



臺灣大學



# Lab 1

## System C Library Installation and Development & Environment Setup

---

TA: Po-Chen Wu (吳柏辰)



臺灣大學

# Outline

- Install SystemC Library
- Run the FIR Example
- Setup Visual C++ for SystemC coding
- Lab 1 Practice: Up-Down Counter



臺灣大學



# Install SystemC Library



臺灣大學

# Install Microsoft Visual C++ 2010 Express

## ■ Install Microsoft Visual C++ 2010 Express

- <http://www.microsoft.com/visualstudio/en-us/products/2010-editions/visual-cpp-express>

The screenshot shows the Microsoft Visual Studio website with the following details:

- Header:** Microsoft Visual Studio, Microsoft Visual Studio on MSDN, United States (English), Search.
- Navigation:** PRODUCTS, STRATEGIES, SCENARIOS, PARTNERS, TRY VISUAL STUDIO, BUY VISUAL STUDIO.
- Section:** VISUAL C++ 2010 EXPRESS
- Description:** Free tools to create applications on Windows using Visual C++.
- Call-to-action:** > INSTALL NOW - ENGLISH
- Text:** See below to download Visual C++ 2010 Express in a different language.
- Image:** A thumbnail image of the Visual C++ 2010 Express setup executable.
- Left sidebar:** OVERVIEW, SYSTEM REQUIREMENTS, RESOURCES.
- Middle section:** UNLEASH YOUR CREATIVITY, describing Visual C++ 2010 Express as part of the Visual Studio 2010 Express family.
- Right sidebar:** Visual C++ 2010 Express, English dropdown menu, > INSTALL NOW button.

# Or Install Microsoft Visual Studio 2010

- As an NTU student, we can download VS2010 from *myNTU*
  - <https://my.ntu.edu.tw>



The screenshot shows the myNTU portal interface. At the top, there's a navigation bar with links like '我的課業' (My Assignments), '我的成績' (My Grades), '我的獎勵' (My Rewards), '我的獎勵' (My Rewards), '我的獎勵' (My Rewards), and '我的獎勵' (My Rewards). Below the navigation bar, there's a section titled '校園資源 >' (Campus Resources) with various icons for services like '門禁管理' (Access Control Management), 'NTU AppShare', 'NTU Space', 'NTU Mail 服務' (Email Service), 'iNTU', '保健中心預約掛號' (Health Center Appointment挂号), '膳食協調委員會' (Dietary Coordination Committee), and '計中全校版權軟體下載' (Download of all campus software). The icon for '計中全校版權軟體下載' is highlighted with a red box. Below this section, there's a large button labeled 'Visual Studio Pro 2010 DVD'. To the right of the button, the date '2011/03/17' is displayed.

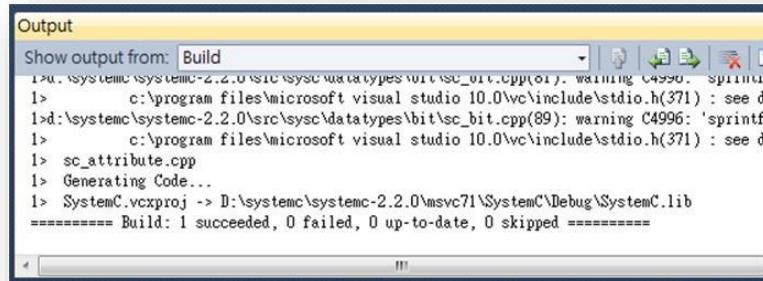
# SystemC Library Installation (1)

- Download OSCI SystemC 2.3 open-source library from <http://www.accellera.org/downloads/standards/systemc> or, a zip package can be found in /code/LIB/systemc-2.3.0.tgz
- Unzip the package, store the directory into d:\systemc

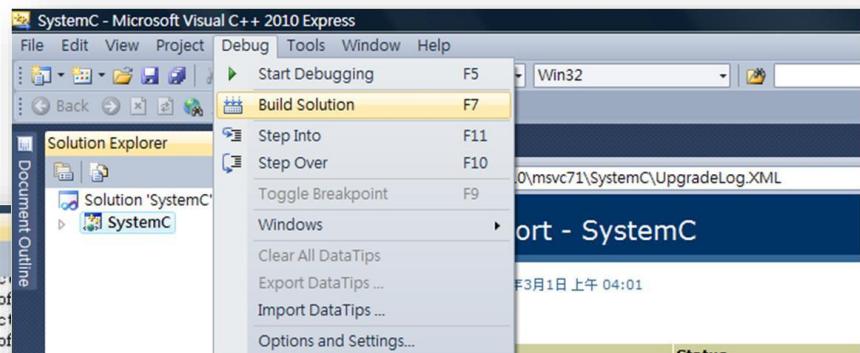
# SystemC Library Installation (2)

