0.6 — Compiling your first program

BY ALEX ON MAY 28TH, 2007 | LAST MODIFIED BY ALEX ON MARCH 20TH, 2018

Before we can write our first program (which we will do very soon), we need to know a few things about development environments.

First, although our programs will be written inside .cpp files, the .cpp files themselves will be added to a **project**. The project stores the names of all the code files we want to compile, and also saves various IDE settings. Every time we reopen the project, it will restore the state of the IDE to where we left off. When we choose to compile our program, the project tells the compiler and linker which files to compile and link. It is worth noting that project files for one IDE will not work in another IDE. You will need to create a new project for each program you write (or overwrite an old one).

Second, there are different kinds of projects. When you create a new project, you will have to pick a project type. All of the projects that we will create in this tutorial will be **console** projects. A console project means that we are going to create programs that can be run from the dos or linux command-line. By default, console applications have no graphical user interface (GUI) and are compiled into stand-alone executable files. This is perfect for learning C++, because it keeps the complexity to a minimum.

Third, when you create a new project for your program, many IDEs will automatically add your project to a “workspace” or a “solution”. A workspace or solution is a container that can hold one or more related projects. Although you can add multiple projects to a single solution, we recommend creating a new workspace or solution for each program. It’s simpler and there’s less chance of something going wrong.

Traditionally, the first program programmers write in a new language is the infamous **hello world program**, and we aren’t going to deprive you of that experience! You’ll thank us later. Maybe.

A quick note about examples containing code

Starting with this lesson, you will see many examples of C++ code presented. Most of these examples will look something like this:

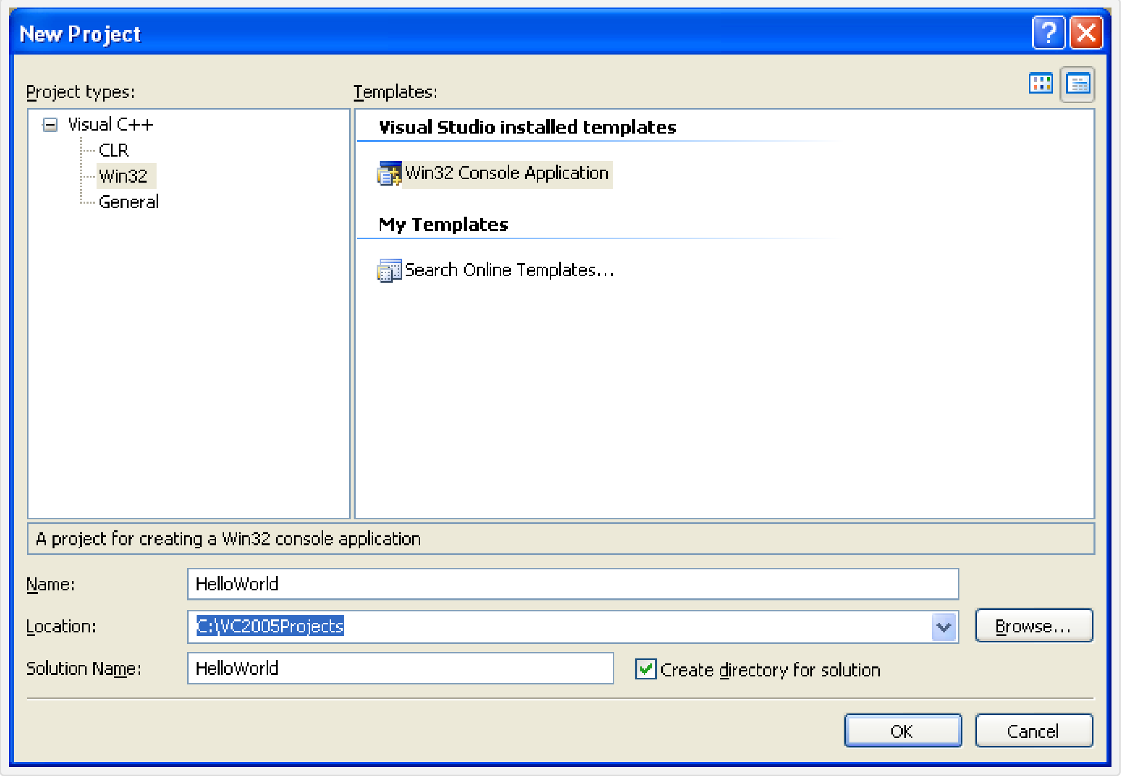
```
#include <iostream>

int main()
{
    std::cout << "Hello world!" << std::endl;
    return 0;
}
```

If you select the code from these examples with your mouse and then copy/paste it into your IDE, you may also get the line numbers (depending on how you made the selection). If so, you’ll need to remove these manually.

