Assignment 17.2

Problem Statement:

A die marked A to E is rolled 50 times. Find the probability of getting a "D" exactly 5 times.

Solution:

Let
⇨ 'n' represent the number of trials attempted, and that
⇨ 'k' is the count of successes that is to be attained in those 'n' trials.
⇨ This implies that number of failures clearly will be 'n - k'.

's' is the probability of succeeding in a trial, we get that the probability of failure as '1 - s'.

N = 50 (No of times the dice is rolled)

Success = Getting a 'D', p(success) = 1/5   and P(failure) = 1-1/5 = 4/5

Using Binomial distribution

Probability (Getting a 'D' exactly 5 times) = $C(n,k) \ s^k \ (1-s)^{(n-k)}$

P (5) = [(50!) / (5! * 45!)] * (1/5) ^ 5 * (3/4) ^ 45

C(50,5) = (50*49*48*47*46)/(5*4*3*2*1) = 2118760

 (1/5) ^ 5 = 0.00032

(4/5) ^ 45 = 4.35561E-05

P(getting a "D" exactly 5 times out of 50) = 2118760 * 0.00032 * 4.35561E-05

= 0.029531204

Thus the probability of getting a 'D' exactly 5 times = 0.02953