



Artificial Intelligence and Data Science Department.

OS / Even Sem 2021-22 / Experiment 1.

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EXPERIMENT - 1.

Linux Commands and system calls

Aim: Exploring basic commands of Unix/LinuxGeneral Purpose Utilities, Working With Directories File Handling Commands, Changing File Attributes, Exploring basic commands of Unix/LinuxSimple Filters, Pattern matching, Advanced pattern matching, Creating and managing the group.

Theory:

Linux commands & system calls
for files, directory & process management.

1) mkdir : It will attempt to create a directory, if they do not exist.

2) cat : (concatenate) command is very frequently used to in Linux. It reads data from the file and gives their content as output.

It helps to create, view, concatenate files.

- i) To view a single file
- ii) To view multiple files
- iii) To view a file with line numbers
- iv) To create a file.
- v) Copy contents of one file to another file.

3) ls : (list) To view the list of files in the given directory.

4) chown : used to change the owner of a file/directory for which we need to be logged into root environment with command 'sudo su'

5) chmod : used to change the permission on a file. Can be done numerically or symbolically:-

r (read) is 4

w (write) is 2

x (execute) is 1

- (no perm) is 0

6) chgrp : (change group) command alters the group name that a file or directory belongs to. We need superuser permissions for this command.

Syntax - chgrp [Grp name] [Directory/File name]

7) ps : gives the current running processes, display the information of the active processes & Syntax: ps

8) sort : used to sort a file, arranging the records in a particular Order.

Syntax - sort [file name]

The options with sort command are:

- r to rearrange content in reverse order.
- n numerically rearrange the content
- c to check if file is sorted or not
- *

9) grep : filters the searches a file for the particular order, characters & displays all the lines that contains the pattern/characters.

Syntax: grep "character" [file name]

- i is for the ignoring case (capital, small)
- c prints only the count of line that match a pattern

10) awk : awk is used for generating reports & manipulating data

11) awk operation: It scans the file line by line.

Syntax: awk '{print}' [filename]

12) open : The open{} system calls opens the file specified by pathname. If the specific file is not in existence, it optionally is created by open().

13) read : It attempts to read up to count bytes from file descriptor & into the buffer.

14) write : It writes data from a buffer declared by a user to a given device, such as a file.

15) close : used to close a file descriptor by the kernel.

16) getpid : returns the process ID (PID) of the calling process.

17) getppid : returns the process ID of the parent of the calling process.

18) setpgid : sets the process group ID of the process specified by PID to pgid. It is also used to transfer a process from one user to another user ID.

- 20) getuid: returns the user ID of the calling process
- 21) getgid: returns the real group ID of the current process.
- 22) getegid: returns the real group ID of the current process.
- 23) who: lets you find / display the user currently logged in to your Linux OS.
- 24) whoami: gives the name of the ~~use~~ ^{user} currently logged in.
- 25) which: used to identify the location of a given executable.
- 26) uname:
 - a kernel name, network nodes, kernel version, etc is displayed.
 - s gives the kernel name
 - n gives the host name (owner name)
 - m machine hardware name.
- 27) tty: short form of teletype, it prints the information of the system related to the terminal.
- 28) cal : shows the calendar of the month which coloring out the date of today

28) date : Shows the day, date, month, year, time (with seconds) and also the timezone

29) bc : basic calculator, command which allows us to use the terminal as a calculator & perform basic operations on it.

30) cd : change directory option to access different directories.

31) rm : To remove file, directory present on the file system of linux.

32) mv : to move one document to any dir.

33) wc : allows to count the no. of lines, words, characters, etc.

-l → no of lines

-w → no of words

-m → no of characters

-L → length of the longest line.

34) cmp : used to compare 2 files.

35) diff : diff command analyzes difference btw 2 files.

36) comm : compare two sorted files line by line. It gives output in column of unique & same lined words.

37) cut : used to cut down the file line by line cut & gives the result as output.

-b: byte wise cutting down the file
-c: to cut by character.

38) sudo su : logs into the root with the environment which is password protected.

39) adduser : used to add a new user

40) passwd : change the password of the current user.

Snippets:

