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## 1. Introduction

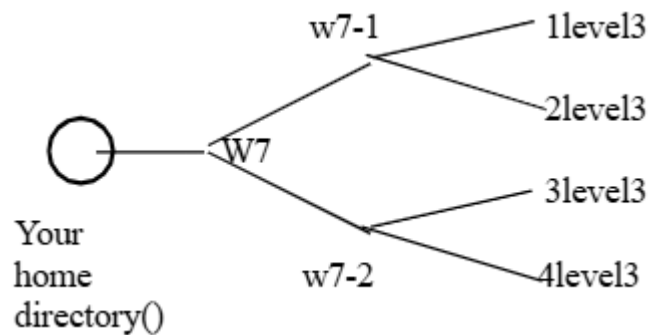
Kali Linux is a unique and freely available operating system that is developed to test vulnerability, hackers groups, security experts. Kali Linux is well-known as an effective tool for performing activities related to security which includes security breaches, computer forensics and debugging. Kali Linux was built and set up by Offensive Security.

Kali Linux uses the ARM architecture, Linux is easily installed on a multiple device such as laptops, computers, servers as well as smartphones and Raspberry Pi which have smaller screens. To be able to start and operate Kali Linux without affecting the host system, people are able to use into a Live USB. The ability to adapt make this tool excellent to use for fast tests and implanting it. Users can check the security of Wi-Fi connections due to their solid backup for wireless harm. In order to maintain the tools and the programs and modules constantly according to the modern security changes, operating system gets updated in many occasions. Kali Linux is commonly used not just among experts but also by students that are receiving information about legal hacking and cybersecurity. It is a powerful instrument and basic design which makes it important means for detection of security breach and security training all over the world.

Kali is a framework that is used to complete a penetration test. However, the tester should never feel tied to the tools that have been installed by default or by the look and feel of the Kali desktop. By customizing Kali, a tester can increase the security of client data that is being collected, and make it easier to do a penetration test. (Velu, Jun 30, 2017 )

## 2. Networks Operating Systems Week 7 Workshop

1. Create the directory structure presented in the figure below. Use `mkdir` command and relative pathnames from your home directory. Try both: no option and `-p` option, for the command.



```
nirjala@kali: ~  
File Actions Edit View Help  
(nirjala@kali)-[~]  
$ mkdir -p W7/{W7-1/{1level3,2level3},W7-2/{3level3,4level3}}  
(nirjala@kali)-[~]  
$ tree W7  
W7  
├── W7-1  
│   ├── 1level3  
│   └── 2level3  
└── W7-2  
    ├── 3level3  
    └── 4level3  
  
7 directories, 0 files
```

The screenshot shows a terminal window on a Kali Linux system. The user runs the command `mkdir -p W7/{W7-1/{1level3,2level3},W7-2/{3level3,4level3}}` to create the directory structure. Then, they run `tree W7` to verify the structure, which shows a tree with 'W7' at the root, branching into 'W7-1' and 'W7-2'. 'W7-1' contains '1level3' and '2level3', and 'W7-2' contains '3level3' and '4level3'. The terminal also reports '7 directories, 0 files'.

Figure 1: Creating the directory structure

2. Change to the 1level3 directory by one step using a relative pathname.

```
(nirjala@kali)-[~]  
$ cd W7/W7-1/1level3/  
  
(nirjala@kali)-[~/W7/W7-1/1level3]  
$ /W7/W7-1/1level3$ cd ../../W7-2/4level3/  
-bash: /W7/W7-1/1level3$: No such file or directory  
  
(nirjala@kali)-[~/W7/W7-1/1level3]  
$ cd ../../W7-2/4level3/  
  
(nirjala@kali)-[~/W7/W7-2/4level3]  
$
```

Figure 2: Changing directory to the 1level3

3. Practice in changing directories in your directory structure by one command using relative pathnames, e.g., from 1level3 to 2level3, from 2level3 to 4level3, from 4level3 to W7, etc. Use names of parent and child directories (‘.’ and ‘..’) as well.

