**PROBABILITY and STATISTICS**

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**ASSIGNMENT-2**

**Data Science Fall-21 Score:100**

**Question-1:** You are surveying people exiting from a polling booth and asking them if they voted independent. The probability (p) that a person voted independent is 20%. What is the probability that 15 people must be asked before you can find 5 people who voted independent? **(25 points) (negative binomial distribution)**

**Question-2:** A man is known to speak the truth 2 out of 3 times. He throws a die and reports that the number obtained is a four. Find the probability that the number obtained is actually a four**. (25 points) (Bayes theorm)**

**Question-3:** It is estimated that 50% of emails are spam emails. Some software has been applied to filter these spam emails before they reach your inbox.

A certain brand of software claims that it can detect 99% of spam emails, and the probability for a false positive (a non-spam email detected as spam) is 5%. Now if an email is detected as spam, then what is the probability that it is in fact a non-spam email? **(30 points)**

**Question-4**: Calculate the probability density function of normal distribution using the following data. x = 3, μ = 4 and σ = 2 **(20 points)**