Assignment 1

V.Samyuktha - MS20BTECH11024

Download python code from

https://github.com/v−samyuktha/AI1103/blob/main/Assignment−1.py

and latex-tikz code from

https://github.com/v−samyuktha/AI1103/blob/main/Assignment−1.tex

1 QUESTION

There are 40 students in class X of a school of whom 25 are girls and 15 are boys. The class teacher has to select one student as the class representative. She writes the name of each student on a separate card, the cards being identical. Then she puts the cards in a bag and stirs them thoroughly. She then draws one card from the bag. What is the probability that the name written on the card is the name of
(i) a girl?
(ii) a boy?

2 SOLUTION

Let random variable $X \in \{0, 1\}$ denote the outcomes of the experiment of drawing a card from the bag, where 0 corresponds to a girl and 1 to a boy respectively.
Then $n(X = 0) = 25$ and $n(X = 1) = 15$

The binomial distribution is defined using the PMF:

$$p(X) = \begin{cases} p & X = 1 \\ 1 - p & X = 0 \\ \text{otherwise} \end{cases} \tag{2.0.1}$$

$$p(X = 1) = \frac{n(X = 1)}{n(X = 0) + n(X = 1)} \tag{2.0.2}$$

$$p(X = 1) = \frac{15}{25 + 15} \tag{2.0.3}$$

$$\begin{aligned} p(X = 1) &= 0.375 \\ p(X = 0) &= 1 - p(X = 1) = 0.625 \end{aligned} \tag{2.0.4}$$

Hence, the probability of picking a boy is 0.375 and a girl is 0.625 respectively.