If you’re using the Visual Studio IDE

Although the following section was written using Visual Studio 2005, it essentially works the same for all versions of Visual Studio.

To create a new project in Visual Studio, go to the File menu, and select New -> Project. A dialog box will pop up that looks like this:



A project for creating a Win32 console application

Name: HelloWorld

Location: C:\VC2005Projects

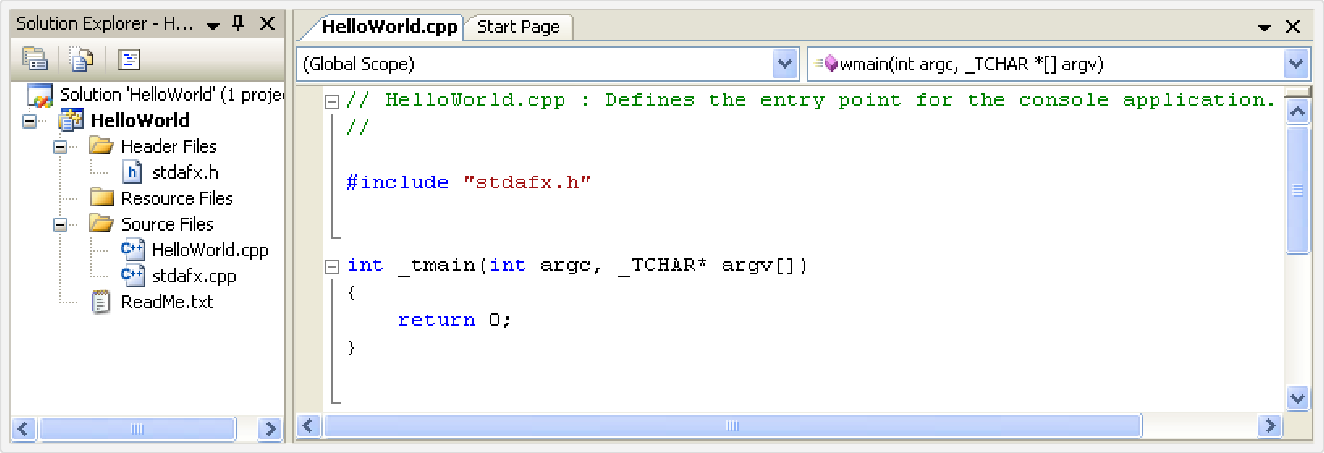
Solution Name: HelloWorld

☑ Create directory for solution

First, make sure “Visual C++” is selected on the left side.

Second, underneath “Visual C++”, select the *Win32 project type*, and *Win32 Console Application* will automatically be selected for you. In the *Name* field, you will enter the name of your program. Type in `HelloWorld`. In the Location field, pick a directory that you would like your project to be placed into. We recommend you place them in a subdirectory off of your C drive, such as `C:\VC2005Projects`. Click OK, and then Finish.

On the left side, in the Solution Explorer, Visual Studio has created a number of files for you, including stdafx.h, HelloWorld.cpp, and stdafx.cpp.

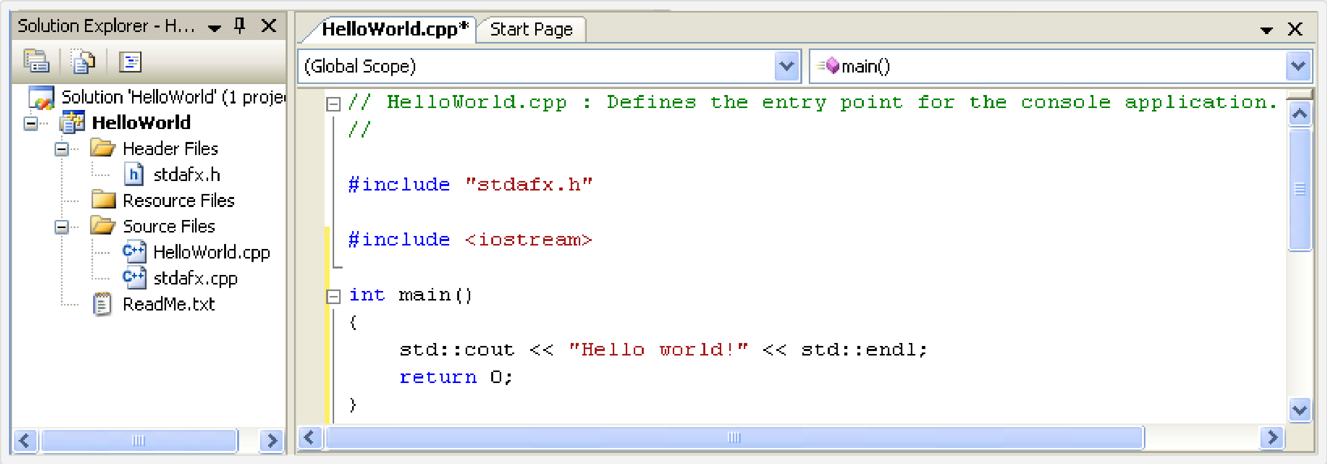


```
// HelloWorld.cpp : Defines the entry point for the console application.
//

#include "stdafx.h"


int _tmain(int argc, _TCHAR* argv[])
{
    return 0;
}
```

