Your First C++ Program

## Aug 27, 2008

C++

- ## Based on the C programming language

- ## One of today's most popular programming languages

  o used extensively in industry

- ## Language + Libraries

  o Libraries: bits of programs you can use

Visual Studio

- ## Microsoft Tools

  - o **I**ntegrated **D**evelopment **E**nvironment

  - o all the tools you need to write a program!

- ## Source code editor

  - o highlights source code as you type

- ## Debugger

- ## Extra Libraries
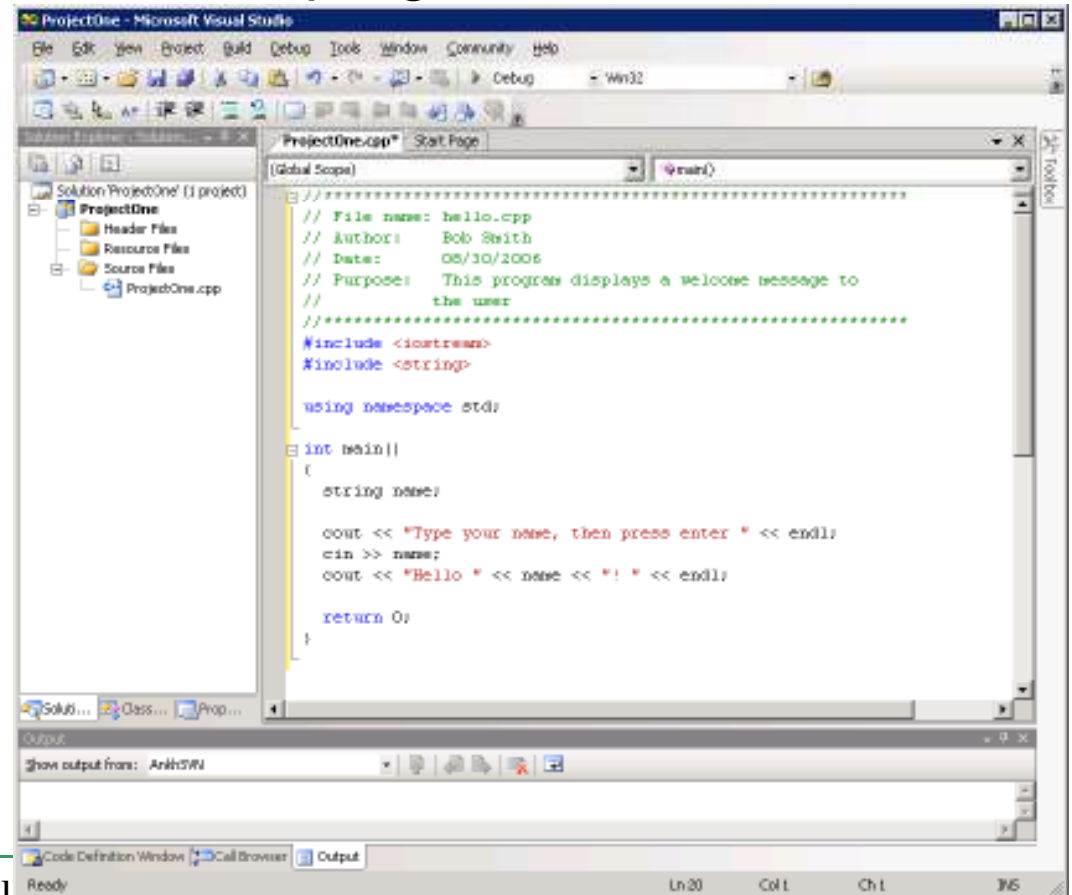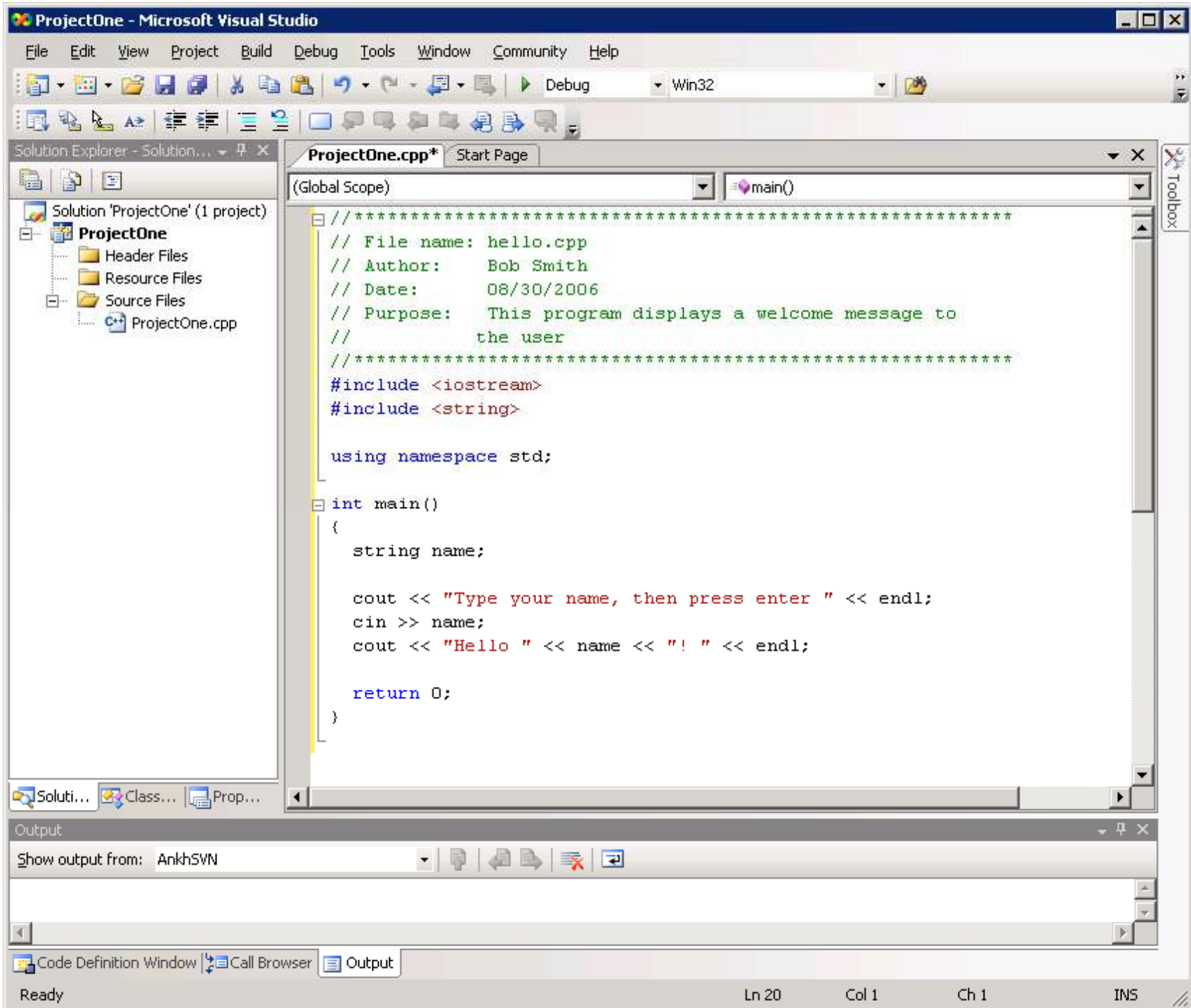
Problem

- Programs are written to solve problems

  - source code

  - process data

- Imagine that you have been asked to solve the following problem

  - Write a program that asks the user to enter their name and display a personalized welcome message
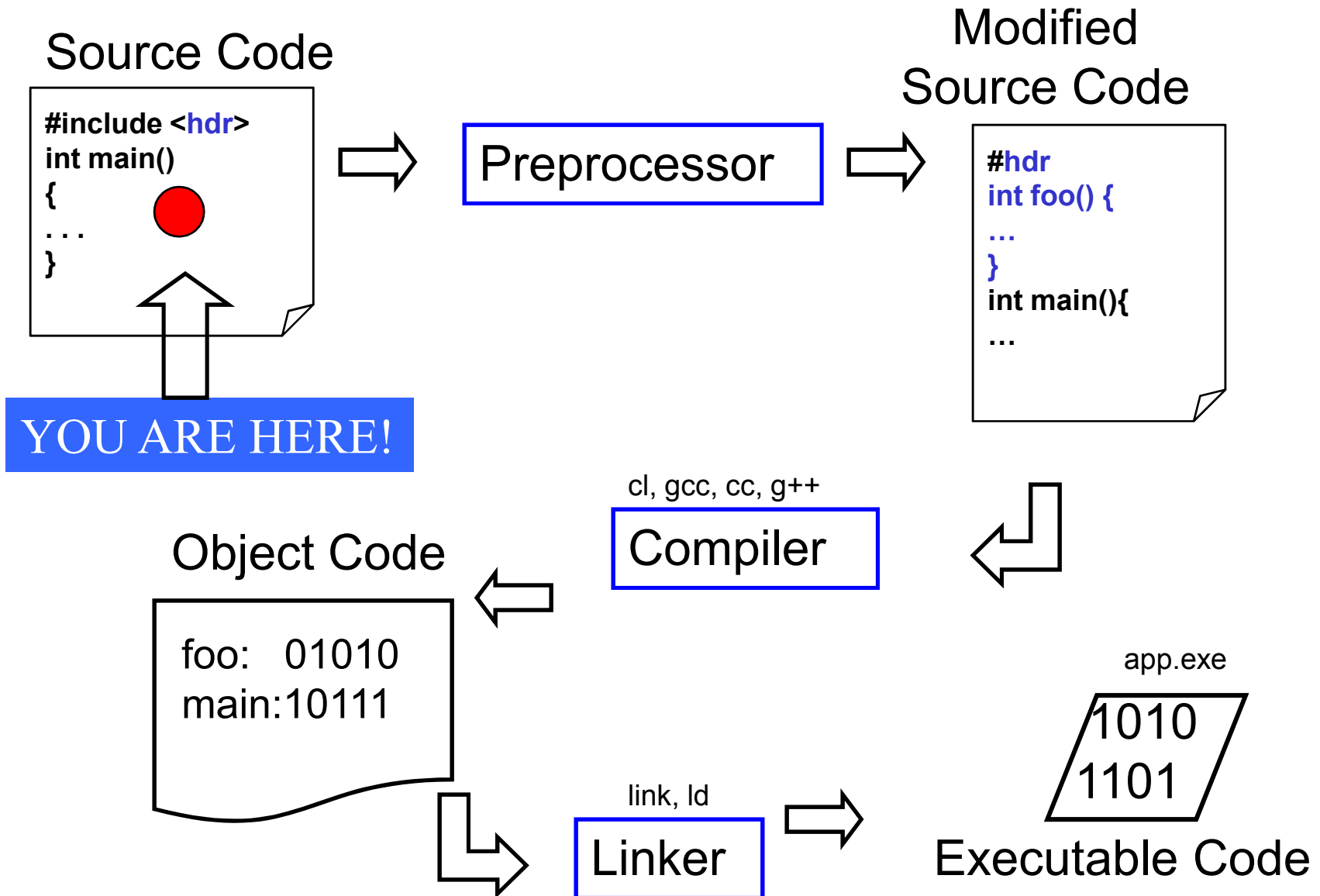
Your First C++ Program

```cpp
//**********************************************************
// File name: hello.cpp
// Author:    Bob Smith
// Date:      08/30/2006
// Purpose:   This program displays a welcome message to
//            the user
//**********************************************************
#include <iostream>
#include <string>

using namespace std;

int main()
{
  string name;

  cout << "Type your name, then press enter" << endl;
  cin >> name;
  cout << "Hello " << name << "!" << endl;

  return 0;
}
```

Program Output:

```
Type your name, then press enter
Shereen
Hello Shereen!
```

File   Edit   View   Project   Build   Debug   Tools   Window   Community   Help

Debug   Win32

Solution Explorer - Solution...

ProjectOne.cpp*   Start Page

(Global Scope)   main()

Solution 'ProjectOne' (1 project)
- ProjectOne
  - Header Files
  - Resource Files
  - Source Files
    - ProjectOne.cpp

```cpp
//**********************************************************
// File name: hello.cpp
// Author:     Bob Smith
// Date:       08/30/2006
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#include <iostream>
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using namespace std;


int main()
{
   string name;

   cout << "Type your name, then press enter " << endl;
   cin >> name;
   cout << "Hello " << name << "! " << endl;

   return 0;
}
```

Soluti...   Class...   Prop...

Output

Show output from: AnkhSVN

Code Definition Window   Call Browser   Output

Ready   Ln 20   Col 1   Ch 1   INS

6

Building an Application

Source Code

```
#include <hdr>
int main()
{
  . . .
}
```

YOU ARE HERE!

Modified Source Code

```
#hdr
int foo() {
…
}
int main(){
…
```

Preprocessor

cl, gcc, cc, g++

Compiler

Object Code

```
foo:  01010
main:10111
```

link, ld

Linker

app.exe

```
1010
1101
```

Executable Code

Language Elements

- ## Key Words
  - Have special meaning in C++
  - **`using    namespace     int`**

- ## Programmer-Defined Identifiers
  - Names made up by the programmer
  - **`name`**

- ## Operators
  - Perform operations
  - **`*     =`**

- ## Punctuation
  - Used to mark the beginning and end of the program
  - **`;`**

Syntax (Grammar)

- Rules that must be followed when constructing a program

- Controls the use of key words, programmer-defined identifiers, operators, and punctuation

Variables

- Names storage location in the computers memory

- Holds data

- The data can change

Address	Contents
0	Shereen
1	354
2	0.05
3	-26

`string name;`
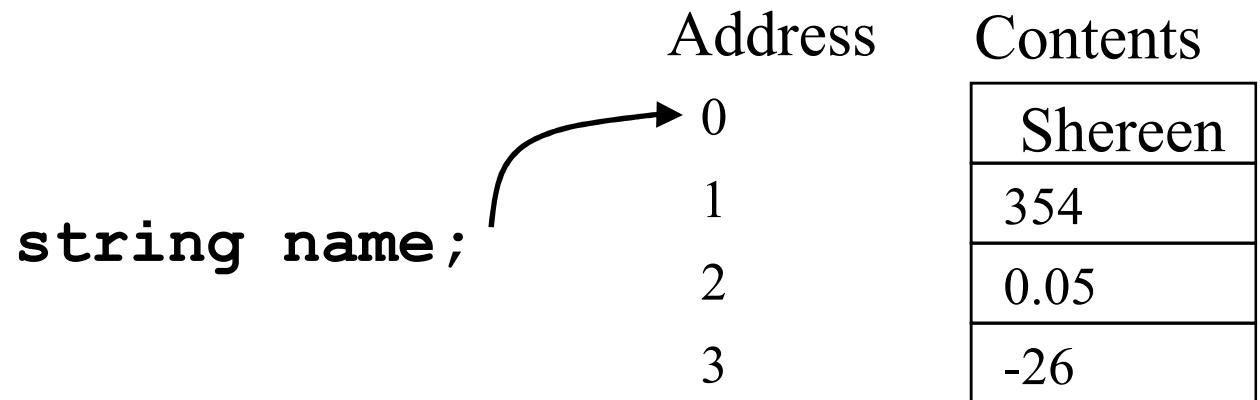
Program Components

- The C++ program on the previous slide consists of the following elements:

  o Comments

  o Preprocessor directives

  o Standard namespace

  o `main` function

  o Declaration statements

  o Executable statements

Comments

- Comments are
  - How you explain in English what the different parts of your program do
  - Ignored by the compiler
  - Very important for you and me

- The editor in Visual Studio will colour code your comments. They will be green

Comments

- There are two ways to write comments
  - `// I am a comment`
    - Anything after `//` to the end of the line will be a comment
  - `/* I am another comment */`
    - You must start the comment with `/*` and end it with `*/` in this style of comment

Preprocessor directives

- **`#include <iostream>`**

- **`#`** signifies preprocessor directive

- Processed before program translation

- **`#include`** tells the preprocessor to look for libraries

- **`<>`** signifies part of standard C++ libraries

- We'll see other examples of preprocessor directives later

Preprocessor directives

- **iostream** is the input/output stream library

- It is needed to output data to the screen and read in data from the keyboard

- **#include** takes the contents of the library file and places them in the current program

Namespace std

- **`using namespace std;`**

- Indicates that we will be using objects (**`cout`** & **`cin`**) that are named in a region called **`std`**

  o predefined objects C++ provides

- The statement ends in a semicolon

- The statement appears in all our programs

`main` Function

```
int main()
{
  // program statements
  return 0;
}
```

- Where the start of your program execution begins

- `return 0;` ends the main function and indicates that the program terminated successfully

- Everything within the double braces {} should be indented
  - Style!

Program Statements

- There are two types of statements that you can write inside the main (or any other) function

  - Declaration statements

    - Specify the data that is needed by the program

  - Executable statements

    - Perform operations

- All statements must end with a semicolon;

Program Statements

- ## Declaration statements

  ```
  string name;
  ```

- ## Executable statements

```
cout << "Type your name, then press enter" << endl;

cin >> name;

cout << "Hello " << name << "!" << endl;
```

Program Skeleton

- ## All programs in C++ should have the following skeleton

```cpp
//*****************************************************************
// File name:  filename.cpp
// Author:     Your Name
// Date:       09/01/2004
// Purpose:    Description about what the program does
//*****************************************************************
#include <iostream>

using namespace std;

int main()
{
   // declaration statements

   // executable statements

   return 0;
}
```
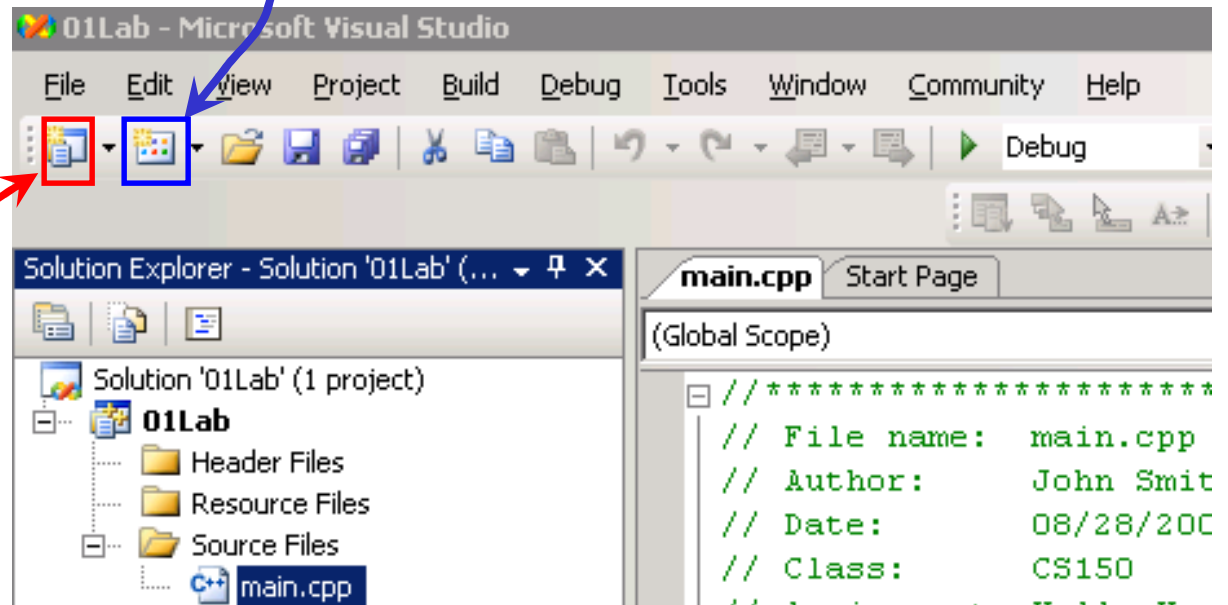
Do try this at home (or in the lab) !

- Add New Project

  o Visual C++ | General | Empty Project

- Add New Item

  o C++ Source File

Summary

- Today we
  - Wrote our first C++ program
  - Introduced the basic components of a C++ program
- We covered p. 12 - 33 from your textbook