Lab – Working with Linux Command Line

Introduction

In this lab, you will use the Linux command line to manage files and folders and perform some basic administrative tasks.

Recommended Equipment

- A computer with a Linux OS, either installed physically or in a virtual machine

Step 1: Access the command line.

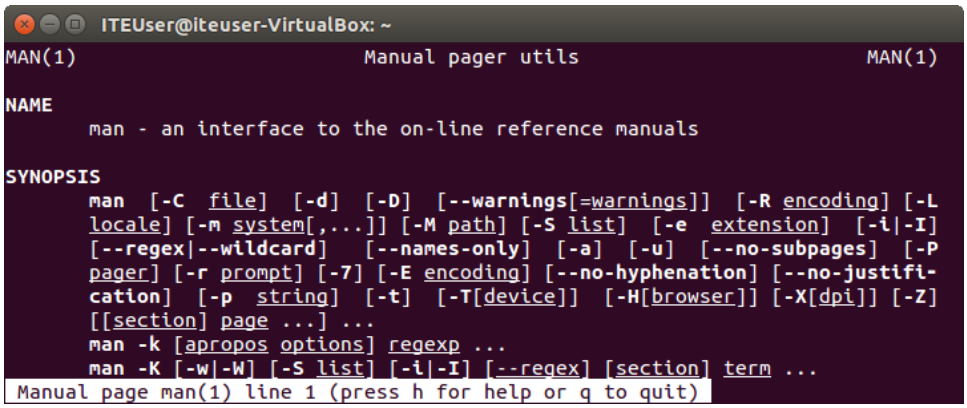
a. Log on to a computer as a user with administrative privileges. The account **ITEUser** is used as the example user account throughout this lab.

b. To access the command line, click **Dash**, and type **terminal** in the search field and press **Enter**. The default terminal emulator opens.

Step 2: Display the man pages from the command line.

You can display command line help using the **man** command. A man page, short for manual page, is an online documentation of the Linux commands. A man page provides detailed information about a command and all the available options.

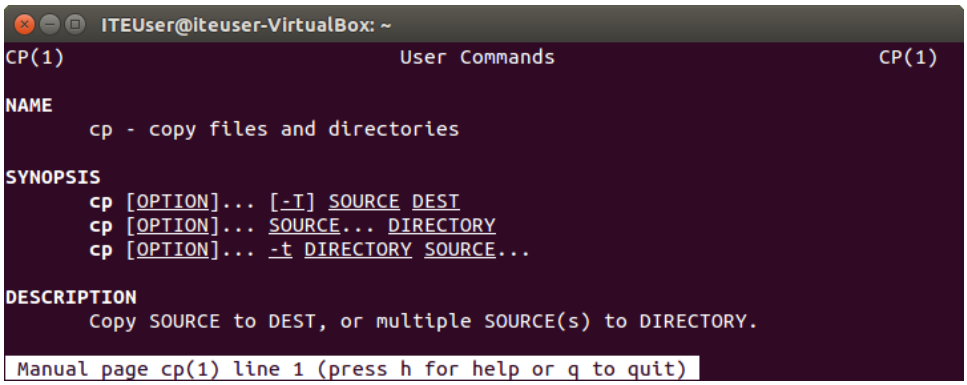
a. To learn more about the man page, type **man man** at the command prompt and press **Enter**.



Name a few sections that included in a man page.

b. Type **q** to exit the man page.

c. Type **man cp** at the prompt to display the information about the **cp** command.



What command would you use to find out more information about the **pwd** command? What is the function of the **pwd** command?

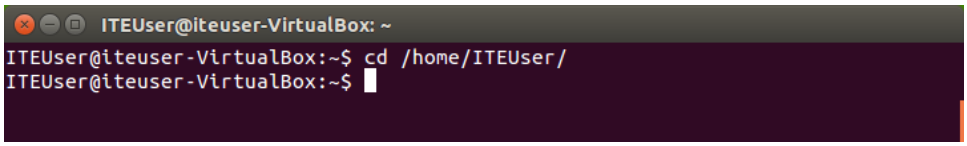
Step 3: Create and change directories.

