## 操作系统 课程设计

**Operating Systems, Module Practice**

**Spring 2024** 钟竞辉

### Important dates

2024/05/10 2:00pm Q&A using Tencent Meeting

2024/06/10 Submission Deadline

2024/06/14 9:00am~12:00pm Demonstration (10 mins each group)

### Requirements

1. Review Unix file system design and i-node usage.
2. Design and implement an i-node-based Unix-style file system.
3. Implement basic functionalities specified in the following section.
4. The task needs to be completed using C++ ONLY

### Tasks/Functionalities

The following functions are required in your file system:

1. Allocate **16MB** space in memory as the storage for your file system. The space is divided into blocks with block size 1KB

Assume **address length is 24-bit，**please design your virtual address structure.

Design what information should be contained in an i-node

The i-node should support **10 direct block addresses, and** **one indirect block address**

1. The first a few blocks can be used for storing the i-nodes, and the first i-node can be used for the root directory (/).

(You can design the structure as you like, as long as it is reasonable and well explained in your report.)

1. Using random strings to fill the files you created. It means you just need to specify the file size (in KB) and path+name.
2. Following commands should be supported in your system：
   1. A welcome message with the group info (names and IDs) when the system is launched. It is also the claim of your ‘copyright’
   2. Create a file：**createFile** **fileName fileSize**

i.e.：createFile /dir1/myFile 10 (in KB)

**if fileSiz > max file size, print out an error message**.

* 1. Delete a file：**deleteFile** filename

i.e.：deleteFile /dir1/myFile

* 1. Create a directory：**createDir**

i.e.：createDir /dir1/sub1 (should support nested-directory)

* 1. Delete a directory：**deleteDir**

i.e.: deleteDir /dir1/sub1 （The current working directory is not allowed to be deleted）

* 1. Change current working direcotry：**changeDir**

i.e.: changeDir /dir2

* 1. List all the files and sub-directories under current working directory：**dir**

You **also need to list at least two file attributes**. (i.e. file size, time created, etc.)

* 1. Copy a file : **cp**

i.e.: cp file1 file2

* 1. Display the usage of storage space：**sum**

Display the usage of the 16MB space. You need to list how many blocks are used and how many blocks are unused.

* 1. Print out the file contents: **cat**

Print out the contents of the file on the terminal

i.e: cat /dir1/file1

* 1. You are NOT required to implement the function of Login!

1. **Loading and exiting**: exit the program and release all the memory occupied, but the contents of the memory should be stored on your disk for re-loading；

### Submissions

An individual report is required to be submitted for each group. The report should follow the listed requirements:

1. **Using university lab report template**
2. Store your report in a fold named as “Chinese GroupID” or “Foreign GroupID” (e.g., “Chinese 1”, “Foreign 1”).
3. **Source code and screenshots should be zipped** as file called “extra.zip”, and stored to the same fold mentioned above.
4. **Each group contains 2-3 students. The student ID and name of each group member should be clearly listed in the report. The contributions of each group member should also be clearly described in the report.**

**Submission Link:**

**https://send2me.cn/H8038rKL/QmqpXkL5EyP1yA**

**截止时间：2024-06-10 23:59**