LAB-3- Shell Scripting

AM.EN.U4CSE20349
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Github : https://github.com/rajpatel8/OS-LAB-3

1. Write shell scripts for the following:
    a. To take your name, program name and enrolment number as input from user and print it on the screen.

Code :

```
#!/bin/bash
echo "Enter your Name : "
read Name
echo "Enter your Branch : "
read Branch
echo "Enter your enrolment number :"
read number
echo "============================"
echo "Hello, $Name"
echo "$Branch"
echo "$number"
echo "============================"
```

Output :

```
(base) rajpatel@Rajs-MacBook-Air LAB-3 % /bin/bash "/Users/rajpatel/Desktop
/OS/LAB-3/1-a.sh"
Enter your Name :
RAJ
Enter your Branch :
CSE
Enter your enrolment number :
AM.EN.U4CSE20349
============================
Hello, RAJ
CSE
AM.EN.U4CSE20349
============================
(base) rajpatel@Rajs-MacBook-Air LAB-3 %
```

b. To find the sum, the average and the product of four integers.

Code :

```
#!/bin/bash

echo "Enter the 1st number :"

read a

echo "Enter the 2nd number :"

read b

echo "Enter the 3rd number :"

read c

echo "Enter the 4th numbers :"

read d

echo "The sum is $((a+b+c+d))"

echo " "

sum=$((a+b+c+d))

div=`expr $sum / 4`

echo "The average is $div"
```

```
echo " "
c=`expr $a \* $b \* $c \* $d`
echo "The product is $c"
```

Output :

```
(base) rajpatel@Rajs-MacBook-Air LAB-3 % bash "/Users/rajpatel/Desktop/OS/LAB-3/1-b.sh"
Enter the 1st number :
1
Enter the 2nd number :
2
Enter the 3rd number :
4
Enter the 4th numbers :
5
The sum is 12

The average is 3

The product is 40
(base) rajpatel@Rajs-MacBook-Air LAB-3 %
```

c. Write a program to check whether a number is even or odd.

Code :

```
#!/bin/bash
echo "Enter the number :"
read n
if [ `expr $n % 2` == 0 ]
then
    echo "$n is an even number "
else
    echo "$n is an odd number "
fi
```

Output :

```
(base) rajpatel@Rajs-MacBook-Air LAB-3 % /bin/bash "/Users/rajpatel/Desktop/OS/LAB-3/1-c.s
h"
Enter the number :
17
17 is an odd number
(base) rajpatel@Rajs-MacBook-Air LAB-3 %
```

d. To exchange the values of two variables.

Code :

```
#!/bin/bash
echo "Enter the value of A"
read A
echo "Enter the value of B"
read B
C=$A
A=$B
B=$C
echo "A = $A"
echo "B = $B"
```

Output :

```
(base) rajpatel@Rajs-MacBook-Air LAB-3 % /bin/bash "/Users/rajpatel/Desktop/OS/LAB-3/1-d.s
h"
Enter the value of A
5
Enter the value of B
3

A = 3
B = 5
(base) rajpatel@Rajs-MacBook-Air LAB-3 %
```

e. To find the lines containing a number in a file.

Code :

```
#!/bin/bash

grep -E '[0-9]' file
```

Output :

```
(base) rajpatel@Rajs-MacBook-Air LAB-3 % /bin/bash "/Users/rajpatel/Desktop/OS/LAB-3/1-e.s
h"
ok now going for numbers (:32)
ok now going for numbers (:12)
ok now going for numbers (:132)
ok now going for numbers (:1324)
(base) rajpatel@Rajs-MacBook-Air LAB-3 %
```

f. To concatenate two strings and find the length of the resultant string.

Code :

```
#!/bin/bash

echo "Enter first String "

read a

echo "Enter second String "

read b

c=$a$b

echo " "
```

```
echo "The final string is $c"

l=${#c}

echo " "

echo "The lenght is $l"
```

Output :

```
(base) rajpatel@Rajs-MacBook-Air LAB-3 % bash "/Users/rajpatel/Desktop/OS/LAB-3/1-f.sh"
Enter first String
Raj
Enter second String
Patel

The final string is RajPatel

The lenght is 8
(base) rajpatel@Rajs-MacBook-Air LAB-3 %
```

g. To concatenate the contents of two files.

Code :

```
#!/bin/bash

echo "Displaying content of first file "

cat num

echo " "

echo "Displaying content of second file "

cat num1
```

```
echo " "
echo "Concatenating content of both the files "
cat num num1
```

Output :

```
(base) rajpatel@Rajs-MacBook-Air LAB-3 % /bin/bash "/Users/rajpatel/Desktop/OS/LAB-3/1-g.s
h"
Displaying content of first file
One
Two
Three
Four
Five
Displaying content of second file
Six
Seven
Eight
Nine
Ten
Concatenating content of both the files
One
Two
Three
Four
FiveSix
Seven
Eight
Nine
Ten%
(base) rajpatel@Rajs-MacBook-Air LAB-3 %
```

h. Write a shell script that would wait 5 seconds and then display the time.

