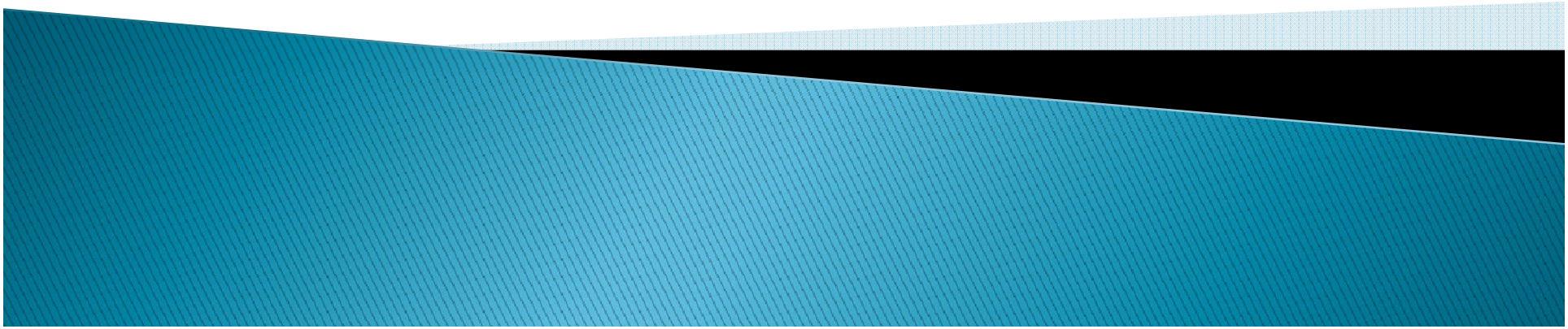
Compiling C/C++

CS 210 Tutorial



C/C++ compiler

- C/C++ **compiler** transforms C/C++ source code into machine code or an executable program.
- There are many compilers can be used:
  - Gcc
  - G++
  - Visual studio compiler
  - Online compiler at: http://codepad.org
  - Many more:
    - http://www.thefreecountry.com/compilers/cpp.shtml
    - http://en.wikipedia.org/wiki/List_of_compilers#C.2B.2B_compilers

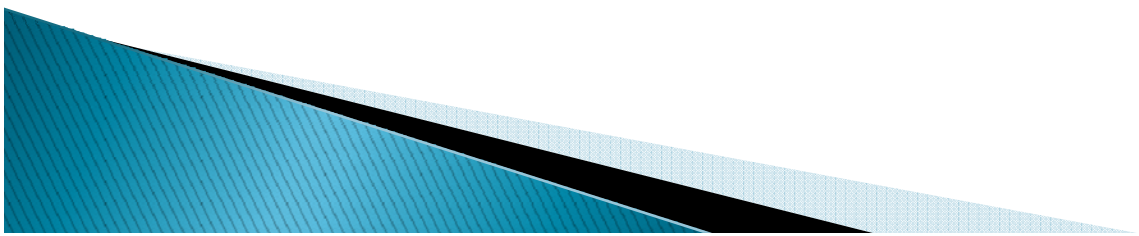
Hello World!

```
// my first program in C++
#include <iostream>
using namespace std;
int main ()
{
cout << "Hello World!";
return 0;
}
```

- Output:
  - Hello World!

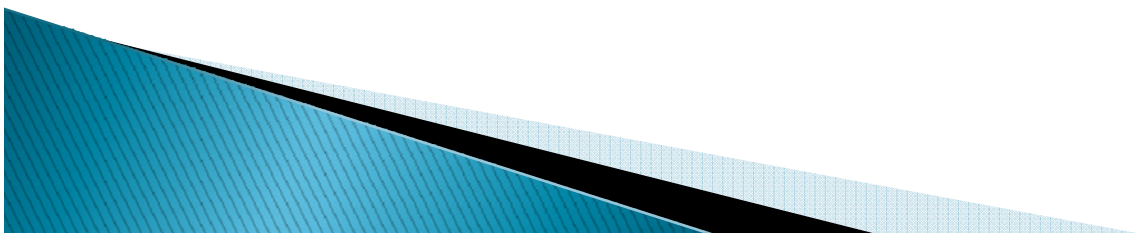
Hello World!

- // my first program in C++
  - This is a comment line. All lines beginning with two slash signs (//) are considered comments.
- #include <iostream>
  - Lines beginning with a hash sign (#) are directives for the preprocessor. They are not regular code lines with expressions but indications for the compiler's preprocessor. In this case the directive #include <iostream> tells the preprocessor to include the iostream standard file.



Hello World!

- **using namespace std;**
  - All the elements of the standard C++ library are declared within what is called a namespace, thenamespace with the name std. So in order to access its functionality we declare with this expression that we will be using these entities.
  - std::cout === cout
- **int main ()**
  - This line corresponds to the beginning of the definition of the main function.

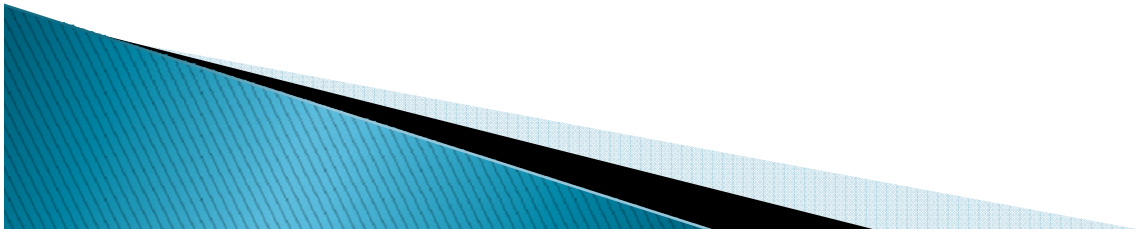


Hello World!

