Unit = 7 (6)

In revised syllabus it is in Unit-6 Unit 7 is Data communication and computer networks.

Navneet

Operating System

1. Objectives of OS :-

i) It controls and co-ordinates the use of hardware among the different application software and users.

ii) It translates the user command into machine understandable form.

main two objectives

iii) It makes computer system convenient and easy to use for the user.

iv) It helps to use the computer hardware in an efficient way, by handling the details of the operations of the hardware.

v) OS hides the working of the hardware from the user and makes it convenient for the user.

vi) OS supervises and manages the hardware of the computer.

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2. Types of OS :-

OS are classified into different types depending on their capability of processing as follows:-

(a) Single user and Single task OS → It is used for performing single task for the single user. Operating system for Personal Computers (PC) are singleuser OS. Single user OS are simple operating system designed to manage one task at a time. MS-DOS is an example of single user OS.

(b) Single user and multitasking OS → It allows execution of more than one task or process simultaneously.

For this, the processor time is divided amongst different tasks. The division of time is also called time sharing. For example:- The user can listen to music and can write an article at the same time. Windows 95 and all later versions of Windows are examples of multitasking OS.

(c) Multiuser OS:→ It is used in computer networks that allow same data and applications to be accessed by multiple users at the same time. The users can also communicate with each other. Linux, UNIX, and Windows 7 are examples of multiuser OS.

(d) Multiprocessing OS → It have two or more processes for a single running process. Processing takes place in parallel and is also called parallel processing. Each processor works on different parts of same task. Linux, UNIX, and Windows 7 are its examples.

(e) Real time OS → These OS are designed to respond to an event within a predetermined time. Processing is done within a time constraint. Lynx OS is an example of real time OS.

(f) Embedded OS → It is embedded in a device in the ROM. They are specific to a device and are less resource intensive. They are used in appliances like microwaves, washing machines, control systems etc.

5 to 8 marks asked

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3) Functions of OS:-

Process management → A process is a program in a state of execution. It is unit of work for the operating system. A process can be created, executed and stopped. The process managend system allocate the resources required by a process is made during process creation and process execution. The various states that a process changes during execution are:-

New → Process is in a new state when it is created,

Ready → Process is in ready state when it is waiting for a processor. etc.

Process management includes CPU sheduling, Process synchronization and Deadlock.

CPU sheduling → CPU or processor is one of the primary computer resource. I/O, memory and CPU these all computer resources are scheduled for use. CPU sheduling is important for the operating system. Sheduler is a component of the operating system that is responsible for sheduling transition of processes. There are different CPU scheduling algorithms that are used to schedule the processes, some of them are as follows:-

First Come First Served (FCFS) Scheduling → As the name says, the process that requests for the CPU first, gets workdone first. A queue is maintained for the processing requesting the CPU.

The drawback of this ~~sh~~ scheduling is that the prosses assigned to CPU may take long time to complete, keeping all other processes waiting in queue.

Short job first (SJF) Scheduling:- The process that requires the least CPU time is allocated the CPU first. The drawback of this scheduling is that a process that requires more CPU time may have to wait for long time.

Round Robin (RR) Scheduling:- It is designed for time-sharing systems. In this scheduling a small time (10-100) ms is defined for each process in the queue. New processes ~~and~~ are added at the tail of the queue and finished program is removed from queue. It overcomes the disadvantage of FCFS and SJF Scheduling.

9) Process Synchronization → In computer multiple processes execute at the same time that share the resources to communicate with one another to prevent a situation where one process disrupts another process. To handle such situations, synchronization and co-ordination of the processes is required.

99) Deadlock → It is a situation when a process waits endlessly for a resource and the requested resource is being used by another process. Deadlock handling can be done by deadlock avoidance and deadlock prevention.

b) Memory Management →

In computer multiple processes are executing at the same time. These every process require a certain amount of memory to execute. This memory is made available by the memory management system of OS. On completion of one process execution, the memory is de-allocated and made available to another process.

The operating system keeps track of blocks of memory which are free and those which are unavailable. The single block of ~~memory~~ available memory is called a hole.

~~c) File Management~~

1) Memory Allocation :— In single user OS the allocated memory is freed and is made available to any other process but in multi-user OS track of processes is allocated to memory, memory protection, sharing etc are done.

2) Virtual Memory :— When the OS keeps track of processes sometimes the space in the memory becomes less than that of those process need. Then, OS creates virtual memory so that the process are allocated properly in the memory.

c) File management :- File is the collection of related information having name and ~~ser~~ stored on a secondry storage. It is the smallest named unit that can be written to secondry storage device. A file has attributes like its name, location, size, type, time and date of creation. The information stored in file can be accessed ~~in different ways~~ mainly in two ways - sequential access and direct access.

The access in a sequential order from start to end is called sequential access and the file that is accessed in any order is called direct access. Directory contains information about all the files within it. Directory contains the name, size and type of all the files stored on the device.

The OS manages the storage media like disk. System call are an interface between the process and the OS. OS provide system calls for creating, reading, writing, deleting etc.

d) Device Management → Device management manages different peripheral devices like mouse, hard disk, printer, plotter etc. which are connected to computer. OS manages and controls the devices attached to computer. OS provide proper functionality to application programs for

controlling different devices. OS handles the devices by combining both hardware and software techniques. OS enables handling of different input/output devices.

e) Protection and Security → Security mechanism prevents unauthorized access to the computer. It includes security of software, security of data stored in computer and security of physical resources of computer. The access of programs, processes and users are controlled by protection mechanism. It ensures that the resources of computer are used in a consistent way.

f) User Interface → The primary goal of OS is to make computer convenient for use by its user. It allows users easily to access and communicate with the applications and the hardware.

The users can interact with computer by mainly two kinds of interfaces – Comand Line Interface (CLI) and Graphical user interface (GUI). CLI is related to user provided commands and GUI is related to different types of view, icons, background etc.