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M10 33231

Assignment 1

A. Study of Basic Linux Commands: echo, ls, read, cat, touch, test, loops, arithmetic comparison, conditional loops, grep, sed etc.

1. ls Command

Description: The `ls` command in Unix and Linux is used to list the contents of a directory. It displays the files and directories contained within the specified directory. The command has many options and variants that control the output.

```
rg8@linux:~$ ls
CGL      DMSL       Downloads  Pictures  snap       Videos
Desktop  Documents  Music      Public    Templates
rg8@linux:~$
```

1.1 ls -l

Description: Lists files and directories in long format. The long format includes permissions, number of links, owner, group, size, and timestamp

```
rg8@linux:~/Desktop$ ls -l
total 28
-rwxrwxr-x 1 rg8 rg8 4100 Jul  6 23:50  1.sh
-rwxrwxrwx 1 rg8 rg8  176 Jul  6 10:55  aa.sh
-rwxrwxr-x 1 rg8 rg8  204 Jul  5 14:36  abc.sh
-rw-rw-r-- 1 rg8 rg8    0 Jul  6 23:50  Address_Book.tx
t
-rwxrwxrwx 1 rg8 rg8  534 Jul  4 18:57  address.sh
-rwxrwxrwx 1 rg8 rg8 3850 Jul  6 23:41  assi.sh
drwxrwxr-x 2 rg8 rg8 4096 May  9 10:54 'New Folder'
```

1.2 ls –a

Description: Lists all files and directories, including hidden files (those starting with a dot).

```
rg8@linux:~$ ls -a
.               Downloads   .vboxclient-clipboard-tty2-control.pid
..              .gnupg      .vboxclient-clipboard-tty2-service.pid
.bash_history   .lesshst    .vboxclient-draganddrop-tty2-control.pid
.bash_logout    .local      .vboxclient-draganddrop-tty2-service.pid
.bashrc         Music       .vboxclient-hostversion-tty2-control.pid
.cache          Pictures    .vboxclient-seamless-tty2-control.pid
CGL             .profile    .vboxclient-seamless-tty2-service.pid
.config         Public      .vboxclient-vmsvga-session-tty2-control.pid
Desktop         snap        .vboxclient-vmsvga-session-tty2-service.pid
DMSL            .ssh        Videos
Documents       Templates
```

1.3 ls –S

Description: Sorts files by size, largest first.

```
rg8@linux:~$ ls -S
CGL      DMSL       Downloads  Pictures  snap       Videos
Desktop  Documents  Music      Public    Templates
```

1.4 ls –A

Description: The `ls -A` command is used to list all files and directories in the current directory, excluding the special entries `.` (current directory) and `..` (parent directory).

```
rg8@linux:~$ ls -A
.bash_history   .gnupg      .vboxclient-clipboard-tty2-control.pid
.bash_logout    .lesshst    .vboxclient-clipboard-tty2-service.pid
.bashrc         .local      .vboxclient-draganddrop-tty2-control.pid
.cache          Music       .vboxclient-draganddrop-tty2-service.pid
CGL             Pictures    .vboxclient-hostversion-tty2-control.pid
.config         .profile    .vboxclient-seamless-tty2-control.pid
Desktop         Public      .vboxclient-seamless-tty2-service.pid
DMSL            snap        .vboxclient-vmsvga-session-tty2-control.pid
Documents       .ssh        .vboxclient-vmsvga-session-tty2-service.pid
Downloads       Templates   Videos
```

2. ps Command

Description: The `ps` command in Linux is used to display information about the currently running processes on the system. It can show a snapshot of the current

processes, including their process ID (PID), user, CPU usage, memory usage, and other relevant details.

```
rg8@linux:~$ ps
    PID TTY          TIME CMD
   3502 pts/0    00:00:00 bash
   3797 pts/0    00:00:00 ps
```

2.1 ps –e

Description: Displays all processes running on the system.

```
rg8@linux:~$ ps -e
    PID TTY          TIME CMD
      1 ?        00:00:01 systemd
      2 ?        00:00:00 kthreadd
      3 ?        00:00:00 rcu_gp
      4 ?        00:00:00 rcu_par_gp
      5 ?        00:00:00 slub_flushwq
      6 ?        00:00:00 netns
      8 ?        00:00:00 kworker/0:0H-events_highpri
     11 ?        00:00:00 mm_percpu_wq
     12 ?        00:00:00 rcu_tasks_kthread
     13 ?        00:00:00 rcu_tasks_rude_kthread
     14 ?        00:00:00 rcu_tasks_trace_kthread
     15 ?        00:00:00 ksoftirqd/0
     16 ?        00:00:01 rcu_preempt
     17 ?        00:00:00 migration/0
     18 ?        00:00:00 idle_inject/0
     19 ?        00:00:00 cpuhp/0
     20 ?        00:00:00 cpuhp/1
     21 ?        00:00:00 idle_inject/1
     22 ?        00:00:00 migration/1
     23 ?        00:00:00 ksoftirqd/1
     25 ?        00:00:00 kworker/1:0H-events_highpri
```

