B.Sc. Computer Science
SEMESTER I
Computer Fundamentals and Basics of PC Hardware (Core)

SYLLABUS

Module I

Introduction to Computers: Generations of Computer (I-V), Classification of Computers: Analog, Digital and Hybrid Computers, Micro, Mini, Mainframe, Super Computers, Servers, Laptop and Block Diagram of a Computer, Functions of the Different Units: Input unit, Output unit, Memory unit, CPU (ALU+CU). Booting Process- POST, BIOS, clock speed, memory speed, memory capacity.

Module II

Introduction to Computer Hardware, DC regulated power supply- Block Diagram, Concepts of Switch Mode Power supply, Inverters, UPS and their applications. Basic Components of CPU, Mother Board.

Module III:

Expansion Slots- ISA, EISA, MCA, VESA, PCI local bus, Processor, Connectors, CMOS memory, SMPS, Serial and Parallel Ports, USB, BIOS chip, Steps for assembling a PC.

Module IV:

Input Devices: Keyboard, Point and draw devices: mouse, joystick, track ball, light pen, Data Scanning devices: image scanner, OCR, OMR, MICR, Bar code reader, Voice Recognition Device: Microphone, Output Devices: Monitor- CRT displays, Non-CRT displays, TFT: LED, LCD, Plasma. Printer, Impact and non-impact, Character, line and Page Printers.

Module V:

Memory: Primary Memory, RAM- SRAM, DRAM, ROM, PROM, EPROM, EEPROM, flash memory, Secondary memory: Hard Disk: Structure of a hard disk, how data is stored in a hard disk, concept of tracks, sectors, clusters, cylinders, CD-R, RW, DVD-RW, Blue-ray disk, HVD, PC memory Units: SIMM, DIMM, RIMM.

Book of study
1. Pradeep Sinha and Priti Sinha - Computer Fundamentals, Fourth Edition- 2007, BPB Publications
2. B. RAM, "Computer Fundamentals: Architecture and Organization", New age international (P) Limited.

Reference
1. Balagurusamy - Fundamentals of Computer, First Edition-2009, McGraw-Hill
2. Anita Goel - Computer Fundamentals, First Edition-2010, Pearson.
3. Peter Norton, "Introduction to Computers", McGraw Hill

Module I

INTRODUCTION TO COMPUTERS

Commonly
Operated
Machine
Particularly
Used for
Technical and
**E**ducational
Research

COMPUTER is an advanced electronic device that takes raw data as an input from the user and processes it under the control of a set of instructions (called program), produces a result (output), and saves it for future use.

Today's world is an information-rich world and it has become a necessity for everyone to know about computers. A computer is an electronic data processing device, which accepts and stores data input, processes the data input, and generates the output in a required format.

Functionalities of a Computer

All digital computer carries out the following five functions –

- Takes data as input.
- Stores the data/instructions in its memory and uses them as required.
- Processes the data and converts it into useful information.
- Generates the output.
- Controls all the above four steps.
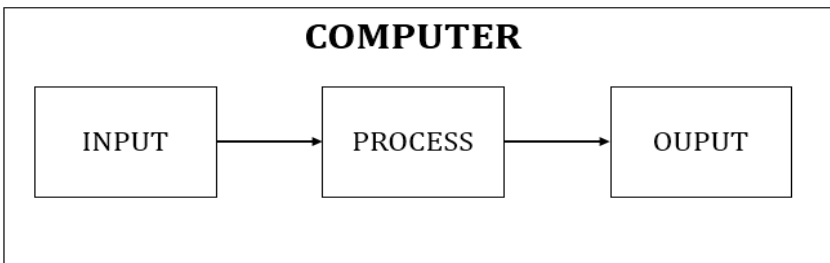
ADVANTAGES OF COMPUTERS
Following are certain advantages of computers.

High Speed
Computer is a very fast device. It is capable of performing calculation of very large amount of data. The computer has units of speed in microsecond, nanosecond, and even the picosecond. It can perform millions of calculations in a few seconds as compared to man who will spend many months to perform the same task.

