Unit:-1

Definition of Computer:-

Computer is an electronic device that accepts data & information process them & gives processed output as information. The word “computer” means “something that computes or “Calculate”. It may be defined as a device that can operate upon data or information which is done through the execution of a program.

Computer typically performs work in three well defined steps:-

- Accepting inputs.
- Processing rules (program), &
- Producing output.

Data & Information:-

Data is a collection of facts unorganized, but able to be organized into useful information. Data is a raw material of information.

A collection of class attendance cards is an example. Data can be manipulated to produce output as student attendance reports. This output is called as information, in organized facts that help people to make decision.

Data is a raw material used as input to data processing.

Program:-

A program is a sequence of instruction which operate on data to perform certain task.

Software:-

Computer software or simply software is any set of machine-readable instructions that directs a computer's processor to perform specific operations. Without software computer is useless For example: Using browser (software) you are able to surf internet, by using anti-virus (software) you are able to protect your computer from viruses, by using Operating System (Software) we are able to use computer etc.

Hardware:-

Computer hardware is the collection of physical elements that constitutes a computer system. Computer hardware is the physical parts or components of a computer, such as the monitor, mouse, keyboard, computer data storage, hard disk drive (HDD), system unit (graphic cards, sound cards, memory, motherboard and chips), and so on, all of which are physical objects that can be touched (that is, they are tangible). In contrast, software is instructions that can be stored and run by hardware.

Unit:-2

Analog Computer:-

Analog computers are used to process analog data. Analog data is of continuous nature and which is not discrete or separate. Such type of data includes temperature, pressure, speed, weight, voltage, depth etc. These quantities are continuous and having an infinite variety of values. It measures continuous changes in some physical quantity e.g. The Speedometer of a car measures speed, the change of temperature is measured by a Thermometer, the weight is measured by Weights machine. These computers are ideal in situations where data can be accepted directly from measuring instrument without having to convert it into numbers or codes. Analog computers are widely used for certain specialized engineering and scientific applications, for calculation and measurement of analog quantities.

Digital Computer:-

A Digital Computer, as its name implies, works with digits to represent numerals, letters or other special symbols. Digital Computers operate on inputs which are ON-OFF type and its output is also in the form of ON-OFF signal. Normally, an ON is represented by a 1 and an OFF is represented by a 0. So we can say that digital computers process information which is based on

the presence or the absence of an electrical charge or we prefer to say a binary 1 or 0.

A digital computer can be used to process numeric as well as non-numeric data. It can perform arithmetic operations like addition, subtraction, multiplication and division and also logical operations. Most of the computers available today are digital computers. The most common examples of digital computers are accounting machines and calculators. The results of digital computers are more accurate than the results of analog computers. Analog computers are faster than digital. Analog computers lack memory whereas digital computers store information. We can say that digital computers count and analog computers measures.

Hybrid Computer:-

A hybrid is a combination of digital and analog computers. It combines the best features of both types of computers, i-e. It has the speed of analog computer and the memory and accuracy of digital computer. Hybrid computers are used mainly in specialized applications where both kinds of data need to be processed. Therefore, they help the user, to process both continuous and discrete data. For example a petrol pump contains a processor that converts fuel flow measurements into quantity and price values. In hospital Intensive Care Unit (ICU), an analog device is used which measures

patient's blood pressure and temperature etc, which are then converted and displayed in the form of digits.

Super Computer:-

A supercomputer is a computer with a high-level computational capacity. Performance of a supercomputer is measured in floating point operations per second (FLOPS). As of 2015, there are supercomputers which can perform up to quadrillions of FLOPS.

"The Blue Gene/P supercomputer at Argonne National Lab runs over 250,000 processors using normal data center air conditioning, grouped in 72 racks/cabinets connected by a high-speed optical network"

Supercomputers were introduced in the 1960s, made initially, and for decades primarily, by Seymour Cray at Control Data Corporation (CDC), Cray Research and subsequent companies bearing his name or monogram. While the supercomputers of the 1970s used only a few processors, in the 1990s machines with thousands of processors began to appear and, by the end of the 20th century, massively parallel supercomputers with tens of thousands of "off-the-shelf" processors were the norm. Since its introduction in June 2013, China's Tianhe-2 supercomputer is currently the fastest in the world at 33.86 petaFLOPS (PFLOPS), or 33.86 quadrillions of FLOPS.

Mainframe Computer:-

Mainframe computers are computers used primarily by large organizations for critical applications, bulk data processing such as census, industry and consumer statistics, enterprise resource planning and transaction processing.