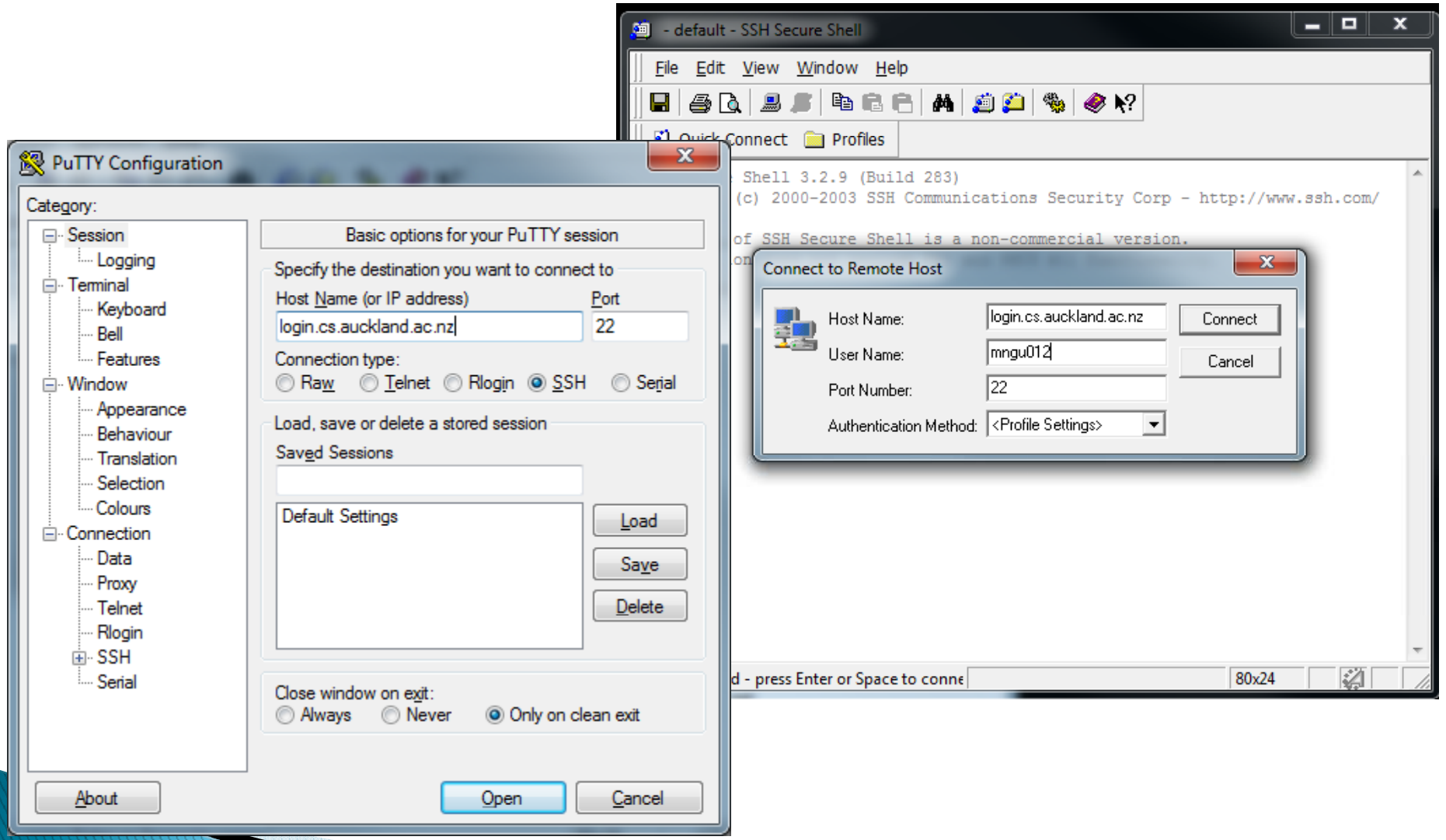
- **cout << "Hello World!";**
  - This line is a C++ statement. A statement is a simple or compound expression that can actually produce some effect.
  - **cout** represents the standard output stream in C++, and the meaning of the entire statement is to insert a sequence of characters ('Hello World' sequence of characters) into the standard output stream.
- **return 0;**
  - The return statement causes the main function to finish.
- http://www.cplusplus.com/files/tutorial.pdf
- http://www.eit.ihk-edu.dk/subjects/cpp/

