MPICH2 and Visual Studio Based C++ Parallel Programming Environment Setting

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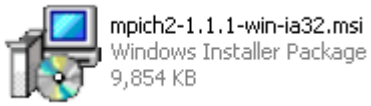
1. MPICH2 Installation

1.1 Download MPICH2.

MPICH2 is a high-performance and widely portable implementation of the Message Passing Interface (MPI) standard. It is free and can be downloaded from many websites. For example:

http://www.mcs.anl.gov/research/projects/mpich2/downloads/index.php?s=downloads

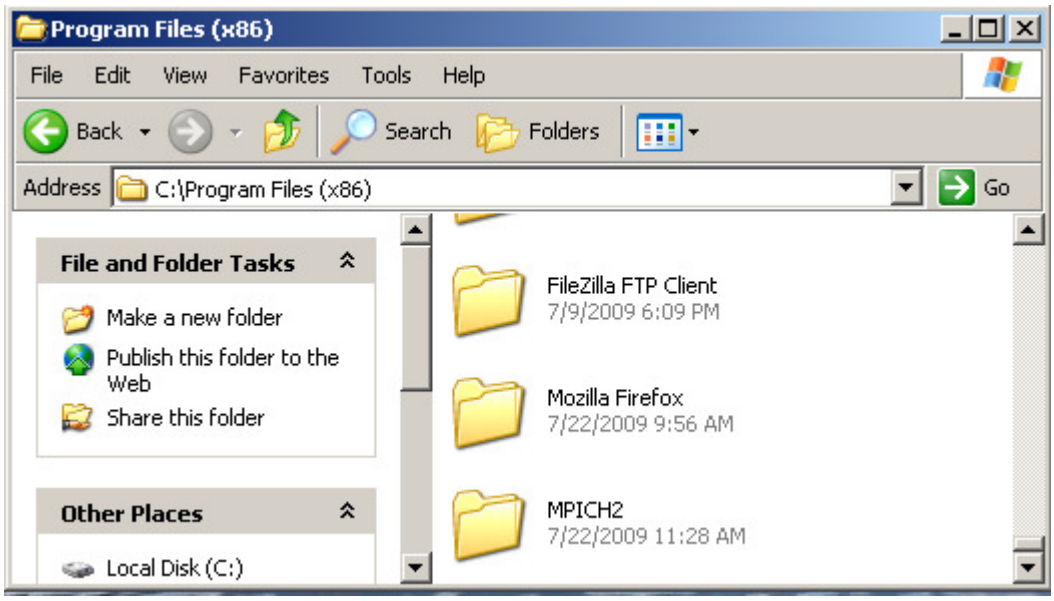
The current stable release for MPICH2 is 1.1.1. It was released on July 21, 2009.



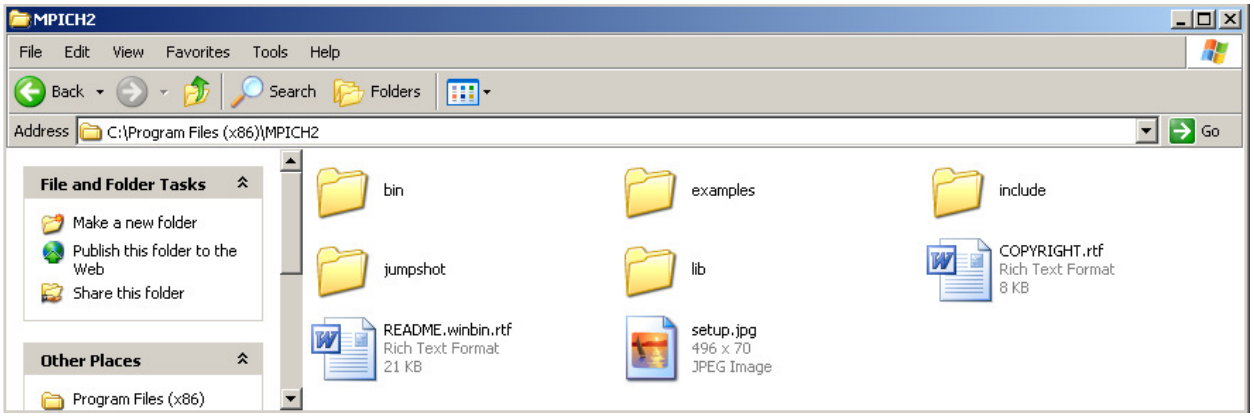
1.2. Run mpich2-1.1.1-win-ia32.msi.

