Sri Krishna College of Technology

Name :PRADEEP G A
Email :727821tuee113@skct.edu.in
Roll no:727821TUEE113
Phone :6369114503
Branch :Sri Krishna College of Technology
Department :EEE
Batch :2021-25
Degree :BE-EEE

2021_25_IRC_Deep Dive into Algorithms

ADSA_Math_Algo_Primary_Focus

Attempt : 1
Total Mark : 50
Marks Obtained : 50

Section 1 : Coding

1. Problem statement

Sieve of Eratosthenes

Given a number n, print all primes smaller than or equal to n.

Answer

```
// You are using Java
import java.util.Scanner;
class main{
   static boolean checkPrime(int n){
     for(int i=2;i*i<=n;i++){
            if(n%i==0)
            {
               return false;
            }
         }
         return true;
   }

   public static void main(String args[]){
      Scanner obj = new Scanner(System.in);
```

```
        int n=obj.nextInt();
        int primeList[] = new int [n+1] ;
        for(int i = 0 ; i <= n ; i++)
        primeList[i] = 1 ;
        primeList[0] = primeList[1] = 0 ;

        for(int i=2;i*i<=n;i++) //O(root(n))
        {
           if(checkPrime(i)) //O(log(n))
           {
              // Sieve Technique O(log(n))
              for(int j = 2*i ; j <= n ; j += i)
                 primeList[j] = 0 ;
           }
        }
        for(int i = 0 ; i <= n ; i++)
        {
           if(primeList[i] == 1)
              System.out.print(i + " ") ;
        }
     }
}
```

Status : Correct **Marks : 10/10**

2. Problem statement

Sieve of Sundaram

Given a number n, print all primes smaller than or equal to n.

Answer

```
// You are using Java
import java.util.Scanner ;
import java.util.Arrays;
class Main {
static int SieveOfSundaram(int n)
   {
     int nNew = (n - 1) / 2 ;
     boolean marked[] = new boolean[nNew + 1] ;
     Arrays.fill(marked, true) ;
```

```
      for (int i = 1; i <= nNew; i++)
     for (int j = i; (i + j + 2 * i * j) <= nNew; j++)
      marked[i + j + 2 * i * j] = false ;



     if (n > 2)
     System.out.print(2 + " ") ;
     for (int i = 1; i <= nNew; i++)
        if (marked[i])
          System.out.print(2 * i + 1 + " ") ;
      return -1;
   }
   public static void main(String[] args)
   {
      Scanner sc = new Scanner(System.in) ;
     int n = sc.nextInt();
     SieveOfSundaram(n);
   }
}
```

Status : Correct **Marks : 10/10**

3. Problem statement

Toggle the Bulbs

There are n bulbs that are initially off. You first turn on all the bulbs, then you turn off every second bulb.

On the third round, you toggle every third bulb (turning on if it's off or turning off if it's on). For the ith round, you toggle every i bulb. For the nth round, you only toggle the last bulb.

Return the number of bulbs that are on after n rounds.

Answer

```
// You are using Java
import java.util.Scanner;
class p
{
   public static void main(String args[])
```

```
    {
        Scanner sc=new Scanner(System.in);
        int n=sc.nextInt();
        System.out.println((int)(Math.sqrt(n)));
    }
}
```

Status : Correct ***Marks : 10/10***

4. Problem statement

Prime number

Check whether the given number(N) is Prime or not.

Answer

```
// You are using Java
import java.util.Scanner;
class p
{
    public static void main(String args[])
    {
        Scanner sc=new Scanner(System.in);
        int n=sc.nextInt();
        for(int i=2;i*i<=n;i++)
        {
            if(n%i==0)
            {
                System.out.print("Not Prime");
                System.exit(0);
            }
        }
        System.out.print("Prime");
    }
}
```

Status : Correct ***Marks : 10/10***

5. Problem statement :

Euclidean Algorithm

Write a program to compute the GCD of 2 numbers using recursion(Euclidean Algorithm).

Answer

```
// You are using Java
import java.util.Scanner;
class p
{
   public static void main(String args[])
   {
      Scanner sc=new Scanner(System.in);
      int n1=sc.nextInt();
      int n2=sc.nextInt();
      int result=hcf(n1,n2);
      System.out.printf("G.C.D of %d and %d is %d",n1,n2,result);
   }
   static int hcf(int n1,int n2)
   {
      if(n2!=0)
      return hcf(n2,n1%n2);
      else
      return n1;
   }
}
```

Status : Correct ***Marks : 10/10***