

**(a) Explain the different generations of computer? List some of the applications areas of computer.**

In terms of computer **hardware**, there are at least four generations of digital computer systems.

**First generation** computers were introduced shortly after World War II. Based on *vacuum tube* technology, these were large, required lots of power, generated plenty of heat, and needed constant maintenance.

**Second generation** computers were introduced in 1959, with the release of the IBM 7090. These used *transistors* instead of vacuum tubes, resulting in a dramatic decrease in cost, size, and power consumption as well as an increase in reliability.

**Third generation** computers, introduced in 1964 with the announcement of the IBM 360, were the first to use *integrated circuits* (ICs). An IC consists of a large number of electronic circuits etched onto a single semiconductor chip. This use of microchips led to more dramatic drops in cost, size, and power consumption, and to greater reliability. By 1971, the first general purpose processor-on-a-chip or *microprocessor* had been released: this was a major breakthrough in chip architecture. Second, *large scale integration* (LSI) had been achieved, delivering a major increase in chip density (number of circuit elements contained on the one chip). Although LSI led to size reductions, its primary purpose was to speed up processing by reducing the distances that electrons had to travel. These advances introduced the **fourth generation** of computers. In 1975, very large scale integration (VLSI) was achieved, packing over 100,000 transistors onto a single chip.

Although some modern CPUs operate at frequencies in excess of 3 GHz, heat generation problems indicate that much higher frequencies may be unattainable. Instead, the main contributor to future performance boosts is likely to come from *multicore* technology, packing many processors onto a single chip. In February 2008, Intel announced its Itanium quad-core CPU (code named "Tukwila") with a record-busting two billion transistors. The year 2008 also saw the introduction of 8-core chips, and chips with much higher core counts are expected in the near future.

**Application areas of computers:**

- Home
- Office
- News Agency
- Airport
- Railway Station
- Banks
- Post Office
- Schools
- College/University
- Research/Laboratory
- Media/Movies
- Hotels
- Hospitals
- Library

**(b) What is Von Neumann Architecture? Explain the functions of different components on von Neumann machine. Why is a computer known as data processor?**

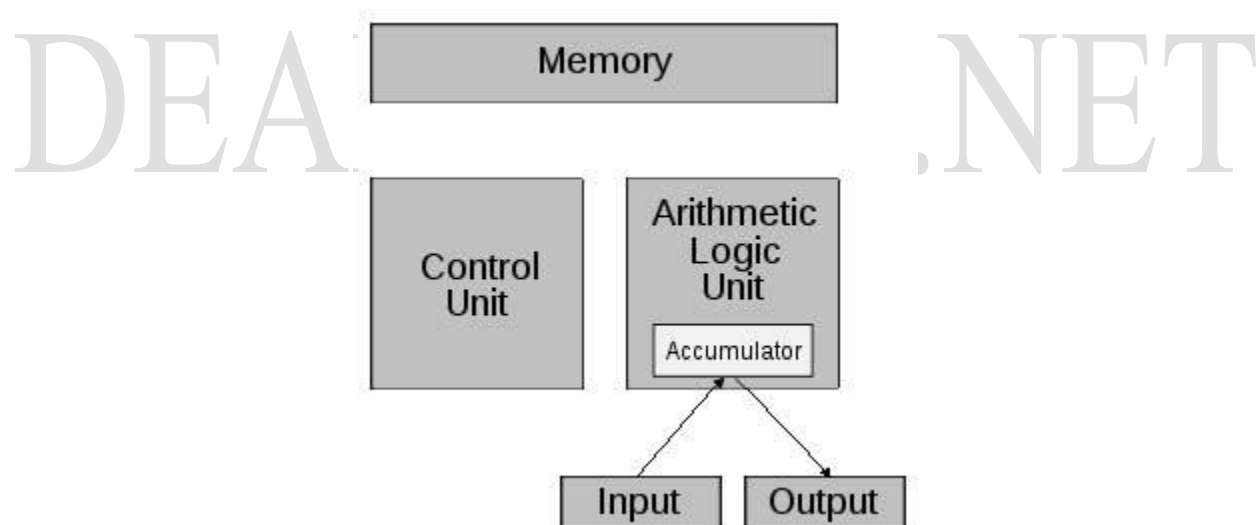
**von Neumann architecture** - A computer architecture conceived by mathematician John von Neumann, which forms the core of nearly every computer system in use today (regardless of size). In contrast to a Turing machine, a von Neumann machine has a random-access memory (RAM) which means that each successive operation can read or write any memory location, independent of the location accessed by the previous operation.