2.2 ps –f

Description: Displays a full-format listing, which includes more detailed information.

```
rg8@linux:~$ ps -f
UID          PID    PPID  C STIME TTY          TIME CMD
rg8         3502    3484  0 00:53 pts/0    00:00:00 bash
rg8         3810    3502  0 01:15 pts/0    00:00:00 ps -f
```

2.3 ps –u

Description: Displays processes owned by a specific user.

```
rg8@linux:~$ ps -u
USER         PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
rg8         2823  0.0  0.0 162388  6144 tty2     Ssl+ 00:53   0:00 /usr/libexec/
rg8         2827  0.0  0.2 223044 15872 tty2     Sl+  00:53   0:00 /usr/libexec/
rg8         3502  0.0  0.0  11140  5120 pts/0    Ss   00:53   0:00 bash
rg8         3816  0.0  0.0  12672  3456 pts/0    R+   01:17   0:00 ps -u
```

2.4 ps –l

Description: Displays a long format listing with additional technical details.

```
rg8@linux:~$ ps -l
F S   UID     PID    PPID  C PRI  NI ADDR SZ WCHAN  TTY          TIME CMD
0 S  1000    3502    3484  0  80   0 -  2785 do_wai pts/0    00:00:00 bash
0 R  1000    3818    3502  0  80   0 -  3168 -      pts/0    00:00:00 ps
```

3. **echo Command**

Description: The `echo` command in Linux is used to display a line of text or string that is passed as an argument. It is commonly used in shell scripts and batch files to output status text to the screen or a file.

```
rg8@linux:~$ echo "Hello World"
Hello World
```

3.1 echo –n

Description: Prints "Hello, World!" without a trailing newline.

```
rg8@linux:~/Desktop$ echo -n "Hello World"
Hello Worldrg8@linux:~/Desktop$
```

3.2 echo –e

Description: Prints "Hello," followed by a newline, and then "World!". The -e option enables interpretation of backslash escapes.

```
rg8@linux:~/Desktop$ echo -e "Hello \nWorld"
Hello
World
```

3.3 echo –E

Description: Prints "Hello\nWorld!" without interpreting backslash escapes.

```
rg8@linux:~/Desktop$ echo -E "Hello \nWorld"
Hello \nWorld
```

4. read command

Description: The `read` command in Linux is used to read a line of input from standard input (such as the keyboard) or from a file. It is commonly used in shell scripts to obtain user input or to process input from files.

```
1 #!/bin/bash
2 echo Enter your name
3 read name
4 echo Entered name is: $name
5
```

4.1 read –p

Description: Displays a prompt message before reading the input.

```
1 #!/bin/bash
2
3 read -p "Enter your name: " name
4 echo Entered name is: $name
5
```

5.touch command

Description: The `touch` command in Linux is used to create, change, and modify the timestamps of a file. It is commonly used to create an empty file or update the access and modification times of an existing file.

```
rg8@linux:~$ touch file.sh
rg8@linux:~$
```

6. cat command

Description: The `cat` command in Linux is used to concatenate and display the content of files. It can be used for various purposes such as viewing file content, combining multiple files, and redirecting output to create new files.

```
rg8@linux:~$ cat aa.sh
#!/bin/bash

echo Hello World
```

7. grep command

Description: The `grep` command in Linux is used to search for a specified pattern within files. It stands for "Global Regular Expression Print" and is a powerful utility for searching through text using patterns and regular expressions.

```
rg8@linux:~$ grep "hello" aa.sh
echo hello World
echo Another line with the word hello.
rg8@linux:~$
```

7.1 grep –i

Description: Searches for lines containing "pattern" in filename, ignoring case.

```
rg8@linux:~$ grep -i "hello" aa.sh
echo HELLO World
echo Another line with the word hello.
rg8@linux:~$
```

8. sed command

Description: The sed command in Linux stands for "stream editor" and is used for performing basic text transformations on an input stream (a file or input from a pipeline). It is commonly used for searching, find and replace, insertion, and deletion.

```
rg8@linux:~$ cat aa.sh
#!/bin/bash

echo This is a sample file.

echo HELLO World

rg8@linux:~$ sed -i '/HELLO/d' aa.sh
rg8@linux:~$ cat aa.sh
#!/bin/bash

echo This is a sample file.
```

