Numpy and Pandas

Section 1 – Numpy

- **Introduction of Numpy**
- **NdArray and Types of NdArray**
- **Data Types**
- **Array Attributes**
- **Array Creation Patterns**
- **Indexing and Slicing**
- **Broadcasting**
- **Iteration in Array**
- **Array Manipulations**
- **String Functions**
- **Math Functions**
- **Arithmetical Functions**
- **Statistical Functions**
- **Sort, Search and Counting Functions**
- **Matrix Functionality**

*1. Create a 1D NumPy array with integers from 1 to 5.
*2. Create a 2D NumPy array with shape (3, 3) and initialize it with random numbers.
*3. Find the data type of elements in a given NumPy array.
*4. Find the shape, size, and dimensions of a given NumPy array.
*5. Create a NumPy array with all zeros and a specified shape.
*6. Extract a subset of elements from a NumPy array using indexing and slicing.
*7. Multiply each element of a NumPy array by a scalar value using broadcasting.
*8. Iterate over each element in a NumPy array and calculate its square.
*9. Reshape a 1D NumPy array into a 2D array with shape (2, 3).
*10. Concatenate two NumPy arrays horizontally.

#1. Convert all elements of a NumPy array to uppercase using string functions.
#2. Calculate the mean, median, and standard deviation of a given NumPy array.
#3. Add two NumPy arrays element-wise.
#4. Sort a NumPy array in ascending order.
#5. Find the maximum and minimum values in a given NumPy array.
#6. Count the number of occurrences of a specific value in a NumPy array.
#7. Perform matrix multiplication between two NumPy arrays.
#8. Create a diagonal matrix using NumPy.
#9. Compute the dot product of two vectors using NumPy.
#10. Calculate the determinant of a 2D NumPy array.

Section 2 – Pandas

- **Introduction to Pandas**
- **Introduction to Data Structures**
- **Series and Dataframe**
- **Basic Functionality**
- **Descriptive Statistics**
- **Function Application**
- **Reindexing**
- **Iteration**
- **Sorting**
- **Indexing and Selecting Data**
- **Statistical Functions**
- **Aggregations**
- **Missing Data**
- **GroupBy**
- **Merging/Joining**
- **Categorical Data**

.*1. Create a pandas Series with integers from 1 to 5.
*2. Create a pandas DataFrame from a dictionary of lists.
*3. Find the shape, size, and dimensions of a given pandas DataFrame.
*4. Access a specific column in a pandas DataFrame.
*5. Calculate the mean, median, and standard deviation of a specific column in a pandas DataFrame.
*6. Apply a custom function to each element in a pandas Series using the apply() function.
*7. Reindex a pandas DataFrame to a specified index.
*8. Iterate over rows of a pandas DataFrame and perform a calculation on a specific column.
*9. Sort a pandas DataFrame by a specific column in ascending order.
*10. Select rows from a pandas DataFrame based on a specific condition.

#1. Perform a count of unique values in a pandas DataFrame column.
#2. Group a pandas DataFrame by a specific column and calculate the sum of another column.
#3. Merge two pandas DataFrames based on a common column.
#4. Perform an inner join between two pandas DataFrames.
#5. Convert a column in a pandas DataFrame to a categorical data type.
#6. Replace missing values in a pandas DataFrame with a specified value.
#7. Drop rows with missing values from a pandas DataFrame.
#8. Calculate the sum of missing values in each column of a pandas DataFrame.
#9. Group a pandas DataFrame by a specific column and fill missing values with the mean of the group.
#10. Perform a left join between two pandas DataFrames.