SUBJECT: COMPUTER SCIENCE
CLASS 11Th

UNIT 2   **SOFTWARE CONCEPTS**   **MARKS: 10**

Q. Define the terms: hardware, software.

Hardware: The physical components of a computer system are called hardware. These are tangible i.e., we can touch them by hand. It is a collection of electronic components that perform different system functions. Example: keyboard, monitor, CPU, printer, etc.

Software: It is a collection of programs that makes a computer system to run. It makes a computer to understand the user's requirements, functions to be performed and the desired output to be given. Software is intangible i.e., we cannot be touch them by hand. Example: paint, word processor, Spread sheet, etc.

Q. Define software? What are types of software?

Software: It is a collection of programs that makes a computer system to run. It makes a computer to understand the user's requirements, functions to be performed and the desired output to be given. Software is intangible i.e., we cannot touch them by hand. Example: paint, word processor, spread sheet, etc.
There are three main types of software,
   1. System software
   2. Application software
   3. Utility software

1. **System software:** System software is defined as a collection of programs designed to control the operation of a computer system.
   System software is required:
   1. To control all operations required to move data in and out of the computer.
   2. For the development of application software.
   3. To run application programs efficiently.
      Examples: operating system, assembler, compiler, interpreter, etc.

2. **Application software:** It is a collection of programs that are written to provide solutions to specific problems. Application software can be developed for purposes like commercial, professional, educational, embedded systems, entertainment, etc.
   Examples: word processor, presentation tools, spreadsheet, etc.

3. **Utility software:** Utility software is also known as tool or utility routine. It is a collection of programs used to manage, tune the computer hardware, operating system or application software. It can perform either a single task or a small range of tasks.
Examples: anti-virus, file compression, disk cleaner, etc.

Q. What is an operating System? What are its functions?
(OR)
Q. What is an operating System? Write down the need for an operating system?

Operating System is system software that acts as an interface between the user and the computer. It is used to control all the hardware devices of the computer system. It makes the computer available to prepare and execute other programs.

Functions:
1. The operating system enables users to interact with the computer.
2. It maintains job priority sequence.
3. It maintains system security and integrity.
4. It manages files on storage devices.
5. It acts as a device manager.
6. It acts as a memory manager.
7. It acts as a processor manager.

Q. Describe the following functions of an Operating System in detail?
1. Processor management:

Processor management means managing CPU time. The CPU processes instructions one by one. Operating system is responsible for the following activities in connection with processor management:
- Creating and deleting both user and system processes.
- Suspending and resuming processes.
- Providing mechanisms for process synchronisation.
- Providing mechanisms for process communication.
- Providing mechanisms for deadlock handling

2. Memory management

The part of the operating system that manages main memory is known as the memory manager. The operating system is responsible for the following activities in connection with memory management:
- Keeping track of the parts of memory in use and by which process.
- Deciding which processes are to be loaded into memory when memory space becomes available.
- Allocating and de-allocating memory space as needed

3. File management

Computers can store information on devices like magnetic tape, magnetic disk, optical disk etc. The OS manages the storage and retrieval of data from these devices. Data is stored as files. These are organised in a system called file system. The operating system is responsible for the following activities in connection with file management:

- Creating and deleting files.
- Creating and deleting directories.
- Support for manipulating files and directories.
- Supporting backup of files.

4. Device management

Device management controls peripheral devices by sending commands to them. The software routine that knows how to deal with each device is called a driver. When a new peripheral is added, that device's driver is installed. The operating system is responsible for the following activities in connection with device management:

- A memory-management component that includes buffering, caching and spooling
- A general device-driver interface
- Drivers for specific hardware devices

Q. Explain the concept of computer languages.
(OR)
Define computer language. Briefly explain types of computer languages.

A computer language is required to communicate with a computer in order to make it perform our job. In order to develop software we need a computer programming language. The three computer programming languages are as follows:

1. **Machine Language:** Computers can directly understand machine language only. Machine language programs are written in binary format using 0s and 1s. The disadvantages of machine language programs are:
   a. It is very difficult to develop, modify and debug a machine language program as all instructions consist of 0s and 1s only.
   b. For different computers different set of instructions needed to perform same job.
   c. Programmers have to remember op-codes for every operation.

