Assignment

1. Simulation and Probability Distributions in R

   R comes with a set of pseudo-random number generators that allow you to simulate from well-known probability distributions like:Binomial, Poisson, Exponential, Uniform,Normal and many more. In this assignment you will simulate and plot the distribution functions.

   (a) A bank issues credit cards to customers.Based on the past data, the bank has found out that 75% of all accounts pay on time the bill. If a sample of 25 accounts is selected at random from the current database, construct the Binomial Probability Distribution of accounts paying on time. Plot the distribution of n clients paying on time.

   Hint
   We have p=0.75 (pays on time), n=25 individuals, We need to calculate P(X=x) when x=0,1,2,3,4,5,…,25

   Try to change the number of individuals, what do you observe?

   (b) Suppose you get approximately 25 calls a day from your friends. Simulate a 365 day call and visualize it by plotting the same. How can you interpret the histogram?

2. Imagine that you are in the classroom (the first one entered in the class!). Now you observe each one of your classmates enter the classroom. As and when they enter, you notice their birthday. When will you find two of your classmates having the same birthday? To find this you simulate the problem with **n (number of classmates)** and the Probability P(A) that two of the classmates have the same birthday. **Plot the simulated data.** What do you notice?

For the above problems, I would like to evaluate the findings in the lab. So be ready before the deadline.