CS 150 Lab 2

Introduction Variables, Assignments and Output

The purpose of today's lab session is to allow you to gain experience using primitive data types, constants, assignment statements and output statements. Each activity today will consist of a small number of computations and a set of output to display the results.

Lab 2.1: Opening and fixing C++ programs

For this next problem, you will be opening an existing program provided to you. This program contain errors that you will need to identify and fix.

Lab 2.1: Syntax & Logic errors

Opening a project:

The following instructions are for opening an existing C++ project. This could be one that I give you or one that you have created.

1) <u>You will need to copy the project to the desktop</u> before opening them in Visual Studio. Go to the 'CS150-02 Public' folder on Turing. Copy the project 02Lab_1 to your Desktop and change the name of the folder from 02Lab to 02Lab_1_XXXXXXXX where XXXXXXXX is your PUNetID. Do not try and open a project directly from Turing.

2) To open your project, start up Visual Studio. Click on 'File' from the menu, then 'Open' and 'Project/Solution'.

3) Click on the drop down box at the top of the window and select 'Desktop'. Double click on the folder '02Lab_1'.

You will see a list of files.

4) Select the Microsoft Visual Studio Solution file called '02Lab_1'. It's the one with this icon.

Click 'Open'.

This will open the project.

Build the program. It will give you errors, which are examples of a **syntax** error. You are likely to encounter many of these errors as you progress through the course, and it's important for you to learn to recognize them.

Each error message shows a line number in the file that contains the error. You can double click on the error message and Visual Studio will mark that line in the editor with a blue bar on the left of the line numbers.   Take a look at the marked lines and fix the errors.

Q. Which line numbers contained an error?   A. _____ and _____

Q. Explain the first error:

A. _____

Q. Explain the first error:

A. _____

Once you have fixed the errors and your program builds, run the program and input the number 10. Write down the output, and run the program again with another number.

Q. Do you feel that you are getting valid output? Why or why not?
A. _____

_____

_____

5) This error is called a **runtime** error, meaning the error occurs when you run the software. The program builds but one or more of the operations the programmer asked the computer to perform is incorrect. Think about the error that you see and then look in the code to try to find the line of code that contains the **runtime** error. Fix the error, rebuild the software, and test it again.

Q. Which line number contained an error?   A. _____

Q. Explain the error and how you fixed the error:

A. _____

_____

6) Show your solution to the TA or instructor.

7) Be sure to save your solution to your personal folder on Turing and put it in the Drop box!

Lab 2.2

For this lab you will need to write a new program!

Be sure to follow the Visual Studio FAQ to build a Win32 Console Application (an empty project!) and use the program skeleton we saw in class to start your project.

►Name your new program **Lab02_2_PUNetID**.

What does this program need to do?
This program should ask the user for two **integers**. The program should then display the sum of the integers and the difference of the integers.

Example input and output is shown below. Your program's output should look exactly like the output below. The large, bold text is data input by the user.

```
*******************
Number Cruncher 1.0
******************


Please enter an integer: 9
Please enter an integer: 100


Sum: 9 + 100 = 109
Difference: 9 - 100 = -91
```

BEFORE YOU START PROGRAMMING answer these questions:

Q: What data does your program need to get from the user?

A: _____

Q: What declaration statements do you need for these data?

A: _____

_____

Show your answer to these questions to the TA or instructor before continuing!

Show your solution to the TA or instructor.
Be sure to save your solution to your personal folder on Turing and put it in the Drop box!

Be sure to submit Lab 2.1 and 2.2 to the Drop Box on Turing and save them to your personal folder on Turing.

Optional Challenge:

You do not need to submit the optional challenge!

For this lab you will create a new Visual Studio Project named **Lab02_Challenge_PUNetID.**

The goal of this program is to calculate the area and perimeter of a rectangle and then display both of these values on the screen. When displaying each value to the screen, display the formula used to calculate that value as well. You may use the previous program as a guide. Ask the user for the length and width of the rectangle as well as the unit of measurement used. Allow the user to provide a number with a **decimal point**. Make sure your program works with a length of 4.1 and width of 1.9. Example input and output follows.

```
*******************
Geometry Helper 1.0
*******************


What is the length and width of the rectangle? 4.1 1.9
What is the unit of measurement? meters

Perimeter:
4.1 + 4.1 + 1.9 + 1.9 = 12 meters
Area
4.1 * 1.9 = 7.79 square meters
```

Q: What data does your program need to get from the user?

A: _____

Q: What declaration statements do you need for these data?

A: _____

_____

Be sure to add comments to your code to detail how each variable is used and the purpose of each calculation.