Assignment 1

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Download all python codes from

https://github.com/Nik123−cpp/Assignment−1/blob/main/assignment1.py

and latex-tikz codes from

https://github.com/Nik123−cpp/Assignment−1/blob/main/Assignment1.tex

1 Problem 3.4

The probability that a bulb produced by a factory will fuse after 150 days is 0.05.Find the probability that out of 5 such bulbs
(i) none
(ii) not more than one
(iii)more than one
(iv) atleast one
will fuse after 150 days of use.

Solution
Let X be random variable which denoting number of bulbs fuses after 150 days of use,among the 5 bulbs.Then by Bionomial Distribution.

$$\Pr(X = r) = \binom{n}{r} p^r q^{n-r} \tag{1.0.1}$$

$$\Pr(X \geq k) = \sum_{r=k}^{n} \binom{n}{r} p^r q^{n-r} \tag{1.0.2}$$

$$\Pr(X \leq k) = \sum_{r=0}^{k} \binom{n}{r} p^r q^{n-r} \tag{1.0.3}$$

$$\Pr(X > k) = \sum_{r=k+1}^{n} \binom{n}{r} p^r q^{n-r} \tag{1.0.4}$$

$$n = 5, \quad p = 0.05, \quad q = 0.95 \tag{1.0.5}$$

n	5	5	5	5
Condition	$\Pr(X = 0)$	$\Pr(X \leq 1)$	$\Pr(X > 1)$	$\Pr(X \geq 1)$
Value	0.77378	0.97740	0.02259	0.22621
Case	(i)	(ii)	(iii)	(iv)