**Python Advanced Assignment 21**

Q1. What is a probability distribution, exactly? If the values are meant to be random, how can you

predict them at all?

Ans-) A probability distribution is a mathematical function that describes the likelihood of obtaining different possible outcomes in an experiment. The values are not meant to be random, but they represent the probabilities of the different outcomes of a random event. The distribution provides a way to predict the likelihood of different outcomes.

Q2. Is there a distinction between true random numbers and pseudo-random numbers, if there is

one? Why are the latter considered “good enough”?

Ans-) True random numbers are generated from a truly random source, such as radioactive decay or atmospheric noise. Pseudo-random numbers are generated using an algorithm that produces a sequence of numbers that appears random but is actually deterministic. The latter are considered "good enough" because they have properties that resemble those of true random numbers, such as uniform distribution and unpredictability.

Q3. What are the two main factors that influence the behaviour of a normal probability distribution?

Ans-) The two main factors that influence the behavior of a normal probability distribution are the mean and the standard deviation. The mean determines the center of the distribution, and the standard deviation determines the spread of the distribution.

Q4. Provide a real-life example of a normal distribution.

Ans-) A real-life example of a normal distribution is the distribution of heights or weights in a population. The majority of people will be clustered around the mean, and the further away from the mean you go, the fewer people you will find.

Q5. In the short term, how can you expect a probability distribution to behave? What do you think will happen as the number of trials grows?

Ans-) In the short term, the behavior of a probability distribution can be unpredictable due to random variation. However, as the number of trials grows, the distribution tends to stabilize around a predictable pattern, known as the law of large numbers.

Q6. What kind of object can be shuffled by using random.shuffle?

Ans-) A list object can be shuffled by using random.shuffle.

Q7. Describe the math package’s general categories of functions.

Ans-) The math package's general categories of functions include mathematical constants, arithmetic functions, power and logarithmic functions, trigonometric functions, hyperbolic functions, and statistical functions.

Q8. What is the relationship between exponentiation and logarithms?

Ans-) Exponentiation and logarithms are inverse operations. Exponentiation raises a base to a power, while logarithms find the power to which a base must be raised to produce a given number. The relationship can be expressed as log (base a) (b) = c if and only if a^c = b.

Q9. What are the three logarithmic functions that Python supports?

Ans-) The three logarithmic functions that Python supports are the natural logarithm (math.log), the base-10 logarithm (math.log10), and the arbitrary base logarithm (math.log (x, base)).