717310: Game Programming

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Overview

- Procedural C++
  - Visual Studio
- Exercises

C++ Programming in Microsoft Windows

- Visual Studio is an Integrated Development Environment...
  - Contains the Microsoft Windows Toolchain for developing on the Windows Operating System...

- Next we will look at:
  - Starting the IDE...
  - Creating Solutions and Projects...
  - Creating Source Code Files...
    - Editing Code.
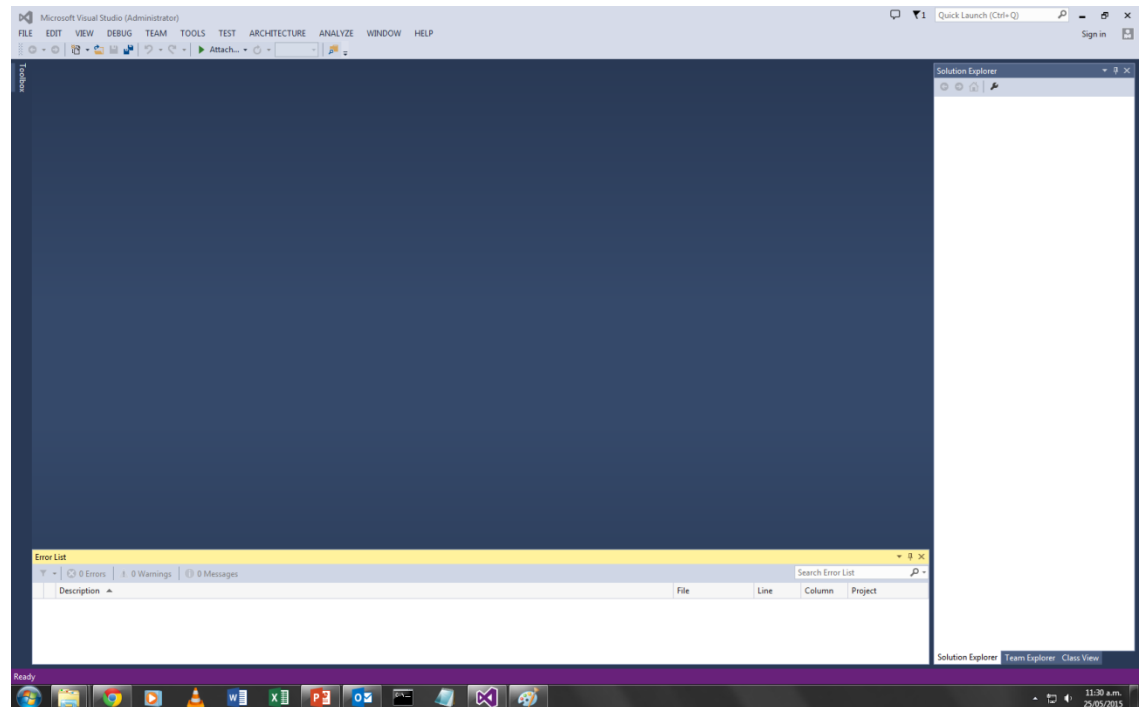 - Compiling, Linking and Running C programs!

Visual Studio 2013

- Installed on CMS lab computers…
  - Visual Studio 2013 Ultimate
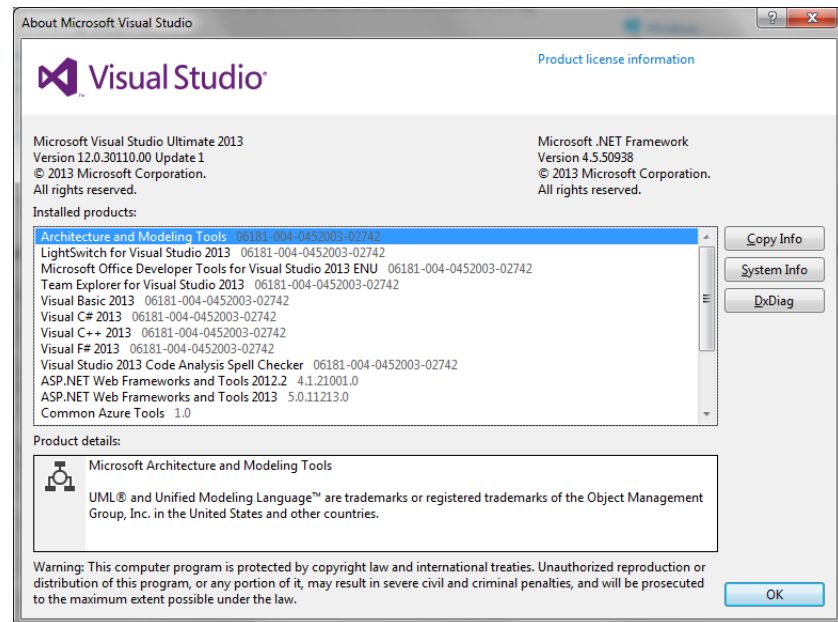
- Microsoft Dreamspark (MDSN AA)
  - Educational license for home use.
  - Sign-in via AUT student email…

Visual Studio 2013

- Integrated Development Environment:
  - Editor
  - Compiler
  - Linker
  - Debugger
 - Code Management
  - Documentation

Visual Studio 2013

- Visual Studio Development…
  - Project Structure:
    - Solution (`.sln`):
      - Contains one or many Projects.
    - Project (`.vcproj`):
      - Contains one or many Source Code Files (`.c`)
      - A project generates an executable (`.exe`)…
        - » Or a static library (`.lib`)
      - One project will be currently active… when you click the run button, it builds and runs the active project…
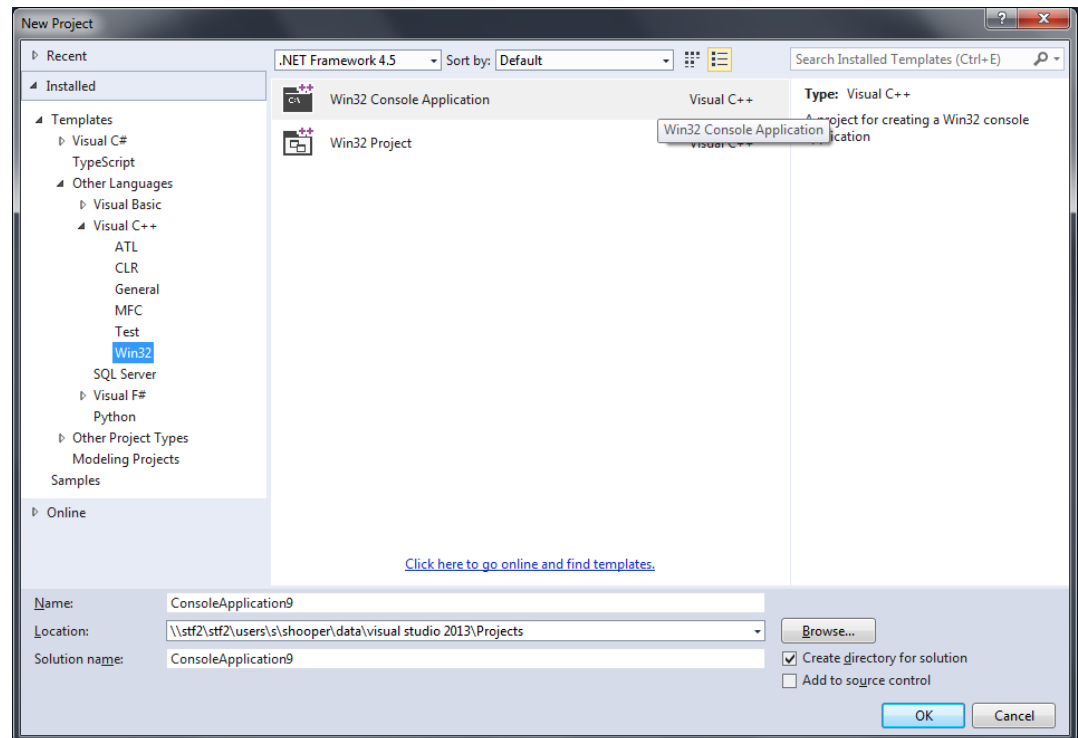 - All of these are things files stored on disk…

