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

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?

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 :

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

X - Random variable for number of boys.

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

where $n = 2$ and $p = \frac{1}{2}$

X = x	$\Pr(X = x)$
X = 0	${}^2C_0 \times q^2$
X = 1	${}^2C_1 \times q \times p$
X = 2	${}^2C_2 \times p^2$

To find $\Pr(X = 2 \mid X \geq 1)$.

$$\Pr(X = 2 \mid X \geq 1) = \frac{\Pr(X = 2)}{\Pr(X \geq 1)} \tag{0.0.1}$$

$$= \frac{\frac{1}{4}}{\frac{3}{4}} \tag{0.0.2}$$

$$= \frac{1}{3} \tag{0.0.3}$$