Be Future Ready

IT Planet®

7

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 Number System

OBJECTIVES

After completing this chapter, you will be able to:

- Understand number system and identify its types.
- Understand conversion of one number system into another.
- Understand bits and bytes.

A computer is a machine that can do calculations very fast. But do you know how? In this chapter, you will learn how a computer calculates.

Introduction

A computer is a man-made electronic machine. It does not understand the language people use to communicate with each other.

Computers recognize only two discrete states: **ON** and **OFF**. This is because computers are electronic devices powered by electricity, which also has only two states: **ON** and **OFF**.
The two digits, **zero** and **one**, can easily represent these two states. The digit, zero (0) represents the electronic state of OFF (absence of an electronic charge). The digit one (1) represents the electronic state of ON (presence of an electronic charge).

BINARY DIGIT (BIT)	ELECTRONIC CHARGE	ELECTRONIC STATE
1		ON
0		OFF

We generally use the decimal number system for counting. A computer uses a binary system because it understands only two states. The **binary system** is a number system that has just two unique digits, **0** and **1**, called **bits**. A **bit** (short for **binary digit**) is the smallest unit of data that a computer represents. When eight bits are grouped together as a unit, they form a **byte**.

Number System

Computer is an electronic machine that stores data in coded form or machine readable form. Therefore, characters have to be represented in the form of electronic pulses. Two pulses that are used to represent basic numbers **(0 and 1)** are absence of pulse (no current) and presence of pulse (current). Absence of pulse represents '0', and presence of pulse represents '1'. Before going into the details, it is essential to have a basic understanding of the number system.

Number system is a way to represent numbers in a computer system. Every value that you are giving to/getting from computer memory has a defined number system.

There are two types of number systems:

1. Non-positional number system
2. Positional number system

NON-POSITIONAL NUMBER SYSTEM

In the past, human beings counted on fingers. For counting beyond ten, they used stones, pebbles, or sticks to indicate values. This method of counting uses an additive approach or non-positional number system. In this system, we have symbols such as I for 1, II for 2, III for 3, IIII for 4, IIIII for 5, etc. Each symbol represents the same value regardless of its position in a number and to find the value of a number, one has to count the number of symbols present in the number. It is very difficult to perform arithmetic calculations with such a number system.

POSITIONAL NUMBER SYSTEM

In a positional number system, there are some symbols called **digits**. These symbols represent different values, depending on the position they occupy in a number. The computer can understand only positional number system. When we type some letters or words, the computer translates them into numbers, as it understands only numbers.

There are four positional number systems. These are:

- Decimal number system
- Octal number system
- Binary number system
- Hexadecimal number system

Decimal Number System

The **decimal number system** is a **base 10** number system (**deci** means **ten**). The base of a number system indicates how many symbols it uses. The decimal number system uses 10 symbols: 0 to 9. Each of the symbols in the number system has a value associated with it. For example, 3 represents a quantity of three, and 5 represents a quantity of five.

The decimal number system is also a positional number system. This means that in a number such as 123, each position in the number has a value associated with it. When you look at the decimal number 123, digit 3 is in the ones or units position and represents three ones (3 x 1); digit 2 is in the tens position and represents two tens (2 x 10); and digit 1 is in the hundreds position and represents one hundred (1 x 100).

The number 123 is the sum of the values in each position of the number (100 + 20 + 3 = 123).

$$123 = 1 \times 100 + 2 \times 10 + 3 \times 1$$
$$= 1 \times 10^2 + 2 \times 10^1 + 3 \times 10^0$$

Binary Number System

As previously discussed, **binary** is a **base 2** number system (**bi** means **two**), and the symbols it uses are **0** and **1**. Just as each position in a decimal number has a place value associated with it, so does each position in a binary number. In binary, the place values, moving from right to left, are successive powers of two (2^0, 2^1, 2^2, 2^3 or 1, 2, 4, 8). To construct a binary number, place **ones** in the positions where the corresponding values add up to the quantity you want to represent and place **zeros** in the other positions. For example, in a four-digit binary number, the binary place values are (from right to left) 1, 2, 4, and 8.

The binary number 1001 has **ones** in the positions for the values 1 and 8, and **zeros** in the positions for 2 and 4. Therefore, the quantity represented by binary number 1001 is 9 (8 + 0 + 0 + 1).

$$1001 = 1 \times 2^3 + 0 \times 2^2 + 0 \times 2^1 + 1 \times 2^0$$
$$= 8 + 0 + 0 + 1$$
$$= 9$$

A **BIT** refers to a **Binary Digit** in the binary number system.

The table given below shows the binary equivalent of some decimal numbers.

Decimal	Binary
0	0000
1	0001
2	0010
3	0011
4	0100
5	0101
6	0110
7	0111
8	1000

Decimal	Binary
9	1001
10	1010
11	1011
12	1100
13	1101
14	1110
15	1111
100	1100100
512	1000000000

Octal Number System

In an **octal number system**, the **base** is **8**. Hence, there are only eight symbols or digits: 0, 1, 2, 3, 4, 5, 6, and 7 (8 and 9 do not exist in this system). The largest single digit is 7 (one less than the base 8). Each position in an octal number represents a power of the **base (8)**.

For example, the binary representation for decimal $(74)_{10}$ is $(1001010)_2$, and the octal representation is $(112)_8$.

$$(112)_8 = 1 \times 8^2 + 1 \times 8^1 + 2 \times 8^0$$
$$= (1 \times 64) + (1 \times 8) + (2 \times 1)$$
$$= 64 + 8 + 2$$
$$= 74$$

So, the decimal equivalent of octal number $(112)_8$ is equal to $(74)_{10}$. Now, since there are only 8 digits (0 to 7) in the octal number system, **3 bits** are sufficient to represent an octal number in a binary system.

The table given below displays that in an octal format, each digit represents three binary digits.

Octal	Binary
0	000
1	001
2	010
3	011
4	100
5	101
6	110
7	111

With this table, it is easy to convert numbers between octal and binary. For example,

3 **7** = $(37)_8$

011 111 = $(011\ 111)_2$

5 **1** = $(51)_8$

101 001 = $(101\ 001)_2$

Difference between Positional and Non-positional Number System

The **positional system** depends on the position where the numbers are placed in the sequence. The **non-positional system** does not depend on the position of the number, and symbols are used to represent the number.

Hexadecimal Number System

The **hexadecimal number system** uses **16** digits including 6 letters of alphabet (**hex** means **six**). These include the symbols **0** to **9** and **A** to **F**. The primary reasons why the hexadecimal number system is used with computers are given below:

- It can represent binary values in a more compact and readable form, and
- The conversion between the binary and the hexadecimal number systems is very efficient.

An eight-digit binary number (a byte) can be represented by a two-digit hexadecimal number.

For example, the decimal number 79, whose binary representation is 01001111, can be written as 4F in hexadecimal (4 = 0100, F = 1111).

Example: $(1FF)_{16} = 1 \times 16^2 + F \times 16^1 + F \times 16^0$

$= 1 \times 256 + 15 \times 16 + 15 \times 1$

$= 256 + 240 + 15$

$= 511$

Thus, the decimal equivalent of hexadecimal number $(1FF)_{16}$ is $(511)_{10}$. Since, there are only 16 digits in the hexadecimal number system, **4 bits** are sufficient to represent any hexadecimal number in binary.

The table given below displays the binary and decimal equivalents of some hexadecimal

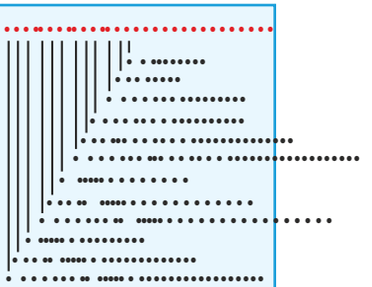
Hexadecimal	Binary	Decimal
0	0000	0
1	0001	1
2	0010	2
3	0011	3
4	0100	4
5	0101	5
6	0110	6
7	0111	7
8	1000	8
9	1001	9
A	1010	10
B	1011	11
C	1100	12
D	1101	13
E	1110	14
F	1111	15

The hexadecimal number 4B3A translates to the following binary number:

4	B	3	A
↓	↓	↓	↓
0100	1011	0011	1010

Difference between International and Indian Number System

In international number system, the comma is placed after every 3 digits from the right; each group has different names that include trillion, billion, million, thousand, and ones.



But in Indian number system, the comma is placed after every 2 digits from the right, except the first 3 digits; each group has different names, such as crore, lakh, thousand, and ones.

Conversion of Number Systems

In this section, we will discuss about the conversion of one number system to another.

DECIMAL TO BINARY CONVERSION

To convert a decimal number to its binary equivalent, follow the given steps:

Step 1: Divide the decimal number by the value of the new base.

Step 2: Record the remainder from Step 1 as the rightmost digit (least significant digit) of the new base number.

Step 3: Divide the quotient of the previous division by the new base.

Step 4: Record the remainder from Step 3 as the next digit (to the left) of the new base number.

Repeat Steps 3 and 4, recording remainders from right to left, until the quotient becomes zero or less than 2 in Step 3.

Example: Convert $(42)_{10}$ to its binary equivalent.

2	42	→ 0
2	21	→ 1
2	10	→ 0
2	5	→ 1
2	2	→ 0
	1	

Arranging the sequence of remainders from the bottom to upwards gives the binary number $(101010)_2$.

BINARY TO DECIMAL CONVERSION

To convert from binary to decimal equivalent, follow the given steps:

Step 1: Note down the place value of each digit.

Step 2: Multiply each digit with its place value.

Step 3: Add the product to get back the number.

Example: Convert $(1001010)_2$ to its decimal equivalent.

$$1001010 = 1 \times 2^6 + 0 \times 2^5 + 0 \times 2^4 + 1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 0 \times 2^0$$
$$= 64 + 0 + 0 + 8 + 0 + 2 + 0$$
$$= 74 \quad \text{(Therefore, the decimal value is 74.)}$$

DECIMAL TO OCTAL CONVERSION

The conversion of decimal to octal is similar to the conversion of decimal to binary. The only difference is the base. In this number system, we have to divide the decimal number using 8.

Example: Convert $(2568)_{10}$ to its octal equivalent.

8	2568	→ 0
8	321	→ 1
8	40	→ 0
	5	

Hence, $(2568)_{10} = (5010)_8$

Do You Know?

The zero power of any value is always equivalent to 1.

DECIMAL TO HEXADECIMAL CONVERSION

The conversion of decimal to hexadecimal is similar to the conversion of decimal to binary and decimal to octal. The only difference is the base. In this number system, we have to divide the decimal number using 16.

Example: Convert $(1000)_{10}$ to its hexadecimal equivalent.

16	1000 →	8
16	62 →	14
	3	

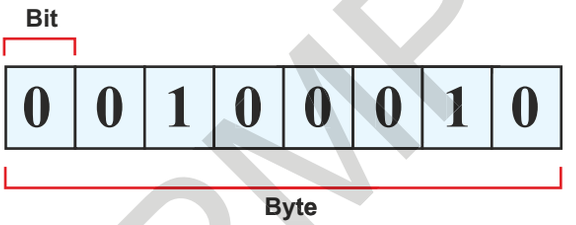
(3 14 8)
↓
E

Hence, $(1000)_{10} = (3E8)_{16}$

Bits and Bytes

BIT (BINARY DIGIT)

The smallest unit in computer processing is called a **bit**. It is a unit of data that can be either of the two conditions, **0** or **1.** Groups of bits make up storage units in the computer, called **characters**, **bytes**, or **words**, which are manipulated as a group. Each of the **0** and **1** in the following diagram indicates a bit.

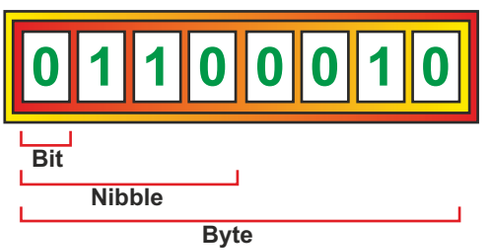


BYTE (BINARY TERM)

A group of 8 bits is called a **byte**. Evidently, many such groups can be made in the binary system. 2^8 or 256 bytes are possible and they can represent 256 characters. Clearly, these 256 bytes are enough to represent 26 letters of the alphabet (both in capital and small forms), numbers from 0 to 9, punctuation marks, currency signs, and some special symbols. These 256 bytes are represented by different binary numerals starting from 00000000 and ending with 11111111.

NIBBLE

Half a byte is called a **nibble**. A nibble is a collection of bits on a 4-bit boundary.



Update Your Knowledge

- If the last digit of a binary number is 1, the number is odd; if it is 0, the number is even.
  Example: 1101 represents an odd number (13); 10010 represents an even number (18).
- In a base-n representation of a number, no digit exceeds n-1.
- Every digit of a base 2 number must be 0 or 1.

Self-Evaluation

After reading the chapter, I know these points:

	CHECKLIST	
	Agree	Disagree
⊙ I know that a computer recognizes only two discrete states: ON and OFF.	☐	☐
⊙ I know that binary system has two unique digits, 0 and 1, called bits.	☐	☐
⊙ I know that number system has two categories—non-positional and positional.	☐	☐
⊙ I know that non-positional number system represents the same value, regardless of its numerical position.	☐	☐
⊙ I know that positional number system can be represented by some symbols called digits.	☐	☐
⊙ I know that main positional number systems are Decimal, Binary, Octal, and Hexadecimal.	☐	☐

Exercises

A. Tick [✓] the correct answer.

1. Computers recognize only two discrete states, i.e. ..... .
   a. Yes and No ☐ b. Right and Wrong ☐ c. On and Off ☐
2. The digit 'zero' represents the electronic state ..... .
   a. on ☐ b. off ☐ c. none ☐
3. The digits used in octal number system are from ..... .
   a. 0 to 9 ☐ b. 0 and 1 ☐ c. 0 to 7 ☐
4. The base 16 number system is ..... .
   a. hexadecimal ☐ b. octal ☐ c. binary ☐
5. The smallest unit in computer processing is called a ..... .
   a. byte ☐ b. bit ☐ c. nibble ☐

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

1. The decimal number system has just two unique digits, 0 and 1. ☐
2. Binary number system has base 2. ☐
3. A byte is used to represent a single character in the computer. ☐
4. A group of 8 bits is called kilobyte. ☐
5. A nibble is a collection of 5 bits. ☐

C. Fill in the blanks.

1. In a positional number system, there are some symbols called ..... .
2. The ..... number system represents numeric values using two symbols, i.e. 0 and 1.
3. The decimal number system has ..... as its base.
4. The octal number system has ..... as its base.
5. The hexadecimal number system includes the symbols ..... and ..... .

D. Define the following.

1. Bit: .....

   .....

2. Byte: .....

   .....

3. Nibble: .....

   .....

E. Differentiate between the following.

1. Binary Number System

   .....

   .....

   .....

   .....

   Decimal Number System

   .....

   .....

   .....

   .....

2. Octal Number System

   .....

   .....

   .....

   .....

   Hexadecimal Number System

   .....

   .....

   .....

   .....

F. Answer briefly.

1. What do you mean by number system? Mention its types.

   .....

   .....

   .....

2. Write the steps to convert from binary to decimal equivalent.

   .....

   .....

   .....

G. Application-based Question

Anjali's teacher has asked her to tell which method was used by humans in the past for counting beyond ten. Help her answer the same.

.....

Group Discussion

Discuss the topic – 'The World of Computer is Based on the Multiples of 1s and 0s'.

Online Link

To learn more about working of number system, visit the website:

https://www.includehelp.com/computer-number-systems.aspx

Activity Section

Activity Conversion

Convert the following.

1. Decimal to Binary

i. 345

ii. 113

iii. 145

iv. 287

2. Binary to Decimal

i. 111

ii. 1101

3. Decimal to Octal

i. 45

ii. 70

4. Decimal to Hexadecimal

i. 22

ii. 330

Lab Activity

Make a presentation on "Number System".

Follow these instructions:

a. Make a folder **'Lab Activity'** in any drive.

b. Make a presentation consisting of five slides which will include Introduction, decimal number system, binary number system, octal number system and hexadecimal number system.

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

d. Save the presentation as **'Number System'** in the main folder **'Lab Activity'** and run it.

Skill Formation

This activity enhances the organizational and presentation skills of the students.

Discover More

ASCII Code

The combinations of 0s and 1s that represent uppercase and lowercase letters, numbers, and special symbols are defined by patterns called **coding scheme**. **ASCII**, which stands for **American Standard Code for Information Interchange**, is the most widely used coding scheme to represent the letters, numbers, symbols and some of the commands used by a computer. The ASCII code gives a **binary code** of eight numbers to each character or command. The binary code controls the switches that send a signal to the computer. For example, the upper case letter **S** sends the binary code 01010011.

How a Letter is Converted into Binary Form and Vice Versa?

Step 1

A user presses the capital letter **S** on the keyboard, which in turn creates a special code, called a scan code, for the capital letter **S**.

Step 2

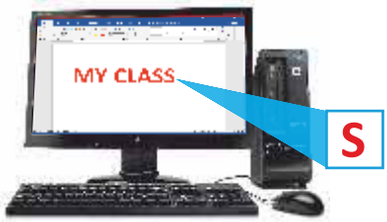
The scan code for the capital letter **S** is sent to the electronic circuitry in the computer.

Step 3

The electronic circuitry in the computer converts the scan code for the capital letter **S** into its ASCII binary code (01010011) and stores it in memory for processing.

Step 4

After processing, the binary code for the capital letter **S** is converted into an image and displayed on the monitor.



2 Computer Virus

OBJECTIVES

After completing this chapter, you will be able to:

- Understand computer virus and its types.
- Identify different types of viruses.
- Learn about antivirus program and its features.
- Learn to take precautions against computer virus.

Computer Virus

VIRUS stands for **V**ital **I**nformation **R**esources **U**nder **S**eize. Viruses are programs which are created deliberately to damage critical information and data. A virus can badly affect or infect your computer without your knowledge and can alter its working. Once a virus is in your computer, your files and operating system may get damaged.

Computer viruses do not generate by chance. The programmer of a virus, known as a **virus author**, intentionally writes a virus program with a motive to damage data or programs residing in the computer. Writing a virus program usually requires significant programming skills.

Very few viruses are harmless. They display only a simple message. But most of the viruses are very harmful. They destroy data or even the entire hard disk. Viruses attach themselves to program files and move with them from disk to disk. Some viruses attach themselves to a file and lie dormant. But when a certain **date** or **event** occurs, they get triggered and become active. One such notorious virus is called **Friday the 13th Virus**. It is also called **Jerusalem Virus** because it was first discovered at the University of Jerusalem in 1987. It gets activated every Friday that occurs on the 13th of a month.

TYPES OF VIRUSES

File Infector: This is the most common type of virus. It adds virus code to the regular programming code within the program files. So, when the infected program is executed, other program files also get infected. This virus can cause irreversible damage to files by permanently destroying the content.

Boot Sector Virus: This virus attaches itself to the boot sector of the disk. This sector is the part of the disk where start-up instructions and the file-allocation tables are kept. This sector is read and loaded into the memory every time the disk is booted. Evidently, this virus is also very dangerous.

Executable File Virus: This virus stores itself in an executable file and infects other files each time the file is run or executed.

Macro Virus: This virus infects files that are created using certain applications or programs that contain macros. These mini-programs make it possible to automate series of operations so that they are performed as a single action, thereby saving the user from having to carry them out one-by-one.

EXAMPLES OF VIRUSES

Worm: **Worm** is a harmless virus that simply **replicates** itself. But in the long run, it takes over all the resources of the computer system, and eventually the computer becomes useless. Worms have the capacity to travel from system to system very easily.

Trojan Horse: **Trojan horse**, according to Greek mythology, was a huge hollow wooden horse constructed by the Greeks that hid a selected force of men inside. They used this horse to gain friendly entrance into Troy during the Trojan War.

In computing, Trojan horse virus comes as a friendly program (as a game, application, etc.); however, it is very **dangerous** as it destroys all the data on your system. Trojan horse does not replicate itself but it can be very destructive. It can be spread through a number of ways, but the common means of infection is attachment through mail.

Rootkit: **Rootkit** is a program that hides in a computer and allows someone from a remote location to take full control of the computer. Once the Rootkit is installed, the Rootkit author can execute programs, change settings, monitor activities, and access files from a remote computer.

Sweeper: **Sweeper,** also known as **rogue**, is a fake antivirus. It is designed in such a way that it looks like an antivirus software but, in reality, it is a virus. People download it unintentionally, and the sweeper virus enters in their computer and change system files, browsing activity, etc.

Sleeper: The **sleeper** virus is known to steal your personal and financial information. This virus is programmed to target large networks only. This virus has infected millions of machines so far.

Alabama: **Alabama** is a computer virus which infects **executable (.exe)** files. It is loaded into the memory by executing an infected program and then affects the computer runtime operation, corrupts the program or overlay files. The virus manipulates the File Allocation Table and swaps file names so that files get lost slowly.

Logic Bomb: A **logic bomb** is a program, or portion of a program, which lies dormant until a specific piece of program logic is activated. In this way, a logic bomb is very analogous to a real-world landmine. The most common activator for a logic bomb is a particular date. The logic bomb checks the system date and does nothing until a pre-programmed date and time is reached. At that point, the logic bomb activates and executes its code.

Christmas Virus: **Christmas virus** is an email worm that spreads via email as a small, executable file with a variety of names and extensions. The worm is propagated by copying itself onto local and networked drives, as well as emailing itself as an attachment to any address. It could breed from the address book and files stored on the infected machine. Infected email messages arrive with the subject “Merry Christmas!” and main body “Happy Holidays!”. The attachment has the name “postcard” followed by an executable extension.

Adware: **Adware** is a program that displays an unwanted advertisement in a banner or pop-up window on web pages, email messages, or on other Internet services. If you click on the advertisement, it takes you to a virus contained site, and the virus will install on your computer.

Spyware: A **spyware** is a program placed on a computer or mobile device without the user's knowledge that secretly collects information about the user and then communicates or sends the same information to some outside source while the user is online.

SOURCES OF VIRUSES

Viruses are activated on your computer through the following sources:

E-MAIL: E-mail viruses are spread by files attached to e-mail messages. You cannot get an e-mail virus from a message that contains only text. When you open an e-mail attachment that contains a virus, the virus spreads to your computer. If you forward the attachment to other people, their computers will also get affected when they open the attachment.

INTERNET DOWNLOAD: There is a lot of stuff to download from the Internet. But if something in the stuff you want to download is infected by virus, then the virus enters your computer system. Virus then replicates itself and infects other files on your computer. This means if your computer is infected by virus then whatever file you share with others could contain the virus.

SOFTWARE DISTRIBUTION: If your computer is virus-infected and you copy a software on a CD or pen drive to distribute to others, the virus of your computer might also get copied on the CD or pen drive. The person, who installs this software on his computer, unknowingly gets his computer infected by the virus.

Malware

Malware (short for **mal**icious soft**ware**) is a term used for computer viruses, worms, trojan horses, and rootkits. It is a program that acts without a user's knowledge and deliberately alters the computer operations. Some **corrupt programmers** or **virus authors** write malware and then test it to ensure if it can deliver its payload. A **payload** is a destructive event a program is intended to deliver.

Malware delivers its payload on a computer in a variety of ways:

- When a user opens an infected file
- When a user runs an infected program
- When a user boots the computer with infected CD or pen drive
- When a user connects an unprotected computer to a network
- When an infected file is downloaded from the Internet

SYMPTOMS OF MALWARE OR VIRUS ATTACK

If your computer works differently from usual, it may have been infected by a virus. A computer, infected by a virus, worm, trojan horse, or rootkit often shows one or more of the following symptoms:

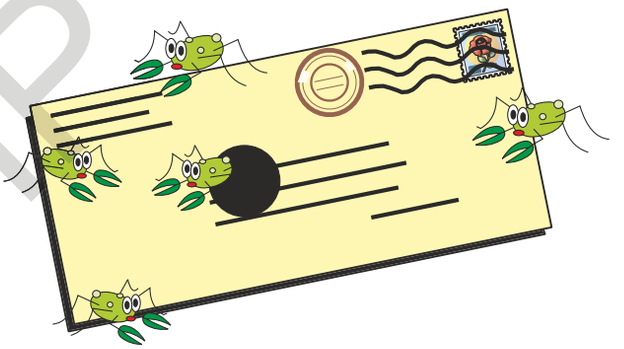
- It runs much slower than usual.
- Its memory becomes less than expected.
- Files become corrupted.

- Screen displays unusual message or image.
- Music or unusual sound plays randomly.
- Existing programs and files disappear.
- Programs or files do not work properly.
- Unknown programs or files mysteriously appear.
- System properties change.
- Operating system does not start up.
- Operating system shuts down unexpectedly.

EFFECTS OF MALWARE OR VIRUS ATTACK

- It can damage or rename the important files.
- It can damage or destroy the operating system.
- It can decrease the speed of the computer.
- It can reduce the memory or hard disk space.
- It can infect boot records.
- It can infect executable files.

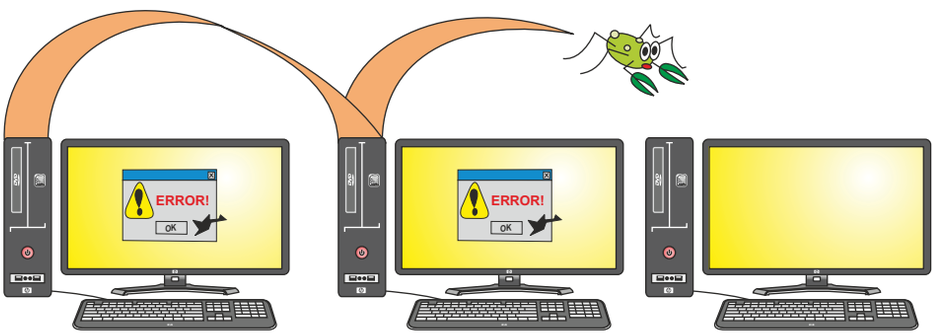
E-mail Virus



E-mail viruses are spread by the files attached to e-mail messages. As e-mail attachments have become more common, the number of e-mail viruses has also increased. You cannot get an e-mail virus from a message that contains only text.

SPREADING OF E-MAIL VIRUSES

When you open an e-mail attachment that contains a virus, the virus spreads to your computer. If you forward the attachment to other people, their computers will also get infected when they open the attachment. Many e-mail viruses can also access your e-mail address book and automatically send themselves to the e-mail addresses stored there.



Email virus spreading from one computer to another

Update Your Knowledge

The **first PC virus** is believed to be a boot sector virus, called **Brain**, created by two Pakistani brothers **Basit** and **Farooq Alvi** in 1986.

Ransomware Virus

Ransomware is a virus that restricts access to your computer system and demands a **ransom** (money) to be paid in order to remove the restriction.

HOW RANSOMWARE SPREADS

Ransomware can enter your computer through an e-mail attachment or through your web browser if you happen to visit a website that is infected with this type of virus. It can also access your PC or computer via your network. If your computer has been infected with ransomware, then most probably you would not be able to access your computer.

HOW TO PREVENT RANSOMWARE ATTACKS

- Make sure the software on your PC is updated, including your operating system and browser.
- Ensure that your antivirus software is up-to-date, and is able to scan for and wipe out any ransomware attempts found on your computer.

Antivirus Program

An **antivirus program** detects the changes that the virus causes in the computer. You should install an antivirus program to safeguard your computer from virus attacks and **update** it regularly. An antivirus program protects a computer against virus, identifying and removing any computer virus found in the memory, storage media, or incoming files.

Antivirus programs use virus signatures as one of their techniques for detecting viruses. A **virus signature**, also called a **virus definition**, is a known specific pattern of virus code. It is necessary to update your antivirus program signature files often, for tackling the files containing patterns of newly discovered viruses. This important activity allows your antivirus software to protect your computer against viruses.

FEATURES OF ANTIVIRUS

- Most antivirus programs contain an **automatic update** feature that regularly prompts the users to download the updated virus signatures, at least once a week.
- Most antivirus programs automatically check for viruses when they are first installed. In addition, many antivirus programs automatically scan files downloaded from the web, e-mail attachments, opened files, and all types of removable media inserted in the computer or mobile device.

WORKING OF ANTIVIRUS

If an antivirus program identifies an infected file, it attempts to remove the malware. If it cannot remove the infection, it often quarantines the infected file. A **quarantine** is a separate area of a hard disk that holds the infected file until the infection can be removed. This step ensures that other files will not be infected. Quarantined files remain on your computer until you delete them or restore them.

Users should stay informed about new virus alerts and virus hoaxes. A **virus hoax** is an e-mail message that warns users of a non-existent virus or malware. It may inform users that an important operating system file on their computer is a virus and encourages them to delete the file, which could make their computer unstable and unusable.

SOME POPULAR ANTIVIRUS SOFTWARE PROGRAMS

Norton Antivirus: It is developed and distributed by Symantec Corporation. It protects your computer from various viruses and Internet threats.

McAfee: This antivirus delivers complete virus protection and Internet security. It protects your computer from harmful viruses.

Kaspersky: It offers a number of new and improved features together with unique protection technologies to address the latest online threats, keeping your PC running smoothly.

AVG AntiVirus: It includes antivirus and spyware protection. It also offers protection from harmful downloads as well as sites.

TotalAV: It is a solid and reliable antivirus, offering some great features at a low price. It provides real-time antivirus protection from viruses, malware, spyware and ransomware for all your devices.

Quick Heal: Quick Heal offers a wide range of antivirus products that protects your PC from viruses, spyware and malware.

Precautions against Computer Virus

There is no method that guarantees protection of a computer or network from viruses and other malware. However, you should take some precautions to protect your computer from these infections.

- Do not start a computer with **removable media** inserted in the drives or plugged in the ports. For example, optical disc drive should be empty, and a USB port should not contain a USB flash drive.
- Never open an **e-mail attachment** unless you are expecting the attachment, and it is from a trusted source. A **trusted source** is a company or person you believe will not send a virus knowingly. If the e-mail message is from an untrusted source, delete the e-mail message immediately — without opening or executing any attachment.
- If a known person unexpectedly sends you a message with an attachment, do not assume that the attachment is safe. That person's computer may be infected with a virus that e-mail may copy itself. Confirm with the person's whether he or she actually sent the file.
- If you receive a message with a file attachment that you suspect is a virus and you have no other way to verify that it is legitimate, delete the message. In all cases, it is better to permanently delete the message rather than send it to Deleted Items folder.
- Never trust any e-mail message or website that asks you to update or confirm sensitive data such as your bank account number, credit card information or account password. Bear in mind that no legitimate company or organization will ever contact you via e-mail to update or confirm such information online.
- To keep your computer safe from viruses, always download software and files from trusted websites.
- Install an antivirus program on your computer. Update the software and the virus signature files regularly.
- Set the macro security in programs so that you can enable or disable macros. Enable macros only if the document is from a trusted source and you are expecting it.
- Stay informed about new virus alerts and virus hoaxes.
- Scan all downloaded programs for viruses and other malware.

Self-Evaluation

After reading the chapter, I know these points:

	CHECKLIST	
	Agree	Disagree
⊙ I know that viruses are programs which are created deliberately to damage critical information and data.	☐	☐
⊙ I know that viruses in computer are not generated accidentally, but are programmed intentionally by a programmer known as virus author.	☐	☐
⊙ I know that malware is a program that acts without a user's knowledge and deliberately alters the computer operations.	☐	☐
⊙ I know that e-mail viruses are spread by files attached to e-mail messages.	☐	☐
⊙ I know that ransomware is a virus that restricts access to our computer system and demands a ransom (money) to be paid in order to remove the restriction.	☐	☐
⊙ I know that antivirus program detects the changes that the virus causes in computer.	☐	☐

Exercises

A. Tick (✓) the correct answer.

1. ..... gets activated every Friday which occurs on the 13th of a month.
   a. Trojan Horse ☐ b. File Infector ☐ c. Jerusalem Virus ☐
2. ..... virus adds virus code to the regular programming code with in the program files.
   a. File Infector ☐ b. Boot Sector ☐ c. Worm ☐
3. ..... is a program that displays unwanted advertisement in a banner on the web page.
   a. Worm ☐ b. Trojan Horse ☐ c. Adware ☐
4. A ..... is a destructive event the malware is intended to deliver.
   a. payload ☐ b. download ☐ c. temp file ☐
5. ..... program detects the changes caused by a virus in the computer.
   a. Virus detector ☐ b. Antivirus ☐ c. E-mail ☐

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

1. Virus can damage or destroy the operating system. ☐
2. Boot sector virus is a harmless virus program. ☐
3. The sleeper virus is known to steal your personal and financial information. ☐
4. Viruses get activated by downloading an infected file from the Internet. ☐
5. We should ignore new virus alerts and virus hoaxes while using Internet. ☐

C. Fill in the blanks.

1. Viruses are programmed intentionally by a programmer known as a ..... .
2. A virus enters a computer through an attachment with an ..... .
3. ..... virus comes as a friendly program.
4. A ..... is a known specific pattern of virus code.
5. A ..... warns users of a non-existent virus or malware.

D. Differentiate between the following.

Adware	Spyware
.....	.....
.....	.....
.....	.....

E. Answer in 1-2 sentences.

1. What is a computer virus?

   .....

   .....

2. Why do we use antivirus program?

   .....

   .....

3. What do you understand by virus signature?

   .....

   .....

F. Answer briefly.

1. What is Boot Sector virus?

   .....

   .....

   .....

2. How does e-mail virus spread?

   .....

   .....

   .....

3. What is ransomware?

   .....

   .....

   .....

4. Write any two precautions that should be taken to prevent computer virus.

   .....

   .....

   .....

G. Application-based Question

You receive an e-mail message that appears to be from someone you know. When you try to open the attachment, nothing happens. You attempt to open the attachment two more times but without any success. A few minutes later, your computer is running slower and you are having trouble running apps. What might be wrong?

.....

Group Discussion

Divide the students into groups and discuss the topic– 'E-mail Virus vs Ransomware'.

Online Link

To learn more about computer virus, visit the website:

https://www.geeksforgeeks.org/types-of-virus/

Activity Section

Lab Activity

Create a document on Trojan Horse.

Follow these instructions:

a. With the help of Internet, search information on Trojan Horse of Troy.
b. Open a Word document and type the story of Trojan Horse using your own words.
c. You can search for pictures using Google and insert them in your story.
d. Save the document as **'Trojan Horse'** in the main folder **'Lab Activity'**.

Skill Formation

This activity enhances the creative writing, typing and information searching skills of the students.

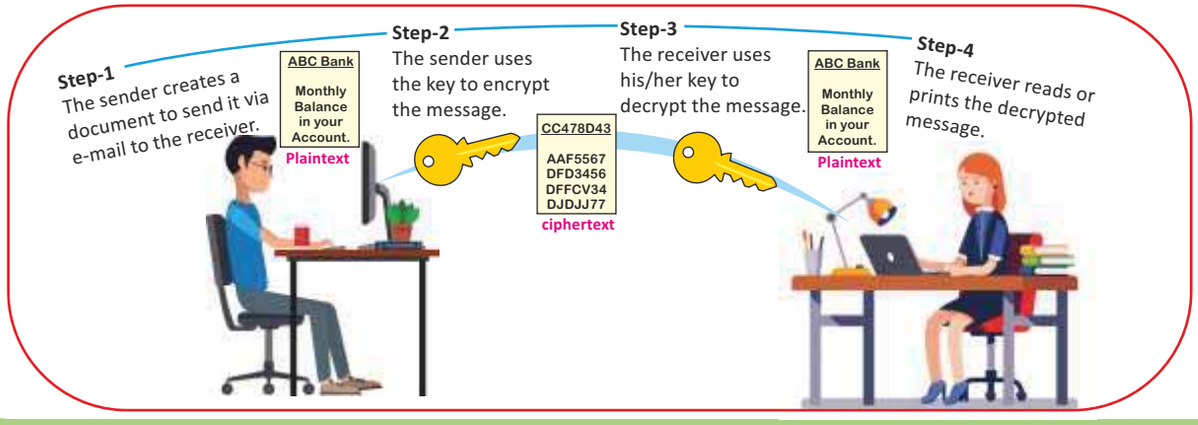
Discover More

Encryption Techniques

Most financial organizations like banks attempt to prevent information theft by implementing the **User ID** and **Password**. To further protect networks and information on the Internet, organizations and individuals use a variety of encryption techniques.

Encryption is the process of changing data that is readable by humans into **encoded characters** to prevent unauthorized access. You treat encrypted data just like any other data. That is, you can store it or send it in an e-mail message. To read the data, the recipient must **decrypt** or **decode** it.

In the encryption process, the unencrypted, readable data is called **plaintext**. The encrypted data is called **ciphertext**. An encryption **algorithm**, or **cipher**, is a set of steps that can convert readable plaintext into unreadable ciphertext. A simple encryption algorithm might switch the order of characters or replace characters with other characters. Encryption programs typically use encryption algorithm, along with an encryption key. An **encryption key** is a set of characters that the originator of the data uses to encrypt the plaintext and the recipient of the data uses to decrypt the ciphertext.



3 Animate – Layers and Animation

OBJECTIVES

After completing this chapter, you will be able to:

- Import graphics in Adobe Animate.
- Perform different functions on layers.
- Create symbols and instances.
- Add animation and tweening effects.

In your previous class, you learnt about Adobe Animate and its tools. Let us move ahead and learn more about it.

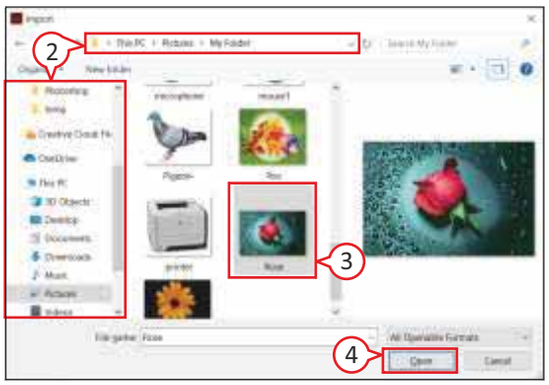
Importing Graphics in Animate

In Animate, you do not need to create all your graphics. You can import **bitmaps** and **vector graphics** from many other applications. When you import a bitmap graphic, it is immediately added to the Animate library for use. You can add it in other frames in your movie.

BITMAP GRAPHIC: A bitmap (also called raster) graphic is composed of many tiny parts called **pixels**, which are of many different colors. When you enlarge, rotate, or stretch, these graphics become ragged and suffer loss in their resolution. **Graphics Interchange Format (GIF)** and **Joint Photographic Experts Group (JPEG)** are examples of graphic image file types that contain bitmaps.

VECTOR GRAPHIC: A vector graphic is not made up of pixels. Instead, vector graphic comprises **paths,** which are defined by a **start** and **end** point as well as with other points, curves, and angles along the way. You can enlarge, rotate, or stretch this graphic without any loss in its resolution. These graphics are very small in size as compared to the bitmap graphics.

IMPORTING A GRAPHIC



Open **Adobe Animate** software.

1. Click on **File** > **Import** > **Import to Stage** (not shown) *(or press Ctrl+R)*.

The Import dialog box appears.

2. Click on these areas to navigate to the folder or drive where you have stored the file.
3. Click on the file name you want to import.
4. Click on **Open**.

The graphic appears on Stage as a grouped object.

The graphic also appears in the Library panel.

Layers

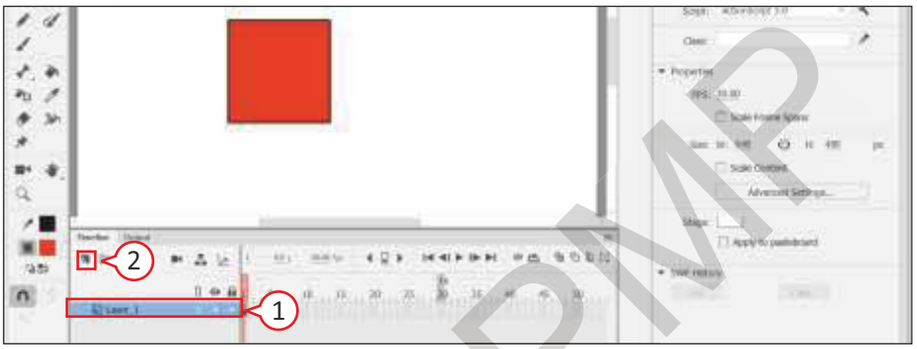
Layers are the key components to work with graphic objects and animation. They are effective in adding depth to your graphic objects. In Animate, related objects can be placed on a single layer to keep them organized. The objects in one layer can be edited without affecting the objects on another layer. Layers are also useful for more complex movies. They are helpful in working with multiple animations.

There are several kinds of layers. These are **normal layers**, **guide layers**, and **mask layers**. By default, all the layers you add to the Timeline are **normal**, which means all the objects on the layer appear in the movie. The objects that you place on **guide layers** do not appear in the movie. A regular guide layer can be used for reference points and alignment. A guided layer is a layer linked to a regular guide layer. A **mask layer** hides layers linked to it.

ADDING AND DELETING LAYERS

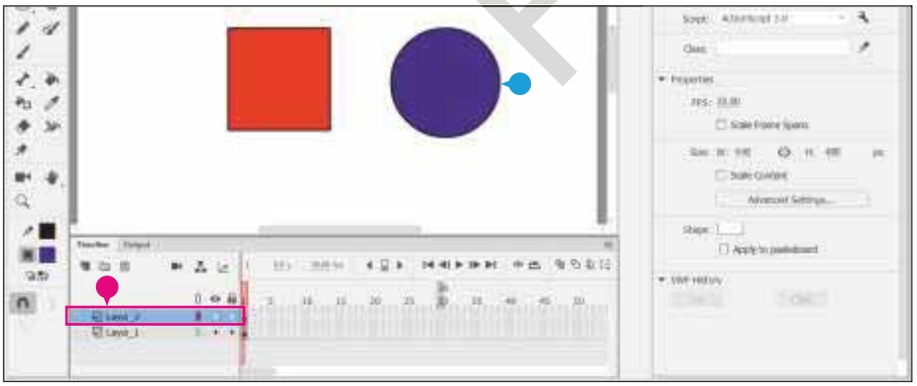
When you create a new movie or scene, Animate starts with a **single layer** and a **Timeline**. You can add layers to the Timeline or delete the layers that you no longer need. Additional layers do not affect the file size, so you can add and delete as many layers as your project requires.

Add Layers



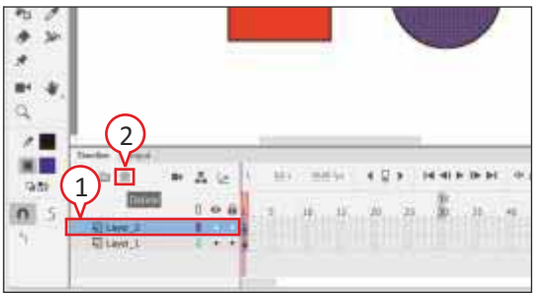
1. Click on the layer that will appear below the new layer.
2. Click on **New Layer** icon.

You can also insert new layer by clicking on **Insert > Timeline > Layer**.



- A new layer appears immediately.
- *Now, you can make any object or shape in this layer.*

Delete Layers



1. Click on the layer you want to delete.
2. Click on **Delete Layer** icon.

You can delete more than one layer by clicking the first layer you want to delete, and then press **Ctrl** key while clicking other layers, and then click on **Delete Layer** icon.

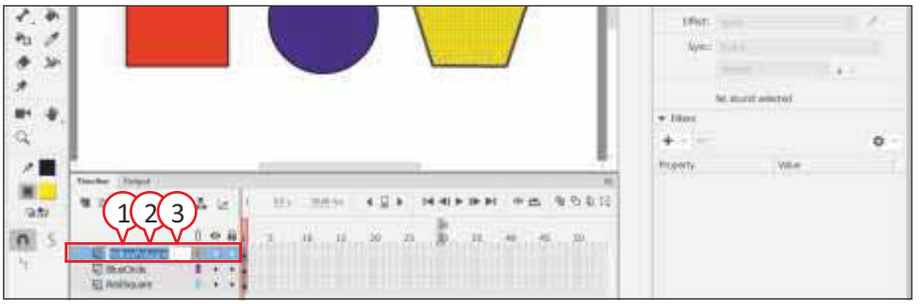
The layer disappears from the Timeline.

*If you have deleted the wrong layer accidentally, you can click on **Edit** menu and then click on **Undo Delete Layer**.*

Working with Layers in Timeline

You can also rename, lock or hide a layer quickly from the Timeline.

RENAMING A LAYER

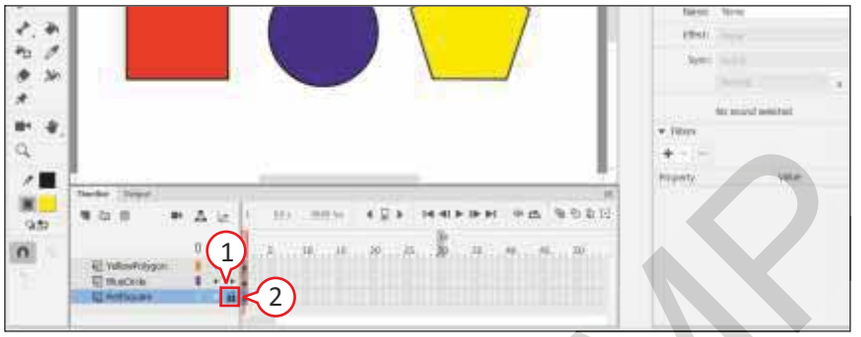


1. Double-click on the layer name.
2. Type a new name.
3. Press **Enter** key.

The layer name changes.

LOCKING AND UNLOCKING A LAYER

You can lock a layer, which helps you avoid moving or deleting elements by mistake.



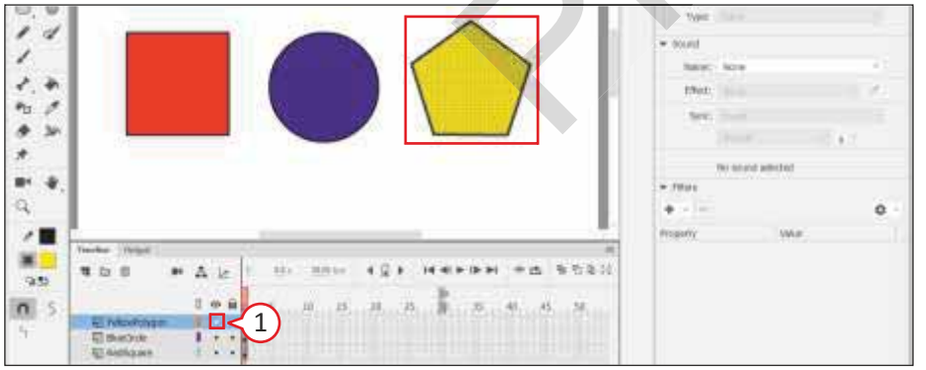
1. In the **padlock** icon column, click on the bullet next to the layer name.

The layer is now locked, and you cannot edit the content.

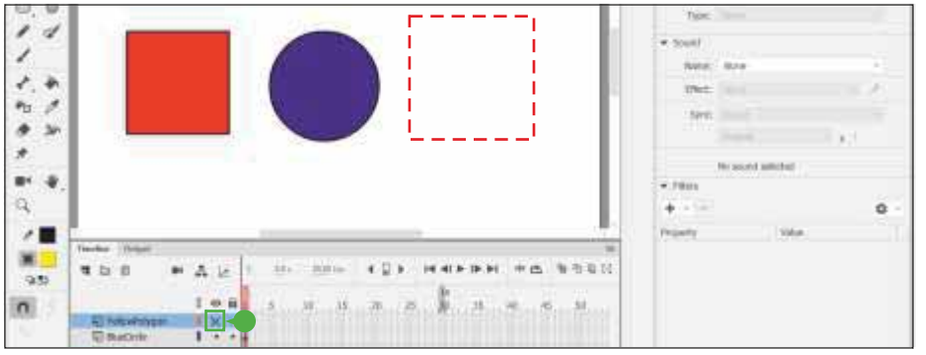
2. To unlock the layer, click on the padlock icon next to the layer name in the Timeline.

SHOWING AND HIDING A LAYER

If you have many layers in the project, you can see the layers you are working on while hiding others.



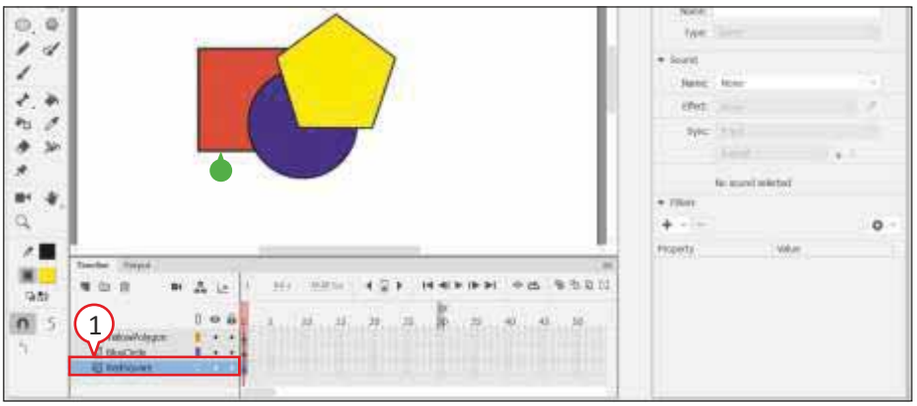
1. In the **Eye** icon column, click on the bullet next to the layer name.



- A **cross mark (x)** appears on the layer bullet, and all the objects or shapes you have made in this layer will hide.
- To make the layer objects visible again, you can click on cross mark **(x)** under the Eye icon column.

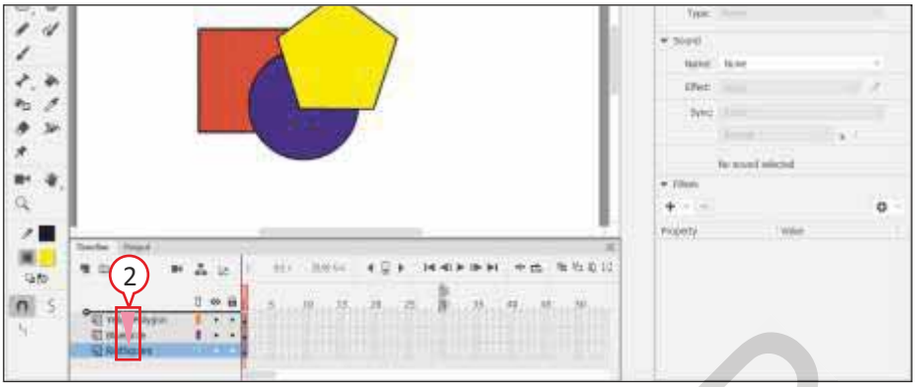
STACKING LAYERS

To rearrange objects in the movie, you can stack layers. For example, if your movie contains a background, then send it to the back of the stack.



1. Click on the layer you want to rearrange in stack.

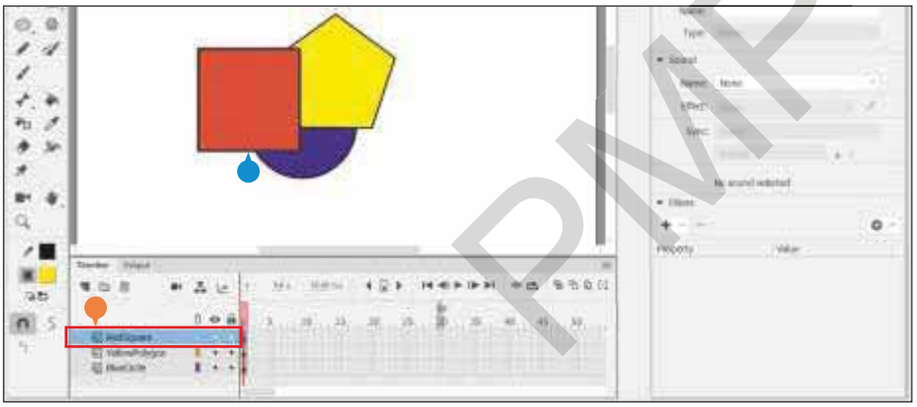
- Selected layer appears behind the others.



2. Click and drag the layer up or down to its new location in the stack.

An insertion bar appears to show where the layer will be placed when the mouse button is released.

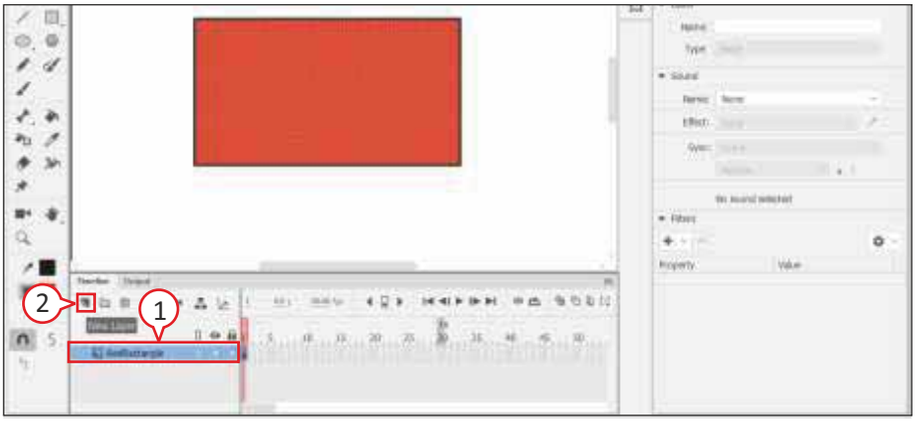
3. Release the mouse button.



- The layer is placed in its new location on the Timeline.
- The layer now appears above the others.

ADDING GUIDE LAYERS

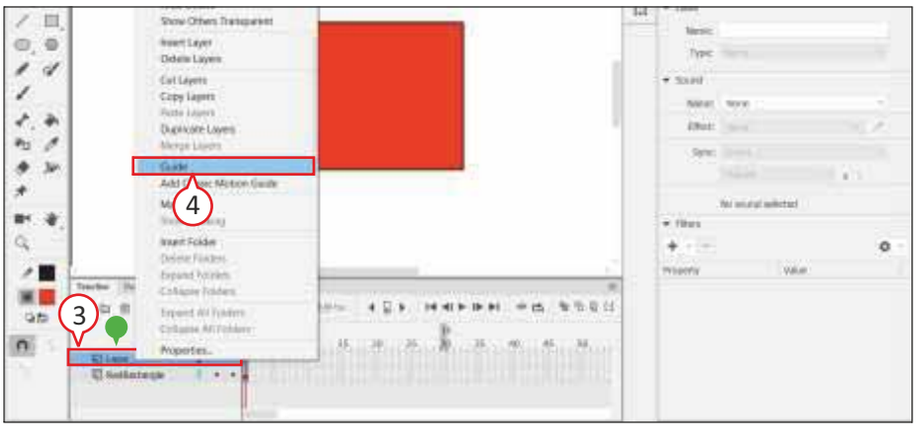
A plain guide layer helps you position any object or element on the Stage, but it does not appear in your final movie. You can place your photograph on a guide layer for reference and draw its asset on another layer.



1. Click a layer where you want to insert guide layer.

New layer will appear above the layer you select.

2. Click on **New Layer** icon.

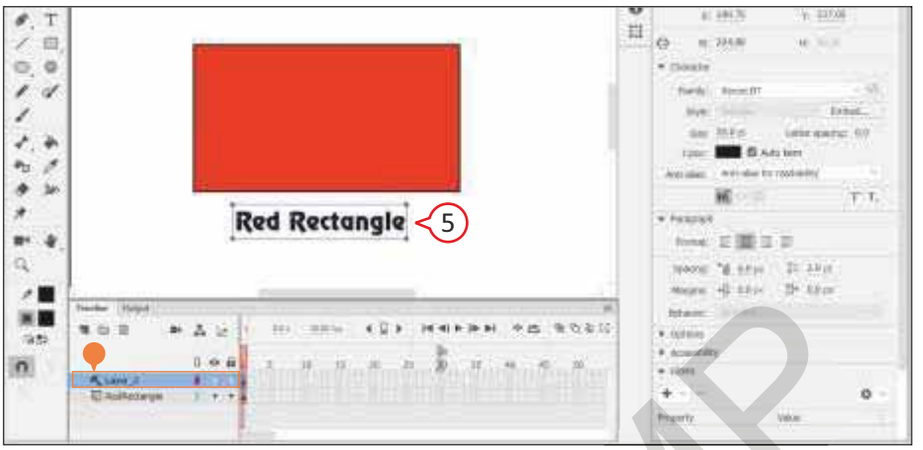


- Animate adds a new layer to the Timeline.

