

Practical: C#, simple programs and data types

Part 1. This exercise will lead you through the process of writing, compiling and running a new C# program called 'HelloWorld'. On completion when the program is run it should display to output the following message>

Hello world!

1. Log on to a computer with your username and password.
2. First, you need to do a bit of housekeeping – you should only need to do this step once on any computer you use. Open any directory on the C: drive (e.g C:\Temp Usage Folder). Select Organise\Folder and search options. In the window that opens, select the 'View' tab. Scroll down and ensure the checkbox item 'Hide extensions for known file types' is unchecked (ie is empty, containing no tick). Then click OK. This will ensure you will be able to see what type of file you are dealing with not just from the icon image but also from the file name extension.
3. Create a new folder called 'CSharpProjects'. You should locate this either a) on the Desktop b) on the local hard drive inside a folder called Temp Usage Folder, c) in your personal network drive or d) on a portable USB drive/stick that you can bring to class with you and take away with you to work from home (this is the best option).
4. Click the *Visual Studio 2015* icon to start the Visual Studio IDE. **If you have an account then sign in, or create an account, or simply choose 'Not now maybe later'. Click the 'Start Visual Studio'.** When the IDE opens close the Start Page by clicking on the 'x' beside the top left tab for the panel.
5. From the menu bar across the top of the IDE, select File/New Project. This opens up a new window in which the project settings can be configured. Now select *Visual C#* (may be default) and then from the central area select *Console Application*.
6. You should then give the project a name. Edit the default name (ConsoleApplication1 or similar) to 'Helloworld'. Then select the *Browse* button tab and navigate to the CSharpProjects folder you created earlier. Do not check the Create directory for solution checkbox.
7. Click *OK*. The project is created after a short delay and an editor window should open into which you can type your code. This is the content of a text file for your program (the source code) and has the default filename **Program.cs** – you will see the file listed in the Solution Explorer window to the right of the text editor. The 'cs' extension tells the operating system it is a C# text file. The project *automatically generates* this code for you.
8. The first thing you should do is change the default name of the source code. Select and right-click on *Program.cs* in the Solution Explorer and

rename it to **Hello.cs**, you will then be prompted if you want to accept all reference changes to this name – select *Yes*.

9. Now – edit the code (delete and add some lines) so that it displays the following:

```
using System;

namespace Helloworld
{
    class Hello
    {
        static void Main(string[] args)
        {
            Console.WriteLine("Hello World!");
            Console.ReadLine();
        }
    }
}
```

To save the file you should select *File/Save Hello.cs* from the top left menu bar.

10. To compile the program, select *Build/Build Solution*. If there are no errors and the program compiles successfully you should see a message in the lower output pane; '== Build All: 1 succeeded, 0 failed, ...'. However if there is an error in the program (try changing 'static' to 'staic' for example and re-compile with *Build/ReBuild Solution*) you will see text marked in the editor and a message in the lower pane reporting the error, so you will need to re-edit and attempt to re-compile the program.
11. Once successfully compiled, to run the compiled code, click *Debug/Start Without Debugging* from the IDE menu bar. A console window should then open up displaying the output from the program.
12. Close Visual Studio (saving the project if prompted). You should be able to find the compiled program in the directory tree of the project and will have the name *Helloworld.exe*. In this case it is probably located at ...\\CSharpProjects\\Helloworld\\bin\\Debug. If you double-click on this file it should execute outside of the IDE, in other words, it is an *executable* compiled file.

Part 2. Developing some simple programs

For each completely new project I suggest you locate (navigate) the project to the *CSharpProjects* folder (or similar), giving the application a name which will generate a folder of that name containing the project. Other strategies are

possible – in principle it is important to save your projects/files to an appropriate location of your choice, otherwise you may end up scattering your files all over the place and may not be able to find them again at a later time.

1. Using simple multiple `Console.WriteLine()` statements (*NOT loops!*), create a new C# project and program to output a hollow 5x5 square of asterisks ('*').
2. Create a new project and copy (type) the program *TempConv.cs* from class notes, compile and run it to verify it executes correctly. Edit the program so that it reads in a celsius temperature and prints out the corresponding fahrenheit temperature.
3. Write a program that reads in the radius of a circle in centimeters (*r*) from the keyboard and prints the circle's diameter ($2*r$), circumference ($2*pi*r$), and area ($pi*r*r$). Use the value 3.14149 for "pi".

Appendix 1

To open, edit, compile and run an existing C# program

1. If the C# program is associated with a specific project then navigate in Windows Explorer to the project files in question and double-click on the file > **projectname.csproj**. For example, if you have a project called *Helloworld* and it has a source code associated with it called *Hello.cs*, then double-click on *Helloworld.proj*. This will open Visual Studio, and open the project, and you should see the relevant source code of *Hello.cs* displayed in the editor window, ready for development.
2. If the C# program is not associated with a specific project (for example, you may wish to only save the source code file(s) with a .cs extension to a USB stick and transfer those files between home and work, where you would re-attach the files to an appropriate project) you should do the following. Either create a new project or open an existing project, and remove any existing .cs file from the project by a) closing the file in the editor window (if open) and b) right-clicking on the name of the file in the Solutions Explorer window and choosing '*Exclude from Project*'. Note this will **not** delete the source code file, but it decouples it from the project. To attach a different .cs file to the project, right-click on the project name in the Solutions Explorer and choose '*Add/Existing item...*'. This opens up a folder a directory window from which you can navigate to the source code (.cs) file you want to use, select it and click *Add*. The file name will now appear in the Solutions Explorer window and on clicking that filename it will open it up in the editor for development.