**Introduction to IT**

**What is information technology (IT)?**

Computer based system that input processing and outputting information.

IT includes hardware and software.

**Components of IT**

Information technology is divided into three primary components. These are

### 🡪Computers: Accept data in some prescribed form as an input

🡪**Communications networks**: to send and receive data and information over a communication network

🡪**Know-how**: to solve problems and to take advantages of the opportunities it creates.

 Therefore IT requires or implies know-how, knowing how to do something well.

**Data Vs information**

**Data:** data is row fact. It is also row material for data processing.

**Information:** data is processed into information.

**Data processing/information**

Input🡪Sorting (Arranging) 🡪Processing🡪Filling (storing information) 🡪output🡪Control (according to goal)

**Form of data:** data is found in many formats for example inform of text, graphics, image, video and etc.

**Mode of information dissemination**

Information can be transmitted in many devises like Telephone, radio, E-mail, TV, Mobil and etc.

**What is Computer?**

It is an electronic device that accepts data and process into information.

**Characteristics of computer**

* + - * **Speed**: The most important characteristic of a computer is its speed. Computer works only one step at a time.
* **Accuracy:** computers are hundred percent accuracy.
* **Reliability:** Once the circuit and design of a computer have been perfected and tested, it becomes very reliable.
* **storing :** A computer is characterized for its greater capacity to hold larger amount of information
* **Versatility:** Computer can be programmed and applied for different purposes.

**Generation of computer**

**1st Generation (1940-1959)**

-Large size in computer.

-Completed at Pennsylvania University.

-Vacuum tubes.

-Storing data.

**2nd Generation (1959-1965)**

-It uses transistors in place of vacuum tubs.

-Much small, faster, reliable, processing capacity.

**3rd Generation (1965-1970)**

-Solid static circuitry

-Improved secondary storage.

-New input and output devices.

**4th Generation (1970)**

-Introducing of microprocessors (CPU)

-Mach small, faster, reliable and processing capacity.

**5th Generation (since)**

-It is programmable and arterial intelligence.

**Type of computer**

1. In terms of size, cost, power and prosing speed.

🖳**Micro Computer**: Is called personal computer (PC) is small but important and frequently used computer.

🡪**Laptop computer**: smaller version of micro computer.

 **Limitation of laptop**: - doesn’t expand easily.

🡪**Palmtop computer**: pocket size micro computer.

 **Limitation of palm top**: - doesn’t perform large application.

🡪**Desktop:** mostly used micro computer type.

 **Limitation of desk top**: - is not portable.

🖳**Mini computer**: it is middle-range computer it is powerful than micro-computer.

🖳**Mainframes computer:** larger, powerful computer than micro and mini computer.

🖳**Super computer**: It is extremely powerful computer.

**2.** In terms of by purpose

* **Special purpose computer:** Special purpose computer performs one specific job
* **General-purpose computers**: A general-purpose computer is able to store different programs of instructions and performs a variety of operation

**Application of computer:**

Information technology can be applied in varied spheres of economic and social activities of human beings

* **At Home**:
* **At office :**
* **At factory** :
* **Transport and communication:**
* **Education and training and etc**

**Components of a Computer**

Computer system can be divided into two categories. These are hardware and software.

 **Hardware**

Computer hardware is the physical part of the computer system that can be seen and felt. The hardware part of a computer system is composed of a number of interacted physical parts.

**Types of Computer Hardware**

Based on information processing, we can divide computer hardware into four:

1. **Input Device:** Input devices are used to enter information into computer.
* They convert the data we give them into the form that can be manipulated in the computer (electronic format).

E.g. keyboard, mouse, light pen, scanner, etc

 **2) Output Device:** Output devices are usedto get data out of a computer so that it can

 Be examined, analyzed or distributed to others.

* It converts information from machine-understandable form to a human understandable form.
* The outputs are of two types: ***Softcopy***: displayed on monitor, projector, or similar devices and ***Hardcopy***: printed on paper

E.g. monitor printer, speaker, etc

3) **Storage device:** It used to store data in the computer. Computer

 Memory measured in Bit, Byte, KB, MB and etc.

 Two types of storage devices:

* **Primary storage device**: is that stores data firstly.
1. RAM (Random access memory): is working area. Its also volatile memory. Temporary storage device.
2. ROM (Read only Memory): is non volatile. It store basic information of computer. Permanent storage.
* **Secondary storage device**: stores data permanently
1. Magnetic storage device: Magnetic disk is the most widely used storage medium on all computers.

E.g. Hard disk, floppy Disk, flash disk, magnetic tape

1. Optical storage: Optical disks use laser light to read or write data from optical disk. *Laser* - Light Amplified Stimulated Emission of Rays.

E.g. CD(Compact disk),DVD(digital video disk)

**4) Central Processing Unit (CPU):** It is bran of computer.

 Speed of CPU is measured in Hz, MHz, KHz, GHz and etc.

CPU has three sub-components:

* **Control Unit (CU)**: control over all activity.
* **Arithmetic Logic Unit (ALU)**: processing the activity of pc.
* **Register**: small storage available on CPU. It stores before and after processing.

