1) Write a shell script to sort an array of numbers using any sort method.

```
echo "Enter Number Of Array Elements : "
read num
echo "Enter Array Elements : "
for(( i=0; i<$num; i++ ))
do
   read input
   array[$i]=$input
done
echo "Array Elements Are : ${array[@]}"
echo "Ascending Order : "
for(( i=0; i<$num; i++ ))
do
   for(( j=$i; j<$num; j++ ))
   do
      if [ ${array[$i]} -gt ${array[$j]} ]
      then
         temp=${array[$i]}
         array[$i]=${array[$j]}
         array[$j]=$temp
      fi
   done
done
echo ${array[@]}
echo "Descending Order : "
for(( i=0; i<$num; i++ ))
do
   for(( j=$i; j<$num; j++ ))
```

```
    do
        if [ ${array[$i]} -lt ${array[$j]} ]
        then
            temp=${array[$i]}
            array[$i]=${array[$j]}
            array[$j]=$temp
        fi
    done
done
echo ${array[@]}
```

2) Write a Shell script to check whether given number is prime or not. Also print the reverse of the given number.

```
echo "Enter a number = "
read num
flag=0
for (( i=2; i<=$num/2; i++ ))
do
    if [ $((num % i)) -eq 0 ]
    then
        echo "$num is not a prime number"
        flag=1
        break
    fi
done
if [ $flag -eq 0 ]
then
    echo "$num is a prime number"
fi
reverse=0
```

```
while [ $num -ne 0 ]
do
   remainder=$(expr $num % 10)
   reverse=$(expr $reverse \* 10)
   reverse=$(expr $reverse + $remainder)
   num=$(expr $num / 10)
done
echo "Reverse = $reverse"
```

3) Write a Shell script to check whether given number is palindrome or not. Also print the reverse of the given number.

```
echo "Enter a number = "
read num
temp=$num
reverse=0
while [ $num -ne 0 ]
do
   remainder=$(expr $num % 10)
   reverse=$(expr $reverse \* 10)
   reverse=$(expr $reverse + $remainder)
   num=$(expr $num / 10)
done
if [ $temp -eq $reverse ]
then
   echo "$temp is a palindrome"
else
   echo "$temp is not a palindrome"
fi
echo "Reverse = $reverse"
```

4) Write a Shell script to find the Factorial of given number using Recurrence Method and Without Recurrence Method (Both way).

```
echo "Enter a number = "
read num
fact=1
for (( i=2; i<=num; i++ ))
do
   fact=$((fact * i))
done
echo "Factorial (Non-Recursive) = $fact"
```

```
function factorial()
{
   local=$1
   if (( local<=2 ))
   then
      echo $local
   else
      f=$((local -1))
      f=$(factorial $f)
      f=$((f*local))
      echo $f
   fi
}
echo "Enter a number = "
read num
if [ $num -eq 0 ]
then
   echo "Factorial (Recursive) = 1"
else
```

```
    factorial $num
fi
```

5) **Compare 3 numbers**

```
if [ $1 -gt $2 ] && [ $1 -gt $3 ]
then
   echo "Number 1 : $1 is greater !!!\n"
elif [ $2 -gt $1 ] && [ $2 -gt $3 ]
then
   echo "Number 2 : $2 is greater !!!\n"
elif [ $3 -gt $1 ] && [ $3 -gt $2 ]
then
   echo "Number 3 : $3 is greater !!!\n"
else
   if [ $1 -eq $2 ] && [ $2 -eq $3 ]
   then
      echo "All Numbers Are Equal !!!\n"
   elif [ $1 -eq $2 ]
   then
      echo "Number 1 and Number 2 are equal !!!\n"
   elif [ $1 -eq $3 ]
   then
      echo "Number 1 and Number 3 are equal !!!\n"
   elif [ $2 -eq $3 ]
   then
      echo "Number 2 and Number 3 are equal !!!\n"
   fi
fi
```

6) **Renaming a file**

```
echo "Enter Old File Name = "
read oldfile
echo "Enter New File Name = "
read newfile
ls -l
mv $oldfile $newfile
echo "File Renamed Successfully !!!\n"
ls -l
```