9. fork command

Description: In Linux programming (typically in C or C++), `fork()` is used to create a new process by duplicating the calling process. After a `fork()` system call, two almost identical processes are created:

```
#include <stdio.h>

#include <unistd.h>

#include <sys/types.h>


int main() {

    pid_t pid;


    // Fork a child process

    pid = fork();


    if (pid < 0) {

        // Error occurred
```

```
        fprintf(stderr, "Fork failed\n");
        return 1;
    } else if (pid == 0) {
        // Child process
        printf("Child process: PID = %d\n", getpid());
        printf("Hello from Child!\n");
    } else {
        // Parent process
        printf("Parent process: PID = %d, Child PID = %d\n", getpid(), pid);
        printf("Hello from Parent!\n");
    }

    return 0;
}
```

Output:

```
Parent process: PID = 1234, Child PID = 1235
Hello from Parent!
Child process: PID = 1235
Hello from Child!
```

10. chmod command

Description: `chmod` (short for "change mode") is a command-line utility in Unix and Unix-like operating systems that allows users to change the permissions (read, write, execute) of a file or directory. Here's how `chmod` works with an example:

```
rg8@linux:~$ gedit aa.sh
rg8@linux:~$ ./aa.sh
bash: ./aa.sh: Permission denied
rg8@linux:~$ chmod +x aa.sh
rg8@linux:~$ ./aa.sh
Enter your name
rishi
```

10.1 chown command

Description: chown is a useful command-line tool for changing the ownership and group of files and directories in Unix-like operating systems. It's commonly used for managing file permissions and ensuring proper access control in multi-user environments.

```
# Create a file for demonstration
echo "Hello, World!" > data.txt

# Check current owner and group
ls -l data.txt

# Change owner and group of the file
sudo chown newuser:newgroup data.txt

# Verify the changes
ls -l data.txt
```

11. pwd command

Description: The pwd command (short for "print working directory") is used in Unix and Unix-like operating systems to display the current working directory.

```
rg8@linux:~/Desktop$ pwd
/home/rg8/Desktop
rg8@linux:~/Desktop$
```

11.1 pwd –P

Description: Prints the physical pathname of the current working directory.

```
rg8@linux:~/Desktop$ pwd -P
/home/rg8/Desktop
rg8@linux:~/Desktop$
```

12. locate command

Description: The `locate` command is used in Unix and Unix-like operating systems to search and locate files in a database. It is generally faster than searching the filesystem directly because it searches a pre-constructed database rather than the filesystem itself.

13. Kill command

Description: The `kill` command in Unix and Unix-like operating systems is used to terminate processes by sending signals to them.

```
rg8@linux:~$ ps
    PID TTY          TIME CMD
   3538 pts/0    00:00:00 bash
  11224 pts/0    00:00:00 ps
rg8@linux:~$ kill 11224
bash: kill: (11224) - No such process
rg8@linux:~$ kill 3538
```

14. ifconfig commnad

Description: The `ifconfig` command in Linux is used to configure network interfaces. It is a part of the net-tools package and can be used to display or configure network settings on your system

15. Ping command

Description: The `ping` command is a network utility used to test the reachability of a host on an IP network. It works by sending Internet Control Message Protocol (ICMP) Echo Request messages to the target host and waiting for an Echo Reply

```
g8@linux:~/Desktop$ ping example.com
ING example.com (93.184.215.14) 56(84) bytes of data.
4 bytes from 93.184.215.14 (93.184.215.14): icmp_seq=1 ttl=49 time=281 ms
4 bytes from 93.184.215.14 (93.184.215.14): icmp_seq=2 ttl=49 time=269 ms
4 bytes from 93.184.215.14 (93.184.215.14): icmp_seq=3 ttl=49 time=267 ms
4 bytes from 93.184.215.14 (93.184.215.14): icmp_seq=4 ttl=49 time=308 ms
4 bytes from 93.184.215.14 (93.184.215.14): icmp_seq=5 ttl=49 time=264 ms
4 bytes from 93.184.215.14 (93.184.215.14): icmp_seq=6 ttl=49 time=361 ms
4 bytes from 93.184.215.14 (93.184.215.14): icmp_seq=7 ttl=49 time=299 ms
4 bytes from 93.184.215.14 (93.184.215.14): icmp_seq=8 ttl=49 time=338 ms
4 bytes from 93.184.215.14 (93.184.215.14): icmp_seq=9 ttl=49 time=277 ms
```

16. cd command

Description: The `cd` command in Linux is used to change the current working directory.

```
rg8@linux:~/Desktop$ cd
rg8@linux:~$ cd Desktop
rg8@linux:~/Desktop$
```