- Use MS Visual C++ 2010 Express **File**→**Open**→**Project**  
`\systemc-2.3.0\msvc80\SystemC\SystemC.sln`  
Solution “SystemC” will appear
  - The Visual Studio Conversion Wizard will help you to convert the file to the new VS version

- Build the SystemC library:  
**Debug**→**Build Solution**



```
Output
Show output from: Build
1>U:\systemc\systemc-2.2.0\src\sysc\datatype\sc_bit.cpp(89): warning C4990: 'sprintf' : This function
1>c:\program files\microsoft visual studio 10.0\vc\include\stdio.h(371) : see declaration of
1>d:\systemc\systemc-2.2.0\src\sysc\datatype\bit\sc_bit.cpp(89): warning C4996: 'sprintf': This functio
1>c:\program files\microsoft visual studio 10.0\vc\include\stdio.h(371) : see declaration of
1> sc_attribute.cpp
1> Generating Code...
1> SystemC.vcxproj -> D:\systemc\systemc-2.2.0\msvc71\SystemC\Debug\SystemC.lib
===== Build: 1 succeeded, 0 failed, 0 up-to-date, 0 skipped ======
```



- File -> Close Solution



臺灣大學



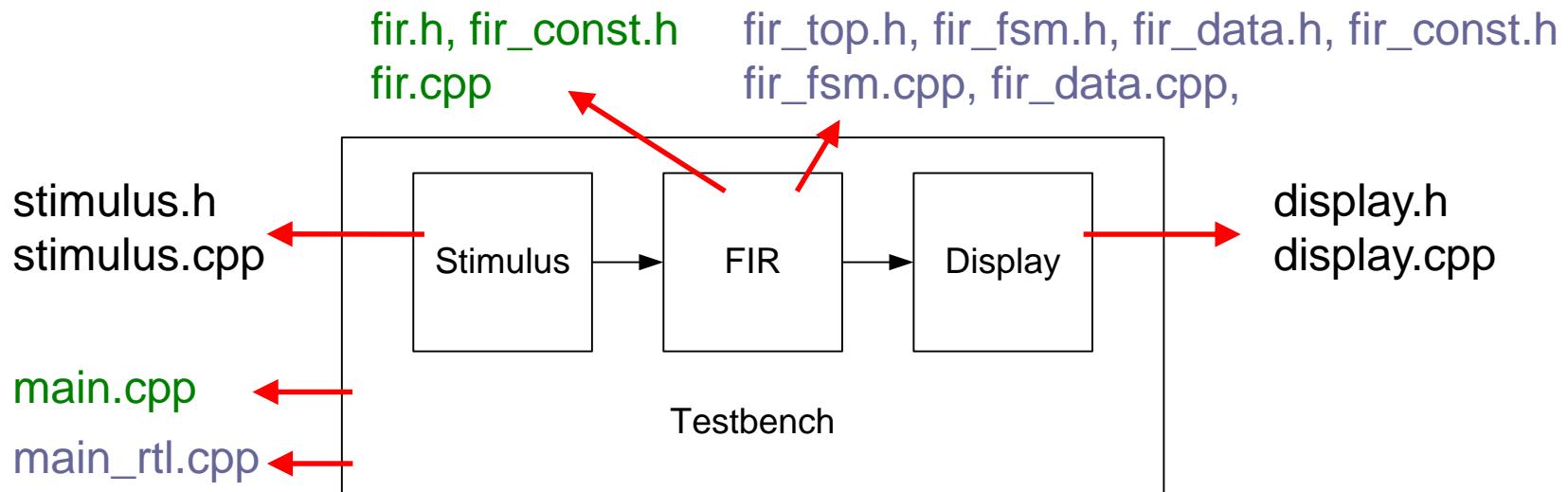
# Run the FIR Example

# Run the FIR Example (1)

- File→Open->Project

\systemc-2.3.0\examples\sysc\fir\fir.vcproj

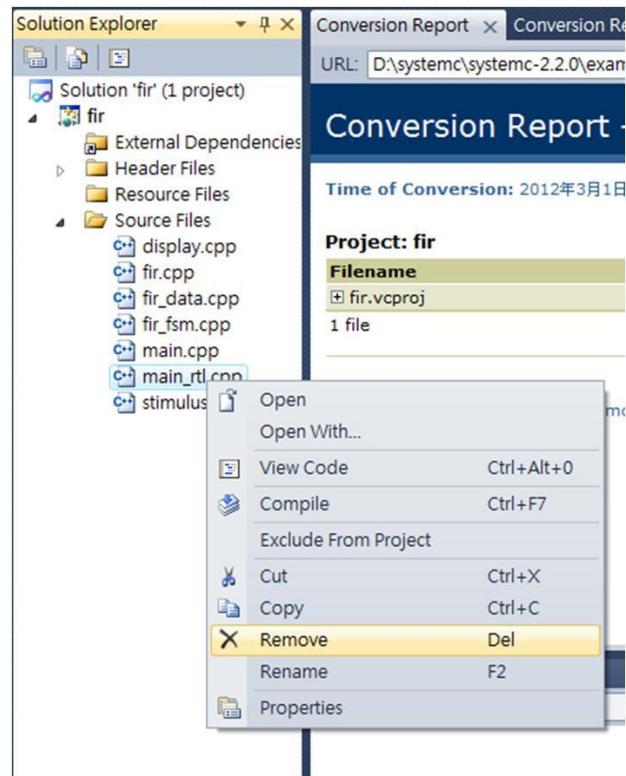
- The Solution “fir” will appear





# Run the FIR Example (2)

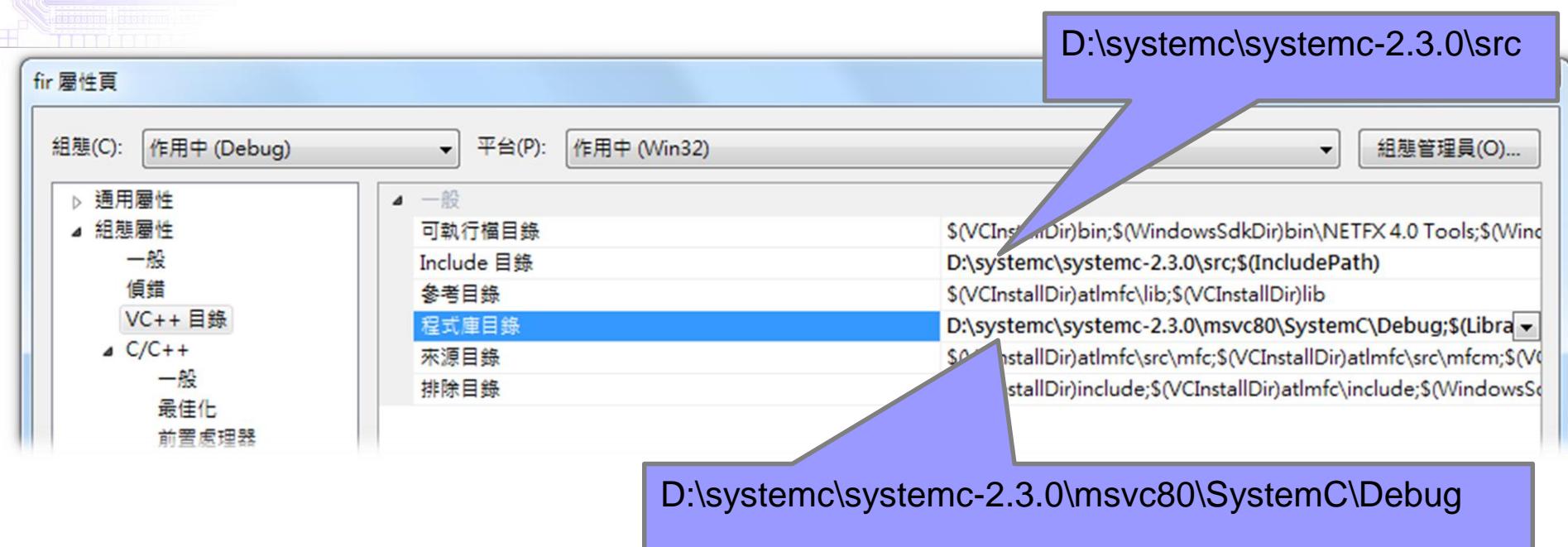
- Remove main\_rtl.cpp
  - main.cpp and main\_rtl.cpp both have sc\_main()
- Build the executable:  
Debug -> Build Solution
- Execute fir.exe  
Debug -> Start Without Debugging
- You may try main\_rtl.cpp instead of main.cpp