Visual Studio 2013

- Getting started…
  - File->New Project

  - You can develop in a number of languages…
    - We will just work with a C example…
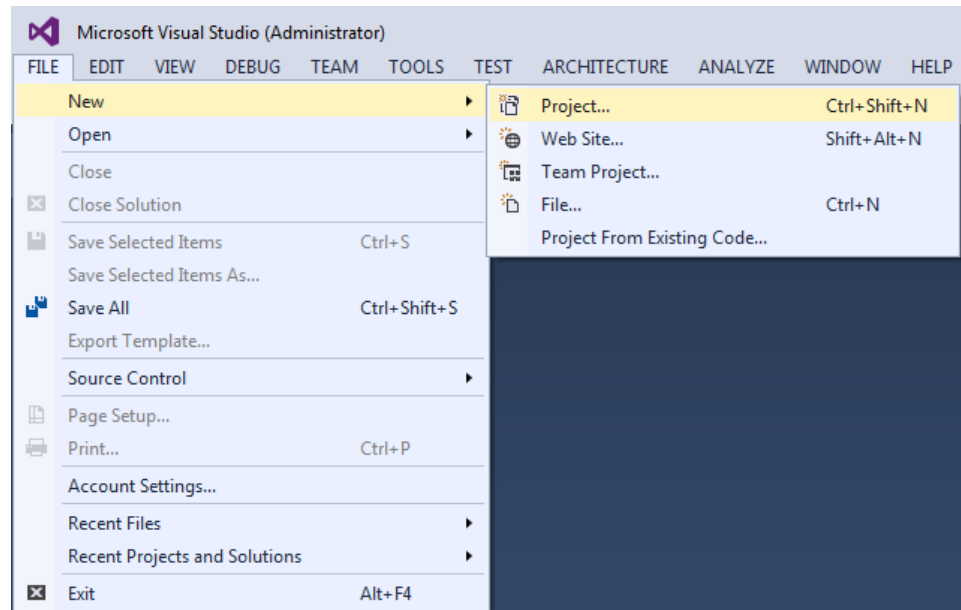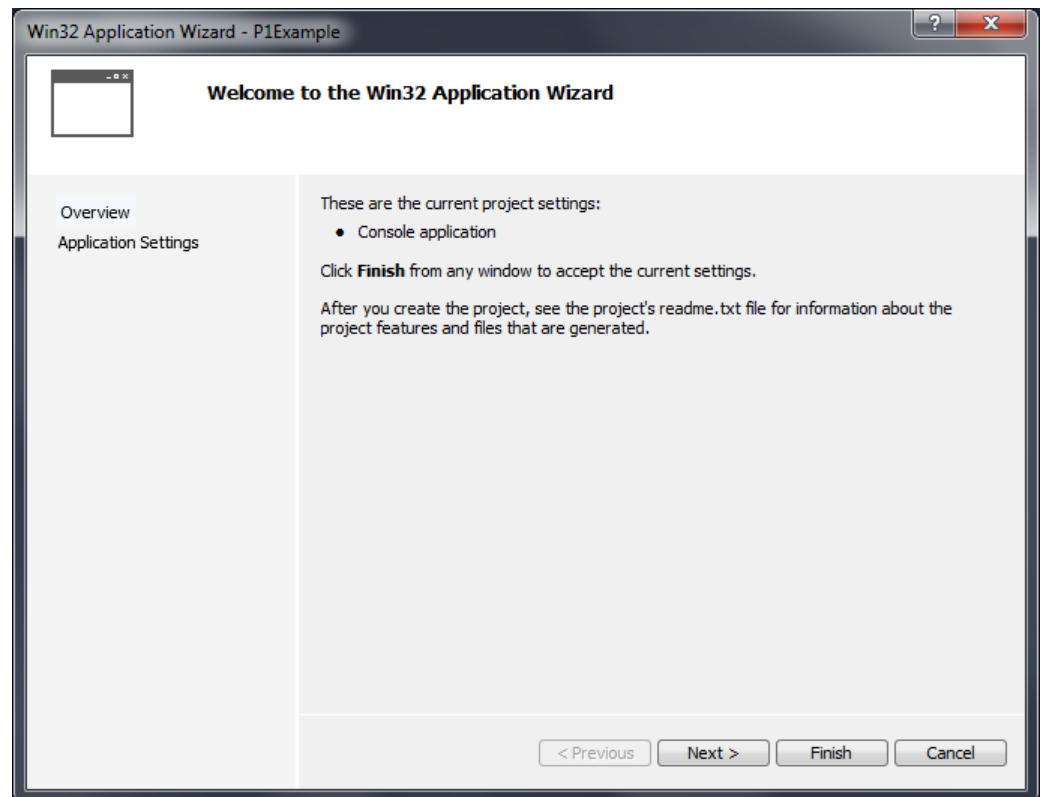
Visual Studio 2013

- Other Languages:
  - Visual C++
    - Win32

  - Win32 Console Application
    - Name
    - Location
    - Solution Name

Visual Studio 2013

- Win32 Application Wizard
  - Overview
  - Application Settings
    - Click next…
      - Not finish!
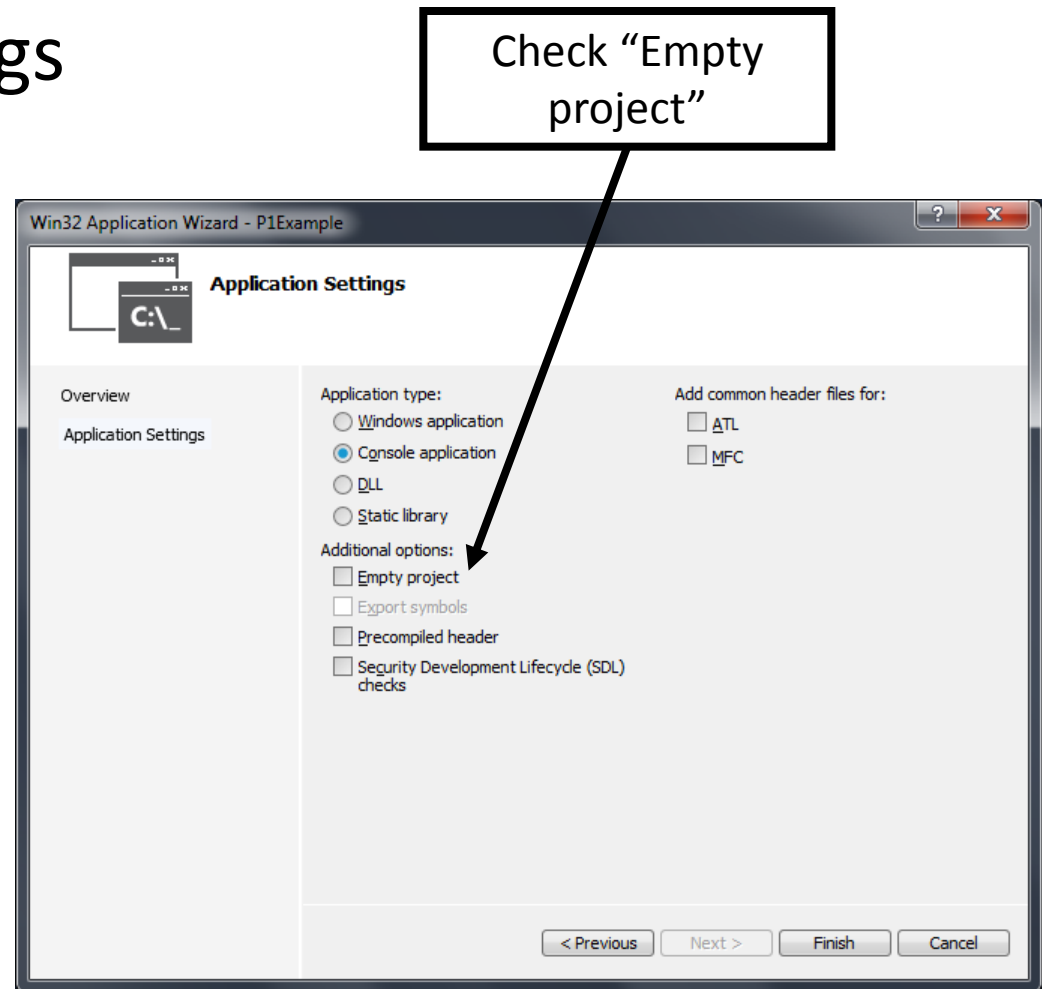
Visual Studio 2013

- Application Settings
  - Application type:
    - Console application
  - Additional options
    - Empty Project

  - Then click "Finish"!

