

Session-5

1. Create a new directory named 'etc' inside 'official' directory.

Solution. `mkdir -p official/etc`

`mkdir` - used to create new directory
`-p` used to interprocess communication

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official (master)
$ mkdir etc
```

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official (master)
$ ls
data/ etc/
```

2. Create copy of entire directory location named 'official/data' under `official/etc`.

`cp -R official/data official/etc`

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments (master)
$ cp -R official/data official/etc
```

3. Remove all the file & sub directories from location `official/etc/corporate`. Also remove `corporate` directory

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc (master)
$ ls
branch/ corporate/ data/
```

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc (master)
$ rm -r corporate
```

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc (master)
$ ls
branch/ data/
```

4. Remove all the file from `official/etc/branch`.
`rm -rf official/etc/branch/*`

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official (master)
$ rm -rf official/etc/branch/*
```

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official (master)
$ ls
data/ etc/
```

5. Remove directory 'branch' located inside 'official /etc' location.

Command: `rm -rf official/etc/*`

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official (master)
$ rm -rf official/etc/*
```

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official (master)
$ ls
data/ etc/
```

6. Change shell prompt to UNIX.

Command : `Export PS1= "[${root}@(UNIX)]# "`

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official (master)
$ export PS1="[$root@(UNIX)]#"
[@(UNIX)]#
```

7. Show the list of all environment variable.

Command: 'printenv' used to show list of environment variables.

```
MSYSTEM_CHOST=x86_64-w64-mingw32
USERNAME=Lakhan Kumawat
LOGONSERVER=\ASUS-TUF
PROCESSOR_ARCHITECTURE=AMD64
LOCALAPPDATA=C:\Users\Lakhan Kumawat\AppData\Local
COMPUTERNAME=ASUS-TUF
FPS_BROWSER_APP_PROFILE_STRING=Internet Explorer
SYSTEMDRIVE=C:
USERPROFILE=C:\Users\Lakhan Kumawat
PATHEXT=.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH;.MSC
SYSTEMROOT=C:\Windows
USERDOMAIN_ROAMINGPROFILE=ASUS-TUF
PROCESSOR_IDENTIFIER=Intel(R) Family 6 Model 158 Stepping 10, GenuineIntel
MINGW_PACKAGE_PREFIX=mingw-w64-x86_64
OneDriveConsumer=C:\Users\Lakhan Kumawat\OneDrive
PWD=/c/Users/Lakhan Kumawat/Desktop/OS/OSLab/assignments/official
SSH_ASKPASS=/mingw64/libexec/git-core/git-gui--askpass
HOME=/c/Users/Lakhan Kumawat
TMP=/tmp
TERM_PROGRAM=Hyper
TERM_PROGRAM_VERSION=3.0.2
MSYSTEM_PREFIX=mingw64
OneDrive=C:\Users\Lakhan Kumawat\OneDrive
PROCESSOR_REVISION=9e0a
FPS_BROWSER_USER_PROFILE_STRING=Default
TMPDIR=/tmp
```

8. Show the home directory name of current user.

Command → `eval echo ~$root`] any of them can be used to show
`echo $home` home directory of current user.

```
# eval echo ~$root
#
#
```

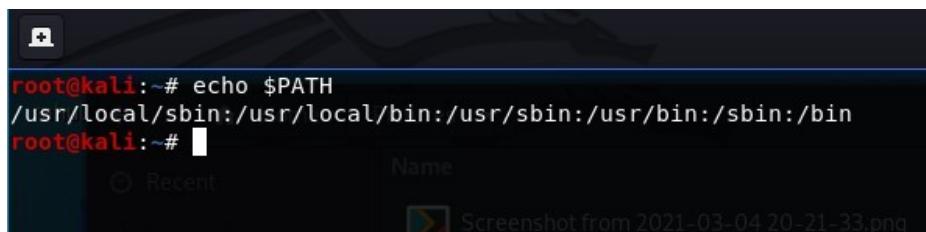
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9. To show the current search path

echo \$PATH



```
root@kali:~# echo $PATH
/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin
root@kali:~#
```

Screenshot from 2021-03-04 20-21-33.png

10. List of information of processes currently running in processes.

'ps' → used to show current running process

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~ (master)
$ ps
  PID  PPID  PGID   WINPID   TTY      UID      STIME COMMAND
 248    229    248     6200  cons0  197609 19:27:15 /usr/bin/ps
 229      1    229     10564  cons0  197609 19:27:10 /usr/bin/bash
```