Accuracy
In addition to being very fast, computers are very accurate. The calculations are 100% error free. Computers perform all jobs with 100% accuracy provided that the input is correct.

Storage Capability
Memory is a very important characteristic of computers. A computer has much more storage capacity than human beings. It can store large amount of data. It can store any type of data such as images, videos, text, audio, etc.

Diligence
Unlike human beings, a computer is free from monotony, tiredness, and lack of concentration. It can work continuously without any error and boredom. It can perform repeated tasks with the same speed and accuracy.

Versatility
A computer is a very versatile machine. A computer is very flexible in performing the jobs to be done. This machine can be used to solve the problems related to various fields. At one instance, it may be solving a complex scientific problem and the very next moment it may be playing a card game.

Reliability

A computer is a reliable machine. Modern electronic components have long lives. Computers are designed to make maintenance easy.

Automation

Computer is an automatic machine. Automation is the ability to perform a given task automatically. Once the computer receives a program i.e., the program is stored in the computer memory, then the program and instruction can control the program execution without human interaction.

Reduction in Paper Work and Cost

The use of computers for data processing in an organization leads to reduction in paper work and results in speeding up the process. As data in electronic files can be retrieved as and when required, the problem of maintenance of large number of paper files gets reduced. Though the initial investment for installing a computer is high, it substantially reduces the cost of each of its transaction.

DISADVANTAGES OF COMPUTERS

Following are certain disadvantages of computers.

No IQ

A computer is a machine that has no intelligence to perform any task. Each instruction has to be given to the computer. A computer cannot take any decision on its own.

Dependency

It functions as per the user's instruction, thus it is fully dependent on humans.

Environment

The operating environment of the computer should be dust free and suitable.

No Feeling
Computers have no feelings or emotions. It cannot make judgment based on feeling, taste, experience, and knowledge unlike humans.

APPLICATIONS
The application of computers in various fields are as follows.

Business
A computer has high speed of calculation, diligence, accuracy, reliability, or versatility which has made it an integrated part in all business organizations.

Computer is used in business organizations for –
- Payroll calculations
- Budgeting
- Sales analysis
- Financial forecasting
- Managing employee database
- Maintenance of stocks, etc.

Banking
Today, banking is almost totally dependent on computers.

Banks provide the following facilities –
- Online accounting facility, which includes checking current balance, making deposits and overdrafts, checking interest charges, shares, and trustee records.
- ATM machines which are completely automated are making it even easier for customers to deal with banks.

Insurance
Insurance companies are keeping all records up-to-date with the help of computers. Insurance companies, finance houses, and stock broking firms are widely using computers for their concerns.

Insurance companies are maintaining a database of all clients with information showing –

- Procedure to continue with policies
- Starting date of the policies
- Next due installment of a policy
- Maturity date
- Interests due
- Survival benefits
- Bonus

Education

The computer helps in providing a lot of facilities in the education system.

- The computer provides a tool in the education system known as CBE (Computer Based Education).
- CBE involves control, delivery, and evaluation of learning.
- Computer education is rapidly increasing the graph of number of computer students.
- There are a number of methods in which educational institutions can use a computer to educate the students.
- It is used to prepare a database about performance of a student and analysis is carried out on this basis.

Marketing

In marketing, uses of the computer are following –

- **Advertising** – With computers, advertising professionals create art and graphics, write and revise copy, and print and disseminate ads with the goal of selling more products.
- **Home Shopping** – Home shopping has been made possible through the use of computerized catalogues that provide access to product information and permit direct entry of orders to be filled by the customers.

Healthcare

Computers have become an important part in hospitals, labs, and dispensaries. They are being used in hospitals to keep the record of patients and medicines. It is also used in scanning and diagnosing different diseases. ECG, EEG, ultrasounds and CT scans, etc. are also done by computerized machines.

Following are some major fields of health care in which computers are used.

