PRIFYSGOL BANGOR UNIVERSITY

Imperative Programming in C

Visual Studio quick start guide

Microsoft Visual Studio is an integrated development environment (IDE) from Microsoft. Built-in languages include C, C++ and C++/CLI (via Visual C++), VB.NET (via Visual Basic .NET), C# (via Visual C#), and F#.

Support for other languages such as M, Python, and Ruby among others is available via language services installed separately. It also supports XML/XSLT, HTML/XHTML, JavaScript and CSS.

Microsoft provides "Express" editions of its Visual Studio at no cost. Commercial versions of Visual Studio along with select past versions are also available for free to students via Microsoft's DreamSpark program.

Visual Studio 2010 Professional is available on all University machines.

Visual Studio 2013 Professional is available to download from Dreamspark.

This guide is intended to get you started in developing C applications using Visual Studio.

As mentioned in the Lab 1 document, we recommend you use either Dev-C++ or Visual Studio for this module. The lab documents concentrate on Dev-C++ because it's a very simple IDE that contains only the functionality needed to complete the exercises, and it is the only IDE we officially support in terms of tech support.

However Dev-C++ is not a good choice for actual professional development. Most professional (windows based) programmers will code in Visual Studio, and so if you'd prefer to use this feature rich IDE then this guide is intended as a quick start guide.