3. Right-click on the new layer name.

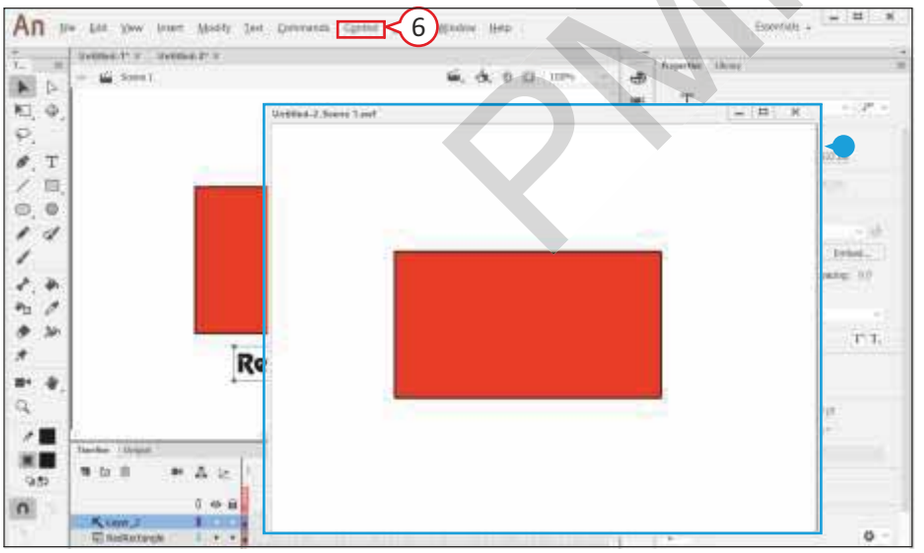
A menu appears.

4. Click on **Guide**.



- The layer becomes a guide layer and shows a Guide symbol in it.

5. Draw any shape or add text.



6. Click on **Control** menu, and click on **Test Scene**.

- Anything that has been placed on the guide layer does not appear in your exported file.

Do You Know?

- By default, all layers you add to the Timeline are normal, which means all the objects on the layer appear in the movie.
- Objects that you place on guide layers do not appear in the movie.
- A mask layer hides layers nested underneath it, which are masked.
- You can also place layers into folders to keep your movie organized.
- Tween layers are the layers that are automatically created when you create a motion tween.

Turning Guide Layer to a Normal Layer

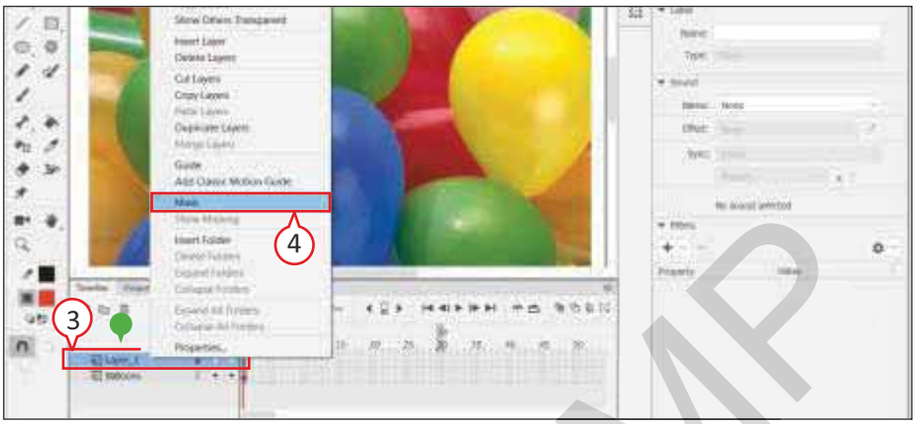
Right-click on your guide layer. In the menu that appears, click on the check box which precedes guide option. Your layer is now a normal layer.

ADDING A MASK LAYER

A **Mask** layer is used to show or hide a portion of your layer. A mask is like a stencil or paper cutout where you can see what is behind it through the hole. You can have many layers masked by a single layer mask.

1. Click a layer where you want to insert a mask.
2. Click on **New Layer** icon.

Your new layer appears above the layer you select.

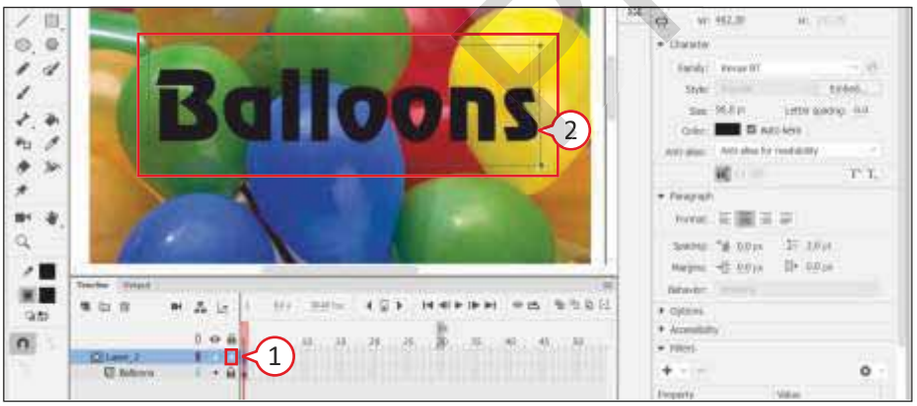


- Animate adds a new layer to the Timeline.

3. Right-click on the new layer name.
4. Click on **Mask**.

Animate marks the layer as a mask layer, locks it against any changes, and links it to the layer below.

Draw a Mask



1. Click on the **Lock** icon on your mask layer to unlock.

The Lock icon becomes Dot icon.

*The mask layer is denoted by the **Mask Layer** icon.*

2. Place some text on the mask layer.

3. Lock the mask layer by clicking on Dot in the lock column.

The Dot icon becomes Lock icon.

You can see the masking effect on the Stage.

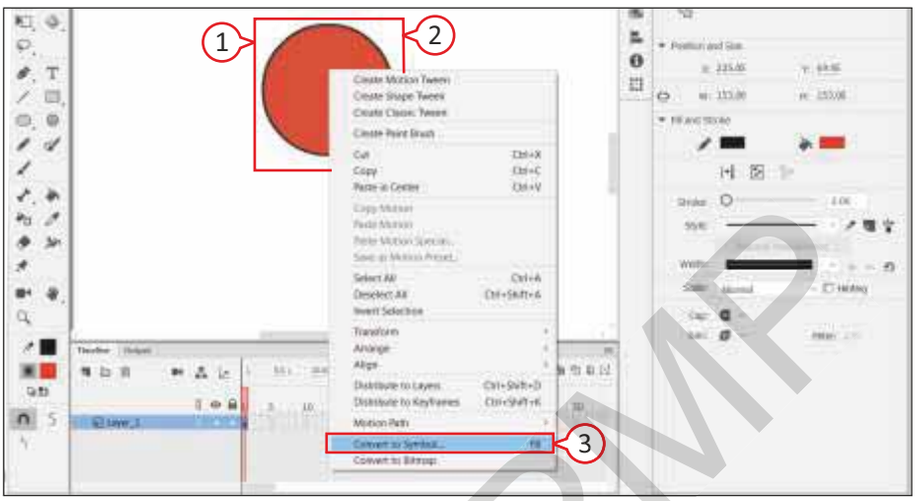
Symbols and Instances

A **symbol** is an object in Animate. This object is stored in the Library; it can be used repeatedly throughout a movie. Symbol can be a graphic object, a movie clip, a graphic created in another program, or a button. Sound clips may also be symbols.

When you drag a symbol from the Library to the Stage, you create an **instance**. Using instance does not affect the file, no matter how many times you reuse a symbol. You can create many instances of the same symbol, each with its own set of properties like different colors, different sizes, etc. You create these symbols so that they can be used in your Animate movie as instances.

CREATING A SYMBOL

You can create symbols directly on the Stage. First, create any object or drawing then convert it into a symbol, so that you can reuse that object throughout your project.



1. Select the object you want to convert into a symbol.
2. Right-click on your selected object.

A menu appears.

3. Click on **Convert to Symbol** from the menu *(or press F8)*.

*The **Convert to Symbol** dialog box appears.*

4. Type a name for your symbol.
5. Click on **Graphic** from the **Type** drop-down list.

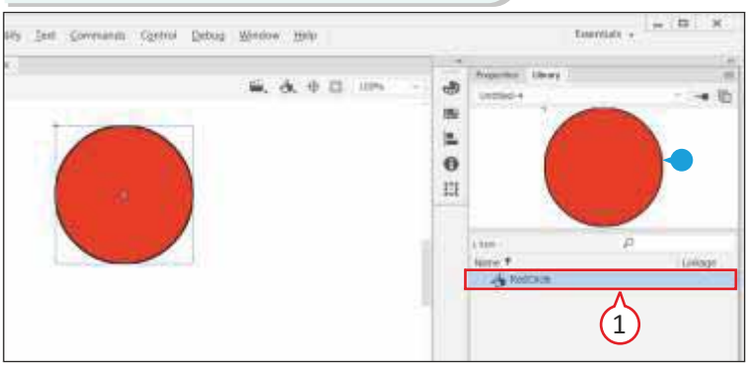
- By clicking on the icon next to **Registration**, you can select your symbol registration point. Each of the little squares is clickable.
- By clicking the text next to **Folder**, you can place your symbol in a subfolder of your Library.
- By clicking the **Advanced** option, you can see the advanced symbol creation options.

***Note:** Advanced options are not available to graphic symbols.*

6. Click on **OK**.

Do You Know?

The **Registration grid** uses a small black square to indicate where within the symbol bounding box, the registration point is located. A registration point is the axis around which the symbol rotates, and the point along which the symbol aligns.



- Your symbol appears in the Library and is ready to be used in your project.

Preview the Symbol

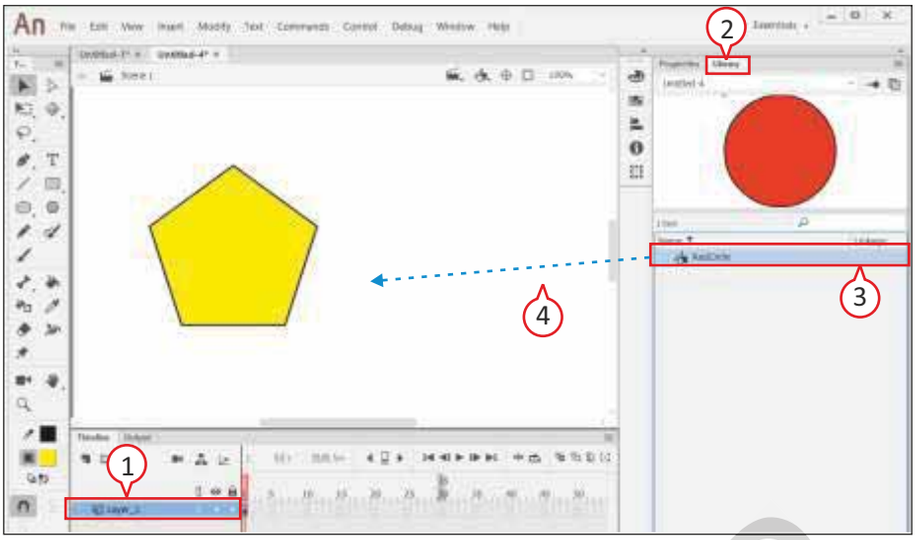
You can preview the symbol if you have more than one symbol.

1. Click on the symbol name.

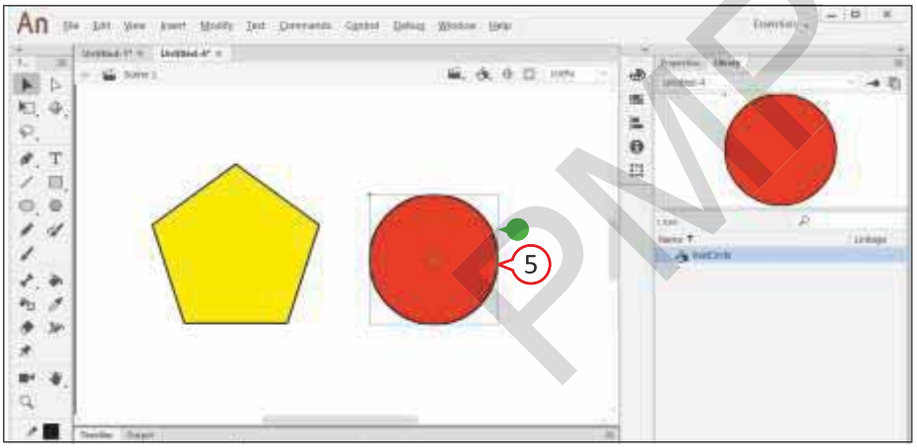
The preview of symbol appears in the top section of Library window.

INSERTING AN INSTANCE

After creating the symbol in your Library, you can add as many instances of that symbol to the Stage as you like. Instance refers to the copy of the original symbol. Copying references the original instead of duplicating it all over again. It will not put much impact on the file size of your exported movie.



1. Open the layer where you want to insert an instance.
2. Click on **Library** tab.
3. Click on the symbol name.
4. Click and drag the symbol from the Library over the Stage.



5. Release the mouse button where you want your instance to appear on the Stage.

- The instance of the symbol appears on the Stage.

Note: *Animate does not let you place an instance on the Stage on a locked layer. You need to make sure that there is no unlocked layer on the stage.*

ORGANIZING SYMBOLS WITH FOLDERS

After creating the symbol, you can organize the symbols in the folders. You can add and delete folders, and move symbols from one folder to another.

1. To create a new folder, click on **New Folder** icon from the bottom of Library window.

A folder appears with a temporary name.

2. Type a new name for the folder, and press the **Enter** key.
3. Now do the following:
   - To view folder contents, double-click on the folder.
   - To move a symbol into the folder, simply drag the symbol over the folder icon. When you release the mouse button, the symbol moves into the folder.
   - To delete the folder, click on it, and then click on **Delete** icon from the bottom of Library window.

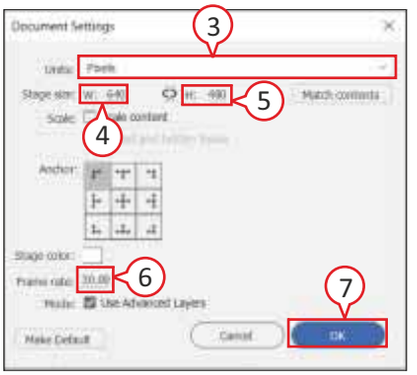
Animation in Animate

Animation feature is the most exciting aspect of Adobe Animate. You can place your Animate project on a web page or distribute it to others to view. **Animations** can be used for a lively message or for entertainment. Animations make a website come to life. In animation effects, the scene or object changes slightly from one frame to the next. It creates the illusion of movement. Each frame replaces the earlier one so quickly that it is difficult to notice it.

SETING MOVIE DIMENSIONS AND SPEED FOR ANIMATION

Before creating any animated movie, you should set up the movie size and speed at which you want to play the movie. A **movie dimension** refers to its horizontal and vertical size on Stage. The play speed of the movie determines the number of **frames per second (fps)** in which the animation occurs. The **frame rate** is measured by the number of frames per second (fps). A frame rate that is too slow makes the animation appear to stutter (stop and start), while a frame rate that is too fast blurs the details of the animation. A frame rate of **30 fps** is the default setting for new Animate documents and usually gives the best results on the web.

1. Click on **Modify** menu.
2. Click on **Document** *(or press Ctrl+J)*. The **Document Settings** dialog box appears.



3. Select the **measuring unit** (e.g., Pixels).
4. Drag the mouse left to decrease value of width and drag right to increase value of width for the movie in **Stage size**.
5. Drag the mouse left to decrease value of height and drag it right to increase value of height for the movie in **Stage size**.
6. Drag the mouse left to decrease number of frames per second and right to increase number of frames per second that you want the movie to play.
7. Click on **OK**.

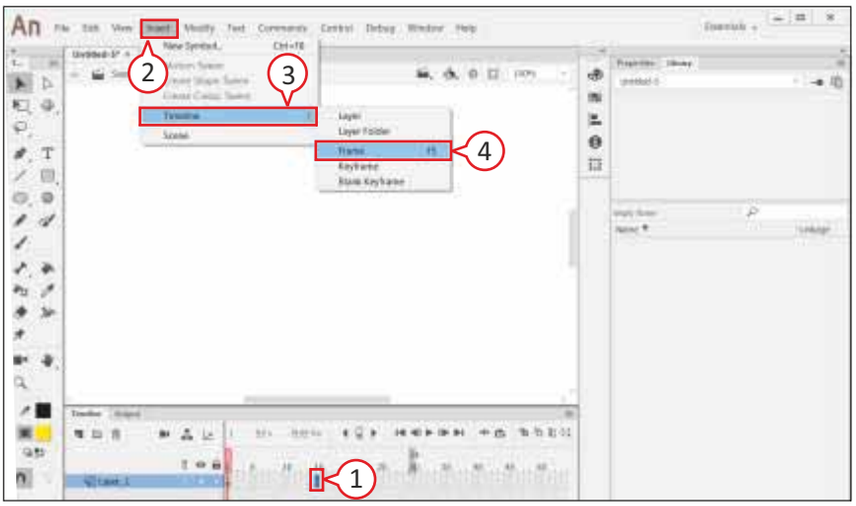
Adding Frames

You can add frames and keyframes to add time to your Animate movie. A **frame** is the empty frame along the timeline. A **keyframe** is the frame which has an animation in it, or where a new symbol appears in the Timeline. It is used for critical points in the Timeline where your content changes. Keyframes are also used to mark the beginning or ending of an animation. You can add or remove frames to adjust timing between keyframes.

A keyframe is indicated on the Timeline with a **black circle**. The frame where a keyframe span ends has a **white rectangle**. When you insert an object in that keyframe, the black circle changes to **black dot**. The frames between the **two black dots** become **light gray**.

You can also add a **blank keyframe** to the Timeline as a placeholder for symbols you plan to add later, or to clearly leave the frame blank. A blank keyframe is indicated by a **black circle**. A blank keyframe is exactly the same as a regular keyframe. The only difference is that Animate automatically removes all of your content from the Stage at a blank keyframe. That way, if you want to start fresh at a certain point on the Timeline, you don't have to manually delete objects from the Stage.

ADDING REGULAR FRAME



1. Click an empty frame on the Timeline where you want to insert a new frame.
2. Click on **Insert** menu.

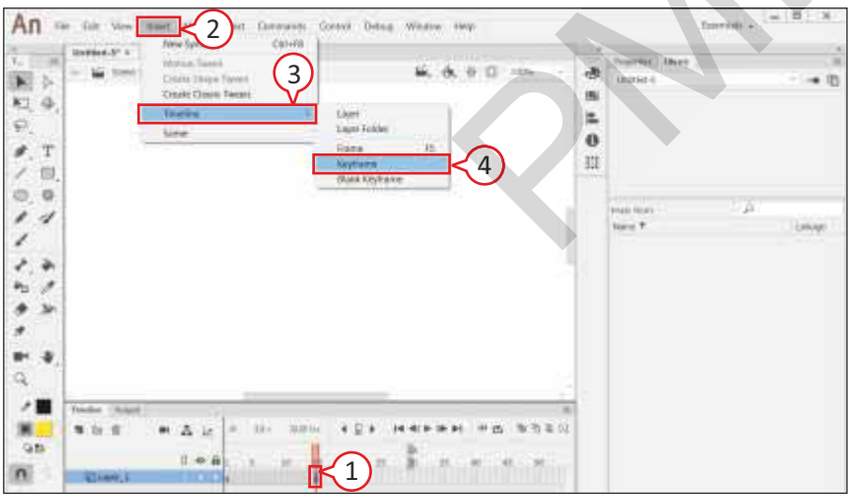
The Insert menu appears.

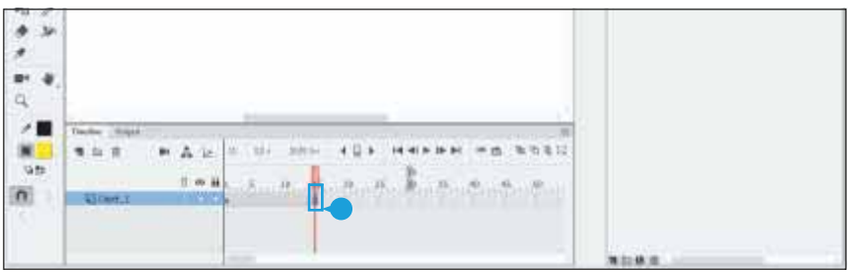
3. Click on **Timeline**.
4. Click on **Frame** to insert a frame *(or press F5)*.

- Animate inserts regular frames between the last regular frame you selected in **Step 1**.

If you add a regular frame in the midst of existing regular frames, all the frames to the right of the insertion move over to make room for the new frame.

ADDING KEYFRAME





1. Click on an empty frame or a regular frame on the timeline where you want to place a new keyframe.
2. Click on **Insert** menu.

The Insert menu appears.

3. Click on **Timeline**.
4. Click on **Keyframe**.

- If the frame you selected in **Step 1** was a regular frame, Animate converts it to a keyframe.

*If the frame is an empty frame, Animate inserts regular frames in between the last keyframe up to the frame you selected in **Step 1**.*

REMOVING KEYFRAME

1. Click and drag over the frames you want to remove. *Animate highlights the selected frames.*
2. Right-click on any of the selected frames.
3. Click on **Remove Frames**. *Animate removes the frames from the Timeline.*

Project: Animating Fish using Frame-by-Frame Animation

Skill Formation

This project aims at providing the skills necessary to become a successful animation storyteller.

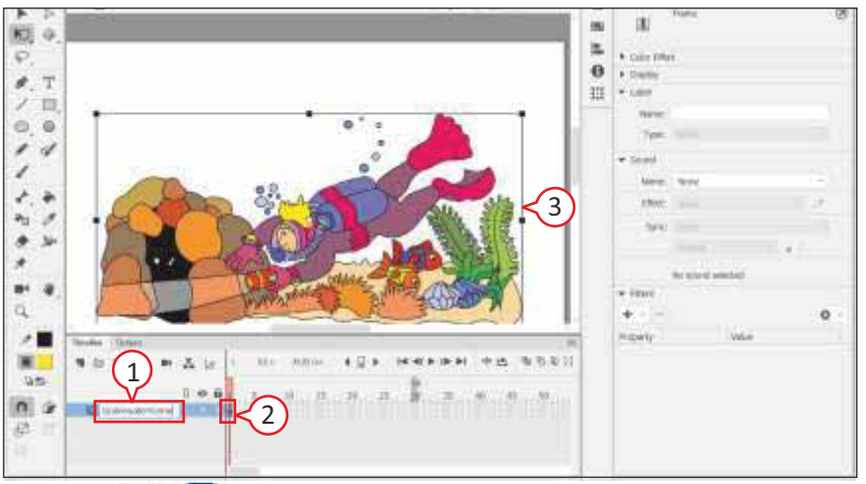
This project deals with creation of frame-by-frame animation. In this animation, we will choose two images to create an underwater scene. We will add background (underwater scene) on one layer and animated object (fish) on another layer. Finally, we will play the animation to see the fish moving on the stage. Now, let us practice using these features through a project. ***(Your pictures may vary in the project.)***

Frame-by-Frame Animation

Frame-by-frame animation is also known as **stop-motion** animation. It is achieved by manipulating a physical object and making it appear to move on its own by shooting one frame, manipulating the object, then shooting another frame and so on. You can create the illusion of movement in an animation movie by changing the placement of the Stage content from keyframe to keyframe.

ADDING BACKGROUND IN THE LAYER

When you start Adobe Animate, the first keyframe is selected in the layer by default.



1. Double-click on the layer and rename it as **Underwater Scene**.
2. Click on the keyframe of new Underwater Scene layer.
3. Create a scene using the tools or **import** an image on the stage.

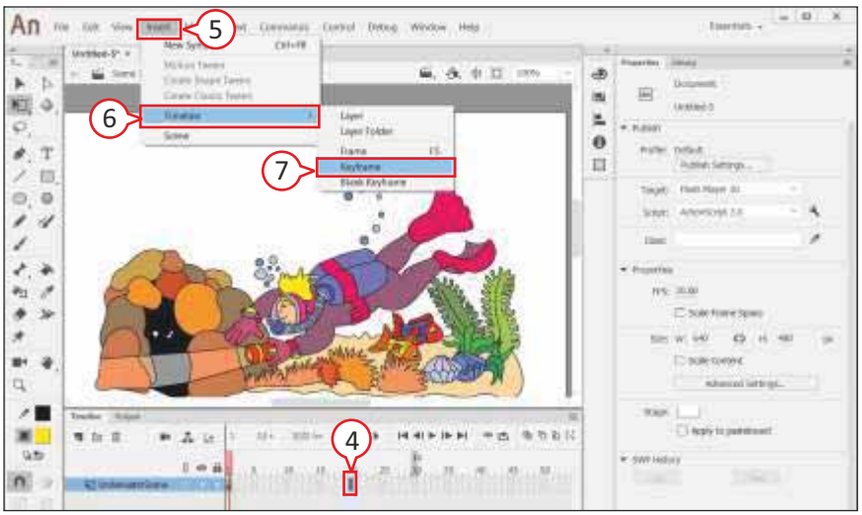
For importing the image, click on **File > Import > Import to Stage**.

Import *dialog box appears.*

Select the file and click on **Open**.

Do You Know?

A famous example of frame-by-frame animation is the 1933 film 'King Kong'. The giant ape is shot in this animation style, making it seem as if he is moving on his own.

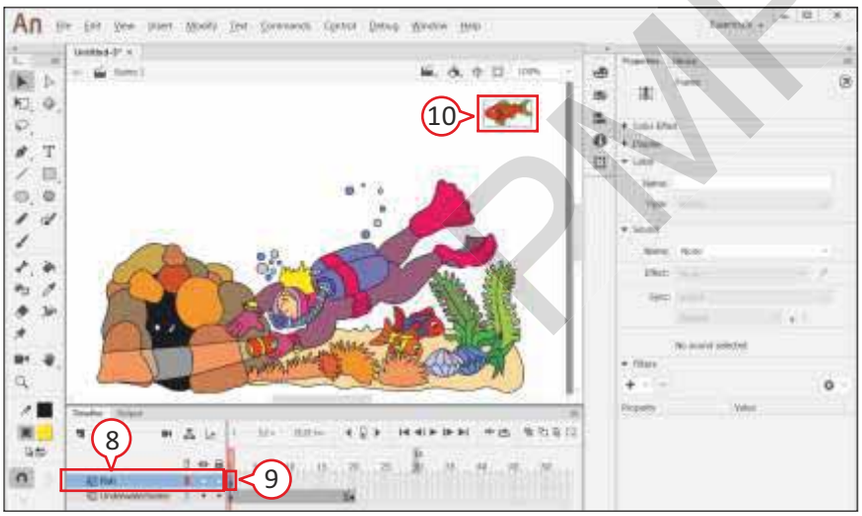


4. Click a frame on the Timeline to select keyframe's location.
5. Click on **Insert** menu.
6. Click on **Timeline**.
7. Click on **Keyframe**.

- Animate creates your keyframe.

  Animate also creates frames between your keyframes.

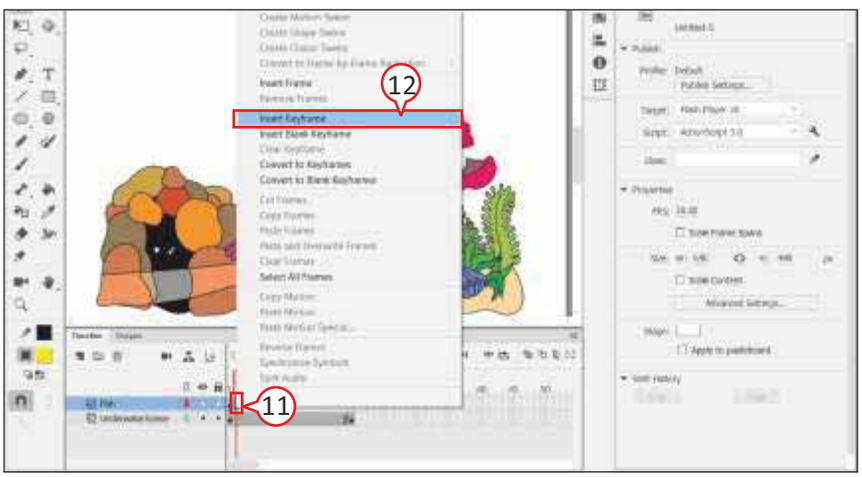
ADDING CONTENT TO FIRST KEYFRAME OF NEW LAYER



8. Insert a second layer and rename it as **Fish**.
9. Click on the keyframe of new Fish layer.
10. Place the object you want to animate on the Stage.

You can create a new object using drawing tool.

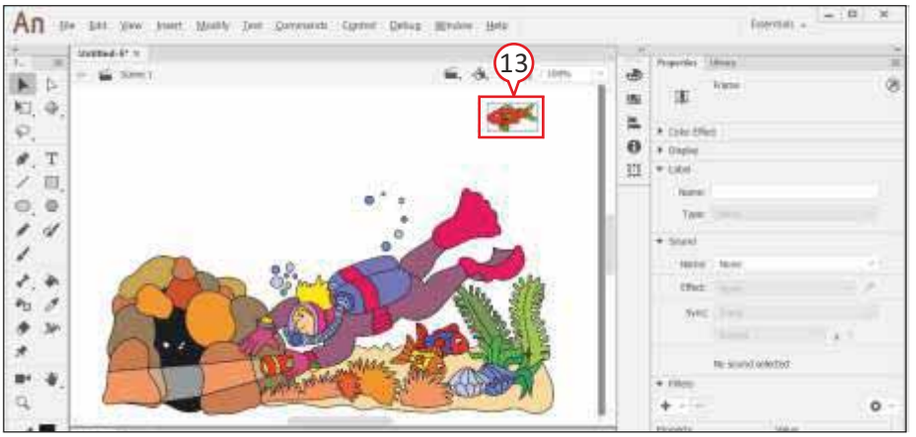
ADDING THE SECOND KEYFRAME



11. Click on the next frame in the timeline to add a keyframe.
12. To add a keyframe, right-click on the frame, and then select **Insert Keyframe** from the menu that appears.

Animate inserts a keyframe that copies the content from the previous frame.

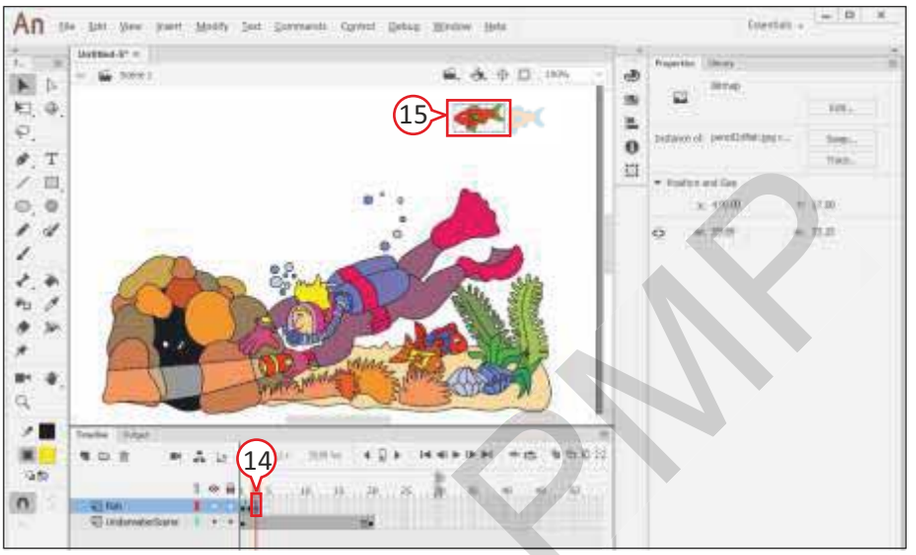
MOVING THE OBJECT SLIGHTLY



13. Change the object slightly to animate.

For example, move the object a bit on Stage or change the appearance of the object.

ADDING THE THIRD KEYFRAME



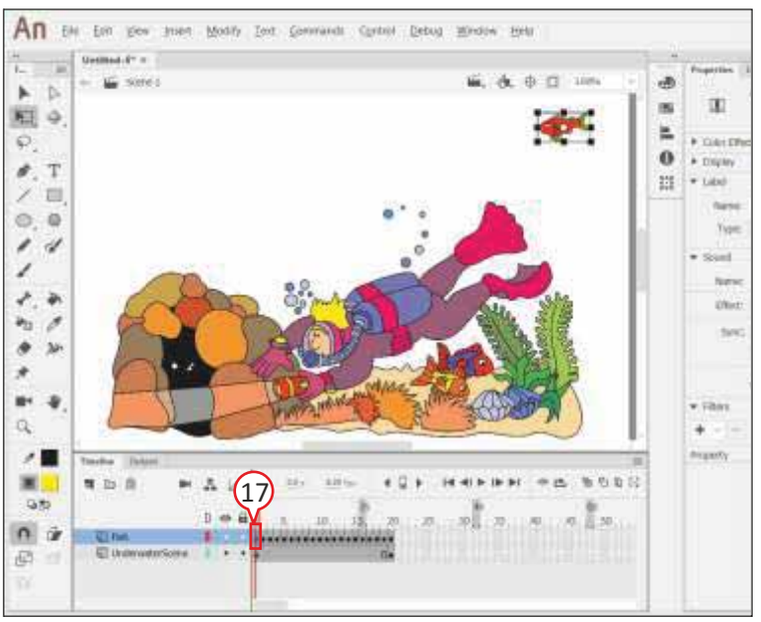
14. Click on the next frame in the layer, and add a keyframe.

Animate copies the content from the previous frame.

15. Change the object slightly again.

16. Repeat **steps 14** and **15** until you finish moving the object.

PLAYING BACK THE MOVIE



17. Click on the first keyframe in the layer and press **ENTER** key.

Adobe Animate plays the entire movie.

Your project is now complete.

Using Tween

You can apply tween when you animate moving symbols. A **tween** defines two points of movement in the Timeline with two keyframes. It lets Animate calculate all the in-between frames necessary to get from first point to the last point.

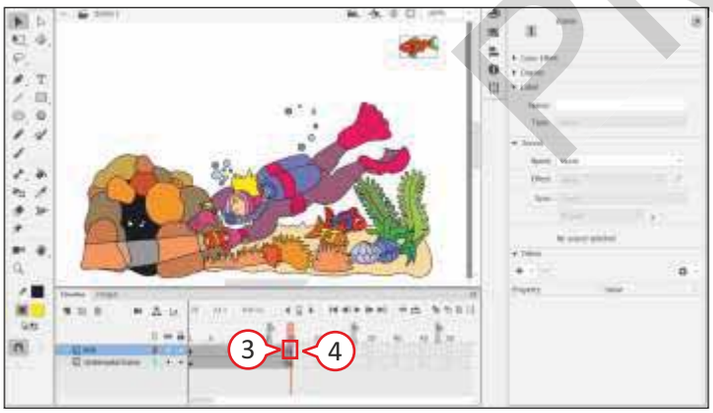
The difference between a frame-by-frame animation and tween is that when you create frame-by-frame animation, you manually input the changes made to each frame in the sequence and when you use tween, you only specify the first frame and the last frame, and let Animate calculate the in-between frames. In Animate, we have three types of tweening: **classical tweening**, **motion tweening**, and **shape tweening**.

CREATING A CLASSIC TWEENING

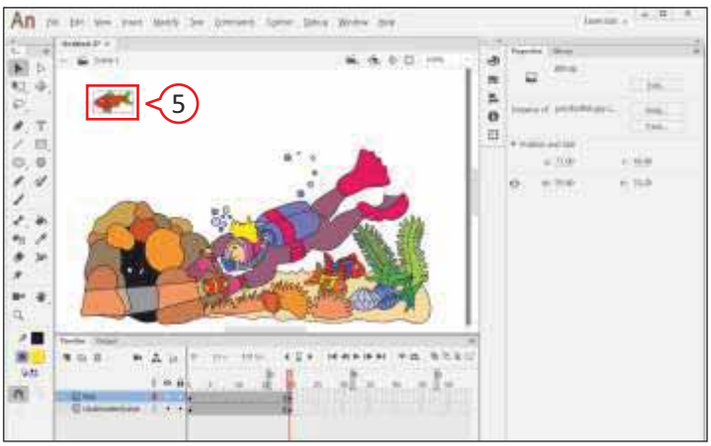
You can use the classic tween to animate between two keyframes.

1. Select a keyframe where you want to start the **Classic tween**.
2. Place the symbol you want to animate on Stage.

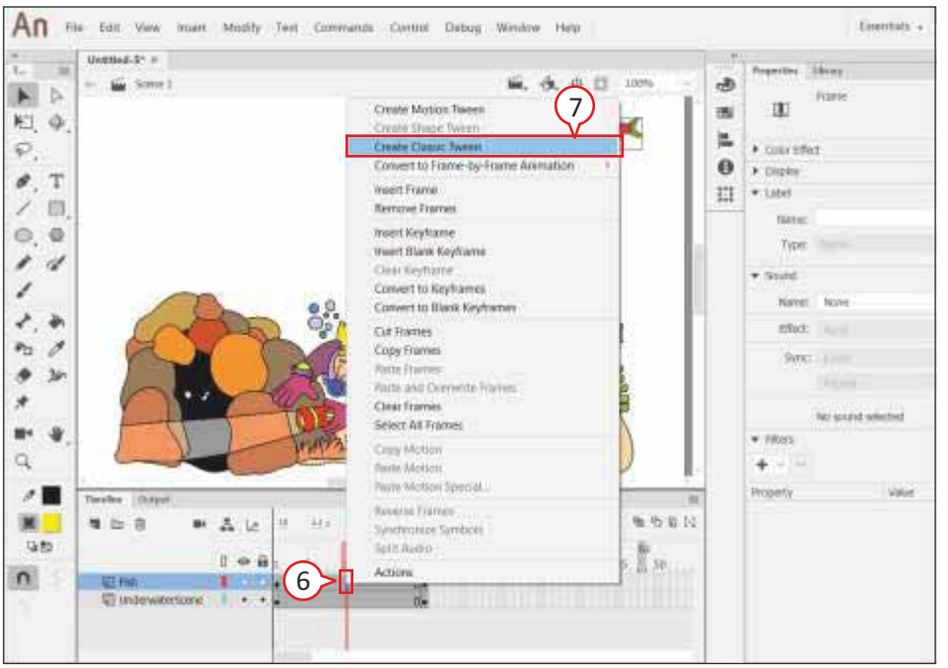
Remember that the position of the symbol should be the **starting point** of the animation.



3. Click on the last frame you want to include in the tween.
4. Insert a keyframe.



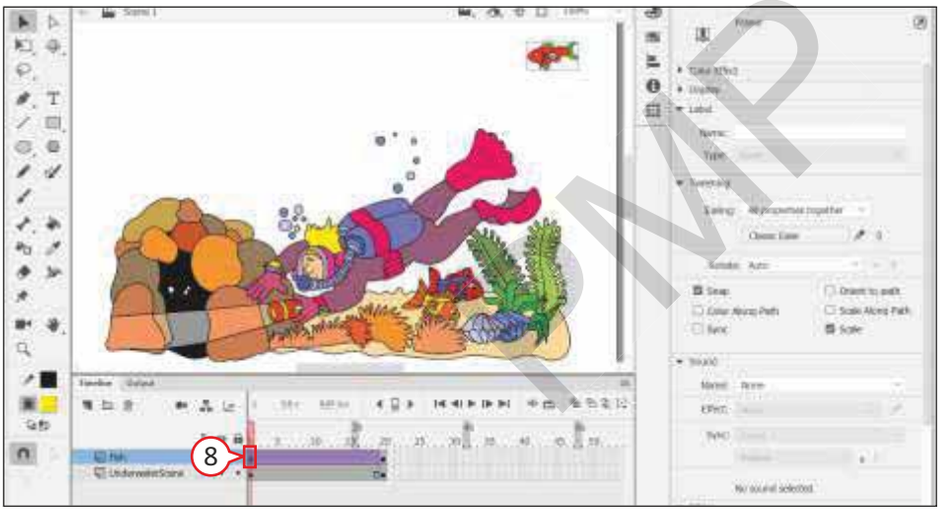
5. Move the symbol to the position on which you want the motion tween to end.



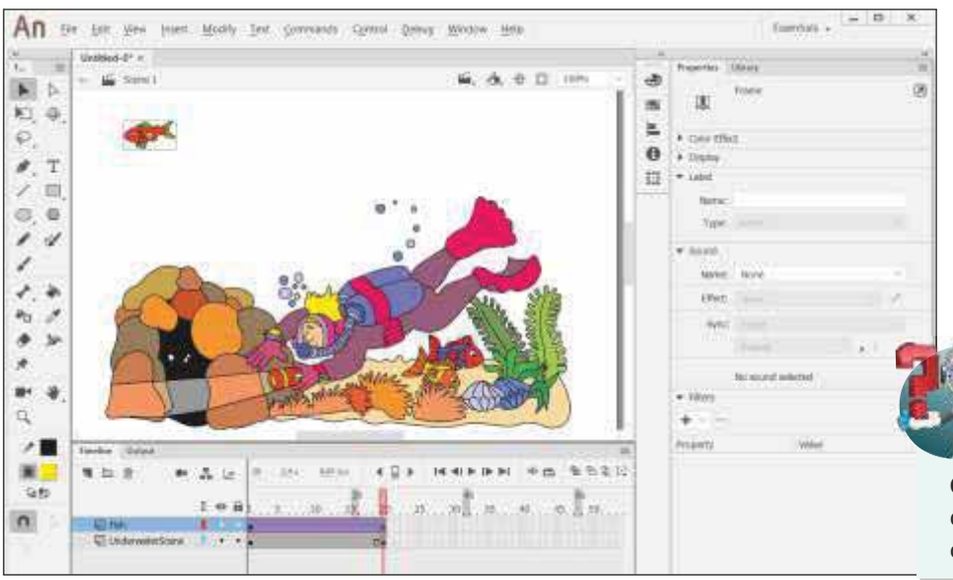
6. Right-click between the two **keyframes** that make up your tween to select the frames.
7. Click on **Create Classic Tween** from the menu that appears.

Animate adds color to the tweened frames and draws an arrow through them.

Testing Classic Tween Effect



8. To view a Classic tween in action, click on the **first frame** of the Classic tween.
9. Press **ENTER** key.



Adobe Animate plays the entire animation sequence.

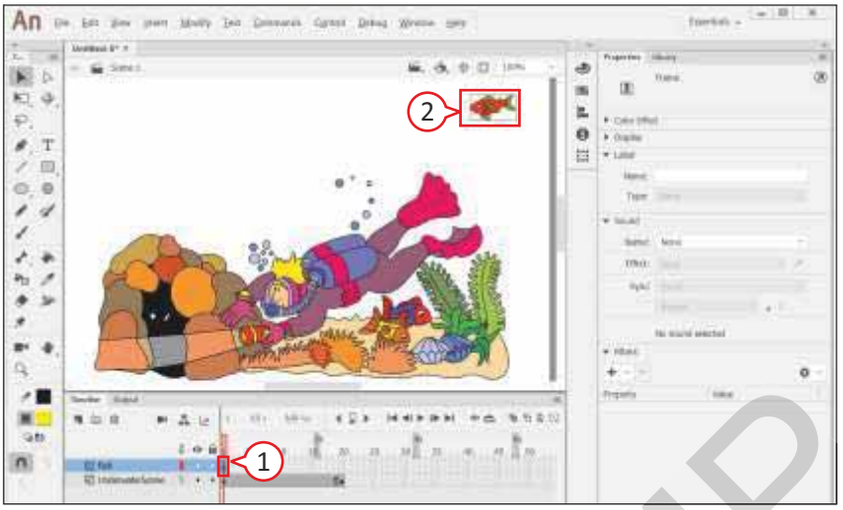
You can also test the movie by clicking on **Control** menu, and then clicking on **Test Movie**.

Do You Know?

Classic tween is complex to create and provides less control over tweened animation.

CREATING A MOTION TWEENING

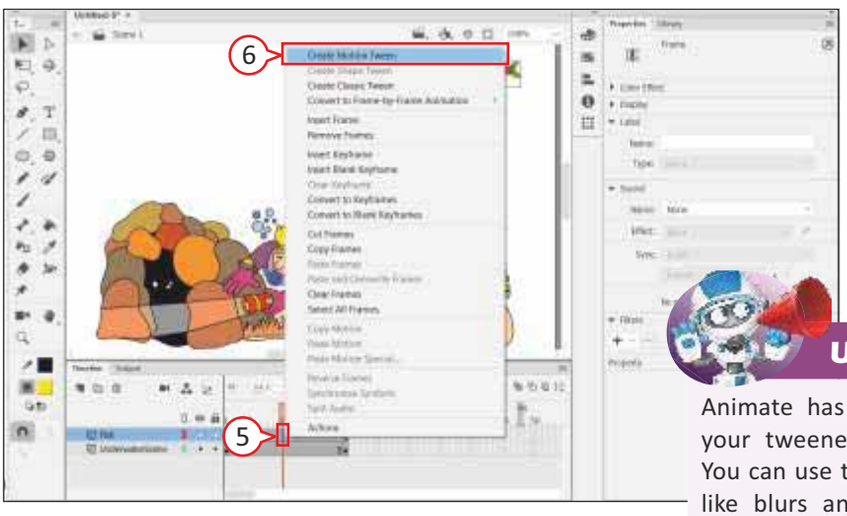
Motion tween is a feature that allows you to easily animate the motion of an object. Instead of defining the location of the object in every frame, you can create a motion tween, which will automatically move the object from the beginning location to ending location. Once the tween has been created, you can click on any frame within the motion tween and move or rotate the object. Animate automatically builds a motion path animating the frames between the first frame and the next keyframe. In order for Animate to create the motion tween, you may need to convert the object to a symbol.



1. Select a keyframe where you want to start the motion tween.
2. Place the symbol you want to animate on Stage.

Remember that the position of the symbol should be the starting point of the animation.

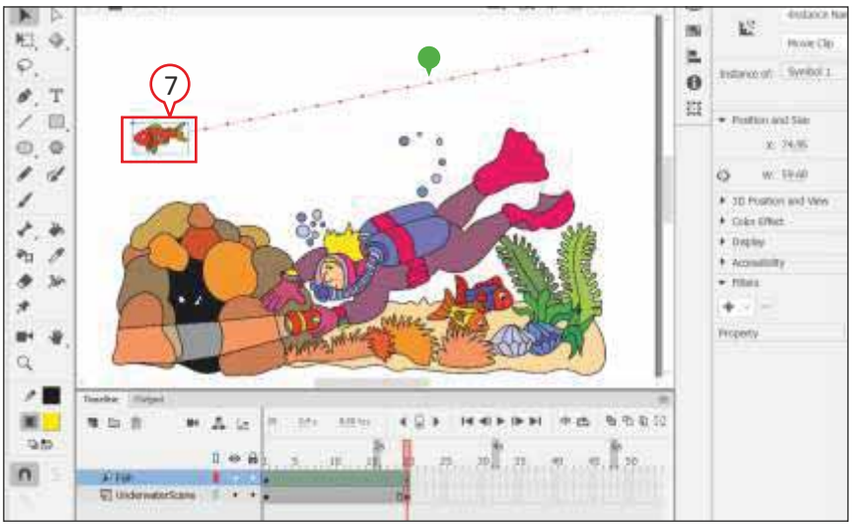
3. Right-click on the **last frame** you want to include in the tween.
4. Click on **Insert Frame**.



5. Right-click between the two frames that make up your tween to select the frames.
6. Click on **Create Motion Tween** in the menu that appears.

Update Your Knowledge

Animate has introduced a new panel for fine-tuning your tweened animation called the **Motion Presets**. You can use the motion presets to add tweened effects like blurs and drop shadows. You can also use the motion editor to choose the types of ease you want.



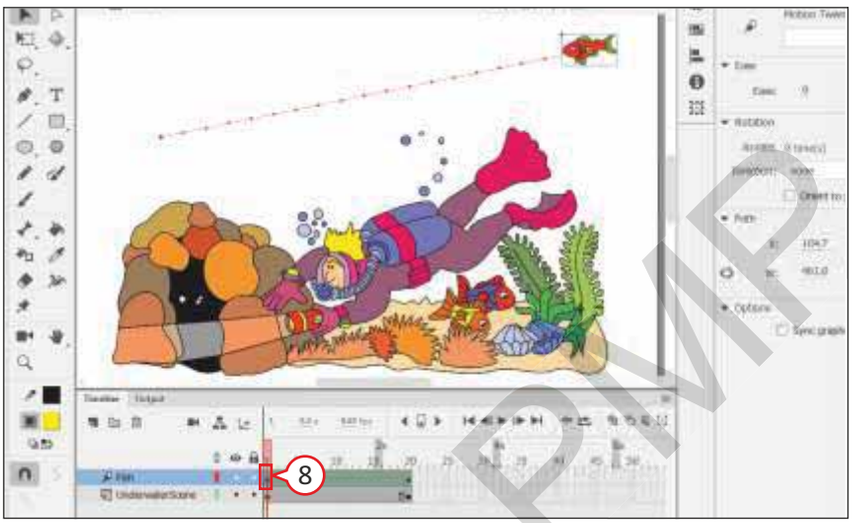
Animate colors your tween layer blue.

7. Drag the symbol to the position on which you want the motion tween to end.

- A path will appear on which the object will move.

You can create curved paths for your objects to follow during a tween. Animate defaults to a straight line, but you can modify it simply by dragging the anchor points along the path.

Testing Motion Tween Effect

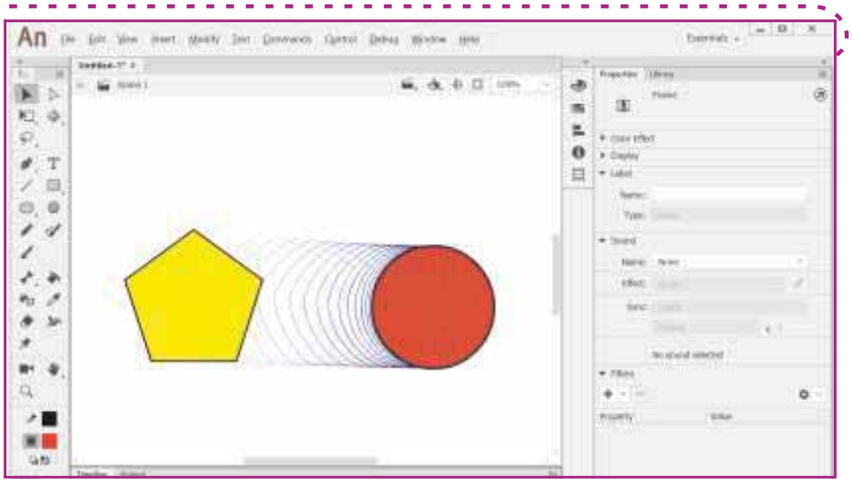


8. To view a Motion tween in action, click on the first frame of the Motion tween.
9. Press **ENTER** Key.

Animate plays the entire animation sequence.

You can also test the movie by clicking on **Control** menu, and then click on **Test Movie**.

Project: Morphing a shape using Shape Tween



Skill Formation

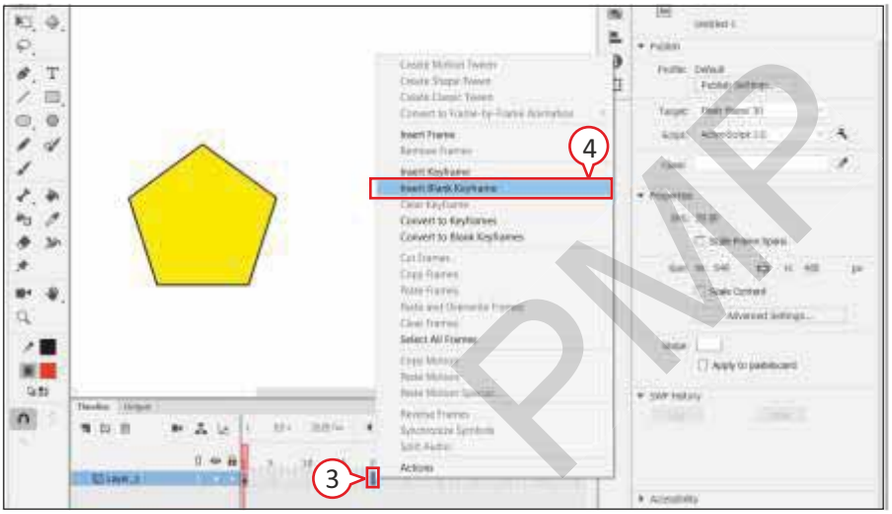
This project enhances the adaptability skills and the modification ability of the students.

This project deals with creation of Shape tween. In this animation, we will choose two shapes and morph them from one shape to another. Now, let us practice using these features through this project.

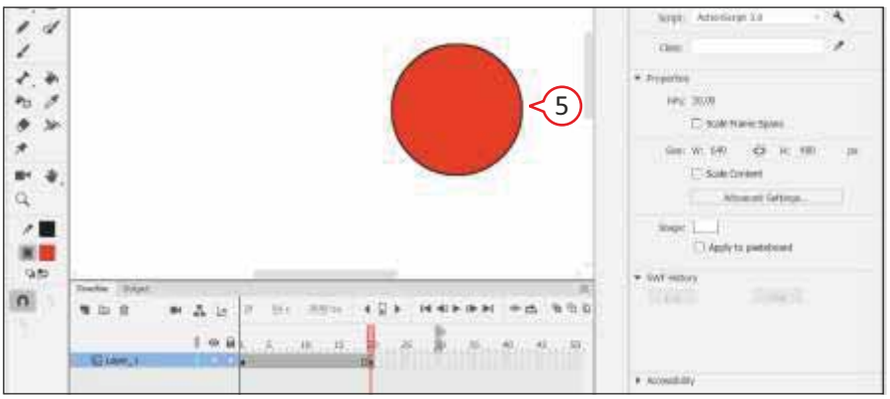
CREATING A SHAPE TWEENING

You can use shape tweening to morph one shape to another. For example, you can morph a circle into a square. Shape tweens can only be applied to shapes.

1. Select the frame in which you want to start a shape tween.
2. Draw the object you want to animate in frame 1.



3. Right-click on the **last frame** you want to include in the tween.
4. Click on **Insert Blank Keyframe.**

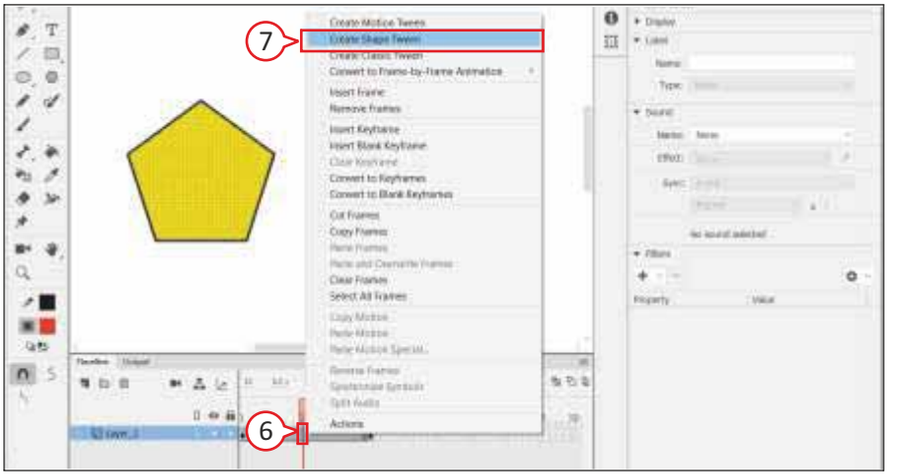


5. Draw the shape into which you want your image to morph or change.

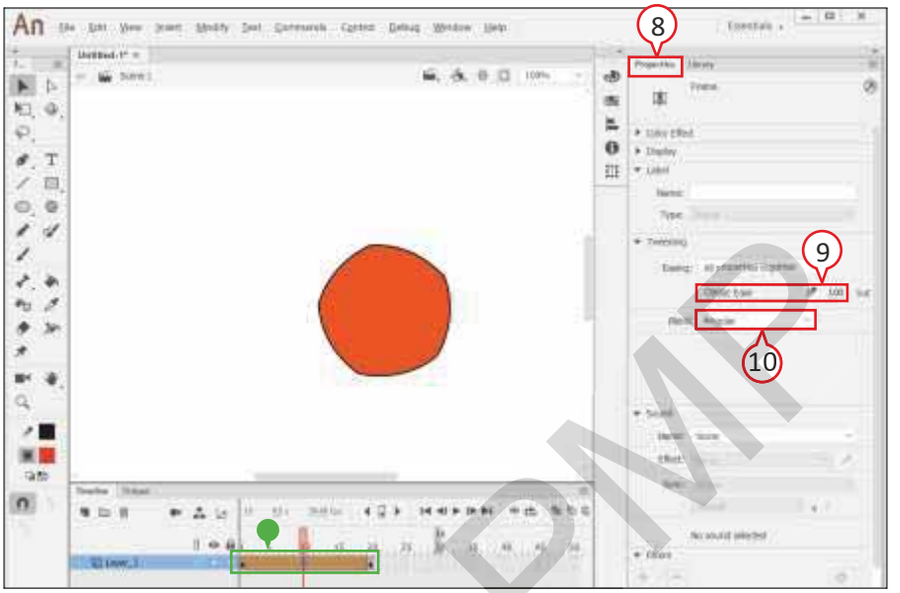
How to Slow Down Animation

There are two ways to slow down an animation:

- You can adjust the frame rate of your Animate movie in the Properties panel.
- You can add frames between your keyframes. To add frames right click on the Timeline, and then click on Insert Frame.