- **Diagnostic System** – Computers are used to collect data and identify the cause of illness.
- **Lab-diagnostic System** – All tests can be done and the reports are prepared by computer.
- **Patient Monitoring System** – these are used to check the patient's signs for abnormality such as in Cardiac Arrest, ECG, etc.
- **Pharma Information System** – Computer is used to check drug labels, expiry dates, harmful side effects, etc.
- **Surgery** – Nowadays, computers are also used in performing surgery.

Engineering Design

Computers are widely used for engineering purpose.

One of the major areas is CAD (Computer Aided Design) that provides creation and modification of images. Some of the fields are –

- **Structural Engineering** – requires stress and strain analysis for design of ships, buildings, budgets, airplanes, etc.
- **Industrial Engineering** – Computers deal with design, implementation, and improvement of integrated systems of people, materials, and equipment.
- **Architectural Engineering** – Computers help in planning towns, designing buildings, determining a range of buildings on a site using both 2D and 3D drawings.

Military

Computers are largely used in defense. Modern tanks, missiles, weapons, etc. Military also employs computerized control

systems. Some military areas where a computer has been used are –

- Missile Control
- Military Communication
- Military Operation and Planning
- Smart Weapons

Communication

Communication is a way to convey a message, an idea, a picture, or speech that is received and understood clearly and correctly by the person for whom it is meant. Some main areas in this category are –

- E-mail
- Chatting
- Usenet
- FTP
- Telnet
- Video-conferencing

Government

Computers play an important role in government services. Some major fields in this category are –

- Budgets
- Sales tax department
- Income tax department
- Computation of male/female ratio
- Computerization of voters lists
- Computerization of PAN card
- Weather forecasting

GENERATION OF COMPUTERS

Generation in computer terminology is a change in technology a computer is/was being used. Initially, the generation term was used to distinguish between varying hardware technologies. Nowadays, generation includes both hardware and software, which together make up an entire computer system.

There are five computer generations known till date. Each generation has been viewed in detail along with their time period and characteristics. In the following table, approximate dates against each generation has been mentioned, which are normally accepted.

Following are the main five generations of computers.

Sl.No	Generation & Description
1	**First Generation** The period of first generation: 1946-1959. Vacuum tube based.
2	**Second Generation** The period of second generation: 1959-1965. Transistor based.
3	**Third Generation** The period of third generation: 1965-1971. Integrated Circuit based.
4	**Fourth Generation** The period of fourth generation: 1971-1980. VLSI microprocessor based.
5	**Fifth Generation** The period of fifth generation: 1980-onwards. ULSI microprocessor based.

First Generation
The period of first generation: 1946-1959. Vacuum tube based.
The main features of the first generation are:
- Vacuum tube technology
- Unreliable
- Supported machine language only
- Very costly
- Generated a lot of heat
- Slow input and output devices
- Huge size
- Need of AC
- Non-portable
- Consumed a lot of electricity

Some computers of this generation were –
- ENIAC
- EDVAC
- UNIVAC
- IBM-701
- IBM-650

Second Generation

The period of second generation was from 1959-1965. In this generation, transistors were used that were cheaper, consumed less power, more compact in size, more reliable and faster than the first generation machines made of vacuum tubes. In this generation, magnetic cores were used as the primary memory and magnetic tape and magnetic disks as secondary storage devices.

In this generation, assembly language and high-level programming languages like FORTRAN, COBOL were used. The computers used batch processing and multiprogramming operating system.

The main features of second generation are –
- Use of transistors
- Reliable in comparison to first generation computers
- Smaller size as compared to first generation computers
- Generated less heat as compared to first generation computers
- Consumed less electricity as compared to first generation computers
- Faster than first generation computers
- Still very costly
- AC required
- Supported machine and assembly languages
Some computers of this generation were –
- IBM 1620
- IBM 7094
- CDC 1604
- CDC 3600

- UNIVAC 1108

Third Generation

The period of third generation was from 1965-1971. The computers of third generation used Integrated Circuits (ICs) in place of transistors. A single IC has many transistors, resistors, and capacitors along with the associated circuitry.

