform mathematical operations.

Operator	Meaning	Example

'+'	**Addition and Concatenation in Strings**	>>> 200+45
		245
		>>> “Good”+“ ”+“Morning”
		‘Good Morning’

'-'	**Subtraction**	>>> 100-20
		80
		>>> 80-160
		-80

'*'	**Multiplication and Replication in Strings**	>>> 4*5
		20
		>>> 'python' *3
		'pythonpythonpython'

'/'	**Division**	>>> 28/4
		7.0
		>>> 50/6
		8.333333333333334

'//'	**Floor Division/Integer Division**	>>> 20//4
		5
		>>> 50//6
		8

'%'	**Modulus/Remainder**	>>> 67%9 4
'**'	**Exponentiation**	>>> 8**2 64

Lines and Indentation

Python is very particular about program layout, especially regarding **lines** and **indentation**.

A Python program is made up of one or more **physical lines**. Each physical line may end with a **comment**. The text written in the comments are ignored by Python.

Python uses **indentation** to express the block structure of a program. An indentation is an empty space at the beginning of block of code. Unlike other languages, Python does not use braces or other beginning/end symbols around blocks of statements; indentation is the only way to denote blocks.

Comments

Comments are very important while writing a program in any language. They are used to explain Python code and make it more readable. Python interpreter ignores the text written in the comment. Python supports the following comments in a program.

SINGLE LINE COMMENTS

Python uses hash symbol (#) for writing a single line comment.

Examples:

>>> #This is the start of program	This is a single line comment
>>> #print hello in Python	This is a single line comment
>>> print ("Hello")	This is a statement

MULTI-LINE COMMENTS

Python uses triple quotes ' ' ' or " " " for multi-line comments.

Example:

```
" " " This is an example of
multi-line comments" " "
```

Statements

A **statement** is an instruction that the Python interpreter can execute. When you type a statement on the IDLE, Python executes it and displays the result.

Example:

```
>>> num1=10              # This is statement
>>> num2=20              # This is statement
>>> add=num1+num2        # This is statement
```

Data Types

Data type is used to define the type of value a data can contain. It represents what kind of operation can be done on a particular data. Data types define the way to store values in the memory.

INTEGER

Integers are the whole numbers consisting of **+** or **–** sign without decimal point such as 1000, -88, etc.

Example:

```
>>> a=12    # This is a positive integer value
>>> b=-20   # This is a negative integer value
```

FLOAT

Float data type represents floating point numbers which contain **decimal point**. For example, 0.5, -4.567, 0.001, etc.

Example:

```
>>> a=12.5   # This is a float value
>>> b=12     # This is an integer value
```

STRING

String is a sequence of characters (alphabets, numbers, operators and punctuation) used to store and represent text-based information. **Single quotes** (' ') and **double quotes** (" ") are used to represent strings in Python.

Example:

```
>>> name="reema"              # name stores a string
>>> password='reema@123'
```

Variables

Variables are used to store data in the memory. The data can be numbers, text and/or objects. The data is given a name, so that it can be re-called whenever it is needed.

Another way of looking at a variable is that it is like a label for something.

INITIALIZING VARIABLE

Initializing a variable means to assign a value to an identifier.

For example, to create a variable named **rose**, we use an **assignment operator (=)** and then tell Python what information the variable should be the label for.

Here, we create the variable **rose** and tell Python that it labels the number 100.

```
>>> rose = 100     # here rose labels with the number 100
```

To find out what value a variable labels, enter **print** in the shell, followed by the variable name in parentheses, like this:

```
>>> print(rose)
100                # here Python prints the result
```

We can also use more than one variable for the same item.

```
>>> rose = 100
>>> flower = rose
>>> print(flower)
100
```

In this example, we are telling Python that we want the variable **flower** to label the same thing as **rose** by using the **assignment operator (=)** between flower and rose.

You can also write variables like **total_marks**.

```
>>> total_marks = 500
>>> print(total_marks)
500
```

This example shows that we are talking about 500 marks.

Variable names can be made up of **letters**, **numbers**, and/or the **underscore character (_)**, but they cannot start with a **number**. They also cannot use reserved **keywords**.

Defining Input and Output Function

Input() and **print()** are used for standard input and output operations in Python. Input() is used to get input from user. This function helps user to input the values and text for the operation. Input() function always returns string value.

Syntax:

variable_name = input("String")

Here **variable_name** means any name where **input()** function assigns the value into it.

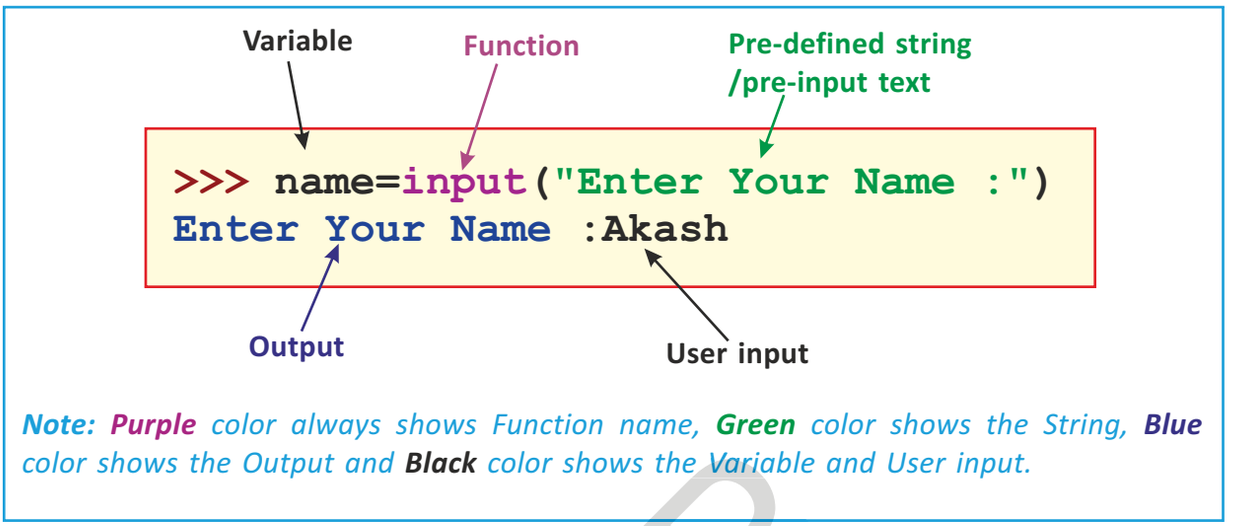
print() is used to print the value of given input value or string. It helps to show output on screen.

Syntax:

print(String/Variable/Constant)

Example:

Open the Python IDLE in interactive mode and type the following:



*Note: **Purple** color always shows Function name, **Green** color shows the String, **Blue** color shows the Output and **Black** color shows the Variable and User input.*

PROGRAMS TO UNDERSTAND INPUT() AND PRINT()

Program 1

Program to get your name, age and then print it.

```
File  Edit  Format  Run  Options  Window  Help
name=input("Enter your Name :")
age=input("Enter your Age:")
print(name)
print(age)
```

1. Create a new file in **Python Script Mode**.
2. Type the given code.
3. Save and Run the module.

By default, **IDLE** saves the Python file with **.py** extension.

After clicking on **Run** module, interactive mode appears with the pre-input text **Enter your Name**.

```
Enter your Name :Akash
Enter your Age:13
Akash
13
>>>
```

4. Type your name.
5. Press the **Enter** key.

Now, next pre-input text **Enter your Age** appears.

6. Type your age.
7. Press the **Enter** key.

Finally **print()** function shows the entered **name** and **age** as the output.

Program 2

Program to print the sum of two numbers using int() function

As discussed earlier, the **input()** function converts the entered value into the string, which could only be used to print using print() function, but could not use for calculation purpose.

Let us understand it with an example.

Source Code in Script Mode

```
File  Edit  Format  Run  Options  Window  Help
num1=input("Enter First Number ")
num2=input("Enter Second Number ")
sum=num1+num2
print(sum)
```

Output in Interactive Mode

```
Enter First Number 20
Enter Second Number 30
2030
>>>
```

When you run the source code, the sum of **20** and **30** shows **2030** as the given value gets converted into string using input() function and the **'+'** operator **concatenates (joins)** both values. Now, to show calculation between these value, you need to convert the entered string values into integer using int() function.

Using Int()

Source Code in Script Mode

```
File  Edit  Format  Run  Options  Window  Help
num1=int(input("Enter First Number "))
num2=int(input("Enter Second Number "))
sum=num1+num2
print(sum)
```

Output in Interactive Mode

```
Enter First Number 20
Enter Second Number 30
50
>>>
```

In the above program, when you run the source code, the sum of **20** and **30** shows **50** as the given value converts into **integer** using **int()** function so **'+'** operator performs the addition between entered values.

Note: You can also convert string into decimal value, using float() function.