includes Mkdir, Cat, Ls, Chown, Chmod, Chgrp, Ps, Sort, Grep, Awk, Who, Whoami, Which, Uname, Tty, Date, Cal , Bc, Mv, Wc, Cmp, Diff.

```
(kali㉿kali)-[~/Desktop/Example]
$ ls -l
total 24
drwxr-xr-x 2 kali kali 4096 Jan 25 11:14 1
drwxr-xr-x 2 kali kali 4096 Jan 25 11:33 Assignment
-rw-r--r-- 1 root root 50 Jan 13 00:36 Example
-rwxrwxrwx 1 Noob noobs 13 Jan 12 00:03 Permissions
-rw-r--r-- 1 root noobs 50 Jan 13 00:29 text.txt
-rwxrwxrwx 1 kali kali 54 Jan 12 00:27 userinput.sh
```

```
(kali㉿kali)-[~/Desktop/Example]
$ diff Example text.txt
1d0
< 420 BruhText, Hehe
3a3
> 420 BruhText, Hehe
```

```
(kali㉿kali)-[~/Desktop/Example]
$ cmp Example text.txt
Example text.txt differ: byte 1, line 1
```

```
(kali㉿kali)-[~/Desktop/Example]
$
```

```
(kali㉿kali)-[~/Desktop/Example]
└─$ mkdir Assignment 1

(kali㉿kali)-[~/Desktop/Example]
└─$ ls -l
total 24
drwxr-xr-x 2 kali kali 4096 Jan 25 11:14 1
drwxr-xr-x 2 kali kali 4096 Jan 25 11:14 Assignment
-rw-r--r-- 1 root root 50 Jan 13 00:36 output.txt
-rwxrwxrwx 1 Noob noobs 13 Jan 12 00:03 Permissions
-rw-r--r-- 1 root root 50 Jan 13 00:29 text.txt
-rwxrwxrwx 1 kali kali 54 Jan 12 00:27 userinput.sh
```

```
(kali㉿kali)-[~/Desktop/Example] userinput.sh
└─$ cat text.txt
69 AnyText, IDK
96 OKText, OOF
420 BruhText, Hehe
```

```
(kali㉿kali)-[~/Desktop/Example]
└─$ sudo su
[sudo] password for kali:
kSorry, try again.
[sudo] password for kali:
Sorry, try again.
[sudo] password for kali:
sudo: 3 incorrect password attempts
```

```
(kali㉿kali)-[~/Desktop/Example]
└─$ sudo su
[sudo] password for kali:
(root㉿kali)-[/home/kali/Desktop/Example]
└─# chgrp noobs text.txt
```

```
(root㉿kali)-[/home/kali/Desktop/Example]
└─# ls -l
total 24
drwxr-xr-x 2 kali kali 4096 Jan 25 11:14 1
drwxr-xr-x 2 kali kali 4096 Jan 25 11:14 Assignment
-rw-r--r-- 1 root root 50 Jan 13 00:36 output.txt
-rwxrwxrwx 1 Noob noobs 13 Jan 12 00:03 Permissions
-rw-r--r-- 1 root noobs 50 Jan 13 00:29 text.txt
-rwxrwxrwx 1 kali kali 54 Jan 12 00:27 userinput.sh
```

```
[root💀 kali]-(/home/kali/Desktop/Example)
```

```
# ps
```

PID	TTY	TIME	CMD
2014	pts/1	00:00:00	sudo
2015	pts/1	00:00:00	su
2016	pts/1	00:00:00	zsh
2912	pts/1	00:00:00	ps

```
[root💀 kali]-(/home/kali/Desktop/Example)
```

```
# cat text.txt
```

```
69 AnyText, IDK
96 OKText, OOF
420 BruhText, Hehe
```

```
[root💀 kali]-(/home/kali/Desktop/Example)
```

```
# sort text.txt -r
```

```
96 OKText, OOF
69 AnyText, IDK
420 BruhText, Hehe
```

```
[root💀 kali]-(/home/kali/Desktop/Example)
```

```
# grep -i oof
```

```
text.txt
```

```
^Z
```

```
zsh: suspended grep --color=auto -i oof
```

```
[root💀 kali]-(/home/kali/Desktop/Example)
```

```
# grep -i oof text.txt
```

```
96 OKText, OOF
```

```
[root💀 kali]-(/home/kali/Desktop/Example)
```

```
# awk text.txt
```

```
awk: cmd. line:1: text.txt
awk: cmd. line:1:      ^ syntax error
```

```
[root💀 kali]-(/home/kali/Desktop/Example)
```

```
# awk '{print}' text.txt
```

```
69 AnyText, IDK
96 OKText, OOF
420 BruhText, Hehe
```

```
[root💀 kali]-(/home/kali/Desktop/Example)
```

```
# who
```

```
kali    tty7          2022-01-25 11:13 (:0)
kali    pts/1          2022-01-25 11:16
```

```
[root💀 kali]-(/home/kali/Desktop/Example)
```

```
# whoami
```

```
root
```

```
(root💀 kali)-[~/home/kali/Desktop/Example]
└─# which ping
/usr/bin/ping

(Computer)
└─# uname
Linux
└─# Desktop
└─# Assignment
└─# output.txt
└─# Permissions

(Desktop)
└─# tty
/dev/pts/1

(Music)
└─# date
Tue Jan 25 11:27:25 AM EST 2022
└─# Videos
└─# Downloads

(Downloads)
└─# cal
Command 'cal' not found, but can be installed with:
apt install ncurses
Do you want to install it? (N/y)cal

(Network)
└─# bc
Command 'bc' not found, but can be installed with:
apt install bc
Do you want to install it? (N/y)y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libgdk-pixbuf-xlib-2.0-0 libgdk-pixbuf2.0-0 libvpx6 ruby-atomic ruby-thread-safe
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
  bc
0 upgraded, 1 newly installed, 0 to remove and 56 not upgraded.
Need to get 110 kB of archives.
After this operation, 247 kB of additional disk space will be used.
Get:1 http://http.kali.org/kali kali-rolling/main amd64 bc amd64 1.07.1-3+b1 [110 kB]
Fetched 110 kB in 2s (67.2 kB/s)
Selecting previously unselected package bc.
(Reading database ... 277255 files and directories currently installed.)
Preparing to unpack ... /bc_1.07.1-3+b1_amd64.deb ...
Unpacking bc (1.07.1-3+b1) ...
Setting up bc (1.07.1-3+b1) ...
Processing triggers for kali-menu (2021.4.2) ...
Processing triggers for man-db (2.9.4-4) ...
```

```
[root@kali] [/home/kali/Desktop/Example]
```

```
[# cal
```

```
Command 'cal' not found, but can be installed with:  
apt install ncal  
Do you want to install it? (N/y)y  
apt install ncal  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
The following packages were automatically installed and are no longer required:  
libgdk-pixbuf-xlib-2.0-0 libgdk-pixbuf2.0-0 libvpx6 ruby-atomic ruby-thread-safe  
Use 'sudo apt autoremove' to remove them.
```

```
The following NEW packages will be installed:  
ncal
```

```
0 upgraded, 1 newly installed, 0 to remove and 56 not upgraded.  
Need to get 30.1 kB of archives.
```

```
After this operation, 69.6 kB of additional disk space will be used.
```

```
Get:1 http://http.kali.org/kali kali-rolling/main amd64 ncal amd64 12.1.7+nmu3 [30.1 kB]
```

```
Fetched 30.1 kB in 3s (9,315 B/s)
```

```
Selecting previously unselected package ncal.
```

```
(Reading database ... 277274 files and directories currently installed.)
```

```
Preparing to unpack .../ncal_12.1.7+nmu3_amd64.deb ...
```

```
Unpacking ncal (12.1.7+nmu3) ...
```

```
Setting up ncal (12.1.7+nmu3) ...
```

```
Processing triggers for kali-menu (2021.4.2) ...
```

```
Processing triggers for man-db (2.9.4-4) ...
```

```
Processing triggers for desktop-file-utils (0.26-1) ... Free space: 62.0 GiB
```

```
[root@kali] [/home/kali/Desktop/Example]
```

```
[# cal
```

```
January 2022
```

```
Su Mo Tu We Th Fr Sa
```