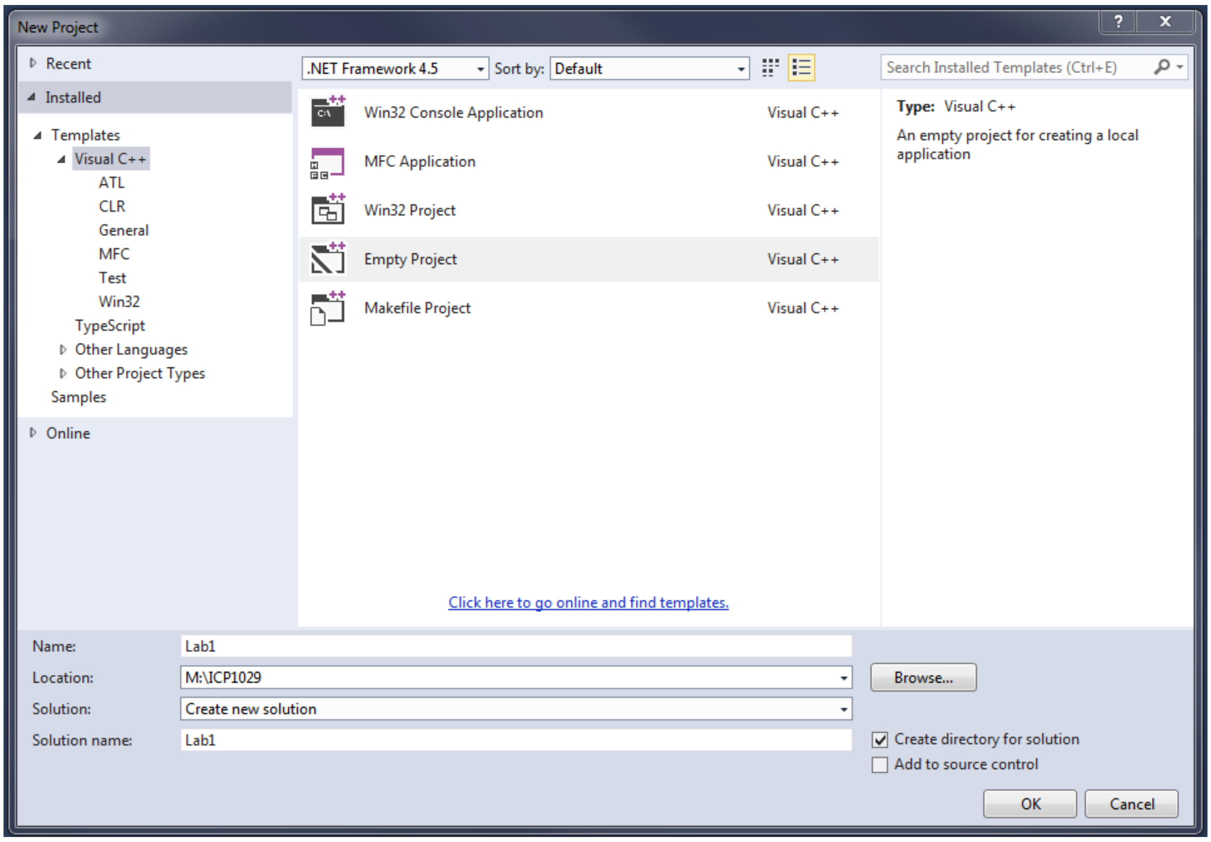
Setup

With Visual Studio installed, it’s time to create your first project.

Go to File – New Project

This will bring up a dialog window.

On the left pane, select the Visual C++ and on the right select Empty Project.
On the bottom pane choose an appropriate name and location for your project.


New Project

.NET Framework 4.5 Sort by: Default

Win32 Console Application	Visual C++
MFC Application	Visual C++
Win32 Project	Visual C++
Empty Project	Visual C++
Makefile Project	Visual C++

Type: Visual C++

An empty project for creating a local application

Name: Lab1

Location: M:\ICP1029

Solution: Create new solution

Solution name: Lab1

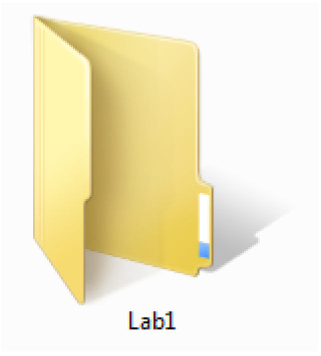
☑ Create directory for solution

☐ Add to source control

Note that by default Visual Studio will list the file’s location using a remote address. You should replace this will a direct path to a folder on your M: drive as it can cause problems on University machines. For example in the above screenshot the location M:/ICP1029 is used.

Click OK

Visual Studio will create a project on your M drive inside a folder called Lab1. If at any time you return to this project, double clicking on Lab1.sln will launch the project in Visual Studio.

