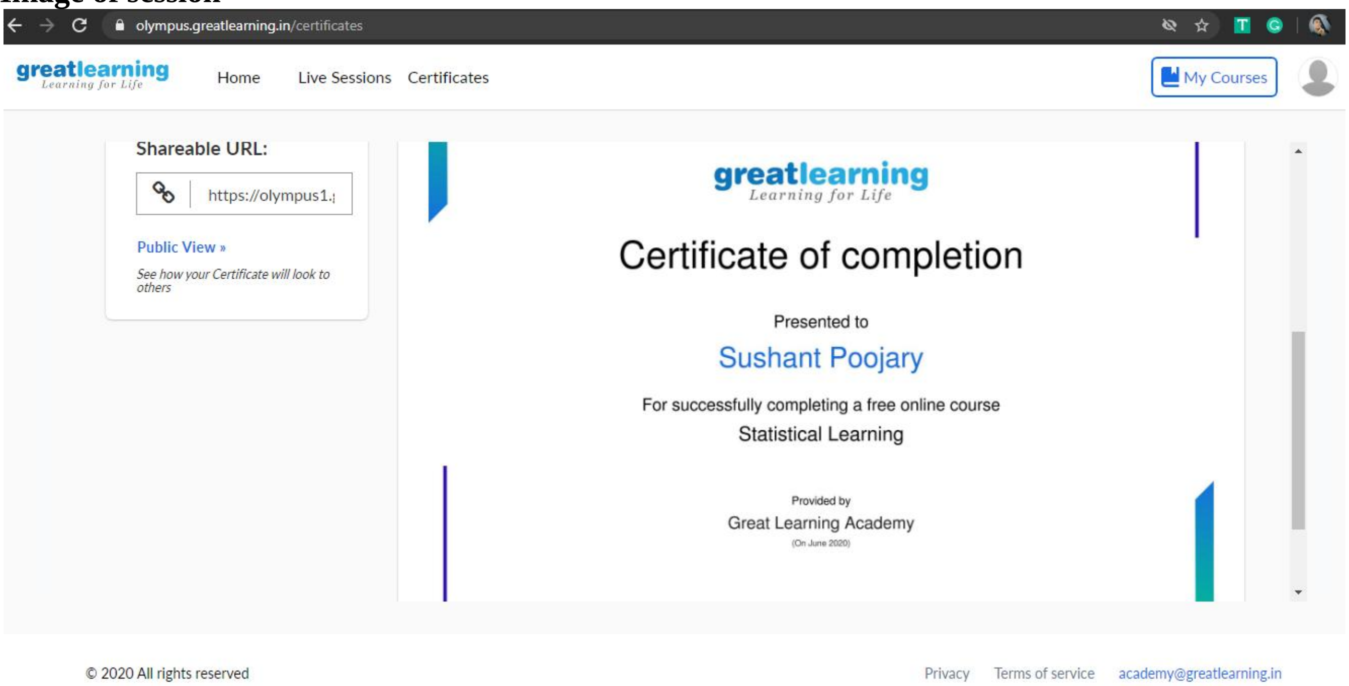
DAILY ASSESSMENT FORMAT

Date:	**17th June 2020**	**Name:**	**Poojary Sushant**
Course:	**Statistical Learning**	**USN:**	**4AL18EC400**
Topic:	**Introduction to Probability, Rules for Probability Calculation, Bayes theorem Normal distribution**	**Semester & Section:**	**6th sem 'B"**
Github Repository:	**Sushant7026**		

FORENOON SESSION DETAILS
Image of session



Report –
Introduction to probability:

Probability is the science of how likely events are to happen. At its simplest, it's concerned with the roll of a dice, or the fall of the cards in a game. ... Probability is used, for example, in such diverse areas as weather forecasting and to work out the cost of your insurance premiums.

Rules for Probability Calculation:

Before discussing the rules of probability, we state the following definitions:

- Two events are **mutually exclusive** or **disjoint** if they cannot occur at the same time.
- The probability that Event A occurs, given that Event B has occurred, is called a **conditional probability**. The conditional probability of Event A, given Event B, is denoted by the symbol P(A|B).
- The **complement** of an event is the event not occurring. The probability that Event A will not occur is denoted by P(A').
- The probability that Events A and B *both* occur is the probability of the **intersection** of A and B. The probability of the intersection of Events A and B is denoted by P(A ∩ B). If Events A and B are mutually exclusive, P(A ∩ B) = 0.
- The probability that Events A or B occur is the probability of the **union** of A and B. The probability of the union of Events A and B is denoted by P(A ∪ B) .
- If the occurrence of Event A changes the probability of Event B, then Events A and B are **dependent.** On the other hand, if the occurrence of Event A does not change the probability of Event B, then Events A and B are **independent.**

Rule of Subtraction:

- The probability of an event ranges from 0 to 1.
- The sum of probabilities of all possible events equals 1.

The rule of subtraction follows directly from these properties.

Rule of Multiplication:

The rule of multiplication applies to the situation when we want to know the probability of the intersection of two events; that is, we want to know the probability that two events (Event A and Event B) both occur.

Rule of Addition:

The rule of addition applies to the following situation. We have two events, and we want to know the probability that either event occurs.

Bayes' theorem:

In probability theory and statistics, Bayes' theorem (alternatively Bayes's theorem, Bayes's law or Bayes's rule) describes the probability of an event, based on prior knowledge of conditions that might be related to the event. For example, if the risk of developing health problems is known to increase with age, Bayes's theorem allows the risk to an individual of a known age to be assessed more accurately than simply assuming that the individual is typical of the population as a whole.

One of the many applications of Bayes's theorem is Bayesian inference, a particular approach to statistical inference. When applied, the probabilities involved in Bayes' theorem may have different probability interpretations. With Bayesian probability interpretation, the theorem expresses how a degree of belief, expressed as a probability, should rationally change to account for the availability of related evidence. Bayesian inference is fundamental to Bayesian statistics. Bayes's theorem is named after Reverend Thomas Bayes (1701?–1761), who first used conditional probability to provide an algorithm (his Proposition 9) that uses evidence to calculate limits on an unknown parameter, published as An Essay towards solving a Problem in the Doctrine of Chances (1763). In what he called a scholium, Bayes extended his algorithm to any unknown prior cause. Independently of Bayes, Pierre-Simon Laplace in 1774, and later in his 1812 Théorie analytique des probabilités, used conditional probability to formulate the relation of an updated posterior probability from a prior probability, given evidence. Sir Harold Jeffreys put Bayes's algorithm and Laplace's formulation on an axiomatic basis, writing that Bayes's theorem "is to the theory of probability what the Pythagorean theorem is to geometry

Normal distribution:

Normal distribution, also known as the Gaussian distribution, is a probability distribution that is symmetric about the mean, showing that data near the mean are more frequent in occurrence than data far from the mean. In graph form, normal distribution will appear as a curve. The normal distribution is the most common type of distribution assumed in technical stock market analysis and in other types of statistical analyses. The standard normal distribution has two parameters: the mean and the standard deviation. For a normal distribution, 68% of the observations are within +/- one standard deviation of the mean, 95% are within +/- two standard deviations, and 99.7% are within +- three standard deviations. The normal distribution model is motivated by the Central Limit Theorem. This theory states that averages calculated from independent, identically distributed random variables have approximately normal distributions, regardless of the type of distribution from which the variables are sampled (provided it has finite variance). Normal distribution is sometimes confused with symmetrical. Symmetrical distribution is one where a dividing line produces two mirror images, but the actual data could be two humps or a series of hills in addition to the bell curve that indicates a normal distribution.