A von Neumann machine also has a central processing unit (CPU) with one or more registers that hold data that are being operated on. The CPU has a set of built-in operations (its instruction set) that is far richer than with the Turing machine, e.g. adding two binary integers, or branching to another part of a program if the binary integer in some register is equal to zero (conditional branch).

The CPU can interpret the contents of memory either as instructions or as data according to the fetch-execute cycle.

Von Neumann considered parallel computers but recognized the problems of construction and hence settled for a sequential system. For this reason, parallel computers are sometimes referred to as non-von Neumann architectures.

A von Neumann machine can compute the same class of functions as a universal Turing machine.



Computer is a digital data processor. In practice this means that all *analogue data* (text, sound, pictures) gets translated into masses of 0's and 1's. These numbers (*binary values*) exist as tiny electrical charges in microscopic circuits, where a transistor can take on two states: *charged* or *not charged*. This is one picture of a *bit*, which you can say is either turned *on* or *off*.

**(c) Explain the purpose of a motherboard in a computer?**

The motherboard is the main printed circuit board and contains the buses, or electrical pathways, found in a computer. These buses allow data to travel between the various components that comprise a computer. A motherboard is also known as the system board, the backplane, or the main board.

The motherboard accommodates the central processing unit (CPU), RAM, expansion slots, heat sink/fan assembly, BIOS chip, chip set, and the embedded wires that interconnect the motherboard components. Sockets, internal and external connectors, and various ports are also placed on the motherboard.

The form factor of motherboards pertains to the size and shape of the board. It also describes the physical layout of the different components and devices on the motherboard. Various form factors exist for motherboards.

An important set of components on the motherboard is the chip set. The chip set is composed of various integrated circuits attached to the motherboard that control how system hardware interacts with the CPU and motherboard. The CPU is installed into a slot or socket on the motherboard. The socket on the motherboard determines the type of CPU that can be installed.

The chip set of a motherboard allows the CPU to communicate and interact with the other components of the computer, and to exchange data with system memory, or RAM, hard disk drives, video cards, and other output devices. The chip set establishes how much memory can be added to a motherboard. The chip set also determines the type of connectors on the motherboard.

Most chip sets are divided into two distinct components, Northbridge and Southbridge. What each component does varies from manufacturer to manufacturer, but in general the Northbridge controls access to the RAM, video card, and the speeds at which the CPU can communicate with them. The video card is sometimes integrated into the Northbridge. The Southbridge, in most cases, allows the CPU to communicate with the hard drives, sound card, USB ports, and other I/O ports.

**(d) Explain the need of ASCII and Unicode?**

**ASCII**

ASCII is an acronym for "american standard code for information interchange". used for storing/displaying text, simple formatting and a few other control characters. below is the ascii table, giving the decimal value, the hexadecimal value, the glyph and the binary value for each. the binary value is how its stored on a disk.

**UNICODE**

A double byte character system designed to store and display a much wider range of letters.(65,536) the extra include foreign languages and mathematical/scientific symbols, plus space for future expansion.

all ascii characters still exist in unicode, either prefixed or suffixed by a null.

