

CSC 246 Spring 2019 Homework 5

Due: April 8 2019, 11:55PM

ChangeLog

03/31: clarify that directory information needs to be printed by myls

03/28: first version online

Problem 1

Consider a disk with 5,000 cylinders. Assume that the tracks on one of its platters are numbered 0 to 4,999. The disk arm is currently at cylinder 2,150 and the previous request was at cylinder 1,805.

1. List the orders with which the disk processes the following requests: 2,069; 1,212; 2,296; 2,800; 544; 1,618; 356; 1,523; 4,965; 3,681 with three different scheduling algorithms FCFS, SCAN, or C-SCAN.
2. Calculate the total distance (in cylinders) that the disk arm moves to satisfy all the pending requests with each scheduling algorithm.

Put your answers in problems.txt (ASCII file).

Problem 2

The following two questions are generated with the script [vsfs.py](#), which is introduced at the end of Chapter 40. Get yourself familiarized with the script by reading the corresponding README-vsfs and try some problems generated by it. Then please answer the following eight questions.

Initial state:

```
inode bitmap  10000000
inodes        [d a:0 r:2] [] [] [] [] [] [] []
data bitmap   10000000
data          [(.,0) (.,0)] [] [] [] [] [] [] []
```

Which operation took place?

```
inode bitmap  11000000
inodes        [d a:0 r:2] [f a:-1 r:1] [] [] [] [] []
data bitmap   10000000
data          [(.,0) (.,0) (b,1)] [] [] [] [] [] [] []
```

Which operation took place?

```
inode bitmap  10000000
inodes        [d a:0 r:2] [] [] [] [] [] [] []
```

```
data bitmap 10000000
data        [(.,0) (.,0)] [] [] [] [] [] [] []
```

Which operation took place?

```
inode bitmap 11000000
inodes       [d a:0 r:2] [f a:-1 r:1] [] [] [] [] [] []
data bitmap 10000000
data         [(.,0) (.,0) (j,1)] [] [] [] [] [] [] []
```

Which operation took place?

```
inode bitmap 11000000
inodes       [d a:0 r:2] [f a:1 r:1] [] [] [] [] [] []
data bitmap 11000000
data         [(.,0) (.,0) (j,1)] [r] [] [] [] [] [] []
```

Which operation took place?

```
inode bitmap 10000000
inodes       [d a:0 r:2] [] [] [] [] [] [] []
data bitmap 10000000
data         [(.,0) (.,0)] [] [] [] [] [] [] []
```

Which operation took place?

```
inode bitmap 11000000
inodes       [d a:0 r:2] [f a:-1 r:1] [] [] [] [] [] []
data bitmap 10000000
data         [(.,0) (.,0) (c,1)] [] [] [] [] [] [] []
```

Which operation took place?

```
inode bitmap 11100000
inodes       [d a:0 r:3] [f a:-1 r:1] [d a:1 r:2] [] [] [] [] []
data bitmap 11000000
data         [(.,0) (.,0) (c,1) (d,2)] [(.,2) (.,0)] [] [] [] [] [] []
```

Which operation took place?

```
inode bitmap 11100000
inodes       [d a:0 r:3] [f a:-1 r:2] [d a:1 r:2] [] [] [] [] []
data bitmap 11000000
data         [(.,0) (.,0) (c,1) (d,2)] [(.,2) (.,0) (v,1)] [] [] [] [] [] []
```

Put your answers in problems.txt (ASCII file).

Problem 3

Write a program that lists files and directories in the given directory. When called without any arguments, the

program should just print the file and directory names. When invoked with the `-l` flag, the program should print out information about each file and directory, such as the owner, group, permissions, and other information obtained from the `stat()` system call. The program should take one additional argument, which is the directory to read, e.g., `"mys -l directory"`. If no directory is given, the program should just use the current working directory. Useful interfaces: `stat()`, `opendir()`, `readdir()`, `getcwd()`.

Note that this is one problem from OSTEP Chapter 39.

Expected output format are listed below. In total we will test four different commands: `"/mys"` and `"/mys -l"`, and each may be supplied with an optional directory path. No specific order is required when you print out the names under one directory.

```
eos$ ./mys [/optional/path/to/your/directory]
```

```
.
```

```
..
```

```
mys.c
```

```
mys
```

```
eos$ ./mys -l [/optional/path/to/your/directory]
```

```
drwx-----  2 gjin2    ncsu          2048 Wed Mar 27 18:46:05 2019 .
drwx-----  4 gjin2    ncsu          2048 Wed Mar 27 18:40:16 2019 ..
-rw-----  1 gjin2    ncsu          2553 Wed Mar 27 18:45:41 2019 mys.c
-rwx-----  1 gjin2    ncsu          9761 Wed Mar 27 18:46:05 2019 mys
```

After you finish, turn in your `mys.c`, `README`, and `Makefile`.