						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

```
[root@kali] [/home/kali/Desktop/Example]
```

```
[# bc
```

```
bc 1.07.1
```

```
Copyright 1991-1994, 1997, 1998, 2000, 2004, 2006, 2008, 2012-2017 Free Software Foundation, Inc.
```

```
This is free software with ABSOLUTELY NO WARRANTY.
```

```
For details type `warranty'.
```

```
warranty
```

```
bc 1.07.1
```

```
Copyright 1991-1994, 1997, 1998, 2000, 2004, 2006, 2008, 2012-2017 Free Software Foundation, Inc.
```

```
[root💀 kali]~[/home/kali/Desktop/Example]
# ls -l
total 24
drwxr-xr-x 2 kali kali 4096 Jan 25 11:14 1
drwxr-xr-x 2 kali kali 4096 Jan 25 11:14 Assignment
-rw-r--r-- 1 root root 50 Jan 13 00:36 output.txt
-rwxrwxrwx 1 Noob noobs 13 Jan 12 00:03 Permissions
-rw-r--r-- 1 root noobs 50 Jan 13 00:29 text.txt
-rwxrwxrwx 1 kali kali 54 Jan 12 00:27 userinput.sh

[root💀 kali]~[/home/kali/Desktop/Example]
# mv output.txt Assignment

[root💀 kali]~[/home/kali/Desktop/Example]
# ls
1 Assignment Permissions text.txt userinput.sh

[root💀 kali]~[/home/kali/Desktop/Example]
# ls -l
total 20
drwxr-xr-x 2 kali kali 4096 Jan 25 11:14 1
drwxr-xr-x 2 kali kali 4096 Jan 25 11:31 Assignment
-rwxrwxrwx 1 Noob noobs 13 Jan 12 00:03 Permissions
-rw-r--r-- 1 root noobs 50 Jan 13 00:29 text.txt
-rwxrwxrwx 1 kali kali 54 Jan 12 00:27 userinput.sh

[root💀 kali]~[/home/kali/Desktop/Example] Free space: 62.9 GiB
# wc text.txt
3 9 50 text.txt

[root💀 kali]~[/home/kali/Desktop/Example]
# cd Assignment

[root💀 kali]~[/home/kali/Desktop/Example/Assignment]
# mv output.txt Example

[root💀 kali]~[/home/kali/Desktop/Example/Assignment]
# cd

[root💀 kali]~[~]
# ls -l
total 0
```

Conclusion:-

Thus we can use the following commands and get more options about them by using ‘man’ or ‘--help’ commands and learn in depth about them.