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## 1. Introduction

In this project multiple linux commands like `mkdir` , `rmdir` ,`rm`, `mv` ,`chmod` and `ls` are used to create , manage , manipulate and delete the files,folders or directory in the system. **`mkdir`** command is used to create a directory in the home directory of the system , **`rmdir`** is used to delete the existing directory ( empty) in the home directory ,**`mv`** command is used to move the file of one directory to another directory using realtive pathnames of the directory the file has to be moved to , **`chmod`** is used to change the permissions of any file, folder or directory within the system and **`ls`** command is used to list all the details of a file which contains the file type , permissions for the file , username , date and etc.

This workshop project gives us a hands-on experience on how to efficiently use the linux commands to interact with files and directories . This knowledge is essential or useful for effective file system management in linux environment.

## 2. Objective

The targeted objectives of this workshop are :

- Learn how to create and manage a hierarchial directory structure using the `mkdir` command with and without options.
- To learn how to navigate the file system ( directories and files ) using realtive and absolute path with `cd` commands.
- use `cat` and `echo` to create files in directories.
- Manage the permisions of the files and directory permissions using `chmod` commands.
- Learn how to safely remove the files and directories using `rm` and `rmdir` commands.
- Use `.` and `..` in realtive pathnames to simplify navigation and operations within the file system.

## 3. Required tools and Software

### 3.1 Kali Linux

Kali Linux (formerly known as BackTrack Linux) is an open-source, Debian-based Linux distribution which allows users to perform advanced penetration testing and security auditing. It runs on multiple platforms and is freely available and accessible to both information security professionals and hobbyists.

This distribution has several hundred tools, configurations, and scripts with industryspecific modifications that allow users to focus on tasks such as computer forensics, reverse engineering, and vulnerability detection, instead of dealing with unrelated activities. (Intorduction, n.d.)

### 3.2 Linux Command Line

The Linux command line is a text interface to your computer. Often referred to as the shell, terminal, console, prompt or various other names, it can give the appearance of being complex and confusing to use. Yet the ability to copy and paste commands from a website, combined with the power and flexibility the command line offers, means that using it may be essential when trying to follow instructions online, including many on this very website. (Tutorials, n.d.)

## 4. Steps to replicate

### 4.1 Question no 1

Creating a directory named W7 under home directory using mkdir .

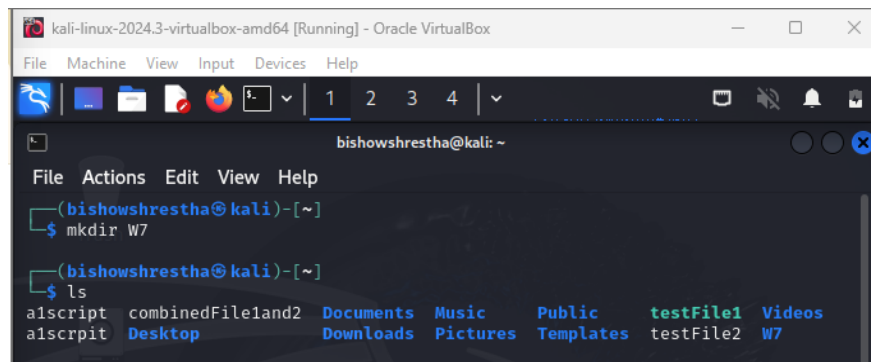
A screenshot of a Kali Linux terminal window. The window title is "kali-linux-2024.3-virtualbox-amd64 [Running] - Oracle VirtualBox". The terminal shows the user "bishowshrestha@kali" in the home directory. The command "mkdir W7" has been executed successfully. Below this, the "ls" command is shown, listing the contents of the home directory, which includes "alscript", "combinedFile1and2", "Documents", "Music", "Public", "testFile1", "Videos", "alscript", "Desktop", "Downloads", "Pictures", "Templates", "testFile2", and "W7". The "W7" directory is highlighted in blue, indicating it is a directory.

