Name - HARSHIL AMIT BUCH

Class - TY CSF-1

Roll Number - 14

Experiment No. 1

Title:

Introduction to Kali Linux Interface, Basic Commands, File Management, System Information, Networking, Process Management, and Compression Commands

Objective:

To familiarize students with the Kali Linux interface and practice essential Linux commands for file management, system info, networking, process handling, and compression.

Software/Tools Required:

- Kali Linux OS (2023 or later)
- Terminal access
- Basic user account

Theory:

Kali Linux Interface Overview:

Kali Linux is a Debian-based Linux distribution used for penetration testing and cybersecurity. Its interface includes:

- Desktop Environment (Xfce by default)
- Terminal Emulator
- Applications Menu
- Taskbar & Notification Area

1. Basic Linux Commands:

Command	Description
`pwd`	Shows current working directory
`ls`	Lists files and directories
`cd`	Changes the directory
`clear`	Clears the terminal

Command	Description
`whoami`	Displays the current user
`man <command>`	Displays manual page of a command

2. File Management Commands:

Command	Description
`touch file.txt`	Creates a new empty file
`mkdir folder`	Creates a new directory
`cp file1 file2`	Copies file1 to file2
`mv old new`	Moves or renames a file/ directory
`rm file.txt`	Deletes a file
`rmdir dir`	Deletes an empty directory
`cat file.txt`	Displays contents of the file
`nano file.txt`	Opens file in terminal editor

3. System Information Commands:

Command	Description
`uname -a`	Shows kernel and system info
`hostname`	Displays the system's hostname
`uptime`	Shows how long the system has been up
`top`	Displays live system processes
`free -h`	Displays memory usage
`df -h`	Shows disk usage of all partitions

4. Networking Commands:

Command	Description
`ifconfig` / `ip a`	Shows IP address and interfaces

Command	Description
`ping <host>`	Sends ICMP echo to check network connectivity
`netstat -tuln`	Shows open ports and services
`traceroute <host>`	Traces route to a network host
`nslookup <domain>`	DNS lookup of a domain name

5. Process Management Commands:

Command	Description
`ps`	Displays running processes
`ps aux`	Detailed view of all processes
`kill <PID>`	Terminates process with given PID
`top`	Interactive real-time view of processes
`htop`	Enhanced process viewer (if installed)

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6. Compression Commands:

Command	Description
`tar -cvf file.tar folder/`	Creates a tar archive
`tar -xvf file.tar`	Extracts tar archive
`gzip file.txt`	Compresses file to file.txt.gz
`gunzip file.txt.gz`	Decompresses file.txt.gz
`zip file.zip file.txt`	Zips the file
`unzip file.zip`	Extracts a zip file

Procedure:

1. Boot into Kali Linux and open a terminal.
2. Run `pwd`, `ls`, and `cd` to explore directories.
3. Create files using `touch`, edit with `nano`, and manage with `cp`, `mv`, and `rm`.

4. Explore system info using `uname -a`, `uptime`, and `df -h`.
5. Check network details using `ifconfig` and test ping to a website.
6. Monitor processes with `top`, and practice using the `kill` command.
7. Create and extract compressed files using `tar`, `gzip`, and `zip`.

Sample Commands with Output:

```
bash
CopyEdit
$ pwd
/home/student

$ mkdir TestLab
$ cd TestLab
$ touch hello.txt
$ echo "Welcome to Kali Linux" > hello.txt
$ cat hello.txt
Welcome to Kali Linux

$ uname -a
Linux kali 6.5.0-kali3-amd64 #1 SMP PREEMPT_DYNAMIC Debian

$ ifconfig
eth0: inet 192.168.1.5  netmask 255.255.255.0

$ ps aux | grep nano
student   1234  0.0  0.1  23212  1056 pts/0    S+   14:52   0:00 nano
hello.txt
```