7) **Even Odd**

```
echo "Enter Number Of Array Elements : "
read num
echo "Enter Array Elements : "
for(( i=0; i<$num; i++ ))
do
   read input
   array[$i]=$input
done
echo "Array Elements Are : ${array[@]}"
for(( i=0; i<$num; i++ ))
do
   val=`expr ${array[$i]} % 2`
   if [ $val == 0 ]
   then
      echo "${array[$i]} -> Even"
   elif [ $val == 1 ]
   then
```

```
        echo "${array[$i]} -> Odd"
    fi
done
```

8) **Fibonacci**

```
echo "Enter n = "
read n
x=0
y=1
i=2
echo "Fibonacci Series up to $n = "
echo "$x"
echo "$y"
while [ $i -lt $n ]
    do
        i=`expr $i + 1 `
        z=`expr $x + $y `
        echo "$z"
        x=$y
        y=$z
    done
```

9) **Largest and Smallest from array**

```
echo "Enter Number Of Array Elements : "
read num
echo "Enter Array Elements : "
for(( i=0; i<$num; i++ ))
do
    read input
    array[$i]=$input
```

```
done
echo "Array Elements Are : ${array[@]}"
smallest=${array[0]}
largest=${array[0]}
for(( i=0; i<$num; i++ ))
do
   if [ ${array[$i]} -lt $smallest ]
   then
      smallest=${array[$i]}
   elif [ ${array[$i]} -gt $largest ]
   then
      largest=${array[$i]}
   fi
done
echo "Smallest Number = $smallest"
echo "Largest Number = $largest"
```

10) **Positive and negative from array**

```
echo "Enter Number Of Array Elements : "
read num
echo "Enter Array Elements : "
for(( i=0; i<$num; i++ ))
do
   read input
   array[$i]=$input
done
echo "Array Elements Are : ${array[@]}"
for(( i=0; i<$num; i++ ))
do
   if [ ${array[$i]} -gt 0 ]
```

```
    then
        echo "${array[$i]} -> Positive"
    elif [ ${array[$i]} -lt 0 ]
    then
        echo "${array[$i]} -> Negative"
    else
        echo "${array[$i]} -> Neither (0)"
    fi
done
```

11) **Compare Strings**

```
echo "\nEnter String 1 = "
read str1
echo "\nEnter String 2 = "
read str2
if [ ${#str1} -eq ${#str2} ]
then
    echo "\nString Lengths are Equal !!!"
else
    echo "\nString Lengths are Not Equal !!!"
    if [ ${#str1} -gt ${#str2} ]
    then
        echo "\nString 1 : ${str1} is greater in length than ${str2} !!!"
    else
        echo "\nString 2 : ${str2} is greater in length than ${str1} !!!"
    fi
fi
if [ "$str1" = "$str2" ]
then
    echo "\nStrings are Same !!!"
```

```
else
   echo "\nStrings are Not Same !!!"
fi
```

12) **Compare characters**

```
echo "\nEnter String 1 = "
read str1
echo "\nEnter String 2 = "
read str2
if [ "$str1" = "$str2" ]
then
   echo "\nStrings are Same !!!"
else
   echo "\nStrings are Not Same !!!"
fi
```

13) **Reversing string**

```
echo "\nEnter String = "
read str
for (( i=${#str}-1; i>=0; i-- ))
do
   reverse="$reverse${str:$i:1}"
done
echo "\nReversed String = "$reverse
if [ "$str" = "$reverse" ]
then
   echo "\nString is Palindrome !!!"
else
   echo "\nString is not Palindrome !!!"
fi
```

14) **All String Operations**

```
# Hardcoded
str1="VIT"
echo "String 1 = "$str1
# User Input
read str2
echo "String 2 = "$str2
# String Length
echo "Length Of String = "${#str2}
# Concatenation
echo "Concatenation Of Strings = "$str1$str2
# Lowercase
echo "Lowercase String = "${str2,,}
# Uppercase
echo "Uppercase String = "${str2^^}
# Slicing
echo "Slicing Of String = "${str2:0:2}
```

15) **Write a shell script to check and count occurrence of a sub-string in the given string using command line arguments.**

```
echo "String = $1"
echo "Sub-string = $2"
echo $1 | grep -o "$2" | wc -l
```