

D) File :

→ data stored in comp. is in the form of file.

→ File is collection of related data.

→ File is stored on secondary memory

File system → File

For OS

For user

If is physical memory

logical memory

area to store data area to store data

data → File → directories / folders

→ File is divided into two types

host file

data file

(sequence of bits,
bytes, lines)

Program file

(set of instructions
given to machine)

→ File name :

Used to interact with user.

file name . extension

logical name

Identifying

given by user type of file.

D) Attributes : Properties of file which stores meta data (i.e. data about data) about file like date, time, creator, owner of file, etc.

→ Attributes are generated by File system except name of file.

Some attributes -

- ① Name: It is specified by user.
- ② Identifier: File system gives an unique tag or number which identifies file within file system.
- ③ Extension: Specifies what kind of file it is.
- ④ Location: Specifies place, where file is stored.
- ⑤ Size: Shows size of file in bytes, KB, MB, etc.
- ⑥ Protection: Specifies control over file for reading, writing, etc.
- ⑦ Time, date, user identification provides protection, security.
- ⑧ Password: Secret code known to file system and authorised user.
- ⑨ Creator: Who created that file.
- ⑩ Owner: Who owns that file currently.
- ⑪ Maximum size: No. of bytes to which file can maximum grow.

Operations :

- File is logical entity represents piece of info.
- It is abstract data type.
- System calls are provided by OS for performing operations on file.

Creating file → There should be space for creating file.
→ Entry of file must be in directory.

Writing a file → pointer is used to write data to file.

- pointer must points to end of file.
- write pointer must be updated time to time.

* System call tells name of file and data to write.

3) Reading a file :

→ Reads data from file using ~~write~~ ~~read~~ pointer

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→ System call tells name of file and location of the next block of file.

→ directory is searched where file entry is done & using read pointer it will read next block.

→ pointer will be updated after reading block.

4) Rewind a file :

→ Operation of repositioning or seeking operation which is used to rewind a file.

→ Current file position is set to beginning.

5) Delete a file :

→ searched directory for named file and

deleted file (releasing all space, removes directory entry of that file) and then

6) Close a file :

→ close the file till next usage

7) Truncate a file :

→ instead of deleting file, truncate it.

→ Truncated file will keep all file attribute as it is except file size, record length.

→ It will delete all content of file only and

8) Append :

→ adding new records at the end of file.

→ Used in DB files.

9) Seek :

→ It searches data / Record depending on specified condition. Used in random Access.

Get attributes.

For getting data about file.

Set attributes:

For setting attributes to file like + readable, archive, hidden, etc.

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b) Rename

Used to give new name to file.

File Types :

→ Info about file is stored in directory.

→ Device directory keep summary info about files.

Types of Files

① simple files

Also called regular

files. Contains user

information (text, programs)

④ Block special file

Also called physical

file. It provide buffered access to H/W devices. data handled in blocks.

② Basic files

Also called directories. It maintains structure of system. It is H/W file that

③ character special files

It is folder hold data from printers, mouse and more

organize multiple

files.

□ File structure:

