



Computer Assignment #3  
Faculty of Computer  
Engineering and Science

In the Name of God

# Operating Systems Assignment

Instructor: Shameli

Due Date: 98/10/19, 23:59  
PM

98-99 First Semester

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## Assignment 3 - File System

### Question 1:

Write a program that implements the following disk-scheduling algorithms: FCFS, SSTF, SCAN, C-SCAN, Look and C-Look. Your program will service a disk with 5000 cylinders numbered 0 to 4999. The program will generate a random series of 1000 cylinder requests and service them according to each of the algorithms listed above. The program will be passed the initial position of the disk head (as a parameter on the command line) and report the total amount of head movement required by each algorithm.

### Question 2:

Create file1.txt and put some random text in it. Next, obtain the inode number of this file with the command:

```
ls -li file1.txt
```

This will produce output similar to the following:

```
16980 -rw-r--r-- 2 os os 22 Sep 14 16:13 file1.txt
```

The ln command creates a link between a source and target file. This command works as follows:

```
ln [-s] <source file> <target file>
```

UNIX provides two types of links: (i) hard links and (ii) soft links. A hard link creates a separate target file that has the same inode as the source file. Enter the following command to create a hard link between file1.txt and file2.txt:

```
ln file1.txt file2.txt
```

What are the inode values of file1.txt and file2.txt? Are they the same or different? Do the two files have the same or different contents? Next, edit file2.txt and change its contents. After you have done so, examine the contents of file1.txt. Are the contents of file1.txt and file2.txt the same or different? Next, enter the following command which removes file1.txt:

```
rm file1.txt
```

Does file2.txt still exist as well? Afterwards, remove file2.txt by entering the command:

```
strace rm file2.txt
```

The strace command traces the execution of system calls as the command `rm file2.txt` is run. What system call is used for removing `file2.txt`? A soft link (or symbolic link) creates a new file that points to the name of the file it is linking to. In the source code available with this text, create a soft link to `file3.txt` by entering the following command:

```
ln -s file3.txt file4.txt
```

After you have done so, obtain the inode numbers of `file3.txt` and `file4.txt` using the command

```
ls -li file*.txt
```

Are the inodes the same, or is each unique? Next, edit the contents of `file4.txt`. Have the contents of `file3.txt` been altered as well? Last, delete `file3.txt`. After you have done so, explain what happens when you attempt to edit `file4.txt`.

### How to submit your assignment?

You should zip all your source code and upload it through the courseware.

Please use the following format to name your file:

`OS_CA_<num>_<studentId>.zip`