AI1103-Assignment 1

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Download latex codes from

https://github.com/srivatsav01/Assignment−1/blob/main/Assignment−1.tex

Question 1.8

A person buys a lottery ticket in 50 lotteires in each of which his chance of winning a prize is $\frac{1}{100}$ what is the probability that he will win a prize

1) at least once?
2) exactly once?
3) at least twice?

Solution 1.8

1) Let X be a random variable such that X=k represents atleast k number of lotteries are won.

2) Let Y be a random variable such that Y=k represents exactly k number of lotteries are won.

$$P(Y=k) = \binom{n}{k} p^k (1-p)^{n-k} \tag{1.8.1}$$

$$P(X=k) = 1 - \sum_{i=0}^{k-1} \binom{n}{i} p^i (1-p)^{n-i} \tag{1.8.2}$$

Total number of lottery tickets=50

	P($X=1$)	$1-\left(\frac{99}{100}\right)^{50} = 0.39499394$
	P($Y=1$)	$50 \times \frac{1}{100} \times \left(1-\left(\frac{1}{100}\right)\right)^{50} = 0.30555861$
	P($X=2$)	1-(1-$\left(\frac{99}{100}\right)^{50}$=0.08943533

TABLE 2: Probabilities of each of given cases