The IC was invented by Jack Kilby. This development made computers smaller in size, reliable, and efficient. In this generation remote processing, time-sharing, multiprogramming operating system were used. High-level languages (FORTRAN-II TO IV, COBOL, PASCAL PL/1, BASIC, ALGOL-68 etc.) were used during this generation.

The main features of third generation are –
- IC used
- More reliable in comparison to previous two generations
- Smaller size
- Generated less heat
- Faster
- Lesser maintenance
- Costly
- AC required
- Consumed lesser electricity
- Supported high-level language

Some computers of this generation were –
- IBM-360 series
- Honeywell-6000 series
- PDP (Personal Data Processor)
- IBM-370/168
- TDC-316

Fourth Generation

The period of fourth generation was from 1971-1980. Computers of fourth generation used Very Large Scale Integrated (VLSI) circuits. VLSI circuits having about 5000 transistors and other circuit elements with their associated

circuits on a single chip made it possible to have microcomputers of fourth generation.

Fourth generation computers became more powerful, compact, reliable, and affordable. As a result, it gave rise to Personal Computer (PC) revolution. In this generation, time sharing, real time networks, distributed operating system were used. All the high-level languages like C, C++, DBASE etc., were used in this generation.

The main features of fourth generation are –
- VLSI technology used
- Very cheap
- Portable and reliable
- Use of PCs
- Very small size
- Pipeline processing
- No AC required
- Concept of internet was introduced
- Great developments in the fields of networks
- Computers became easily available

Some computers of this generation were –
- DEC 10
- STAR 1000
- PDP 11
- CRAY-1(Super Computer)
- CRAY-X-MP(Super Computer)

Fifth Generation
The period of fifth generation is 1980-till date. In the fifth generation, VLSI technology became ULSI (Ultra Large Scale Integration) technology, resulting in the production of microprocessor chips having ten million electronic components. This generation is based on parallel processing hardware and AI (Artificial Intelligence) software. AI is an emerging branch in computer science, which interprets the means and method of making computers think like human beings. All the high-level

languages like C and C++, Java, .Net etc., are used in this generation.

AI includes –
- Robotics
- Neural Networks
- Game Playing
- Development of expert systems to make decisions in real-life situations
- Natural language understanding and generation

The main features of fifth generation are –
- ULSI technology
- Development of true artificial intelligence
- Development of Natural language processing
- Advancement in Parallel Processing
- Advancement in Superconductor technology
- More user-friendly interfaces with multimedia features
- Availability of very powerful and compact computers at cheaper rates

Some computer types of this generation are –
- Desktop
- Laptop
- Notebook
- Ultrabook
- Chromebook

CLASSIFICATION OF COMPUTERS

Computers can be broadly classified by their Architecture and computing capability is shown in figure.
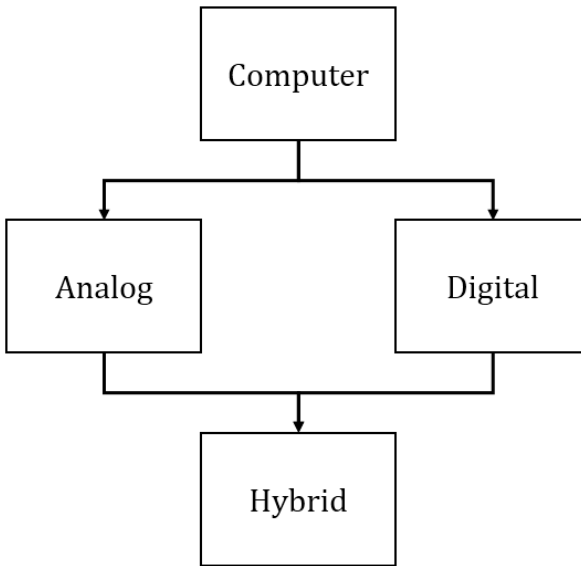
Analog Computer

An **analog computer** is a form of computer that uses the continuously changeable aspects of physical phenomena such as electrical, mechanical, or hydraulic devices to model the problem being solved. Analog computers were widely used in scientific and industrial applications. Analog computers can have a very wide range of complexity.

