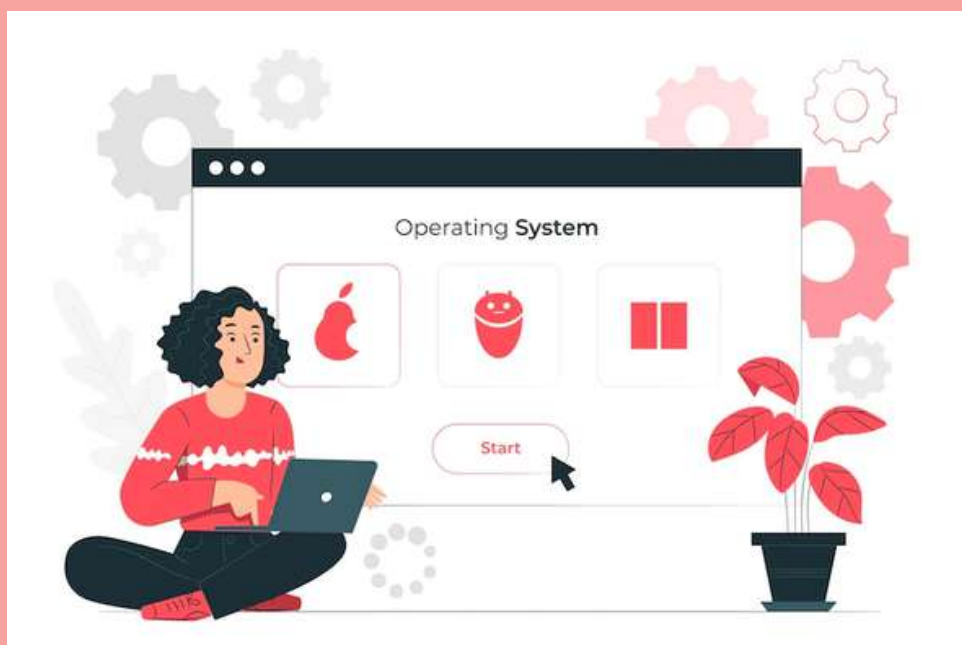


FREE EBOOK



OPERATING SYSTEMS

PHASE-II STUDY NOTES FOR NABARD GR. A IT OFFICER EXAM



Operating Systems

Phase-II Study Notes for NABARD Gr. A IT Officer Exam

What is an Operating System?

- An operating system is the most important software that runs on a computer.
- An Operating System (OS) is software that acts as an interface between computer hardware components and the user.
- It manages the computer's memory and processes, as well as all of its software and hardware.
- It also allows you to communicate with the computer without knowing how to speak the computer's language.
- Every computer system must have at least one operating system to run other programs.
- Applications like Browsers, MS Office, Notepad Games, etc., need some environment to run and perform their tasks.
- The OS helps you to communicate with the computer without knowing how to speak the computer's language.
- It is not possible for the user to use any computer or mobile device without having an operating system.
- Without an operating system, a computer is useless.

Types of Operating Systems

- Operating systems usually come pre-loaded on any computer you buy. Most people use the operating system that comes with their computer, but it's possible to upgrade or even change operating systems.
- The three most common operating systems for personal computers are Microsoft Windows, macOS, and Linux.
- Modern operating systems use a graphical user interface, or GUI (pronounced gooey).

- A GUI lets you use your mouse to click icons, buttons, and menus, and everything is clearly displayed on the screen using a combination of graphics and text.
- An Operating System (OS) is an interface between a computer user and computer hardware.
- An operating system is software which performs all the basic tasks like file management, memory management, process management, handling input and output, and controlling peripheral devices such as disk drives and printers.
- Some popular Operating Systems include Linux Operating System, Windows Operating System, VMS, OS/400, AIX, z/OS, etc.

Functions of an Operating System

1. Memory Management

- Memory management refers to the management of primary memory or main memory.
- Main memory is a large array of words or bytes where each word or byte has its own address.
- Main memory provides fast storage that can be accessed directly by the CPU. For a program to be executed, it must be in the main memory.
- An Operating System does the following activities for memory management –Keeps track of primary memory, i.e., what parts of it is in use by whom, and what part are not in use.
- In multiprogramming, the OS decides which process will get memory when and how much.
- 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.

2. Processor Management

- In a multiprogramming environment, the OS decides which process gets the processor when and for how much time. This function is called process scheduling.

- An Operating System does the following activities for processor management –Keeps track of the processor and the status of the process. The program responsible for this task is known as the traffic controller.
- Allocates the processor (CPU) to a process.
- De-allocates processor when a process is no longer required.

