

# Assignment 1

Gyara Yagnavalkya - CS20BTECH11019

Download all python codes from

<https://github.com/Yagna20/AI1103/blob/main/Assignment1/Assignment%201.py>

and latex-tikz codes from

<https://github.com/Yagna20/AI1103/edit/main/Assignment1/Assignment1.tex>

So the probability that both the children are female is  $\frac{1}{2}$ .

## 1 PROBLEM 2.5

A couple has two children, (i) Find the probability that both children are males, if it is known that at least one of the children is male. (ii) Find the probability that both children are females, if it is known that the elder child is a female.

## 2 SOLUTION

Let  $X \in \{0, 1, 2, 3\}$  represent a random variable where

- $0 \rightarrow$  elder male and younger male.
- $1 \rightarrow$  elder male and younger female.
- $2 \rightarrow$  elder female and younger male.
- $3 \rightarrow$  elder female and younger female.

(i) From the given information

$$\Pr(X = 3) = 0 \quad (2.0.1)$$

$$\Pr(X = 0) = \frac{1}{3} \quad (2.0.2)$$

$$\Pr(X = 1) = \frac{1}{3} \quad (2.0.3)$$

$$\Pr(X = 2) = \frac{1}{3} \quad (2.0.4)$$

$$(2.0.5)$$

So the probability that both the children are male is  $\frac{1}{3}$ . (ii) From the given information

$$\Pr(x = 0) = \Pr(x = 1) = 0 \quad (2.0.6)$$

$$\Pr(x = 2) = \frac{1}{2} \quad (2.0.7)$$

$$\Pr(x = 3) = \frac{1}{2} \quad (2.0.8)$$

$$(2.0.9)$$