Self-Evaluation

After reading the chapter, I know these points:

	CHECKLIST Agree	Disagree
I know that token is the smallest element of a program that is meaningful to the interpreter.	☐	☐
I know that operators are special symbols that carry out arithmetic and logical computations.	☐	☐
I know that data types define the type of value a data can contain.	☐	☐
I know that variables are used to store data in the memory.	☐	☐
I know that input() and print() functions are used to get input and display output.	☐	☐

Exercises

A. Tick [✓] the correct answer.

1. All Python keywords contain ..... letters except True, False and None.
   a. lowercase ☐ b. uppercase ☐ c. sentence case ☐
2. ..... are the special symbols that carry out arithmetic and logical computations.
   a. Literals ☐ b. Operators ☐ c. Identifies ☐
3. The values operated by the operator are called ..... .
   a. constants ☐ b. operands ☐ c. literals ☐
4. ..... define the way to store the values in memory.
   a. Statements ☐ b. Variables ☐ c. Data types ☐

B. Write 'T' for True and 'F' for False statements.

1. Python is named after Monty Python's Flying Circus, a comedy program. ☐
2. Python is not a case-sensitive language. ☐
3. Python interpreter never ignores the text written in comment. ☐
4. Single quotes (' ') and double quotes (" ") are used to represent strings in Python. ☐
5. Initializing a variable means to assign a value to an identifier. ☐
6. Input () function always returns string value. ☐

C. Fill in the blanks.

1. You can also press ..... key to run a program.
2. ..... are the reserved words in Python.
3. ..... are the data items which never change their value throughout program run.
4. Python uses ..... to express the block structure of a program.
5. When we type a ..... in IDLE, Python executes it and displays the result.

D. Define the following.

1. Token: .....
   .....
2. Operator: .....
   .....
3. Comments: .....
   .....

E. Differentiate between the following.

Keywords	Literals
.....	.....
.....	.....
.....	.....

F. Answer in 1-2 sentences.

1. Who developed Python and when?

.....

.....

2. What do you mean by identifier?

.....

.....

3. What are variables?

.....

.....

4. What do you understand by line and indentation?

.....

.....

G. Answer briefly.

1. How many data types are used in Python? Explain in detail.

.....

.....

.....

2. Define Input() and Print () functions of Python.

.....

.....

.....

H. Application-based Question

Riya has written a program in Python in which she has used input function for giving input value of a variable. After executing the program that value is a string, not a number. She wants to convert this string into a number. By which function can she do so?

.....

Group Discussion

Divide the students into two groups and discuss the topic – 'Importance of Int() Function for Calculation'.

Online Link

To learn more about Python programming, visit the website:

https://tutorialspoint.com/python/index.htm

Activity Section

Lab Activity

Subject Integration

Mathematics

This integration will make the students learn coding by using mathematical operations.

PROGRAMS IN SCRIPT MODE

Program 1: Python program to convert kilogram into grams

Source Code in Script Mode

```
File  Edit  Format  Run  Options  Window  Help
kg=int(input("Enter Kilogram "))
gram=1000*kg
print("Gram : ",gram)
```

Output in Interactive Mode

```
Enter Kilogram 2
Gram :  2000
>>>
```

Program 2: Python program to multiply two integer numbers

Source Code in Script Mode

```
File  Edit  Format  Run  Options  Window  Help
num1=int(input("Enter First Number "))
num2=int(input("Enter Second Number "))
mul=num1*num2
print(mul)
```

Output in Interactive Mode

```
Enter First Number 10
Enter Second Number 20
200
>>>
```

Program 3: Python program to find the average of three numbers

Source Code in Script Mode

```
File  Edit  Format  Run  Options  Window  Help
num1=int(input("Enter First Number "))
num2=int(input("Enter Second Number "))
num3=int(input("Enter Third Number "))
add=num1+num2+num3
avg=add/3
print(add)
print(avg)
```

Output in Interactive Mode

```
Enter First Number 10
Enter Second Number 20
Enter Third Number 30
60
20.0
>>>
```

Program 4: Python program to calculate area of a rectangle

Source Code in Script Mode

```
File  Edit  Format  Run  Options  Window  Help
l=int(input("Enter the Length  "))
b=int(input("Enter the Breadth "))
area=l*b
print("Area of Rectangle is :", area)
```

Output in Interactive Mode

```
Enter the Length  4
Enter the Breadth 5
Area of Rectangle is : 20
>>>
```

10 Fields of Artificial Intelligence

OBJECTIVES

After completing this chapter, you will be able to:

- Understand different types of AI.
- Understand the importance of AI.
- Understand different fields of AI.
- Understand AI ethics.

Classification of Artificial Intelligence

Artificial Intelligence refers to the process of simulating human intelligence in man-made machines like computer systems. Human intelligence includes learning, reasoning, and self-correction, among other traits.

Artificial Intelligence can be categorized into three types.

ARTIFICIAL NARROW INTELLIGENCE (ANI)

ANI is the ability of AI systems to perform a single assigned task effectively and efficiently.

These systems are specialized in one area and solve one problem at a time like **Siri**, **Alexa** and **Cortana** which are designed only for voice recognition.

ARTIFICIAL GENERAL INTELLIGENCE (AGI)

AGI can be defined as the ability of AI systems to learn, perceive, understand, and function completely like humans.

These systems are hard to develop because replication of the human brain is theoretically possible but not practical to implement.

Currently, there is no AGI system. It is still at the research stage.

ARTIFICIAL SUPER INTELLIGENCE (ASI)

ASI refers to the ability of an AI system that could perform any task better than humans with cognitive behaviour.

With ASI, a system would become so self-aware that it would surpass the level of cognitive performance and decision-making skills found in humans.

ASI is currently a hypothetical situation as depicted in movies and series, where machines have taken over the world.

Importance of Artificial Intelligence

Nowadays, **Artificial Intelligence** has become an indispensable part of our lives. The fields where AI can be applied and utilized are limitless. Almost every human activity can benefit from the use of AI and AI-based devices. Some important applications of AI in our daily lives are as follows:

AI IN GAMING

Gaming industry uses AI technology to improve the **strategic aspects** of games. The main objective of AI in games is to generate responsive, adaptive or intelligent behavior primarily in non-player characters (NPCs) similar to human-like intelligence. Games such as **F.E.A.R.**, **Alien: Isolation** and **Tic-Tac-Toe** use AI technology to present different game scenarios and unpredictable opponents each time when a user plays the game.

AI IN E-COMMERCE

E-commerce companies like **Amazon** and **Flipkart** use AI technology to recommend products to a user on the basis of their browsing history, preference and order history. It helps in improving relationship of such companies with their customers and their loyalty towards various brands.

AI IN BANKING

AI in the banking sector makes banks efficient, trustworthy, helpful, and more understanding. AI-powered **chatbots** assist customers by responding to their doubts and queries. AI automation in banking reduces the workload of its employees. It serves the customers 24x7. It also protect the banks from security breaches.

AI IN ROBOTICS

AI technology is widely being used to improve the working of **robots** which can perform multiple tasks with their own experiences and also learn new things with a better perception of the environment. Robots powered by AI use real-time updates to sense obstacles in their path and pre-plan their journey beforehand.

AI IN HEALTHCARE

AI in healthcare is changing the way information gets collected, analyzed and developed for patient care. It helps in detecting diseases and identifying infections at an early stage and then suggest the suitable treatment.

Wearable healthcare technology also uses AI to better serve patients. Software that uses AI in **smartwatches** can analyze data to alert users on potential health issues and risks.

Fields of Artificial Intelligence

The field of AI has certain core technologies that makes it possible for machines to mimic the human brain and learning. The core components of an AI-based system are as follows:

MACHINE LEARNING

Machine learning is a subset of AI that enables systems to learn automatically from experience or past information. It focuses on the development of computer programs that can access data and use them to learn by themselves. For example, **auto-complete suggestion** feature in search engines gives better result with more experience and data.

DEEP LEARNING

Deep learning is the subset of machine learning which itself is a subset of AI. It is a function of Artificial Intelligence that imitates the workings of the human brain in processing data and creating patterns for making decisions. To achieve this, deep learning uses a multi-layered structure of algorithms called **neural networks**. For example, self-driving cars use neural network to find the obstacles or lane lines.

Neural Networks

Neural networks are a set of algorithm designs based on the structure of human brain to recognize patterns and classify different types of information.

AI Ethics

The term **ethics** refers to a system of **moral principles** and **rules of conduct** that govern an individual's acceptable behavior of actions. It is usually concerned with what is good or what is bad for individuals as well as for the society.

The term **AI ethics** refers to a set of rules which employ widely accepted standards of right and wrong to guide moral conduct in the development of Artificial Intelligence technologies. AI-enabled systems are becoming more capable day-by-day which raises complex ethical issues for the human world.

As every coin has two sides, similarly AI technology also has two sides. On one side, it is expanding in multiple fields rapidly, from self-driving cars to smart appliances. On the other hand, AI system has also raised serious ethical concerns, such as privacy safeguard, threat to employment and problem of biased decision-making.

As large set of real world data is used by AI system for analyzing and learning purpose, it can result in **privacy violations** and **discrimination**. In addition, there are a number of other potential risks of using more of AI.

Let us understand it with the help of an example. **Chatbots** are used by banks for customer support but on the other side, they are the replacement of human workforce, i.e. they are eliminating human jobs. The survival of human beings will be gravely impacted if AI technology replaces human workers at such an accelerating pace.

CONCLUSION

Artificial intelligence has numerous benefits if implemented in day-to-day life by making our work easier and faster. But if AI system is developed with compromised privacy and fed with inaccurate data, then it will cause more harm than good. So, it is the duty of every tech giant or organization to take care of all ethical issues while creating and deploying an AI system.

AI Lab

MICROSOFT COMPUTER VISION

You must have heard the term **facial recognition** many times but do you know which type of AI technique is used for the same? This technology is completely based on **computer vision**. In facial recognition, the digital equipment captures images at high resolution and uses them for classifying and recognizing the visual data that can even surpass the human vision system.

Game Introduction

Microsoft Computer Vision AI service has been developed by Microsoft for the analysis of visual data and extracting information in the form of text.