The term originally referred to the large cabinets called "main frames" that housed the central processing unit and main memory of early computers. Later, the term was used to distinguish high-end commercial machines from less powerful units. Most large-scale computer system architectures were established in the 1960s, but continue to evolve. Modern mainframe design is generally less defined by single-task computational speed (typically defined as MIPS rate or FLOPS in the case of floating point calculations), and more by:

- Redundant internal engineering resulting in high reliability and security
- Extensive input-output facilities with the ability to offload to separate engines
- Strict backward compatibility with older software
- High hardware and computational utilization rates through virtualization to support massive throughput.

Their high stability and reliability enables these machines to run uninterrupted for decades.

Mini Computer:-

A minicomputer, is a class of smaller computers that developed in the mid-1960s. In a 1970 survey, the *New York Times* suggested a consensus definition of a minicomputer as a machine costing less than 25,000 USD, with an input-output device such as a tele-printer and at least four thousand words of memory, that is capable of running programs in a higher level language, such as Fortran or BASIC. The class formed a distinct group with its own software architectures and operating systems. Minis were designed for control, instrumentation, human interaction, and communication switching as distinct from calculation and record keeping. During the two decade lifetime of the minicomputer class (1965-1985), almost 100 companies formed and only a half dozen remained.

Some popular mini computers in current date are:-

- Samsung NC10 NC20 och,
- Acer Aspire One A150-B,
- MSI Wind U100,
- Asus Eee PC 901,
- HP Compaq Mini 730eo, etc.

Microcomputer:-

A microcomputer is a small, relatively inexpensive computer with a microprocessor as its central processing unit (CPU). It includes a microprocessor, memory, and input/output (I/O) facilities. Microcomputers became popular in the 1970s and 80s with the advent of

increasingly powerful microprocessors. The predecessors to these computers, mainframes and minicomputers, were comparatively much larger and more expensive.

Some popular microcomputers are:-

- Intel SIM8-01,
- Motorola MEK6800D2,
- Rockwell AIM-65,
- Synertek SYM-1, &
- Intel SDK-85, etc

Unit-3

Roles of Computer:-

Computers have changed the way we work, be it any profession. Therefore, Computers play a vital role in every field. They aid industrial processes, they find application in medicine; they are the reason why software industries developed and flourished and they play an important role in education.

a) Education:-

Computer teaching plays a key role in the modern education system. Students find it easier to refer to the Internet than searching for information in fat books. The process of learning has gone beyond learning from prescribed textbooks. Internet is a much larger and easier-to-access storehouse of information. When it comes to storing retrieved information, it is easier done on computers than maintaining hand-written notes. The advantages of computers in education primarily include:

- Storage of information,
- Quick data processing,
- Audio-visual aids in teaching,
- Better presentation of information,
- Access to the Internet,
- Quick communication between students, teachers and parents.

b) Health:-

Computer availability in medical sector provides information on all things. New knowledge on operational procedures, medicines, research reports are available online. It is easy for the drug worldwide. The medical reports can be sent by e-mail and instant feedback from a doctor who is very far from you. Live broadcasts of live operation in a remote corner of the world can see around the world. The webinar will help doctors learn the techniques without loss of travel time. Lives of seriously ill patients can be saved, because it saves time. The medical sector also benefit from computers. These days, a specially developed software and automated machines are used to treat various diseases and disorders. Diagnostic tools such as MRI, CT, ultrasound, radiation equipment needed. New computer technologies for operations eg laparoscopic surgery are the use of micro-cameras, laser surgery, cutting at very short stays in hospitals after surgery and a speedy recovery as well.

c) Transportation:-

Even in transportation, it is beneficiated from computer. One common computer used in land transportation today is the Global Positioning System, or GPS. By this service we can navigate our current position while travelling. Some major benefits are:-

- Navigation,
- Mapping,
- Ticket Booking,
- Traffic control,
- Aviation Controls, etc.

d) Business:-

Computers have helped workers in business perform their jobs more efficiently, since their introduction in the 1980s. Routine functions such as sending memos can instead be done by email. Workers can research information from the Internet with a click of the button. The importance of computers in business includes money saved for various business activities. For example, a small business can maintain a database of customers in its computer. The business can then send coupons or special promotions to these customers by email. Companies also save on paper costs when interacting through their computers. Computers also help the businessman save time. For example, a businessman can write a report, do a spell check, edit it and distribute the report in just a few hours even long distance.

