x processes are initially kept in an area called job pool.

x one CPU and multiple processes

x CPU time will be allocated to a single process at a time.

x At some stages, if the admitted process needs some resources, for example, I/o devices, then that process will be temporarily suspended from the CPU and the CPU time will be allocated to the next process in the ready queue.

x A user cannot suspend a running process, only CPU can do that.

x Idle time of the CPU time is minimized and the response time will be increased.

III Multitasking / Timesharing OS

x Time quantum / slice

x multipgmming + CPU scheduling.

x Maximize CPU utilization

x Minimize Response Time

x No starvation

x User interactive

IV. Multi-Processing OS
* Multiple CPUs / Multiple Processors.

V. Real Time OS
* An operating system intended to serve real-time applications that process data as it comes-in, typically without buffer delays.
* Hard Real Time OS – process completed within exact time.
* Soft Real Time OS – within a given time.
  → Eg : Missile Launch

Files

→ A file is a collection of related information (sequence of bits) that is recorded on secondary storage.

→ It is a collection of logically related entities.

→ OS kernel contains file management module
  ↳ controlling file related applications.

→ Windows – folder
→ Linux – directory

File Concept

→ uniform logical view of information storage
  (logical storage unit)
→ OS maps files onto physical devices.
→ collection of related info. recorded on a
  secondary storage.
→ Smallest allotment of seconday storage

File Attributes (Properties of file)

- Name : only info kept in human-readable form
- Identifier : unique tag (number) identifies
  file within file s/m.
- Type : needed for s/ms that support diff.
  types
- Location : pointer to file location on device
- Size - current file size
- Protection : controls who can do reading,
  writing, executing
- Time, date and user identification - data for
  protection, security and usage monitoring.

File Management

- Main objectives of file management s/m are :

* It provides I/o support for a variety of storage device types.
* Minimizes the chances of lost or destroyed data.
* It provides I/o support for multiple users in a multiuser s/ms environment.

Properties of a File System.

* Files are stored on disk or other storage and do not disappear when a user logs off.
* Files have names and are associated with access permission that permits controlled sharing.
* Files could be arranged or more complex structures to reflect the relationship b/w them.

File Types — Name, Extension

9/9/21 File Operations

→ File is an abstract data type
  o Create
  o Write
  o Read
  o Reposition within file
  o Delete — entire file with attributes will be deleted

o Truncate – attributes will not be deleted but contents will be deleted.

→ Windows – GUI for file operations
→ Lenux – commands for the same

Access Methods

I. Sequential Access : read next
                        write next
                        reset

II. Direct Access : read n
                    write n
                    position to n
                    read next
                    write next
                    rewrite n

n = relative block number

o Sequential Access used in magnetic tapes.
o Write – append to end of file

Direct Access

→ directly access any record
→ based on disk
→ disk divided to blocks.

Directory Structure

- A collection of nodes containing information about all files.
- Both the directory structure and the files reside on disk.
- Backups of these two structures are kept on tapes.

Disk Structure

- Disk can be subdivided into partitions
- Disks or partitions can be RAID protected against failure
- Disk or partition can be used raw - without a file s/m or formatted with a file s/m.
- Partitions are also known as minidisks, slices

Operations Performed on Directory

→ Search for a file
→ Create a file
→ Delete a file
→ List a directory
→ Rename a file
→ Traverse the file s/m

why directory organization is important

→ Efficiency – locating a file quickly

→ Naming – convenient to users.
  ↳ Two users can have same name for different files.
  ↳ The same file can have several different names.

→ Grouping – logical grouping of files by ppties

I Single Level Directory

* A single directory for all users.

1) Naming Problem

2) Grouping Problem
  ↳ all users cannot have same file name
     (no users can have same file name)
  ↳ Grouping cannot be done

II. Two-Level Directory

* Separate directory for each user.
* can have same file name for diff user.
* Efficient searching
* No grouping capability

III - Tree - Structured Directories.

* Efficient searching
* Grouping Capability
* Current directory (working directory)
* Absolute or relative path name
* Creating a new file is done in current directory
* Creating a new subdirectory is done in current directory.
* It allows each user to create additional subdirectories
* allows us to use the current directory as a working directory without the need to specify the whole path name.
* The deletion of a directory must be recursive to delete all subdirectories and files under the directory
* None of the above three directory structure enable sharing of files or subdirectories

File System Mounting

* A file s/m must be mounted before it