Repetition Practice Problems with for loop

BridgeLabz
Employability Delivered

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.

```
for (( n=0;n<11;n++ ))
do
if (( n==0 ))
then
let p=1
else
let p=p*2
echo "2^$n = $p"
fi
done
```

```
$ sh pow.sh
2^1 = 2
2^2 = 4
2^3 = 8
2^4 = 16
2^5 = 32
2^6 = 64
2^7 = 128
2^8 = 256
```

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

$$H_n = \frac{1}{1} + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \ldots + \frac{1}{n}$$

```
read -p "Enter number " n

for (( a=0;a<1;a++ ))
do
echo -n "Hn = "
for (( i=1;i<=n;i++ ))
do
echo -n "1/$i + "
done
done
```

```
Enter number 5
Hn = 1/1 + 1/2 + 1/3 + 1/4 + 1/5
```

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

```
echo "ENTER NUMBER TO CHECK PRIME OR NOT"
read -p "enter " n
for (( i=2;i<=n/2;i++ ))
do
if (( n%i==0 ))
then
flag=1
break
fi
done
if (( flag==0 ))
then
echo "prime"
else
echo "not a prime"
fi
```

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

5. Write a program that computes a factorial of a number taken as input.
   5 Factorial – 5! = 1 * 2 * 3 * 4 * 5

```
echo -n "Enter a number"
read num

fact=1

for((i=2;i<=num;i++))
{
  fact=$((fact * i))
}

echo $fact
```

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.