Name: Krithika Swaminathan
Roll No.: 205001057

Assignment 3 – File system Permissions

Exercise 1:

Commands: **groups [user-id]**
umask [umask no. (octal)]
chmod [option] [filename]

1. Launch the terminal. - A terminal window was opened.

2. Check which group or groups you belong to.
```
kri@kri-ubuntu:~$ groups kri
kri : kri adm cdrom sudo dip plugdev lpadmin lxd sambashare
```

(The groups that the user (kri) belongs to are displayed.)
Description: The groups command is used to find out which group or groups the user belongs to.

3. Use the umask command to set the default permission to 700. What is the default permission for files after this command?
```
kri@kri-ubuntu:~/workspace$ umask 077
kri@kri-ubuntu:~/workspace$ ls -l
total 20
-rw------- 1 kri kri    0 Oct 17 18:34 asst3.txt
drwxrwxr-x 3 kri kri 4096 Oct 17 18:33 C
drwxrwxr-x 2 kri kri 4096 Oct 17 18:33 java
drwxrwxr-x 2 kri kri 4096 Sep 30 08:09 python
drwxrwxr-x 2 kri kri 4096 Oct 17 17:38 unix
drwxrwxr-x 4 kri kri 4096 Sep 30 08:08 webdev
```

(The default permission is set to 700 by using taking away 077 permissions. The default permission for files is now seen to be 600 – read, write but not execute for user and none for group and others.)
Description: The umask command followed by an octal number as the argument is used to change the default permissions of files by taking away the specified number of permissions.

4. Create a directory named chapter4 under your home directory.
```
kri@kri-ubuntu:~$ mkdir chapter4
```

(A new directory, *chapter4*, has been created in the *home* directory.)
Description: The mkdir command is used to create a new directory in the working directory.

5. Check the default permission of this directory. Is it 700?.
```
kri@kri-ubuntu:~/chapter4$ umask
0077
```

(The umask number for the directory is seen to be 077, which implies that the default permission of the file is 700.)
Description: The umask command fwithout any argument displays the current umask number of the directory.

(alternate method...)
kri@kri-ubuntu:~$ ls -l
total 60
drwx------ 3 kri kri 4096 Oct 17 18:48 chapter4
drwxr-xr-x 2 kri kri 4096 Sep 16 20:09 Desktop
drwxr-xr-x 2 kri kri 4096 Oct 2 21:49 Documents
drwxr-xr-x 6 kri kri 4096 Oct 17 17:20 Downloads
drwxr-xr-x 2 kri kri 4096 Oct 3 09:09 Pictures
drwxr-xr-x 2 kri kri 4096 Sep 16 18:05 Public
drwxr-xr-x 2 kri kri 4096 Sep 16 18:05 Templates
drwxr-xr-x 2 kri kri 4096 Oct 12 15:47 Videos
drwxrwx--- 7 kri kri 4096 Oct 17 18:34 workspace

(The permission is listed as rwx------- which implies that the user has read, write and execute permissions while group and others have none. This shows that the permission for this directory is 700.)
Description: The ls command with no arguments lists the contents of the working directory. The ls command with the option -l lists the contents of the specified directory in the long format.

6. Create a directory under the chapter4 directory (without moving from your home directory) and name it session1.
kri@kri-ubuntu:~$ mkdir chapter4/session1

(A new directory called *session1* was created in the *chapter4* directory without moving to it.)
Description: The mkdir command is used to create a new directory in the directory specified by the path given as the argument to the command. The absolute or relative path can be used to specify the location, eliminating the need to change directories.

7. Check the permission of this directory. Is it 700?
kri@kri-ubuntu:~$ ls -l chapter4
total 4
drwx------ 2 kri kri 4096 Oct 17 18:48 session1

(The permission is listed as rwx------- which implies that the user has read, write and execute permissions while group and others have none. This shows that the permission for this directory is 700.)
Description: The ls command with no arguments lists the contents of the working directory. The ls command with the option -l lists the contents of the specified directory in the long format.

8. Move to the session1 directory.
kri@kri-ubuntu:~$ cd chapter4/session1
kri@kri-ubuntu:~/chapter4/session1$

(The working directory was changed from the home directory to *session1*.)
Description: The cd command is used to change the working directory to the directory specified in the argument.

9. Create a file named hw41 under this directory. Save this file.
kri@kri-ubuntu:~/chapter4/session1$ touch hw41

(A file called *hw41* has been created and saved in the *session1* directory.)
Description: The touch command creates a file in the specified directory and saves the file.

10. Check the permission of this file. Is it 700 or 600? Why? Explain the difference between the permissions for files and directories.

```
kri@kri-ubuntu:~/chapter4/session1$ ls -l
total 0
-rw------- 1 kri kri 0 Oct 17 19:07 hw41
```

(The permission for the file is read and write for user, and none for everything else, i.e., the file permission is 600.)
- This is because the defualt permission for files is 666 while it is 777 for directories. Therefore, when umask command 077 is used to take away permissions, 0 permissions are taken from the user, leaving 6, while all the permissions are taken away from group and others, leaving 0 for each.

