

# Information and Communication Technology

## ❖ Introduction

**Information Technology (IT)** can be defined as the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware.

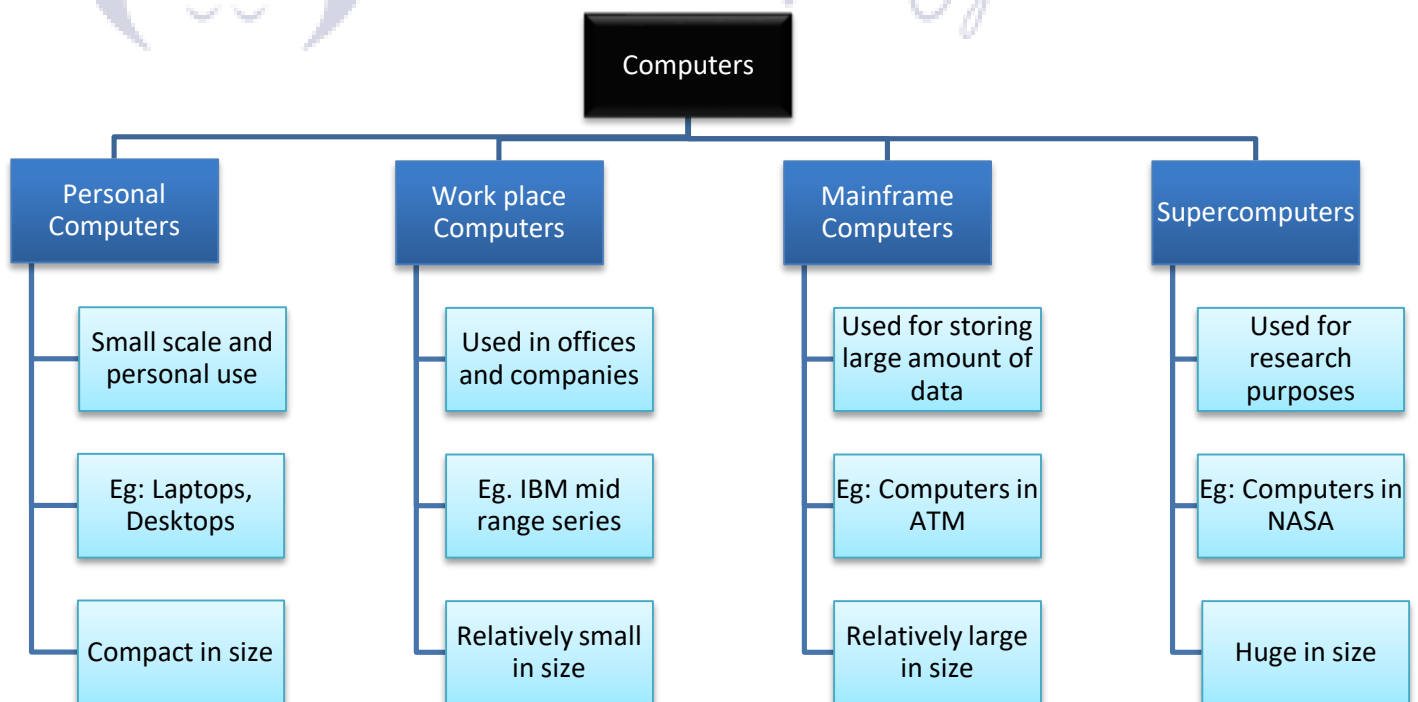
**ICT** stands for Information and Communication Technology, and can be defined as technology used for collection, storage and processing of data for various uses like broadcasting media, transferring information through wired or wireless media.

## ❖ Significance of ICT/Computers

- Increased speed of communication and processing.
- Easy storage, accessibility and processing of data for research and development purposes.
- Minimum chances of error except human errors.
- Increased storage capacity.
- Decrease in cost with increase in technological development.
- Multitasking and reliability.
- Can be used for teaching with the help of presentations (ppt), videos, audios etc.