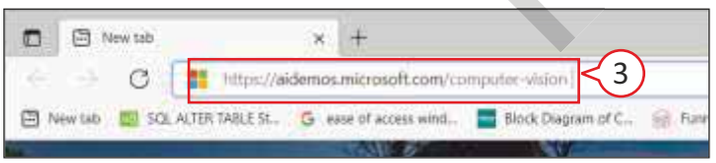
Microsoft has explained four features of Computer Vision:

- Analyze and describe images
- Read handwriting in imagery
- Read text in imagery
- Recognize celebrities and landmarks

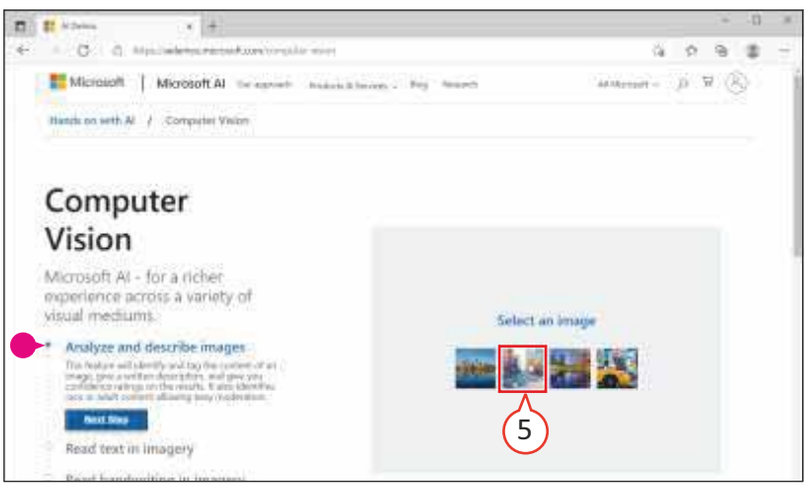
Let us learn more about this service by performing an experiment.

To start this game, you need a computer with Internet connection.

1. Click on **Start** icon to open Start menu.
2. Click on **Microsoft Edge**. **Microsoft Edge** window will appear.



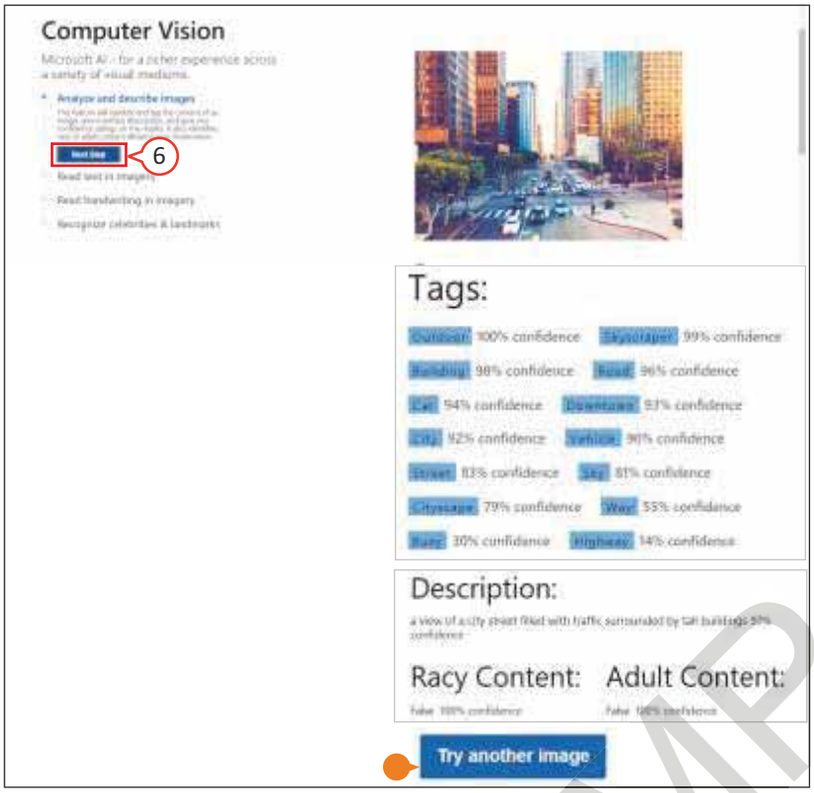
3. Click on address bar and type https://aidemos.microsoft.com/computer-vision
4. Press **Enter** key from the keyboard.



- By default, **Analyze and describe images** feature is selected. This feature identifies and tags the content of an image and gives a written description.

5. Select an image for the analysis and description of the image.

The AI system will interpret the different **Tags** of the selected image. Also, it will display the **Description** of the image along with the possibility of containing **Racial Content**. You will understand it better with the help of the screenshot given below.



- You can click on **Try another image** button to go back and select different image.

6. Click on **Next Step** to see new feature.

- **Read text in imagery** feature appears. This feature detects text for the image.

7. Select an image for reading the text from it.

The AI system will use **Optical Character Recognition (OCR)** to detect text in an image and extract the recognized words into a machine-readable character stream. You will understand it better with the help of the screenshot given below.

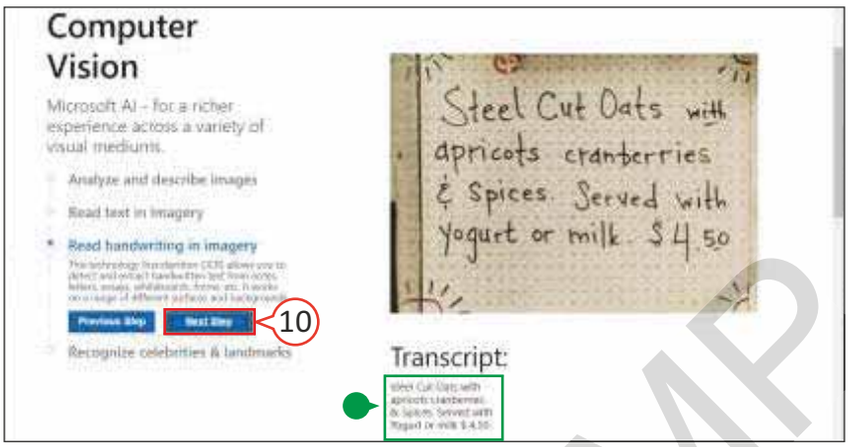
- The text of the image is transcripted below the selected image.

8. Click on **Next Step** to see new feature.

- **Read handwriting in imagery** feature appears. This feature detects the handwritten text.

9. Select an image for reading the handwritten text from it.

The AI system will use **handwritten OCR** technology to detect and extract handwritten text from notes, letters, essays, whiteboards, forms, etc. You will understand it better with the help of the screenshot given below.



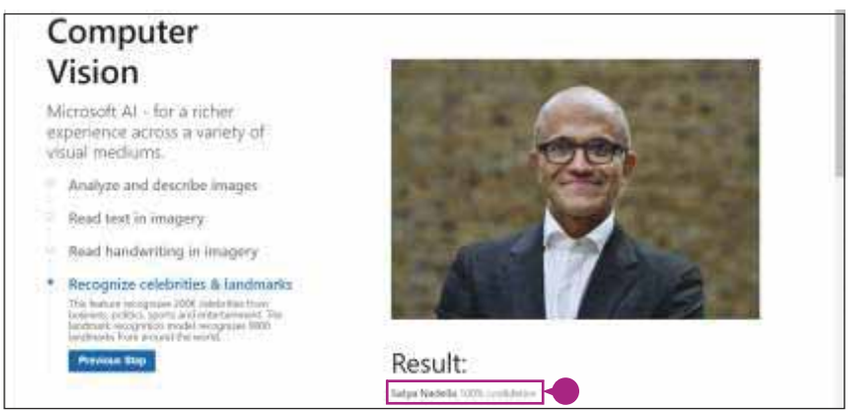
- The handwritten text of the image is transcripted below the selected image.

10. Click on **Next Step** to see new feature.

- **Recognize celebrities & landmark** feature appears. This feature recognizes several celebrities and landmarks of the world.

11. Select an image to be recognized.

The AI system recognizes 200K celebrities and 9000 landmarks from around the world. You will understand it better with the help of the screenshot given below.



- AI recognizes the image and gives the result of the selected image.

Self-Evaluation

CHECKLIST

After reading the chapter, I know these points:

	Agree	Disagree
I know that human intelligence includes learning, reasoning and self-correction.	☐	☐
I know that AI can be categorized into three types– ANI, AGI and ASI.	☐	☐
I know that Artificial Intelligence finds its applications in many fields such as gaming, e-commerce, banking, robotics, healthcare and so on.	☐	☐
I know that the core components of AI-based system are Machine Learning and Deep Learning.	☐	☐
I know that emergence of Artificial Intelligence has also raised certain issues such as privacy safeguard, threat to employment and problem of biased decision-making.	☐	☐

Exercises

A. Tick [✓] the correct answer.

1. ..... is the ability of AI systems to learn, perceive, understand and function completely like humans.
   a. ANI ☐ b. AGI ☐ c. ASI ☐
2. Which of the following is not an e-commerce company?
   a. Amazon ☐ b. Flipkart ☐ c. Google ☐
3. AI powered ..... can assist customers by responding to their doubts and queries.
   a. chatbot ☐ b. robot ☐ c. Alexa ☐
4. Auto-complete suggestion feature in search engine is an example of ..... learning.
   a. machine ☐ b. deep ☐ c. intelligent ☐
5. ..... are set of algorithm designs based on the structure of human brain to recognize patterns.
   a. Neural Networks ☐ b. Machine Learning ☐ c. Chatbots ☐

B. Write 'T' for True and 'F' for False statements.

1. AGI is the ability of computer to perform a single assigned task effectively. ☐
2. AI helps in improving relationships of e-commerce companies with their customers. ☐
3. Machine learning is the subset of deep learning. ☐
4. Organizations have to take care of all ethical issues while creating an AI system. ☐
5. Chatbots are not used by banks for customer support. ☐

C. Fill in the blanks.

1. ..... systems are intelligent enough to perform a single task very well.
2. The field where AI can be applied and utilized are ..... .
3. Gaming industry uses AI technology to improve the ..... aspects of games.
4. Robots powered by AI use real-time updates to sense ..... in their path.

