# **Topic Name:**

The main aim of this lab session is to provide hands-on experience on

- Explore file structure
- File management commands
- Absolute path and Relative path
- Globbing
- Scripting

# File Structure

• Under the root directory there are many files like

/bin , /boot , /dev , /etc , ....

Find out the importance of those files

Example: /etc is for user account details

S.No	Directory	Usage		
1	/	Root directory		
2	/bin	Binary files		
3	/boot	OS boot files		
4	/dev	Device files		
5	/etc	Configuration files		
6	/home	Personal files		
7	/lib	Kernel modules &		
		Shared libraries		
8	/proc	Hardware &		
		Process		
		Information		
9	/sbin	System command		
		binaries		
10	/tmp	Temporary files		
11	/var	Variable data files		
12				
13				

• In Linux, there are three different files

# Regular file

• A standard file that contains data, such as text, executable binaries, or other content.

### Directory

• A folder that contains other files or directories, organizing the file system hierarchy.

#### Special file

• A file used to represent hardware devices or other special resources in the system.

#### Block file

• A special file that provides buffered access to hardware devices, such as a hard drive.

#### Character file

 A special file that provides unbuffered, direct access to hardware devices, such as a keyboard or terminal.

#### Socket file

• A special file used for inter-process communication, allowing data exchange between processes, often over a network.

# Pipe file

• A special file that facilitates communication between processes by allowing data to be passed from one process to another.

# Fill the below table:

File Type	Represented by (Hint ls )	Role	How to create	Screen shot	
Regular file	-filename	Store data	touch filename	test  (kali@ kali)-[~/Desktop]  (kali@ kali)-[~/Desktop]	
Text file	-filename.txt	Store information	touch filename .txt	File Actions Edit View Hele  (kali@kali)-[~/Desktop]  t1.txt	
Compressed file	filename.zip/.tar /.rar etc	Reduce data size	gzip filename	File Actions Edit View Hell  test.gz  (kali@kali)-[~/Desktop]  \$ gzip test t1.txt  (kali@kali)-[~/Desktop]  t1.txt.gz	
• Image	- filename.jpg/.pn g.bmp	Visual representation	NA	NA	
Directory	d directoryname	Store files	mkdir	File Actions Edit View Help  F1	

Block file	b	Hardware interfaces that handle data in fixed-size blocks	NA	brw-rw—— 1 root disk
Character file	С	Hardware interfaces that handle data one character at a time	NA	crw-rw-rw-       1 root root         crw-rw-       1 root root         crw-rw-       1 root lp         crw-r-       1 root kmem         crw-       1 root root         crw-rw-rw-       1 root root         crw-rw-rw-       1 root tty
Socket file	S	Inter-process communicatio n(IPC)	NA	<pre>(kali@ kali)-[/] \$ ls -l /run   grep '^s' srw-rw 1 root</pre>
pipe file	р	Inter-process communication (1 to another)	NA	(pb@ kali)-[/run/systemd/inhibit   \$\frac{1}{20}\$   total 20   -rw-r-r   1 root root   163 Aug   20   1 prw   1 root root   0 Aug   20   1   -rw-r-r   1 root root   171 Aug   20   1   prw   1 root root   0 Aug   20   1   -rw-r-r   1 root root   143 Aug   20   1   prw   1 root root   0 Aug   20   1   prw   1 root root   166 Aug   20   1   prw   1 root root   0 Aug   20   1   rw-r-r   1 root root   248 Aug   20   1   prw   1 root root   0 Aug   20   1   prw   1   prw   1 root root   0 Aug   20   1   prw   1   prw

- Globbing
- Go back to CYS
- Create multiple subdirectories using single command

```
Unit1

command
glob
Unit2

command
grep
Unit3

constructs
```

```
(kali@kali)-[~/Desktop]

s mkdir -p LS/{Unit1/{command,glob},Unit2/{command,grep},Unit3/contructs}

LS

(kali@kali)-[~/Desktop]
```

• Navigate to unit1/glob

```
File Actions Edit View Help

(kali@kali)-[~/Desktop]

$ cd LS/Unit1/glob

(kali@kali)-[~/Desktop/LS/Unit1/glob]

$ [
```

• Create the following files:

