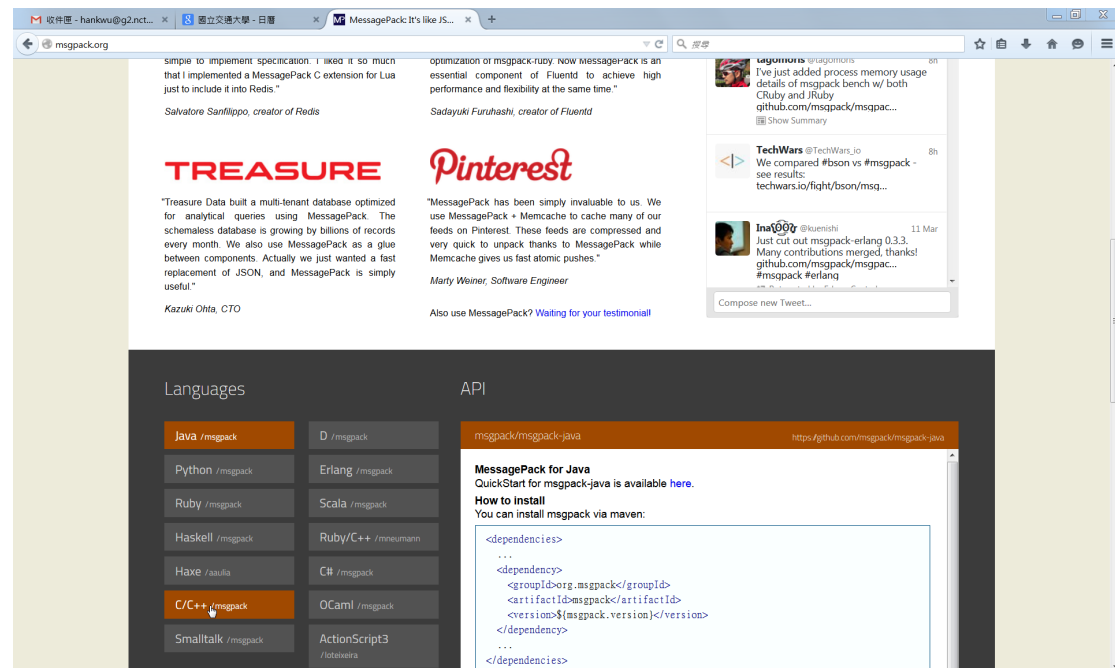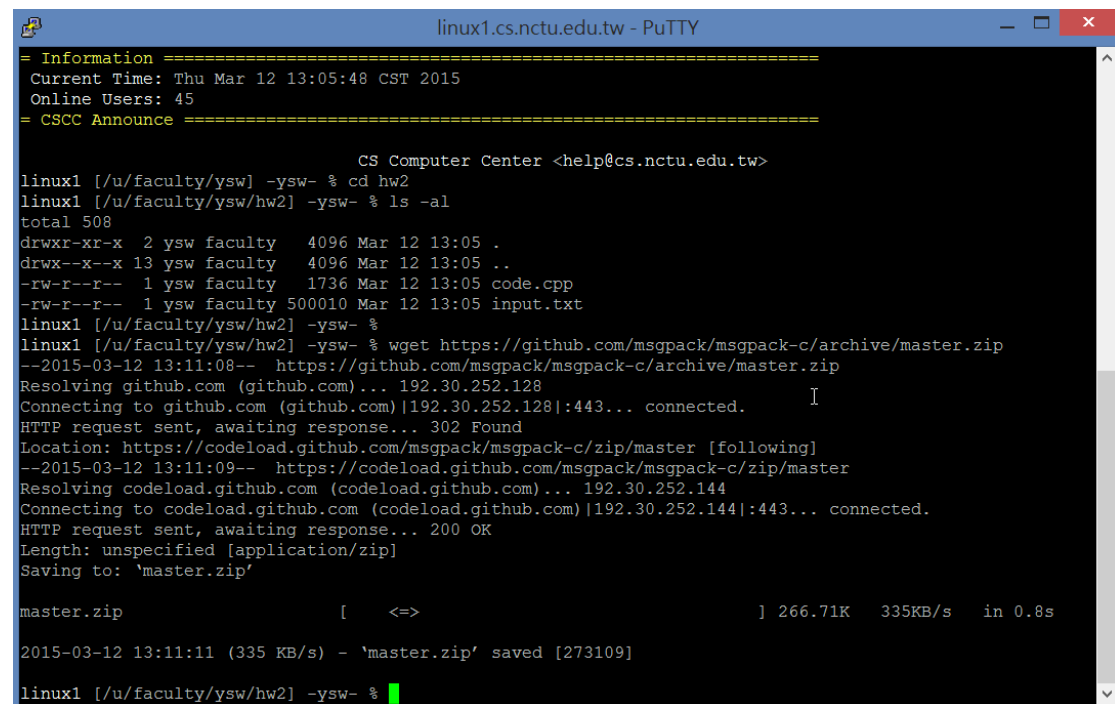1. We use `msgpack-c`. Its link is