5. ..... is a form of AI that enables systems to learn automatically from experience.

6. AI-enabled systems raise complex ..... issues for the human world.

D. Differentiate between the following.

Machine Learning	Deep Learning
.....	.....
.....	.....
.....	.....

E. Write the full form of the following.

1. AGI: .....

2. ANI: .....

F. Answer in 1 - 2 sentences.

1. What is ASI (Artificial Super Intelligence)?

   .....

   .....

2. List two games that use Artificial Intelligence.

   .....

   .....

3. What do you mean by Artificial Intelligence ethics?

   .....

   .....

4. Name some ethical concerns raised by AI system?

   .....

   .....

G. Answer briefly.

1. Explain the role of AI in gaming industry.

   .....

   .....

   .....

2. What are the future possibilities of ASI?

   .....

   .....

   .....

H. Application-based Question

Enthiran is a 2010 Indian science-fiction movie where a scientist creates a humanoid robot to protect mankind. But things go upside down when it is programmed with human emotions. Can you tell, which type of Artificial Intelligence has been depicted in the movie?

.....

Activity Section

Activity– What AI Can Do

With the help of Internet, search about new developments in AI in the following areas and write 2-3 lines about them.

1. **Healthcare:** .....

   .....

   .....

2. **Education:** .....

   .....

   .....

Lab Activity

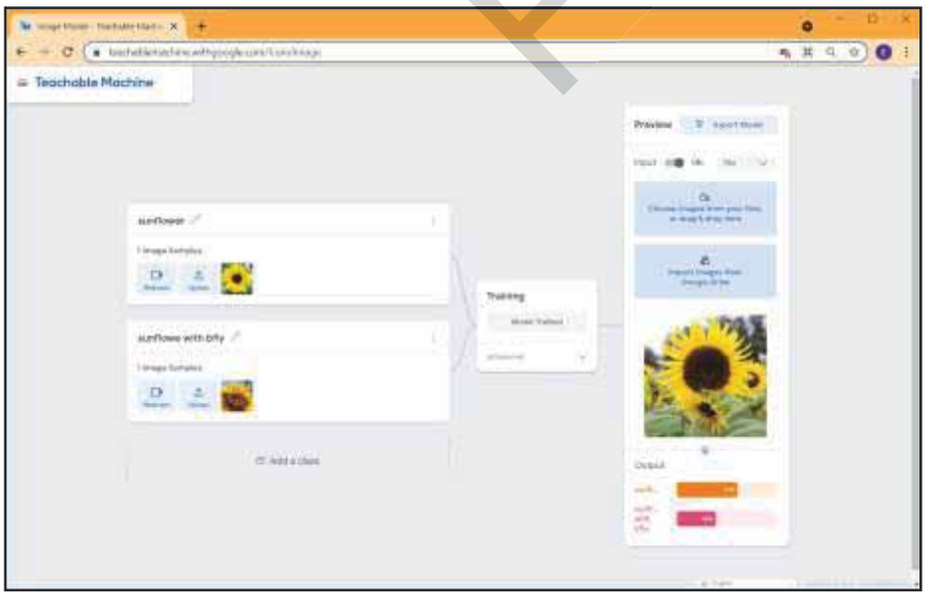
Teachable Machine (Domain – Computer Vision)

Teachable Machine is a web tool that makes it fast and easy to create machine learning models for your project which require no coding. Using this tool, you can train a model to recognize your images, sounds, and poses, then instantly test out and export your model. Let us type and click on the link given below to play and train the model with images.

https://teachablemachine.withgoogle.com/train/image

Skill Formation

This activity will make students learn training and development skills.



a. Download two images:
   i. Sunflower
   ii. Sunflower with butterfly

b. Rename the **Class 1** as **Sunflower** and **Class 2** as **Sunflower with butterfly**.

c. Upload the two downloaded images in their respective classes and click on **Train Model**.

d. Once the model is trained with the given images, select **File** from the drop-down menu of **Preview** section, in order to test your model.

After your model has been tested, you will find that the given image has been identified under its respective category.

Note: *You can also train your model with different images.*

Worksheet-II

Chapters 6 - 10

A. Tick [✓] the correct answer.

1. ..... is a store for apps, songs, books, movies, games and other contents for Android-powered phones and tablets.

   a. Google Play ☐ b. Google Allo ☐ c. Google Docs ☐

2. ..... offers tens of millions of videos as well as movies, movie trailers, commercials, clips from TV shows and much more.

   a. YouTube ☐ b. Google Drive ☐ c. Google Assistant ☐

3. A single person who maintains many blogs is known as a ..... .

   a. blogger ☐ b. user ☐ c. programmer ☐

4. A popular search engine that used to be MSN until it was updated in 2009 is ..... .

   a. Bing ☐ b. Yahoo ☐ c. Dogpile ☐

5. ..... allows cloud providers to pool large-scale IT resources to serve multiple cloud consumers.

   a. Elasticity ☐ b. Service provider ☐ c. Resource pooling ☐

6. ..... gives you 15 GB of free online storage.

   a. Facebook ☐ b. YouTube ☐ c. Google Drive ☐

7. The values operated by the operator are called ..... .

   a. constants ☐ b. operands ☐ c. literals ☐

8. Auto-complete suggestion feature in search engine is an example of ..... learning.

   a. machine ☐ b. deep ☐ c. intelligent ☐

B. Write 'T' for True and 'F' for False statements.

1. Google glass is a high quality video calling app. ☐
2. In Google Nest, photos and videos always have to be backed up and organized manually. ☐
3. Facebook and Instagram are popular social networking sites. ☐
4. We should apply two factor authentication to all online accounts. ☐
5. A public cloud is not proprietary of any organization. ☐
6. AWS is not a service provider of cloud computing. ☐
7. Python is not a case-sensitive language. ☐
8. AI helps in improving relationships of e-commerce companies with their customers. ☐
9. Organizations have to take care of all ethical issues while creating and deploying an AI system. ☐

C. Fill in the blanks.

1. ..... is a time management app developed by Google.
2. For ..... connection, we use a computer, modem, and a regular telephone line.
3. ..... search engine uses crawler-based technology.
4. In ..... , we can keep files, folders, backups and everything important, online.
5. After finishing our work in Google Drive, we must ..... from it.
6. When we type a ..... in IDLE, Python executes it and displays the result.
7. The field where AI can be applied and utilized are ..... .
8. Robots powered by AI use real-time updates to sense ..... in their path.

D. Define the following.

1. Google Pixel
2. Google Play
3. PaaS
4. SaaS
5. Token
6. Comments
7. Data Types
8. ASI
9. Neural Network

E. Differentiate between the following.

1. Google Chrome and Google Chrome OS
2. Dial-up Connection and Broadband Connection
3. Public Cloud and Private Cloud
4. Keywords and Literals
5. ANI and AGI
6. Machine Learning and Deep Learning

F. Answer the following questions.

1. What do you mean by Google Drive?
2. What is the function of Google Translator app?
3. What is blogging?
4. What do you mean by Hotspot?
5. What is use of video conferencing?
6. What is a search engine? Explain some popular search engines.
7. What are the characteristics of Cloud Computing?
8. Define Input() and print() function of Python.
9. What do you mean by identifiers?
10. What are variables?
11. Explain the role of AI in gaming industry.
12. Name some ethical concerns raised by AI system.

Project Work

Project Excel

A. Open Excel and create the following worksheet.

Roll No.	Name	Maths	English	S.St.	Computer	Total	Average
1	Rahul	50	70	89	92		
2	Ashok	80	90	92	80		
3	Kamal	76	80	70	75		
4	Sonali	79	75	80	85		
5	Karina	80	75	85	80		
6	Raju	90	70	75	90		
7	Raman	70	90	80	85		
8	Rashi	69	85	90	75		
Subject-wise Average							
Highest Total			Lowest Total				

- Select the first cell of the **Total** column, and calculate the total marks scored by the first student, using **AutoSum** feature.
- Copy the formula using **AutoFill** handle to calculate the total marks of other students.
- Calculate the average marks of each student.
- Calculate the subject-wise average of the class.
- Using the inbuilt functions, find out the highest total and the lowest total in the class.
- Save the workbook as '**Students Result**' and close Excel.

B. Open Excel and create the following worksheet.

Item Name	Rate	Qty. Sold	Amount	Discount	Discounted Amount	Tax	Net Payable
LCD TV	42000	45		5%			
DVD Player	4500	30		8%			
Video Camera	35000	10		5%			
Microwave	6000	60		10%			
AC	18000	70		15%			

- Calculate the Amount as product of Rate and Qty. Sold.
- Calculate the Discounted Amount after multiplying the Amount with Discount percentage.
- Calculate the Tax as 5% of the (Amount — Discounted Amount).

$$\text{Formula} = (\text{Amount} - \text{Discounted Amount}) \times \frac{5}{100}$$

- Finally, calculate the Net Payable amount as Discounted Amount + Tax.
- Calculate the total bill amount as the sum of all the cell values in the Net Payable field.
- Save the workbook as '**Price List**'.

