18/10/24

Operating System

MODULE - 1 : Introduction to Operating system

1. Introduction : Defination, evolution, types of OS.
2. Operating System Sevices : Process management, networking, security.
3. System Calls : Introduction, types of system calls, API (Application Programming Interface)
4. System Structure : Layered architecture, monolithic vs, microkernel architecture.

MODULE - 2 : Process Management

1. Process Concept : Process defination, process states, process control block (PCB)
2. Process Scheduling : Premptive vs. non-premtive Scheduling algorithms (FCFS, SJF, priority, Round Robin).
3. Inter-process Communication (IPC) : Shared memory, msg passing, semaphores, mutexes
4. Process Synchronization : Critical section problem, semaphores, mutexs, monitor.

MODULE-3 Memory Management

1. Memory Management Techniques: Contagious allocation, paging segimentation.
2. Virtual Memory : Adress space and memory space, demand paging, page replacement, alorigthms (FIFO, LRU, optimal).
3. Thrashing : Causes, detection, and prevention
4. Memory ~~Fraction~~ Protection - Memory segementation and paging for protection, memory acess control.

MODULE-4 : File System Management

1. File ~~management~~ System Concept: File Organisation, directory structure, acess control mechanism.
2. File System Implementation : Indexed allocation, linked allocation, i-nodes.
3. File System Operation : Creating, deleting, opening, closing, reading writing, seeking
4. Disk Scheduling : FCFS, SCAN, C-SCAN, sechduling alogrithms.

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MODULE - 5 Security and Operating System

1. Operating System Security : Threats and vulnerabilities, user authentication, access control, encryption, firewalls

2. Case studies : Introduction to popular operating System like, windows, linux, and their key features.

Computer System structure

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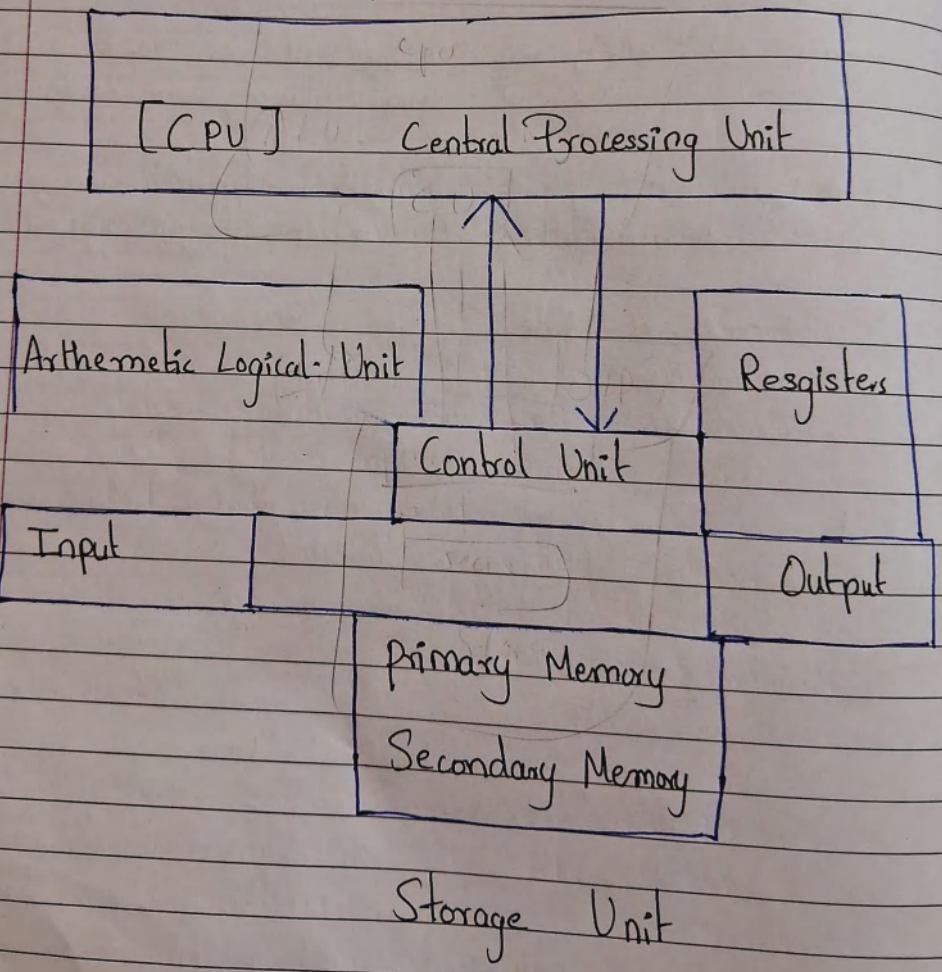
Computer Startup

Bootstrap program is loaded at power-up or reboot

Firmware – ROM, EPROM generally know as firmware
Initializes all aspects of system
Loads o.s kernel starts execution

Bootstraping is a proces



1. What is Operating System?
2. What are the four components of the Comp Operating System and architecture
3. List out the functions of the Operating System and Explain each
4. Explain Kernel

1. A program that acts an intermediate between a user of a computer and the computer hardware

2. The four components of four components

Hardware – provides basic computing resources.
→ CPU, memory, I/O devices

Operating system
→ controls and coordinates use of hardware among various application and users

Application → defines the ways in which the system resources are used to solve the computing problem of the users.

Users → people, machines, other computers

3 Function of the operating system

1. Resource management - The operating system and allocates memory, CPU time, and other hardware resources among the various program and process running on the computer

2. Process management - The Operating system is responsible for starting, stoping and managing process and programs

3. Memory management - The operating system manages the computer's primary memory and provide mechanisms for optimizing memory usage

4. Security - provides a secure environment for user, application and data by implementing security policies and mechanisms such as access control and encryption

5. Job accounting: It keeps track of time and resources used by various jobs or users.

6. file management - Responsible for organizing and managing the file system, including the file systems, including the creation, deletion and manipulation of files and directories.

7. Device management - O.S manages input/output devices such as printer, keyboards, mouse

8. Networking management :- The operating system provides networking capabilities such as establishing and managing network connections, handling network protocols and sharing resources such as printers.

9. User Interface - The system provides a User interface that enables users to interact with the computer system This can be graphical User Interface (GUI), a command Line Interface (CLI) or a combination of both

10. Backup and Recovery: provides mechanism for backing up data and recovering it in case of system failures errors or disasters.

11. Virtualization - Provides Virtualization capabilities that allow multiple operating System or applications to run on single physical machine.

12 Performance Monitoring : Provide tools for monitoring and optimizing system performance, including identifying bottlenecks optimizing resource usage and analyzing system logs and metrics

13 Time sharing :- It enables multiple users to share a computer system and its resources simultaneously by providing time-share mechanism that allocate re-sources fairly and efficiently.

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12. System calls :: The operating system provides a set of system calls that enable applications to interact with the O.S and access its resources.

4. The kernel is the core component of O.S that acts as a bridge between the O.S and computer's hardware.

Case Study

The main types of operating systems are: