Advanced OS
Assignment #4 - Inode based file system Implementation
Deadline: 24/11/2021 (11:55 pm)

Guidelines:

- Languages Allowed: C/C++
- Submission format: <rollno>_a4.zip
- Zip should contain **a single C++ file** and a readme file.
- **ZERO tolerance towards any kind of code plagiarism. Plagiarism will fetch you a ZERO or 'F' in the course.**

Pre-requisites:

- C++
- Working of inode
- Working of File Handling
- Working of System Calls

Goal:

- In this assignment, you need to build an Inode-based file system with limited functionality.
- This file system is a simplified version of a typical UNIX file system and thus serves to introduce some of the basic on-disk structures, access methods, and various policies that you will find in many file systems today.

Architecture Overview:

The following things will be present in the application:

Section1:

This is the region outside the disks. From here you will create a disk and then mount/open it to perform all basic operations mentioned in section 2.

- **create disk:** Creates an empty disk of size 500Mb.
  While creating an empty disk a unique name will be given to it which will be used to mount it.
- **mount disk:** Opens the specified disk for various file operations. As mentioned in section 2.
- **exit:** Close the application.

Section 2:
This is the region inside the disk. You may have multiple disks. You will open only 1 disk at a time. After opening/mounting a particular disk, you will perform below mentioned operations in the disk:

1. **create file:** creates an empty text file.
2. **open file:** opens a particular file in read/write/append mode as specified in input, multiple files can be opened simultaneously.
3. **read file:** Displays the content of the file.
4. **write file:** Write fresh data to file(override previous data in file).
5. **append file:** Append new data to an existing file data.
6. **close file:** Closes the file.
7. **delete file:** Deletes the file.
8. **list of files:** List all files present in the current disk.
9. **list of opened files:** List all opened files and specify the mode they are open in.
10. **unmount:** Closes the currently mounted disk.

Working:

For this assignment, you have to perform operations in a menu-driven fashion as specified below:

<u>Section 1:</u>

Disk Menu:
1: create disk
On press 1: Take unique disk name as input on next line.
2: mount disk
On press 2: Open the disk for mounting purposes(display options of section2 for that disk).
3: exit
On press 3: Exit the application.

Section 2:

Mounting Menu:

1: create file

On press 1: Take unique file name as input on next line.

2: open file

On press 2: Take file name as input on next line.

Then take file mode as input as mentioned below on next line:

0: read mode

1: write mode

2: append mode

** After specifying the mode, display the file descriptor allocated to the opened file along with the mode in which the file is opened.

3: read file

- **On press 3**: Take input file descriptor of the file which you want to read.
- File descriptor has been obtained in the open file command.

4: write file

- **On press 4**: Take input file descriptor of the file which you want to write.
- File descriptor has been obtained in the open file command.
- Enter file content that you want to write in the file.

5: append file

- **On press 5**: Take input file descriptor of the file to which you want to append further text.
- File descriptor has been obtained in the open file command.
- Enter the file content that you want to append to the file.

6: close file

- **On press 6**: Take the input file descriptor of the file to which you want to close.

7: delete file

- **On press 7**: Take the input file name which you want to delete.

8: list of files

- **On press 8**: List all existing files on the disk.

9: list of opened files

- **On press 8**: List all existing files which are currently open along with their file descriptors and mode in which they are open.

10: unmount

- **On press 10**: Unmount/close the disk which is current mount(in which you are working currently) and return to the previous menu.