**Pakistan School, Ministry of Education, Kingdom of Bahrain**

**ONLINE GUDIANCE AND SUPPORT FOR HSSC-II**

**Ch 1: Operating System**

**Q1: What do you know about Operating System? Give Introduction to Operating System.**

**Ans:** An operating System is the most important System software that runs on a computer. It manages the computer memory & processes, software & hardware. It also allows users to communicate with the computer. Without an operating system, a computer user cannot run any program on the computer. It automatically loads in RAM when the computer is turned on.

**Q2: Define Operating System. List commonly used operating system.**

**Ans: An operating System is a** program that controls the execution of application programs and acts as an interface between user of a computer and computer hardware.

 Its primary goal is to provide convenience to user and secondary goal is to use computer hardware in efficient manner.

 The commonly used operating systems are DOS, Windows, OS X and UNIX/LINUX.

**Q3: Which tasks are performed by Operating System?**

**Ans:** Operating system performs the following tasks:

1. Loads application/system software into main memory & executes it.
2. Controls the operation of main memory & external storage devices.
3. Manages files & folders on storage devices.
4. Manages the operations of all the I/O devices.
5. Allows multitasking.
6. Performs network operations which enable a number of users to communicate with each other.
7. Detects hardware failures.
8. Provides security.

**1.1.2 TYPES OF OPERATING SYSTEM:**

**Q3: Define DOS.**

**Ans:** DOS stands for “Disk Operating System”. It is Command based OS, developed in 1070s when microcomputer was introduced.

It was called Disk operating system as the entire operating system was stored on a single floppy disk.

**Q4: What is purpose of following DOS commands?**

**Ans:**

|  |  |
| --- | --- |
| **Command** | **Purpose of Command** |
| CD | For changing directory eg “CD c:\test” – it will change to subdirectory of C: |
| DIR | To display directories & files in a directory |
| DEL | To delete one or more files. Eg “DEL A.txt” – it will delete the file A.txt in the current directory |
| FORMAT | To format disk. It makes the disk useful my dividing into tracks & sectors. Eg “Format C:” |
| RENAME | For renaming a file. |

**Q5: What do you know about Windows OS?**

**Ans:** Windows OS is a GUI (Graphical User Operating System). It is user friendly OS. The user does not have to memorize commands like DOS, instead they use icons, menus and buttons etc to give commands.

**Q6: List some popular versions of Windows.**

**Ans:**

1. Windows 95
2. Windows 98
3. Windows 2000
4. Windows XP
5. Windows Vista
6. Windows 10

Q7: **What do you know about Mac OS?**

**Ans:** Mac OS is a series of OS developed by Potato. Mostly installed on Apple computers. The Latest version is OS X. It is more secure & efficient as compared to Windows as Mac hardware & software works together very well.

Q8: **What do you know about UNIX?**

**Ans:** UNIX OS was developed in early 1970s at bell Lab. It has greater processing power, Security & least malware attack than Windows OS. It has both Command line & GUI interface.

Q9: **What do you know about iOS & Android OS?**

**Ans:** Google's **Android** and **Apple's iOS** are operating systems used primarily in mobile technology, such as smartphones and tablets etc. **Android** is now the world's most commonly used smartphone platform and is used by many different phone manufacturers. **iOS** is only used on **Apple** devices, such as the **iPhone**.

**1.1.3: Types of Operating Systems(OS)**

**Q10: List types of OS?**

**Ans:**

1. Batch Processing OS
2. Multiprogramming OS
3. Multitasking OS
4. Time Sharing OS
5. Real Time OS
6. Multiprocessor OS

**Q11: Define Batch Processing OS.**

**Ans:** It groups together same type of jobs in batches & automatically execute them one by one. It performs the same type of task on all the jobs in a batch in the sequence in which they appear.



For example, at the end of month, banks print statement for each account holder. A batch processing system can easily and efficiently print each account holder’s statement one by one.

**Q12: Describe briefly Multiprogramming OS.**

**Ans: It** is a software that loads one or more programs in main memory and executes them using a single CPU (Central Processing Unit). In fact, the CPU executes only one program at a time while other programs are waiting in queue.

In multiprogramming system when one program is busy with input/output operation, the CPU executes another program that is in queue. In this way, multiprogramming operating system uses the CPU time and other resources of computer to improve the performance of computer.

**Advantages**



1. High and efficient CPU utilization.
2. User feels that many programs are allotted CPU almost simultaneously.

### Disadvantages

* CPU scheduling is required.
* To accommodate many jobs in memory, memory management is required.

