

Worksheet 2 – Machine Learning

Q1 – B & C

Q2 – B

Q3 – A,C & D

Q4 – A & B

Q5 – A & C

Q6 – C

Q7 – D

Q8 – A

Q9 – A

Q10 – B

Worksheet 2 - Python Answers

Q1 – B

Q2 – C

Q3 – A

Q4 – A

Q5 – B

Q6 – C

Q7 – B

Q8 – A & D

Q9 – C & D

Q10 – C

Q11 - Differentiate between a list, tuple, set and dictionary.

Ans - In Python, a list, tuple, set, and dictionary are all different data structures with unique properties and use cases. Here's a brief overview of each:

- **List:**
A list is a mutable ordered sequence of elements that can contain any type of data, such as numbers, strings, or other lists. Lists are defined using square brackets '[']' and each element in the list is separated by a comma. Elements in a list can be accessed by their index, which starts from 0. Lists allow for duplicate elements and can be modified, which means that elements can be added, removed, or updated after the list is created.
- **Tuple:**
A tuple is an immutable ordered sequence of elements that can also contain any type of data. Tuples are defined using parentheses '(')' and each element is separated by a comma. Like lists, elements in a tuple can be accessed by their index. However, tuples cannot be modified after they are created, which means that elements cannot be added, removed, or updated.
- **Set:**
A set is an unordered collection of unique elements that can also contain any type of data. Sets are defined using curly braces '{ }' or the set() function, and elements are separated by commas. Unlike lists and tuples, sets do not allow for duplicate elements, and they are not indexed, which means that elements cannot be accessed by their position in the set. However, sets have powerful built-in methods for performing set operations like union, intersection, and difference.
- **Dictionary:**
A dictionary is an unordered collection of key-value pairs, where each key is associated with a value. Keys in a dictionary must be unique and immutable, and values can be any type of data. Dictionaries are defined using curly braces '{ }' and colons (:) to separate the key-value pairs. Values can be accessed by their corresponding keys, and dictionaries also have built-in methods for adding, updating, and removing key-value pairs.

Q12. Are strings mutable in python? Suppose you have a string "I+Love+Python", write a small code to replace '+' with space in python.

Ans - No, strings are immutable in Python, which means that once a string is created, its individual characters cannot be modified. Instead, you can create a new string with the desired modifications.

Here's some code to replace the plus signs with spaces in the string "I+Love+Python":

```
String = " I+Love+Python"
```

```
New_string=string.replace('+', ' ')
```

```
Print(New_string)
```

Q13. What does the function `ord()` do in python? Explain with an example. Also, write down the function for getting the data type of a variable in python.

Ans - In Python, the **`ord()`** function returns an integer representing the Unicode character. The Unicode standard assigns a unique number, called a code point, to each character in every language and writing system that is commonly used in the world today.

Here's an example of using the **`ord()`** function in Python:

```
>>> ord('A')  
65
```

In this example, the **`ord()`** function is used to get the Unicode code point for the uppercase letter 'A'. The function returns the integer value 65, which is the code point for the character 'A' in the Unicode standard.

To get the data type of a variable in Python, you can use the `type()` function. Here's an example:

```
In [2]: x = 42  
>>> type(x)  
  
Out[2]: int
```

Q 14 and 15 program has written in attached jupyter note book

Worksheet 2 – Statistics

Q1 – c

Q2 – c

Q3 – b

Q4 – d

Q5 – a

Q6 – c

Q7 - c

Q8 –b

Q9 – a

Q10 –b

Q11 – a

Q12 – b

Q13. What is T distribution and Z distribution?

Ans - The t-distribution and the standard normal (Z) distribution are both probability distributions that are commonly used in statistical inference.

The standard normal (Z) distribution is a continuous probability distribution that is symmetric and bell-shaped. It is centered at zero and has a variance of 1. The area under the curve of the Z distribution between any two points represents the probability that a random variable will take on a value within that range. The Z distribution is often used in hypothesis testing when the sample size is large or when the population standard deviation is known. In these cases, the Z distribution can be used to calculate test statistics and p-values.

The t-distribution, on the other hand, is also a continuous probability distribution that is symmetric and bell-shaped. However, it has heavier tails and is less peaked than the Z distribution. The shape of the t-distribution depends on the degrees of freedom, which is a measure of the sample size. As the sample size increases, the t-distribution approaches the standard normal distribution. The t-distribution is commonly used in hypothesis testing when the sample size is small or when the population standard deviation is unknown. In these cases, the sample standard deviation is used as an estimate of the population standard deviation, and the t-distribution is used to calculate test statistics and p-values.

Q14 Is the T distribution normal ?

Ans - The t-distribution is a probability distribution that is similar to the normal (Z) distribution in shape, but it is not exactly the same. The t-distribution is bell-shaped and symmetric, but it has fatter tails and a flatter peak than the normal distribution. The shape of the t-distribution depends on the degrees of freedom, which is a measure of the sample size. As the sample size increases, the t-distribution approaches the normal distribution. When the sample size is large (usually greater than 30), the t-distribution is very similar to the normal distribution. So, in short, the t-distribution is not exactly normal, but it becomes more similar to the normal distribution as the sample size increases.

Q15 What does the T distribution tell us?

Ans- The t-distribution is a probability distribution that arises when estimating the mean of a normally distributed population in situations where the sample size is small and/or the population standard deviation is unknown. Specifically, the t-distribution provides a way to estimate the standard error of the mean of a population, which is a measure of how much the sample mean is likely to vary from the true population mean.

The t-distribution is similar in shape to the normal distribution but has heavier tails, meaning that it assigns more probability to extreme values. The shape of the t-distribution depends on the degrees of freedom, which is the number of independent observations used to estimate the mean of the population.