Assignment 2

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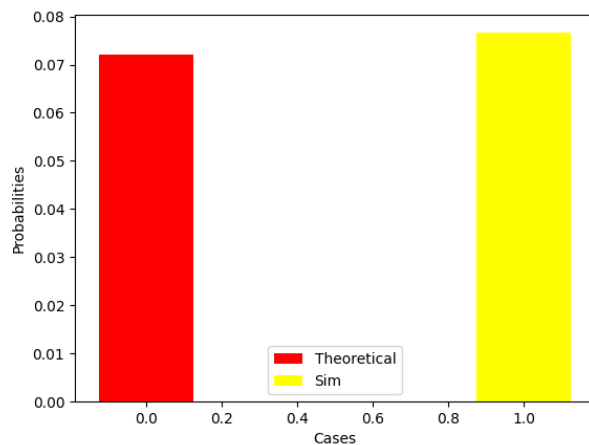
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1 PROBLEM

The probability of getting a "head" in a single toss of a biased coin is 0.3. The coin is tossed repeatedly till a "head" is obtained. If the tosses are independent, then the probability of getting "head" for the first time in the fifth toss is........

2 SOLUTION

Let $X \in \mathbb{N}$ represent the number of times the experiment is performed.
$X = k$ represents $k - 1$ failures were obtained before getting 1 success. p represents the probability of success

$$p_X(k) = \begin{cases} (1-p)^{k-1} \times p & k \in \mathbb{N} \\ 0 & otherwise \end{cases} \quad (2.0.1)$$

Using (2.0.1) we get

$$\Pr(X = 5) = (1-p)^{k-1} \times p$$
$$= (0.7)^4 \times 0.3 = 0.07203 \quad (2.0.2)$$

The graph in given below