Digital Computer

By the invention of semiconductors, electrical, mechanical, or hydraulic devices were replaced less power devices made by semiconductors. The size of the systems were gradually reduced. The computers what we see today are digital computers.

Hybrid Computer

Hybrid computers are computers that exhibit features of both analog computers and digital computers. The digital component normally serves as the controller and provides logical and numerical operations. The analog component often serves as a solver of differential equations and other mathematically complex equations.

The first desktop hybrid computing system was the Hycomp 250, released by Packard Bell in 1961. Another early example was the HYDAC 2400, an integrated hybrid computer released by EAI in 1963.

Computers can be broadly classified by their **speed and computing power.**

S.No.	Type	Specifications
1	**PC (Personal Computer)**	It is a single user computer system having moderately powerful microprocessor
2	**Workstation**	It is also a single user computer system, similar to personal computer has more powerful microprocessor.
3	**Mini Computer**	It is a multi-user computer system, capable of supporting hundreds of users simultaneously.
4	**Main Frame**	It is a multi-user computer system, capable of supporting hundreds of users simultaneously. Software technology is different from minicomputer.
5	**Supercomputer**	It is an extremely fast computer, which can execute hundreds of millions of instructions per second.

PC (Personal Computer)

A PC can be defined as a small, relatively inexpensive computer designed for an individual user. PCs are based on the microprocessor technology that enables manufacturers to put an entire CPU on one chip. Businesses use personal computers for word processing, accounting, desktop publishing, and for running spreadsheet and database management applications. At home, the most popular use for personal computers is playing games and surfing the Internet.

Although personal computers are designed as single-user systems, these systems are normally linked together to form a network. In terms of power, now-a-days high-end models of the Macintosh and PC offer the same computing power and graphics capability as low-end workstations by Sun Microsystems, Hewlett-Packard, and Dell.

Workstation

Workstation is a computer used for engineering applications (CAD/CAM), desktop publishing, software development, and other such types of applications which require a moderate amount of computing power and relatively high quality graphics capabilities.

Workstations generally come with a large, high-resolution graphics screen, large amount of RAM, inbuilt network support, and a graphical user interface. Most workstations also have mass storage device such as a disk drive, but a special type of workstation, called diskless workstation, comes without a disk drive.

Common operating systems for workstations are UNIX and Windows NT. Like PC, workstations are also single-user computers like PC but are typically linked together to form a local-area network, although they can also be used as stand-alone systems.

Minicomputer

It is a midsize multi-processing system capable of supporting up to 250 users simultaneously.

Mainframe

Mainframe is very large in size and is an expensive computer capable of supporting hundreds or even thousands of users simultaneously. Mainframe executes many programs concurrently and supports many simultaneous execution of programs.

Supercomputer

Supercomputers are one of the fastest computers currently available. Supercomputers are very expensive and are employed for specialized applications that require immense amount of mathematical calculations (number crunching).

For example, weather forecasting, scientific simulations, (animated) graphics, fluid dynamic calculations, nuclear energy research, electronic design, and analysis of geological data (e.g. in petrochemical prospecting).

Servers

A server is a computer or a computer program that provides services to other computer programs (and their users) in the same or other computers. The computer that a server program runs in is also referred to as a server. That machine may be a dedicated server or used for other purposes as well.

Servers are often categorized in terms of their purpose.
Web server: serves requested HTML pages or files.

Application server: provides the business logic for an application program.

Proxy server: acts as an intermediary between an endpoint device, such as a computer, and another server from which a user or client is requesting a service.

Mail server: receives incoming e-mail from local users (people within the same domain) and remote senders and forwards outgoing e-mail for delivery.

Virtual server: running on a shared server that is configured in such a way that it seems to each user that they have complete control of a server.

File server: responsible for the central storage and management of data files so that other computers on the same network can access them.

Policy server: provides authorization services and facilitates tracking and control of files.

