
Assignement-VI
National Institute of Technology Silchar
Due date: 04 January 2023

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Subject Code: CS-101
Semester: 1st
Course: B.Tech

Subject: Introduction to Computer Programming
Department: CSE
Section: J

Answers should be submitted in a scanned copy of the handwritten format. Also, submit the source code of the corresponding questions in your github link.

Write functions for all questions given below.

1. Given two matrices, $A[m][n]$ and $B[m][n]$ of size $m \times n$. The two matrices are filled with random numbers. Write a program to solve the following equations:

$$\mu = \frac{1}{mn} \sum_{i=0}^{m-1} \sum_{j=0}^{n-1} \sqrt{|A_{ij}^2 - B_{ij}^2|}$$

$$A_{ij} = \mu A_{ij}$$

$$B_{ij} = \mu B_{ij}$$

2. Write a program to generate prime numbers using the Sieve of Eratosthenes method.
3. Write a program to generate a random one-time password of eight characters long. The password should contain at least one small letter, one capital letter, one symbol, and one digit.
4. Given two array $X[2][n]$ and $Y[2][n]$ containing random numbers, i.e., 2 rows and n columns. Write a program to solve the following equation-

$$\frac{1}{n} \sum_{i=0}^{(n-1)} \sqrt{(X_{1i} - X_{0i})^2 - (Y_{1i} - Y_{0i})^2}$$

Hints: X_{0i} means $X[0][i]$ in C programming. Initialization of the array is as given below-

```
//#include "random.h"
for (i=0; i<n; i++)
{
    X[0][i]=random32();
    X[1][i]=random32();
    Y[0][i]=random32();
    Y[1][i]=random32();
}
```

-
5. Given an array $A[]$ containing n random numbers. Write a program to find the mean, variance, and standard deviation of the given array.

The mean is defined as

$$\mu = \sum_{i=0}^{(n-1)} A_i$$

The variance is defined as

$$\sigma^2 = \frac{1}{n} \sum_{i=0}^{(n-1)} (A_i - \mu)^2$$

The standard deviation is defined as

$$\sigma = \sqrt{\frac{1}{n} \sum_{i=0}^{(n-1)} (A_i - \mu)^2}$$

Hints: Initialize the array using random numbers as follows-

```
//#include "random.h"
for ( i=0; i<n; i++)
    A[ i]=random32 ( );
```