Figure 1 Creating W7 .

then ,going to W7 direcotry and creating W7-1 and W7-2.

```
(bishowshrestha@kali)-[~]
$ cd W7

(bishowshrestha@kali)-[~/W7]
$ mkdir W7-1 W7-2
```

*Figure 2 Creating W7-1 and W7-2*

then going to W7-1 and creating directories named 1level3 and 2level3.

```
(bishowshrestha@kali)-[~/W7]
$ cd W7-1

(bishowshrestha@kali)-[~/W7/W7-1]
$ mkdir 1level3 2level3
```

*Figure 3 Creating 1level3 and 2level3*

now , going to W7-2 using realtive path and creating 3level3 and 4level 3 named directories.

```
(bishowshrestha@kali)-[~/W7]
$ cd W7-2

(bishowshrestha@kali)-[~/W7/W7-2]
$ mkdir 3level3 4level3
```

*Figure 4 Creating 3level3 and 4level3*

Showing the tree structure of W7 directory using "tree" command.

```
(bishowshrestha@kali)-[~]
$ tree W7
W7
├── W7-1
│   ├── 1level3
│   └── 2level3
└── W7-2
    ├── 3level3
    └── 4level3
```

*Figure 5 tree command*

Removing W7 directory and all its sub directories to use -p command to again create the directories.

```
(bishowshrestha@kali)-[~]
$ rm -r W7
(bishowshrestha@kali)-[~]
$ mkdir -p W7/W7-1/{1level3,2level3} W7/W7-2/{3level3,4level3}
(bishowshrestha@kali)-[~]
$ tree W7
W7
├── W7-1
│   ├── 1level3
│   └── 2level3
└── W7-2
    ├── 3level3
    └── 4level3
7 directories, 0 files
```

Figure 6 Using -p command to create directories.

## 4.2 Question no 2

```
(bishowshrestha@kali)-[~/W7]
$ cd W7-1/1level3
(bishowshrestha@kali)-[~/W7/W7-1/1level3]
$ cd ../2level3
```

Figure 7 Changing to 1level3 .

First i was in W7 and then to 1level3 using "cd W7-1/1level3".

## 4.3 Question no 3

```
(bishowshrestha@kali)-[~/W7]
$ cd W7-1/1level3
(bishowshrestha@kali)-[~/W7/W7-1/1level3]
$ cd ../2level3
```

Figure 8 Going to 2level3 from 1level3

In above figure ,first i was in 1level3 of W7-1 and then using " cd ../2level3" i changed my current directory to 2level3 .

```
(bishowshrestha@kali)-[~/W7/W7-1/2level3]
$ cd ../../W7-2/4level3
(bishowshrestha@kali)-[~/W7/W7-2/4level3]
$ cd ../../
```

Figure 9 Changig to 4level3 from 2level3

I used "cd ../../W7-2/4level3" to move to 4level3 directory of W7-2 directory from 1level3 of W7-1 directory.

```
(bishowshrestha@kali)-[~/W7/W7-2/4level3]
$ cd ../../

(bishowshrestha@kali)-[~/W7]
$
```

Figure 10 Going to W7 from 4level3

Again going to W7 from 4level3 using " cd ../../" command.

## 4.4 Question no 4

Changing the current directory to 1level3 and creating a single line file named "CreatedFile" using echo.

```
(bishowshrestha@kali)-[~/W7]
$ cd W7-1/1level3

(bishowshrestha@kali)-[~/W7/W7-1/1level3]
$ echo "This is a file in 1level3" >CreatedFile
```

Figure 11 Creating file in 1level3

## 4.5 Question no 5

Copying the text file "CreatedFile" from 1level3 to 1level3 with the name file 1.

```
(bishowshrestha@kali)-[~/W7/W7-1/1level3]
$ cp CreatedFile file1
```

Figure 12 Copying and pasting file within same directory with different name.

and then , copying the file named "CreatedFile" to 2level3 from 1level3.

```
(bishowshrestha@kali)-[~/W7/W7-1/1level3]
$ cp CreatedFile ../2level3/
```

Figure 13 Copying the file to 2level3 from 1level3

now , copying the file named "CreatedFile" to 3level3 with the name new\_file1.



```
Home
(bishowshrestha@kali)-[~/W7/W7-1/1level3]
$ cp CreatedFile ../../W7-2/3level3/new_file1
```

Figure 14 Copying the file to 3level3 with different name.

