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

1. 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	Static files of the boot loader
4	/dev	Device files
5	/etc	Host specific system Configuration
6	/home	User home directories
7	/lib	Shared Libraries
8	/proc	Process information
9	/sbin	System binaries
10	/tmp	Temporary files
11	/var	Variable Files
12	/media	Removable files
13	/mnt	Mounted File system

Commented [w1]:

2. In Linux, there are three different files
   Regular file
   Directory
   Special file
   Block file
   Character file
   Socket file
   Pipe file

Fill the below table:

File Type	Represented by (Hint ls)	Role	How to create	How to check	Location
Regular file	-	Contain data of various types	touch	NA	Any directory
- Text file	-	Contains text data	-	NA	Any directory
- Compressed file	-	Contains script data	-	NA	Any directory
- Image	-	Contains image data	NA	NA	Any directory
Directory	‘d’	Contains name and address of other files	mkdir	NA	Directory
Block file	‘b’	Accesses block device I/O	NA	NA	/dev
Character file	‘c’	Character of raw device	NA	NA	/dev
Socket file	‘s’	Provides inter-process communication	NA	NA	/dev
pipe file	‘p’		NA	NA	/dev

3. Globbing
a. Go back to CYS
b. Create multiple subdirectories using single command

LS
Unit1
command
glob
Unit2
command
grep
Unit3
constructs

```
┌──(kali㉿kali)-[~/CYS]
└─$ mkdir -p CYS/LS/Unit1/{command,glob} CYS/LS/Unit2/{command,grep} CYS/LS/Unit3/constructs

┌──(kali㉿kali)-[~/CYS]
└─$ tree -d CYS
CYS
└── LS
    ├── Unit1
    │   ├── command
    │   └── glob
    ├── Unit2
    │   ├── command
    │   └── grep
    └── Unit3
        └── constructs

10 directories
```

c. Navigate to unit1/glob

```
┌──(kali㉿kali)-[~/CYS]
└─$ cd CYS/LS/Unit1/glob

┌──(kali㉿kali)-[~/…/CYS/LS/Unit1/glob]
└─$
```

d. Create the following files :

Commands.txt
Commands1.txt
Commands2.txt
page1.html
page2.html
page3.html
file1
file10
file11
file2
File2
File3
file33
fileAB
filea
fileA
fileAAA
file(
file 2

```
┌──(kali㉿kali)-[~/…/CYS/LS/Unit1/glob]
└─$ touch Commands.txt Commands{1,2}.txt page{1..3}.html file{1,10,11,2,33,AB,a,A,AAA} File{2,3}

┌──(kali㉿kali)-[~/…/CYS/LS/Unit1/glob]
└─$ ls
Commands.txt   Commands2.txt  File3  file10  file2   fileA    fileAB  page1.html  page3.html
Commands1.txt  File2          file1  file11  file33  fileAAA  filea   page2.html
```

i. List all files starting with file

```
┌──(kali㉿kali)-[~/…/CYS/LS/Unit1/glob]
└─$ ls file*
file1  file10  file11  file2  file33  fileA  fileAAA  fileAB  filea
```

ii. List all files starting with File

```
┌──(kali㉿kali)-[~/…/CYS/LS/Unit1/glob]
└─$ ls File*
File2  File3
```

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

```
┌──(kali㉿kali)-[~/…/CYS/LS/Unit1/glob]
└─$ ls file*[0-9]
file1  file10  file11  file2  file33
```

iv. List all files starting with file and ending with a letter

```
┌──(kali㉿kali)-[~/…/CYS/LS/Unit1/glob]
└─$ ls file*[a-zA-Z]
fileA  fileAAA  fileAB  filea
```

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

```
┌──(kali㉿kali)-[~/…/CYS/LS/Unit1/glob]
└─$ ls File????*
ls: cannot access 'File????*': No such file or directory
```

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

```
┌──(kali㉿kali)-[~/…/CYS/LS/Unit1/glob]
└─$ ls File?????
ls: cannot access 'File?????': No such file or directory
```

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

```
┌──(kali㉿kali)-[~/…/CYS/LS/Unit1/glob]
└─$ ls [a-zA-Z]*[0-9]
File2  File3  file1  file10  file11  file2  file33
```

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

```
┌──(kali㉿kali)-[~/…/CYS/LS/Unit1/glob]
└─$ ls ?????
File2  File3  file1  file2  fileA  filea
```

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

```
┌──(kali㉿kali)-[~/…/CYS/LS/Unit1/glob]
└─$ ls [fF]*[3A]
File3  file33  fileA  fileAAA
```

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

```
┌──(kali㉿kali)-[~/…/CYS/LS/Unit1/glob]
└─$ ls [f][iR]*[0-9]
file1  file10  file11  file2  file33
```