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

Figure 3 Changing directory 1level3 to 2level3, 2level3 to 4level3, 4level3 to W7

4. Change to 1level3 and create a text file by any tool (e.g., by cat or cal like last tutorial)

```
└─$ cd ../ ../W7-2/4level3/
└─(nirjala@kali)-[~/W7/W7-2/4level3]
└─$ cd ../ ../W7-1/1level3/
└─(nirjala@kali)-[~/W7/W7-1/1level3]
└─$ cat>file
This is my file.
^Z
[1]+  Stopped                  cat > file
└─(nirjala@kali)-[~/W7/W7-1/1level3]
└─$
```

Figure 4: Changing to 1level3 and creating a text file

5. Copy this text file from 1level3 to 1level3 (with the name file1), 2level3, and to 3level3 changing its name. Show that there are these files in corresponding directories.

```
[1]+  Stopped                  cat > file
└─(nirjala@kali)-[~/W7/W7-1/1level3]
└─$ cp file file1
└─(nirjala@kali)-[~/W7/W7-1/1level3]
└─$ ls
file file1
└─(nirjala@kali)-[~/W7/W7-1/1level3]
└─$ cp file ../2level3/
└─(nirjala@kali)-[~/W7/W7-1/1level3]
└─$ ls ../2level3/
file
└─(nirjala@kali)-[~/W7/W7-1/1level3]
└─$
```

Figure 5: Copying the textfile and changing its name

6. Move this file to 4level3. Show that there is this file in 4level3 and there is not in 1level3.

```
(nirjala@kali)-[~/W7/W7-1/1level3]
$ mv file ../../W7-2/4level3/

(nirjala@kali)-[~/W7/W7-1/1level3]
$ ls ../../W7-2/4level3/
file

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

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

Figure 6: Moving the file

7. Print the following texts each in one echo or printf command:

Hello! I can do it

5 > (20: 8) < (30 \* 2)

Line 1 Line 2

a-b, A-B, -, +, <, >, #, \$, %, &.

```
5>(20:8)<(30*2)

(nirjala@kali)-[~/W7/W7-1/1level3]
$ echo -e "Hello ! I can do it\n5>(20:8)<(30*2)\nLine1\nLine2\na-b,A-B,-,+,<,>,#,$,%,&."
Hello ! I can do it
5>(20:8)<(30*2)
Line1
Line2
a-b,A-B,-,+,<,>,#,$,%,&.

