

# ASSIGNMENT 3

CS21BTECH11020

## 1 EXAMPLE 14 (STATISTICS)

1.1. Find the mode of the following marks (out of 10) obtained by 20 students.

4 6 5 9 3 2 7 7 6 5 4 9 10 10 3 4 7 6 9 9

TABLE 1.1.1

**Solution:** Since we know *mode* is the value that appears most often in a set of data values.

We can also write,

If  $\mathbf{X}$  is a discrete random variable, the *mode* is the value  $x$  ( i.e,  $\mathbf{X} = x$  ) at which the probability mass function (  $\mathbf{P}_{\mathbf{X}}(\mathbf{X} = x)$  ) takes its maximum value.

Taking Data from Table 1.1.1,

Let the marks obtained be the random variable ( $\mathbf{X}$ ). Then  $\mathbf{X}$  can be.

$$\mathbf{X} = 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 \quad (1.1.1)$$

Distribution of data is as follow:

Marks Obtained (out of 10) (X)	Frequency of Student	Probability Distribution ( $\mathbf{P}(\mathbf{X}=\mathbf{x})$ )
0	0	0
1	0	0
2	1	0.05
3	2	0.1
4	3	0.15
5	2	0.1
6	3	0.15
7	3	0.15
8	0	0
9	4	0.2
10	2	0.1

TABLE 1.1.2

Plotting the data from Table 1.1.2

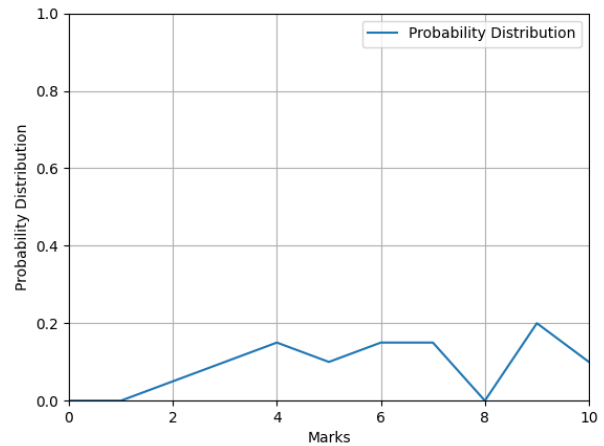


Fig. 1.1.1. From graph  $x = 9$  has maximum value of probability mass function

Clearly, From Graph 1.1.1,  $x = 9$  has maximum value of probability mass function. Therefore,

$$mode = 9 \quad (1.1.2)$$