<u>**Assignment: Probability - 02**</u>

Instructions:
- Solve the questions with pen and paper
- Scan the solutions and convert them to pdf
- Upload the pdf document on Github
- Share the link to your solution on Github

Q1. The flight delay times of planes leaving an airport in California are monitored (on time flights or early departures are not included, hence no negative times). The delay in departures of 6 flights is noted. These delay times are 5.5, 10.5, 13, 22.5, 45, 55 minutes. The sample mean of this data set is 25.25 and sample standard deviation is 20.2 minutes. (use a t-distribution with 5 df)

Q2. MyGrocery.com, an online grocery store, makes a claim to deliver orders within 90 minutes. Based on past data, it was found that the avg time to deliver is 68 min with standard deviation of 14 minutes and follows a normal distribution.
1. What proportion of orders is delivered after 90 minutes?
2. What should be the promised delivery time, if the target is to deliver at least 99% orders before that time?

Q3. Gauges are used to reject all components for which a certain dimension is not within the specification 1.50 ± d. It is known that this measurement is normally distributed with mean 1.50 and standard deviation 0.2. Determine the value d such that the specifications "cover" 95% of the measurements.

Q4. The number of miles traveled by a given car before its transmission ceases to function is governed by the exponential distribution with mean 100, 000. What is the probability that a car's transmission will fail during its first 50, 000 miles of operation?

Q5. The time to failure (in hours) of bearings in a mechanical shaft is satisfactorily modelled as a Weibull random variable with α =5000 and gamma = 0.5.
1. Determine the probability that a bearing lasts fewer than 6000 hours.
2. What is the mean time to failure?