OPERATING SYSTEM LAB 2

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1. Write shell scripts for the following:

   a. To take your name, programme name and enrolment number as input from user and print it on the screen.

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

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

   d. To exchange the values of two variables.

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

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

   g. To concatenate the contents of two files.

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

```
#!/bin/bash

echo "Name and Details : "

read -p "Enter Your Name : "  varname1

read -p "Enter the Program Name : " varname2

read -p "Enter the Enrolment Number : " varname3
```

```
echo Hello $varname1
echo Program Name :  $varname2
echo Enrolment Number : $varname3

##################################################

num1=0
num2=0
num3=0
num4=0
ave=0

read -p "Enter the first number : " num1
read -p "Enter the second number : " num2
read -p "Enter the third number : " num3
read -p "Enter the fourth number : " num4
echo "Sum = $((num1 + num2 + num3 + num4))"
echo "Product = $((num1 * num2 * num3 * num4))"
ave=$(echo "scale=2;($num1 + $num2 + $num3 + $num4)/4"| bc)
echo "Average = "$ave
```

```
##################################################
 echo "Odd or Even : "
num1=0
 read -p "Enter the Number : " num1
 if [ $((num1 % 2)) == 0 ]
then
echo "This is Even"
else
echo "This is Odd"
fi

##################################################

echo "Swap Inputs : "
read -p "Enter the Input 1 : " num1
read -p "Enter the Input 2 : " num2
 echo "Before Swapping : "
echo "Input 1 = "$num1
echo "Input 2 = "$num2
temp=$num1
num1=$num2
```

```
num2=$temp
echo "After Swapping : "
echo "Input 1 = "$num1
echo "Input 2 = "$num2

##################################################

echo "Find the Line with Numbers in it : "
read -p "Enter the File Name : " file
grep [0-9] $file

##################################################

echo "Concatenate Two Inputs And find its Length : "
read -p "Enter the Input 1 : " num1
read -p "Enter the Input 2 : " num2
echo "Input 1 = "$num1
echo "Input 2 = "$num2
num3="$num1$num2"
echo "Output = "$num3
size=${#num3}
```

```
echo "Length of the Output = "$size

##################################################

echo "Concatenate File Contents : "

read -p "Enter the File 1 : " num1

read -p "Enter the File 2 : " num2

cat $num1 > out

cat $num2 >> out

cat out

##################################################

echo "Sleep for 5 Seconds and Display the Time : "

sleep 5

date +"%r"
```

```
sabhishek@S:~/Downloads/OS$ ./All_Shell.sh
Name and Details :
Enter Your Name : Abhishek
Enter the Program Name : Shell
Enter the Enrolment Number : 19147
Hello Abhishek
Program Name : Shell
Enrolment Number : 19147
Enter the first number : 1
Enter the second number : 2
Enter the third number : 3
Enter the fourth number : 4
Sum = 10
Product = 24
Average = 2.50
Odd or Even :
Enter the Number : 4
This is Even
Swap Inputs :
Enter the Input 1 : Hello
Enter the Input 2 : Amrita
Before Swapping :
Input 1 = Hello
Input 2 = Amrita
After Swapping :
Input 1 = Amrita
Input 2 = Hello
```

```
Concatenate File Contents :
Enter the File 1 : 1.txt
Enter the File 2 : 2.txt
Abhi1
Abhi2
Amrita
Hello
Hai
Bharath
Harsha
Arvind123
Ram
Hello World
Shell Scripting
Operating System
Sleep for 5 Seconds and Display the Time :
12:57:35 AM IST
```

```
sabhishek@S:~/Downloads/OS$ cat 1.txt
Abhi1
Abhi2
Amrita
Hello
Hai
Bharath
Harsha
Arvind123
sabhishek@S:~/Downloads/OS$ cat 2.txt
Ram
Hello World
Shell Scripting
Operating System
sabhishek@S:~/Downloads/OS$
```

