AI1103 Assignment 1

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Download all python codes from

https://https://github.com/Sandeep−L/AI1103_1/blob/main/Assignment_1_AI1103.py

and latex-tikz codes from

https://https://github.com/Sandeep−L/AI1103_1/blob/main/Assignment_1_AI1103.tex

4.5 Question

Find the probability of getting 5 exactly twice in 7 throws of a die.

Solution

There are 6 outcomes when we throw a die, which are independent of one another. The probability of getting 5 on the die

$$p = \frac{1}{6} \tag{0.0.1}$$

The die is thrown 7 times and are not dependent on one another

$$n = 7 \tag{0.0.2}$$

Let the Random Variable be X denote the number of 5s in 7 throws By Binomial Distribution, we have

$$\Pr(X = k) = \binom{n}{k} p^k (1-p)^{n-k} \tag{0.0.3}$$

We should get 5 exactly twice, so $k = 2$

Variables	
p	Probability that outcome is 5 when we throw the die
n	No of times the die is thrown
X	Random Variable denoting the number of 5s out of n number of throws
k	Required number of times 5s appear on the die which is 2

TABLE 0: Definition of the variables

The probability of getting 5 exactly twice in 7 throws of a die is given by

$$\Pr(X = 2) = \binom{7}{2} \left(\frac{1}{6}\right)^2 \left(\frac{5}{6}\right)^5 \tag{0.0.4}$$

$$\Pr(X = 2) = 0.234428 \tag{0.0.5}$$

Hence, the probability of getting 5 exactly twice in 7 throws of a die is 0.234428