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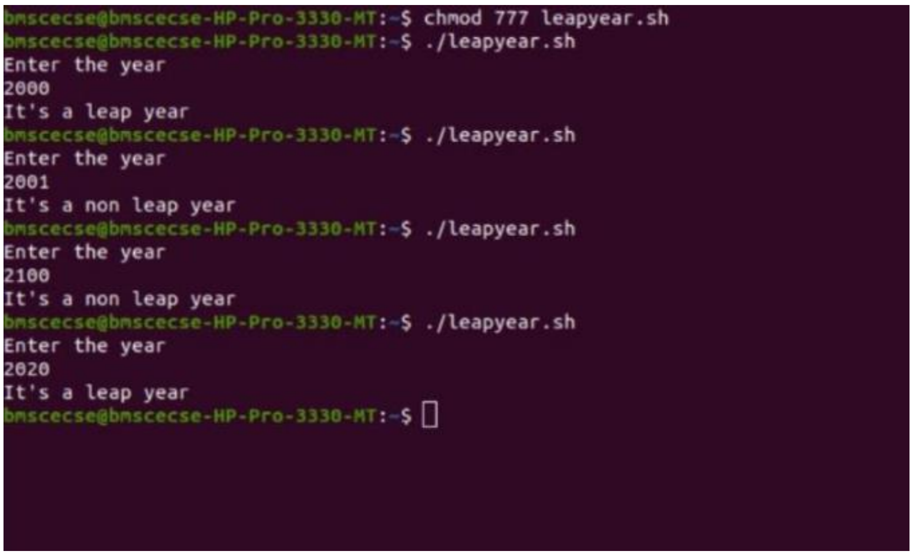
USP LAB RECORD

1 Shell script to find if the given year is leap or not .

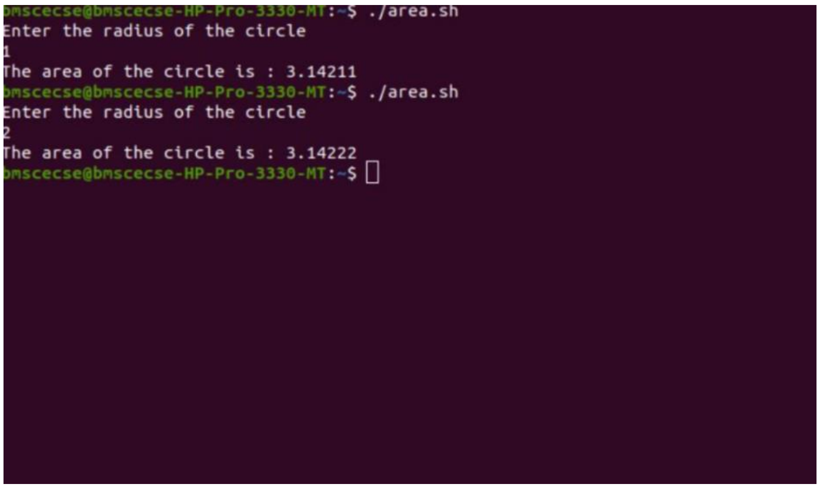
```
#!/bin/sh

echo "Enter the year: "

read y

if [ $((y%100)) -eq 0 ]

then

        if [ $((y%400)) -eq 0 ]

        then

                echo "It is a leap year"

        else

                echo "It is not a leap year"

        fi

else

        rem=$((y%4))

        if [ $rem -eq 0 ]

        then

                echo "It is a leap year"

        else

                echo "It is not a leap year"

        fi fi
```



```
bmscecse@bmscecse-HP-Pro-3330-MT:~$ chmod 777 leapyear.sh
bmscecse@bmscecse-HP-Pro-3330-MT:~$ ./leapyear.sh
Enter the year
2000
It's a leap year
bmscecse@bmscecse-HP-Pro-3330-MT:~$ ./leapyear.sh
Enter the year
2001
It's a non leap year
bmscecse@bmscecse-HP-Pro-3330-MT:~$ ./leapyear.sh
Enter the year
2100
It's a non leap year
bmscecse@bmscecse-HP-Pro-3330-MT:~$ ./leapyear.sh
Enter the year
2020
It's a leap year
bmscecse@bmscecse-HP-Pro-3330-MT:~$
```

2 Shell script to find the area of a circle.

```
#!/bin/sh

echo "Enter radius: "

read rad

pi=3.14

ans=`echo $pi\$rad\$rad|bc`

echo $ans
```

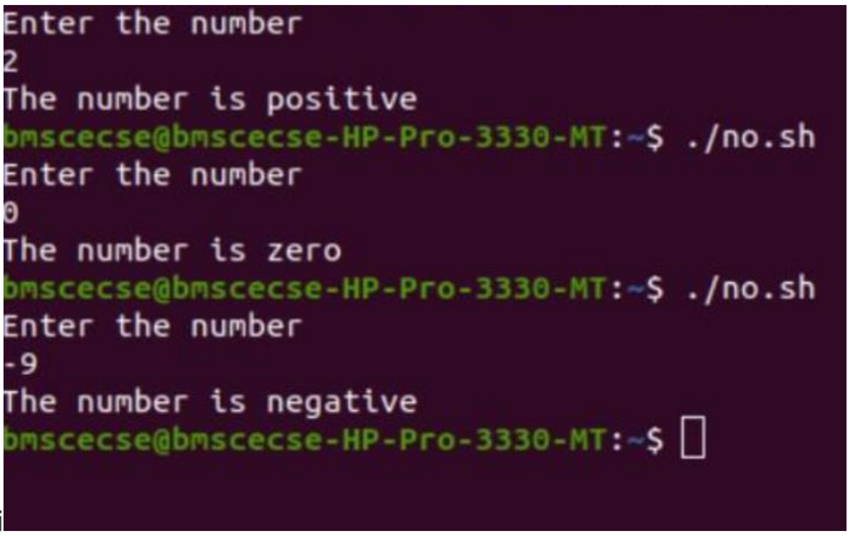


```
bmscecse@bmscecse-HP-Pro-3330-MT:~$ ./area.sh
Enter the radius of the circle
1
The area of the circle is : 3.14211
bmscecse@bmscecse-HP-Pro-3330-MT:~$ ./area.sh
Enter the radius of the circle
2
The area of the circle is : 3.14222
bmscecse@bmscecse-HP-Pro-3330-MT:~$
```

