Written Assignment #2

Due: Check My Courses

To be completed in groups of 2-3 students. Submit a PDF file containing the answers with the names and student IDs of all the group members.

In this written assignment you will describe a simple file system design by showing the pseudo code for the key operations performed in a file system. You need to use the simple file system as described in the PA3 handout. You can make further assumptions on top of the design provided in that handout. Also, you can take material from that handout to answer the questions posed here. The purpose of this assignment is to make you think through the design of the simple file system.

You can illustrate the pseudo codes with diagrams as appropriate.

1. Provide all major data structures you would use in the file system design. Categorize them as: on-disk and in-memory. Note that all on-disk data structures need to deal with the block-oriented storage organization. Suppose a directory entry is 100 bytes (for discussion sake), a 1024-byte disk block would hold 10 directory entries plus a portion of the 11^{th} block.
2. Categorize the in-memory data structures as primary data holders and cache memory data holders. You obtain better performance from the file system by increasing the number of cache memory data holders in the system. However, you need to allocate primary data holders for a properly functioning file system.
3. Provide the pseudo code for a function that initializes the simple file system. Your simple file system is running over a disk (an array of blocks that are randomly addressable). The initialization function is responsible for writing the formatting information onto the disk. You cannot use the disk without the initialization step. That is, you cannot create a file before running this step. The initialization step does not store any data. It would create the root directory and make the file system ready for storing files.
4. Provide the pseudo code for a function that creates a file. In this file system we don't have any directories. So, all files are stored in the root directory of the file system.
5. Provide the pseudo code for a function that writes to a file. Assume that the file is already open.
6. Provide the pseudo code for a function that reads from a file. Assume that the file is already open.
7. Provide the pseudo code for a function that closes the file system.