GNU compiler gcc on login.fos.auckland.ac.nz

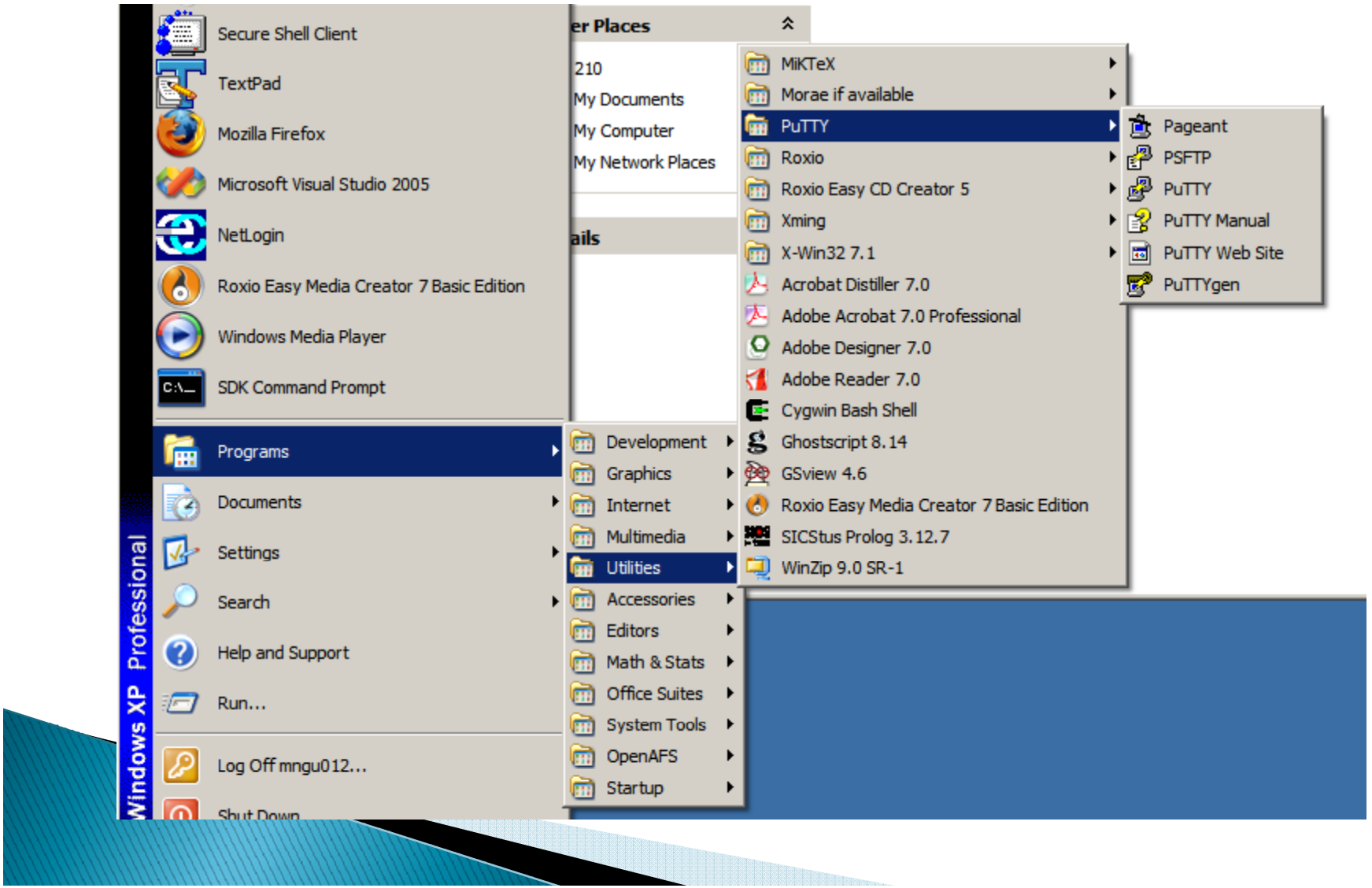
- Use
  - Putty (http://www.putty.org/)
  - SSH Secure Shell Client
- To connect to a University Unix Server using upi/password:
  - login.fos.auckland.ac.nz
  - chaos.cs.auckland.ac.nz
  - login.cs.auckland.ac.nz
- To compile C/C++ using gcc/g++
- It can connect to your H: drive



