

Assignment 2

1. Array Creation:

- Write a NumPy code to create a 2D array of shape (4, 5) filled with random integers between 10 and 50.
- Create a 1D NumPy array of 20 evenly spaced values between 0 and 5.

2. Array Manipulation:

- Given a 2D array `arr`, write a code to swap the first and last rows.
- How would you flatten a 3D array into a 1D array using NumPy?

3. Array Indexing:

- Write a code to extract all elements from a NumPy array that are greater than a specified value.
- Given a 2D array, write a code to extract a subarray that contains only the second and third columns.

4. Mathematical Operations:

- Write a NumPy code to normalize a 1D array so that its values range between 0 and 1.
- Create a code that calculates the dot product of two matrices using NumPy.

5. Statistical Operations:

- Write a code to calculate the mean, median, and standard deviation of a NumPy array.
- Given an array of values, how would you find the most frequent value using NumPy?

6. DataFrame Creation:

- Write a pandas code to create a DataFrame from a dictionary with lists. Each key in the dictionary should represent a column.
- Create a pandas DataFrame from a CSV file, and display the first 10 rows.

7. DataFrame Manipulation:

- Given a DataFrame, write a code to rename columns and drop any rows with missing values.
- How would you add a new column to a DataFrame that contains the cumulative sum of another column?

8. Filtering and Selection:

- Write a code to filter rows in a DataFrame where a specific column's value is greater than 100.
- How would you select specific rows and columns from a DataFrame using ``.loc`` and ``.iloc``?

9. Handling Missing Data:

- Write a code to replace all missing values in a DataFrame with the mean of their respective columns.
- How would you drop columns in a DataFrame that contain more than 50% missing values?