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Operating System (lab)

Assignment: 02

Question:

Consider a system that supports the strategies of contiguous, linked and indexed allocation. What criteria should be used in deciding which strategy is best utilized for a particular file? Also compare different file allocation strategies.

Answer:

Contiguous file allocation:

Contiguous file allocation is one of the most used method for allocation. Contiguous allocation means we allocate the block in such a manner, so that in the hard disk, all the blocks get the contiguous physical block.

If the file is usually accessed sequentially if the file is relatively small.

Advantages of Contiguous Allocation:

- 1- Contiguous allocation is easy to implement.
- 2- The contiguous allocation method gives excellent read performance.
- 3- The contiguous allocation method supports both types of file access methods that are sequential access and direct access.

Disadvantages of contiguous Allocation:

- 1- In contiguous allocation method, sometimes disk can be fragmented.
- 2- In this method, it is difficult to increase the size of the file due to availability of the contiguous memory blocks.

Linked List Allocation:

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In this file allocation method, each file is treated as a linked list of disk blocks. In this method, it is not required that disk blocks assigned to a specific file are in the contiguous order on the disk. The directory entry comprises of a pointer for starting file block and also for the ending file block.

Advantages of linked list Allocation:

- 1- In this method, there is no external fragmentation. Due to this, we can utilize the memory better.
- 2- In this method, a directory entry only comprises of the starting block address.

Disadvantages of linked list Allocation:

- 1- This method does not support direct access or random access.
- 2- In this method, we need to traverse each block.
- 3- In the disk block for the pointer, it needs some extra space.

Indexed file Allocation Method:

In this method, we have an additional block, and that block is known as the index block. For each file, there is an individual index block. In the index block, the i th entry holds the disk address of the i th file block. If the file is large and we usually accessed those files randomly.

Advantages of Index Allocation:

- 1- This method solves the problem of external fragmentation.
- 2- Index allocation provides direct access.

Disadvantages of Index Allocation:

- 1- In index allocation, pointer overhead is more.
- 2- we can lose the entire file if an index block is not correct.
- 3- It is totally a wastage to create an index for a smaller file.