Basic Concepts of Operating System

Very Short Answer Type Questions

Question 1.
What is an operating system?

Answer:
An operating system is a system software that acts as an interface between the user and the hardware resources. It provides a variety of services to the computer.

Question 2.
Which is the first program that loads in memory?

Answer:
Operating system is the first program that loads in computer's main memory, when a computer is switched on.

Question 3.
What do you mean by buffering?

Answer:
Buffering is a technique of storing data in memory area (buffer).

Question 4.
Data can be transferred in which form?

Answer:
Data can be transferred in the form of units such as characters, words, bytes, blocks or records from one component to another.

Question 5.
Is Windows NT a family of an operating system (s)?

Answer:
Yes, it is a family of an operating system produced by Microsoft in July 1993. NT stands for New Technology.

Question 6.
Name any two commonly used operating system.

Answer:
Windows 7 and Windows XP.

Question 7.
Who released the first Android OS Astro'?

Answer:
The First Android OS 'Astro' was released by Google on September 20th, 2008.

Short Answer Type Questions

Question 1.
State any two functions of operating system,.

Answer:

1. **Device management**
   In a computer system, there is a tremendous speed mismatch between the CPU and the I/O devices. The job of an operating system is to maintain a balance between the CPU and I/O devices. Apart from this, it has to maintain a balance between various I/O devices and has to keep the CPU busy in various processing.

2. **Processor Management**
   A process or a job is an application program in running state. Processor management is the important part of an OS, which enables the activities of planning, monitoring and performing a process. During execution, a process needs certain resources such as CPU time, memory space, files and I/O devices.

Question 2.
Differentiate between hard and soft real-time operating systems.

Answer:
Difference between hard and soft real-time OS are as follows:

Hard Real-Time OS	Soft Real-Time OS
A hard real-time system guarantees that critical tasks complete on time.	A soft real-time system where a critical real-time task gets priority over other tasks and retains that priority until it completes.
This goal requires that all delays in the system be bounded from the retrieval of the stored data to the time that it takes the operating system to finish any request made of it.	As in hard real-time systems kernel delays need to be bounded.
Its tasks are periodic that receive, process and send messages.	Usually, they are periodic tasks scheduled in background, during the idle time of the processor.

Question 3.
Which OS operates on Smartphones and explain any one type of OS?
Answer:
Mobile OS is the type of OS, that operates on Smartphones, Tablets, PDAs or other Digital Mobile devices. Several types of mobile operating systems are available in market as follows:

Android, BlackBerry, iOS, Windows etc.
Android is a Mobile OS which is based on Linux kernel and primarily designed for touch screen mobile devices.

It provides access to a wide range of useful libraries and tools that can be used to build rich applications. The latest version of Android operating system is Marshmallow 6.0.

Question 4.
What do you mean by Linux?

Answer:
Linux is an open source operating system, means anyone can download it and use it without any fees.
It is similar to Unix in its working and difficult to understand. It is an OS that controls your computer system.

Question 5.
Kernel is the central module of operating system. Explain.

Answer:
Kernel is like heart of operating system which plays a vital role in modern OS. Kernel is a program that manages I/O requests and translate them into data processing instructions for CPU and other components. It is a part of the OS that loads first and it remains in the main memory.

Question 6.
Differentiate between CUI and GUI.

Answer:
Differences between CUI and GUI are as follows:

CUI	GUI
CUI stands for Character User Interface.	GUI stands for Graphical User Interface.

In CUI, user interacts with applications by making use of commands.	In GUI, user interacts with applications by making use of graphics.
Only one task can run at a time.	More than one task can run simultaneously.
A CUI will require less computer resources.	A GUI will require a lot of more system resources because each element that needs to be loaded such as icons, fonts etc.
E.g. MS-DOS.	E.g. Windows.

Long Answer Type Questions

Question 1.
What is used to interface between the user and the hardware?

Answer:
An operating system is a system software that acts as an interface between the user and hardware resources. It controls and co-ordinates the hardware used by various application programs. OS acts as resource allocator and manager. Since, there are many possible conflicting requests for resources, the OS must decide which requests are allocated resources to operate the computer system efficiently and fairly. An OS is a control program, which controls the user programs to prevent errors and improper use by the computer. It is especially concerned with the operation and control of I/O devices. Main functions of an OS are as follows:

- Processor management
- Memory management
- File management
- Device management
- Storage management

Question 2.
What do you mean by storage management?

Answer:
Storage Management
It is the process, which describes the technologies and processes used by a computer to improve the performance of its data resources.

The data or files will be stored into the computers in such a way that an authorised user can easily access and use it. It is a wide process which includes virtualisation, replication, security, compression of data, traffic analysis etc.

It helps to improve the visibility control and automation for data and storage. Most programs including compilers, assemblers, Word processors etc., are stored on a disk until loaded into main memory and then, use the disk as both the source and destination of their processing. This entire process is handled by the operating system itself.

