**Day 6 for loop problems**

**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.**

#! /bin/bash -x

echo enter a number

read number

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

do

poweroftwo=$((2\*\*$i))

echo $i " "$poweroftwo

done

output:

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$ ./forexample.sh

enter a number

4

0 1

1 2

2 4

3 8

4 16

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

#!/bin/bash

echo "Enter a number"

read n

i=1

sum=0

for((;i<=$n;))

do

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

i=`expr $i + 1`

done

echo sum of n series is

i=1

for((;i<=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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$ ./harmonicnumber1.sh

Enter a number

5

Sum n series is

2.2833

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

#! /bin/bash

echo "enter a num"

read num

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

do

if [ $((num%i)) -eq 0 ]

then

echo "$num is not a prime number"

exit

fi

done

echo "$num is a prime number"

output:

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$ ./prime.sh

enter a num

56

56 is not a prime number

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$ ./prime.sh

enter a num

23

23 is a prime number

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

#! /bin/bash

echo "Enter the number"

read a

echo "Enter the second number"

read b

for (( i=$a+1; i <= $b; i++ ))

do

p=0

for (( j=2; j <= $i-1; j++ ))

do

if [ `expr $i % $j` = 0 ]

then

p=1

break

fi

done

if [ `expr $p` = 0 ]

then

echo $i

fi

done

output:

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$ ./primerange.sh

Enter the number

2

Enter the second number

23

3

5

7

11

13

17

19

23

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

#! /bin/bash

echo Enter Number

read num

factorial=1

for ((i=1;i<=num;i++))

do

factorial=$(($factorial\*$i))

done

echo Factorial of $num is $factorial

output:

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$ ./forloop.sh

Enter Number

5

Factorial of 5 is 120

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

#! /bin/bash

echo "enter an integer:"

read input

if [ $input -lt 1 ];then

echo "not allowed!"

exit 1

fi

i=2

count=0

flag=0

for ((i;i<$input;))

do

if [ `expr $input % $i` -eq 0 ];then

factor=$i

for ((j=2;j<=`expr $factor / 2`;));do

flag=0

if [ `expr $factor % $j` -eq 0 ];then

flag=1

break

fi

j=`expr $j + 1`

done

if [ $flag -eq 0 ];then

echo "[ $factor ]"

count=1

fi

fi

i=`expr $i + 1`

done

if [ $count -eq 0 ];then

echo "no prime factors found except 1 and $input"

fi

output:

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$ ./factorization.sh

enter an integer:

101

no prime factors found except 1 and 101

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$ ./factorization.sh

enter an integer:

24

[ 2 ]

[ 3 ]