Putty/SSH connect

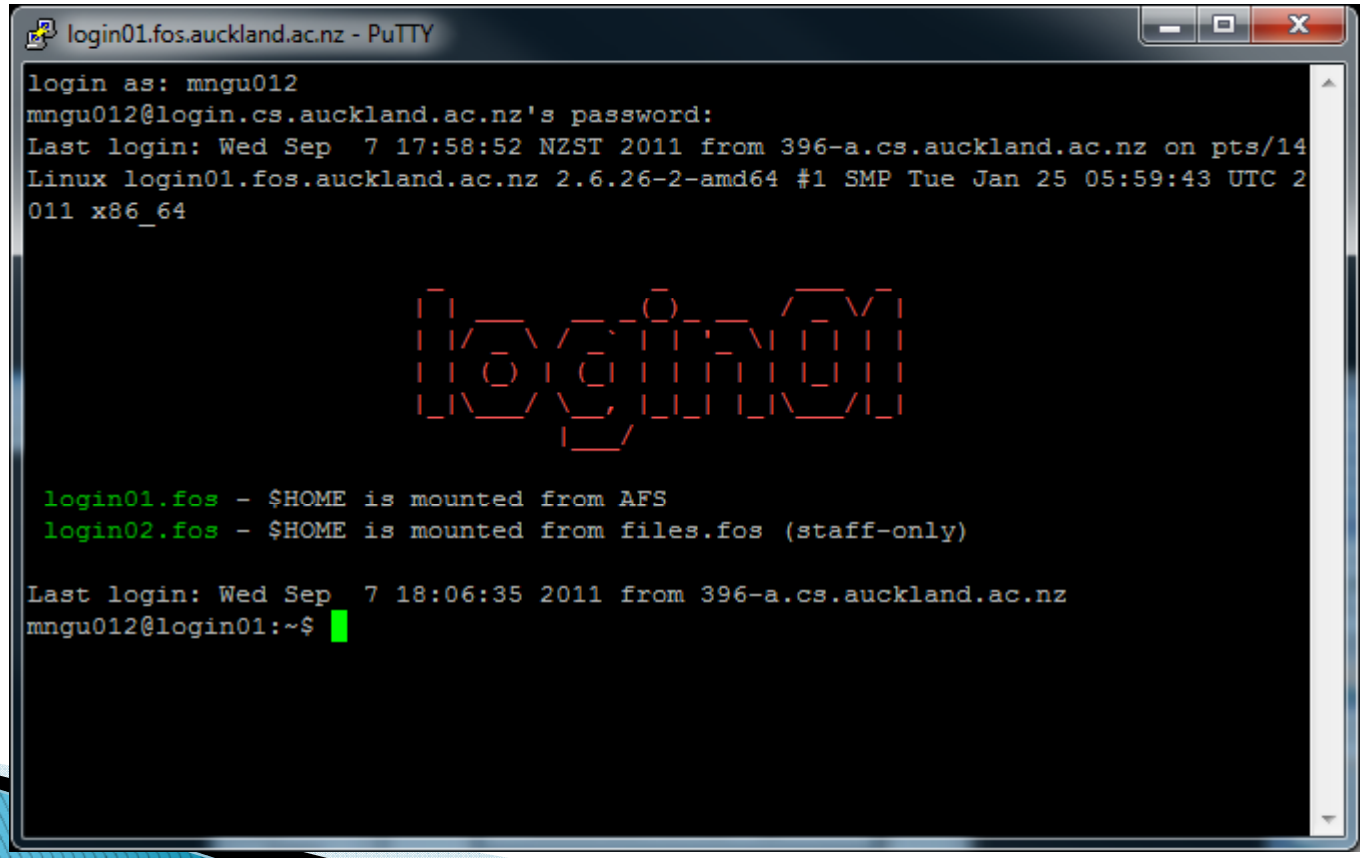


Putty is installed in Lab computer



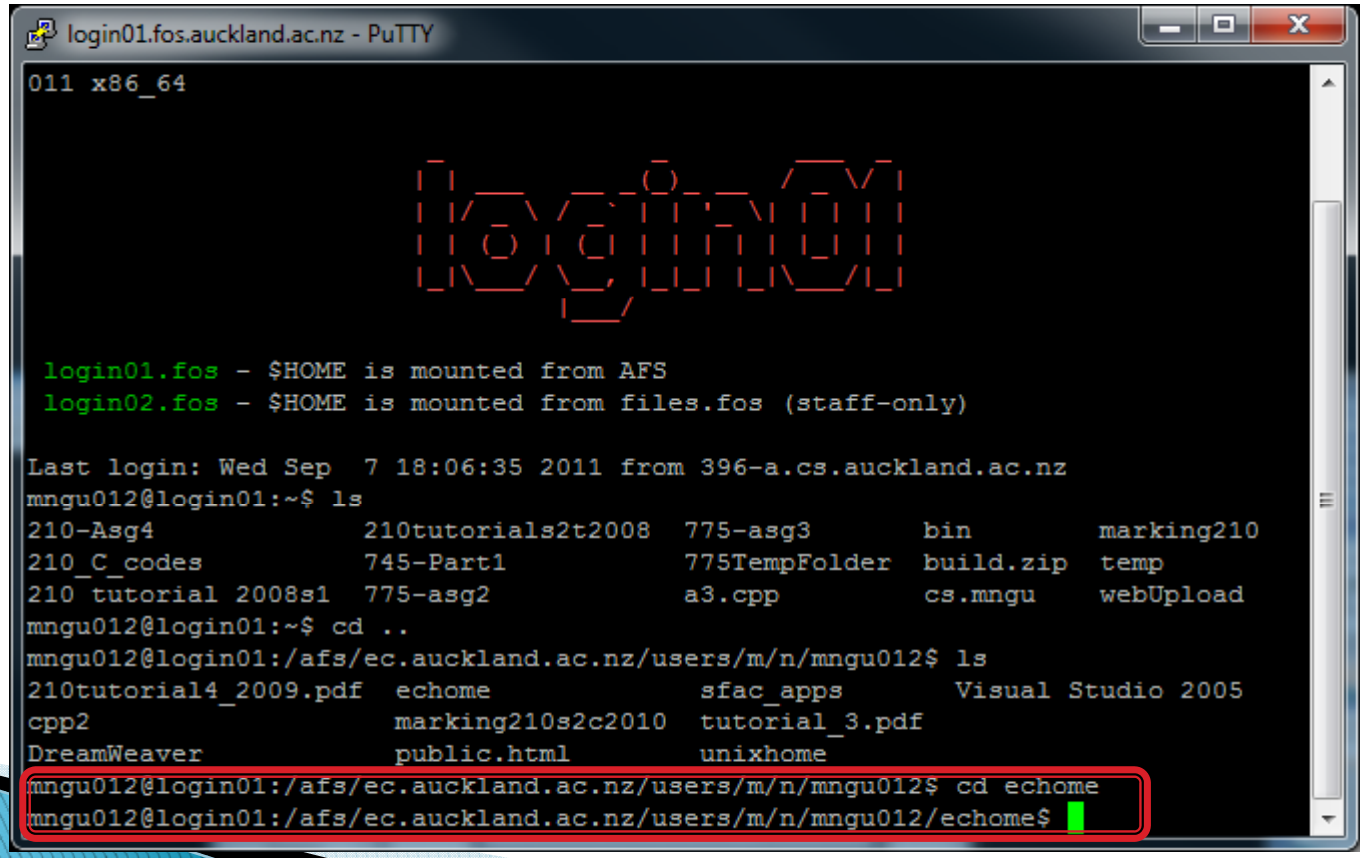
Login to UNIX HOME drive

- Note that **password is not shown** like in Windows.



Unix command to access H: drive

- cd ..
- cd echome



Compile with g++

- Basic Unix commands:
  - http://mally.stanford.edu/~sr/computing/basic-unix.html
- Assume you have a C/C++ code file called:
  - Abc.cpp
- To compile use commands:
  - **g++ abc.cpp**
    - It will create a.out
    - To run call: **./a.out**
  - **g++ -o run.exe abc.cpp**
    - It will create run.exe
    - To run call: **./run.exe**