available from the official website
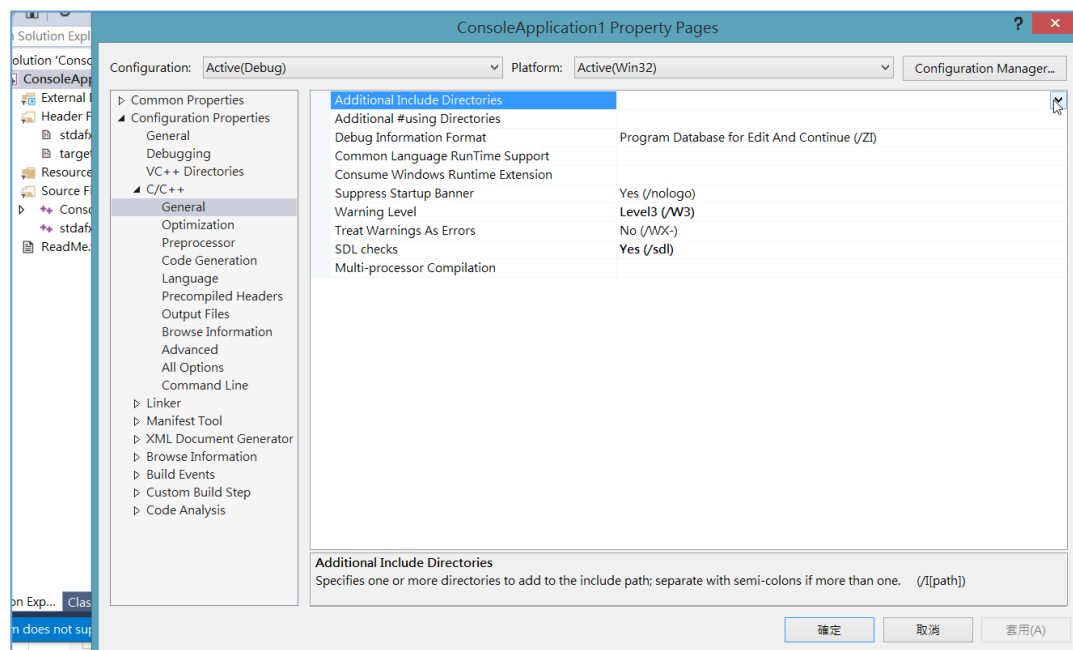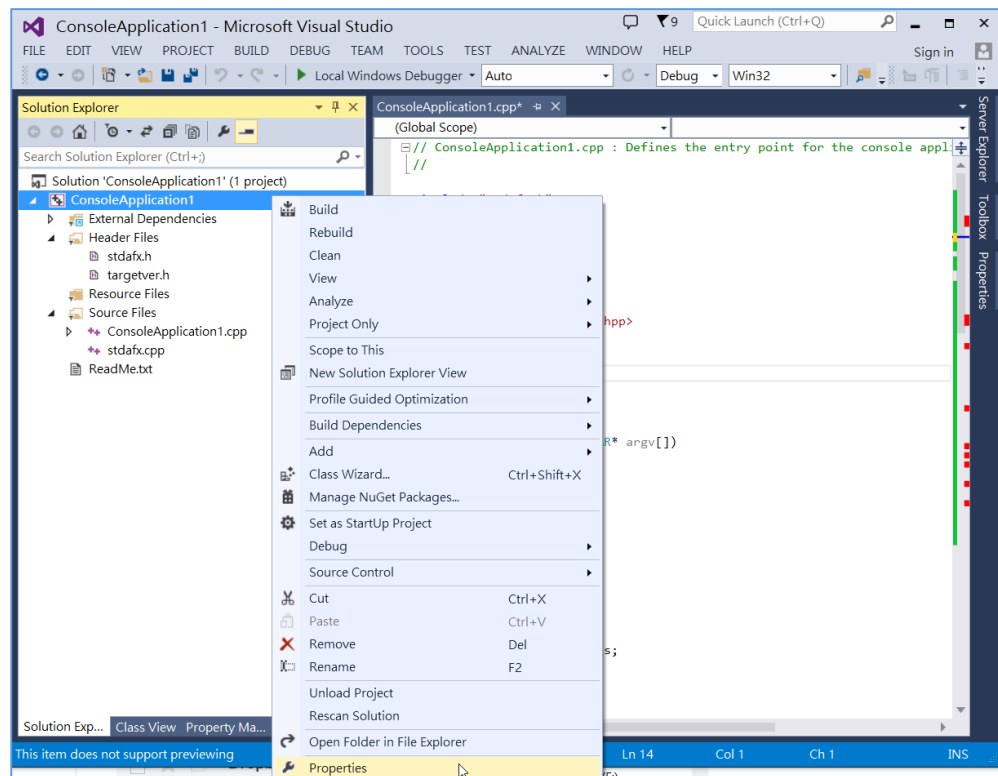