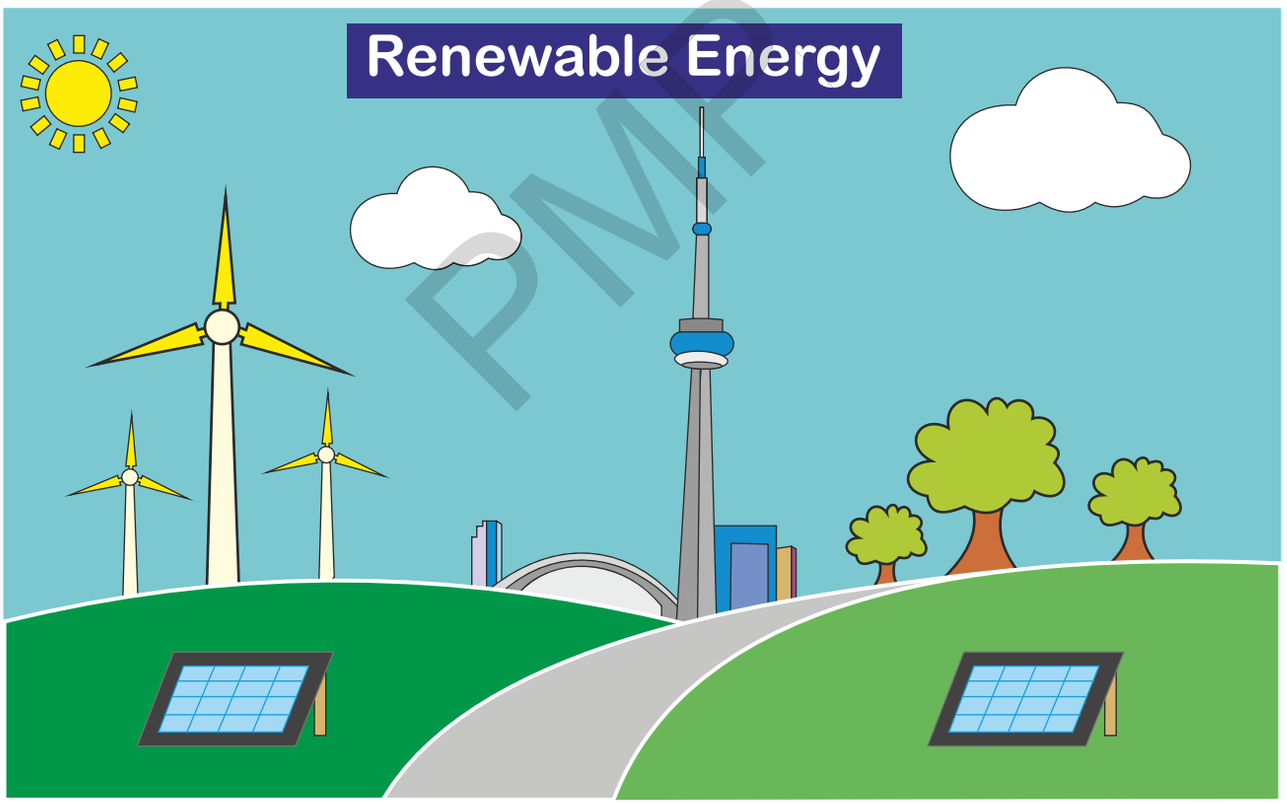
C. Open Excel and create charts for the following worksheet.

Sales Analysis (2019 - 2021)				
Salesman No.	**2019**	**2020**	**2021**	**Sparklines**
S531	34,620	35, 490	38,000	
S532	32, 000	34,500	37,000	
S533	33,000	36,700	37,000	
S534	34,200	35,900	38,000	

- Create Sparklines Chart showing the sales of three years.
- Create a Column Chart showing the sales of three years.
- Create a Pie Chart showing the performance of Salesman S533 for three years.
- Apply formatting on Row Header.

Project Animate

D. Draw the following image in Adobe Animate by using different available tools.



Project Python

E. Create a Python program to calculate simple interest.

si=(p * r * t)/100

where

si=Simple Interest, p=Principal Amount, r=Rate, t=Time

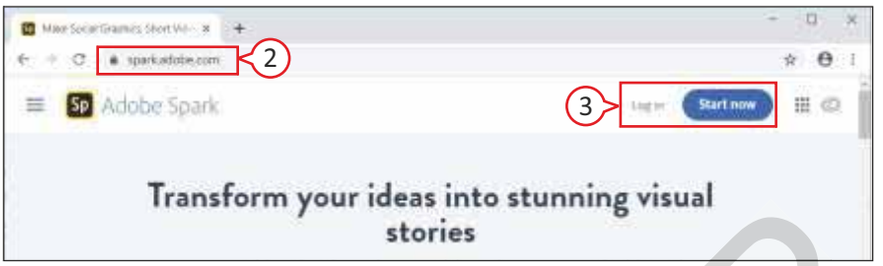
Additional Information

Adobe Spark

Adobe Spark is a free online graphic design tool developed by **Adobe Systems**. It allows both web and mobile users to create three types of content: Post, Page, and Video.

You can use Adobe Spark from your desktop web browser on both **Windows** and **Mac** computers. Adobe Spark can also be used on **Android** and **iOS** devices using the Spark mobile app.

GETTING STARTED WITH ADOBE SPARK

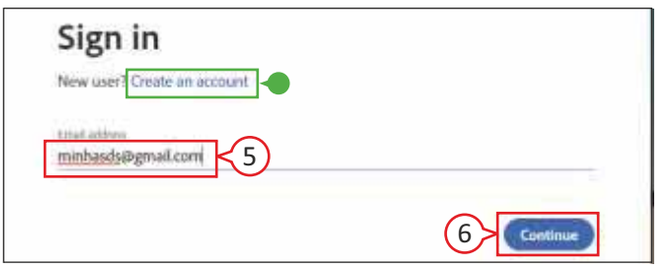


1. Open your web browser.
2. Type spark.adobe.com in the address bar and press the **Enter** key.
3. Click on **Log in** or **Start now** button.

Welcome to Adobe Spark log in options page appears. You can log in with any of the given four options.

4. Click on **Log in** option of your choice.

*In this example, we have selected **Log in with Adobe ID**.*



Sign in page will appear.

- If you are a new user, you can create your account by clicking on **Create an account** button.

5. Type the **Email address**.
6. Click on **Continue**.

Enter your password page will appear.

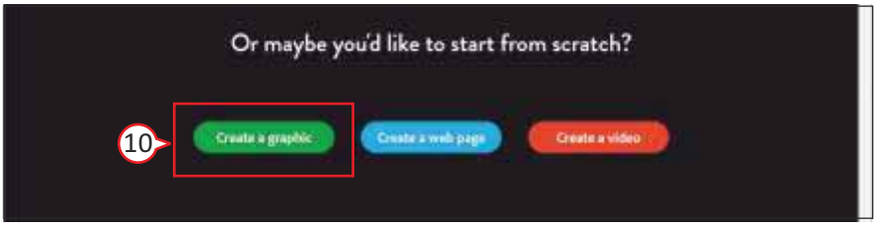
7. Type the **Password**.

Your password will appear in dots.

8. Click on **Continue**.

Once signed in, you will arrive at the starting page with a variety of templates.

- You can click on any template and start working on it or you can work from the scratch.



9. Scroll down to the bottom of the page to start from the scratch.
10. Click on **Create a graphic**.

This welcome page is only available when you first log into your account. Afterward, whenever you will log in, you will be taken directly to the Adobe Spark dashboard.

CREATING A GRAPHIC

You can create professional graphics in Adobe Spark. In this section, we will create the graphic using the dashboard.

1. Click on the **Plus** sign button.

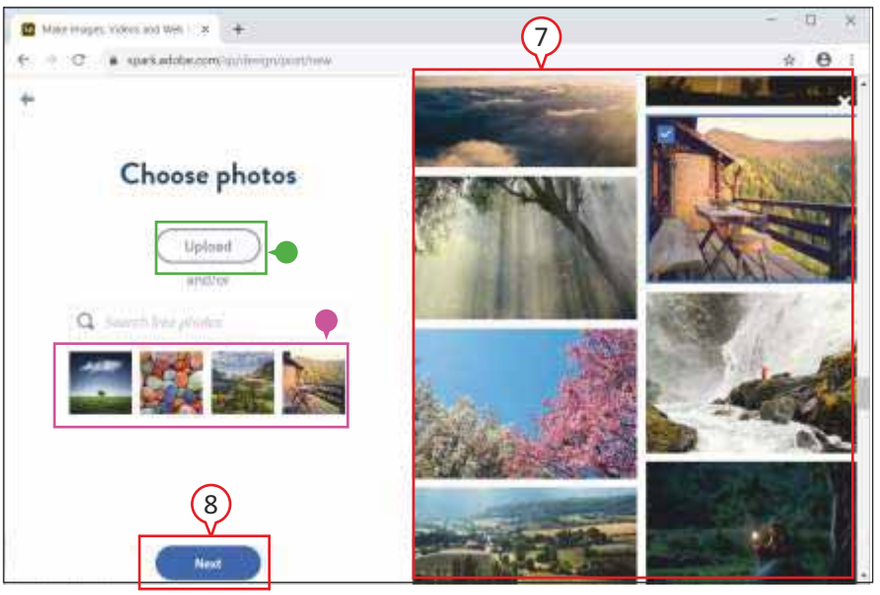
2. Click on **Start from scratch**.

A menu appears.

3. Click on **Graphic**.

Adobe Spark now allows you to select from a variety of size options, ranging from social post, print, social profile, standard, and custom options.