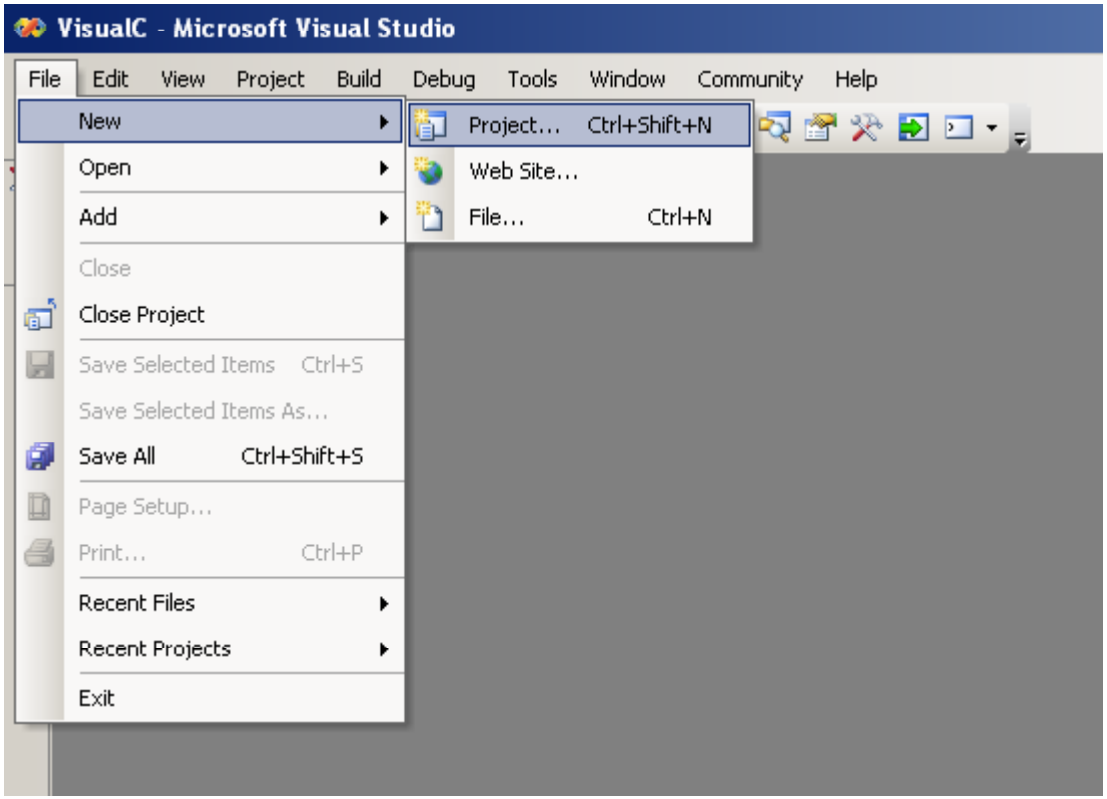
Compile C on Cygwin

- Document on Cygwin
  - http://www.cs.auckland.ac.nz/~bruce-h/resources/cygwin/
- Download from
  - http://www.cygwin.com/
- Help on how to make cygwin run with gcc/g++
  - http://www.eecg.utoronto.ca/~aamodt/ece242/cygwin.html
- Everything else just the same as Unix server at login.cs.auckland.ac.nz
- Or you can install your own Unix/Linux operation system. Download here for free:
  - http://mirror.cs.auckland.ac.nz/iso/Linux/

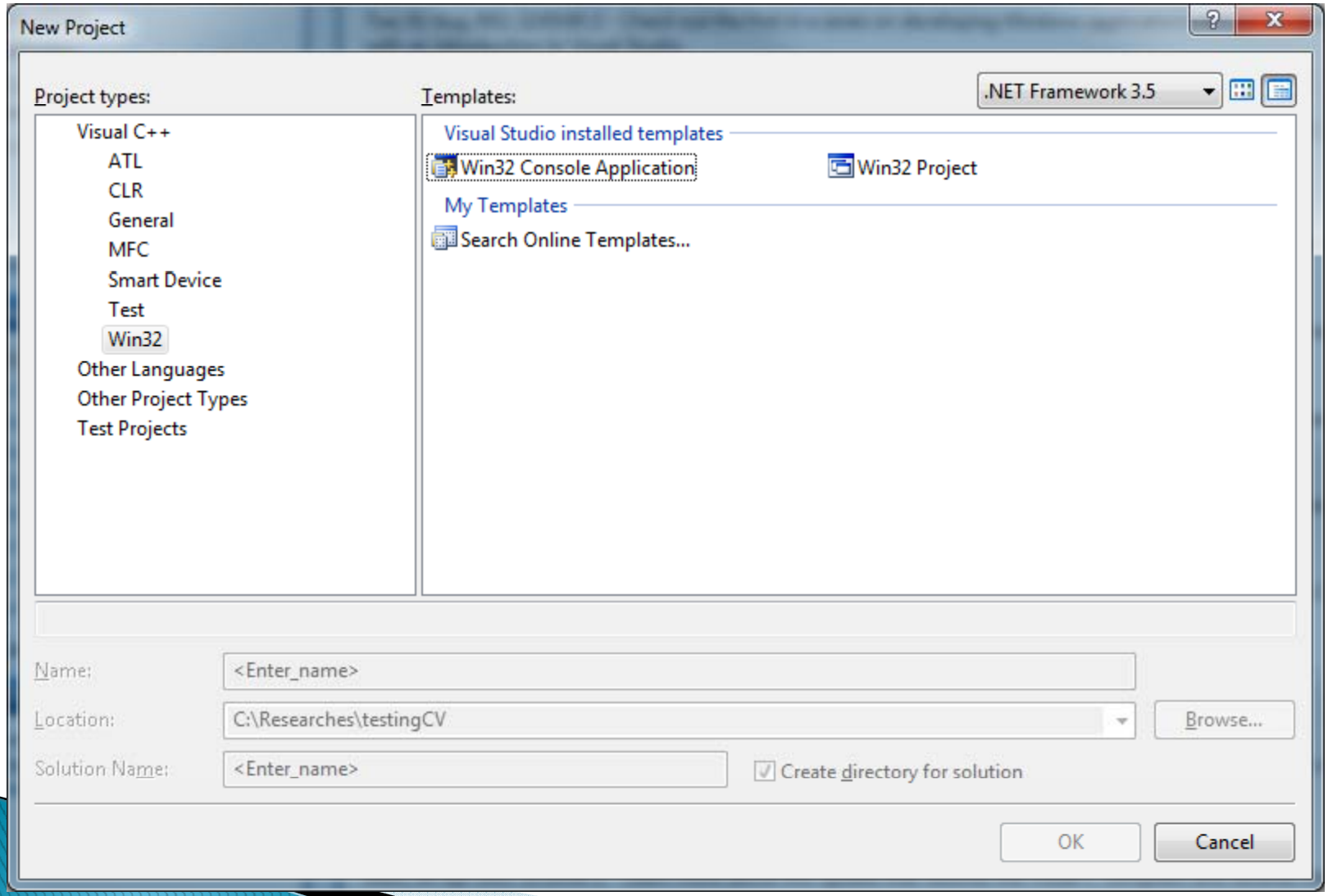
Microsoft Visual Studio

- Visual Studio supports different programming languages. Built-in languages include
  - C/C++ (via Visual C++)
  - Visual Basic .NET (VB.NET)
  - C# (via Visual C#)
  - Visual J#
  - F#
  - Support for other languages: M, Python, and Ruby.
  - It also supports XML/XSLT, HTML/XHTML, JavaScript and Cascading Style Sheets (CSS).
- Download for free (v. 2010 recommended):
  - http://www.cs.auckland.ac.nz/software/external/

