

Homework 6 (*Due: Oct 18*)

PYTHON PROGRAMMING FOR DATA SCIENCE - COSC 3360

Department of Computer Science and Electrical Engineering

Fall Semester, 2022

Exercises

Create a **New Project** for every exercise. Take a screenshot of the source code along with its output and place the **source code** and the **screenshot** in a **zipped folder** named **LastNameFirstName_HW6**

Exercise 1

Given the following 3 lists:

```
fruitName = ['Apples', 'Oranges', 'Cherries', 'Watermelon']
```

```
fruitQuantity_2020 = [25, 25, 10, 18]
```

```
fruitQuantity_2021 = [22, 18, 9, 19]
```

Create 4 *subplots*, as shown in the Figure in the next page, that is, **plot**, **scatter**, **stack**, **pie** plots. The **x-axis** is the list: **fruitName** while the **y-axes** consist of **fruitQuantity_2020** and **fruitQuantity_2021**

Note 1: In order to create two plots in one graph, as is in first subplot, you can use:

```
ax[0][0].plot(fruitName, fruitQuantity_2020, label='2020', color = 'b')
```

```
ax[0][0].plot(fruitName, fruitQuantity_2021, label='2021', color = 'c')
```

```
ax[0][0].legend()
```

Similarly for the others but use different indices and functions

Note 2: For the **pie** chart add the respective elements from the two lists, that is, **fruitQuantity_2020** and **fruitQuantity_2021** resulting in one list

Exercise 2

Ask user to enter **min**, **max** and **step** values for the **x-axis**. Use the **np.arange()** function with the three values the user entered in order to create an array named **x**. For the **y** array use the **eval()** function and ask user to enter an **expression** (see Notes below), e.g., **'abs(x)'** or **'x**2'**. Plot (x, y) and add **label**, **xlabel**, **ylabel**, **title**, **legend** to your plot

Note 1: **eval()** is a powerful function that can parse a string and convert it into an expression, that is, **eval(expression)** where **expression = 'x**2'** will raise all x values to the power of 2

Note 2: For more examples with the **eval()** function you may check the online tutorials on *programiz* and *geeksforgeeks*

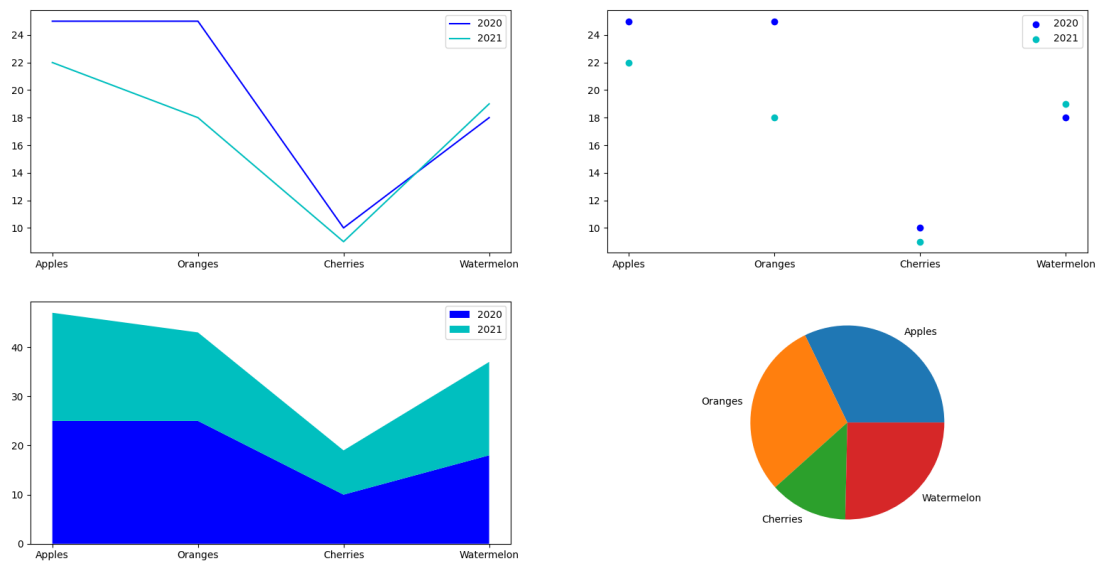
See overleaf

Exercise 3

Create a 2×4 *Numpy* array filled with *zeros*. Using a nested **for** loop enter **int** grade values to all elements of the array (assume the first row is Fall Semester and the second row is Spring Semester). Change the *shape* of the array to 4×2 . Using **slicing**, create an array that consists of the elements of the first column of the *reshaped* array and a second array that consists of the elements of the second column of the *reshaped* array

Exercise 4

Using the original 2×4 *Numpy* array from Ex. 3 filled with Fall and Spring grades, find the **min**, **max**, **mean**, and **standard deviation** of each semester, using slicing, and by calling the respective functions: **min()**, **max()**, **mean()**, **std()**



Note: Submit through Canvas