Output Screenshots:

```
┌──(root㉿ cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt]
└─# pwd
/mnt
```

```
┌──(root㉿ cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt]
└─# ls
Applications                Desktop     Downloads   Movies   Pictures   PycharmProjects  'Virtual Machines.localized'   build     secure_data
Cisco Packet Tracer 8.2.2'  Documents   Library     Music    Public     Python            bash_profile                 private
```

```
┌──(root㉿ cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt]
└─# cd Downloads

┌──(root㉿ cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads]
└─#
```

```
┌──(root㉿ cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads/Sample]
└─# nano sample2.txt
```

```
┌──(root㉿ cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads/Sample]
└─# touch sample.txt

┌──(root㉿ cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads/Sample]
└─# ls
file.tar  original.txt  sample.txt  sample2.txt

┌──(root㉿ cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads/Sample]
└─# gzip sample.txt

┌──(root㉿ cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads/Sample]
└─# ls
file.tar  original.txt  sample.txt.gz  sample2.txt
```

```
┌──(root㉿dc5ad3f3-c788-4bd3-9e4e-3b6c70f62eaf)-[/mnt/Downloads/Sample]
└─# nano sample.txt

┌──(root㉿dc5ad3f3-c788-4bd3-9e4e-3b6c70f62eaf)-[/mnt/Downloads/Sample]
└─# cp sample.txt name.txt

┌──(root㉿dc5ad3f3-c788-4bd3-9e4e-3b6c70f62eaf)-[/mnt/Downloads/Sample]
└─# ls
file.tar  original.txt  sample.zip   unzipped_sample.txt
name.txt  sample.txt    sample2.txt

┌──(root㉿dc5ad3f3-c788-4bd3-9e4e-3b6c70f62eaf)-[/mnt/Downloads/Sample]
└─#
```

```
┌──(root㉿cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads/Sample]
└─# ls
friends.txt  sample.txt  sample2.txt

┌──(root㉿cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads/Sample]
└─# mv sample.txt original.txt

┌──(root㉿cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads/Sample]
└─# ls
friends.txt  original.txt  sample2.txt
```

```
┌──(root㉿cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads/Sample]
└─# rm friends.txt

┌──(root㉿cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads/Sample]
└─# ls
original.txt  sample2.txt
```

```
┌──(root㉿cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads/Sample]
└─# uname -a
Linux cfda92dc-57cf-4d5e-afbb-9d4f5119448a 6.12.28 #1 SMP Tue May 20 15:19:05 UTC 2025 aarch64 GNU/Linux
```

```
┌──(root㉿cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads/Sample]
└─# uptime
 06:31:26 up  1:05,  0 users,  load average: 0.00, 0.00, 0.00
```

```
┌──(root㉿cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads/Sample]
└─# df -h
Filesystem                              Size  Used Avail Use% Mounted on
/dev/vdb                                504G  1.1G  503G   1% /
none                                    496M     0  496M   0% /dev
tmpfs                                    64M     0   64M   0% /dev/shm
d24b1a3dfc5fd1590d43f7bd020be89c615e  229G  169G   61G  74% /mnt
```

```
┌──(root㉿ cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads/Sample]
└─# ping google.com
PING google.com (142.250.67.174) 56(84) bytes of data.
64 bytes from bom12s07-in-f14.1e100.net (142.250.67.174): icmp_seq=1 ttl=116 time=7.90 ms
64 bytes from bom12s07-in-f14.1e100.net (142.250.67.174): icmp_seq=2 ttl=116 time=12.2 ms
64 bytes from bom12s07-in-f14.1e100.net (142.250.67.174): icmp_seq=3 ttl=116 time=8.80 ms
64 bytes from bom12s07-in-f14.1e100.net (142.250.67.174): icmp_seq=4 ttl=116 time=9.05 ms
64 bytes from bom12s07-in-f14.1e100.net (142.250.67.174): icmp_seq=5 ttl=116 time=12.9 ms
64 bytes from bom12s07-in-f14.1e100.net (142.250.67.174): icmp_seq=6 ttl=116 time=11.4 ms
64 bytes from bom12s07-in-f14.1e100.net (142.250.67.174): icmp_seq=7 ttl=116 time=12.3 ms
^C
--- google.com ping statistics ---
7 packets transmitted, 7 received, 0% packet loss, time 6039ms
rtt min/avg/max/mdev = 7.898/10.659/12.866/1.868 ms
```

```
top - 06:31:58 up  1:05,  0 users,  load average: 0.00, 0.00, 0.00
Tasks:   2 total,   1 running,   1 sleeping,   0 stopped,   0 zombie
%Cpu(s):  0.0 us,  0.1 sy,  0.0 ni, 99.9 id,  0.0 wa,  0.0 hi,  0.0 si,  0.0 st
MiB Mem :    992.2 total,    150.2 free,     59.8 used,    798.2 buff/cache
MiB Swap:      0.0 total,      0.0 free,      0.0 used.    932.4 avail Mem

  PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
    1 root      20   0    4596   3500   2988 S   0.0   0.3   0:00.21 bash
 7100 root      20   0    7636   4684   2636 R   0.0   0.5   0:00.02 top
```

```
┌──(root㉿ cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads/Sample]
└─# ls
file.tar  original.txt  sample2.txt

┌──(root㉿ cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads/Sample]
└─# tar -cvf file.tar original.txt
original.txt

┌──(root㉿ cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads/Sample]
└─# ls
file.tar  original.txt  sample2.txt
```

```
┌──(root㉿ cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads/Sample]
└─# tar -xvf file.tar
original.txt

┌──(root㉿ cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads/Sample]
└─# ls
file.tar  original.txt  sample2.txt
```

```
┌──(root㉿ cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads/Sample]
└─# touch sample.txt

┌──(root㉿ cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads/Sample]
└─# ls
file.tar  original.txt  sample.txt  sample2.txt

┌──(root㉿ cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads/Sample]
└─# gzip sample.txt

┌──(root㉿ cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads/Sample]
└─# ls
file.tar  original.txt  sample.txt.gz  sample2.txt
```

```
┌──(root㉿cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads/Sample]
└─# gunzip sample.txt.gz

┌──(root㉿cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads/Sample]
└─# ls
file.tar  original.txt  sample.txt  sample2.txt
```

```
┌──(root㉿cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads/Sample]
└─# zip sample sample.txt
  adding: sample.txt (stored 0%)

┌──(root㉿cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads/Sample]
└─# ls
file.tar  original.txt  sample.txt  sample.zip  sample2.txt
```

```
┌──(root㉿cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads/Sample]
└─# unzip sample.zip
Archive:  sample.zip
replace sample.txt? [y]es, [n]o, [A]ll, [N]one, [r]ename: r
new name: unzipped_sample.txt
 extracting: unzipped_sample.txt

┌──(root㉿cfda92dc-57cf-4d5e-afbb-9d4f5119448a)-[/mnt/Downloads/Sample]
└─# ls
file.tar  original.txt  sample.txt  sample.zip  sample2.txt  unzipped_sample.txt
```

Outcome:

- Navigate the Kali Linux interface using a terminal
- Execute basic file handling and directory commands
- Retrieve system and network configuration details
- Monitor and manage running processes
- Perform file compression and decompression using Linux commands

Conclusion:

In this experiment, students gained hands-on experience with the Kali Linux interface and practiced essential Linux commands required for managing files, viewing system and network information, and handling processes.