Click Run. And then click the Next button and use the default configuration to install it.

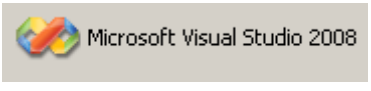
A folder named MPICH2 can be found under the path where the MPICH2 is installed (C:\Program Files (x86)) as shown in following picture.



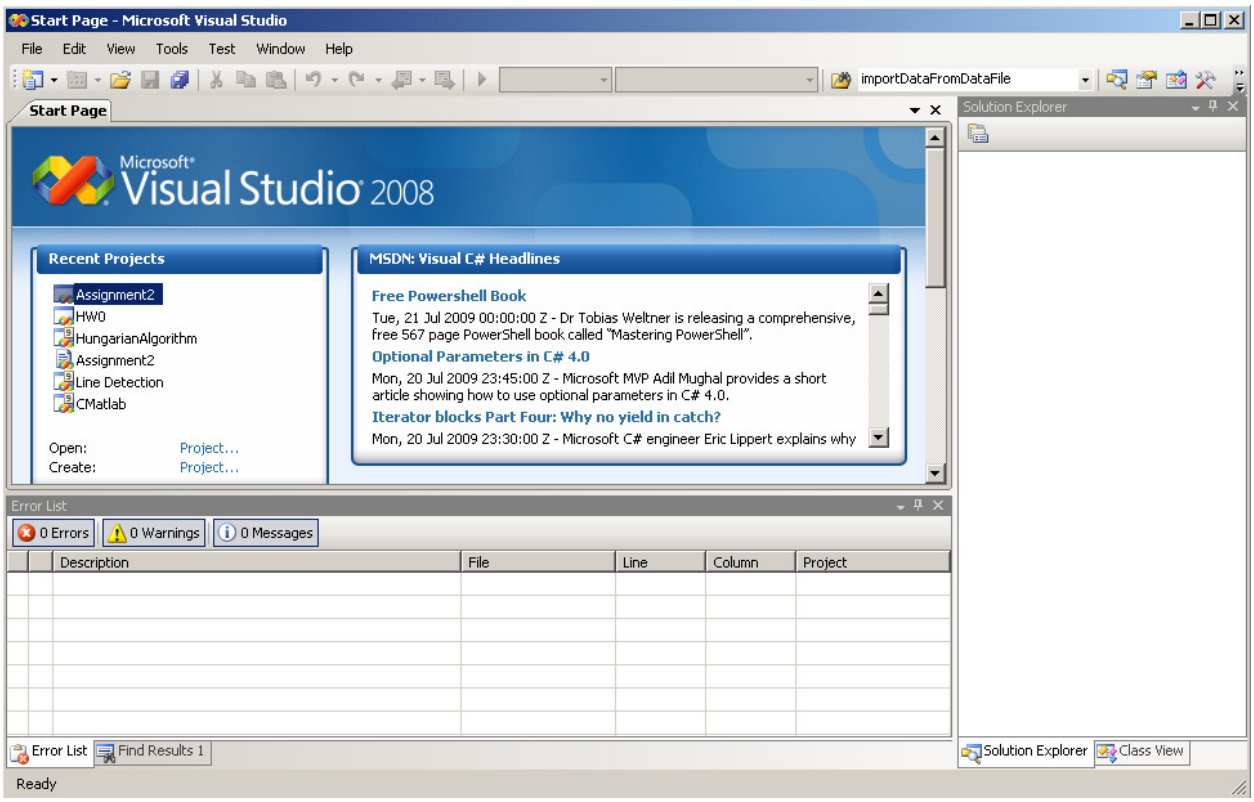
There are five folders and three documents in MPICH2 folder as shown in following picture. Among them the README.winbin.rtf file gives some instructions about system requirements, installer and compiling of the MPICH2.



