Name: Udandarao Sai Sandeep
Roll Number: 180123063
Dept.: Mathematics and Computing

Q1.

To calculate the discrepancy, function **'func()'** was implemented**.** It takes in **N** as the input variable. The value of **n** has been set to **10000** for all cases. In each case, the [0,1] closed interval was divided into N equal intervals, and the number of x_i's in each case was counted for each interval. **Vol(A)** is equal to 1/N. This is because the lebesgue measure of a closed interval is equal to the length of the interval. The **discrepancy** was calculated by taking the maxmimum of **abs** (cnt(A)/n – vol(A)) for all sub-intervals, where **cnt(A)** represents the number of x_i's lying in A and **vol(A)** represents the lebesgue measure of A. The ouput obtained is as follows:

```
The supremum obtained for N = 10 is : 0.1
The supremum obtained for N = 20 is : 0.05
The supremum obtained for N = 50 is : 0.02
The supremum obtained for N = 100 is : 0.01

Table :

N                       Discrepancy

10                         0.1
20                         0.05
50                         0.02
100                        0.01
```

Ouptut in Tabulated form:

N	Discrepancy
10	**0.1**
20	**0.05**
50	**0.02**
100	**0.01**

With increase in the value of N, the discrepancy value decreases.