Munster Technological University

Computer Science Dept.

COMP6042 - Operating Systems in Practice

Spring 2024

Lab 4

Date: *Week starting March 04, 2024* - your COMP1-group scheduled Lab-class.

- Attendance at your Lab class is strongly recommended.
- You may be asked show your lecturer your working questions.
- *For answering descriptive questions, we recommend **not to use cut & paste**; use **your own words**.*

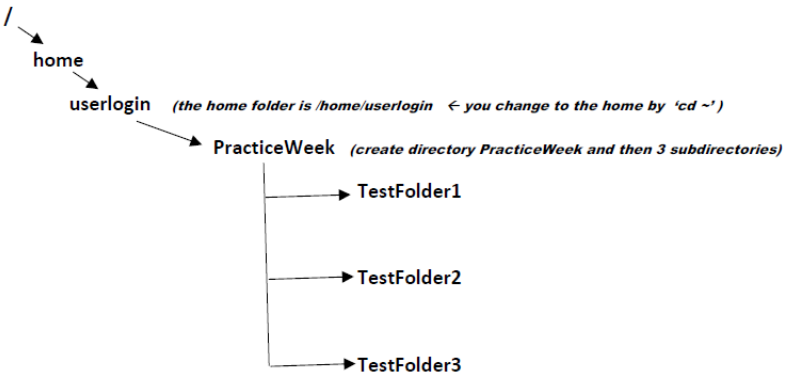
- Login to your ***Linux Ubuntu, V22.04.x LTS***, virtual machine.
- ***Download this*** pdf-document (in a folder created for this module and Lab class).
- ***Create & Open*** your solutions-file, ***answer*** the questions, ***save*** the file.
- Use the Snipping tool program to copy extracts from your terminal session into your document to help answer questions.
- This is a practice lab. No Canvas submission.

Question 1

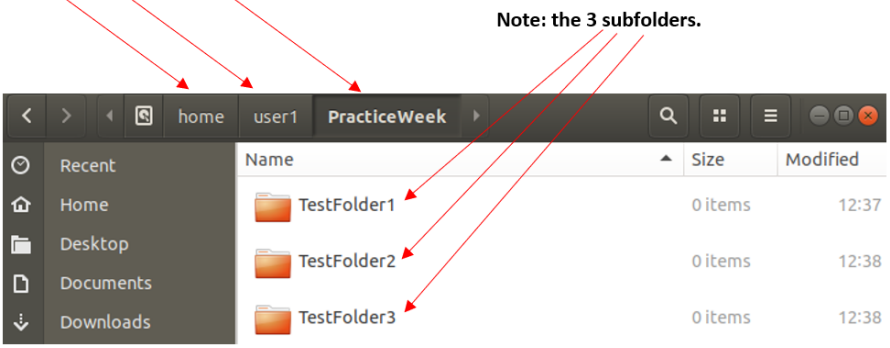
*Show your understanding of **directories** (terminal view) and **folders** (desktop GUI view).*

DO NOT FORGET to show as much as possible in your report. Take snipping of the terminal showing the sequence of commands you type…

Create a structure of directories (folders) as follows:



If the user that is logged in is called 'user1', then the 3 subfolders should be in the folder of '/home/user1/PracticeWeek'.



1. Open a terminal.
2. Change to your home directory by typing: **cd ~**
3. Check that you are in the correct directory by typing: **pwd**
4. Make a directory called *PracticeWeek* by typing: **mkdir PracticeWeek**
5. Ensure that the directory was created by typing: **ls -l**
6. Change to this directory by typing: **cd PracticeWeek**
7. Check that you are in the correct directory by typing: **pwd**
   i. *(You should see the directory /home/userlogin/PracticeWeek - If not, ask your lecturer for assistance).*
8. Now, within directory PracticeWeek, create 3 directories called TestFolder1, TestFolder2 and TestFolder3. You will have to use the ***mkdir*** command 3 times:
   mkdir TestFolder1
   mkdir TestFolder2
   mkdir TestFolder3
9. List the contents of the current directory by typing: **ls -l**
10. Open the desktop graphical File Manager (either click on the ***File Manager icon,*** or type **nautilus /**). Check that your directories/folders are created the way you expected.
11. Close the terminal.

