Stamatios Morellas
COM S 352 - Homework 10
Due 4/24/20 @ 11:59pm

Ex. 13.9 (10 points)

It is possible for a file to confuse its data with an old link. So if the old file is deleted and replaced with a new one in the same storage area or with the same absolute path, then the old file data will be displayed instead of the new one. To prevent this, one must ensure that when deleting a file, all of the links should be deleted as well.

Ex. 13.10 (10 points)

The operating system should maintain one central table of references to files being accessed. If a file is being accessed by multiple user processes and that file is deleted, it should only be removed from the disk when all of the processes that are accessing it have closed it. This is only possible with a central table. If the same file is being accessed by two different users, there needs to be a way to keep track of the two individual states for the processes accessing the same file.

Ex. 13.12 (10 points)

Sequential: Music players, video players, word processors
Random: Databases, video editors, sound editors

Ex. 14.8 (12 points)

Contiguous allocation

A file occupies a certain set of blocks on the disk. The blocks that are occupied can be determined by using the starting block address as well as the total length of the file. For this technique, both sequential and random file access are supported. This method is also very fast since it allows for the number of seeks to be minimized.

Linked allocation

For this technique, every file is linked to a set of disk blocks, which can be located anywhere on the disk since the allocation of blocks is not contiguous. This method is desirable because the size of the file can very easily be changed since the system does not have to search for a contiguous block. It also is very efficient for memory utilization.

Indexed allocation:

For this technique, there exists an ‘index’ block, which contains pointers to every block that is occupied by a specific file, hence the term index. Every file has its own index block. This supports direct access to the blocks that are occupied by a file, so it is very efficient. It also defeats the problem of external fragmentation.

Ex. 14.9 (6 points)

The advantages are as follows:

- Random-access time will be improved since the disk head is able to find the location of any block by reading the information in FAT.
- The location of a block that is stored in the middle of a file can be determined by analyzing the pointers that are stored in the FAT instead of attempting to find a block in a sequential manner.

Ex. 14.14, part b. (6 points)

For contiguous: 1 block
For linked: 4 blocks
For indexed: 2 blocks

Ex. 14.15 (6 points)

$$(12 * 8KB) + (2048 * 8KB) + (2048 * 2048 * 8KB) + (2048 * 2048 * 2048 * 8KB) = 64\, terabytes$$