finally showing that there are files in corresponding directories.

```
(bishowshrestha@kali)-[~/W7/W7-1/1level3]
$ ls
CreatedFile file1
```

Figure 15 Listing 1level3

```
Home
(bishowshrestha@kali)-[~/W7/W7-1]
$ cd 2level3
(bishowshrestha@kali)-[~/W7/W7-1/2level3]
$ ls
CreatedFile
(bishowshrestha@kali)-[~/W7/W7-1/2level3]
$ cd ../../W7-2/3level3
(bishowshrestha@kali)-[~/W7/W7-2/3level3]
$ ls
new_file1
(bishowshrestha@kali)-[~/W7/W7-2/3level3]
```

Figure 16 Listing 2level3 and 3level3

## 4.6 Question no 6

Moving the file "CreatedFile" to 4level3 from 1level3 using "mv" commands.

```
(bishowshrestha@kali)-[~/W7/W7-1/1level3]
$ ls
CreatedFile file1
(bishowshrestha@kali)-[~/W7/W7-1/1level3]
$ mv CreatedFile ../W7-2/4level3/
(bishowshrestha@kali)-[~/W7/W7-1/1level3]
$ cd ../../W7-2/4level3
(bishowshrestha@kali)-[~/W7/W7-2/4level3]
$ ls
CreatedFile
(bishowshrestha@kali)-[~/W7/W7-2/4level3]
$ cd ../../W7-1/1level3
(bishowshrestha@kali)-[~/W7/W7-1/1level3]
$ ls
file1
```

Figure 17 Moving file from 1level3 to 4level3

In the above figure, Firstly listing 1level3 to see the file is there.

Secondly, using 'mv' command to move the file "CreatedFile" to 4level3.

Thirdly, going to 4level3 and listing 4level3.

lastly , listing 1level3 to see the file is not there.

## 4.7 Question no 7

- Hello ! I can do it
- $5 > (20:8) < (30 * 2)$
- Line 1 Line 2
- a-b, A-B, -, +, <, >, #, \$, %, &.

```
(bishowshrestha@kali)-[~/W7/W7-1/1level3]
$ echo "hello ! i can do it "
hello ! i can do it

(bishowshrestha@kali)-[~/W7/W7-1/1level3]
$ printf " 5> (20:8) < (30*2)"
5> (20:8) < (30*2)

(bishowshrestha@kali)-[~/W7/W7-1/1level3]
$ echo -e "Line 1\nLine2"
Line 1
Line2
```

Figure 18 Using echo and printf command

```
(bishowshrestha@kali)-[~/W7/W7-1/1level3]
$ echo " a-b, A-B, -, +, <, >, #, $, %, &.\n"
a-b, A-B, -, +, <, >, #, $, %, &.\n
```

Figure 19 Using echo command (2)

## 4.8 Question no 8

Using ls command without options .

```
(bishowshrestha@kali)-[~]
$ ls W7
W7-1
```

Figure 20 ls W7

```
(bishowshrestha@kali)-[~]
$ ls W7/W7-1
1level3 2level3 file1 file2

(bishowshrestha@kali)-[~]
$ ls W7/W7-1/1level3
file1 file2

(bishowshrestha@kali)-[~]
$ ls W7-1
```

Figure 21 ls W7-1 and ls 1level3

Using 'ls -adglr' command in W7,W7-1 and 1level3

Using 'ls' command on directories is showing the sub-directories and files present in the listed directory and nothing else.

```
(bishowshrestha@kali)-[~]
$ cd W7

(bishowshrestha@kali)-[~/W7]
$ ls -adglR
drwxrwxr-x 4 bishowshrestha 4096 Dec 19 10:02 .
drwxrwxr-x 4 bishowshrestha 4096 Dec 19 10:02 ..
drwxrwxr-x 2 bishowshrestha 4096 Dec 19 10:02 W7-1

(bishowshrestha@kali)-[~/W7]
$ cd W7-1

(bishowshrestha@kali)-[~/W7/W7-1]
$ ls -adglR
drwxrwxr-x 4 bishowshrestha 4096 Dec 19 10:02 .
drwxrwxr-x 4 bishowshrestha 4096 Dec 19 10:02 ..
drwxrwxr-x 2 bishowshrestha 4096 Dec 19 10:30 1level3

(bishowshrestha@kali)-[~/W7/W7-1]
$ cd 1level3

(bishowshrestha@kali)-[~/W7/W7-1/1level3]
$ ls -adglR
drwxrwxr-x 2 bishowshrestha 4096 Dec 19 10:30 .
drwxrwxr-x 2 bishowshrestha 4096 Dec 19 10:30 ..
```

only 'ls' command was showing the files present in the certain directory but adding a,d,g,l and R options give the file type , permissions , username , date and time also. So Using these options are more helpful when we need the detailed information of any file, folder or directory.

