**Tasks for you to do & Answer Sheet**

**MacOS users**: please read the information in the Lab2 section on QMPlus about some of the tasks described here and see notes in some of the tasks.

1. **Experiment with the commands given in the sheet** 
   * Run the examples from a Linux terminal, try variations and experiment with different options. Keep in mind that if you use a Mac or certain versions of Ubuntu, output may vary from the examples given.
   * If some of the output or command options are not clear:

o Look for help through the man pages, or online o Ask for help during your lab time

1. **Simple ps command**

Open two terminal windows. In one of them start the firefox browser by typing firefox & - include the & character: this will run firefox and make the terminal available for further use – runs the process in the background. Run the command ps from the same terminal and from the second terminal.

**NOTE: If you have firefox already open in your system e.g. via the menus, this task will not work. Close all other instances of firefox and make sure the first one opening is the one in this task.**

**For Mas Users:** use/Applications/Safari.app/Contents/MacOS/Safari & instead of firefox &

**In which terminal window can you see the firefox process in the ps output? Why?**

The first one because ps by default only prints processes opened by the selected terminal, and the firefox process was created in the first terminal.

**In both outputs you will see the shell process (bash or tcsh** (or zcsh in Mac)**). It does not have the same pid, even if it has the same process name. Why?**

They are two instances of the shell executable because they were opened in different terminals.

**In the window you ran the firefox command from, type: ps –Oppid** (O is the capital letter, not the number) – this gives you a neat view of process id and parent pid for processes in the current terminal window. You will most likely see a few processes with the firefox name.

**Identify which is the “main” firefox process (hint: try to look at the ppid information to do this).**

**Which process is the parent process of the main firefox process?** The shell

1. **Working with two terminal windows.**

Open two terminal windows. From one terminal run “gedit” (it is a text editing application). You will see that this terminal window is now “tied up” with running gedit. From the other terminal, try to find out the process id of gedit.

**gedit pid:** 141328

**Mac users:** use nano instead of gedit

**Command(s) you used to get this information:**

ps -a | grep nano

**Now kill gedit from the second terminal (i.e. not from the one you ran the command from).** Show two different commands that can do this:

Kill 141328; killall nano

1. **How many of the running processes are “owned” by user “root”?** (do not count yourselves, have a command do the counting for you!!!)

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**How many running processes are owned by you?** (do not count yourselves, have a command do the counting for you!!!)

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**What command(s) did you use to find out these answers?**

pgrep -u root | grep -c ^

**Can you think of a way to answer the same question by using pipes and some of the commands we saw in Lab 1** (e.g. wc)?

Ps -u <user> | wc

1. **What is the ‘root’ user in Linux systems?**

Root is a superuser in linux systems, which means it has the highest privilege and access to all commands/files.

**What is the ‘init’ process in Linux systems (nowadays called ‘systemd’, or if you are using MacOS then it is launchd)?**

Systemd is used to launch and manage services running in the background.

**What command can you use to find out the process state for the process init (system or launchd in MacOs)? What is the process state?**

Ps -aux | grep init. The process is Ss: Sleeping