Systems Programming 1 – 300167

Tutorial and Lab Practice Four (follows Lecture Four).
This work will not be marked. You should complete it within one week.

Tutorial

1. Read chapter two of the textbook. Study/review C data type, especially structure and pointer.
2. Review the terminology introduced and concepts taught in lecture 4.
3. Review Unix I/O primitive system calls *open*, *read*, *write* and *creat*. Explain their functions.
4. Describe how unix command *cp* works.

Lab Practice

1. Practise Unix commands man, ls, cp, who etc. from chapter two of the textbook.
2. Experiment with opening the same file several times. Write a program that does the following:

   (a) Open a file for reading, then
   (b) Open the same file for writing, then
   (c) Open the same file for reading.

   You should now have three file descriptors. The program should then

   (d) read 50 bytes using the 1st *fd* and print what you get
   (e) Write the string "testing 1 2 3 ..." using the 2nd *fd*
   (f) Read 50 bytes using the 3rd *fd* and print what you get.

3. *lseek* allows you to set the current position to locations after the end of the file. For example,
   lseek(fd, 100, SEEK_END)
   sets the position to 100 bytes past the end of a file. What happens if you *read* data after the end of a file? What happens if you *write* data after the end of a file? Try some large value, something like writing "hello" at 20000 bytes after the end of a file. You can check the size of a file with unix command *ls -al*.
4. What does the standard cp do if you try to copy a file onto itself? For example: cp file file. What do you think is the correct action? Modify cp1.c (in the lecture 4) to handle that situation.

Optional Work (for those students who wish to practise more)

1. The standard version of *cp* silently overwrites existing files. That is, if you have an existing file called *file2* and if you type:
   cp file1 file2
   you will destroy the original content of *file2*. The standard version of *cp* supports a *-i* option which causes the program to ask you before writing over a file. Add this feature to cp1.c.