Assignment 4

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I. Section 3 problem 5

Code source: https://github.com/harshal9876/AI5002/blob/main/Assignment_4/Codes/Assignment_4.py

Problem: Find the mean number of heads in three tosses of a fair coin.

Solution:
Let **X** : No of heads
We toss 3 coins simultaneously
The possible number of heads we can get is 0 Heads,1 Heads, 2 Heads, 3 Heads
So the possible values **X** can take is 0,1,2,3 .

Tabulating

X	Outcomes	Number of outcomes	P(X)
0	(T,T,T)	1	1/8
1	(T,H,T),(T,T,H),(H,T,T)	3	3/8
2	(H,H,T),(H,T,H),(T,H,H)	3	3/8
3	(H,H,H)	1	1/8

So the probability distribution is :

X	0	1	2	3
P(X)	1/8	3/8	3/8	1/8

The mean number is given by :

$$\begin{aligned}\mu = E(x) &= \sum_{i=1}^{n} x_i p_i \\ &= 0 \times \frac{1}{8} + 1 \times \frac{3}{8} + 2 \times \frac{3}{8} + 3 \times \frac{1}{8} \\ &= 0 + \frac{3}{8} + \frac{6}{8} + \frac{3}{8} \\ &= \frac{12}{8} \\ &= \frac{3}{2} \\ &= 1.5\end{aligned}$$

Mean number of heads in a three coin toss is 1.5 .