In this step, you will use the change directory (**cd**), make directory (**mkdir**), and list directory (**ls**) commands.

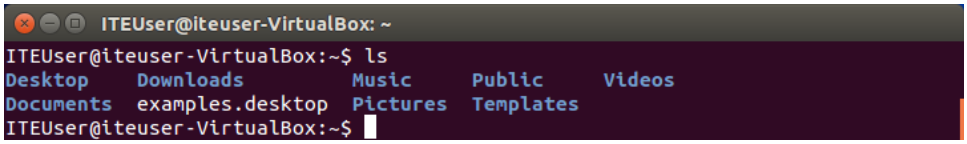
Note: A directory is another word for folder. The terms directory and folder are used interchangeably throughout this lab.

a. Type **pwd** at the prompt. What is the current directory?

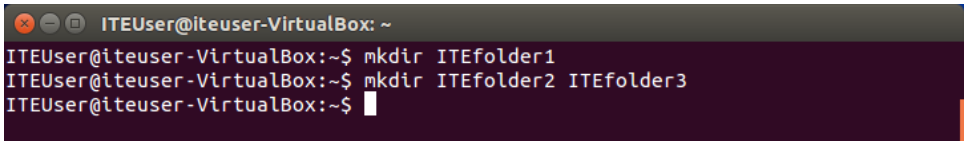
b. Navigate to the /home/ITEUser directory if it is not your current directory. Type **cd /home/ITEUser**.



c. Type **ls** at the command prompt to list the files and folders that are in the current folder.



d. In the current directory, use the **mkdir** command to create three new folders: **ITEfolder1**, **ITEfolder2**, and **ITEfolder3**. Type **mkdir ITEfolder1** and press **Enter**. Create **ITEfolder2** and **ITEfolder3**.



e. Type **ls** to verify the folders have been created.

f. Type **cd ITEfolder3** at the command prompt and press **Enter**. Which folder are you in now?

Another way to determine your location in the directory tree is to looking at the prompt. In this example, the prompt, **ITEUser@iteuser-VirtualBox:~/ITEfolder3$**, provides the name of the current user, the computer name, the current working directory, and the privilege level.

~/ITEfolder3: is the current working directory. The symbol **~** represents the current user's home directory. In this example, it is /home/ITEUser.

$: indicates regular user privilege. If **#** is displayed at the prompt, this indicates elevated privilege (root).

g. Within the **ITEfolder3** folder, create a folder named **ITEfolder4**. Type **mkdir ITEfolder4**. Use the **ls** command to verify the folder creation.

h. Type **cd ..** to change the current directory. Each **..** is a shortcut to move up one level in the directory tree.

After issuing the **cd ..** command, what is your directory now?

What would be the current directory if you issue this command at **ITEUser@iteuser-VirtualBox:~$**?

Step 4: Create text files.

a. Navigate to the **/home/ITEUser1/ITEfolder1** (**~\ITEfolder1)** directory. Type **cd ITEfolder1** at the prompt.

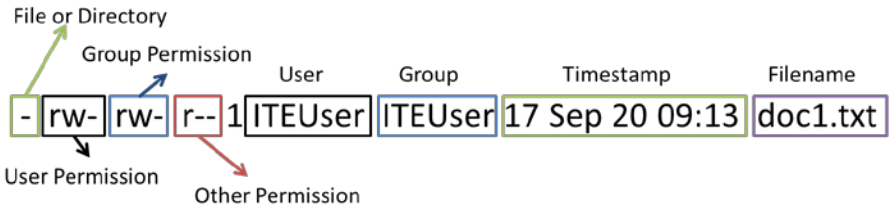
b. Type **echo This is doc1.txt > doc1.txt** at the command prompt. The **echo** command is used to display a message at the command prompt. The **>** is used to redirect the message from the screen to a file. For example, in the first line, the message **This is doc1.txt** is redirected into a new file named **doc1.txt**. Use the **echo** command and **>** redirect to create these files: **doc2.txt**, **file1.txt**, and **file2.txt**.

```
ITEUser@iteuser-VirtualBox: ~/ITEfolder1
ITEUser@iteuser-VirtualBox:~/ITEfolder1$ echo This is doc1.txt > doc1.txt
ITEUser@iteuser-VirtualBox:~/ITEfolder1$ echo This is doc2.txt > doc2.txt
ITEUser@iteuser-VirtualBox:~/ITEfolder1$ echo This is file1.txt > file1.txt
ITEUser@iteuser-VirtualBox:~/ITEfolder1$ echo This is file2.txt > file2.txt
ITEUser@iteuser-VirtualBox:~/ITEfolder1$
```

