VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.

LAB REPORT
on

UNIX SHELL AND PROGRAMMING

Submitted by

EKTHA KARTHIK(1BM20CS045)

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
October-2022 to Feb-2023

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 **EKTHA KARTHIK(1BM20CS045),** 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.

Madhavi R P
Assistant Professor
Department of CSE
BMSCE, Bengaluru

Dr. Jyothi S Nayak
Professor and Head
Department of CSE
BMSCE, Bengaluru

Index

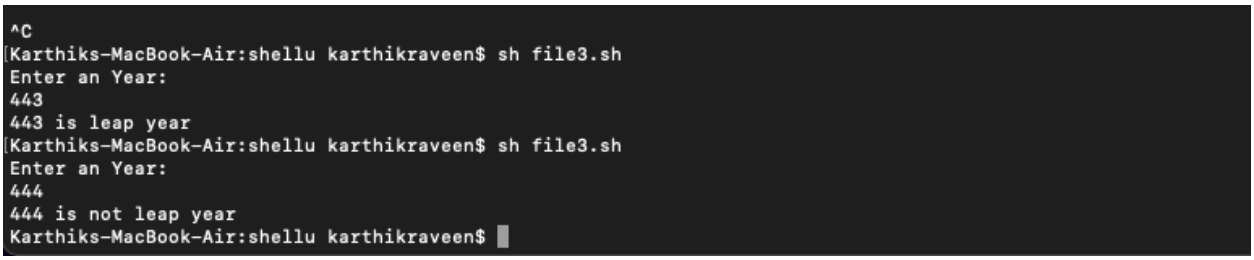
Experiment 1

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

Program

```
#!/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 – Screen shot

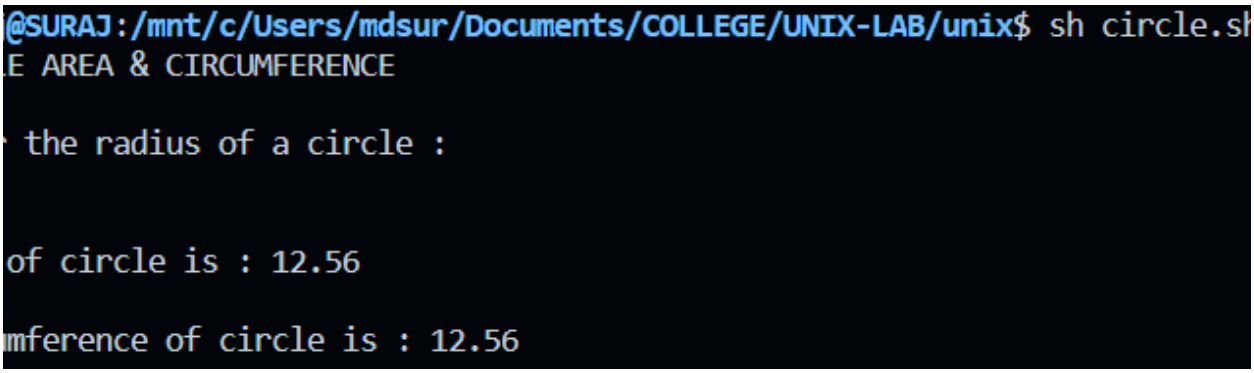


Experiment 2

Shell script to find the area of a circle

```
echo "CIRCLE AREA & CIRCUMFERENCE"

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 – Screen shot



Experiment 3

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

```
echo "\n---------------Pos Neg Zero---------------\n"

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
```

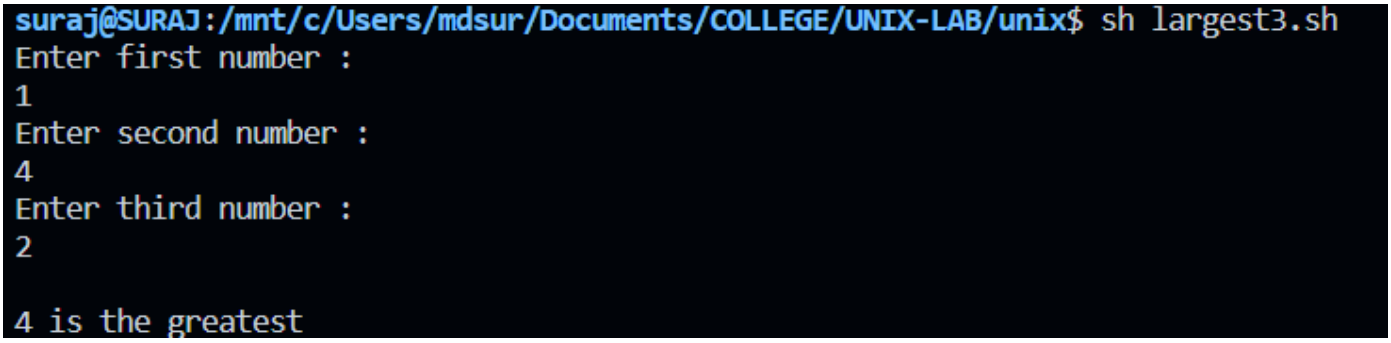
Output – Screen shot

Experiment 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 – Screen shot

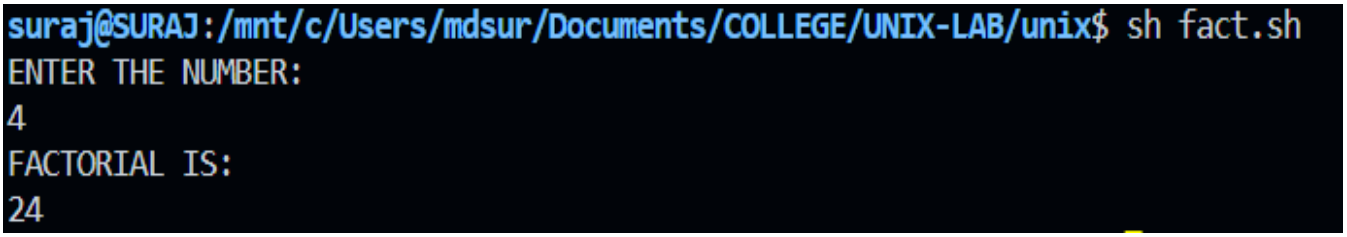


Experiment 5

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 – Screen shot

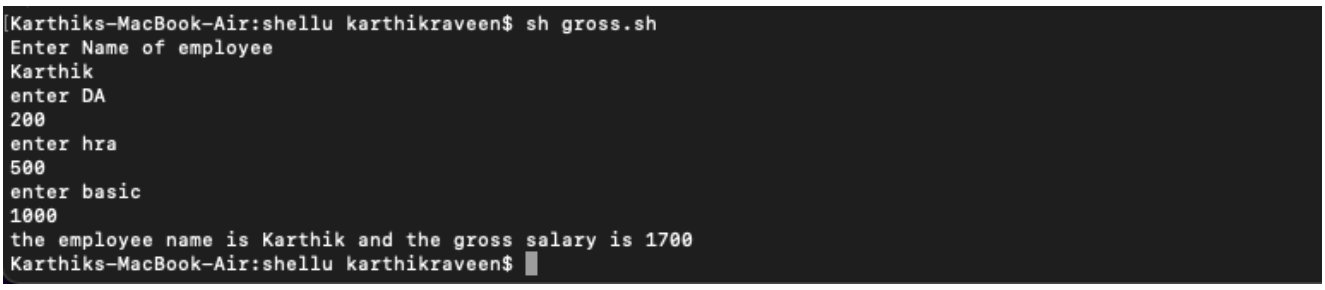


Experiment 6

Shell script to compute the gross salary of an employee

```
echo "\n---------------EMPLOYEE---------------\n"

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 – Screen shot

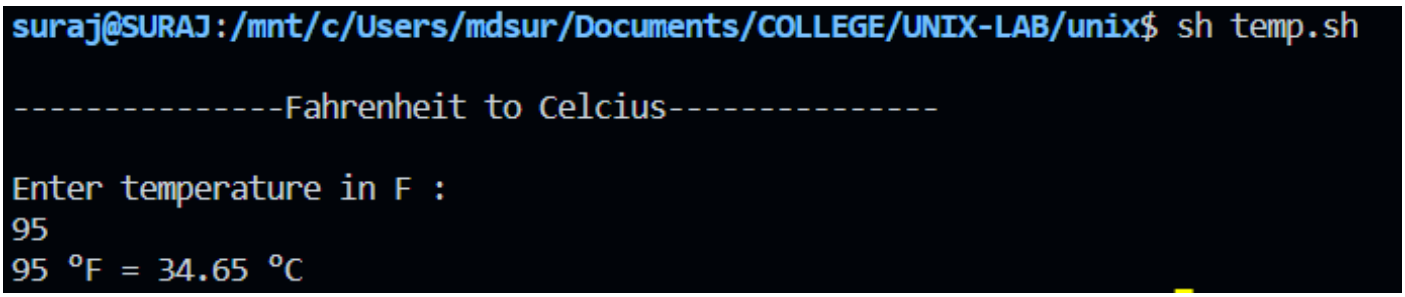


Experiment 7

Shell script to convert the temperature Fahrenheit to Celsius

```
echo "\n----------Fahrenheit to Celcius----------\n"

echo "Enter temperature in F : "
read f

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

Output – Screen shot

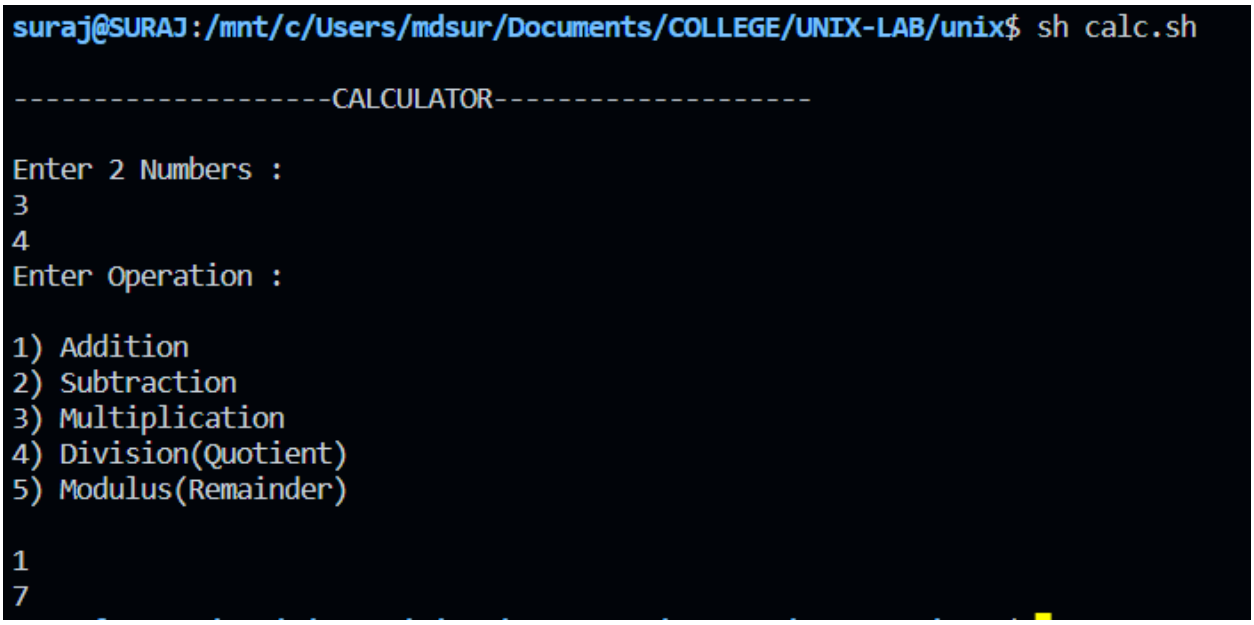


Experiment 8

Shell script to perform arithmetic operations on given two numbers

```
echo "\n--------------------CALCULATOR--------------------\n"

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 – Screen shot

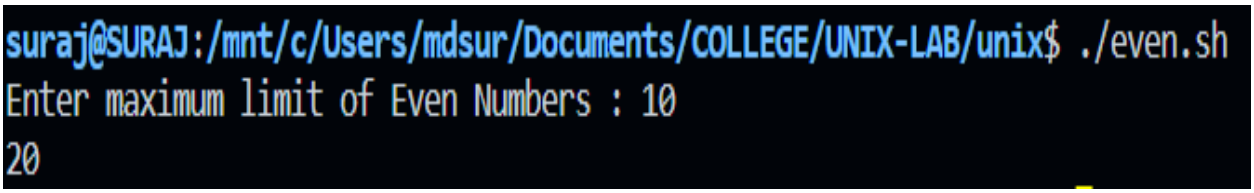


Experiment 9

Shell script to find the sum of even numbers upto n

```
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 – Screen shot



Experiment 10

Shell script to print the combinations of numbers 123

```
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 – Screen shot

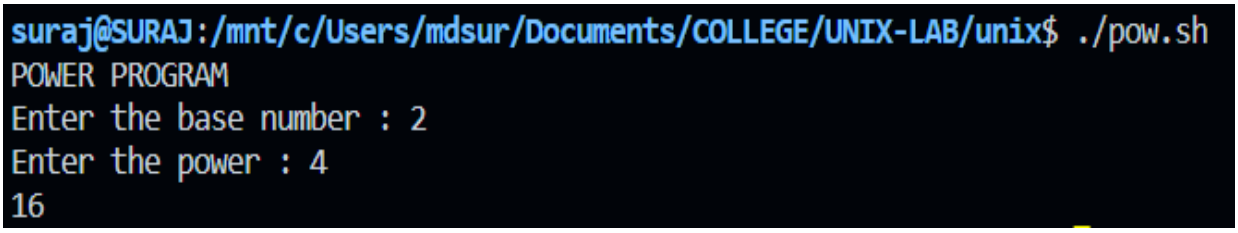
```
suraj@SURAJ:/mnt/c/Users/mdsur/Documents/COLLEGE/UNIX-LAB/unix$ sh combi.sh
1 2 2
1 2 3
1 3 1
1 3 2
1 3 3
2 1 1
2 1 2
2 1 3
2 2 1
2 2 2
2 2 3
2 3 1
2 3 2
2 3 3
3 1 1
3 1 2
3 1 3
3 2 1
3 2 2
3 2 3
3 3 1
3 3 2
3 3 3
```

Experiment 11

Shell script to find the power of a number

```
echo "POWER PROGRAM"
read -p "Enter the base number : " a
read -p "Enter the power : " b

