

## Assignment 4

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### Question :

A die is thrown 1000 times with frequencies for outcomes 1,2,3,4,5 and 6 as given in the following table:

Outcome	1	2	3	4	5	6
Frequency	179	150	157	149	175	190

Table 1:

Find the probability of getting each outcome.

### Solution :

Let Rolling of a dice be the experiment and the random variable  $X \in \{1, 2, 3, 4, 5, 6\}$  denote the outcome of the experiment.

Where  $X = i$  denote the occurrence of outcome  $i$  in the experiment for  $i = 1, 2, 3, 4, 5, 6$

$$\Pr(X = 1) = \frac{179}{1000} = 0.179 \quad (1)$$

$$\Pr(X = 2) = \frac{150}{1000} = 0.150 \quad (2)$$

$$\Pr(X = 3) = \frac{157}{1000} = 0.157 \quad (3)$$

$$\Pr(X = 4) = \frac{149}{1000} = 0.149 \quad (4)$$

$$\Pr(X = 5) = \frac{175}{1000} = 0.175 \quad (5)$$

$$\Pr(X = 6) = \frac{190}{1000} = 0.190 \quad (6)$$

If we plot PMF(Probability Mass Function) of theoretical and experimental data we get the following bar graph

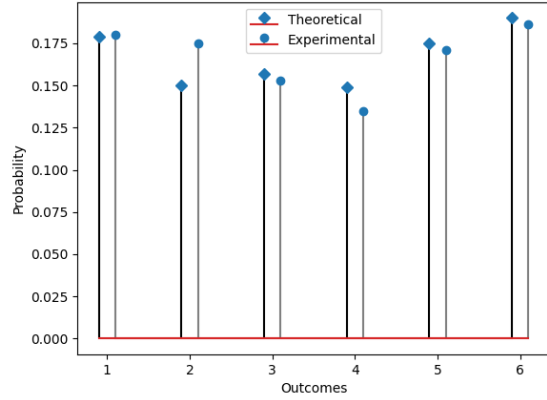


Figure 1: PMF of theoretical and experimental data

For a fair die probability of each number =  $\frac{1}{6}$

$$\Rightarrow \Pr(X = i) = \frac{1}{6} \quad (7)$$

for  $i = 1, 2, 3, 4, 5, 6$