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

```
┌──(kali㉿kali)-[~/…/CYS/LS/Unit1/glob]
└─$ ls | grep -v '^F'
Commands.txt
Commands1.txt
Commands2.txt
file1
file10
file11
file2
file33
fileA
fileAAA
fileAB
filea
page1.html
page2.html
page3.html
```

xii. Remove all the *.html

```
┌──(kali㉿kali)-[~/…/CYS/LS/Unit1/glob]
└─$ rm *.html

┌──(kali㉿kali)-[~/…/CYS/LS/Unit1/glob]
└─$ ls
Commands.txt   Commands2.txt  File3  file10  file2   fileA    fileAB
Commands1.txt  File2          file1  file11  file33  fileAAA  filea
```

xiii. Rename *.txt to *.json

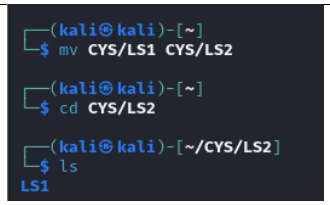
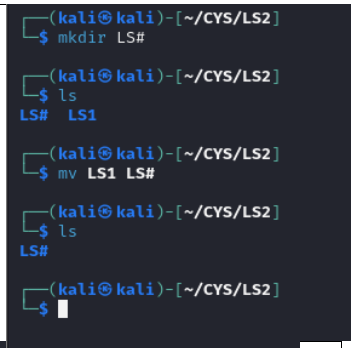
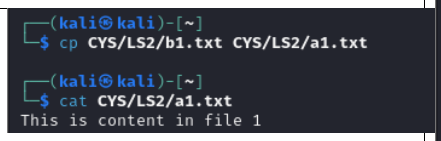
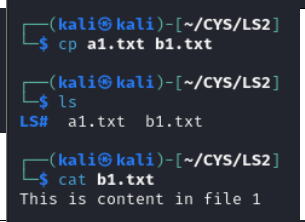
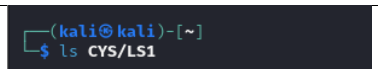
```
┌──(kali㉿kali)-[~/…/CYS/LS/Unit1/glob]
└─$ rename 's/\.txt$/\.json/' *.txt

┌──(kali㉿kali)-[~/…/CYS/LS/Unit1/glob]
└─$ ls
Commands.json   Commands2.json  File3  file10  file2   fileA    fileAB
Commands1.json  File2           file1  file11  file33  fileAAA  filea
```

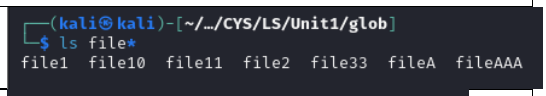
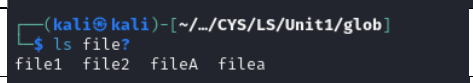
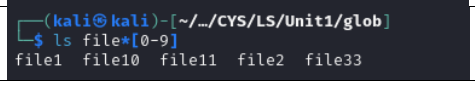
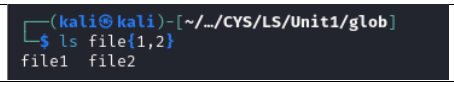
4. Absolute path and relative path

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

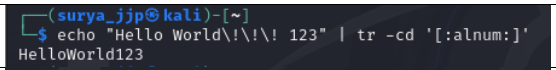
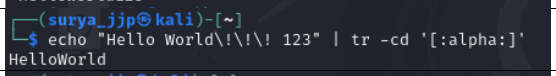
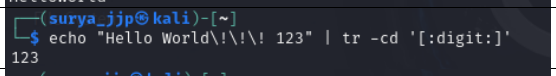
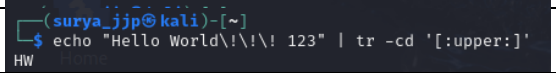
commands	absolute path	relative path
rm	`┌──(kali㉿kali)-[~]` `└─$ rm CYS/unit4`	`┌──(kali㉿kali)-[~/CYS]` `└─$ rm commands.txt`

mv		
cp		
ls		

5. Wildcards

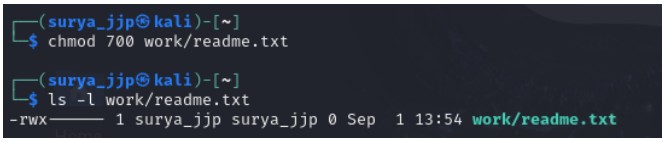
Notation	Use	Example	Screenshot
*	Represents all the characters	ls file*	
?	Single Character	ls file?	
[ ]	Range of Characters	ls file 8[0-9]	
[!]	Matches any character that is not a member of the set characters		
{ }	Range of characters	ls file{1, 2}	