11. Write a command to terminate a process whose process is known

'kill' → used to kill process

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~ (master)
$ kill 229

Lakhan Kumawat@ASUS-TUF MINGW64 ~ (master)
$
```

12. Write the program to send email to a user whose login name is manager.

Sol. mail Command is used to send mail to user with given id

\$ mail -s A mail Send to mails :- manager@gmail.com.

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Test - 1

13. Write a command to view mails from your mailbox.

Command :- Using the mail Command With no argument display all the mail in mailbox

Note: First you have to install mail apt in your OS-system.

14. Start online conversation with a currently logged in user name student working on terminal 'Pty/2'.

Command : Write

[Lakhman @ localhost ~] \$ write Nitish

15. Write a message feature for your terminal.

Command - mesg n

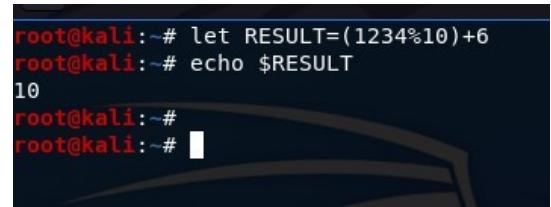


```
root@kali:~# mesg n
root@kali:~#
```

16. Store the result of arithmetic expression "(1234%10) + 6" into a variable name RESULT.

Command →

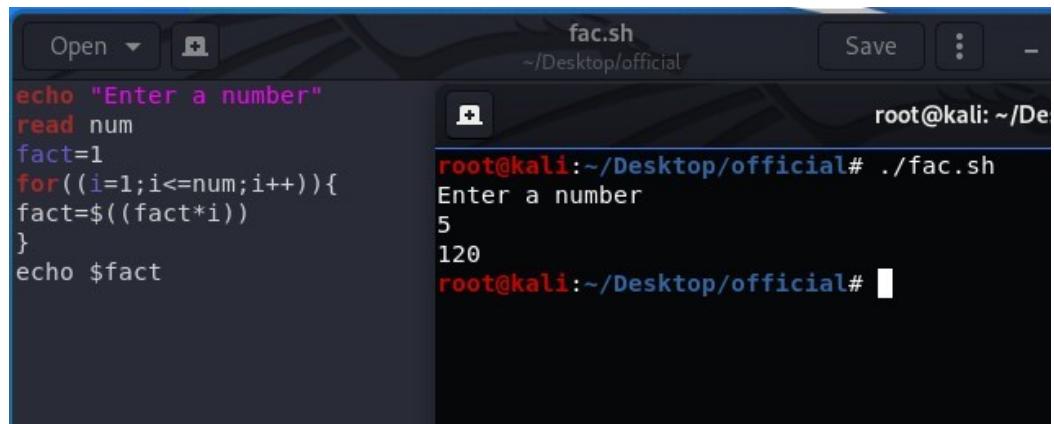
let RESULT= `\$(1234 % 10) + 6`
echo \$RESULT.



```
root@kali:~# let RESULT=(1234%10)+6
root@kali:~# echo $RESULT
10
root@kali:~#
root@kali:~#
```

17. Use UNIX calculator 'bc' to find Factorial of any number.

Command :-



```
fac.sh
~/Desktop/official
Open Save ...
root@kali:~/Desktop/official# ./fac.sh
Enter a number
5
120
root@kali:~/Desktop/official#
```

The screenshot shows a terminal window with two panes. The left pane displays a script named 'fac.sh' containing the following code:

```
echo "Enter a number"
read num
fact=1
for((i=1;i<=num;i++)){
fact=$((fact*i))
}
echo $fact
```

The right pane shows the terminal session where the script is run and the factorial of 5 is calculated and displayed as 120.

SESSION-6

1. list the information about all currently logged in user along with information that whether write permission for those is enabled or not.

Command : 'w' to check all currently logged in users.