**Q13: Define Multitasking Operating System**

**Ans: It** is a OS that performs multiple tasks at the same time on a computer that has a single CPU. The CPU executes only one program at a time but it rapidly switches between multiple programs and it appears as if all the users’ programs are being executed at the same time.



**Q14: Describe briefly Time-sharing Operating System**.

**Ans:**  A time-sharing operating system shares the CPU time between multiple programs that are loaded in main memory. A time-sharing operating system gives a very short period of CPU time to each program one by one. This short period of time is called time slice or quantum.

The CPU is switched between the programs at extremely fast speed, all the users get the impression of having their own CPU.

It is used in mini and mainframe computers that support large number of users in big organization such as airline, bank, university, Military etc.

**Q15: Describe briefly Real-Time-sharing Operating System**.

**Ans:** A real-time operating system is a software that runs real-time applications that must process data as soon as it comes and provides immediate response. Real-time operating system executes special applications within specified.

They executes special applications within specified time with high reliability. It is **used** in:

* space research programs
* real-time traffic control
* and to control industrial processes such as oil refining.

**Q16: Describe briefly Multiprocessor Operating System.**

**Ans:** A multiprocessor operating system is a software that controls the operations of two or more CPUs within a single computer system. All the CPUs of computer share the same main memory and input/output devices. It executes a single program using many CPUs at the same time to improve processing speed.

**Uses:** Multiprocessing operating systems are used to obtain very high speed to process large amount of data.

**Q17: Describe briefly** Parallel Processing Operating System**.**

**Ans:** It executes programs developed in a parallel programming language. It uses many processors at the same time. In a parallel processing system, the task of a program that requires many calculations is divided into many smaller tasks and these are processed by multiple processors at the same time.

**Uses:** They are used in supercomputers that have thousands processors.

**Q18: Describe briefly Distributed Operating System.**

**Ans:** It manages the operation of a distributed system. A distributed system allows execution of application software on different computers in a network.

. Multiple central processors are **used** by **Distributed systems** to serve multiple real-time **applications** and multiple users. Accordingly, Data processing jobs are **distributed** among the processors.

**Q19: Describe briefly Embedded Operating System**

**Ans:** It is a built-in operating system which is embedded in the hardware of the device. It controls the operation of devices such as microwave oven, TV, camera, washing machine, games, etc. It runs automatically when the device is turned on and performs specific task.

**Q20: Differentiate between single user & multiuser Operating System.**

**Ans:**

|  |  |
| --- | --- |
| **Single User OS** | **Multi User OS** |
| **Only one user can access the computer system at a time.** | **Multiple users can access the computer system at a time.** |
| These types of operating systems are commonly found in home computers.  | These types of operating systems are commonly used in Offices & Businesses. |
| There are two types of single user operating systems called single user, single task operating system and single user, multi-task operating system. | Time Sharing & Distributed OS are some types. |
| Simple | Complex |
| Eg: Windows, Apple MAC | Unix, Linux |

**OPERATING SYSTEM FUNCTIONS**

**Q21: List functions of Operating System.**

**Ans:** The following are the functions performed by operating system.

1. Process Management
2. Memory Management
3. File Management
4. I/O Management
5. Secondary Storage Management
6. Network Management
7. Protection System
8. Command-interpreter

**Q22: Describe functions of Operating System in Detail.**

**Ans:**

1. **Process Management:**  A process is a program in execution. Process management is the part of operating system that manages allocation of computer resources (like CPU time) to various processes in main memory. Process management actually describes the state and resource ownership of each process.

 Example: In this example there are 3 processes X, Y and Z ready for execution. The OS will manage the CPU time as follows.

Process A has CPU cycle (ta = 5 milli sec)

Process B has CPU cycle (tb = 2 milli sec)

 Process C has CPU cycle (tc = 1 milli sec)

 Case 1: When the 3 processes become ready in the order of XYZ, the total execution time will be: τ = (5 + 7 + 8)/3 = 6.67 milli sec

Case 2: When the 3 processes become ready in the order of YZX, the total execution time will be: τ = (2 + 3 + 8)/3 = 4.33 milli sec

In Case2, the OS is managing the processes more efficiently. The execution time in Case 2 is less as compare to Case 1.

1. **Memory Management** : It controls and manages the operation of main memory during the operation of computer. It allocates space to programs which are loaded in main memory for execution. It keeps track of free memory when a program is closed and updates the memory status.
2. **File Management** : OS manages files and folders on storage devices eg hard disk, USB flash drive and DVD. It allows computer user to perform operations such as creating, copying, moving, renaming, deleting, and searching files and folders. It also allows the user to perform read, write, open and close operations upon files and folders.
3. **I/O Management**: I/O management is the part of operating system that controls all the input & output operations during program execution. It manages all the input/output operations of input/output and storage devices. Efficient I/O management improves the performance of computer.
4. **Secondary Storage Management:** OS manages free space and storage allocation of user programs and data on secondary storage devices.

