操作系统 课程设计

Operating Systems, Module Practice

Spring 2019 王昊翔

This is a group project.

Important dates

2019/03/13 Project briefing, A3-408
2019/03/20 Group list
2019/05/22 Submission
2019/05/29 Demonstration
ALL Wednesdays!

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**

2. 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.)

3. Using random strings to fill the files you created. It means you just need to specify the file

size (in KB) and path+name.

4. Following commands should be supported in your system：
   a) A welcome message with the group info (names and IDs) when the system is launched. It is also the claim of your ‘copyright’
   b) Create a file：**createFile fileName fileSize (5 marks)**

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

      if fileSiz > max file size, print out an error message.
   c) Delete a file：**deleteFile** filename **(5 marks)**

      i.e.：deleteFile /dir1/myFile
   d) Create a directory：**createDir (5 marks)**

      i.e.：createDir /dir1/sub1 (should support nested-directory)
   e) Delete a directory：**deleteDir (5 marks)**

      i.e.: deleteDir /dir1/sub1 （The current working directory is not allowed to be deleted）
   f) Change current working direcotry：**changeDir (5 marks)**

      i.e.: changeDir /dir2
   g) List all the files and sub-directories under current working directory：**dir (5 marks)**

      You **also need to list at least two file attributes**. (i.e. file size, time created, etc.)
   h) Copy a file : **cp (5 marks)**

      i.e.: cp file1 file2
   i) Display the usage of storage space：**sum (10 marks)**

      Display the usage of the 16MB space. You need to list how many blocks are used and how many blocks are unused.
   j) Print out the file contents: **cat (5 marks)**

      Print out the contents of the file on the terminal

      i.e: cat /dir1/file1
   k) You are NOT required to implement the function of Login!

5. Answer following questions in your report:
   a) **What is the maximum number of files does your file system support and why?**
   b) **What is the maximum file size supported and why?**
   c) **How do you track the usage of blocks?**

6. **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；**(10 marks)**

Submissions

An individual report is required to be submitted for each of you. Your report should follow the listed requirements:

1. **Using university lab report template**

2. **Group work, but individual report. Each group contains 2-3 students. You need to specify your contribution clearly in your report.**
3. **NO PLAGIARISM**.
4. Store your report in a fold named as “studentID-name”(for example “20160123456789-张三”.doc). **Do NOT zip your report file**.
5. **Source code and screenshots should be zipped** as file called “extra.zip”, and stored to the same fold mentioned above.

Deadline:

A CD with all the files burned should be submitted before 2019/05/22

Please also email me the all-in-one zip file to hxwang@scut.edu.cn

Marking Schema

Report:	**30**
Submission structure	**10**
Functionalities:	**60**
Total:	**100**