2. Visual Studio Setting. (Using VS 2008 for example)



2.1. Run VS 2008.



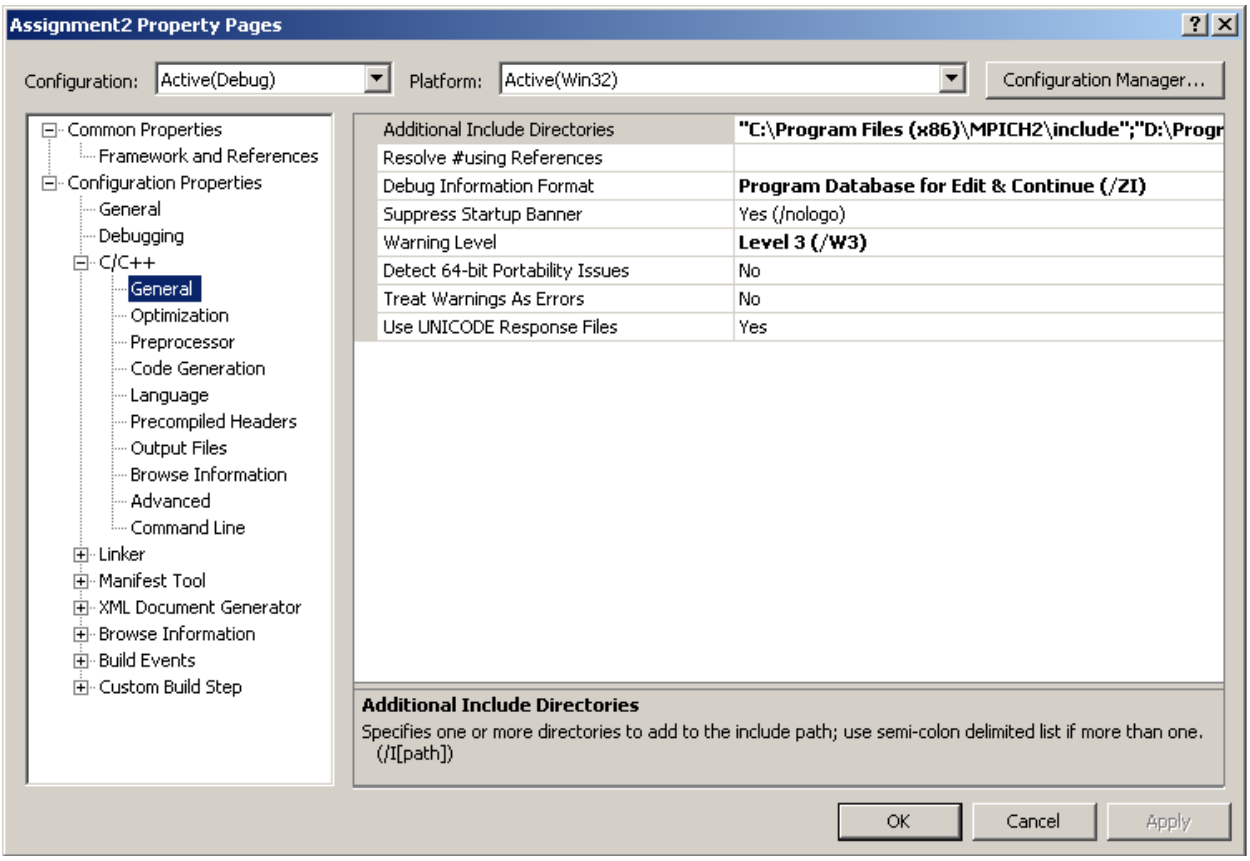
2.2. Create a new project via File->New->Project

For example, the name of the project is Assignment2.