Eg: Program ‘A’ is ready to be stored in Harddisk. Now OS will look for any free space in the Hard disk and assign proper address to it. If space is not available, OS will prompt the user to empty some space.

1. **Network Management:**  Network management is the part of network operating system that monitors and manages the resources of a network. It creates user groups and assigns privileges to them. It shares the network resources among users and detects and fixes network problems.
2. **Protection System: I**t ensures that each resource of computer is used according to the privileges given to users by the system administrator. It creates account for each user and gives privileges to prevent misuse of the system eg provides user name & password to maintain network security.
3. **Command-Interpreter** : It provides interface between user and the computer system. It is a file in operating system that reads and executes user commands entered as text through keyboard.

For example, Windows operating system uses the cmd.exe file as command-interpreter.

**PROCESS MANAGEMENT**

**Q23: Define process management.**

**Ans:** Process management is an important task of operating system. It allocates systems resources to various processes so that they can run efficiently.

**Q24: Define process. Also give example.**

 **Ans:** A process is a program in execution.

 Process is a part of program under execution that is scheduled and controlled by operating system. When a program is loaded in memory for execution, it becomes a process.

A program is an executable code that is stored in disk as a text file whereas a process is a dynamic instance of a program during its execution in RAM.

It represents basic unit of work. It uses various resources of computer such as CPU time, files, I/O devices, memory, etc.

For example, when we write a program in C or C++ and compile it, the compiler creates a binary code. The original code and Binary code, both are programs. When we actually run the binary code, it becomes a process.

**Q25: Describe briefly five states of a process.**

Five states of a process are: new, ready, running, waiting and terminated.

1. **New State:** This is the first state of a process when it is created. Any new operation or service that is requested by a program for execution by the processor is known as new state of process.
2. **Ready State**: A process is said to be in ready state when it is ready for execution but it is waiting to be assigned to the processor by the operating system.
3. **Running State:** A process is said to be in running state when it is being executed by the processor. A process is assigned to a processor for execution by operating system.
4. **Blocked State/Waiting State**: A process is in blocked or waiting state when it is not under execution. It is waiting for a resource to become available.
5. **Terminated State**: A process is in terminated state when it completes its execution.

**Q26: Define process & thread**

**Ans:** In programming, there are two basic units of execution: processes and threads. They both execute a series of instructions. A Process is an instance of a program that is being executed. A process may be made up of multiple threads. A Thread is a basic ordered sequence of instructions within a process that can be executed independently. The threads are made of a Process & exist within a process; every process has at least one thread. Multiple threads can also exist in a process and share resources.

Q: Choose the Correct answer

1. \_\_\_\_\_\_\_ allocates systems resources to various processes so that they can run efficiently.

a) Process b) Process Management

c) System d) None of these

1. Process is a part of program under execution that is scheduled and controlled by operating system.

a) Process b) Process Management

c) System d) None of these

1. Any new operation or service that is requested by a program for execution by the processor is known as \_\_\_\_\_\_ state of process.

a) Block b) Running

c) New d) Ready

1. When process is ready for execution but it is waiting to be assigned to the processor by the operating system is said to be in \_\_\_\_\_\_ state

a) Block b) Running

c) New d) Ready

1. When a process is assigned to a processor for execution by operating system, it is said to be in \_\_\_\_\_\_\_ state.

a) Block b) Running

c) New d) Ready

1. When process is not under execution, It is waiting for a resource to become available called \_\_\_\_\_\_\_ state of process

a) Block b) Running

c) New d) Ready

1. **\_\_\_\_\_\_\_\_** is a subset of the process

a) Process b) Process Management

c) Sub-System d) Thread

1. The process of executing multiple threads simultaneously is known as

a) Process b) Multiprocessing

c) Multithreading d) Thread

1. Loading multiple (programs, processes, tasks, threads) in main memory and executes them at the same time by rapidly switching the CPU among them.

a) Multitasking b) Multiprocessing

c) Multithreading d) Multiprogramming

1. In \_\_\_\_\_\_\_\_\_\_\_\_\_\_many programs are loaded in memory but the CPU only executes one program at a time

a) Multitasking b) Multiprocessing

c) Multithreading d) Multiprogramming

1. \_\_\_\_\_\_\_\_\_\_\_\_the ability of an operating system to execute more than one process simultaneously on a multi-processor machine (having more than one CPUs).

 a) Multitasking b) Multiprocessing

c) Multithreading d) Multiprogramming