```
/home/lakhun/.hushlogin file.
lakhan@ASUS-TUF:~$ w
08:20:36 up 0 min, 0 users, load average: 0.52, 0.58, 0.59
USER TTY FROM LOGIN@ IDLE JCPU PCPU WHAT
```

2. get the information such as machine name, server name, & unix version for the machine where UNIX is running.

Command: uname -a

```
lakhan@ASUS-TUF:~$ uname -a
Linux ASUS-TUF 4.4.0-18362-Microsoft #1049-Microsoft Thu Aug 14 12:01:00 PST 2020 x86_64 x86_64 x86_64 GNU/Linux
lakhan@ASUS-TUF:~$
```

3. What are use of type command find the location of command line is clear.

Type: The Type Command is used to find out information about Linux Command. As the name of implies. we can easily find whether the given Command is an alias ,shell, built-in, file or keyword using the command.

Command: Which ls,
Which clear,

```
lakhan@ASUS-TUF:~$ which ls
/usr/bin/ls
lakhan@ASUS-TUF:~$
```

```
lakhan@ASUS-TUF:~$
lakhan@ASUS-TUF:~$ which clear
/usr/bin/clear
lakhan@ASUS-TUF:~$
```

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4. Find the information about disk usage.

Command : df -h

```
lakhan@ASUS-TUF: ~$  
lakhan@ASUS-TUF: ~$ df -h  
Filesystem      Size  Used Avail Use% Mounted on  
rootfs        238G  134G  105G  56% /  
none          238G  134G  105G  56% /dev  
none          238G  134G  105G  56% /run  
none          238G  134G  105G  56% /run/lock  
none          238G  134G  105G  56% /run/shm  
none          238G  134G  105G  56% /run/user  
tmpfs         238G  134G  105G  56% /sys/fs/cgroup  
C:\           238G  134G  105G  56% /mnt/c  
D:\           302G   11G  292G   4% /mnt/d  
E:\           391G  108M  391G   1% /mnt/e  
lakhan@ASUS-TUF: ~$
```

5. Find the information about free disk space.

Command - df / free-h

df -h :- disk free space in human readable format

```
lakhan@ASUS-TUF: ~$  
lakhan@ASUS-TUF: ~$ free -h  
              total        used        free      shared  buff/cache   available  
Mem:       7.9Gi       3.1Gi       4.5Gi     17Mi       223Mi       4.6Gi  
Swap:      24Gi        14Mi       23Gi  
lakhan@ASUS-TUF: ~$
```

6. Change the permission for 'cstudent.dat' file located in 'official /data/corporate' to following.

For user -read, write

δ = read permission

For group -- read

w = write permission

For others -- none

x = execute permission

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)  
$ cat > cstudent.dat
```

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)  
$ chmod +x cstudent.dat
```

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)  
$ chmod +r cstudent.dat
```

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)  
$ chmod +w cstudent.dat
```

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7. Sort the contents of 'exstudent.dat' in descending order on the basis of passing field.

Command : sort

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ sort -k2 cstudent.dat
```

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ cat exstudent.dat
cat: exstudent.dat: No such file or directory
```

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ cat > exstudent.dat
course1 12 namex 2020
course1 419 name8 5761
course2 611 name10 4829
course3 390 name8 7400
course4 619 name5 2400
course5 733 name2 4117
course6 584 name7 3815
course7 170 name5 5602
course8 535 name1 6530
course9 236 name6 6755
course10 660 name1 4783
```

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ sort -t"," -k 4 -r exstudent.dat
course9 236 name6 6755
course8 535 name1 6530
course7 170 name5 5602
course6 584 name7 3815
course5 733 name2 4117
course4 619 name5 2400
course3 390 name8 7400
course2 611 name10 4829
course10 660 name1 4783
course1 419 name8 5761
course12 12 namex 2020
```

8. Sort the contents of 'student.dat' in ascending order on their roll no.

Command : sort -t", " -k 2 -r student.dat

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ sort -t"," -k 2 -r student.dat
Williams 65
Williams 43
Johnson 56
Johnson 41
John 63
John 1
Joe 41
Joe 16
Andy 41
Andy 28
```

9. Sort the contents of student.dat in ascending order on the basis of roll nos.

Sort -n student.dat.

↓
stands for number

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ sort -k2 student.dat
```

```
John 1
Joe 16
Andy 28
Andy 41
Joe 41
Johnson 41
Williams 43
Johnson 56
John 63
Williams 65
```

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9.

Sort the contents of 'student.dat' in descending order on their course name & ascending order on their roll no.s. State the sorted record in new file name Student.dat.

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ sort -k3 -r student.dat
Williams 65
Williams 43
Johnson 56
Johnson 41
John 63
John 1
Joe 41
Joe 16
Andy 41
Andy 28
```

10. Count the number of records in Student.dat file.

Command- wc used to count word

wc -l student.dat.

