

PROJECT 1 (Due 3/5/2017)

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The goal of this project is to make you become familiar with the basic implemented in a computer programming language, like C++. For this assignment, please first visit the links <http://cpp.sh/8vb1s> for the **Maximum** and <http://cpp.sh/9f5o> **BubbleSort Programs**, written in C++.

You can complete this assignment in groups of **at most** two people, that means, either alone or with only one of your classmates. You are not allowed to use or copy someone else's code. I will use BlackBoard's *SafeAssign* feature to check whether your code is plagiarized from the internet or from your classmate. In case of a plagiarism, the assignment(s) will automatically get a zero, and the case will be brought to the Academic Integrity Committee.

The level of C++ used in this program is very basic, and the program will be explained thoroughly in class. If you prefer to use some other language (like Java, R, C, Python etc.), you are welcome to do so, but you will need to make a presentation to me in my office and explain how your code works. You may read the first 60 pages of C++ tutorial www.cplusplus.com/files/tutorial.pdf for all the programming skills you need (plus some more) on C++.

Assignments:

1. Create a **Minimum Program** in C++, by modifying the **Maximum Program** <http://cpp.sh/8vb1s> which we discussed in class. If you have any questions about how the program works, feel free to post it on Piazza.
2. Recall the definition of **selection sort algorithm**: We start with an integer array of n elements. In first step, we choose the maximum of the **first n elements**, and put it at the end of the list (to do this, you may interchange the n th element in the array with the maximum element). Then, we find the maximum of the remaining $n-1$ elements, and put it at the **$n-1$ st** location in the array, right before the n th element. And so on. The process will stop after $n-1$ steps. Write a **pseudocode** that describes this algorithm. You can look at the pseudocode for **bubblesort** and **insertionsort** (see the slides for Chapter 3 on BlackBoard) as a guidance.
3. By utilizing the **maximum function** above, create a code for **SelectionSort** in C++. You should use the **bubblesort program** <http://cpp.sh/9f5o> as the template to modify. Include the pseudocode you wrote in Step 2 at the beginning of the program as a comment. As in **BubbleSort** program, your program must first ask the user about how many integers they want to enter. Then record these integers in an array. Apply SelectionSort, and finally print the list. Make sure to delete all unnecessary line of codes after you are finished. The end result should also be user-friendly, that is, make sure your output is readable and understandable by any person who doesn't know any programming language.
4. Save the **minimum** program and the **selectionsort** program on cpp.sh. Create a short URL for each program, by clicking the "Get URL" button.
5. Finally, think of **other uses** of the programs you just created. Implement **one example** on C++, and **create a short URL** for your work.

Submit the following by e-mail by the due date:

1. Three cpp.sh links containing the codes for **Minimum**, **SelectionSort**, and the **extra program** in Step 5 above.
2. **A short paragraph** that explains how you extended the code in Step 5 to accomplish other tasks.

Grading Scheme:

70% for the accuracy: Your code is expected to do everything what is asked in the assignment. It must be error-free. Especially if you are working on this assignment in pairs...

20% for the clarity: You are expected to write comments within your code that explain the role of each of the line you add to the original code. Pay attention to spacing and indentation. Name your variables and functions appropriately.

10% for additional work: Think of other possible uses of the code you've written, and extend it to make it more useful.

Important warning: The website cpp.sh occasionally goes offline for a few minutes. So, if you can't reach the website, try again after a few minutes. This may also cause a problem when you are working on a code. Thus I suggest you to take work on a different compiler, such as Microsoft Visual Studio (to work offline) or <https://www.codechef.com/ide> etc (to work online) and FREQUENTLY SAVE YOUR WORK somewhere else. When you are finished with the assignments, send the URL of the final version via cpp.sh.