Check "Empty project"

Visual Studio 2013

- IDE…
  - Mutliple Windows…

    Lots of menus!

  - Solution Explorer…

  - Output Windows…

Compiler / Linker message output

Solution Explorer view…
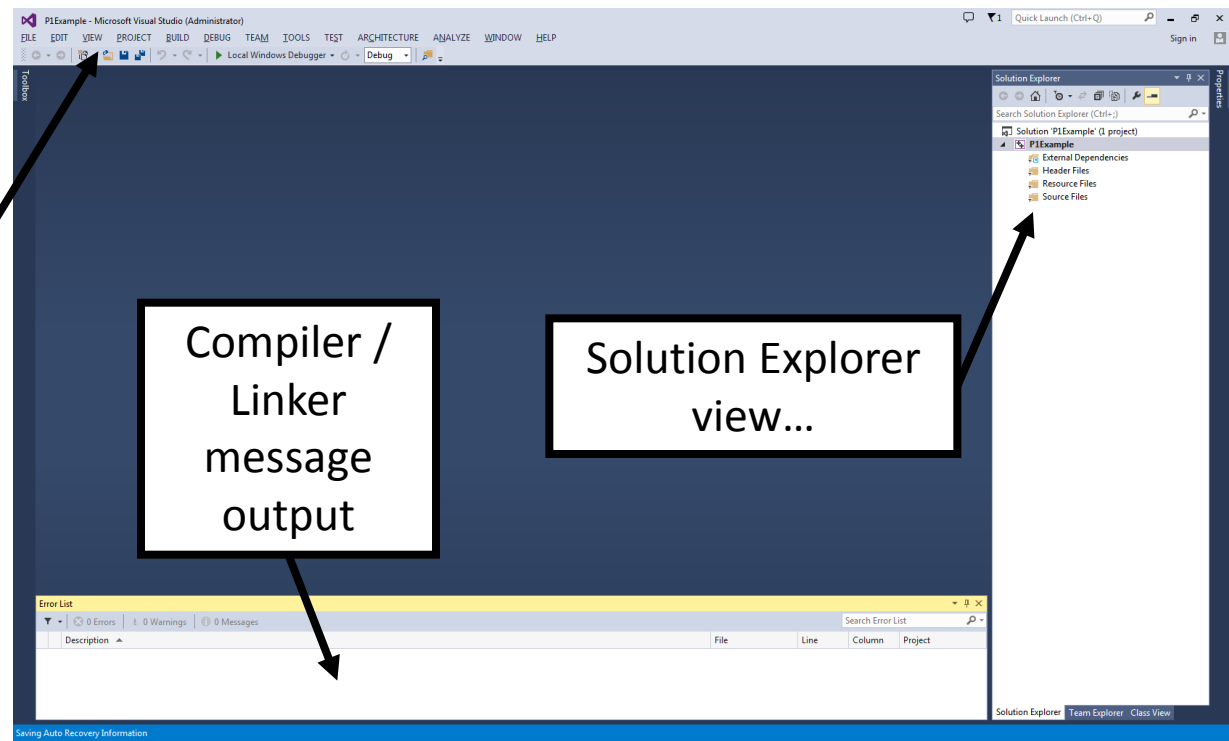
Visual Studio 2013

- Files on disk…
  - ***.sln**
    - The solution.

This folder contains the Solution and related files to be used by the IDE…

Visual Studio Solution File
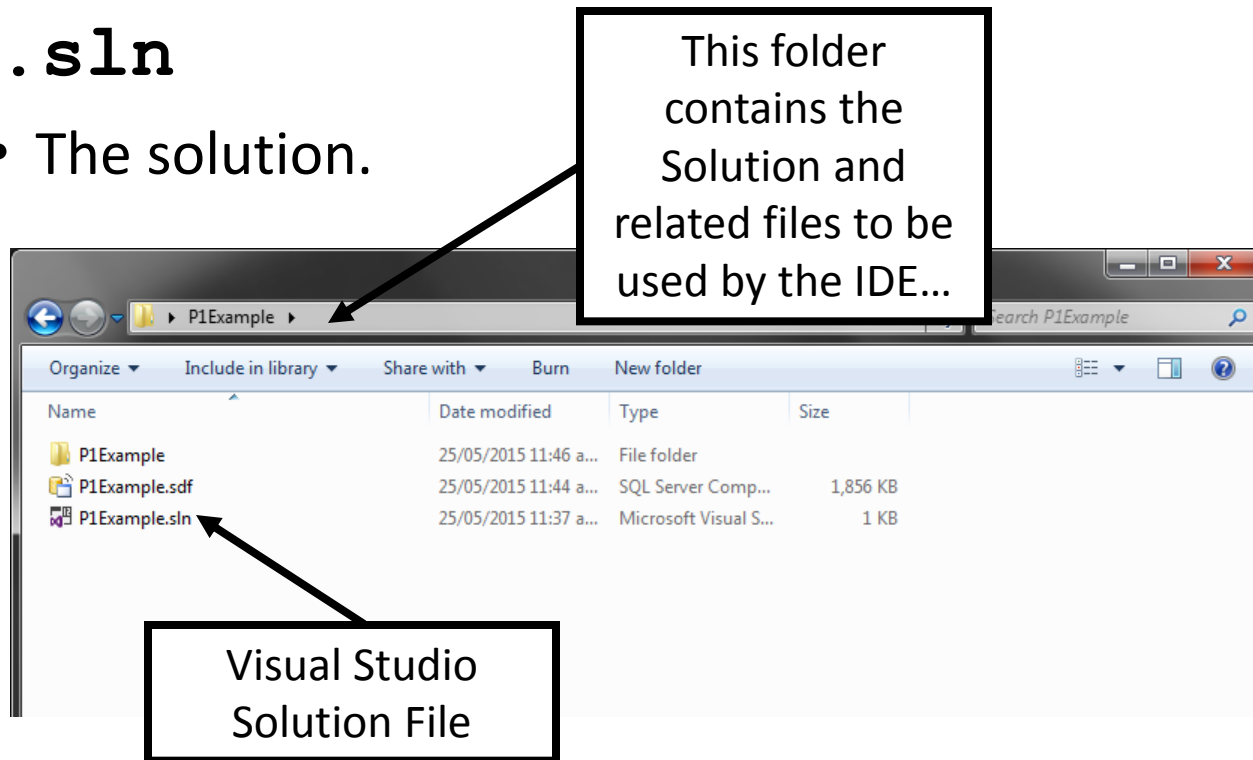
Visual Studio 2013

- Creating a new source file.
  - Source code files need to be added to a project…