6. Right-click between the two frames that make up your shape tween to select the frames.
7. Click on **Create Shape Tween** from the menu that appears.

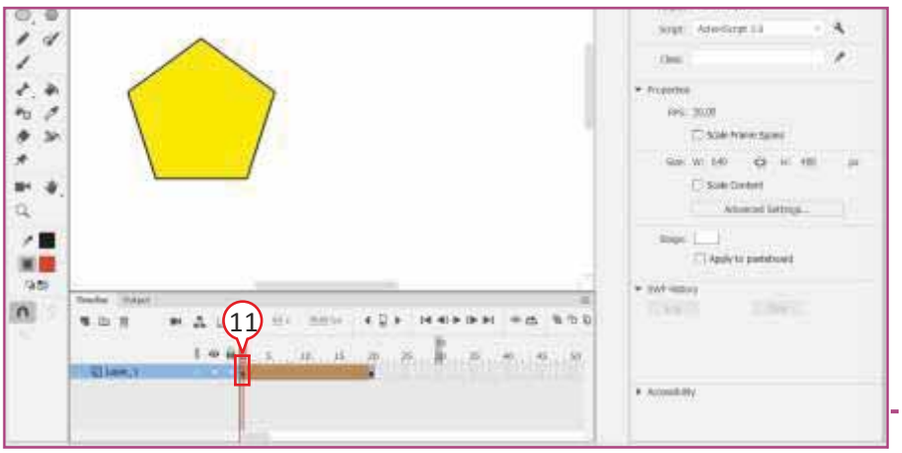


- Animate colors the frames of your shape tween.

8. Open the **Properties** panel.
9. Drag and enter a **Classic Ease** value of 100.
10. Click the **Blend** menu, and select **Angular**.

Angular blending attempts to keep the straight lines straight and corners sharp as the animation plays.

Testing Shape Tween

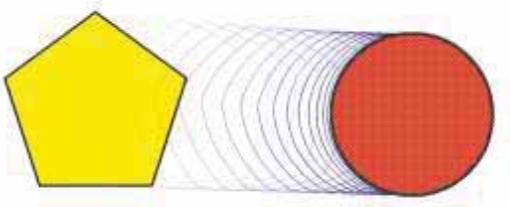


11. To view a Shape tween in action, click on the **first frame** of the Shape tween.
12. Press **ENTER** key.

Animate plays the animation.

Your shape morphs from Polygon to circle.

Your project is now complete.



Finish

Self-Evaluation

CHECKLIST

After reading the chapter, I know these points:

	Agree	Disagree
I know that layers are the key components to work with graphic objects and animation.	☐	☐
I know that symbol can be a graphic object or a movie clip.	☐	☐
I know that in Animate, the scene and object change slightly from one frame to next frame due to animation effect.	☐	☐
I know that in Animate, before creating any animated movie, we have to set up the movie size and speed at which the movie will play.	☐	☐
I know that user can add frames and keyframes to add time to their animated movie.	☐	☐
I know that user can create frame-by-frame animation in Adobe Animate.	☐	☐
I know that user can apply three types of tweening: classic, motion and shape.	☐	☐

Exercises

A. Tick (✓) the correct answer.

1. ..... is effective in adding depth in our graphic objects.
   a. Layer ☐ b. Animation ☐ c. Frame ☐
2. ..... creates the illusion of movement.
   a. Transition ☐ b. Animation ☐ c. Symbol ☐
3. A frame rate of ..... is the default setting for new Animate document.
   a. 12fps ☐ b. 30fps ☐ c. 24fps ☐
4. A keyframe is indicated on the Timeline with a ..... circle.
   a. red ☐ b. black ☐ c. green ☐
5. In Animate, Shape tween can only be applied to ..... .
   a. shapes ☐ b. images ☐ c. text ☐

B. Write 'T' for true and 'F' for false statements.

1. We cannot import bitmap graphic in Animate. ☐
2. We can create many instances of the same symbol. ☐
3. In frame-by-frame animation, Animate calculates in-between frames automatically. ☐
4. While doing Motion tween, Animate changes the color of timeline tween layer blue. ☐
5. Shape tween can only be applied to shapes. ☐

C. Fill in the blanks.

1. A bitmap graphic is composed of many tiny parts called ..... .
2. A ..... layer can be used for reference point and alignment.
3. Frame-by-frame animation is also known as ..... animation.
4. We can use the ..... tween to animate between two keyframes.
5. To morph one shape to another, ... tween is used.

D. Differentiate between the following.

1. Keyframe ..... Blank Keyframe .....

2. Motion Tween ..... Shape Tween .....

E. Answer in 1-2 sentences.

1. What is layer? Write its type.

2. Why do we add frames in Animate?

3. What do you understand by symbols and instances?

F. Answer briefly.

1. What is frame-by-frame animation? Explain.

2. What is tween? Write its type.

G. Application-based Question

Sakshi wants to apply shape tweening animation on a symbol. But when she started the work, the shape tween option got disabled. Tell her the mistake she is doing.

Group Discussion

Discuss the topic– 'Impact of Animated Movies on Kids'.

Online Link

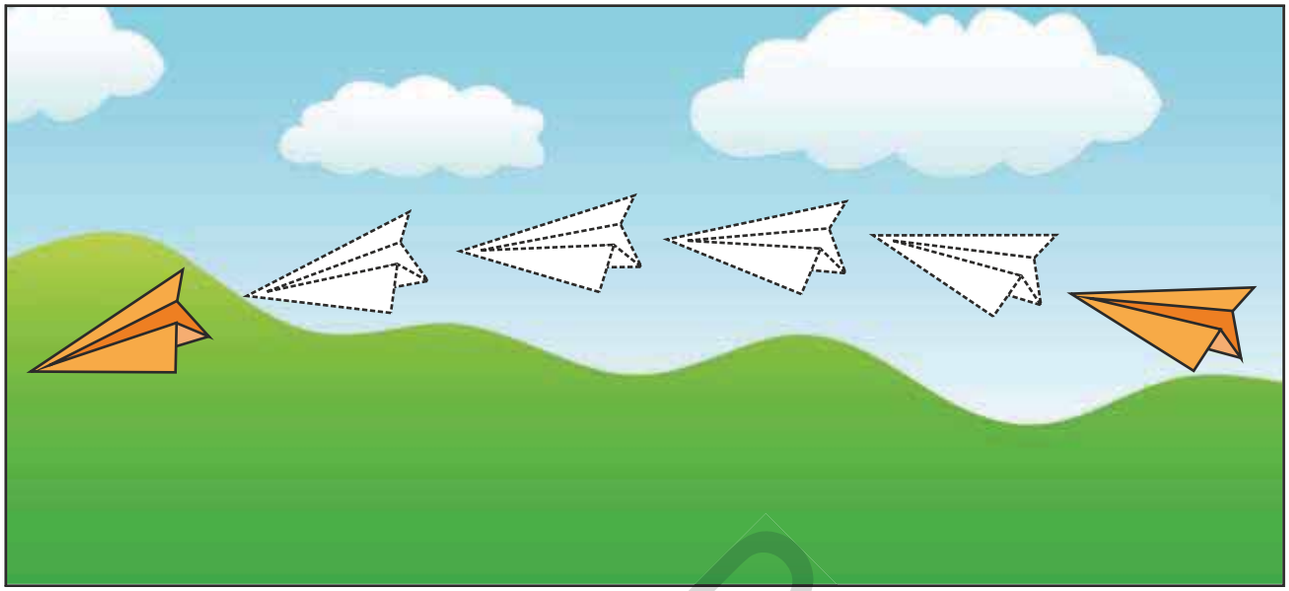
To learn more about animation in Adobe Animate, visit the website:

https://www.skillshare.com/classes/2D-Animation-For-Beginners-With-Adobe-Animate/1155877/projects

Activity Section

Lab Activity

Draw a paper plane in Animate and make it fly in different directions.



Follow the instructions given below:

a. Insert any picture of sky as a background in Layer 1.

b. In Layer 2, draw a paper plane by using the tools from the Drawing toolbar.

c. Make the plane fly by using:
   - Frame-by-Frame Animation
   - Classic Tweening
   - Motion Tweening

d. Save the animation as **'Paper Plane'** in **'Lab Activity'** folder and play it.

Skill Formation

This activity will enhance the creativity and animation skills of the students.

Subject Integration

Science

This integration will make the students learn about motion and time.

Technology Trailblazers

Larry Ellison

Co-founder: Oracle | ORACLE | **YEAR: 1977**

Larry Ellison is the co-founder of **Oracle Corporation**, and is the eighth-wealthiest person in the world. Larry Ellison was born in the Bronx, New York, on August 17, 1944, to single mother Florence Spellman.

In 1977, Ellison and two of his colleagues founded Software Development Labs and soon had a contract to build a database-management system—which they called **Oracle**. Earlier, the company was not in a good position but in 1981, IBM signed on to use Oracle, and the company's sales doubled every year for the next seven years. Ellison soon renamed the company after its best-selling product.

4 Photoshop – Introduction

OBJECTIVES

After completing this chapter, you will be able to:

- Understand the features of Photoshop.
- Understand the components of Photoshop window.
- Learn how to use various tools of Photoshop.
- Identify various color modes and filters.

Introduction to Photoshop

Photoshop is an image editing software developed by **Adobe Systems**. It allows you to create, modify, and optimize digital images. You can then save the images to print, share via e-mail, publish online, or view on a handheld device (such as an iPad or smartphone).

FEATURES OF PHOTOSHOP

Understanding and Selecting Pixels: In Photoshop, digital images are made of tiny, solid color squares called **pixels**. It provides various selection tools to edit specific pixels in the image.

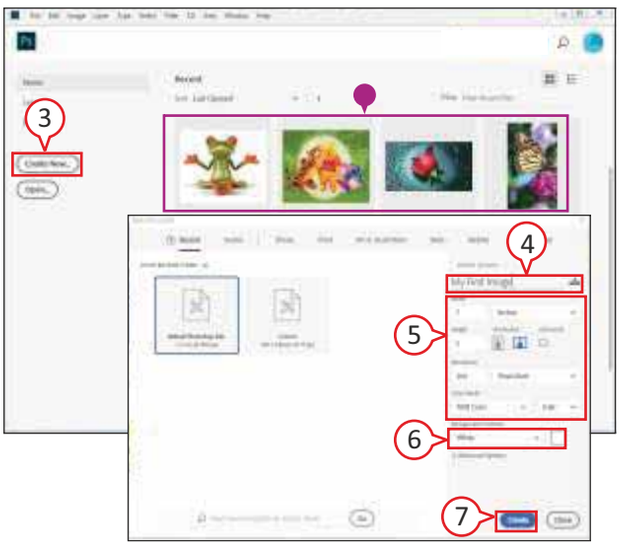
Painting Image: You can use Photoshop Paintbrush, Airbrush and Pencil tools to apply colors or patterns to your images after selecting their pixels. You can also fill the arrows of your selections with solid or semi-transparent colors.

Adjusting Colors: You can brighten, darken, and change the shades of colors in parts of your image with Photoshop Dodge, Burn and similar tools.

Applying Filters: Photoshop filters can make your image look like an impressionist painting; sharpen or blur your image, or distort your image in various ways.

Starting Photoshop and Creating New Document

1. Click on **Start** icon to open Start menu *(or press ⊞). A list of all installed apps appears.*
2. Scroll down and click on **Adobe Photoshop.** *Adobe Photoshop window appears.*



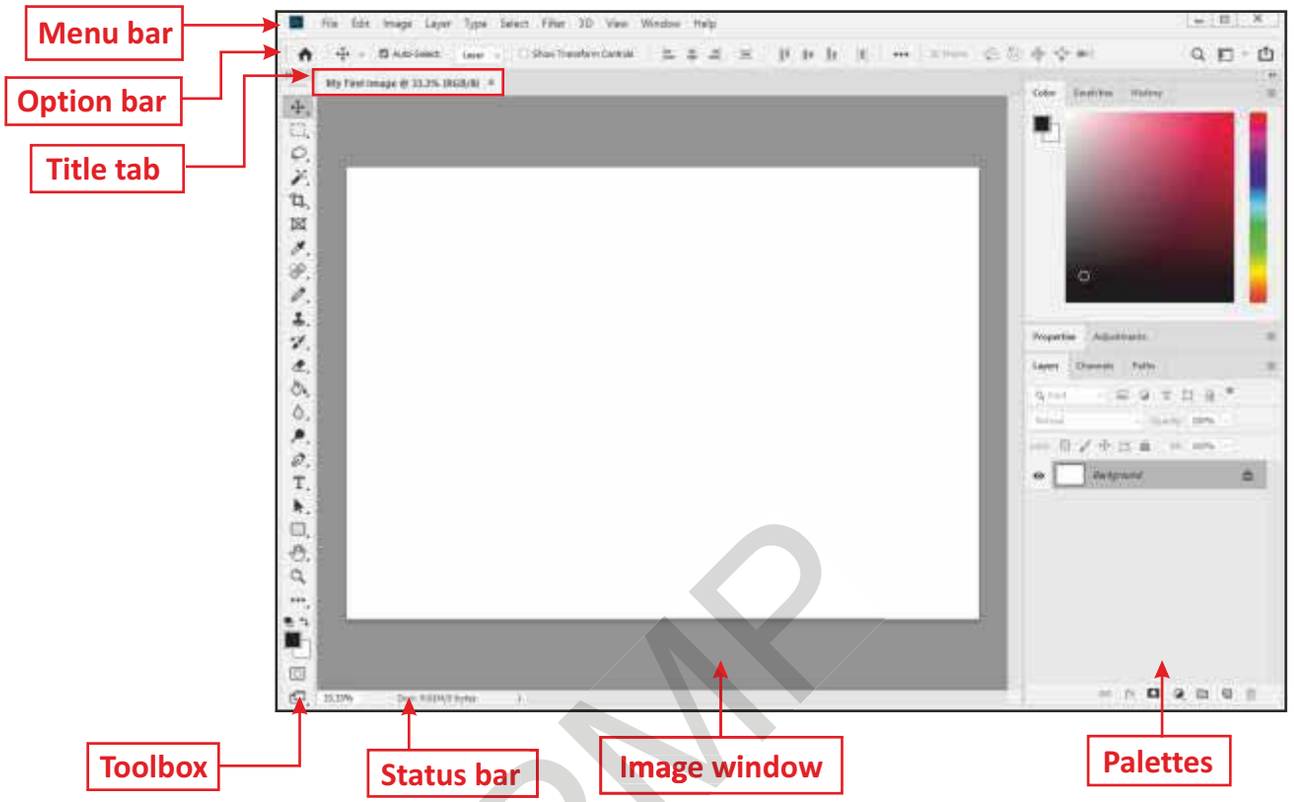
- Photoshop gives you quick access to your recent files. You can open any recently used file by clicking on it.

3. Click on **Create New** *(or press Ctrl+N)*. The **New Document** dialog box appears.
4. Type a name for the new image.
5. Type the desired dimension and resolution.
6. Click on the down arrow for the type of color you want in the background.
7. Click on **Create**.

Photoshop creates a new image window with the specified dimensions. The name of the new image appears in the Title tab.

THE PHOTOSHOP WINDOW

Each image you open in Photoshop appears in its own window. Window can take up the entire workspace, and you can use a combination of tools, menu commands and palette-based features to open and edit your digital images in Photoshop.



Menu bar: It displays menus that contain most of the commands and functions of Photoshop.

Option bar: It displays controls that let you customize the selected tool in the toolbox.

Title tab: It displays the name, magnification, and color mode of an open image. You can switch between images by clicking their respective tabs.

Image window: You can open an image in the image window in Photoshop. All the image editing is done in image window.

Palettes: These are small windows that give you access to common commands and resources. You can click the tabs and icons to display and hide panels.

Status bar: It displays the magnification of the current image and the amount of computer memory that the image uses.

Toolbox: There are many tools in the Toolbox that you can use for working on your image. If you leave your mouse cursor over the tool, Adobe Photoshop will indicate the name of the tool and the keyboard shortcut to access the tool. Some of the tools are stacked in group of tools. A **small black arrow** in the bottom right corner of the tool indicates that additional tools are stacked behind. To access any of the tools in this stack, click and hold down the mouse button on the uppermost tool for a second.

Working with Photoshop

OPENING AN IMAGE

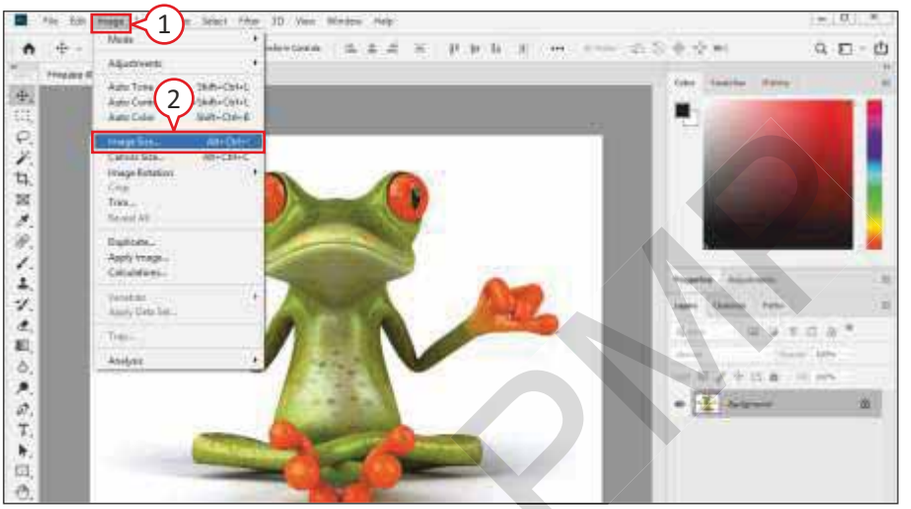
You can open an existing image file in Photoshop.

1. Click on **File** in the Menu bar. *The File menu will open.*
2. Click on **Open** *(or press Ctrl+O). The Open dialog box appears.*
3. Navigate to the folder that contains the image you want to open.
4. Click on the file name to open. *The preview of your image file will appear.*
5. Click on **Open**. *The image appears in a new window of Photoshop.*

The name of the file appears in the Title tab.

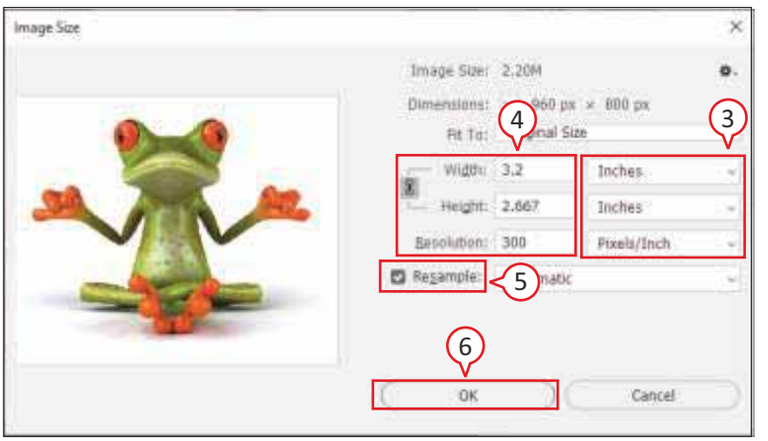
CHANGING ON-SCREEN SIZE OF IMAGE

You can change the size of an image on the screen, in order to view the entire image.



1. Click on **Image** in the Menu bar.
2. Click on **Image Size** *(or press Alt+Ctrl+I)*.

The **Image Size** dialog box appears.



3. Click on the down arrow to change the unit of measurement.
4. Type a new size for the dimension in this area.
5. Make sure that **Resample** checkbox is selected to change the number of pixels in the image. Changing the number of pixels changes the on-screen size.
6. Click on **OK**.

Photoshop resizes the image.

Measurement Units in Photoshop

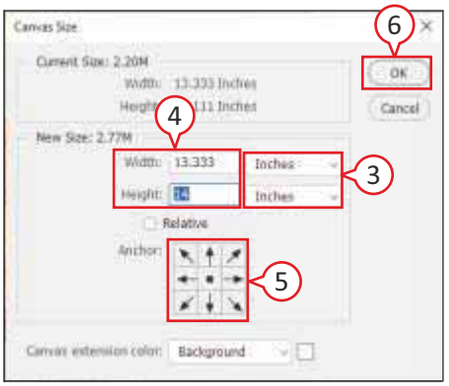
You should use the units most applicable to the type of output you intend to produce. Pixel units are useful for web imaging because monitor dimensions are measured in pixels. Inches, centimeters, and pixels are useful for print because those are standards for working on paper. You can set this under the Units and Rulers preferences.

CHANGING THE CANVAS SIZE OF AN IMAGE

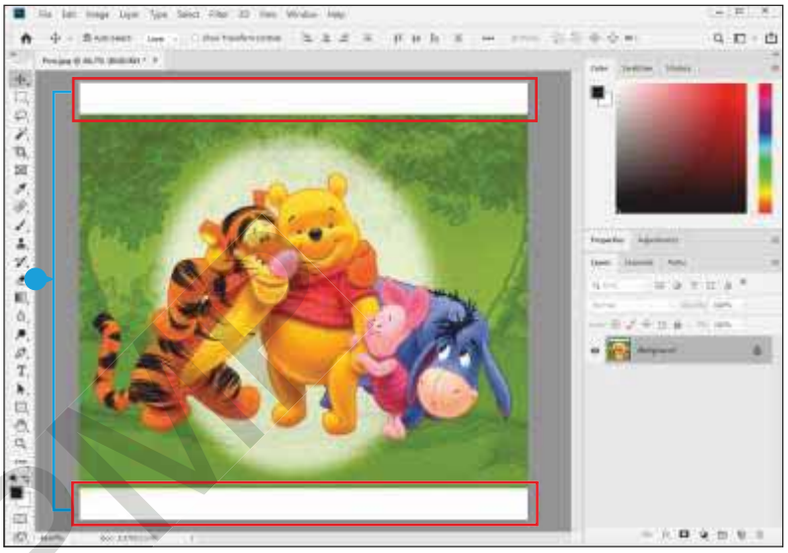
You can change the canvas size of an image to add blank space to its sides.

1. Click on **Image** menu.
2. Click on **Canvas Size** *(or press Alt+Ctrl+C)*.

The **Canvas Size** dialog box appears.



3. Click on the arrows to change the unit of measurement.
4. Type the dimensions (Width and Height) for the new canvas.
5. Click an Anchor point (such as **Center**).
6. Click on **OK**.



Photoshop changes the canvas size of the image.

- The canvas changes equally on both the opposite sides because you have selected the middle (center) anchor point.

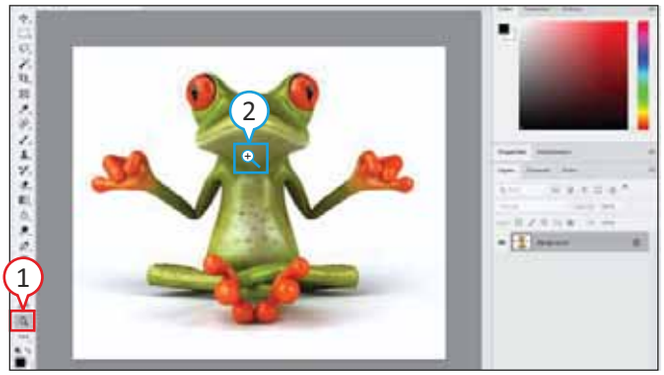
Do You Know?

To determine the printed size of a Photoshop image, you can divide the on-screen size by the resolution. If you have an image with an on-screen width of 480 pixels and a resolution of 120 pixels per inch, the **printed width** is 4 inches.

Using Photoshop Tools

ZOOM TOOL

You can change the magnification of the desired part of an image with the help of the **Zoom** tool. It helps you see small details in an image.



1. Click on the **Zoom** tool ( ) *(or press Z)*.
2. Click on the part of the image that you want to magnify.

As you click on the part of the image, it will become larger and will be seen in magnified form.

You can also use the Zoom tool to magnify the whole image.

- Photoshop ***increases*** the magnification of the image.

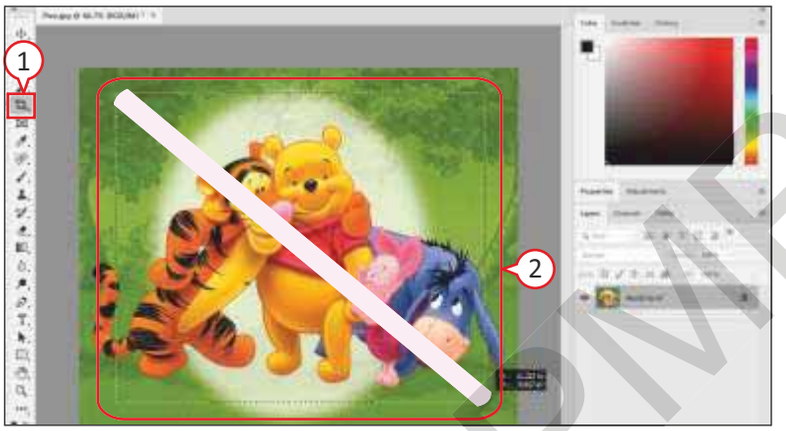
You can also press **Ctrl +** = keys to zoom in.

You can also drag the Zoom tool ( ) on the image to increase a portion of image.

To decrease the magnification, click on the Zoom tool ( ), press and hold the **Alt** key on the keyboard, and click on the image.

CROP TOOL

Crop tool can be used to cut only the desired part of an image. It crops some part of the image and gives you the required part of the image.

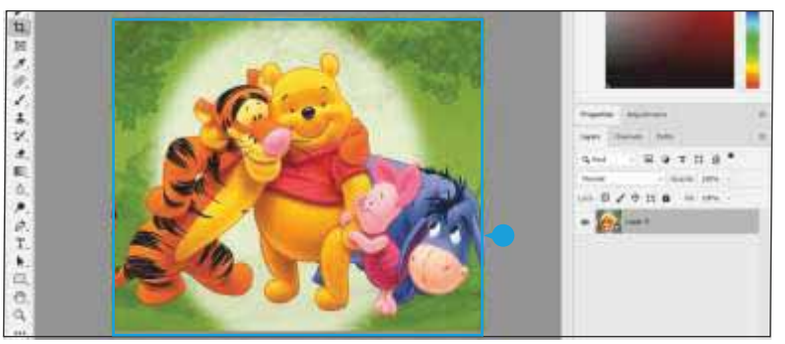


1. Click on the **Crop** tool *(or press C)*.
2. Click and drag to select the area of the image you want to display.

3. You can click and drag the sides and corner handles to adjust the size of the cropping boundary.

*Press **Esc** key on the keyboard to exit from the cropping process.*

4. Press the **Enter** key on the keyboard.



- Photoshop crops the image, deleting the pixels outside the cropping boundary to make it appear smooth.

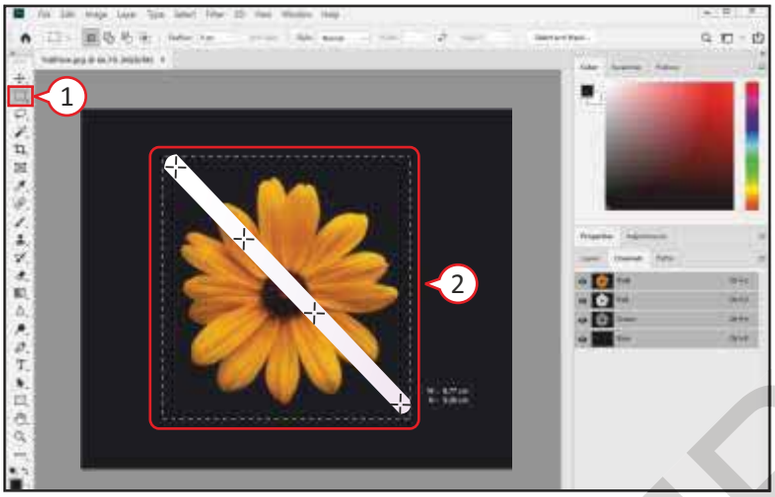
SELECTING TOOLS

Digital images consist of tiny, solid-color squares called **pixels**. To edit specific pixels in your image, you must first select them by using one of the Photoshop's selection tools. You can move, delete, or stylize the selected area using other Photoshop commands.

Selecting with Marquee Tools

Marquee tools are used to select a rectangular or elliptical area of an image.

Rectangular Marquee Tool

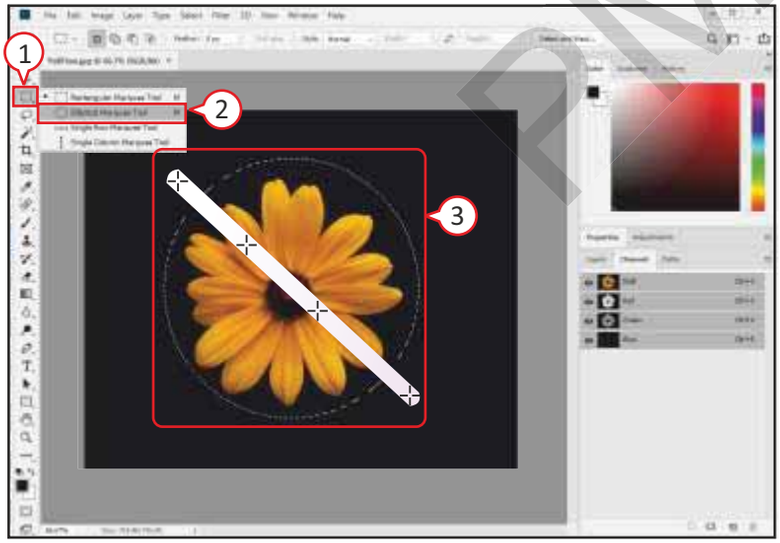


1. Click, on **Rectangular Marquee** tool ( ) *(or press M)*.
2. Click and drag diagonally inside the image window.

Photoshop selects the rectangular portion of your image.

You can deselect a selection by clicking on **Select** in the Menu bar, and then clicking on **Deselect**.

Elliptical Marquee Tool



1. Click and hold **Rectangular Marquee** tool.

A box will appear.

2. In the box, select **Elliptical Marquee** tool [ ] *(or press M)*.
3. Click and drag diagonally inside the image window.

Photoshop selects the elliptical portion of your image.

You can deselect a selection by clicking on **Select** in the Menu bar, and then clicking on **Deselect**.

Changing the Size of an Image for the Web

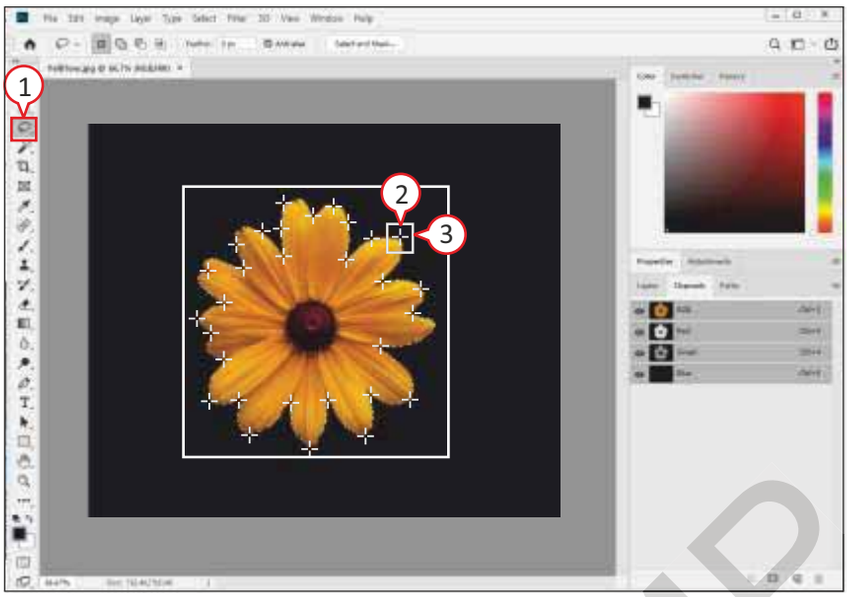
1. Click on **File,** then on **Export**, and then **Save for Web**.
   The **Save for Web** dialog box opens.
2. Type a new value in the **W** or **H** field to change the dimensions of your image.
3. Click on **Save** to save the resized image.

Selecting with Lasso Tool

With the help of **Lasso** tool, you can make odd-shaped selections. Then you can move, delete, or stylize the selected area using other Photoshop commands.

Regular Lasso Tool

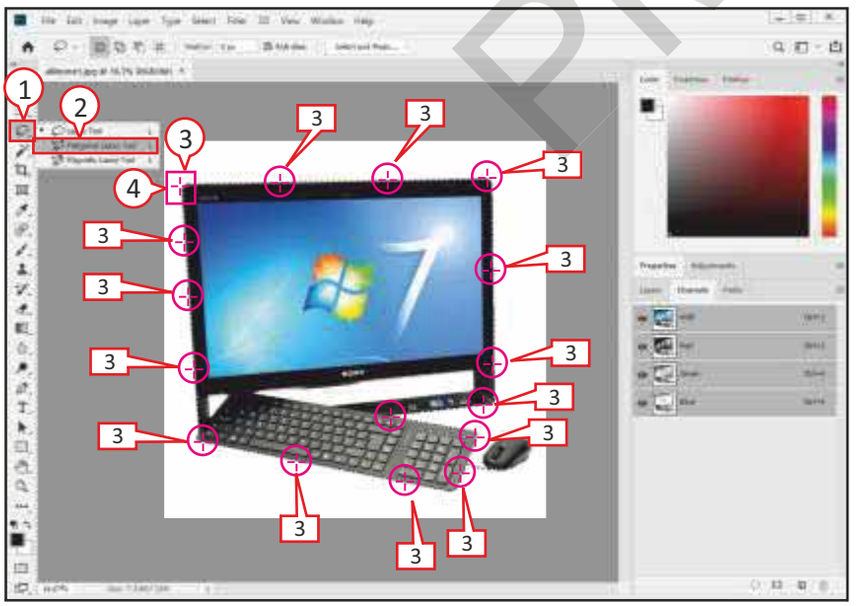
Regular Lasso Tool is used to create curved or jagged selections.



1. Click on **Lasso** tool ( ) *(or press L)*.
2. Click and drag with the mouse pointer to make a selection.
3. Drag till you reach the beginning point, and release the mouse button to complete the selection.

Polygonal Lasso Tool

Polygonal Lasso tool helps to select an area of a picture having straight edges.



1. Click and hold **Lasso** tool.

A box will appear.

2. In the box, select **Polygonal Lasso** tool [ ] *(or press L)*.
3. Click multiple times along the border of the area you would like to select.
4. To complete the selection, click on the starting point.

Update Your Knowledge

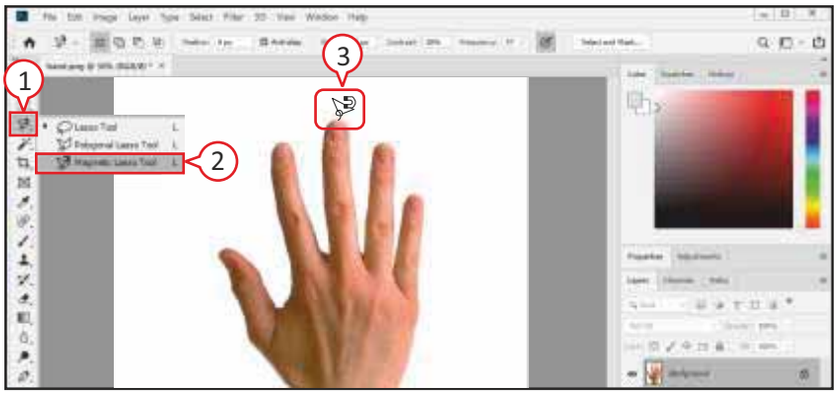
You can also use Polygon Lasso tool to select an area of a picture having straight edges.

Do You Know?

Selecting complicated outlines with Regular Lasso tool can be difficult, even for the steadiest of hands. For that, you can use other Lasso tools like Polygonal or Magnetic.

Magnetic Lasso Tool

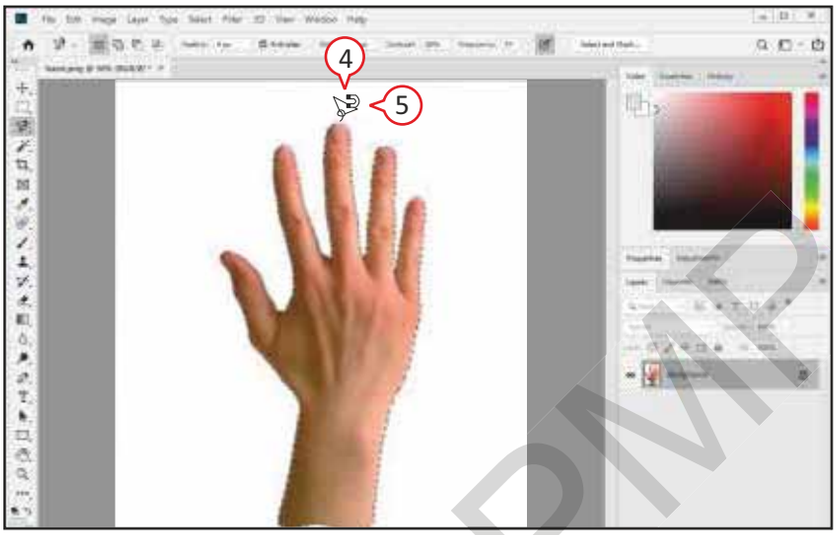
Magnetic Lasso tool is used to select elements of your image that have well-defined edges.



1. Click and hold **Lasso** tool.

A box will appear.

2. In the box, select **Magnetic Lasso** tool [ ] *(or press L)*.
3. Click on the edge of the element you want to select to create the beginning of the anchor point.



4. Drag your mouse pointer along the edge of the element.

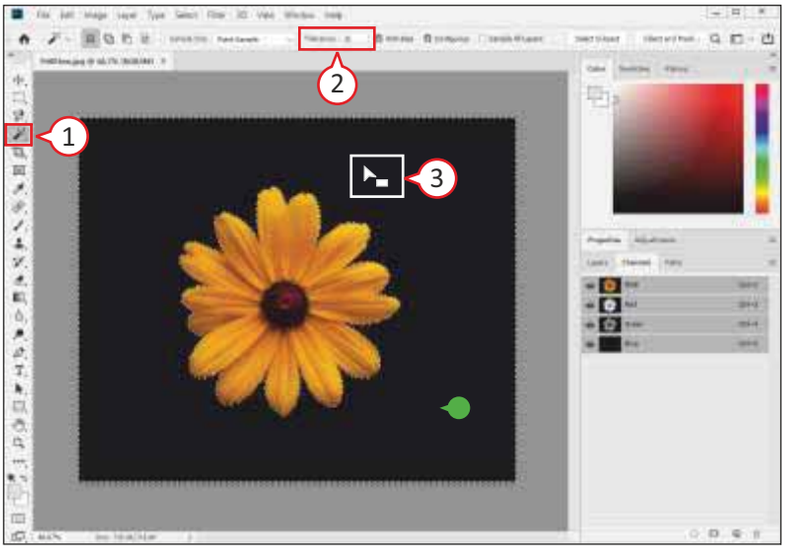
Magnetic Lasso tool snaps on to the edge of the element as you drag.

You can click to add anchor points as you go along to guide the Lasso tool.

5. Click on the beginning anchor point to finish your selection.

Selecting With Magic Wand Tool

Magic Wand tool is used to select the groups of similarly colored pixels. It works best on solid color background.



1. Click on **Magic Wand** tool ( ) *(or press W)*.
2. Type a number from 0 to 255 in **Tolerance** field.

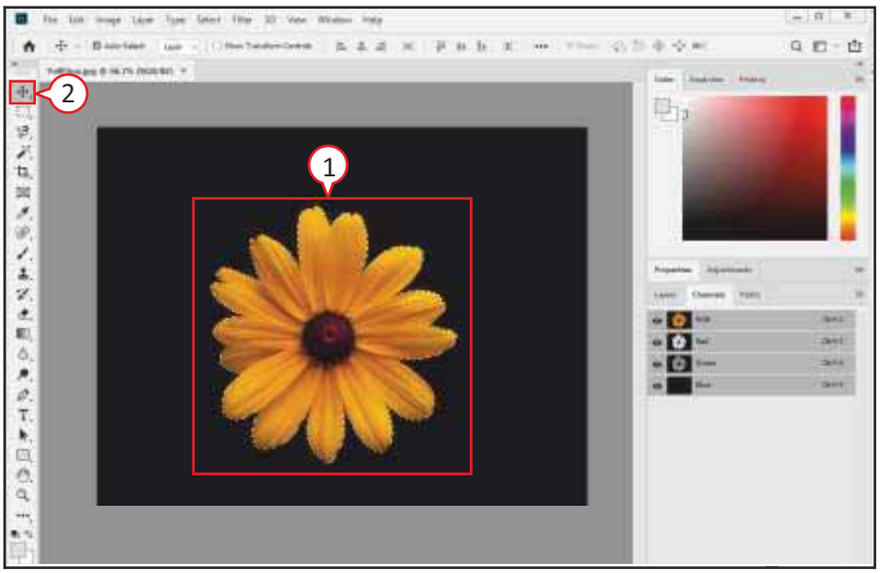
Type smaller number to select narrow range of colors, and type large number to select wide range of colors.

3. Click on the area (pixels) you want to select inside the image.

- Photoshop selects the pixel you clicked and any similar color pixels near it.

MOVING THE SELECTION

With the help of **Move** tool, you can move objects which lets you rearrange the elements of your image.



1. Make a selection with any of the selection tools.
2. Click on **Move** tool ( ) *(or press V)*.

3. Click inside the selection and drag.

*The area (where the selection used to be filled) appears with the current **background color**.*

White is the default background color in Photoshop.

SELECTING ENTIRE IMAGE

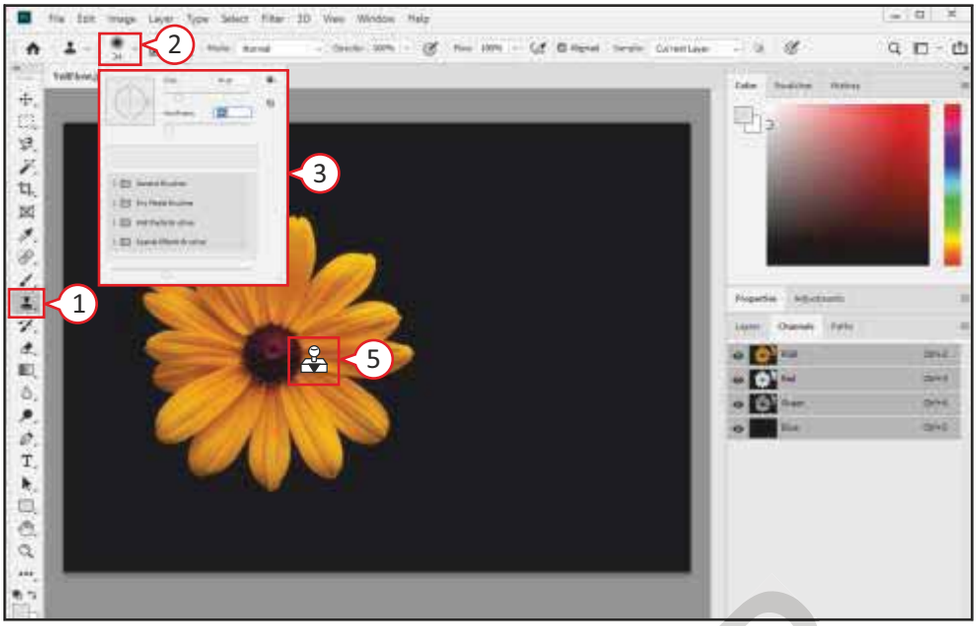
You can select all the pixels in an image by using a single command. This lets you perform a subsequent command on the entire image, such as copying it to a different image window.

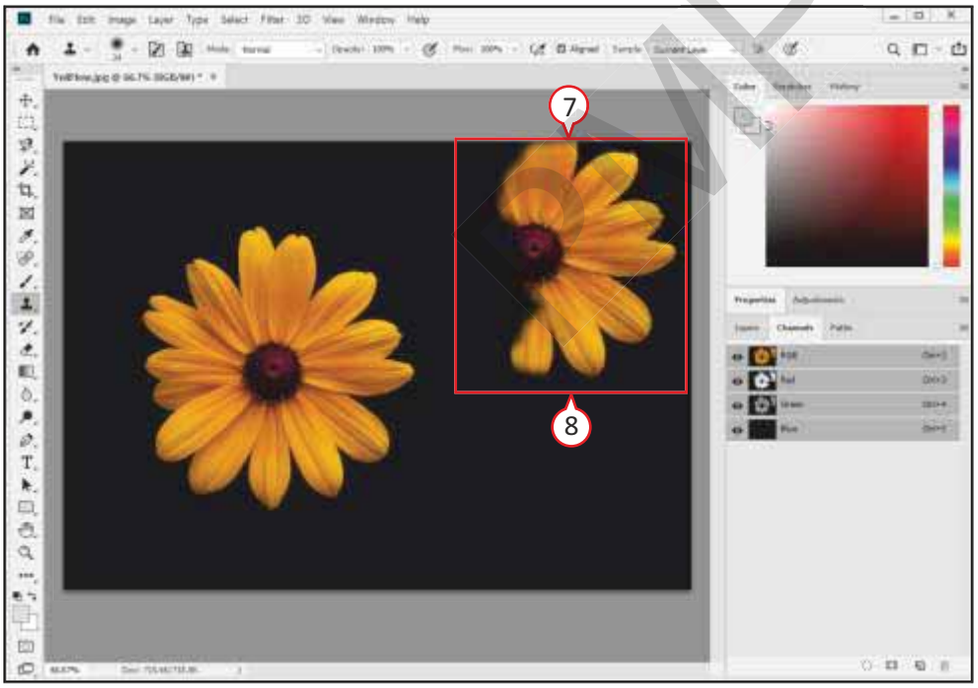
1. Click on the **Select** in the Menu bar. *Select menu will appear.*
2. Click on **All** *(or press Ctrl+A). The entire image window is selected.*

With the entire image window selected, you can easily delete your image by pressing Delete key, or copy and paste it into another window.

CLONE STAMP TOOL

You can clean up small flaws or erase elements on your image with the help of **Clone Stamp** tool. The tool also copies information from one area of an image to another.





1. Click on **Clone Stamp** tool ( ) *(or press S)*.
2. Click on the down arrow of **Brush**.
3. Select the brush **Size** and **Hardness**.
4. Press and hold the **Alt** key on the keyboard.
5. Click on the area of the image where you want to copy from.
6. Release the **Alt** key.
7. Click and drag to apply the Clone Stamp tool.

The area is copied to where you click and drag.

8. Click and drag repeatedly over the area to achieve the desired effect.

Update Your Knowledge

You can use **Clone** tool to:

- erase elements from your image without leaving a trace.
- clone between areas of similar color and texture.

Do You Know?

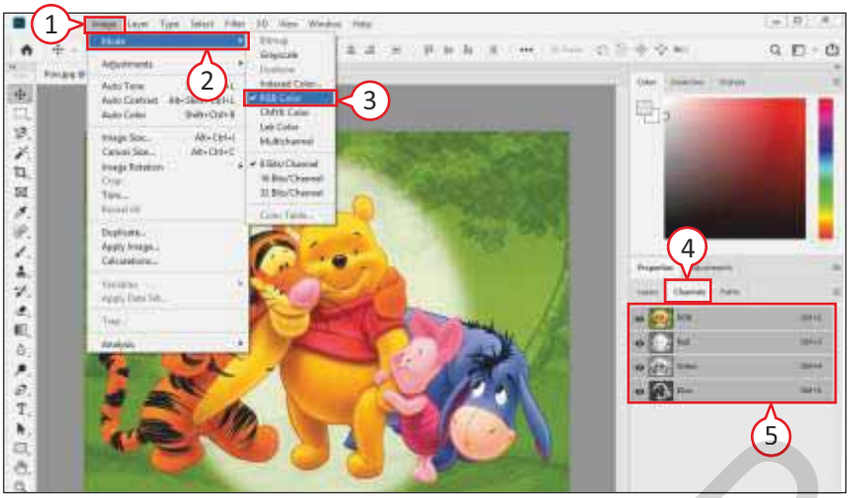
The **Clone** tool is the oldest and the most widely known cloning tool. The basic concept is that you can duplicate certain portions of an image using a source, destination, and brush.

Color Modes

You can use **Color Mode** to apply specific colors on your image. Popularly used color modes in Photoshop are **RGB** and **Grayscale**. You can change the color modes in the picture according to your preference.

RGB MODE

RGB is the common mode for working with color images in Photoshop.



1. Click on **Image** menu.
2. Click on **Mode**.
3. Click on **RGB Color**.

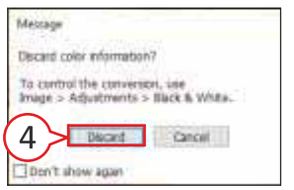
RGB is displayed in the Title tab.

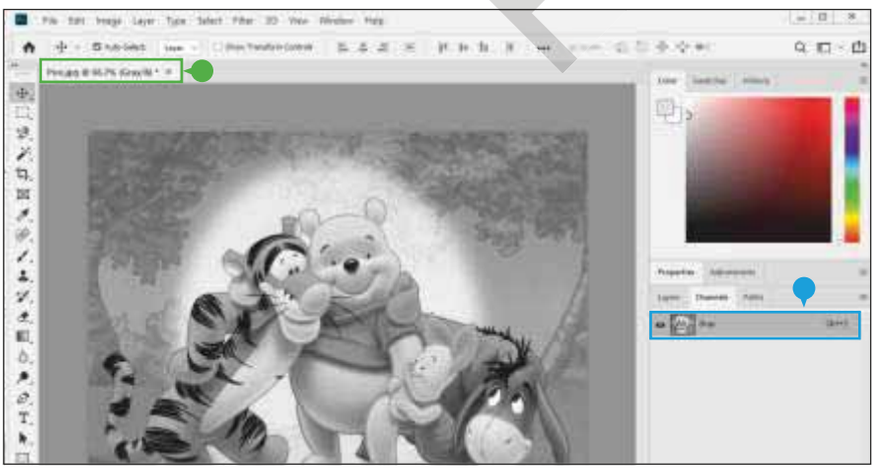
4. Click on **Channels** to view the different color components of an RGB image.
5. Click on any channel (Red, Green or Blue).

CONVERTING COLORED IMAGES TO GRAYSCALE

You can convert an image to grayscale mode to remove the color from your image.

1. Click on **Image** in the Menu bar.
2. Click on **Mode**.
3. Click on **Grayscale**. *Photoshop displays an alert box.*
4. Click on **Discard**.

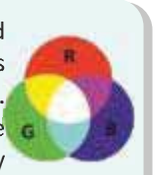




- **Gray** gets displayed in the image Title tab.
- Grayscale images have a single channel, that is the reason why grayscale image files take up less space than RGB images.

Do You Know?

In the RGB color mode, the red, green, and blue colors are added together in various ways to reproduce a broad array of colors. The name of the mode comes from the initials of the three additive primary colors—red, green, and blue (RGB).



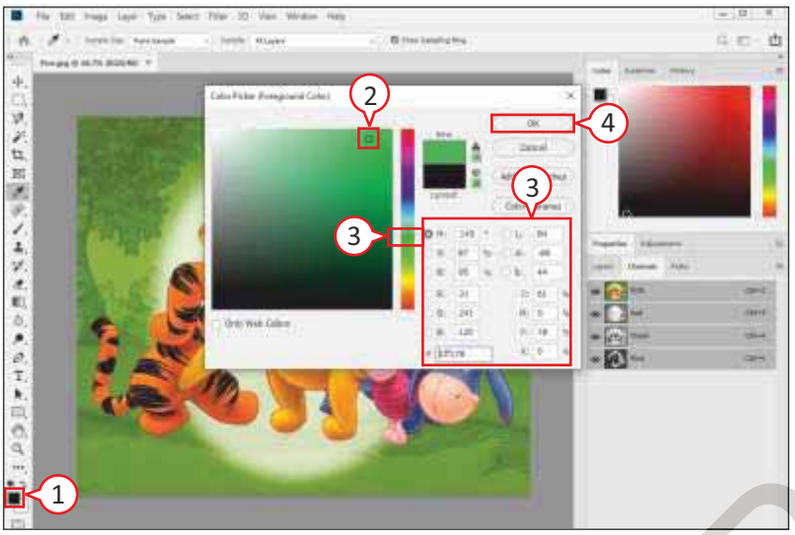
Web-safe Color

Web browsers on some older monitors can display only colors from a specific 216-color palette. These colors are known as web-safe colors. You can click the **Only Web Colors** checkbox in the Color Picker dialog box to restrict your choices to web-safe colors.

FOREGROUND AND BACKGROUND COLORS

Foreground color and background color are the two colors you can select to work with, at a time, in Photoshop. Painting tools, such as the Brush tool, apply the **Foreground color**.
You apply the **Background color** when you use the Eraser tool on the Background layer, enlarge the image canvas, or cut pieces out of your image.

Foreground Color



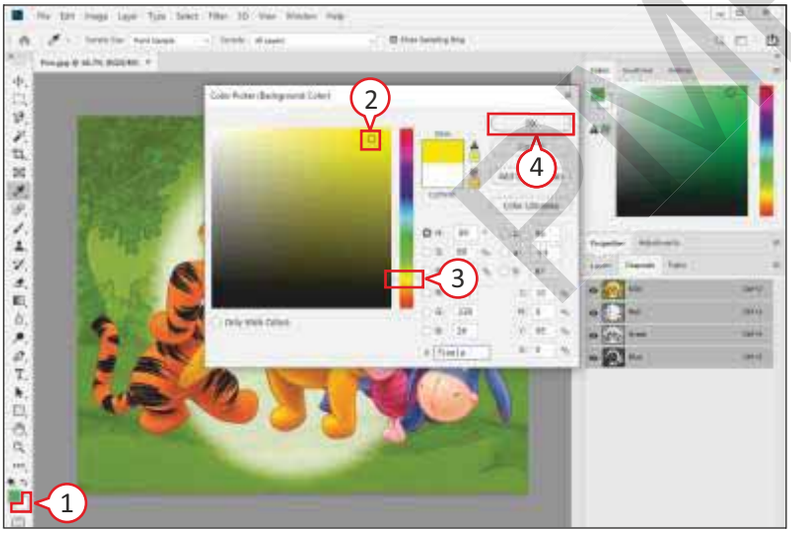
1. Click on the **Foreground Color** icon ( ).

The **Color Picker** dialog box appears.

2. Click in the color box to select a color.
3. Drag the slider or enter the value in the boxes to change the range of color in the window.
4. Click on **OK**.

The selected color appears in the Foreground Color icon.

Background Color



1. Click on the **Background Color** icon ( ).

The **Color Picker** dialog box appears.

2. Click in the color box to select a color.
3. Drag the slider to change the range of color in the window.
4. Click on **OK**.

The selected color appears in the Background Color icon.

SELECTING COLOR USING EYEDROPPER TOOL

You can select a color from an open image with the **Eyedropper** tool. This tool enables you to paint using a color already present in your image.

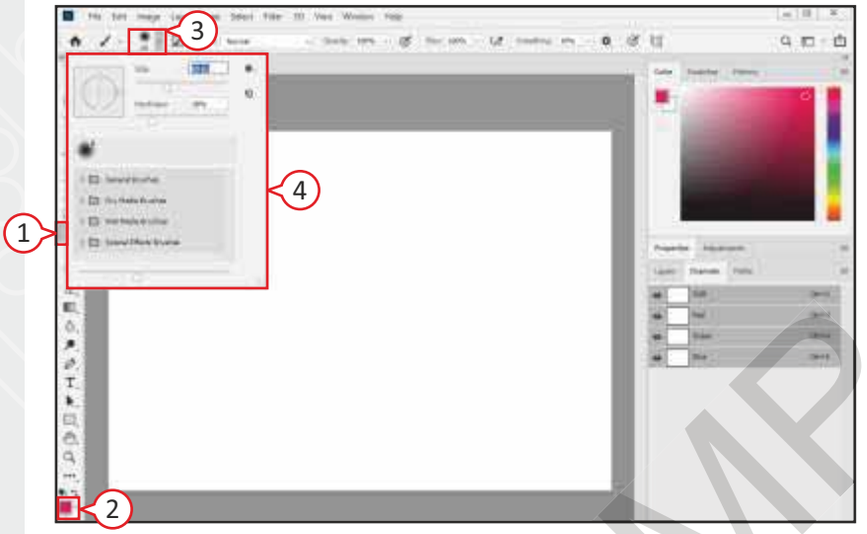
1. Click on the **Eyedropper** tool ( ) *(or press I)*.
2. Place the **Eyedropper** tool over an open image, and click to select the color in Eyedropper tool tip.

- The selected color becomes the **new foreground color**.

To select the **new background color**, perform step **2** while pressing the **Alt** key on the keyboard.

