Assignment 4
CBSE Class 10 Probability
Example 2

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Question:

A bag contains a red ball, a blue ball and a yellow ball, all the balls being of the same size. Kritika takes out a ball from the bag without looking into it. What is the probability that she takes out the

(i) yellow ball?
(ii) red ball?
(iii) blue ball?

Solution:

Let the random variable $X \in \{0, 1, 2\}$ denote the outcome of the experiment, where $X = 0, 1, 2$ denote the event of choosing the yellow, red, and blue balls respectively.

Since all the balls are identical, each event is equally likely. So we have

$$\Pr(X = 0) = \Pr(X = 1) = \Pr(X = 2) \quad (1)$$

And since the 3 events are exhaustive,

$$\Pr(X = 0) + \Pr(X = 1) + \Pr(X = 2) = 1 \quad (2)$$

And so we have the theoretical solution:

$$\Pr(X = 0) = \Pr(X = 1) = \Pr(X = 2) = \frac{1}{3} \quad (3)$$

The program `./codes/sim.py` simulates this problem experimentally.