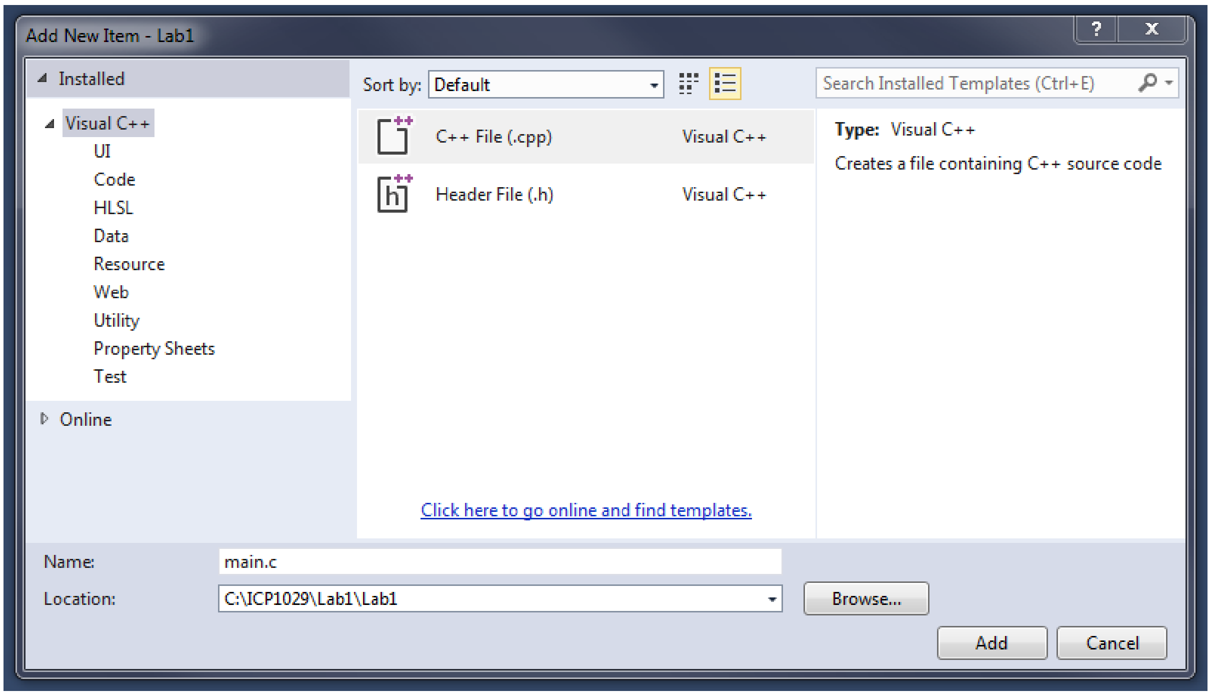


Hello World

On the left you will see a Solution Explorer pane, containing all the relevant files and settings for your project.

Go to Project – Add New Item

This will bring up the following dialogue window:


Add New Item - Lab1
Installed
Visual C++
UI
Code
HLSL
Data
Resource
Web
Utility
Property Sheets
Test
Online
Sort by: Default
Search Installed Templates (Ctrl+E)
C++ File (.cpp) Visual C++
Header File (.h) Visual C++
Click here to go online and find templates.
Browse...
Add
Cancel

Type: Visual C++
Creates a file containing C++ source code

Name: main.c
Location: C:\ICP1029\Lab1\Lab1

Visual Studio will default to creating C++ files. While the vast majority of the code you write in this module will compile in C++, for the time being name the file main.c (rather than main.cpp).

Change the Name: text field to main.c
Click Add

This will create a new source file for your project called main.c

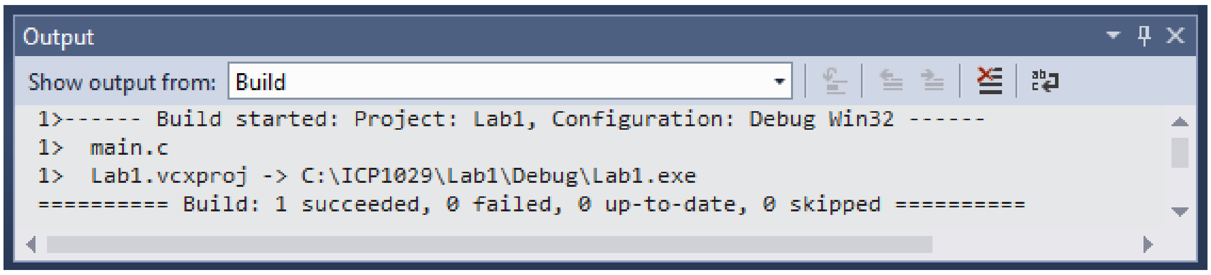
Paste the following code into the file:

```
#include <stdio.h>
#include <stdlib.h>

int main(int argc, char *argv[])
{
    printf("\nHello World \n\n");
    system("PAUSE");
    return 0;
}
```

Go to Build – Build Solution (or press F7)

Visual Studio will now compile your program. The output window will tell you if there are any errors during compilation.

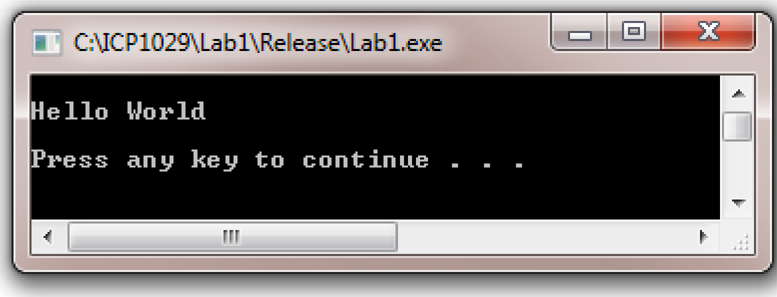


```
1>------ Build started: Project: Lab1, Configuration: Debug Win32 ------
1>  main.c
1>  Lab1.vcxproj -> C:\ICP1029\Lab1\Debug\Lab1.exe
========== Build: 1 succeeded, 0 failed, 0 up-to-date, 0 skipped ==========
```

If the build succeeded, we can run our program.

