Lab and Homework #3

Introduction to Operating Systems CS-UY 3224 | CS-UY 3224G

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Due date for the Homework problems : September 25th, 2023 by 5 PM, Paris time

Please hand in through the *Assignments* option on *Brightspace*.

Question 1: *A bit of commands in Unix/Linux.*

Please work on this question from the Terminal. Make a directory `Lab3` in your home directory and work from there.

In this exercise we wish to understand the serial and the parallel commandes in the shell. The commands to be executed in a series can be written in one line after the prompt and separated by ; . The commands in parallel are separated by the pipe | , where the output of one command serves as the input of the next. We also learn the basic scripts editor `sh`.

- Make and execute on the same line of a prompt a series of commands which achieves the following:

  show the current directory, give a listing of its contents, make a new directory `class`, list the contents of the current directory, move to the directory `class`, show its contents, show the current directory, move up one directory, show the current directory

- Make a file `series.sh` which consists of the commands you put on line in the previous item, each finishing by ; . Make the file executable. The file is now a *shell script* which you can execute by running `./series.sh`. It will have the same effect as the commands you run in series in the previous item.

- Create a pipeline which searches all the files finishing by `.sh` for the lines containing the word `pw`, then sorts the lines received, sends them to `head`, which sends the first 20 to `tail`, which writes the last 5 in the file called `fileo`.

To do at home and hand in: The files `series.sh` and asciifileo.

Question 2: *C for communication.*

In this exercise you are asked to write a C program that emulates the work of pipe. This is a challenging exercise where you are invited to do the `man` and literature search and to discuss among you.

You can use the systems calls `dup2(), fd[], pipe()` and `fork()`.

To do at home and hand in: Your C program.

Question 3: *Scheduling.*

Here we are practising the scheduling algorithms that we learned. The calculations might be a bit time-consuming, but they are simple.

Suppose that there are four jobs, A, B, C, D such that:

- A lasts 10 ms and arrives at time 10, slightly before B
- B lasts 20ms and arrives at time 10
- C lasts 20 ms and arrives at time 20
- D lasts 30 ms and arrives at time 0

Give the ordering of these jobs under the scheduling policies:

- FIFO
- SJF
- STCF
- RR with a time slice of 5ms.

In each case calculate the average turnaorund time and the average response time. I suggest to make a graphic representation first, in the style of OSTEP7, as then the calculations become easier to visualize.

To do at home and hand in: Represent each scheduling in the form of a graphic such as Figures 7.1. and 7.2. pg. 61 of OSTEP 7 and hand in the answers for the average turnaorund time and the average response time.

Question 4: *Git.*

This exercise might be simple, if you are already used to `git` (in this case you can do something more challenging from the site, your choice). If not, it will help you get started. Do the exercise on the site.

`https://kbroman.org/github_tutorial/pages/init.html`

To do at home and hand in: Give me a link/access to the git repository you created.