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. π.r

```
#!/bin/bash
len=0.0
bre=0.0
rad=0.0
read -p "Enter the Length of the Rectangle : " len
read -p "Enter the Breadth of the Rectangle : " bre
read -p "Enter the Radius of the Circle : " rad
echo "Area of Rectangle : "$((len*bre))
echo "Perimeter of Rectangle : "$((2*(len+bre)))
area=$(echo "scale=2;3.14 * $rad * $rad" | bc)
```

```
peri=$(echo "scale=2;2 * $rad * 3.14"|bc)

echo "Area of circle : " $area

echo "Perimeter of circle : " $peri
```

```
sabhishek@S:~/Downloads/OS$ chmod 744 Array.sh
sabhishek@S:~/Downloads/OS$ ./Array.sh
Enter the number of Elements in the Array : 5
Enter the Element : 1
Enter the Element : 2
Enter the Element : 3
Enter the Element : 4
Enter the Element : 5
Array = 1 2 3 4 5
Average = 3.00
```

3. Write a menu driven shell program to read two numbers and print the results of all the arithmetic operations.

(+ , - , * , / , % , ++ , --)

```
#!/bin/bash

len=0.0

bre=0.0

rad=0.0

read -p "Enter the Length of the Rectangle : " len

read -p "Enter the Breadth of the Rectangle : " bre

read -p "Enter the Radius of the Circle : " rad

echo "Area of Rectangle : "$((len*bre))
```

```
echo "Perimeter of Rectangle : "$((2*(len+bre)))


area=$(echo "scale=2;3.14 * $rad * $rad" | bc)
peri=$(echo "scale=2;2 * $rad * 3.14"|bc)
echo "Area of circle : " $area
echo "Perimeter of circle : " $peri
```

```
sabhishek@S:~/Downloads/OS$ ./Arithmatic.sh
Enter the first number : 5
Enter the second number : 4
    MAIN-MENU
1 - Addition
2 - Subtraction
3 - Multiplication
4 - Division
5 - Modulo
6 - Pre Increment
7 - Post Increment
8 - Pre Decrement
9 - Post Decrement
Please enter option [1 - 9] 1
Sum = 9
```

```
sabhishek@S:~/Downloads/OS$ ./Arithmatic.sh
Enter the first number : 9
Enter the second number : 8
    MAIN-MENU
1 - Addition
2 - Subtraction
3 - Multiplication
4 - Division
5 - Modulo
6 - Pre Increment
7 - Post Increment
8 - Pre Decrement
9 - Post Decrement
Please enter option [1 - 9]4
Quotient = 1.12
```

```
sabhishek@S:~/Downloads/OS$ ./Arithmatic.sh
Enter the first number : 6
Enter the second number : 4
    MAIN-MENU
1 - Addition
2 - Subtraction
3 - Multiplication
4 - Division
5 - Modulo
6 - Pre Increment
7 - Post Increment
8 - Pre Decrement
9 - Post Decrement
Please enter option [1 - 9]5
Reminder = 2
```

```
sabhishek@S:~/Downloads/OS$ ./Arithmatic.sh
Enter the first number : 5
Enter the second number : 3
    MAIN-MENU
1 - Addition
2 - Subtraction
3 - Multiplication
4 - Division
5 - Modulo
6 - Pre Increment
7 - Post Increment
8 - Pre Decrement
9 - Post Decrement
Please enter option [1 - 9] 8
Pre Decremented Number 1 = 4
Pre Decremented Number 2 = 2
```

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

```
#!/bin/bash

i=1

sum=1

read -p "Enter the Number : " num

num=$(( num+1 ))

while [ $i -lt $num ]

do

sum=$(( sum*i ))
```

```
i=$(( i+1 ))
done
echo "Factorial : "$sum
```

```
#!/bin/bash
sum=1
read -p "Enter the Number : " num
for ((i=1; i<=num; i++ ))
do
sum=$(( sum*i ))
done
echo "Factorial : "$sum
```

```
sabhishek@S:~/Downloads/OS$ ls
1.txt            Arithmatic.sh    Fact_while.sh    Pattern_2.sh   Transpose_Matrix.sh
2.txt            Array.sh         File.sh          Sample.sh
Add_Matrix.sh    Con_2_files.sh   Odd_or_Even.sh   Str_Len.sh
All_Shell.sh     Date.sh          out              Sum.sh
Area.sh          Fact_For         Pattern_1.sh     Swap.sh
sabhishek@S:~/Downloads/OS$ chmod 744 Fact_while.sh
sabhishek@S:~/Downloads/OS$ ./Fact_while.sh
Enter the Number : 5
Factorial : 120
sabhishek@S:~/Downloads/OS$ chmod 744 Fact_For
sabhishek@S:~/Downloads/OS$ ./Fact_For
Enter the Number : 5
Factorial : 120
sabhishek@S:~/Downloads/OS$ ./Fact_For
Enter the Number : 10
Factorial : 3628800
sabhishek@S:~/Downloads/OS$ ./Fact_while.sh
Enter the Number : 8
Factorial : 40320
```