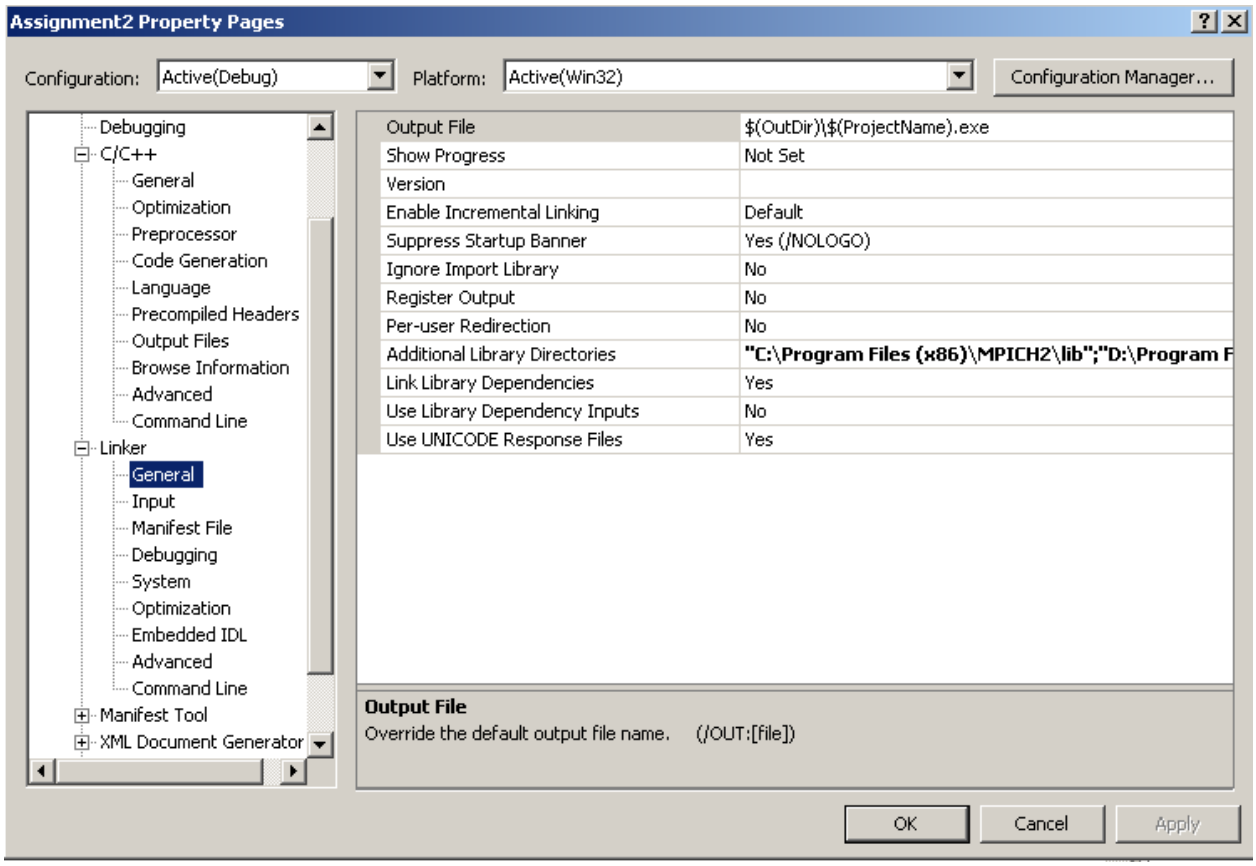
2.3. Include and Lib setting

Click Project-> Assignment2 Properties...

