Instructions:

In this assignment, the following constant(s) may be required:

Bday = _____(for e.g. if your Date Of Birth is 29/03/2002 then, Bday is 29)

d = 2 + (Bday % 2) = _____

m = 1 + (Bday // 2) = _____

By setting the corresponding values for the variables in your programming task, you will get 10 points.

Also, please note that all questions below are worth 10 points each.
For this assignment, please use this online editor at Process Feedback throughout your undefined work. After completing, please download and submit your process report PDF and code. Please consider following instructions while using the editor. Please note that only main.py will be executed when you try to run the code in the editor. So, please be mindful while trying to solve multiple questions using the tool. You might want to watch this video tutorial before you proceed.

- *Avoid typing in external applications and paste your content here to prevent common errors.*
- *After completing your work, review the generated report within the editor.*
- *Download files to share or submit your work.*
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The questions below are based on Module 5, so the assumption here is you will use appropriate datastructures discussed in the module to solve the problems given below.

1. Research the NumPy broadcasting rules and then create your own arrays to test the rules.

2. Create the two-dimensional arrays: array_1 = np.array([[0, d], [m, 3]]) and array_2 = np.array([[4, 2*d], [2*m, 7]])
    a. Use vertical stacking to create the *4-by-2* array named array_3 with array_1 stacked on top of array_2
    b. Use horizontal stacking to create the *2-by-4* array named array_4 with array_2 to the right of array_1.
    c. Use vertical stacking with two copies of array_4 to create a *4-by-4* array_5.
    d. Use horizontal stacking with two copies of array_3 to create a *4-by-4* array_6.

3. Research and use NumPy's one of the functions given below to do the task given below

    a. **tile** function to create a checkerboard pattern of dashes and asterisks if your bday is even.
    b. **bincount** function to count the number of occurrences of each non-negative integers in a *5-by-5* array of random integers in the range 0-99 otherwise.

4. You manage a recreational table tennis league. There are 10 participants, and to make the first round of matchups as exciting as possible, you develop a model that predicts the score difference for every possible pair of players. That is, you produce a 10x10 matrix where (i,j) represents your prediction for player i's score minus player j's score if they were to compete. Given this matrix, determine the "best" schedule for round one - the schedule whose matchups minimize the sum of squared point differentials.

5. Perform the following tasks with pandas Series:
    a. Create a Series from the list [d, m, d+m, m-d].
    b. Create a Series with five elements that are all 100*d.0 .
    c. Create a Series with d*10 elements that are all random numbers in the range 0 to 100. Use method describe to produce the Series' basic descriptive statistics.
    d. Create a Series called temperature of the floating-point values 98.6, 98.9, 100.2 and 97.9. Using the index keyword argument, specify the custom indices 'Julie', 'Charlie', 'Sam' and 'Andrea'.
    e. Form a dictionary names and values in Part(d), then use it to initialize a Series.

6. Perform the following tasks with pandas *DataFrames*:
    a. Create a DataFrame named temperatures from a dictionary of three temperature readings each for 'Maxine', 'James' and 'Amanda'.
    b. Recreate the DataFrame temperatures in Part (a) with custom indices using the index keyword argument and a list containing 'Morning', 'Afternoon' and 'Evening'.
    c. Select from temperatures the column of temperature readings for 'Maxine'.
    d. Select from temperatures the row of 'Morning' temperature readings.
    e. Select from temperatures the rows for 'Morning' and 'Evening' temperature readings.
    f. Select from temperatures the columns of temperature readings for 'Amanda' and 'Maxine'.
    g. Select from temperatures the elements for 'Amanda' and 'Maxine' in the 'Morning' and 'Afternoon'.
    h. Use the describe method to produce temperatures' descriptive statistics.
    i. Transpose temperatures.

    Sort temperatures so that its column names are in alphabetical order.

7. You own a national restaurant chain called Applewasps. To increase sales, you have decided to launch a multi-regional television marketing campaign. At the end of the campaign, you have a table of commercials indicating when and where each commercial aired, and a table of sales indicating when and where customers generated sales. To analyze the performance of each commercial, map each sale to the commercial that aired prior to the sale, in the same region.