Lab 8

Deadline 11:59PM Nov 27

Descriptions

In this lab, you will write a dynamic array that takes different types of data. It will be an user interactive program.

Requirements

The program command will be just ./a.out and it will prompt the user the following.
What data type do you want?

1) Int
2) Float
3) Scientific
4) Character

Based on the user input, you will create a dynamic array. The array size is not know ahead of time, so you will have to allocate the space dynamically. Do not use a large fixed size array as this will result in penalty. You should write the code in a way that the array size increases as the user types in more inputs. It is called an array, but there is no restriction on what data structure you use. You will have to make the data structure work like an array.

After the first menu, you will prompt two menu options, which are:

1) Input the data
2) Sort the array
3) Index the array
4) Exit the program

When Option 1) is selected, you will prompt the user:

Input the data:

The user will hit an enter and you can assume that if I chose int, I will put integer data type only. In case of a character, it will only type in a single character. Scientific notation will be of the form YY.XXeYY. I will have up to two decimal places. It is not guaranteed that it will be two decimal places only. YY can be any length and it will always be provided, meaning if I don't want a digit there, then I will put 0. After user hits an enter after inputting a data, you will prompt the user back to the previous menu item which is:

1) Input the data
2) Sort the array
3) Index the array
4) Exit the program

When a user selects Option 3), you will ask the user the following menu:

Please input the index

If I inserted, 1, 2, 3, 4, then your array has 1 through 4. In this menu, if I put 3, then you should print 4.

When a user selects Option 2), you will perform a merge sort and print the result. If I selected a float and typed 1.0, 0.0, 2.0, -1, you will print

2.0
1.0
0.0
-1.0

It is in descending order. Same for the character where it is printed from a->z and I will only input lower case letters. After sorting, your original array is sorted. This means when I select Option 3) to index and type 1, it should print 1.

Note that there will be no corner case testing, and all your code must be in lab8.c. Your program must be written in generic way, so there must not be separate functions for each data type. What this means is there must be only one sort function, one index function, etc. The code will be visually inspected, so there will be penalties if data specific functions or data structures are used. However, a generic printf is difficult, so I will let you have a type specific printf, but other than this, everything else should be generic. Lastly, in each run, I will only test one data type. If I finished testing your code for int, I will exit the program and relaunch the code to test double.

Grading

This lab will be marked out of 10. For full marks this week, you must:

- (1 point) Correctly use git/GitHub and the repository following the handout
- (9 points) Generate a correct solution to the problem(s) in this lab

Submissions

1. Github link is posted on Learning Hub
2. lab8.c (lower case)
3. AXXXX.txt (empty file, but with you're A number as file name)
4. Your main function must be in lab8.c.