3 Shell script to check whether the number is zero/ positive/ negative .

```
#!/bin/sh

echo "Enter the number-"

read n
```

```
if [ $n -lt 0 ]
then
	echo "Number is negaitve"
elif [ $n -eq 0 ]
then
	echo "Number is zero"
else
	echo "Number is positive"
```



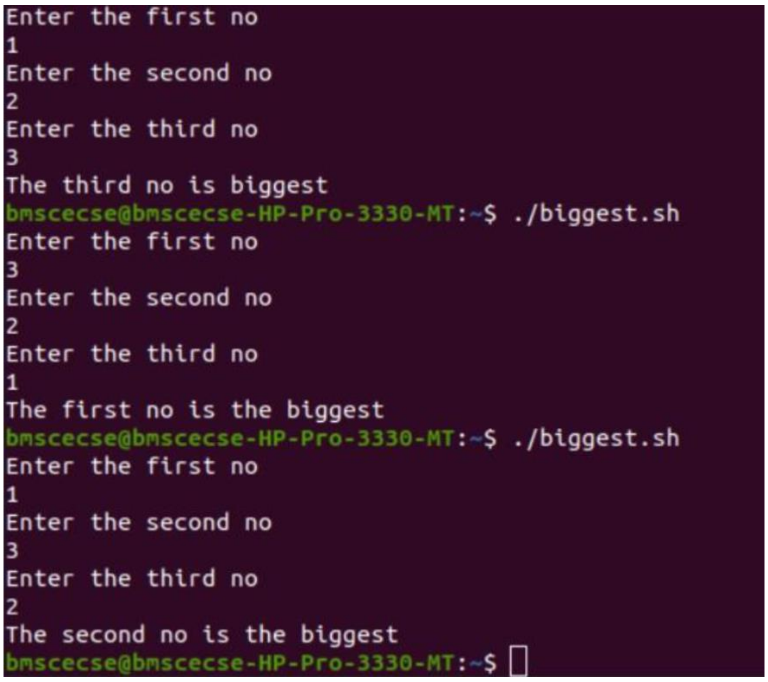
```
Enter the number
2
The number is positive
bmscecse@bmscecse-HP-Pro-3330-MT:~$ ./no.sh
Enter the number
0
The number is zero
bmscecse@bmscecse-HP-Pro-3330-MT:~$ ./no.sh
Enter the number
-9
The number is negative
bmscecse@bmscecse-HP-Pro-3330-MT:~$ 
```

```
fi
```

4 Shell script to find the biggest of three numbers .

```
#!/bin/sh
echo "Enter the numbers-"
read a b c
if [ $a -ge $b ]
then
	if [ $a -ge $c ]
	then
		echo "$a is the largest"
	fi
elif [ $b -ge $c ]
then
```

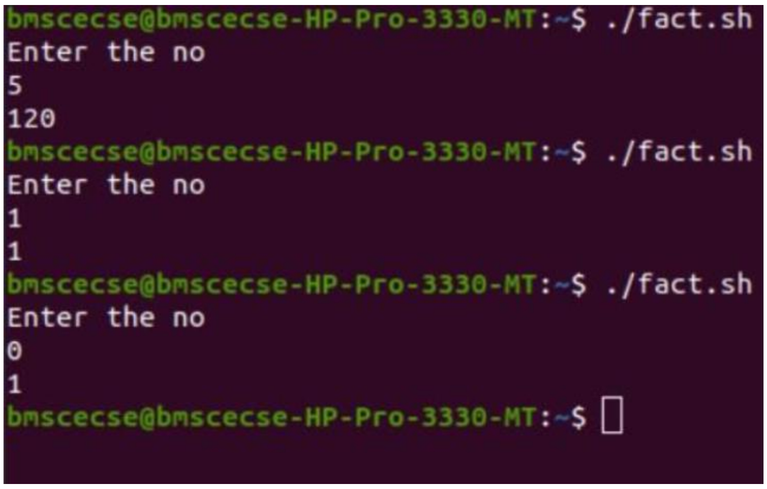
```
        if [ $b -ge $a ]
        then
                echo "$b is the largest"
        fi
else
echo "$c is the largest"
fi
```



```
Enter the first no
1
Enter the second no
2
Enter the third no
3
The third no is biggest
bmscecse@bmscecse-HP-Pro-3330-MT:~$ ./biggest.sh
Enter the first no
3
Enter the second no
2
Enter the third no
1
The first no is the biggest
bmscecse@bmscecse-HP-Pro-3330-MT:~$ ./biggest.sh
Enter the first no
1
Enter the second no
3
Enter the third no
2
The second no is the biggest
bmscecse@bmscecse-HP-Pro-3330-MT:~$
```

5. Shell script to find the factorial of a number .

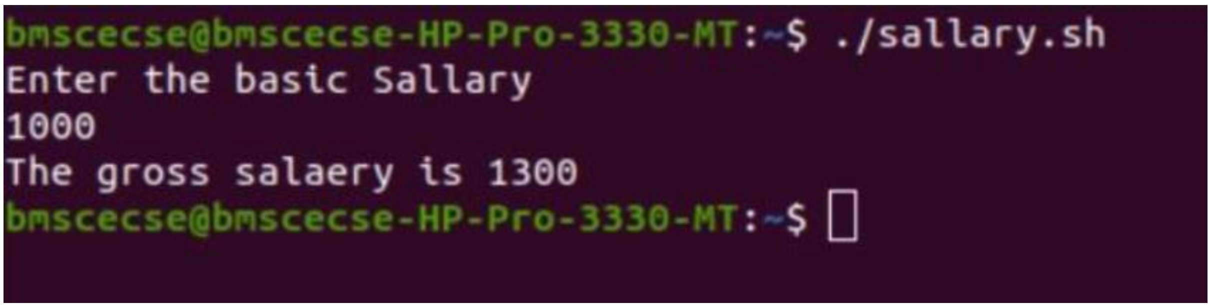
```
echo "Enter the number: "
read n
result=1
for (( i=1; i<=$n; i++ ))
do
        result=$((result*i))
done
echo "factorial is $result”
```



```
bmscecse@bmscecse-HP-Pro-3330-MT:~$ ./fact.sh
Enter the no
5
120
bmscecse@bmscecse-HP-Pro-3330-MT:~$ ./fact.sh
Enter the no
1
1
bmscecse@bmscecse-HP-Pro-3330-MT:~$ ./fact.sh
Enter the no
0
1
bmscecse@bmscecse-HP-Pro-3330-MT:~$ 
```

