Experiment 1

1. Simulate Bernoulli random variable with p=0.6. Plot probability mass function.
2. Simulate Binomial random variable with p=0.6, n=50. Plot probability mass function.
3. Find mean and variance of a Binomial random variable (x) by creating an R function for finding q^{th} moment of x. Consider p=0.6, n=50.
4. Consider a server which is handling requests from its users. We are interested in finding an optimal set of computing resources that will be required by the server. The resources can be identified if we know the average number of requests that the server will receive in a given time interval T.
   Divide T into small intervals of t. Let there be n such intervals. In each interval t, a request may or may not come with p=0.4. Assume that t is so small that only a single request can come in interval t. The arrival of request in an interval t is Bernoulli random variable. Therefore, the total number of requests in interval T is Binomial random variable. (a)Simulate the experiment multiple times and find the probability mass function for the random variable X (Number of requests in time interval T). (b) Find the expected value and variance of X. (c) Using your results in (b), what can you say about max. number of requests in T.
5. Simulate Poisson random variable (X) with lambda=10,20,30,40,50. Plot probability mass function.
6. The probability mass function obtained in 4 (a) will be similar to one of the plots obtained in 5. Find the lambda value.
7. Implement 4 for increasing values of n and validate 6. Show a plot (error vs n) as an output of the experiment.
8. Answer the questions in shared report.