VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.

LAB REPORT
on

UNIX SHELL AND PROGRAMMING

Submitted by

ANUSHREE HARRISH (1BM20CS020)

in partial fulfillment for the award of the degree of
BACHELOR OF ENGINEERING
in
COMPUTER SCIENCE AND ENGINEERING

B.M.S. COLLEGE OF ENGINEERING
(Autonomous Institution under VTU)
BENGALURU-560019
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B. M. S. College of Engineering,

Bull Temple Road, Bangalore 560019

(Affiliated To Visvesvaraya Technological University, Belgaum)

Department of Computer Science and Engineering

CERTIFICATE

This is to certify that the Lab work entitled "LAB COURSE **UNIX SHELL AND PROGRAMMING**" carried out by **ANUSHREE HARRISH (1BM20CS020),** who is bonafide student of **B. M. S. College of Engineering.** It is in partial fulfillment for the award of **Bachelor of Engineering in Computer Science and Engineering** of the Visvesvaraya Technological University, Belgaum during the year 2022. The Lab report has been approved as it satisfies the academic requirements in respect of a **Unix Shell and Programming - (20CS5PCUSP)** work prescribed for the said degree.

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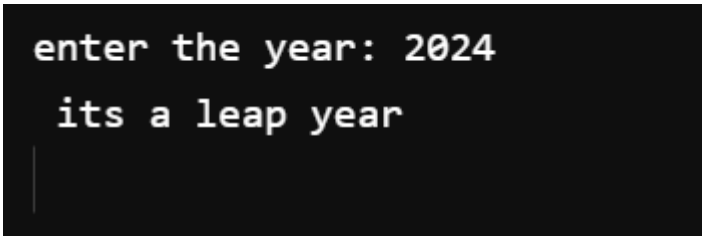
Experiment No 1

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

```
#!/bin/bash
echo "Enter an Year: "
read year
if [ $((year % 4)) -eq 0 ]
then
  if [ $((year % 100)) -eq 0 ]
    then
    if [ $((year % 400)) -eq 0 ]
          then
        echo "$year is a leap year"
    else
          echo "$year is not a leap year"
    fi
  else
  echo "$year is a leap year"
  fi
else
 echo "$year is not a leap year"
fi
```

Output

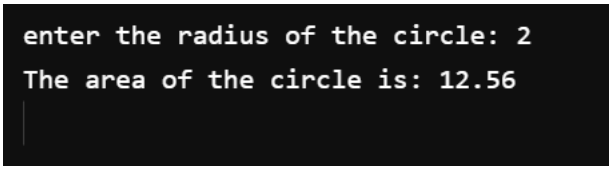


Experiment No 2

Shell script to find the area of a circle

```
#!/bin/bash
echo "\nEnter the radius of a circle : "
read r
d=$(echo "scale=2;2 * $r"| bc) #Diameter
area=$(echo "scale=2; 22/7 * ($r * $r)" | bc)
circumference=$(echo "scale=2; 22/7 * $d"| bc)
echo "\nArea of circle is : $area"
echo "\nCircumference of circle is : $circumference \n"
```

Output

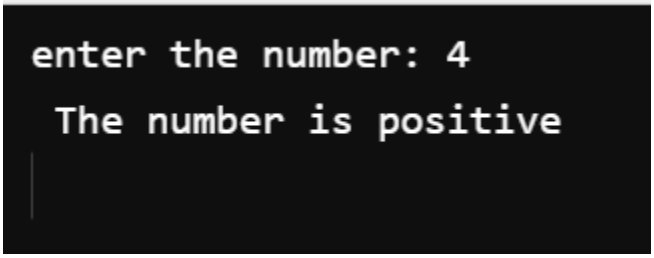


Experiment No 3

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

```
#!/bin/bash
echo "Enter the number : "
read num
if [ $num -gt 0 ]
then
    echo "$num is positive"
elif [ $num -lt 0 ]
then
    echo "$num is negative"
else
    echo "$num is zero"
fi
```

Output

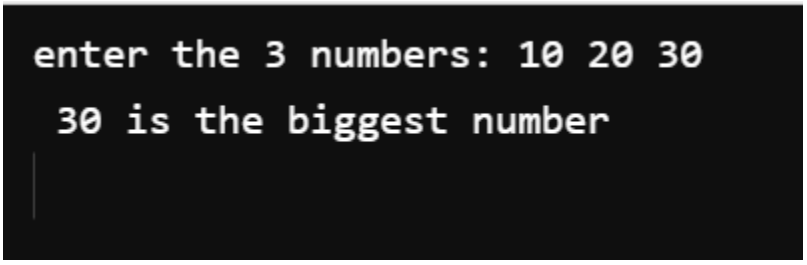


Experiment No 4

Shell script to find the biggest of three numbers

```
#!/bin/bash
echo "Enter first number : "
read num1
echo "Enter second number : "
read num2
echo "Enter third number : "
read num3
if [ $num1 -gt $num2 ] && [ $num1 -gt $num3 ]
then
    echo "\n$num1 is the greatest"
elif [ $num2 -gt $num1 ] && [ $num2 -gt $num3 ]
then
    echo "\n$num2 is the greatest"
else
    echo "\n$num3 is the greatest"
fi
```

Output

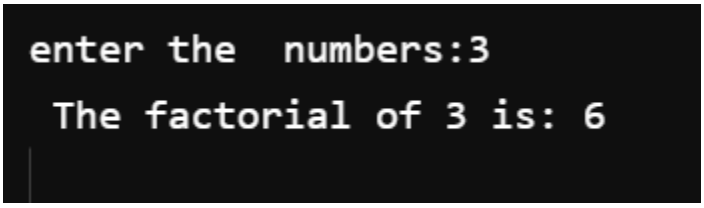


Experiment No 5

Shell script to find the factorial of a number

```
#!/bin/bash
echo "ENTER THE NUMBER: "
read n
fact=1
while [ $n -gt 1 ]
do
   fact=$(( fact * n))
   n=$((n-1 ))
done
echo "FACTORIAL IS: "
echo $fact
```

Output

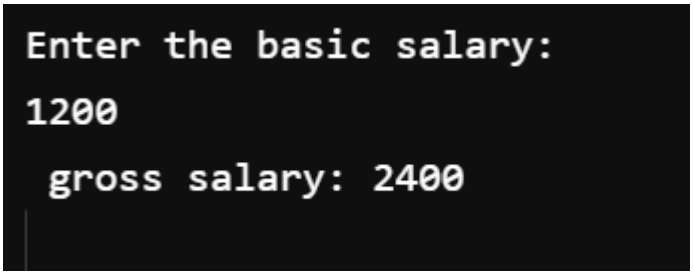


Experiment No 6

Shell script to compute the gross salary of an employee

```
#!/bin/bash
echo "\nEnter name of Employee :"
read name
echo "\nEnter DA :"
read da
echo "\nEnter HRA:"
read hra
echo "\nEnter basic"
read basic
sal=$(( $da + $hra + $basic ))
echo "\nGross Salary of $name is $sal"
```

Output



Experiment No 7

Shell script to convert the temperature Fahrenheit to Celsius

```
#!/bin/bash
echo "Enter temperature in F : "
read f
c=$(echo "scale=2;(5/9)*($f-32)"|bc)
echo "$f °F = $c °C"
```

Output:

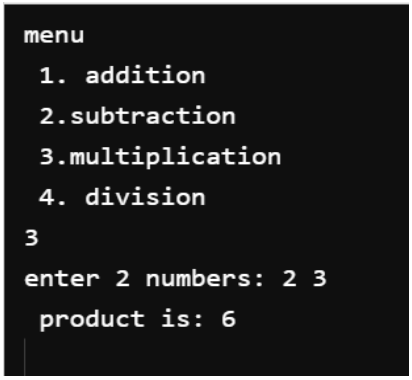
```
“Enter the Fahrenheit temp”
150
65
```

Experiment No 8

Shell script to perform arithmetic operations on given two numbers

```
#!/bin/bash
echo "Enter 2 Numbers : "
read a
read b
echo "Enter Operation : \n"
echo "1) Addition"
echo "2) Subtraction"
echo "3) Multiplication"
echo "4) Division(Quotient)"
echo "5) Modulus(Remainder)\n"
read op
case $op in
   1)echo "scale=3; $a + $b" | bc -l  ;;
   2)echo "scale=3; $a - $b" | bc -l ;;
   3)echo "scale=3; $a \* $b" | bc -l ;;
   4)echo "scale=3; $a / $b" | bc -l ;;
   5)echo "scale=3; $a % $b" | bc -l ;;
   *)echo "Choose a valid option"
esac
```

Output



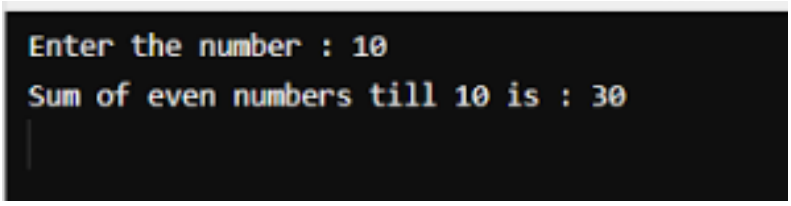
Experiment No 9

Shell script to find the sum of even numbers upto n

Program:

```
#!/bin/bash
sum=0
read -p "Enter maximum limit of Even Numbers : " m
for ((i = 0; i < m; i++)); do
    if [[ $i%2 -eq 0 ]]; then
        sum=$(expr $sum + $i)
    fi
done
echo $sum
```

Output



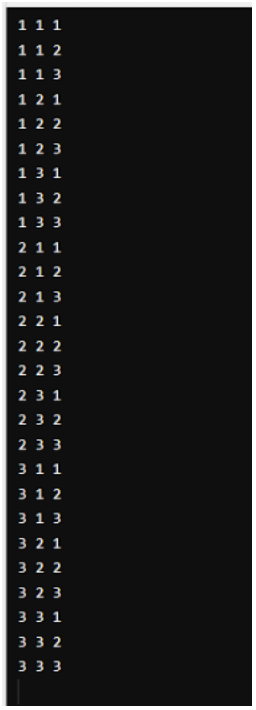
Experiment No 10

Shell script to print the combinations of numbers 123

Program:

```
#!/bin/bash
echo "Combinations for 123 :"
for ((i = 1; i <= 3; i++)); do
    for ((j = 1; j <= 3; j++)); do
        for ((k = 1; k <= 3; k++)); do
            echo $i $j $k
        done
    done
done
```

Output



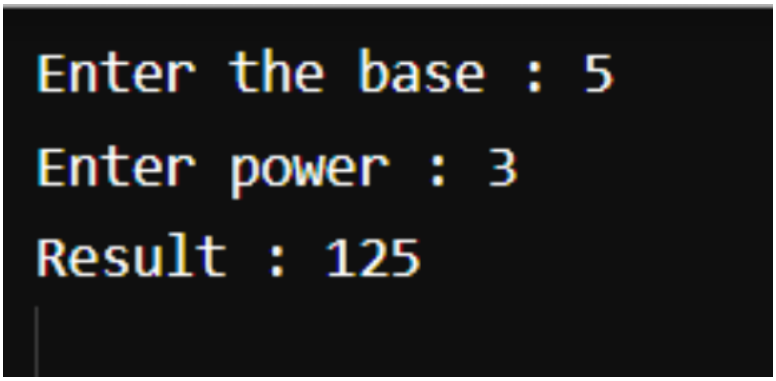
Experiment No 11

Shell script to find the power of a number

Program:

```
#!/bin/bash
echo "Enter base"
read a
echo "Enter power"
read b
res=1
for ((i = 1; i <= b; i++)); do
    res=`expr $res \* $a`
done
echo $res
```

Output



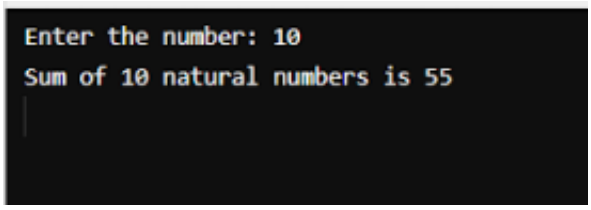
Experiment No 12

Shell script to find the sum of n natural numbers

Program:

```
#!/bin/bash
echo "Enter a number"
read n
i=1
sum=0
while [ $i -le $n ]
  do
   echo "$i"
   sum=$(( $sum + $i ))
       i=$(( $i + 1 ))
  done
echo "Sum=$sum"
```