2. wget msgpack-c zip file
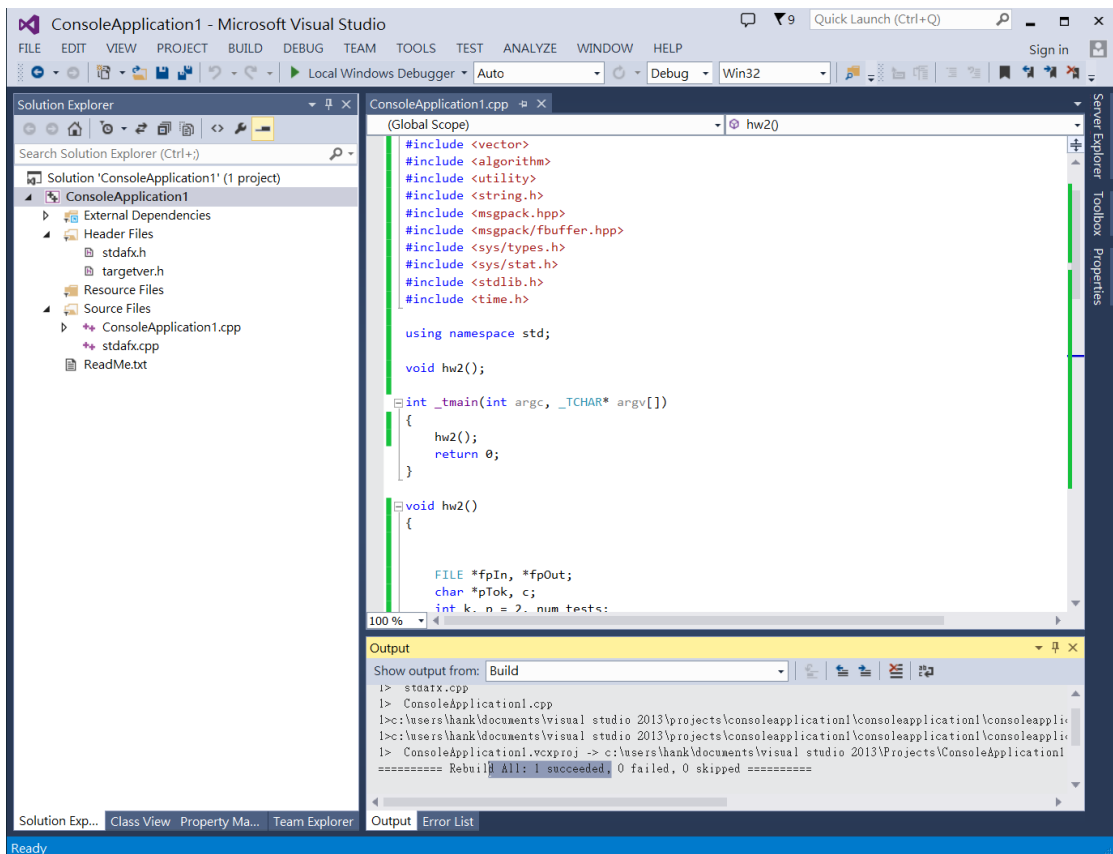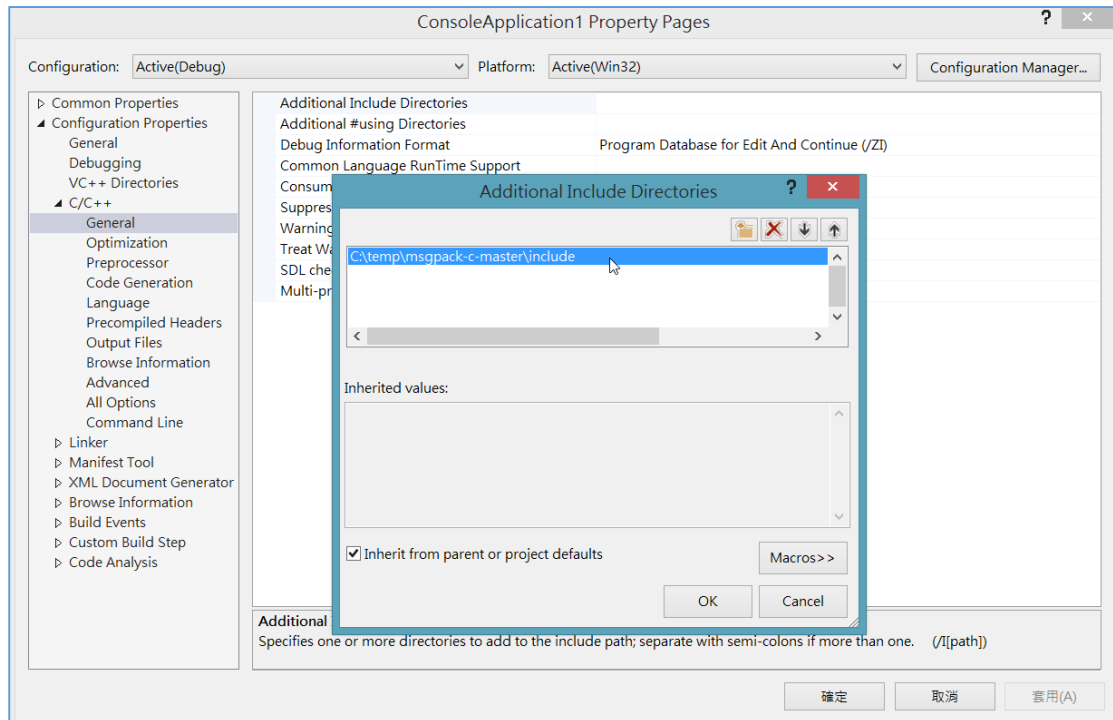
3. Unzip it

```
linux1 [/u/faculty/ysw/hw2] -ysw- % unzip master.zip
Archive:  master.zip
156a4403ab625e05ac6988cc6eac9877e407794e
   creating: msgpack-c-master/
  inflating: msgpack-c-master/.gitignore
  inflating: msgpack-c-master/.travis.yml
  inflating: msgpack-c-master/CHANGELOG.md
  inflating: msgpack-c-master/CMakeLists.txt
  inflating: msgpack-c-master/COPYING
  inflating: msgpack-c-master/CROSSLANG.md
  inflating: msgpack-c-master/Doxyfile
  inflating: msgpack-c-master/LICENSE
  inflating: msgpack-c-master/Makefile.am
  inflating: msgpack-c-master/QUICKSTART-C.md
  inflating: msgpack-c-master/QUICKSTART-CPP.md
  inflating: msgpack-c-master/README.md
  inflating: msgpack-c-master/bootstrap
  inflating: msgpack-c-master/cases.json
  inflating: msgpack-c-master/cases_gen.rb
   creating: msgpack-c-master/ci/
  inflating: msgpack-c-master/ci/build_autotools.sh
  inflating: msgpack-c-master/ci/build_cmake.sh
  inflating: msgpack-c-master/configure.in
  inflating: msgpack-c-master/crosslang.cc
  inflating: msgpack-c-master/crosslang.rb
   creating: msgpack-c-master/erb/
  inflating: msgpack-c-master/erb/cpp03_define.hpp.erb
  inflating: msgpack-c-master/erb/cpp03_msgpack_tuple.hpp.erb
  inflating: msgpack-c-master/erb/cpp03_msgpack_tuple_fwd.hpp.erb
  inflating: msgpack-c-master/erb/cpp03_zone.hpp.erb
```

4. Compile your code

```
  inflating: msgpack-c-master/test/cases.mpac
  inflating: msgpack-c-master/test/cases_compact.mpac
  inflating: msgpack-c-master/test/convert.cpp
  inflating: msgpack-c-master/test/fixint.cpp
  inflating: msgpack-c-master/test/fixint_c.cpp
  inflating: msgpack-c-master/test/iterator_cpp11.cpp
  inflating: msgpack-c-master/test/limit.cpp
  inflating: msgpack-c-master/test/msgpack_basic.cpp
  inflating: msgpack-c-master/test/msgpack_c.cpp
  inflating: msgpack-c-master/test/msgpack_container.cpp
  inflating: msgpack-c-master/test/msgpack_cpp11.cpp
  inflating: msgpack-c-master/test/msgpack_stream.cpp
  inflating: msgpack-c-master/test/msgpack_tuple.cpp
  inflating: msgpack-c-master/test/msgpack_vref.cpp
  inflating: msgpack-c-master/test/object.cpp
  inflating: msgpack-c-master/test/object_with_zone.cpp
  inflating: msgpack-c-master/test/pack_unpack.cpp
  inflating: msgpack-c-master/test/pack_unpack_c.cpp
  inflating: msgpack-c-master/test/reference.cpp
  inflating: msgpack-c-master/test/reference_cpp11.cpp
  inflating: msgpack-c-master/test/streaming.cpp
  inflating: msgpack-c-master/test/streaming_c.cpp
  inflating: msgpack-c-master/test/version.cpp
  inflating: msgpack-c-master/test/zone.cpp
linux1 [/u/faculty/ysw/hw2] -ysw- % ls -al
total 784
drwxr-xr-x  3 ysw faculty    4096 Mar 12 13:12 .
drwx--x--x 13 ysw faculty    4096 Mar 12 13:05 ..
-rw-r--r--  1 ysw faculty    1736 Mar 12 13:05 code.cpp
-rw-r--r--  1 ysw faculty  500010 Mar 12 13:05 input.txt
-rw-r--r--  1 ysw faculty  273109 Mar 12 13:11 master.zip
drwxr-xr-x  8 ysw faculty    4096 Mar 11 10:53 msgpack-c-master
linux1 [/u/faculty/ysw/hw2] -ysw- %
linux1 [/u/faculty/ysw/hw2] -ysw- %
linux1 [/u/faculty/ysw/hw2] -ysw- % g++ -I msgpack-c-master/include/ code.cpp
linux1 [/u/faculty/ysw/hw2] -ysw- %
```