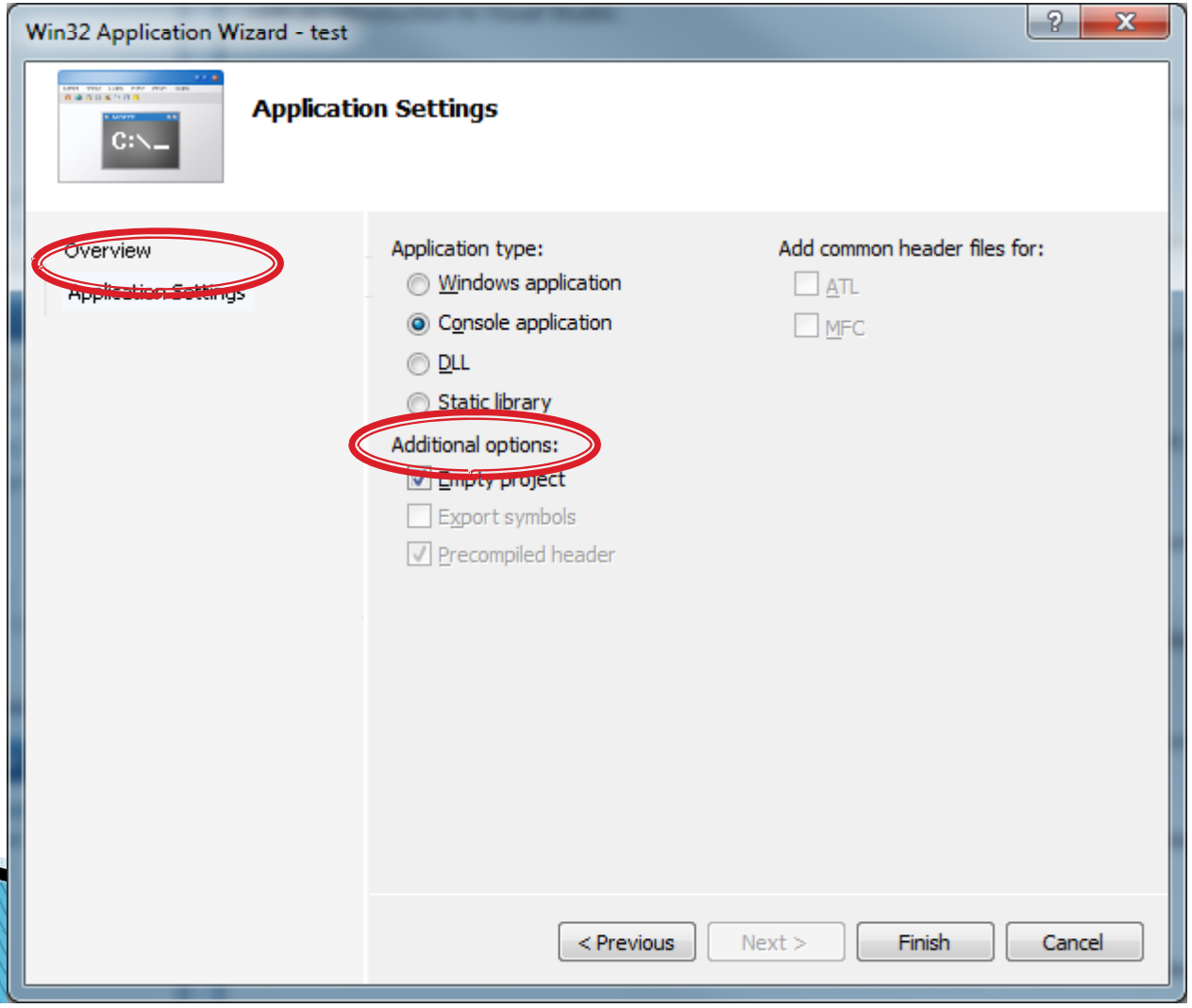
Start new Project in Visual Studio



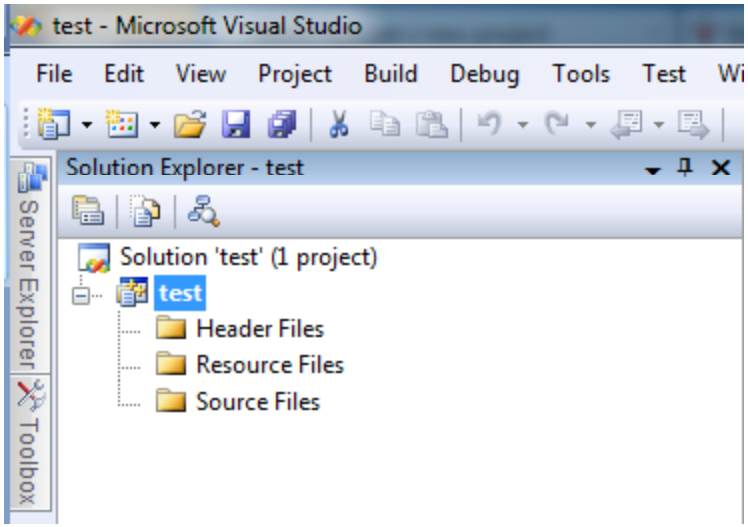
Choose Visual C++/Win32/ Win32 Console Application