res=1

for ((i = 1; i <= b; i++)); do
   res=$(expr $res \* $a)
done

echo $res
```

Output – Screen shot

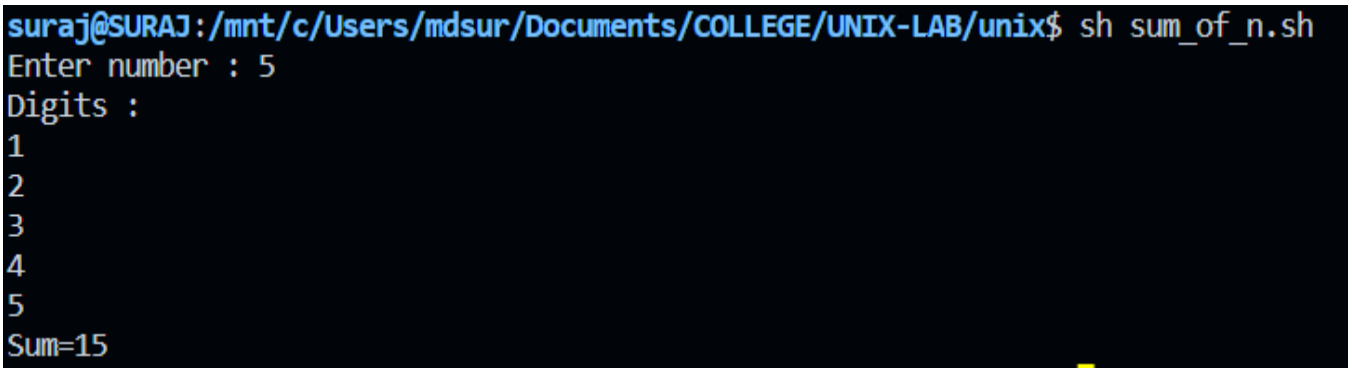


Experiment 12

Shell script to find the sum of n natural numbers

```
read -p "Enter number : " n

i=1
sum=0
echo "Digits : "
while [ $i -le $n ]
  do
   echo "$i"
   sum=$(( $sum + $i ))
       i=$(( $i + 1 ))
  done
echo "Sum=$sum"
```

Output – Screen shot

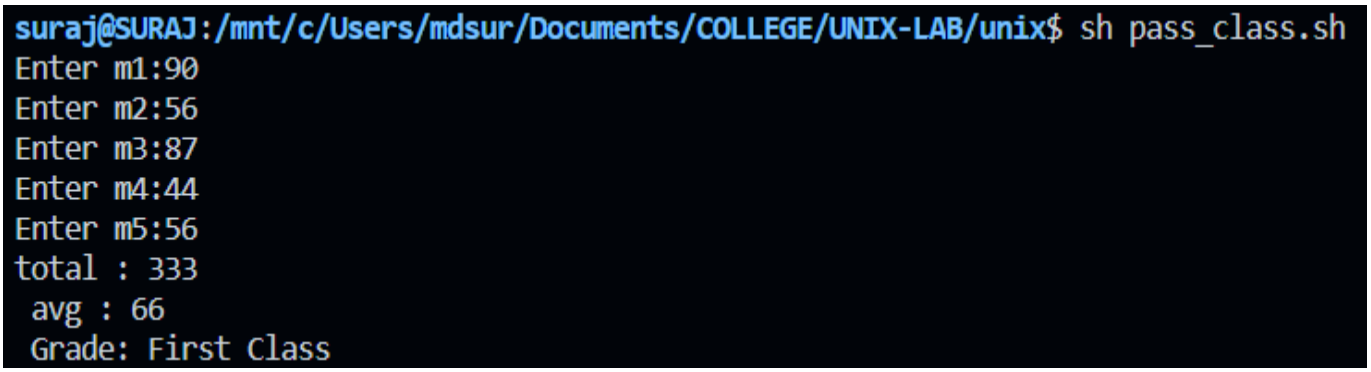


Experiment 13

Shell script to display the pass class of a student