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

```
#!/bin/bash

read -p "Enter the File Name : " file

echo "Highest : "$(grep [0-9] $file | sort -g | tail -1)

echo "Lowest : "$(grep [0-9] $file | sort -g | head -1)
```

```
sabhishek@S:~/Downloads/OS$ ./Sort_File.sh
Enter the File Name : 1.txt
Highest : 9
Lowest : 1
sabhishek@S:~/Downloads/OS$ cat 1.txt
9
6
5
4
7
2
1
5
9
```

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

```
#!/bin/bash

declare -a arr
```

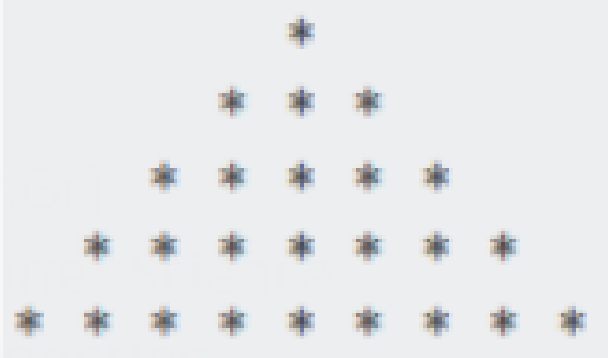
```
read -p "Enter the number of Elements in the Array : "  count
sum=0
for(( i = 0 ; i < $count ; i++))
do
read -p "Enter the Element : "  x
arr[$i]="$x"
sum=$((sum+x))
done
echo -e "Array = ${arr[@]}"
ave=$(echo "scale=2;($sum)/$count"| bc)
echo "Average = "$ave
```

```
sabhishek@S:~/Downloads/OS$ chmod 744 Array.sh
sabhishek@S:~/Downloads/OS$ ./Array.sh
Enter the number of Elements in the Array : 5
Enter the Element : 1
Enter the Element : 2
Enter the Element : 3
Enter the Element : 4
Enter the Element : 5
Array = 1 2 3 4 5
Average = 3.00
```

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

```
#!/bin/bash
for(( i = 5 ; i > 0 ; i--))
do
for(( j = 0 ; j < $i ; j++))
do
echo -n "*"
done
echo ""
done
```

```
sabhishek@S:~/Downloads/OS$ chmod 744 Pattern_1.sh
sabhishek@S:~/Downloads/OS$ ./Pattern_1.sh
* * * * *
* * * *
* * *
* *
*
```



```
#!/bin/bash
space=4
star=1
for(( i = 1 ; i <= 5 ; i++))
do
for((j=0;j<space;j++))
do
echo -n " "
done
space=$(( space-1 ))
for((j=0;j<$star;j++))
do
echo -n "*"
done
star=$(( star+2 ))
```

```
echo ""

done
```

```
sabhishek@S:~/Downloads/OS$ chmod 744 Pattern_2.sh
sabhishek@S:~/Downloads/OS$ ./Pattern_2.sh
      *
    * * *
  * * * * *
* * * * * * *
* * * * * * * * *
```

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

```
#!/bin/bash

read -p "Enter the No of Rows : " row

read -p "Enter the No of Columns : " col

echo "Matrix 1"

for((i=1;i<=$row;i++))

do

for((j=1;j<=$col;j++))

do

read -p "Enter the Element : " arr1[$i$j]

done

done
```

```
echo "Matrix 2"
for((i=1;i<=$row;i++))
do
for((j=1;j<=$col;j++))
do
read -p "Enter the Element : " arr2[$i$j]
done
done
echo "Matrix 1"
for((i=1;i<=$row;i++))
do
for((j=1;j<=$col;j++))
do
echo -n ${arr1[$i$j]}
echo -n " "
done
echo ""
done

echo "Matrix 2"
for((i=1;i<=$row;i++))
```