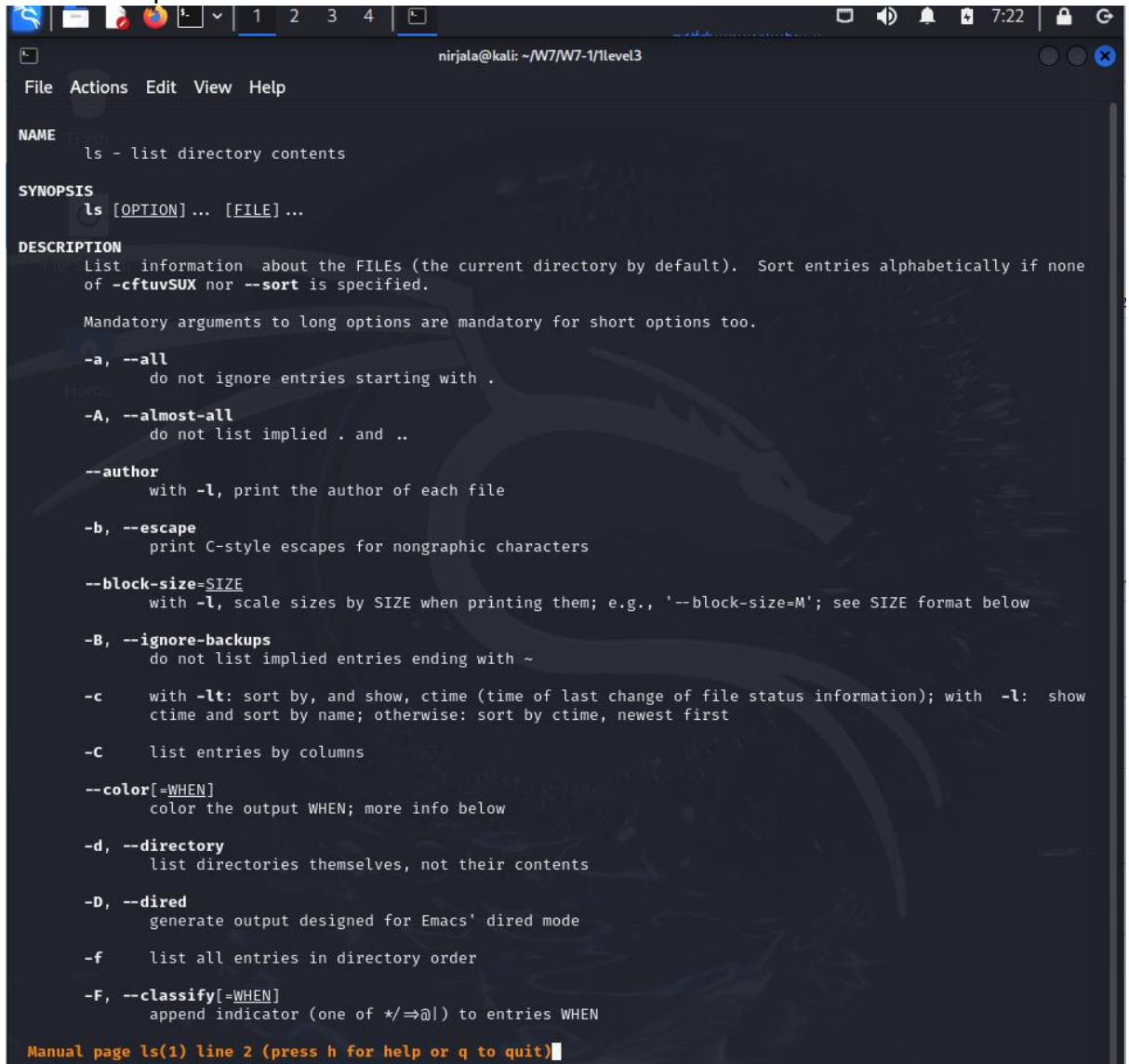
(nirjala@kali)-[~/W7/W7-1/1level3]
$
```

Figure 7: Printing the text using echo



8. Give the ls command (without options and with a, d, g, l, R options) in home directory, w7, w7-1, and 1level3 directories. Explain for yourself the results received.

-man ls output



```
nirjala@kali: ~/W7/W7-1/1level3
File Actions Edit View Help

NAME
  ls - list directory contents

SYNOPSIS
  ls [OPTION]... [FILE]...

DESCRIPTION
  List information about the FILES (the current directory by default). Sort entries alphabetically if none of -cftuvSUX nor --sort is specified.

  Mandatory arguments to long options are mandatory for short options too.

  -a, --all
      do not ignore entries starting with .

  -A, --almost-all
      do not list implied . and ..