Question 3.
Explain the two types of memory management techniques, which are used for allocating memory.

Answer:
Memory Management
It is the act of managing computer's primary memory or main memory. Main memory is a large array of words or bytes where each ward or byte has its own address. Main memory provide a fast storage that can be accessed directly by the CPU.
An operating system does the following activities:

- It keeps track of the status of each memory location either allocated or free.
- Each process must have enough memory to execute and it cannot run into the memory space of another process.
- Allocates the memory when a process requests it to do so.
- De-allocates the memory when a process no longer needs it or has been terminated.

In most of the computers, it is possible to add memory beyond the original capacity, e.g. you might expand RAM according to your system configuration and requirement. Partitioned allocation divides primary memory of computer into multiple memory.

Question 4.
Describe a real-time operating system.

Answer:
A real-time operating system has well defined fixed time constraints.
Process must be done within the defined constraints otherwise the system will fail. OS for a flight control computer or an advanced Jet airplane is the example of a real-time operating system.

Often used as a control device in a dedicated applications such as controlling scientific experiments, medical imaging systems, industrial control systems and some display systems.

Real-time operating system can be classified as follows:
Hard real-time operating system It is the OS which can guarantee the maximum time for the operations it performs.

Soft real-time operating system It is the OS which cannot guarantee the maximum time for the operations it performs.

Question 5.
What is multi-tasking and multi-user operating system?

Answer:
Multi-Tasking Operating System
The OS that allows the execution of multiple tasks at one time is known as multi-tasking OS. In this type of OS, several applications may be simultaneously loaded and used in the memory. While, the processor handles only one application at a particular time. It is capable of switching between the applications effectively,
e.g. Unix, Windows 2000/XP/NT/Vista etc.

Multi-User Operating System
It is the type of OS that allows many users to take advantages of the computer's resources, simultaneously. This OS makes sure that the requirements of the various users are balanced and each of the programs they are using has sufficient and separate resources, i.e. problem with one user doesn't affect the entire community of users.
e.g. Unix, Linux, Windows 2000 etc.

Question 6.
Explain some of the characteristics of modern operating systems.

Answer:
Some characteristics of modern operating system are as follows:

1. **Microkernel Architecture**
   Provide a communication facility between the client program and the various services that are also running in user space.

2. **Multl-Threadlng**
   It is a process, which can be divided into threads, that can run simultaneously. In other words, it is the ability of an OS to execute different parts of a program called threads, simultaneously by more than one user at a time.

   - **Thread**
     It is a dispatch able unit of work. It includes a processor context program counter, stack pointer and its own data storage for the stack. It executes sequentially and is interruptible. It is a light weight process. In other words, it is the smallest sequence of program instructions in execution. Threads are managed by OS scheduler.

   - **Process**
     Process is a collection of one or more threads. Each process have its own

address in memory, i.e. each process allocates separate memory area. Switching from one process to another require some time for saving and loading registers, memory maps, updating lists etc.

3. **Symmetric Multi-Processing**
   In this processing, stand-alone computers with multiple processors that share the common memory and I/O facilities are connected by a communication bus. All processors can perform the same functions.

4. **Object-Oriented Design**
   It is used for adding modular extensions to a small kernel. Also, it enable programmers to customise an OS without disrupting system integrity.

Application Oriented Questions

Question 1.
Suchi has recently installed a new operating system on her computer.

1. Describe the main functions of an operating system.
2. What does command-driven user interface mean?

Answer:

1. Monitors the performance of the system, enables software to communicate with hardware, enables applications, software to be loaded; gives prompts and error reports to the users.
2. Command-driven user interface means CUI, by which a user gives instructions via typing command onto the computer.

Question 2.
Some features of a specific operating system are given below:

- Free/Open source
- Virus free
- Stable, long running operating system
- Multiple work spaces

(i) Which operating system supports these features?
(ii) What is the meaning of multiple workspace?

Answer:
(i) Linux
(ii) With Linux, you get four desktop screens known as workspace.

Question 3.
The job of an operating system is to maintain a balance between the CPU and I/O devices in the sense that it has to keep the CPU busy. How is it achieved?

Answer:
It is achieved through overlapped processing.

Question 4.
The operating system of computers has progressed from a command-driven system to a Graphical User Interface (GUI). Give the reason behind this.

Answer:
A GUI allows more information to be communicated to the user through the icons, pictures etc. Icons can make it easier for a user to know what a computer is going to do after providing a command or instruction.

Question 5.
Now-a-days many OS are available, name one Indian OS available free throughout India.

Answer:
BOSS is an Indian OS. It is developed by C-DAC derived from Debian for enhancing the use of Free/Open source software throughout India.

Multiple Choice Questions

Question 1.
An operating system manages
(a) memory
(b) processor
(c) disk and I/O devices
(d) All of these

Answer:
(d) An operating system manages disk and I/O devices as it is responsible for input from keyboard, mouse etc. It also manages the computer memory, so that each process can run most effectively.

