CSC345 Operating Systems
Class 29 File Systems Programming Project
April 11, 2015

Part 1: Developing a simulated disk
Completion date: Monday, April 18

Create an environment that provides the functionality of a disk. You will use a single large Linux file to "create" the disk. The host file is to be divided into blocks of size 4096 bytes to simulate the cluster size in the advanced format used in modern hard drives.

As a first step, Review section 11.1.2 File Operations in Silberschatz. Then, you should read the Linux man pages on system calls to open, read, write, and seek files, as well as any other system calls you may need. These descriptions are available from the command line, or you may use an online resource such as http://linux.die.net/man/ or https://www.kernel.org/doc/man-pages/, or other sources.

The disk interface you are to support is summarized as follows:

int openDisk(char *filename, int nbytes);
openDisk opens the filename file for reading and writing.
openDisk returns a descriptor which is used to access the disk.
The file size is specified as nbytes.
If filename does not already exist, openDisk creates the file.

int readBlock(int disk, int blocknum, void *block);
readBlock reads the disk block blocknum from the disk into a buffer pointed to by block.

int writeBlock(int disk, int blocknum, void *block);
writeBlock writes the data in block to disk block blocknum into the disk.

void syncDisk();
syncDisk forces all outstanding writes to the disk.

Each call returns an error if the underlying Linux system call fails.

Your solution must be written in C and execute on the Linux lab machines in the "Simpsons" environment. Your project must be your original work. Standard programming practices must be used, including coding documentation. Submit a report that discusses the design and implementation of your disk simulation, the code that implements the disk simulation, and a discussion with exhibits of your testing. Include a user's manual in your documentation that discusses compilation details and how use the program. (Your submission should be self-contained and self-explanatory such that I could hand off your project to a student next year for use in a different project.)

You may work in a small group of 2-3 people. You will be working with this self-selected group for all phases of the project. Please self-identify group membership by signing into a group on Canvas. The first person to sign up is the designated team leader. https://guides.instructure.com/m/4212/l/64913-how-do-i-join-a-group-as-a-student