Code :

```
#!/bin/bash
sleep 5
date "+%T"
```

Output :

```
/bin/bash "/Users/rajpatel/Desktop/OS/LAB-3/tempCodeRunnerFile.sh"
(base) rajpatel@Rajs-MacBook-Air LAB-3 % /bin/bash "/Users/rajpatel/Desktop/OS/LAB-3/tempC
odeRunnerFile.sh"
22:53:13
(base) rajpatel@Rajs-MacBook-Air LAB-3 %
```

2. The length and breadth of a rectangle and radius of a circle are provided as user input. Write a shell script that will calculate the area and perimeter of the rectangle and the area and circumference of the circle. Hint: - Area of Rectangle = L*B Perimeter of Rectangle = 2(L+B) Area of Circle = pi.r^2 Circumference of circle = 2.pi.r

Code :

```
#!/bin/bash
echo "Enter the lenght of Reactangle "
read l
echo "Enter the width of rectangle "
read b
echo "Enter the radius of Circle "
read r
echo " "
echo "The area of reactangle is $(($l * $b)) sqm"
echo " "
periR=`expr $l \* 2 + $b \* 2`
echo "The perimeter of reactangle is $periR m"
echo " "
pi=`expr 22 / 7`
periC=`expr 2 \* $pi \* $r`
echo "The perimeter of circle is $periC m"
```

```
areaC=`expr $pi \* $r \* $r`
echo " "
echo "The area of circle is $areaC sqm"
```

Output :

```
(base) rajpatel@Rajs-MacBook-Air LAB-3 % /bin/bash "/Users/rajpatel/Desktop/OS/LAB-3/2.sh"

Enter the lenght of Reactangle
2
Enter the width of rectangle
2
Enter the radius of Circle
2

The area of reactangle is 4 sqm

The perimeter of reactangle is 8 m

The perimeter of circle is 12 m

The area of circle is 12 sqm

(base) rajpatel@Rajs-MacBook-Air LAB-3 %
```

3. Write a menu driven shell program to read two numbers and print the results of all the arithmetic operations. (+,-,* /,%, ++,--)

Code :

```
#!/bin/bash
echo "Enter the first number "
read A
echo "Enter the second number "
read B
sum=`expr $A + $B`
echo "The + of A and B is $sum"
echo " "
sub=`expr $A - $B`
```

```
echo "The - of A and B is $sub"
echo " "
mul=`expr $A \* $B`
echo "The * of A and B is $mul"
echo " "
div=`expr $A / $B`
echo "The / of A and B is $div"
echo " "
mod=`expr $A % $B`
echo "The % of A and B is $mod"
a=$((++A))
b=$((++B))
echo " "
echo "The value of A and B after increment is $a and $b respectively"
# Setting the value of A and B to intial value
a1=$((--A))
b1=$((--B))
# Performing decrement operation
a1=$((--A))
b1=$((--B))
echo " "
echo "The value of A and B after decrement is $a1 and $b1 respectively"
echo " "
```

Output :

```
(base) rajpatel@Rajs-MacBook-Air LAB-3 % bash "/Users/rajpatel/Desktop/OS/LAB-3/3.sh"
Enter the first number
5
Enter the second number
3
The + of A and B is 8

The - of A and B is 2

The * of A and B is 15

The / of A and B is 1

The % of A and B is 2

The value of A and B after increment is 6 and 4 respectively

The value of A and B after decrement is 4 and 2 respectively
```

4. Write two separate shell scripts to find the factorial of a number using while statement and for statement.

Code-For-loop :

```
#!/bin/bash

echo "Enter the number"

read A

B=1

for((i=2;i<=A;i++))

{

   B=$((B*i))

}

echo "$B"
```

Output :

```
(base) rajpatel@Rajs-MacBook-Air LAB-3 % /bin/bash "/Users/rajpatel/Desktop/OS/LAB-3/4-for
.sh"
Enter the number
5
120
(base) rajpatel@Rajs-MacBook-Air LAB-3 %
```

Code-While-Loop :

```
#!/bin/bash

echo " Enter the number "

read A

B=1

while [ $A -gt 1 ]

do

   B=$((B * A))

   A=$((A - 1))

done


echo "$B"
```

Output :

```
(base) rajpatel@Rajs-MacBook-Air LAB-3 % bash "/Users/rajpatel/Desktop/OS/LAB-3/4-while.sh"
 Enter the number
4
24
(base) rajpatel@Rajs-MacBook-Air LAB-3 %
```

