AI1103-Assignment 1

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PROBLEM

(4.6) Find the probability of throwing at most 2 sixes in 6 throws of a single die.

SOLUTION

Let X represent the number of sixes in six throws of a dice

$X \in \{0,1,2,3,4,5,6\}$

By Binomial distribution formula,

$$P(X = k) = \binom{n}{k}p^k(1 - p)^{n-k}$$

Here,

Symbol	k	n	p
Meaning	no. of sixes in six throws of a dice	no. of throws = 6	probability of getting a six in a single throw of dice = $\frac{1}{6}$

TABLE 0: Description

To find the probability of getting atmost two sixes in six throws of a single dice:

$$P(X \leq 2) = P(X = 0) + P(X = 1) + P(X = 2)$$

$$P(X = 0) = \binom{6}{0} \times (\frac{1}{6})^0 \times (\frac{5}{6})^{6-0}$$

$$P(X = 1) = \binom{6}{1} \times (\frac{1}{6})^1 \times (\frac{5}{6})^{6-1}$$

$$P(X = 2) = \binom{6}{2} \times (\frac{1}{6})^2 \times (\frac{5}{6})^{6-2}$$

$$P(X \leq 2) = \left(\frac{5^6}{6^6}\right) \times 1 + \left(\frac{5^5}{6^6}\right) \times 6 + \left(\frac{5^4}{6^6}\right) \times 15$$

$$= 0.937714$$