c. Use the **ls** command to verify the files are in the **ITEfolder1** folder. To determine the file permission and other information, type the **ls –l** command at the prompt.

```
ITEUser@iteuser-VirtualBox: ~/ITEfolder1
ITEUser@iteuser-VirtualBox:~/ITEfolder1$ ls -l
total 16
-rw-rw-r-- 1 ITEUser ITEUser 17 Sep 21 08:58 doc1.txt
-rw-rw-r-- 1 ITEUser ITEUser 17 Sep 21 08:59 doc2.txt
-rw-rw-r-- 1 ITEUser ITEUser 18 Sep 21 08:59 file1.txt
-rw-rw-r-- 1 ITEUser ITEUser 18 Sep 21 08:59 file2.txt
ITEUser@iteuser-VirtualBox:~/ITEfolder1$
```

The following figure breaks down the information provided by the **ls –l** command. The user **ITEUser** is owner of file. The user can read and write to the file. The user **ITEUser** belongs to the group name **ITEUser**. Anyone in the group **ITEUser** has the same permission. The group can read and write to the file. If the user is not the owner or in the group **ITEUser**, the user can only read the file as indicated by the permission for other.



d. Type the **man ls** command at the prompt. What option would you use to list all the files in the directory, including the hidden files starting with **.**?

e. Use the **cat** command to view the content of the text files. To view the content of doc2.txt, type **cat doc2.txt**.

```
ITEUser@iteuser-VirtualBox: ~/ITEfolder1
ITEUser@iteuser-VirtualBox:~/ITEfolder1$ cat doc2.txt
This is doc2.txt
ITEUser@iteuser-VirtualBox:~/ITEfolder1$
```

Step 5: Copy, delete, and move files.

a. At the command prompt, type **mv doc2.txt ~/ITEfolder2** to move the file **doc2.txt** to the **/home/ITEUser/ITEfolder2** directory.

```
ITEUser@iteuser-VirtualBox: ~/ITEfolder1
ITEUser@iteuser-VirtualBox:~/ITEfolder1$ mv doc2.txt ~/ITEfolder2
ITEUser@iteuser-VirtualBox:~/ITEfolder1$
```

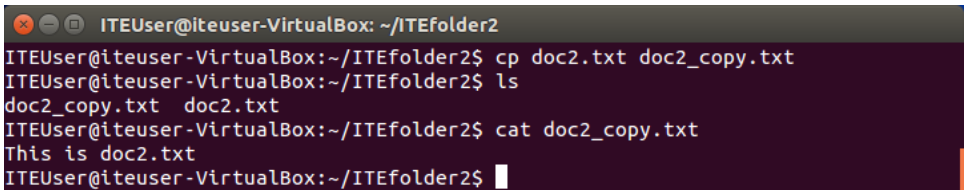
b. Type **ls** at the prompt to verify that **doc2.txt** is no longer in the current directory.

```
ITEUser@iteuser-VirtualBox: ~/ITEfolder1
ITEUser@iteuser-VirtualBox:~/ITEfolder1$ ls
doc1.txt  file1.txt  file2.txt
ITEUser@iteuser-VirtualBox:~/ITEfolder1$
```