Laptop

A laptop computer, sometimes called a notebook computer by manufacturers. It is a battery or AC-powered personal computer generally smaller than a briefcase that can easily be transported and conveniently used in temporary spaces such as on airplanes, in libraries, temporary offices, and at meetings. A laptop typically weighs less than 5 pounds and is 3 inches or less in thickness.

Laptop computers generally cost more than desktop computers with the same capabilities because they are more difficult to design and manufacture.

Laptops usually come with displays that use thin-screen technology. Laptops use several different approaches for integrating a mouse into the keyboard, including the touch pad, the trackball, and the pointing stick. A serial port also allows a regular mouse to be attached. The PC Card is insertable hardware for adding a modem or network interface card to a laptop. CD-ROM and digital versatile disc drives may be built-in or attachable.

BLOCK DIAGRAM OF A COMPUTER
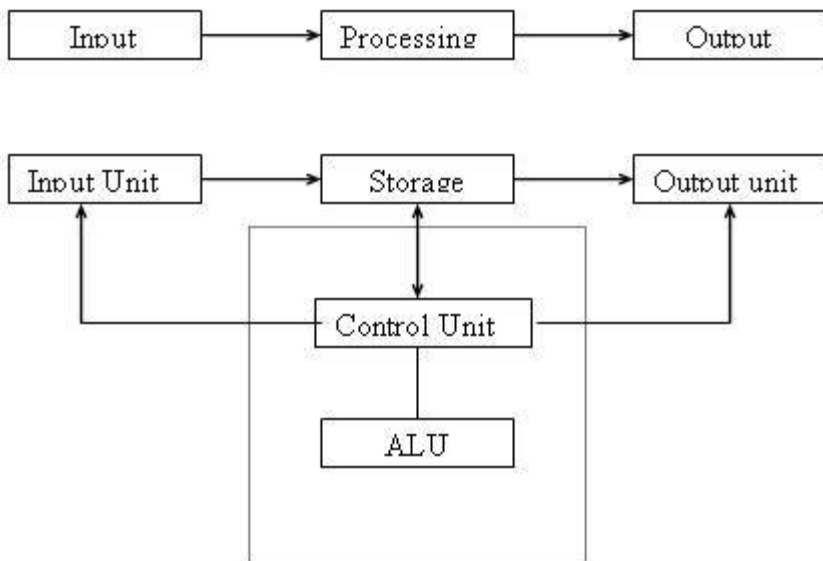
A computer can process data, pictures, sound and graphics. They can solve highly complicated problems quickly and accurately.

Input Unit
Computers need to receive data and instruction in order to solve any problem. Therefore we need to input the data and instructions into the computers. The input unit consists of one or more input devices. **Keyboard** is the one of the most commonly used input device. Other commonly used input devices are the **mouse**, floppy disk drive, magnetic tape, etc. All the input devices perform the following **functions**.

- Accept the data and instructions from the outside world.
- Convert it to a form that the computer can understand.
- Supply the converted data to the computer system for further processing.

Storage Unit

The storage unit of the computer holds data and instructions that are entered through the input unit, before they are processed. It preserves the intermediate and final results before these are sent to the output devices. It also saves the data for the later use. The various storage devices of a computer system are divided into two categories. **Primary Storage and Secondary Storage.**

Output Unit

The output unit of a computer provides the information and results of a computation to outside world. Printers, Visual Display Unit (VDU) are the commonly used output devices. Other commonly used output devices are floppy disk drive, hard disk drive, and magnetic tape drive.

Central Processing Unit:

The control unit and ALU of the computer are together known as the Central Processing Unit (CPU).The CPU is like brain performs the following functions:

- It performs all calculations.
- It takes all decisions.
- It controls all units of the computer.

Arithmetic & Logical Unit

All calculations are performed in the Arithmetic Logic Unit (ALU) of the computer. It also does comparison and takes decision. The ALU can perform basic operations such as addition, subtraction, multiplication, division, etc. and does logic operations namely, >, <, =, ! etc.