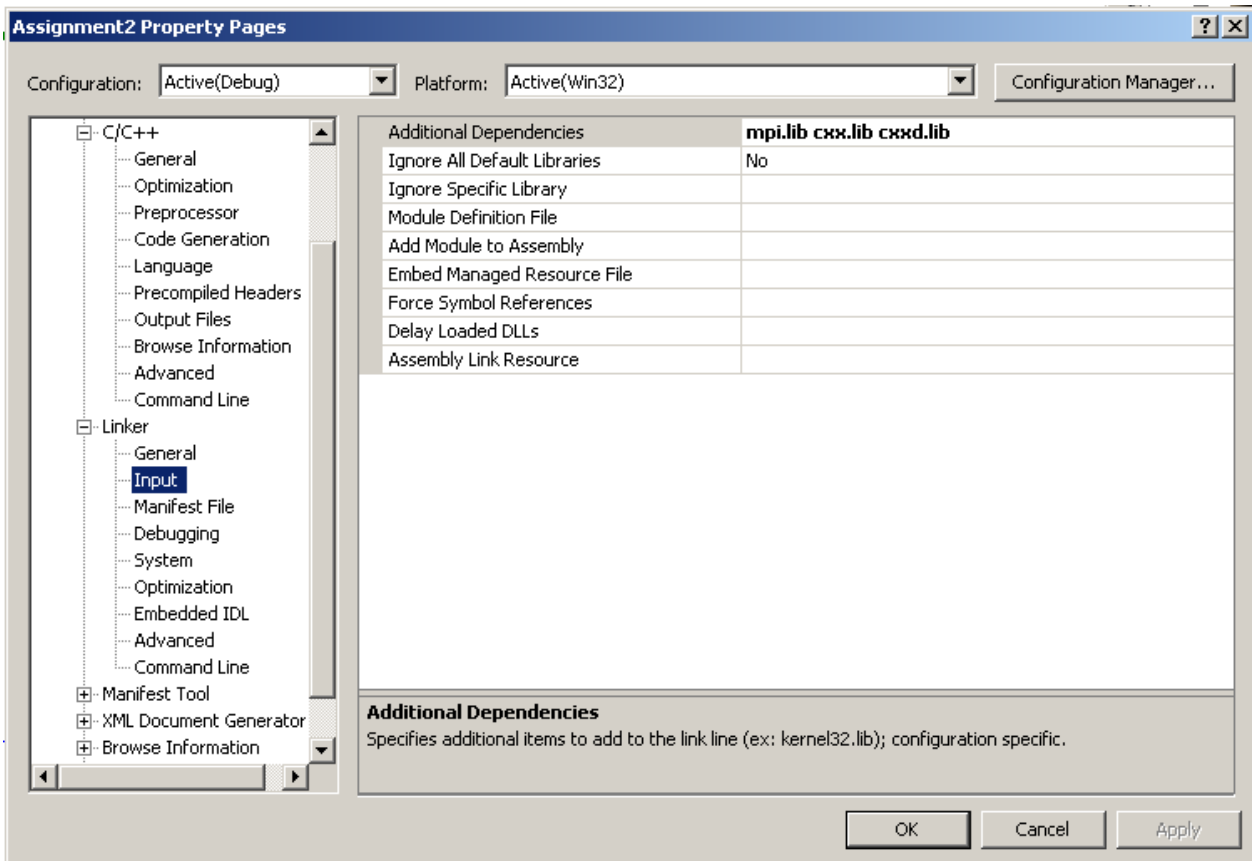
2.3.1 Add the directory containing the include folder of MPICH2 (C:\Program Files (x86)\MPICH2\include) into the Additional Include Directories as shown in following picture.



2.3.2 Add the directory containing the lib folder of MPICH2 (C:\Program Files (x86)\MPICH2\lib) into the Additional Library Directories as shown in following picture.



2.3.3 Add three lib names (mpi.lib cxx.lib cxxd.lib) into Additional Dependencies as shown in following picture:



3. Executable program generation.

3.1. MPI & C/C++ based programming.

- #include"mpi.h"
- Common MPI function in c++ language:
  - MPI::Init (argc, argv);
  - proID = MPI::COMM_WORLD.Get_rank ( );
  - numOfPro = MPI::COMM_WORLD.Get_size ( );
  - time01 = MPI::Wtime();
  - MPI::COMM_WORLD.Send(&subLength[dest-1], 1, MPI::INT, dest, from_master);
  - MPI::COMM_WORLD.Recv(&subLength[proID-1], 1, MPI::INT, 0, from_master, status);
  - MPI::Finalize();