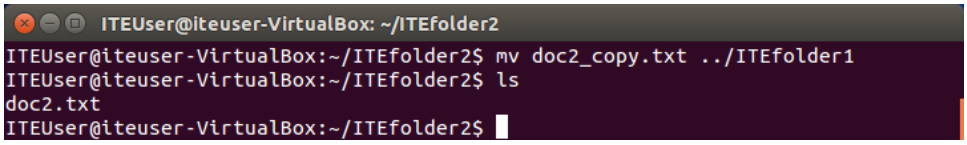
c. Type **cd ../ITEfolder2** to change the directory to **ITEfolder2**. Type **ls** at the prompt to verify **doc2.txt** has been moved.

```
ITEUser@iteuser-VirtualBox: ~/ITEfolder2
ITEUser@iteuser-VirtualBox:~/ITEfolder1$ cd ../ITEfolder2
ITEUser@iteuser-VirtualBox:~/ITEfolder2$ ls
doc2.txt
ITEUser@iteuser-VirtualBox:~/ITEfolder2$
```

d. Type **cp doc2.txt doc2_copy.txt** to create a copy of **doc2.txt**. Type **ls** at the prompt to verify a copy of the file has been created. Use the **cat** command to look at the content of **doc2_copy.txt**. The content in the copy should be the same as the original file.

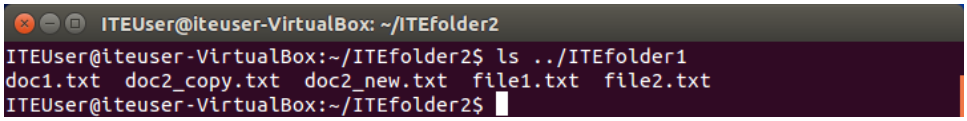


e. Now use the **mv** command to move **doc2_copy.txt** to **ITEfolder1**. Type **mv doc2_copy.txt ../ITEfolder1**. Use the **ls** command to verify that **doc2_copy.txt** is no longer in the directory.



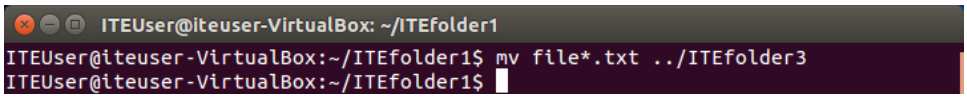
f. A copy of **doc2.txt** can be created and renamed with the **cp** command. Type **cp doc2.txt ../ITEfoler1/doc2_new.txt** at the prompt.

g. Type **ls ..\ITEfolder1** to view the content in **ITEfolder1** without leaving the current directory.

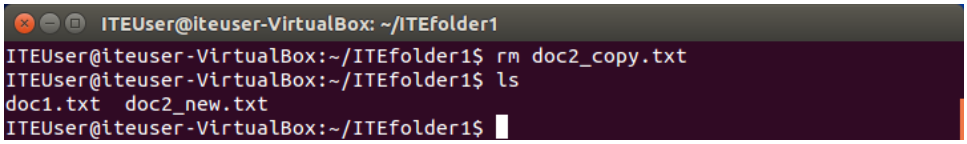


h. Change the current directory to **ITEfolder1**. Type **cd ../ITEfolder1** at the prompt.

i. Move **file1.txt** and **file2.txt** into **ITEfolder3**. To move all the files that contain the word **file** into **ITEfolder3** with one command, use a **wildcard** (*****) character to represent one or more characters. Type **mv file*.txt ..\ITEfolder3**.



j. Now delete **doc2_copy.txt** from the **ITEfolder1** directory. Type **rm doc2_copy.txt**. Use the **ls** command to verify the file deletion.



Step 6: Delete directories.

