SEN101 – Introduction to Programming Lab

Fall 2022 – Programming Homework V

Due: Wednesday, 23/11/2022, 23:59

Requirements:

1. Only properly demonstrated homework assignments will be graded.
2. Homework assignments should be solved individually, cheating will be penalized.
3. Do not share your answers with other students.
4. Submit the assignment by the deadline, electronically through Google Classroom.
5. Late submissions will not be accepted.
6. Create .cs files for each exercise and name them as EXC1, EXC2, etc.
7. Archive all .cs files into a zip/rar file. Use your student number to build your filename. Example: "21*******.zip/rar"

1 (20 Pts.) Sorting an Array

- For this question, you are asked to create an integer array with length 15 from random numbers between (-100 and 100).
- You are asked to sort the array that you randomly created and use Bubble Sort for your sorting algorithm.
- You can search for Bubble Sort and understand the algorithm behind it. A video is attached below, you can watch and reinforce your knowledge about the algorithm:
    - https://www.youtube.com/watch?v=Iv3vgjM8Pv4
- It is important for you to complete this exercise because you will use this sorting algorithm in the next exercises (and probably rest of your life).
- You can modify your output based on Figure 1.

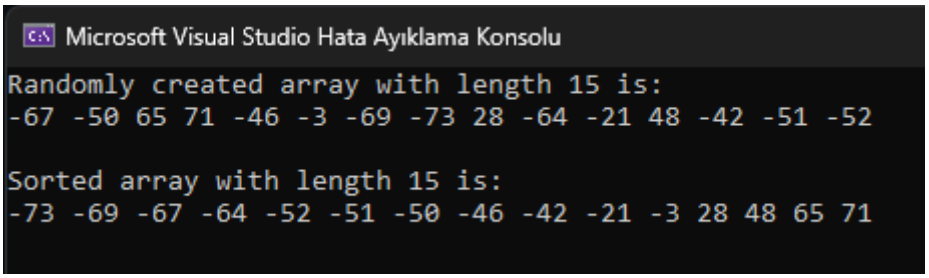

Figure 1

2 (20 Pts.) Box Plot of Dataset

- For this question, you are asked to create an integer array with length 15 from random numbers between (-100 and 100).
- You are asked to sort the array and find out Q1, Q3, IQR, Minimum, Maximum and Median values of the array and print it.
- All these values will be explained below:
    - Minimum: Smallest value on dataset.
    - Maximum: Greatest value on dataset.
    - Median: Middle value of the dataset.
    - Q1: First quarter (left middle) of the dataset.
    - Q3: Last quarter (right middle) of the dataset.
    - IQR: Q3 – Q1.
- Print out all these values.
- You can modify your output based on Figure 2.

