Mohammed Jahangir Alom
Student Number – R00144214
Module – Operating Systems Fundamental
Class – Software Development
Lecturer – Mr. Karl O`Connell
Assessment 2 Part 4
Date – 23/04/2018

Question 1

Set up an environment so that you can answer the group question for Question 4. Create users and create a simple program in a directory where it is accessible.
Note: As with all QUESTIONS, do not forget to record your progress by copying your progress to your report. Please ask your lab lecturer if you have any questions or require assistance.

- Create user accounts called june, roseand edward. Give each user the password ‘OperatingSystems’. To create a user account, on the desktop, go to SystemSettings, then UserAccounts, then click Unlock, then click ‘+’ to add a new user, choose standard user, add password =OperatingSystems.
- Open a terminal.
- Change to the /usr directory, by typing cd /usr. Make a directory call ed Test, by typing sudo mkdir Test
- Change to the /usr/Test directory by typing cd /usr/Test
- Type a simple script called myAdd by typing sudo nano myAdd, the program will have 6 lines:

```
echo –n "Enter the first number > "
read N1
echo –n "Enter the second number > "
read N2
let N3="N1+N2"
echo "The sum of $N1 + $N2 = $N3"
```

- Change the permissions so that it may be run by the group and owner, by typing sudo chmod 755myAdd
- Change to the home user directory (type cd ~). Now test the program by typing /usr/Test/myAdd

```
mohammed@mohammed-virtual-machine:/usr/Test$ cd ~
mohammed@mohammed-virtual-machine:~$ /usr/Test/myAdd
Enter the first number>10
Enter the second number>20
The sum of 10 + 20 = 30
mohammed@mohammed-virtual-machine:~$
```

•Describethe output of the script program. What is the let command? Why is the program placed in the directory /usr/Test?

Ans- Here output is the arithmatic operation done by from the user input and displayed the total result.

let is a builtin *command* of the Bash shell which evaluates arithmetic expressions. Using *let* is similar to enclosing an arithmetic expression in double parentheses, for instance: ((expr)) However, unlike ((...)), which is a compound *command*, *let* is a builtin *command*.

Program is placed in the usr/Test dorectory so that other user can use it.

Question 2

Examine process priority, and nice/renice commands.
•Open a terminal.
•$ nice-n17gedit

```
0 S  1000  20657  19638  0  80   0 - 398712 poll_s ?          0:00 /usr/lib/firef
0 S  1000  20788   9384  2  97  17 - 155337 poll_s pts/0     0:02 gedit
```

•Minimise the gedit program, do not close gedit.
•Open a second terminal, to type commands.
•Type ps x–l to view NI and PRI values of all processes (look at first line of output for fields).

```
mohammed@mohammed-virtual-machine:~$ ps x -l
F S   UID    PID   PPID  C PRI  NI ADDR SZ WCHAN  TTY        TIME CMD
4 S  1000   1414      1  0  80   0 - 11319 ep_pol ?          0:00 /lib/systemd/s
5 S  1000   1415   1414  0  80   0 - 15849 -      ?          0:00 (sd-pam)
```

•psx –l | grep gedit Look at nice and priority values (PRI=...., NI=17)
 of the gedit process only.

```
mohammed@mohammed-virtual-machine:~$ ps x -l | grep gedit
0 S  1000  20788   9384  1  97  17 - 155337 poll_s pts/0     0:02 gedit
```

•Identify the value of the NI and PRI and briefly explain why you think these are the values?

Ans : NI was set at first 17 which is nice value so PRI is become 97 (80+17 = 97)

•CLOSE the programs and the terminals.

•Open a terminal.
•$ nice –n 7ping www.cit.ie Set nice value to 7.

```
mohammed@mohammed-virtual-machine:~$ nice -n 7 ping www.cit.ie
PING www.cit.ie (54.72.5.20) 56(84) bytes of data.
```

•Open a second terminal. From the second terminal, you may now type commands:
•$ ps x –l | grep ping Note: the NI and PRI value.

```
mohammed@mohammed-virtual-machine:~$ ps x -l |grep ping
4 S  1000  21061  21048  0  87   7 -  3737 -      pts/0      0:00 ping www.cit.ie
0 S  1000  21085  21069  0  80   0 -  3556 pipe_w pts/1      0:00 grep --color=auto ping
mohammed@mohammed-virtual-machine:~$
```

•Change the nice value of the ping process to 15 using the sudo renice command. Check this this has occurred, also show and describe the new PRI value.

```
mohammed@mohammed-virtual-machine:~$ sudo renice 15 21061
21061 (process ID) old priority 7, new priority 15
```

```
mohammed@mohammed-virtual-machine:~$ ps x -l |grep ping
4 S  1000  21061  21048  0  95  15 -  3737 -      pts/0      0:00 ping www.cit.ie
0 S  1000  21250  21069  0  80   0 -  3556 pipe_w pts/1      0:00 grep --color=auto ping
```