Question 2.
An operating system of a computer serves as a
software interface between the user and the
(a) hardware
(b) peripheral
(c) memory
(d) screen

Answer:
(a) An operating system of a computer serves as a software interface between the user and the hardware.

Question 3.
Suppose you have bought all hardware components required for assembling a computer. After assembling the computer system, which will be the very first software to be installed?
(a) Hardware drivers
(b) Operating system
(c) Antivirus software
(d) Word processing software

Answer:
(b) Operating system will be the very first software to be installed after assembling the computer system.

Question 4.
Identify the option, which is not a feature covered under device management?
(a) Speed
(b) Spooling
(c) Sharing
(d) Programming

Answer:
(d) Among given options, programming is not a feature covered under device management.

Question 5.
…… is not covered under file management.
(a) Secure files
(b) Easy access to files
(c) Schedule processes
(d) Keep backup of files

Answer:
(c) Because schedule processes comes under processor management.

Question 6.
Which of the following is not a function of an operating system?
(a) File management
(b) Memory management
(c) Storage management
(d) Database management

Answer:
(d) Database management is not a function of an operating system.

Question 7.
……. OS pays more attention on the meeting of the time limits.
(a) Distributed
(b) Network
(c) Real-time
(d) Online

Answer:
(c) Real-time operating system is the operating system, which gives the result on defined time or at deadline. So, it pays more attention on the meeting of the time limits.

Question 8.
Real-time operating systems
(a) are primarily used on mainframe computers
(b) can respond quickly to an event
(c) are used for program development
(d) are used for real-time interactive users

Answer:
(b) Real-time operating systems can respond more quickly or predictably to an event than any other OS.

Question 9.
Amoeba is an example of
(a) Embedded OS
(b) Distributed OS
(c) Multi-User OS
(d) Batch Processing OS

Answer:
(b) Amoeba is an example of Distributed OS.

Question 10.
A thread is a ……. process, which is managed by OS scheduler.
(a) heavy weight
(b) multiprocess
(c) inter thread
(d) light weight

Answer:
(d) A thread is a light weight process because it executes sequentially.

Question 11.
Which of the following is like a heart of operating system?
(a) Kernel
(b) Thread
(c) Process
(d) Window
Answer:
(a) Kernel is like heart of operating system which plays a vital role in modern OS.

Question 12.
Which of the following is not an OS?
(a) Android
(b) Windows
(c) Apple
(d) BOSS

Answer:
(c) Apple is not an OS while it is the name of a company

Question 13.13.
Which of the following is/are mobile operating system?
(a) Android
(b) Symbian
(c) Both (a) and (b)
(d) None of these

Answer:
(c) Both Android and Symbian are two different mobile operating systems.

Question 14.
Marshmallow 6.0 is the version of
(a) Android
(b) Symbian
(c) iOS
(d) BlackBerry

Answer:
(a) Marshmallow 6.0 is the version of Android.

Fill in the Blanks

Question 1.
…… is a program that mediates between application programs and hardware.

Answer:
Operating system

Question 2.
The most common type of spooling is ……
Answer:
print spooling

Question 3.
Buffering is a …….. Management technique.

Answer:
device

Question 4.
Partitioned allocation divides primary memory of computer into ……. memory partitions.

Answer:
multiple

Question 5.
The embedded operating system is used for …… computers.

Answer:
embedded

Question 6.
The …….. is regarded as shell, is the layer that actually interacts with the user.

Answer:
user interface

Question 7.
…… is a program interface that enables a user to communicate with computer through graphics or symbols.

Answer:
GUI (Graphical User Interface)

Question 8.
Symbian is the operating system developed and sold by ……..

Answer:
Symbian Ltd

True or False

Question 1.
Operating system refers to the core software components of a computer system that manages internal operations and hardware.

Answer:
True
Operating system is a set of programs that control internal computer operations and make best use of hardware.

Question 2.
CPU time, memory space are the examples of system resources.

Answer:
True
System resources include many resources such as CPU time, memory space, I/O address, DMA channel to alert the need of hardware and software.

Question 3.
The speed of an I/O device is generally different from each other.

Answer:
True
Different I/O devices possess different speed from each other because of their different data access and execution time.

Question 4.
Several applications can be opened at one time.

Answer:
True
This feature comes under the multi-tasking capability of OS.

Question 5.
Spooling handles the overlapped processing of I/O and same job.

Answer:
False
It is a process of sending data to a spool or temporary storage area in the computer's memory.

Question 6.
The time-sharing operating system allows multiple programs share the computer resources simultaneously.

Answer:
True
In time-sharing OS, a small amount of time is allocated for the processing simultaneously.

Question 7.
Windows is a graphical user interface.

Answer:
True
In Windows, we can provide commands by clicking on the icons using mouse.