Commands.txt

Commands1.txt

Commands2.txt

page1.html

page2.html

page3.html

file1 file10 file11 file2 File2 File3 file33

file33 fileAB filea fileA

fileAAA
file(
file 2

```
(pb® kali)-[~/Desktop/LS/Unit1/glob]
$ touch Commands.txt Commands1.txt Commands2.txt page{1..3}.html file1 file
10 file11 file2 File2 File3 file33 fileAB filea fileA fileAAA 'file(' 'file 2')
```

• List all files starting with file

```
(pb® kali)-[~/Desktop/LS/Unit1/glob]
$\file*
'file 2' file1 file11 file33 fileAAA filea
'file(' file10 file2 fileA fileAB
```

• List all files starting with File

```
(pb@ kali)-[~/Desktop/LS/Unit1/glob]
$ ls File*
File2 File3
```

• List all files starting with file and ending in a number.

```
(pb⊗ kali)-[~/Desktop/LS/Unit1/glob]
$\frac{1}{2} \text{ file 1 file 10 file 11 file 2 file 33}
```

• List all files starting with file and ending with a letter

```
(pb⊗ kali)-[~/Desktop/LS/Unit1/glob]
$\frac{1}{2}$ ls file*[a-zA-Z]
fileA fileAAA fileAB filea
```

• List all files starting with File and having a digit as fifth character.

```
(pb@ kali)-[~/Desktop/LS/Unit1/glob]
$ ls File[0-9]*
File2 File3
```

• List all files starting with File and having a digit as fifth character and nothing else.

```
(pb@ kali)-[~/Desktop/LS/Unit1/glob]
$ ls File[0-9]
File2 File3
```

• List (with ls) all files starting with a letter and ending in a number.

```
(pb⊕ kali)-[~/Desktop/LS/Unit1/glob]
$\ls [a-zA-Z]*[0-9]
File2 File3 'file 2' file1 file10 file11 file2 file33
```

• List (with ls) all files that have exactly five characters.

```
(pb® kali)-[~/Desktop/LS/Unit1/glob]
$ ls ?????
File2 File3 'file(' file1 file2 fileA filea
```

• List (with ls) all files that start with f or F and end with 3 or A.

```
(pb⊕ kali)-[~/Desktop/LS/Unit1/glob]
$\text{ls [fF]*[3A]}
File3 file33 fileA fileAAA
```

• List (with ls) all files that start with f have i or R as second character and end in a number.

```
(pb@ kali)-[~/Desktop/LS/Unit1/glob]
$ ls f[iR]*[0-9]
'file 2' file1 file10 file11 file2 file33
```

• List all files that do not start with the letter F.

```
(pb@ kali)-[~/Desktop/LS/Unit1/glob]
-$ ls [\!F]*
Commands.txt
                'file 2'
                           file10
                                     file33
                                                fileAB
                                                              page2.html
                'file('
                           file11
                                                filea
Commands1.txt
                                     fileA
                                                              page3.html
                                                page1.html
Commands2.txt
                 file1
                            file2
                                     fileAAA
```

• Remove all the \*.html

```
-(pb® kali)-[~/Desktop/LS/Unit1/glob]
                                               page1.html
Commands.txt
                 File3
                           file10
                                     fileA
                'file 2'
                                               page2.html
Commands1.txt
                           file11
                                     fileAAA
                'file('
Commands2.txt
                           file2
                                     fileAB
                                               page3.html
File2
                 file1
                           file33
                                     filea
 -(pb@kali)-[~/Desktop/LS/Unit1/glob]
└$ rm *.html
(pb@kali)-[~/Desktop/LS/Unit1/glob]
Commands.txt
                 File2
                           'file('
                                     file11
                                              fileA
                                                         filea
Commands1.txt
                 File3
                           file1
                                     file2
                                              fileAAA
                'file 2'
Commands2.txt
                           file10
                                     file33
                                              fileAB
```

• Rename \*.txt to \*.json

```
-(pb@kali)-[~/Desktop/LS/Unit1/glob]
                 File2
                          'file('
                                    file11
                                             fileA
                                                       filea
Commands.txt
Commands1.txt
                 File3
                           file1
                                    file2
                                             fileAAA
Commands2.txt 'file 2'
                                             fileAB
                           file10
                                    file33
 -(pb®kali)-[~/Desktop/LS/Unit1/glob]
rename 's/.txt$/.json/' *.txt
 --(pb:skali)-[~/Desktop/LS/Unit1/glob]
Commands.json
                           'file('
                                     file11
                                              fileA
                                                         filea
                  File2
Commands1.json
                 File3
                            file1
                                     file2
                                              fileAAA
                 'file 2'
                            file10
                                     file33
                                              fileAB
Commands2.json
```

Absolute path and relative path

Use rm, mv, cp, ls with absolute path and relative path as per your choice.