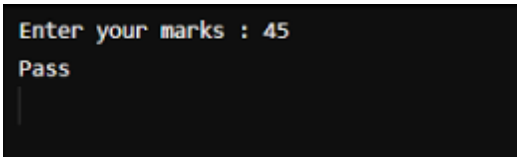
Output



Experiment No 13

Shell script to display the pass class of a student

```
#!/bin/bash
echo "Enter m1:\c and Enter m2:\c "
read m1
echo "Enter m3:\c"
read m3
echo "Enter m4:\c"
read m4
echo "Enter m5:\c"
read m5
tot=`expr $m1 + $m2 + $m3 + $m4 + $m5`;
avg=`expr $tot / 5`;
echo "total : $tot \n avg : $avg"
if [ $avg -gt 85 ];then
echo " Grade: Distinction "
elif [ $avg -gt 65 ];then
echo " Grade: First Class "
elif [ $avg -gt 50 ];then
echo " Grade: Second Class  "
elif [ $avg -gt 35 ];then
echo " Grade: Pass "
else echo " Grade: Fail"
fi
```



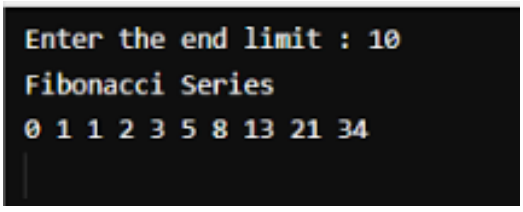
Experiment No 14

Shell script to find the Fibonacci series up to n

Program:

```
#!/bin/bash
read N
a=0
b=1
echo "The Fibonacci series is : "
for (( i=0; i<N; i++ ))
do
    echo "$a"
    fib=$((a + b))
    a=$b
    b=$fib
done
```

Output



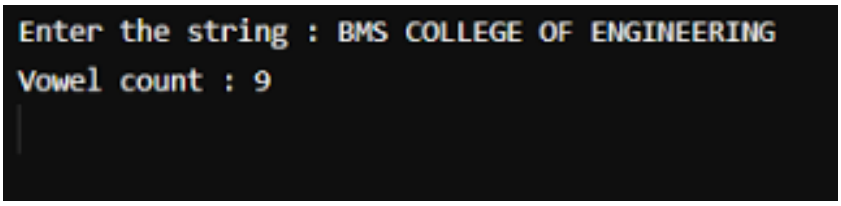
Experiment No 15

Shell script to count the number of vowels of a string

Program:

```
#!/bin/bash
echo "enter filename"
read filename
vowels=`cat $filename | tr -cd 'aeiouAEIOU' | wc -c`
echo "Number of vowels in $filename: $vowels"
```

Output

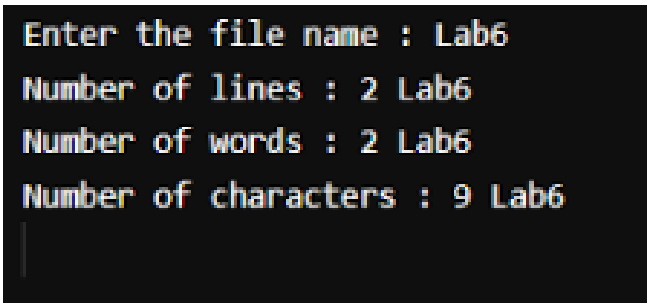


Experiment No 16

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

```
#!/bin/bash
echo "Enter the filename or path to proceed"
read filename
words=`wc -w $filename`
lines=`wc -l $filename`
chars=`wc -c $filename`
echo "Words is $words"
echo "Lines is $lines"
echo "Characters is $chars"
```