In this step, you will delete a directory using the **rm** command. The **rm** command can be used to delete files and directories.

a. Navigate to the **/home/ITEUser/ITEfolder3** directory. Use the **ls** command to list the content of the directory.

b. Use the **rm ITEfolder4** to delete the empty directory, and the message **rm: cannot remove 'ITEfodler4/': Is a directory**.

```
ITEUser@iteuser-VirtualBox: ~/ITEfolder3
ITEUser@iteuser-VirtualBox:~/ITEfolder3$ rm ITEfolder4/
rm: cannot remove 'ITEfolder4/': Is a directory
ITEUser@iteuser-VirtualBox:~/ITEfolder3$
```

c. Use the man pages to determine what options are necessary so the **rm** command can delete directory. Type **man rm** at the prompt.

What option is needed to delete a directory?

d. Use the **rm –d ITEfolder4** command to delete the empty directory and use the **ls** command to verify the removal of the directory.

```
ITEUser@iteuser-VirtualBox: ~/ITEfolder3
ITEUser@iteuser-VirtualBox:~/ITEfolder3$ rm -d ITEfolder4
ITEUser@iteuser-VirtualBox:~/ITEfolder3$ ls
file1.txt  file2.txt
ITEUser@iteuser-VirtualBox:~/ITEfolder3$
```

e. Navigate to **/home/ITEUser**.

f. Now remove the folder **ITEfolder3** using the **rm –d ITEfolder3** command to delete the non-empty directory. The message indicates that the directory is not empty and cannot be deleted.

```
ITEUser@iteuser-VirtualBox: ~
ITEUser@iteuser-VirtualBox:~$ rm -d ITEfolder3
rm: cannot remove 'ITEfolder3': Directory not empty
ITEUser@iteuser-VirtualBox:~$
```

g. Use man pages to find out more information about the **rm** command.

What option is necessary to delete a non-empty folder using the **rm** command?

h. To remove a non-empty directory, type the **rm –r ITEfolder3** command to delete the non-empty folder. Use the **ls** command to verify that directory was deleted.

```
ITEUser@iteuser-VirtualBox: ~
ITEUser@iteuser-VirtualBox:~$ rm -r ITEfolder3
ITEUser@iteuser-VirtualBox:~$ ls
Desktop    Downloads         ITEfolder1  Music     Public     Videos
Documents  examples.desktop  ITEfolder2  Pictures  Templates
ITEUser@iteuser-VirtualBox:~$
```

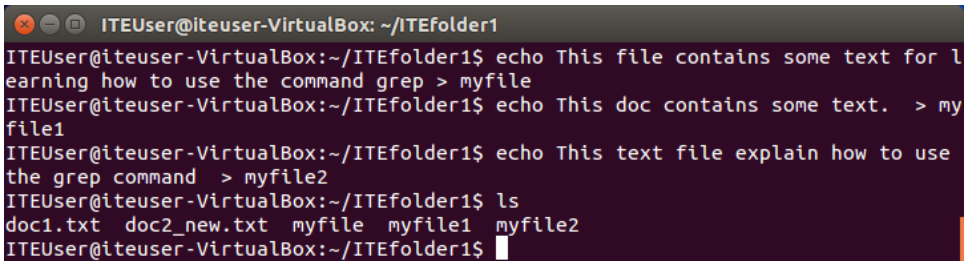
Step 7: Print lines matching a pattern.

The **cat** command is used to view the content of a text file. To search the content of a text file, you can use the **grep** command. The **grep** command can also be used to match a pattern with screen outputs.

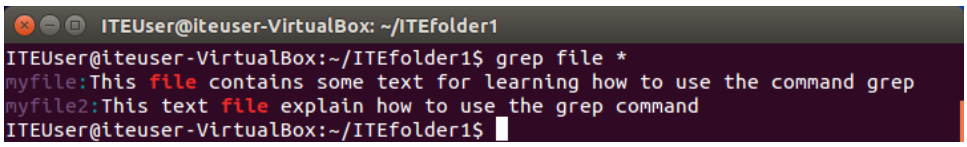
In this step, you will create a few additional text files in the **/home/ITEUser/ITEfolder1** directory. The content and the filename are of your choosing. Three text files are used as example in this step.

a. Navigate to **/home/ITEUser/ITEfolder1**.

b. Use the **echo** command and redirect **>** to create a few text files ~/**ITEfolder1** and verify that the files were created in **~/ITEfolder1**.