Unit-4

History of computer:-

The earliest known tool for use in computation was the abacus, developed in the period between 2700–2300 BCE abacus consisted of a table of successive columns which delimited the successive orders of magnitude of their sexagesimal (base 60) number system. Its original style of usage was by lines drawn in sand with pebbles. The Antikythera mechanism is believed to be the earliest known mechanical analog computer. It was designed to calculate astronomical positions. It was discovered in 1901 in the Antikythera wreck off the Greek island of Antikythera, between Kythera and Crete, and has been dated to c. 100 BCE.

When John Napier discovered logarithms for computational purposes in the early 17th century, there followed a period of considerable progress by inventors and scientists in making calculating tools. In 1623 Wilhelm Schickard designed a calculating machine, but abandoned the project, when the prototype he had started building was destroyed by a fire in 1624 A.d. Around 1640 A.d, Blaise Pascal, a leading French mathematician, constructed a mechanical adding device based on a design described by Greek mathematician Hero of Alexandria. Then in 1672 A.d

Gottfried Wilhelm Leibnitz invented the Stepped Reckoner which he completed in 1694 A.d. Then, in 1837 A.d English mathematician professor Charles Babbage first described his Analytical Engine which is accepted as the first design for a modern computer. The analytical engine had expandable memory, an arithmetic unit, and logic processing capabilities able to interpret a programming language with loops and conditional branching. Although never built, the design has been studied extensively and is understood to be Turing equivalent. The analytical engine would have had a memory capacity of less than 1 kilobyte of memory and a clock speed of less than 10 Hertz.

Generations of Computer:-

1. First Generation Computer (1940 - 1956 A.d):- The first generation computers used vacuum tubes for circuitry and magnetic drums for memory, and were often enormous, taking up entire rooms. They were very expensive to operate and in addition to using a great deal of electricity, generated a lot of heat, which was often the cause of malfunctions. First generation computers relied on machine language, the lowest-level programming language understood by computers, to perform operations, and they could only solve one problem at a time. Input was based on punched

cards and paper tape, and output was displayed on printouts.

The UNIVAC and ENIAC computers are examples of first-generation computing devices. The UNIVAC was the first commercial computer delivered to a business client, the U.S. Census Bureau in 1951.

2. Second Generation Computer (1956 - 1963 A.d):-

Transistors replaced vacuum tubes and ushered in the second generation of computers. The transistor was invented in 1947 but did not see widespread use in computers until the late 1950s. The transistor was far superior to the vacuum tube, allowing computers to become smaller, faster, cheaper, more energy-efficient and more reliable than their first-generation predecessors. Though the transistor still generated a great deal of heat that subjected the computer to damage, it was a vast improvement over the vacuum tube. Second-generation computers still relied on punched cards for input and printouts for output.

High-level programming languages were also being developed at this time, such as early versions of COBOL and FORTRAN. These were also the first computers that stored their instructions in their memory, which moved from a magnetic drum to magnetic core technology.

The first computers of this generation were developed for the atomic energy industry.

3. Third Generation Computer (1964 - 1971 A.d):-

The development of the integrated circuit was the hallmark of the third generation of computers. Transistors were miniaturized and placed on silicon chips, called semiconductors, which drastically increased the speed and efficiency of computers.

Instead of punched cards and printouts, users interacted with third generation computers through keyboards and monitors and interfaced with an operating system, which allowed the device to run many different applications at one time with a central program that monitored the memory. Computers for the first time became accessible to a mass audience because they were smaller and cheaper than their predecessors.

4. Fourth Generation Computer (1971 - Present):-

The microprocessor brought the fourth generation of computers, as thousands of integrated circuits were built onto a single silicon chip. What in the first generation filled an entire room could now fit in the palm of the hand. The Intel 4004 chip, developed in 1971, located all the components of the computer from the central processing unit and memory to input/output

controls on a single chip. In 1981 IBM introduced its first computer for the home user, and in 1984 Apple introduced the Macintosh. Microprocessors also moved out of the realm of desktop computers and into many areas of life as more and more everyday products began to use microprocessors. As these small computers became more powerful, they could be linked together to form networks, which eventually led to the development of the Internet. Fourth generation computers also saw the development of GUIs, the mouse and handheld devices.

5. Fifth Generation Computer (Present - Beyond):-

Fifth generation computing devices, based on artificial intelligence, are still in development, though there are some applications, such as voice recognition, that are being used today. The use of parallel processing and superconductors is helping to make artificial intelligence a reality. Quantum computation and molecular and nanotechnology will radically change the face of computers in years to come. The goal of fifth-generation computing is to develop devices that respond to natural language input and are capable of learning and self-organization.

