Data Structures (2028C) -- Spring 2024 – Lab 1

Topics covered: IDE, Debugging, Arrays and Structs

Lab due: ***Sunday, Jan 21 at 11:55PM for Monday Section***
Tuesday, Jan 23 at 11:55 PM for Wednesday Section

Objective:

The objective of this homework is to get familiar with the editing and compilation environment, modify a simple C++ program, design a Struct and implement it in a C++ program, and submit it to the lab instructor.

Task 1: Familiarize yourself with the IDE.

1. Download and install the IDE of your choice. My recommendation is Visual Studio. The community edition is located at https://www.visualstudio.com/downloads/. Make sure you include the C++ language during the setup.
2. Create a new project. You can name this whatever you like. Follow the steps listed here: https://learn.microsoft.com/en-us/cpp/windows/walkthrough-creating-a-standard-cpp-program-cpp?view=msvc-170
3. Type in the code for the program 8-6 (page 482-484) from Gaddis, compile and run the program.
4. Create a breakpoint on line from the program containing the part of the code **cout << setprecision(2) << fixed << showpoint;** and step through the code until you have displayed two rows of products on the screen.
5. Take a screenshot of the output screen and the IDE to include in your lab report.

Task 2: Debugging.

1. Create a new project.
2. Copy the provided code from the file Lab1-Task2.cpp into your project.
3. Compile and run the code.
4. Your user has noted the following errors. Fix them.
    a. The division in the output is incorrect
    b. The amounts in the division are incorrect. One of the values is a really large negative number that looks like garbage.
    c. The total is 0 but it shouldn't be.
5. Submit the corrected source code and include a screenshot of the output in your lab report.

Task 3: Structures.

1. Reuse the project from task 1.
2. Create a structure to replace the 4 arrays in the program (id, units, prices, sales).
3. Modify the code in the main function to have a single products array of type defined in step 2.
4. Modify the code in the rest of the program to use the single products array rather than the 4 original arrays.
5. Submit your working (meaning you tested and removed all bugs) code and include a screen

shot of the output in your lab report.

Lab Submission:

1. Write a lab report including the following information:
    a. A description of the objectives/concepts explored in this assignment including why you think they are important to this course and a career in CS and/or Engineering. Include screen shot(s) from Task 1.
    b. A description of how you approached debugging Task 2, why you think a programmer may have made the mistakes and how you think they can be avoided in the future. Include screen shot(s) from Task 2.
    c. A description of what you had to do in Task 3 including any bugs you may have introduced and had to fix. Include screen shot(s) from Task 3.
2. Include all source code from Tasks 2 and 3 as well as any special instructions to compile and run those programs.
3. Include the effort/contribution of each team member for the assignment and the code has to be properly commented.
4. Package all files in a single zip folder and submit to Canvas.

Lab Grading:

1. 20% - Lab attendance
2. 30% - Task 2 has been correctly debugged and is displaying the correct output.
3. 30% - Task 3 has been correctly converted to use a single array of structures instead of multiple arrays and is displaying the correct output.
4. 20% - Lab report contains all required information and is well written.

If the program fails to compile only 0% will be given for that Task.