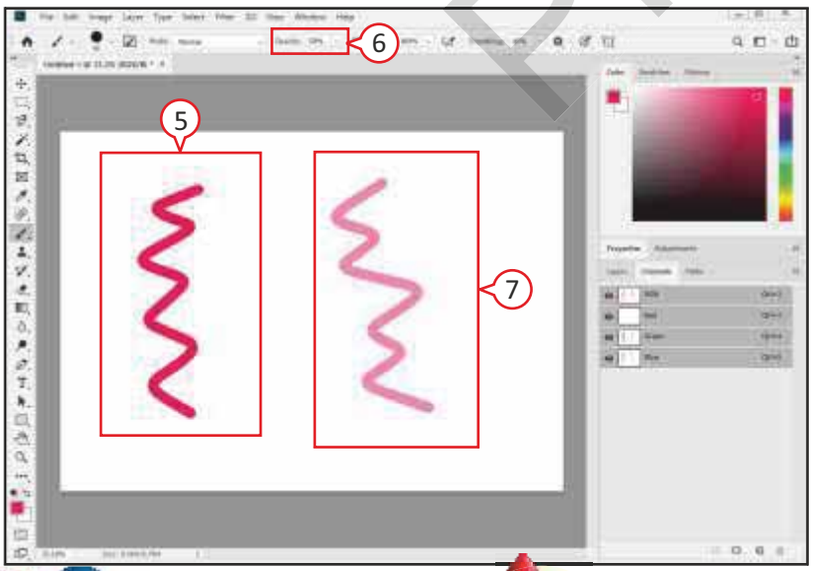
USING BRUSH TOOL

You can use the **Brush** tool to paint the brush strokes or add color to your image. The steps to use the Brush tool are as follows.



1. Click on the **Brush** tool ( ) *(or press B)*.
2. Click the **Foreground Color** icon to select a color to paint with.
3. Click on the down arrow of **Brush**.
4. Select a brush **Size** and **Hardness** from the menu that appears.

Note: *You need to be a bit careful while using the Brush tool as it can also fill those areas where color is not needed.*



5. Click and drag to apply the foreground color to the image.
6. Type the percentage value to change the **Opacity** of the brush strokes.
7. Now click and drag to apply the semi-transparent brush.

Do You Know?

You can click on **Window** menu and then **Info**. The **Info panel** opens, which shows you the color values as you move the eye dropper tool on the object.

Bristle-tip Brushes

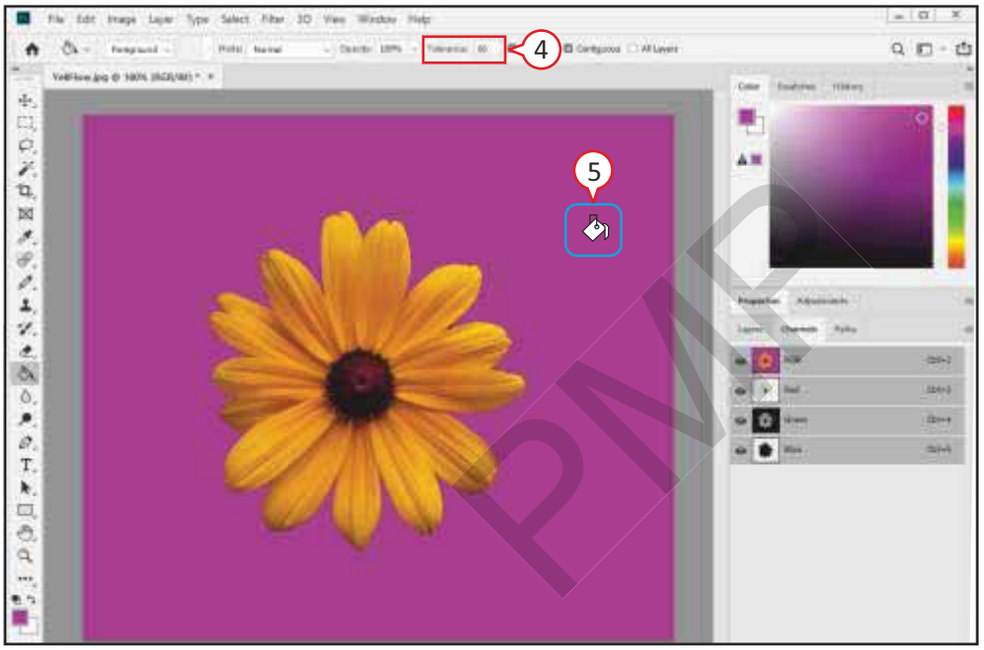
Some brushes have bristles which create lifelike strokes.

1. Click on Window menu and then Brush. The Brush panel opens.
2. Click a bristle-tip brush.
3. Specify the bristle settings for the brush.

USING PAINT BUCKET TOOL

An area can be filled in your image with solid color using the **Paint Bucket** tool.

1. Click and hold the **Gradient** tool ( ).
2. Click the **Paint Bucket** tool ( ) in the box that appears *(or press G)*.
3. Click on the **Foreground Color** icon to select a color for painting.



4. Type a **Tolerance** value from 0 to 255.

The Tolerance value influences the range that the paint bucket uses to fill a given area.

5. Click inside the image.

Photoshop fills an area of image with the foreground color.

The Paint Bucket tool affects adjacent pixels in the image.

BRIGHTNESS AND CONTRAST

You can adjust the brightness and contrast of your image.

1. Click on **Image** menu *(not shown)***.**
2. Click on **Adjustments** *(not shown)*.
3. Click on **Brightness/Contrast** *(not shown)* .

A dialog box appears.

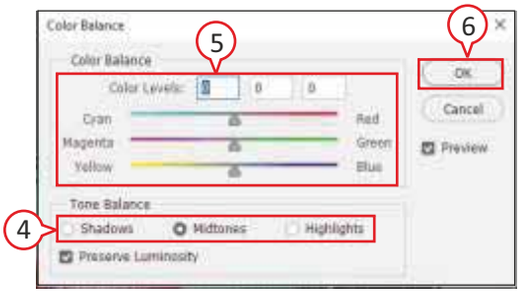
4. To lighten the image, click and drag the **Brightness** slider to the **right**, or darken the image by dragging it to the **left**.
5. To increase the **Contrast**, click and drag the **Contrast** slider to the **right**, or to decrease contrast, drag it to the **left**.
6. Click on **OK**.

Photoshop applies the new brightness and contrast to the image.

COLOR BALANCE

You can use the **Color Balance** utility to change the amount of specific colors in your image.

1. Click on **Image** in the Menu bar.
2. Click on **Adjustments**.
3. Click on **Color Balance** *(or press Ctrl+B). A dialog box appears.*



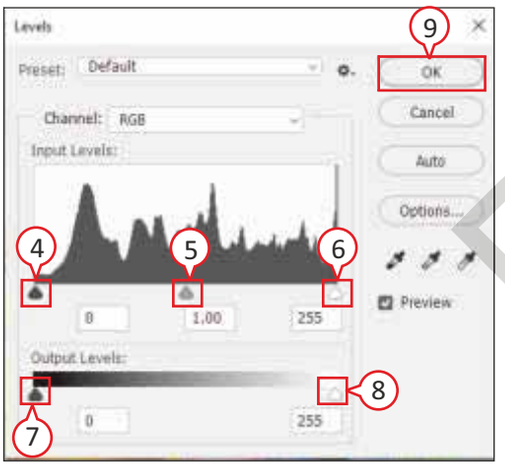
4. Select one of the radio buttons of **Tone Balance** in the image that you want to edit. There are three options: Shadows, Midtones, and Highlights.
5. Type a number from **-100** to **100** in the **Color Levels** field or Click and drag the **color slider** to adjust the color.
6. Click on **OK**.

Photoshop makes color adjustments to the image.

ADJUSTING LEVELS

The Levels lets you make fine adjustments to the **shadows**, **midtones**, or **highlights** of an image.

1. Click on **Image** in the menu bar**.**
2. Click on **Adjustments**.
3. Click on **Levels** *(or press Ctrl+L). A dialog box appears.*



The **Input Levels** sliders let you adjust brightness of the shadows **(left slider)**, midtones **(middle slider)**, and highlight **(right slider)**.

4. Click and drag the **left slider** to the right to darken the shadow in the image.
5. Click and drag the **middle slider** to adjust the midtones of the image.
6. Click and drag the **right slider** to the left to increase the brightness of the image.

The **Output Levels** sliders let you decrease the contrast to either lighten (using the left slider) or darken (using the right slider) the image.

7. Click and drag the **left slider** to the right to lighten the image.
8. Click and drag the **right slider** to the left to darken the image.
9. Click on **OK**.

Photoshop makes brightness and contrast adjustment to the image.

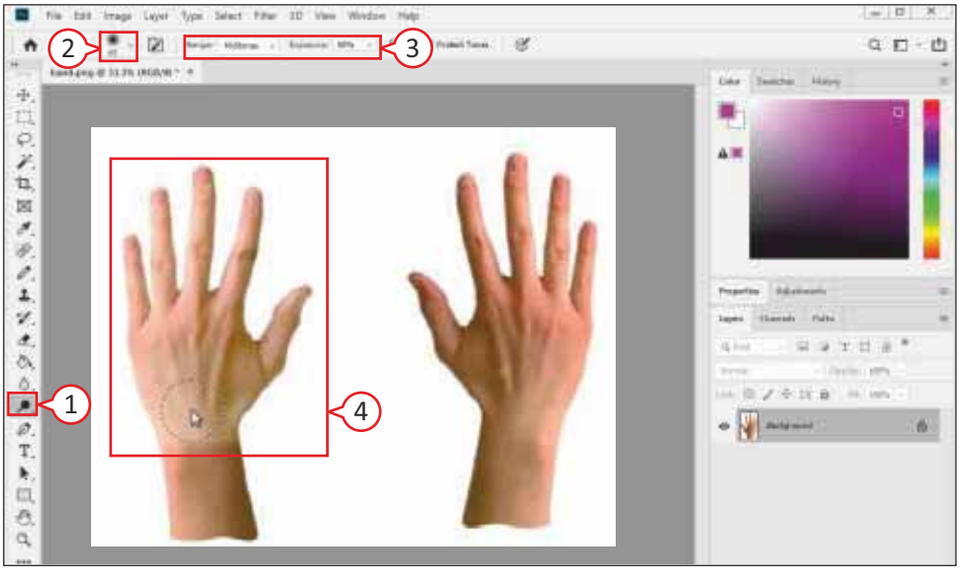
If you make a selection before performing the Levels command, only the selected pixels are affected. Similarly, if your image is multilayered, only the selected layer is affected.

Automatically Adjust the Brightness Levels of an Image

You can click on **Image** menu and then **Auto Tone**. This converts the **lightest** pixel in the image to **white** and the **darkest** pixel to **black**. This command is similar to the **Auto Contrast** command and can quickly improve the contrast of an overly gray photographic image.

USING DODGE EFFECT

You can use the **Dodge** tool to lighten a specific area of an image. Dodge is a photographic term that describes the diffusion of light when developing a film negative.



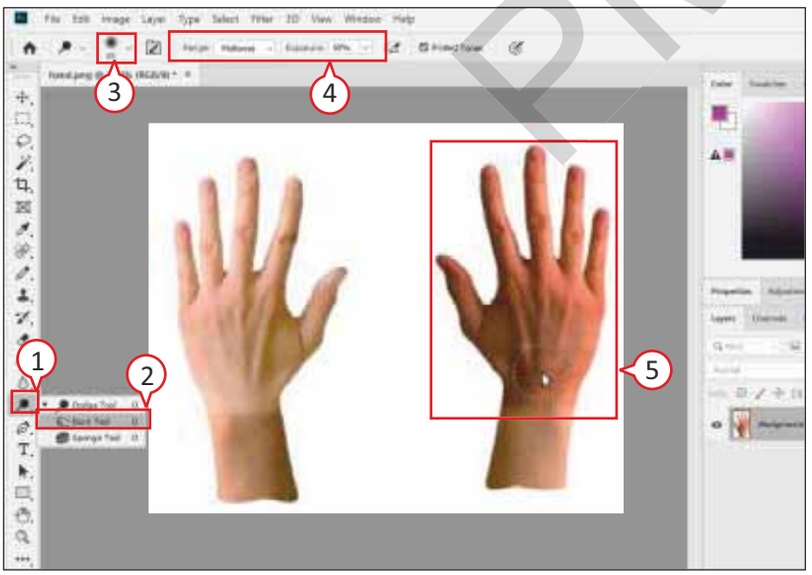
1. Click on **Dodge** tool ( ) *(or press O)*.
2. Click on the down arrow button of **Brush,** and choose the brush size.
3. In this area, you can select the range of colors you want to apply.
4. Click and drag over the area that you want to lighten.

The impact can be observed on the dragged area.

Photoshop lightens the area.

USING BURN EFFECT

You can use the **Burn** tool to darken a specific area of an image. Burn is a photographic term that describes the focus of light when developing a film negative.



1. Click and hold the **Dodge** tool from the Toolbox. A list of tools appears.
2. Click the **Burn** tool in the box that appears *(or press O)*.
3. Click on the down arrow button of **Brush,** and choose the brush size.
4. In this area, you can also select the range of colors you want to apply.
5. Click and drag over the area that you want to darken.

The impact can be observed on the dragged area.

Photoshop darkens the area.

Blur and Sharpen Tools

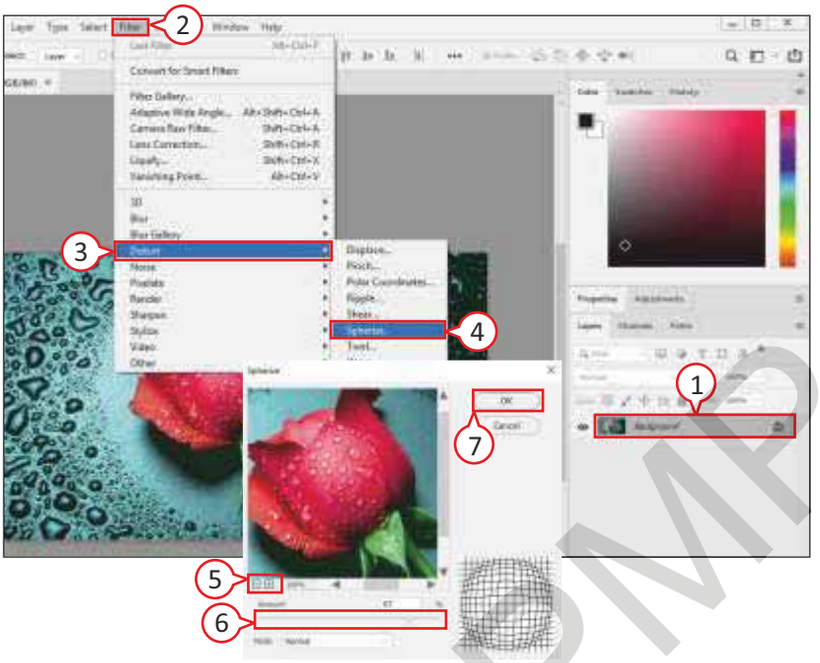
You can use **blur** or **sharpen tool** on specific areas of your image. This enables you to emphasize or de-emphasize objects in a photo.

Filters in Photoshop

With Photoshop **filters**, you can quickly and easily apply enhancements to your image, including artistic effects, texture effects, and distortions. Filters can help you correct defects in your image or enable you to turn a photograph into something that resembles an impressionist painting. Photoshop comes with many filters.

APPLYING A DISTORT FILTER: SPHERIZE FILTER

Distort filter stretches and squeezes areas of your image. It has many options. **Spherize filter** produces a fun-house effect. It makes the image look like it is being reflected off a mirrored sphere.



1. Select the layer to which you want to apply the filter.

If you want to apply the filter to just a part of your image, make the selection with Selection tool.

2. Click on **Filter** menu.
3. Click on **Distort**.
4. Click on **Spherize**.

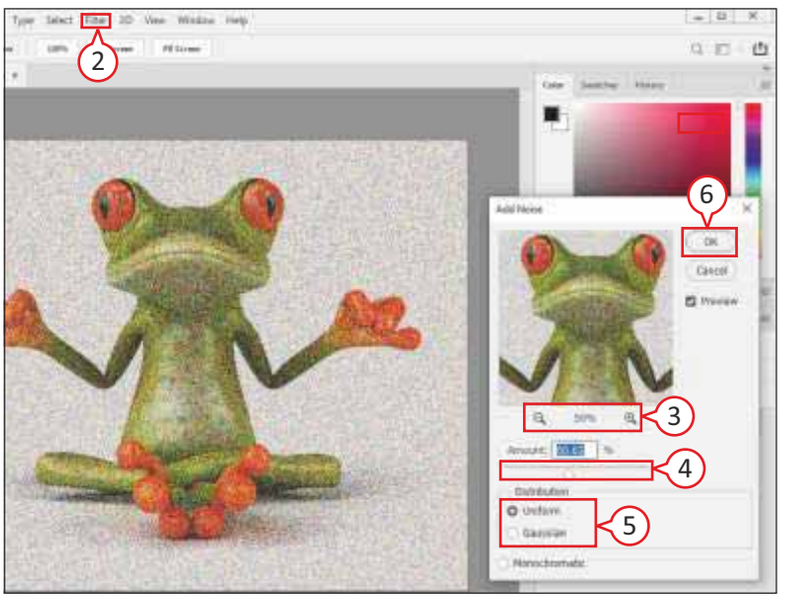
A small window displays the preview of the filter effect.

5. Click the **—** or **+** button to zoom out or zoom in respectively.
6. Click and drag the **Amount** slider to control the amount of distortion needed.
7. Click on **OK**.

Photoshop applies the filter.

APPLYING A NOISE FILTER

Filters in Noise menu add or remove a texture resembling that of sand in your image. You can add graininess with the **Add Noise** filter.



Photoshop applies the filter.

1. Select the layer.
2. Click on **Filter > Noise > Add Noise**.

*A small **Add Noise** window displays the preview of the filter effect.*

3. Click the **[ ]** or **[ ]** button to zoom out or zoom in respectively.
4. Click and drag the **Amount** slider to control the amount of noise needed.
5. Select the way you want the noise to be distributed by clicking a radio button.

Uniform spreads the noise more evenly than Gaussian.

6. Click on **OK**.

Self-Evaluation

After reading the chapter, I know these points:

	Agree	Disagree
I know that Photoshop allows us to create, modify, and optimize digital images.	☐	☐
I know that to edit specific pixel in an image, we must first select them by using selection tools.	☐	☐
I know that clone stamp tool is used to copy information from one area of an image to another.	☐	☐
I know that Eyedropper tool enables us to paint, selecting a color already present in our image.	☐	☐
I know that we can adjust the color balance, brightness and contrast of an image.	☐	☐
I know that Dodge tool is used to lighten the specific area of an image.	☐	☐
I know that Burn tool is used to darken the specific area of an image.	☐	☐
I know that with filters, we can quickly and easily apply enhancements to our image, including artistic effects, texture effects, and distortions.	☐	☐

Exercises

A. Tick [✓] the correct answer.

1. Photoshop is developed by ..... .
   a. Microsoft ☐ b. Google ☐ c. Adobe ☐
2. ..... tool can be used to cut out the desired part of an image.
   a. Crop ☐ b. Fuzzy ☐ c. Pencil ☐
3. Digital images in Photoshop are made up of tiny, solid color squares called ..... .
   a. dots ☐ b. effects ☐ c. pixels ☐
4. ..... tool can be used to copy information from one area of an image to another.
   a. Magic Wand ☐ b. Lasso ☐ c. Clone Stamp ☐
5. ..... tool can be used to select a color from an open image.
   a. Clone ☐ b. Crop ☐ c. Eyedropper ☐
6. To darken a specific area of an image, we use ..... tool.
   a. Burn ☐ b. Brush ☐ c. Dodge ☐

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

1. Adobe Photoshop is a word processor software. ☐
2. Brush tool is used to draw straight lines of colors in Photoshop. ☐
3. Regular Lasso tool is also used to make curved or jagged selections. ☐
4. The default background color in Photoshop is black. ☐
5. Dodge tool is used to lighten a specific area of an image. ☐
6. Burn tool is not used to darken a specific area of an image. ☐

C. Fill in the blanks.

1. ..... are small windows that give access to common commands and resources.
2. We can change the ..... size of an image to add blank space to its sides.
3. ..... tool is used to select the groups of similarly colored pixels.
4. Painting tools such as the Brush tool apply the ..... color.
5. ..... filter produces a fun-house effect.

D. Define the following.

1. Crop Tool: .....

   .....

2. Clone Stamp Tool: .....

   .....

E. Differentiate between the following.

1. Brush Tool ..... Paint Bucket Tool .....

2. Foreground Color ..... Background Color .....

3. Dodge Effect ..... Burn Effect .....

F. Answer in 1-2 sentences.

1. What is the function of Photoshop toolbox?

   .....

   .....

2. What is the use of Magnetic Lasso tool?

   .....

   .....

3. What is the use of color balance in Photoshop?

   .....

   .....

G. Answer briefly.

1. What is Photoshop? Write down its features.

   .....

   .....

   .....

   .....

2. What are the uses of filters in Photoshop?

.....

.....

.....

.....

H. Application-based Question

You went for a picnic with your friends and clicked a group photograph. From that photograph, you want to keep your photo and remove the rest of your friends. Which tool of Photoshop will you use for this purpose?

.....

Group Discussion

Divide the students into two groups and discuss the topic– 'Image Editing vs Drawing Software'.

Online Link

To learn more about working with Photoshop, visit the website:

https://www.howtogeek.com/361342/how-to-learn-photoshop/

Activity Section

Skill Formation

- This activity enhances the image editing skills of the students.

Lab Activity

Opening Images

a. Click on **File** menu, navigate any image and click on **Open** to open the image file. In this example, we have chosen an image of flower. Your image may vary from the given image.

Changing the Size

a. Select the desired part of an image by using **Crop** tool.

b. Make the **canvas size** bigger from the original image.

c. Cover the extra part of the canvas by using **Clone Stamp** tool.

Exposure Correction

a. If the image is overexposed, i.e. there is too much light, you can correct the exposure by using the **brightness-contrast** level tool.

b. Apply **dodge** and **burn** tool wherever it is needed in the image.

Applying Filter

a. You can give your image an artistic look by applying filter to it.

b. Click on **Filter** menu, then select **Noise** and then change the amount of noise.

5 Photoshop – Working with Layers

OBJECTIVES

After completing this chapter, you will be able to:

- Learn to create layers and add images to it.
- Understand how to work with layer.
- Learn various blending modes.
- Save the Photoshop image.

Layers in Photoshop

In Photoshop, layers are the key components to work with graphic objects. These are used to work on individual parts of an image without affecting the other parts. A Photoshop image consists of multiple layers, with each layer containing different objects in the image. When you open a digital-camera photo or a newly scanned image in Photoshop, it exists as a single layer known as the **Background** layer. You can add new layers on top of the Background layer as you work.

Layered Photoshop files act like several images combined into one. Each layer of an image has its own set of pixels that you can move and transform independently. Most commands affect only the layer that you select. For example, if you click and drag with the Move tool, the selected layer moves while the other layers stay in place. In order to perform most actions in Photoshop, you need to have at least one layer selected.

Project: Create a Collage

Skill Formation

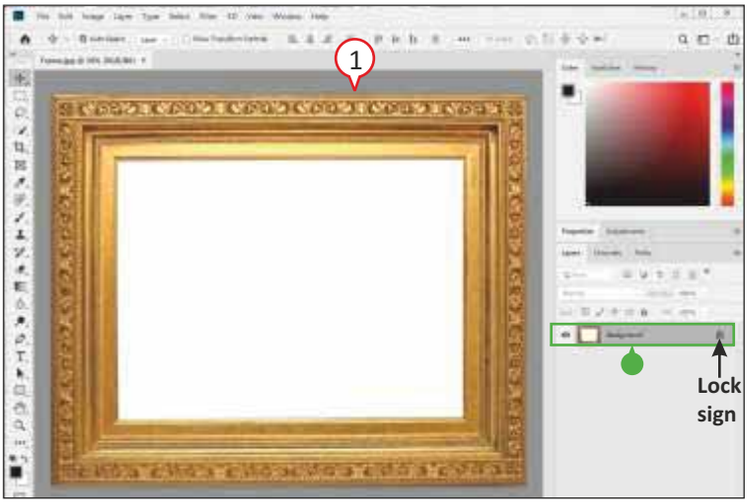
- This project will capture the students' interest while creating a collage and enhance their creative skills.

This project deals with creating and rearranging the layers to make a collage, which contains one picture of frame and three different pictures of flowers.

Note: *These pictures may vary from your pictures.*

CREATING AND ADDING LAYERS

You can create separate layers and add objects in them which keeps them independent from one another.



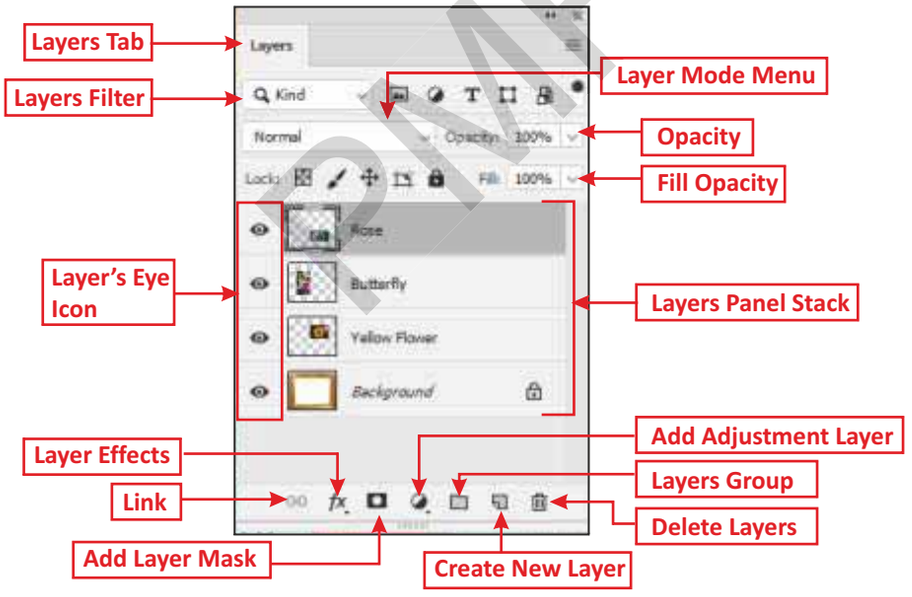
1. Open an image of **Frame**.

- Any image opened in Photoshop appears as the background which is locked because it is like the canvas on a painting. You can create new layers on top of a Background layer.

  To unlock it, you need to convert the background to a layer. You can do this either by **double-clicking** on the background layer in the Layers palette and **renaming** the layer or by simply clicking on the **Lock sign** and then renaming the layer.

Understanding Layers Dialog Panel

The Layers dialog panel appears on the right-side of Photoshop window, where you can work with Layers. Layers dialog panel has options which are used to perform specific tasks.



Layers Tab: It is used to move the Layers dialog panel around the Photoshop work area.

Layers Filter: It enables you to hide layers based on different things. There are so many types of layers like a normal layer, adjustment layers, etc. You can filter the similar types of layers with this.

Layer Mode Menu: It has many options to change the appearance of a selected layer.

Opacity: It is used to change the transparency of a selected layer, where 0 is total transparency and 100 is no transparency.

Fill Opacity: It adjusts the amount of opacity of the pixels only, but layer styles remain unaffected and remain 100% opaque.

Layer's Eye Icon: When you click on the Layer's eye icon, the layer image along with the eye icon disappears. Click again on the layer's eye icon to make the image as well as the eye icon appear again.

Layers Panel Stack: All the working layers are displayed here.

Link: It enables you to link layers which will move together unless unlinked.

Layer Effects: It applies effects like a shadow, outer glow, etc. to your image layer.

Add Layer Mask: It adds a layer mask to the currently selected layer which allows you to paint the parts of your layer without damaging your original image.

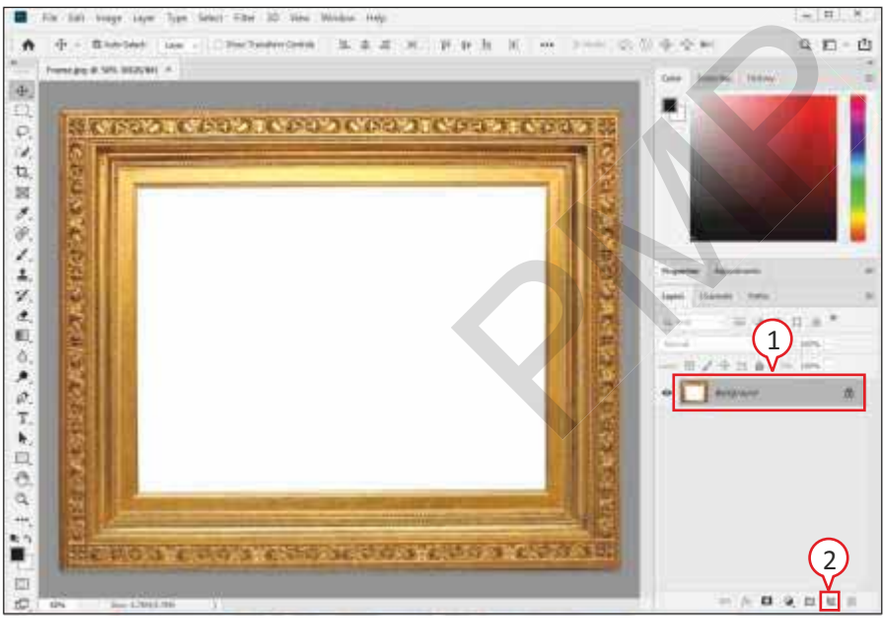
Add Adjustment Layer: It allows you to do basic adjustments like brightness, contrast, saturation, photo filter, color balance, etc.

Layers Group: It creates a new layer group to add the layers in it.

Create New Layer: It creates a new layer to add the images in it.

Delete Layers: It deletes the selected or active layer from the Layers panel.

Creating a New Layer



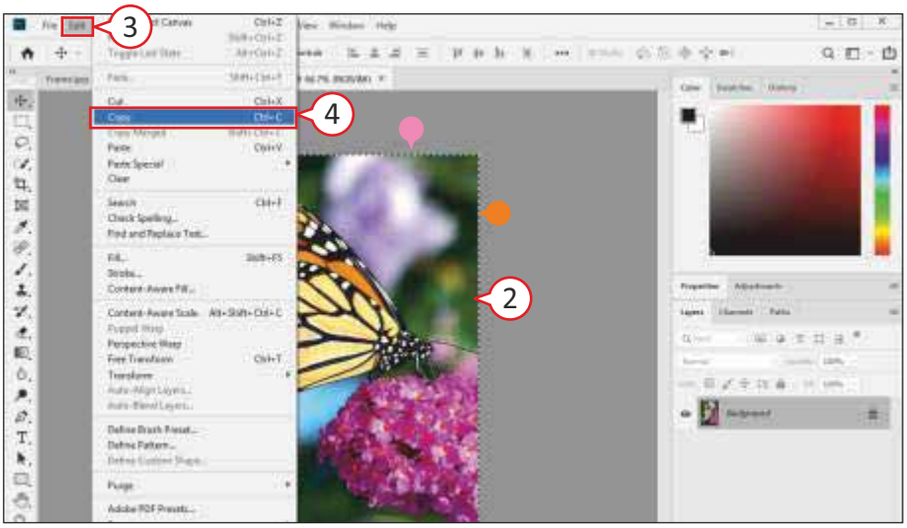
1. Select a layer above which you want to add the new layer.
2. In the Layers palette, click on **Create a New Layer** icon *(or press Shift+Ctrl+N)*.

*If the Layer palette is not visible, you can click **Window** menu and then **Layers** to see it.*

- Photoshop creates a new, transparent layer.

Adding an Image in the Layer

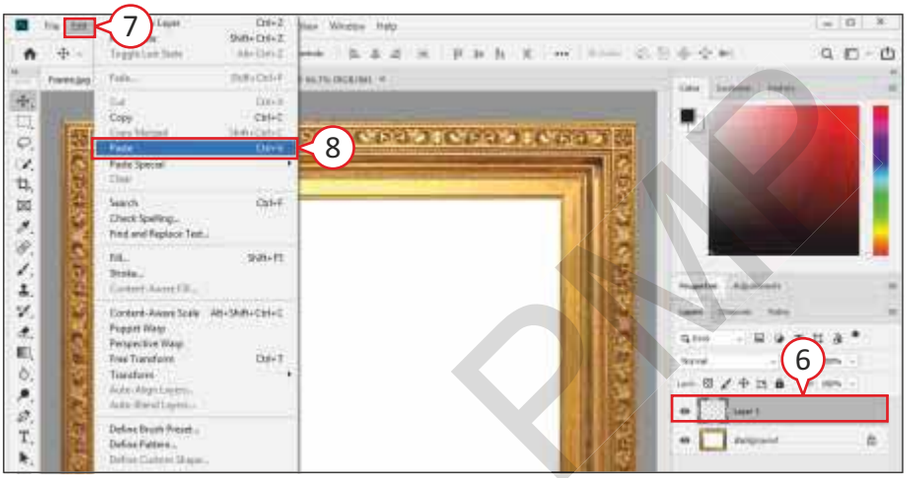
You can add content to the new layer by copying and pasting from another image.



1. Open another image.
   - The image appears in a new window of Photoshop.
   - You can resize the image according to your frame.
2. Using a **selection** tool, select the content you want to copy in other image.
3. Click on **Edit** menu.

The Edit menu appears.

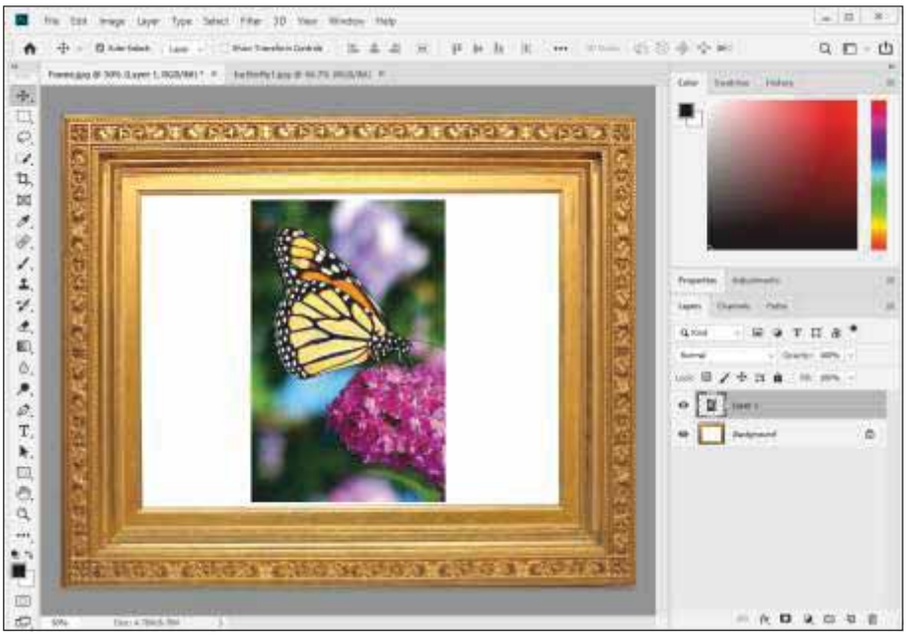
4. Click on **Copy** *(or press Ctrl+C)*.



5. Click on the image window where you have already created the new layer to select it.
6. Select the new layer in the Layers palette.
7. Click on **Edit** menu.

The Edit menu appears.

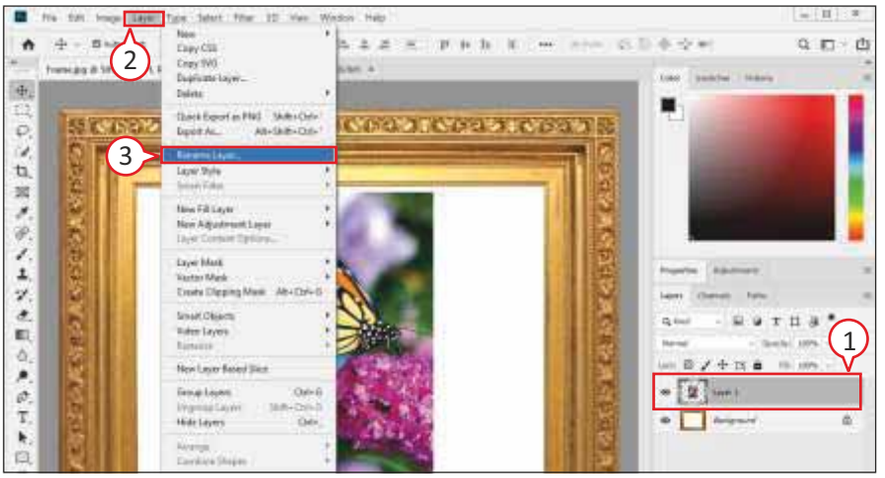
8. Click on **Paste** *(or press Ctrl+V)*.



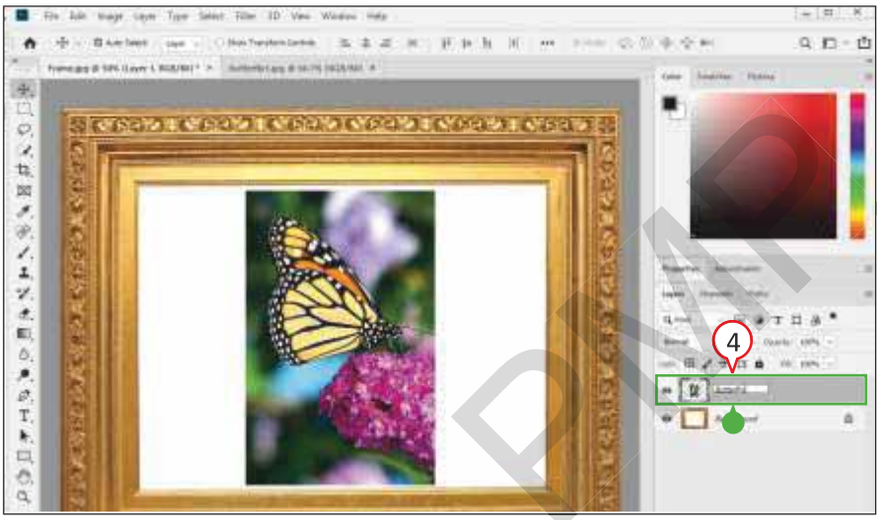
*The content from other image will be pasted into the new layer in **Layers palette**.*

Renaming a Layer

You can rename the layer after adding it. This will help you in identifying it in a better way or managing many layers in a single image.



1. Select a layer which you want to rename.
2. Click on **Layer** menu.
3. Click on **Rename Layer**.



Name box appears in the layer.

4. Type a name (Butterfly) for the layer.
5. Press the **Enter** key.

- The name of the layer changes in the Layers panel.

You can also double-click the name of the layer in the Layers panel to change the name.

INSERTING TWO MORE IMAGES IN TWO NEW LAYERS

- By following the steps of **creating**, **adding** and **renaming layer** section, you can insert two layers and add images in them and then rename them.

Working with Layers

After adding the layers, you can do many tasks with the layers.

These tasks may or may not be used in the project.

HIDING A LAYER

You can hide a layer to temporarily remove elements in that layer from view.

1. Select a **layer** *(Rose)*.
2. Click on the **Eye icon** [ ] of the layer.

The eye icon disappears.

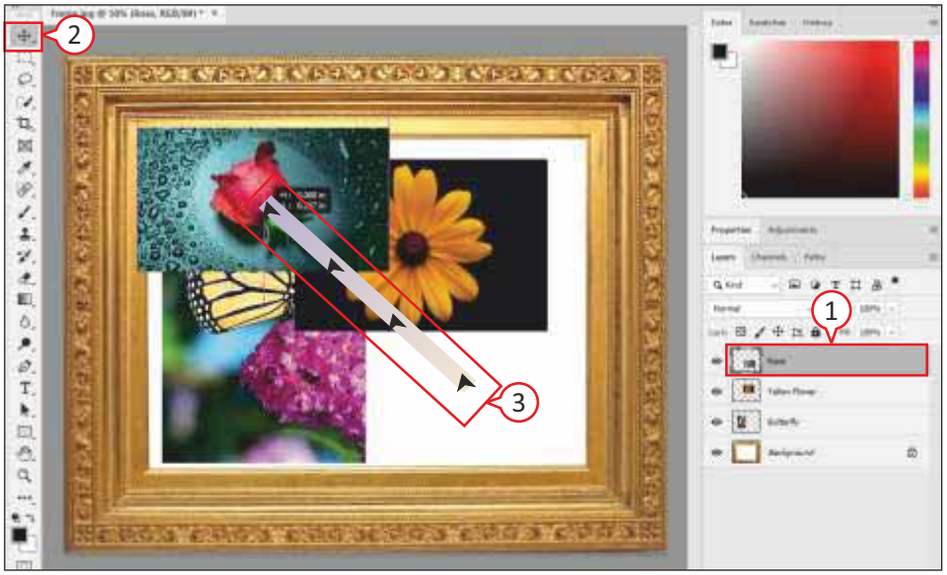
- Photoshop hides the layer.

Hidden layer will not be displayed when you print.

To unhide the layer, click on **Eye icon** again.

MOVING A LAYER

You can move a layer by using **Move** tool to reposition the element in one layer without moving those in the other.



1. Select a layer.
2. Click on the **Move** tool *(or press V)*.
3. Click and drag inside the window.

Content in the selected layer moves.

Content in the other layers remains in the same location.

DUPLICATING A LAYER

By duplicating a layer, you can manipulate elements in an image while keeping a copy of their original state.

1. Select a layer.
2. Click and drag the **New layer** icon [ ].

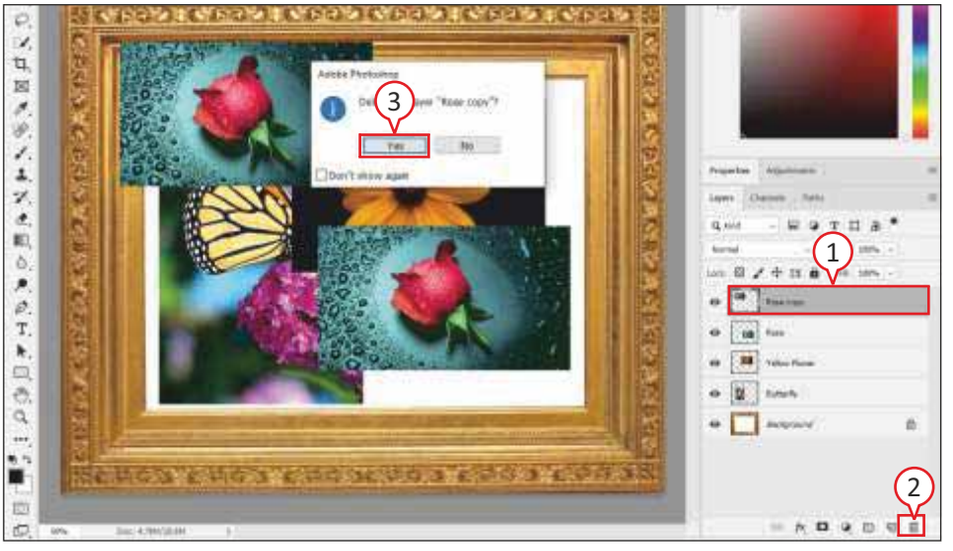
Or, you can click **Layer** menu and then **Duplicate Layer** in which a dialog box will appear for you to give a name to the layer.

You can also press **Ctrl + J** to duplicate the layer.

- Photoshop duplicates the selected layer.
- You can see that the layer has been duplicated by selecting a new layer. To check, click on the **Move** tool and drag the layer.

DELETING A LAYER

You can delete a layer when you no longer need it.



1. Select a layer.
2. Click on **Delete layer** icon.

A confirmation box appears.

3. Click on **Yes**.

Photoshop deletes the selected layer, and the content in the layer disappears from the image window.

REORDERING A LAYER

You can change the stacking order of layers to move elements forward or backward in your image.

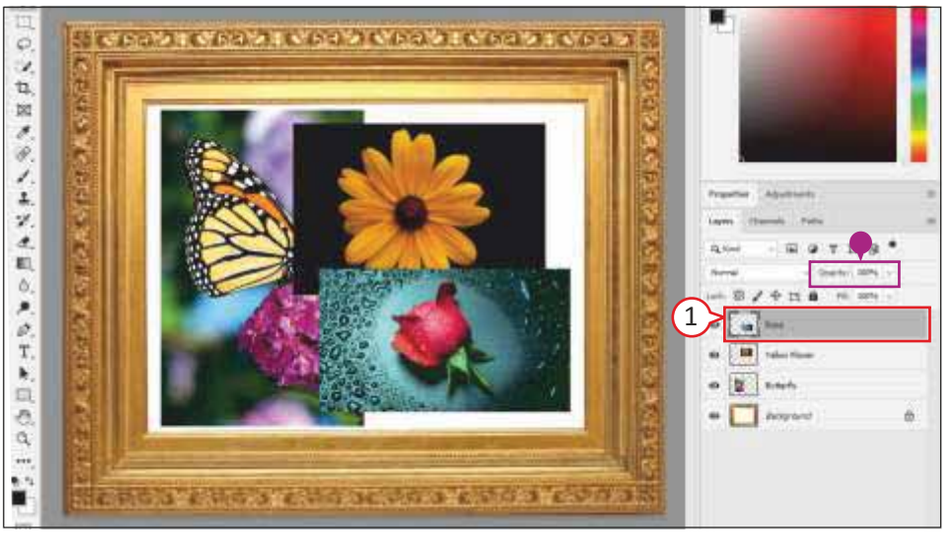
1. Select a layer.
2 Click and drag the layer to change its arrangement in the stack.

In this example, the Rose layer which is on the top is dragged to come under Yellow Flower.

- The layer assumes its new position in the stack.

CHANGING THE OPACITY OF A LAYER

Adjusting the opacity of a layer can let the elements in the layer which is below, to appear in the upper layer. **Opacity** is the opposite of transparency. Decreasing the opacity of a layer increases its transparency and vice versa.



1. Select a layer.

- The default **Opacity** is 100%.

2. Type a new value in the **Opacity** field.

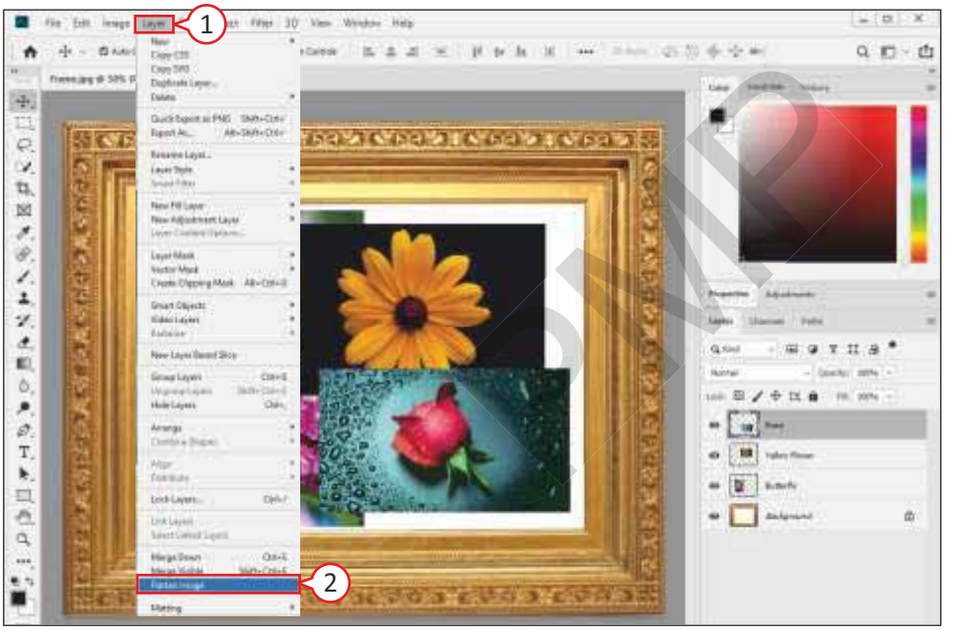
- Alternatively, you can click side arrow button and drag the slider.

Layer opacity can be changed from 1% to 100%.

- The layer changes its opacity.

FLATTENING LAYERS

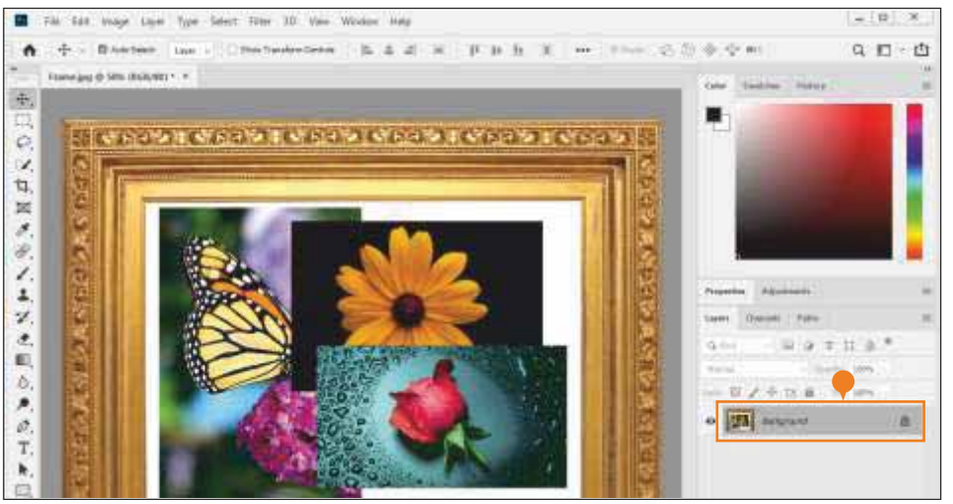
Flattening layers combine all the layers of an image into one background layer.



1. Click on the **Layer** menu.

A menu appears.

2. Click on **Flatten Image**.

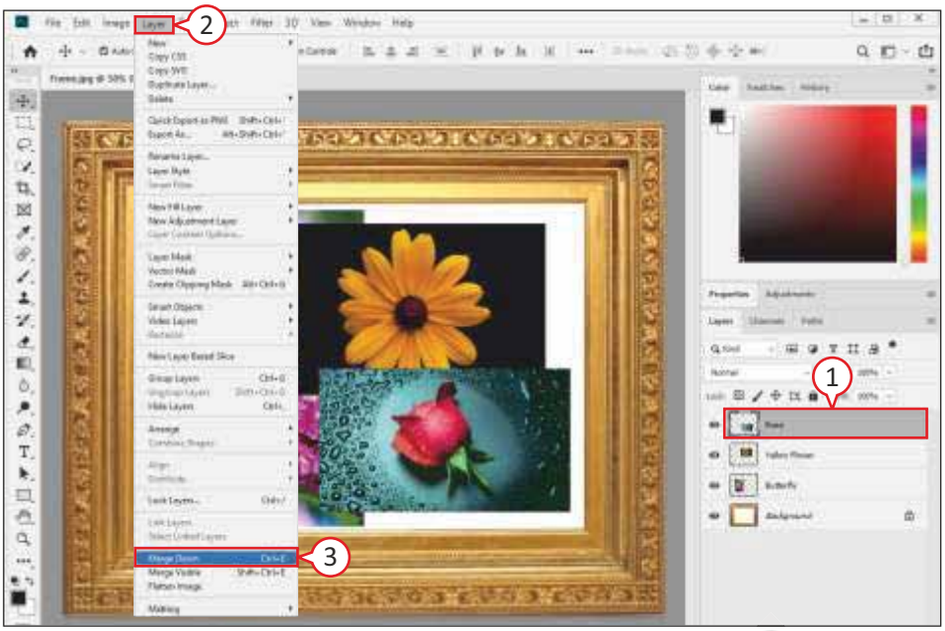


- All the layers are merged into one layer.

To remove flatten layer, you can use **Undo** command from **Edit** menu or press **Ctrl + Z**.

MERGE LAYERS

Merging layers can let you permanently combine information from two separate layers.



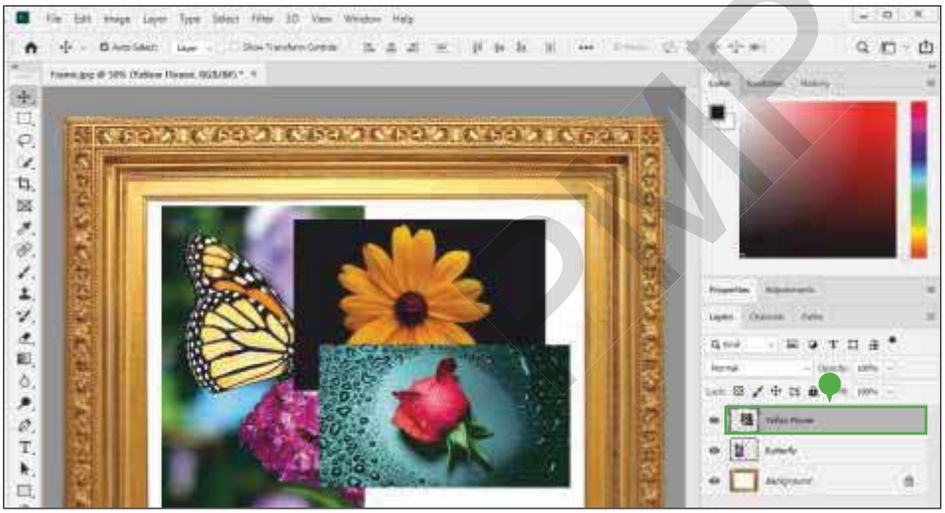
1. Click on a layer to select.

This layer should be the top layer which you want to merge with other layers.

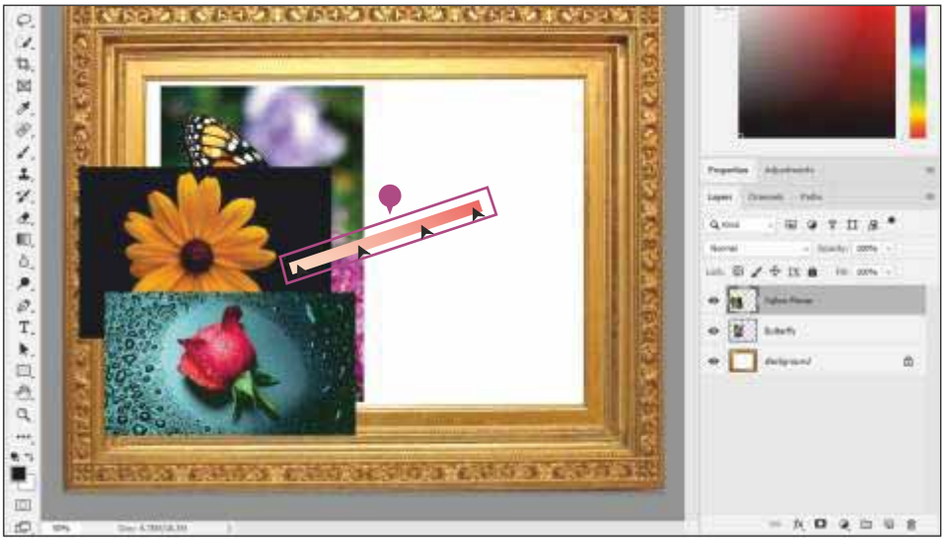
2. Click on **Layer** menu.

The Layer menu opens.

3. Click on **Merge Down** *(or press Ctrl+E)*.



- The layers merge and Photoshop keeps the name of the lowermost layer.



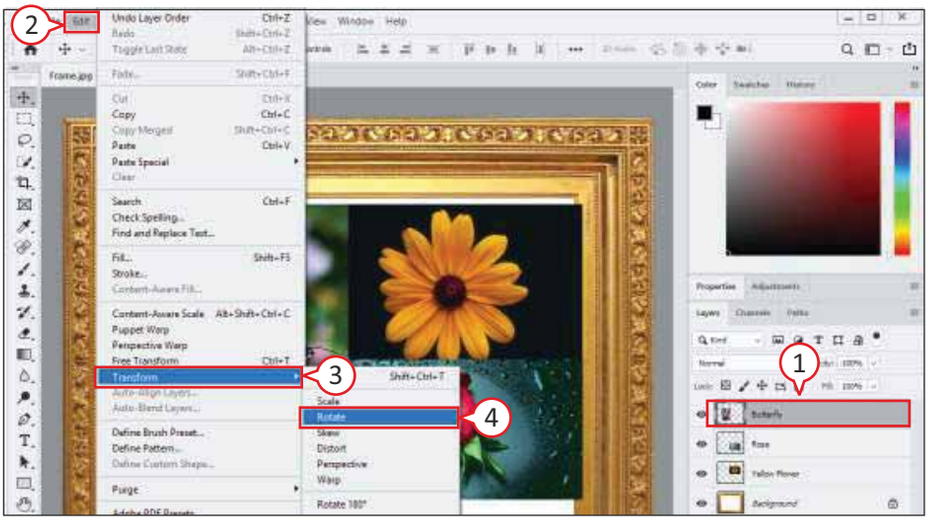
- To see the result of the merge, select the new layer, click on **Move** tool, and drag. The elements that were previously in separate layers now move together.

To remove merging from layer, you can use **Undo** command from **Edit** menu or press **Ctrl + Z**.

TRANSFORMING A LAYER

You can use **Transform** tool to change the shape of the objects in the layer. Transforming a layer allows you to keep the rest of your image unchanged.

