**Lesson No. 2: Classification of Computers**

What is a Computer?

It is an automatic, high speed, digital, electronic data processing device that can be programmed to accept data, process it into useful information and store it away for safe keeping or later reuse.

**The Data Processing Cycle**

**Input** — entering data into the computer.

**Processing** — performing operations on the data.

**Output** — presenting the results.

**Storage** — saving data, programs, or output for future use.

**Input** - The collection of raw data from the outside world so it can be put into an information system. Putting the acquired data into the information system.

Examples of input

* The payroll clerk collects workers' timecards so she knows how many hours each person worked that week and types the hours from the timecards into a spreadsheet
* Conducting a survey of customer's opinions and then scanning the survey cards with a card reader.
* Collecting jokes for a joke book and typing jokes into a word processor.
* Using a form on a website to collect visitors' opinions

**Processing**

1. **A central processing unit (CPU**), or sometimes simply processor, is the key component in a digital computer capable of executing a program. It interprets computer program instructions and processes data. CPUs provide the fundamental digital computer trait of programmability, and are one of the necessary components found in computers of any era, along with memory and input/output facilities. A CPU that is manufactured as a single integrated circuit is usually known as a microprocessor.
2. **RAM** often referred to as "primary storage" or "main memory".
* Random Access Memory receives and temporarily stores data and program instructions from the CPU. This data bank communicates with the CPU, constantly exchanging information and constantly changing as long as the computer is on
* RAM is an active, electronic state. When the power is on, RAM retains data. When the computer is turned off, all data in RAM is erased unless you have saved it to some mass storage device. Each time the computer boots, the computer goes through it's startup routine and lastly loads operating system instructions into RAM
* Random Access Memory (RAM) is the workhorse behind the performance of your computer.
* RAM temporarily stores information from your operating system, applications, and data in current use. This gives your processor easy access to the critical information that makes your programs run.
* The amount of RAM you have determines how many programs can be executed at one time and how much data can be readily available to a program.
* It also determines how quickly your applications perform and how many applications you can easily toggle between at one time. Simply put, the more RAM you have, the more programs you can run smoothly and simultaneously.

**Output** is the process of transmitting the processing information

Essentially, output is the presentation of any data exiting a computer system. This could be in the form of printed paper, audio, video. In the medical industry this might include CT scans or x-rays. Typically in computing, data is entered through various forms (input) into a computer, the data is often manipulated, and then information is presented to a human (output).

**Storage**

Storage, or mass storage refers to various techniques and devices for storing large amounts of data. Modern mass storage devices include all types of disk drives and tape drives. Mass storage is distinct from memory, which refers to temporary storage areas within the computer. Unlike RAM memory, mass storage devices retain data even when the computer is turned off.

Examples of Mass Storage Device

1. Disk storage – ( Secondary Storage)hundreds of thousands of cycles latency, but very large
* Floppy  Disks: Relatively slow and have a small capacity, but they are portable, inexpensive, and universal
* Hard disks: Very fast and with more capacity than floppy disks, but also more expensive.
1. Tertiary Storage
* Optical storage: Unlike floppy and hard disks, which use electromagnetism to encode data, optical disk systems use a laser to read and write data. Optical disks have very large storage capacity, but they are not as fast as hard disks. Examples: CD, CD-R, CD-RW, DVD or DVD-R
* Tapes: Relatively inexpensive and can have very large storage capacities, but they do not permit random access of data.
* Flash Memory – faster than disk storage, with up to 4GB or more of data, transferring (usually) over universal serial bus (USB)

**File**- The smallest unit of storage that contains such data as a resume, letter, budget, images or any one of the thousands of items that you may have saved for future reference. Additionally, files can be executable program files, or system files reserved for the operating system.

Measurement of Mass Storage

**Byte** - Abbreviation for *binary* *term,* a unit of storage capable of holding a single character. On almost all modern computers, a byte is equal to 8 bits.

 kilobytes (1,024 bytes),

 megabytes (1,024 kilobytes),

 gigabytes (1,024 megabytes) and

 terabytes (1,024 gigabytes).

Computer is………

A machine that is capable of accepting, manipulating, sharing data and gives meaningful form of result.

It is an electronic device that helps people performs different tasks.

Example

* Measuring the amount of gasoline in our car
* Assists us in balancing our checkbook
* Write letters
* Create pictures
* Make calculations
* Play games
* Communicate and send messages

**Characteristics of Computer**

* It is an inanimate object that needs outside intervention.
* It cannot correct wrong instructions.
* Its capability to perform logical operations depends on the choice prepared by the programmer.
* Just like any man-made machine, it is subject to occasional breakdown or malfunction.

**Capabilities of Computer**

* It can store large amount of facts, instructions and information.
* It can process data with accuracy at a very high speed.
* It can repeat operation at exactly the same way over long period of time.
* It can check the accuracy of its work.
* It is capable of executing instructions on its own after the data and program had been fed into its memory.
* It can perform logical operations.
* It can communicate with the operator.

**Classification of Computers According to Capacity**

1. **Super Computers** - The most powerful computer made. These systems are built to process huge amount of data ideal for handling large and highly complex problems that require extreme calculating power.

**Common Uses**

* weather forecasting,
* climate research (including research into global warming),
* molecular modeling (computing the structures and properties of chemical compounds, biological macromolecules, polymers, and crystals),
* physical simulations (such as simulation of airplanes in wind tunnels, simulation of the detonation of nuclear weapons, and research into nuclear fusion),
* cryptanalysis, and the like.
* Major universities, military agencies and scientific research laboratories are heavy users.
* A particular class of problems, known as Grand Challenge problems, is problems whose full solution requires semi-infinite computing resources.
1. **Mainframe Computer -** A very large and expensive computer capable of supporting hundreds or even thousands of users simultaneously.

**Common Uses of Mainframes**

* Census
* Industry and consumer statistics
* Financial transaction processing
1. **Minicomputer-** it is also known as midrange computer since it capabilities are somewhere between mainframes and microcomputers.A minicomputer is a multiprocessing system capable of supporting from 4 to about 200 users simultaneously.
2. **Microcomputers -** Small which are portable. Sometimes known as the “single chip processor”.Any of a class of small digital computers whose central processing unit (CPU) is contained on a single integrated semiconductor chip.

**2 types of micro computers**

1. Personal computers - powerful, affordable and easy to use.
2. Portable computers – small enough to move easily from one place to another and they can operate on batteries

Examples of Micro computer

* Personal Computer
* Laptop
* Notebook
* Subnotebook
* Palmtop
* PDA
* Tablet PC

**Portable computers**

* Laptop – a computer small enough to sit on your lap.
* Notebook – similar to laptop, uses a variety of techniques known as flat-panel technologies.
* Subnotebook – slightly lighter and smaller than full sized notebook.
* Palmtop – A computer that fit on our palm.
* PDA or Personal Digital Assistant – a handheld device that combines computing, telephone, fax and networking features (pen-based).
* Tablet PC – A fully equipped PC that allows users to take note using handwriting on stylus or digital pen. It has sensitive touch screen

**Classification of Computer according to Data Handled**

1. **Analog computer** - is a form of computer that uses continuous physical phenomena such as electrical, mechanical, or hydraulic quantities to model the problem being solved. A computer that performs mathematical operations in a parallel manner on continuous variables. The components of the computer are assembled to permit the computer to perform as a model, or in a manner analogous to some other physical system.
2. **Digital Computers-** Work with values that are in discreet form; the operation is done by counting.A device that processes numerical information; more generally, any device that manipulates symbolic information according to specified computational procedures
3. **Hybrid Computers -** Combination of analog and digital computers. Known as “digi-ana” or “ana-digi”

**Classification of Computer according to Purpose**

1. **General-Purpose Computers -** Capable of dealing with a variety of different problems made possible by utilizing the stored program concept
2. **Special Purpose Computers -** Designed to perform a specific task, with limited capabilities and the program of instruction is built into the machine.