Compiling and Running C# Programs

Windows

Because C# was written by Microsoft, it is easier to develop C# programs on a Windows machine than it is on a Mac. (It is still possible to develop on a Mac, but you will need to follow different instructions.)

Windows XP

For Windows XP, you need to download and install the .NET Framework (which includes the C# compiler. Go to:

> http://www.microsoft.com/downloads/details.aspx?FamilyId=333325FD-AE52-4E35-B531-508D977D32A6&displaylang=en

This is the .NET Framework Version 3.5. Download and install the framework.

Windows Vista or 7

Newer versions of Windows already have a version of the .NET framework installed. You don't need to download anything.

Setting the Path

First, you need to find where the .NET framework was installed. Go to:

```
C:\WINDOWS\Microsoft.NET\Framework
```

You should see a folder in there that says "v3.5" or "v4.0.30319" or something like that. Go into the folder with the highest number after the "v". You are going to add this directory to your "path" environment variable. Here's how:

- Open the `Control Panel`
- Open `System`
- Click `Advanced`
- Click `Environment Variables`
- Find the variable `Path` and click on it
- Press `Edit`
- Add this to the END of the `Path` value:

  ```
  ;C:\WINDOWS\Microsoft.NET\Framework\v3.5;.
  ```

  (Replace the v3.5 with whatever folder you found.)

- Press `OK` twice

Compiling from the Command-Line

Suppose you want to compile a one-class C# program stored in the file `Hello.cs`. First open a command window:

- Press "`Start`"
- Type `cmd` in the search

Change directories (use the `cd` command) to the folder where `Hello.cs` is stored. To compile your program, type:

```
csc Hello.cs
```

If everything works correctly, it will compile your program into the executable file `Hello.exe`, which it will put in the same directory as `Hello.cs`. If you made any mistakes in your program, the compiler will print error messages describing the problems.

If you want to compile a C# program that has several classes, do this instead:

```
csc *.cs
```

This will compile ALL your classes and will generate an `.exe` file with the same name as the main class.

Running from the Command-Line

Suppose you just compiled your `Hello.cs` file and have the executable `Hello.exe`. To run your program, type:

```
Hello
```

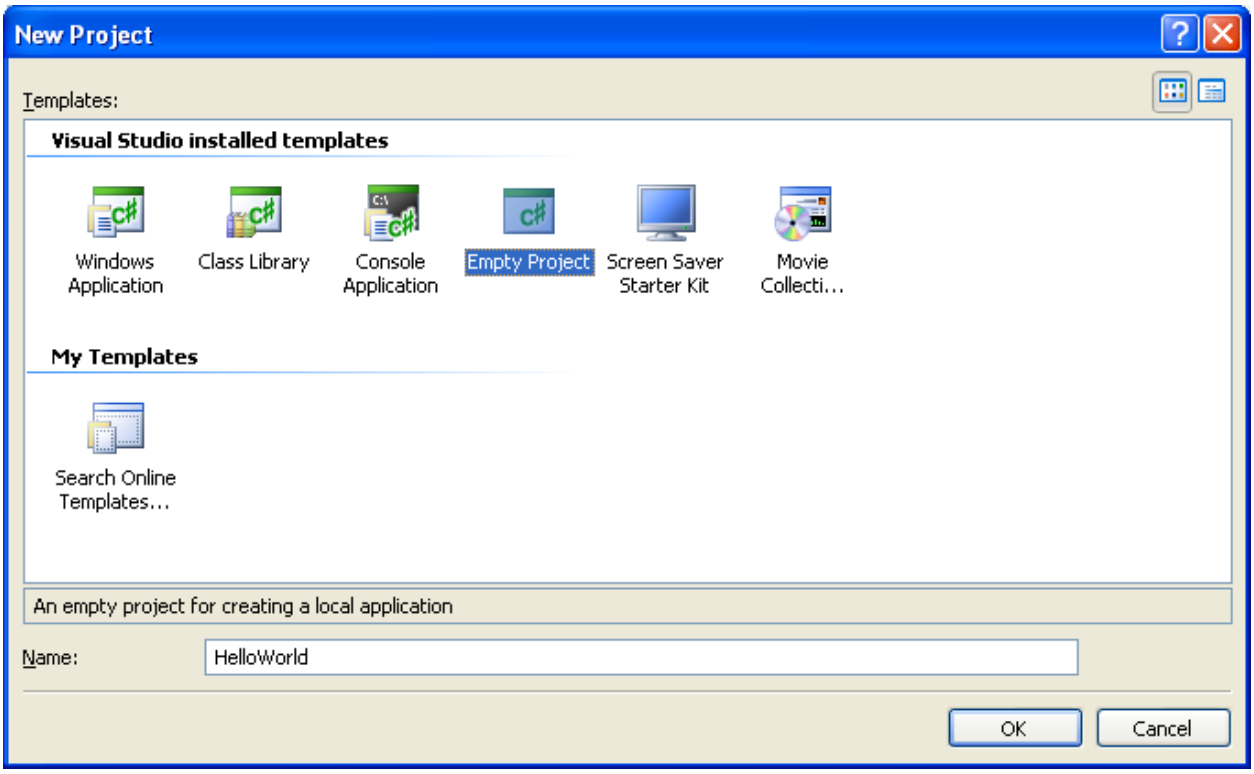
in the command window (again, after changing directories to the folder where `Hello.exe` is). If you compiled a program with several files, then the executable has the same name as the class with the `Main` method.

