

AI1103-Assignment 1

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Download all python codes from

<https://github.com/Umesh-k26/Assignment/blob/main/Assignment1/assignment.py>

and latex-tikz codes from

<https://github.com/Umesh-k26/Assignment/blob/main/Assignment1/assignment.tex>

To find $P(X = 2 | X \geq 1)$.

$$\begin{aligned} P(X = 2 | X \geq 1) &= \frac{P(X \geq 1) \cap P(X = 2)}{P(X \geq 1)} \\ &= \frac{P(X = 2)}{P(X \geq 1)} \\ &= \frac{\frac{1}{4}}{\frac{3}{4}} \\ &= \frac{1}{3} \end{aligned}$$

QUESTION

A family has two children. What is the probability that both the children are boys given that at least one of them is a boy?

\therefore The probability that both the children are boys given that at least one of them is a boy is $\frac{1}{3}$.

SOLUTION

Given, a family has two children.

Let's denote girl by 'G' and boy by 'B'.

Sample space of the outcomes is given by :

$$S = [(B, B), (G, B), (B, G), (G, G)]$$

Let X denote the random variable representing number of boys.

$$X = \{0, 1, 2\}$$

$$P(X = 0) = \frac{1}{4}$$

$$P(X = 1) = \frac{2}{4}$$

$$P(X = 2) = \frac{1}{4}$$

$$P(X \geq 1) = \frac{3}{4}$$