  --author
      with -l, print the author of each file

  -b, --escape
      print C-style escapes for nongraphic characters

  --block-size=SIZE
      with -l, scale sizes by SIZE when printing them; e.g., '--block-size=M'; see SIZE format below

  -B, --ignore-backups
      do not list implied entries ending with ~

  -c
      with -lt: sort by, and show, ctime (time of last change of file status information); with -l: show ctime and sort by name; otherwise: sort by ctime, newest first

  -C
      list entries by columns

  --color[=WHEN]
      color the output WHEN; more info below

  -d, --directory
      list directories themselves, not their contents

  -D, --dired
      generate output designed for Emacs' dired mode

  -f
      list all entries in directory order

  -F, --classify[=WHEN]
      append indicator (one of */=>@|) to entries WHEN

Manual page ls(1) line 2 (press h for help or q to quit)
```

Figure 8: The output of man ls

```
(nirjala@kali)-[~/W7/W7-1/1level3]
$ man ls

(nirjala@kali)-[~/W7/W7-1/1level3]
$ ls -a
.  ..  file1

(nirjala@kali)-[~/W7/W7-1/1level3]
$ ls -d
.

(nirjala@kali)-[~/W7/W7-1/1level3]
$ ls -g
total 4
-rw-rw-r-- 1 nirjala 17 Dec 18 07:06 file1

(nirjala@kali)-[~/W7/W7-1/1level3]
$ ls -R
.:
file1

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

Figure 9: Using the ls command (a, d, g, l, R options)

9. Change to the W7 directory. Remove the directory files w7-2, 3level-3, 4level3 and all ordinary files in them. Use the option `-i` of the `rm` and `rmdir` commands. Show that there are not these ordinary and directory files in your file structure.

```
nirjala@kali: ~/W7
File Actions Edit View Help

(nirjala@kali)-[~]
$ ls
alscript combinedFile test1 test2 W7

(nirjala@kali)-[~]
$ mkdir -p W7/{W7-1/{1level3,2level3},W7-2/{3level3,4level3}}

(nirjala@kali)-[~]
$ cd W7

(nirjala@kali)-[~/W7]
$ rm -ri W7-2
rm: descend into directory 'W7-2'? yes
rm: remove directory 'W7-2/3level3'? yes
rm: remove directory 'W7-2/4level3'? yes
rm: remove directory 'W7-2'? yes

(nirjala@kali)-[~/W7]
$ ls -R
.:
W7-1

./W7-1:
1level3 2level3

./W7-1/1level3:

./W7-1/2level3:

(nirjala@kali)-[~/W7]
$ rm -i 3level3
rm: cannot remove '3level3': No such file or directory

(nirjala@kali)-[~/W7]
$ tree W7
W7 [error opening dir]

0 directories, 0 files

(nirjala@kali)-[~/W7]
$ tree
.
├── W7-1
│   ├── 1level3
│   └── 2level3
└──

4 directories, 0 files
```

## 10. Change to w7-1.

- Display access permissions for the file file1 in 1level3.

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

(nirjala@kali)-[~/W7/W7-1]
$ ls -l 1level3/
total 4
-rw-rw-r-- 1 nirjala nirjala 17 Dec 18 07:06 file1

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

Figure 10: Changing directory to W7-1

- Remove all access permissions for this file.
- Display access permissions for this file.

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

(nirjala@kali)-[~/W7/W7-1]
$ ls -l 1level3/
file1

(nirjala@kali)-[~/W7/W7-1]
$ ls -l 1level3/
total 4
1 nirjala nirjala 17 Dec 18 07:06 file1
```

Figure 11: Removing all the access permissions for the file

- Try to read this file using any utility (e.g., cat).
- Try to write into this file using any utility (e.g., cat with the sign >> – append).

```
(nirjala@kali)-[~/W7/W7-1]
$ ls -l 1level3/
total 4
1 nirjala nirjala 17 Dec 18 07:06 file1

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

(nirjala@kali)-[~/W7/W7-1]
$ cat>>1level3/file1
-bash: 1level3/file1: Permission denied

(nirjala@kali)-[~/W7/W7-1]
```

Figure 12: Reading and writing the file

- Add read and write access permissions for yourself for this file.
- Display access permissions for this file.

```
(nirjala@kali)-[~/W7/W7-1]
$ chmod u+rw 1level3/file1

(nirjala@kali)-[~/W7/W7-1]
$ ls -l 1level3/
total 4
-rw----- 1 nirjala nirjala 17 Dec 18 07:06 file1

(nirjala@kali)-[~/W7/W7-1]
```

Figure 13: Reading and Writing the access permission for file

- Try to read this file using any utility.
- Try to write into this file using any utility.