Right click on the source files folder…
Choose Add->New Item…
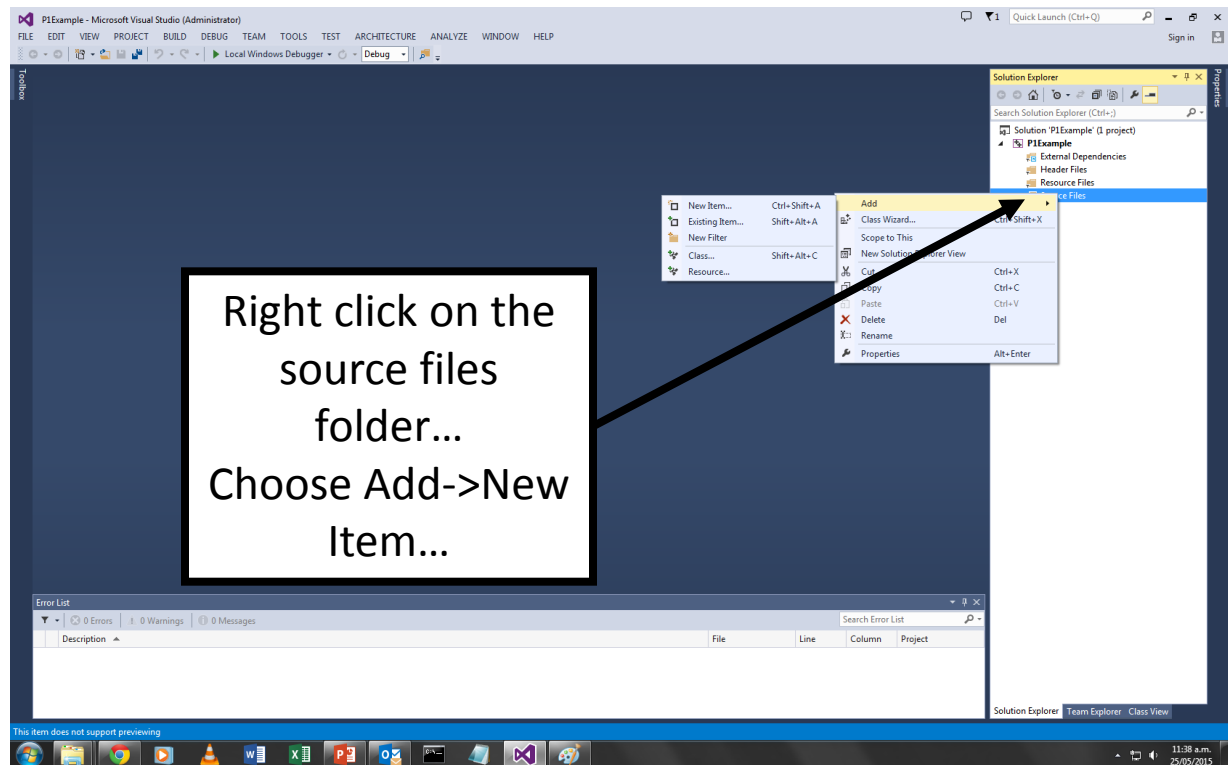
Visual Studio 2013

- Visual C++:
  - C++ File (.cpp)

  - Name:
    - **example.cpp**
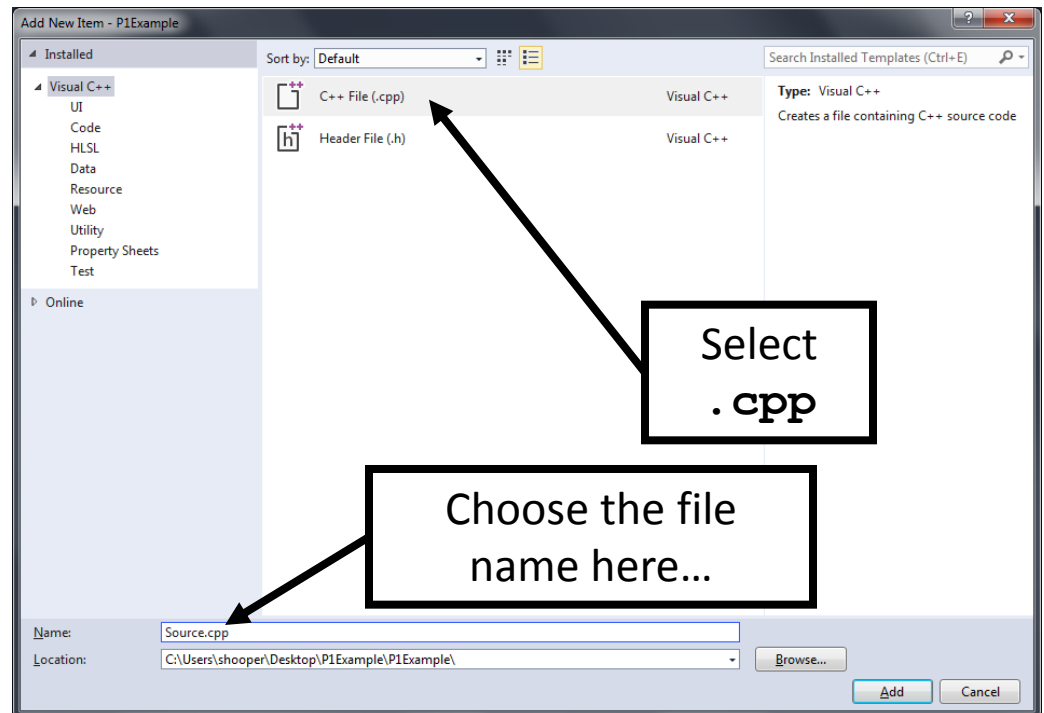
Visual Studio 2013

- Files on disk…

  - **`*.vcproj`**
    - Project file

  - **`*.c`**
    - Sourc code!

Inside the folder next to the **`.sln`** file…

Name	Date modified	Type	Size
example.c	25/05/2015 11:41 a…	C Source	1 KB
P1Example.vcxproj	25/05/2015 11:41 a…	VC++ Project	4 KB
P1Example.vcxproj.filters	25/05/2015 11:41 a…	VC++ Project Filte…	1 KB