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ wc -l student.dat
10 student.dat
```

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ [ ]
```

1. Count the number of words & lines in cstudent.dat

Command: wc -w command
↓
to word

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ wc -w student.dat
20 student.dat
```

2. Find the student who have passed their courses in the year 1999 from the file exstudent.dat.

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ grep -i '1999' exstudent.dat
```

3. Count the number of directories at location \bin.

Command :- ls /bin | wc

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ ls /bin | wc
    438      438     6056
```

4. Count the number of terminals where user student is currently logged in.

Sol. Command → who -a

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ who -a
```

5. List all the those students record from student.dat who are not studying in M.Tech course.

Command: grep -i -v --exclude "M.Tech" exstudent.dat
↓
Command to exclude.

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6. Show only roll number and student name of each student from cstudent.dat

Command: cat student.dat | awk '{ print \$1, \$2 }'

command used to print particular column of file

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ cat student.dat | awk '{ print $1, $2 }'
Johnson 41
Andy 28
Williams 43
Williams 65
Andy 41
John 63
Johnson 56
John 1
Joe 16
Joe 41
```

7. Submit the file allstudent.dat for printing on printer.

Command: lp to print file in Linux
"lp filename"

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ lp allstudent.dat
bash: lp: command not found
```

8. To cancel a print job whose job is known.

Command: lprm id or cancel printer id

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ cancel laser-101
bash: cancel: command not found
```

9. Mount the cdrom drive ('/dev/cd0') in directory 'mnt'.

Command: wodim --devices

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ wodim devices
bash: wodim: command not found
```

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10. Format a 3.5" disk of 1.44mb capacity in the drive A.

Command: `format [-highV] [-f 1] [-format [1.44]]`

]

11. Display your terminal number.

Command:- `tty`

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ tty
/dev/cons0
```

12. Show current date & Time.

Command :- `date`

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ date
Mon, Mar 8, 2021 10:51:08 AM
```

13. Show the contents of file located in /bin in octal form

Command:- `od /bin/ls`

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ od /bin/ls
00000000 055115 000220 000003 000000 000004 000000 177777 000000
00000020 000270 000000 000000 000000 000100 000000 000000 000000
```

14. Show calendar of current month.

Command :- 'Cal' → month for this month.

15. Use comm , cmp and diff Commands .

`Cmp` - used to compare two file character by character.

`Comm` → used to compare sorted file

`Diff` → used to compare line by line.

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```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ cmp student.dat exstudent.dat
student.dat exstudent.dat differ: byte 1, line 1

Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ comm student.dat exstudent.dat
course1 12 namex 2020
course1 419 name8 5761
course2 611 name10 4829
course3 390 name8 7400
course4 619 name5 2400
course5 733 name2 4117
course6 584 name7 3815
course7 170 name5 5602
course8 535 name1 6530
course9 236 name6 6755
comm: file 2 is not in sorted order
course10 660 name1 4783
Johnson 41
comm: file 1 is not in sorted order
Andy 28
Williams 43
Williams 65
Andy 41
John 63
Johnson 56
John 1
Joe 16
Joe 41
comm: input is not in sorted order
```

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ diff student.dat exstudent.dat
1,10c1,11
< Johnson 41
< Andy 28
< Williams 43
< Williams 65
< Andy 41
< John 63
< Johnson 56
< John 1
< Joe 16
< Joe 41
---
> course1 12 namex 2020
> course1 419 name8 5761
> course2 611 name10 4829
> course3 390 name8 7400
> course4 619 name5 2400
> course5 733 name2 4117
> course6 584 name7 3815
> course7 170 name5 5602
> course8 535 name1 6530
> course9 236 name6 6755
> course10 660 name1 4783
```

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
```

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Session - 8

(13.)