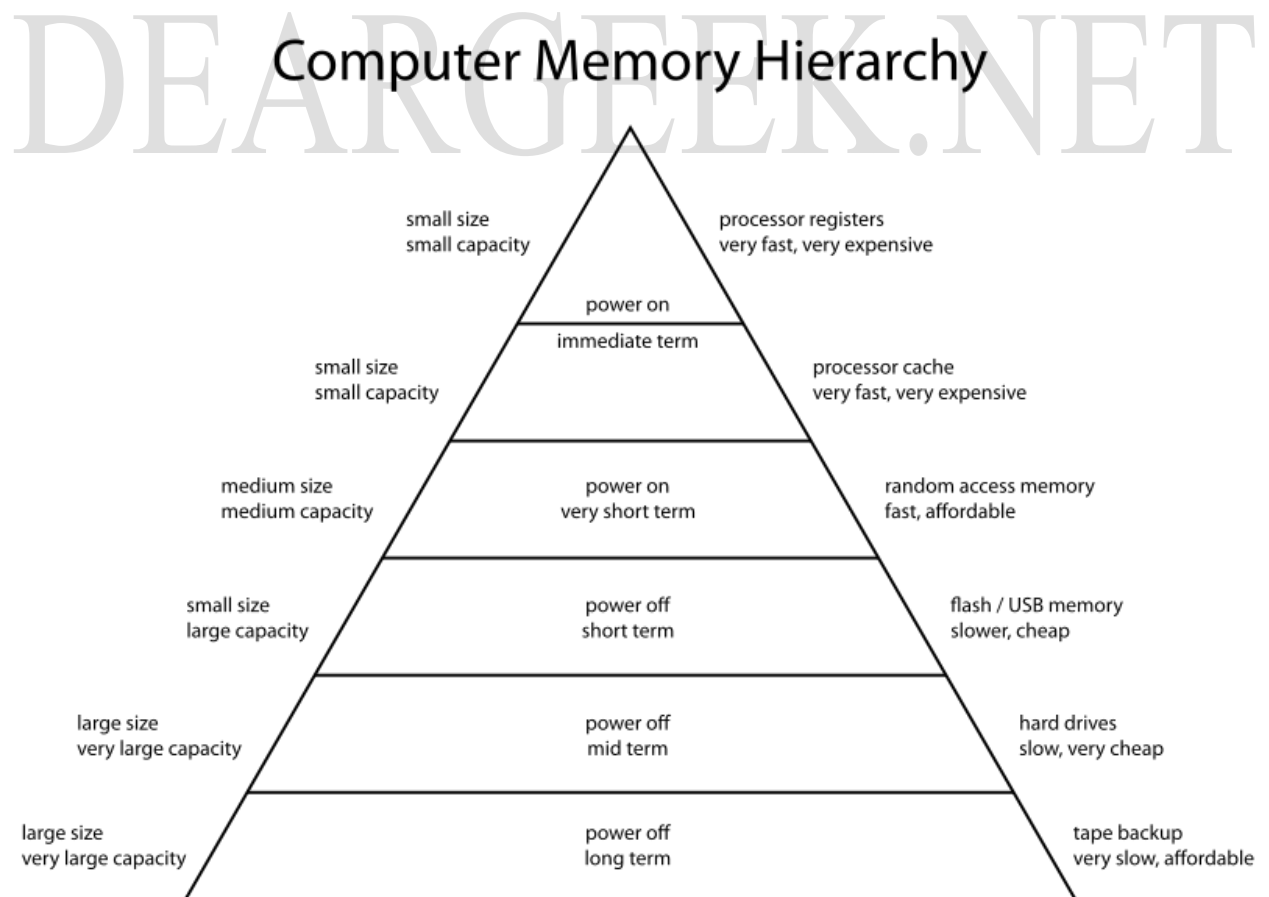
**(e) What is need of memory in a computer? Also explain the need of a memory hierarchy.**

In computing, memory refers to the physical devices used to store programs (sequences of instructions) or data (e.g. program state information) on a temporary or permanent basis for use in a computer or other digital electronic device. The term primary memory is used for the information in physical systems which are fast (i.e. RAM), as a distinction from secondary memory, which are physical devices for program and data storage which are slow to access but offer higher memory capacity. Primary memory stored on secondary memory is called "virtual memory".

The term "storage" is often (but not always) used in separate computers of traditional secondary memory such as tape, magnetic disks and optical discs (CD-ROM and DVD-ROM). The term "memory" is often (but not always) associated with addressable semiconductor memory, i.e. integrated circuits consisting of silicon-based transistors, used for example as primary memory but also other purposes in computers and other digital electronic devices.

There are two main types of semiconductor memory: volatile and non-volatile. Examples of non-volatile memory are flash memory (sometimes used as secondary, sometimes primary computer memory) and ROM/PROM/EPROM/EEPROM memory (used for firmware such as boot programs). Examples of volatile memory are primary memory (typically dynamic RAM memory, DRAM), and fast CPU cache memory (typically static RAM memory, SRAM, which is fast but energy-consuming and offer lower memory capacity per area unit than DRAM) .

**Memory Hierarchy:**



**(f) Explain with examples, the different types of main memory in computer systems.**

Every computer comes with a certain amount of physical memory, usually referred to as main memory or RAM. You can think of main memory as an array of boxes, each of which can hold a single byte of information. A computer that has 1 megabyte of memory, therefore, can hold about 1 million bytes (or characters) of information.

