# COP 3014: Spring 2022 Homework 1

#### Total Points: 50 Due: Friday, 01/28/2022 11:59:00 PM EST through Canvas

## 1 Objective

The purpose of this assignment is to

- Practice writing small programs in C++.
- Use the iostream library to perform console input and output.
- Use the iomanip library to format output.
- Use variables and arithmetic operators in C++ to do basic math.
- Familiarize yourself with the C++ programming environment and compiling and running C++ programs on CLion.

# 2 Spongebob's Catering Venture

Spongebob has a great idea for a new business venture. Instead of selling Pretty Patties on a pop-up stand, he's going to start a new catering business, where he only sells the patties in bulk. He now needs to make sure his business is profitable. He decides to calculate how much he needs to charge for each catering order of 100 patties to make this desired profit.

Running a business is not easy. Spongebob needs to account for monthly costs (rent, utilities, insurance etc), payroll (cost per employee), and material costs. He has to pay taxes. To avoid the oncoming panic attack, Spongebob enlists your help to calculate the minimum charge to ensure profitability.

Write a C++ program to help Spongebob ensure his catering business is profitable. Please make sure you follow the instructions below.

- 1. Please call your program calculator.cpp (5 points)
- 2. Include the basic header (to be published on the course website) in your program. (5 points)
- 3. Print a welcome message to the user. (5 points)
- 4. You can assume tax rate is 2.3% and that Spongebob wants to make a 12.25% pre-tax profit. Declare these 2 quantities as constants. (3 points)
- 5. Prompt the user to enter monthly costs, the number of employees, the cost per employee, and the material costs. Read the values in. (7 points)
- 6. Calculate the total cost of the business. Print this value (5 points)

- 7. Calculate the total sales (factoring in the profit) Spongebob should make and the amount of tax. Print these amounts. (6 points)
- 8. Read in the number of catering orders. Calculate the price per order, and print it. Add the tax to the total after profit before calculating this. (5 points)
- 9. Please note that all costs/prices should be printed as dollars and cents. That means all floating point numbers should be printed accurate to 2 digits after the decimal points. (4 points)
- 10. Include comments in your code as required. (5 points)
- 11. You don't need to be exact on the whitespace. A couple of extra or fewer newlines is not an issue as long as your output is legible.
- 12. You may assume that Spongebob will have at least 1 customer. The number of orders will never be 0 or less. You may also assume Spongebob will only have "full" orders i.e. you do not have to account for partial (fractional) number of customers.
- 13. You may assume that Spongebob will have 1 or more employees, and no fractional employees.
- 14. You may assume that all user input will be correct (i.e. numeric entries). You do not need to handle any situation in which the user enters a negative value, or a letter (Character).
- 15. You are restricted to the concepts introduced in the course as of 01/24/2022. DO NOT use if statements to do error checking. You do not need to do so. This is just a math calculation.

### 3 Sample Run

These are just a couple of possible sample runs. You should test your code for several different input values to make sure it works.

#### 3.1 Sample Run 1

Welcome to the profit calculator! Enter the monthly cost: \$ 60 Enter the cost per employee: \$ 18 Enter the number of employees: 1 Enter the material cost: \$ 22 Total cost of the business is \$ 100.00 Total pre-tax sales should be \$ 112.25 Tax: \$ 2.58 Enter the number of orders: 2 The required cost per order is \$ 57.42

#### 3.2 Sample Run 2

Welcome to the profit calculator! Enter the monthly cost: \$ 3500.00 Enter the cost per employee: \$ 1200.00 Enter the number of employees: 3 Enter the material cost: \$ 1450.00 Total cost of the business is \$ 8550.00 Total pre-tax sales should be \$ 9597.38 Tax: \$ 220.74 Enter the number of orders: 43 The required cost per order is \$ 228.33

## 4 General Requirements

- 1. Include the header comment with your name and other information on the top of your files.
- 2. This is individual work. You may NOT collaborate with other students in the course, former students, hire tutors to "help", copy solutions off the internet, or use pay-for solution websites, including but not limited to Chegg, CourseHero, WiseAnt, Bartelby, tutor.com, assorted Social Media groups, whatever GroupMe students might have created, etc.) This includes posting the problem statements on these websites even if you do not use the answer obtained. Doing so is a violation of the Academic Honor Code. Violation of the Honor Code will result in a 0 grade on the program, a reduced letter grade in the course and potentially more serious consequences.
- 3. No global variables (variables outside of main())
- 4. No goto statements or the auto keyword.
- 5. All input and output must be done with streams, using the library iostream
- 6. You may only use the iostream and iomanip libraries (you do not need any others for these tasks)
- 7. NO C style printing is permitted. (Aka, don't use printf). Use cout if you need to print to the screen.
- 8. When you write source code, it should be readable and well-documented (comments).
- 9. Make sure you either develop with or test with JetBrains CLion (to be sure it reports no compile errors or warnings) before you submit the program.
- 10. Testing your program thoroughly is a part of writing good code. We give you sample runs to make sure you match our output requirements and to get a general idea of how we would test your code. Matching your outputs for JUST the sample runs is not a guarantee of a 100. We have several extensive test cases.
- 11. Please make sure you've compiled and run your program before you turn it in. Compilation errors can be quite costly. We take 5 points off per compiler error for the first 9 errors. The 10th compiler error will result in a grade of 0.
- 12. Only a file turned in through Canvas counts as a submission. A file on your computer, even if it hasn't been edited after the deadline, does not count.
- 13. The student is responsible for making sure they have turned in the right file(s). We will not accept any excuses about inadvertently modifying or deleting files, or turning in the wrong files.
- 14. **Program submissions** should be done through the Canvas class page, under the assignments tab (if it's not there yet I'll create it soon.) Do not send program submissions through e-mail e-mail attachments will not be accepted as valid submissions.
- 15. The ONLY file you will submit via Canvas is calculator.cpp
- 16. General Advice always keep an untouched copy of your finished homework files in your email. These files will have a time-stamp which will show when they were last worked on and will serve as a backup in case you ever have legitimate problems with submitting files through Canvas. Do this for ALL programs.