6. Shell script to compute the gross salary of an employee .

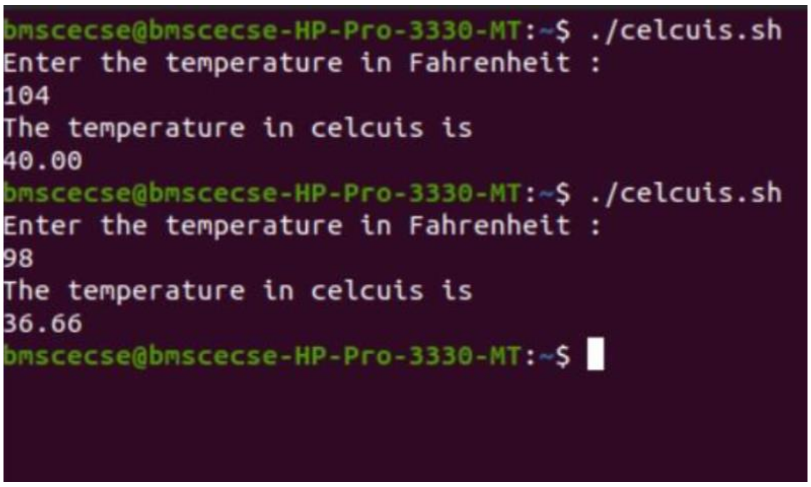
```
echo "Enter the basic salary-"

read basic_salary

da=`echo "scale=4;$basic_salary * 10 / 100"|bc`

hra=`echo "scale=4;$basic_salary * 20 / 100"|bc`

gross_salary=`echo "scale=4;$basic_salary + $hra + $da"|bc`

echo "Gross salary is $gross_salary"
```



```
bmscecse@bmscecse-HP-Pro-3330-MT:~$ ./sallary.sh
Enter the basic Sallary
1000
The gross salaery is 1300
bmscecse@bmscecse-HP-Pro-3330-MT:~$ 
```

7. Shell script to convert the temperature Fahrenheit to Celsius .

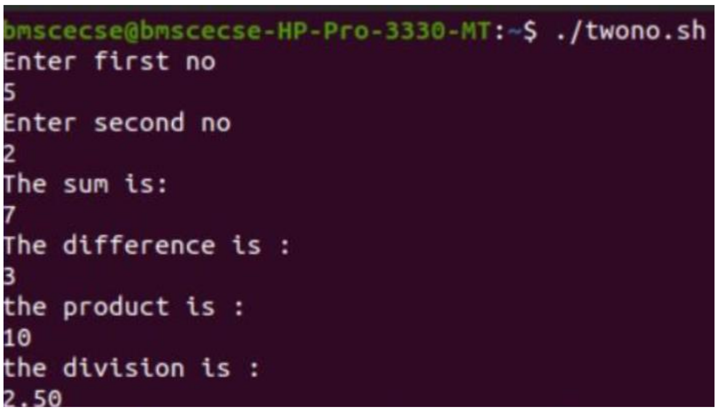
```
echo "Enter temperature in fahrenheit-"

read f

c=`echo "scale=2;(5/9) * ($f-32)"|bc`

echo $c
```



```
bmscecse@bmscecse-HP-Pro-3330-MT:~$ ./celcuis.sh
Enter the temperature in Fahrenheit :
104
The temperature in celcuis is
40.00
bmscecse@bmscecse-HP-Pro-3330-MT:~$ ./celcuis.sh
Enter the temperature in Fahrenheit :
98
The temperature in celcuis is
36.66
bmscecse@bmscecse-HP-Pro-3330-MT:~$
```

8. Shell script to perform arithmetic operations on given two numbers .

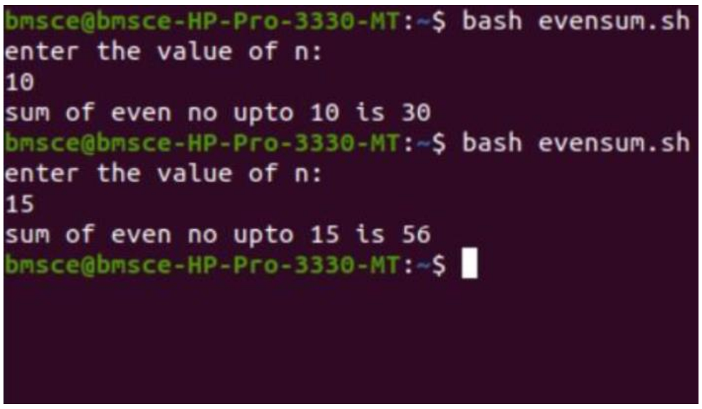
```
echo "Enter the numbers-"

read n1 n2

echo "Enter the operation +,-,*,/"

read opr

case $opr in

'+') ans=$((n1+n2));;

'-') ans=$((n1-n2));;

'*') ans=$((n1*n2));;

'/') ans=$(echo "scale=2;$n1 / $n2"|bc);;

*) echo "Enter a valid choice";;

esac

echo "Reqiured answer is $ans"
```



```
bmscecse@bmscecse-HP-Pro-3330-MT:~$ ./twono.sh
Enter first no
5
Enter second no
2
The sum is:
7
The difference is :
3
the product is :
10
the division is :
2.50
```