Rotate a Layer



1. Click on a layer to select.
2. Click on **Edit** menu.
3. Click on **Transform**.
4. Click on **Rotate**.

Handles appear around the image of the layer.

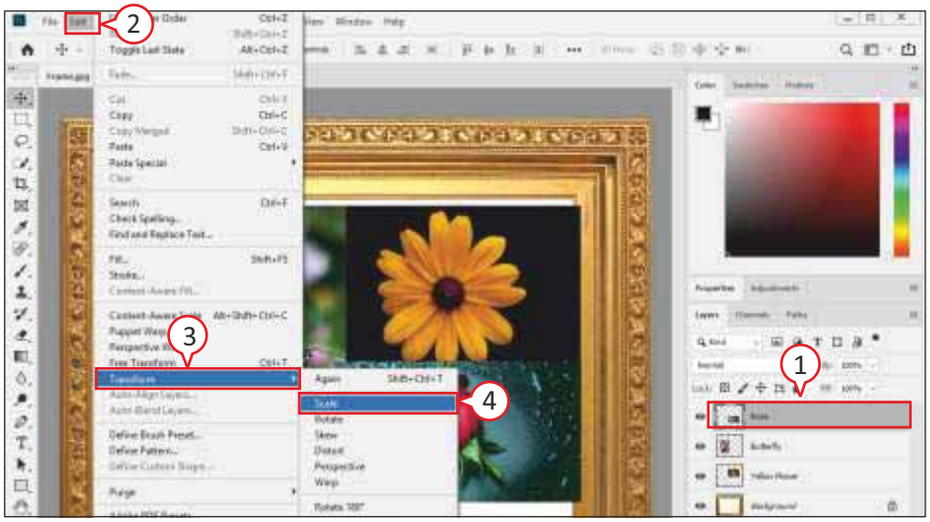
5. Click and drag the corner handles to rotate the shape of the layer.

You can press **Esc** key to cancel the change.

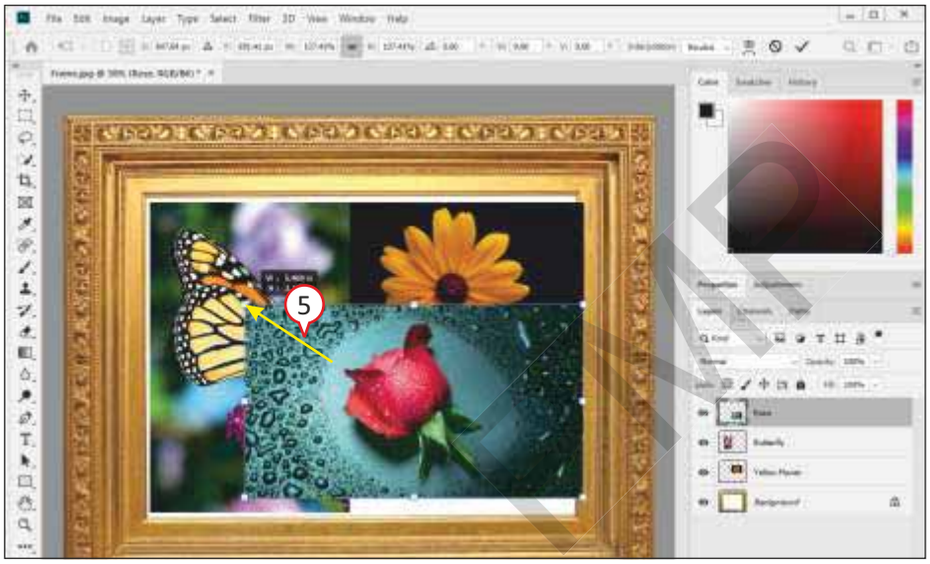
6. Press the **Enter** key to do the change.

Photoshop rotates your image.

Scale a Layer



1. Click on a layer to select.
2. Click on **Edit** menu.
3. Click on **Transform**.
4. Click on **Scale**.



Handles appear around the image of the layer.

5. Click and drag the side handles to resize the image of the layer.

You can press **Esc** key to cancel the change.

6. Press **Enter** key to do the change.

Photoshop scales up your image.

BLENDING MODES

You can use Photoshop blending modes to specify how pixels in a layer should blend with the layers below. You can blend layers to create all kinds of visual effects in your photos.

Photoshop has many blending modes. Selecting a blending mode changes the appearance of the layer or image, based on the layer or layers beneath it. If there is only one layer, the layer mode has no effect. Hence, there must be at least two layers in the image to be able to use layer modes.

Some Blending Modes

Normal: By using this mode, nothing much happens; normal image appears.

Dissolve: By using this mode, a black layer under image enables us to see the effect.

Lighten: By using this mode, image becomes lighter.

Screen: By using this mode, light will boost in image.

Dodge: By using this mode, image becomes brighter and looks funky.

Darken: By using this mode, image becomes darker.

Multiply: By using this mode, image darkens because it multiplying the color of blending layer.

Overlay: By using this mode, brightness and contrast are added in an image.

Soft light: By using this mode, a soft brightness and a contrast add to an image.

Hard light: By using this mode, image becomes brighter and adds hard contrast.

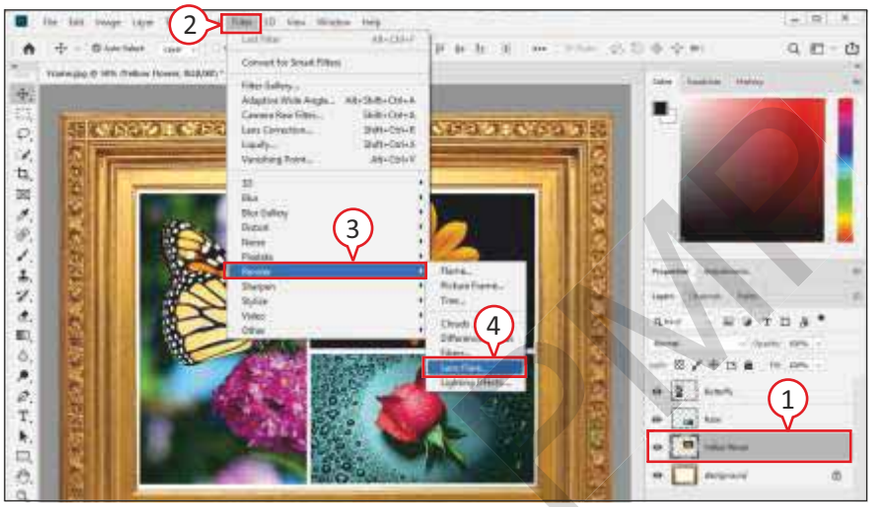
1. Click on a layer to select.
2. Click on **Mode** drop-down menu to choose a blend mode.
3. Click on any blending mode (Hard light).

- Photoshop blends the selected layer with the layers below it.

FINALIZING THE PROJECT

By using the different tools like scaling, moving, etc., you can adjust the picture in the frame as per the project.

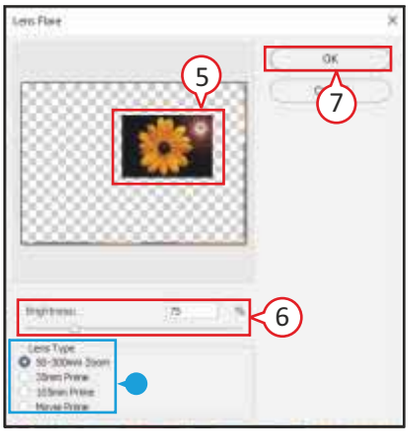
APPLYING A LENS FLARE FILTER



1. Select the layer to which you want to apply the filter.

If you want to apply the filter to just a part of your image, make the selection with Selection tool.

2. Click on **Filter** menu.
3. Click on **Render** filter.
4. Click on **Lens Flare**.

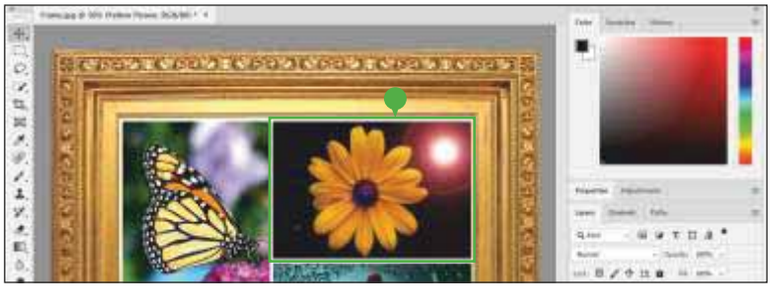


Lens Flare *window appears and displays the preview of the filter effect.*

5. Click in the preview window where you want to change the position of the flare in the picture.
6. Click and drag the **Brightness** slider to control the amount of brightness added in the flare.

- You can select the **Lens Type** option to change the look of flare.

7. Click on **OK**.



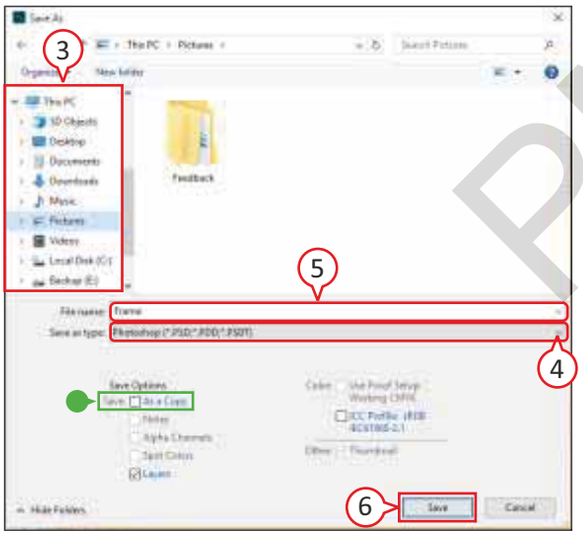
- Photoshop applies the filter to the selected layer.

After applying the filter, your given project is now complete.

Saving a Photoshop Image

You can save your image in the native image format of Photoshop. This format enables you to retain multiple layers in your image, if it has those layers.

1. Click on **File**. The File menu appears.
2. Click on **Save** *(or press Ctrl+S)*. If the file has yet to be named and saved, the **Save As** dialog box appears.



3. Navigate the folder in which you want to save the image file.
4. Click the arrow button and select the Photoshop file format, e.g., *psd*.
5. Name the image file.

*Photoshop automatically assigns **.psd** extension.*

- If you would like to save a copy of the file and keep the existing file open, click the checkbox of **As a Copy**.

6. Click on **Save**.

Photoshop saves the image file.

Saving an Image to Use it in Another Application

You can save your image in a format that can be opened and used in other imaging or page layout applications. **TIFF** (Tagged Image File Format) and **EPS** (Encapsulated PostScript) are standard printing formats that are supported by many applications on both Windows and Macintosh platforms. **BMP** (bitmap) is a popular Windows image format, and **PICT** is a popular Macintosh image format.

CHOOSING THE FILE FORMAT FOR YOUR IMAGE

You should choose the format based on how you want to use the image. If it is a multilayered image and you want to preserve the layers, save it as a Photoshop file. If you want to use the image in word-processing or page layout application, save it as a TIFF or EPS file. If you want to use the image on the web, save it as a JPEG, PNG, or GIF file.

Self-Evaluation

CHECKLIST

After reading the chapter, I know these points:

	Agree	Disagree
I know that a Photoshop image consists of multiple layers, with each layer containing different objects.	☐	☐
I know that user can create separate layers and add elements in an image independent from one another.	☐	☐
I know that user can hide a layer, move a layer, create its duplicate, and also delete a layer.	☐	☐
I know that Flatten layers combine all the layers of an image into one background layer.	☐	☐
I know that Blending modes specify how pixels in a layer should blend with the layers below.	☐	☐
I know that Photoshop automatically assigns .psd extension to the saved file.	☐	☐

Exercises

A. Tick [✓] the correct answer.

1. When we open an image in Photoshop, it appears as a ..... layer in Layers palette.
   a. Foreground ☐ b. Background ☐ c. Upward ☐
2. We can hide a layer to ..... remove elements in that layer from view.
   a. temporarily ☐ b. permanently ☐ c. suspend ☐
3. ..... is the opposite of transparency.
   a. Blend ☐ b. Color ☐ c. Opacity ☐
4. ..... a layer allows we to keep the rest of our image unchanged.
   a. Merging ☐ b. Transforming ☐ c. Stacking ☐
5. ..... is a popular Windows image format.
   a. BMP ☐ b. PICT ☐ c. EPS ☐

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

1. Layered Photoshop files act like several images combined into one. ☐
2. We cannot combine, duplicate, and hide layers in Photoshop. ☐
3. We can delete a layer when we no longer need it. ☐
4. Merging layer stretches and squeezes area of our image. ☐
5. Photoshop Image editor has one blending mode. ☐

C. Fill in the blanks.

1. ..... are the key components to work with graphic objects in Photoshop.
2. ..... layers combine all the layers of an image into one background layer.
3. By decreasing the ..... of a layer, its transparency increases.
4. ..... modes specify how pixels in a layer should blend with the layers.
5. ..... is a popular Macintosh image format.

D. Differentiate between the following.

Merge Layer	Flatten Layer
.....	.....
.....	.....
.....	.....

E. Answer in 1-2 sentences.

1. What are layers in Photoshop?

   .....

   .....

2. What is the use of renaming a layer?

   .....

   .....

3. What is the use of hiding a layer?

   .....

   .....

4. What do you mean by transforming a layer?

   .....

   .....

F. Answer briefly.

1. What are layers? Name the various tasks that you can do with them.

   .....

   .....

   .....

   .....

2. What do you mean by blending modes of layer?

   .....

   .....

   .....

G. Application-based Question

Rahul's teacher asked him to create an image of flowers in different layers and then combine all the layers of the image into one background layer. Rahul is unable to do so. Tell him the option.

.....

Group Discussion

Divide the students into two groups and discuss the topic– 'Importance of Layers in Photoshop'.

Online Link

A. To learn more about working of layers in Photoshop, visit the website:
https://photoshopcafe.com/tutorials/layers/intro.htm

B. To learn more keyboard shortcuts of Photoshop, visit the website:
https://helpx.adobe.com/content/dam/help/attachments/PhotoshopCC-KBSC.pdf

Activity Section

Lab Activity

Create the following in Photoshop.

a. Open an image of sky in Photoshop. (Image 1)
b. Create a new layer by clicking on **New layer** icon and renaming it as Gas Balloon.
c. Open an image of balloon. (Image 2)
d. Use any selection tool and select the balloon from Image 2.
e. Click on **Copy** from the **Edit** menu.
f. Now, come back to sky image (Image 1) and select the layer (Gas Balloon).
g. Click on **Paste** from the **Edit** menu. The selected balloon appears on the layer. (Image 3)

Image 2

Image 3

h. Click on **Eye** icon of balloon layer to hide it. (Image 4)
i. **Duplicate** the layer of Gas Balloon. (Image 5)
j. **Rotate** the balloon. (Image 6)
k. **Blend** the layer (Burn blend). (Image 7)

Image 5

Image 6


Image 7

l. Save the image as **'Hot Air Balloon'** in **'Lab Activity'** folder.

Subject Integration

Science

This integration will introduce the students to the basic scientific principle, "Warmer air is lighter than cooler air."


Image 1


Image 4

Technology Trailblazers

Thomas Knoll

CREATOR: PHOTOSHOP **YEAR: 1989**

Thomas Knoll is an American software engineer who created **Adobe Photoshop**. He was born and raised in Ann Arbor, Michigan, and graduated from the University of Michigan. He initiated the development of image processing routines in 1988. After Knoll created the first core routines, he showed them to his brother, John Knoll, who worked at Industrial Light and Magic. John liked what he saw, suggested new features, and encouraged Thomas to bundle them into a package with a graphical user interface. In **1989**, the program was successfully sold to Adobe Systems which brought it out as Photoshop.

The Adobe Photoshop version CC 2015, which was released on June 15, 2015, was dedicated to Thomas Knoll and his brother.

Worksheet-I

Chapters 1 - 5

A. Tick [✓] the correct answer.

1. The base 16 number system is ..... .
   a. hexadecimal ☐ b. binary ☐ c. octal ☐
2. The digits used in octal number system are from ..... .
   a. 0 to 9 ☐ b. 0 and 1 ☐ c. 0 to 7 ☐
3. ..... gets activated every Friday which occurs on the 13 of a month.
   a. Trojan Horse ☐ b. File Infector ☐ c. Jerusalem Virus ☐
4. ..... is a program that displays online advertisement in a banner on the web page.
   a. Adware ☐ b. Trojan Horse ☐ c. Worm ☐
5. A frame rate of ..... fps is the default setting for a new Animate document.
   a. 12 ☐ b. 30 ☐ c. 24 ☐
6. A keyframe is indicated on the Timeline with a ..... circle.
   a. red ☐ b. black ☐ c. green ☐
7. Photoshop is developed by ..... .
   a. Microsoft ☐ b. Google ☐ c. Adobe ☐
8. ..... tool can be used to select a color from an open image.
   a. Clone ☐ b. Crop ☐ c. Eyedropper ☐
9. You can hide a layer to ..... remove elements in that layer from view.
   a. temporarily ☐ b. permanently ☐ c. suspend ☐
10. ..... is a popular Windows image format.
    a. BMP ☐ b. PICT ☐ c. EPS ☐

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

1. A byte is used to represent a single character in the computer. ☐
2. A nibble is a collection of 5 bits. ☐
3. Boot sector virus is a harmless virus program. ☐
4. Virus cannot affect executable file. ☐
5. Shape tween can only be applied to shapes. ☐
6. In frame-by-frame animation, Animate calculates in-between frames automatically. ☐
7. Brush tool is used to draw straight lines of colors in Photoshop. ☐
8. Dodge tool is used to lighten a specific area of an image. ☐
9. You can delete a layer when you no longer needed it. ☐
10. You cannot combine, duplicate and hide layers in Photoshop. ☐

C. Fill in the blanks.

1. In a positional number system, there are some symbols called ..... .
2. The octal number system has ..... as its base.
3. A ..... warns users of a non-existant virus or malware.
4. ..... virus comes as a friendly program.
5. A bitmap graphic is composed of many tiny parts called ..... .
6. To morph one shape to another, ... tween is used.
7. Painting tools such as the Brush tool apply the ..... color.
8. We can change the ..... size of an image to add blank space to its sides.
9. ..... are the key components to work with graphic objects in Photoshop.
10. ..... modes specify how pixels in a layer should blend with the layers below.

D. Define the following.

1. Nibble
2. Adware
3. Christmas virus
4. Guide layer
5. Zoom tool
6. Opacity

E. Convert the following decimal numbers.

1. $285_{(10)}$ = ( )$_2$
2. $938_{(10)}$ = ( )$_{16}$
3. $592_{(10)}$ = ( )$_8$

F. Differentiate between the following.

1. Bit and Byte
2. Sweeper and Sleeper virus
3. Motion tween and Shape tween
4. Dodge and Burn Effect
5. Merge and Flatten Layer

G. Answer the following questions.

1. What do you mean by number system? Mention its types.
2. What is Boot Sector virus?
3. What is Ransomware?
4. What is layer in Animate? Write its type.
5. Why do we add frames in Animate?
6. What do you understand by symbols and instances?
7. What is the function of Photoshop toolbox?
8. What are the uses of filters in Photoshop?
9. What are layers in Photoshop?
10. What are blending modes in Photoshop?

6 Internet – Ethics and Safeguard

OBJECTIVES

After completing this chapter, you will be able to:

- Understand how to protect yourself on the web.
- Learn about the role of parents and teachers in protecting children from digital world.

Internet

Internet, also called **Net**, is one of the largest networks that links millions or trillions of computers all over the world. You can access this network via communication devices and media such as modems, cables, telephone lines, and satellites. Through the Internet, you have the access to information from all around the globe. The Internet enables you to read the latest news, do research, shop, communicate, listen to music, play games, and access a wide variety of information.

Internet has truly revolutionized the means of communication. Any person who gets connected to the Internet gets connected to you. You can communicate with anyone on the Internet. It touches the lives of everyone.

Protecting Yourself from Potential Threats on Web

you can protect yourself from a potential threat by understanding and preventing a number of security and privacy problems while using Internet. It is important when you want to send personal information like your bank account or credit card number over the Internet. If you do not take measures to protect yourself from potential threats in the cyberworld, you and your computer could become the target of cybercrime.

Cybercrimes are those instances when a person illegally accesses your computer for malicious reasons.

Given below is a list of the different types of threats that are out there along with some recommended precautions you can take to protect yourself.

SPYWARE

Spyware is a software program that gets installed on your computer without your knowledge or consent. It gets downloaded from websites, email messages, instant messages or direct file-sharing connections. It can also enter in your computer while installing a software. This program secretly gathers data from your computer, steals your passwords, displays unwanted advertisements, and takes control of your web browser.

Precautions

- Use an Internet security program to protect computer from spyware and other security risks.
- Install a personal firewall (software that protects network resources from outside intrusions).
- Do not accept or open any doubtful error dialogs from within the browser.
- Do not accept free deals because spyware may come as a part of “free deal” offer.

- Always read the End User License Agreement (EULA) carefully at the installation time and cancel if other programs are being installed as part of the desired program.

POP-UP AD

Pop-up Ad is an advertisement that disturbs your web browsing by appearing in a separate browser window on the top of your current window. Pop-ups are irritating and may also be dangerous because clicking items in the pop-up window can cause spyware or viruses to be installed on your computer.

Precaution

- You can use a pop-up blocker to block such ads in the browser.

SPAM

Email **spam**, also known as **junk mail**, involves sending unwanted messages by a spammer to a large number of recipients. It can be used to deliver emails that contain viruses and targeted attacks aimed at obtaining sensitive, personal information. Some spam may include hidden text that becomes visible only if you highlight the content; it is a common trick that spammers use to get their email to pass through spam filters without detection.

Precautions

- Sign up for **email filtering** through your ISP, or use an anti-spam program.
- Do not click links in spam or reply to spam for any reason.
- If you suspect an email to be spam, do not respond; just delete it.
- Keep your security software up-to-date.

PHISHING

Phishing is a scam in which you will receive an official or legitimate-looking email message that attempts to obtain your personal and/or financial information. These messages request you to update your credit card number, bank account number, password, or other private information. Phishing scams can be executed via email messages, websites, and even on the phone.

Precautions

- If you receive an email from someone requesting you to verify online account or financial information, do not reply.
- If you receive a phone call from someone claiming to be from a legitimate company or bank, record caller name and the time of the call. Do not disclose personal or financial information to the caller.
- Never click on links in email messages even if you know the sender.
- While visiting a bank's website that requires you to enter confidential information, make sure to type the web address correctly. Typing it incorrectly may take you to a phishing website where the information you enter can be collected by an unknown party.
- Enable **phishing filter** in your browser that warns or blocks you from suspicious websites.

VIRUS

Virus are programs which are created deliberately to damage data. A virus can badly affect or infect your computer without your knowledge. Once a virus is in your computer, your files and operating system may be damaged. Viruses usually enter into your computer when you open an email attachment or download data from web.

Precautions

- Open only those email attachments that come from trusted sources and are expected.
- Delete all unwanted emails without opening.
- Do not click on web links sent by someone you do not know.
- Install an antivirus program and keep it updated.
- Scan all files with an antivirus program before transferring them to your system.

KEYLOGGERS

A **keylogger** (keystroke logging) is a type of software that gets installed very easily and is often found on public computers. It records keystrokes you make to enter the data in the computer in a hidden file.

Precautions

- Avoid checking your email or performing banking activities on public computers. These computers may be running keyloggers, which record keystrokes in a hidden file or other tracking software.
- If you use a public computer for critical activities, be certain to sign out of any password-protected website and to clear the browser history.

MANAGE PASSWORD

When you add User name and Password to login your account in a particular website, web browser sometimes displays a prompt message that offers to remember the password you have typed. If you click on 'Yes' and then access the website in future, the web browser bypasses the login page and takes you directly to the site. Therefore, anyone who uses your computer can also access your account from the site.

Precaution

- Always click on 'No' when your web browser prompts to remember the password.

COOKIES

A **cookie** is a small text message that a web browser stores on your computer to keep track of websites. Cookie files typically contain data about you, such as your user name, postal code, or viewing preferences. Websites use cookies for a variety of purposes.

- Most websites that allow for personalization use cookies to track user preferences.
- Some websites use cookies to store user names and/or passwords, so that users do not need to enter this information every time they sign into the website.
- Online shopping sites generally use cookies to keep track of items in a user's shopping cart.
- Other websites use cookies to track how often users visit a website.

Precautions

- Some websites sell or trade information stored in your cookie to advertisers. If you do not want personal information to be distributed, you should limit the amount of information you provide to a website or adjust how your browser handles cookies.
- Clear or disable cookies in your browser. Most modern browsers allow users to decide whether to accept cookies and the time frame to keep them. However, rejecting cookies makes some websites unreadable.

VULNERABILITIES

Vulnerabilities are flaws in a computer software that weaken overall security of your computer. They can also be created by improper computer or security configurations. Cybercriminals, like hackers or crackers, exploit such weaknesses and damage the computer or tamper its data.

Precautions

- Keep software and security patches up-to-date.
- Configure security settings for your operating system and Internet browser.
- Install an antivirus and keep it updated to block threats targeting vulnerabilities.
- Clear cookies in your browser.

CYBERBULLYING

Cyberbullying is a harassment that takes place using technology which includes sending or forwarding threatening text messages; posting embarrassing or altered pictures of someone without his or her permission; or setting up a fake online social network page where others make harsh comments and spread rumors about someone. Teenagers face the problem of cyberbullying most often.

Precautions

- Never give your personal information and password to any unknown person. They can use this information to harass you.
- Check for **privacy settings**, usually found on the **Settings** on most social networking sites, to set permissions. In this way, you can control who can review your profile and photos, make comments, and if desired, block certain people from viewing your page.
- You should search your name on major search engine such as Google on regular basis. If any personal information or photo appears, which may be used for cyberbullying, you must take an action to remove it.
- Installation of filtering software on the computer can protect teenagers from viewing inappropriate content online.

HACKING

The term **hacker** refers to someone who accesses a computer or network illegally. This is known as **hacking**. This can happen either for positive or negative reasons. Some hackers claim the intent of their security breaches is to improve security (positive). Other hackers develop computer malware or virus to gain access to confidential information (negative). A **cracker** is someone who also accesses a computer or network illegally, but has the intent of destroying data, stealing information, or carry out other malicious action. Both hackers and crackers have advanced computer and networking skills.

Precautions

- You should make a strong password and change it frequently. Your password should be at least six characters long and include at least one number, letter (combination of upper and lower cases) and special character (@, *, &, !, etc.). Do not use your date of birth, name or any sensitive information as your password. It is strongly advised that you use different passwords for different accounts.

SOCIAL ENGINEERING

Social engineering is a term used for gaining unauthorized access or obtaining confidential information by taking advantage of the trusting human nature of victims. It is the art of convincing people to reveal confidential information, such as user names and passwords, on the phone, in person, or on the Internet. Human nature of trust is the basis of such social engineering attacks.

Social engineers are aware of the fact that most people are unaware of their valuable information and are careless about protecting it. They obtain information from users who do not conceal information properly.

Phases in a Social Engineering Attack

- Research on the Target (person or a company)

  From websites, employees, tour information, etc.

- Select the Victim

  Identify the frustrated employees of the target.

- Develop Relationship

  Develop relationship with the selected employees.

- Exploit the Relationship

  Collect sensitive and financial information.

Precautions

- Verify the identity of the person or organization requesting personal or confidential information.
- While relaying personal or confidential information, ensure that only authorized people hear your conversation or get the information.
- When personal or confidential information appears on a computer or mobile device, ensure that only authorized people can see your screen.
- Shred all sensitive or confidential paper documents after use.
- After using a public computer, clear the history in its browser.
- Avoid using public computers to conduct banking or other sensitive transactions.

DIGITAL FOOTPRINT

Everytime you surf the Internet, you leave a trail behind known as **digital footprint**. Whatever activity you perform on the Internet such as checking mails, filling forms, online banking, buying and selling things, and posting on social networking leaves traces of your personal information online. This information can be seen by other users.

Open the history section of your web browser, and you can see all the websites you have visited in the past. Everyone who uses the Internet has a digital footprint, so it is not something to be worried about. However, it is wise to consider what trail of data you are leaving behind.

Precautions

- Keep your privacy settings as high as possible.
- Never post personal information such as home address, telephone number, or office address of your family members.
- Never upload or download inappropriate picture or videos.
- Never post inappropriate matter about any person because your post is public.
- If you see something online that makes you feel uncomfortable, unsafe or worried, leave the website and turn off your computer. If you want, tell a trusted adult immediately.
- When you use a public computer, make sure you logout of the accounts you have accessed before leaving the computer.

Role of Parents and Teachers

The growth and popularity of technology, especially the Internet, has brought up a 'digital generation' which excites as well as worries parents and teachers. So, both parents and teachers have to play their role and protect the children in the virtual world.

- Parents and teachers should advise children to play only those online games which are suitable for their age.
- Parents and teachers should advise children that most social networks are not suitable for children under 11-12 years of age.
- They should be an active part of the children's online life. At the same time, they should gain their trust as far as the use of Internet is concerned.
- They should advise children not to share any personal information to any unknown person.
- They should make such environment at home and at school so that children can discuss their internet-related problems openly, without hesitation.
- They should advise children to create a strong password for every account (such as email account) and keep on changing password after a certain period of time. Most importantly, never share it with anyone.
- Internet is full of objectionable content such as violence and obscene material. Parents and teachers should use content filtering to restrict access of minors to inappropriate sites.

Let us not forget that Internet is an excellent tool for education, entertainment, and communication. Parents and teachers should be aware that the online world is here and the only thing they can do is to prepare their children/students to become better, responsible digital citizens.

Self-Evaluation

CHECKLIST

After reading the chapter, I know these points:

	Agree	Disagree
⊙ I know that Internet is one of the largest networks that links millions of computers.	☐	☐
⊙ I know that protecting ourselves is important when we want to send personal information over the Internet.	☐	☐
⊙ I know that phishing is a scam in which we receive an official or legitimate-looking email message.	☐	☐
⊙ I know that cyberbullying includes sending or forwarding threatening messages, posting embarrassing or altered pictures of someone without his or her permission.	☐	☐
⊙ I know that social engineering is a term used for gaining unauthorized access or obtaining confidential information.	☐	☐

Exercises

A. Tick [✓] the correct answer.

1. A software that installs on our computer without our consent is ..... .
   a. cookie ☐ b. spyware ☐ c. keylogger ☐
2. ..... are irritating while web browsing and can also install viruses on our computer.
   a. Antivirus ☐ b. Pop-up Ads ☐ c. Vulnerabilities ☐
3. ..... is a small text message that a browser saves to keep track of websites.
   a. Virus ☐ b. Junk ☐ c. Cookie ☐
4. ..... is a harassment that takes place using technology.
   a. Cyberbullying ☐ b. Vulnerability ☐ c. Pop-up Ad ☐
5. ..... is the art of convincing people to reveal confidential information.
   a. Phishing ☐ b. Spam ☐ c. Social engineering ☐

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

1. Internet is one of the largest networks that links millions or trillions of computers. ☐
2. We should never click on links in email messages, even if we know the sender. ☐
3. Vulnerabilities are flaws in computer software that weaken the security of computer. ☐
4. Spam involves sending important messages to a large number of recipients. ☐
5. We should click on 'yes' when our web browser asks to remember the password. ☐

C. Fill in the blanks.

1. ..... are programs which are created deliberately to damage data.
2. ..... records our keystrokes to enter the data in the computer in a hidden file.
3. ..... refers to someone who accesses a computer or network illegally.
4. Every time we surf the Internet, we leave a trail behind, known as ..... .
5. Parents should advise children to create ..... password for every account.

D. Differentiate between the following.

1. Spam — Phishing

....

....

2. Hacker — Cracker

....

....

E. Answer in 1-2 sentences.

1. What is cyberbullying?

.....

.....

2. What is social engineering?

.....

.....

F. Answer briefly.

1. How can we protect our computer from hacking?

.....

.....

.....

2. Why should we not save password of our account in a particular website?

.....

.....

.....

3. Write any two roles of parents and teachers in protecting the children in the virtual world.

.....

.....

.....

G. Application-based Question

Your teacher wants you to read this case and tell the answer:

"A man calls in the company's help desk and says that he has forgotten his password. He further adds that if he missed to send an urgent mail by the evening, his boss might fire him. The help desk worker trusts him and quickly reveals/resets the password."

Under which potential threat can this come?

.....

Group Discussion

Divide the students into two groups and discuss the topic– 'Is Online Threat Inevitable?'.

Online Link

To learn more about ethics of Internet, visit the website:

https://www.teachthought.com/the-future-of-learning/11-tips-for-students-tomanage-their-digital-footprints/

Activity Section

Activity Write

Write 'E' for Ethical and 'U' for Unethical statements.

1. An employee uses his computer at work to complete his personal assignment.	.....
2. A student copies text from the web and uses it in a research paper for his English subject.	.....
3. An employee makes a copy of software from office and installs it on his personal computer.	.....
4. An employee who has been laid off installs a computer virus on his employer's computer.	.....
5. Someone reads a well-known novel on the web and encourages others to read it.	.....
6. Your friend downloads your picture from Internet and uses it on social networking.	.....

Lab Activity

Create a presentation on Ethical Hacking.

Follow these instructions:

a. With the help of Internet, search information on the given topic and make a presentation of minimum five slides.

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

c. Save the presentation as **'Ethical Hacking'** in the main folder **'Lab Activity'** and run it.

Skill Formation

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

Discover More

Biometric Devices

A **biometric device** authenticates a person's identity by translating a personal characteristic, such as a fingerprint, into a digital code that is compared with a digital code stored in a computer verifying the unique physical characteristic. If the digital code in the computer does not match the personal characteristic code, the computer denies access to that person. Some of the popular biometric devices are fingerprint reader, face recognition system, hand geometry system, voice verification system, signature verification system, iris recognition system, and retinal scanner.

Fingerprint Reader: A fingerprint reader captures unique curves and indentations of a fingerprint. Many laptops, smartphones, and smartwatches have a built-in fingerprint reader. Using their fingerprint, users unlock the computer or device, or sign in to programs instead of entering a user name and a password.

Face Recognition System: A face recognition system captures a live face image and compares it with a stored image to determine if the person is a legitimate user. Some mobile devices use face recognition system to unlock.

Iris Recognition System: The iris recognition system reads pattern in the iris of the eye which is as unique as a fingerprint. This system is quite expensive and is used by security organizations, and banks that deal with highly sensitive data.

7 HTML 5 – Creating Web Pages

OBJECTIVES

After completing this chapter, you will be able to:

- Understand the elements of HTML5 such as tags, attributes, etc.
- Learn basic building-blocks of HTML5 tags for creating web pages.
- Learn about tags for formatting the text.

Introduction to HTML

Today in this age of computers, you can download any information or document containing text, sound, graphic, and/or video through the Internet, with the help of a web browser. **Web browser** is a software that enables a computer to display any type of document or information present on the Internet.

Do you know, how these documents are displayed on the Internet? These web documents are written in a special language which is popularly known as **HTML**.

HTML (HyperText Markup Language) is a language which is used to make web pages to be displayed on the Internet. HTML documents are made up of text content and special codes known as **tags** that tell web browsers how to display the content. It also provides the means to link the web pages. HTML documents are identified by **.html** or **.htm** file extensions.

You can display HTML documents on any type of computer platform (operating system), such as Windows, Mac OS and Linux.

HISTORY OF HTML

HTML was developed by **Tim Berners Lee** in early 1990s. HTML has gone through several versions, each of which, expands its capabilities. Although most browsers still support HTML versions 3.2 and 2.0, version 4.01 includes rules for using more than 90 HTML tags. It is an improvement of previous versions by adding better support for multimedia and style sheets.

The most recent version **HTML5** includes rules for using more than 100 different HTML tags. HTML5 succeeds HTML 4.01, which was released in 1999.

HTML5

HTML5 is an improvement of previous versions by including new tags for defining common types of page content, better support for audio and video, and drawing capability. It is designed to deliver almost everything without requiring additional plugins.

With HTML5, web pages can store data locally within the user's browser, also known as **local storage**. Earlier, this was done with cookies. However, web storage is now more secure and faster. The data is not included with every server request, but used only when asked for.

HTML5 is also **cross-platform**, that is, it works on Tablets, smartphones, notebooks, and smart TVs. Major browsers like Safari, Chrome, Firefox, Opera, and Edge support HTML5 features.

FEATURES OF HTML5

- HTML5 is not a case-sensitive language. This means that HTML5 commands can either be written in lower case or in upper case.
- Spaces and tabs can be used anywhere in the document because it does not affect the appearance of the document.
- HTML5 document is saved with **.htm** or **.html** file extension.
- HTML5 document is written in text editors like Notepad and Gedit, and word processors like WordPad, MS-Word, and Writer.

UNDERSTANDING HTML5 ELEMENTS

HTML consists of text with special instructions known as **tags**. Each tag giving a specific instruction is enclosed within angular brackets < >. HTML tags tell a browser how to organize and present text, images, and other contents.

Uppercase or lowercase letters can be used for typing tags. But you should use uppercase letters to make the tags stand out.

HTML tags can be categorized into two categories: **Container tags** and **Empty tags**.

- **Container Tags:** Tags that have both starting as well as ending are known as **container tags**. A tag is opened using **opening angular brackets (<>)**, and closed using **closing angular brackets** with **forward slash (</>)**.

  For example: <HTML> Starting Tag (opening tag)
  </HTML> Ending Tag (closing tag)

- **Empty Tags:** Tags that have only a starting, and there is no need to close them (using </>) are known as **empty tags**.

  For example
 Starting Tag (opening tag)

SEMANTIC TAGS

HTML5 includes various **semantic tags** that enable you to describe the different parts of your web page.

DOCTYPE: The **DOCTYPE** declaration at the beginning of your page specifies that the document is written in HTML5. In HTML5, the DOCTYPE declaration is required.

NAVIGATION: The **<nav>** tag is used to define important navigational links to other pages on your site.

HEADER: The **<header>** tag can be used to define introductory information like site name, company name and logo, and slogan. This <header> tag appears at the very beginning of the body of a web page.

FOOTER: A **<footer>** tag is used to put copyright information, contact address, and other small-print items on a page. It typically goes at the end of your page, before the closing </body> tag.

SECTION: A **<section>** tag offers a generic way of grouping related information on a web page.

ARTICLE: The **<article>** tag is for defining a self-contained information on a web page.

ASIDE: You can mark information on your page as tangential to the main content with the **<aside>** tag. The <aside> tag is useful for defining pull quotes, glossary terms, or sets of links related to an article.

CANVAS: The **<canvas>** tag enables you to define a blank drawing area on your web page on which you can create shapes, draw straight and curved lines, apply color, and even add images within the area.

AUDIO AND VIDEO: HTML5 offers a new **<video>** tag for embedding video clips and an **<audio>** tag for integrating sound in web pages.

HTML ATTRIBUTES

Some tags have attributes that offer options for the tag. Most attributes work by setting a numeric or descriptive value. Attributes always go inside the opening HTML tag, and it is a good practice to enclose attribute values in **quotation marks** (“ ”). Some tags use attributes, for example, the **<FONT>** tag has a COLOR attribute that allows you to change the color of text.

```
<FONT COLOR=“#0000FF”>
```

Some tags do not need attributes such as **
** tags.

ENTITIES

Entities are the special characters such as a **copyright symbol** or a **fraction** that you can add to a web page by using special codes. Entities represent characters not readily available on the keyboard. All entities are preceded by **an ampersand (&)** and followed by a **semicolon (;)**. For example, the code **©** adds copyright symbol (©) to your web page.

AVOIDING SYNTAX ERRORS IN HTML

You should always check your code to avoid HTML errors. Make sure that your tags have **brackets**, closing tags include a **slash**, and attribute values are surrounded by **quotation marks**. Multiple HTML tags should be properly **nested**; it means your closing tags should be in the reverse order of the opening tags. For example:

```
<P ALIGN=“center”><B>Minhas Web Page</B></P>
```

Always consider using new lines to type code instead of running everything together in one long line. It will make your HTML readable. Doing so will not affect how your page is displayed because web browsers ignore extra white space.

RENDERING HTML

When a browser displays a web page, it retrieves the HTML file for that page from a local storage or server, reads the HTML tags to determine how the content should be formatted, and displays the page. The HTML tags tell the browser what images, video, audio, and other content need to be downloaded and integrated into the page.

Text Editors

HTML documents are plain-text documents, so you can use any text-editing program to code HTML and create a web page. A **text editor**, such as Notepad, is a program that allows a user to enter, change, save and print text. Text editors do not have many advanced features, but they do allow you to develop HTML documents easily. Microsoft Windows comes with **Notepad**, Apple Mac computers come with **TextEdit**, and Ubuntu comes with **Gedit**. These three are well-known simple text editors.

Web Browser for HTML5

A **web browser** is a software that displays the resulting web pages. Browser is also used to display HTML documents you save locally on your computer. When coding your HTML, you can use a web browser to test your work. Popular browsers used nowadays are Microsoft Internet Explorer, Mozilla Firefox, Apple Safari, Google Chrome, and Opera.

VIEWING HTML5 CODE IN A BROWSER

You can view the HTML code used to create a web page of your choice. Viewing HTML from different websites is a good way to learn to write your own code and get new ideas for your own pages.

1. Start the web browser that you want to use.

In this example, we have started Microsoft Internet Explorer.

2. Open the web page for which you want to view the HTML code.
3. Press the **Alt** key from the keyboard.

Menu bar will appear.

4. Click on **View** menu.
5. Click on **Source** *(or press Ctrl+U)*.

- A window displays the HTML code used for creating the web page.

6. After you have viewed the HTML code, click on **[x]** to close the window.

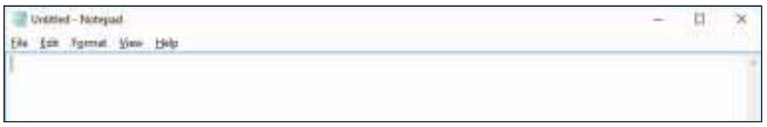
Creating and Saving a Web Page

You can use a text editor to create a web page. In this chapter, we will use Notepad (text editor). To open Notepad, perform these steps:

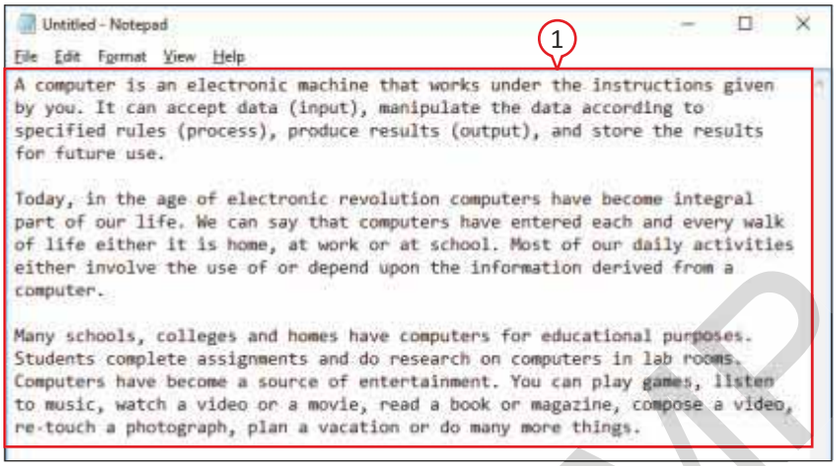
1. Click on **Start** icon.

A list of all installed apps appears on left.

2. Click on **Windows Accessories**.
3. Click on **Notepad**.



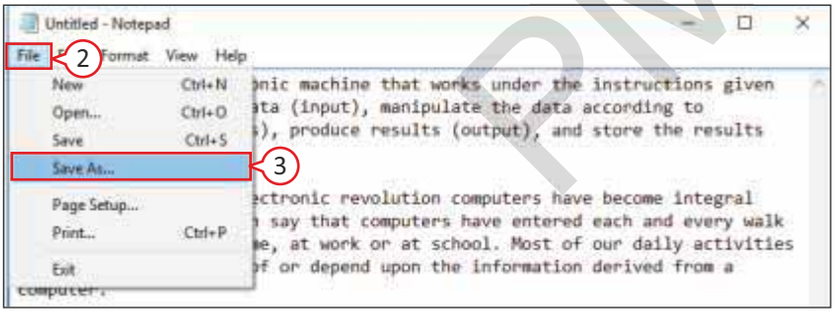
CREATE AND SAVE A HTML DOCUMENT



1. Open Notepad, and type the text that you want to appear on the web page.

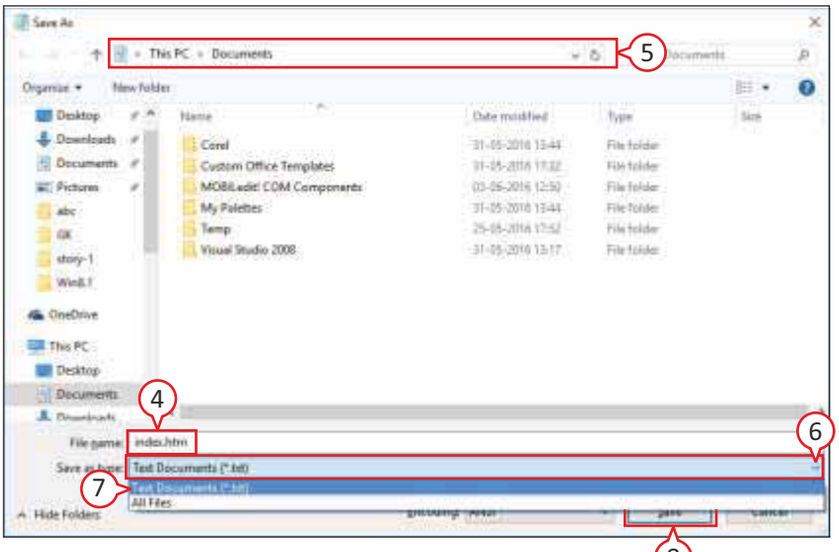
Note: *Do not format the text. You must use HTML tags to format the text.*

You can check for any spelling and grammatical errors in the web page.



2. Click on **File** in the Menu bar.
3. Click on **Save As** to save the web page *(or press Ctrl+Shift+S)*.

The **Save As** dialog box appears.



4. Type a name for the web page. Make sure you add the **.html** or **.htm** extension to the web page name.

A web page name can have letters and numbers, but no spaces. The main web page is usually named **index.htm**.

5. Navigate to the folder where you want to save the page.
6. Click on **Save as type:** box to see a list of the ways by which you can save the web page.
7. Click on **Text Documents**.
8. Click on **Save**.

Notepad saves the page.

Basic HTML Tags

You use sets of HTML tags to define the basic structure of your page. HTML tags control the layout and formatting of the elements in HTML. These tags are the **building blocks** of HTML. Some basic HTML tags <HTML>, <HEAD>, <TITLE>, and <BODY> that you must add to every web page you create are discussed below.

ADDING DOCTYPE DECLARATION

The **DOCTYPE declaration** at the beginning of your page specifies that the document is written in HTML5. In HTML5, the DOCTYPE declaration is required. In the past versions of HTML, the DOCTYPE declared the particular version of HTML that a browser can expect to see in your document.

<!DOCTYPE html> 1

A computer is an electronic machine that works under the instructions given by you. It can accept data (input), manipulate the data according to specified rules (process), produce results (output), and store the results for future use.

Today, in the age of electronic revolution computers have become integral part of our life. We can say that computers have entered each and every walk of life either it is home, at work or at school. Most of our daily activities either involve the use of or depend upon the information derived from a computer.

Many schools, colleges and homes have computers for educational purposes. Students complete assignments and do research on computers in lab rooms. Computers have become a source of entertainment. You can play games, listen to music, watch a video or a movie, read a book or magazine, compose a video, re-touch a photograph, plan a vacation or do many more things.

1. Type **<!DOCTYPE html>** before the entire text on the web page.

This declares the document as HTML5.

HTML TAGS

The first set of tags after the <!DOCTYPE html> tag, **<HTML>** and **</HTML>**, indicates the start and end of an HTML document. These tags declares the document as HTML.

<!DOCTYPE html>
<HTML> 1

A computer is an electronic machine that works under the instructions given by you. It can accept data (input), manipulate the data according to specified rules (process), produce results (output), and store the results for future use.

Today, in the age of electronic revolution computers have become integral part of our life. We can say that computers have entered each and every walk of life either it is home, at work or at school. Most of our daily activities either involve the use of or depend upon the information derived from a computer.

Many schools, colleges and homes have computers for educational purposes. Students complete assignments and do research on computers in lab rooms. Computers have become a source of entertainment. You can play games, listen to music, watch a video or a movie, read a book or magazine, compose a video, re-touch a photograph, plan a vacation or do many more things.

</HTML> 2

1. Type **<HTML>** just below the **<!DOCTYPE html>.**
2. Type **</HTML>** at the end of the entire text on the web page.

HEAD TAGS

The next set of tags, **<HEAD>** and **</HEAD>**, contains the web page title and other descriptive information (metadata) about a web page.

```
<!DOCTYPE html>
<HTML>
<HEAD>

</HEAD>
A computer is an electronic machine that works under the instructions
given by you. It can accept data (input), manipulate the data according
to specified rules (process), produce results (output), and store the
results for future use.
Today, in the age of electronic revolution computers have become
integral part of our life. We can say that computers have entered each
and every walk of life either it is home, at work or at school. Most of
our daily activities either involve the use of or depend upon the
information derived from a computer.
Many schools, colleges and homes have computers for educational
```

1. Type **<HEAD>** directly below the **<HTML>** tag.
2. Press the **ENTER** key twice.
3. Type **</HEAD>**.

These tags define where the title and the other descriptive information will appear.

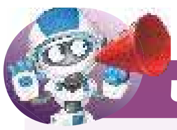
TITLE TAGS

The **<TITLE>** and **</TITLE>** tags indicate the title of the web page. The **Title bar** or **Tab** of a web browser window usually displays the title.


```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE>Computer System</TITLE>
</HEAD>
A computer is an electronic machine that works under the instructions
given by you. It can accept data (input), manipulate the data according
to specified rules (process), produce results (output), and store the
results for future use.
Today, in the age of electronic revolution computers have become an
integral part of our life. We can say that computers have entered each
and every walk of life either it is home, at work or at school. Most of
our daily activities either involve the use of or depend upon the
information derived from a computer.
Many schools, colleges and homes have computers for educational
purposes. Students complete assignments and do research on
computers in lab rooms. Computers have become a source of
entertainment. You can play games, listen to music, watch a video or a
```

1. Type **<TITLE>** directly below the **<HEAD>** tag.
2. Type the title for the web page, using only letters and numbers.
3. Type **</TITLE>**.

Title text describes the contents of the page, and appears in the Title bar or Tab of the web browser.



Update Your Knowledge

- HTML tags mostly come in pairs with the ending tag containing an additional forward slash "/".
- Tag names cannot contain spaces.
- An element in HTML refers to a tag (such as <head>, <body>, and <p>) or element of structure of a document (such as body, title, and paragraph).

META TAG

You can add **metadata** to your page to include extra descriptive information that does not appear in the browser window. Metadata can include a page description, author and copyright information, keywords, and more. What you insert in metadata tags can help search engines categorize your page. You define metadata in the document header using the <META> tag.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE> Computer System </TITLE>
<META NAME="author" CONTENT="Davinder Singh Minhas">
</HEAD>
A computer is an electronic machine that works under the instructions given by you. It can accept data (input), manipulate the data according to specified rules (process), produce results (output), and store the results for future use.
Today, in the age of electronic revolution computers have become an integral part of our life. We can say that computers have entered each and every walk of life either it is home, at work or at school. Most of our daily activities either involve the use of or depend upon the information derived from a computer.
```

1. Click between the <HEAD> and </HEAD> tags, and press **Enter** key to start a new line.

In this example, the metadata appears below the <TITLE> tags.

2. Type **<META NAME= "author"** followed by a space.
3. Type **CONTENT=*"My Name"*>**, replacing *My Name* with your name.

BODY TAGS

The final set of tags, **<BODY>** and **</BODY>**, contains the main content of the web page. It is a container element, which includes text, graphics and other elements.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE> Computer System </TITLE>
<META NAME="author" CONTENT="Davinder Singh Minhas">
</HEAD>
<BODY>
A computer is an electronic machine that works under the instructions given by you. It can accept data (input), manipulate the data according to specified rules (process), produce results (output), and store the results for future use.
Today, in the age of electronic revolution computers have become an integral part of our life. We can say that computers have entered each and every walk of life either it is home, at work or at school. Most of our daily activities either involve the use of or depend upon the information derived from a computer.
Many schools, colleges and homes have computers for educational purposes. Students complete assignments and do research on computers in lab rooms. Computers have become a source of entertainment. You can play games, listen to music, watch a video or a movie, read a book or magazine, compose a video, re-touch a photograph, plan a vacation or do many more things.
</BODY>
</HTML>
```

1. Type **<BODY>** directly below the **</HEAD>** tag.

This tag marks the beginning of the actual content of your web page.

2. Type **</BODY>** directly above the **</HTML>** tag.

This tag closes the body portion of the page.

Save the file once again to save the changes.

Displaying Web Page in a Web Browser

After creating and saving, the web page can be displayed in the web browser. This allows you to see how your web page will appear on the web. Start the web browser to display your web page.

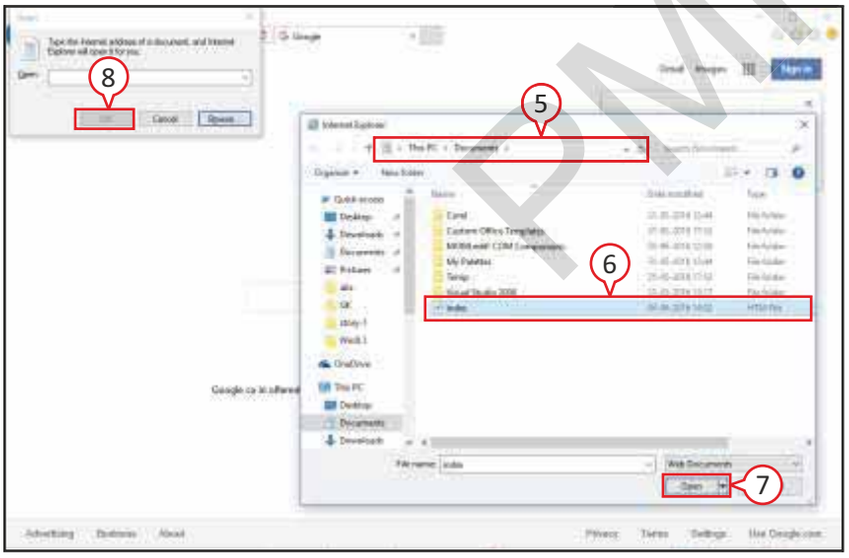
In this example, we are using **Internet Explorer** web browser.

1. Press the **Alt** key from the keyboard to bring the Menu bar in the web browser.
2. Click on **File** to open File menu.
3. Click on **Open** *(or press Ctrl+O)*.

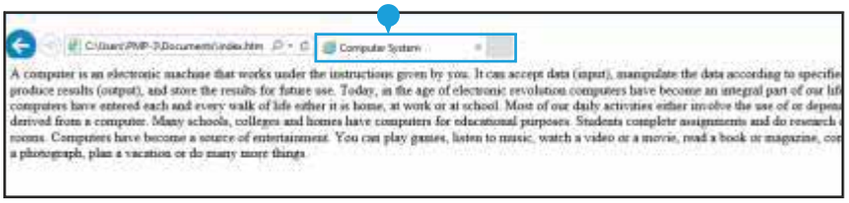
The **Open** dialog box appears.

4. Click on **Browse** in the Open dialog box to locate the web page on your computer.

The Internet Explorer dialog box appears.



5. Navigate the folder from where you want to open the web page.
6. Click on the web page you want to open.
7. Click on **Open.**
8. Click on **OK** in the **Open** dialog box.



You can see the web page appearing in the web browser.

- **The Tab of web browser shows the title you have given to your web page.**

Do You Know?

You can save the HTML file on the desktop and double-click on it to open it.

Modifying Paragraph Text

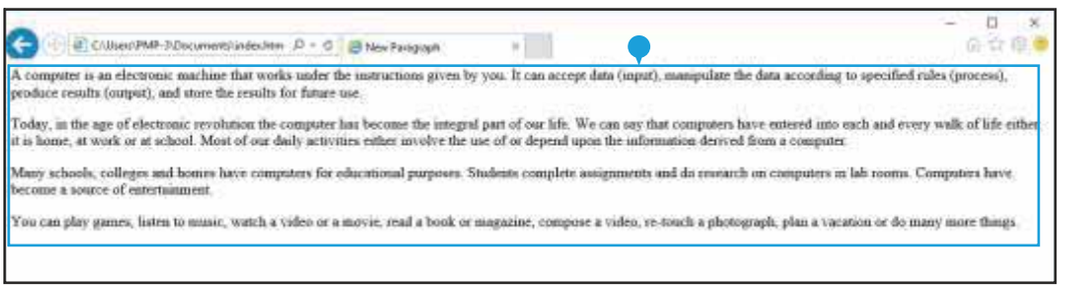
Paragraphs are surrounded by a vertical space of one line. Paragraph tag <P> indicates the starting of a paragraph in a text. The first line in a paragraph is indented in some browsers.