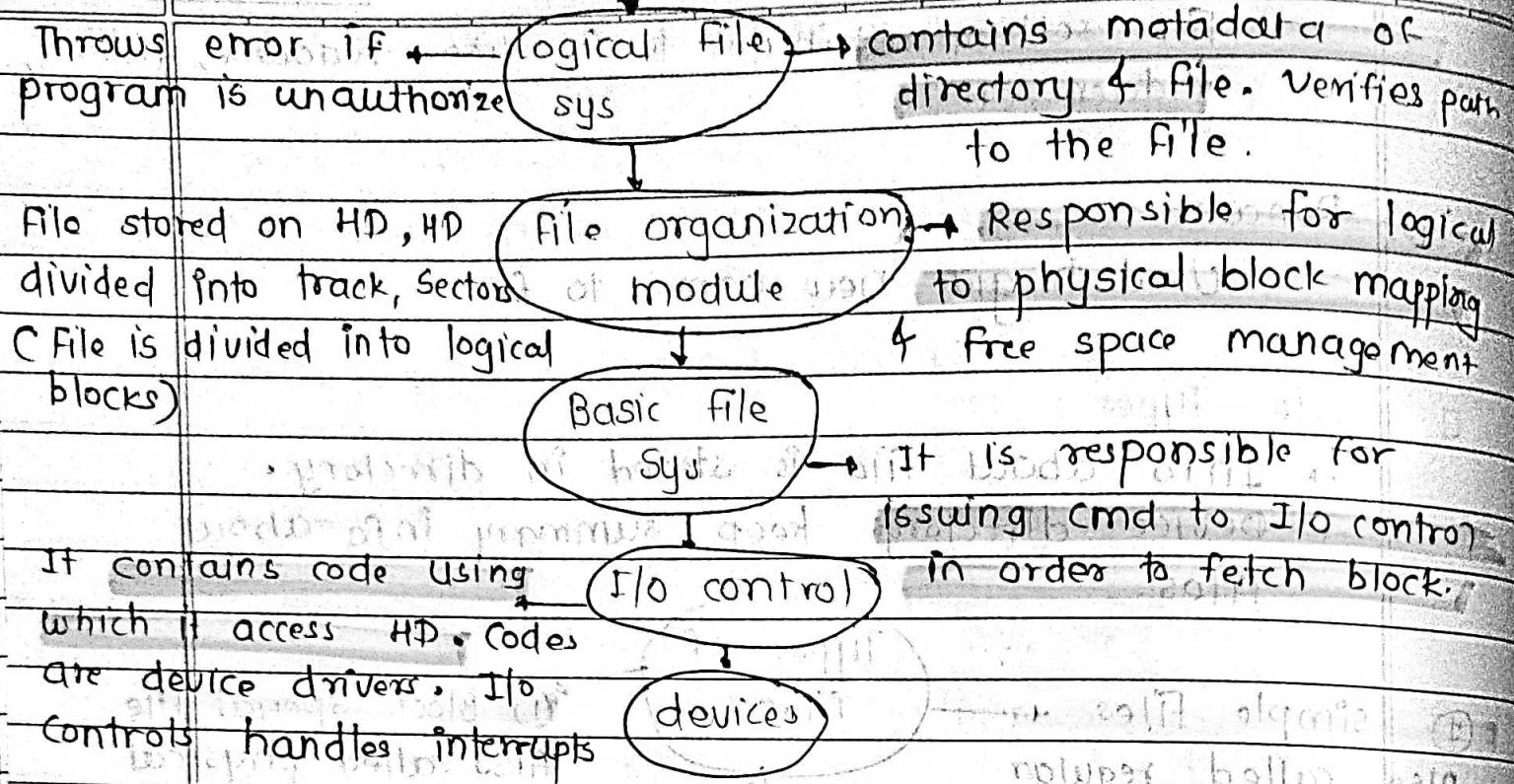
→ File system provides efficient access to the disk by allowing data to be stored, located & retrieved in convenient way.

→ OS uses layering approach for every task including file system.

Application programs

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File Access methods :

* Tape drive

Many files are stored in memory, when those files are required by application then OS has to read the computer memory and access the required file.

methods : ① Sequential

② Direct

③ Indexed Sequential

① Sequential : Tape drive

Here,

→ access of information occurs sequentially.

→ OS read the file one word by word

→ It uses the pointer which initially points to base address.

Operations of sequential access :

- ① Read next :- Recds the next portion of file
→ file pointer will automatically go to the next portion of file.

beginning ahead. But following all read operation
are divided at position to two places
not present in file and hence both read

- ② Write next :- It will automatically go to the end
of file and then contents are added at
the end of file.

- ③ Reset (Rewind) : It brings file read or write at
beginning of file.

Advantage : Easy implementation

Disadvantage : Time consuming.

- ④ Direct Access Method : Disk mode / split unit +
it required coincident database system, when filtered records
from database required

→ File is divided into fixed length blocks and
given id so that blocks are numbered, thus reads can
perform operation on any random numbered
block +
all block are equal
operations:

- ① Read n :
② Write n : n is block no.
③ Goto n :

Advantage : Immediate access

disadvantage : don't have back up facility

- ⑤ Indexed sequential access method -

→ Here, index for each file is created which contains
pointer to various location.