This is the **`example.c`** file on disk
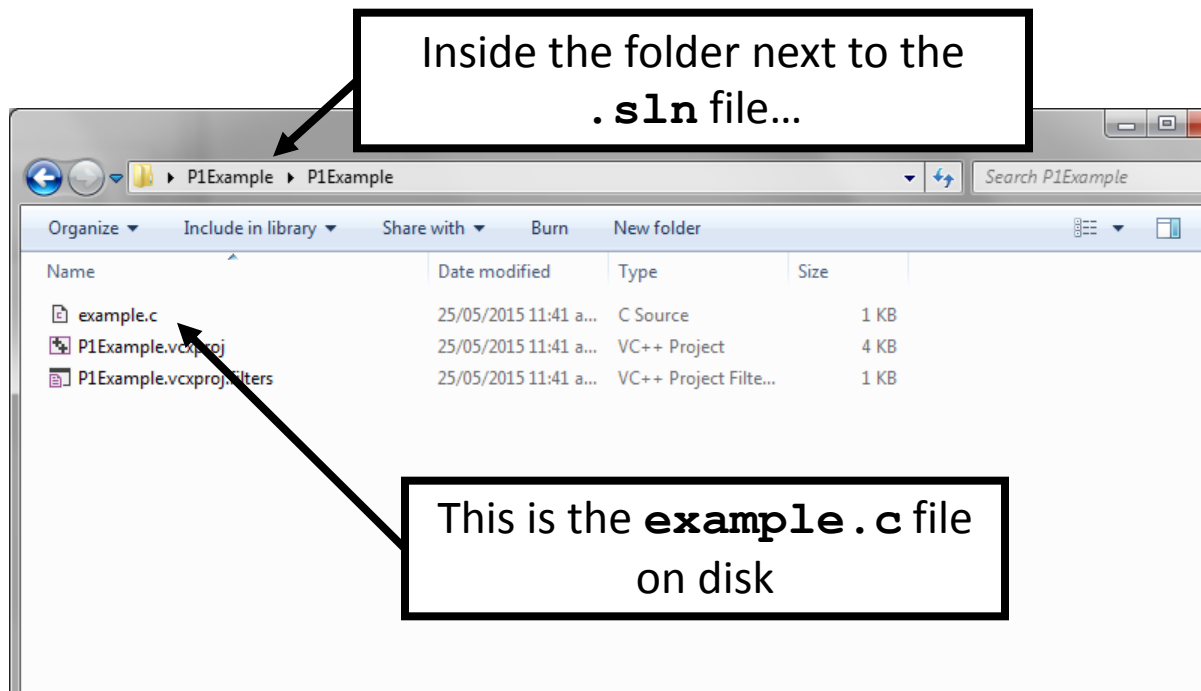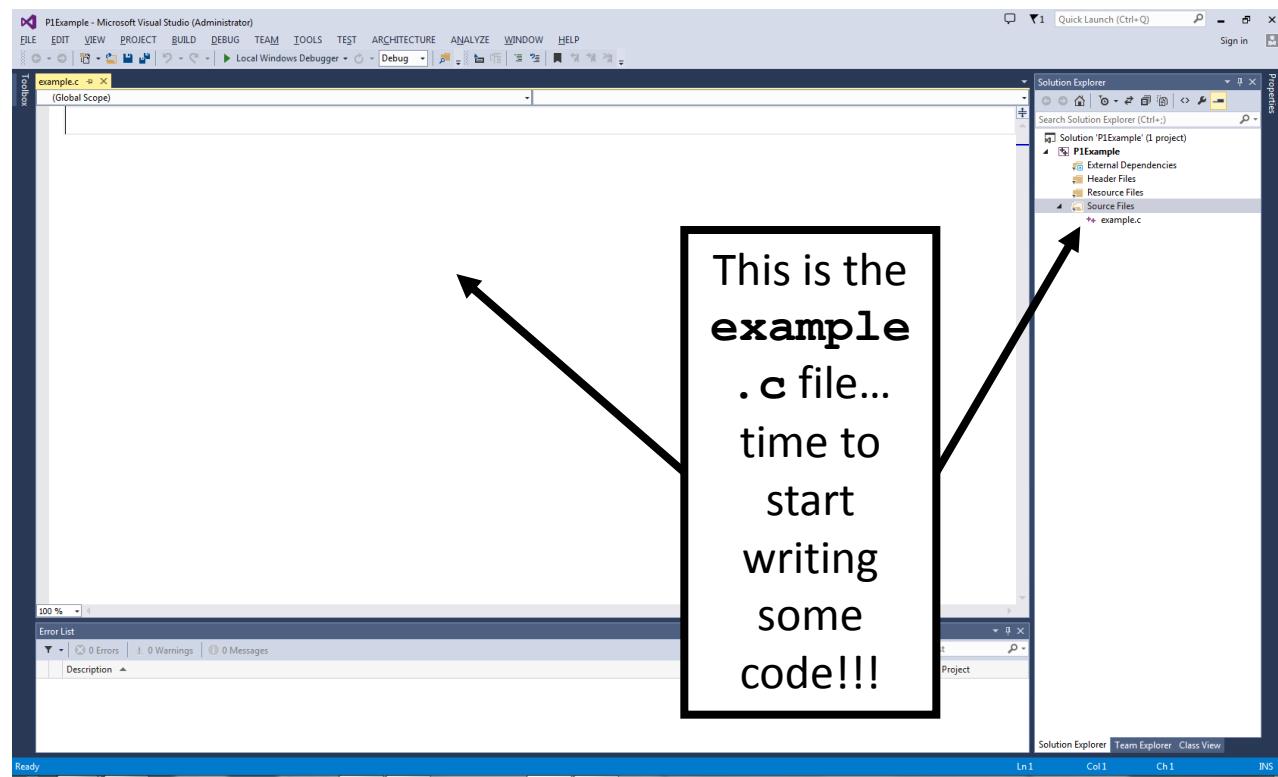
Visual Studio 2013

- Solution Explorer:
  - File View:
    - Header Files
    - Source Files
- Editor:
  - Type code here…

This is the **example.c** file… time to start writing some code!!!

Visual Studio 2013

- Notice…
  - Coloured text!
    - Syntax Highlighting
  - Auto complete suggestions…
  - Easy navigation…

Colour!!

This is the **example .cpp** file…

Compiler warnings and errors will be shown here…
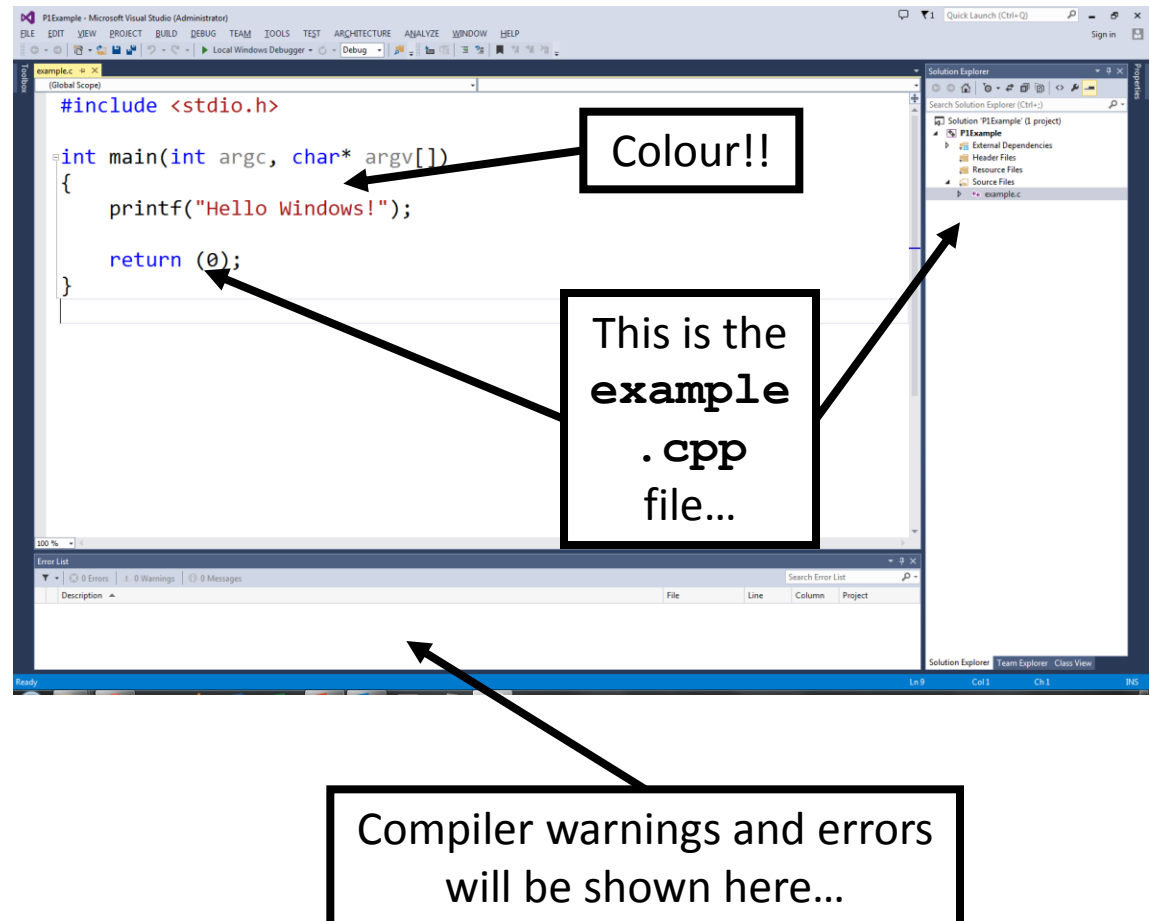
Visual Studio 2013

