

Assignment 1

Gaureesha Kajampady - EP20BTECH11005

Download all python codes from

<https://github.com/gaureeshk/AI1103/blob/main/Codes/assignment1.py>

and latex-tikz codes from

<https://github.com/gaureeshk/AI1103/blob/main/assignment1.tex>

probability of getting a tail, $q = \frac{1}{2}$

From binomial distribution we know that,

$$\Pr(X = r) = {}^nC_r p^r q^{n-r} \quad (2.0.1)$$

$$\begin{aligned} \Pr(X = n) &= {}^{2n}C_n \times \left(\frac{1}{2}\right)^n \times \left(\frac{1}{2}\right)^n \\ &= \frac{{}^{2n}C_n}{4^n} \end{aligned} \quad (2.0.2)$$

1 PROBLEM

For each element in a set of size $2n$, an unbiased coin is tossed. The $2n$ coin tosses are independent. An element is chosen if the corresponding coin toss were head. The probability that exactly n elements are chosen is:

(A)

$$\frac{{}^{2n}C_n}{4^n}$$

(B)

$$\frac{{}^{2n}C_n}{2^n}$$

(C)

$$\frac{1}{{}^{2n}C_n}$$

(D)

$$\frac{1}{2}$$

Hence option (A) is correct.

2 SOLUTION

The number of elements chosen is equal to the number of heads obtained by $2n$ coin tosses. Let X be a random variable with value of X equal to the number of heads obtained.

probability of getting a head, $p = \frac{1}{2}$