Description: The ls command with no arguments lists the contents of the working directory. The ls command with the option -l lists the contents of the specified directory in the long format.

11. Do users in your group have any access to this file? Do other users (outside of your group) have any access to this file?

```
sel-20@sel20-HP-Compaq-Pro-6305-SFF:~/kriths/assignment/UNIX$ exit
```

- No, the users in the group do not have any access to this file since the file permission is 0 for group. Similarly, the file permission is 0 for others and hence, the other users also cannot access this file.

12. Change the permissions to allow users in your group only to copy this file to their own directories. Is there a need to change the permission of any directories? If yes, make necessary changes.

```
kri@kri-ubuntu:~/chapter4/session1$ chmod g=r hw41
kri@kri-ubuntu:~/chapter4/session1$ ls -l
total 0
-rw-r----- 1 kri kri 0 Oct 17 19:07 hw41
```

(The permission for group is changed to *read*.)
Description: The chmod command is used to modify the permissions of a given file. The argument g=r specifies that the user's group has been given *read* permission, but not *write* or *execute*.

Note: It is not possible to answer the following question due to a lack of other users on this system. Hence, the permission for the "user" itself shall be modified to get a close approximate of the required answer.

```
kri@kri-ubuntu:~/chapter4/session1$ chmod u=r hw41
kri@kri-ubuntu:~/chapter4/session1$ ls -l
total 0
-r--r----- 1 kri kri 0 Oct 17 19:07 hw41
```

13. Let a user in your group copy this file into her home directory. Was the copy

successful? If not, find the reason and take the appropriate action(s) to correct it.
Then try again with the other user in your group.

(answering the question for "user" instead of "group")
sel-20@sel20-HP-Compaq-Pro-6305-SFF:~/kriths/assignment/UNIX$ exit
kri@kri-ubuntu:~/chapter4/session1$ cp ~/chapter4/session1/hw41 ~
kri@kri-ubuntu:~/chapter4/session1$ ls ~
chapter4 Downloads Public workspace
Desktop hw41 Templates
Documents Pictures Videos

(The file has been copied.)
Description: The cp command is used to copy a file from the source to the specified destination.

14. Quit the terminal.
sel-20@sel20-HP-Compaq-Pro-6305-SFF:~/kriths/assignment/UNIX$ exit

(The terminal window is closed.)
Description: The exit command can be used to quit the terminal.

Exercise 2:

Commands: **groups [user-id]**
umask [umask no. (octal)]
chmod [option] [filename]

1. Launch the terminal. - A terminal window was opened.

2. Check which group or groups you belong to.
kri@kri-ubuntu:~$ groups kri
kri : kri adm cdrom sudo dip plugdev lpadmin lxd sambashare

(The groups that the user (kri) belongs to are displayed.)
Description: The groups command is used to find out which group or groups the user belongs to.

3. Check your default mask.
kri@kri-ubuntu:~$ umask
0077

(The umask number for the directory is seen to be 077, which implies that the default permission of the file is 700.)
Description: The umask command fwithout any argument displays the current umask number of the directory.

4. Create a directory called garbage under your home directory..
kri@kri-ubuntu:~$ mkdir garbage

(A new directory, *garbage*, has been created in the *home* directory.)

Description: The mkdir command is used to create a new directory in the working directory.

5. Check the permission of this directory. Make a note of it.

```
kri@kri-ubuntu:~$ ls -l
total 64
drwx------  3 kri kri 4096 Oct 17 18:48 chapter4
drwxr-xr-x  2 kri kri 4096 Sep 16 20:09 Desktop
drwxr-xr-x  2 kri kri 4096 Oct  2 21:49 Documents
drwxr-xr-x  6 kri kri 4096 Oct 17 17:20 Downloads
drwx------  2 kri kri 4096 Oct 17 20:28 garbage
-r--------  1 kri kri    0 Oct 17 19:33 hw41
drwxr-xr-x  2 kri kri 4096 Oct  3 09:09 Pictures
drwxr-xr-x  2 kri kri 4096 Sep 16 18:05 Public
drwxr-xr-x  2 kri kri 4096 Sep 16 18:05 Templates
drwxr-xr-x  2 kri kri 4096 Oct 12 15:47 Videos
drwxrwx---  7 kri kri 4096 Oct 17 18:34 workspace
```

(The permission is listed as rwx------- which implies that the user has read, write and execute permissions while group and others have none. This shows that the permission for this directory is 700.)

Description: The ls command with no arguments lists the contents of the working directory. The ls command with the option -l lists the contents of the specified directory in the long format.

6. Change your default mask so that the default permission is 664. What is the default permission for directories after you make this change?

```
kri@kri-ubuntu:~$ umask 113
```

(The default permission is set to 664 by taking away 113 permissions. The default permission for directories is now seen to be 664.)

Description: The umask command followed by an octal number as the argument is used to change the default permissions of files by taking away the specified number of permissions.