In the text editor, you will see that VC2005 has already created some code for you. Select and delete all of the code, and type/copy the following into your compiler:

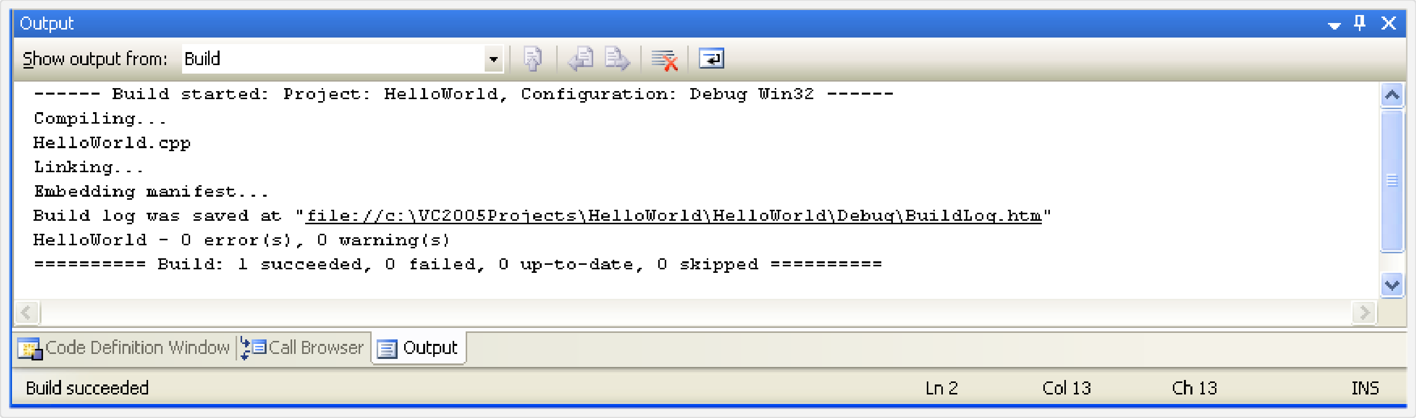
```cpp
#include "stdafx.h"
#include <iostream>

int main()
{
    std::cout << "Hello world!" << std::endl;
    return 0;
}
```

What you end up with should look like this:



```
// HelloWorld.cpp : Defines the entry point for the console application.
//

#include "stdafx.h"

#include <iostream>

int main()
{
    std::cout << "Hello world!" << std::endl;
    return 0;
}
```

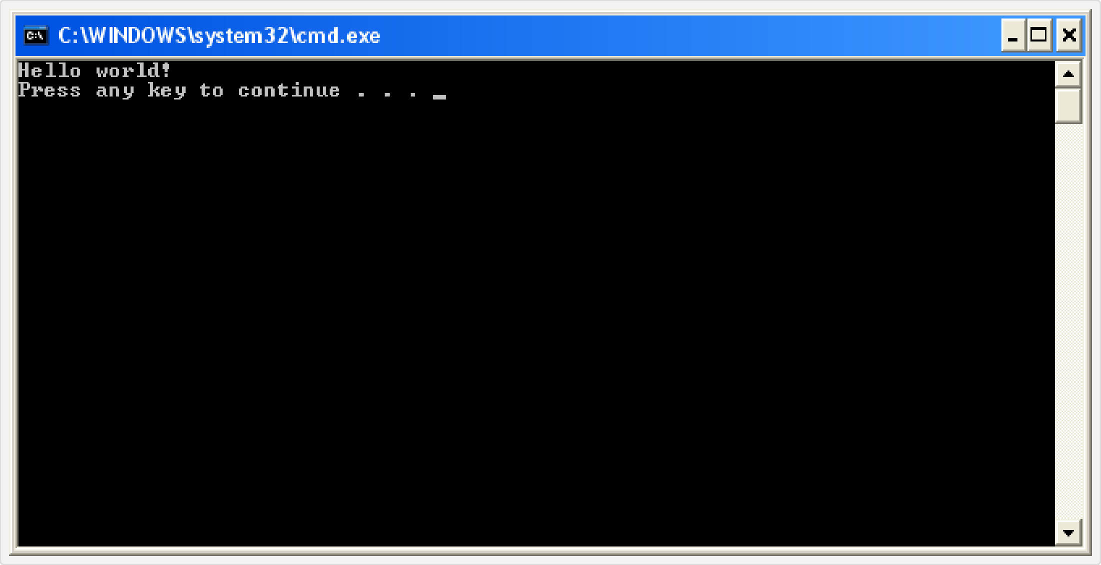
To compile your program, either press F7 or go to the Build menu and choose “Build Solution”. If all goes well, you should see the following appear in the Output window:



```
------ Build started: Project: HelloWorld, Configuration: Debug Win32 ------
Compiling...
HelloWorld.cpp
Linking...
Embedding manifest...
Build log was saved at "file://c:\VC2005Projects\HelloWorld\HelloWorld\Debug\BuildLog.htm"
HelloWorld - 0 error(s), 0 warning(s)
========== Build: 1 succeeded, 0 failed, 0 up-to-date, 0 skipped ==========
```

This means your compile was successful!

To run your compiled program, press ctrl-F5, or go the Debug menu and choose “Start Without Debugging”. You will see the following:



```
Hello world!
Press any key to continue . . . _
```

That is the result of your program!

Note: If you see the console window (black box) without any text, your anti-virus may be interfering. Try turning your anti-virus off temporarily and try again.

Important note to Visual Studio users: Visual studio programs should ALWAYS begin with the following line:

```
#include "stdafx.h"
```

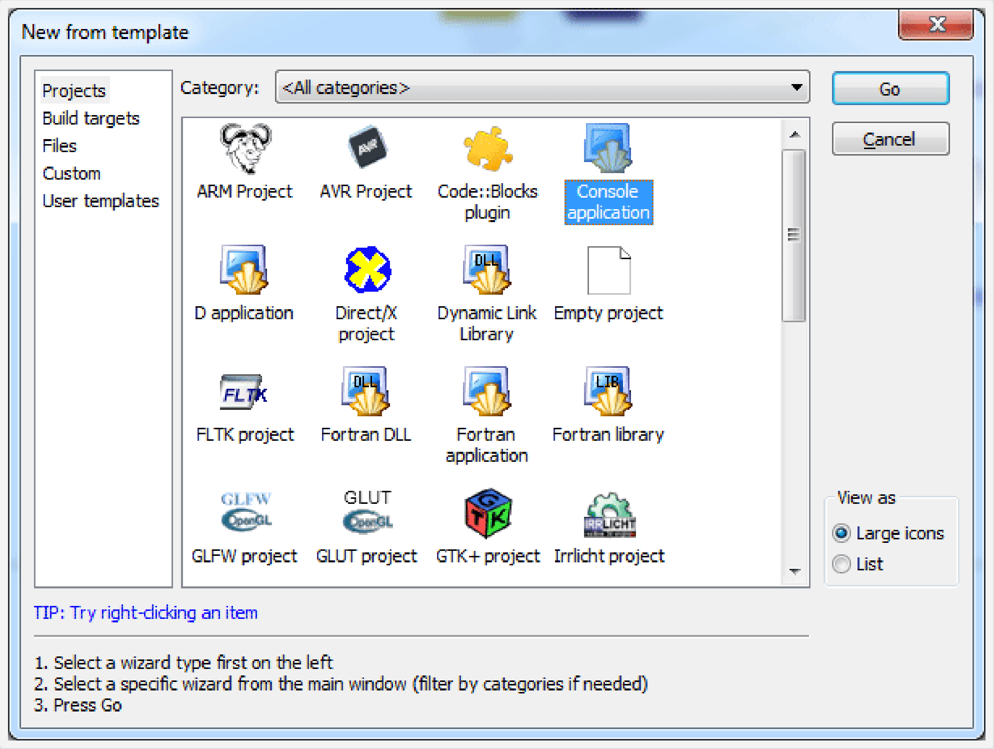
Otherwise you will receive a compiler warning, such as `c:testtest.cpp(21) : fatal error C1010: unexpected end of file while looking for precompiled header directive`

Alternately, you can turn off precompiled headers. However, using precompiled headers will make your program compile much faster, so we recommend leaving them on unless you are developing a cross-platform program (a program that can be compiled on different operating systems/architectures).

The example programs we show you throughout the tutorial will not include this line, because it is specific to your compiler.

If you're using the Code::Blocks IDE

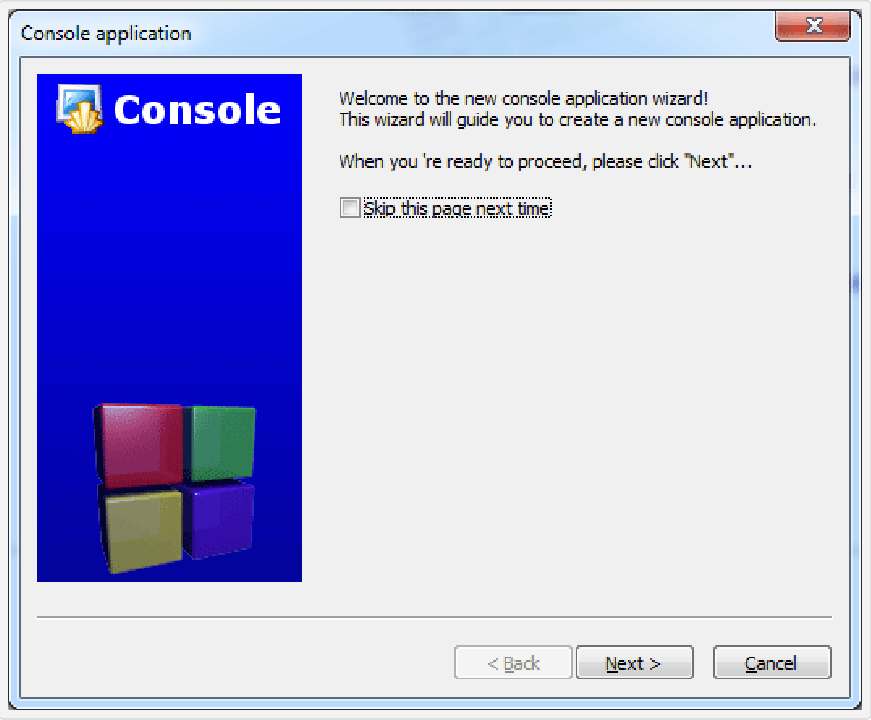
To create a new project, go to the File menu, and select New Project. A dialog box will pop up that looks something like this:



1. Select a wizard type first on the left
2. Select a specific wizard from the main window (filter by categories if needed)
3. Press Go

Select *Console Application* and press the *Go* button.

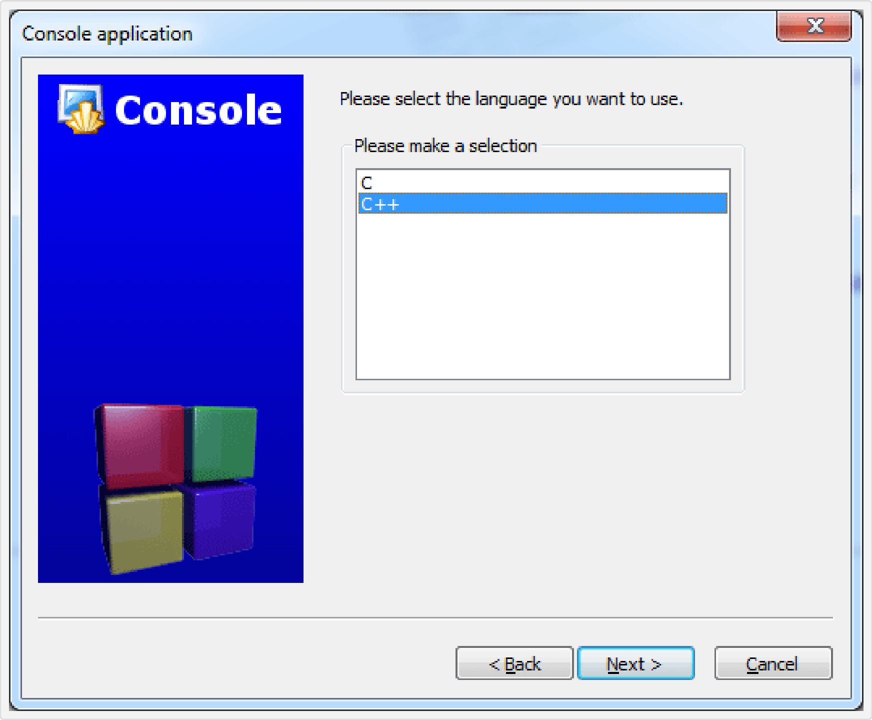
This should pop up a wizard:



Welcome to the new console application wizard!
This wizard will guide you to create a new console application.

When you 're ready to proceed, please click "Next"...

On the next page, select "C++" as your language. Click Next.



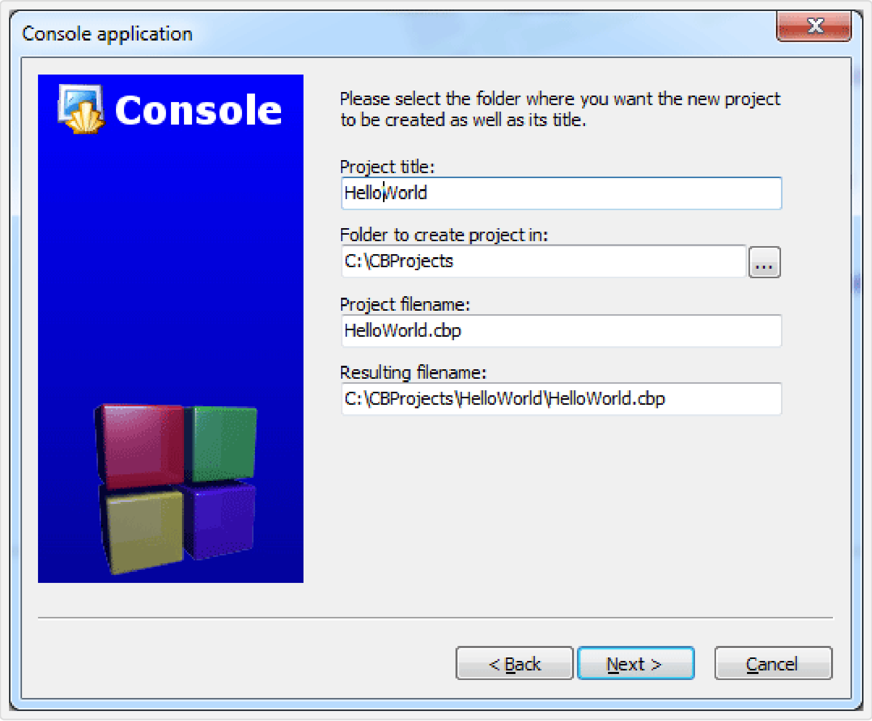
Console application

Please select the language you want to use.

Please make a selection

C
C++

Next, you'll be asked to name your project and choose a location. For your project title, set a name (such as HelloWorld). In the *Project Title* field, you will enter the name of your program. Type in `HelloWorld`. In the *Folder to create project in* field, pick a directory that you would like your project to be placed into. We recommend you place them in a subdirectory off of your C drive, such as `C:\CBProjects`. Click Next.



Console application

Please select the folder where you want the new project to be created as well as its title.

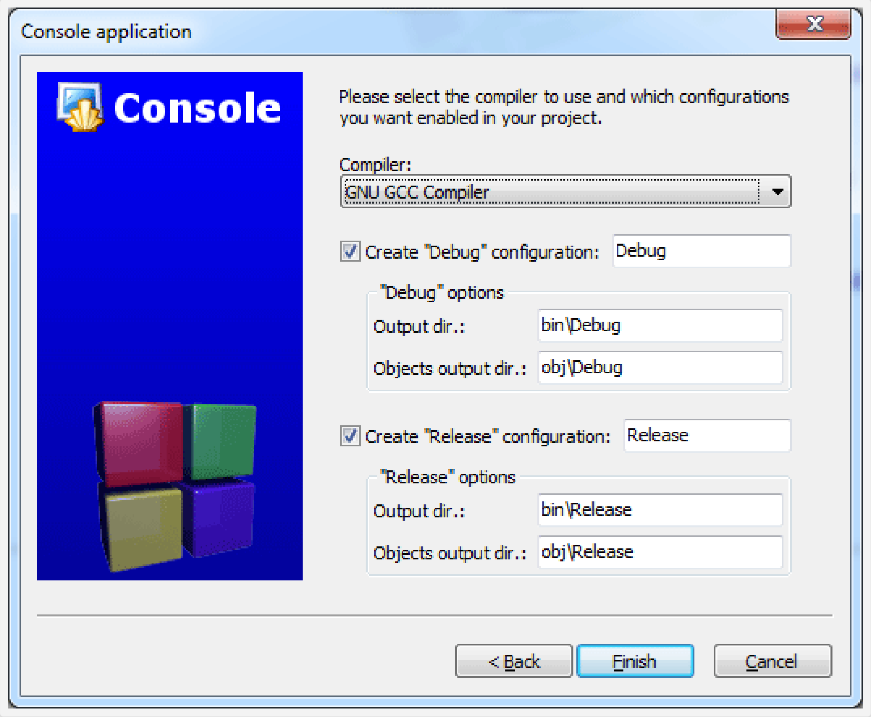
Project title: HelloWorld

Folder to create project in: C:\CBProjects

Project filename: HelloWorld.cbp

Resulting filename: C:\CBProjects\HelloWorld\HelloWorld.cbp

On the next screen, Code::Blocks asks you what compiler you want to use, and what configurations you want. Don't touch anything here, just hit Finish.



Please select the compiler to use and which configurations you want enabled in your project.

Compiler: GNU GCC Compiler

☑ Create "Debug" configuration: Debug

"Debug" options

Output dir.: bin\Debug

Objects output dir.: obj\Debug

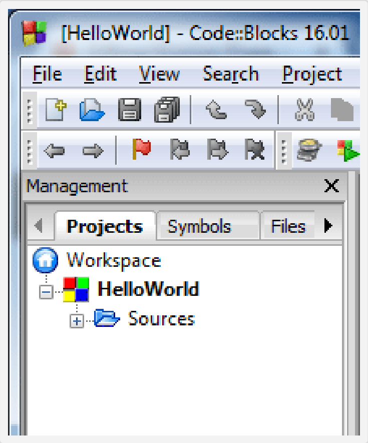
☑ Create "Release" configuration: Release

"Release" options

Output dir.: bin\Release

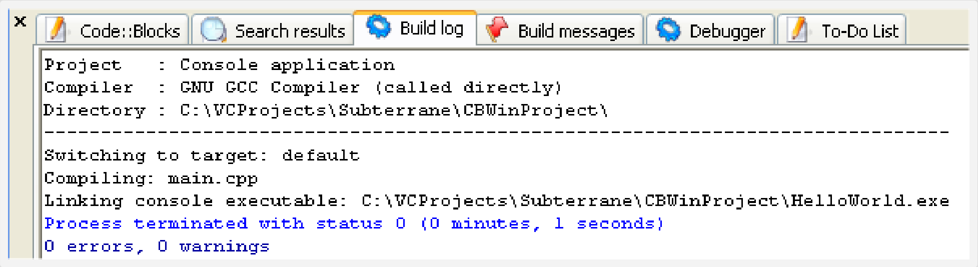
Objects output dir.: obj\Release

Now you've created your project, and should see your project under the default workspace:



Open your project node, then open "Sources", and double click on "main.cpp". You will see that the hello world program has already been written for you!

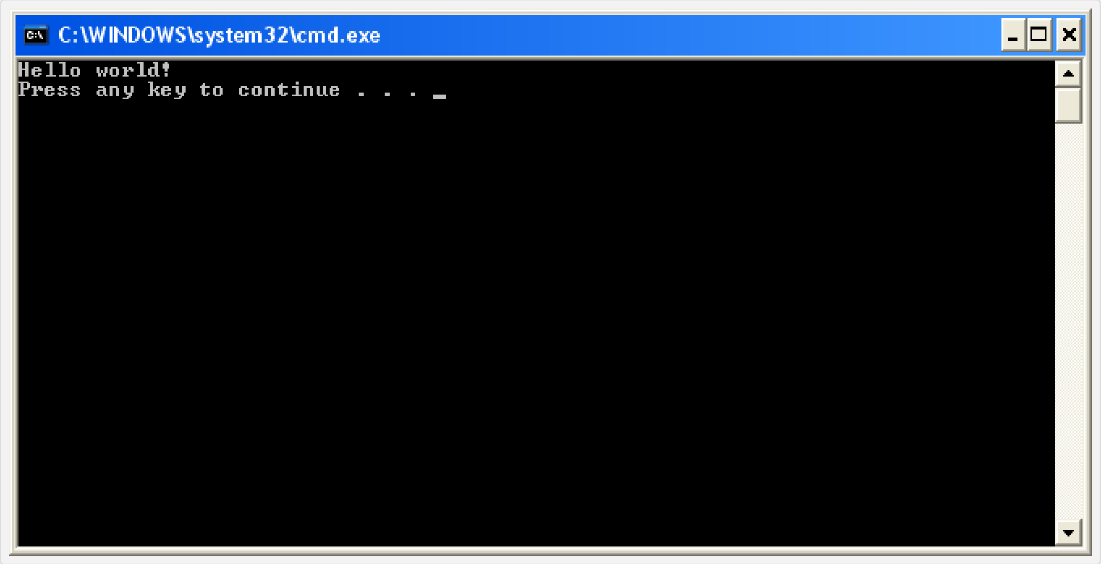
To build your project, press ctrl-F9, or go to the Build menu and choose "Build". If all goes well, you should see the following appear in the Build log window:



```
Project   : Console application
Compiler  : GNU GCC Compiler (called directly)
Directory : C:\VCProjects\Subterrane\CBWinProject\
--------------------------------------------------------------------------------
Switching to target: default
Compiling: main.cpp
Linking console executable: C:\VCProjects\Subterrane\CBWinProject\HelloWorld.exe
Process terminated with status 0 (0 minutes, 1 seconds)
0 errors, 0 warnings
```

This means your compile was successful!

To run your compiled program, press ctrl-F10, or go the Build menu and choose "Run". You will see something similar to the following:



```
Hello world!
Press any key to continue . . .
```

That is the result of your program!

If you're using a command-line based compiler

Paste the following into a text file named HelloWorld.cpp:

```cpp
#include <iostream>

int main()
{
    std::cout << "Hello world!" << std::endl;
    return 0;
}
```

From the command line, type:

```
g++ -o HelloWorld HelloWorld.cpp
```

This will compile and link HelloWorld.cpp. To run it, type:

`HelloWorld` (or possibly `./HelloWorld`), and you will see the output of your program.

If you're using a web-based compiler temporarily

Paste the following into the input form:

```cpp
#include <iostream>

int main()
{
    std::cout << "Hello world!" << std::endl;
    return 0;
}
```

and then press "Run". You should see your output below the form.

Once you install a full IDE, you'll want to return to this lesson again to learn how to create a project in your IDE.

If you're using other IDEs

You will have to figure out how to do the following on your own:
1) Create a console project
2) Add a .cpp file to the project (if necessary)
3) Paste the following code into the file:

```cpp
#include <iostream>

int main()
{
    std::cout << "Hello world!" << std::endl;
    return 0;
}
```

4) Compile the project
5) Run the project

If compiling fails ("Something went wrong!")

It's okay, take a deep breath. We can probably fix it. ☺

First, check to ensure that you've typed the code in correctly, with no typos or misspellings (also, make sure you're not including line numbers in your code). The compiler's error message may give you a clue as to where or what the problem is.

Second, check lesson **0.7 -- A few common C++ problems**, as many common problems are addressed there (including the COFF error that many of you are encountering).

If that fails, try searching for your error message on Google. It's likely someone else has encountered this before and figured out how to fix it.

If you are using a much older C++ compiler, the compiler may give an error about not understanding how to include iostream. If this is the case, try the following program instead:

```
#include <iostream.h>

int main()
{
    cout << "Hello world!" << endl;
    return 0;
}
```

In this case, you should upgrade your compiler to something more compliant with recent standards.

If your program runs but the window closes immediately

This is an issue with some compilers, such as Bloodshed's Dev-C++. We present a solution to this problem in section **0.7 -- A few common C++ problems**.

Conclusion

Congratulations, you made it through the *hardest part* of this tutorial (installing the IDE and compiling your first program)!

Don't worry if you don't understand what all the different lines in the Hello World program do. We'll look at and explain each line in detail in the upcoming lesson **1.1 -- Structure of a program**.

0.6a -- Build configurations

Index

0.5 -- Installing an Integrated Development Environment (IDE)

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587 comments to 0.6 — Compiling your first program

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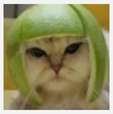
Josh
July 6, 2018 at 12:48 am · Reply

What if I'm using Visual Studio on Mac? It doesn't show up with the Visual C++ nor the Win32. What should I do?



Alex
July 9, 2018 at 1:46 pm · Reply

Unsure, as I don't have a Mac. 32-bit applications are being deprecated on Mac though, so it probably just assumes you want a 64-bit app. That's still fine, just the size of some of your variables may vary a bit.

nascardriver
July 10, 2018 at 7:47 am · Reply

VS on Mac doesn't support C++.

Kaitlynn
June 25, 2018 at 7:42 pm · Reply

Is there a reason you'd suggest against using namespace(std)?

nascardriver
June 26, 2018 at 8:46 am · Reply

Hi Kaitlynn!

They can cause name collisions, this is part of lesson 4.3.

References
* Lesson 4.3c - Using statements

Crystal blue
June 25, 2018 at 8:13 am · Reply

It says Compilation successful but then just everything freeze. Only hello world is seen in the screen.
Can you please help me out?

Kaitlynn
June 25, 2018 at 7:43 pm · Reply

Only hello world should be seen in the screen as this is a simple output program. It's simply attempting to display the words : "Hello World!" in your command prompt. In your code it shows
cout << "Hello World!" << endl;
return 0;

That return 0 tells the compiler that there is nothing else in that function for it to compile and since you don't have any other functions (This is main, if you don't already know) it stops there.

Brook
June 15, 2018 at 9:37 pm · Reply

here I am again. I also tried "not using precompiled headers" in the solution explorer properties. IDK. I'll just keep going with what I have till I run across something or someone give me a lead. I'm not going to spend too much time worrying about it.

Brook
June 14, 2018 at 11:55 pm · Reply

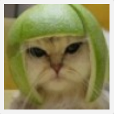
using vs 2017 community

I get an error when using stdafx.h.
cannot open source file "stdafx.h"
cannot open precompiled header file: Debug\HelloWorld/pch: No such file or directory.

I right clicked solution explorer->properties->precompiled headers->precompiled header Use:(/Yu).

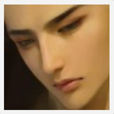
Not letting me do it. Am I missing something?
in the meantime, I'm using #include "Windows.h"... is this bad?

Alex



June 18, 2018 at 3:50 pm · Reply

Not sure why it's not working. You shouldn't need to #include windows.h. Try turning off precompiled headers. You don't need them to do these tutorials.



Arthur Vũ

July 11, 2018 at 1:04 am · Reply

Did you find how to resolve this problem?
I saw someone told that we need to write:
#include <iostream>
#include "stdafx.h"
To fix this problem.

« Older Comments 1 … 8 9 10