Unit - 5

System Cases:-

A computer case also known as a computer chassis, tower, system unit, cabinet, base unit or simply case and sometimes incorrectly referred to as the "CPU" or "hard drive", is the enclosure that contains most of the components of a computer (usually excluding the display, keyboard and mouse). Cases are usually constructed from steel (often SECC Steel, electro galvanized, cold-rolled, coil) or aluminum. Plastic is sometimes used, and other materials such as glass, wood and even Lego blocks have appeared in home-built cases.

System Case Style & Sizes:-

Computer cases usually include sheet metal enclosures for a power supply unit and drive bays, as well as a rear panel that can accommodate peripheral connectors protruding from the motherboard and expansion slots. Most cases also have a power button or switch, a reset button, and LEDs to indicate power status as well as hard drive and network activity (in some models). Some cases include built-in I/O ports (such as USB and headphone ports) on the front of the case. Such a case will also include the wires needed to connect these ports, switches and indicators to the motherboard.

Cases can come in many different sizes (known as *form factors*). The size and shape of a computer

case is usually determined by the form factor of the motherboard, since it is the largest component of most computers.

1. Full tower Case:-

Full tower cases are typically 56 cm (22 in) or more in height and intended to stand on the floor. They have anywhere from six to ten externally accessible drive bays. The ratio of external to internal bays is shifting, however, as computing technology moves from floppy disks and CD-ROMs to large capacity hard drives, USB flash drives, and network-based solutions. The full tower case was developed to house file servers which would typically be tasked with serving data from expensive CD-ROM databases which held more data than the hard drives commonly available. Hence many full tower cases include locking doors and other physical security features to prevent theft of the discs.

2. Mid Tower Case:-

A mid tower case is good to those who neither wants full tower nor mini tower case. Mid tower cases are smaller, about 46 cm (18 in) high with two to four external bays. It has less space for air circulation then full tower but more then mini tower case.

3. Mini Tower Case:-

Mini tower case are more popular then full tower or mid tower & it is widely in use nowadays. Mini-tower usually have up to 2 or sometimes 3 internal drive bays. Mini-cases normally stand at a height of 12 to 18 inches (30 to 45 cm). Expandability is a problem with these cases.

System Case form factors:-

In computing, the form factor is the specification of a motherboard the dimensions, power supply type, location of mounting holes, number of ports on the back panel, etc. Specifically, in the IBM PC compatible industry, standard form factors ensure that parts are interchangeable across competing vendors and generations of technology, while in enterprise computing, form factors ensure that server modules fit into existing rack mount systems. Some of the form factors are:-

1. Pc/xt Form Factor:-

The first PC to use Pc/xt form factor was of course the IBM (1983 A.d). Its power supply, and that of its hard-drive equipped successor, the IBM PC/XT, used the same original form factor. These systems were all desktop units, with the power supply tucked into the rear of the case on the right-hand side, and controlled via an up/down toggle switch. While the PC/XT power supply began as an IBM design, IBM's key decision to keep the PC

architecture *open* allowed "clone" manufacturers to make similar PC boxes and use the same size and shape of power supply for interoperability. In this manner, the first PC form factor "standard" was born.

2. AT Form factor:-

In 1984 IBM introduced the IBM PC/AT, "AT" standing for "advanced technology", an abbreviation whose use still survives to this day in some contexts. Very similar in overall physical design to the PC and XT models that preceded it, the power supply in these units was increased in size and changed slightly in shape, establishing it as a distinct form factor. Whereas "clone" manufacturers made a few PC/XT units compatible with the IBM PC and XT, it was with the AT that the PC world really began to explode. Many different manufacturers began creating AT-compatible systems and with them, AT form factor power supplies. The original AT power supply provided 192 W.

3. Baby AT form factor:-

The Baby AT form factor is so named because it is a smaller version of the original AT form factor. It has the same height and depth, but is about 2" narrower. Since it is "similar but smaller", the Baby AT power supply will fit both in Baby AT form factor cases and

in full-size AT cases as well, in both tower and desktop styles. It has the same output motherboard and drive connectors as the AT. Due to this flexibility, and the fact that it was introduced at around the time that PCs began to really grow in popularity, the Baby AT form factor reigned as the most popular design for over a decade far longer than any other. From around 1985 to 1995, a large percentage of new PCs were Baby ATs.

Case Switches:-

Older form factor desktop PC/XT cases had the power switch at the back of the machine or usually on the right side of the case. This switch was actually inside the power supply itself, with a hole cut out in the case so that it could be reached from the outside. Users hated having to reach to the back of the machine to turn it on or off! The positioning of the switch also meant the PC could not be oriented with its right side towards a wall or partition.