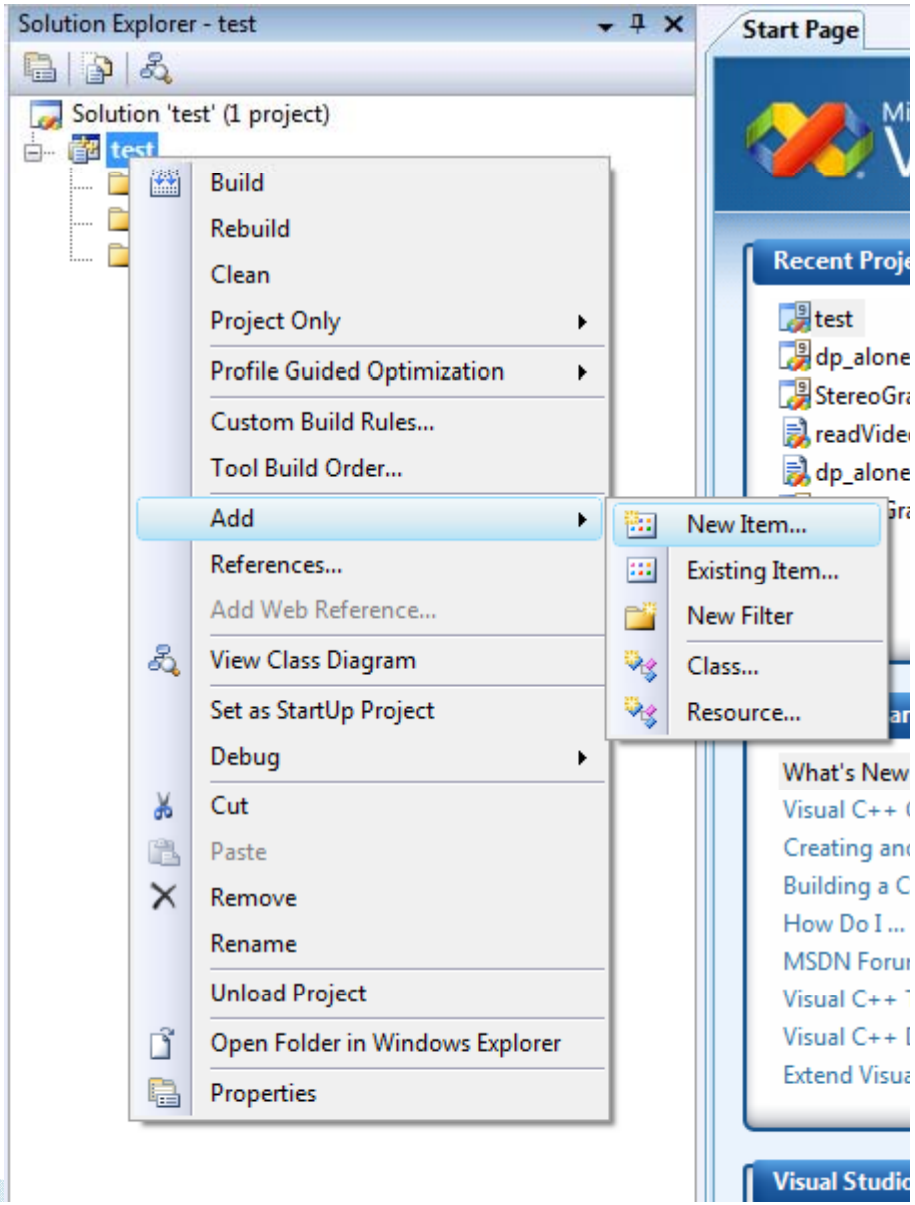


Select Application Settings and Empty project



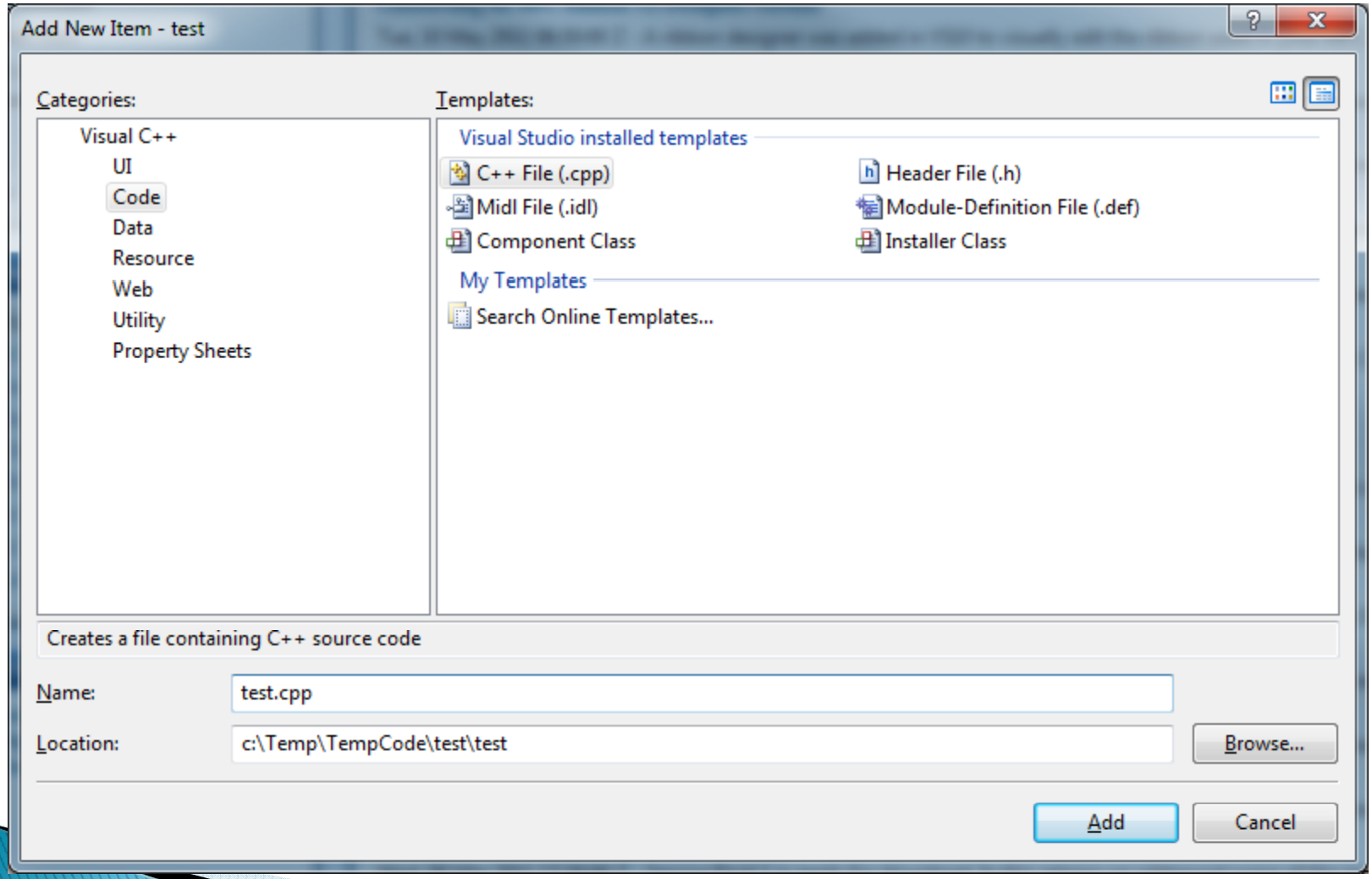
Add new item: your code



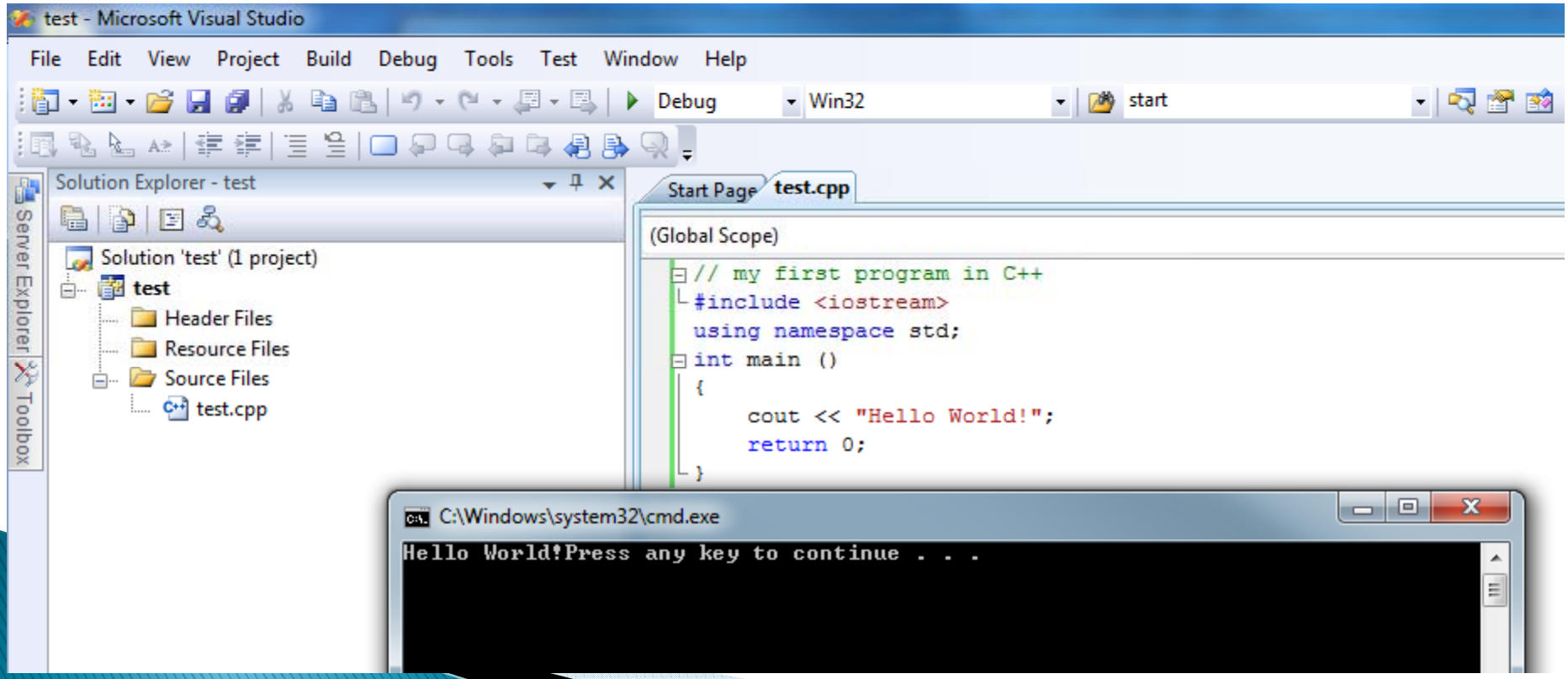


- Right-click on solution project
- Choose add new item
- If Solution project is not visible, click View/Solution Explorer

Choose Code/C++ file



Compile C++ in Visual Studio
Press Debug or F5
Press Ctrl F5 if you want tokeep the window open at the end.



Online compiler with Codepad

http://codepad.org – Limited control

C++, pasted just now:

```
1  // my first program in C++
2  #include <iostream>
3  using namespace std;
4  int main ()
5  {
6  cout << "Hello World!";
7  return 0;
8  }
```

Output:

```
1  Hello World!
```

New paste:

Language: C++

```
// my first program in C++
#include <iostream>
using namespace std;
int main ()
{
cout << "Hello World!";
return 0;
}
```

Examples and Exercises

- Run some examples given in:
  - http://www.eit.ihk-edu.dk/subjects/cpp/
- Exercise:
  - Write your own first programs:
    - Print out all odd numbers from 0 to 1000
    - Print out all prime numbers from 0 to 1000
    - Print out number sequence from 0 to 1000 which fulfil:
      - $N_i = N_{(i-2)} + N_{(i-1)}$
- Any question?