## 4.9 Question no 9

Going to W7 then W7-2 and using **rm -ri** command to remove the directory "3level3" and "4level3" .

```
(bishowshrestha@kali)-[~/W7/W7-2/3level3]
$ cd ../..

(bishowshrestha@kali)-[~/W7]
$ cd W7-2

(bishowshrestha@kali)-[~/W7/W7-2]
$ cd ..

(bishowshrestha@kali)-[~/W7]
$ rm -ri W7-2/3level3
rm: descend into directory 'W7-2/3level3'? y
rm: remove regular file 'W7-2/3level3/new_file1'? y
rm: remove directory 'W7-2/3level3'? y

(bishowshrestha@kali)-[~/W7]
$ rm -ri W7-2/4level3
rm: descend into directory 'W7-2/4level3'? y
rm: remove regular file 'W7-2/4level3/CreatedFile'? y
rm: remove directory 'W7-2/4level3'? y
```

Figure 22 Removing 3level3 and 4level3

finally when the W7-2 directory is empty , removing the W7-2 directory using same command **ri**.

```
(bishowshrestha@kali)-[~/W7]
$ rm -ri W7-2
rm: remove directory 'W7-2'? y
```

Figure 23 Removing W7-2 directory

now showing W7-2 doesnot exist using 'tree' command in home directory.

```
(bishowshrestha@kali)-[~]
$ tree W7
W7
├── W7-1
│   ├── 1level3
│   │   └── file1
│   └── 2level3
│       └── CreatedFile
4 directories, 2 files
```

Figure 24 Using tree command to show W7-2 has been removed.

## 4.10 Question no 10

Displaying access permissions for the file file1 in 1level3 using ls command.

```
(bishowshrestha@kali)-[~/W7]
$ cd W7-1

(bishowshrestha@kali)-[~/W7/W7-1]
$ ls -al 1level3/file1
-rwxrwxrwx 1 bishowshrestha bishowshrestha 26 Dec 19 10:17 1level3/file1
```

Figure 25 Displaying permissions for file1 in 1level3

Removing all access permissions for this file using chmod command and displaying the access permissions for this file.

```
(bishowshrestha@kali)-[~/W7/W7-1]
$ chmod 000 1level3/file1

(bishowshrestha@kali)-[~/W7/W7-1]
$ ls -al 1level3/file1
----- 1 bishowshrestha bishowshrestha 26 Dec 19 10:17 1level3/file1
```

Figure 26 Removing all access for file1.

Trying to read this file

```
(bishowshrestha@kali)-[~/W7/W7-1]
$ cat 1level3/file1
cat: 1level3/file1: Permission denied
```

Figure 27 Trying to read file using cat.

Trying to put a file using echo command.

```
(bishowshrestha@kali)-[~/W7/W7-1]
$ echo " Trying to write file in filee">1level3/file1
bash: 1level3/file1: Permission denied
```

Figure 28 Trying to write in file1

Adding read and write access permissions for myself for this file using chmod command and listing the files permissions.

```
(bishowshrestha@kali)-[~/W7/W7-1]
$ chmod 600 1level3/file1

(bishowshrestha@kali)-[~/W7/W7-1]
$ ls -al 1level3/file1
-rw----- 1 bishowshrestha bishowshrestha 26 Dec 19 10:17 1level3/file1
```

Figure 29 adding read and write access.