9 Shell script to find the sum of even numbers upto n .

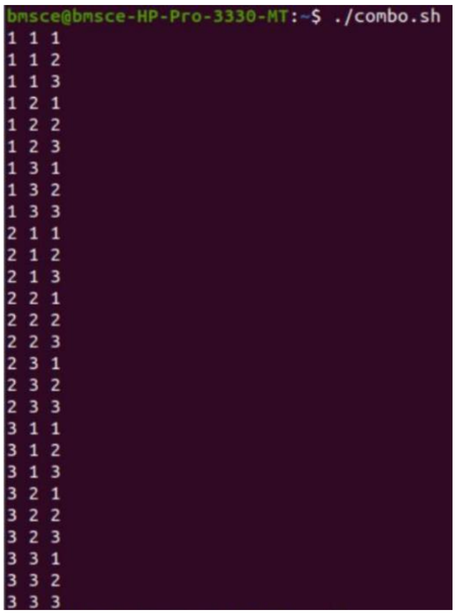
```
echo "Enter a number-"

read n

sum=0

for (( i=0 ; i<=$n ; i=i+2 ))

do

        sum=$((sum+i))

done

echo $sum
```



```
bmsce@bmsce-HP-Pro-3330-MT:~$ bash evensum.sh
enter the value of n:
10
sum of even no upto 10 is 30
bmsce@bmsce-HP-Pro-3330-MT:~$ bash evensum.sh
enter the value of n:
15
sum of even no upto 15 is 56
bmsce@bmsce-HP-Pro-3330-MT:~$
```

10 Shell script to print the combinations of numbers 123 .

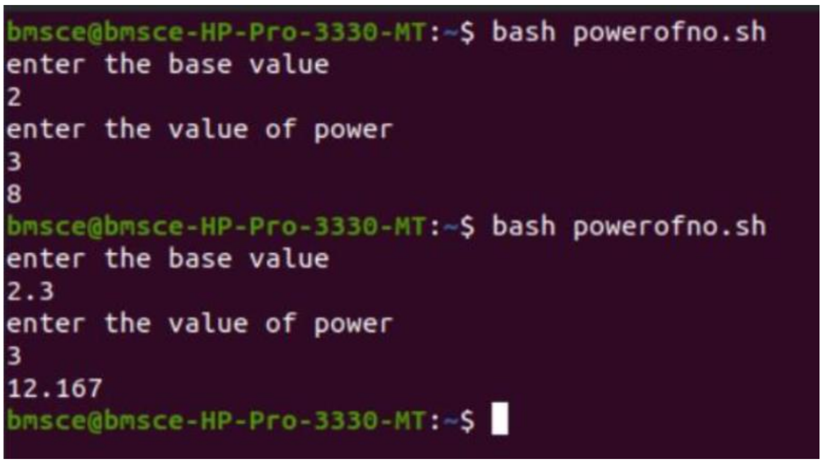
```
for i in 1 2 3

do

        for j in 1 2 3

        do

                for k in 1 2 3

                do

                        echo $i $j $k

                done

        done

done
```



```
bmsce@bmsce-HP-Pro-3330-MT:~$ ./combo.sh
1 1 1
1 1 2
1 1 3
1 2 1
1 2 2
1 2 3
1 3 1
1 3 2
1 3 3
2 1 1
2 1 2
2 1 3
2 2 1
2 2 2
2 2 3
2 3 1
2 3 2
2 3 3
3 1 1
3 1 2
3 1 3
3 2 1
3 2 2
3 2 3
3 3 1
3 3 2
3 3 3
```

11 Shell script to find the power of a number .

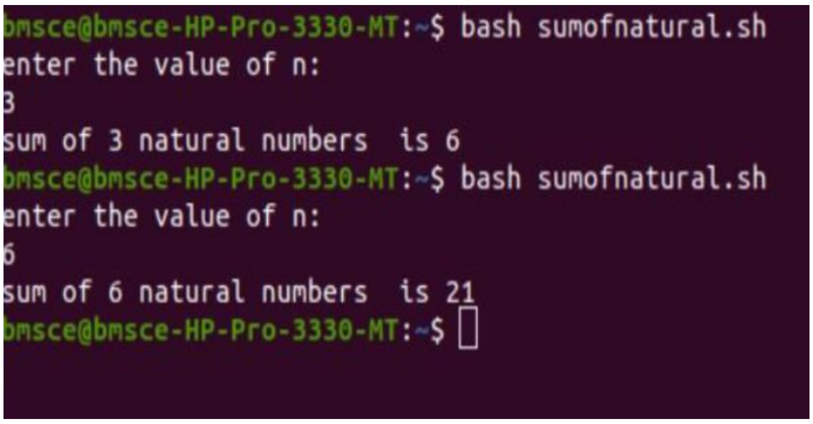
```
echo "Enter base-"

read b

echo "Enter power-"

read p

ans=1

while [ $p -ge 1 ]

do

        ans=$(echo "scale=2;$ans * $b"|bc)

        p=$((p-1))

done

echo $ans
```



```
bmsce@bmsce-HP-Pro-3330-MT:~$ bash powerofno.sh
enter the base value
2
enter the value of power
3
8
bmsce@bmsce-HP-Pro-3330-MT:~$ bash powerofno.sh
enter the base value
2.3
enter the value of power
3
12.167
bmsce@bmsce-HP-Pro-3330-MT:~$ 
```

12 Shell script to find the sum of n natural numbers .

```
echo "Enter a number-"

read n

sum=0

for (( i=0 ; i<=$n ; i++ ))

do

        sum=$((sum+i))

done

echo $sum
```