STARTING A NEW PARAGRAPH

To start new paragraphs in an HTML document, you use paragraph tags. In a word processing program, you can press **Enter** key from the keyboard to start a new paragraph. Web browsers do not read these line breaks; so you need to insert **<P>** tag every time you want to start a new paragraph. When the browser finds a **<P>** tag in an HTML file, it starts a new paragraph and inserts a blank line above the new paragraph. The **</P>** end tag indicates the end of the paragraph.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE> New Paragraph </TITLE>
</HEAD>
<BODY>
A computer is an electronic machine that works under the instructions given by you. It can accept data (input), manipulate the data according to specified rules (process), produce results (output), and store the results for future use.
<P>Today, in the age of electronic revolution the computer has become the integral part of our life. We can say that computers have entered into each and every walk of life either it is home, at work or at school. Most of our daily activities either involve the use of or depend upon the information derived from a computer.</P>
<P>Many schools, colleges and homes have computers for educational purposes. Students complete assignments and do research on computers in lab rooms. Computers have become a source of entertainment.</P>
<P>You can play games, listen to music, watch a video or a movie, read a book or magazine, compose a video, re-touch a photograph, plan a vacation or do many more things.</P>
</BODY>
</HTML>
```

1. Type **<P>** in front of each paragraph on the web page.
2. Type **</P>** at the end of each paragraph on the web page.



- **The web browser displays a blank line between each paragraph.**

STARTING A NEW LINE

You can insert a line break to instruct the browser to break the text and go to a new line. You can use the line break tag **
** to break the text. Web browsers normally wrap text automatically; when a line of text reaches the right side of the browser window, it breaks and continues on the next line. You can also use the **
** tag to add blank lines between the paragraphs.

**
** tag is an empty element, which means that **
** only has an opening tag.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE> NEW LINE </TITLE>
</HEAD>
<BODY>
ADDRESS OF PM PUBLISHERS
<P>
<BR>PM Publishers Pvt. Ltd.
<BR>C-55, Sector 65,
<BR>Gautam Budh Nagar,
<BR>Noida - 201301 (U.P.)
</P>
</BODY>
</HTML>
```

1

Web browser displays each line of the text in a new line.

1. Type **
** in front of each line where you want to start the text from a new line.

If you do not use <BR> tag, all the text given between <P> and </P> tags will appear in the same line.

Update Your Knowledge

You can use the **<wbr>** tag to specify where a browser may add a line break, if needed. You can use this tag for long words that might present problems if they were to appear near the end of a line and cause awkward spacing. The **<wbr>** tag differs from the **
** tag in that it results in a new line only if the flow of text requires it. The <wbr> is a new tag in HTML5.

INSERTING A BLANK SPACE

By typing ** ** you can insert a blank space within a line of text to indent or add emphasis to your text. This code stands for **nonbreaking space**. Web browsers will not create a line break where you insert these characters. You can also use blank spaces to help position an element on a web page, such as a graphic or a photo.

1. Type ** ** in the line where you want to add a blank space.

To add multiple spaces, type the code multiple times.

The web browser displays blank spaces in the line.

ADDING A COMMENT

Comment can be added to web page to write a note meant for you. Besides, it also helps to update a section of the text and specifies the reasons for using a specific tag. However, these comments will not appear when readers view your web page.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE> Adding Comments </TITLE>
</HEAD>
<BODY>
<!-- This Web page is giving the information about Computer -->
A computer is an electronic machine that works under the instructions
given by you. It can accept data (input), manipulate the data according
to specified rules (process), produce results (output), and store the
```

1 2 3

1. Type **<!--** where you want to add a comment. Then press the **SPACEBAR** key.
2. Type the comment and press **SPACEBAR** again.
3. Type **-->** to complete the comment.

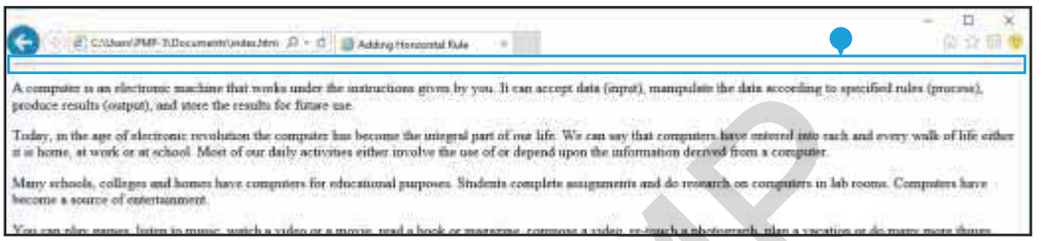
The comment on your web page is not displayed by the web browser.

INSERTING A HORIZONTAL RULE

You can add a **horizontal rule** or **line** across your web page to separate different sections of information. By default, most web browsers display a horizontal rule as a thin gray line. You can insert any number of horizontal rules on a web page.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE> Adding Horizontal Rule </TITLE>
</HEAD>
<BODY>
<HR>
<P>A computer is an electronic machine that works under the
instructions given by you. It can accept data (input), manipulate the
data according to specified rules (process), produce results (output),
and store the results for future use.</P>
```

1. Type **<HR>** where you want to insert a horizontal rule on your web page.



- **The horizontal rule on your web page is displayed by the web browser.**

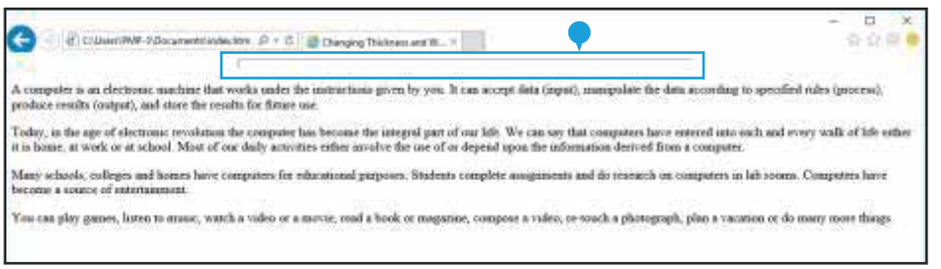
Changing Thickness and Width of Horizontal Rule

You can define the thickness and length (width) of a horizontal line using the **SIZE** and **WIDTH** attributes. It will give a better view to the web page.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE>Changing Thickness and Width of Horizontal Rule</TITLE>
</HEAD>
<BODY>
<HR SIZE= “10” WIDTH= “50%”>
<P>A computer is an electronic machine that works under the
instructions given by you. It can accept data (input), manipulate the
data according to specified rules (process), produce results (output),
and store the results for future use.</P>
```

1. Within **<HR>** tag, type **SIZE=“?”**, replacing **?** with the thickness you want to assign, measured in pixels.
2. Within the **<HR>** tag, type **WIDTH=“?%”**, replacing **?** with the percentage of the page you want the rule to extend across.

You can also set a numeric value to set the width of the rule in pixels.



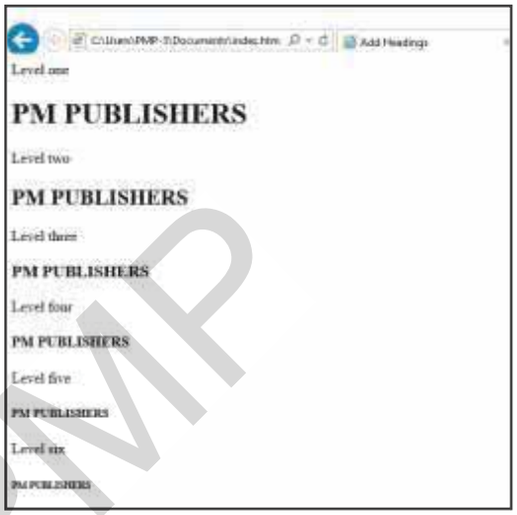
- **The horizontal rule on your web page is displayed by the web browser with the specified thickness and width.**

Heading Tag

We use heading tags to define headings in the web page. Headings are used to separate text or add topics on the web page. There are six different heading-levels which vary from <H1> to <H6>. **<H1>** tag defines the **largest heading**, and **<H6>** defines the **smallest heading**.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE> Add Headings </TITLE>
</HEAD>
<BODY>
Level one
<H1>PM PUBLISHERS</H1>
Level two
<H2>PM PUBLISHERS</H2>
Level three
<H3>PM PUBLISHERS</H3>
Level four
<H4>PM PUBLISHERS</H4>
Level five
<H5>PM PUBLISHERS</H5>
Level six
<H6>PM PUBLISHERS</H6>
</BODY>
</HTML>
```

1. Type **<H?>** in front of the text you want to make a heading.
   Replace **?** with the desired heading-level numbered from **1** to **6**.
2. Type **</H?>** at the end of the text that you want to make a heading.
   Replace **?** with the desired heading-level numbered from **1** to **6**.



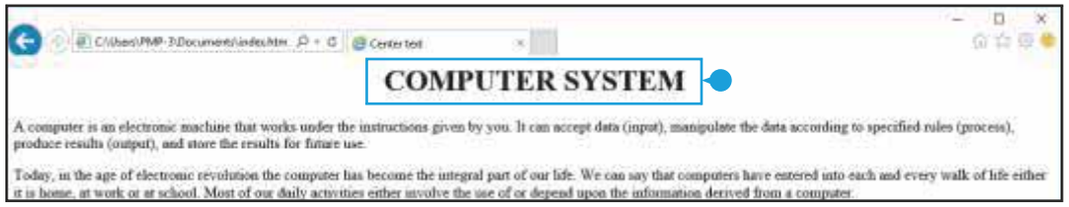
The web browser displays each heading with a different heading level.

CENTERING THE HEADING

You can emphasize on some important information by centering the heading text.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE> Center text </TITLE>
</HEAD>
<BODY>
<H1><CENTER>COMPUTER SYSTEM</CENTER></H1>
<P>A computer is an electronic machine that works under the instructions
```

1. Type **<CENTER>** in front of the text you want to align in the center.
2. Type **</CENTER>** at the end of the text you want to align in the center.



The text is centered on the web page in the web browser.

Update Your Knowledge

Headings have larger font size than normal text and are often bold or italic, or are of different color than normal text.

Formatting Text

HTML provides a number of tags to format text. These tags fall into two categories: **Logical style tags** and **Physical style tags**.

Logical style tags allow a browser to interpret the tag based on browser settings, relative to other text on a web page. The **<h2>** heading tag, for example, is a logical style tag which indicates that the heading text should be larger than the regular text but smaller than text formatted using an <h1> heading tag. The **** tag is another logical style tag, which indicates that the text should have a strong emphasis, and for which most browsers interpret and display the text in bold font.

Physical style tags specify a particular font change that is interpreted strictly by all browsers. For example, to ensure that text appears in bold font, you should enclose it between a start **** and on end **** tag.

BOLD, ITALIC AND UNDERLINE TEXT

The appearance of the text can be changed by making it **bold**, **italic**, or **underline** to emphasize important information or make your web page more visually appealing.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE> Making text Bold, Italic and Underline </TITLE>
</HEAD>
<BODY>
<P>Plain text<BR>
PM PUBLISHERS
</P>
<P>Bold text<BR>
<B>PM PUBLISHERS</B>
</P>
<P>Italic text<BR>
<I>PM PUBLISHERS</I>
</P>
<P>Underline text<BR>
<U>PM PUBLISHERS</U>
</P>
</BODY>
</HTML>
```


BOLD TEXT

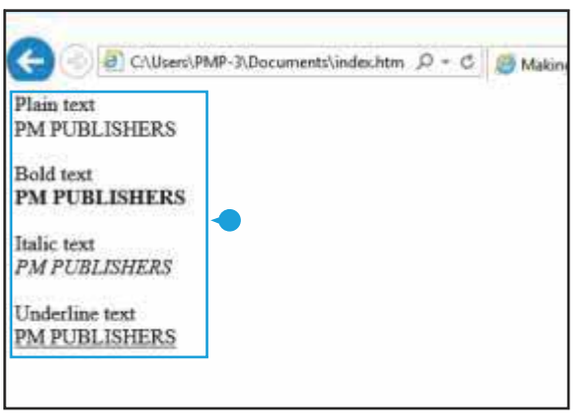
1. Type **<B>** in front of the text which you want to appear in bold.
2. Type **</B>** at the end of the text.

ITALICS TEXT

1. Type **<I>** in front of the text which you want to appear in italics.
2. Type **</I>** at the end of the text.

UNDERLINE TEXT

1. Type **<U>** in front of the text which you want to appear underlined.
2. Type **</U>** at the end of the text.



- **The text as bold, italic, and underline is displayed by the web browser.**

CHANGING THE ALIGNMENT OF HEADING

You can control the horizontal positioning or alignment of your heading by using the **ALIGN** attribute.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE> Heading align </TITLE>
</HEAD>
<BODY>
Level one Left align
<H1 align = left>PM PUBLISHERS</H1>
Level two center align
<H2 align = center>PM PUBLISHERS</H2>
Level three right align
<H3 align = right>PM PUBLISHERS</H3>
</BODY>
</HTML>
```

1. Type **<H?>** tag for the heading you want to use.

   Replace **?** with the desired heading-level numbered from **1** to **6.**
2. In the heading tag, type **ALIGN=?**.

   Replacing **?** with the way you wish to align the heading (**left**, **center**, or **right**).

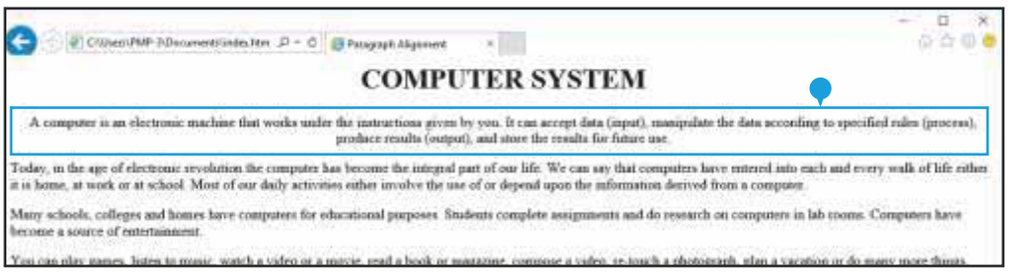
- **The heading with the alignment you have selected is displayed by the web browser.**

CHANGING THE PARAGRAPH ALIGNMENT

By using the **ALIGN** attribute, you can control the horizontal positioning or alignment of your paragraph. You can choose to align a paragraph to the **left**, **right**, **center,** or **justify** the text so that it is aligned on both the left and the right margins. Paragraphs are left-aligned by default.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE> Paragraph Alignment </TITLE>
</HEAD>
<BODY>
<H1 align = center>COMPUTER SYSTEM</H1>
<P ALIGN="CENTER">A computer is an electronic machine that
works under the instructions given by you. It can accept data (input),
```

1. Click inside the **<P>** tag in which you want to change the alignment.
2. Add a space and then, type **ALIGN="?"**, replacing **?** with Left, Center, Right or Justify.



- **When displayed in a browser, the text aligns as specified.**

In this example, text of the paragraph is centered on the page.

CHANGING FONT OF TEXT

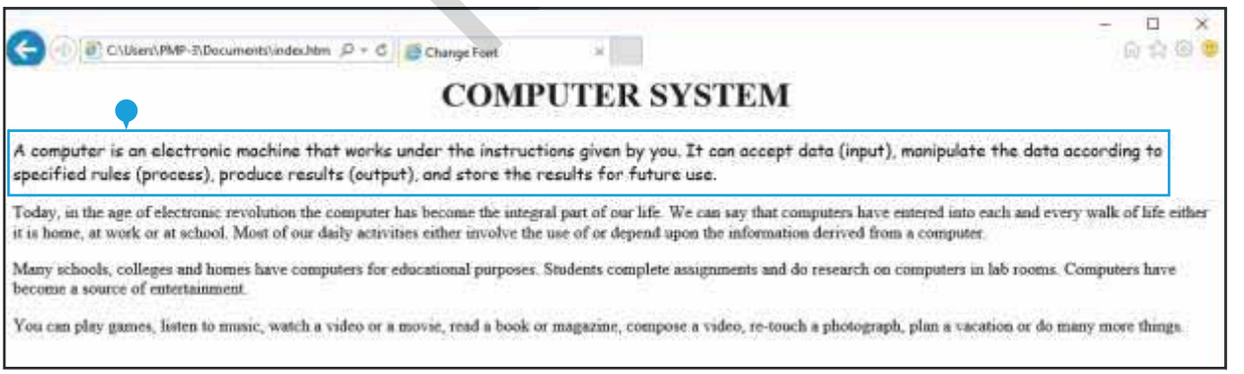
You can change the appearance of your text using the tags **<FONT>** and **</FONT>**, along with the **FACE** attribute. You should specify more than one font while changing the font, as it comes handy if one font is missing on a user's computer, the text can be displayed with another font that you have specified. One of the fonts you specify should be a common font such as Arial, Times New Roman, etc.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE> Change Font </TITLE>
</HEAD>
<BODY>
<H1><CENTER>COMPUTER SYSTEM</CENTER></H1>
<P><FONT FACE="Comic Sans MS">A computer is an electronic machine
that works under the instructions given by you. It can accept data (input),
```

1. Type **<FONT FACE="** in front of the text you want to change.
2. Type the name of the font you want to use.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE> Change Font </TITLE>
</HEAD>
<BODY>
<H1><CENTER>COMPUTER SYSTEM</CENTER></H1>
<P><FONT FACE="Comic Sans MS, Arial">A computer is an electronic
machine that works under the instructions given by you. It can accept
data (input), manipulate the data according to specified rules (process),
produce results (output), and store the results for future use.</FONT></P>
<P>Today, in the age of electronic revolution the computer has become
```

3. To specify the second font, type a **comma (,)** and then press **Spacebar** key. Now, type the name of second font choice.
4. Type **">** to complete the Font tag.
5. Type **</FONT>** at the end of the text you want to change.



- **The text is displayed in the font you have specified in the HTML code.**

Specifying Alternative Fonts

If a web page font is not available on a user's computer, you can create a list of fonts and the browser will determine the font to use. For example, if the web page uses Geneva font, but Arial or Helvetica would also work well, you create a comma-separated list of acceptable fonts, using ** your text** as the code. If a web page uses a font that a web page visitor does not have on their computer, the web page appears using a default font (usually Times New Roman).

CHANGING THE FONT SIZE OF TEXT

You can change the size of the text on your web page using the **SIZE** attribute. You can even change the size of individual characters on your web page. There are seven font sizes available in HTML. Font **Size 1** creates the **smallest text** while Font **Size 7** creates the **largest**.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE> FONT SIZES </TITLE>
</HEAD>
<BODY>
<p>Font size one<BR>
<FONT SIZE="1">PM PUBLISHERS</FONT></P>
<p>Font size two<BR>
<FONT SIZE="2">PM PUBLISHERS</FONT></P>
<p>Font size three<BR>
<FONT SIZE="3">PM PUBLISHERS</FONT></P>
<p>Font size four<BR>
<FONT SIZE="4">PM PUBLISHERS</FONT></P>
<p>Font size five<BR>
<FONT SIZE="5">PM PUBLISHERS</FONT></P>
<p>Font size six<BR>
<FONT SIZE="6">PM PUBLISHERS</FONT></P>
<p>Font size seven<BR>
<FONT SIZE="7">PM PUBLISHERS</FONT></P>
</BODY>
</HTML>
```

1 2

1. Type **<FONT SIZE= "?">** in front of the text you want to change to a new font size.

Replace **?** with the numbers from **1** to **7**.

2. Type **</FONT>** at the end of the text you want to change.

- **The text is displayed in the font sizes you have specified in the HTML code.**

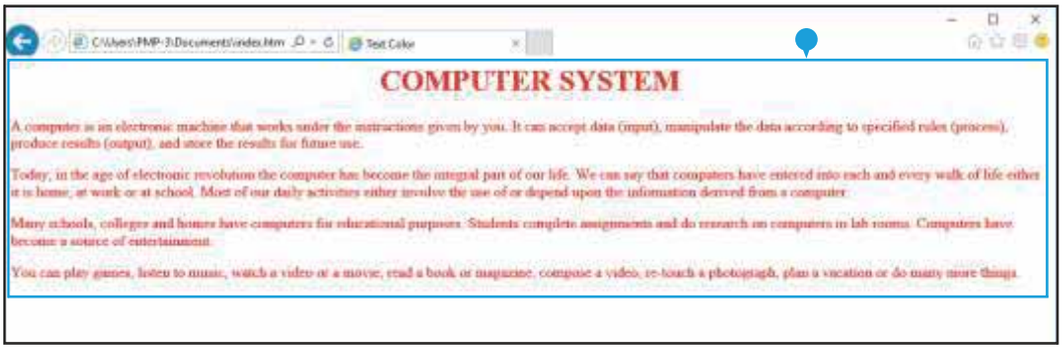
CHANGING THE COLOR OF TEXT

You can change the color of the entire text of your web page to change its appearance.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE>Text Color</TITLE>
</HEAD>
<BODY TEXT= "RED">
<H1><CENTER>COMPUTER SYSTEM</CENTER></H1>
<P>A computer is an electronic machine that works under the
```

1

1. In the **<BODY>** tag, type **TEXT = "?"**, replacing **?** with the name or code for the color you want to use. For example, if you wish to have the text red in color, then type: **<BODY TEXT= "RED">**



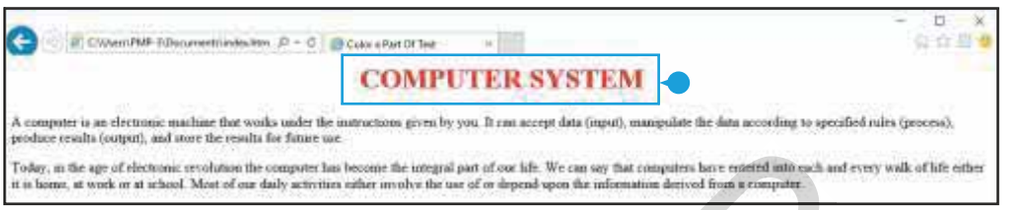
- **All the text on the web page is displayed by the web browser in the color you specify.**

CHANGING THE COLOR OF A PART OF TEXT

You can change the color of a part of text. The **COLOR** attribute works with the **<FONT>** tag to change text on a page from the default black to a different color. You can specify the color using a hexadecimal value (code) for certain common colors or the name of the desired color.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE>Color a Part Of Text</TITLE>
</HEAD>
<BODY>
<H1><CENTER><FONT COLOR = "#FF0000">COMPUTER SYSTEM
</FONT></CENTER></H1>
<P>A computer is an electronic machine that works under the instructions
given by you. It can accept data (input), manipulate the data according to
```

1. Type **<FONT COLOR="?">** in front of the text you want to change, replacing **?** with the color name or hexadecimal value of the desired color.
2. At the end of the text, type **</FONT>**.



- **The text appears in the designated color on the web page.**

There are certain codes assigned to each color. These color codes are in hexadecimal format. There are sixteen colors which you can specify by name also.

Aqua #00FFFF	Black #000000	Blue #0000FF	Fuchsia #FF00FF
Grey #808080	Green #008000	Lime #00FF00	Maroon #800000
Navy #000080	Olive #808000	Purple #800080	Red #FF0000
Silver #C0C0C0	Teal #008080	White #FFFFFF	Yellow #FFFF00

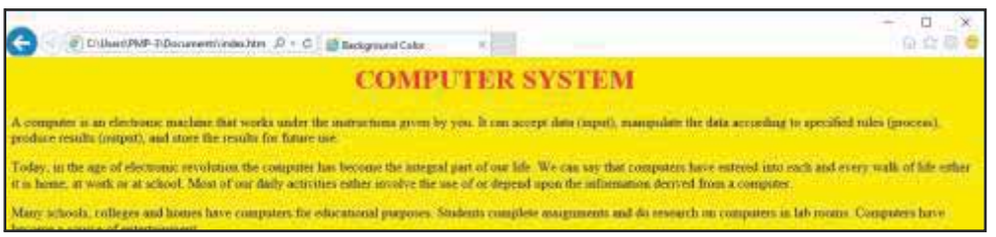
CHANGING BACKGROUND COLOR OF THE PAGE

You can add color to the background of the page using the **BGCOLOR** attribute. It is a good idea to choose a background color that does not obscure your text.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE>Background Color</TITLE>
</HEAD>
<BODY BGCOLOR = "YELLOW">
<H1><CENTER><FONT COLOR = "RED">COMPUTER SYSTEM
</FONT></CENTER></H1>
<P>A computer is an electronic machine that works under the instructions
```

1. Within the **<BODY>** tag, type **BGCOLOR="?"**.

Replace **?** with a color name or hexadecimal value.



The specified color is applied as the background color.

Self-Evaluation

After reading the chapter, I know these points:

	CHECKLIST	
	Agree	Disagree
⊙ I know that HTML was developed by Tim Berners Lee in early 1990s.	☐	☐
⊙ I know that HTML5 consists of text with special instructions known as tags, which are of two types—Container tags and Empty tags.	☐	☐
⊙ I know that basic structure of HTML5 must include DOCTYPE declaration at the beginning of our HTML document.	☐	☐
⊙ I know that body tag includes text, graphics and other elements.	☐	☐
⊙ I know that HTML provides formatting text tags of two categories: Logical style tags and Physical style tags.	☐	☐
⊙ I know that the text can be entered in web page by applying various basic HTML tags, including <P>, <H1>, <HR>, , etc.	☐	☐

Exercises

A. Tick [✓] the correct answer.

1. The language used to make web pages is ..... .
   a. QBASIC ☐ b. HTML ☐ c. Scratch ☐
2. The text with special instructions in HTML is called ..... .
   a. syntax ☐ b. tag ☐ c. command ☐
3. The sign used for closing a tag is ..... .
   a. / ☐ b. \ ☐ c. * ☐
4. ..... use to insert a blank space with in a line.
   a.   ☐ b. &bnsp; ☐ c. &nsbp; ☐
5. ..... rule or line is used to separate different sections of the web page.
   a. Slanting ☐ b. Vertical ☐ c. Horizontal ☐

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

1. HTML5 is not case-sensitive language. ☐
2. <\HTML> is an opening tag of an HTML document. ☐
3. The text we enter in the comment appears when readers view the web page. ☐
4. Font Size 1 creates the smallest text while Font Size 7 creates the largest text. ☐
5. There are 13 colors in HTML which we can specify by name also. ☐

C. Fill in the blanks.

1. ..... is a text editor in which HTML document is written.
2. The ..... declaration at the beginning of web page specifies HTML5 document.
3. ..... tag is used to add a line break if needed by the browser.
4. To add background color to the web page, ... attribute is used in body tag.
5. ..... attribute works with the font tag to change text to any color.

D. Differentiate between the following.

1. Container Tag — Empty Tag

.....

.....

.....

.....

2. Physical Style Formatting — Logical Style Formatting

.....

.....

.....

.....

E. Answer in 1-2 sentences.

1. What is HTML?

.....

.....

2. What are semantic tags?

.....

.....

3. What do you mean by DOCTYPE?

.....

.....

4. What do you mean by attributes?

.....

.....

F. Answer briefly.

1. What are the main features of HTML5?

.....

.....

.....

2. What do you understand by text editors?

.....

.....

.....

3. What is the use of meta tag?

.....

.....

.....

4. What is horizontal rule? Write steps to insert it.

.....

.....

.....

G. Application-based Question

Rishabh created a web page in Notepad but he saved it with .txt file extension. His file is not getting identified as an HTML file. What should he do now to make it an HTML file?

.....

Group Discussion

Divide the students into groups and discuss the various tags of HTML 5.

Online Link

To learn more about creating a web page in HTML, visit the website:

https://www.tutorialspoint.com/html/index.htm

Activity Section

Activity Quiz

Reema and Kavita are playing a quiz on HTML. Help Kavita answer all the questions correctly.

Reema: Hi Kavita! Do you know about HTML?

Kavita: Yes Reema! Our teacher told us about HTML language yesterday.

Reema: Great! Then let us play a quiz. I will give you clues and you will guess the correct answers.

Kavita: It will be fun! Let us start the quiz quickly.

Reema: He developed HTML in this year.

Kavita: I have guessed it. He is ..... who developed HTML in ..... .

Reema: Now, the second one. It is the latest version of HTML which succeeded this version.

Kavita: It is ..... which succeeded ..... .

Reema: OK! Next question for you. It consists of text with special instructions enclosed within <>.

Kavita: It is called a ..... .

Reema: Now answer this. Two categories of tags.

Kavita: These are called ..... .

Reema: Great! Now answer this. It provides more options for the tags.

Kavita: It is called an ..... .

Reema: Wonderful, next one. These are three well-known simple text editors to write HTML code.

Kavita: They are .....
..... .

Reema: Now, the last one for you. A software used to display the result of web page.

Kavita: It is called a ..... .

Lab Activity

Write the HTML code for the following web page.

Follow the instructions given below:

a. Set the background color to yellow.
b. First level heading should be red color and 'Center aligned', and second level heading should be blue color, 'Underlined' and 'Center aligned'.
c. Set the three paragraphs in 'Comic Sans MS' font.
d. Set the text, 'Delhi first became the capital of a kingdom.', 'Delhi', in bold style.
e. Make the third level heading 'Center aligned'.
f. Insert line breaks for the events and make them 'left aligned'.
g. Make the 'written by' text 'right aligned'.
h. Write your name in place of XYZ.
i. Save the file **'Delhi Sultanate'** in **'Lab Activity'** folder.

Subject Integration

Social Science

This integration will help the students learn about famous rulers of Delhi.

Technology Trailblazers

Steve Jobs

Co-Founder: Apple Inc. **YEAR: 1976**

Popularly known as the Father of the Digital Revolution, Steve Jobs was and still continues to remain the legendary, futurist visionary who created a sensation across the globe with his personal computer revolution. The founder of Apple Inc, Pixar Animation Studios and NeXT Inc, Jobs gave information technology its life and blood.

A master of innovation, he was known for his perfectionist attitude and futuristic vision. During his years at the Apple, he administered the development of the iMac, iTunes, iPod, iPhone, and iPad. He was the mastermind behind the working of the company's Apple Retail Stores, iTunes Store and the App Store.

8 HTML 5 – Images, Links and Table

OBJECTIVES

After completing this chapter, you will be able to:

- Learn about the tags used for inserting images.
- Create numbered and bulleted list.
- Learn about the tags used for linking the web pages.
- Understand how to insert table in a web page.

In the previous chapter, you learnt how to make web page using HTML scripting language. You learnt about basic tags which are used in making web pages.

Now, let us add images to our web page to make it more attractive. Images include photographs, logos, and any other visual object that can be added to a web page. This chapter guides you how to insert images, links, and tables in the web page.

Images in Web Pages

A web page can also display drawings, paintings, or computer-generated art. You can also display your favorite artwork on the web page.

On the web page, a concept that is difficult to explain in the form of text can be explained with the help of picture. Images can be used as navigational tools to help readers browse through your web page.

You can add **images** to improve the appearance of your web page. Many websites offer free images that can be used for your web pages, but a prior permission should be taken to use any image you download from other websites on the Internet.

You can scan photographs, logos or drawings with the help of a scanner, and then add the scanned images on your web page.

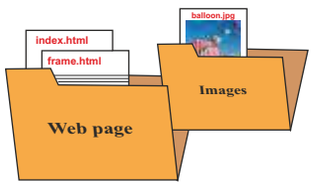
At computer stores, collections of ready-made images are available. These collections include cartoons, drawings, photographs, or computer-generated art. Before buying, make sure that these images are in a format that web browsers can display, such as **JPEG** (Joint Photographic Export Group), **PNG** (Portable Network Graphics) and **GIF** (Graphics Interchange Format).

You can create your own images that best suit your web page with the help of an image editing program. **Adobe Photoshop**, **GIMP**, and **Paint Shop Pro** are popular image editing programs.

STORING IMAGES AND WEB PAGES

You should store all your web pages and images in one folder on your computer. If the folder contains many files, you can store your images in a sub-folder.

If an image you want to add to a web page is stored in the same folder as the web page, you can specify just the name of the image (example: balloon.jpg).



If an image is stored in a sub-folder, you must specify the name of the sub-folder and the name of the image (example: images/balloon.jpg).

Inserting Images

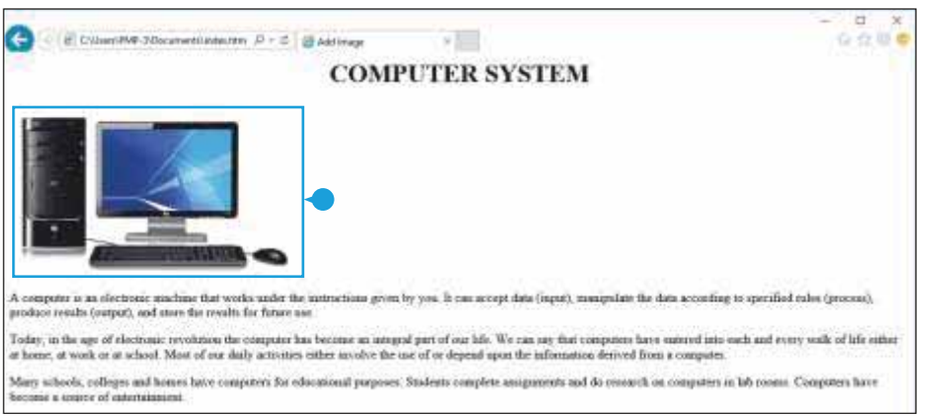
You can add an image to your web page to illustrate a topic. **IMG** is the short form of **IMAGE**. This is used to include images in your HTML document. The **<IMG>** tag incorporates graphics in the HTML document. The <IMG> is an empty tag. It contains five attributes:

ATTRIBUTES	DESCRIPTION
ALIGN	It is used to align an image on the web page– left, right, top, middle, and bottom.
ALT	It specifies which alternative text should be displayed, if a selected image is not displayed.
SRC	**SRC** stands for 'source'. It is the source of image file. It specifies the URL (Uniform Resource Locator) of the image.
HEIGHT	It specifies the height of an image in pixels.
WIDTH	It specifies the width of an image in pixels.

Syntax : <IMG SRC = "..." ALIGN = "..." ALT = "..." HEIGHT = "..." WIDTH = "....">

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE>Add Image</TITLE>
</HEAD>
<BODY>
<H1><CENTER>COMPUTER SYSTEM</CENTER></H1>
<IMG SRC="computer.jpg">
<P>A computer is an electronic machine that works under the
instructions given by you. It can accept data (input), manipulate the
data according to specified rules (process), produce results (output),
and store the results for future use.</P>
```

1. Place the cursor where you want to insert the image.
2. Type **<IMG SRC="?">**. Now, replace **?** with the name of the image file.



- **The web browser displays the image on your web page.**

Update Your Knowledge

- HTML5 works on any platform like Windows, Macintosh, Linux, etc.
- Remember, when you are giving the name of the image file as <IMG SRC ="computer.jpg">, make sure that this **computer.jpg** file exists in the folder in which your web page is stored. If it does not, then you have to give full path of the file of the location.

CENTERING AN IMAGE IN THE WEB PAGE

Center alignment of the image on your web page enhances the appearance of your web page.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE>Center Image</TITLE>
</HEAD>
<BODY>
<H1><CENTER>COMPUTER SYSTEM</CENTER></H1>
<CENTER><IMG SRC="computer.jpg"></CENTER>
<P>A computer is an electronic machine that works under the instructions
given by you. It can accept data (input), manipulate the data according to
```

1. Type **<CENTER>** in front of the image tag you want to center.
2. Type **</CENTER>** at the end of the image tag.

- **The image appears center aligned on the web page.**

SPECIFYING THE SIZE OF IMAGE

The size of an image on a web page can be increased or decreased by specifying a new width and height for it. You can set the width and height of an image in pixels or as a percentage of the overall window size.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE>Increasing Size of Image</TITLE>
</HEAD>
<BODY>
<H1><CENTER>COMPUTER SYSTEM</CENTER></H1>
<IMG SRC="computer.jpg" WIDTH = "450" HEIGHT = "350">
<P>A computer is an electronic machine that works under the
instructions given by you. It can accept data (input), manipulate
```

1. Click inside the <IMG> tag and type **WIDTH="?"**, replacing **?** with the width measurement you want to set.
2. Give a space by pressing the **Spacebar** key.
3. Type **HEIGHT="?"**, replacing **?** with the height measurement you want to set.

- **The image with the new size appears in the web browser.**

Update Your Knowledge

Resizing images using HTML can reduce their quality, especially if you use HTML to enlarge them. For this reason, it is better to resize images using an image editor.

ALIGNING IMAGE HORIZONTALLY

You can use the **left** and **right** alignment attributes to control the horizontal positioning of an image on the page. These attributes also control how text wraps around the image.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE>Align Image Horizontally</TITLE>
</HEAD>
<BODY>
<H1><CENTER>COMPUTER SYSTEM</CENTER></H1>
<IMG SRC="computer.jpg" ALIGN= left>
<P>A computer is an electronic machine that works under the instructions
```

1. Type **ALIGN = left** in the <IMG> tag of the image to wrap text around the right side of the image.

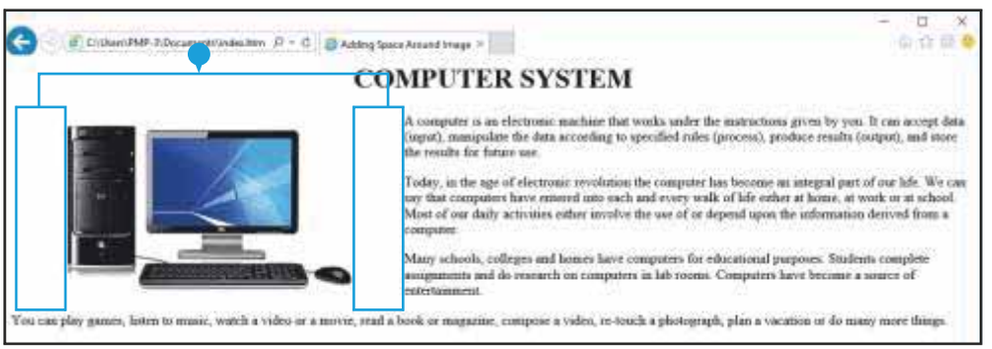
- **The image aligns to the left with the text wrapping around it on the right.**

ADDING SPACE AROUND AN IMAGE

Web browsers display only a small amount of space between images and text. You can increase the amount of space, also called **padding**, to make the page more visually appealing.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE>Adding Space Around Image</TITLE>
</HEAD>
<BODY>
<H1><CENTER>COMPUTER SYSTEM</CENTER></H1>
<IMG SRC="computer.jpg" ALIGN= left HSPACE=50>
<P>A computer is an electronic machine that works under the
instructions given by you. It can accept data (input), manipulate
```

1. To increase space around the left and right of an image, type **HSPACE =?** in the <IMG> tag for the image you want to add space around, replacing **?** with the amount of space you want to add to both the left and right sides of the image in pixels.



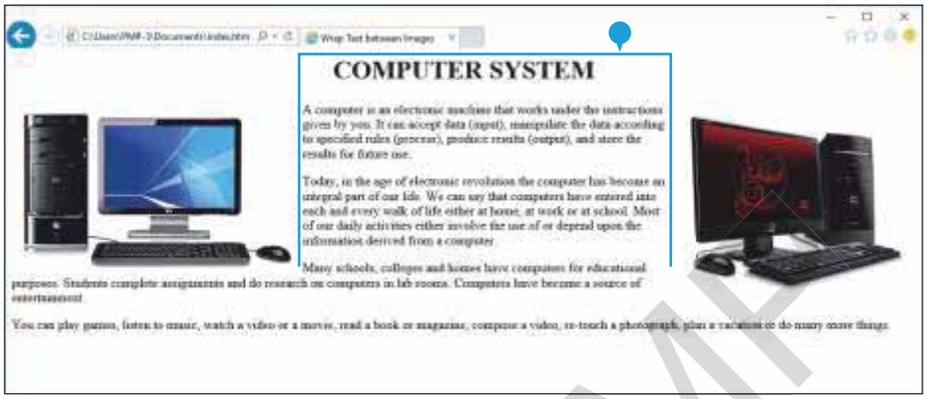
- **The image with added space around its left and right sides appears in the web page.**

WRAPPING TEXT BETWEEN TWO IMAGES

You can wrap text between two images (one image to the left and other to the right) to change the layout of your web page.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE>Wrap Text between Images</TITLE>
</HEAD>
<BODY>
<H1><CENTER>COMPUTER SYSTEM</CENTER></H1>
<IMG SRC="computer.jpg" ALIGN=left>
<IMG SRC="desktop.jpg" ALIGN=right>
<P>A computer is an electronic machine that works under the
```

1. In the **<IMG>** tag for the image you want to appear on the left side of text, type **ALIGN=left**.
2. In the **<IMG>** tag for the image you want to appear on the right side of text, type **ALIGN=right**.



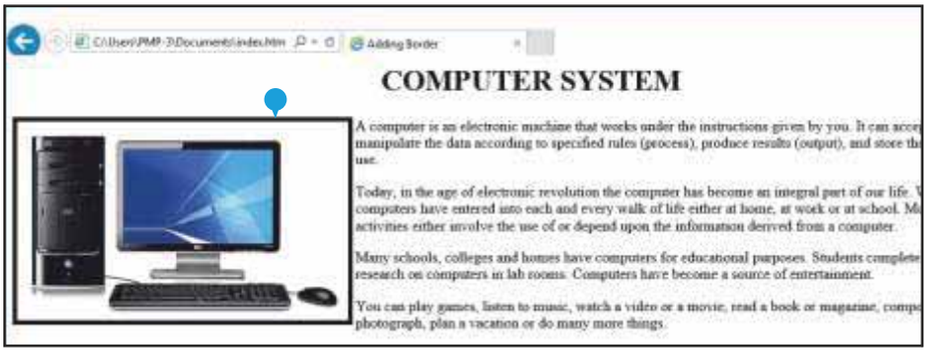
- **The text wrapped around the two images appears in the web browser.**

ADDING BORDER TO AN IMAGE

You can add a border to an image to give it added emphasis, or make it stand out on the web page. You can even define the thickness of the border in pixels.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE>Adding Border</TITLE>
</HEAD>
<BODY>
<H1><CENTER>COMPUTER SYSTEM</CENTER></H1>
<IMG SRC="computer.jpg" ALIGN= left BORDER=5>
<P>A computer is an electronic machine that works under the
instructions given by you. It can accept data (input), manipulate the
```

1. In the **<IMG>** tag for the image you want to display a border, type **BORDER = ?**, replacing **?** with the thickness of the border you want to use in pixels.



- **The image is displayed with a border around it.**

You can remove the existing border with the number 0. For example, <IMG SRC = "computer.jpg" BORDER = 0>

Creating List

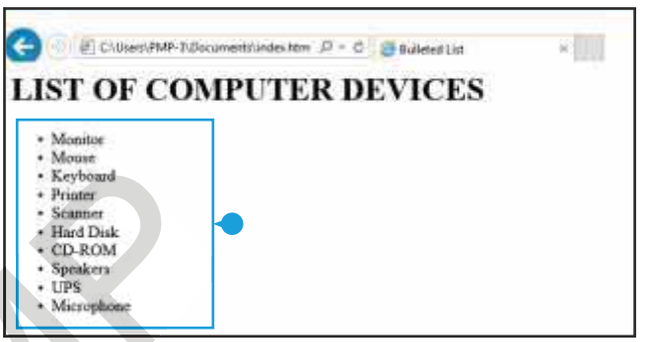
Lists are used to organize the information and present it in a structured manner. You can add an **ordered** or an **unordered** list to your document to set a list of items apart from the rest of the text in the page.

CREATING A BULLETED OR UNORDERED LIST

Bulleted list or **unordered list** is used to show the items not in a particular order. Bullets are used to list the contents in such a way that it looks more organized.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE> Bulleted List </TITLE>
</HEAD>
<BODY>
<H1>LIST OF COMPUTER DEVICES</H1>
<UL>
<LI>Monitor
<LI>Mouse
<LI>Keyboard
<LI>Printer
<LI>Scanner
<LI>Hard Disk
<LI>CD-ROM
<LI>Speakers
<LI>UPS
<LI>Microphone
</UL>
</BODY></HTML>
```

1. Type **<UL>** before the list.
2. Type **<LI>** in front of each item in the list.
3. Type **</UL>** at the end of the list.



- **The unordered list is displayed by the web browser. A bullet appears in front of each item in the list.**

Setting A Bullet Style

You can change the style of an unordered list. For example, in place of bullets, you can place **circle**, **disc**, or **square**.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE> Bullet Style </TITLE>
</HEAD>
<BODY>
<H1>LIST OF COMPUTER DEVICES</H1>
<UL Type= "square">
<LI>Monitor
<LI>Mouse
<LI>Keyboard
<LI>Printer
<LI>Scanner
<LI>Hard Disk
<LI>CD-ROM
<LI>Speakers
<LI>UPS
<LI>Microphone
</UL>
</BODY></HTML>
```

1. Type **<UL>** before the list.
2. Type **TYPE="?"** within the **<UL>** tag, replacing **?** with a bullet style code; for example,

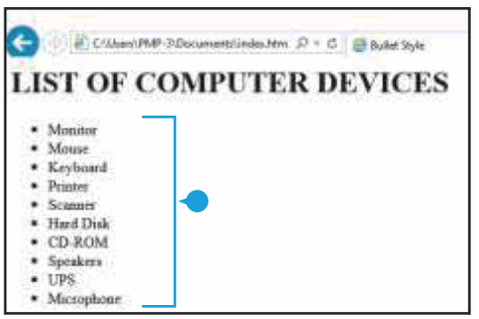
   TYPE = "circle" for open circular bullet

   TYPE = "disc" for solid circular bullet

   TYPE = "square" for solid square bullet

In this example, the bulleted list uses solid square bullets.

3. Type **<LI>** in front of each item in the list.
4. Type **</UL>** at the end of the list.



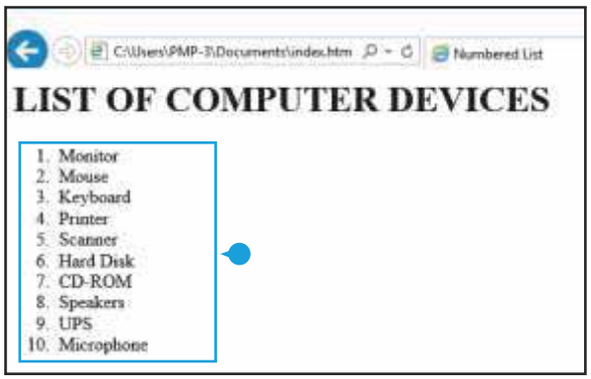
- **The bulleted list is displayed in the style you have selected.**

CREATING A NUMBERED OR ORDERED LIST

You can use **numbered list** or **ordered list** on your web page to display items in a specific order, such as a set of instructions or a table of contents.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE> Numbered List </TITLE>
</HEAD>
<BODY>
<H1>LIST OF COMPUTER DEVICES</H1>
<OL>
<LI>Monitor
<LI>Mouse
<LI>Keyboard
<LI>Printer
<LI>Scanner
<LI>Hard Disk
<LI>CD-ROM
<LI>Speakers
<LI>UPS
<LI>Microphone
</OL>
</BODY>
</HTML>
```

1. Type **<OL>** before the list.
2. Type **<LI>** in front of each item in the list.
3. Type **</OL>** at the end of the list.



- **The ordered list is displayed by the web browser. A number appears in front of each item in the list.**

Setting Number Style

You can change the style of an ordered list. For example in place of 1, 2, 3 ....., you can use A, B, C, ... or i, ii, iii, etc.

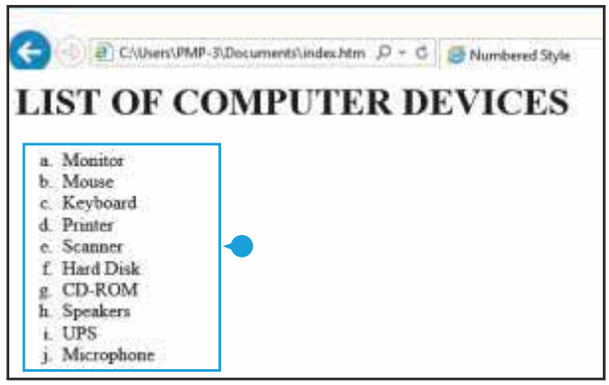
```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE> Numbered Style </TITLE>
</HEAD>
<BODY>
<H1>LIST OF COMPUTER DEVICES</H1>
<OL Type= "a">
<LI>Monitor
<LI>Mouse
<LI>Keyboard
<LI>Printer
<LI>Scanner
<LI>Hard Disk
<LI>CD-ROM
<LI>Speakers
<LI>UPS
<LI>Microphone
</OL>
</BODY>
</HTML>
```

1. Type **<OL>** before the list.
2. Type **TYPE="?"** within the **<OL>** tag, replacing **?** with a number style code:

   A: A, B, C **a:** a, b, c

   I: I, II, III **i:** i, ii, iii

   1: 1, 2, 3
3. Type **<LI>** in front of each item in the list.
4. Type **</OL>** at the end of the list.



- **The numbered list is displayed in the style you have selected. In this example, the list uses letters rather than numbers.**

Links in Web Page

Any web page can be connected to another by creating a **link** or **hyperlink**. Links enable users to navigate from one topic to the next on a website or from one website to another. The user clicks the link, and the browser opens the destination page. Links can be text and/or images. Text links typically appear as underlined, differently-colored words on a web page. Any image on a web page can also be turned into a link. When a user holds the mouse pointer over a link, the pointer takes the shape of a **pointing hand**, indicating the presence of an active, clickable link. There are mainly two types of links: **Internal** and **External**.

INTERNAL LINKS

Internal links are the links to the pages within a website. These links can be either **absolute** or **relative**. Web address for the web page such as **http://www.pmpublishers.in** is included in absolute links. Relative links locate web pages within the same directory or subdirectory that can be defined from the current position such as **/Store/books.htm**.

Anchors are links to sections within the same page. These can also be created using the <A> tag.

EXTERNAL LINKS

External links are links outside the currently opened website. These links must always be **absolute**. An absolute link can include a protocol, such as HTTP; a domain name, such as **www.pmpublishers.in;** and a file name. Each directory in an absolute link is separated by a slash symbol **(/)**.

Given below is an example of creating a link to the PMP home page.

<A HREF="http://www.pmpublishers.in">Click here to visit PMP home page</A>

Now understand it.

- **<A>** stands for **Anchor**. It begins the link to another page.
- **HREF** stands for **Hypertext REFerence**. "This is where the link will take you to"
- **http://www.pmpublishers.in** is the full address of the link. Note that the address has an equal to sign (=) before it and is enclosed in inverted commas.
- Where it reads **"Click here to visit PMP home page"** is where you write the text you want to appear on the page. Whatever is within that space will appear on the page for the viewer to click. So, write something that denotes the link.
- **</A>** ends the entire link command.

Here is what will appear on the page using the command mentioned above:

Click here to visit the PMP home page

Now, without clicking, simply place your mouse pointer on the words. You will see the address of the link you created on the bottom of the browser window.

Update Your Knowledge

You can use a **nested list** to add a list within a list to your web page. Nested lists enable you to display listed text at different levels within the list hierarchy, such as when you are displaying products arranged in categories and subcategories. Web browsers use indentation to show where list items exist in the hierarchy. You can use both numbered and bulleted lists within an existing list.

CREATING LINKS

You can create a text link in your web page that, when clicked, takes the visitors to another website. The text link will appear **colored** and **underlined**.

```
<H1><CENTER>COMPUTER SYSTEM</CENTER></H1>
<CENTER><IMG SRC="computer.jpg"></CENTER>
<HR>
<P>A computer is an electronic machine that works under the instructions given by you. It can accept data (input), manipulate the data according to specified rules (process), produce results (output), and store the results for future use.</P>
<P>Today, in the age of electronic revolution the computer has become an integral part of our life. We can say that computers have entered into each and every walk of life either at home, at work or at school. Most of our daily activities either involve the use of or depend upon the information derived from a computer.</P>
<P>Many schools, colleges and homes have computers for educational purposes. Students complete assignments and do research on computers in lab rooms. Computers have become a source of entertainment.</P>
<P>You can play games, listen to music, watch a video or a movie, read a book or magazine, compose a video, re-touch a photograph, plan a vacation or do many more things.</P>
<P><CENTER><A HREF = "http://www.pcworld.com">Click Here For More Computer Knowledge</A></CENTER></P>
</BODY>
</HTML>
```

(2) (1) (3)

1. Type the text you want readers to click on in order to display another web page.
2. Type **<A HREF= "?">** in front of the text, replacing **?** with the address of the web page you want to display.
3. Type **</A>** at the end of the text.

- **The text link is displayed, and appears colored and underlined in the web browser.**

When you place the mouse pointer on the link, the linked web address is displayed on the bottom of the browser window.

When the visitor selects or clicks on the link, the specified website will open.

Update Your Knowledge

Link: A hypertext link is used to connect one document with another document or file.

Broken links: These are the links that do not work because the destination has been deleted or the path has been changed.

Hotspot: It is a defined area on an image that acts as a hyperlink.

CREATING A LINK TO AN IMAGE

You can create a link to an image so that the visitor can click on that image to display the link. You can also create a link that can take visitors to an image. This is helpful in case you wish to display a large number of images on your page. But putting a large number of images on a single web page will increase its opening time. So, in that case, we can display the images in small size on a page and create hyperlinks to their larger sizes. If a person wishes to see any image, he can see its larger view by simply clicking on it. Let us see how an image can be created as a hyperlink to open a website.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE>Creating a Link to an Image</TITLE>
</HEAD>
<BODY>
<H1><CENTER>COMPUTER SYSTEM</CENTER></H1>
<CENTER><IMG SRC="computer.jpg"></CENTER>  (1)
<P>A computer is an electronic machine that works under the instructions
```

1. Add the image location that you want visitors to select to display the linked image.

```
<TITLE>Creating a Link to an Image</TITLE>
</HEAD>
<BODY>
<H1><CENTER>COMPUTER SYSTEM</CENTER></H1>  (2)
<CENTER><A HREF = "http://www.pcworld.com"><IMG SRC=
"computer.jpg"></A></CENTER>  (3)
<P>A computer is an electronic machine that works under the instructions
given by you. It can accept data (input), manipulate the data according to
specified rules (process), produce results (output), and store the results for
```

2. Type **<A HREF = "?">** in front of the image, replacing **?** with the address of the website you want to display.
3. Type **</A>** at the end of the image.

The web browser displays the link on the image.

- When you place the mouse pointer on the image, the linked web address is displayed in the Status bar. To open the link, click on the image.

When the visitor clicks on the link, the specified website appears.

CREATING AN E-MAIL LINK

You can create a link that allows visitors to send you an e-mail message directly. When the visitor clicks on the e-mail link, the default e-mail program opens and displays the e-mail address you specified to ensure that the message reaches the correct person. An e-mail link allows users to send queries and feedback that can help you improve your website.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE>Creating an E-mail Link</TITLE>
</HEAD>
<BODY>
<H1><CENTER>COMPUTER SYSTEM</CENTER></H1>
<CENTER><IMG SRC="computer.jpg"></CENTER>
<P>A computer is an electronic machine that works under the instructions given by you. It can accept data (input), manipulate the data according to specified rules (process), produce results (output), and store the results for future use.</P>
<P>Today, in the age of electronic revolution the computer has become an integral part of our life. We can say that computers have entered into each and every walk of life either at home, at work or at school. Most of our daily activities either involve the use of or depend upon the information derived from a computer.</P>
<P>Many schools, colleges and homes have computers for educational purposes. Students complete assignments and do research on computers in lab rooms. Computers have become a source of entertainment.</P>
<P>You can play games, listen to music, watch a video or a movie, read a book or magazine, compose a video, re-touch a photograph, plan a vacation or do many more things.</P>
<P ALIGN = CENTER> mail us at: minhasds@gmail.com</P>
</BODY>
</HTML>
```

1. Type the text or add image that you want visitors to select to send you an e-mail message.

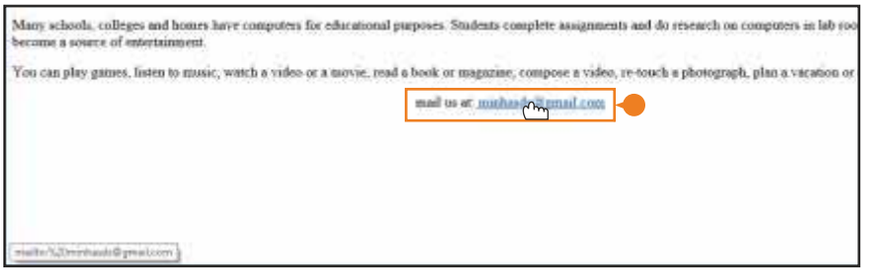
```
<P>Many schools, colleges and homes have computers for educational purposes. Students complete assignments and do research on computers in lab rooms. Computers have become a source of entertainment.</P>
<P>You can play games, listen to music, watch a video or a movie, read a book or magazine, compose a video, re-touch a photograph, plan a vacation or do many more things.</P>
<P ALIGN = CENTER>mail us at:<A HREF="mailto: minhasds@gmail.com">
minhasds@gmail.com</A></P>
</BODY>
</HTML>
```

2. Type **<A HREF = "mailto:?">** in front of the text or image, replacing **?** with the e-mail address of the person you want to receive the e-mail message.