To find the number of users working in the system also. find whether a user is currently logged in or not

Command: Users

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2. Find sum of digit of given integer.

```
#!/bin/bash

# Program to find sum
# of digits
echo Enter a Number
# Static input of the
# number
read Num
g=$Num

# store the sum of
# digits
s=0

# use while loop to
# calculate the sum
# of all digits
while [ $Num -gt 0 ]
do
    # get Remainder
    k=$(( $Num % 10 ))
    #
    # get next digit
    Num=$(( $Num / 10 ))
    # calculate sum of
    # digit
    s=$(( $s + $k ))
done
echo "sum of digits of $g is : $s"
```

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ vi sumofdigits
```

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ sh sumofdigits
Enter a Number
123
sum of digits of 123 is : 6
```

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3. Find greatest of three numbers.

```
#shell script to find the greatest of three numbers

echo "Enter Num1"
read num1
echo "Enter Num2"
read num2
echo "Enter Num3"
read num3

if [ $num1 -gt $num2 ] && [ $num1 -gt $num3 ]
then
    echo $num1
elif [ $num2 -gt $num1 ] && [ $num2 -gt $num3 ]
then
    echo $num2
else
    echo $num3
fi
```

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ vi Greatestof3
```

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ sh Greatestof3
Enter Num1
90
Enter Num2
3
Enter Num3
23
90
```

4. Check whether the given string is palindrome or not

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```
echo enter n
read n
num=0
on=$n
while [ $n -gt 0 ]
do
num=$(expr $num \* 10)
k=$(expr $n % 10)
num=$(expr $num + $k)
n=$(expr $n / 10)
done
if [ $num -eq $on ]
then
echo palindrome
else
echo not palindrome
fi[]
~
```

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/0
$ sh palindromecheck
enter n
767
palindrome
```

5. check whether the given year is leap year or not.

```
leap=$(date +"%Y")
echo taking year as $leap
if [ `expr $leap % 400` -eq 0 ]
then
echo leap year
elif [ `expr $leap % 100` -eq 0 ]
then
echo not a leap year
elif [ `expr $leap % 4` -eq 0 ]
then
echo leap year
else
echo not a leap year
fi[]
~
```

```
Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/as
$ sh leapyear
taking year as 2021
not a leap year
```

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Q. generate first 15 numbers & also check whether given number is prime or not

```
clear
echo "enter the range"
read n
echo "the prime no are:"
m=2
while [ $m -le $n ]
do
i=2 flag=0
while [ $i -le `expr $m / 2` ]
do
if [ `expr $m % $i` -eq 0 ]
then
flag=1
break
fi
i=`expr $i + 1`
done
if [ $flag -eq 0 ]
then
echo $m
fi
m=`expr $m + 1`
done
~
```

```
"enter the range"
15
"the prime no are:"
2
3
5
7
11
13
```

Lakhan Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/of
\$ ~

Write a program to convert Decimal to Binary and vise versa

```
echo "Enter any decimal no:"
read num
rem=1
bno=" "
while [ $num -gt 0 ]
do
rem=`expr $num % 2 `
bno=$bno$rem
num=`expr $num / 2 `
done
i=${#bno}
final=" "
while [ $i -gt 0 ]
do
rev=`echo $bno | awk '{ printf substr( $0,'$i',1 ) }'`
final=$final$rev
i=$(( $i - 1 ))
done
echo "Equivalent Binary no:" $final

echo "Enter any Binary no;"
read bino
len=${#bino}
i=1
pow=$((len - 1 ))
while [ $i -le $len ]
do
n=`echo $bino | awk '{ printf substr( $0,'$i',1 ) }' `
j=1
p=1
while [ $j -le $pow ]
do
p=$(( p * 2 ))
j=$(( j + 1 ))
done
dec=$(( n * p ))
findec=$(( findec + dec ))
pow=$((pow - 1 ))
i=$(( i + 1 ))
done
echo "Equivalent Decimal no:"$findec
~
```

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```
Lakhan.Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ vi binary2decimal

Lakhan.Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ sh binary2decimal
Enter any decimal no:
34
Equivalent Binary no: 100010
Enter any Binary no;
110
Equivalent Decimal no:6
```

8. Write a program to Count number of word, white space, character
Vovel, Consonant in given string.