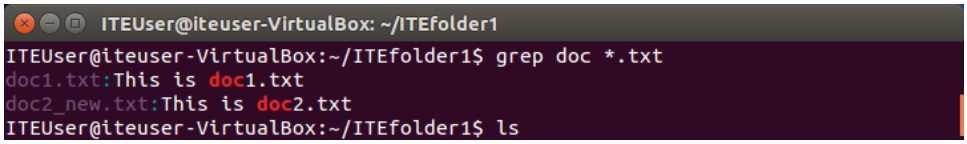


c. To determine which files contains the word **file** within the content of all the files, type **grep file *** to search for the word. The **wildcard** (*) allows any filename to be included in the search. The files, **myfile** and **myfile2** have the word **file** in the content.

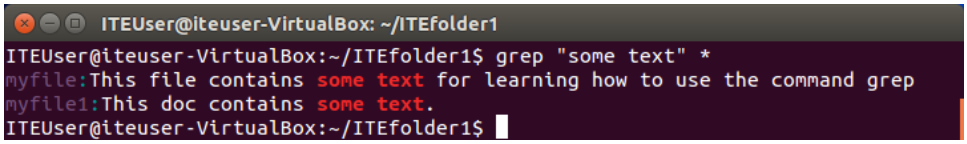


What command would you use to search for the word **doc** in the content of the files? Which files contains the word **doc** in this example?

d. Type **grep doc *.txt** to search for the files with **.txt** in the filename and has the word **doc** in the content.



e. Type **grep "some text" *** at the prompt to determine which files contain the phrase **some text**. The files, **myfile** and **myfile1** have the phase **some text** in the content.



What command would you use to search for word **the** in the file with the .txt extension? Which files met the requirements?

f. The search pattern is case sensitive in the **grep** command. The option **–i** or **--ignore-case** is used to ignore the case distinction. To search for all the patterns of **th**, type the **grep –i th *** command at the prompt.

```
ITEUser@iteuser-VirtualBox: ~/ITEfolder1
ITEUser@iteuser-VirtualBox:~/ITEfolder1$ grep -i th *
doc1.txt:This is doc1.txt
doc2_new.txt:This is doc2.txt
myfile:This file contains some text for learning how to use the command grep
myfile1:This doc contains some text.
myfile2:This text file explain how to use the grep command
ITEUser@iteuser-VirtualBox:~/ITEfolder1$
```

What command would you use to search for the pattern **th** or **Th** in the file with the .txt extension? Which files met the requirements?

g. To search for a certain pattern for a screen output, the vertical bar (**|**), commonly referred to as the pipe. The pipe (|) is used to direct the output from the first command into the input for the second command. Using the output of **ls** command as an example, type **ls | grep file** at the prompt to list all the filenames with the word **file**.

```
ITEUser@iteuser-VirtualBox: ~/ITEfolder1
ITEUser@iteuser-VirtualBox:~/ITEfolder1$ ls | grep file
myfile
myfile1
myfile2
ITEUser@iteuser-VirtualBox:~/ITEfolder1$
```

Step 8: Display the IP Address.

The **ifconfig** command allows you to configure a network interface. In this step, you will use the **ifconfig** to display the IP address associated with a network interface.

At the command prompt, type **ifconfig**. In this example, the **eth0** interface has been assigned an IP address of 192.168.1.7 with a subnet mask of 255.255.255.0.