# Add Include Path and Library Path

- Project→Property





臺灣大學

# Execution Result

```
C:\Windows\system32\cmd.exe
Stimuli : 13 at time 139000
Display : 2467 at time 140000
Stimuli : 14 at time 149000
Display : 2960 at time 150000
Stimuli : 15 at time 159000
Display : 3466 at time 160000
Stimuli : 16 at time 169000
Display : 3968 at time 170000
Stimuli : 17 at time 179000
Display : 4470 at time 180000
Stimuli : 18 at time 189000
Display : 4972 at time 190000
Stimuli : 19 at time 199000
Display : 5474 at time 200000
Stimuli : 20 at time 209000
Display : 5976 at time 210000
Stimuli : 21 at time 219000
Display : 6478 at time 220000
Stimuli : 22 at time 229000
Display : 6980 at time 230000
Stimuli : 23 at time 239000
Display : 7482 at time 240000
Simulation of 24 items finished at time 240000
SystemC: simulation stopped by user.
請按任意鍵繼續 . . .
```



臺灣大學



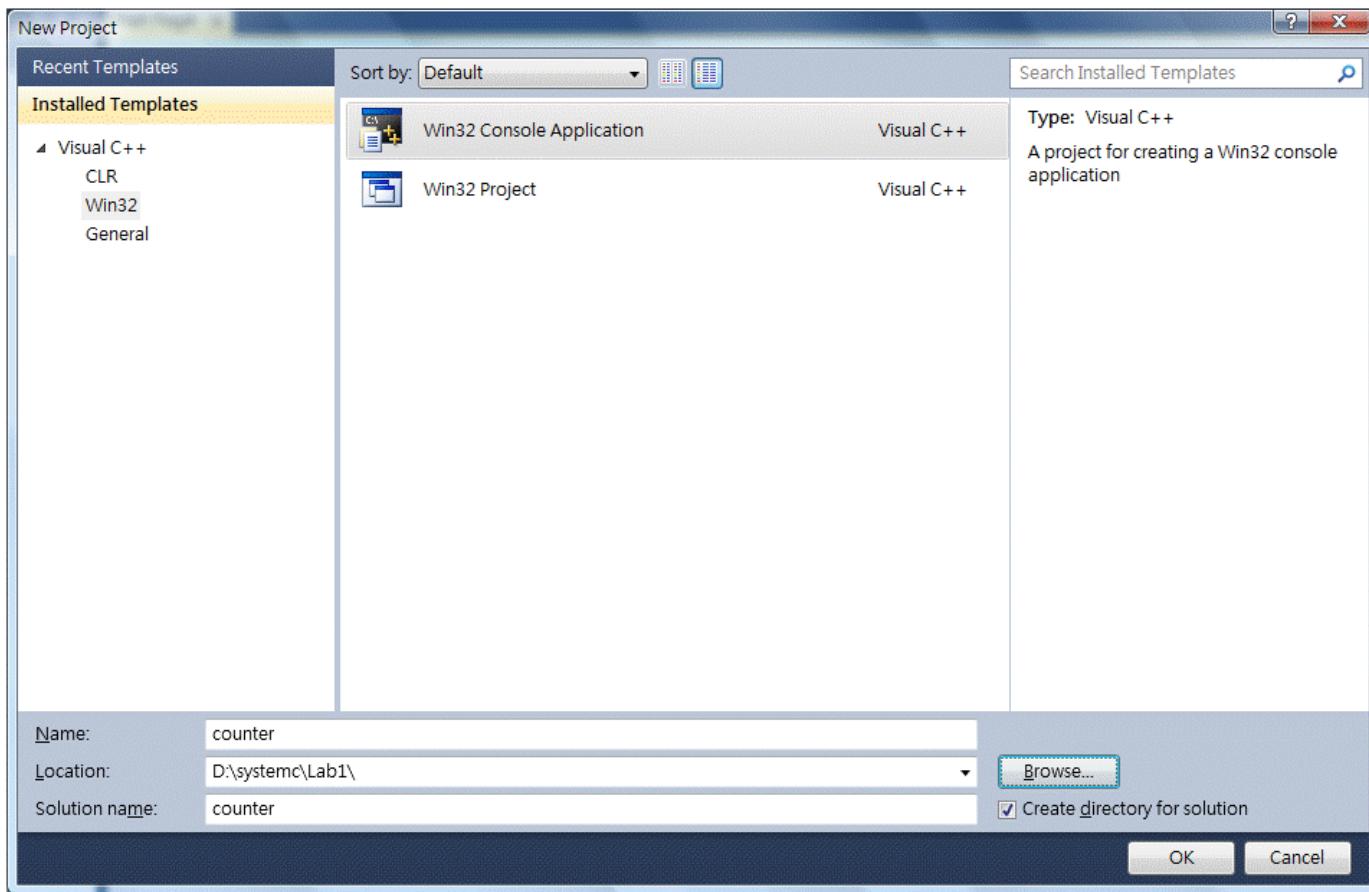
# Setup Visual C++ for SystemC coding



臺灣大學

# Create a New Project

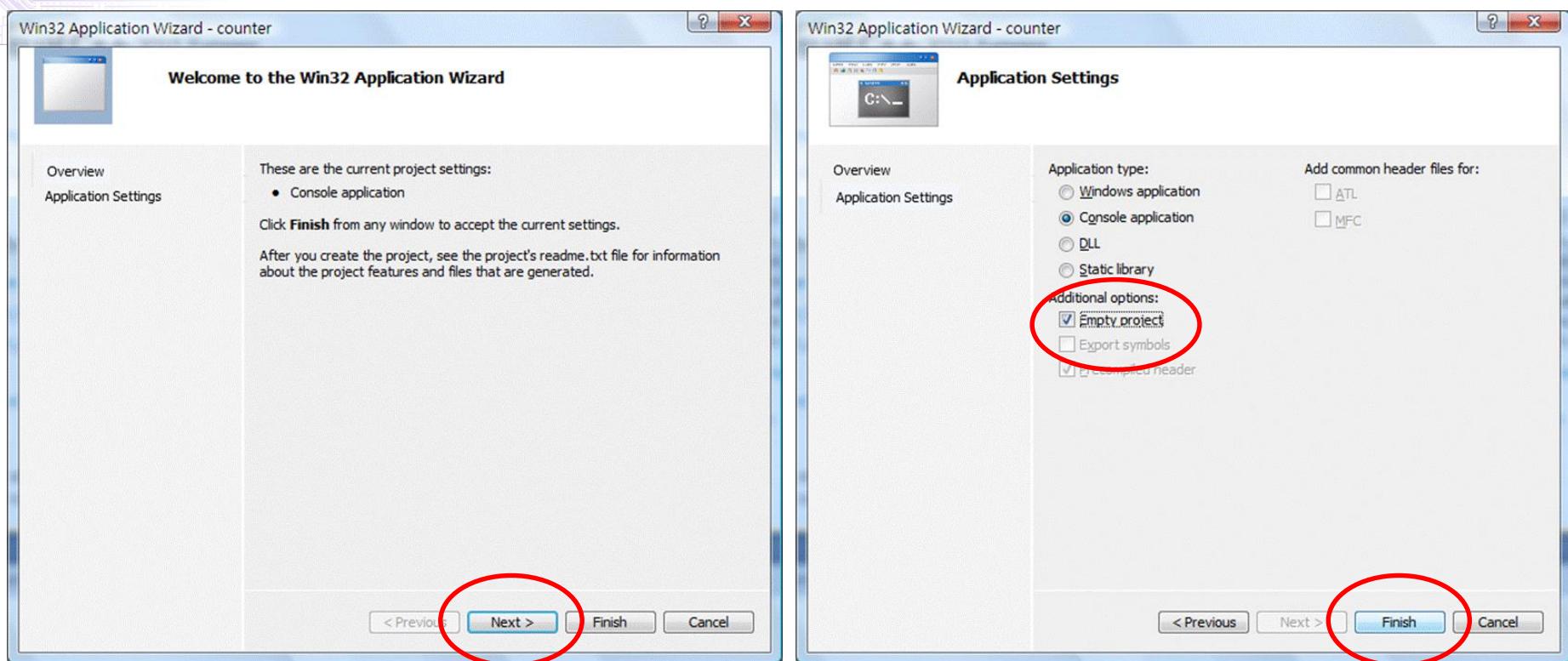
- File->New->Project



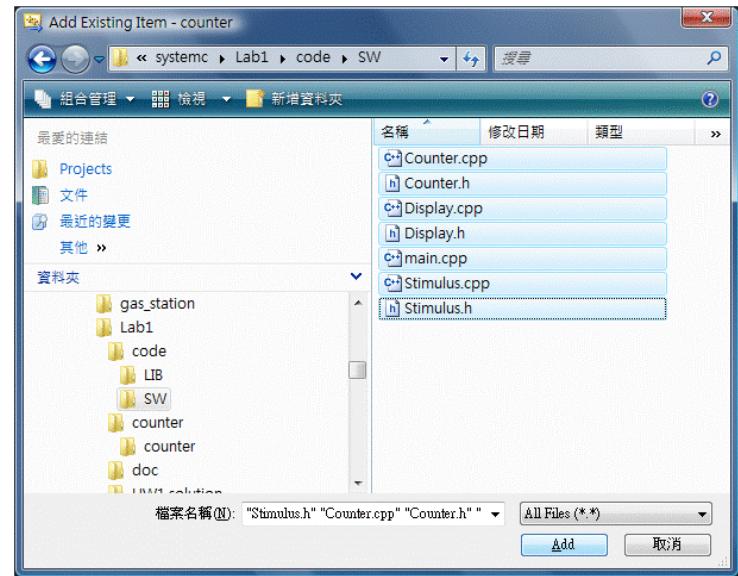
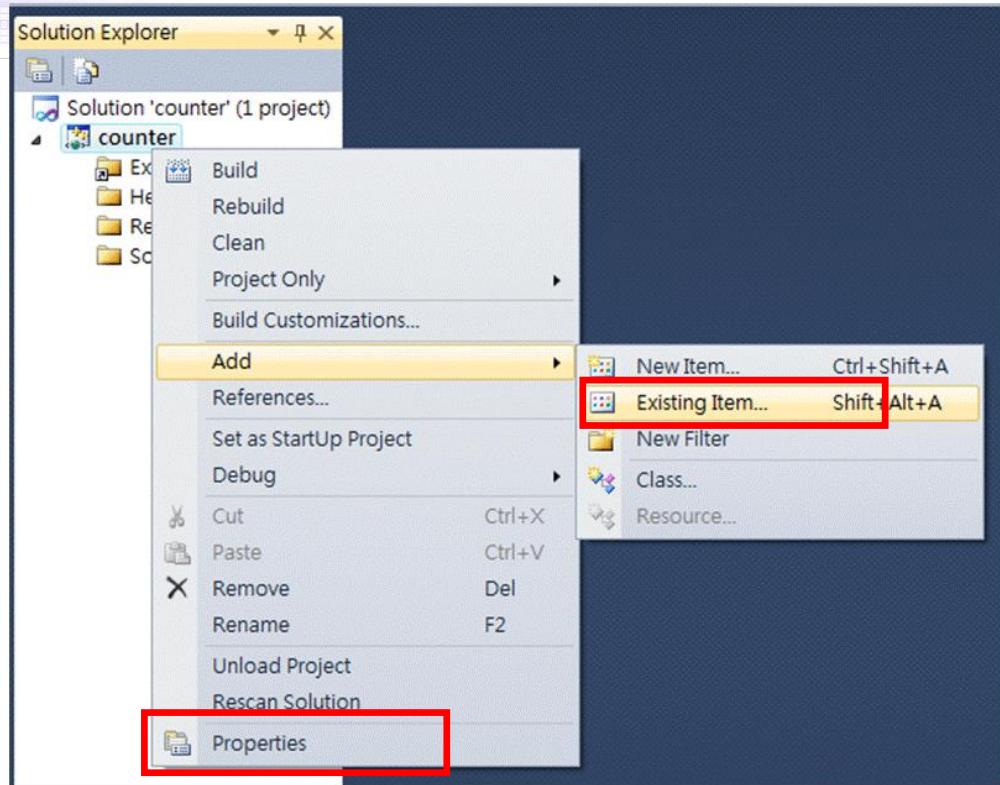


