# 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 some existing programs and running them in Visual Studio. These programs contain errors that you will need to identify and fix.

### Lab 2.1.a: Syntax 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 projects to the desktop</u> before opening them in Visual Studio. Go to the 'CS150-01 Public' folder on Turing. Copy all projects from the 02Lab folder to your Desktop and change the name of the folder from 02Lab to 02LabXXXXXXXX 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 and select 'Desktop'. Double click on the folder '01CompileError' inside of 02LabXXXXXXXX.**

You will see a list of files.

**4) Select the Microsoft Visual Studio Solution file called '01CompileError'. It's the one with this icon.**



**Click 'Open'.**

This will open the project.

Build the program. It will give you an error, which is an example 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.

Note: The error message shows a line number in the file that contains the error. Right now, let's turn on the line numbering and set the tabs to 2 spaces.

Tools → Options → Text Editor → C/C++

Check the line numbers check box.

Then go to Tabs and set the Tab size and Indent size to 2.

Now, try to find the error and fix it. Note that the line number given to you by the compiler could be misleading.

Once you have fixed the error and your program builds, run the program and input the number 9. Write down the output, and run the program again with another number.

**Q. Do you feel that you are getting valid output?**
**A.** _____

_____

_____

__

_____

**5) Show your solution to the TA or instructor.**

## *Lab 2.1.b Run-Time Errors*

**6) Open the '02RunTimeError' project.**

**7) Try and build the program and run it.**

**Q.** Input any number into the program. What is the result? Is this the result that you expected?
**A.** _____

_____

_____

__

_____

The problem here is that we are asking the computer to break the laws of Math by dividing by zero. It cannot be done, so the compiler outputs a nonsense answer.

**8) Fix the problem, and then show it to the instructor or the TA.**

**Q.** What happens if you comment out the statement divider = 0; ?

**A.** _____

_____

_____

_____


**Q.** What kind of error is produced? Syntax or Runtime? Explain.

**A.** _____

_____

_____

_____


# Lab 2.2

For this lab you will receive a partially written solution and will need to implement the missing parts of the code as described by the comments. When the program is built, it will calculate the area and circumference of a circle and print these values to the screen. Be sure to read the comments in the source code carefully when implementing this lab.

**1) Locate the folder 03Circle in the folder 02Lab.**

**2) Open up the project and add the logic to main.cpp so that the code matches the comments. Build and run your project. Test your results using the Windows calculator in the Accessories folder.**


# Lab 2.3

For this lab you will create a new Visual Studio Project in the 02LabXXXXXXXX folder that will contain your own source code. Name this project **04Rectangle**.

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. The length and width of the rectangle may be given as constants (Length=8 and Width=3).

What is the formula for the area of a rectangle? _____

What is the formula for the perimeter of a rectangle? _____

Continue to work until your program produces the correct output. The area of the rectangle is 24 and the perimeter is 22.

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

## Optional Challenge:

Once you have completed all of the above required work, you can try the optional challenge. Create a project called 05Challenge. Copy existing code from your 04Rectangle project and modify as follows: Ask the user to type in the length of the rectangle and then ask the user to type in the width of the rectangle. After successfully reading in the length and width of the rectangle, the program must calculate and display the area and perimeter as described above. Make your input and output look as professional as possible.

## Submitting your finished projects:

Once you have completed all Lab projects, you will need to submit them for grading. You will submit your projects to the 'CS150-01Lab' folder on Turing. You may only submit your project once, so make sure that your projects are in their final form and correct. Be sure to close Visual Studio before copying and moving your folder.

To submit the projects, copy (do not move) the folder 02LabXXXXXXXX from the Desktop to the directory Turing\Students\**CS150-01 Lab**. The folder 02LabXXXXXXXX must contain all 4 completed lab projects.

To save a copy of your project for yourself, move the folder 02LabXXXXXXXX into your own personal folder on Turing.