Bansilal Ramnath Agarwal Charitable Trust's
Vishwakarma Institute of Technology
(An Autonomous Institute affiliated to Savitribai Phule Pune University)

Operating Systems Lab

Assignment No: 2

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1. Basic Arithmetic Operations in Shell Scripting.

Addition, Subtraction, Multiplication, Division Code:

```
~/vit-comp/Module-4/Operating-System/Assignment-2 on  main
❯ bat basic-arithmetic.sh
       File: basic-arithmetic.sh
   1   #!/bin/bash
   2
   3   echo "Basic Arithmetic"
   4
   5   echo "Addition of $1 and $2 is $(($1 + $2))"
   6   echo "Substraction of $1 and $2 is $(($1 - $2))"
   7   echo "Multiplication of $1 and $2 is $(($1 * $2))"
   8   echo "Division of $1 and $2 is $(($1 / $2))"
   9
  10

~/vit-comp/Module-4/Operating-System/Assignment-2 on  main
❯ ./basic-arithmetic.sh 32 23 2
Basic Arithmetic
Addition of 32 and 23 is 55
Substraction of 32 and 23 is 9
Multiplication of 32 and 23 is 736
Division of 32 and 23 is 1
```

2. Control Structure in Shell.

Even and Odd Code:

```
~/vit-comp/Module-4/Operating-System/Assignment-2 on main !1
❯ bat even-odd.sh
```

File: even-odd.sh

```
#!/bin/bash

echo "even odd prgm"
read num1

if [ $((num1%2)) -eq 0 ];
then
  echo "Even"
else
  echo "Odd"
fi
```

```
~/vit-comp/Module-4/Operating-System/Assignment-2 on main !1
❯ ./even-odd.sh
even odd prgm
12
Even

~/vit-comp/Module-4/Operating-System/Assignment-2 on main !1
❯ ./even-odd.sh
even odd prgm
11
Odd
```

Switch Statement:

```
~/vit-comp/Module-4/Operating-System/Assignment-2 on main !2
❯ bat switch.sh
```

File: switch.sh

```
#!/bin/bash

read num

case $num in
  1)
    echo "1 is entered"
  ;;
2)
  echo "2 is entered"
  ;;
*)
  echo "Exited"
esac
```

```
~/vit-comp/Module-4/Operating-System/Assignment-2 on main !2
❯ ./switch.sh
2
2 is entered

~/vit-comp/Module-4/Operating-System/Assignment-2 on main !2
❯ ./switch.sh
12
Exited
```

3. Looping.

Fibonacci Series using for loop:

```
~/vit-comp/Module-4/Operating-System/Assignment-2 on main !2 ?3
❯ bat Fibonacci.sh
File: Fibonacci.sh
1  a=0
2  b=1
3  echo "Fibbonaci Series"
4  echo $a
5  echo $b
6  for ((i=2 ; i<$1 ; i++))
7  do
8    fib=$((a+b))
9    a=$b
10   b=$fib
11   echo $fib
12 done

~/vit-comp/Module-4/Operating-System/Assignment-2 on main !2 ?3
❯ ./Fibonacci.sh 12
Fibbonaci Series
0
1
1
2
3
5
8
13
21
34
55
89
```

Sum and average using for loop:

```
~/vit-comp/Module-4/Operating-System/Assignment-2 on main !2 ?3
❯ bat forloop.sh
File: forloop.sh
1  #!/bin/bash
2
3  echo "Sum and average"
4  file=$1;
5  sum=0
6
7  if [ ! $# -eq 1 ];
8  then
9    echo "Give me one parameter i.e the file"
10 else
11  for i in $(cat "$file");
12   do
13     sum=$((sum+i))
14   done;
15
16 echo "Sum = $sum"
17 echo "Average = $((sum/i))"
18
19 fi
20

~/vit-comp/Module-4/Operating-System/Assignment-2 on main !2 ?3
❯ ./forloop.sh nosfile
Sum and average
Sum = 55
Average = 5
```

while loop:

```
~/vit-comp/Module-4/Operating-System/Assignment-2 on main !3 ?3
❯ bat whileloop.sh
```

File: whileloop.sh

```
#!/bin/bash
num=1
while [ $num -le $1 ]; do
  echo $num;
  num=$((num+1))
done
```

```
~/vit-comp/Module-4/Operating-System/Assignment-2 on main !3 ?3
❯ ./whileloop.sh 7
1
2
3
4
5
6
7
```

Pyramid using until loop:

```
~/vit-comp/Module-4/Operating-System/Assignment-2 on main !3 ?4
❯ bat pyramid.sh
```

File: pyramid.sh

```
height=$1
row=1
until [ "$row" -gt "$height" ]; do
  spaces=$((height-row))
  star=$((2*row -1))
  until [ ! "$spaces" -gt 0 ]; do
    echo -n " "
    spaces=$((spaces-1))
  done
  until [ ! "$star" -gt 0 ]; do
    echo -n "*"
    star=$((star-1))
  done
  row=$((row+1))
  echo
done
```

```
~/vit-comp/Module-4/Operating-System/Assignment-2 on main !3 ?4
❯ ./pyramid.sh 7
      *
     ***
    *****
   *******
  *********
 ***********
*************
```