5. Given a file of numbers (one number per line), write a shell script that will find the lowest and highest number.

Code :

```
#!/bin/bash

echo "The smallest number is "
```

```
cat number | sort -n |head -n 1
echo "The largest number is "
cat number | sort -n |tail -n 1
```

Output :

```
(base) rajpatel@Rajs-MacBook-Air LAB-3 % bash "/Users/rajpatel/Desktop/OS/LAB-3/5.sh"
The smallest number is
0
The largest number is
789
(base) rajpatel@Rajs-MacBook-Air LAB-3 %
```

6. Write a shell program to read n numbers into an array and display the average of them.

Code :

```
#!/bin/bash
declare -a arr
echo "Press enter after entering all the numbers"
read -a arr
B=0
for i in ${arr[@]}
do
  let B+=$i
done
a=${#arr[@]}
b=$((B/a))
echo "The average of the given array is $b"
```

Output :

```
(base) rajpatel@Rajs-MacBook-Air LAB-3 % bash "/Users/rajpatel/Desktop/OS/LAB-3/6.sh"
Press enter after entering all the numbers
1 2 3 4 5
The average of the given array is 3
(base) rajpatel@Rajs-MacBook-Air LAB-3 %
```

7. Write a shell program to print the following Patterns.

```
* * * * *
* * * *
* * *
* *
*
        *
      * * *
    * * * * *
  * * * * * * *
* * * * * * * * *
```

Code :

```
#!/bin/bash
for((i=5; i>=1; i--))
do
  for((j=1; j<=i; j++))
```

```
 do
   echo -n "* "
 done
 echo
done
for((i=1; i<=5; i++))
do
 for((j=1; j<=5 - i; j++))
 do
   echo -n "  "
 done
 for((j=1; j<=2*i - 1; j++))
 do
   echo -n "* "
 done
 echo
done
```

Output :

```
(base) rajpatel@Rajs-MacBook-Air LAB-3 % bash "/Users/rajpatel/Desktop/OS/LAB-3/7.sh"
* * * * *
* * * *
* * *
* *
*
        *
      * * *
    * * * * *
  * * * * * * *
* * * * * * * * *
(base) rajpatel@Rajs-MacBook-Air LAB-3 %
```

8. Write a shell program to read two matrices, add them and print the output matrix.

Code :

```
#!/bin/bash
declare -A arr
echo "Enter the row"
read r
echo "Enter the column"
read c
i=0
j=0
echo "Enter the elements"
while [ $i -lt $r ]
do
  j=0
  while [ $j -lt $c ]
  do
    echo $i $j
    read m
    arr[${i},${j}]=$m
    j=`expr $j + 1`
  done
  i=`expr $i + 1`
done

i=0
j=0
while [ $i -lt $r ]
```

```
do
  j=0
  while [ $j -lt $c ]
  do
    echo -n ${arr[${i},${j}]} " "
    j=`expr $j + 1`
  done
  echo ""
  i=`expr $i + 1`
done
```

Output :

```
/Users/rajpatel/Desktop/OS/LAB-3/8.sh: line 1: declare: -A: invalid option
declare: usage: declare [-afFirtx] [-p] [name[=value] ...]
Enter the row
2
Enter the column
2
Enter the elements 0 0
1
Enter the elements 0 1
2
Enter the elements 1 0
3
Enter the elements 1 1
4
1  2
3  4
(base) rajpatel@Rajs-MacBook-Air LAB-3 %
```

9. Write a program to read a matrix and print the transpose of it.

Code :

```
#!/bin/bash
matrix1=(1 2 3 4 5 6 7 8 9)
rows=3
cols=3
echo "Matrix"
```

```
for((i=0; i<rows; i++))
do
  for((j=0; j<cols; j++))
  do
    index=$((i*cols+j))
    echo -n "${matrix1[index]} "
  done
  echo
done

for((i=0; i<rows; i++))
do
  for((j=i+1; j<cols; j++))
  do
    index1=$((rows*i + j))
    index2=$((rows*j + i))
    temp=${matrix1[index1]}
    matrix1[index1]=${matrix1[index2]}
    matrix1[index2]=$temp
  done
done

echo "Transpose of a matrix"
for((i=0; i<rows; i++))
do
  for((j=0; j<cols; j++))
```

```
  do
    index=$((i*cols+j))
    echo -n "${matrix1[index]} "
  done
  echo
done
```

Output :

```
(base) rajpatel@Rajs-MacBook-Air LAB-3 % bash "/Users/rajpatel/Desktop/OS/LAB-3/9.1.sh"
Matrix
1 2 3
4 5 6
7 8 9
Transpose of a matrix
1 4 7
2 5 8
3 6 9
(base) rajpatel@Rajs-MacBook-Air LAB-3 %
```

=========X==X==X==X==X==X=========