BINOMIAL DISTRIBUTION

- Trials of a random experiment are called **Bernoulli trials**, if they satisfy the following conditions :

  (i) Each trial has exactly two outcomes : success or failure.

  (ii) The probability of success remains the same in each trial.

  Thus probability of getting x successes in n-Bernoulli trial is

  $$P(x \text{ successes out of } n \text{ trials}) = \frac{n!}{x!\,(n-x)!} \times p^x \times q^{n-x} = {}^nC_x\, p^x \times q^{n-x}$$

  Clearly, $P(x \text{ successes})$, i.e. ${}^nC_x\, p^x\, q^{n-x}$ is the $(x+1)^{th}$ term in the binomial expansion of $(q+p)^n$.

- Let $X \sim B(n, p)$ then mean of expected value of r.v. X is denoted by μ.
  $E(X)$ and given by $\mu = E(X) = np$.

  The variance is denoted by $Var(X)$ and given by $Var(X) = npq$.

  Standard deviation of X is denoted by $SD(X)$ or σ and given by $SD(X) = \sigma_x = \sqrt{Var(X)}$