Question 2

*Show your understanding of text **editors** and graphical editors. Go to your sub-folders, and create some files.*

1. Open the terminal.
2. Go to the ***/home/"**userlogin"**/PracticeWeek/TestFolder1*** and create two files using the ***gedit*** editor. Type the following:
    i. **cd ~**
    ii. **pwd**
    iii. **ls**
    iv. **cd PracticeWeek**
    v. **pwd**
    vi. **ls -l**
    vii. **cd TestFolder1**
    viii. **pwd**
    ix. **ls -l**

    A. *Create a file, called MyFile1, using* **gedit***, type the following:*
    - **gedit MyFile1** ← *In the graphical editor, type 2 lines of your own choice, then save the file and exit the editor.*
    - **pwd**
    - **ls -l** ← *Note: Size of the file.*
    - **cat MyFile1**

    B. *Create a file, called MyFile2, using* **gedit***, type the following:*
    - **gedit MyFile2** ← *In the graphical editor, type 2 lines of your own choice, then save the file and exit the editor.*
    - **pwd**
    - **ls -l** ← *Note: Size of the file.*
    - **cat MyFile2**

3. Go to the ***/home/"****userlogin"****/PracticeWeek/TestFolder2*** and create two files using the ***nano*** editor.

   NOTE*: The* ***nano*** *editor is the editor you will use when completing Assessment 2.*

   Type the following:

   i. **cd ..**
   ii. **pwd**
   iii. **ls**
   iv. **cd TestFolder2**
   v. **pwd**
   vi. **ls -l**

   A. *Create a file, called MyFile3, using* ***nano****, type the following:*
      - **nano MyFile3** ← *In the text editor, type 2 lines of your own choice, then save the file and exit the editor.*
      - **pwd**
      - **ls -l** ← *Note: Size of the file.*
      - **cat MyFile3**

   B. *Create a file, called MyFile4, using* ***nano****, type the following:*
      - **nano MyFile4** ← *In the text editor, type 2 lines of your own choice, then save the file and exit the editor.*
      - **pwd**
      - **ls -l** ← *Note: Size of the file.*
      - **cat MyFile4**

4. Open the ***desktop graphical File Manager*** (either click on the File Manager icon, or type **nautilus /**). Check that your files are as you expected, and stored in the correct directories/folders.

5. Compare the **nano** and **gedit** editor. *[~5 lines]*

DO NOT FORGET to show as much as possible in your report. Take snipping of the terminal showing the sequence of commands you type…

Question 3

*The **root directory** contains many directories. Explore and describe some of these directories.*

1. Open a terminal.
2. Change to the *root directory* of the file system,

   type: **cd /**

   then type: **pwd**
3. View the contents of the root directory – type: **ls –l**
4. Discuss the contents of the root directory. Identify the *directories/folders,* the *file(s)* and the *link file(s)*. Explain the file '***swapfile'*** and give a description. *[~10 lines]*
5. Write a short description of each of the below-listed directories:
   i. **/home**
   ii. **/bin**
   iii. **/etc**
   iv. **/usr**

   When describing the ***/etc*** directory, change to ***/etc*** and show the ***passwd file*** by typing:

   ls –l passwd

   Briefly describe this file.
   For the other 3 directories ***(/home***, ***/bin*** and ***/usr***), using ***Linux shell*** commands, identify (at least) one item in each directory that you can *briefly describe*.