4. Click on **Popular**.
5. Click on **Square** option.
6. Click on **Next**.

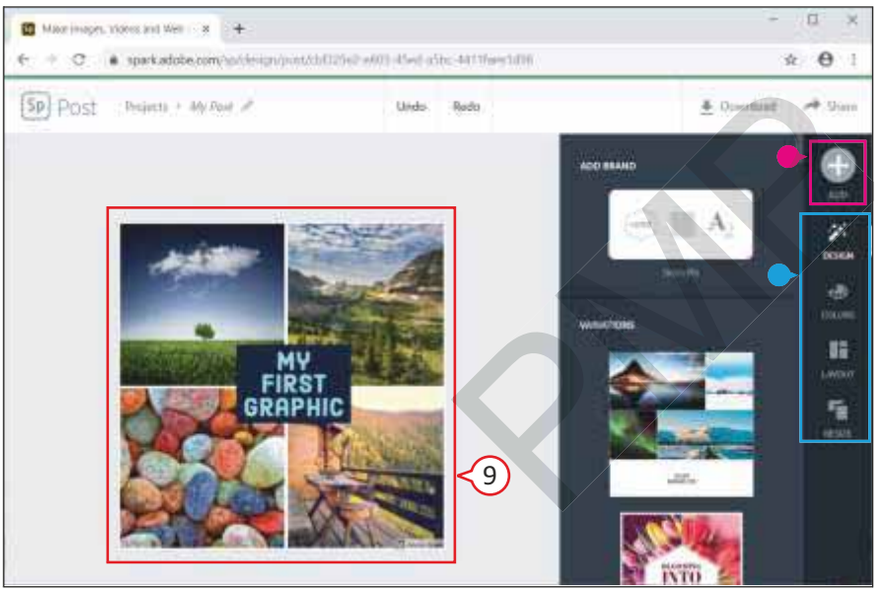


Many beautiful stock photos appears.

7. Click on the photos to put into your post.

- You can also click on **Upload** button to insert your own photos.
- Selected photos appear here.

8. Click on **Next**.

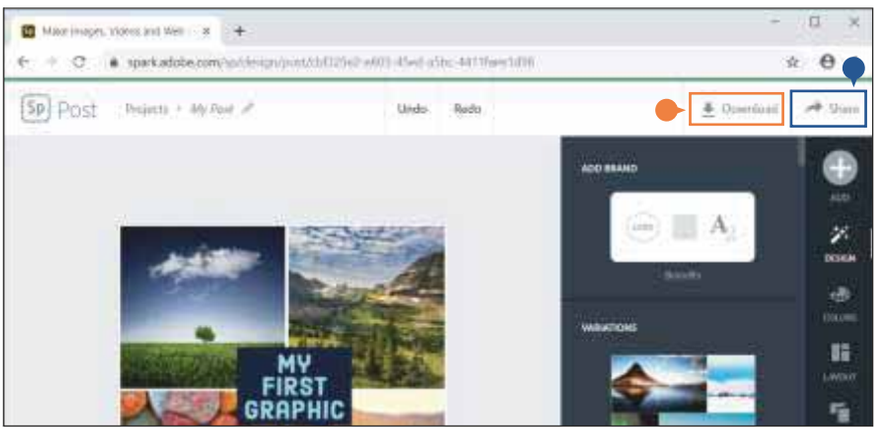


- You can click on **ADD** button to add text, more photos, icons, and logos in your graphic.
- You can also change the design, colors, layout, and size of the project.

9. Finalize your project by using all the above-mentioned tools.

Adobe Spark automatically saves your graphic and places it in the dashboard.

Sharing or Downloading Project



- You can click on **Share** button to share your graphic on Facebook, Twitter, Classroom, E-mail, or to create a link.
- You can click on **Download** button to download a JPG/PNG/PDF format of the project to your computer.

CREATING A WEB PAGE

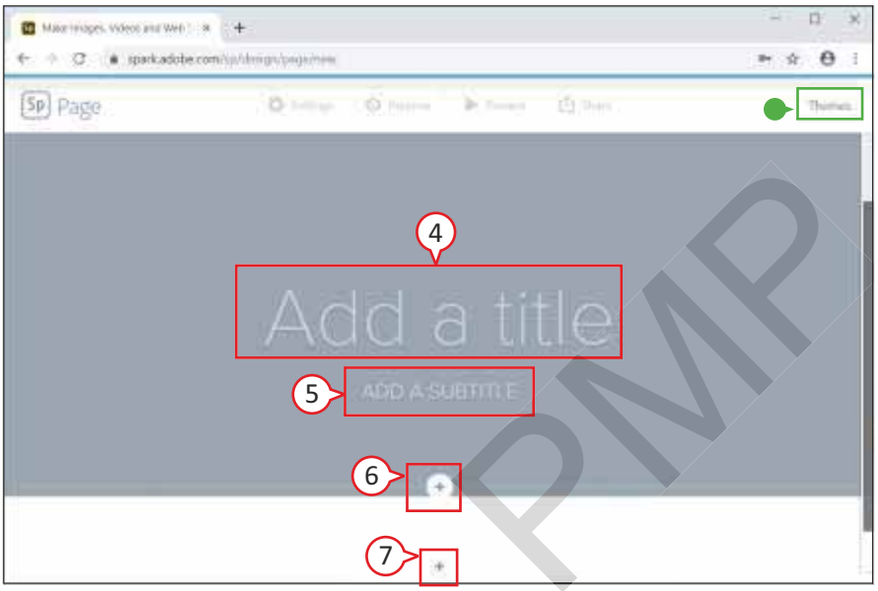
You can create stories, photos, newsletters, etc. and embed them into an existing website.

1. Click on the **Plus** sign button.

2. Click on **Start from scratch**.

A menu appears.

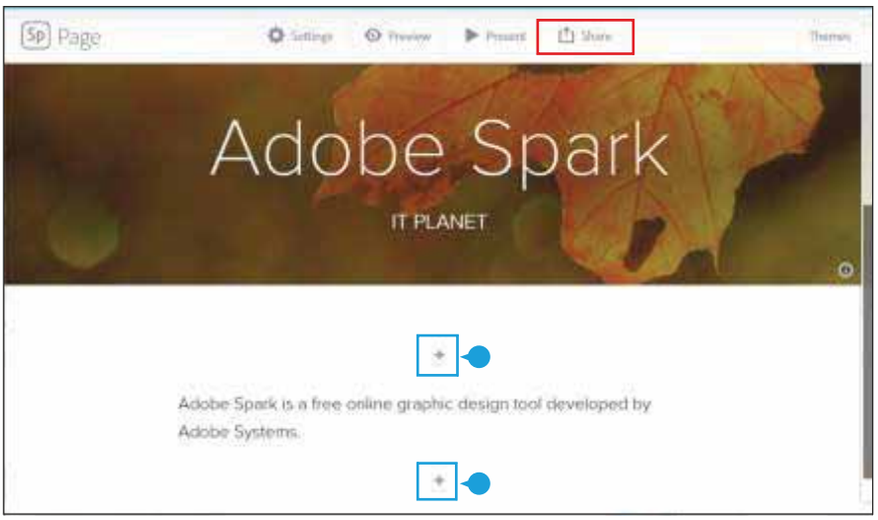
3. Click on **Web Page**.



A blank page appears for you so you can start creating your web page.

4. Click on **Add a title** and type your title.
5. Click on **ADD A SUBTITLE** and type your Subtitle.
6. Click on this **plus sign (+)** and insert a background image.
7. Click on this **plus sign (+)** to add a photo, text, button, video, photo grid, and/or slide show.

- You can change the theme by clicking on the **Themes** button.



- You can keep on adding different elements by simply clicking the plus signs (+) and selecting the type of content.

Adobe Spark will automatically save your page.

After finishing your project, you can click on **Share** button for creating a clickable link for sharing it on Facebook, Twitter, E-mail, or embed it into an existing website.

CREATING A VIDEO

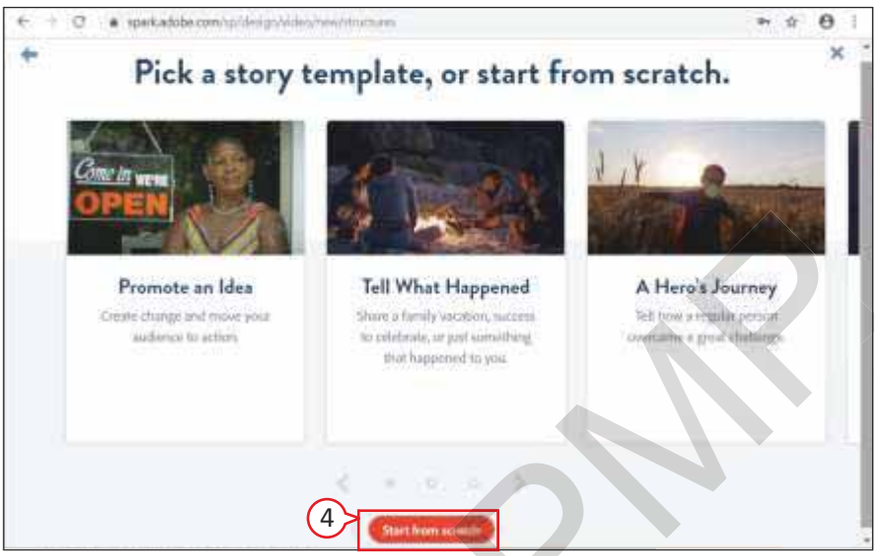
You can create a small video by adding audio/video recording, music, text, and photos.

1. Click on the **Plus** sign button.

2. Click on **Start from scratch**.

   A menu appears.