7. Check the permission for the garbage directory. Has it been changed after setting the default mask? Why or why not?

```
kri@kri-ubuntu:~$ ls -l
total 64
drwx------  3 kri kri 4096 Oct 17 18:48 chapter4
drwxr-xr-x  2 kri kri 4096 Sep 16 20:09 Desktop
drwxr-xr-x  2 kri kri 4096 Oct  2 21:49 Documents
drwxr-xr-x  6 kri kri 4096 Oct 17 17:20 Downloads
drwx------  2 kri kri 4096 Oct 17 20:28 garbage
-r--------  1 kri kri    0 Oct 17 19:33 hw41
drwxr-xr-x  2 kri kri 4096 Oct  3 09:09 Pictures
drwxr-xr-x  2 kri kri 4096 Sep 16 18:05 Public
drwxr-xr-x  2 kri kri 4096 Sep 16 18:05 Templates
drwxr-xr-x  2 kri kri 4096 Oct 12 15:47 Videos
drwxrwx---  7 kri kri 4096 Oct 17 18:34 workspace
```

(The permission is listed as rwx------- which implies that the user has read, write and execute permissions while group and others have none. This shows that the permission for this directory is 700.)
- No, the permission for the file *garbage* has not been changed. This is because the umask command changes only the default permission setting and not the file permission of the existing files in the directory.

8. Delete this directory.
kri@kri-ubuntu:~$ rm -d garbage

(The file *garbage* has been deleted.)
Description: The rm -d command is used to delete empty directories.

9. Create a directory called session2 under the chapter4 directory.
kri@kri-ubuntu:~$ mkdir chapter4/session2

(A new directory called *session2* was created in the *chapter4* directory.)
Description: The mkdir command is used to create a new directory in the directory specified by the path given as the argument to the command.

10. Check the permission of this directory and make a note of it.
kri@kri-ubuntu:~$ ls -l chapter4
total 8
drwx------ 2 kri kri 4096 Oct 17 19:07 session1
drw-rw-r-- 2 kri kri 4096 Oct 17 20:41 session2

(The permission is listed as rw-rw-r--. This shows that the permission for this directory is 664.)
Description: The ls command with no arguments lists the contents of the working directory. The ls command with the option -l lists the contents of the specified directory in the long.

11. Remove the x permission for the user from this directory.
kri@kri-ubuntu:~$ chmod u-x chapter4

(x permission for *chapter4* is removed for the user.)
Description: The chmod command is used to modify the permissions of a given file. The argument u-x specifies that the *execute* permission is to be removed for the user.

12. Move to the session2 directory. You should have a problem. Do you know what the problem is? Fix the problem.
kri@kri-ubuntu:~$ cd chapter4/session2
bash: cd: chapter4/session2: Permission denied

(Since the execute permission is removed for the user, permission is denied to move to *session2*.)
- The problem can be fixed by giving *execute* permission to the user.

kri@kri-ubuntu:~$ chmod u+x chapter4
kri@kri-ubuntu:~$ chmod u+x chapter4/session2
kri@kri-ubuntu:~$ cd chapter4/session2
kri@kri-ubuntu:~/chapter4/session2$

(x permission is added for *chapter4* and *session2* for the user.)
Description: The chmod command is used to modify the permissions of a given file. The argument u+x specifies that the *execute* permission is to be added for the user.

13. Create a file named hw42 under this directory. Save this file.
kri@kri-ubuntu:~/chapter4/session2$ touch hw42

(A file called *hw42* has been created and saved in the *session2* directory.)
Description: The touch command creates a file in the specified directory and saves the file.

14. Check the permissions of this file. Can users in your group copy this file? Can they change this file? Can users outside your group copy this file? Can they change this file? Is this file executable?
kri@kri-ubuntu:~/chapter4/session2$ ls -l
total 0
-rw-rw-r-- 1 kri kri 0 Oct 17 20:58 hw42

(The permission for the file is rw-rw-r--, i.e., the file permission is 664.)
- Yes, users in the group can copy this file and can change the file. Users outside the group can also copy this file, but they cannot change it. The file is not executable for both users in the group and others.
Description: The ls command with no arguments lists the contents of the working directory. The ls command with the option -l lists the contents of the specified directory in the long format.

15. Change the permissions of this file so that every user can read, modify, but not execute this file.
kri@kri-ubuntu:~/chapter4/session2$ chmod 666 hw42
kri@kri-ubuntu:~/chapter4/session2$ ls -l
total 0
-rw-rw-rw- 1 kri kri 0 Oct 17 20:58 hw42

(The permission for the file is rw-rw-rw-, i.e., the file permission is 666.)
- This implies that every user can read and modify the file, but cannot execute it.
Description: The chmod command is used to modify the permissions of a given file. The argument u+x specifies that the *execute* permission is to be added for the user. The ls command with no arguments lists the contents of the working directory. The ls command with the option -l lists the contents of the specified directory in the long format.

16. Quit the terminal
sel-20@sel20-HP-Compaq-Pro-6305-SFF:~/kriths/assignment/UNIX$ exit

(The terminal window is closed.)
Description: The exit command can be used to quit the terminal.