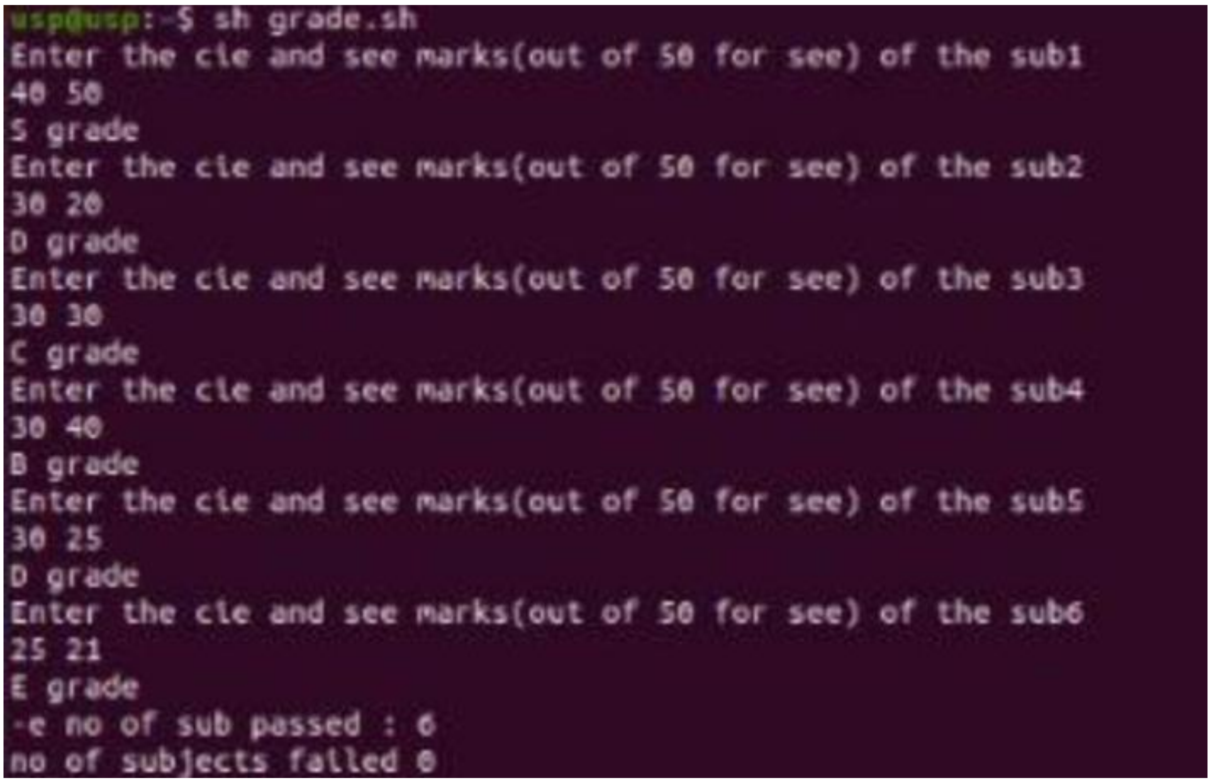


```
bmsce@bmsce-HP-Pro-3330-MT:~$ bash sumofnatural.sh
enter the value of n:
3
sum of 3 natural numbers  is 6
bmsce@bmsce-HP-Pro-3330-MT:~$ bash sumofnatural.sh
enter the value of n:
6
sum of 6 natural numbers  is 21
bmsce@bmsce-HP-Pro-3330-MT:~$ 
```

13 Shell script to display the pass class of a student .

```
pass=6

for (( i=0 ; i<6 ; i++ ))

do

        echo "Enter subject: "

        read sub
```

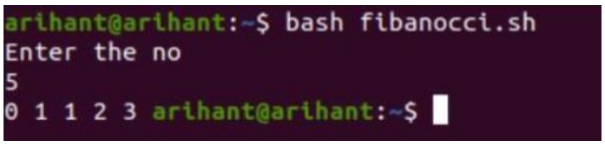
```
            echo "Enter CIE marks(out of 100):"
            read cie
            echo "Enter SEE marks(out of 100):"
            read see
            cie=$((cie/2))
            see=$((see/2))
            tot=$((cie + see))
            echo $tot
            case $tot in
            100) echo "The grade for $sub is S grade";;
            9[0-9]) echo "The grade for $sub is S grade";;
            8[0-9]) echo "The grade for $sub is A grade";;
            7[0-9]) echo "The grade for $sub is B grade";;
            6[0-9]) echo "The grade for $sub is C grade";;
            5[0-9]) echo "The grade for $sub is D grade";;
            4[0-9]) echo "The grade for $sub is E grade";;
            [0-3][0-9]) echo "FAIL in $sub"
            pass=$((pass-1));;
            *) echo "Enter a valid marks: "
            esac
    done
    echo "Total passes is $pass"
    fail=$((6 - pass))
    echo "Total fails is $fail"
```



```
usp@usp:~$ sh grade.sh
Enter the cie and see marks(out of 50 for see) of the sub1
40 50
S grade
Enter the cie and see marks(out of 50 for see) of the sub2
30 20
D grade
Enter the cie and see marks(out of 50 for see) of the sub3
30 30
C grade
Enter the cie and see marks(out of 50 for see) of the sub4
30 40
B grade
Enter the cie and see marks(out of 50 for see) of the sub5
30 25
D grade
Enter the cie and see marks(out of 50 for see) of the sub6
25 21
E grade
-e no of sub passed : 6
no of subjects failed 0
```

14 Shell script to find the Fibonacci series up to n .

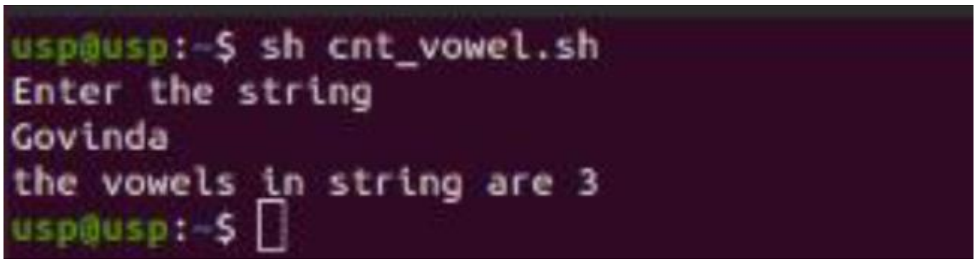
```
echo "Enter the number: "
read n
a=0
b=1
c=2
d=0
echo -e "$a $b \c"
while [ $c -lt $n ]
do
        c=`expr $c + 1`
        d=`expr $a + $b`
        echo -e "$d \c"
        a=$b
        b=$d
done
```



```
arihant@arihant:~$ bash fibanocci.sh
Enter the no
5
0 1 1 2 3 arihant@arihant:~$
```

