AI1103: Assignment 6

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Download all latex codes from

https://github.com/Geetha495/Assignment6/blob/main/Assignment6.tex

Download all python codes from

https://github.com/Geetha495/Assignment6/blob/main/Assignment6.py

1 Problem

A coin is tossed 4 times. What is the probability of getting heads exactly three times ?

1) $\frac{1}{4}$
2) $\frac{3}{8}$
3) $\frac{1}{2}$
4) $\frac{3}{4}$

2 Solution

In an experiment of tossing a coin $n(= 4)$ times, random variable $X \in \{0, 1, 2, 3\}$ follows binomial distribution.
The binomial distribution formula is:

$$\Pr(X = k) = {}^{n}C_k \times p^k \times (1 - p)^{n-k} \tag{2.0.1}$$

Where:

k	total number of "successes"
p	probability of a success on an individual trial
n	number of trials = 3

TABLE 4: The binomial distribution formula

Let X denote the number of heads

$$\Pr(X = 3) = {}^{4}C_3 \times \left(\frac{1}{2}\right)^3 \times \left(1 - \frac{1}{2}\right)^{4-3} \tag{2.0.2}$$

$$= \frac{1}{4} \tag{2.0.3}$$

Correct option is 1.