Whenever calculations are required, the control unit transfers the data from storage unit to ALU once the computations are done, the results are transferred to the storage unit by the control unit and then it is send to the output unit for displaying results.

Control Unit

It controls all other units in the computer. The control unit (**CU**) instructs the input unit, where to store the data after receiving it from the user. It controls the flow of data and instructions from the storage unit to ALU. It also controls the flow of results from the ALU to the storage unit. The control unit is generally referred as the central nervous system of the computer that control and synchronizes its working.

BOOTING PROCESS

Booting is a startup sequence that starts the **operating system** of a computer when it is turned on. A **boot sequence** is the initial set of operations that the computer performs when it is switched on. Every computer has a boot sequence. The average computer doesn't understand the boot sequence but is important to know for customizing and troubleshooting your computer.

Boot Loader

Computers powered by the central processing unit can only execute code found in the systems memory. Modern operating systems and application program code and data are stored on nonvolatile memories or mass storage devices. When a computer is first powered on, it must initially rely only on the code and data stored in nonvolatile portions of the systems memory. At boot time, the operating system is not really loaded and the computer's hardware cannot perform many complex systems actions.

The program that starts the "chain reaction" which ends with the entire operating system being loaded is known as the **boot loader** (or **bootstrap loader**). The term creatively came from early designers imagining that before a computer "runs" it must have its "boots strapped". The boot loader's only job is to load other software for the operating system to start.

Multiple-stage boot loaders are used, in which several small programs of increasing complexity sequentially call one after the other, until the last of them loads the operating system.

Boot Devices

The boot device is the device from which the operating system is loaded. A modern PC **BIOS** (**Basic Input/output System**) supports booting from various devices. These include the local hard disk drive, optical drive, floppy drive, a network interface card, and a USB device. Typically, the BIOS will allow the user to configure a boot order. If the boot order is set to:

1. CD Drive
2. Hard Disk Drive
3. Network

Then the BIOS will try to boot from the CD drive first, and if that fails then it will try to boot from the hard disk drive, and if that fails then it will try to boot from the network, and if that fails then it won't boot at all.

Boot Sequence

There is a standard boot sequence that all personal computers use. First, the CPU runs an instruction in memory for the BIOS. That instruction contains a jump instruction that transfers to the BIOS start-up program. This program runs a **power-on self-test (POST)** to check that devices the computer will rely on are functioning properly. Then, the BIOS goes through the configured boot sequence until it finds a device that is bootable.

Once BIOS has found a bootable device, BIOS loads the **boot sector** and transfers execution to the boot sector. If the boot device is a hard drive, it will be a **master boot record (MBR).** The MBR code checks the partition table for an active partition. If one is found, the MBR code loads that partition's boot sector and executes it. The boot sector is often operating system specific, however in most operating systems its main function is to load and execute the operating system **kernel**, which continues startup.

If there is no active partition or the active partition's boot sector is invalid, the MBR may load a secondary boot loader which will

select a partition and load its boot sector, which usually loads the corresponding operating system kernel.

CLOCK SPEED

In a computer, clock speed refers to the number of pulses per second generated by an **oscillator** that sets the tempo for the **processor**. Clock speed is usually measured in **MHz** (**megahertz**, or millions of pulses per second) or **GHz** (**gigahertz**, or billions of pulses per second). Today's personal computers run at a clock speed in the hundreds of megahertz and some exceed one gigahertz.

Clock speed is one measure of computer "power," but it is not always directly proportional to the performance level.

Some processors execute only one **instruction** per clock pulse. More advanced processors can perform more than one instruction per clock pulse. The latter type of processor will work faster at a given clock speed than the former type.

Similarly, a computer with a 32-bit bus will work faster at a given clock speed than a computer with a 16-bit bus. For these reasons, there is no simplistic, universal relation among clock speed, "bus speed," and millions of instructions per second (MIPS).

Excessive clock speed can be detrimental to the operation of a computer. As the clock speed in a computer rises without upgrades in any of the other components, a point will be reached beyond which a further increase in frequency will render the processor unstable. Some computer users deliberately increase the clock speed, hoping this alone will result in a proportional improvement in performance, and are disappointed when things don't work out that way.