#### Relative Path

```
-(pb®kali)-[~/Desktop/LS/Unit1/glob]
                 File3
                           'file('
                                     file10
                                              file2
                                                       fileA
                                                                  fileAB
Commands2.json
                 'file 2'
                                     file11
                                              file33
File2
                           file1
                                                       fileAAA
                                                                  filea
  -(pb@kali)-[~/Desktop/LS/Unit1/glob]
─$ rm Commands2.json
 -(pb® kali)-[~/Desktop/LS/Unit1/glob]
s mv File2 File2.txt
 -(pb⊛kali)-[~/Desktop/LS/Unit1/glob]
 -$ cp File3 Unit1
```

# **Absolute Path**

```
-(pb⊕ kali)-[~]
s ls Desktop/LS/Unit1/glob
File2.txt
            Unit1
                    'file('
                               file10
                                        file2
                                                 fileA
                                                           fileAB
           'file 2' file1
File3
                               file11
                                        file33
                                                 fileAAA
                                                           filea
 -(pb⊕ kali)-[~]
sm Desktop/LS/Unit1/glob/File2.txt
 —(pb⊕ kali)-[~]
—$ mv Desktop/LS/Unit1/glob/Unit1 /home/pb/Desktop/
  -(pb⊕kali)-[~]
S cp Desktop/LS/Unit1/glob/file10 /home/pb/Desktop/
```

# Wildcards

Notatio	Use	Example	Screenshot			
n						
*	Match any character	Is file*	<pre>(pb® kali)-[~/Desktop/LS/Unit1/glob] \$ ls file*</pre>			
	(0 or more)		'file 2' file1 file11 file33 fileAAA filea 'file(' file10 file2 fileA fileAB			
?	Match any 1	Is file?	<pre>(pb@ kali)-[~/Desktop/LS/Unit1/glob] \$ ls file?</pre>			
	character per question mark		'file(' file1 file2 fileA filea			
[]	Match any one of the characters inside the brackets	Is file[123]	<pre>(pb® kali)-[~/Desktop/LS/Unit1/glob] \$ ls file[123] file1 file2</pre>			
[!]	Matches any	Is [!F]*	<pre>(pb@kali)-[~/Desktop/LS/Unit1/glob] \$ ls [\!F]*</pre>			
	character that is not a member of the set character s		Commands.txt 'file 2' file10 file33 fileAB page2.htm Commands1.txt 'file(' file11 fileA filea page3.htm Commands2.txt file1 file2 fileAAA page1.html			
{}	Match all characters inside braces	Is 1.{txt,doc,png,htm I}	<pre>(pb@ kali)-[~/Desktop/LS/Unit1/glob] \$ ls 1.{txt,doc,png,html} 1.doc 1.html 1.png 1.txt</pre>			

#### More on Character class

Notation	Use	Example	Screenshot
[:alnum: ]	Matches any alphanumeri c character	ls *[:alnum:] *	<pre>(pb® kali)-[~/Desktop/LS/Unit1/glob] \$\frac{1}{2} \text{ s *[:alnum:]*} 1.html File3 'file(' file10 file2 fileA fileAB 1.png 'file 2' file1 file11 file33 fileAAA filea</pre>
[:alpha:]	Matches any alphabetical character	ls *[:alpha:]*	<pre>(pb@ kali)-[~/Desktop/LS/Unit1/glob] \$ ls *[:alpha:]* 1.html File3 'file(' file10 file2 fileA fileAB 1.png 'file 2' file1 file11 file33 fileAAA filea</pre>
[:digit:]	Matches any digit	ls *[:digit:]*	<pre>—(pb⊕ kali)-[~/Desktop/LS/Unit1/glob] —\$ ls *[:digit:]* 1.doc 1.png File3 'file(' file10 file2 fileA fileAB 1.html 1.txt 'file 2' file1 file11 file33 fileAAA filea</pre>
[:lower:]	Matches any lowercase letter	ls *[:lower:]*	<pre>(pb⊕ kali)-[~/Desktop/LS/Unit1/glob] \$ ls *[:lower:]* 1.doc File3 'file(' file10 file2 fileA fileAB 1.html 'file 2' file1 file11 file33 fileAAA filea</pre>
[:upper:]	Matches any uppercase letter	ls *[:upper:]*	<pre>(pb@ kali)-[~/Desktop/LS/Unit1/glob] \$ ls *[:upper:]* 1.png 'file 2' file1 file11 file33 fileAAA filea File3 'file(' file10 file2 fileA fileAB</pre>