4. Command line arguments.

Addition, Subtraction, Multiplication, Division program using command line arguments:

```
~/vit-comp/Module-4/Operating-System/Assignment-2 on  main !4 ?4
❯ bat arguments.sh
       File: arguments.sh
   1   #!/bin/bash
   2
   3   echo "Command line Arguments"
   4   sum=0
   5
   6   for i in "$@";
   7   do
   8     sum=$((sum+i))
   9   done
  10
  11   echo "sum is $sum"
  12

~/vit-comp/Module-4/Operating-System/Assignment-2 on  main !4 ?4
❯ ./arguments.sh 1 2 3 4 5
Command line Arguments
sum is 15
```

5. Functions

Addition of two numbers using function :

```
~/vit-comp/Module-4/Operating-System/Assignment-2 on main !4 ?4
❯ bat functions.sh
```

File: functions.sh

```
#!/bin/bash
#

function addition(){
  echo "Addition of $1 and $2 is $(($1 + $2))";
}

function substraction(){
  echo "Substraction of $1 and $2 is $(($1 - $2))";
}

function multiplication(){
  echo "Multiplication of $1 and $2 is $(($1 * $2))"
}

function division(){
  echo "Division of $1 and $2 is $(($1 / $2))"
}

echo "Calculator functions: addition substraction mulitplication division"
"$@"
```

```
~/vit-comp/Module-4/Operating-System/Assignment-2 on main !4 ?4
❯ ./functions.sh substraction 20 18
Calculator functions: addition substraction mulitplication division
Substraction of 20 and 18 is 2

~/vit-comp/Module-4/Operating-System/Assignment-2 on main !4 ?4
❯ ./functions.sh addition 20 18
Calculator functions: addition substraction mulitplication division
Addition of 20 and 18 is 38
```

Factorial of given number using recursive function:

```
~/vit-comp/Module-4/Operating-System/Assignment-2 on main !5 ?4
❯ bat factorial.sh
```

File: factorial.sh

```
fact(){
  if [ "$1" -le 1 ]; then
    echo 1
  else result=$(( $1 * $(fact "$(( $1 - 1))") ))
    echo "$result"
  fi
}

num=$1
result=$(fact "$num")
echo "The factorial of $num is $result "
```

```
~/vit-comp/Module-4/Operating-System/Assignment-2 on main !5 ?4
❯ ./factorial.sh 5
The factorial of 5 is 120
```

6. Array

Taking Array as input from user and displaying sum of all the elements in array :

```
~/vit-comp/Module-4/Operating-System/Assignment-2 on main !6 ?4
❯ bat array.sh
       File: array.sh
   1 ~ echo "Enter Size of Array : "
   2 ~ read n
   3
   4 ~ echo "Enter Number : "
   5 ~ i=0
   6 ~ while [ $i -lt $n ]
   7   do
   8 ~   read arr[$i]
   9 ~   i=`expr $i + 1`
  10   done
  11
  12 + sum=0
  13 + for i in ${arr[@]}
  14 + do
  15 +   sum=`expr $sum + $i`
  16 + done
  17 +
  18 + echo "Sum of array is $sum"

~/vit-comp/Module-4/Operating-System/Assignment-2 on main !6 ?4
❯ ./array.sh
Enter Size of Array :
4
Enter Number :
1
2
4
5
Sum of array is 12
```

7. String Operations

String concatenation, length, uppercase to lowercase, lowercase to uppercase and slicing:

```
~/vit-comp/Module-4/Operating-System/Assignment-2 on  main !7 ?4
❯ bat strings.sh
```

File: strings.sh

```
findLength (){
    echo "Length of $1 is : ${#1}"
    echo "Length of $2 is : ${#2}"
}

concat (){
    echo "After concatenation : "
    echo ${1}${3}${2}
}

lower (){
    res=$(echo $1 | tr '[A-Z]' '[a-z]');
    res2=$(echo $2 | tr '[A-Z]' '[a-z]');

    echo "Lower Case of $1 is $res"
    echo "Lower Case of $2 is $res2"
}

upper (){
    res=$(echo $1 | tr '[a-z]' '[A-Z]');
    res2=$(echo $2 | tr '[a-z]' '[A-Z]');
    echo "Upper Case of $1 is $res"
    echo "Upper Case of $2 is $res2"
}

slice (){
    echo "Slicing $1 from  : ${1:2:4}"
}

findLength $1 $2
concat $1 $2 $3
lower $1 $2
upper $1 $2
slice $1
```

```
~/vit-comp/Module-4/Operating-System/Assignment-2 on  main !7 ?4
❯ ./strings.sh Gourav Suram -
Length of Gourav is : 6
Length of Suram is : 5
After concatenation :
Gourav-Suram
Lower Case of Gourav is gourav
Lower Case of Suram is suram
Upper Case of Gourav is GOURAV
Upper Case of Suram is SURAM
```