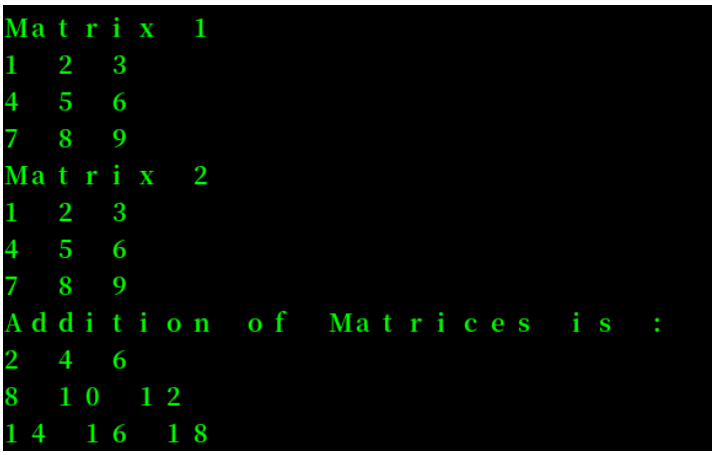
```
do
for((j=1;j<=$col;j++))
do
echo -n ${arr2[$i$j]}
echo -n " "
done
echo ""
done

for((i=1;i<=$row;i++))
do
for((j=1;j<=$col;j++))
do
arr3[$i$j]=`expr ${arr1[$i$j]} + ${arr2[$i$j]}`
done
done

echo "Addition of Matrices is : "
for((i=1;i<=$row;i++))
do
for((j=1;j<=$col;j++))
```

```
do
echo -n ${arr3[$i$j]}
echo -n " "
done
echo ""
done
```

```
sabhishek@S:~/Downloads/OS$ chmod 744 Add_Matrix.sh
sabhishek@S:~/Downloads/OS$ ./Add_Matrix.sh
Enter the No of Rows : 3
Enter the No of Columns : 3
Matrix 1
Enter the Element : 1
Enter the Element : 2
Enter the Element : 3
Enter the Element : 4
Enter the Element : 5
Enter the Element : 6
Enter the Element : 7
Enter the Element : 8
Enter the Element : 9
Matrix 2
Enter the Element : 1
Enter the Element : 2
Enter the Element : 3
Enter the Element : 4
Enter the Element : 5
Enter the Element : 6
Enter the Element : 7
Enter the Element : 8
Enter the Element : 9
```



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

```
#!/bin/bash
read -p "Enter the No of Rows : " row
read -p "Enter the No of Columns : " col
echo "Matrix 1"
for((i=1;i<=$row;i++))
do
for((j=1;j<=$col;j++))
do
read -p "Enter the Element : " arr[$i$j]
done
done
```

```
echo "Original Matrix :"
for((i=1;i<=$row;i++))
do
for((j=1;j<=$col;j++))
do
trans[$j$i]=$((arr[$i$j]))
echo -n ${arr[$i$j]}
echo -n " "
done
echo ""
done
echo "Transpose Matrix :"
for((i=1;i<=$row;i++))
do
for((j=1;j<=$col;j++))
do
echo -n ${trans[$i$j]}
echo -n " "
done
echo ""
done
```

```
sabhishek@S:~/Downloads/OS$ chmod 744 Transpose_Matrix.sh
sabhishek@S:~/Downloads/OS$ ./Transpose_Matrix.sh
Enter the No of Rows : 3
Enter the No of Columns : 3
Matrix 1
Enter the Element : 1
Enter the Element : 2
Enter the Element : 3
Enter the Element : 4
Enter the Element : 5
Enter the Element : 6
Enter the Element : 7
Enter the Element : 8
Enter the Element : 9
Original Matrix :
1 2 3
4 5 6
7 8 9
Transpose Matrix :
1 4 7
2 5 8
3 6 9
```

ThankYou !!