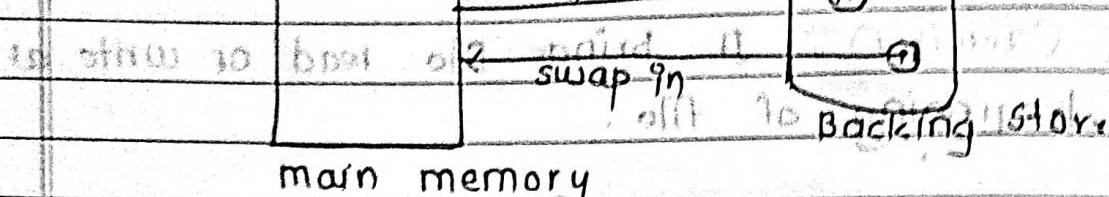
Swapping :

- memory management technique
- Any process must be in the

memory for its execution, but can be swapped temporarily out of memory to backing store and then again come back in memory for execution. It is called swapping.

Process to status and vice versa

status to busy or ready to



Round Robin Scheduling

→ Time slice is given

to processes

→ When time slice

expires memory manager swap out current

swap out those processes in process off

→ An swap in another process for execution

Priority-Based Scheduling

→ If higher priority

process enters in ready

queue, memory manager

swap out current

swap in - roll in

→ swap out - roll out

swap in - roll in

Swap in - process remove from secondary memory and placed in main memory

Swap out - Removing process from main memory and placed in backing store / secondary memory.

Interactions between OS and memory management

File Allocation Methods

There are many files that are present on same disk, problem is how to allocate these files so that disk space will be utilized effectively.

Contiguous File Allocation

Methods :

Linked File Allocation

Indexed File Allocation

Non contiguous

① Contiguous File Allocation -

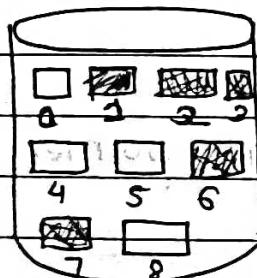
→ Each file occupies contiguous set blocks on disk.

→ Head movement is done from one track to another.

→ directory entry of file contains

① Address of starting file

② length of file



directory

	file	start	length	blocksize
1	file1	1	3	1
2	file2	4	2	1
3	file3	5	1	1

Advantages : → Faster data access

→ support direct and sequential Access

Disadvantages : → External fragmentation (space available but not contiguous)

→ file grow is not possible

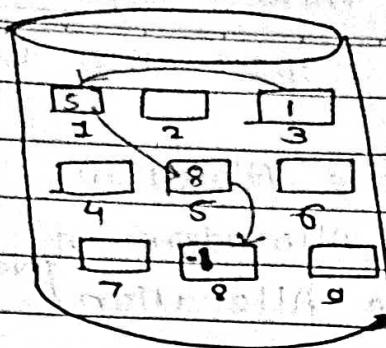
difficult.

② Linked list Allocation :

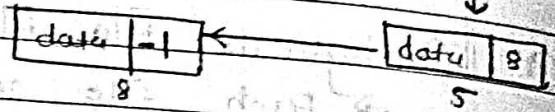
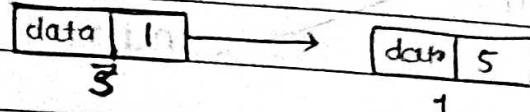
→ Non-contiguous allocation.

→ disk blocks of file are chained together with linked-list.

→ Directory contains pointer to first and last block file.



directory	file	start	end
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Advantages → Solve external fragmentation

→ File can grow

→ Start and end of file is easy to find.

Disadvantages: → pointer overhead

→ Not useful for direct access

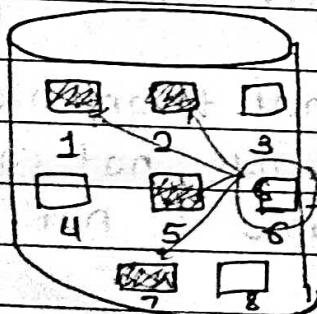
(Searching done from beginning)

→ Time consuming

Indexed Allocation

3) Indexed Allocation

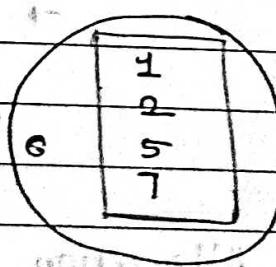
- Here, special Index block contains pointer to all blocks occupied by a file.
- Each file has own index block.
- Directory contains address of index block.



Index Allocation

File and Index block

A



Disadvantages:

→ Space wastage

→ pointer overhead

→ Not efficient to use index

box in case of small file.

Advantages: + Faster

→ Set of pointers are at one location

→ No fragmentation

→ Easy Access