

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.

X - Random variable for number of boys.

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

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

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

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

$$\Pr(X = 2 | X \geq 1) = \frac{\Pr(X = 2)}{\Pr(X \geq 1)} \quad (0.0.1)$$

$$= \frac{\frac{1}{4}}{\frac{3}{4}} \quad (0.0.2)$$

$$= \frac{1}{3} \quad (0.0.3)$$