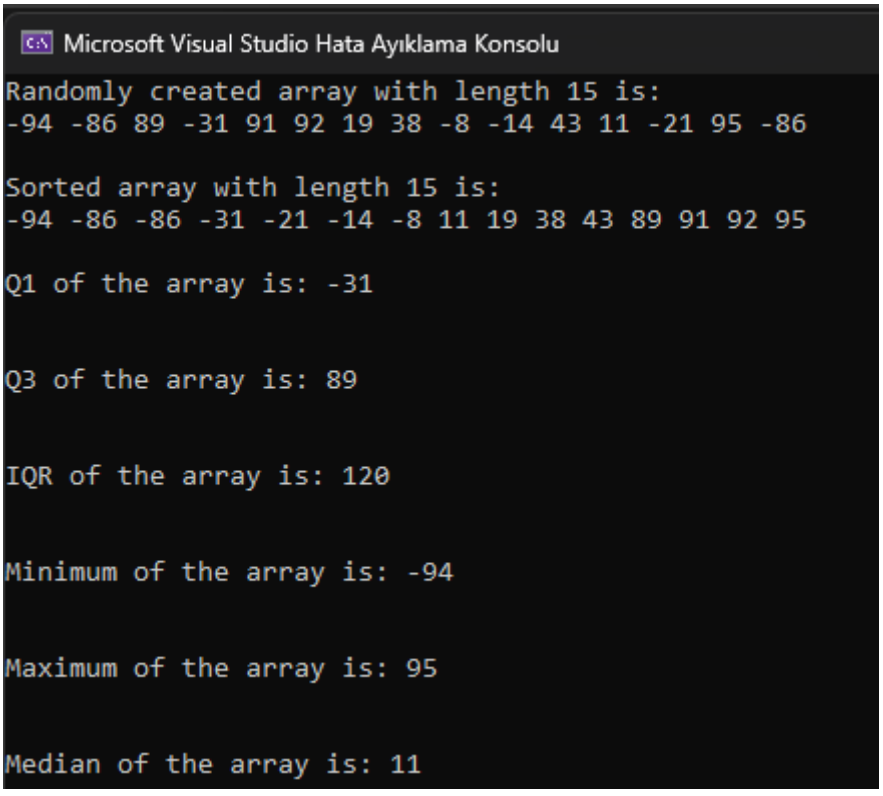

Figure 2

3 (20 Pts.) Numbers with Maximum Sum

- In this question, you are asked to take length (N) of an integer array and create an array with that length.
- You are asked to take N integer values to fill the array.
- You are asked to write a program which finds sebsequence of numbers with maximal summation in an array.
- You can modify your output based on Figure 3.

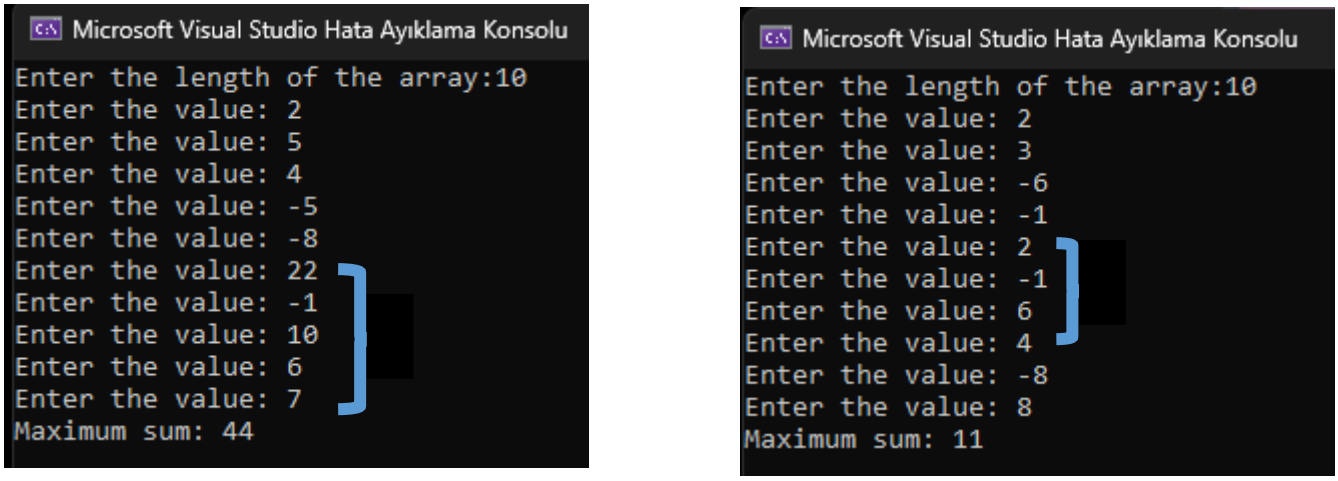

Figure 3

4 (20 Pts.) Traffic Lights

- For this question, you are asked to print some warning messages based on two traffic lights on a junction.
- You will be given 4 different arrays which indicate the current state of two different traffic lights and the duration that these lights are on.

Green	Yellow	Red
35	10	20

Red	Green	Yellow
10	20	35

- Assume that traffic lights are starting to light up at same time.

- If Green and Green matches, print a warning.
- If Green and Yellow matches, print a warning.
- If Green and Red matches, do not print a warning.
- If Yellow and Yellow matches, print a warning.
- If Yellow and Red matches, do not print a warning.
- If Red and Red matches, do not print a warning.

- You can modify your output based on Figure 4.