# 4. change permission

• Change the permission set of /work/readme.txt so that only the user (owner) can read,write, and execute it. Use absolute mode.

```
(pb@ kali)-[~]
chmod 700 work/readme.txt
```

• Change the permission set of /work/readme.txt so that any user can read it, the group can read/write to it and the user (owner) can read/write/execute it. Use absolute mode.

```
(pb@ kali)-[~]
$ chmod 764 work/readme.txt
```

Change the permission set of /bin/bash so that only the user (owner) can read/write/ execute, group, and
any user can execute it. However, whenever anyone executes it, it should run with the privileges of the
owner user. Use absolute mode.

```
(pb⊕ kali)-[~]
$ chmod 4711 /bin/bash
chmod: changing permissions of '/bin/bash': Operation not permitted
```

Change the permission set of /work/readme.txt so that only the user (owner) can read, write, and execute it.
 Use relative mode.

```
(pb@ kali)-[~/work]
$ chmod u+rwx,go-rwx readme.txt
```

• Change the permission set of /work/readme.txt so that any user can read it, the group can read/write to it and the user (owner) can read/write/execute it. Use relative mode.

 Change the permission set of /work/readme.txt so that only the user (owner) can read/write/ execute, group, and any user can execute it. However, whenever anyone executes it, it should run with the privileges of the group. Use absolute mode.

```
(pb@ kali)-[~/work]
$ chmod 2711 readme.txt
```

• Change the permission set of /work/readme.txt so that only the owner can rename or delete this file while maintaining the existing permissions. Use absolute mode.

```
(pb@ kali)-[~/work]
     chmod 700 readme.txt
```

What are the default permissions for the new file?

```
-rw-rw-r-- 1 pb pb 0 Nov 12 19:05 new.txt
```

What was the command to view the file permissions?

Change chmod.exercises permissions to -r--r--r—

```
(pb⊕ kali)-[~/work]
$ chmod 444 chmod.exercises
```

Change the file permissions to Read only for the owner, group and all other users.

```
(pb@ kali)-[~/work]
$ chmod 444 chmod.exercises
```

What was the command for changing the file permissions to -r--r--?

```
(pb® kali)-[~/work]
$ chmod 444 chmod.exercises
```

Change chmod.exercises permissions to -rw-r-----

```
(pb@ kali)-[~/work]
$ chmod 640 chmod.exercises
```

• Change the file permissions to match the following:

owner: Read and Write

· group: Read

• other: no permissions (None)

```
(pb@ kali)-[~/work]
$ chmod 640 chmod.exercises
```

• What was the command for changing the file permissions to -rw-r----?

```
(pb@ kali)-[~/work]
$ chmod 640 chmod.exercises
```

Change chmod.exercises permissions to -rwxr-x—x

```
(pb@ kali)-[~/work]
$ chmod 751 chmod.exercises
```

Change the file permissions to match the following:

owner: Read, Write and Execute

• group: Read and Execute

• other: Execute

```
(pb@ kali)-[~/work]
$ chmod 751 chmod.exercises
```

What was the command for changing the file permissions to -rwxr-x--x?

```
(pb@ kali)-[~/work]
$ chmod 751 chmod.exercises
```

#### Evaluation:

Marks: 10 (Deadline: 4 – Originality: 3 – Completeness: 3)

Deadline: 06.08.2024

In life there are no shortcuts. All things are connected. For success there is no fast lane. Work hard. Focus your energy, practice, remain honest, Truthful, loyal and committed.