2. **Assembly Language:** In assembly languages, op-codes were replaced with Mnemonic codes like LDA, ADD, and SUB etc. So it is easier to develop, modify and debug assembly language programs as compared to

machine language. But still it is not very user friendly and to develop assembly language programs is very hectic. In order to run an assembly language program it needs to be translated into machine language. This job is performed by the assembler.

3. **High Level Language:** A high level language is very user friendly. It uses English alphabets, numbers and symbols to write programs. It is very easy to develop, modify and debug a high level language program. In order to run a high level language program it needs to be translated into machine language. This job is performed by a compiler or interpreter.
   Examples: C++, Visual Basic etc.

Q. Define a language processor/ language translator. Describe functions of an assembler, a compiler and an interpreter.

A language processor is computer software. It is used to convert a program from one computer language into another computer language. In performing this conversion, a language processor performs a number of steps.

1. **Assembler:** An assembler is a system program used for translating an assembly language program into machine code.
   E.g. Macro Assembler, Turbo Assembler

2. **Compiler:** A compiler is a system program that translates the instructions of a high-level language to machine language. It reads the entire program first, checks it for errors and then translates it into machine code.
   E.g. C++ is compiler based.

3. **Interpreter:** An interpreter is a system program that translates the instructions of a high-level language to machine language. But it considers one statement of a high-level language program, translates it into machine language and then executes it immediately.
   E.g. Basic language is interpreter based.

Q. Differentiate between Compiler and Interpreter.
COMPILER:
1. Compiler takes entire program as an input.
2. Conditional control statements are executed faster.
3. Memory requirement is more.
4. Program need not to be compiled every time.
5. Errors are displayed after entire program is checked.
6. Example: C Compiler

INTERPRETER:
1. Interpreter takes single instruction as an input.
2. Conditional control statements executed slower.
3. Memory requirement is less.
4. Every time program is converted into low level program.
5. Errors are displayed for every line of program code.
6. Example: BASIC language

(OPTIONAL QUESTIONS)

Q. Explain different types of operating systems.
  1. On the basis of interface.
   a. CUI operating system: It has a command user interface. Commands are written using a keyboard to perform a task. It provides a plain screen environment as an interface. If the command typed is not correct, the system will not perform the job. It is very hard to remember the commands for performing various operations. Example: DOS, UNIX
   b. GUI operating system: It has a graphical user interface. It uses windows, icons, pointers and menus to make the interface user friendly. A user does not need to remember the commands. Instead he can press any label or icon to get the job done. Example: Windows operating system

  2. On the basis of number of tasks they can run at a time.
   a. Single Tasking operating system: It allows only one program to execute at a time. Example: DOS
   b. Multi-Tasking operating system: It allows more than one programs to execute at a time. Example: Windows

  3. On the basis of number of users they can accommodate at one time.
   a. Single User operating system: It allows a single user to access a computer system at a time. Example: DOS
   b. Multi User operating system: It allows more than one user to access a computer at the same time. Example: UNIX

  4. On the basis performing the sequence of tasks.

    a. Time-sharing operating system: It works on time sharing technique. Here each process is assigned its own time slot to use CPU. If the time elapses, the processor serves the next process in waiting state.

    b. Real-time operating system: In real-time operating systems each job has a deadline in which the job has to be completed.

Q. Explain booting.

    Booting is a process that begins when a user turns on a computer system and prepares the computer to perform its normal operations. This typically involves loading and starting an operating system. The booting process works as follows:

    When we switch on the computer it runs a complex set of instructions stored in a ROM chip known as BIOS (Basic Input Output System). It is also known as ROM-BIOS. It provides the basic functions for controlling the system hardware. First it performs POST (Power On Self-Test) to check whether the computer's RAM, disk drives, peripheral devices and other components are properly working or not. If hardware is not found or is not in a working order then the BIOS issues an error message, otherwise it continues the booting process. Then it loads the master boot record from the boot sector of the secondary storage device which in turn loads the operating system and makes it ready to accept user commands and perform the user tasks.

Q. Explain types of booting.

1. **Hard Boot (Cold boot):** It involves booting the system from the initial stage by pressing the power on-off button. It is done when the system is already in power-off condition. It initializes all the components to a fresh state and performs all the booting steps to make the system ready.

2. **Soft Boot (Warm Boot):** It means to restart a computer without turning it off. If our computer does not respond due to hanging or deadlock, we prefer to restart the computer instead of completely shutting down it. It reinitializes the operating system boot without forcing hardware components to clear state or depower.