

CS6401- Operating System**QUESTION BANK****UNIT-IV****Part-A****1. What is a File?**

A file is a named collection of related information that is recorded on secondary storage. A file contains either programs or data. A file has certain “structure” based on its type.

- ☐ File attributes: Name, identifier, type, size, location, protection, time, date
- ☐ File operations: creation, reading, writing, repositioning, deleting, truncating, appending, renaming
- ☐ File types: executable, object, library, source code etc.

2. List the various File Attributes.

A file has certain other attributes, which vary from one operating system to another, but typically consist of these: Name, identifier, type, location, size, protection, time, date and user identification.

3. What are the various File Operations?

The basic file operations are,

- ☐ Creating a file
- ☐ Writing a file
- ☐ Reading a file
- ☐ Repositioning within a file
- ☐ Deleting a file
- ☐ Truncating a file

4. What is the information associated with an Open File?

Several pieces of information are associated with an open file which may be:

- ☐ File pointer
- ☐ File open count
- ☐ Disk location of the file
- ☐ Access rights

5. What are the different Accessing Methods of a File?

The different types of accessing a file are:

- ☐ Sequential access: Information in the file is accessed sequentially
- ☐ Direct access: Information in the file can be accessed without any particular order.
- ☐ Other access methods: Creating index for the file, indexed sequential access method

6. What is Directory?

The device directory or simply known as directory records information- such as name, location, size, and type for all files on that particular partition. The directory can be viewed as a symbol table that translates file names into their directory entries.

7. What are the operations that can be performed on a Directory?

The operations that can be performed on a directory are,

- ☐ Search for a file
- ☐ Create a file
- ☐ Delete a file
- ☐ Rename a file
- ☐ Listdirectory
- ☐ Traverse the file system

8. What are the most common schemes for defining the Logical Structure of a Directory?

The most common schemes for defining the logical structure of a directory

- ☐ SingleLevel Directory
- ☐ Twolevel Directory
- ☐ Tree-Structured Directories
- ☐ AcyclicGraph Directories
- ☐ General Graph Directory

9. Define UFD and MFD.

In the two-level directory structure, each user has own user file directory. Each UFD has a similar structure, but lists only the files of a single user. When a job starts the system's master file directory

10. What is a Path Name?

A pathname is the path from the root through all subdirectories to a specified file. In a two-level directory structure a user name and a file name define a path name.

11. What is Access Control List?

The most general scheme to implement identity-dependent access is to associate with each file and directory an access control unit.

12. Define Equal Allocation.

The way to split ' m ' frames among ' n ' processes is to give everyone an equal share, m/n frames. For instance, if there are 93 frames and 5 processes, each process will get 18 frames. The leftover 3 frames could be used as a free-frame buffer pool. This scheme is called equal allocation.

13. What is the cause of Thrashing? How does the system detect thrashing? Once it detects thrashing, what can the system do to eliminate this problem?

Thrashing is caused by under allocation of the minimum number of pages required by a process, forcing it to continuously page fault. The system can detect thrashing by evaluating the level of CPU utilization as compared to the level of multiprogramming. It can be eliminated by reducing the level of multiprogramming.

14. If the average page faults service time of 25 ms and a memory access time of 100ns. Calculate the effective access time.

$$\begin{aligned}\text{Effective access time} &= (1-p) * ma + p * \text{page fault time} \\ &= (1-p) * 100 + p * 25000000 \\ &= 100 - 100p + 25000000 * p \\ &= 100 + 24999900p\end{aligned}$$

15. What is Belady's Anomaly?

For some page replacement algorithms, the page fault rate may increase as the number of allocated frames increases.

16. What are the types of Path Names?

Path names can be of two types.

- ☐ **Absolute path name:** Begins at the root and follows a path down to the specified file, giving the directory names on the path.
- ☐ **Relative path name:** Defines a path from the current directory.

17. What is meant by Locality of Reference?

The locality model states that, as a process executes, it moves from locality to locality. Locality is of two types.

- ☐ Spatial locality
- ☐ Temporal locality.

18. Define Seek Time and Latency Time.

The time taken by the head to move to the appropriate cylinder or track is called seek time. Once the head is at right track, it must wait until the desired block rotates under the read- write head. This delay is latency time.

19. What are the Allocation Methods of a Disk Space?

Three major methods of allocating disk space which are widely in use are

- ☐ Contiguous allocation
- ☐ Linked allocation
- ☐ Indexed allocation

20. What are the advantages of Contiguous Allocation?

The advantages are,

- ☐ Supports direct access
- ☐ Supports sequential access
- ☐ Number of disk seeks is minimal.

21. What are the drawbacks of Contiguous Allocation of Disk Space?

The disadvantages are,

- ☐ Suffers from external fragmentation
- ☐ Suffers from internal fragmentation
- ☐ Difficulty in finding space for a new file
- ☐ File cannot be extended
- ☐ Size of the file is to be declared in advance

22. What are the advantages of Linked Allocation?

The advantages are,

- ☐ No external fragmentation
- ☐ Size of the file does not need to be declared

23. What are the disadvantages of Linked Allocation?

The disadvantages are,

- ☐ Used only for sequential access of files.
- ☐ Direct access is not supported
- ☐ Memory space required for the pointers.
- ☐ Reliability is compromised if the pointers are lost or damaged

24. What are the various Disk-Scheduling Algorithms?

The various disk-scheduling algorithms are,

- ☐ First Come First Served Scheduling
- ☐ Shortest Seek Time First Scheduling
- ☐ SCAN Scheduling
- ☐ GSCAN Scheduling
- ☐ LOOK scheduling

25. What are the techniques used for performing I/O.

- ☐ Programmed I/O
- ☐ Interrupt driven I/O
- ☐ Direct Memory Access (

26. Give an example of an application in which data in a file should be accessed in the following order:

Sequentially - Print the content of the file.

Randomly - Print the content of record *i*. This record can be found using hashing or index techniques

27. What problems could occur if a system allowed a file system to be mounted simultaneously at more than one location?

There would be multiple paths to the same file, which could confuse users or encourage mistakes. (Deleting a file with one path deletes the file in all the other).

28. Why must the bit map for file allocation be kept on mass storage rather than in main memory?

In case of system crash (memory failure), the free-space list would not be lost as it would be if the bit map had been stored in main memory.

Part-B

1. Write briefly about file attributes, operations, types and structure.
2. Discuss in detail about file allocation methods. What are the possible structures for directory? Discuss them in detail.
3. Explain about disk scheduling and any of its two algorithms with suitable example.
4. Explain the following:
 - a. RAID
 - b. I/O in Linux
5. Write a detailed note on various file access methods with neat sketch.
6. Explain in detail about free space management with neat diagram.
7. a. Describe the two levels and tree type directory structures in detail.
 - b. Describe the life cycle of an I/O request in detail.
8. a. Describe the Windows XP file system in detail.
 - b. Explain the directory structure of Linux operating system.
9. a. Describe how the disk space from deleted files can be reused.
 - b. Explain in detail the process management and file system in LINUX system.
10. Suppose that the disk drive has 5000 cylinders number 0 to 4999. The drive is currently serving a request at cylinder 143 and the previous request was at 125, the queue of the pending request in FIFO order is: 86,1470,913,1174,948,1509.1022,1750,130 starting from the current head position, what is the total distance (cylinders) that the disk arm moves to satisfy all the pending requests for each of the disk scheduling algorithms.
 - i. SSTF
 - ii. SCAN
 - iii. LOOK
 - iv. C-LOOK