Visual C# Express

Visual C# Express is a free IDE for developing C# programs. It is similar to Visual Studio .NET, but does not have some of the advanced features. However, Visual C# Express can be downloaded for free at:

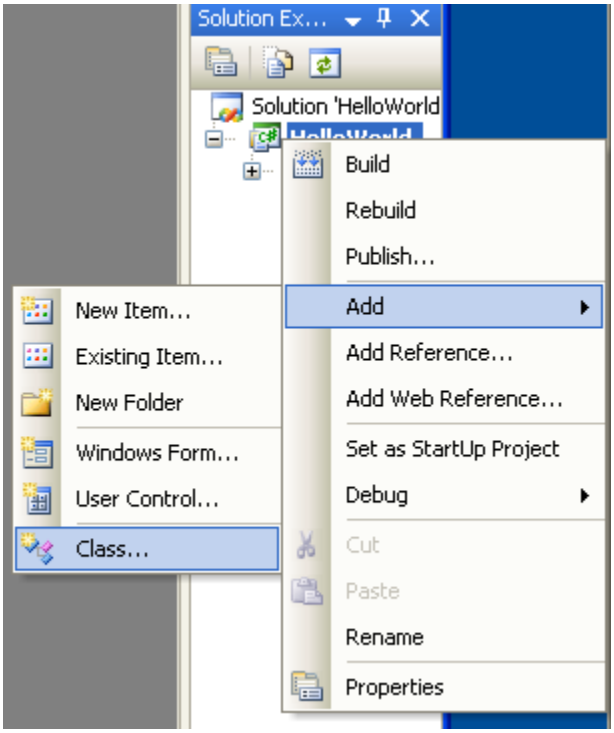
http://www.microsoft.com/express/vcsharp/

(Just click the "Download" link under the "English" drop-down menu.) To write a program in Visual C# Express, first launch the program. Next, go to "**`File->New Project`**" to create a new project. Create an **`Empty Project`**, and give it a name:

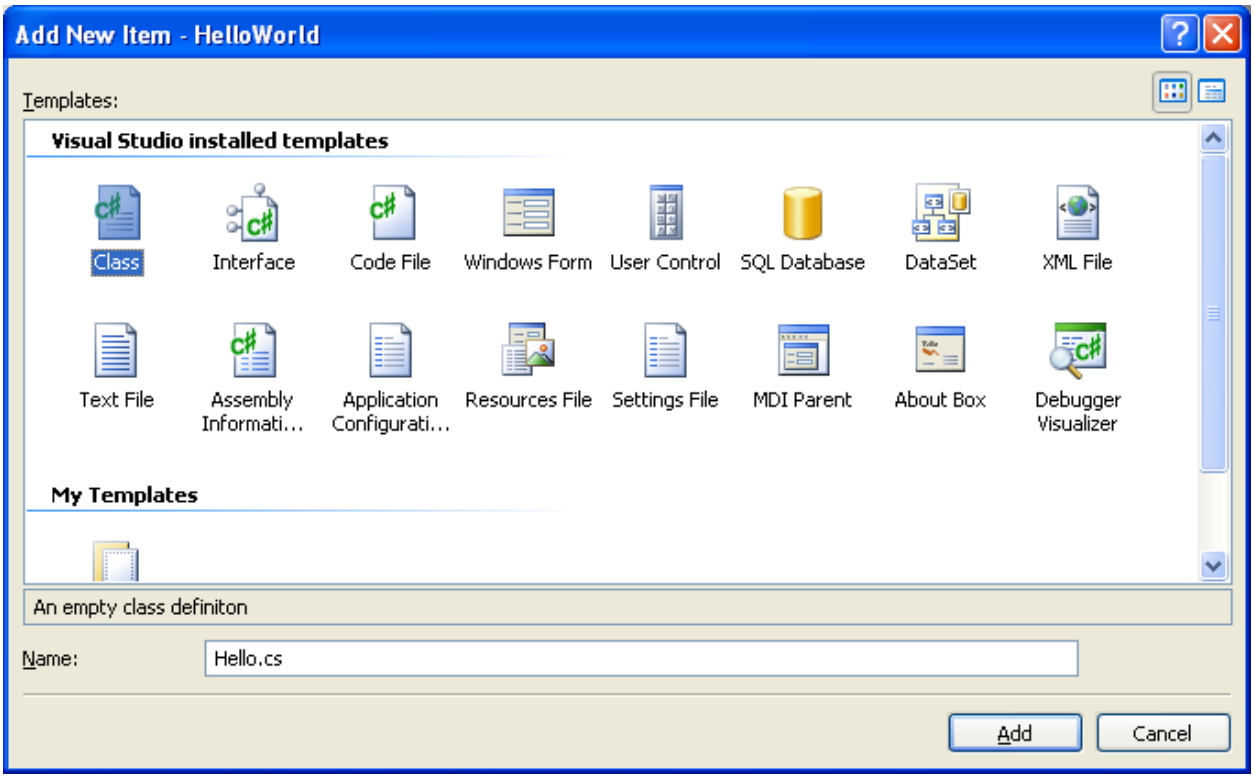


Select "**OK**" to create the project.

To add a class to your project, right-click on the project name on the upper-right side of the screen. Select "**Add**" and then "**Class**":

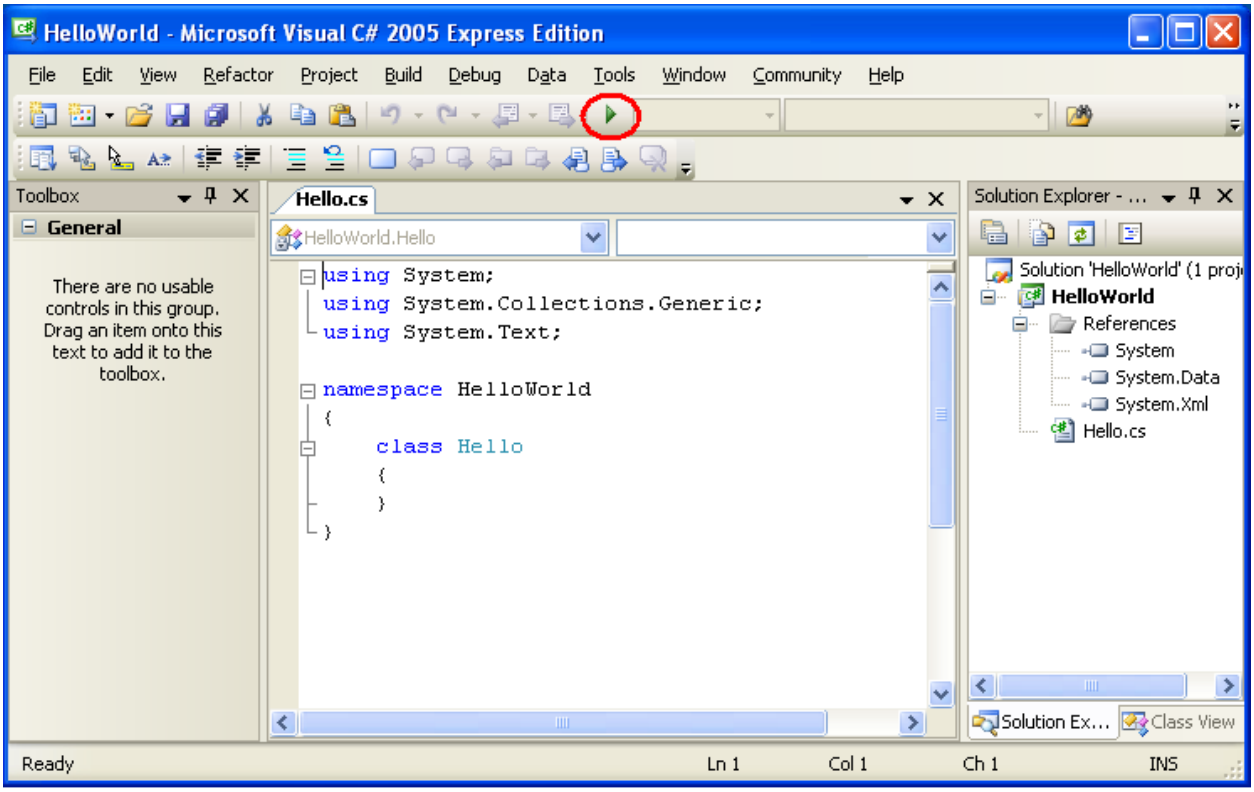


Select "**`Class`**" in the dialog, and provide a name for the new class:



Click "**`Add`**" to create the new class. When you do this, the code for the new class will appear in the screen. You can complete the class there. Repeat this process for every class you want in your program.

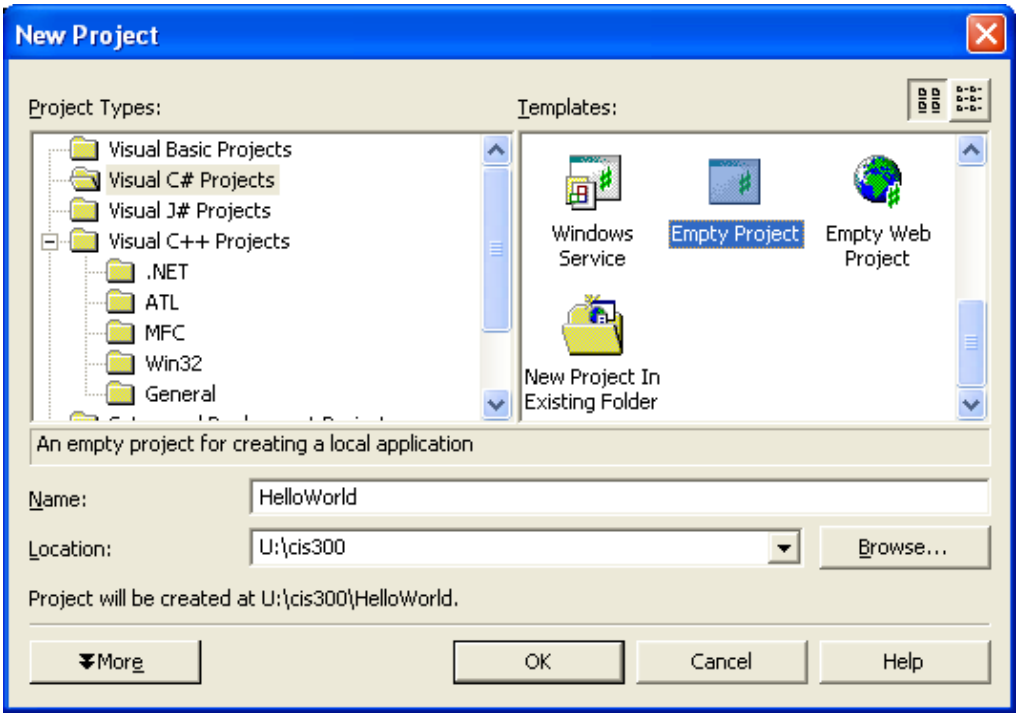
To **compile** your program, select **`Build->Build Solution`** from the menu bar. If you have any errors in your code, they will appear at the bottom of the screen. When you are ready to **run** your program, click the **green arrow** under the menu bar:



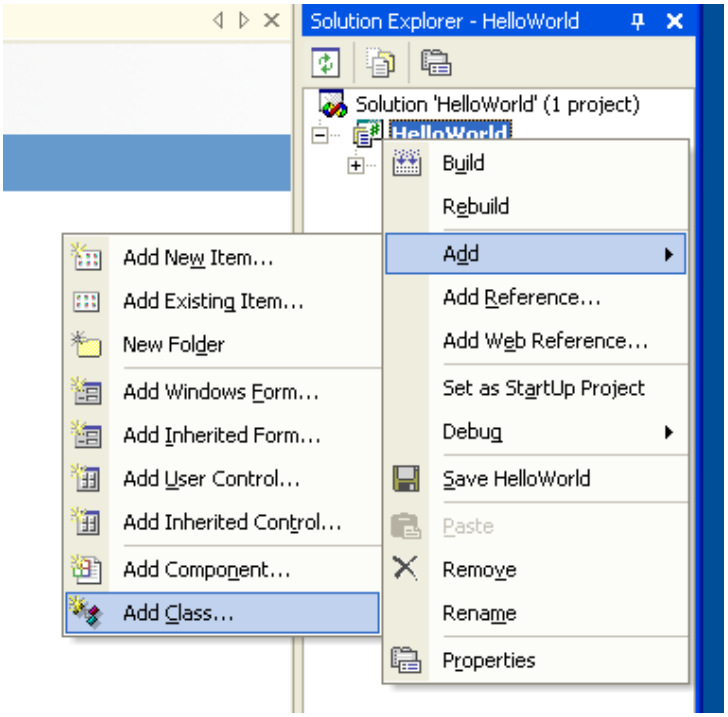
Visual Studio .NET

Another IDE you can use to develop C# programs is Visual Studio .NET. This software package is available in all the CIS labs and most of the Engineering labs. (The Express version is very similar to Visual Studio, especially for the purposes of this class.) You can get a free student version of this software through the MSDN Academic Alliance program. You should have gotten an e-mail about this program from the system administrators at the very beginning of this semester, which provided information on accessing the software. Please look for this email first, but if you can't find it and want Visual Studio, you can e-mail the system administrators at help@cis.ksu.edu.

