AI1103 : Assignment 1

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Download all python codes from

https://github.com/YashasTadikamalla/AI1103/tree/main/Assignment1/codes

and latex codes from

https://github.com/YashasTadikamalla/AI1103/blob/main/Assignment1/Assignment1.tex

PROBLEM(1.2)

A bag contains lemon flavoured candies only. Malini takes out one candy without looking into the bag. What is the probability that she takes out

1) an orange flavoured candy ?
2) a lemon flavoured candy ?

SOLUTION(1.2)

Given, a bag containing exclusively lemon flavoured candies. Let the random variable $X = \{0, 1\}$ represent the outcome of the flavour of the candy Malini picks. $X = 0$ denotes an orange flavoured candy, while $X = 1$ denotes a lemon flavoured candy.

We know, for an event E with a sample space S, the probability for it to occur is given by

$$Pr(E) = \frac{n(E)}{n(S)} \tag{1.2.1}$$

where $n(E), n(S)$ denote the number of favourable outcomes(i.e, event E), total number of outcomes respectively.

Let us set the number of candies in the bag as 1000.

$$\therefore n(Can) = 1000 \tag{1.2.2}$$

1) Since there is no orange flavoured candy in the bag, Malini choosing an orange flavoured candy is an impossible event.

$$\therefore n(X = 0) = 0 \tag{1.2.3}$$

So, the probability for picking an orange flavoured candy is

$$Pr(X = 0) = \frac{n(X = 0)}{n(Can)} \tag{1.2.4}$$

Substituting the values in (1.2.4), we get

$$Pr(X = 0) = \frac{0}{1000} = 0 \tag{1.2.5}$$

Therefore, the probability for Malini choosing an orange flavoured candy is 0.

2) As it is given that all the candies in the bag are lemon flavoured, Malini choosing a lemon flavoured candy is a sure event.

$$\therefore n(X = 1) = n(Can) = 1000 \tag{1.2.6}$$

So, the probability for picking a lemon flavoured candy is

$$Pr(X = 1) = \frac{n(X = 1)}{n(Can)} \tag{1.2.7}$$

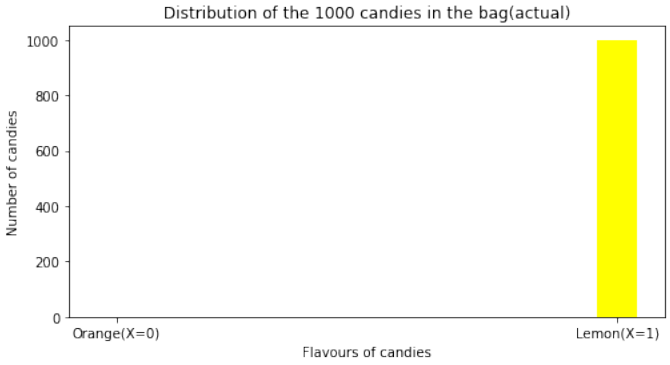
Substituting in (1.2.7), we get

$$Pr(X = 1) = \frac{1000}{1000} = 1 \tag{1.2.8}$$

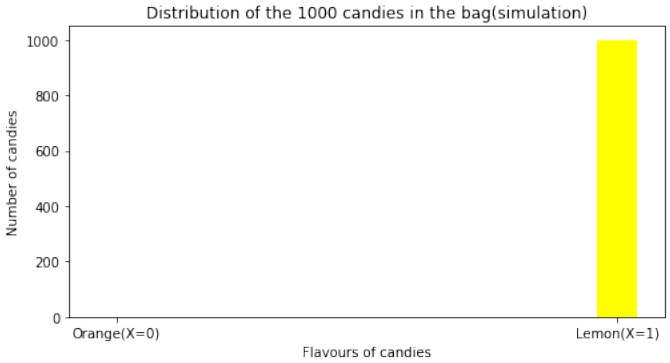
Therefore, the probability for Malini choosing a lemon flavoured candy is 1.

P.T.O

Here are the plots depicting the distribution of the candies in the bag.



a)



b)