15 Shell script to count the number of vowels of a string .

```
echo "Enter the string: "
read s
count=0
len=`expr "$s" : '.*'`
for ((i=1 ; i<=len ; i++))
do
        c=`echo $s | cut -c $i`
        case $c in
                [aeiouAEIOU]) count=$((count+1))
        esac
done
echo "Number of vowels is $count"
```

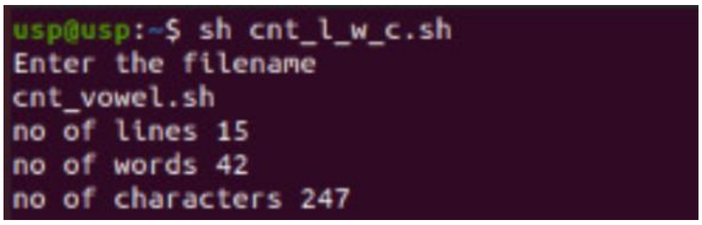


```
usp@usp:~$ sh cnt_vowel.sh
Enter the string
Govinda
the vowels in string are 3
usp@usp:~$
```

16 Shell script to check number of lines, words, characters in a file .

```
echo "Enter file to open: "
read f
lines=`wc -l < $f`
words=`wc -w < $f`
characters=`wc -m < $f`
```

echo "Lines = $lines \n Words = $words \n Characters = $characters"

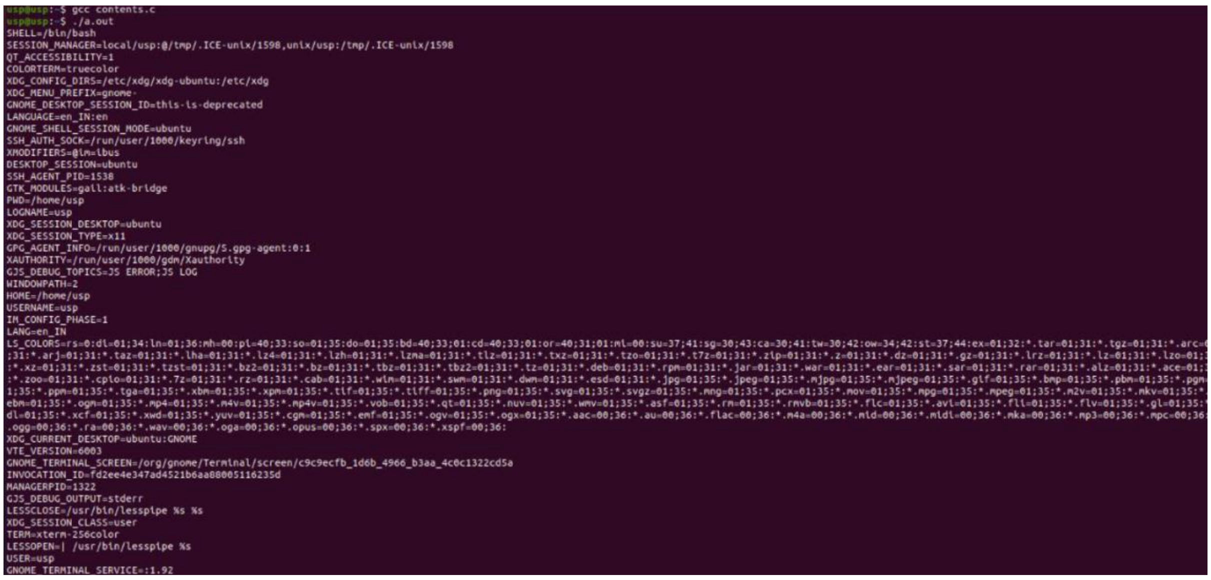


```
usp@usp:~$ sh cnt_l_w_c.sh
Enter the filename
cnt_vowel.sh
no of lines 15
no of words 42
no of characters 247
```

17. Write a C/C++ program to that outputs the contents of its Environment list

PROGRAM

```
#include&lt;stdio.h&gt;

int main(int argc, char* argv[ ])

{

int i;

char **ptr;

extern char **environ;

for( ptr = environ; *ptr != 0; ptr++ ) /*echo all env strings*/

printf(&quot;%s\n&quot;, *ptr);

return 0;

}
```



