Shell Programming

Experiment No : 2 Date :-

Aim :- To implement the following shell programs:

(a) Print prime numbers from 1-50 and generate its sum

(b) Count numbers of files in a directory

(c) Find area of rectangle, square and circle

(d) Root of quadratic equation

(e) Menu driven program:

   i) Display present working directory

   ii) Display users of the system

   iii) Display calendar of year input through keyboard

Theory :

Shell script

A shell script is a computer program written in a scripting language that is interpreted by a command-line shell. The primary purpose of a shell script is to automate tasks and execute a series of commands in a specific sequence.

1) If else statement
   if-else statement in shell programming is a control structure used for making decisions based on certain conditions. It allows you to execute different blocks of code depending on whether a given condition is true or false.

   Syntax :

```
if [ condition is true ]
then
   # Commands to execute if the condition is true
else
   # Commands to execute if the condition is false
fi
```

Example :

```
echo "Please enter your age: "
read age
if [ "$age" -ge 18 ]; then
   echo "You are an adult."
else
   echo "You are a minor."
fi
```

2) while loop

   while loop is used to repeatedly execute a block of code as long as a certain condition is true.

   Syntax :

```
while [ condition is true ]
do
   # Commands to execute if the condition is true
done
```

Example :

```
counter=1
while [ $counter -le 5 ]
do
   echo $counter
   ((counter++))
Done
```

3) for loop

   for loop is used to iterate over a sequence of values (usually a list of items) and perform a set of commands for each value in the sequence.

   Syntax :

```
for i in {1..n}                        for((c = 1; c <= n; c++))
do                                     do
   # Commands to execute                  # Commands to execute
done                                   done
```

Example :

```
n=5
for i in {1..$n}
do
   echo "Iteration $i"
done
```

4) case statement

   case statement is used for conditional branching based on the value of a variable. It is a more versatile alternative to using multiple if statements when you have several different cases to handle.

   Syntax :

```
case expression in
pattern1)
      # Code to execute if variable matches pattern1
      ;;
   pattern2)
      # Code to execute if variable matches pattern2
      ;;
   pattern3)
      # Code to execute if variable matches pattern3
      ;;
   *)
      # Code to execute if variable matches none of the patterns
      ;;
Esac
```

Example :

```
echo "Enter a number between 1 and 3: "
read number
case $number in
   1)
      echo "You selected one."
      ;;
   2)
      echo "You selected two."
      ;;
```

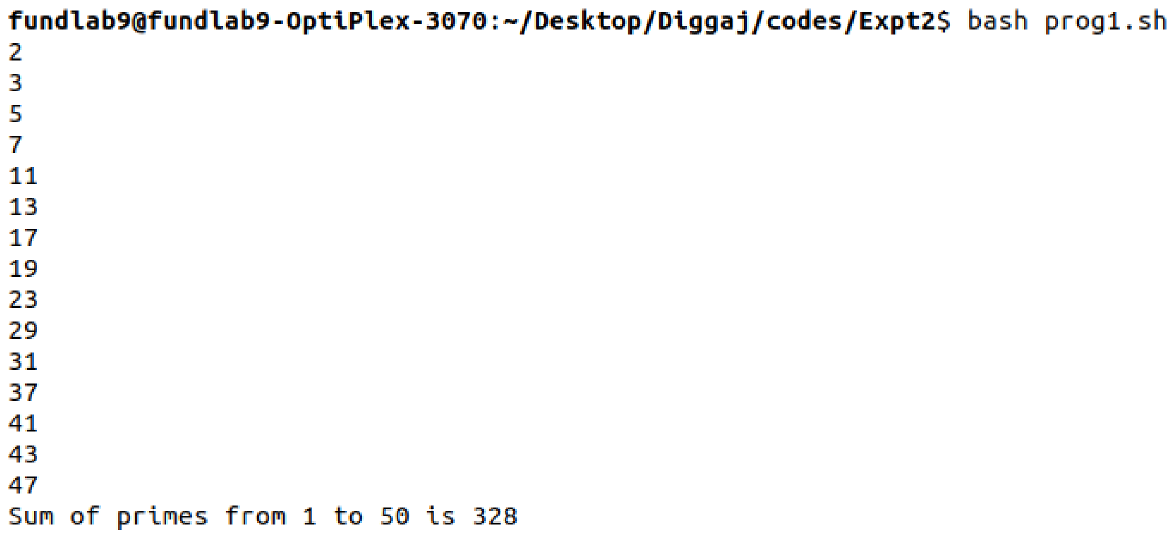
```
    3)
      echo "You selected three."
      ;;
    *)
      echo "Invalid input. Please enter a number between 1 and 3."
      ;;
  esac
```

Code

Program 1:

```
for num in {1..50}
do
if [ $num -eq 1 ]; then
continue
fi
is_prime=true
for ((i=2; i*i<=num; i++))
do
if [ $((num % i )) -eq 0 ];
then
is_prime=false
break
fi
done
if $is_prime
then
echo $num
sum=$(($sum+$num))
fi
done
echo "Sum of primes from 1 to 50 is $sum"
```

Output 1:

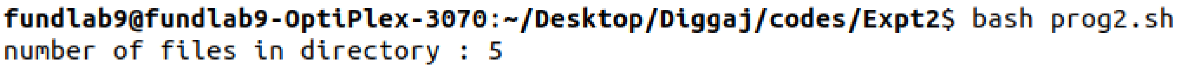


```
fundlab9@fundlab9-OptiPlex-3070:~/Desktop/Diggaj/codes/Expt2$ bash prog1.sh
2
3
5
7
11
13
17
19
23
29
31
37
41
43
47
Sum of primes from 1 to 50 is 328
```

Program 2:

```
directory="/home/fundlab9/Desktop/Diggaj/codes/Expt2"

count=$(ls -l $directory| grep ^- | wc -l)

echo "number of files in directory : $count"
```

Output 2:

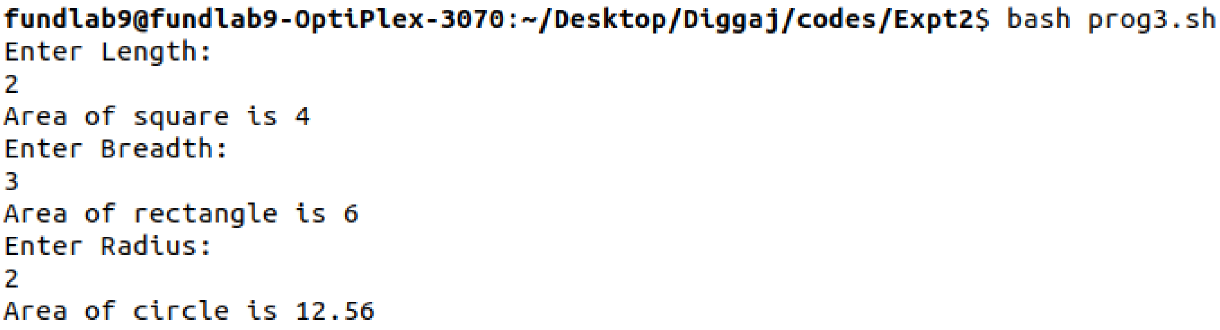


```
fundlab9@fundlab9-OptiPlex-3070:~/Desktop/Diggaj/codes/Expt2$ bash prog2.sh
number of files in directory : 5
```

Program 3:

```
echo "Enter Length:"

read l

squ=$((l * l))

echo "Area of square is $squ"

echo "Enter Breadth:"

read b

rec=$((l * b))

echo "Area of rectangle is $rec"

echo "Enter Radius:"

read r

pi=3.14

cir=$(echo "$pi * $r * $r" | bc)

echo "Area of circle is $cir"
```

Output 3:

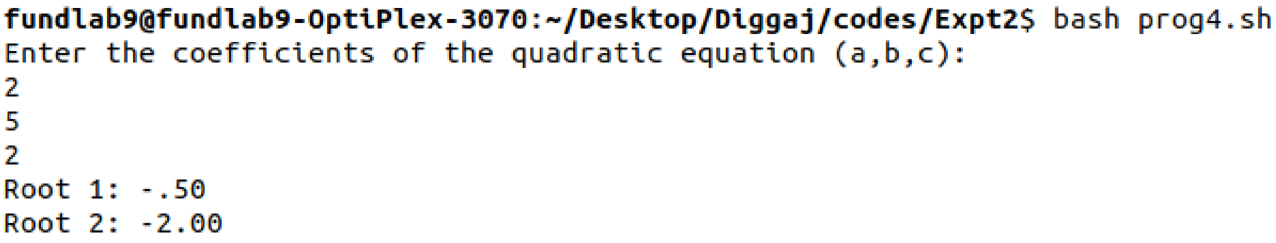


```
fundlab9@fundlab9-OptiPlex-3070:~/Desktop/Diggaj/codes/Expt2$ bash prog3.sh
Enter Length:
2
Area of square is 4
Enter Breadth:
3
Area of rectangle is 6
Enter Radius:
2
Area of circle is 12.56
```

Program 4:

```
echo "Enter the coefficients of the quadratic equation (a,b,c):"

read a

read b

read c

d=$((b*b - 4*a*c))

if [ $d -gt 0 ]

then

root1=$(echo "scale=2; (-$b + sqrt($d)) / (2*$a)" | bc)

root2=$(echo "scale=2; (-$b - sqrt($d)) / (2*$a)" | bc)

echo "Root 1: $root1"

echo "Root 2: $root2"

else

if [ $d -eq 0 ]; then

  root1=$(echo "scale=2; -$b / (2*$a)" | bc)

  echo "Root: $root1"

else

  real=$(echo "scale=2; -$b / (2*$a)" | bc)

  imag=$(echo "scale=2; sqrt(-$d) / (2*$a)" | bc)

  echo "Root 1: $real + $imag i"

  echo "Root 2: $real - $imag i"

fi

fi
```

Output 4:



```
fundlab9@fundlab9-OptiPlex-3070:~/Desktop/Diggaj/codes/Expt2$ bash prog4.sh
Enter the coefficients of the quadratic equation (a,b,c):
2
5
2
Root 1: -.50
Root 2: -2.00
```

Program 5:

```
ch=1

while [ $ch -eq 1 ]

do

echo "\nMenu\n"

echo "1)Display present working directory\n2)Display users of the system\n3)Display calender of a year\n"

echo "Enter you choice "

read choice

case $choice in

1)echo $(pwd)

;;

2)echo $(who)

;;

3)echo "Enter the year"

read year

echo "\n"

echo $(cal $year)

;;

*)echo "Invaild Choice"

esac

echo "Do you want to continue(0 or 1)"

read ch

done
```

Output 5:

```
fundlab9@fundlab9-OptiPlex-3070:~/Desktop/Diggaj/codes/Expt2$ sh prog5.sh

Menu

1)Display present working directory
2)Display users of the system
3)Display calender of a year

Enter you choice
1
/home/fundlab9/Desktop/Diggaj/codes/Expt2
Do you want to continue(0 or 1)
1

Menu

1)Display present working directory
2)Display users of the system
3)Display calender of a year

Enter you choice
2
fundlab9 :0 2023-08-16 11:09 (:0)
Do you want to continue(0 or 1)
1

Menu

1)Display present working directory
2)Display users of the system
3)Display calender of a year

Enter you choice
3
Enter the year
2023

2023 January February March Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa Su Mo
Tu We Th Fr Sa 1 2 3 4 5 6 7 1 2 3 4 1 2 3 4 8 9 10 11 12 13 14 5 6 7 8 9 10
 11 5 6 7 8 9 10 11 15 16 17 18 19 20 21 12 13 14 15 16 17 18 12 13 14 15 16
 17 18 22 23 24 25 26 27 28 19 20 21 22 23 24 25 19 20 21 22 23 24 25 29 30
31 26 27 28 26 27 28 29 30 31 April May June Su Mo Tu We Th Fr Sa Su Mo Tu W
e Th Fr Sa Su Mo Tu We Th Fr Sa 1 1 2 3 4 5 6 1 2 3 2 3 4 5 6 7 8 7 8 9 10 1
1 12 13 4 5 6 7 8 9 10 9 10 11 12 13 14 15 14 15 16 17 18 19 20 11 12 13 14
15 16 17 16 17 18 19 20 21 22 21 22 23 24 25 26 27 18 19 20 21 22 23 24 23 2
4 25 26 27 28 29 28 29 30 31 25 26 27 28 29 30 30 July August September Su M
o Tu We Th Fr Sa Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa 1 1 2 3 4 5 1 2 2
 3 4 5 6 7 8 6 7 8 9 10 11 12 3 4 5 6 7 8 9 9 10 11 12 13 14 15 13 14 15 16
17 18 19 10 11 12 13 14 15 16 16 17 18 19 20 21 22 20 21 22 23 24 25 26 17 1
8 19 20 21 22 23 23 24 25 26 27 28 29 27 28 29 30 31 24 25 26 27 28 29 30 30
 31 October November December Su Mo Tu We Th Fr Sa Su Mo Tu We Th Fr Sa Su M
o Tu We Th Fr Sa 1 2 3 4 5 6 7 1 2 3 4 1 2 8 9 10 11 12 13 14 5 6 7 8 9 10 1
1 3 4 5 6 7 8 9 15 16 17 18 19 20 21 12 13 14 15 16 17 18 10 11 12 13 14 15
16 22 23 24 25 26 27 28 19 20 21 22 23 24 25 17 18 19 20 21 22 23 29 30 31 2
6 27 28 29 30 24 25 26 27 28 29 30 31
Do you want to continue(0 or 1)
0
```

Conclusion : Shell Programs (a), (b), (c), (d) and (e) were implemented successfully.