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

read -p "Enter number: " num

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

do

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

echo "2 ^" $i "=" $val

done

Enter number: 6

2 ^ 0 = 1

2 ^ 1 = 2

2 ^ 2 = 4

2 ^ 3 = 8

2 ^ 4 = 16

2 ^ 5 = 32

2 ^ 6 = 64

Write a program that takes a command-line argument n and prints the nth harmonic

number. Harmonic Number is of the form

Hn = 1/1 + ½ + 1/3 + ¼ + …. + 1/n

#! /bin/bash

read -p "Enter nth Number: " num

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

do

if [ $i -ne $num ]

then

printf "1/"$i" + "

else

printf "1/"$i

fi

done

Enter nth Number: 5

1/1 + 1/2 + 1/3 + 1/4 + 1/5

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

#! /bin/bash

read -p "Enter a number: " num

flag=0

if [ $num -eq 1 -o $num -eq 2 ]

then

flag=1

else

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

do

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

then

flag=0

break;

else

flag=1

fi

done

fi

if [ $flag -eq 1 ]

then

echo $num "is Prime"

else

echo $num "is Not Prime"

fi

Enter a number: 7

7 is Prime

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

#! /bin/bash

read -p "Enter start number: " start

read -p "Enter end number: " end

flag=0

for ((num=start;num<=end;num++))

do

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

do

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

then

flag=0;

break;

else

flag=1;

fi

done

if [ $flag -eq 1 ]

then

echo $num

fi

done

Enter start number: 3

Enter end number: 21

3

5

7

11

13

17

19

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

5 Factorial – 5! = 1 \* 2 \* 3 \* 4 \* 5

#! /bin/bash

read -p "Enter number: " num

fact=1

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

do

fact=$((fact\*i))

done

echo "Factorial of" $num "is" $fact

Enter number: 5

Factorial of 5 is 120

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.

#! /bin/bash

read -p "Enter the Number: " num

flag=0

if [ $((num%2)) -eq 0 ]

then

echo 2

fi

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

do

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

then

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

do

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

then

flag=0

break;

else

flag=1

fi

done

if [ $flag -eq 1 ]

then

echo $i

fi

fi

done

Enter the Number: 30

2

3

5