

Visual Studio Express

For the ECE 312 lab assignments, you will be using [NBEclipse](#), the NetBurner (NB) version of [Eclipse](#), an Integrated Development Environment (IDE) popular for cross-platform C/C++ programming. For the ECE 312 lecture assignments, you are advised to use [Visual Studio Express](#), an IDE also available in the labs with a compiler that supports concurrency features of the new C++ 11 standard. Dr. Joseph will be using this IDE in the lectures, and it is available free of charge for you to install on your own laptop.

Instructions are given below regarding Dr. Joseph's installation of Visual Studio Express 2013 on his 64-bit Windows 7 system. The 2012 version is also acceptable – both are free. These instructions should work for most Windows users. Mac users can install and run Visual Studio Express through [Boot Camp](#), included with OS X, or through a third-party Windows emulator, such as [Parallels Desktop](#).

Installation

On the [Visual Studio Express 2013... for Windows Desktop](#) page, make sure the “Download language” is English. Click on “Install now” to install Visual Studio Express using the Internet. (If you click on “DVD5 ISO image...”, you will download a large file that you can then use to burn an installation disc.)

You will be taken to a “Sign in to Visual Studio” page. You can sign in using an existing Microsoft account, you can sign up for a Microsoft account (free of charge) and then use it, or you can sign in with a single-use code (?). Because Dr. Joseph previously created a Microsoft account when he installed an earlier version of Visual Studio Express, he picked the first option and proceeded as follows.

Click on the “Express 2013 for Windows Desktop” button to download a small executable, which you should run, e.g., click on it, and then click on Run if a confirmation dialog pops up. You can install the software if you agree with the “Licence Terms” and “Privacy Policy”. Alternately, please use Visual Studio 2012 on the lab computers. After installation, you may need to restart your computer.

Launch the VS Express 2013 for Desktop application, e.g., see Programs >> Visual Studio 2013. Sign in using your Microsoft account. This permanently unlocks Visual Studio Express, instead of limiting it to a trial period of 30 days. You need not create a Visual Studio Online account, but click on Continue (if “you agree to the Terms of Service and Privacy Statement”). This should finally take you to a Start Page.

New Project

Create a Hello World application as follows. Select FILE >> New Project. Choose Templates >> Visual C++ in the left pane and Empty Project in the right pane. Enter HelloWorld in the Name field and uncheck “Create directory for solution”. Click on OK to create a single-project solution (a solution can have multiple projects). In the Solution Explorer, right click on HelloWorld >> Source Files. Choose Add >> New Item. At this stage, the IDE should propose to add a “C++ File (.cpp)” to your project. You can either accept the default name or choose another name. Click on Add to add the blank C++ file.

Enter the following code, select BUILD >> Build Solution, and then select DEBUG >> Start Without Debugging. Your Hello World application should run until you press Enter.

```
#include <stdio.h>

int main() {
    printf("Hello world!\n");
    getchar(); // Wait for Enter
    return 0;
}
```

If you look in the "...\\Visual Studio 2013\\Projects\\HelloWorld\\Debug" folder on your computer (most likely, in your "Documents" or "My Documents" folder), you should find an application (.exe file) called HelloWorld. Double click on this file to run the application outside of Visual Studio Express.

Existing Item(s)

Run some code provided by your instructor as follows. First, download the "Code in Slides" zip file below "Introduction to Embedded Systems" on eClass. Using the above instructions, create an empty one-project Visual Studio Express solution called Examples. Copy/unzip the contents of the zip file, including the slides34to36 folder, into the folder called "...\\Visual Studio 2013\\Projects\\Examples\\".

In the Solution Explorer, right click on Examples >> Source Files and select Add >> Existing Item. Double click on the C++ source file called slide27 (.cpp), just to pick one example. Select DEBUG >> Start Debugging to build and run the program with the debugger enabled. Although the program will build and run, producing some output, it will crash because there is a bug (dereferencing of a null pointer). Click on Break in the dialog window that pops up and select DEBUG >> Stop Debugging.

Following the instructions in the paragraph above, try another C++ source file. However, first right click, in the Solution Explorer, on Examples >> Source Files >> slide27.cpp and select Exclude From Project. Any project can have at most only one "int main()" function. To try out code in the slides34to36 subfolder, first add main.cpp and Register8.cpp to Examples >> Source Files, using the above approach. In a similar fashion, add Register8.h to Examples >> Header Files. You can then build and run the example.

C/C++ Reference

Although we sometimes talk about C programming in ECE 312, we are always using a C++ compiler. Though not strictly true, programmers often treat the C language as a subset of the C++ language. The term "procedural C++" may be used to mean C++ programming that looks like C programming, in particular C++ programming with little or no object-oriented programming (OOP).

If you need to brush up on your C/C++ programming, the subject matter of the ECE 220 "prerequisite", Dr. Joseph recommends the following textbook: [C++ For Everyone by Cay Horstmann \(Wiley\)](#).