AI1103-Assignment 1

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Download all python codes from

https://github.com/cs20btech11007/assignment1/blob/main/assignment1/assignment1.py

and latex-tikz codes from

https://github.com/cs20btech11007/assignment1/blob/main/assignment1/assignment1.tex

Problem 1.12

A coin is biased so that the head is 3 times as likely to occur as tail. If the coin is tossed twice, find the probability distribution of number of tails.

sol.

let X be random varaible X$\in$ $\{0, 1, 2\}$ denotes outcomes of tail in a experiment.
using binomial distribution and now finding probability distribution of number of tails in the events.

$$Pr(X = k) = {}^{n}C_k p^k (1-p)^{n-k} \tag{0.0.1}$$

Here,

Symbol	Meaning
k	no. of tails in two throws of a coin
n	no. of throws = 2
p	Pr of getting tail in single throw=$\frac{1}{4}$

TABLE 0: This table gives the meaning of each symbol used in the formula

To find the probability of getting tails in 2 throws of a single coin:

$$\Pr(X = 0) = {}^{2}C_0 \times \left(\frac{1}{4}\right)^{0} \times \left(\frac{3}{4}\right)^{2-0} = \frac{9}{16} = 0.5625 \tag{0.0.2}$$

$$\Pr(X = 1) = {}^{2}C_1 \times \left(\frac{1}{4}\right)^{1} \times \left(\frac{3}{4}\right)^{2-1} = \frac{6}{16} = 0.375 \tag{0.0.3}$$

$$\Pr(X = 2) = {}^{2}C_2 \times \left(\frac{1}{4}\right)^{2} \times \left(\frac{3}{4}\right)^{2-2} = \frac{1}{16} = 0.0625 \tag{0.0.4}$$

(0.0.5)