- To compile and run: **`CTRL-F5`**

Program running!
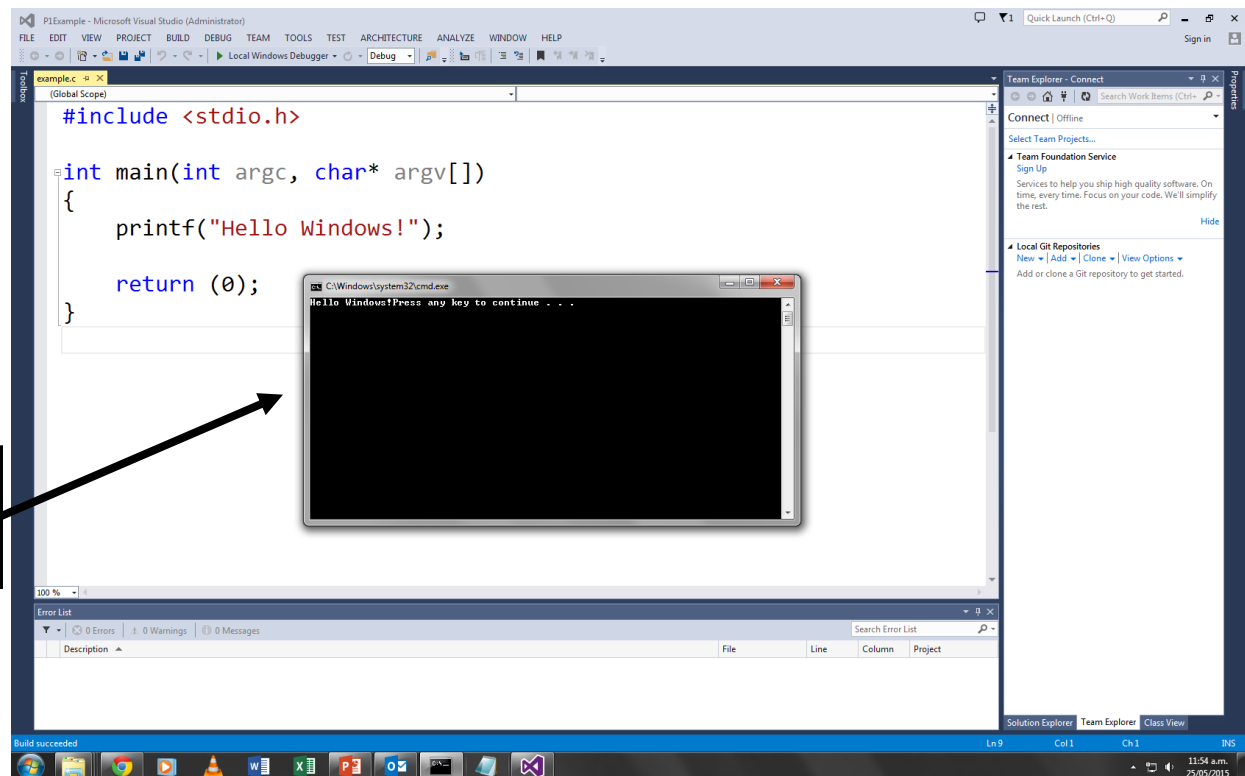
Visual Studio 2013

- Notice…
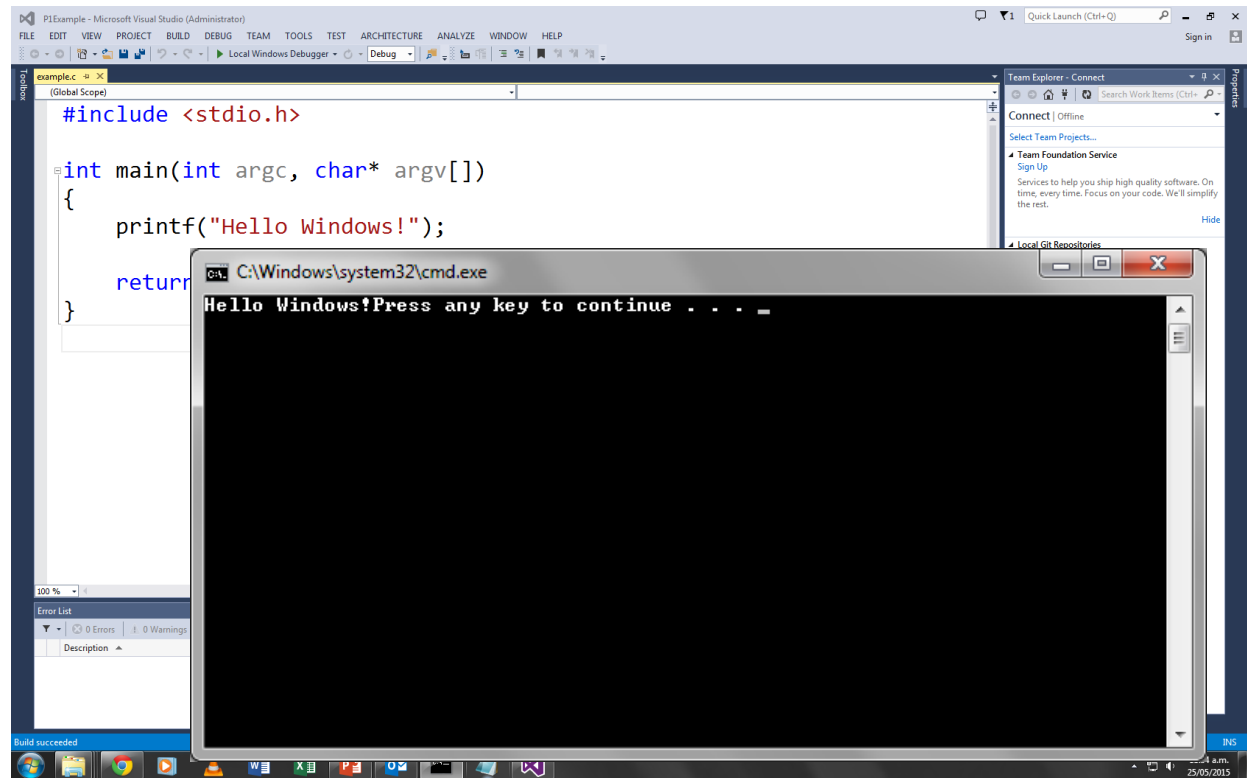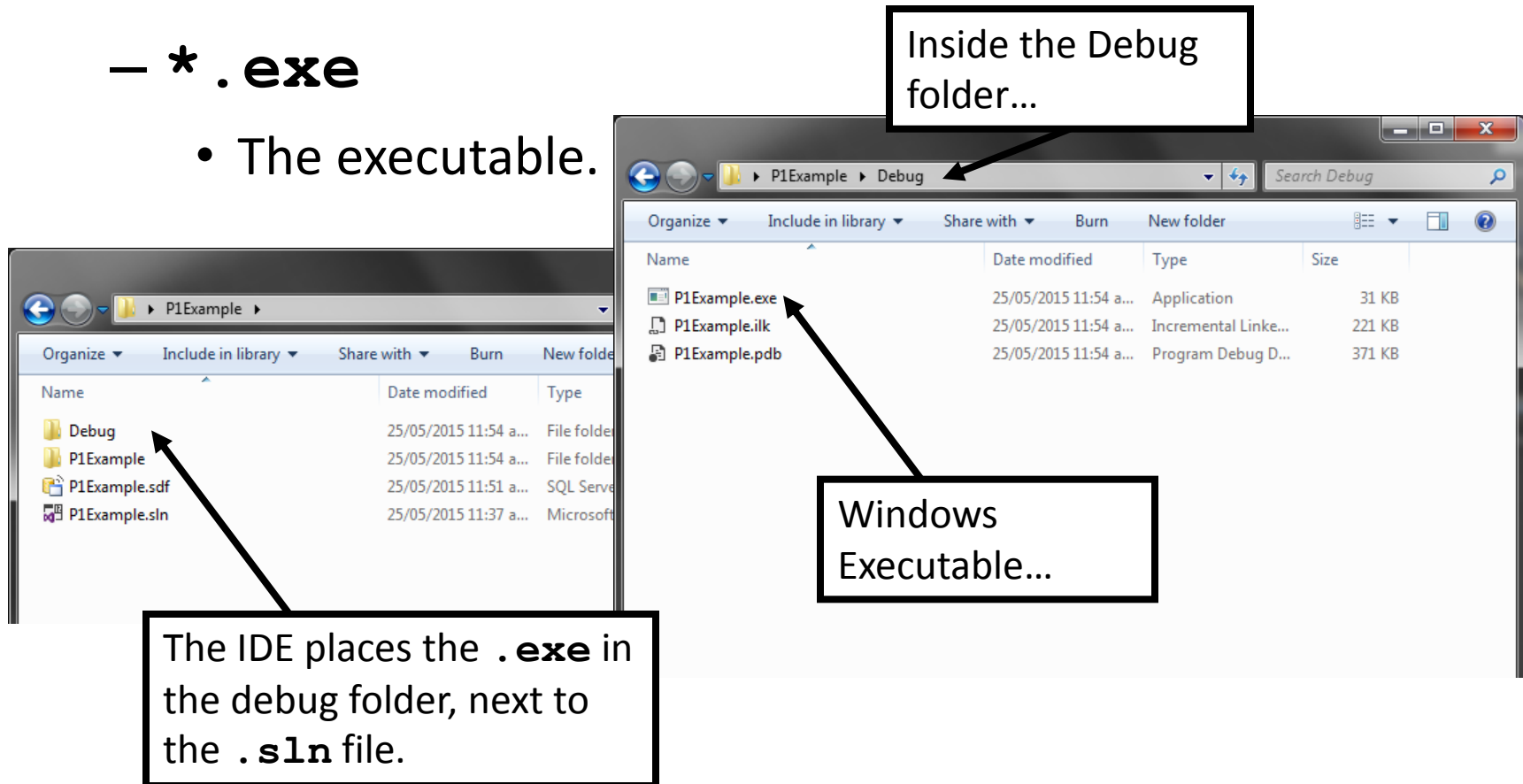 - **printf**!
  - Working…