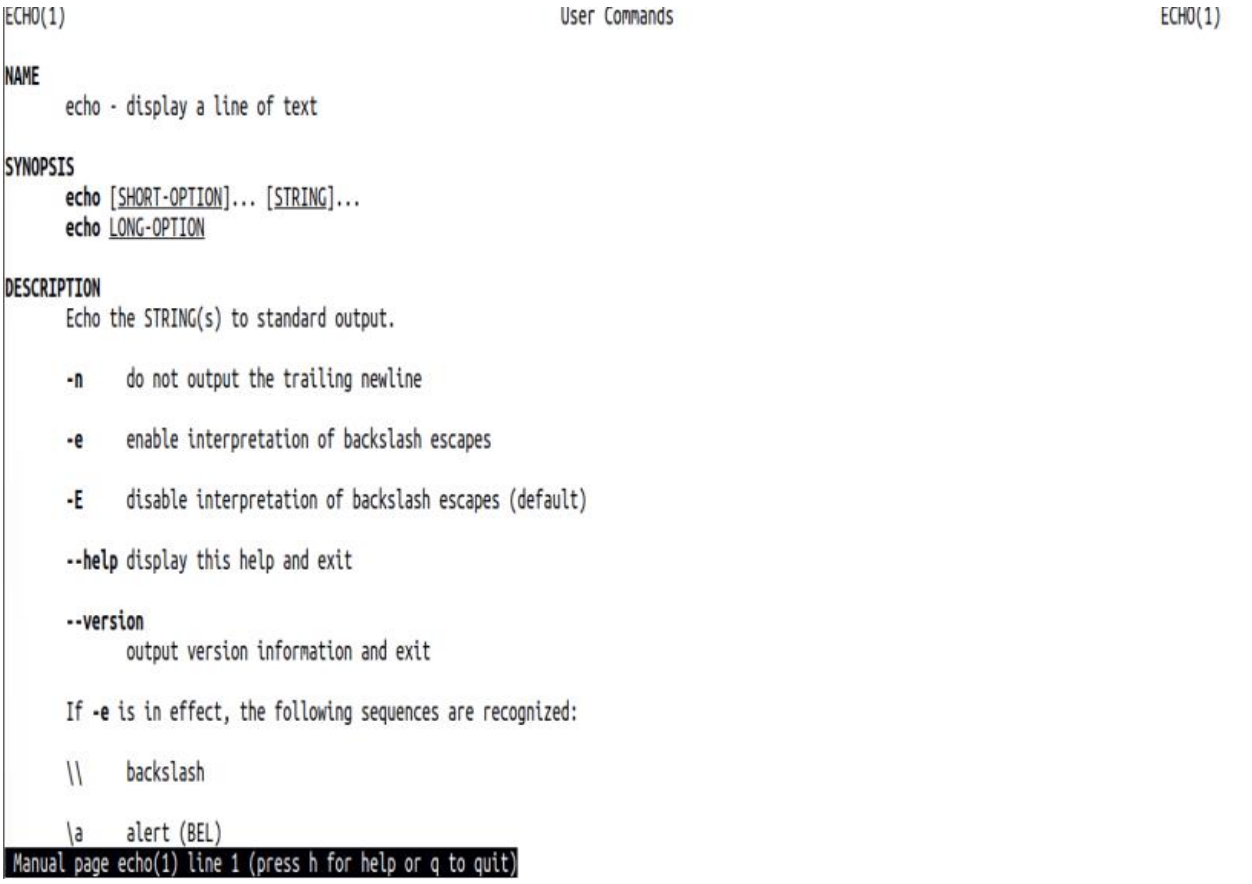
17. mkdir command

Description: The `mkdir` command in Linux is used to create new directories (folders)

```
rg8@linux:~/Desktop$ mkdir 33231_OSL
```

18. man command

Description: The `man` command in Linux is used to display the manual pages for other commands. It provides comprehensive documentation, including command syntax, options, and examples.



19. wc command

Description: The `wc` command in Linux is used to display the number of lines, words, and bytes (characters) in files or standard input (stdin).

```
rg8@linux:~/Desktop$ wc assi_1a.sh
 260  885 7439 assi_1a.sh
rg8@linux:~/Desktop$
```

---

20. sort command

Description: The `sort` command in Linux is used to sort lines of text files or standard input data. It's a versatile tool for arranging data in ascending or descending order based on various criteria.

```
rg8@linux:~/Desktop$ cd
rg8@linux:~$ sort data.sh
#!/bin/bash
do
done
 echo "$name selected"
#echo Hello World
select name in rachana vishal sonal tushar
rg8@linux:~$
```