```
-rw----- 1 nirjala nirjala 17 Dec 18 07:06 file1

(nirjala@kali)-[~/W7/W7-1]
$ cat 1level3/file1
This is my file.

(nirjala@kali)-[~/W7/W7-1]
$ cat >> 1level3/file1
This is my second line
^Z
[2]+  Stopped                  cat >> 1level3/file1
```

Figure 14: Trying to read and write the file

## 11. Display access permissions for 1level3.

```
(nirjala@kali)-[~/W7/W7-1]
$ ls -l
total 8
drwxrwxr-x 2 nirjala nirjala 4096 Dec 18 07:10 1level3
drwxrwxr-x 2 nirjala nirjala 4096 Dec 18 07:07 2level3
(nirjala@kali)-[~/W7/W7-1]
$
```

Figure 15: Displaying the access permissions of file

- Remove all access permissions for the 1level3 directory.
- Display access permissions for 1level3.

```
(nirjala@kali)-[~/W7/W7-1]
$ chmod -rwx 1level3/
(nirjala@kali)-[~/W7/W7-1]
$ ls -l
total 8
d----- 2 nirjala nirjala 4096 Dec 18 07:10 1level3
drwxrwxr-x 2 nirjala nirjala 4096 Dec 18 07:07 2level3
(nirjala@kali)-[~/W7/W7-1]
$
```

Figure 16: Remove all access permissions for the 1level3 directory

- Try to read a file from 1level3 using any utility.
- Try to put a file into 1level3 using any utility.
- Try to search in 1level3 using any command (e.g., the ls command).

```
drwxrwxr-x 2 nirjala nirjala 4096 Dec 18 07:07 2level3
(nirjala@kali)-[~/W7/W7-1]
$ cat 1level3/file1
cat: 1level3/file1: Permission denied
(nirjala@kali)-[~/W7/W7-1]
$ cat>>1level3/file1
-bash: 1level3/file1: Permission denied
```

Figure 17: Read and append a file from 1level3

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

Figure 18: Search a file from 1level3

- Add read, write, and execute access permissions for yourself for the 1level3 directory.
- Display access permissions for 1level3.

```
(nirjala@kali)-[~/W7/W7-1]
$ chmod u+rw 1level3/

(nirjala@kali)-[~/W7/W7-1]
$ ls -l
total 8
-rwx----- 2 nirjala nirjala 4096 Dec 18 07:10 1level3
-rwxrwxr-x 2 nirjala nirjala 4096 Dec 18 07:07 2level3
```

Figure 19: Add read, write, and execute access permissions for 1level3.

- Try to read a file from 1level3 using any utility.
- Try to put a file into 1level3 using any utility.
- Try to search in 1level3 using any command (e.g., the ls command).

```
(nirjala@kali)-[~/W7/W7-1]
$ cat 1level3/file1
this is my file.
this is my second line

(nirjala@kali)-[~/W7/W7-1]
$ cat>>1level3/file1
His is my third file.
^Z
[3]+  Stopped                  cat >> 1level3/file1

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

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

Figure 20: Read, put and search 1level 3 directory

### 3. References

Velu, V. K. (Jun 30, 2017 ). *Mastering Kali Linux for Advanced Penetration Testing Edition 2*. UK: Packt Publishing Ltd.

### 4. Conclusion

In Kali Linux, deleting data and folders properly needs several kinds of careful methods to promote correct and safe deletion. The command `rm-i` that asks for permission before clearing every document, helps to delete records inside a file system. Furthermore, the `rmdir-l` command that needs confirmation, may be used to eliminate empty folders when the files were already deleted. When the removal part is finished, run the `ls -l` command to make sure all the selected files and folders were properly erased.