3.2. Compile

Build->Compile

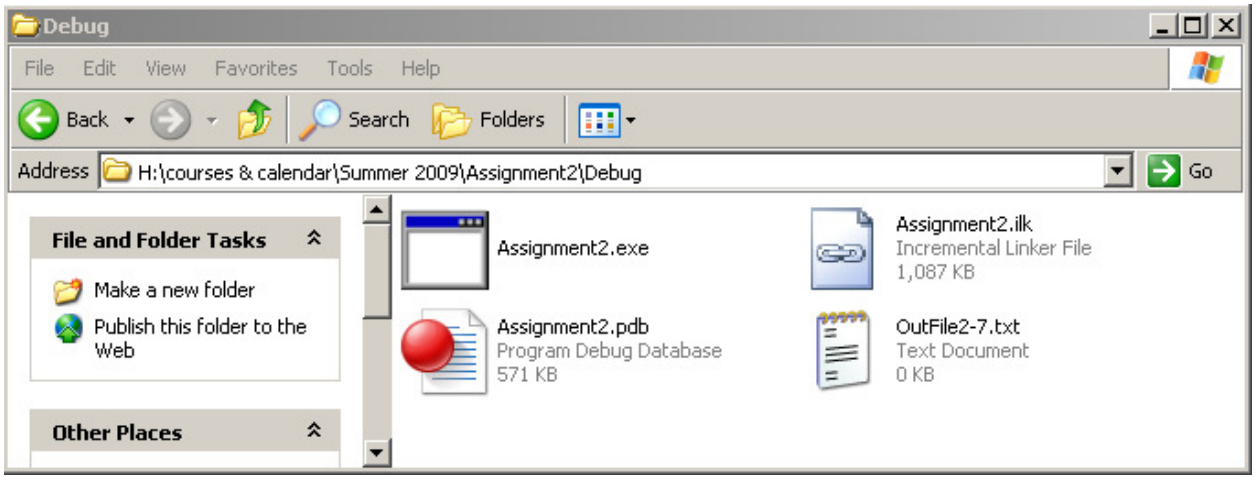
3.3. Build

Build->Build Solution

3.4. Generate executable program

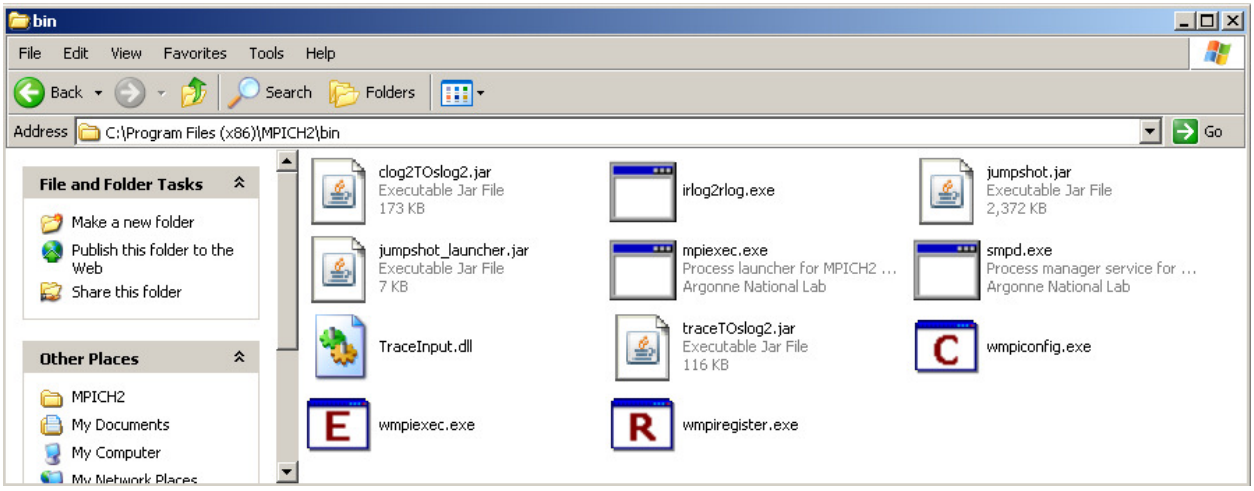
Debug->Start Debugging.

After the program is debugged sucessfully, an executable program (Assignment2.exe) will be found in the Debug folder of this project.



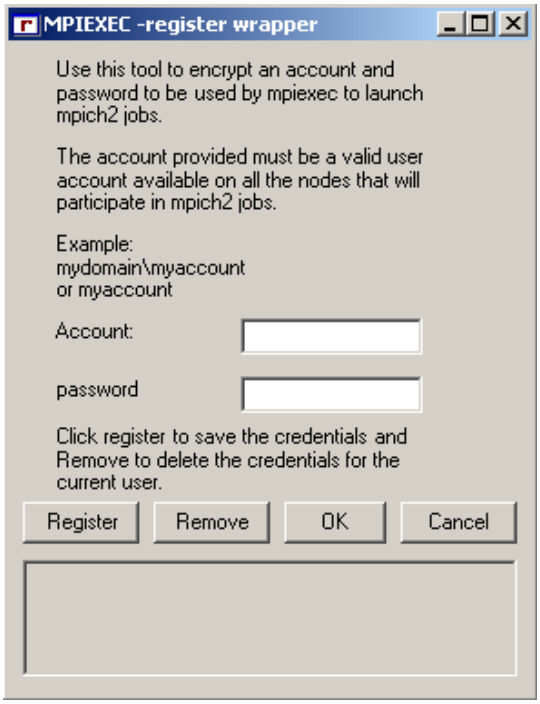
4. Use MPICH2 to do the simulation.

4.1. Copy all files in the bin folder of the MPICH2 (C:\Program Files (x86)\MPICH2\bin) and paste them in the project folder (H:\courses & calendar\Summer 2009\Assignment2).



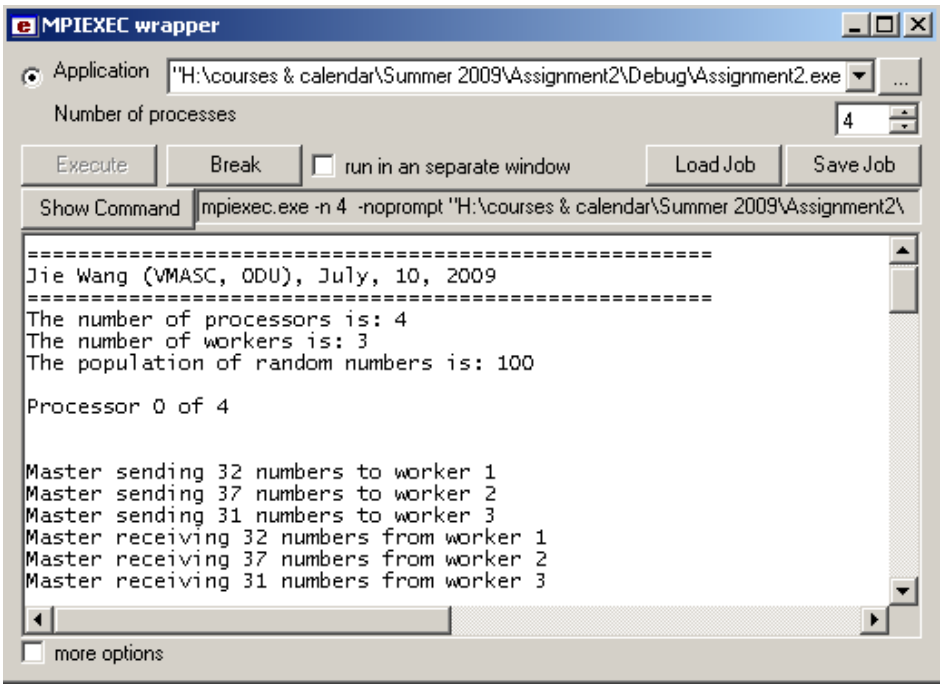
4.2. Run wmpiregister.exe in the project folder.

In order to use MPICH2 to do the parallel simulation, you must know the administrator account and password of the computer. Input the required information and register. This operation just need to do once at the beginning of using MPICH2.



4.3. Run wmpiexec.exe.

Input the directory of the executable program ("H:\courses & calendar\Summer 2009\Assignment2\Debug\Assignment2.exe") into the Application and decide the Number of processes. Click Execute, the simulation results will display on the output window as shown in following picture.


MPIEXEC wrapper
Application
"H:\courses & calendar\Summer 2009\Assignment2\Debug\Assignment2.exe
...
Number of processes
4
Execute
Break
run in an separate window
Load Job
Save Job
Show Command
mpiexec.exe -n 4 -noprompt "H:\courses & calendar\Summer 2009\Assignment2\
==========
Jie Wang (VMASC, ODU), July, 10, 2009
==========
The number of processors is: 4
The number of workers is: 3
The population of random numbers is: 100
Processor 0 of 4
Master sending 32 numbers to worker 1
Master sending 37 numbers to worker 2
Master sending 31 numbers to worker 3
Master receiving 32 numbers from worker 1
Master receiving 37 numbers from worker 2
Master receiving 31 numbers from worker 3
more options