**Q.1 Write a program that takes a command-line argument n and prints a table of the powers of 2 that are less than or equal to 2^n.**

read -p "Enter a Number " num

pow=1

for (( i=0; i<= $num; i++ ))

do

echo $i $pow

pow = 2 \* $pow

done

**Q.2 Write a program that takes a command-line argument n and prints the nth harmonic number. Harmonic Number is of the form**

echo Enter a number

read n

i=1

sum=0

while [ $i -le $n ]

do

sum=`expr $sum + \\( 10000 / $i \\)`

i=`expr $i + 1`

done

echo Sum n series is

i=1

while [ $i -le 5 ]

do

a=`echo $sum | cut -c $i`

echo -e \"$a\\c\"

if [ $i -eq 1 ]

then

echo -e \".\\c\"

fi

i=`expr $i + 1`

done

echo

Output:-

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$ bash Q2.sh

Enter a number

5

Sum n series is

"2"."2"8"3"3

**Q.3 Write a program that takes a input and determines if the number is a prime.**

echo -e "Enter Number : "

read n

for((i=2; i<=$n/2; i++))

do

ans=$(( n%i ))

if [ $ans -eq 0 ]

then

echo "$n is not a prime number."

exit 0

fi

done

echo "$n is a prime number."

**Output:**

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$ touch Q3.sh

admin@Feb-01 MINGW64 ~/Desktop/practice/Assignment/Day6

$ notepad Q3.sh

admin@Feb-01 MINGW64 ~/Desktop/practice/Assignment/Day6

$ bash Q3.sh

Enter Number :

4

4 is not a prime number.

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$ bash Q3.sh

Enter Number :

11

11 is a prime number.

**Q.4 Extend the program to take a range of number as input and output the Prime Numbers in that range.**

echo -e "Enter the range m and n:"

read m n

echo "the prime no between $m And $n Are: "

for i in $(seq $m $n)

do

flag=0

for j in $(seq 2 $(( $i-1 )))

do

ans=$(( i%j ))

if [ $ans -eq 0 ]

then

flag=1

fi

done

if [ $flag -eq 0 ]

then

echo $i

fi

done

Output :

admin@Feb-01 MINGW64 ~/Desktop/practice/Assignment/Day6

$ notepad Q3.sh

admin@Feb-01 MINGW64 ~/Desktop/practice/Assignment/Day6

$ bash Q3.sh

Enter the range m and n:

1 10

the prime no between 1 And 10 Are:

1

2

3

5

7

**Q.5 Write a program that computes a factorial of a number taken as input.**

Answer:-

read -p "Enter a number" num

fact=1

for i in $(seq $num)

do

fact=$((fact\*i))

done

echo $fact

Output:

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$ notepad Q5.sh

admin@Feb-01 MINGW64 ~/Desktop/practice/Assignment/Day6

$ bash Q5.sh

Enter a number 5

120

Q.6 Write a program to compute Factors of a number N using prime factorization method.

Logic -> Traverse till i\*i <= N instead of i <= N for efficiency.

O/P -> Print the prime factors of number N.

Answer:-

read -p "Enter a number " num

echo "All Prime Factors of $num are: "

for (( i=2; i\*i<=$num; i++ ))

do

if [ $num%i == 0 ]

then

prime=1

for (( j=2; j<=i/2; j++ ))

do

if [ i % j == 0 ]

then

prime=0

fi

done

if [ $prime == 1 ]

then

echo $prime

fi

fi

done

**Repetition Practice Problems with while loop**

Q.2 Find The magic Number

a. Ask the user to think of a number n between 1 to 100

b. Then check with the user if the number is less then n/2 or greater

c. Repeat till the Magic Number is reached..

echo "Think of a no. in between 1 to 100"

number=$((RANDOM%100+1))

echo $number

m=$(( number/ 2 ))

if [ $number -le $m ]

then

echo "Number is Less Than N/2"

else

echo "Number is greater Than N/2"

fi

no= $(( (number-1)%9 ))

if [[ $no -eq 0 ]]

then

echo "$number is a Magic Number"

else

echo "$number is Not Magic Number"

fi

Output :-

$ notepad Q7.sh

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$ bash Q7.sh

Think of a no. in between 1 to 100

83

Number is greater Than N/2

Q7.sh: line 13: 1: command not found

83 is a Magic Number

Q.3 Extend the Flip Coin problem till either Heads or Tails wins 11 times.

Answer:=

flips=1

heads=0

tails=0

while [ $flips -le 11 ]

do

Result=$((RANDOM%2))

flips = $(( flips+1 ))

if [[ ${Result} -eq 0 ]]

then

echo "HEADS"

head = $(( heads+1 ))

elif [[ ${Result} -eq 1 ]]

then

echo "TAILS"

tails =$(( heads+1 ))

fi

done

echo "You Got $heads HEADS And $tails TAILS"

Q.4