COP3331 Lab 1

Submission Instructions:

1. Create a folder named Lab1_lastNamefirstInitial (e.g. Lab1_NealT).

2. In your folder, place a **PDF** file containing your answers to questions with a ◇.

3. Copy your directories containing your programs for questions with a ♠ into the folder; **these directories should only contain files needed to run your program, which may include one or more of the following file types: .cpp, .h., and .txt**. Do NOT include the full project (e.g., solution file). Test your program on CIRCE before submitting by compiling and running with **g++**. Your file containing main() should **always** be named main.cpp.

4. Ensure that all programs have block comments at the very beginning (starting at the first line) in the file containing main() with your name and the program's description. **The block comment's format should be identical to what's provided in Figure 2-1.**

5. Use single-line comments to describe your code's functionality as needed.

6. Do not submit anything for questions with a ♣.

7. Zip the folder and submit it via Canvas.

◇ = 5 points each, ♠ = 15 points each

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1. ♣ Read *Chapter 1: An introduction to C++ programming.*

2. ♣ Follow the instructions in Appendix A or B to set up the appropriate IDE (Visual Studio (Windows) or Xcode (macOS)).

3. ♣ Download the book's programs and exercises at the bottom of `https://www.murach.com/shop/murach-s-c-programming-382-detail` under the tab "FREE Downloads."

4. ♣ Complete Exercises 1-1 and 1-2.

5. ♠ Copy folder `ch01_circle_calculator` to a new folder named `lab1_q5`. In the new folder, edit the Circle Calculator program to receive the diameter instead of the radius from the user, and write the radius, circumference, and area to the console instead of the diameter, circumference, and area. Here's an example output:

```
Circle Calculator

Enter diameter:  10
Radius:       5
Circumference: 31.4
Area:          78.5

Bye!
```

6. ♣ Read *Chapter 2: How to write your first programs.*

7. ◇ Which of the following are valid identifiers?
`_word, CoLoR, !value, question#, one2many, Ratio, goto, +Value, break, concept, False, this`?

8. ◇ What is contained in the `iostream` header?

9. ◇ The _____ object represents the standard output stream to write a stream of characters to the console.

10. ♠ Write a program that receives five `doubles` from the user. The program should print the sum, average, product, and the absolute value (using the `cmath` library) of each number to the console. Place the main.cpp file in a folder `lab1_q10`. The console should appear as:

```
Enter five numbers: 1 -9.1 4.23 7.1 -3
Sum: 0.23
Average: 0.046
Product: 819.901
Absolute Values: 1 9.1 4.23 7.1 3
Done
```

11. ◇ A _____ is a reusable block of code that performs a specified task. A block of code consists of statements inside a set of _____.

12. ◇ In `cmath`'s `pow(base, exponent)`, `base` and `exponent` are the _____ of the `pow` function.

13. ◇ `int`, `double`, and `char` are built-in _____; `string`, on the other hand, is an _____ defined by the string class.

14. ◇ Forgetting a semi-colon at the end of statement will result in a _____ or _____ error.

15. ◇ How do runtime exceptions and logic errors differ?

16. ♠ Write a console application that computes a random midterm grade, a random final exam grade, and the average of the two scores. Set the seed for the random number generator using `time(0)`. Each grade should be an integer value between 0 and 100. Your program should start by asking the user to provide their first name, and then printing the user's first name to the console with the message:

    "Welcome, `first_name`. Were these your exam grades last semester?"

    Format the placement of each grade using tabs such that they appear to lie in the same column. After printing the grades, print the statement:

    "Maybe I didn't do so good... What do you think?"

    Receive the user's feedback; the user can enter any message that they like. Respond to the user with the message:

    "`first_name`, I understand. You feel that "`user_feedback`"; I assure you I tried my best!"

    Input the user's feedback in place of `user_feedback`. Place your program in the folder `lab1_q16`. The console should appear as:

    ```
    Hi! Enter your first name: Tempestt
    Welcome, Tempestt. Were these your exam grades last semester?

    Midterm Grade:              41
    Final Exam Grade:           85
    Average:                    63

    Maybe I didn't do so good... What do you think?
    41?! That's too low! I made a 92. Final is spot on though!
    ```

```
Tempestt, I understand. You feel that "41?! That's too low!
I made a 92. Final is spot on though!"; I assure you I tried my
best!
```

17. ♣ Complete Exercise 2-3.