臺灣大學

# Create a New Empty Project



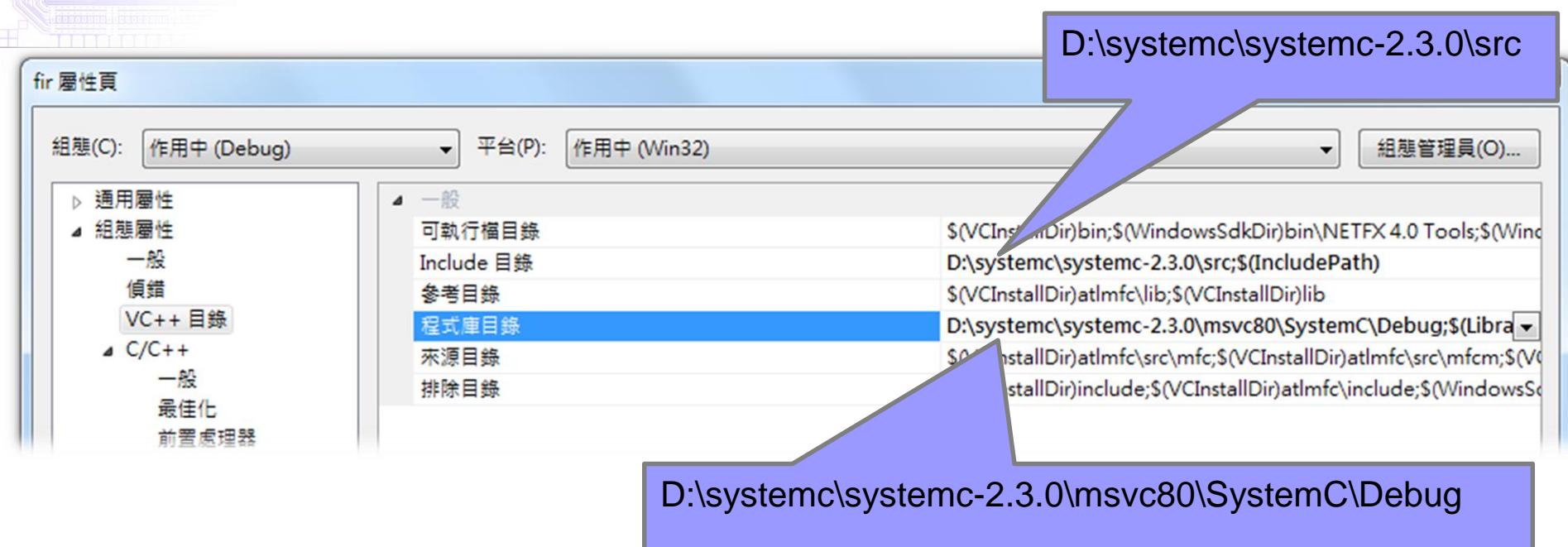
# Add Existing Files to Project and Setup Project Properties





# Add Include Path and Library Path

- Project→Property





臺灣大學

## counter Property Pages

Configuration: Active(Debug)

Platform: Active(Win32)

Configuration Manager...

- ▷ Common Properties
- △ Configuration Properties
  - General
  - Debugging
  - VC++ Directories
- ▷ C/C++
- △ Linker
  - General
  - Input**
  - Manifest File
  - Debugging
  - System
  - Optimization
  - Embedded IDL
  - Advanced
  - Command Line
- ▷ Manifest Tool
- ▷ XML Document Generator
- ▷ Browse Information
- ▷ Build Events
- ▷ Custom Build Step

### Additional Dependencies

- Ignore All Default Libraries
- Ignore Specific Default Libraries
- Module Definition File
- Add Module to Assembly
- Embed Managed Resource File
- Force Symbol References
- Delay Loaded DLLs
- Assembly Link Resource

systemc.lib;%AdditionalDependencies

systemc.lib

### Additional Dependencies

Specifies additional items to add to the link command line [i.e. kernel32.lib]

確定

取消

套用(A)



臺灣大學

counter Property Pages

Configuration: Active(Debug) Platform: Active(Win32) Configuration Manager...

Common Properties	Enable String Pooling	Yes (/Gm)
Configuration Properties	Enable Minimal Rebuild	Yes (/EHsc)
General	Enable C++ Exceptions	No
Debugging	Smaller Type Check	Both (/RTC1 equiv to /RTCsu) (/RTC1)
VC++ Directories	Basic Runtime Checks	
C/C++	Runtime Library	Multi-threaded Debug (/MTd)
General	Struct Member Alignment	Default
Optimization	Buffer Security Check	Yes (/GS)
Preprocessor	Enable Function-Level Linking	
<b>Code Generation</b>	Enable Enhanced Instruction Set	Not Set
Language	Floating Point Model	Precise (/fp:precise)
Precompiled Headers	Enable Floating Point Exceptions	
Output Files	Create Hotpatchable Image	

Runtime Library  
Specify runtime library for linking. (/MT, /MTd, /MD, /MDd)

確定 取消 套用(A)

## counter Property Pages

Configuration: Active(Debug)

Platform: Active(Win32)

Configuration Manager...

