**Introduction to Computer Engineering**

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1. What is computer? Explain with the block diagram of it.

Ans. Computer is an electronic device which does various arithmetical, logical calculations very quickly. It takes input from user, processes it and then outputs the result. It is made by set of hardware and software. Modern day computers can do many tasks than basic calculations like playing music, solving physics calculations, server use, etc. It comes with several sizes, specifications for different uses but all computers work on same principal. It takes Input from user, processes it then presents output through an output device.

Internal working of computer can be explained by this block diagram:

Control Unit

Arithmetic & Logical Unit

Output Unit

Input Unit

Main Memory

CPU

The computer first takes Input from user. It is then transferred to Main Memory. Then performs Arithmetical and Logical calculations depending on Input. After the data is processed, it is sent through Output Unit. This all flow of work is managed by Control Unit. It controls which data should be processed first, which data should remain in memory…

2. Differentiate B/w Machine language And Assembly Language.

Ans. Machine language and assembly language have the following differences:

|  |  |
| --- | --- |
| Machine Language | Assembly Language |
| It is language in which written programs can be executed directly by a computer’s central processing unit (CPU) | It is a low-level language which is very close to machine language but it cannot be executed directly by a computer’s CPU |
| It consists of binary digits (one and zero) | It follows syntax of Maths and English like language |
| It is only understandable by computer, But not by programmer | It can be understandable by programmer |
| It is platform dependent | It is not platform dependent |
| It doesn’t need conversion before execution by CPU | It needs to be converted to machine code before execution by CPU |

3. Explain any 5 application of computer.

Ans. These are the 5 applications of computer:  
 **Medical Fields:** Computers are used in hospitals for different diagnosis like performing X-rays scan, monitoring heartbeat of patients, conducting surgeries. They are also used in staff work like managing databases of patients, medicines.

**Banking:** Computers are used in Banks for managing database, transaction records, in ATMs. Computers have reduced transaction errors and increased safety.

**Science:** Computers are used for research in various field which would be practically impossible without them. From finding new species of grains to rocket science and quantum mechanics, solving a dna fold.

**Home:** Computers are used in homes for making office documents, paying bills, communicating, entertainment, learning . Now a days there are even more uses like working from home and learning through remote access which increased safety.

**Government:** Computers are used in vast fields in government sector. They are used from managing people’s information and databases to working of satellites, defence system. Computers accelerated India’s growth with “Digital India” initiative.

4. What is Number system? And how can we convert (1100 1100)2 to

Decimal hexadecimal and octal?

Ans. Number system is a way to represent use of numbers in computers. As computer can only understand numbers not words, it converts instruction from our decimal number system to it’s binary in order to understand it. There are many number systems, but most commonly used are: decimal, binary, hexadecimal, octal.

We can convert (1100 1100)2 to decimal system and then from decimal to other systems by following method:

1. Write binary number above and base of binary number system which is “2” below each binary digit

2. Now start writing exponential power of each base digit from right hand side

3. Now multiply each binary digit to its corresponding base digit below. Add + sign between different digits and add them in the end.

1 1 0 0 1 1 0 0

X

X

X

X

X

X

X

X

7

6

5

4

2

1

0

Exponential Power

3

2 2 2 2 2 2 2 2

Base of Decimal

0

1

2

3

4

5

6

7

(1x2 ) + (1x2 ) + (0x2 ) + (0x2 ) + (1x2 ) + (1x2 ) + (0x2 ) + (0x2 )

128 + 64 + 0 + 0 + 8 + 4 + 0 + 0 = (204)10

Now, we will convert from decimal to other systems:

1. We need to find base of number system in which we convert, in our case 16 is for hexa-decimal and 8 for octal

2. Now, we need to keep dividing our decimal number from base digit like we find LCM. And writing remainder of each corresponding number

3. Now, we write remainder from bottom to up. This will be our converted number

Decimal to Hexa Decimal:

16 204 0

16 12 12 = 12 12 = (CC)16 (12 is referred as C in hexa decimal system)

12 12

Decimal to Octal:

8 204 0

8 25 4 = (314)8

8 3 1

3 3

5. Briefly explain the classification of Computer.

Ans. Computer is classified into these forms: Personal Computer or Micro Computer, Mini Computer, Main Frame Computer and Super-Computer.

**Micro-Computer:** A Micro-Computer is a small, relatively inexpensive computer with a microprocessor as it’s CPU. It includes a microprocessor, memory and minimal input/output circuit mounted on a single PCB which is called motherboard. Micro Computers are used in homes, offices for general purpose computing like using office applications, viewing and editing pictures.

Examples of Micro-Computer are desktop computer, Laptops**,** Workstation.

**Mini-Computer:** A mini-computer is a mid-sized computer which is much faster and more capable than a micro-computer. It has is multi-user computer which can we used by several users at the same time. Mini-computer are expensive than micro computer but affordable than mainframe. These are used in universities, offices, science labs for research and higher calculations.

**Mainframe Computer:** A mainframe-computer is very large in size and it is an expensive computer. It is capable of supporting thousands of users simultaneously. Main frame computers are used in corporations for handling databases, servers, calculating statistics, performing large calculations and simulations. They are usually combined together with several other mainframe computers to increase capability further. For example, IBM zSystems z13.

**Super Computer:** A super computer is fastest computer than all other categories. It is very expensive and it is used for very specialised task. It has capabilities to perform several tera flops of floating point – 16, 32 calculations. These are also combined with several other computers to work together. These are used in science laboratories for research in many fields, like simulating a virus to solving quantum mechanics. For example, PARAM Brahma.

6. What is software explain the types of it?

Ans. Software is a part of computer which cannot be physically touched or accessed directly by us. Software are usually programs, files, database, a collection of data and information. Modern computer software are divided into multiple programs which is a more efficient way and enable user to parallelize their programs (Ability to run through different CPU or computers at same time).  
There are 3 types of software:

1. Application Software: These are the software which perform a specific function for productivity and entertainment purpose. These are most generally used software after system software. This software can do a wide range of tasks depending on for what purpose it is made. For example, Office software, VLC Media player, Telegram Messenger. All have very different purpose and working.

2. System Software: These are software which are used to manage system you’re running and run other software run on top over these. System software are further classified in 3 types:

(1) Operating Systems: These are most essential software which allow users to do run a program and to do most of work with computer. Without Operating systems, Modern day computers are nearly un usable for common users. For example: Ubuntu

(2) System Drivers: These are software which operate hardware. Usually system drivers are pre-installed while installing an operating system. Each specific hardware has its own driver. For example: Audio driver

(3) Utilities: These are non-essential software designed to maintain and care computers. For example: Disk defragment tool

3. Malicious Software: These are developed to harm and disrupt computers. These are part of computer related crimes and they can steal user’s data, make computer un usable.