Python Project

Choose a project from one of the projects below try and use as much of what you have learned as possible

Project 1

Complete the following short basic NumPy tasks.

1. Create a 1D array of numbers from 0 to 9
2. Convert a 1D array to a 2D array with 2 rows
3. Write a NumPy program to create an array of the integers from 30 to 70.
4. Write a NumPy program to append values to the end of an array.

Extension

1. Write a NumPy program to find the number of rows and columns of a given matrix.
2. Write a NumPy program to create an array of all the even integers from 30 to 70.
3. Write a NumPy program to convert a list and tuple into arrays.
4. Write a NumPy program to create a structured array from given student name, height, class and their data types.

   data_type = [('name', 'S15'), ('class', int), ('height', float)] students_details = [('James', 5, 48.5), ('Nail', 6, 52.5),('Paul', 5, 42.10), ('Pit', 5, 40.11)]

   Now sort the array on height.

Task 2: Mathematics

Complete the following short Mathematics tasks

1. Write a NumPy program to add, subtract, multiply, divide arguments elementwise.
2. Write a NumPy program to round elements of the array to the nearest integer.
3. Write a NumPy program to get true division of the element-wise array inputs.

Extension

1. Write a NumPy program to multiply a 5x3 matrix by a 3x2 matrix and create a real matrix product.
2. Write a NumPy program to create a random array with 1000 elements and compute the average, variance, standard deviation of the array elements.
3. Write a NumPy program to calculate round, floor, ceiling, truncated and round (to the given number of decimals) of the input, elementwise of a given array.
4. Write a Python program to find the maximum and minimum value of 1D array.

Optional task: Connecting Python and SQL
Using the example code to help you, connect SQL to Python and complete the following tasks. Use the NumPy library to complete the following calculations. 1. Using the club table, calculate the total cost of joining fee, membership fee and equipment fee for each club. 2. Using the fees table, calculate the total cost of the full-time fees and part-time fess after applying the scholarship discount. 3. Using the schedule table, find the Class ID with the lowest and highest feedback score.