- ▷ Common Properties
- ▲ Configuration Properties
  - General
  - Debugging
  - VC++ Directories
- ▲ C/C++
  - General
  - Optimization
  - Preprocessor
  - Code Generation
  - Language
  - Precompiled Headers
  - Output Files
  - Browse Information
  - Advanced
- Command Line**
- ▷ Linker
- ▷ Manifest Tool
- ▷ XML Document Generator
- ▷ Browse Information
- ▷ Build Events
- ▷ Custom Build Step

## All Options

```
/ZI /nologo /WX- /Od /Oy- /D "WIN32" /D "_DEBUG" /D "CONSOLE" /D "UNICODE" /D "UNICODE" /Gm /EHsc /RTC1 /MTd /GS /fp:precise /Zc:wchar_t /Zc:forScope /Fp"Debug\counter.pch" /Fa"Debug\" /Fo"Debug\" /Fd"Debug\vc100.pdb" /Gd /analyze- /errorReport:queue
```

## Additional Options

Inherit from parent or project defaults 

確定

取消

套用(A)

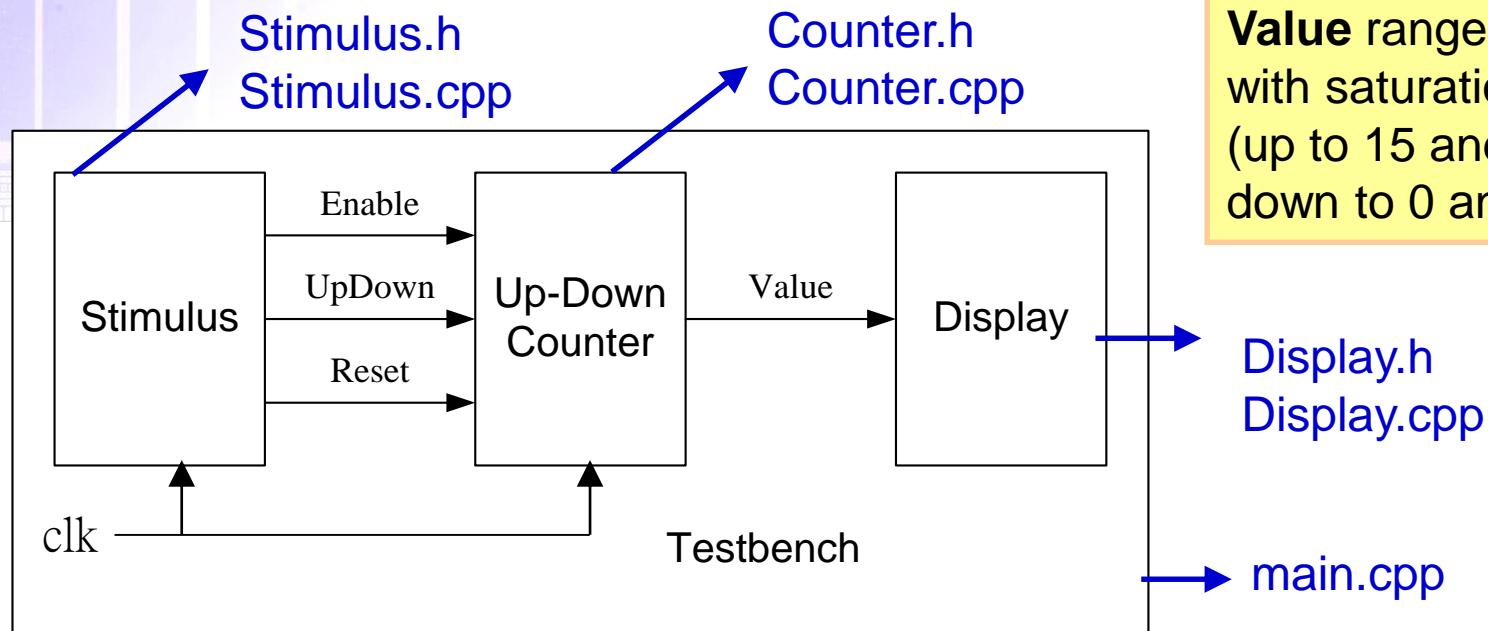


臺灣大學



# Lab 1 Practice: Up-Down Counter

# Up-Down Counter



## Counter Spec.

**Value** range: [0,15] ,  
with saturation  
(up to 15 and stop at 15;  
down to 0 and stop at 0)

Enable	T: Count / F: Hold value
UpDown	T: Count up / F: Count down (in range)
Reset	T: Reset to zero / -
Value	Value of counter



臺灣大學

# Requirements of the Lab

- Modify source files
  - Connect modules by channels
  - Complete the behavior of the counter
  - Complete the behavior of display
  - Add count down test to stimulus