## ❖ Computer and its Types

A computer is a machine that can be instructed to perform various tasks like mathematical or logical calculations, playing audio or video files, storing and processing of data at high speed and reliability. It can be divided as:



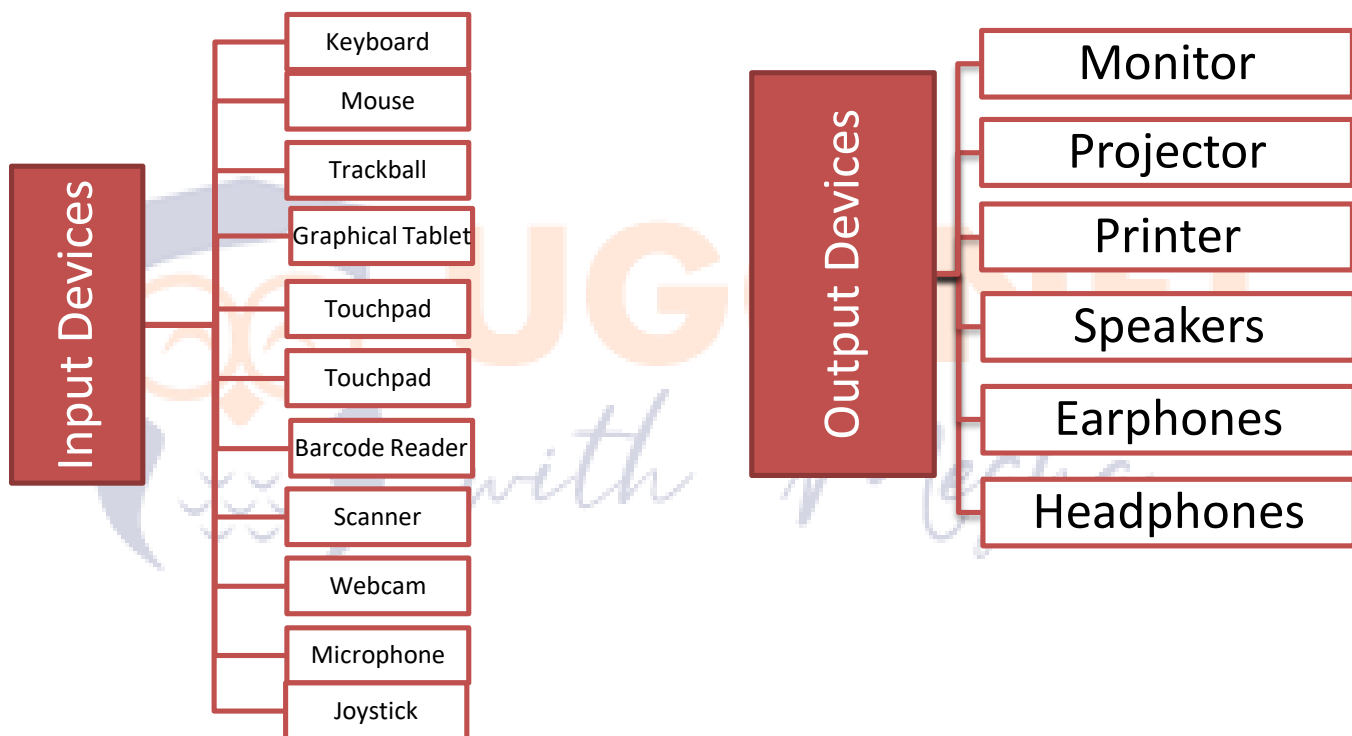
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❖ **Components of a computer:**

- Input Unit.
- Output Unit.
- Storage Unit.
- Central Processing Unit (CPU) : It consists of - a)Arithmetic and Logical Unit (ALU)  
b)Control Unit (CU)                      c) Registers
- Everything is mounted on a circuit board called the “mother board”.
- Every character on the keyboard has an ASCII (American Standard Code for Information Interchange). It is a code for representing 128 English characters as numbers, with each letter assigned a number from 0 to 127. ASCII codes represent text in computers, telecommunications equipment, and other devices. For e.g.: “A” is 65, “n” is 110, “a” is 97 etc.