**The system Unit**: The system unit control and executes all pc operation.

 **Front of system:**

 Power on/off

 Rest button

 Light

 Floppy disk drive and CD ROM drive

  **Back of the system unit:**

 Power in and out sockets

 Serial port

 Video /monitor port

 Parallel port (for printer)

 PS2

 Fan housing

 USB

 Expansion cards

 **Inside your system unit:**

 Mother board

 CPU

 Random access memory (RAM)

 RAM chipset

 Floppy disk drives and CD ROM drives

 Hard disk drive

 Power supply box

 Expansion slot

 ROM chips

**The peripherals**

A peripheral is any device connected to the system unit. These are keyboards, monitors, mice, printers, scanners, microphones, speakers, cameras, to list just the most familiar ones.

**Software**

A **“software”** is a series of instructions given to a computer to solve any particular problem. These instructions should be understandable to the computer.

**Types of computer software**

Computer software can be classified in to two broad categories:

* **Application Software:** is specific function software.

E.g. Word processor, spread sheet, database.etc

* **System Software:** system software divided in two.
1. **Computer Programming Languages**: human being is communicates with the computer-programming languages understandable to the computer.
* Programming languages for computers are divided in to two:
1. **Low level programming language :***Low level programming languages* are further sub divided in to:
	1. ***Machine Languages.***
	2. ***Assembly Languages.***
2. **Machine Languages:** Machine language is the “Mother Tongue” of the computer. In this language only 0s and 1s are used while communicating with the computer
3. **Assembly Languages:** In assembly language instead of using 0s and 1s, each code is represented by a “mnemonic”. A mnemonic is an aid to the human memory
4. **High level programming languag**e: High-level languages use complete words taken from the ***English language***. They are therefore relatively easy to learn. It is relatively easy to understand and It is easy to modify

1. **Operating system software**: The operating system is the link between the hardware and the software.

**E.g.** win xp, win2000, vista, UNIX

 **Functions of an Operating system**-resource management,
-data management,
-job (task) management, and
-standard means of communication between user and computer.

**Types of an of an operating system**

1. **Single User Operating System**: A single user OS as the name suggests is designed for one user to effectively use a computer at a time.
2. **Multi-Tasking Operating System**: In this type of OS several applications maybe simultaneously loaded and used in the memory
3. **Multi-User Operating System**: This type of OS allows multiple users to simultaneously use the system

**Virus**

Virus is a malicious (destructive) program/software that damages computer. It copies itself on to other programs and spreads through multiple computer system.

Some of actions performed by virus include:

* Duplicating themselves
* Delete or modify your files(documents)
* Damage your software
* Damage your hardware, etc.

**Worm**

Worm is a malicious program like virus. But it does not need help to move from one computer to another which viruses can’t do.

**Trojan horse**

Trojan horses are software that seems to perform useful activity but which has malicious programs in it. It may damage files, and perform other harmful actions on your computer.

**Unit two**

**Data representation**

* 1. **Units of data representation**
1. When data is stored, processed or communicated within the computer system, it is packed in units;
2. Arranged from the smallest to the largest, the units are called ***bit*, *byte*** and ***word***;
3. These units are based on the binary number system;

***Bit***

1. Bit (derived from binary digit) is the basic unit of data storage
2. Bits are the smallest units and can convey only two possible states 0 or 1;
3. In the computer “ON” is represented by the existence of current and “OFF” is represented by the non existence of current.

***Byte***

1. Bits can be organized into large units to make them represent more and meaningful information;
2. This large unit is called a byte and is the basic “unit of data representation” in a computer system;
3. The commonly used byte contains 8 bits;
4. Since each bit has two states and there are 8 bits in a byte, the total amount of data that can be represented is 28 or 256 possible combinations;
5. Each byte can represent a character(a character is either a letter, a number or a special symbol such as +,-,?,\*, $, etc

***Word***

1. A word can contain one, two, three or four bytes based on the capacity of the computer;
2. Word length is usually given in bits
3. We say that a computer is an 8-bits, a 16 bit, a 32 bit or a 64 bit computer to indicate that the amount of data it can process at a time;

***Kilobyte***

1 Kilobyte (1KB) is 210 or 1024 bytes

***Megabyte***

1 Megabyte (MB) is 220 bytes or 210 kilobytes

***Giga byte***

1 Gigabyte (GB) is 230 bytes or 220 kilobytes or 210 megabytes

* 1. **The number system:** A number system is a set of symbols used for counting. There are various number systems

E.g.

Decimal, binary, octal, hexadecimal etc.

1. **Decimal Number System:** The number system that we use in our day-to-day life is called decimal number system. Starting from (0-9) used in the system.
2. **Binary Number System:** The binary numeral system ([base](http://en.wikipedia.org/wiki/Base_%28mathematics%29) [2](http://en.wikipedia.org/wiki/2_%28number%29) numerals) represents numeric values using two symbols, typically [0](http://en.wikipedia.org/wiki/0_%28number%29) and [1](http://en.wikipedia.org/wiki/1_%28number%29).

**Example**

The decimal equivalent of the binary number 10101 (written as 10101 2) is

 1\*24+0\*23 +1\*22+0\*21+1\*20

=16+0+4+0+1=2

**Octal Number System**

In octal number system the base is 8. so, in this system there are only eight symbols or digits(0,1,2,3,4,5,6,7).

**Hexadecimal Number System**

The hexadecimal system uses base 16. Thus, it has 16 possible digit symbols. It uses the digits 0 through 9 plus the letters A, B, C, D, E, and F as the 16 digit symbols. Numbers in base 16 need 16 symbols. The letters A-F are used to give 16 symbols.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Decimal | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Hexadecimal | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |