

C++ Programming Basics

C++ Lecture I

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Course Goals

- Introduction to integrated development environments (IDEs)
- Crash course in C++ programming
- Workable understanding of variables, functions, and objects

Class Structure

- Class time from 9-11am and 2-4pm on Monday, Wednesday, and Friday
- Class time is used for lectures and worktime
- Daily activities reinforcing concepts
- Concepts will build on each other so ask questions early

Motivation

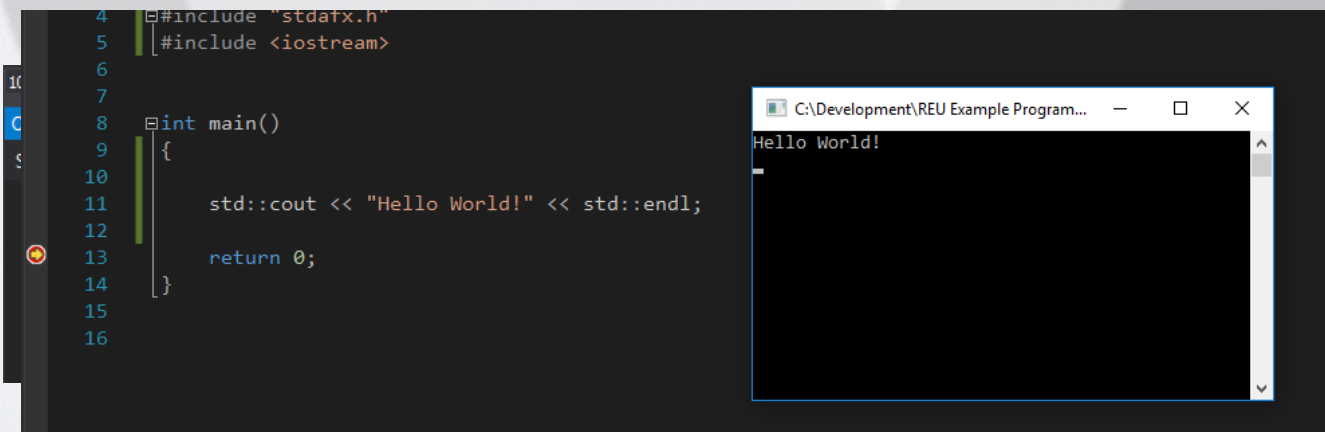
- C++ is a challenging but powerful language
- Basis of many major software packages
- Concepts in this class extend to many other languages
- Today is devoted to the basic building blocks
 - Setting up the IDE
 - C++ Syntax
 - Using Includes
 - Commenting Code
 - Output to the Command Line

What is an IDE?

- Definition: An **integrated development environment (IDE)** is a software application that provides comprehensive facilities to computer programmers for software development. An IDE normally consists of a **source code editor**, **build automation tools** and a **debugger**.

What is an IDE

- ◉ Source Code – The letters, numbers, and symbols that make up a program
- ◉ Build Automation – Translates source code into computer speak
- ◉ Debugging – Looking through code while running to gain understanding



The screenshot displays an IDE with two windows. The left window shows C++ source code for a 'Hello World' program. The right window shows the program's output, which is 'Hello World!'.

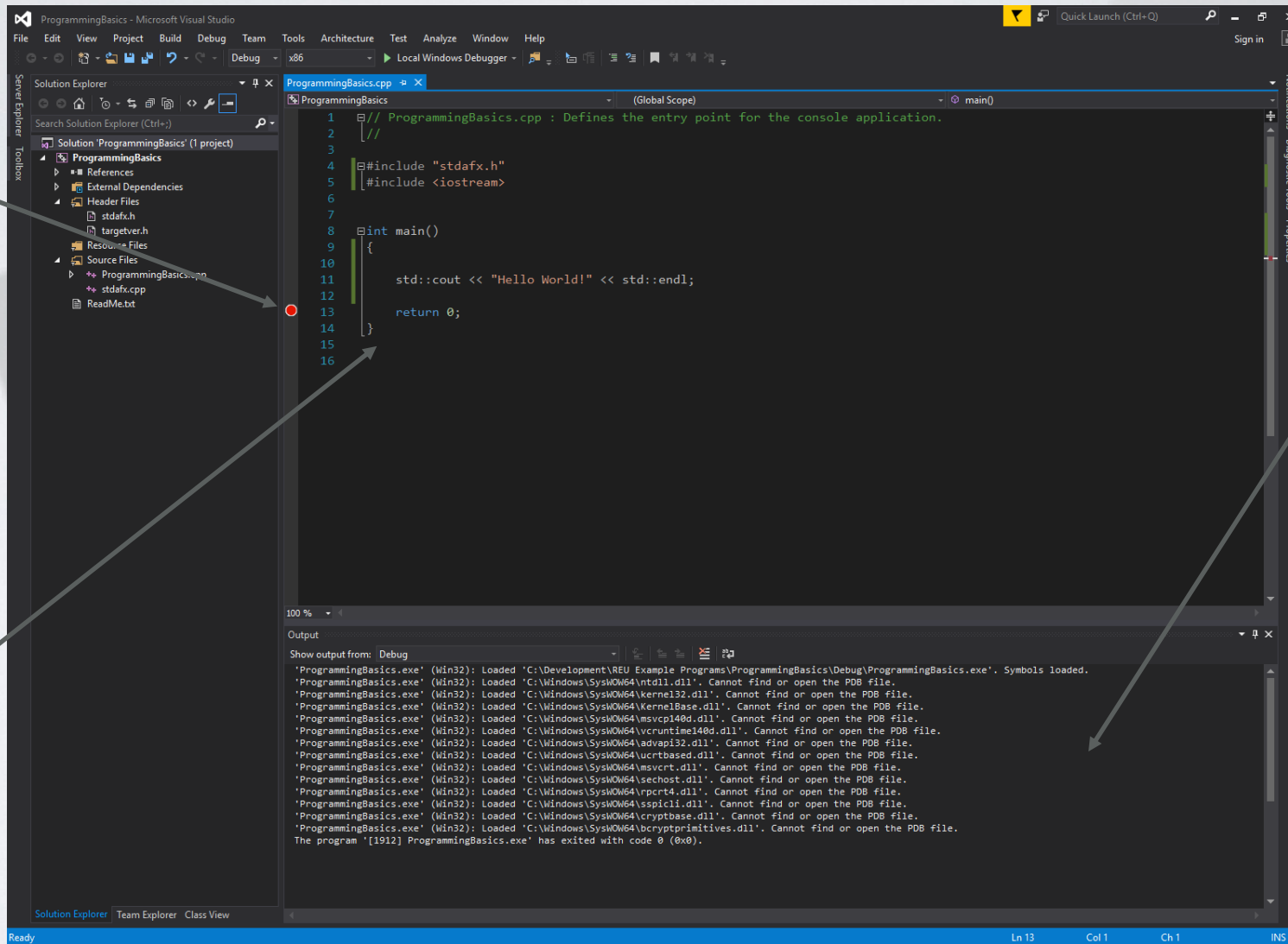
```
4 | #include "stdafx.h"
5 | #include <iostream>
6 |
7 |
8 | int main()
9 | {
10 |
11 |     std::cout << "Hello World!" << std::endl;
12 |
13 |     return 0;
14 | }
15 |
16 |
```

C:\Development\REU Example Program... - - X
Hello World!

Visual Studio

Debugging
Breakpoint

Build
Output



Source
Code

Checkpoint

- Open Visual Studio and create a new visual C++ Win32 Console Application

Properties of C++

- Program statements are executed line-by-line
- Lines are terminated with the a ;
- Everything starts in the main function
- Source code is translated into machine code prior to execution
- Syntax similar to other "curly brace languages" (C, Java, C#)

Checkpoint

- Obligatory “Hello World!” application. Enter code into IDE and run.
- Delete a ;
- What happens?
- Remove “return 0;”
- What happens?

```
4  #include "stdafx.h"
5  #include <iostream>
6
7
8  int main()
9  {
10
11     std::cout << "Hello World!" << std::endl;
12
13     return 0;
14 }
15
```

Comments

- ◉ Good programmers comment their code
- ◉ Comments explain in plain language what a portion of code does
- ◉ Comments are helpful to yourself and others when reading code

```
int main()
{
    std::cout << "Hello World!" << std::endl; // This is a one line comment

    /*This is a multi line comment.
    I
    I can
    I can go
    I can go on
    I can go on forever
    I can go on forever and
    I can go on forever and ever.....*/

    return 0;
}
```


Checkpoint

- Add your own comments to your Hello World program
- What happens when you run the program without the // or /***/ with the text?

Include Statements

- Remember C++ complies syntax line-by-line
- If we want to do something we need the syntax or machine code
- There are common operations that users want to perform
- Don't want to reinvent the wheel every time we want a printout
- Sooooo we use the standard library and include statements

Include Statements

- To specify what standard features we want we use `#include`
- Lets us call and use all the functionality in our own program without having to write the code ourselves
- For example in our Hello World program we used `#include <iostream>` to print to the command line

Checkpoint

- Uncomment the `#include <iostream>` and try to run the program

```
3
4  #include "stdafx.h"
5  // #include <iostream>
6
7
8  int main()
9  {
10
11     std::cout << "Hello World!" << std::endl; // This is a one line comment
12
13     /* This is a multi line comment.
14     I
15     I can
16     I can go
17     I can go on
18     I can go on forever
19     I can go on forever and
20     I can go on forever and ever.....*/
21
22     return 0;
23 }
```

Questions?

Assignment

- Play with different wording in your Hello World application
- Challenge: Can you split the words onto different lines?