If you use MS Visual Studio on Windows, you may add the msgpack include path with the following steps

ConsoleApplication1 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
    - All Options
    - Command Line
  - ▷ Linker
  - ▷ Manifest Tool
  - ▷ XML Document Generator
  - ▷ Browse Information
  - ▷ Build Events
  - ▷ Custom Build Step
  - ▷ Code Analysis

Additional Include Directories
Additional #using Directories
Debug Information Format   Program Database for Edit And Continue (/ZI)
Common Language RunTime Support
Consum...
Suppres...
Warning...
Treat Wa...
SDL che...
Multi-pr...

Additional Include Directories

```
C:\temp\msgpack-c-master\include
```

Inherited values:

☑ Inherit from parent or project defaults   Macros>>

OK   Cancel

Additional...
Specifies one or more directories to add to the include path; separate with semi-colons if more than one.   (/I[path])

確定   取消   套用(A)

ConsoleApplication1 - Microsoft Visual Studio

FILE EDIT VIEW PROJECT BUILD DEBUG TEAM TOOLS TEST ANALYZE WINDOW HELP   Sign in

Local Windows Debugger ▾ Auto ▾ Debug ▾ Win32 ▾

Solution Explorer

Search Solution Explorer (Ctrl+;)

- Solution 'ConsoleApplication1' (1 project)
  - ▲ ConsoleApplication1
    - ▷ External Dependencies
    - ▲ Header Files
      - stdafx.h
      - targetver.h
    - Resource Files
    - ▲ Source Files
      - ▷ ConsoleApplication1.cpp
      - stdafx.cpp
    - ReadMe.txt

ConsoleApplication1.cpp

(Global Scope)   hw2()

```cpp
#include <vector>
#include <algorithm>
#include <utility>
#include <string.h>
#include <msgpack.hpp>
#include <msgpack/fbuffer.hpp>
#include <sys/types.h>
#include <sys/stat.h>
#include <stdlib.h>
#include <time.h>

using namespace std;

void hw2();

int _tmain(int argc, _TCHAR* argv[])
{
    hw2();
    return 0;
}

void hw2()
{


    FILE *fpIn, *fpOut;
    char *pTok, c;
    int k, n = 2, num_tests;
```

Output

Show output from: Build

```
1>  stdafx.cpp
1>  ConsoleApplication1.cpp
1>c:\users\hank\documents\visual studio 2013\projects\consoleapplication1\consoleapplication1\consoleappli
1>c:\users\hank\documents\visual studio 2013\projects\consoleapplication1\consoleapplication1\consoleappli
1>  ConsoleApplication1.vcxproj -> c:\users\hank\documents\visual studio 2013\Projects\ConsoleApplication1
========== Rebuild All: 1 succeeded, 0 failed, 0 skipped ==========
```

Solution Exp... Class View Property Ma... Team Explorer   Output Error List

Ready

References

https://github.com/msgpack/msgpack-c/wiki/cpp_packer

https://github.com/msgpack/msgpack-c/wiki/cpp_unpacker

```cpp
 4    #include <utility>
 5    #include <string.h>
 6    #include <msgpack.hpp>
 7    #include <msgpack/fbuffer.hpp>
 8    #include <sys/types.h>
 9    #include <sys/stat.h>
10    #include <unistd.h>
11    #include <stdlib.h>
12    #include <time.h>
13
14    using namespace std;
15
16    int main()
17    {
18        FILE *fpIn, *fpOut;
19        char *pTok, c;
20        int k, p=2, num_tests;
21        vector<int> NUMBERS;
22        msgpack::sbuffer sbuf;
23
24        msgpack::unpacked result;
25        struct stat st;
26        size_t off = 0;
27        stat("input.txt", &st);
28
29        char* buf = new char[st.st_size];
30
31        fpIn = fopen("input.txt", "rb");
32        fread(buf, st.st_size, 1, fpIn );
33        fclose(fpIn);
34
35        msgpack::unpack(result, buf, st.st_size, off);
36        result.get().convert(&num_tests);
37
38        printf("num_tests = %d\n", num_tests);
39
40        for ( k = 0; k < num_tests; k++) {
41            msgpack::unpack(result, buf, st.st_size, off);
42            result.get().convert(&NUMBERS);
43            sort(NUMBERS.begin(), NUMBERS.end());
44            msgpack::pack(&sbuf, NUMBERS);
45
46        }
47
48        assert(off == st.st_size);
49
50        fpOut = fopen("output.txt", "wb");
51
52        fwrite(sbuf.data(), sbuf.size(),1, fpOut);
53
54        if(fpOut)
55            fclose(fpOut);
```