```
echo Enter a text
read text
w=`echo $text | wc -w`
w=`expr $w`
c=`echo $text | wc -c`
c=`expr $c - 1`
s=0
alpha=0
j=
n=1
while [ $n -le $c ]
do
ch=`echo $text | cut -c $n`
if test $ch = $j
then
s=`expr $s + 1`
fi
case $ch in
a|b|c|d|e|f|g|h|i|j|k|l|m|n|o|p|q|r|s|t|u|v|w|x|y|z) alpha=`expr $alpha + 1`;;
esac
n=`expr $n + 1`
done
special=`expr $c - $s - $alpha`
echo Words=$w
echo Characters=$c
echo Spaces=$s
echo Special symbols=$special
~
```

```
Lakhan.Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ vi count
```

```
Lakhan.Kumawat@ASUS-TUF MINGW64 ~/Desktop/OS/OSLab/assignments/official/etc/corporate (master)
$ sh count
Enter a text
Ram is a good Boy
```

```
Words=5
Characters=19
Spaces=4
Special symbols=4
```

g. Count the number of words of five character length

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```
Noah  
Oliver  
William  
Elijah  
James  
Benjamin  
Lucas  
Mason  
Ethan  
Alexander  
Henry  
Jacob  
Michael  
Daniel  
Logan  
Jackson  
Sebastian  
□  
~
```

10. Write a program to sort the numbers using bubble sort

```
clear  
echo Enter Array of 5 elements  
  
for (( i=0;i<5;i++))  
do  
    read arr[$i]  
done  
for ((i = 0; i<5; i++))  
do  
    for((j = 0; j<5-i-1; j++))  
    do  
        if [ ${arr[$j]} -gt ${arr[$j+1]} ]  
        then  
            # swap  
            temp=${arr[$j]}  
            arr[$j]=${arr[$j+1]}  
            arr[$j+1]=$temp  
        fi  
    done  
done  
echo "Array in sorted order :"  
echo ${arr[*]}  
□
```

```
Enter Array of 5 elements  
8  
1  
2  
7  
5  
Array in sorted order :  
1 2 5 7 8
```

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11. Write a program to sort the numbers using Selection Sort.

```
clear
echo Enter the size of array
read n
for (( i=0;i<$n;i++))
do
read arr[$i]
done
min=0
for((i=0;i<$n-1;i++))
do
small=${arr[$i]}
index=$i
for((j=i+1;j<$n;j++))
[ ]
~
```

```
Enter the size of array
5
8
1
2
3
5
1
2
3
5
8
```

12. Write a program to calculate GCD of given numbers.

```
clear
echo Enter two numbers with space in between
read a b
//reads numbers
m=$a
if [ $b -lt $m ]
then
m=$b
fi
while [ $m -ne 0 ]
do
x=`expr $a % $m`
y=`expr $b % $m`
if [ $x -eq 0 -a $y -eq 0 ]
then
echo gcd of $a and $b is $m
break
fi
m=`expr $m - 1`
done
~
```

Enter two numbers with space in between

45 25

gcd of 45 and 25 is 5

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\$ []

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root of given quadratic equation.

```
echo "Program o find roots of quadratic equation of the form :"
echo "ax^2 + bx + c = 0"
echo Enter value of coefficient a :
read a
echo Enter value of coefficient b :
read b
echo Enter value of constant c :
read c
D=$((b*b - 4*a*c))
D=$(echo "scale=2;sqrt($D)" | bc)
root1=$((D-b))
root2=$((D+b))
root1=$((root1/2*a))
root2=$((root2/2*a))

echo root1 = $root1
echo root2 = $root2
```

Program o find roots of quadratic equation of the form :

ax² + bx + c = 0

Enter value of coefficient a :

1

Enter value of coefficient b :

-3

Enter value of constant c :

2

root1 = 2

root2 = -1

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14. Write a program to check whether a given number is Armstrong number or not

```
clear
echo "Enter the number"
read n
function ams
{
t=$n
s=0
b=0
c=10
while [ $n -gt $b ]
do
r=$((n % c))
i=$((r * r * r))
s=$((s + i))
n=$((n / c))
done
echo $s
if [ $s == $t ]
then
echo "Amstrong number"
else
echo "Not an Armstrong number"
fi
}
result=`ams $n`
echo "$result"
~
```

Enter the number

153

153

Amstrong number

Lakhan Kumawat@ASUS-TUF MIN

\$ □

15. Write a program to print reverse of a string.

```
lakhan@ASUS-TUF:~$ echo Lakhan Kumawat 1906055 | rev  
5506091 tawamuk nahkaL  
lakhan@ASUS-TUF:~$
```