Go to Debug – Start without Debugging (or press Ctrl + F5)

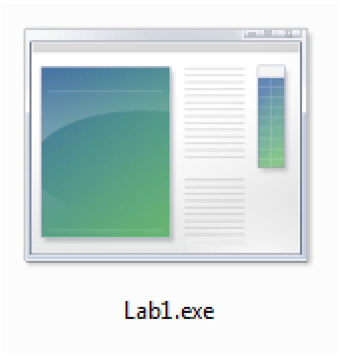
This will launch a command prompt and run your executable:



```
Hello World
Press any key to continue . . .
```

Congratulations, you have created your first C program in Visual Studio!

When we compile and link programs in C, an executable is created (a file with an .exe extension). You can now also run your program by going into the Debug or Release folder for Lab 1 and double clicking on Lab1.exe.



We can now continue to create source files and invoke them from the main function. For example, let's create another two C files:

Use Project – Add New Item to create two more source files – Lab1Ex1.c and Lab1Ex2.c

Modify your source files so that they look like the following:

main.c

```
#include <stdio.h>
#include <stdlib.h>

int main(int argc, char *argv[])
{
	printf("\nHello World \n");

	Exercise1();
	Exercise2();

	system("PAUSE");
	return 0;
}
```

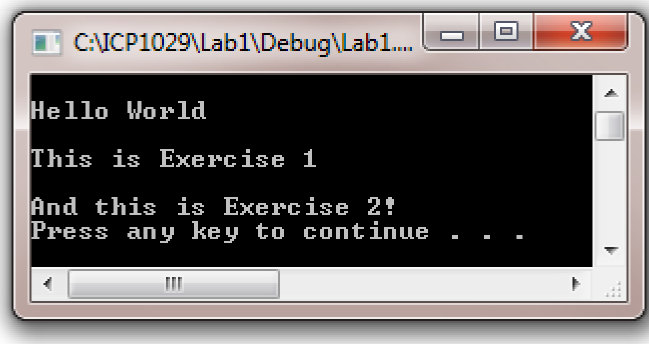
Lab1Ex1.c

```
void Exercise1()
{
	printf("\nThis is Exercise 1! \n");
}
```

Lab1Ex2.c

```
void Exercise2()
{
	printf("\nAnd this is Exercise 2! \n");
}
```

Build and Run your modified program



```
Hello World

This is Exercise 1

And this is Exercise 2!
Press any key to continue . . .
```

This guide has shown a useful way of structuring your Labs and Exercises over the coming weeks. Refer to the Lab1 document for more detail about the contents of the code and the relationship between main.c and the two other source files.

Headers

While you can setup all the labs and exercises throughout the course in this way, as opposed to some other IDE's like Dev-C++ the method we have covered so far will lead to some warnings. To resolve these properly, we need to include a header.

Create a new header file:

Go to Project – Add New Item

Choose Header File and name it main.h

Select main.h and paste the following code:

```
#include <stdio.h>
#include <stdlib.h>
```

Modify your main.c file so that it looks like the following:

```
#include "main.h"

extern int Exercise1();
extern int Exercise2();

int main(int argc, char *argv[])
{
	printf("\nHello World \n");

	Exercise1();
	Exercise2();

	system("PAUSE");
	return 0;
}
```

Add #include "main.h" to the top of both Lab1Ex1.c and Lab1.Ex2.c

Recompile your program and the warnings should be gone

Note: Including a header file is similar to copying the content of the header file's contents into the source file. A simple practice in C or C++ programs is that we keep all the constants, macros, system wide global variables, and function prototypes in header files and include that header file wherever it is required. We will look at header files in more detail over the course of the module.