❖ **Memory/Storage Devices:**

- **ROM – Read Only Memory** is **non-volatile**, i.e. data is not lost even if the computer is turned off.
  - It can only be read.
  - One time write only.
  - BIOS (Basic Input Output System) is loaded by ROM into memory.
  - Types are: PROM, EPROM and EEROM.
- **RAM – Random Access Memory** is **volatile**, i.e. data is lost if the computer is turned off.
  - Read and Write access.
  - Types are: Static RAM (SRAM), Dynamic RAM (DRAM)
  - Also called as “Main Memory” of computer.
- **CPU Registers:** Registers in processor are for very small storage and fastest speed.

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- **Cache Memory:** It is a small part of RAM or processor.
  - Very high speed.
  - Volatile in nature.
  - Stores data of current running programs to load them faster.
- **Secondary Memory:**
  - Hard Disks
    - Can be internal or external.
    - Types: HDD(Hard Disk Drive) or SSD(Solid State Drive)
    - SSDs are lighter, faster and consume less power than HDDs.
    - A hard disk is divided into tracks.
    - It is further subdivided into sectors.
  - Memory Card
  - Pen Drives
  - Compact Disks (CDs), Digital Versatile Disks (DVDs)
    - Writing/Moving/Copying at data to a disk is known as Burning.
  - USB flash drive – Universal Serial Bus Flash Drive
- **Virtual Memory:** It creates the illusion to users of a very large main memory.
- **Speed of different memories:** CPU Register > ROM > Cache Memory > RAM > Secondary Storage

❖ **Memory Units**

MEMORY UNITS	
1 bit = 0 or 1	1 Megabyte (MB) = 1024 Kilobytes = $2^{20}$ bytes
$2^2$ bits or 4 bits = 1 nibble	1 Gigabyte (GB) = 1024 Megabytes = $2^{30}$ bytes
$2^3$ bits or 8 bits = 1 byte	1 Terabyte (TB) = 1024 Gigabytes = $2^{40}$ bytes
1 Kilobyte (KB) = 1024 bytes = $2^{10}$ bytes	1 Petabyte (PB) = 1024 Terabytes = $2^{50}$ bytes

- Therefore in a system the data hierarchy is as follows:  
 Bit < Byte (8 bits) < Field (Several bytes) < Record (Several Fields) < Files (Several Records) < Database (Several Files)

❖ **Software**

It is the non-physical part of a computer and can be defined as a set of instruction, data or programs used to operate computers or work with specific type of files.

For eg: Microsoft Windows, Adobe Reader, GIMP etc.

**Types of Software:**

- 1) **System Software:** These software are necessary to operate the computer and provide us with the user interface. For eg: Operating System (OS), Disk Cleanup, Magnifier etc.

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**Some of the commonly used Operating Systems:** Microsoft Windows, Linux, COS (Smart Card Operating System), Kali Linux, Ubuntu, Mac, Unix, MS-DOS, Solaris, Fedora Linux etc.

Some OS provides **GUI** (Graphical User Interface) while some provide **CLI** (Command Line Interface).

**2) Application Software:** These are application specific software to perform different kinds of tasks like image editing, word processing, video playing etc.