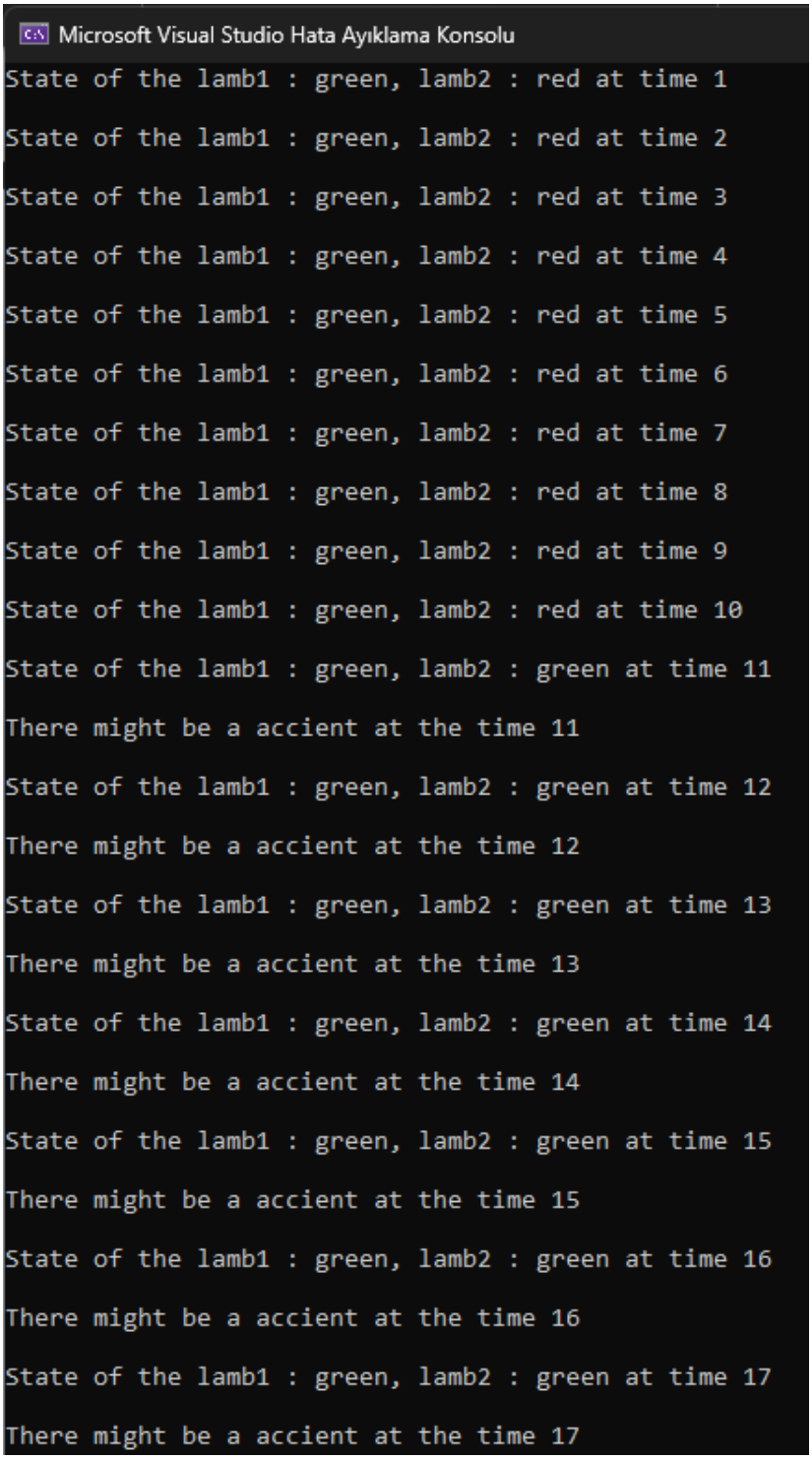

Figure 4

5 (20 Pts.) Second Largest Element

- For this question, you are asked to create an array with length 15 and fill the array with random numbers between 0 and 50.
- You are asked to find the largest and second largest element on the array.
- If the largest value appers more than once, that value should be listed as both the largest and second largest value.
- You can modify your output based on Figure 5.

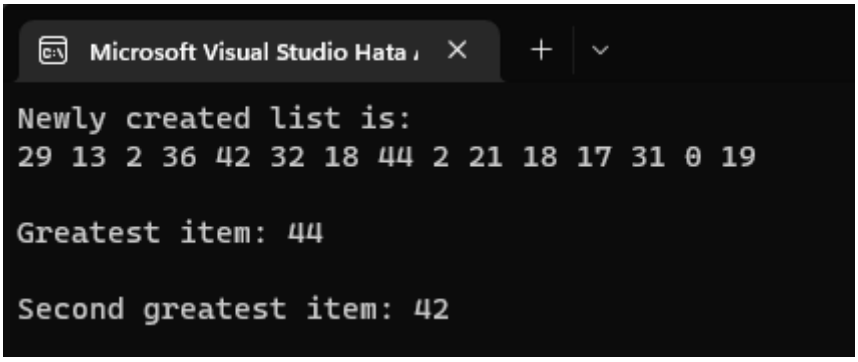

Figure 5