```
echo "Enter m1:\c"
read m1
echo "Enter m2:\c"
read m2
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
```

Output – Screen shot

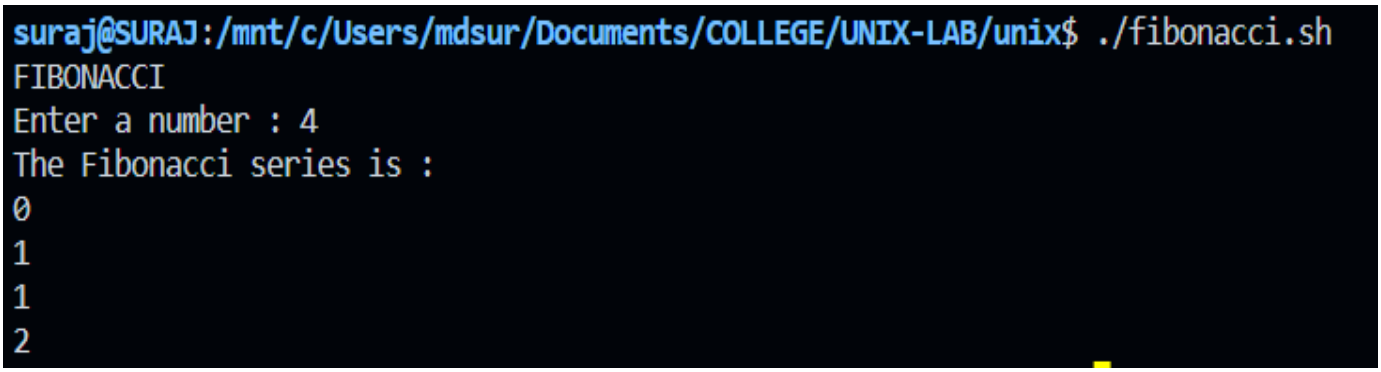


Experiment 14

Shell script to find the Fibonacci series up to n

```
echo "FIBONACCI"
read -p "Enter a number : " 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 – Screen shot

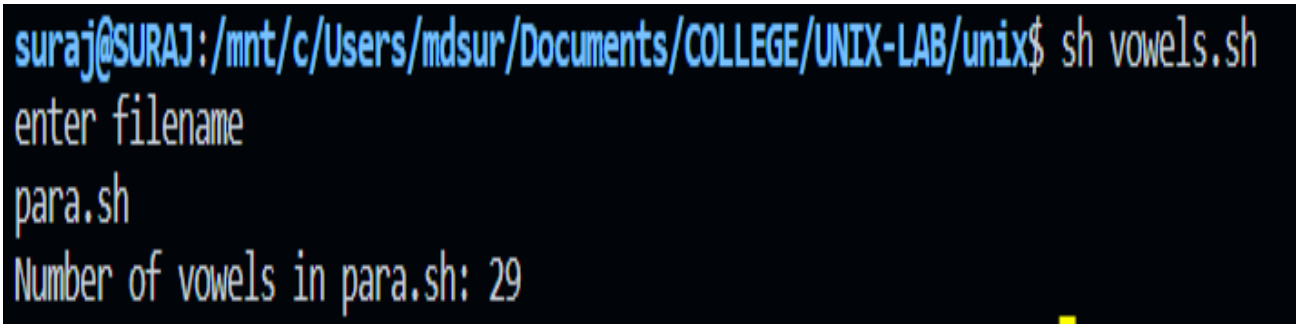


Experiment 15

Shell script to count the number of vowels of a string

```
echo "enter filename"
read filename

vowels=`cat $filename | tr -cd 'aeiouAEIOU' | wc -c`

echo "Number of vowels in $filename: $vowels"
```

