2.1 Different Services of Operating System

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Services Provided by an Operating System

Service	Description	Service's Operation
Program Execution	Manages the execution of user and system programs.	- Loads programs into memory - Schedules execution - Handles process control
I/O Operations	Handles input and output operations for all devices connected to the system.	- Manages device drivers - Buffers input/output operations - Coordinates data transfers
File System Manipulation	Provides mechanisms for creating, deleting, reading, writing, and managing files and directories.	- Handles file creation - Manages file deletion - Manages file reading and writing - Manages directory management
Communication	Facilitates inter-process communication through shared memory, message passing, and sockets.	- Coordinates data exchange - Uses IPC mechanisms like shared memory and message passing - Manages sockets
Error Detection and Handling	Monitors system operations to detect and correct errors.	- Implements error-checking routines - Performs recovery procedures - Ensures system stability
Resource Allocation	Manages allocation and deallocation of resources like CPU time, memory, and I/O devices.	- Distributes CPU time - Allocates memory - Manages I/O resources - Handles resource deallocation
Accounting	Keeps track of resource usage for each user and process to optimize system performance and provide usage reports.	- Logs resource usage - Generates usage reports - Provides system and user activity data
Protection and Security	Ensures authorized access to system resources, protecting data and resources from unauthorized access.	- Enforces access controls - Manages user authentication - Uses data encryption

Service	Description	Service's Operation
User Interface	Provides a means for users to interact with the system, either through a CLI (Command Line Interface) or GUI (Graphical User Interface).	- Manages command input - Provides graphical displays - Handles system feedback
System Services	Offers various system calls and services to user programs for performing system-related operations.	- Provides API functions - Facilitates file operations - Supports process control - Manages application communication

Example Questions

Question	Answer
What does the OS do during program execution?	The OS loads programs into memory, schedules their execution, and controls their process lifecycle.
How does the OS manage I/O operations?	The OS uses device drivers to manage I/O operations, buffers data, and coordinates transfers between devices.
What is involved in file system manipulation by the OS?	The OS handles tasks such as creating, deleting, reading, writing, and managing files and directories.
What methods does the OS use for inter-process communication?	The OS uses shared memory, message passing, and sockets for inter-process communication.
Why is error detection and handling important in an OS?	It ensures the system remains stable by identifying and correcting errors that occur during operation.
How does the OS perform resource allocation?	The OS allocates CPU time, memory, and I/O resources based on process requirements and priorities.
What is the role of accounting in an OS?	Accounting tracks and reports on resource usage by different processes and users, helping with system optimization.
How does the OS provide protection and security?	By enforcing access controls, performing user authentication, and using encryption to protect data and resources.
What types of user interfaces are provided by the OS?	The OS provides either a CLI or GUI to facilitate user interaction with the system.
What are system services in the context of an OS?	System services include various system calls and APIs that allow user programs to perform system-related tasks.