

CSE 332 Studio Session on C++ Development Environments

These studio exercises are intended to acquaint you with Visual C++ and with some basic programming concepts and techniques that are likely already familiar from your previous programming experience, and to make sure that the programming tools and environment we'll use this semester are working correctly for you.

In this studio (and in the others this semester) you will work in self-selected small groups of people, and will report the results of your work on the studio exercises in an e-mail to the course e-mail account. Students who are more familiar with the material are encouraged to help those who are less familiar with it, and asking questions of your classmates, professor and teaching assistants during the studio sessions is highly encouraged as well.

If you are present in class, please create a new email to the course account (cse332@seas.wustl.edu). CC all teammates in the email. As you work, record your answers directly in the email. As class ends, please send your email with the subject line **"Development Environment Studio"** for full credit on the studio. You may not finish all exercises in class, however the material covered in any exercise may be covered on an exam. So even though it is not required to receive full credit on the studio, it may be a good idea to finish the required exercises outside of class.

If you are not present in class, you are required to complete all required exercises in the studio for full credit. The enrichment exercises are optional but are a good way to dig into the material a little deeper, especially if you breeze through the required ones. Finish the full studio on your own time and send an email with your answers to the course email account with the subject line **"Development Environment Studio"**.

PART I: REQUIRED EXERCISES

1. Form a team of people of your choice and write down the names of the team members as the answer to this first exercise.
2. Log into one of the studio lab's Windows machines, and open up Visual Studio 2015 (make sure you open the full visual studio app, not "Blend for Visual Studio 2015"). When the program opens, choose Microsoft Visual C++ as your development environment. Click on the Help→About Microsoft Visual Studio menu item at the top of the main window, and write down the serial number for Microsoft Visual C++ 2015 from the Installed products list of the dialog window that appears, as the answer to this exercise. Close the dialog window.
3. Click on the File→New→Project menu item at the top of the main window, and from the list under Visual C++ that appears in the upper left of the New Project window, select Win32. Select the Win32 Console Application template that should appear to the right of that list. Enter a name for the project (for example, **DevEnvStudio** or something similar that identifies which studio this is for). Note that you should see a directory in the location field that starts either with **h:** or with **\\warehouse2** (if you do not see that, please let us know, but you can also try typing **h:** into the location field and then clicking

the **Browse** button which should then give you a network drive directory in which Visual Studio 2015 can create the directory for your new project). Click the **OK** button, and if the Win32 Application Wizard dialog appears, just click on the **Finish** button. (Possibly after a while) Visual Studio will bring up the newly created project, and a list of the files in it will appear in the Solution Explorer window. Write down (a) the name you chose for the project, (b) the directory where you created the project, and (c) the names of all of the files that appear in the Solution Explorer window, as the answer to this exercise.

4. Click on the Build→Build Solution menu item at the top of the main window, and watch the output messages that are generated by Visual C++ when it builds the project. Write down the names of the source (.cpp) files that were compiled when you built your project, as the answer to this exercise.

5. In the search window on your computer's main start menu, enter **cmd**, and click on the item for the **cmd** utility that should appear. In the terminal window that then appears, type **h:** and hit enter. Then, use the **cd** command to change to the directory on the **H:** drive where your new project was created, and then use **cd** again to change into the **Debug** directory under it. Type **dir** and hit enter to list the contents of that directory. You should see a file with a **.exe** extension, which is the executable file the compiler created (on Linux, executable files usually have no extension at all). Run the built program by typing in the name of that file and hitting enter. Write down what output (if any) is produced by running the program, as the answer to this exercise.

6. Switch back to the Visual C++ development environment and add the following line just above the line that says **return 0;** in your project's main source file (which should be named something similar to **DevEnvStudio.cpp**):

```
cout << "hello, world!" << endl;
```

Build your project again. Write down the names of the unrecognized symbols (as given by the error messages that should appear), as the answer to this exercise.

7. Below the line that says **#include "stdafx.h"** (a required inclusion for Windows, which must be the first non-comment line of the program) add the necessary pre-compiler directives to the top of your project's main source file (e.g., **DevEnvStudio.cpp**) to allow the symbols from exercise 6 above to be recognized when you try to build the program (**hint:** see the C++ program structure slides from today's lecture). After successfully building the program, go back to the terminal window and run the updated executable program. Write down what output is produced, as the answer to this exercise.

PART II: ENRICHMENT EXERCISES (optional, feel free to skip some and do ones that interest you)

8. Add a directive to include C++ style strings as a recognized type in your program (i.e., include **<string>**) and replace the **cout << "hello, world!" << endl;** line with a declaration of a C++ style string variable (that is initially empty). Use the assignment operator **=**, the concatenation (addition) operator **+**, and/or the "concatenate (add) and assign" operator **+=** to add the names of your team members to that string variable. Following that code, add a line to your program that prints out the contents of that variable as program output. Build your program, fixing any errors and/or warnings you encounter, until it builds successfully. Run the program, and show its output as the answer to this exercise.

9. Declare an unsigned integer variable (for example, of type **size_t** which is commonly used to represent lengths and indices in C++), and assign it the length of the string (once you've concatenated all your team members' names into it), which can be obtained by calling the string variable's **length()** method. Add a line to your program that prints out the value of this unsigned integer variable. Build your program, and make sure there are no warnings or errors (if there are, fix them) and then switch back to the terminal window and run the program. Write down the program's output as the answer to this exercise.