Output – Screen shot

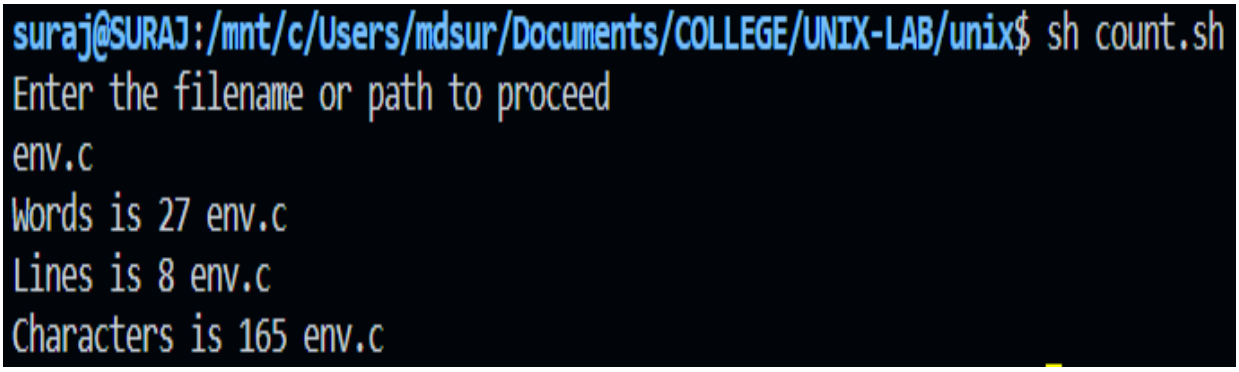


Experiment 16

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 – Screen shot

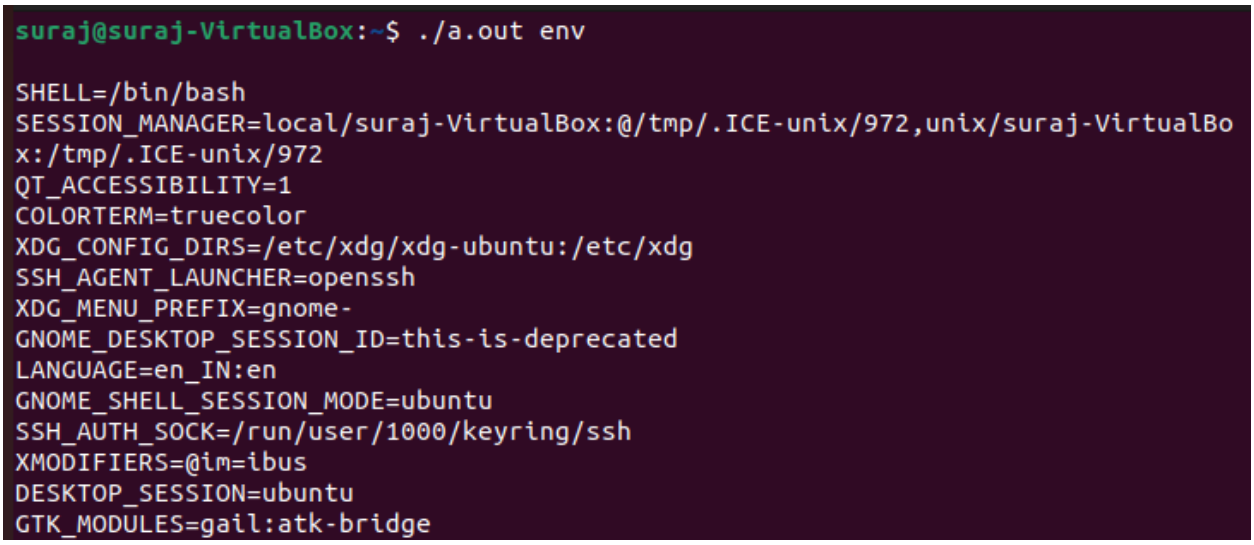


Experiment 17

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

```
#include<stdio.h>
int main(int argc, char *argv[], char * envp[])
{
int i;
for (i = 0; envp[i] != NULL; i++)
printf("\n%s", envp[i]);
getchar();
return 0;
}
```