- And…
  - "Press any key to continue …"

Windows does that…

Visual Studio 2013

- Files on disk…
  - ***.exe**
    - The executable.

Inside the Debug folder…

P1Example ▸ Debug

Name	Date modified	Type	Size
P1Example.exe	25/05/2015 11:54 a...	Application	31 KB
P1Example.ilk	25/05/2015 11:54 a...	Incremental Linke...	221 KB
P1Example.pdb	25/05/2015 11:54 a...	Program Debug D...	371 KB

Windows Executable…

P1Example ▸

Name	Date modified	Type
Debug	25/05/2015 11:54 a...	File folder
P1Example	25/05/2015 11:54 a...	File folder
P1Example.sdf	25/05/2015 11:51 a...	SQL Serve
P1Example.sln	25/05/2015 11:37 a...	Microsoft

The IDE places the **.exe** in the debug folder, next to the **.sln** file.

Visual Studio 2013

- What else is the IDE good for?

- Debugging!
  - Breakpoints...
  - Stepping...
    - Into, over, out...
  - Call Stack...
  - Watch Windows...
  - Memory View...
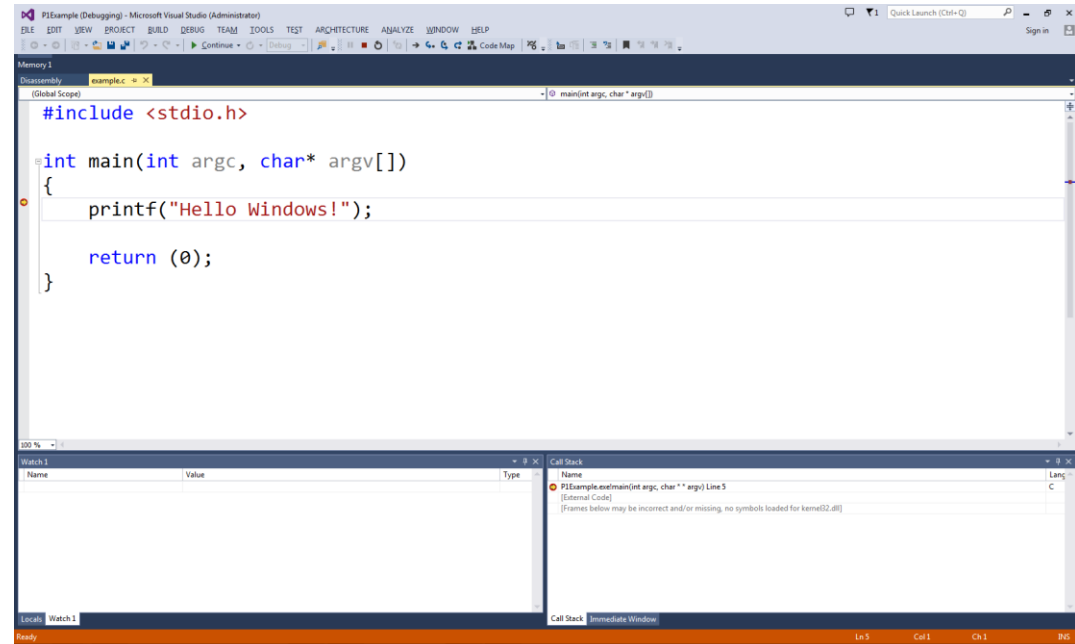
Visual Studio 2013

- What else is the IDE good for?
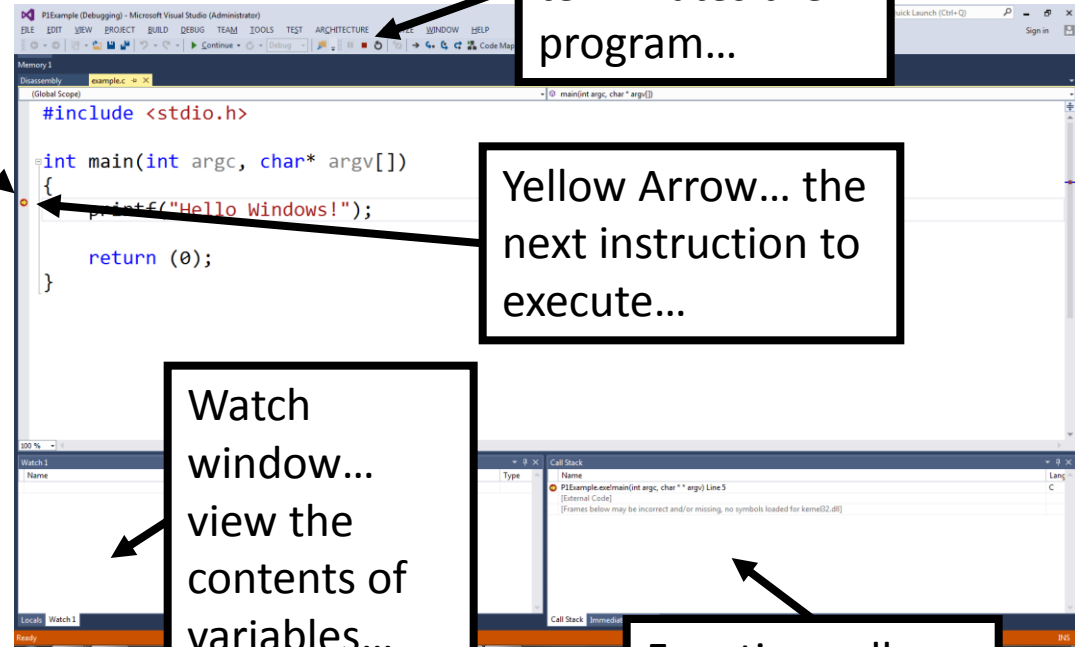
Break Point… (Red circle)

- Debugging!
  - Breakpoints…
  - Stepping…
    - Into, over, out…
  - Call Stack…
  - Watch Windows…
  - Memory View…