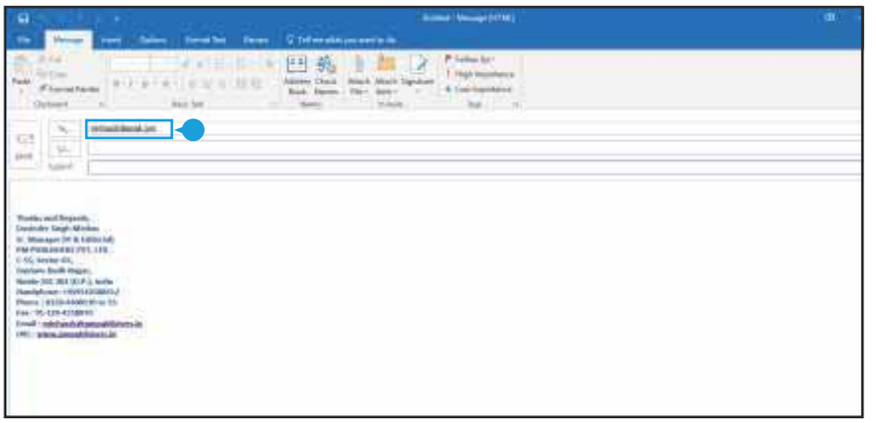
3. Type **</A>** at the end of text or image.

Update Your Knowledge

You should be cautious when placing a personal e-mail address on a web page. E-mail addresses on web pages are notorious magnets for unsolicited e-mails because such addresses can be harvested automatically by spamming tools that crawl the web. For this reason, you should create a separate e-mail account just for your web generated e-mail messages.



- The web browser displays the text or an image you added in step **1** as an e-mail link.



- **When the visitor selects or clicks on the e-mail link, the default e-mail program on the visitor's computer opens, and the e-mail program will automatically display the specified e-mail address to ensure the message reaches the correct person.**

Tables in Web Page

HTML **tables** enable you to effectively present large volume of data in **rows** and **columns**. You can also use tables to organize the overall structure of a web page. For example, you can create a two-column table that organizes a list of navigational links in one column, and the main text or image content in another. Every table is basically a rectangle containing rows and columns. The places where the columns and rows intersect are called **cells**. Each cell can hold web page content or link. Using HTML attributes, you can set the size of an entire table as well as the size of particular cells.

The building blocks of HTML tables are the **<TABLE>**, **<TR>**, **<TH>**, and **<TD>** tags.

The <TABLE> tag defines the table itself.

The <TR> tag defines a table row.

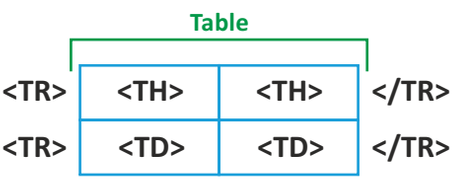
The <TH> tag defines a table header.

The <TD> tag defines the table data or cell content.

In addition to these codes, you can assign captions and column groups. You can also create tables within tables called **nested tables**.

A simple table structure in HTML is shown below:

```
<TABLE>
    <TR> < ! --Table row -->
    <TH> Content <! -- table header --> </TH>
    <TD> Content < ! -- table data --> </TD>
    </TR>
</TABLE>
```



ATTRIBUTES ASSOCIATED WITH THE <TABLE> TAG

ATTRIBUTES	DESCRIPTION
SUMMARY	It defines a text string that gives a brief description of the table.
BORDER	It specifies the width of a border around the table in pixels. The default value varies with each browser. For example, <TABLE BORDER = "1">
BORDER-COLOR	It specifies a color for the table border as the RGB number or a color name.
BGCOLOR	It specifies a color for the table background as the RGB number or a color name.
ALIGN	It is used for aligning the content in an individual cell and the table itself. Two types of alignments are given below. **Horizontal Alignment:** It aligns the header across the width of a cell or table across the width of a page. ALIGN attribute can be set equal to LEFT, RIGHT, or CENTER. **Vertical Alignment:** It is the alignment of the content between the top and bottom of a cell. Vertical alignment of cell contents is controlled by setting the V-ALIGN attribute to TOP, MIDDLE, or BOTTOM. Vertical alignment for an entire table cannot be specified.
WIDTH	It specifies breadth of the table in the browser window. WIDTH attribute can be set to a specific number of pixels or to a percentage of the available screen width. The percentage value is used to ensure compatibility across a variety of displays and platforms. The pixel value is useful when a fixed width is required for the content, such as images.

CREATING A TABLE

You can create a table to clearly display information on a web page. Sometimes, we may like to display information in a tabular format. For example, if we like to display the price list or sales order of items, the best possible solution is to display it using a table. We can also use tables to present information in columns like those found in newspapers or magazines. A table has three parts:

i. Row — It is a horizontal line of data.

ii. Header Cell — It contains text that describes the data in a row or column.

iii. Data Cell — It contains data or information we like to display.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE> CREATING TABLE  </TITLE>
</HEAD>
<BODY>
<H1><CENTER>INVOICE</CENTER></H1>
Item Name    Price Per Unit    Quantity    Total Price
Laptop       30000             2           60000
Desktop      25000             4           100000
</BODY>
</HTML>
```

1. Type the data you want to appear in the first row of the table.

You can use Tab keys to separate the data for each cell. The web browser will ignore the spacing you add.

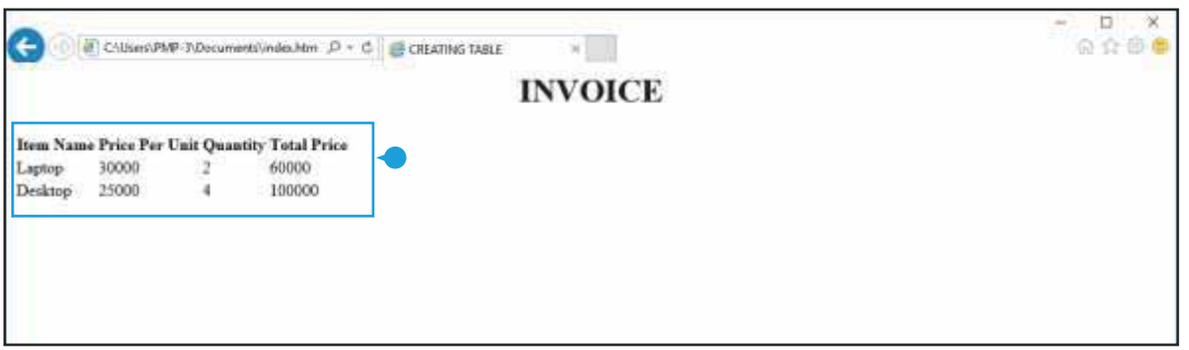
2. Type the data you want to appear in the next row of table. Repeat this step until you have finished entering the entire data for the table.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE> CREATING TABLE  </TITLE>
</HEAD>
<BODY>
<H1><CENTER>INVOICE</CENTER></H1>
<TABLE>
<TR>
Item Name      Price Per Unit      Quantity      Total Price
</TR>
<TR>
Laptop         30000               2             60000
</TR>
<TR>
Desktop        25000               4             100000
</TR>
</TABLE>
</BODY> </HTML>
```

3. Type **<TABLE>** before the text you entered for the table.
4. Type **</TABLE>** at the end of the text you entered for the table.
5. Type **<TR>** before the text for each row in the table.
6. Type **</TR>** at the end of the text for each row in the table.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE> CREATING TABLE  </TITLE>
</HEAD>
<BODY>
<H1><CENTER>INVOICE</CENTER></H1>
<TABLE>
<TR>
<TH>Item Name</TH><TH>Price Per Unit</TH><TH>Quantity </TH>
<TH>Total Price</TH>
</TR>
<TR>
<TD>Laptop</TD><TD>30000</TD><TD>2</TD><TD>60000</TD>
</TR>
<TR>
<TD>Desktop</TD><TD>25000</TD><TD>4</TD><TD>100000</TD>
</TR>
</TABLE></BODY></HTML>
```

7. Type **<TH>** in front of the text for each header cell.
8. Type **</TH>** at the end of the text for each header cell.
9. Type **<TD>** in front of the text for each data cell.
10. Type **</TD>** at the end of the text for each data cell.



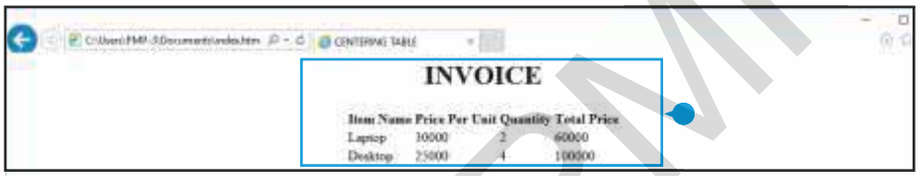
- **The web browser displays the table.**

CENTERING THE TABLE

You can center align a table to improve the appearance of your web page.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE> CENTERING TABLE  </TITLE>
</HEAD>
<BODY>
<H1><CENTER>INVOICE</CENTER></H1>
<CENTER>  1
<TABLE>
<TR>
<TH>Item Name</TH><TH>Price Per Unit</TH><TH>Quantity </TH>
<TH>Total Price</TH>
</TR>
<TR>
<TD>Laptop</TD><TD>30000</TD><TD>2</TD><TD>60000</TD>
</TR>
<TR>
<TD>Desktop</TD><TD>25000</TD><TD>4</TD><TD>100000</TD>
</TR>
</TABLE>
</CENTER>  2
</BODY> </HTML>
```

1. Type **<CENTER>** above the <TABLE> tag.
2. Type **</CENTER>** below the </TABLE> tag.



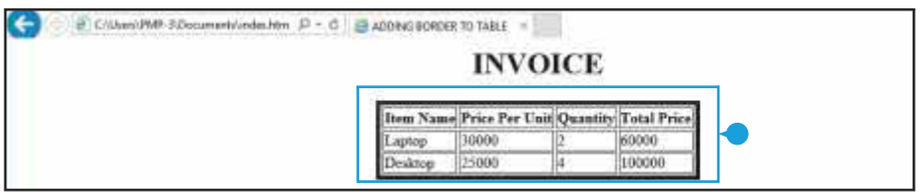
- **The web browser displays the table center aligned.**

ADDING BORDER TO TABLE

By default, a table does not have any border unless you add one. You can add a border to a table to separate each cell in the table using **BORDER** attribute. This will make the data in the table easier to read. You can also define the thickness of border in pixels.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE> ADDING BORDER TO TABLE  </TITLE>
</HEAD>
<BODY>
<H1><CENTER>INVOICE</CENTER></H1>
<CENTER>
<TABLE BORDER=5  1
<TR>
```

1. In the **<TABLE>** tag, for the table you want to display a border, type **BORDER = ?**, replacing **?** with the thickness you want to use for the border.



- **The web browser displays the table with a border.**

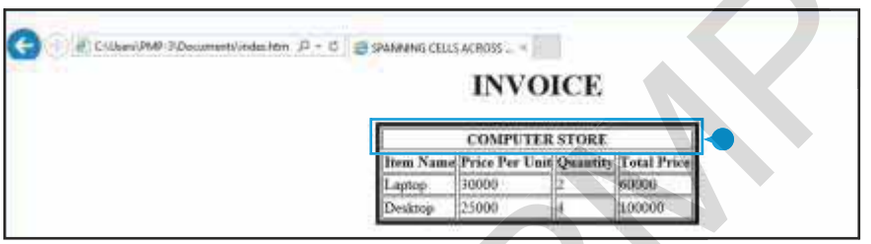
SPANNING CELLS

You can combine two or more cells in a row or column to make one large cell. The attributes COLSPAN ("how many across") and ROWSPAN ("how many down") indicate how many columns or rows a cell should take up. **Spanning cells,** also called **merging cells,** are mainly used to display a title across the top or down side of a table.

Spanning Cells Across Columns

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE> SPANNING CELLS ACROSS COLUMNS  </TITLE>
</HEAD>
<BODY>
<H1><CENTER>INVOICE</CENTER></H1>
<CENTER>
<TABLE  BORDER=5>
<TR>
<TH COLSPAN=4>COMPUTER STORE</TH>
</TR>
<TR>
```

1. In the **<TH>** or **<TD>** tag for the cell you want to span across columns, type **COLSPAN=?**, replacing **?** with the number of columns you want the cell to span across.

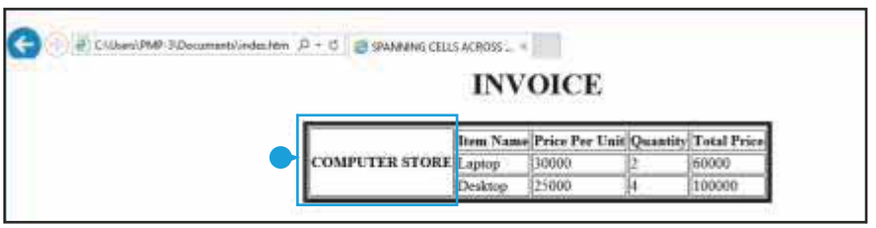


- **The web browser spans the cell across the number of columns you specified.**

Spanning Cells Across Rows

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE> SPANNING CELLS ACROSS ROWS  </TITLE>
</HEAD>
<BODY>
<H1><CENTER>INVOICE</CENTER></H1>
<CENTER>
<TABLE  BORDER=5>
<TR>
<TH ROWSPAN=3>COMPUTER STORE</TH>
<TH>Item Name</TH><TH>Price Per Unit</TH><TH>Quantity
</TH> <TH>Total Price</TH>
```

1. In the **<TH>** or **<TD>** tag for the cell you want to span across rows, type **ROWSPAN=?**, replacing **?** with the number of rows you want the cell to span across.



- **The web browser spans the cell across the number of rows you specified.**

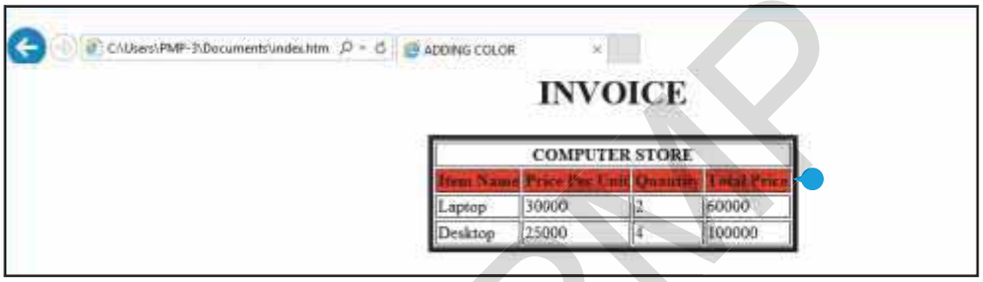
ADDING BACKGROUND COLOR TO A TABLE

You can add background color to a table to emphasize important information. Background color can be added to a cell, a row, or to an entire table according to the need.

```
<TH COLSPAN=4>COMPUTER STORE</TH>
</TR>
<TR BGCOLOR = "#FF0000">
<TH>Item Name</TH><TH>Price Per Unit</TH><TH>Quantity
</TH> <TH>Total Price</TH>
</TR>
<TR>
<TD>Laptop</TD><TD>30000</TD><TD>2</TD><TD>60000</TD>
</TR>
<TR>
<TD>Desktop</TD><TD>25000</TD><TD>4</TD><TD>100000</TD>
</TR>
</TABLE>
</CENTER>
</BODY>
</HTML>
```

1. Place the cursor in the tag for the cell (**<TH>** or **<TD>**), row (**<TR>**) or table (**<TABLE>**) you want to add color to.
2. Type **BGCOLOR = "?"**, replacing **?** with the name or color code of the color you want to use.

For example, if you wish to apply color to a row, in the **<TR>** tag, type **BGCOLOR = ?**, replacing **?** with the color name or color code. (Color code of Red is #FF0000.)



- **The web browser displays the cell, row, or entire table in the color you specified.**

ADJUSTING TABLE SIZE

You can control the exact size of a table using the **WIDTH** and **HEIGHT** attributes in the <TABLE> tag. A table size can be specified in pixels of the browser window. When setting a width in pixels, limit the value to 750 pixels to ensure that the table fits the screen.

```
<H1><CENTER>INVOICE</CENTER></H1>
<CENTER>
<TABLE BORDER=5 WIDTH="600" HEIGHT="300">
<TR>
<TH COLSPAN=4>COMPUTER STORE</TH>
</TR>
<TR BGCOLOR = "#FF0000">
```

1. In the **<TABLE>** tag, type **WIDTH="?"**, replacing **?** with the pixel value you want to assign.
2. Press Spacebar key.
3. Type **HEIGHT="?"**, replacing **?** with the pixel value you want to assign.

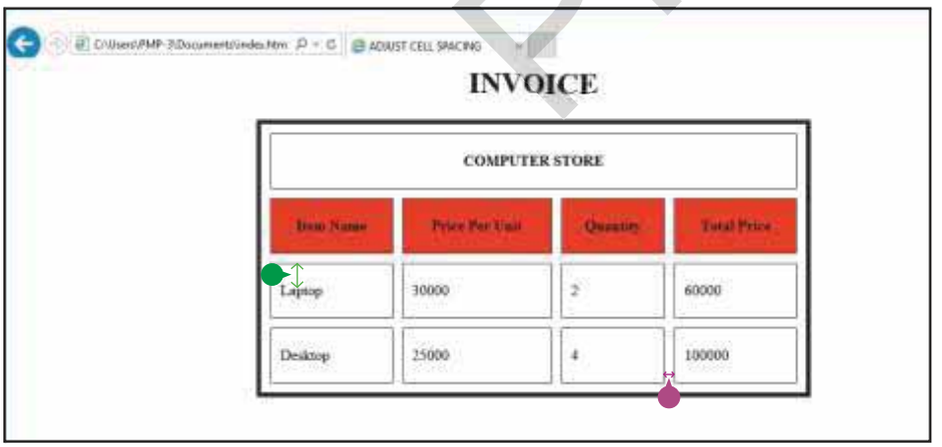
The web browser displays the table with the specified size.

ADJUSTING CELL PADDING AND SPACING

You can use **padding** to add space between the border and the contents of a cell. You can use **spacing** to increase the border size or distance between cells. Padding and spacing sizes are measured in pixels.

```
<!DOCTYPE html>
<HTML>
<HEAD>
<TITLE> ADJUST CELL SPACING  </TITLE>
</HEAD>
<BODY>
<H1><CENTER>INVOICE</CENTER></H1>
<CENTER>
<TABLE BORDER=5 WIDTH="600" HEIGHT="300"
CELLPADDING="10" CELLSPACING="10">
<TR>
<TH COLSPAN=4>COMPUTER STORE</TH>
</TR>
<TR BGCOLOR = "#FF0000">
<TH>Item Name</TH><TH>Price Per Unit</TH><TH>Quantity
</TH> <TH>Total Price</TH>
</TR>
<TR>
<TD>Laptop</TD><TD>30000</TD><TD>2</TD><TD>60000</TD>
</TR>
<TR>
<TD>Desktop</TD><TD>25000</TD><TD>4</TD><TD>100000</T
D>
```

1. In the **<TABLE>** tag, type **CELLPADDING="?"**, replacing **?** with the pixel value you want to assign.
2. Give space.
3. Type **CELLSPACING="?"**, replacing **?** with the pixel value you want to assign.



- ***Cell padding:** The web browser displays the designated amount of space between the cell contents and the cell borders.*
- ***Cell spacing:** The web browser displays the designated amount of space between the cell borders.*

Update Your Knowledge

The cellspacing attribute adds pixels between cells. The cellpadding attribute adds pixels within a cell border.

Self-Evaluation

After reading the chapter, I know these points:

	CHECKLIST	
	Agree	Disagree
⊙ I know that images can also be added to the web page.	☐	☐
⊙ I know that IMG stands for 'image' which is a tag used to include an image file.	☐	☐
⊙ I know that we can use various list tags to show the items in a particular order.	☐	☐
⊙ I know that any web page can be connected to another by creating a link.	☐	☐
⊙ I know that <A> stands for 'Anchor'. It begins the link to another page.	☐	☐
⊙ I know that HREF stands for Hypertext REFerence.	☐	☐
⊙ I know that an e-mail link is created to allow visitors to send an e-mail directly.	☐	☐
⊙ I know that building blocks of HTML tables are <TABLE>, <TR>, <TH>, and <TD> tags.	☐	☐
⊙ I know that we can add background color, border, and span cells in a table.	☐	☐

Exercises

A. Tick [✓] the correct answer.

1. The format of an image that web browser can display is ..... .
   a. JPEG ☐ b. JIG ☐ c. JEG ☐
2. The attribute used to mention the path of the image where it is located is ..... .
   a. IMG ☐ b. SRC ☐ c. JPEG ☐
3. Which link is used to link two pages within a website?
   a. E-mail ☐ b. External ☐ c. Internal ☐
4. ..... are links to sections within the same page.
   a. Anchors ☐ b. Images ☐ c. Text ☐
5. ..... attribute combines two or more cells in a column to make one large cell.
   a. ROWSPAN ☐ b. COLSPAN ☐ c. CELLSPAN ☐

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

1. We can wrap text between two images to change the layout of web page. ☐
2. We cannot link an image in the HTML. ☐
3. A hypertext link is used to connect one document with another document or file. ☐
4. An e-mail link does not allow users to send queries and feedback. ☐
5. We cannot control exact size of the table. ☐

C. Fill in the blanks.

1. The ..... tag incorporates graphics in the HTML document.
2. Internal links can be either ..... or ..... .
3. We can create ..... to display information in rows and column.
4. Spanning cells is also called ..... cells.
5. We can use ..... to add space between the border and the contents of a cell.

D. Define the following.

1. Cell Spanning: .....

   .....

2. Cell Spacing: .....

   .....

3. Absolute Link: .....

   .....

E. Differentiate between the following.

1. Bulleted List Tag	Numbered List Tag
.....	.....
.....	.....
.....	.....
2. Internal Link	External Link
.....	.....
.....	.....
.....	.....

F. Answer in 1-2 sentences.

1. Why do we add images to the web pages?

   .....

   .....

2. What do you mean by SRC in image tag?

   .....

   .....

3. What is the use of adding links to the web page?

   .....

   .....

4. What is the purpose of creating a table?

   .....

   .....

G. Answer briefly.

1. Why do we create image link? Write its syntax.

   .....

   .....

   .....

2. What are the various attributes associated with Table tag?

   .....

   .....

   .....

3. What is the use of spanning cells?

.....

.....

.....

H. Application-based Questions

1. Kavya wants to create a web page displaying a school circular, that contains list of ten students who got highest marks in the academic year in an ordered form. She is unable to make it. What tag should she use to do it?

.....

2. Divya has created a web page and mentioned the tags used for inserting an image in the web page correctly. But still, the image is not displayed on the web page. What might be the problem? Explain any two possibilities due to which the image is not getting displayed.

.....

Group Discussion

Divide the students into two groups and discuss the topic— 'Importance of Images and Tables in a Web Page'.

Online Link

To learn more about images, links and tables in HTML, visit the website:

https://codeclubprojects.org/en-GB/webdev/

Activity Section

Lab Activity

Open Notepad and write the HTML code to create the given web page using the instructions mentioned below.

TIME TABLE

Hour	Monday	Tuesday	Wednesday	Thursday	Friday
9:00-9:45	English	English	English	English	English
9:45-10:30	Computer	Computer	Computer	Science	Science
10:30-11:15	Science	Science	Science	Science	Science
11:15-11:30	RECESS	RECESS	RECESS	RECESS	RECESS
11:30-12:15	Maths	Maths	Maths	Maths	Maths
12:15-1:00	Hindi	Hindi	Hindi	Hindi	Hindi
1:00-1:45	Geography	Geography	Geography	Moral&Civics	Moral&Civics
1:45-2:00	Games	Games	Games	Games	Meditation

This web page is designed by .....

Click here to know more about my school.

Skill Formation

This activity enhances the time management skills of the students.

Instructions

a. Insert a picture of your school in place of Clipart.

b. Write your name in the last line "This web page is designed by ..... ".

c. At the bottom, give a text link to your school website. For this, write the text "Click here to know more about my school." The website address is "www.....".

d. Save the web page as **'Time table'** in the **'Lab Activity'** folder.

9 Python – Conditional Control Structures and Turtle

OBJECTIVES

After completing this chapter, you will be able to:

- Identify different operators and operator precedence.
- Understand different types of statements.
- Understand different types of conditional control structures.
- Learn how to program in Python using Turtle.

Computer Program

Computer software is a set of computer programs which contains instructions that tell the computer how to work. Before writing a program, one must first plan the program. In other words, to write a correct and effective computer program, we must first plan its logic. If we attempt to plan the logic and write the program at the same time, we are likely to become so involved with the required instruction formats that program logic will suffer.

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, Assignment, etc.

1. **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

'*'	**Multiplication and Replication in Strings**	>>> 4*5
		20
		>>> 'python' *3
		'pythonpythonpython'

'/'	**Division**	>>> 28/4 7.0
'//'	**Floor Division/Integer Division**	>>> 20//4 5
'%'	**Modulus/Remainder**	>>> 67%9 4
'**'	**Exponentiation**	>>> 8**2 64

2. **Relational Operators or Comparison Operators**: These operators are used to compare the values. They either return True or False according to the condition.

Operator	Meaning	Example
'>'	**Greater than**	>>> 6>1 True
'<'	**Less than**	>>> 8<9 True
>='	**Greater than or equal to**	>>> 5>=9 False
'<='	**Less than or equal to**	>>> 1<=2 True
'=='	**Equal to**	>>> 6==7 False
'!='	**Not equal to**	>>> 7!=4 True

3. **Logical Operators:** These operators perform Logical AND, Logical OR and Logical NOT operations.

Operator	Meaning	Example	

and	**If both the operands are true then condition becomes true.**	>>> x=True
		>>> y=True
		>>> x and y
		True
			>>> x=True
			>>> y=False
			>>>x and y
			False

or	**If any of the operands is true then condition becomes true.**	>>> x=True
		>>> y=False
		>>> x or y
		True
			>>> x=False
			>>> y=False
			>>> x or y
			False

not	**If operand is false then condition becomes true.**	>>> a=False
		>>> not a
		True
			>>> a=True
			>>> not a
			False

4. **Assignment Operators:** These operators are used to assign value to the variables.

Operator	Meaning	Example	

'='	**Assign the value from right side to variable**	>>> x=30
		>>> print (x)
		30
			#Assign the value 30 to x
			#print the value of x

'+='	**Add and assign the value to the variable**	>>> a=12
		>>> a+=2 *# a=a+2*
		>>> print (a)
		14

'-='	**Subtract and assign the value to the variable**	>>> a=12
		>>> a-=2 *# a=a-2*
		>>> print (a)
		10

'*='	**Multiply and assign the value to the variable**	>>> a=12
		>>> a*=2 *# a=a*2*
		>>> print (a)
		24

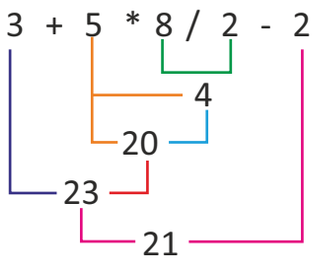
'/='	**Divide and assign the value to the variable**	>>> a=12
		>>> a/=2 *# a=a/2*
		>>> print (a)
		6.0

OPERATOR PRECEDENCE

Operator precedence determines the order in which expressions are evaluated, so you can predict the outcome of an expression. It can also determine the overall value of the expression.

Example:

Solve the following expression using operator precedence.



Operator	Name	Priority
()	parentheses	1st
* / %	multiplication, division, modulus	2nd
+ -	addition, subtraction	3rd
=	assignment	4th

The output of the above expression is 21.

Statements

Statement is the executable part of any program. It is an instruction that the Python interpreter executes and produces output. There are three main types of statements.

SIMPLE STATEMENT

A **simple statement** lies entirely within a logical line. You do not need to place more than one statement on a single logical line with a semicolon (;) as the separator. Python recommends one statement per line to make programs more readable.

Example:
```
>>> name= "Mohan"
Mohan
```

EXPRESSION STATEMENT

Expression is a combination of variables, values and operators. It is a type of instruction that combines values and operators and evaluates down to a single value.

Example:
```
>>> 2+5
7
```

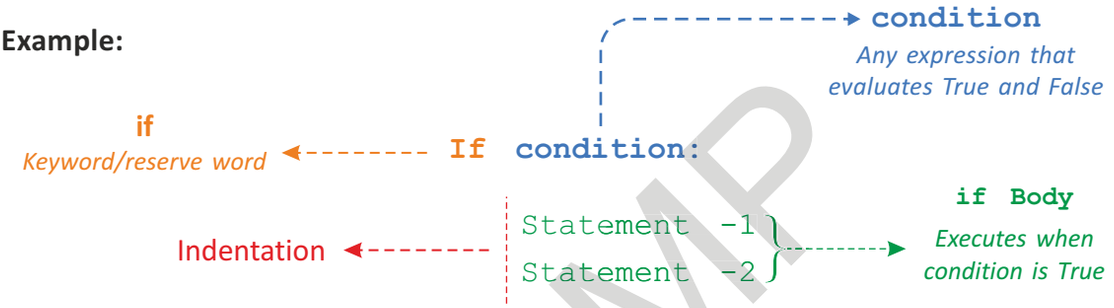
Here, **2** and **5** are the values (operends) and **'+'** is the operator, which return single value 7.

COMPOUND STATEMENT

A **compound statement** contains one or more statements and controls their execution. A compound statement has one or more **clauses** aligned at the same **indentation**. Each clause has a **header** starting with a keyword and ending with a colon (:), followed by a body, which is a sequence of one or more statements.

When the body contains multiple statements, also known as a **block**, these statements are on separate logical lines after the header line, indented **one Tab** or **four spaces rightward**. The block ends when the indentation returns to that of the clause header. Some of compound statements are if, for, while, etc.

Example:



Control Structures

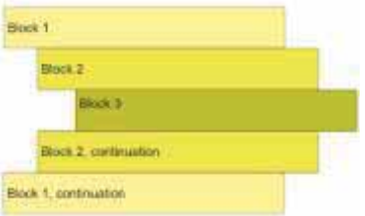
A **program** is the set of instructions which are executed in a sequential manner. In some situations, we have to change the order of execution of the program based on conditions or repetition of statements until conditions are met. Therefore, **control structures** are used to control or change the flow of execution. Three basic control structures are:

1. **Sequential**: A sequential control structure shows one or more actions following each other in order. Actions include input, process, and output. All actions must be executed, that is, none can be skipped. Examples of actions are calculating totals and printing them. *The programs you have learnt in the previous class have followed this control structure.*
2. **Conditional**: A conditional control structure tells the program which action to take, based on a certain condition. If, if-else, elif, and nested if-else come under this structure.
3. **Loop**: The loop control structure enables a program to perform one or more actions repeatedly as long as certain condition is met.

INDENTATION IN PYTHON

Python programs get structured through **indentation**, i.e. code blocks are defined by their indentation. All the statements in conditional and looping statements are structured using indentation (**one tab space)**.

This principle makes it easier to read and understand other people's Python code.

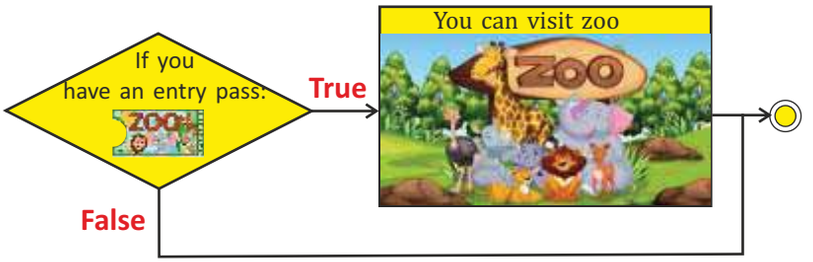


CONDITIONAL CONTROL STRUCTURES

We have a number of situations where we may have to change the order of execution of statements based on certain conditions. This involves a kind of decision-making to see whether a particular condition has occurred or not, and then direct the computer to execute certain statements accordingly.

When a program breaks the sequential flow and jumps to another part of the code, it is called **branching**.

For example, if you want to visit a zoo, what is the one thing you must have? It should be **entry pass**; if you have an entry pass, you can enter the zoo.



Another example: If you are thirsty, what would you prefer – **juice** or **bread**? Of course your answer will be in favor of juice, and if you are hungry then you will have opted for bread. So the decision is based on situation, which is logically called **condition**.

If **you are thirsty,**

You will prefer **juice.**

If **you are hungry,**

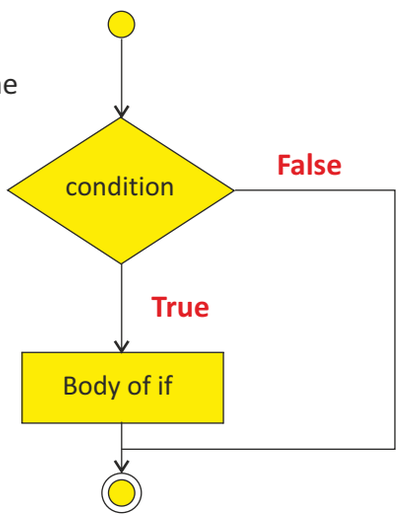
You will prefer **bread.**

In Python programming language, we have four conditional control structures:

1. if-statement 2. if-else statement 3. if-elif-else statement 4. Nested if statement

If Statement

The **if statement** is a first decision-making statement. It contains the body of statements which executes only when the condition is **True**.



Syntax:

```
if condition:
    Body of if
```

This flowchart shows the execution process of **if statement.** If the given condition is **True** then the **Body of if** will be executed. If the given condition is **False** then the **Body of if** will not be executed.

Program 1: Program to check if the given number is negative.

```
File Edit Format Run Options Window Help
num = -2
if num<0:
    print("Number is Negative")
```

Output in Interactive Mode

```
Number is Negative
>>>
```

If statement is made up of the **if** keyword, followed by a **condition** and a **colon (:)**, as in **if num<0:**. The lines following the colon must be in a block, and if the given condition is True, then the statement in the **if block** will run.

Program 2: Program to check whether you are eligible to vote.

```
File  Edit  Format  Run  Options  Window  Help
age=int(input("Enter you Age : "))
if age>18:
    print("You are eligible for vote.")
```

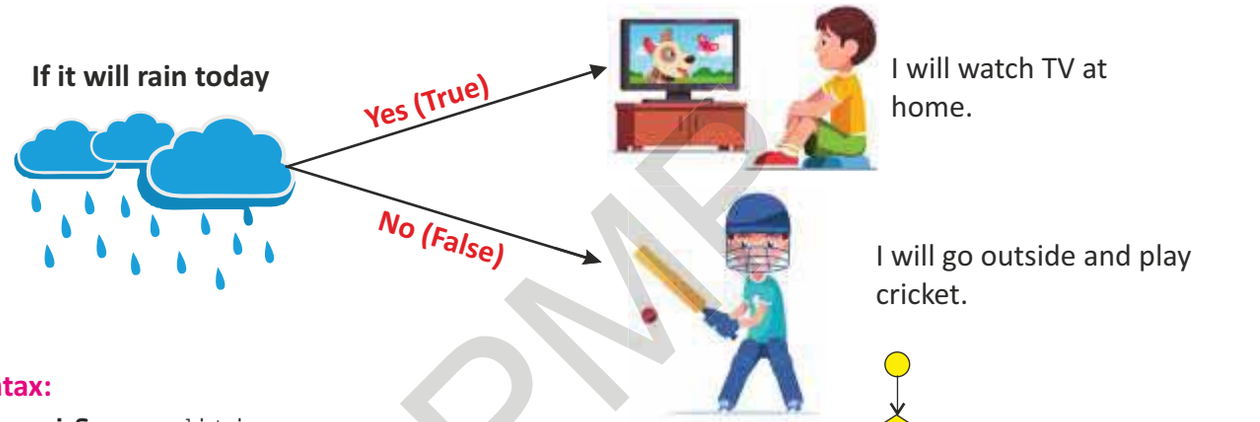
Output in Interactive Mode

```
Enter you Age : 20
You are eligible for vote.
>>>
```

If-else Statement

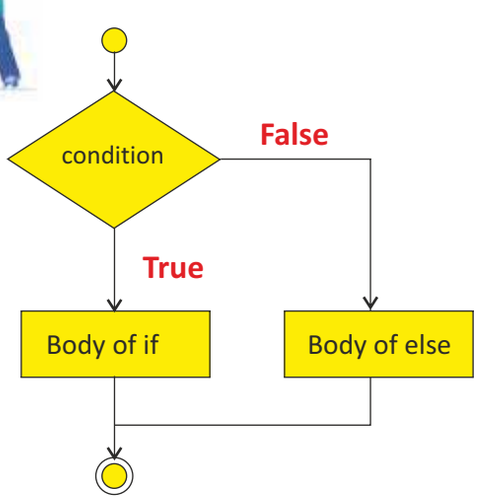
The **if...else** statement is an extension of the simple **if** statement. The if statement will check the condition; if it is **True**, the **if** block statement is executed, if the condition is **False** then it executes **else** block statement.

Let us take a real life example:



Syntax:

```
if condition:
    Body of if
else:
    Body of else
```



If the given condition is **True**, The **body of if** will execute. If the given condition is **False**, **body of else** will execute.

Note: *Use the* ***Indentation*** *for block separations.*

Program 1: Program to print the largest between the two numbers.

```
File  Edit  Format  Run  Options  Window  Help
num1=20
num2=10
if num1>num2:
    print("Num1 is Largest")
else:
    print("Num2 is Largest")
```

Output in Interactive Mode

```
Num1 is Largest
>>>
```

In the above example, the given value of **num1** is greater than **num2**, so the statement in **if** block will be executed.

Program 2: Program to check whether the given number is even or odd.

```
File  Edit  Format  Run  Options  Window  Help
num=int(input("Enter a Number :"))
if num%2==0:
    print("Number is Even")
else:
    print("Number is Odd")
```

Output in Interactive Mode

```
Enter a Number :25
Number is Odd
>>>
```

If-elif-else Statement

When multipath decisions are involved, we can put **ifs** together. A **multipath decision** is a chain of ifs in which the statement associated with each **else** is an **if** or **elif**.

Let us take a real life example:

if light is red, then Stop!

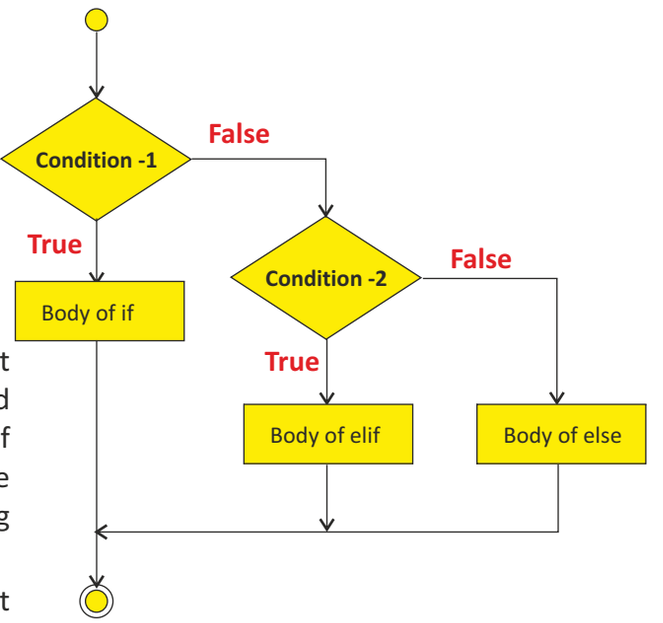
elif light is yellow, then Ready!

elif light is green, then Go!

else wait for signal!

Syntax:

```
if condition-1:
    Body of if
elif condition-2:
    Body of elif
else:
    Body of else
```



If the condition-1 of **if** statement is **False**, it checks the condition-2 of the next **elif** block and so on. If all the conditions are **False**, body of **else** is executed. Only one block among the several i**f...elif...else** blocks is executed, according to the **condition**.

The **if** block can have only one **else** block but it can have multiple **elif** blocks.

Program 1: Program to input the marks from users and print the grades accordingly.

```
marks=int(input("Enter the marks :"))
if marks>=90:
    print("Grade A")
elif marks>=70:
    print("Grade B")
elif marks>=50:
    print("Grade C")
else:
    print("Grade D")
```

Output in Interactive Mode

```
Enter the marks :85
Grade B
>>>
```

In the above example, if the marks are greater than or equal to 90, then the statement following **if** will get executed and print **Grade A**; if the marks are greater than or equal to 70 but lesser than 90, then **first elif** will be executed and print **Grade B**; if the marks are greater than or equal to 50 but lesser than 70, then **second elif** will be executed and print **Grade C**; if the marks are less than 50, **else** will be executed and print **Grade D**.

Program 2: Create a simple calculator using if-elif-else statement.

File Edit Format Run Options Window Help

```
num1=int(input("Enter First Number :"))
num2=int(input("Enter Second Number :"))
op=input("Enter an Operator : ")
if op=='+':
    print("Addition is : ", num1+num2)

elif op=='-':
    print("Subtraction is: ", num1-num2)

elif op=='*':
    print("Multiplication is ", num1*num2)

elif op=='/':
    print("Division is ", num1/num2)

else:
    print("Wrong Operator")
```

Output in Interactive Mode

First Run

```
Enter First Number :50
Enter Second Number :20
Enter an Operator : +
Addition is :  70
>>>
```

Second Run

```
Enter First Number :50
Enter Second Number :20
Enter an Operator : *
Multiplication is  1000
>>>
```

On running the program for the first time with the given values **50, 20** and **+**, the operator will execute the **first if block** and it will show 70 (addition of 50 and 20) as an output.

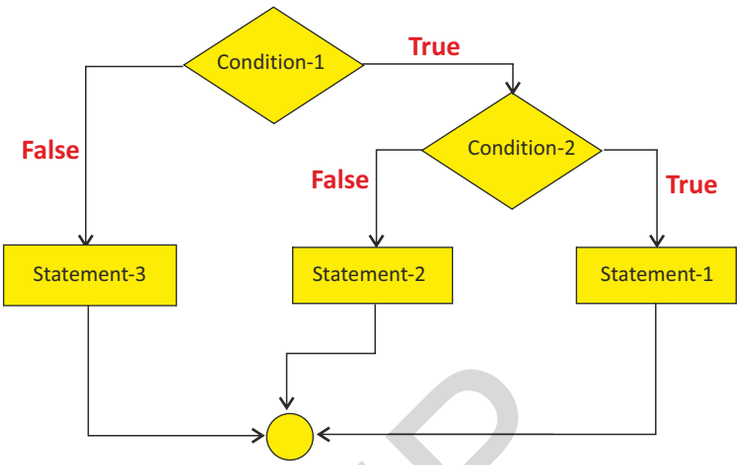
In the second run, the entered values are **50, 20** but the given operator is ***,** so the **elif block** will execute and it will show 1000 (multiplication of 50 and 20) as an output.

Nested If Statement

Nesting is the process of placing the **if** or **if-else** or **elif** statement in another statement. It enables us to make complex decisions based on different inputs. It is used to check multiple conditions.

Syntax:

```
if condition-1:
    if condition-2:
        statement-1
    else:
        statement-2
else:
    statement-3
```



The logic of execution is— **if** the **condition-1** is False, the **Statement-3** will be executed; otherwise, it continues to perform the second test. If the **condition-2** is True, the **Statement-1** will be evaluated; otherwise, the **Statement-2** will be evaluated, and then the control is transferred to the **Statement-n**.

Program 1: Program to print the greatest number among the three numbers.

```
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: "))
if num1 > num2:
    if num1 > num3:
        print("Num1 is greatest:", num1)
    else:
        print("Num3 is greatest:", num3)
else:
    if num2 > num3:
        print("Num2 is greatest:", num2)
    else:
        print("Num3 is greatest:", num3)
```

Output in Interactive Mode

```
Enter First Number: 80
Enter Second Number: 100
Enter Third Number: 50
Num2 is greatest: 100
>>>
```

In the above program, user input three numbers 80, 100 and 50. Here, the first condition will check whether 80 is greater than 100; this condition goes to **False**. So **outer if** block will not get executed and it jumps to **outer else** block and tests the condition 100 greater than 50 in the **inner if**. Now, the condition goes to **True** so the **inner if** block will get executed and show the output **Num2 is greatest: 100**.

Python Turtle

Turtle is a pre-installed library of Python which is used to create shapes in attractive manner. This library helps students understand the world of programming in fun and interactive way. Let us understand abouts Turtle Library.

IMPORTING TURTLE LIBRARY

Importing means to activate Turtle class (Module) in a program. Without importing Turtle Library, you cannot access its function and commands. So at first you need to import Turtle Library.

Note: The Turtle is built in Library in Python 3. You only need to import it with Python IDLE.

Open python IDLE in **interactive mode** and type the following code:

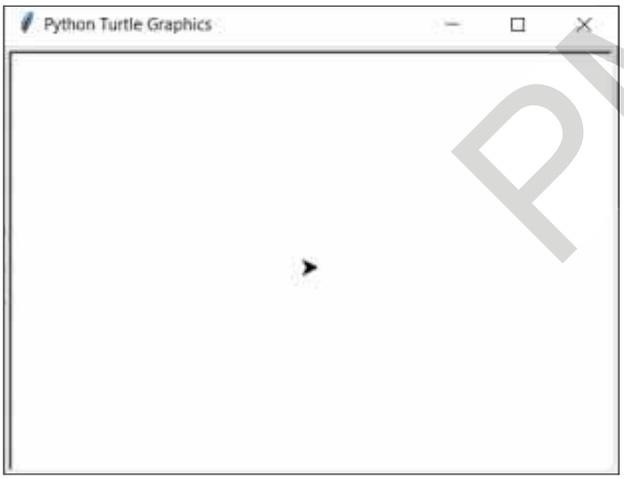
```
>>>import  turtle
>>>
```

SHOWING TURTLE

After importing the Turtle Library, you can access all of its functions. To show the Turtle on screen, you need to create a turtle's object by assigning Turtle function to a variable.

```
File  Edit  Format  Run  Options  Window  Help
import turtle                #turtle library
t=turtle.Turtle()            #creating turtle object
```

1. Type the code.
2. Save the file with **.py** extension.
3. **Run** the module *(or press F5)*.



Python Turtle Graphics window appears which shows the turtle [➤] in the center of the screen.

PROGRAMMING WITH TURTLE

The Turtle works with movement and direction. To understand its direction and motion, you need to understand its associated motion functions.

Turtle can move in four directions:

1. **forward** 2. **backward** 3. **left** 4. **right**

Let us understand about it in detail.

forward( )

Forward function or **fd()** is used to move the turtle in forward direction with given distance. Distance value can be **integer** or **float**.

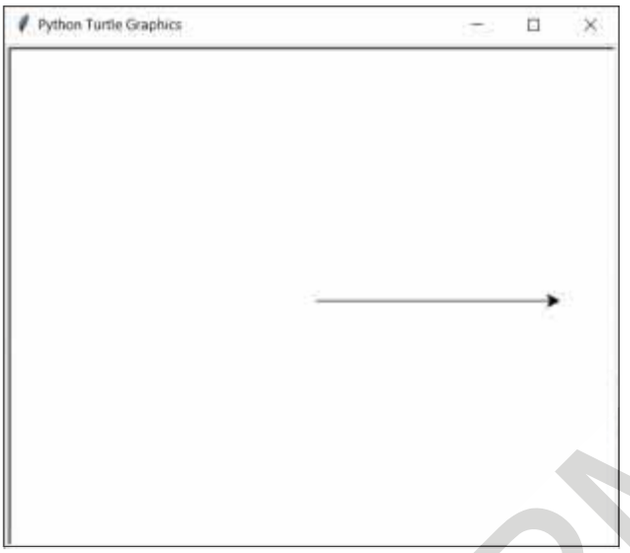
Syntax:

```
turtle_object.forward(distance  value)
or
turtle_object.fd(distance  value)
```

Here, **turtle_object** is the **variable name** that assigns the Turtle ().

Let us understand **forward motion function** with code:

```
File  Edit  Format  Run  Options  Window  Help
import turtle
t=turtle.Turtle()
t.forward(200)
```



1. Type the code.
2. Save the file with **.py** extension.
3. **Run** the module *(or press F5)*.

The turtle head moves dynamically to the forward direction with distance of 200.

backward( )

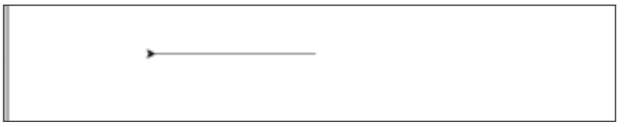
Backward function or **back()** or **bk()** is used to move the turtle in backward or opposite direction with given distance.

Syntax:

```
turtle_object.backward(distance  value)
or
turtle_object.back(distance  value)
or
turtle_object.bk(distance  value)
```

Let us understand **backward motion function** with code:

```
File  Edit  Format  Run  Options  Window  Help
import turtle
t=turtle.Turtle()
t.backward(200)
```



1. Type the code.
2. Save the file with **.py** extension.
3. **Run** the module *(or press F5)*.

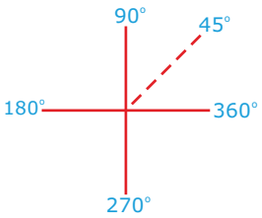
The turtle head moves dynamically to the backward or opposite direction with the distance of 200.

left( )

Left function or **lt()** is used to move the turtle head to the left direction with given angle value. Angle value may be integer or float.

Syntax:

```
turtle_object.left(angle  value)
or
turtle_object.lt(angle  value)
```



Let us understand **left motion function** with code:

```
File  Edit  Format  Run  Options  Window  Help
import turtle
t=turtle.Turtle()
t.left(90)
t.forward(100)
```

1. Type the code.
2. Save the file with **.py** extension.
3. **Run** the module *(or press F5)*.

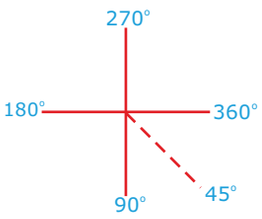
*The turtle head first moves to the left direction at **90 degree angle** and then moves in **forward** direction with the given distance value of 100.*

right( )

Right function or **rt()** is used to move the turtle head to the right direction with given angle value. Angle value may be integer or float.

Syntax:

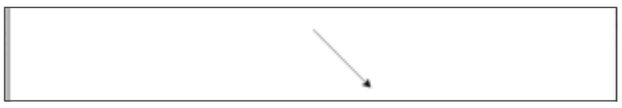
```
turtle_object.right(angle  value)
or
turtle_object.rt(angle  value)
```



Let us understand **right motion function** with code:

```
File  Edit  Format  Run  Options  Window  Help
import turtle
t=turtle.Turtle()
t.rt(45)
t.forward(100)
```

1. Type the code.
2. Save the file with **.py** extension.
3. **Run** the module *(or press F5)*.



*The turtle head first moves to the right direction at **45 degree angle** and then moves in forward direction with the given distance value of 100.*

DRAWING LINES WITH TWO DIRECTIONS

Till now, we have learnt the direction and angle of the turtle. Now, let us create two lines along the right direction.

```
File  Edit  Format  Run  Options  Window  Help
import turtle
t=turtle.Turtle()
t.forward(100)
t.right(90)
t.forward(100)
```

1. Type the code.
2. Save the file with **.py** extension.
3. **Run** the module *(or press F5)*.

*Firstly, Turtle moves in forward direction with the given distance, then turtle head moves to the right direction at **90 degree angle**. Finally, turtle moves in forward direction with given distance value of 100.*

Using the above coding method, you can draw many shapes as per the given distance and angle value.

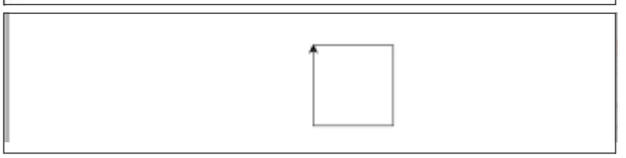
DRAW A SQUARE

By repeating the code, you can draw a square, rectangle, triangle, star, polygon, etc.

```
File  Edit  Format  Run  Options  Window  Help
import turtle
t=turtle.Turtle()
t.forward(100)
t.right(90)
t.forward(100)
t.right(90)
t.forward(100)
t.right(90)
t.forward(100)
```

1. Type the code.
2. Save the file with **.py** extension.
3. **Run** the module *(or press F5)*.

- Here, you can see the repetition of same code.



Turtle first moves in forward direction then turtle head moves to right direction. This process needs to be executed four times to draw a square.

DRAWING PREDEFINE SHAPES

Turtle has some predefined functions for creating curving shapes like circles or dots. Let us have a look to understand it.

circle( )

This turtle function is used to create a circle shape by using the radius value.

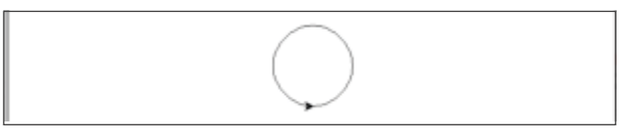
Syntax:

```
turtle_object.circle(radius)
```

Let us type the code to draw a circle shape.

```
File  Edit  Format  Run  Options  Window  Help
import turtle
t=turtle.Turtle()
t.circle(50)
```

1. Type the code.
2. Save the file with **.py** extension.
3. **Run** the module *(or press F5)*.



*The turtle draws the circle with radius **50**.*

PRACTICE PROGRAMS

Program 1: Program to check whether the given letter is a vowel or a consonant.

```
File Edit Format Run Options Window Help
alpha=input("Enter any letter in lower case ")
if alpha=='a' or alpha=='e' or alpha=='i' or alpha=='o' or alpha=='u':
    print("It is a  Vowel")
else:
    print("It is a Consonant ")
```

Output in Interactive Mode

```
Enter any letter in lower case o
It is a  Vowel
>>>
```

Program 2: Program to check whether the shape is a square or a rectangle based on dimension.

```
File  Edit  Format  Run  Options  Window  Help
side1=int(input("Enter Side 1 : "))
side2=int(input("Enter Side 2 : "))
if side1==side2:
    print("It is Square")
else:
    print("It is Rectangle")
```

Output in Interactive Mode

```
Enter Side 1 : 20
Enter Side 2 : 30
It is Rectangle
>>>
```

Program 3: Program to check whether the market or school is near by home.

```
File Edit Format Run Options Window Help
dis1=int(input("Enter the distance of Home to Market in KM : "))
dis2=int(input("Enter the distance of Home to School in KM : "))
if dis1<dis2:
    print("Market is Near by Home ")
else:
    print("School is Near by Home ")
```

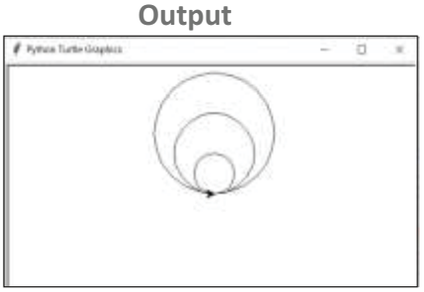
Output in Interactive Mode

```
Enter the distance of Home to Market in KM : 50
Enter the distance of Home to School in KM : 80
Market is Near by Home
>>>
```

Program 4: Program to draw tangent circles using turtle module.

```
File Edit Format Run Options Window Help
import turtle
t=turtle.Turtle()
t.circle(25)
t.circle(50)
t.circle(75)
```

Output



Self-Evaluation

CHECKLIST

After reading the chapter, I know these points:

	Agree	Disagree
⊙ I know that operators are the special symbols that carry out arithmetic and logical computations.	☐	☐
⊙ I know that statement is the executable part of any program.	☐	☐
⊙ I know that control statements are used to control or change the flow of execution.	☐	☐
⊙ I know that Python programs get structured through indentation.	☐	☐
⊙ I know that in Python programming language, the four conditional control structures are: if, if-elif-else, if-else, nested if.	☐	☐
⊙ I know that Turtle is the pre-installed library of Python used to create shapes in interactive manner.	☐	☐

Exercises

A. Tick [✓] the correct answer.

1. ..... operator is used to assign value to variable.
   a. Arithmetic ☐ b. Logical ☐ c. Assignment ☐
2. A ..... control structure shows one or more actions following each other in order.
   a. sequential ☐ b. procedure ☐ c. branching ☐
3. The ..... statement is an extension of the simple if statement.
   a. if ☐ b. if-else ☐ c. if-elif-else ☐
4. Without ..... Turtle Library, you cannot access its function and commands.
   a. exporting ☐ b. importing ☐ c. including ☐

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

1. The if....else is an extension of the simple if statement. ☐
2. We use if-elif-else statement when the multipath decisions are involved. ☐
3. Conditional and looping statements are structured using indentation. ☐
4. Turtle cannot move in four directions. ☐
5. We can create square in turtle by repeating same code. ☐

C. Fill in the blanks.

1. A compound statement has one or more ..... , aligned at the same ..... .
2. If statement is made up of the ..... keyword, followed by a ..... and a ..... .
3. ..... is the process of placing the if or if-else or elif statement in other statements.
4. ..... is used to move the Turtle in forward direction with given distance.
5. Circle function is used to create a circle shape by using ..... value.

D. Define the following.

1. Assignment operator: .....

   .....

2. Logical operator: .....

   .....

E. Differentiate between the following.

Simple statement	Expression statement
.....	.....
.....	.....

F. Answer in 1-2 sentences.

1. What is indentation?

   .....

   .....

2. What do you mean by control structures?

   .....

   .....

3. Why do we use if-elif-else statement?

   .....

   .....

G. Answer briefly.

1. What is if-else statement? Write its syntax.

   .....

   .....

   .....

2. Define Turtle and its associated motion function.

   .....

   .....

   .....

H. Application-based Question

Your teacher has asked to write a program in which she wants the execution of statements to be based on certain conditions. By which control structure can you do so?

.....

Group Discussion

Divide the students into two groups and discuss the topic – 'Does Indentation in Python Makes it an Easy or a Complex Programming Language?'.

Online Link

To learn more about control structures of Python, visit the website:
https://www.w3schools.com/python/python_conditions.asp

Activity Section

Lab Activity

Find the output of the following.

a.