MEMORY SPEED

The speed of the memory will determine the rate at which the CPU can process data. The higher the clock rating on the

memory, the faster the system is able to read and write information from the memory. All memory is rated at a specific clock rate in megahertz that the memory interface talks to the CPU with.

All the versions of DDR memory are referred to by the clock rating. Memory manufacturers are starting to refer to the bandwidth of the memory.

Memory types can be listed in two ways. The first method lists the memory by its overall **clock speed** and the **version** of DDR that is used. For instance, you may see mention of 1600MHz DDR3 or DDR3-1600 which essentially is just the type and the speed combined.

Latency

For memory there is another factor that impacts the performance, latency. This is the amount of time (or clock cycles) it takes the memory to respond to a command request. Most computer BIOS and memory manufacturers list this rating.

With each generation of memory, the number of cycles for command processing is increasing. For instance, DDR3 generally runs between 7 and 10 cycles. Newer DDR4 tends to run at nearly twice that with latency running between 12 and 18. Even though there are higher latency with the newer memory, other factors such as higher clock speeds and improve technologies generally do not make them slower.

Lower the latency the faster the memory is to respond to commands. Faster clock speed memory with slightly higher may be a bit slower to respond but offer a great amount of memory bandwidth which can offer better performance.

MEMORY CAPACITY OF LATEST MOTHERBOARDS

A motherboard (sometimes alternatively known as the main board, system board, planar board or logic board) is a printed circuit board (PCB) found in many modern computers which

holds many of the crucial components of the system, such as the central processing unit (CPU) and memory, and provides connectors for other peripherals.

Motherboard specifically refers to a PCB with expansion capability. The term main board is applied to devices with a single board and no additional expansions or capability. In modern terms this would include controlling boards in televisions, washing machines and other embedded systems.

Motherboards contain some non-volatile memory to initialize the system and load an operating system from some external peripheral device. Microcomputers such as the Apple II and IBM PC used ROM chips, mounted in sockets on the motherboard. At power-up, the central processor would load its program counter with the address of the boot ROM and start executing ROM instructions. These instructions displayed system information on the screen, ran memory checks, and then loaded an operating system from an external or peripheral device (disk drive). If none was available, then the computer would perform tasks from other memory stores or display an error message, depending on the model and design of the computer and version of the BIOS.

Most modern motherboard designs use BIOS, stored in an EEPROM chip soldered or socketed to the motherboard, to bootstrap an operating system.

Model Questions
Part A: Answer in One or Two Sentences

1. Define computer.
2. What is VLSI?
3. What is a hybrid computer?
4. What is a super computer?
5. What is a policy server?
6. What is the use of CU?
7. Define what is booting?
8. Mention any two boot devices.
9. What is latency?
10. Compare GHz and MHz
11. How computer is applicable in engineering design?
12. Compare SSI, LSI and VLSI.
13. Compare mainframe and super computer.
14. What are the operations performed by ALU?
15. What are multi stage boot loaders?
16. What is PCB?
17. What will determine the speed of memory?
18. Write note on MBR?
19. What do you mean by boot sequence?
20. Explain shortly about boot loader.

Part B: Short Essay Type Questions

1. What are functionalities of a computer?
2. What are disadvantages of a computer?
3. Compare 1st and 2nd generations of computers?
4. Distinguish between analog and digital computer.
5. Write note on different types of servers.
6. Write short note on CPU.
7. Explain clock speed.
8. Describe what is POST?
9. What is a notebook computer?
10. Compare what is laptop and tablet.

Part C: Long Essay Type Questions

1. What are the advantages of computers?
2. Describe briefly the applications of computer?
3. Write note on generations of computer?
4. Classify digital computers according to the speed and computing power.
5. Draw block diagram of a computer and explain each blocks.
6. Describe the sub units of CPU and its operations in detail.
7. Explain the running generation of computer in details