Stop button terminates the program…

Yellow Arrow… the next instruction to execute…
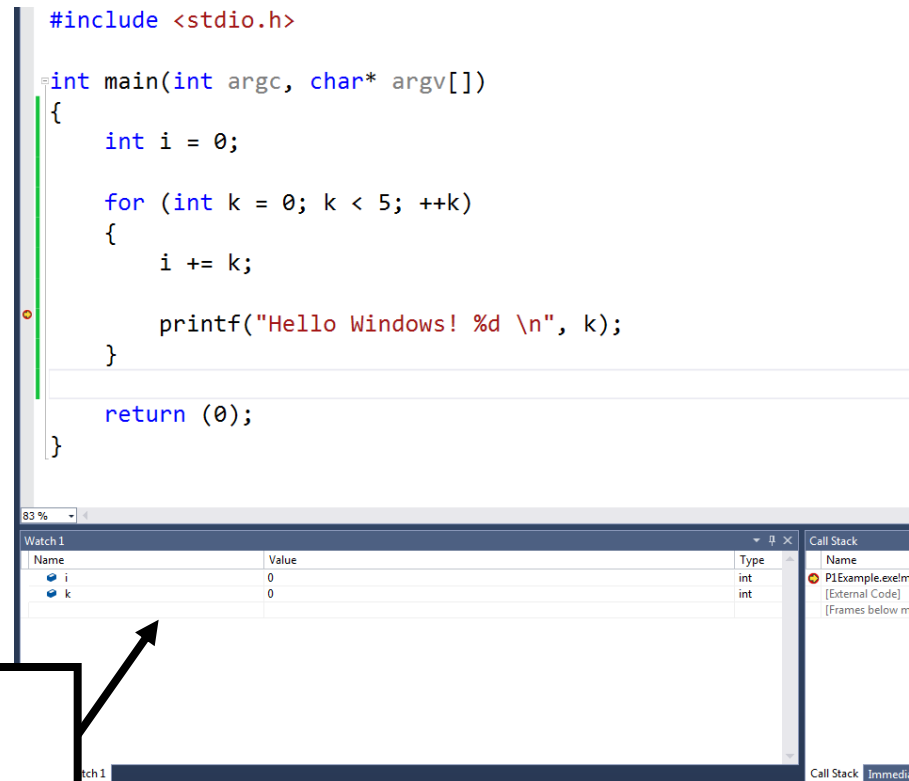
Watch window… view the contents of variables…

Function call stack… Stack frames are here…

Visual Studio 2013

- Watch Window…

  - Drag and drop variables into this window…

  - Watch them change as the program executes, while in debug mode…

    - Set a breakpoint!

```c
#include <stdio.h>

int main(int argc, char* argv[])
{
    int i = 0;

    for (int k = 0; k < 5; ++k)
    {
        i += k;

        printf("Hello Windows! %d \n", k);
    }

    return (0);
}
```

83 %

Watch 1				Call Stack
Name	Value		Type	Name
i	0		int	P1Example.exe!m
k	0		int	[External Code]
				[Frames below m

Watch 1

Call Stack   Immedi

What does `i` and `k` currently hold?

Visual Studio 2013
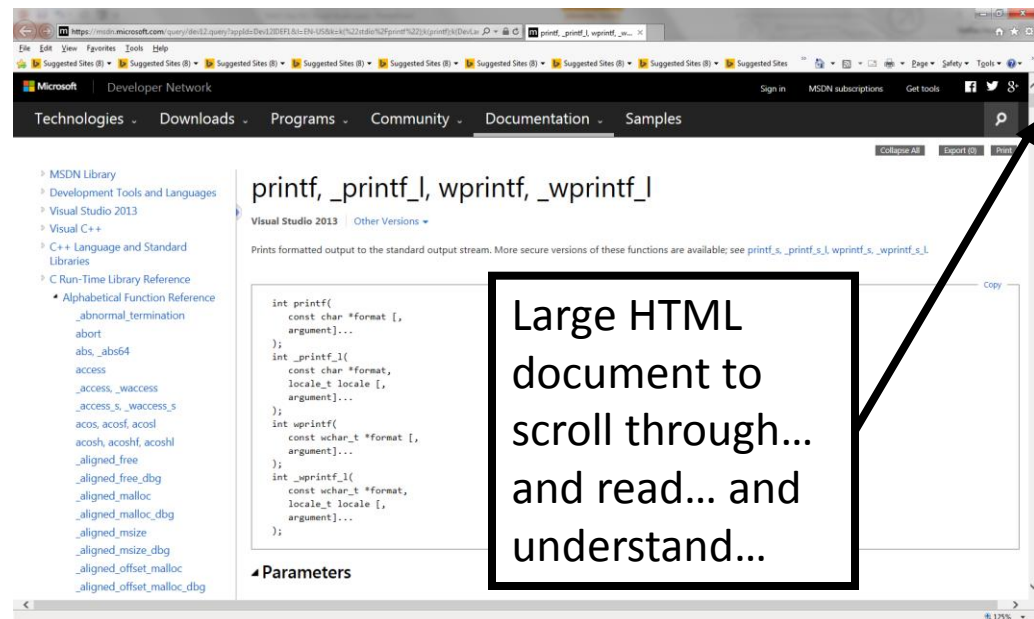
- MSDN Help…
  - Highlight a function of interest…
  - Press F1…

Highlight something to learn more about it… Press F1… similar to using man pages…
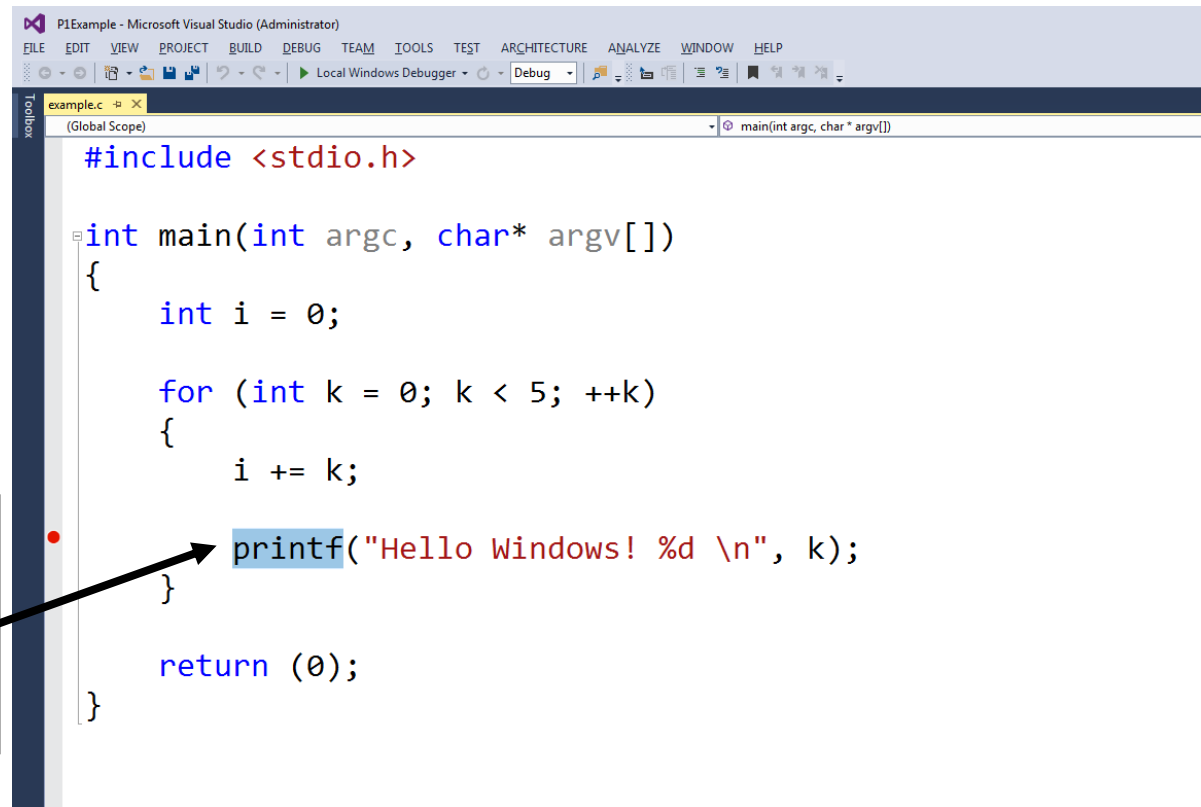
Visual Studio 2013

- ## MSDN Help…
  - Programmer documentation:
    - Function Overview
    - Parameters
    - Return Value
    - Remarks
    - Requirements
    - Example
    - Sample Output

Large HTML document to scroll through… and read… and understand…

Exercises

- Week 1:
  - Day 001.1 – "Simple" Dice Game
  - Day 001.2 – Noughts and Crosses
  - Day 001.3 – "Simple" Dice Game, with Statistics Reporting

Summary

- Procedural C++
  - Visual Studio
- Exercises