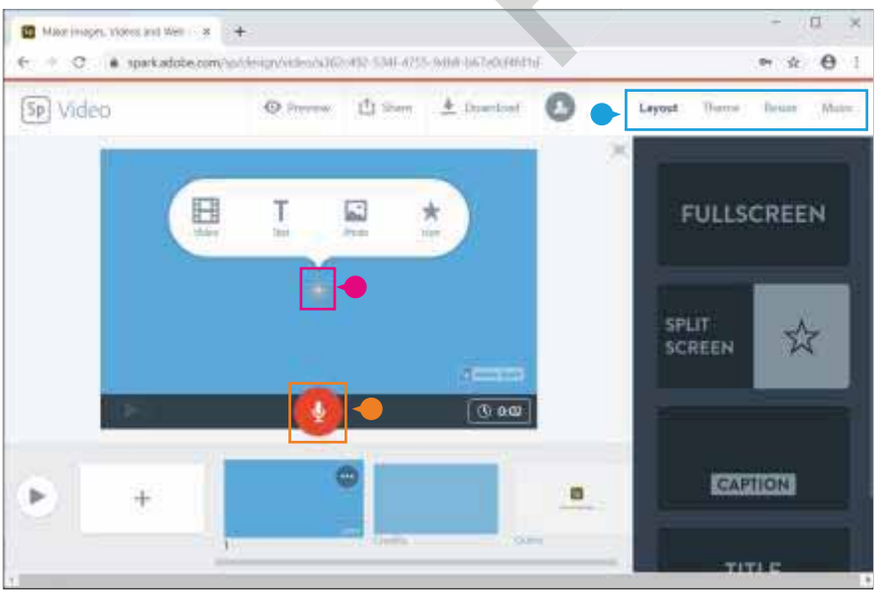
3. Click on **Video**.



You can pick a story template or choose **Start from scratch**.

4. Click on **Start from scratch** option.

A video screen appears that gives you some quick tips to get started.



After watching the tutorial, you will get a blank video screen.

- You can click on the **plus sign (+)** to insert Video, Text, Photo, or Icon.
- You can also record audio by selecting and holding down the **microphone** button.
- You can **customize** your video by using the four design options: **Layout**, **Theme**, **Resize**, and **Music**.

Adobe Spark will automatically **save** your video.

After finishing your project, you can click on **Share** button for creating a **clickable link** to share it on Facebook, Twitter, E-mail, or embed it into an existing website. If you select **Download**, your video will immediately download in an MP4 file format in your computer.

Google Sheets

Google Sheets is a free online spreadsheet application that allows you to organize data and calculation in rows and columns. These rows and columns are collectively called **worksheet**. The intersection of a column and a row is called **cell**. A cell is the basic unit of a worksheet in which you enter data.

The advantages of using Google Sheet are given below:

- It offers a fully functional spreadsheet alternative to the major office suites, such as Microsoft Office and OpenOffice.
- You can access the applications wherever you have access to the Internet and a web browser.
- There are no compatibility issues; everyone is on the same version.
- Documents are stored online, and there is no need to carry any media including USB drive, disc, etc. while you travel.
- The data stored online is very much secure and well-protected.
- Real time editing of spreadsheet can be done by multiple users simultaneously.

STARTING GOOGLE SHEETS

To start Google Sheets, open **Google** web page in the web browser.

1. In the Google page, click on **Sign in**. **Google account** page will appear.
2. Type your **login ID** and the **password.**

Your login ID and password are same as that of your Gmail account.

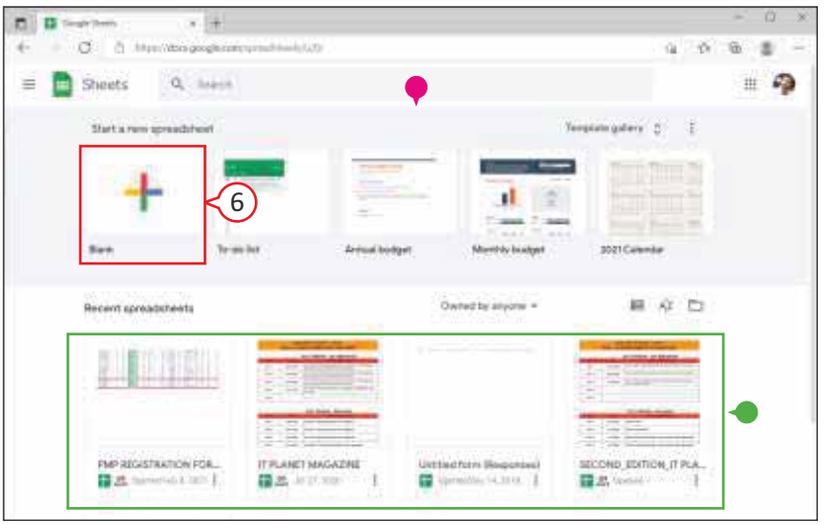
3. Click on **Next** button.

Google page appears again with your login details.

4. Click on **Google Apps** button.

A list of all Google apps appears.

5. Scroll down and click on **Sheets**.



An empty spreadsheet appears on your screen.

Sheets app appears.

- This area shows you **Template gallery**, which includes blank and pre-designed documents. You can select and work on it.

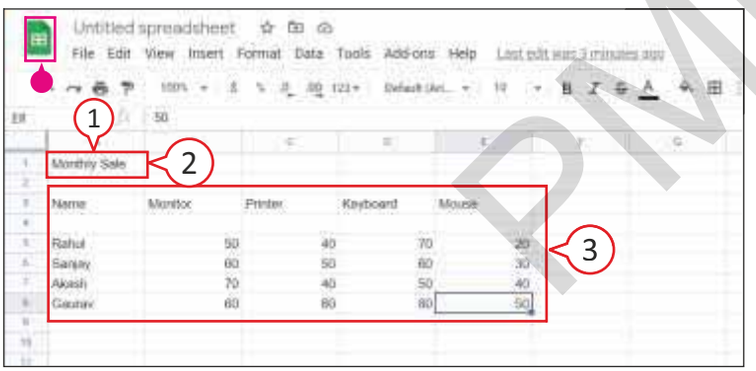
6. Click on **Blank** to start a new spreadsheet.

- This area shows the list of existing spreadsheets.

Working in Google Sheets

ENTERING DATA

Entering data is the first step in creating a worksheet. You can enter data in the form of numbers or text. Sheet automatically **left-aligns** the text and **right-aligns** the numbers in a cell.



1. Click on the cell where you want to enter data.
2. Type the data.

To enter the data and move one cell in any direction, press **Arrow** keys from keyboard.

3. Repeat steps **1** and **2** until you finish entering all your data.

- You can click on Sheets **home** button to return to **Google Sheets** home.

All your data is automatically saved as you type. This spreadsheet will be saved in **Google Drive**. Google Drive is an online storage used to store your data.

When you return to **Google Sheets home**, the new spreadsheet will be displayed in the Spreadsheet listing.

RENAMING THE SPREADSHEET

By default, the name of the blank sheet appears as **Untitled spreadsheet**, but you can rename it and give it a new name.

1. Click inside the **Untitled spreadsheet** box.

The text in the box will be highlighted.

2. Type the desired name in the box.
3. Press the **Enter** key.

The new name will appear in Sheets app.

The new name will also appear in **Google Drive**.

SELECTING CELLS

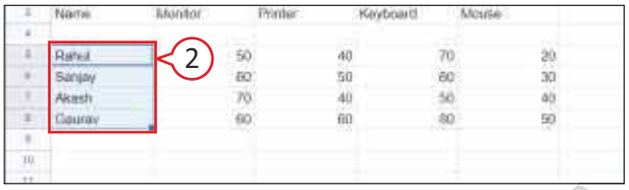
You have to select cells in Sheets to perform tasks like editing, calculating and formatting. Selected cells are highlighted on your screen. Selected group of cells is also called a **range**.

To Select a Cell

1. Click on the cell you want to select.

The cell becomes the active cell and displays a dark border.

To Select a Range



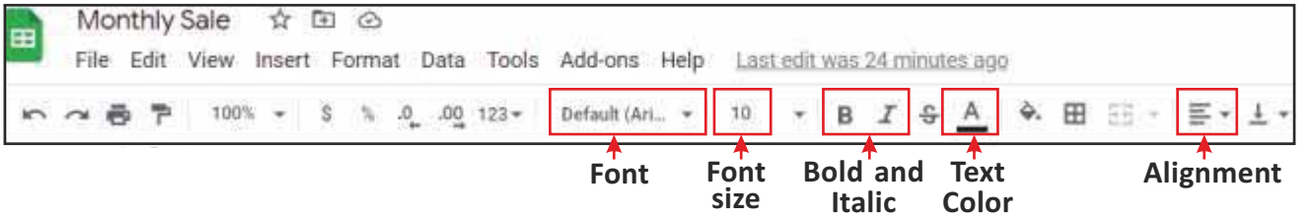
1. Drag the mouse until you highlight all the cells you want to select.
2. Release the mouse to select the desired cell range.

DELETING DATA

1. Select the cells containing the data you want to delete.
2. Press the **Delete** key. *The data in the cells that you have selected disappears.*

FORMATTING DATA

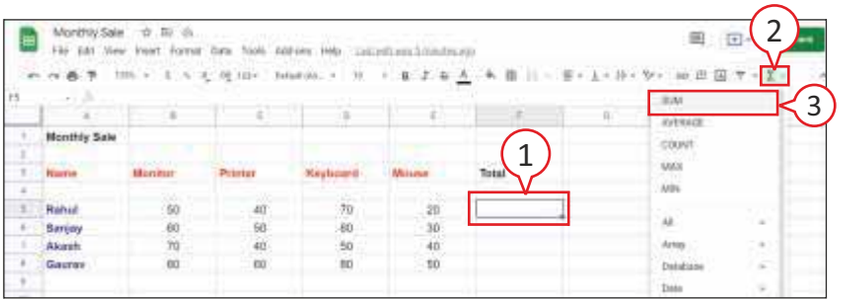
Formatting displays the data in an attractive outlook. You can make your spreadsheet more presentable by applying several formatting features like change **font**, **font size**, **text color**, **bold, italic** and **alignment.**



	A	B	C	D	E
1	Monthly Sale				
2					
3	Name	Monitor	Printer	Keyboard	Mouse
4					
5	Rahul	50	40	70	20
6	Sanjay	60	50	60	30
7	Akash	70	40	50	40
8	Gaurav	60	60	80	50
9					

APPLYING FUNCTIONS

A **function** is a built-in formula that you can use to perform a calculation on the data in your spreadsheet.



