ISAM 5931 Assignment 1

In this assignment, students practice functions defined in NumPy. One of the main characteristics of NumPy is to avoid looping for processing arrays. In your solutions, there is no looping to be allowed.

Write your statements in Anacondas Jupyter Notebook. Copy each question number as a comment. Below the comment it is your solution for that question. Submit your notebook file to Blackboard and also print a hardcopy and submit the hardcopy in next class.

Q1. Create a NumPy ndarray named sales with the following values. It is assumed that the rows are for cities and the columns are for Quarters. Each value is the sales of vehicles for a specific city in a specific quarter.

[[1200, 1400, 800, 1100],

[1300, 1500, 1600, 1000],

[1100, 1200, 1000, 1050]]

Q2. Create two NumPy array named cities and quarters with the following values. The order of the cities is used for the row order in Q2 and the order of Quarters is used for the column order in Q2.

['Dallas', 'Houston', 'Austin']

['Q1', 'Q2', 'Q3', 'Q4']

Q3. Use the following statement to get an input of a city from the user:

city = input(“What is the city? “)

After the statement is executed, enter a city, such as ‘Houston’.

Write a statement to compare the cities array with the input city. For example, if the input city is ‘Houston’, the output of the comparison is a Boolean array: array([False, True, False])

Q4. Write a statement to show the sales of all quarters of the input city. For example, if the input city is “Houston”, the output is array([[1300, 1500, 1600, 1000]])

Q5. Write a statement to show the total sales of all quarters and also the average sales of each quarter of the input city. For example, if the input city is ‘Houston’, the output is 5400 and 1350.

Q6. Use the following statement to get an input of a quarter.

Quarter = input(“Which Quarter? “)

Enter a quarter in the input area, such as ‘Q2’.

Q7. Write a statement to display the sales of all cities in the input quarter. For example, if the input quarter is “Q2”, the output is

array([[1400],

[1500],

[1200]])

The textbook (slides) do not show all of the functions. The Internet is good place to learn other functions and examples. Use Google to search NumPy function amax. Understand how it works with the examples to find the largest value in an array. Especially, understand how axis is used. Kindly keep this in your mind, if axis is 0, we use values row by row or we use values vertically. If axis is 1, we use values column by column or we use values horizontally. Use amax function to solve Q8 – Q10.

Q8. Find the largest sales in the input quarter. For example, if the input quarter is ‘Q2’, the output is 1500.

Q9. Find the largest sales (in all quarters) for each city. For example, the output is array([1400, 1600, 1200]).

Q10. Find the largest sales (in all cities) for each quarter. For example, the output is array([1300, 1500, 1600, 1100])

Q11. Change the structure of sales as: use the rows for quarters and use the columns for cities. Display sales. For example, the output is:

array([[1200, 1300, 1100],

[1400, 1500, 1200],

[ 800, 1600, 1000],

[1100, 1000, 1050]])