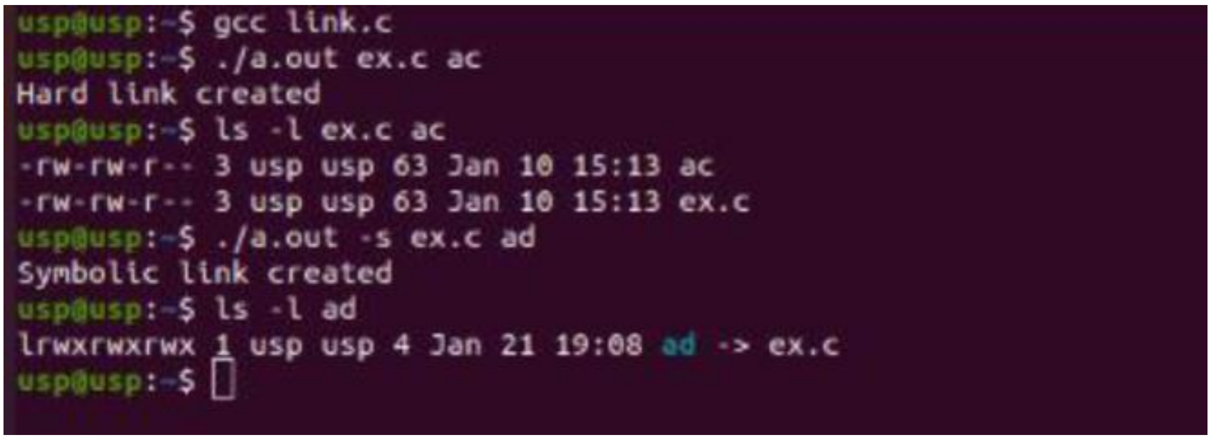
```
usp@usp:~$ gcc contents.c
usp@usp:~$ ./a.out
SHELL=/bin/bash
SESSION_MANAGER=local/usp:@/tmp/.ICE-unix/1598,unix/usp:/tmp/.ICE-unix/1598
QT_ACCESSIBILITY=1
COLORTERM=truecolor
XDG_CONFIG_DIRS=/etc/xdg/xdg-ubuntu:/etc/xdg
XDG_MENU_PREFIX=gnome-
GNOME_DESKTOP_SESSION_ID=this-is-deprecated
LANGUAGE=en_IN:en
GNOME_SHELL_SESSION_MODE=ubuntu
SSH_AUTH_SOCK=/run/user/1000/keyring/ssh
XMODIFIERS=@im=ibus
DESKTOP_SESSION=ubuntu
SSH_AGENT_PID=1538
GTK_MODULES=gail:atk-bridge
PWD=/home/usp
LOGNAME=usp
XDG_SESSION_DESKTOP=ubuntu
XDG_SESSION_TYPE=x11
GPG_AGENT_INFO=/run/user/1000/gnupg/S.gpg-agent:0:1
XAUTHORITY=/run/user/1000/gdm/Xauthority
GJS_DEBUG_TOPICS=JS ERROR;JS LOG
WINDOWPATH=2
HOME=/home/usp
USERNAME=usp
IM_CONFIG_PHASE=1
LANG=en_IN
LS_COLORS=rs=0:di=01;34:ln=01;36:mh=00:pi=40;33:so=01;35:do=01;35:bd=40;33;01:cd=40;33;01:or=40;31;01:mi=00:su=37;41:sg=30;43:ca=30;41:tw=30;42:ow=34;42:st=37;44:ex=01;32:*.tar=01;31:*.tgz=01;31:*.arc=0
;31:*.arj=01;31:*.taz=01;31:*.lha=01;31:*.lz4=01;31:*.lzh=01;31:*.lzma=01;31:*.tlz=01;31:*.txz=01;31:*.tzo=01;31:*.t7z=01;31:*.zip=01;31:*.z=01;31:*.dz=01;31:*.gz=01;31:*.lrz=01;31:*.lz=01;31:*.lzo=01;3
:*.xz=01;31:*.zst=01;31:*.tzst=01;31:*.bz2=01;31:*.bz=01;31:*.tbz=01;31:*.tbz2=01;31:*.tz=01;31:*.deb=01;31:*.rpm=01;31:*.jar=01;31:*.war=01;31:*.ear=01;31:*.sar=01;31:*.rar=01;31:*.alz=01;31:*.ace=01;3
:*.zoo=01;31:*.cpio=01;31:*.7z=01;31:*.rz=01;31:*.cab=01;31:*.wim=01;31:*.swm=01;31:*.dwm=01;31:*.esd=01;31:*.jpg=01;35:*.jpeg=01;35:*.mjpg=01;35:*.mjpeg=01;35:*.gif=01;35:*.bmp=01;35:*.pbm=01;35:*.pgm=
1;35:*.ppm=01;35:*.tga=01;35:*.xbm=01;35:*.xpm=01;35:*.tif=01;35:*.tiff=01;35:*.png=01;35:*.svg=01;35:*.svgz=01;35:*.mng=01;35:*.pcx=01;35:*.mov=01;35:*.mpg=01;35:*.mpeg=01;35:*.m2v=01;35:*.mkv=01;35:*.
ebm=01;35:*.ogm=01;35:*.mp4=01;35:*.m4v=01;35:*.mp4v=01;35:*.vob=01;35:*.qt=01;35:*.nuv=01;35:*.wmv=01;35:*.asf=01;35:*.rm=01;35:*.rmvb=01;35:*.flc=01;35:*.avi=01;35:*.fli=01;35:*.flv=01;35:*.gl=01;35:*
dl=01;35:*.xcf=01;35:*.xwd=01;35:*.yuv=01;35:*.cgm=01;35:*.emf=01;35:*.ogv=01;35:*.ogx=01;35:*.aac=00;36:*.au=00;36:*.flac=00;36:*.m4a=00;36:*.mid=00;36:*.midi=00;36:*.mka=00;36:*.mp3=00;36:*.mpc=00;36:
.ogg=00;36:*.ra=00;36:*.wav=00;36:*.oga=00;36:*.opus=00;36:*.spx=00;36:*.xspf=00;36:
XDG_CURRENT_DESKTOP=ubuntu:GNOME
VTE_VERSION=6003
GNOME_TERMINAL_SCREEN=/org/gnome/Terminal/screen/c9c9ecfb_1d6b_4966_b3aa_4c0c1322cd5a
INVOCATION_ID=fd2ee4e347ad4521b6aa88005116235d
MANAGERPID=1322
GJS_DEBUG_OUTPUT=stderr
LESSCLOSE=/usr/bin/lesspipe %s %s
XDG_SESSION_CLASS=user
TERM=xterm-256color
LESSOPEN=| /usr/bin/lesspipe %s
USER=usp
GNOME_TERMINAL_SERVICE=:1.92
```

18. Write a C/C++ program to emulate the unix ln command

Program

```
#include&lt;stdio.h&gt;

#include&lt;sys/types.h&gt;

#include&lt;unistd.h&gt;

#include&lt;string.h&gt;

int main(int argc, char * argv[])

{

if(argc &lt; 3 || argc &gt; 4 || (argc == 4 &amp;&amp; strcmp(argv[1],”-s”)))

{

printf(“Usage: ./a.out [-s] &lt;org_file&gt; &lt;new_link&gt;\n”);

return 1;

}

if(argc == 4)

{

if((symlink(argv[2], argv[3])) == -1)

printf(“Cannot create symbolic link\n”) ;

else

printf(“Symbolic link created\n”) ;

}

else

{

if((link(argv[1], argv[2])) == -1)

printf(“Cannot create hard link\n”) ;

else

printf(“Hard link created\n”) ;

}

return 0;
```