```
File  Edit  Format  Run  Options  Window  Help
#Write a program to check whether a triangle is equilateral.
angle1=int(input("Enter First Angle  :"))
angle2=int(input("Enter Second Angle :"))
angle3=int(input("Enter Third Angle  :"))

if angle1==angle2==angle3:
    print("It is an equilateral triangle")
else:
    print("It is not an equilateral triangle")
```

Subject Integration

Mathematics

This integration will help the students learn how to code by using mathematical concept.

b.

```
File  Edit  Format  Run  Options  Window  Help
#Write a program to print lesser weight between two kids.
aman=int(input("Enter weight of Aman :"))
jaya=int(input("Enter weight of Jaya :"))
if aman<jaya:
    print("Aman has lesser weight")

else:
    print("Jaya has lesser weight")
```

c.

```
File  Edit  Format  Run  Options  Window  Help
"""write a program to check which vehicle(car1, car2 and car3)
has the highest speed."""

car1=int(input("Enter distance covered by car1 in 1 hour : "))
car2=int(input("Enter distance covered by car2 in 1 hour : "))
car3=int(input("Enter distance covered by car3 in 1 hour : "))
if car1>car2:
    if car1>car3:
        print("Car 1 has highest speed")
    else:
        print("Car 3 has highest speed")
else:
    if car2>car3:
        print("Car 2 has highest speed")
    else:
        print("Car 3 has highest speed")
```

Subject Integration

Science

This integration will help the students understand about the relationship between speed, time and distance.

d.

```
File  Edit  Format  Run  Options  Window  Help
# write a program to draw right-angle triangle
import turtle
t = turtle.Turtle()

t.forward(100) # Draw base

t.left(120)
t.forward(100) # Draw right edge

t.left(120)
t.forward(100) # Draw left edge
```

Subject Integration

Maths

This integration will help the students learn about coding to make geometric shapes.

10 AI for Sustainable Development Goals

OBJECTIVES

After completing this chapter, you will be able to:

- Understand sustainable development and its pillars.
- Understand 17 SDGs and role of AI in achieving these goals.
- Learn about ethical concerns of AI related to data.

Sustainable Development

In your daily life, you must have seen poor people struggling to find the daily necessities like food, safe water, healthcare, and shelter for their survival while on the other side many people who are just above the poverty line are trying to make their ends meet. In short, we can say that all the people on this planet are seeking economic and social development.

Sustainable development can be defined as:

"The development that satisfies the needs of the present generation without compromising the capacity of future generations, guaranteeing the balance between economic growth, care for the environment and social well-being."

We can break the above definition into two parts:

Part I: The development that satisfies the needs of the present generation.

Part II: The development that will enhance the capability of future generations to meet their own needs.

THREE PILLARS OF SUSTAINABLE DEVELOPMENT

On the basis of different criteria such as context and level of decision-making, the three elements of sustainable development are as follows:

1) Social 2) Economic 3) Environmental

These three elements are interconnected and also known as the **pillars of sustainability.** These pillars are informally referred to as **people, profit** and **planet**. Various topics come under the categories of these three elements.

Sustainable Development Goals (SDGs)

In 2015, a set of **seventeen Sustainable Development Goals (SDGs)** also known as **Global Goals** were formulated in the **United Nations Conference** and were adopted by all the developed and developing countries of the world to combat poverty, protect the planet and ensure peace and prosperity for all by the year 2030.

The main issues covered under this conference are:

- Eradicate poverty across the world
- Improve quality education and promote lifelong learning opportunities for all
- Promoting practices for better consumption and production of resources

The seventeen Sustainable Development Goals (SDGs) are as follows:

Goal I: Removal of poverty in all its forms across the world.

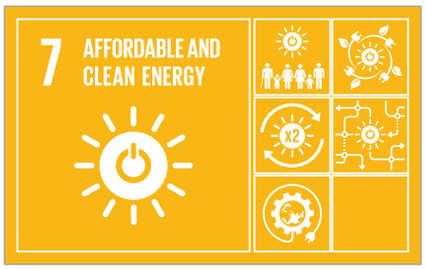
Goal II: End hunger, achieve food security and improve nutrition, and promote sustainable agriculture.

Goal III: Promotion of good health and well-being for all at all ages.

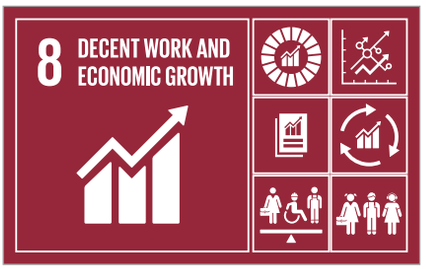
Goal IV: Provision of high quality education and lifelong learning opportunities to all.

Goal V: Achieving gender equality and women empowerment.

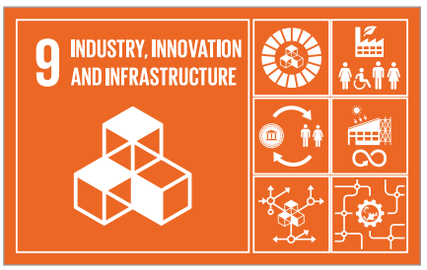
Goal VI: Ensure availability and sustainable management of water and sanitation for all people.



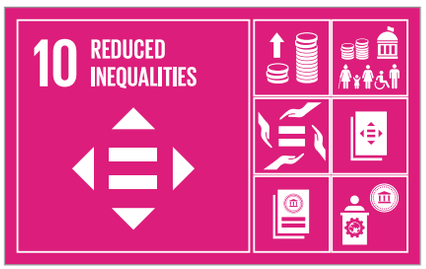
Goal VII: Enabling access to affordable and clean energy for all.



Goal VIII: Promote sustainable economic growth, productive employment and decent work for all.



Goal IX: Building up strong infrastructure, sustainable industrialization, and support economic development.

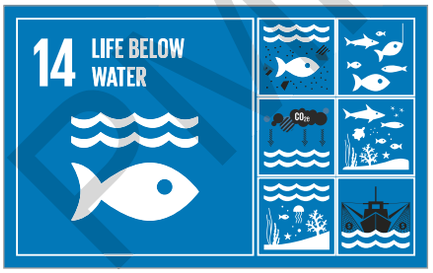


Goal X: Reduce inequalities within and among countries.

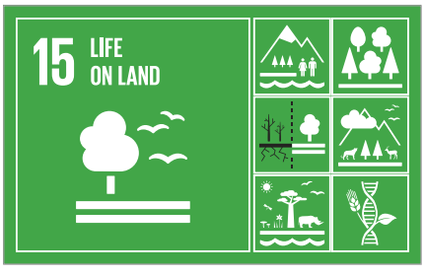
Goal XI: Make cities and human settlements inclusive, safe, resilient and sustainable.

Goal XII: Ensure sustainable consumption and production patterns of resources.

Goal XIII: Take urgent action to combat climate change and its impacts.



Goal XIV: Ensure sustainable use and conservation of the oceans, seas and marine resources to combat the adverse effects of overfishing.



Goal XV: Ensure improved life on land by protecting, restoring and promoting sustainable use of terrestrial ecosystems, manage forests and halt biodiversity loss.

Goal XVI: Promote peaceful societies for sustainable development, provide access to justice for all and build inclusive institutions at all levels.

Goal XVII: Global partnership for the goals; strengthen the means of implementation and revitalize the global partnership for sustainable development.

ROLE OF ARTIFICIAL INTELLIGENCE IN ACHIEVING SDGS

You have learnt that Artificial Intelligence is a powerful technology which has limitless applications. Now, we will explore how AI technology serves as a tool to deal with global issues like SDGs. One of the most powerful applications of AI, the exploration of satellite imagery, is accessible to almost every business.

It is stated by various researchers that AI technology has enough potential to help in lifting people out of poverty, reducing energy consumption and promoting clean, affordable energy. Let us understand about the role of AI technology in achieving SDGs.

SDG1 (No Poverty):

AI technology is helping a lot in achieving the first goal of sustainable development because poverty-striken areas can be easily captured or identified through satellite images. Using these images, the government can easily identify the location of poor people and help them through various schemes in lifting out of poverty.

SDG3 (Good Health and Well-Being):

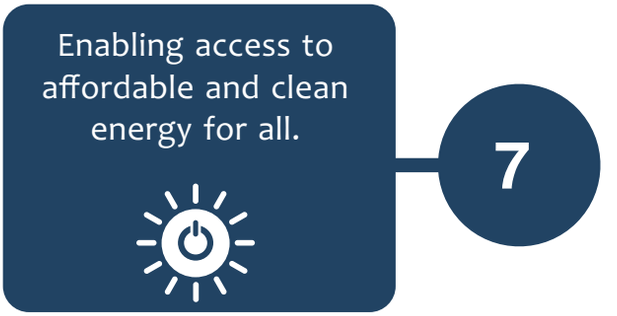
You know that health is wealth. Nowadays, healthcare industry has adopted AI as a support system because this technology has enough potential to diagnose illness at a very early stage. For example, Radiologists are using AI to locate tumours, anomalies, cancer cells, etc.

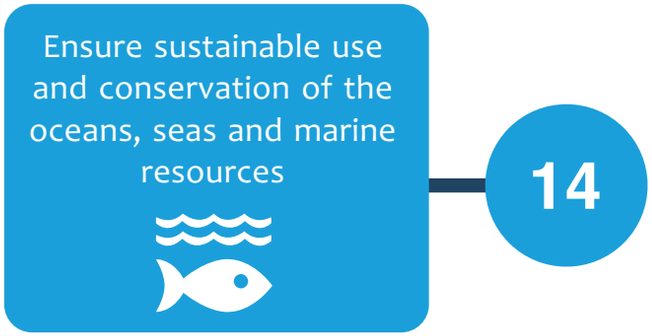
SDG4 (Quality Education):

Using AI, you can learn any subject from anywhere, and at any time across the globe. AI applications also try to eliminate the boundaries of discrimination in the education sector.

SDG7 (Affordable and Clean Energy):

AI technology is used promoting for renewable energy use because it has enough potential to optimize energy production and make adjustments according to circumstances and demand. So renewable energy production can be better than ever and the non-renewable sources will eventually be replaced.





SDG14 (Life Below Water):

AI technology helps in predicting the spread of invasive species, locating marine litter, monitoring ocean currents, keeping track of dead zones, measuring pollution levels and do much more to conserve marine life.

AI technology has already revolutionized the way of living of the entire world and is being used to achieve the **Sustainable Development Goals**.

Ethical Concerns of AI Related to Data

POSSIBLE BIAS IN DATA COLLECTION

In computer science, **Garbage In, Garbage Out** or **GIGO** implies that accuracy of output would depend upon the accuracy of input given to the computer. This principle is also applicable to AI systems.

AI systems make decisions on the basis of data which is being fed by the programmer at the development stage. If the data fed into it is biased, the AI system is bound to act in a biased way.

Let us understand it with the help of an example. Amazon, a big IT giant, developed an AI system for hiring **software engineers** in 2014. Soon, it was found out that their AI system was biased against women and was causing gender discrimination. This system was following the data of candidates hired over the past 10 years. Since most of the candidates were men, the algorithm also favoured men over women. Ultimately, Amazon was forced to shut down the biased AI recruitment system.

PROBLEM OF INCLUSION IN AI SYSTEM

The problem of inclusion is found in most of AI systems, showing signs of systematic racism and bias. This happens because the data used for training are already tainted with existing societal biases. For example, **facial recognition** technology is not so accurate to recognize **dark-skinned faces**. In this situation, AI systems exhibit racial bias which makes many dark-skinned people feel inferior and excluded. This racial bias towards dark-skinned people is due to lack of diversity in the images and other data used in training the AI systems.

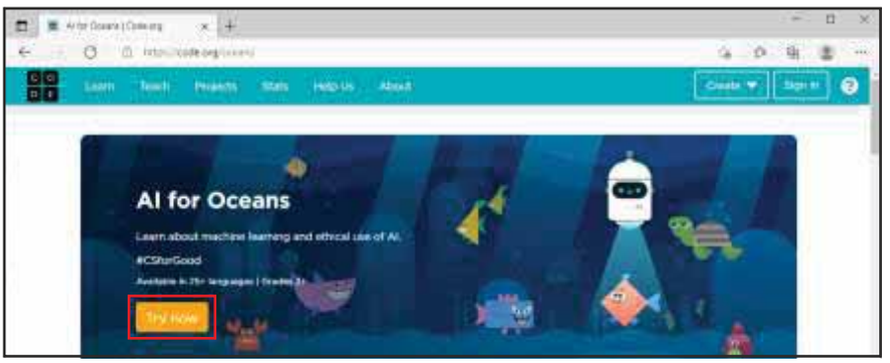
AI Lab

AI FOR OCEANS (ACHIEVING SDG 14 USING AI)

AI for Oceans application is very helpful in achieving **SDG 14**. This application is based on machine learning techniques. With the help of this activity, you can easily understand how training data is used to enable a machine learning model classify objects.

Skill Formation

This activity will make students acquire knowledge and skills and promote commitment to protect marine life.

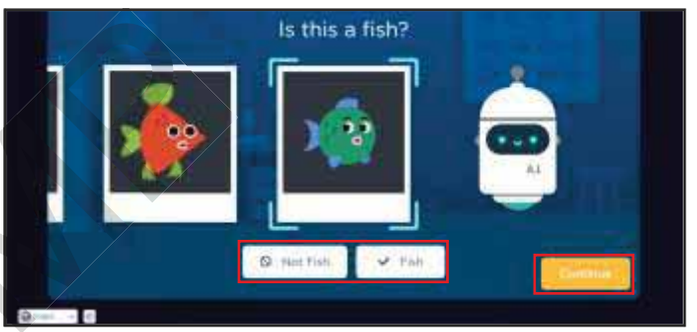


To use this application, you should open the web browser and type the URL in this address bar: **https://code.org/oceans** and press **Enter** key. You will get the following screen.

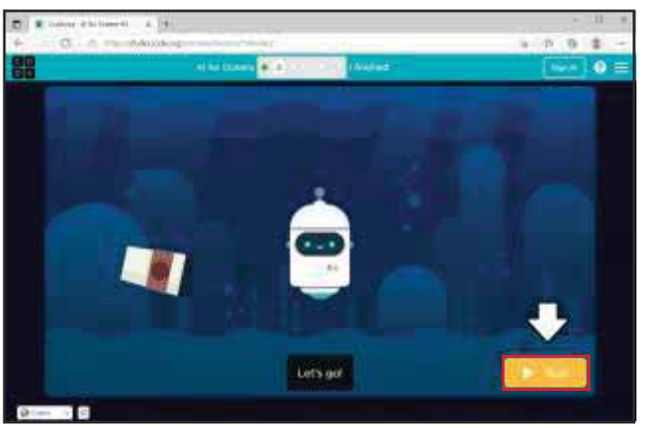
On this screen, click on the **Try Now** button.

A new screen appears.

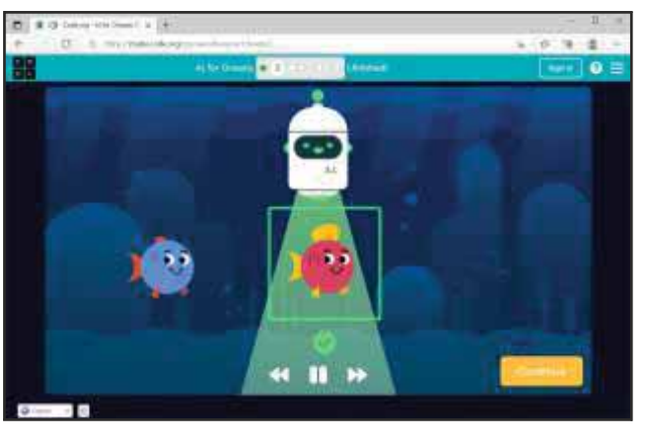
Click on **Continue** button.



Now you will get a new screen where an AI model is trained by us. You will click on the **Fish** and **Not Fish** buttons to provide training or label an image. Due to labelled images, AI model can easily recognize patterns in the images. After providing training, click on **Continue** button.



Click on **Run** button to see how the AI model can easily classify and recognize objects on its own without any human intervention.



With the help of this activity, you can see that **AI technology** is beneficial for locating and removing garbage waste from oceans which is good for marine life as well as for human life.

Self-Evaluation

After reading the chapter, I know these points:

	CHECKLIST	
	Agree	Disagree
⊙ I know that sustainable development is used to satisfy the needs of present generation and enhance the capability of future generations to meet their own needs.	☐	☐
⊙ I know that the three elements of sustainable development are: Social, Economic and Environmental.	☐	☐
⊙ I know that Artificial Intelligence is a powerful technology which serves as tool to deal with global issues like SDGs.	☐	☐
⊙ I know that AI eliminates the boundaries of discrimination in the education sector.	☐	☐
⊙ I know that there are ethical concerns of AI related to data, i.e. problem of bias in data collections and problem of inclusion in AI system.	☐	☐

Exercises

A. Tick [✓] the correct answer.

1. Which of the following is not the element of sustainable development?
   a. Social ☐ b. Economic ☐ c. Political ☐
2. SDGs were adopted by all the United Nations member states in the year ..... .
   a. 2010 ☐ b. 2012 ☐ c. 2015 ☐
3. Which of the following goal deals with the promotion of healthy lives and well-being for all at all ages?
   a. Goal V ☐ b. Goal III ☐ c. Goal II ☐
4. ..... implies that the accuracy of output depends upon the accuracy of input.
   a. GIGO ☐ b. SDGs ☐ c. IPO ☐
5. ..... problems are found in AI systems which makes decisions on the basis of biased data.
   a. Technical ☐ b. Exclusion ☐ c. Inclusion ☐

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

1. The seventeen SDGs are also known as Global Goals. ☐
2. Artificial Intelligence is a powerful technology which has limited applications. ☐
3. The racial bias towards dark-skinned people is due to lack of diversity in images. ☐
4. Amazon's AI recruitment system was biased towards women candidates. ☐
5. GIGO principle is not an applicable to AI system. ☐

C. Fill in the blanks.

1. The three elements of sustainability are also known as ..... .
2. A very powerful application of AI, the exploration of ..... , is an effective tool.
3. AI application eliminates the boundaries of discrimination in the ..... sector.
4. AI technology has enough potential to ..... energy production.
5. Facial recognition technology is not so accurate to recognize ..... faces.

D. Write full form of the following.

1. SDG: .....
2. GIGO: .....

E. Answer the following questions.

1. What are the pillars of sustainability?

.....

.....

.....

2. What were the main issues covered under the United Nations conference in 2015?

.....

.....

.....

3. Write a short note on the problem of inclusion in AI system.

.....

.....

.....

F. Application-based Question

Samaira's teacher has asked her to tell which Sustainable Development Goal is related to provision of high quality education and life long learning opportunities to all. Can you help her in answering it?

.....

Group Discussion

Divide the students into two groups and discuss – 'Problem of Biased Data is the Biggest Obstacle in Achieving Perfect AI System'.

Activity Section

Activity - What AI can do?

The names of some important AI-enabled systems are given below. With the help of the Internet, search one advantage and one ethical concern related to these systems.

1. **Biometric System :** .....

.....

2. **Smart Thermostat :** .....

.....

3. **Smart Security System :** .....

.....

4. **Clinical Trial Matching :** .....

.....

Lab Activity

Game: Sustainable Development Goals

The basic objective of this game is to help children understand their role as a responsible citizen in a simple way.

In every field, younger generation are the key players to ensure a bright future. keeping it in view, this game has been created for the students. This game encourages and guides them on how they can actively pursue Sustainable Development Goals.

Skill Formation

- This activity would aid in cultivating pro-social skills in the students which are crucial for achieving SDGs.

Play Go-goal Game

To play this game, you need to download it first.

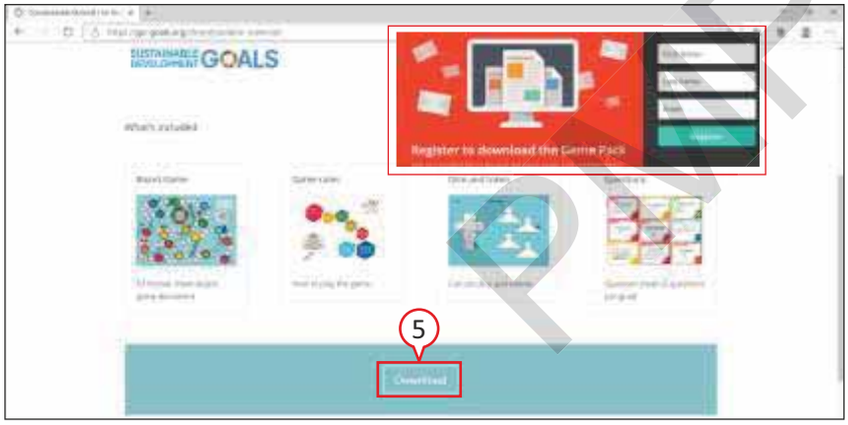
a. Click on **Start** icon to open Start menu *(or press ⊞)*.

b. Click on **Microsoft Edge**. **Microsoft Edge** window appears.

c. Click on address bar and type https://go-goals.org/downloadable-material/

d. Press **Enter** key.

Registration page appears. You can either register by giving the required details or close it.



e. Scroll down the screen and click on **Download** button.

The game gets downloaded as a zip file in the Download folder.

f. Unzip the file and open it.

You will get three PDF files.

1. **GoGoals_SDG_BoardGame_EN_web.pdf** contains the board game. You can take a printout.
2. **GoGoals_SDG_Game Brochure_EN_web.pdf** contains the review of SDG, SDG Go-Goals game, cutouts of dice and tokens, and rules to play.
3. **GoGoals_SDG_Question_cards 1-5-EN_web.pdf** contains five sets of multiple choice questions for each SDG.

1

2

3

Worksheet-II

Chapters 6 - 10

A. Tick [✓] the correct answer.

1. ..... is harassment that takes place using technology.
   a. Cyberbullying ☐ b. Vulnerabilities ☐ c. Pop-up Ad ☐
2. ..... is the art of convincing people to reveal confidential information.
   a. Phishing ☐ b. Spam ☐ c. Social engineering ☐
3. The text with special instructions in HTML is called ..... .
   a. syntax ☐ b. tag ☐ c. command ☐
4. ..... rule or line is used to separate different sections of our web page.
   a. Slanting ☐ b. Vertical ☐ c. Horizontal ☐
5. ..... style tags specify a particular font change that is interpreted by all browsers.
   a. Physical ☐ b. Logical ☐ c. Conceptual ☐
6. A web page is linked by using ..... , which are links to section within the same page.
   a. anchors ☐ b. images ☐ c. text ☐
7. The attribute used to mention the path of the image where it is located is ..... .
   a. IMG ☐ b. SRC ☐ c. JPEG ☐
8. ..... attribute is used to combine two or more cells in a column to make one large cell.
   a. ROWSPAN ☐ b. COLSPAN ☐ c. CELLSPAN ☐
9. A ..... control structure shows one or more actions following each other in order.
   a. sequential ☐ b. procedure ☐ c. branching ☐
10. Which of the following is not the element of sustainable development?
    a. Social ☐ b. Economic ☐ c. Political ☐

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

1. Vulnerabilities are flaws in computer software that weaken the security of computer. ☐
2. Hacking is the art of convincing people to reveal confidential information. ☐
3. The text we enter in the comment appears when readers view the web page. ☐
4. There are 13 colors in HTML which we can specify by name also. ☐
5. A hypertext link is used to connect one document with another document or file. ☐
6. We cannot control exact size of the table. ☐
7. Conditional and looping statements are structured using indentation. ☐
8. We use if-elif-else statement when the multipath decisions are involved. ☐
9. Python programs get structured through indentation. ☐
10. Amazon's AI recruitment system was biased towards women candidates. ☐

C. Fill in the blanks.

1. ..... refers to someone who accesses a computer or network illegally.
2. Every time we surf the Internet, we leave a trail behind known as ..... .
3. The ..... declaration at the beginning of web page specifies HTML5 document.
4. To add background color to the web page, ... attribute is used in body tag.
5. Spanning cells is also called ..... cells.
6. Internal links can be either ..... or ..... .
7. ..... is the process of placing the if or if-else or elif statement in other statements.
8. A compound statement has one or more ....., aligned at the same ..... .
9. AI technology has enough potential to ..... energy production.
10. Facial recognition technology is not so accurate to recognize ..... faces.

D. Define the following.

1. Cyberbullying
2. Cell spacing
3. Cell padding
4. Operator
5. Turtle
6. GIGO

E. Differentiate between the following.

1. Hacker and Cracker
2. Container tag and Empty tag
3. Internal link and External link
4. Simple statement and Expression statement

F. Answer the following questions.

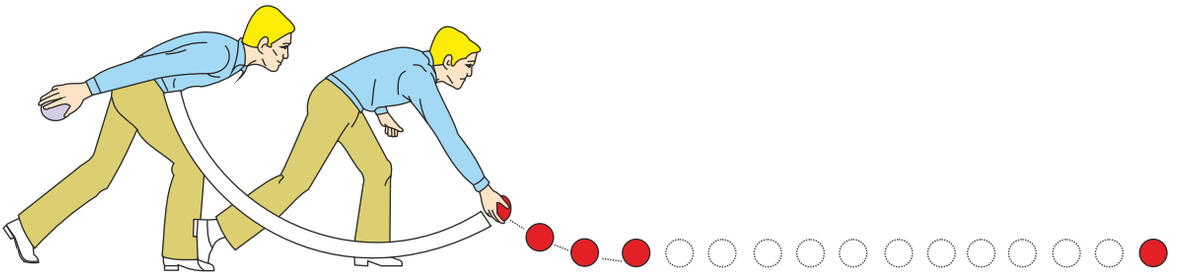
1. What is social engineering?
2. How can we protect our computer from hacking?
3. What are semantic tags?
4. What do you understand by text editors?
5. What do you mean by SRC in Image tag?
6. What are the various attributes associated with Table tag?
7. What do you mean by control structures?
8. Define Turtle and its associated motion function.
9. What were the main issues covered under the United Nations conference in 2015?
10. Write a short note on the problem of inclusion in AI system.

Project Work

Project Animate

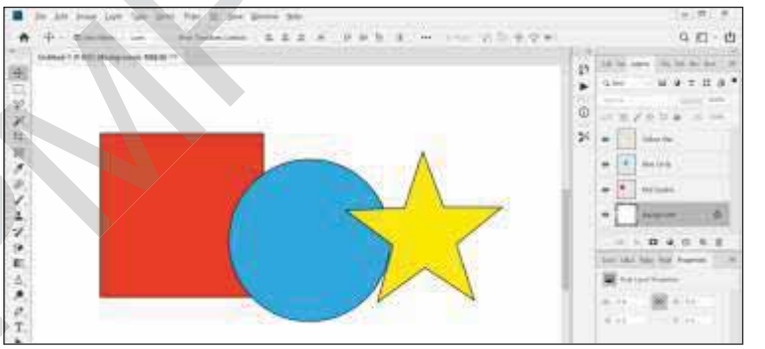
A. Draw an image of a fish in Adobe Animate and make it move.

B. Draw the image of a ball and a boy in Animate and make the ball move.



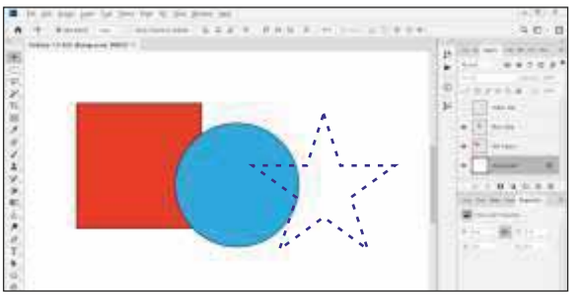
Project Photoshop

Open Photoshop and create three shapes — red square, blue circle and yellow star — in three different layers.

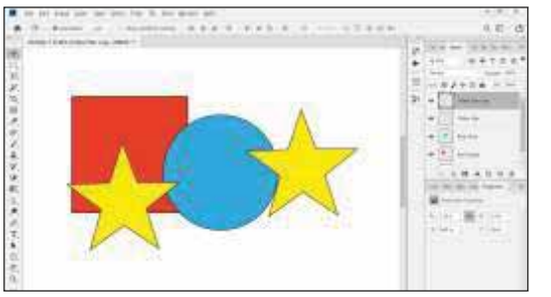


Now, perform the following tasks on the yellow star layer:

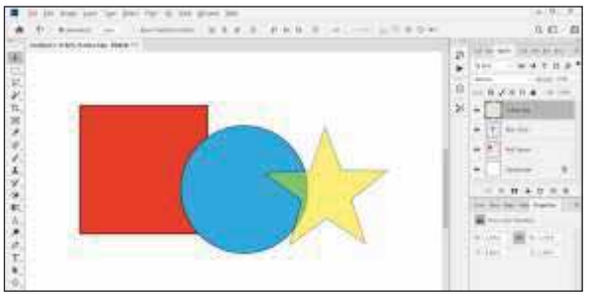
1. Hide the layer



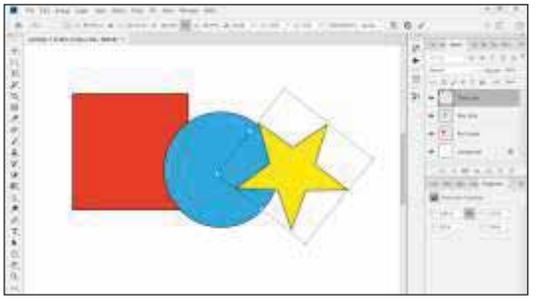
2. Duplicate the layer



3. Change Opacity of the layer



4. Transform the layer



Project HTML

A. Write the following HTML Code in text editor and get the output in a web browser.

```
<HTML>
<HEAD>
<TITLE> Creating A Link </TITLE>
</HEAD>
<BODY>
<H1><CENTER> <FONT COLOR = "RED"> OPTICAL DISC</FONT></CENTER></H1>
<CENTER><IMG SRC="cd.jpg"></CENTER>
<HR SIZE= "10" Width= "50%" COLOR= "Blue">
<P>An optical disc is a type of storage media that consists of a flat, round, portable disc made of metal, plastic or lacquer that is written and read by a laser. Optical discs used in personal computers are 4.75 inches in diameter, and less than one-twentieth of an inch thick.</P>
<P>Optical discs primarily store software, data, digital photos, movies, and music. 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.</P>
<P>Nearly every personal computer today has some type of optical disc drive installed in a drive bay. On some, you push a button to slide out a tray, insert the disc, and then push the same button to close the tray; others are slot loaded, which means you insert the disc in a narrow opening in the drive. When you insert the disc, the operating system may automatically start the program, music, or video on the disc.</P>
<P><CENTER><A HREF = "http://www.moserbaer.com"> Click Here For More Knowledge on Optical Disc</A></CENTER></P>
</BODY>
</HTML>
```

Now, perform the following tasks:

- Write the HTML code to design the web page.
- You can use the picture of the Optical Disc according to your choice.
- At the bottom, give a link to any website related to information on optical discs (moserbaer.com).
- Save the Source code file as 'disc.html'.
- Open the browser and view the source code output in it.

B. You and your friend have opened an electronic shop, which has several electronic household products. Your friend wants to create a table in HTML document to show the various electronic products. Each electronic product has its name, manufacturer, model and its cost. As you know the HTML programming, write the HTML code to create the following table:

ELECTRONIC SHOP

Item	Manufacturer	Model	Cost
LED TV 32 inch	Sony	Ex550	Rs. 44900
Refrigerator	LG	GL 368 YAQ	Rs. 32000
Food Processor	Bajaj	FX 10	Rs. 4500
Air Conditioner	Carrier	Duracool	Rs. 29000
Smartphone	Apple	iPhoneX	Rs. 89000
Smart Speakers	Google	Google Home	Rs. 10000

C. Your computer teacher has asked you to create the following notice so that she can link the notice to the school website. You are supposed to create the following web document along with a table in HTML.

NOTICE

This is to bring to your kind notice that on 30th January 2022, Annual Function of **PM Public School** was organized in the school premises. **Mr. Rajesh Bajaj** was the honorable Chief Guest. The function commenced by lighting of the lamp by the school Principal.

At the end of the function, **Award Ceremony** was conducted to acknowledge the outstanding efforts of the students. The awards were conferred by the Chief Guest and the Principal.

PM PUBLIC SCHOOL

List of Awardees			
CATEGORY	**STUDENT NAME**	**CLASS**	**COMPETITION**
Best Athlete	Ankur Srivastava	8th C	Annual Sports
Best Dancer	Kanak Chawla	10th A	Inter-school Dancing
Best Singer	Pooja Sharma	5th B	Inter-school Singing
Best Orator	Anchal Melhotra	9th A	Debate Competition

Project Python

A. Create a Python program which prints color names based on given condition.

If user enters **R** print **"Red"**

If user enters **Y** print **"Yellow"**

If user enters **P** print **"Pink"**

If user enters **G** print **"Green"**

Else print **"Black"**

B. Create a Python program which prints names of days based on given condition.

If user enters **1** print **"Monday"**

If user enters **2** print **"Tuesday"**

If user enters **3** print **"Wednesday"**

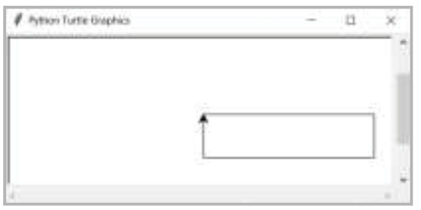
If user enters **4** print **"Thursday"**

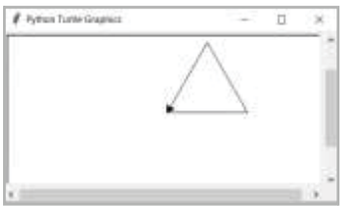
If user enters **5** print **"Friday"**

If user enters **6** print **"Saturday"**

Else print **"Sunday"**

C. Create a Turtle program in Python to draw the following shapes.





Additional Information

Screen Time

Screen time is a term used for activities done in front of a screen, such as that of a smartphone, tablet, TV, computer, etc.

When teens spend more hours on the screen, they have less time for other important things, like exercise, learning, real-world socializing, and even sleep. More than normal screen time is known as **screen addiction**.

CHALLENGING FOR THE PARENTS

It is a challenge for most of the parents to know whether children are spending too much time on their devices or addicted to the Internet and social media. As technology is becoming more pervasive, children and young people are experiencing tech-related dependencies.

Loss of Interest in Other Things

Many children may become less interested in anything that does not include their **devices**. It is important to discuss this with children as soon as parents notice a behaviour change.

FINDINGS IN A SURVEY

- Children aged eight to ten spend nearly eight hours a day on media.
- Older children and teens spend more than eleven hours a day on media.
- Seventy-one percent of children have a TV or Internet device in their room.
- One-third of teens send more than a hundred texts per day.

SCREEN-TIME ADDICTION TREATMENT

Limit Screen Time

Dependency on the screen makes kids lethargic. They do not want to get out and indulge in any outdoor activities like sports. Instead of banning the children from using screen, parents can limit the screen time.

Be a Role Model for Children

Children always learn from the parents. So if their parents are constantly on their device, they will see this as acceptable. Parents show try to follow the same rules they have set for children. If parents ask their children not to use their device at the food table, they should make sure to avoid doing it.

Remove Devices from Bedroom

Removing devices (TV, smartphone, tablet, computer) from children's bedroom will help them to get a sound sleep.

Less Time Means Less Risk

There are many risks associated with devices, such as cyberbullying, viewing inappropriate content, etc. The lesser time spent on the web means more safety for the children from these risks.

Inclusive Education

Inclusion in education refers to an education system that ensures quality education to every student without any barriers like physical disability, language, culture, family background, and age.

It brings all students together in one classroom and community, regardless of their strengths or weaknesses in any area, and seeks to maximize the potential of all students.

TYPES OF DISABILITIES

1. **Physical problems:** Epilepsy, Cerebral Palsy, Hearing Impairment, Visual Impairment
2. **Communication disorders:** Speech Impairments, Oral Language Disorders
3. **Behaviour disorders:** Hyperactivity and Attention Disorders, Suicidal tendencies

ROLE OF TEACHERS

Interaction with family

To be able to solve their problems

To develop new learning strategies

To be able to develop self confidence

To be able to provide special facilities

To be able to look after their personal needs

To be able to recognize their hidden talents

To inculcate positive attitude

APPS FOR STUDENTS WITH SPECIAL NEEDS

Technology serves as the catalyst for the changes in the way we teach and learn. With the help of technology, the goal of Inclusive Education, too, can be realised in no time.

Seeing AI

Seeing AI is highly useful in the classroom setting that can help blind or visually-impaired children. It can be used for reading different types of texts.

Link: https://apps.apple.com/us/app/seeing-ai/id999062298

Envision

Envision, an AI-based app, has been specially created to aid visually impaired children.

Link: https://www.letsenvision.com/envision-app

Google Forms

Google Forms is a free online data collection tool which works in conjunction with Spreadsheet. It allows you to easily create and analyse survey which involves collection of data from users.

Google Forms uses drop down menus, multiple choice checklists, rating scales, and short answers text boxes to gather data. Data gathered using the form is typically stored in a spreadsheet.

The advantages of using Google Forms are given below.

- Google Forms is free for the individual user. It does not need to be installed on any computer.
- We can create and analyze surveys easily and get real time response information and charts.
- There are no compatibility issues; everyone is on the same version.
- You can personalize your Google Form with question types, a header image, and a color theme.

STARTING GOOGLE FORMS

To start Google Forms, open **Google** web page in the web browser.

1. In the Google page, click on **Sign in**. **Google account** page appears.
2. Type your **login ID** and the **password.**

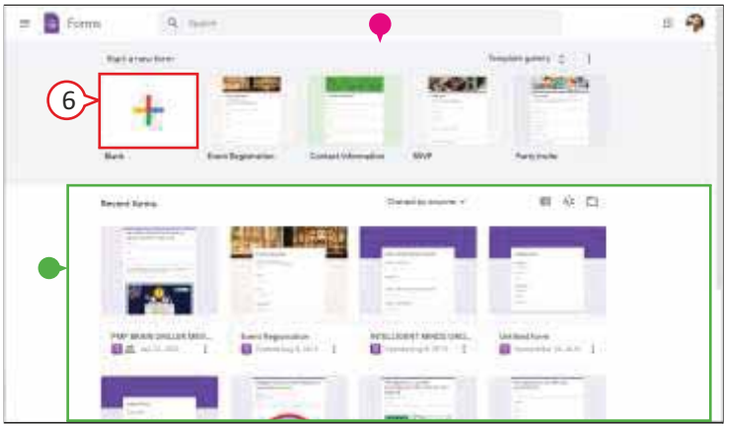
Your login ID and password are same as that of your Gmail account.

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 **Forms**.



Forms app appears.

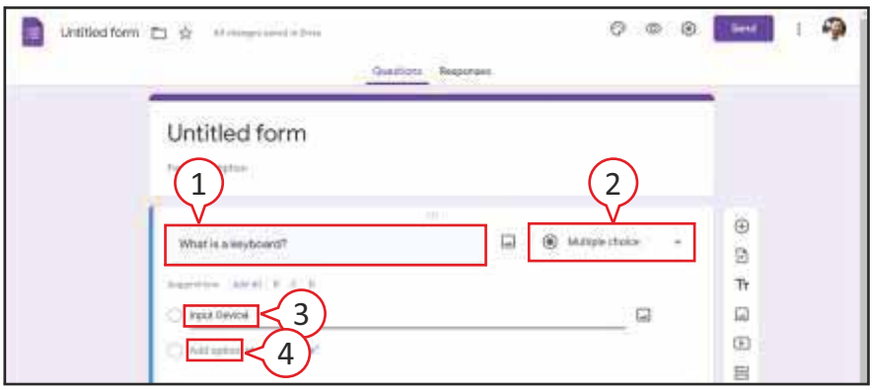
- This area shows you Template Gallery, which includes blank and pre-designed forms. You can select and work on it.
- This area shows the list of existing forms.

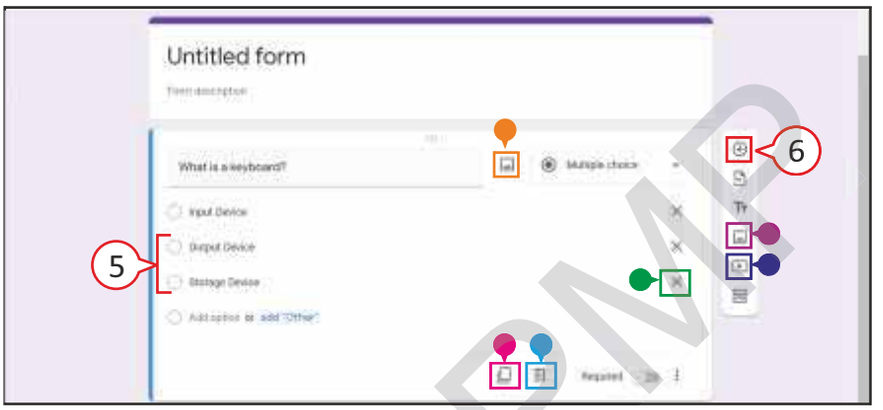
6. Click on **Blank** to start a new Form.

Creating Google Forms

The blank form appears on the screen with spaces for title and description followed by the form field.

ENTERING THE TEXT IN FORM FIELDS





1. Click on the **Untitled Question** and type the question.
2. Click on drop down and select the type of question from the list.
3. Enter the option for the answer by clicking on **Option 1**.
4. Enter second option for the answer by clicking on **Add option**.
5. Repeat **step 4** to add more options.

- You can click on **Remove** button [×] to remove the option for the question.

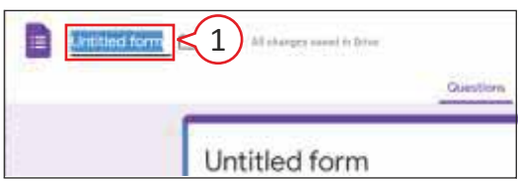
- You can click on **Duplicate** button [ ] to copy the same question and paste it in next question and modify the duplicated question.
- You can click on **Delete** button [ ] to delete the question.
- You can click on **Add image** button [ ] to add image in the question.

6. Click on **Add question** button [ ] to add more questions in the form and repeat the steps 1 to 5.

- You can also click on **Add image** button [ ] to add image in the form.
- You can also click on **Add video** button [ ] to add video in the form.

RENAMING THE FORM

By default, the name of the blank form appears as **Untitled form**, but you can rename it and give it a new name.

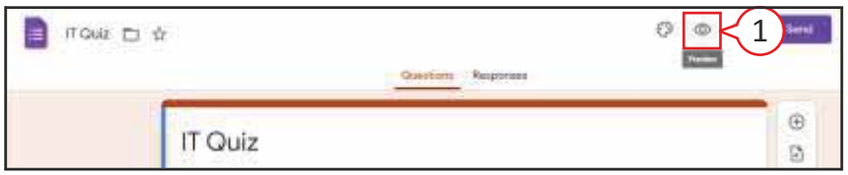


The new name appears in Forms app.

1. Click inside the **Untitled form** box to highlight the text.
2. Type the name you desire in the box.

PREVIEWING YOUR FORM

After creating the form, you can preview it to see how your form looks when others open it.



1. Click on **Preview** icon.

The preview of the form appears in new tab.

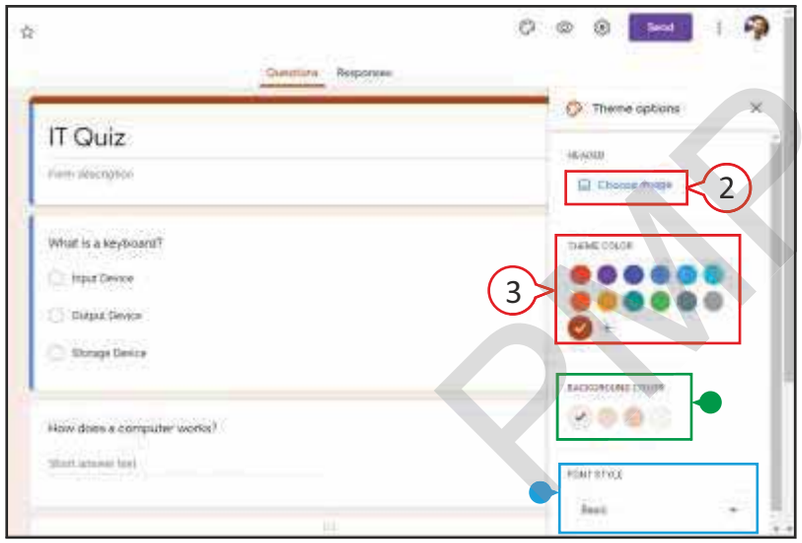
Now you can view the final look of the form.

FORM CUSTOMIZATION

After knowing the basics of Google Form, now you can customize your form.

1. Click on **Customize Theme** icon.

Themes option appears.

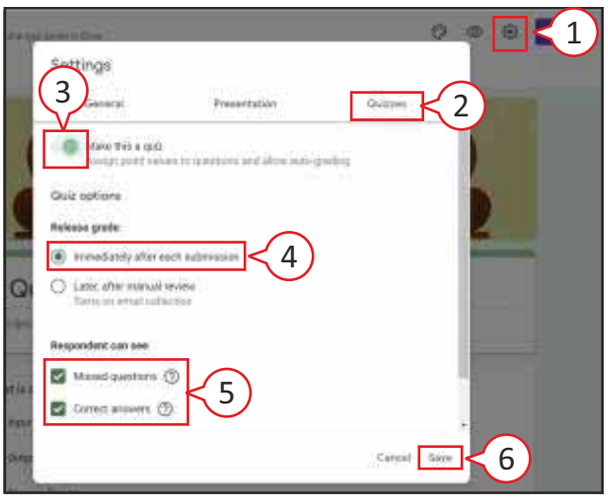


2. Click on **Choose image** button to choose a preloaded image as header.
3. Click on the **THEME COLOR** to change theme color of your liking.

- The **BACKGROUND COLOR** depends on the Theme color you choose.
- You can also change the **FONT STYLE** for your form.

CREATING A QUIZ FROM THE FORM

After creating and customizing the form, which is basically used for survey or a questionnaire, you can create a quiz by transforming your form into a quiz.

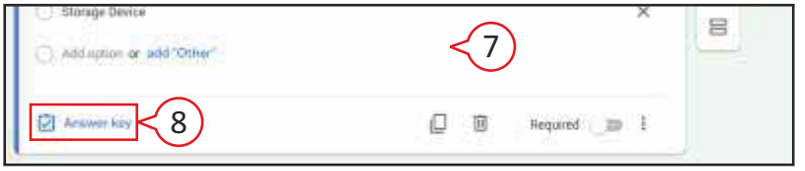


1. Click on **Settings** [⚙] icon.

***Settings** box will appear.*

2. Click on **Quizzes** tab.
3. Enable **Make this a quiz** option.
4. Click on the radio button of **Immediately after each submission** if you want the respondent to get the result same time.
5. Select the options for **Missed questions** and **Correct questions** for the respondent.
6. Click on **Save** to close the box.

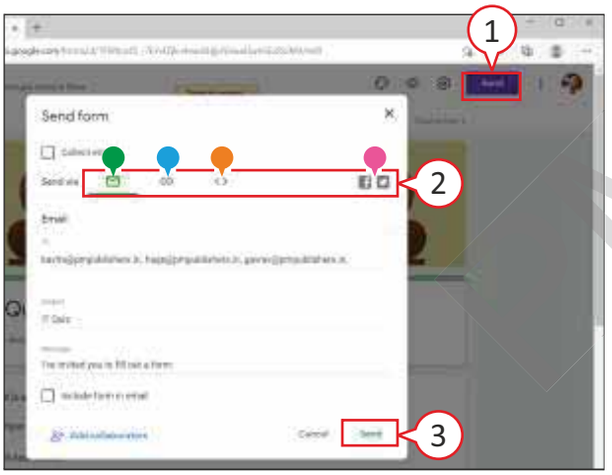
Now, you need to assign the correct answer under every question.



7. Click inside the question to select.
8. Click on **Answer key**.
9. Select the correct answer.
10. Assign the **points** for your question.
    - You can click on **Add answer feedback** to enter feedback for correct and incorrect answers.
11. Click on **Done**.

SENDING YOUR FORM

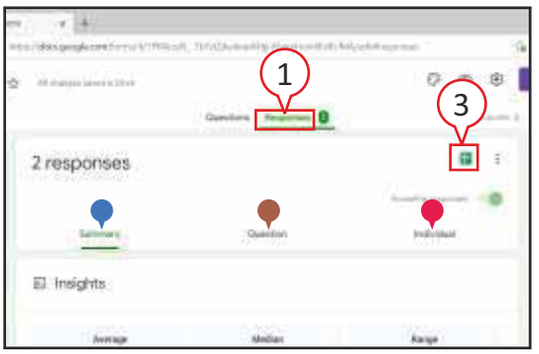
After creating the form, you can send the form by email, copy and paste a link in a messenger or email, embed it on a website or share a link on social media.



1. Click on **Send** button.
2. Choose how you want to send the form:
    - **Email:** Click on it and enter email addresses in the **To: field**.
    - **Link:** Click on it and then click on **Copy** button to copy the link of the form.
    - **Embed:** Click on it and then click on **Copy** button to copy the HTML link for pasting it in the website.
    - **Social Media:** Click on one of the icon to post it on social media.
3. Click on **Send**, once you are ready to share your form.

FORM RESPONSES

You can evaluate the responses of your form in the following way.



1. Click on **Responses** tab.
2. Click on the following tabs to view responses:
    - The **Summary** tab gives you a summary of your form responses.
    - **Question** tab lets you see all of the answers to a particular question on your form.
    - **Individual** tab lets you see how each respondent answered every question.
3. Click on **Sheets** icon to see your responses in Google Sheet.

SIGN OUT FROM GOOGLE FORMS

After finishing your work in Google Forms, you must sign out from it.

NATIONAL CYBER OLYMPIAD
SAMPLE PAPER — SYLLABUS 2021-22

CLASS 7

SYLLABUS

Section – 1 : Verbal and Non-Verbal Reasoning.

Section – 2 : Fundamentals of Computer, Evolution of Computers, Memory & Storage Devices, Using Windows 7, MS-Word(Links, Mail Merge, Macros, Exploring Styles group), MS-PowerPoint (Working with Slides Master and Themes, Advancing slides using Hyperlink and Actions, Customizing and Broadcasting Slide Shows), MS-Excel (Components of MS-Excel window, Editing and formatting cells in a worksheet, Introduction to Formulas, Sorting and filtering data, Macros, Features of Insert and Page layout tabs), Programming in QBasic, Internet & Viruses, Networking, Latest Developments in the field of IT.

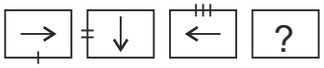
Section – 3 : Higher Order Thinking Questions - Syllabus as per Section – 2.

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. Which of the following options will continue the given series?

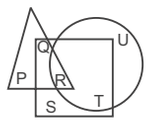


(A)  (B)  (C)  (D) 

2. In a certain code language, if TOGETHER is written as RQEGRJCT, then how will PAROLE be written in same language?

(A) NCPQJG (B) NCQPJG (C) RCPQJK (D) RCTQNG

3. In the given figure, the triangle represents girls, square represents sportspersons and circle represents coaches. Which of the following alphabet represents girls who are sportspersons but not coaches?



(A) P (B) Q

(C) R (D) S

4. Five boys A, B, C, D and E are standing in a row. A is between C and D and B is between D and E. Which of the following pairs represents the boys standing at both the ends?

(A) C, B (B) E, C (C) E, A (D) A, C

5. A man goes towards east five kilometres, then he takes a turn towards right and goes five kilometres. He again takes a turn towards right and goes five kilometres. In which direction is he now with respect to the starting position?

(A) East (B) North (C) West (D) South

COMPUTERS AND INFORMATION TECHNOLOGY

6. MBP is a short form for a famous high end notebook from Apple. It is called _____.

(A) Macintosh Book Pro (B) Mac Book Programmable (C) Mountain Book Pro (D) MacBook Pro

7. You can join an Active Directory domain in which of the following Windows 7 versions?

(i) Windows Home Edition (ii) Windows Professional Edition

(iii) Windows Ultimate Edition (iv) Windows Enterprise Edition

(A) Only (i) and (ii) (B) Only (iv) (C) Only (ii), (iii) and (iv) (D) All of these

8. The function of 'Wrap Text' icon in MS-Excel is used to _____.

(A) Join selected cells into one larger cell (B) Rotate text to a diagonal angle

(C) Make all content visible within a cell by displaying it on multiple lines (D) Highlight interesting cells

9. What is Microblog?

(A) It is a combination of instant messaging and content production.

(B) A blog which is an online diary or commentary written by an individual.

(C) A blog that creates micro proxy.

(D) All of these

10. A browser is an interactive program that permits a user to view web pages on the computer. The browser performs which of the following services?

(A) Connecting to the source computer whose address is specified (B) Requesting new page from the server

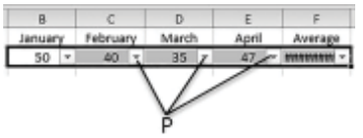
(C) Receiving new page (D) All of these

11. Modern Computers compared to earlier computers are _____.

(A) Faster and larger (B) Less reliable (C) Larger and stronger (D) Faster and smaller

12. The arrows indicated by 'P' in the given image are called _____ in MS-Excel 2010.

(A) Filter switches
(B) Data switches
(C) Form switches
(D) Label switches



13. Match the virus types given in Column-I with their corresponding examples given in Column-II.

Column-I	Column-II
(a) Macro Virus	(i) Lamer Exterminator
(b) Boot Sector Virus	(ii) Natas
(c) Polymorphic Virus	(iii) Melissa

(A) (a)-(iii), (b)-(i), (c)-(ii) (B) (a)-(i), (b)-(ii), (c)-(iii) (C) (a)-(ii), (b)-(i), (c)-(iii) (D) (a)-(iii), (b)-(ii), (c)-(i)

ACHIEVERS SECTION

14. Match the following output devices given in Column-I with their descriptions given in Column-II.

Column-I	Column-II
(a) Voice Response System	(i) It produces audio output by selecting an audio output from a set of pre-recorded audio response.
(b) Voice Reproduction System	(ii) It enables a computer to talk to a user.
(c) Speech Synthesizer	(iii) It converts text information into spoken sentences.

(A) (a)-(ii), (b)-(i), (c)-(iii) (B) (a)-(i), (b)-(ii), (c)-(iii) (C) (a)-(iii), (b)-(ii), (c)-(i) (D) (a)-(i), (b)-(iii), (c)-(ii)

15. Which of the following QBASIC codes will produce the given output?

Output:

1
2
3

(A)
```
FOR x = 1 TO 3
    PRINT x
NEXT x
```

(B)
```
FOR x = 1 TO 5
    PRINT x
NEXT x
```

(C)
```
FOR x = 1 TO 3
    PRINT x
EXIT FOR
NEXT x
```

(D)
```
FOR x = 1 TO 3
    PRINT x
EXIT FOR
MORE x
```

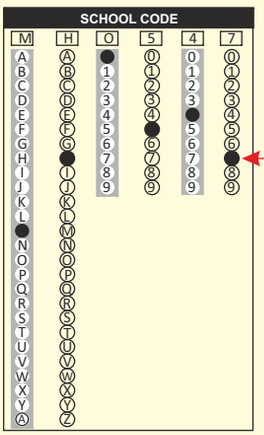
SAMPLE ANSWER SHEET

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													

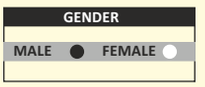
2. Father's Name: If your father's name is DINESH GUPTA then you should write as follows:

D	I	N	E	S	H		G	U	P	T	A													



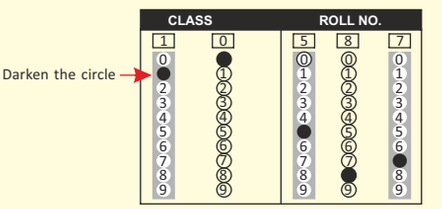
3. SCHOOL CODE
Write your school code i.e. if your school code is MH0547 darken as follows:

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. (A) 3. (B) 4. (B) 5. (D) 6. (D) 7. (C) 8. (C) 9. (A) 10. (D) 11. (D)
12. (A) 13. (A) 14. (A) 15. (A)