

Worksheet 8

1. The open-file table is used to maintain information about files that are currently open. Should the operating system maintain a separate table for each user or just maintain one table that contains references to files that are being accessed by all users at the current time? If the same file is being accessed by two different programs or users, should there be separate entries in the open file table?
2. Sequential access can simulate direct access, and direct access can also simulate sequential access. Which simulation is more efficient? Justify your answer.
3. In two-level directory, how do users access system files?
4. Consider a system where free space is kept in a free-space list. Suppose that the pointer to the free-space list is lost. Can the system reconstruct the free-space list? Explain your answer. Suggest a scheme to ensure that the pointer is never lost as a result of memory failure.
5. 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?
6. Consider a file currently consisting of 200 blocks. Assume that the file control block (and the index block, in the case of indexed allocation) is already in memory. Calculate how many disk I/O operations are required for contiguous, linked, and indexed (single level) allocation strategies, if for one block, the following conditions hold. In the contiguous-allocation case, assume that there is no room to grow in the beginning, but there is room to grow in the end. Assume that the block information to be added is stored in memory.
 - a. The block is added at the beginning
 - b. The block is added at the middle
 - c. The block is added at the end
 - d. The block is removed from the beginning
 - e. The block is removed from the middle
 - f. The block is removed from the end
7. Why must the bit-map for file allocation be kept on mass storage, rather than in main memory?
8. Consider a file system on a disk that has both logical and physical block size of 512 bytes. Assume that the information about each file is already in memory. For each of the three

allocation strategies (contiguous, linked, and indexed), answer these questions:

- a. How is the logical-to-physical address mapping accomplished in this system? (For the indexed allocation, assume that a file is always less than 512 blocks long)
- b. If we are currently at logical block 10 (the last block accessed was block 10) and want to access logical block 4, how many physical blocks must be read from the disk?