New PRI value is now 95

•Change the PRI value of the ping process to 83 using the sudo renice command. Check this this has occurred, also show and describe why you choose the nice value.

```
mohammed@mohammed-virtual-machine:~$ sudo renice 3 21061
21061 (process ID) old priority 15, new priority 3
mohammed@mohammed-virtual-machine:~$ ps x -l |grep ping
4 S  1000  21061  21048  0  83   3 -  3737 -      pts/0      0:00 ping www.cit.ie
0 R  1000  21321  21069  0  80   0 -  3556 pipe_w pts/1      0:00 grep --color=auto ping
```

•CLOSE the programs and the terminals.

Question 3

Write a script to display the Nth directory.

•Open a terminal.

•Go to the home directory (i.e. type cd ~).

•The following bash for loop displays all directories in the current directory (note: the variable count is increment each time the for loop displays a directory):

```
count=0
for d in */ ; do
        let "count++"
        echo "$d"
done
```

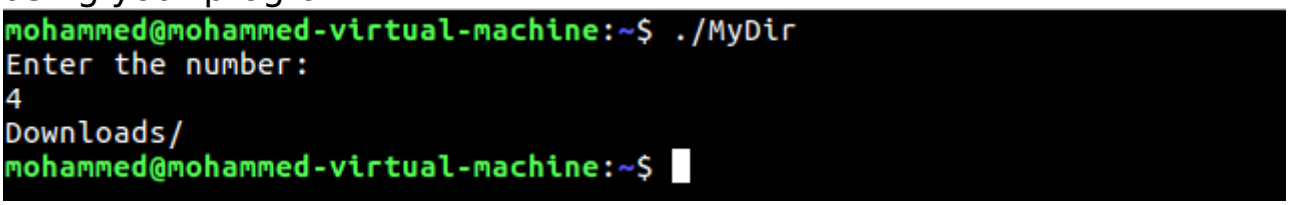
•Refer to A2Part4 lab question 2 to see how to use the read command and if statement.

•Write a bash shell program (using nano) called MyDir, by typing nano MyDir. Make it a program (using chmod). Run the program (~/MyDir). The program should prompt the user for a number called N. Display the name of the Nth directory if it exists.

- Hint 1: Initially prompt the user for a number. Read the number into the variable N.
- Hint 2: Within the for loop if ["$count" -eq "$N"], then you should display the name of the directory using the echo command(echo "$d").

•Test the program: Display the first 5 directories for your home directory using your program (hint: type cd ~, then run your program ~/MyDir 5 times).

•Test the program:Display the first 5 directories for the root directory using your program.



```
#!/bin/bash
echo "Enter the number:"
read N
count=0
for dir in */; do
        if [ "$count" -eq "$N" ]; then
                echo $dir;
        fi
        let "count++"
done
```

Question 4

It is assumed that you have completed Question 1, which has set up an environment for this problem.
Refer to the notes/slides from week 6, especially the group case studies. Solve the following:The program called myAdd is in the directory /usr/Test. At least 3 standard users have been created called june, rose and edward.
Structure your environment so that the users rose and edward can run the program myAdd. All other standard users (including june) may not have access to the program myAdd.

```
mohammed@mohammed-virtual-machine:/usr/Test$ cd ~
mohammed@mohammed-virtual-machine:~$ su june
Password:
june@mohammed-virtual-machine:/home/mohammed$ cd ~
june@mohammed-virtual-machine:~$ cd /usr
june@mohammed-virtual-machine:/usr$ cd Test
bash: cd: Test: Permission denied
june@mohammed-virtual-machine:/usr$
```

1)Implement the solution.Note: You will probably have to use sudo be fore many of the group commands...

2)Test that you have solved the program, by showing that rose and edward can login and run the program. Also, test by showing that june can login, however, june does not have access to the program.

```
mohammed@mohammed-virtual-machine:~$ su rose
Password:
rose@mohammed-virtual-machine:/home/mohammed$ cd ~
rose@mohammed-virtual-machine:~$ cd /usr
rose@mohammed-virtual-machine:/usr$ cd Test
rose@mohammed-virtual-machine:/usr/Test$ ./myAdd
Enter the first number>
2
Enter the second number>
2
The sum of 2 + 2 = 4
rose@mohammed-virtual-machine:/usr/Test$
```

```
mohammed@mohammed-virtual-machine:~$ su edward
Password:
edward@mohammed-virtual-machine:/home/mohammed$ cd ~
edward@mohammed-virtual-machine:~$ cd /usr/Test
edward@mohammed-virtual-machine:/usr/Test$ ./myAdd
Enter the first number>
2
Enter the second number>
5
The sum of 2 + 5 = 7
edward@mohammed-virtual-machine:/usr/Test$
```