Output – Screen shot



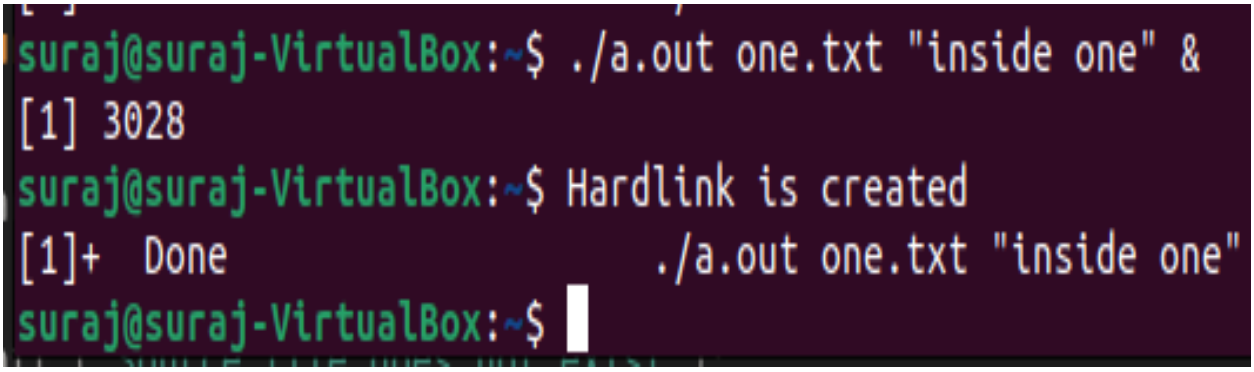
Experiment 18

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

```
#include <stdio.h>
#include <unistd.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("Hardlink is created");
return 0;
}
return 0;
}
```

Output – Screen shot



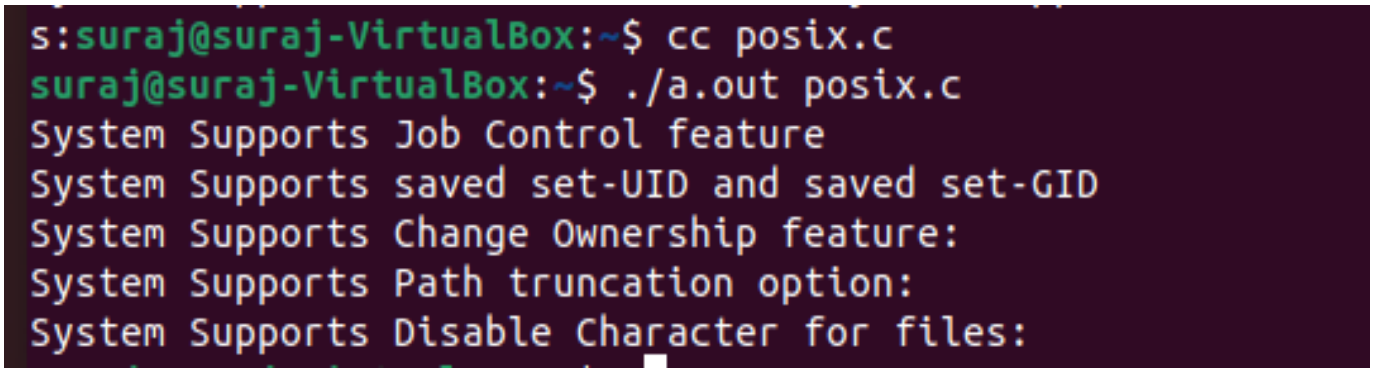
Experiment 19

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<unistd.h>
#include<stdio.h>
int main()
{
#ifdef _POSIX_JOB_CONTROL
printf("System Supports Job Control feature\n");
#else
printf("System doesnot support job control\n");
#endif
#ifdef _POSIX_SAVED_IDS
printf("System Supports saved set-UID and saved set-GID\n");
#else
printf("System doesnot support saved set-UID\n");
#endif
#ifdef _POSIX_CHOWN_RESTRICTED
printf("System Supports Change Ownership feature:\n");
#else
printf("System doesnot support change Ownership feature\n");
#endif
#ifdef _POSIX_NO_TRUNC
printf("System Supports Path truncation option:\n");
#else
printf("System doesnot support Path truncation \n");
#endif
```

```
#ifdef _POSIX_VDISABLE
printf("System Supports Disable Character for files:\n");
#else
printf("System doesnot support Disable Characters \n");
#endif
return 0;
}
```

Output – Screen shot



Experiment 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);
}
}
```

Output – Screen shot