Starting with the AT form factor, tower cases changed to a remote, physical toggle power switch that was connected to the power supply using a cable. AT desktop cases retained the old style case in the back of the PC, but clone manufacturers soon began to use a remote switch on these units as well. The switch is normally mounted to the front of the case. Some "slimline" (LPX) systems actually use a mechanical plastic stick (!) that is

pushed on by the button on the front of the case, and presses against the real power switch on the power supply itself, in the back of the machine.

Power on/off switch:-

The power on/off switch for modern PCs is on the front of the case. (Older PCs, using the PC/XT or AT desktop form factors, have no power switch on the case at all; the case is designed so that the on/off switch of the power supply is accessible directly through a hole in the case, usually at the rear.)

On most Baby AT form factor cases, the power button doesn't in fact do anything other than mechanically transfer the "push" of your finger to the real metal or plastic power supply switch that is behind it. That remote switch is in fact part of the power supply, and so is discussed in that section. Newer form factors, including the ATX family, NLX and WTX, have a true power switch on the case, which is connected to the motherboard. The motherboard on these systems turns on and off the PC, not the power supply directly.

Reset Button:-

The reset button is a simple normally-open switch that is connected to two pins on the motherboard. When the button is pressed, the switch is closed. When it is released, the system performs a hardware reset. Most new cases have the reset switch *recessed* to prevent it from being pressed by accident (or

by small, curious fingers.) Some put the reset switch on the back of the system, which is even safer, but can be very inconvenient.

Turbo Button:-

A leftover from machines of five to ten years ago, the turbo switch still remains on many cases, even though it really serves no purpose any more. In the early days of the PC, there was only IBM, and there were only a handful of different speeds a PC could run at. Early software was written by programmers who believed they were writing it to run on a machine of a specific speed. When newer, faster machines would come out, some of this software (especially games) would stop working properly because it would run too fast. Turning off the "turbo" function of the PC would make the machine run slower so this software would work. In essence, it was a "compatibility mode" feature, to slow down the machine for older software.

The Key lock:-

Some cases have key locks, which when locked, essentially lock out the keyboard. The system detects this condition and puts an error message on the screen, effectively disabling access to the computer. This can be useful in an office setting to prevent casual access to a computer that is normally kept off. It can also

effectively prevent your kids (or parents) from booting your PC when you are not around.

System Case LEDs:-

Most cases have the following LEDs on the front panel, which vary greatly in style, shape and color but usually work the same way. "LED" stands for light-emitting diode, a low-power component that emits light when supplied with electricity. They are used extensively as status indicators in electronic devices.

Power Leds:-

The power LED is usually green and pretty simple: it comes on when the power is on. The wires from this LED are often combined with the keylock wires into a single 5-pin plastic connector, especially on older AT or Baby AT form factor PCs.

Turbo LED:-

The turbo LED is often yellow in color. It will obviously only mean something if your system has a turbo button that is connected and working. Many systems have this LED set permanently on regardless of the position of the turbo switch.If the turbo switch is functional on the PC, the LED should reflect its status (on or off). Many newer cases skip the turbo LED entirely, and you won't find it on newer retail PCs.

Hard disk drive activity led:-

The most important indicator on the case, this LED normally flickers on when the hard disk is being accessed. It is important in that it gives you a visual indication of how active your system is, and can help ensure that you don't shut off your system while the hard disk is active (which you should never do).

Speed Indicator LEDs:-

Some older PCs have a digital LED readout that shows the "speed" of the processor, usually comprised of several LEDs that taken together can form different combinations of numbers, like a digital wristwatch. These are obsolete today but they were quite popular for many years, especially in systems that used the turbo button the speed indicator would change the system "speed" when the turbo button was changed. Well, these speed indicators don't really measure anything. They are not connected to the processor or the motherboard at all.

System Case Drive Bays:-

Drive bays are the spaces in the system case where you mount your hard disk, floppy, CD-ROM, tape and other drives. They come in two general types, external and internal, and two sizes: 5.25" and 3.5".

1. External Drive Bays:-

External means "outside" but these drive bays are certainly inside the case. However, they are called "external" because they allow access to the device from the outside. Any drive that uses removable media or has controls that must be operated manually must go in an external drive bay. This includes floppy disk, CD-ROM, DVD, tape and removable-storage drives.

2. Internal Drive Bays:-

These bays are entirely within the case and are not accessible from the outside. If a device does not require any access from the outside it is preferable to use an internal bay, and save the case's external bays for drives that need them. In practical terms, this means that internal drive bays are usually used for hard disk drives, which do not require any access by the user.