**Some commonly used software:** Microsoft Office, Google Chrome, Adobe Photoshop etc.

**Note:** World Wide Web (WWW) was the first ever web browser.

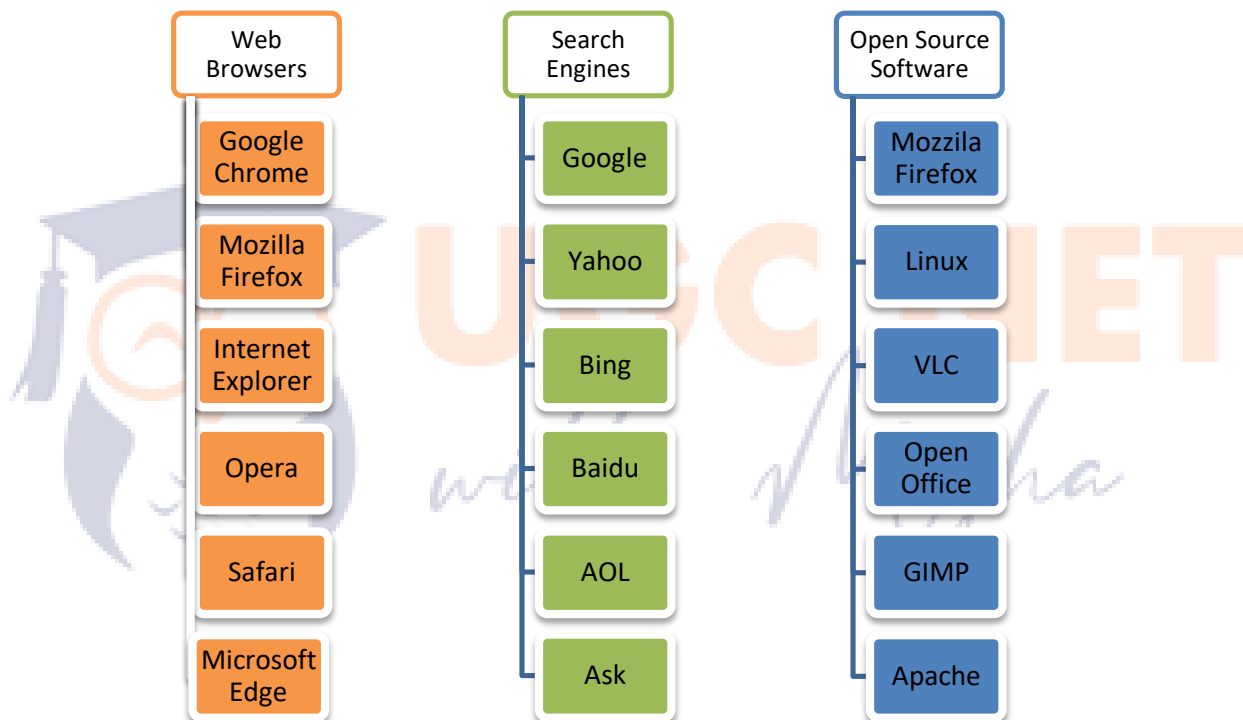


Fig: Some popular application softwares

❖ **File extensions/formats**

Image Files	Audio Files	Video Files	Compressed Files
<ul style="list-style-type: none"> <li>• .jpg or .jpeg (Joint Photographic Experts Group)</li> <li>• .png (Portable Network Graphics)</li> <li>• .tiff (Tagged Image File)</li> <li>• .gif (Graphics Interchange Format)</li> <li>• .raw (Raw Image Formats)</li> <li>• .psd (Photoshop Document)</li> </ul>	<ul style="list-style-type: none"> <li>• .mp3(MPEG-1 Audio Layer 3)</li> <li>• .wav (Waveform Audio File Format)</li> <li>• .wma (Windows Media Audio)</li> <li>• .pcm (Pulse Code Modulation) - PCM is the most common audio format used in CDs and DVDs.</li> <li>• .bmp (Bitmap Image)</li> </ul>	<ul style="list-style-type: none"> <li>• .mp4(MPEG-1 Audio Layer 3)</li> <li>• .3gp(Third Generation Partnership)</li> <li>• .ogg</li> <li>• .wmv(Windows Media Video)</li> <li>• .webm</li> <li>• .flv(Flash Video)</li> <li>• .avi(Audio Video Interleave)</li> </ul>	<ul style="list-style-type: none"> <li>• .zip</li> <li>• .rar</li> <li>• .tar</li> <li>• .7z</li> </ul>

Some more file extensions/formats	
Text Document	.doc , .docx , .txt , .pdf
Spreadsheet Document	.xls , .xlsx , .xml , .ods
Executable Files	.exe
Presentation Document	.ppt , .pptx

➤ Some points to note:

- Images with .png format have transparent background.
- SD (Standard Definition), HD (High Definition) and UltraHD are some commonly used video qualities.
- Different HD formats are: 720p, 1080i, 1080p and 1440p.
- Different UHD formats are: 4k and 8k
- .CDR is extension of CorelDraw files.
- Mail Merge is used to send the same letter to different persons in MS Word.

❖ **Number Systems**

• **Binary Number System:**

- With base as '2' the binary number system only uses 0 and 1.
- For eg:  $4_{10} = 100_2$ , here "<sub>10</sub>" indicates decimal number system and "<sub>2</sub>" indicates binary number system.
- For decimal expressions:  $10.101_{10} = 1 \times 2^1 + 0 \times 2^0 + 1 \times 2^{-1} + 0 \times 2^{-2} + 1 \times 2^{-3}$

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