1. Select the cell where you want the result of function.
2. Click on **Function** button.
3. Select the desired function from the menu.

In this example, we have selected **SUM** function for adding the cell data.

4. Select the range you want to be added for the sum function.

5. Press the **Enter** key.

- The calculated result will appears in the selected cell.

SHARING YOUR SHEET WITH SPECIFIC PEOPLE

You can share your sheet with your friends, family, etc. through email.

1. Click on **Share** button on the upper right side of the Google Sheets.

Share with others dialog box appears.

2. Type the e-mail ID of the receiver.

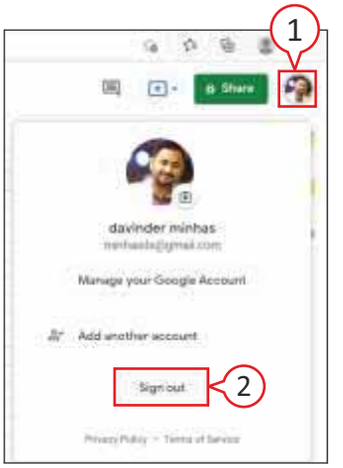
You can share the file to more people by typing their e-mail IDs.

3. Click on **Send**. *The email is sent to the people you shared with.*

SHARING A LINK TO ANYONE

After creating the sheet, you can share it with other people through a link.

1. Click on **Share** button. **Share with others** dialog box appears.
2. At the top right, click on **Get shareable link**. A link of your file appears.
3. Copy and paste the link in an email or any other place you want to share it.



SIGNING OUT FROM GOOGLE SHEETS

After finishing your work in Google Sheets, you must logout from it.

1. Click on **Google Account**. A pop-up window appears.
2. Click on **Sign out** button. The Google Sheets window will close.

NATIONAL CYBER OLYMPIAD
SAMPLE PAPER — SYLLABUS 2021-22

CLASS 6

SYLLABUS

Section – 1 : Verbal and Non-Verbal Reasoning.

Section – 2 : History and Generation of Computers, Types of Computers, MS-Windows 7, MS-Word(Working with Charts and Tables, Using Page Layout tab, Arranging multiple windows of a document), MS-PowerPoint(Creating presentation using Animation, Custom Animation and Transitions, Creating new slides using Slides pane, Outline pane and Slides from Outline, Working with Handouts and Notes Master, Arranging multiple windows of a presentations, Working with Charts and Tables), Internet & E-mail, Introduction to QBasic, Hardware, Software, Input & Output Devices, Memory & Storage Devices, Latest Developments in the field of IT.

Section – 3 : Higher Order Thinking Questions - Syllabus as per Section – 2.

Questions are based on Windows 7 and MS-Office 2010. **Total Questions: 50** **Time: 1 hr.**

PATTERN & MARKING SCHEME			
Section	**(1) Logical Reasoning**	**(2) Computers & IT**	**(3) Achievers Section**
No. of Questions	**10**	**35**	**5**
Marks per Ques.	**1**	**1**	**3**

LOGICAL REASONING

1. Select a figure from the options in which the figure (X) is exactly embedded as one of its parts.

(A)  (B)  (C)  (D) 


Figure (X)

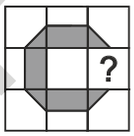
2. The given equations are solved on the basis of a certain system. On the same basis, find out the correct answer from amongst the options. If 12 – 5 = 84, 10 – 5 = 50, 8 – 5 = 24, then 6 – 5 = ?

(A) 11 (B) 30 (C) 6 (D) 1

3. Select a figure from the options which will complete the Fig. (X).

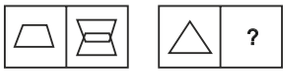
(A)  (B) 

(C)  (D) 

Fig. (X) 

4. There is a certain relationship between figures (i) and (ii). Establish a similar relationship between figures (iii) and (iv) by selecting a figure from the options which will replace the question mark in fig. (iv).

(A)  (B)  (C)  (D) 



(i) (ii) (iii) (iv)

5. If 'Cloud' is coded as 'Rain', 'Rain' is coded as 'Tree', 'Tree' is coded as 'Axe', 'Axe' is coded as 'House' and 'House' is coded as 'Mason', then from which of the following 'Wood' is obtained?

(A) Tree (B) Rain (C) Axe (D) Mason

COMPUTERS AND INFORMATION TECHNOLOGY

6. Which of the following operators will combine two string constants?

(A) - (B) + (C) * (D) ++

7. Windows 7 can run on _____.

(A) 32-bit processors (B) 64- bit processors (C) 128-bit processors (D) Both (A) and (B)

8. In an MS-Word Table, which key is used to move to the next cell?

(A) Tab (B) Function (C) Space (D) Alt

9. The software program that acts as an interface between the user and the www is _____.

(A) E-mail (B) Internet (C) Protocol (D) Web browser

10. Which of the following is a volatile memory ?

(A) ROM (B) RAM (C) EPROM (D) PROM

11. As soon as Windows starts up and you log in, you see the _____.

(A) Notes (B) Folder (C) Desktop (D) Logo

12. To switch between the running applications, _____ in Windows 7.

(A) Press F1 (B) Press ALT + F4 (C) Press TAB (D) Press and hold down ALT and press TAB

13. What is the difference between Volatile and Non-Volatile Memory?

(A) They are both same types of memory.

(B) Volatile memory loses its contents when there is no electricity while non-volatile memory retains its content with or without electricity.

(C) Non-volatile memory loses its contents when there is no electricity while volatile memory retains its content with or without electricity.

(D) None of these

ACHIEVERS SECTION

14. What would be the output of given QBASIC code if user enters the value of A = 1 and B = 5?

```
CLS
INPUT A
INPUT B
SUM = A + B
Avg = SUM/2
PRINT "SUM="; SUM
PRINT "Average="; Avg
```

(A) SUM = 6
Average = 3

(B) A = 1
B = 5
SUM = 7
Average = 3

(C) A = 1
B = 5
SUM = 6
Average = 3

(D) SUM = 6
Avg = 3

15. Transition effect deals with the entrance and exit of a slide in a slide show. Which of the following categories of Transitions is depicted in the given image of MS-PowerPoint 2010?


Dissolve


Checkerboard


Blinds


Clock

(A) Subtle (B) Exciting (C) Dynamic Content (D) Static Content

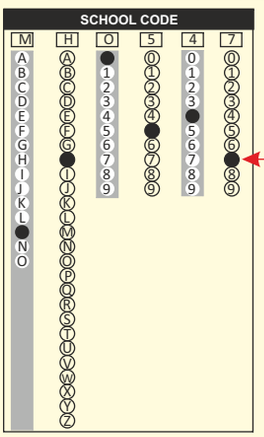
SAMPLE ANSWER SHEET

1. Name: If your name is SAURAV GUPTA. then you should write as follows:

S	A	U	R	A	V		G	U	P	T	A												

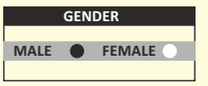
2. Father's Name: If your father's name is DINESH GUPTA then you should write as follows:

D	I	N	E	S	H		G	U	P	T	A												



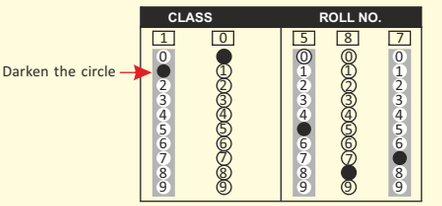
3. SCHOOL CODE
Write your school code i.e. if your school code is MH0547 darken as follows:

6. GENDER
If you are a boy then darken **Male** circle



4. CLASS
If you are in Class 10 then you should darken as follows:

5. ROLL NO.
If your roll no. is 587, then you should write and darken the circles as follows:



7. If your choice for Answer 1 is C, then you should darken the circle as follows: 1. Ⓐ Ⓑ ● Ⓓ

MARK YOUR ANSWERS WITH HB PENCIL/BALL POINT PEN (BLUE/BLACK)

National Cyber Olympiad

1. Ⓐ Ⓑ Ⓒ Ⓓ	**4.** Ⓐ Ⓑ Ⓒ Ⓓ	**7.** Ⓐ Ⓑ Ⓒ Ⓓ	**10.** Ⓐ Ⓑ Ⓒ Ⓓ	**13.** Ⓐ Ⓑ Ⓒ Ⓓ
2. Ⓐ Ⓑ Ⓒ Ⓓ	**5.** Ⓐ Ⓑ Ⓒ Ⓓ	**8.** Ⓐ Ⓑ Ⓒ Ⓓ	**11.** Ⓐ Ⓑ Ⓒ Ⓓ	**14.** Ⓐ Ⓑ Ⓒ Ⓓ
3. Ⓐ Ⓑ Ⓒ Ⓓ	**6.** Ⓐ Ⓑ Ⓒ Ⓓ	**9.** Ⓐ Ⓑ Ⓒ Ⓓ	**12.** Ⓐ Ⓑ Ⓒ Ⓓ	**15.** Ⓐ Ⓑ Ⓒ Ⓓ

ANSWERS

1. (A)	2. (C)	3. (C)	4. (C)	5. (C)	6. (B)	7. (D)	8. (A)	9. (D)	10. (B)
11. (C)	12. (D)	13. (B)	14. (A)	15. (B)					