Trying to read the file using cat command.

```
(bishowshrestha@kali)-[~/W7/W7-1]
$ cat 1level3/file1
This is a file in 1level3
```

Figure 30 reading file 1

Trying to write in the file using echo command and displaying the file using cat command.

```
(bishowshrestha@kali)-[~/W7/W7-1]
$ echo "writing in file1 after giving access for myself" >> 1level3/file1

(bishowshrestha@kali)-[~/W7/W7-1]
$ cat 1level3/file1
This is a file in 1level3
writing in file1 after giving access for myself
```

Figure 31 writing in file1

## 4.11 Question no 11

Displaying access permissions for 1level3.

```
(bishowshrestha@kali)-[~/W7/W7-1]
$ ls -al 1level3
total 12
drwxrwxrwx 2 bishowshrestha bishowshrestha 4096 Dec 19 10:30 
drwxrwxr-x 4 bishowshrestha bishowshrestha 4096 Dec 19 11:00 ..
-rw----- 1 bishowshrestha bishowshrestha 74 Dec 19 11:08 file1
```

Figure 32 Displaying permissions of 1level3

Removing all access permissions for the 1level3 directory using chmod command and trying to display the permissions of 1level3 using ls -al command.

```
(bishowshrestha@kali)-[~/W7/W7-1]
$ chmod 000 1level3

(bishowshrestha@kali)-[~/W7/W7-1]
$ ls -al 1level3
ls: cannot open directory '1level3': Permission denied
```

Figure 33 Removing all access for 1level3.

Trying to read "file1" using cat.

```
(bishowshrestha@kali)-[~/W7/W7-1]
$ cat 1level3/file1
cat: 1level3/file1: Permission denied
```

Figure 34 Trying to read file1 from 1level3.

Trying to write a file into 1level3 using echo.

```
(bishowshrestha@kali)-[~/W7/W7-1]
$ echo " Trying to write in 1level3 " > 1level3/file2
bash: 1level3/file2: Permission denied
```

Figure 35 Trying to write a file in 1level3

Trying to list 1level3 using ls command.

```
(bishowshrestha@kali)-[~/W7/W7-1]
$ ls -a 1level3
ls: cannot open directory '1level3': Permission denied
```

Figure 36 Trying to list 1level3 .

Adding read ,write and execute access permissions for myself for the 1level3 directory using chmod command.

```
(bishowshrestha@kali)-[~/W7/W7-1]
$ chmod 700 1level3
```

Figure 37 Adding read,write and execute permissions to 1level3.

Displaying access permissions for 1level3.

```
(bishowshrestha@kali)-[~/W7/W7-1]
$ ls -al
total 20
drwxrwxr-x 4 bishowshrestha bishowshrestha 4096 Dec 19 11:00 .
drwxrwxr-x 3 bishowshrestha bishowshrestha 4096 Dec 19 10:52 ..
drwx----- 2 bishowshrestha bishowshrestha 4096 Dec 19 10:30 1level3
drwxrwxr-x 2 bishowshrestha bishowshrestha 4096 Dec 19 10:18 2level3
-rw-rw-r-- 1 bishowshrestha bishowshrestha 128 Dec 19 11:07 file1
```

Figure 38 Displaying access permissions for 1level3.

Trying to read a file1 from 1level3 using cat.

```
(bishowshrestha@kali)-[~/W7/W7-1]
$ cat 1level3/file1
This is a file in 1level3
writing in file1 after giving access for myself
```

*Figure 39 Trying to read a file from 1level3*

Trying to write a file into 1level3 using echo and lastly listing 1level 3 using ls command.

```
(bishowshrestha@kali)-[~/W7/W7-1]
$ echo "This is a new file in 1level3" > 1level3/file2

(bishowshrestha@kali)-[~/W7/W7-1]
$ ls 1level3
file1 file2
```

*Figure 40 Writing a file in 1level3.*

## 5. Conclusion

This workshop helped a lot to enhance my understanding of linux directory and file management system including creating hierarchial structured directories , using real pathnames and modifying permissions . I learned the importance of access control and system security through permissions . Overall , It was a short yet knowledgeable hands-on learning experience.

## References

*Intorduction.* (n.d.). Retrieved from kali.org: <https://www.kali.org/docs/introduction/what-is-kali-linux/>

*Tutorials.* (n.d.). Retrieved from ubuntu.com: <https://ubuntu.com/tutorials/command-line-forbeginners#1-overview>