There are several different types of memory:

- RAM (random-access memory): This is the same as main memory. When used by itself, the term RAM refers to read and write memory; that is, you can both write data into RAM and read data from RAM. This is in contrast to ROM, which permits you only to read data. Most RAM is volatile, which means that it requires a steady flow of electricity to maintain its contents. As soon as the power is turned off, whatever data was in RAM is lost.
- ROM (read-only memory): Computers almost always contain a small amount of read-only memory that holds instructions for starting up the computer. Unlike RAM, ROM cannot be written to.
- PROM (programmable read-only memory): A PROM is a memory chip on which you can store a program. But once the PROM has been used, you cannot wipe it clean and use it to store something else. Like ROMs, PROMs are non-volatile.
- EPROM (erasable programmable read-only memory): An EPROM is a special type of PROM that can be erased by exposing it to ultraviolet light.
- EEPROM (electrically erasable programmable read-only memory): An EEPROM is a special type of PROM that can be erased by exposing it to an electrical charge.

**(g) What are different input/output (I/O) devices in a computer?**

**Explain any two output devices.**

An input device is any hardware device that sends data to the computer, without any input devices, a computer would only be a display device and not allow users to interact with it, much like a TV. In the picture to the right, is a Logitech trackball mouse and an example of an input device. Below is a complete listing of all the different computer input devices that can be used on a computer.

- Barcode reader
- Digital camera
- Gamepad
- Joystick
- Keyboard
- Microphone
- MIDI keyboard
- Mouse (pointing device)
- Remote
- Scanner
- Webcam

Any peripheral that receives or displays output from a computer. In the picture to the right, is an inkjet printer and a good example of an output device that can make a hard copy of anything on a computer. Below is a listing of all the different computer output devices found on a computer.

- Flat panel
- Monitor
- Printer
- Projector
- Sound card
- Speakers
- Video card

**(h) What is a port? Differentiate between serial and parallel port.**

In computer networking, the term port can refer to either physical or virtual connection points. Physical network ports allow connecting cables to computers, routers, modems and other peripheral devices.

Like a single laned road (serial) and a highway (parallel).

Although the data is going in one direction, the data is sent bit-by-bit with serial communication (single lane road-car by car). With parallel the data is moved multi bits at a time (a multi lane highway going in the same direction with full of traffic)

Serial communication means less number of wire and it is slow, one by one bit of message signal is send to receiver. Parallel communication has so many numbers of wire & it is fast.

Serial communication: Modem.

Parallel Communication: Printer.

**i) What are different types of PC? Explain the configuration of a PC with the help of an example.**

There are mostly two type of PCs:

1. Stationary and 2. Mobile

**Stationary Computers:** Workstations, Desktop Computers, NETTops etc.

**Mobile:** Laptops, NetBooks, Tablet PC, Ultra mobile PC, Pocket PC.

**Configuration of a computer:**

configuration is an arrangement of functional units according to their nature, number, and chief characteristics. Often, configuration pertains to the choice of hardware, software, firmware, and documentation. The configuration affects system function and performance.

For example: Configuration of a home PC is given below:

PC Type : PC  
OS: Windows 7 Ultimate  
Bit: 32 bit  
Processor: Intel  
Processor Config: Core 2 Duo  
Mother Board: GigaByte 945 S Series  
RAM: Transcend  
RAM Size: 3Gb DDR2  
HDD Size: 160Gb + External HDD 500Gb  
HDD Company: Seagate  
DVD ROM: Samsung ( Not working now , going to buy LG)  
Memory Card Reader: N/A  
TV Tuner Card: Gonna buy it soon  
Graphics Card: NVidia XForce  
Graphics Card Size: 512Mb  
Speakers/Monitor/Keyboard: Creative 2 Small Sized Speakers/Samsung 17"/Logitech Mouse+Keyboard  
Any other extra accessories: None ..

**g) What is software component of a PC? Explain use of Disk Defragmenter utility Software.**

**Computer Software:**

Written programs or procedures or rules and associated documentation pertaining to the operation of a computer system and that are stored in read/write memory.

**Disk Defragmenter Utility:**

Disk Defragmenter MMC is based on the full retail version of Executive Software Diskeeper. The version that is included with Windows XP and later provides limited functionality in maintaining disk performance by defragmenting volumes that use the FAT, FAT32, or NTFS file system.

To start Disk Defragmenter MMC, use one of the methods that is described below:

**Method: Use the Properties of Your Local Disk**

- Open My Computer.
  - Right-click the local disk volume that you want to defragment, and then click Properties.
  - On the Tools tab, click Defragment Now.
  - Click Defragment.
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