}

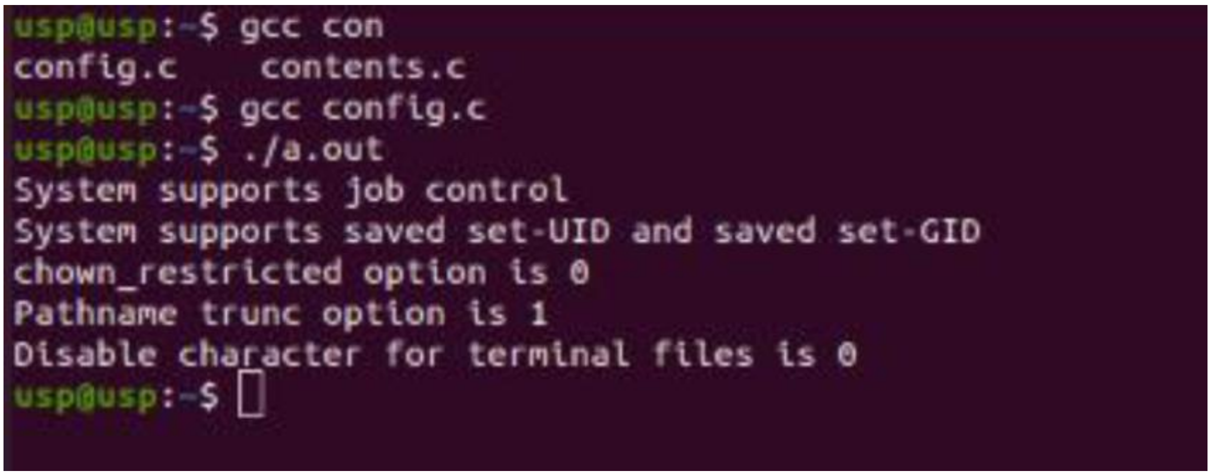


```
usp@usp:~$ gcc link.c
usp@usp:~$ ./a.out ex.c ac
Hard link created
usp@usp:~$ ls -l ex.c ac
-rw-rw-r-- 3 usp usp 63 Jan 10 15:13 ac
-rw-rw-r-- 3 usp usp 63 Jan 10 15:13 ex.c
usp@usp:~$ ./a.out -s ex.c ad
Symbolic link created
usp@usp:~$ ls -l ad
lrwxrwxrwx 1 usp usp 4 Jan 21 19:08 ad -> ex.c
usp@usp:~$ 
```

19. Write a C/C++ POSIX compliant program that prints the POSIX defined configuration options supported on any given system using feature test macros.

PROGRAM

```
#define _POSIX_SOURCE
#define _POSIX_C_SOURCE 199309L
#include&lt;stdio.h&gt;
#include&lt;unistd.h&gt;
int main()
{
#ifdef _POSIX_JOB_CONTROL
printf(&quot;System supports job control\n&quot;);
#else
printf(&quot;System does not support job control \n&quot;);
#endif
#ifdef _POSIX_SAVED_IDS
printf(&quot;System supports saved set-UID and saved set-GID\n&quot;);
#else
printf(&quot;System does not support saved set-UID and saved set-GID \n&quot;);
#endif
#ifdef _POSIX_CHOWN_RESTRICTED
printf(&quot;chown_restricted option is %d\n”,
_POSIX_CHOWN_RESTRICTED);
#else
printf(&quot;System does not support chown_restricted option \n&quot;);
#endif
#ifdef _POSIX_NO_TRUNC
printf(&quot;Pathname trunc option is %d\n&quot;,_POSIX_NO_TRUNC);
#else
printf(&quot;System does not support system-wide pathname trunc option \n&quot;);
#endif
#ifdef _POSIX_VDISABLE
printf(&quot;Disable character for terminal files is %d\n&quot;,
_POSIX_VDISABLE);
#else
printf(&quot; System does not support _POSIX_VDISABLE \n&quot;);
#endif
return 0;
}
```



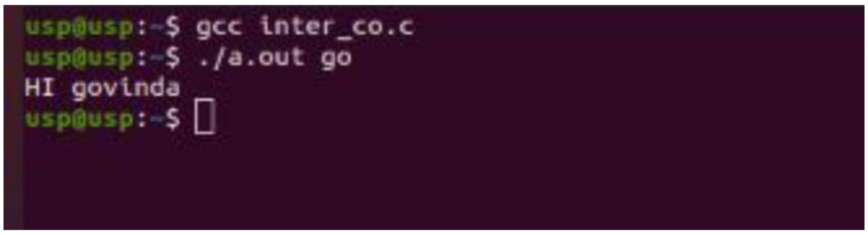
```
usp@usp:~$ gcc con
config.c    contents.c
usp@usp:~$ gcc config.c
usp@usp:~$ ./a.out
System supports job control
System supports saved set-UID and saved set-GID
chown_restricted option is 0
Pathname trunc option is 1
Disable character for terminal files is 0
usp@usp:~$ 
```

20.Write a C/C++ program which demonstrates interprocess communication between a reader

process and a writer process. Use mkfifo, open, read, write and close APIs in your program.

PROGRAM:

```
#include&lt;sys/types.h&gt;
#include&lt;unistd.h&gt;
#include&lt;fcntl.h&gt;
#include&lt;sys/stat.h&gt;
#include&lt;string.h&gt;
#include&lt;errno.h&gt;
#include&lt;stdio.h&gt;
int main(int argc, char* argv[])
{
int fd;
char buf[256];
if(argc != 2 &amp;&amp; argc != 3)
{
printf(&quot;USAGE %s &lt;file&gt; [&lt;arg&gt;]\n&quot;,argv[0]);
return 0;
}
mkfifo(argv[1],S_IFIFO | S_IRWXU | S_IRWXG | S_IRWXO );
if(argc == 2) //reader process
{
fd = open(argv[1], O_RDONLY|O_NONBLOCK);
while(read(fd, buf, sizeof(buf)) &gt; 0)
printf(&quot;%s&quot;,buf);
}
else
{
fd = open(argv[1], O_WRONLY);
write(fd,argv[2],strlen(argv[2]));
}
close(fd);
}
```



```
usp@usp:~$ gcc inter_co.c
usp@usp:~$ ./a.out go
HI govinda
usp@usp:~$ 
```