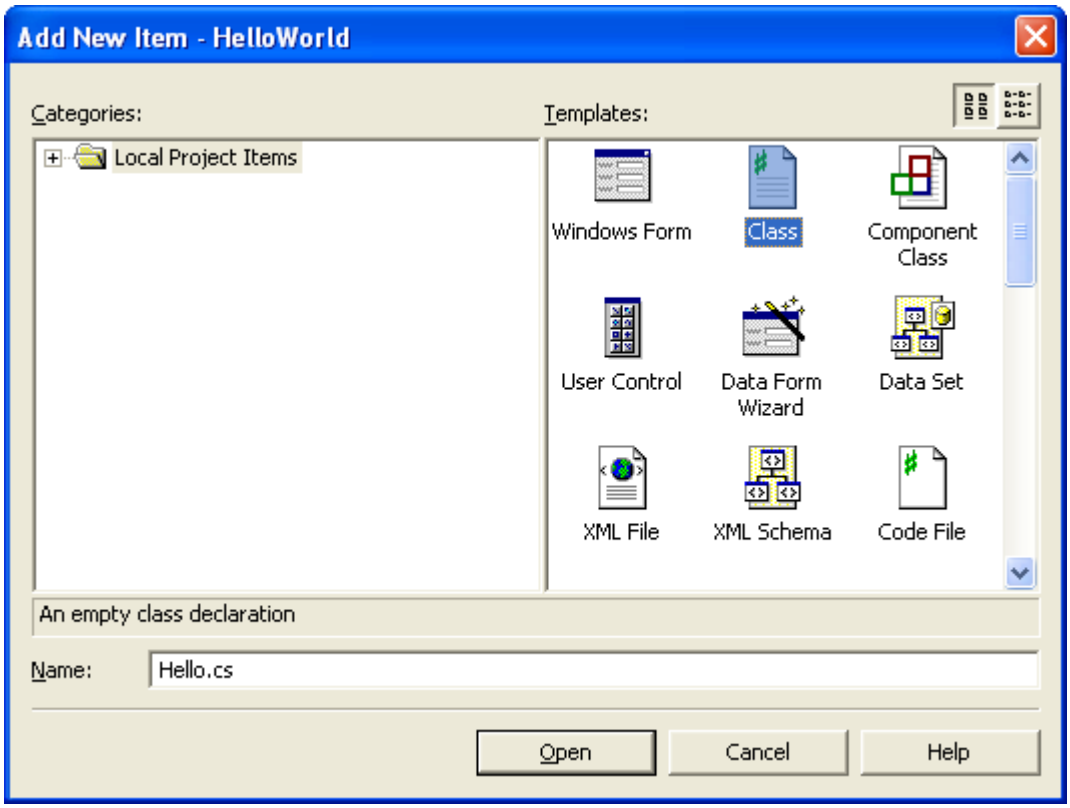
To write a C# program, first open Visual Studio .NET. Next, select "**`New Project`**". Then, select "**`Visual C# Projects`**" and "**`Empty Project`**". You can provide a name and location for you project at the bottom of the dialog:



Click "**OK**" to create the project. To add a class to your project, right-click on the project name in the upper-left corner, and select "**Add**" and then "**Add Class**":



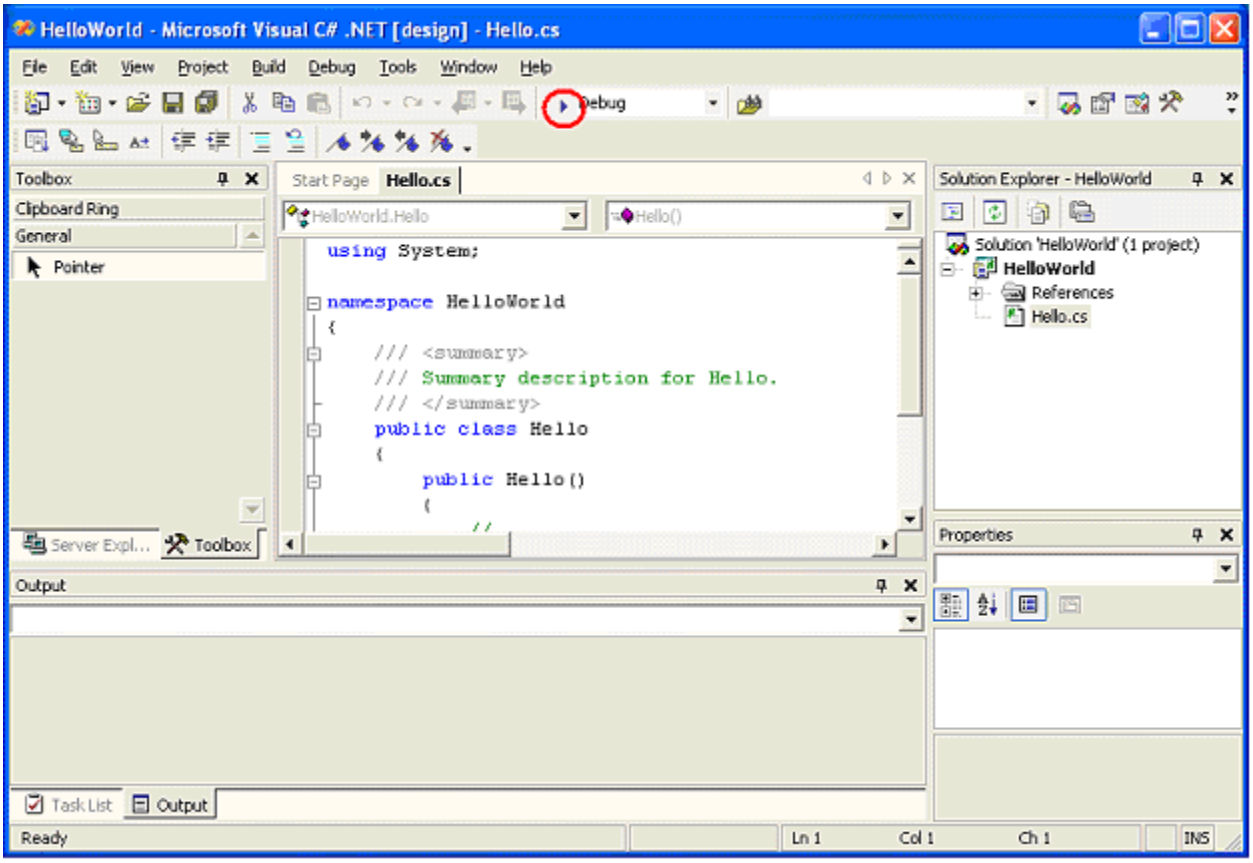
Select "**Class**", and provide a name for the class at the bottom:



Click "**`Open`**" to create the class. Repeat this step for every class you want in the program. After you create a class, the code view will appear on the screen. You can write all the code for the class there.

Once you've written your program, you need to **compile** your code. To do this, select "**`Build`**" and then "**`Build Solution`**" from the menu bar. If you have any errors in your code, they will appear at the bottom of the screen.

To **run** your program, press the **blue arrow** under the menu bar:



Macintosh

C# is intended for Windows machines, so it is a little trickier to write C# programs on a Macintosh. If you have access to a Windows machine, I would recommend using it instead. The `csc` compiler is not available on a Mac, so you will have to use a slightly different compiler. If you only have a Mac, you might try compiling and running your programs in the Windows labs to make sure that everything still works OK.

Getting the Compiler

The C# compiler for a Mac is called **Mono**. You can download it at:

http://www.mono-project.com/Downloads

Select Mac OS X, and download the Mono framework.

Compiling from the Command-Line

Once you have mono installed, you can compile C# programs from the command-line. (You can write C# programs using any text editor.) First open a terminal window, and then change directories (with the `cd` command) until you get to your C# code. Here's how to compile a C# program with a single file, `hello.cs`:

```
mcs hello.cs
```

If you have any errors in your program, they will be described below. If not, this will generate the executable file `hello.exe`. If you want to compile a program with multiple files, do:

```
mcs *.cs
```

This will compile all C# files in the current directory and generate an executable with the same name as the class with the main method.

Running from the Command-Line

After compiling your program using `mcs` in a terminal window, you are ready to run your program. Suppose you compiled the file `hello.cs`, which generated the executable `hello.exe`. Here's how you would run your executable:

```
mono hello.exe
```

This would run your executable in the terminal window.

MonoDevelop

The major IDEs for C# -- Visual Studio .NET and Visual C# Express – are not available for the Macintosh. However, you can download **MonoDevelop**, which is a free C# IDE that can be run on a Mac. You can download it at:

http://www.monodevelop.com/Download

It is similar to Visual Studio/Visual C# Express, and you should be able to create projects in a similar way to the screenshots above. However, I do not have a Macintosh (and there are no Macintosh machines in any of the CIS labs), so I am unable to provide detailed running instructions for MonoDevelop.