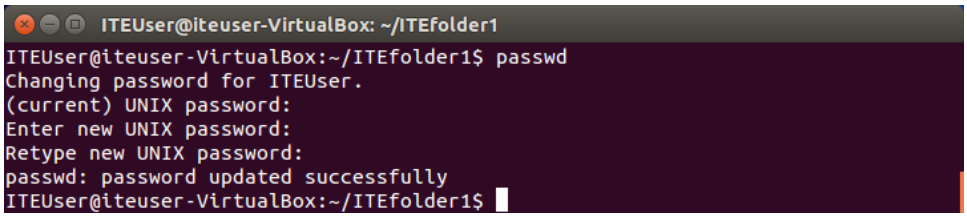
```
ITEUser@iteuser-VirtualBox: ~
ITEUser@iteuser-VirtualBox:~$ ifconfig
eth0      Link encap:Ethernet  HWaddr 08:00:27:35:5c:6b
          inet addr:192.168.1.7  Bcast:192.168.1.255  Mask:255.255.255.0
          inet6 addr: fe80::a00:27ff:fe35:5c6b/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:43107 errors:0 dropped:0 overruns:0 frame:0
          TX packets:819 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:3392720 (3.3 MB)  TX bytes:126835 (126.8 KB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:162 errors:0 dropped:0 overruns:0 frame:0
          TX packets:162 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:14250 (14.2 KB)  TX bytes:14250 (14.2 KB)

ITEUser@iteuser-VirtualBox:~$
```

Step 9: Change your login password.

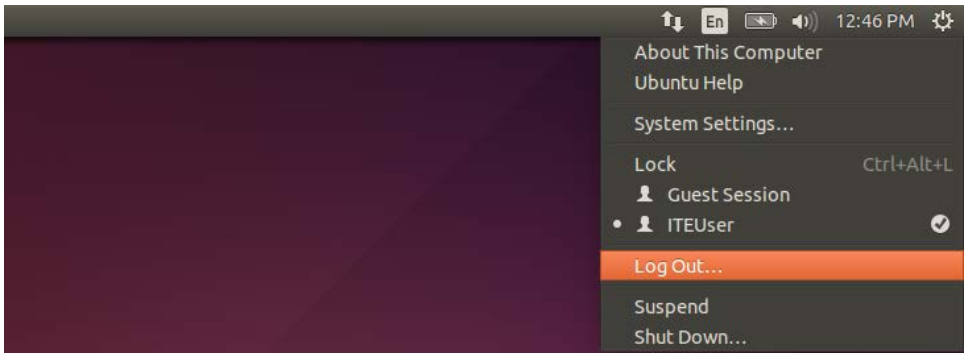
Changing your login password is a good practice in compute security and to unauthorized access to your information and your account.

In this step, you will change your login password. You will need your current password and choose a new password to access your account.

a. Type **passwd** at the prompt to start the process of changing your password. Enter the current password and provide your new password twice. When the message **passwd: password updated successfully** is displayed, your password has been changed.



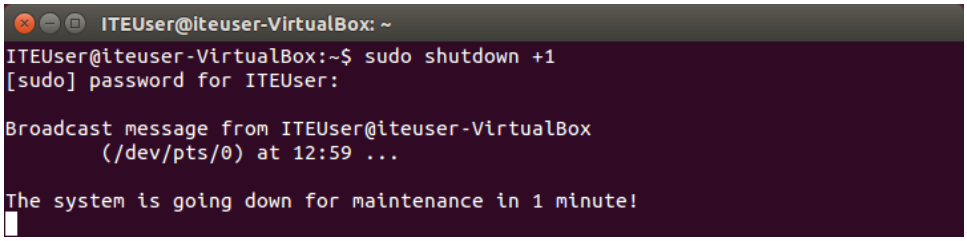
b. Log out of the computer and use the new password to log on to the computer again.



Step 10: Use the shutdown command.

The **shutdown** command is used to bring the computer down gracefully. It requires elevated privileges and a time parameter. Because the user ITEUser is the first user account on the computer, the **sudo** command and the password allows this user the elevated privileges. The time parameter can be now, number of minutes from now, or at a specific time, such as 13:00.

Type **sudo shutdown +1** to bring the computer down gracefully in 1 minute. When prompted, enter your password.



Reflection

What are the advantages of using the Linux command line?