C++ Tutorial - Google Test (gtest)

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Google Unit Test (GTest)

The Framework of Google C++ Testing is based on xUnit architecture. It is a cross platform system that provides automatic test discovery. In other words, we don't have to enumerate all of the test in our test suite manually. It supports a rich set of assertions such as fatal assertions (**ASSERT**_), non-fatal assertions (**EXPECT**_), and death test which checks that a program terminates expectedly.

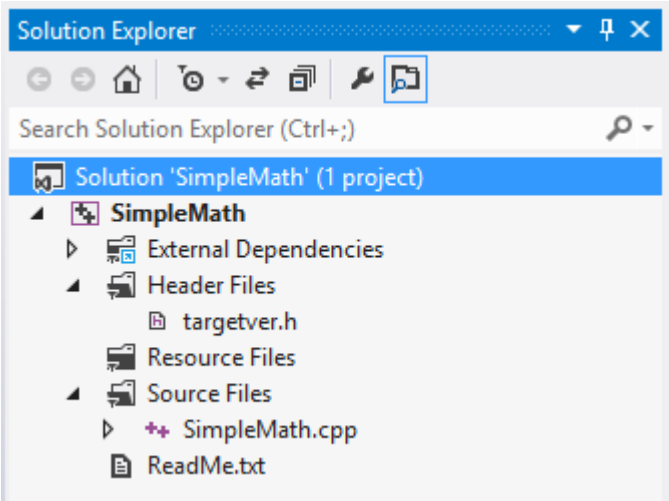
Here is the Primer.

GTest also provides various options for running tests and offers textual and XML report. It also supports a mock object testing framework (Google Mock).

Initially, we have a project calculating a cubic:

```
// simplemath.h


#include <cmath>


double cubic(double d)

{

       return pow(d,3);
```

```
}



// SimpleMath.cpp : Defines the entry point for the console
application.

#include "simplemath.h"


int main()

{

	cubic(10);

	return 0;

}
```



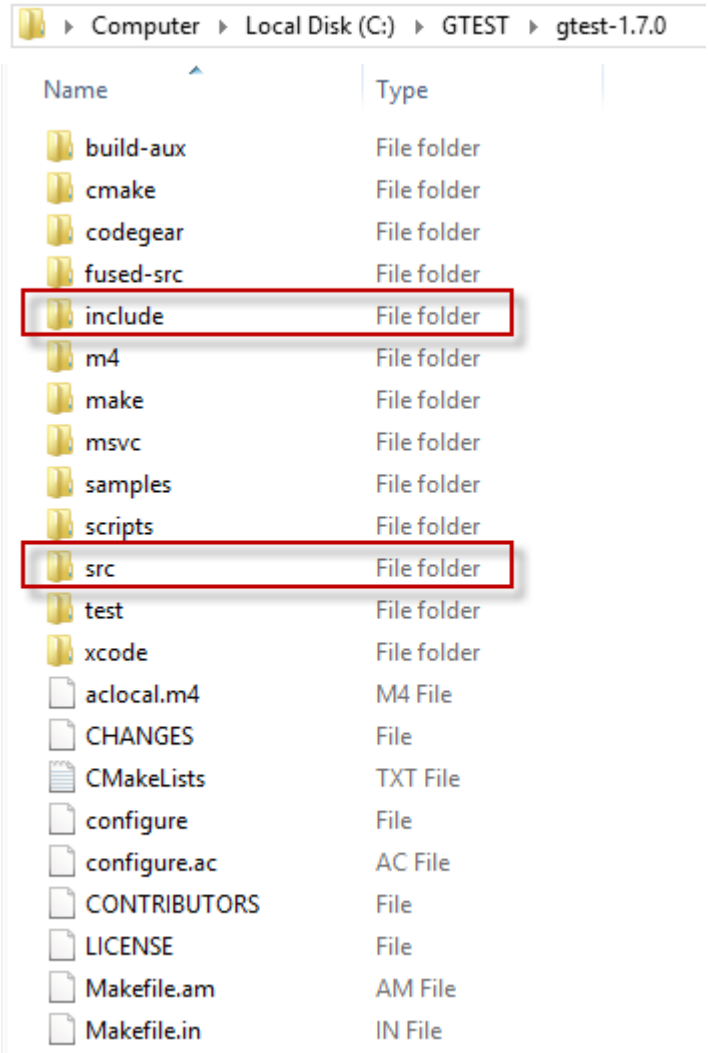
In the following example, we used Visual Studio 2012 with 4 steps:

1. Download Google test
2. Compile gtest into a static library
3. Create a unit test project
4. Make a test case

Step 1. Download Google test (gtest)

Download the **gtest-1.7.0-rc1.zip** from Google C++ Unit Test or from gtest-1.7.0-rc1.zip, then extracts it.

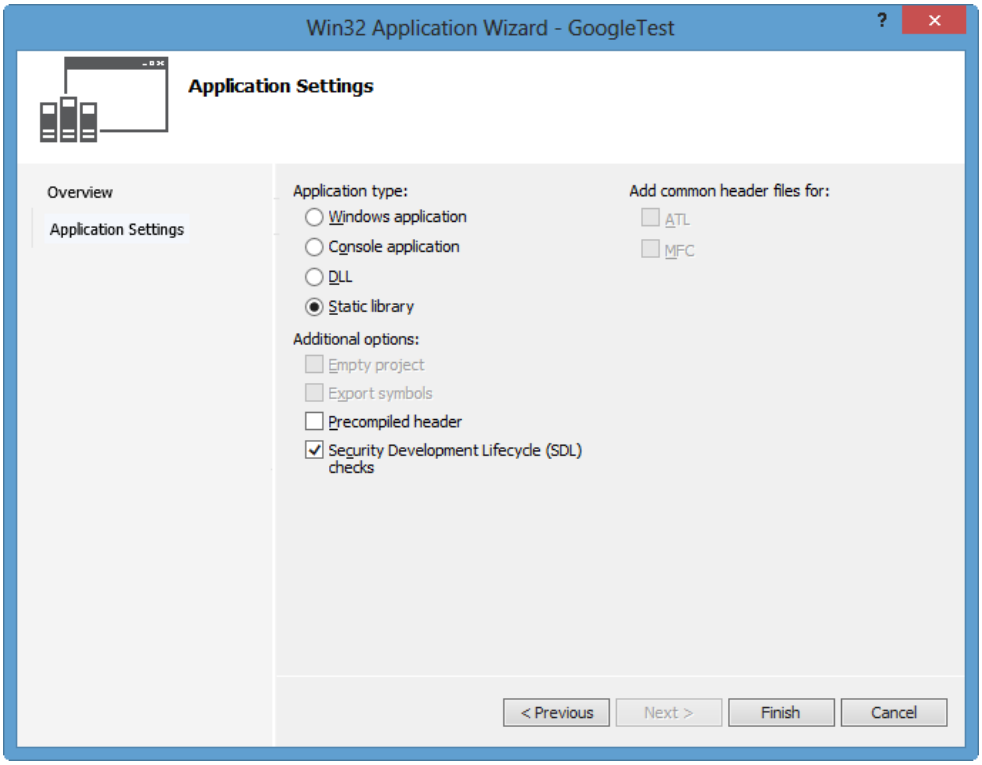
Let's look at the **C:\GTEST\gtest-1.7.0** directory to see what files are there.



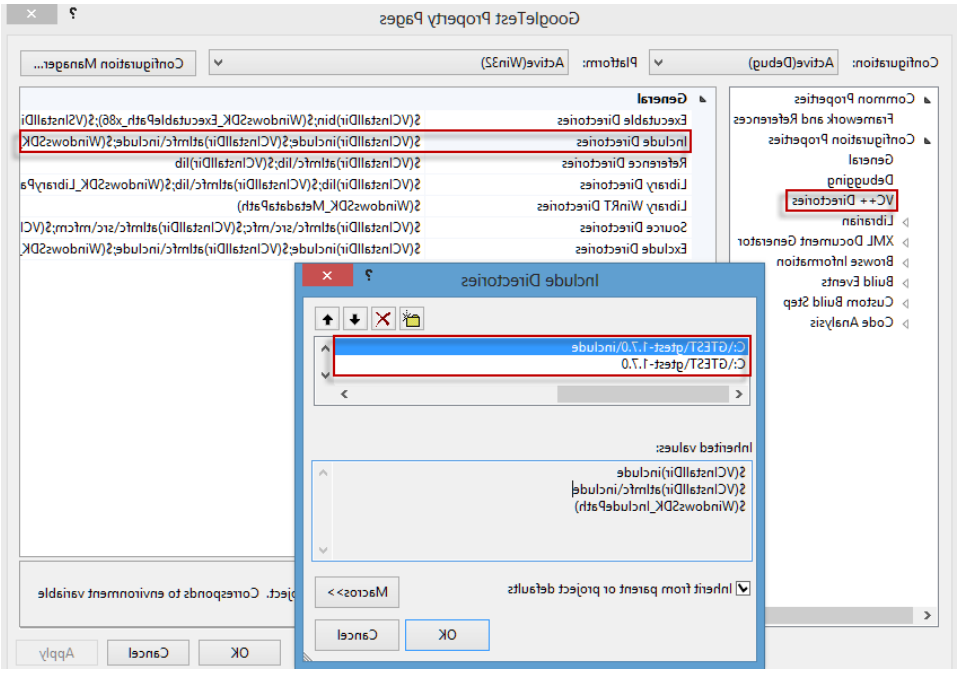
The **src** folder has all the gtest source files and later we need to add the **include** directory to the include path.

Step 2. Compile gtest into a static library

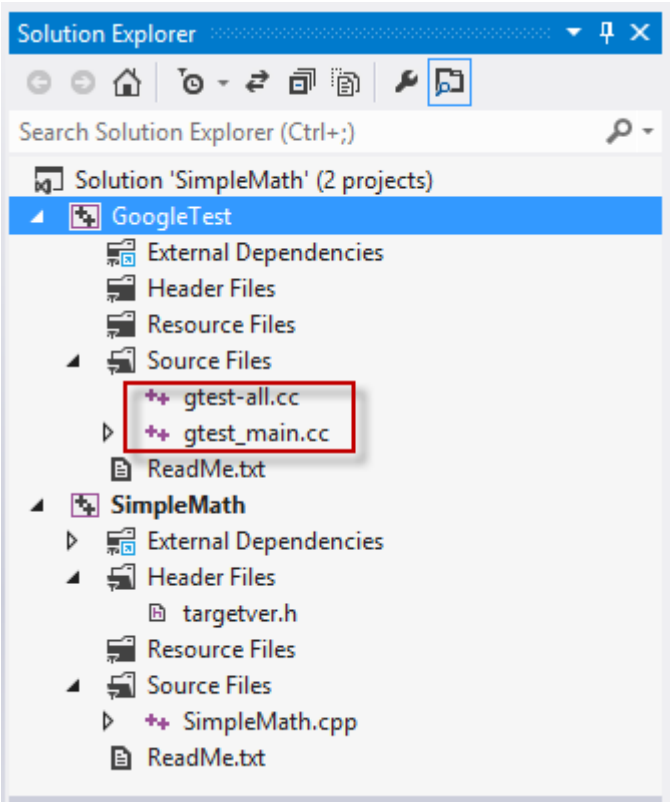
1. Create a new static library project with a name **GoogleTest**.
   Add->New Project->Win32 Project->Static Library without precompiled header.



2. Right click on our new project, **GoogleTest**.
   On the Properties Pages, add include path:
   C:\GTEST\gtest-1.7.0 and **C:\GTEST\gtest-1.7.0\include**.



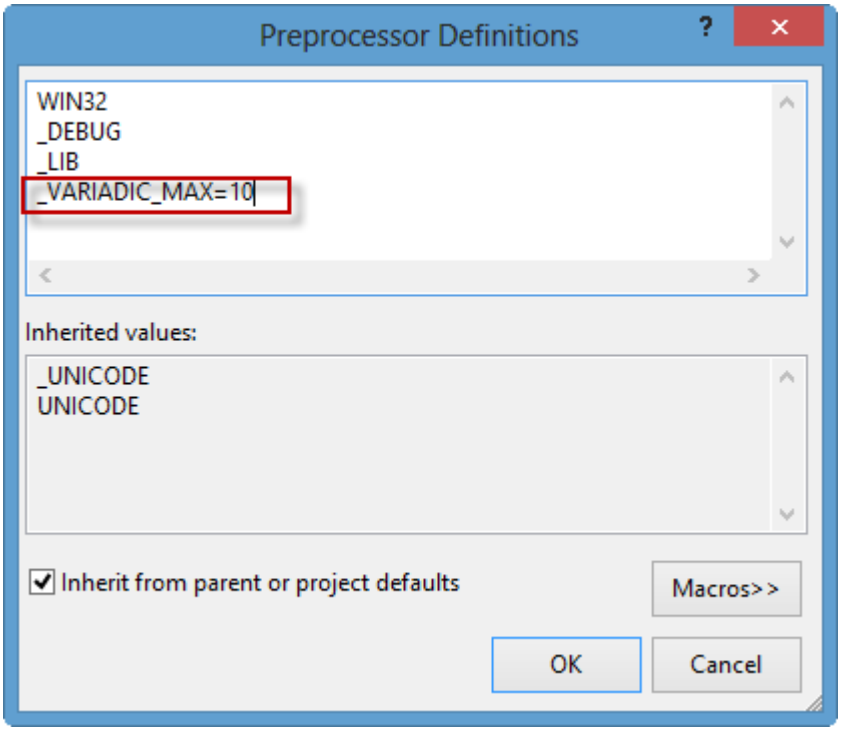
3. Add source files by Add->Existing Item...
   C:\GTEST\gtest-1.7.0\src\gtest_all.cc
   and **C:\GTEST\gtest-1.7.0\src\gtest_main.cc**.



4. Build **GoogleTest** into static library.
   In the build process, we may have some errors related to class template:

   > VC++ 2012 does not (and will never) support variadic templates; consequently, its standard library implementation attempts to fake them using preprocessor-generated overloads and specializations. The number of faux variadic template parameters defaults to 5 - the problem is that gtest is trying to instantiate std::tuple<> with as many as 10 template arguments. - Google Test in Visual Studio 2012.

   So, we need to set **_VARIADIC_MAX=10** for Preprocessor Definitions under C/C++.



   Now, build it again:

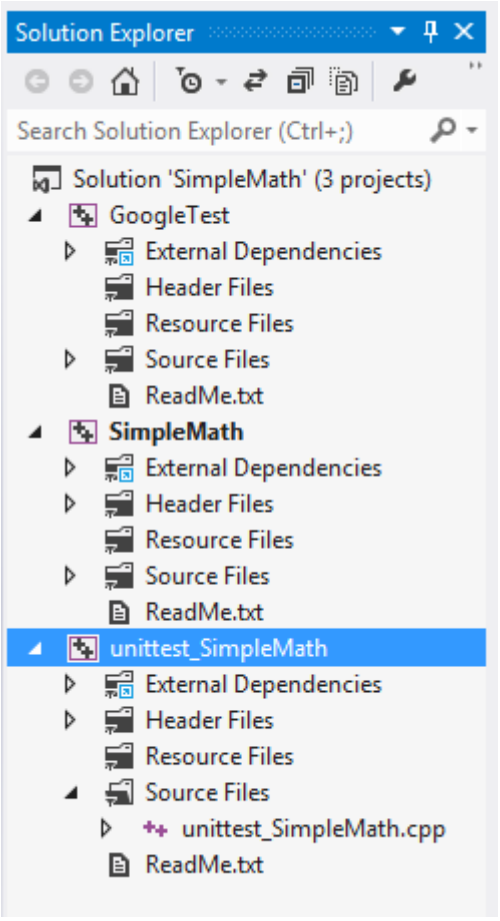
```
1>------ Rebuild All started: Project: GoogleTest,
Configuration: Debug Win32 ------

1>  gtest_main.cc

1>  gtest-all.cc

1>  Generating Code...
```

```
1>                          GoogleTest.vcxproj          ->
c:\users\khyuck\documents\visual                    studio
2012\Projects\SimpleMath\Debug\GoogleTest.lib

========== Rebuild All: 1 succeeded, 0 failed, 0 skipped
==========
```

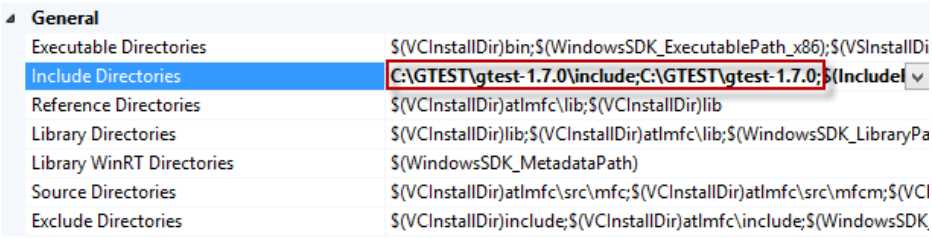
Step 3. Create a unit test project

Now, it's time to create a unit test project.

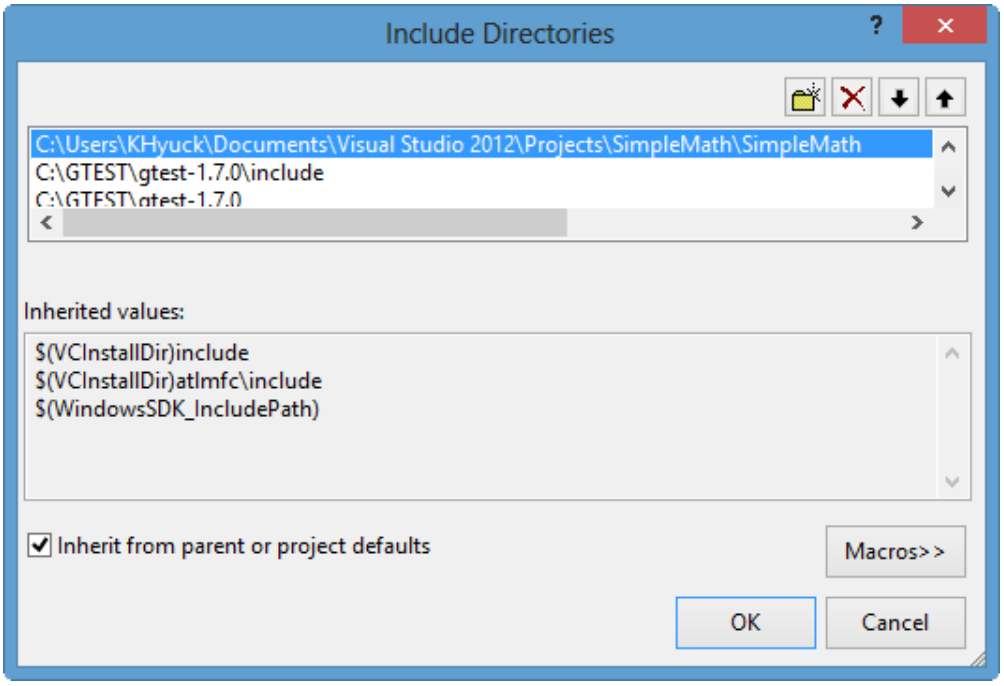
1. Right click on Solution->Add->New Project with a name **unittest_SimpleMath** as a Win32 Console. We've just added 3rd prodject to our solution:



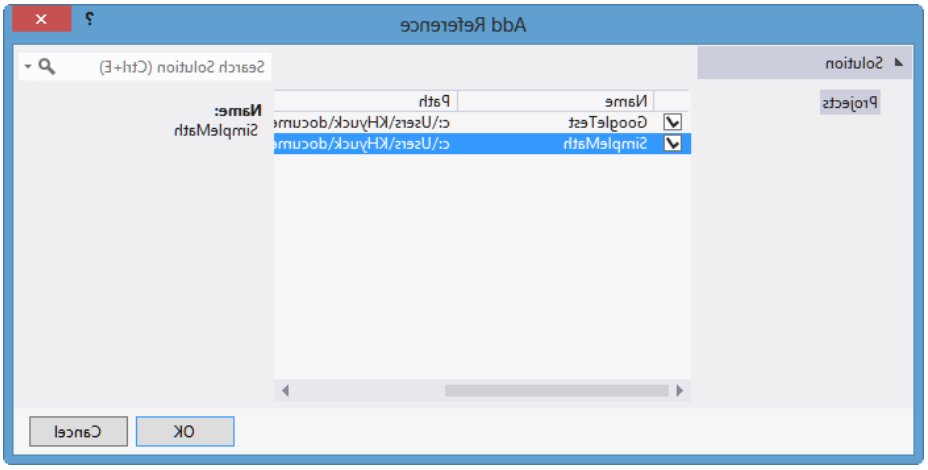
2. We need to add the two paths as we've done in Step 2:
   Right click on our new project, **unittest_SimpleMath**.
   On the Properties Pages, add include path:
   C:\GTEST\gtest-1.7.0 and **C:\GTEST\gtest-1.7.0\include**.

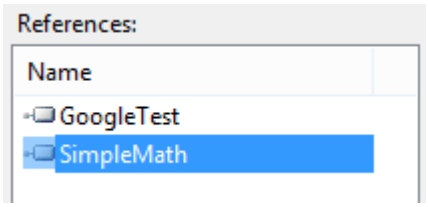


3. This project needs additional path to the initial project (**SimpleMath**) which we want to be tested.



4. Let's add new references (**GoogleTest** and **SimpleMath**) to **unittest_SimpleMath**.
   Right click on **unittest_SimpleMath**->References...
   Under Property Pages->Add New References...





5. Great. Our Unit Test project has been set up.
   Final step will be making a test case.

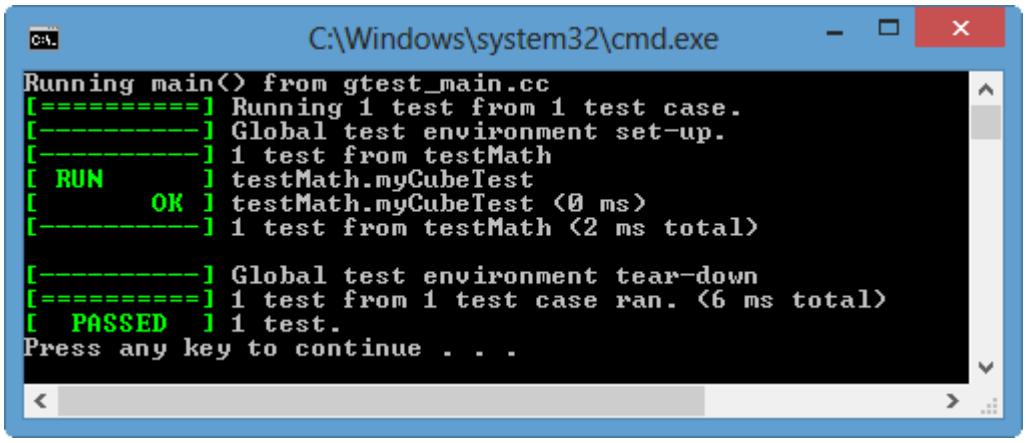
Step 4. Create a Test Case

Now, we need to create a test case.
Type in the following lines of code:

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


#include "gtest/gtest.h"

#include "simplemath.h"


TEST(testMath, myCubeTest)

{

    EXPECT_EQ(1000, cubic(10));
```

```
}
```

Here, we're testing the **cubic()** function we wrote before, and it compares the output of 10^3 with 1000 using macro **EXPECT_EQ**.
If we run the **unittest_SimpleMath**, we get the test result:



OK!
We passed our first Google Test!