3. Device Management

- An Operating System manages device communication via their respective drivers. It does the following activities for device management –Keeps track of all devices.
- The program responsible for this task is known as the I/O controller.
- Decides which process gets the device when and for how much time.
- Allocates the device in an efficient way.
- De-allocates devices.

4. File Management

- A file system is normally organized into directories for easy navigation and usage. These directories may contain files and other directions.
- An Operating System does the following activities for file management –Keeps track of information, location, uses, status etc. The collective facilities are often known as file systems.
- Decides who gets the resources.
- Allocates the resources.
- De-allocates the resources.

5. Security: By means of passwords and similar other techniques, it prevents unauthorized access to programs and data.

6. Control over System Performance: Recording delays between requests for service and responses from the system.

7. Job Accounting: Keeping track of time and resources used by various jobs and users.

8. Error Detecting Aids: Production of dumps, traces, error messages, and other debugging and error detecting aids.

9. Coordination between other software and users: Coordination and assignment of compilers, interpreters, assemblers, and other software to the various users of the computer systems.

Types of Operating System (OS)

Following are the popular types of OS (Operating System):

1. Batch Operating System

- Some computer processes are very lengthy and time-consuming.
- To speed the same process, a job with a similar type of needs is batched together and run as a group.
- The user of a batch operating system never directly interacts with the computer.
- In this type of OS, every user prepares his or her job on an offline device like a punch card and submits it to the computer operator.

2. Multitasking/Time Sharing OS

- The time-sharing operating system enables people located at a different terminal(shell) to use a single computer system at the same time.
- The processor time (CPU) which is shared among multiple users is termed time sharing.

3. Multiprocessing OS: Multiprocessing system means, there are more than one processor which work parallel to perform the required operations. It allows the multiple processors, and they are connected with physical memory, computer buses, clocks, and peripheral devices.

4. Real-Time OS

- A real-time operating system's time interval to process and respond to inputs is very small.
- Examples: Military Software Systems and Space Software Systems are the Real-time OS example.

5. Distributed OS: Distributed systems use many processors located in different machines to provide very fast computation to their users.

6. Network OS: Network Operating System runs on a server. It provides the capability to serve to manage data, users, groups, security, application, and other networking functions.

7. Mobile OS: Mobile operating systems are those OS which are especially that are designed to power smartphones, tablets, and wearables devices.

Functions of Operating System

Some typical operating system functions may include managing memory, files, processes, I/O system & devices, security, etc.

Main Functions of the Operating System

1. Process Management: Process management helps OS to create and delete processes. It also provides mechanisms for synchronization and communication among processes.

2. Memory Management: The memory management module performs the task of allocation and de-allocation of memory space to programs in need of these resources.

3. File Management: It manages all the file-related activities such as organization storage, retrieval, naming, sharing, and protection of files.

4. Device Management: Device management keeps track of all devices. This module also responsible for this task is known as the I/O controller. It also performs the task of allocation and de-allocation of the devices.

5. I/O System Management: One of the main objects of any OS is to hide the peculiarities of that hardware device from the user.

6. Secondary-Storage Management: Systems have several levels of storage which include primary storage, secondary storage, and cache storage. Instructions and data must be stored in primary storage or cache so that a running program can reference them.

7. Security: The security module protects the data and information of a computer system against malware threats and authorized access.

8. Command Interpretation: This module is interpreting commands given by the acting system resources to process those commands.

9. Networking: A distributed system is a group of processors which do not share a memory, hardware devices, or a clock. The processors communicate with one another through the network.

10. Job Accounting: Keeping track of time & resources used by various jobs and users.

11. Communication Management: Coordination and assignment of compilers, interpreters, and other software resource of the various users of the computer systems.

Features of Operating System (OS)

Here is a list of important features of OS:

- Protected and supervisor mode
- Allows disk access and file systems device drivers networking security
- Program Execution
- Memory management Virtual Memory Multitasking
- Handling I/O operations
- Manipulation of the file system

- Error Detection and handling
- Resource allocation
- Information and Resource Protection

Advantages of Operating System

- Allows you to hide details of hardware by creating an abstraction.
- Easy to use with a GUI.
- Offers an environment in which a user may execute programs/applications
- The operating system must make sure that the computer system is convenient to use
- Operating System acts as an intermediary among applications and the hardware components
- It provides the computer system resources with easy to use the format
- Acts as an intermediary between all hardware and software of the system

Disadvantages of Operating System

- If any issue occurs in OS, you may lose all the contents which have been stored in your system
- Operating system software is quite expensive for small size organizations which adds a burden on them. Example Windows
- It is never entirely secure as a threat can occur at any time.

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