More on Character class

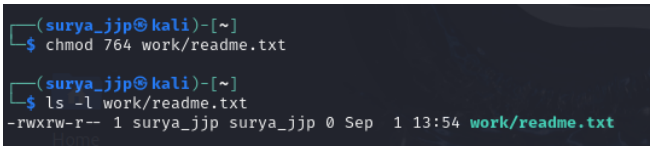
Notation	Use	Example	Screenshot
[:alnum:]	0-9,a-z,A-Z	[:alnum:]	
[:alpha:]	a-z & A-Z	[:alpha:]	
[:digit:]	0-9	[:digit:]	
[:lower:]	a-z	[:lower:]	
[:upper:]	A-Z	[:upper:]	

4. change permission

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



b) 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.



c) 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.

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

```
┌──(surya_jjp㉿kali)-[~]
└─$ cd work

┌──(surya_jjp㉿kali)-[~/work]
└─$ chmod 700 readme.txt

┌──(surya_jjp㉿kali)-[~/work]
└─$ ls -l readme.txt
-rwx------ 1 surya_jjp surya_jjp 0 Sep  1 13:54 readme.txt
```

e) 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.

```
┌──(surya_jjp㉿kali)-[~/work]
└─$ chmod 764 readme.txt

┌──(surya_jjp㉿kali)-[~/work]
└─$ ls -l readme.txt
-rwxrw-r-- 1 surya_jjp surya_jjp 0 Sep  1 13:54 readme.txt
```

f) 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.

```
┌──(surya_jjp㉿kali)-[~/work]
└─$ chmod 4711 readme.txt

┌──(surya_jjp㉿kali)-[~/work]
└─$ ls -l readme.txt
-rws--x--x 1 surya_jjp surya_jjp 0 Sep  1 13:54 readme.txt
```

g) 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.

```
┌──(surya_jjp㉿kali)-[~]
└─$ chmod 1777 work/readme.txt

┌──(surya_jjp㉿kali)-[~]
└─$ ls -l work/readme.txt
-rwxrwxrwt 1 surya_jjp surya_jjp 0 Sep  1 13:54 work/readme.txt
```

h) What are the default permissions for the new file?

The default permissions for a new file depend on the system's `umask` setting. Typically:

- **Files:** `rw-r--r--` (644) if `umask` is 022.
- **Directories:** `rwxr-xr-x` (755) if `umask` is 022.

i) What was the command to view the file permissions?

ls –l filename

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

```
┌──(surya_jjp㉿kali)-[~]
└─$ chmod 444 work/readme.txt

┌──(surya_jjp㉿kali)-[~]
└─$ ls -l work/readme.txt
-r--r--r-- 1 surya_jjp surya_jjp 0 Sep  1 13:54 work/readme.txt
```

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

```
┌──(surya_jjp㉿kali)-[~]
└─$ chmod 444 work/readme.txt

┌──(surya_jjp㉿kali)-[~]
└─$ ls -l work/readme.txt
-r--r--r-- 1 surya_jjp surya_jjp 0 Sep  1 13:54 work/readme.txt
```

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

chmod 444 filename

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

```
┌──(surya_jjp㉿kali)-[~]
└─$ chmod 640 work/readme.txt

┌──(surya_jjp㉿kali)-[~]
└─$ ls -l work/readme.txt
-rw-r----- 1 surya_jjp surya_jjp 0 Sep  1 13:54 work/readme.txt
```

n) Change the file permissions to match the following:

a. owner: Read and Write
b. group: Read
c. other: no permissions (None)

```
┌──(surya_jjp㉿kali)-[~]
└─$ chmod 640 work/readme.txt

┌──(surya_jjp㉿kali)-[~]
└─$ ls -l work/readme.txt
-rw-r----- 1 surya_jjp surya_jjp 0 Sep  1 13:54 work/readme.txt
```

o) What was the command for changing the file permissions to -rw-r-----?
chmod 640 filename

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

```
┌──(surya_jjp㉿kali)-[~]
└─$ chmod 751 work/readme.txt

┌──(surya_jjp㉿kali)-[~]
└─$ ls -l work/readme.txt
-rwxr-x--x 1 surya_jjp surya_jjp 0 Sep  1 13:54 work/readme.txt
```

q) Change the file permissions to match the following:

a. owner: Read, Write and Execute
b. group: Read and Execute
c. other: Execute

```
┌──(surya_jjp㉿kali)-[~]
└─$ chmod 751 work/readme.txt

┌──(surya_jjp㉿kali)-[~]
└─$ ls -l work/readme.txt
-rwxr-x--x 1 surya_jjp surya_jjp 0 Sep  1 13:54 work/readme.txt
```

r) What was the command for changing the file permissions to -rwxr-x--x?
chmod 751 filename

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.

-unknown