05.04.2022

Istanbul Technical University
Faculty of Computer and Informatics Engineering
BLG 102E - Int to Scientific&Eng.Computing (C)
Spring 2021-2022

Midterm 1

- Midterm exam will take **75 minutes** and it will be held in ITU computer laboratories.
- The questions will be announced through Ninova. **Submit your solutions to the corresponding Ninova announcements**: The solution for Q1 must be submitted to the **Midterm 1 – Q1**, whereas the solution for Q2 must be submitted to the **Midterm 1 – Q2**.
- Make sure your source code is compiled and linked successfully, and passed all the tests given with the questions before your submission.
- You are **not** allowed to use any data structures or types that have not been taught in the lectures.
- Remember to use **–std=c99 –Wall –Werror** flags while compiling with gcc.

Q1. (40 pts) Check the program "m1q1.c" and correct it to function properly according to the description:

The program takes a list of three numbers from the user, and prints "strictly increasing" if the numbers are in increasing order, or "strictly decreasing" if the numbers are in decreasing order, or "none of the two" otherwise. The list is not "strictly increasing" or "strictly decreasing" if there are same numbers in the list, e.g. 1 2 2 is not a strictly increasing list, or similarly, 3 3 2 is not a strictly decreasing list.

Assume that the user enters three valid integers.

Use "test_m1q1.t" file to test your program using calico. (python -m calico.cli m1q1.t).
Don't forget to submit your code through Ninova.

Q2. (60 pts) Modify the code "m1q2.c" to accomplish the following:

At the beginning, the user enters three integers, and then the program asks the user which task they would like to perform:

- 1 to check if the list is strictly increasing or decreasing,
- 2 to check if the list is increasing or decreasing,
- 3 to compute the maximum number in the list,
- 4 to reverse the list,
- 5 to enter a new list of integers,
- -1 to terminate the program

If the user enters 1, the program must print whether the list is strictly increasing or strictly decreasing (as described above).

If the user enters 2, the program must check if the numbers are in increasing/decreasing order and print "increasing" or "decreasing" or "none of the two". This option differs from option 1 by allowing same numbers in the list, e.g. 1 2 2 is an increasing list. But if all of the three integers are the same, the program must print "none of the two".

If the user enters 3, the program must find and print the maximum number in the list. It is allowed to see the maximum number multiple times in the list, e.g. 1 5 5 has the maximum number of 5.

If the user enters 4, the program must reverse the order of numbers in the list and print the new list. e.g. 1 4 5 must be printed as 5 4 1.

If the user enters 5, the program must ask the user to enter three new integers.

The user can ask the program to perform one of these tasks given a list of integers as much as they want until they enter -1.

Assume that the user enters three valid integers.

Use “test_m1q2.t” file to test your program using calico. (python -m calico.cli m1q2.t).
Don’t forget to submit your code through Ninova.

The C file provided for this question includes some of the lines to be printed only. Check the sample executions and the test file to complete the other output messages and the rest of the program.

A sample execution of the program can be seen below:

```
[akab@ssh midterm_ws]$ ./m1q2
Give three integers separated with space:3 6 9
Which task would you like to perform?
1 to check if the list is strictly increasing or decreasing
2 to check if the list is increasing or decreasing
3 to compute the maximum number in the list
4 to reverse the list
5 to enter a new list of integers
-1 to terminate the program
1
strictly increasing
Which task would you like to perform?
1 to check if the list is strictly increasing or decreasing
2 to check if the list is increasing or decreasing
3 to compute the maximum number in the list
4 to reverse the list
5 to enter a new list of integers
-1 to terminate the program
3
the maximum number is 9
Which task would you like to perform?
1 to check if the list is strictly increasing or decreasing
2 to check if the list is increasing or decreasing
3 to compute the maximum number in the list
4 to reverse the list
5 to enter a new list of integers
-1 to terminate the program
4
9 6 3
```

```
Which task would you like to perform?
1 to check if the list is strictly increasing or decreasing
2 to check if the list is increasing or decreasing
3 to compute the maximum number in the list
4 to reverse the list
5 to enter a new list of integers
-1 to terminate the program
5
Give three integers separated with space:6 6 3
Which task would you like to perform?
1 to check if the list is strictly increasing or decreasing
2 to check if the list is increasing or decreasing
3 to compute the maximum number in the list
4 to reverse the list
5 to enter a new list of integers
-1 to terminate the program
2
decreasing
Which task would you like to perform?
1 to check if the list is strictly increasing or decreasing
2 to check if the list is increasing or decreasing
3 to compute the maximum number in the list
4 to reverse the list
5 to enter a new list of integers
-1 to terminate the program
5
Give three integers separated with space:1 1 1
Which task would you like to perform?
1 to check if the list is strictly increasing or decreasing
2 to check if the list is increasing or decreasing
3 to compute the maximum number in the list
4 to reverse the list
5 to enter a new list of integers
-1 to terminate the program
2
none of the two
Which task would you like to perform?
1 to check if the list is strictly increasing or decreasing
2 to check if the list is increasing or decreasing
3 to compute the maximum number in the list
4 to reverse the list
5 to enter a new list of integers
-1 to terminate the program
-1
[akab@ssh midterm_ws]$
```