AI1103: Assignment 5

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Download all latex codes from

https://github.com/Geetha495/Assignment5/blob/main/Assignment5.tex

1 Problem

A fair coin is tossed n times. The probability that the difference between number of heads and tails is $(n-3)$ is

1) 2^{-n}
2) 0
3) ${}^{n}C_{n-3}2^{-n}$
4) 2^{-n+3}

2 Solution

Let number of heads be k , then number of tails are $n-k$.
Given : $|k-(n-k)| = n-3$
Case(i)

$$2k - n = n - 3$$
$$k = n - \frac{3}{2}$$

As k cannot be fractional, it's impossible.
Case(ii)

$$-(2k - n) = n - 3$$
$$k = \frac{3}{2}$$

As k cannot be fractional, it's impossible.

Thus, probability that the difference between number of heads and tails is $(n-3)$ is 0
Correct option is 2