

AI1103-Assignment 1

Shambhu Prasad Kavir - CS20BTECH11045

Download all python codes from

<https://github.com/Shambhu-K/Assignment-1/blob/main/assignment-1.py>

and latex-tikz codes from

<https://github.com/Shambhu-K/Assignment-1/blob/main/Assignment-1.tex>

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

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

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

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

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

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

$$= 0.937714$$

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

TABLE 0: Description