6. Choose **2 other directories** in the **root** directory. Describe these two directories.

7. Close the terminal.

DO NOT FORGET to show as much as possible in your report. Take snipping of the terminal showing the sequence of commands you type…

Question 4

*On Terminal 1, examine operators **pipe** and **redirection**. On Terminal 2, examine the **grep** command.*

DO NOT FORGET to show as much as possible in your report. Take snipping of the terminal showing the sequence of commands you type…

1. Open the terminal. [This is the first terminal, ***terminal 1***]
2. Go to the ***PracticeWeek*** directory. *[Hint: Type **cd ~** followed by **cd PracticeWeek** and **pwd**]*
3. Get help/information on the ***grep*** command by typing: **man grep**
4. ***Question***: What is the purpose of the ***grep*** command? [~3 lines]
5. List the items in the directory by typing: **ls –l**
6. Type **man grep > hold** ← note: Nothing is displayed on screen!
7. Type **ls –l** ← note: Has the file ***hold*** appeared?
8. Display this new file called ***hold*** by typing: **cat hold**
9. ***Question***: What has happened? Explain the redirection operator of **'>'** above. [~4 lines]
   [Hint: Instead of something being displayed on the terminal screen, it is re-directed to a file.]

10. The **cat** command displays the contents of a file.
11. The **more** command displays 24 lines at a time (hit spacebar to see next 24 lines).
12. The **'|'** operation is the pipe operator.
13. Now type **cat hold | more**
14. Question: Explain the pipe operator '**|**' referring to the above example (i.e. ***cat hold | more***).

    [Hint: You have a left side program and a right side program. The pipe operator '|' is between the two programs. The output data from the left side program will not be displayed on the terminal screen, instead it is redirected to the pipe. Then, the right side program reads the data from the pipe as its input.]
15. Open another terminal. [This is the second terminal, ***terminal 2]***
16. Go to the ***PracticeWeek*** directory. *[Hint: Type cd ~ followed by cd PracticeWeek and pwd]*
17. Using **nano**, create a file called *MyTest* and insert the following 5 lines:

    This is line one.
    We will have 5 lines in the file.
    We use the word 'the' 4 times, but only on 3 lines.
    Not in this line.
    Yes, the is in this line.

    *[Hint: Type **nano MyTest** and then type the 5 lines]*
18. Display the file by typing: **cat MyTest**

19. Now, use the grep command by typing: **grep the MyTest**
20. Explain the operation of the grep command in your above example [~6 lines]
21. Close both terminals.

Question 5

*Using the Terminal, create a **simple script** program and run the program.*

DO NOT FORGET to show as much as possible in your report. Take snipping of the terminal showing the sequence of commands you type…

1. Open the terminal.
2. Go to the ***PracticeWeek/TestFolder3*** directory.

   Type ***cd ~*** *followed by* ***cd PracticeWeek/TestFolder3*** *followed by* ***pwd***

3. Create the file *MyProgram* using ***nano***, type: **nano MyProgram**

   Add the following 5 lines to your file:

   ```
   cd ~/PracticeWeek/TestFolder1
   pwd
   ls -l
   cat MyFile1
   cat MyFile2
   ```

4. Save the file and exit nano.
5. Check that the file exists, by typing:

   ```
   pwd
   ls
   cat MyProgram
   ```

6. Finally, run your 5 line program by typing:

   ```
   bash MyProgram
   ```

7. Close the terminal.

Exercise 01

1. Open the terminal.
2. Go to the ***PracticeWeek*** directory. Create a new directory called ***MyDocuments.***
3. Go to your ***MyDocuments*** directory.
4. Create two new directories called ***Dir1*** and ***Dir2***
5. Display the directory contents using **ls**.
6. Use the ***file manager*** to make sure the correct directories/folders are created.
7. Remove the 2 directories that you have created using the **rmdir** command.
8. Confirm that they are removed using **ls**.
9. Use the ***file manager*** to make sure the correct directories/folders are removed.

10. ***Repeat*** Exercise 01 steps 1 through 9 again, however, first add a small text file, using ***nano,*** to the ***Dir1*** directory?

Exercise 02

1. Go to CANVAS. Open your notes for ***Chapter 02.*** Look for different commands. Try the commands.
   Note: Use the **man** command to get help, (***e.g.*** man ls).

2. Go to CANVAS. Open your notes for ***Chapter 03.*** Look for different commands. Try the commands.

3. Go to CANVAS. Revisit & redo ***Lab2***.

Lab 04 – End!