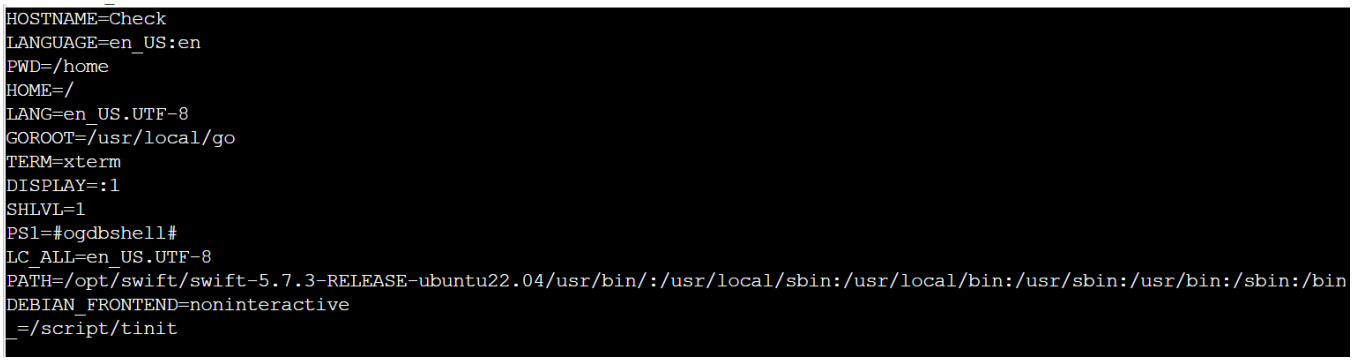
Output



Experiment No 17

Write a C/C++ program to that outputs the contents of its environment list

```
#include&lt;stdio.h&gt;
#include&lt;unistd.h&gt;
int main(int argc,char *argv[])
{
char **ptr;
extern char **environ;
for(ptr=environ; *ptr; ptr++)
printf(&quot;%s\n&quot;,*ptr);
return 0;
}
```



Experiment No 18

Write a C/C++ program to emulate the Unix ln command

```
#include<unistd.h>
#include<stdio.h>
#include<string.h>
int main(int argc , char * argv[])
{
	if(argc<3 || argc>4)
	{
		printf("Error in usage\n");
		return -1;
	}
	if(argc==4 && strcmp(argv[1],"-s")!=0)
	{
		printf("for symbolic link use -s option");
		return -1;
	}
	if(argc==4 && access(argv[2] , F_OK)==-1)
	{
		printf("Source file does not exist");
		return -1;
	}
	if(argc==3 && access(argv[1] , F_OK)==-1)
	{
		printf("Source file does not exist");
		return -1;
	}
	if(argc==4)
	{
		symlink(argv[2] , argv[3]);
		printf("Symbolic link is created");
		return 0;
	}
	if(argc==3)
	{
		link(argv[1] , argv[2]);
		printf("Hard link is created");
		return 0;
	}
}
```

```
Hard link is created
```

Experiment No 19

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

```
#define _POSIX_SOURCE
#define _POSIX_C_SOURCE 199309L
#include&lt;iostream&gt;
#include&lt;unistd.h&gt;
int main()
{
using namespace std;
#ifdef _POSIX_JOB_CONTROL
cout&lt;&lt;&quot;System Supports Job Control feature&quot;&lt;&lt;endl;
#else
cout&lt;&lt;&quot;System doesnot support job control\n&quot;;
#endif
#ifdef _POSIX_SAVED_IDS
cout&lt;&lt;&quot;System Supports saved set-UID and saved set-GID&quot;&lt;&lt;endl;
#else
cout&lt;&lt;&quot;System doesnot support saved set-UID\n&quot;;
#endif
#ifdef _POSIX_CHOWN_RESTRICTED
cout&lt;&lt;&quot;System Supports Change Ownership feature:&quot;&lt;&lt;endl;
#else
cout&lt;&lt;&quot;System doesnot support change Ownership feature\n&quot;;
#endif
#ifdef _POSIX_NO_TRUNC
cout&lt;&lt;&quot;System Supports Path truncation option:&quot;&lt;&lt;endl;
#else
```

```
cout&lt;&lt;&quot;System doesnot support Path truncation \n&quot;;
#endif
#ifdef _POSIX_VDISABLE
cout&lt;&lt;&quot;System Supports Disable Character for files:&quot;&lt;&lt;endl;
#else
cout&lt;&lt;&quot;System doesnot support Disable Characters \n&quot;;
#endif
return 0;
```

Experiment No 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.

```
#include <sys/stat.h>
        #include <string.h>
        #include <fcntl.h>
        #include <stdio.h>
        #include <unistd.h>
        int main(int argc, char *argv[])
        {
        char buf[100];
        int fd,n;
        mkfifo (argv[1], S_IFIFO |0777);
        if (argc == 3){
        fd =  open (argv[1], O_WRONLY);
        write (fd, argv[2], strlen(argv[2]));
        close(fd);}
        if (argc ==2){
        fd = open (argv[1], O_RDONLY);
        n= read (fd, buf, sizeof(buf));
        buf[n]='\0';
        printf ("%s", buf);
        close(fd);
        }
```

```
$ cc interprocess.c
$ ./a.out interprocess 5th semester
[1] 3801
 $ ./a.out interprocess
 5th semester[1]+ Done
```