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Multithreaded Program Debug Visualization Helper

User Manual

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Multithreaded Program Debug Add-in	Version: <1.0>
User Manual	Date: <29/Aug/08>
No.0002	

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User Manual

1. Project Overview

This project is an add-in for Microsoft Visual Studio 2005, which will help the programmer debug with multithreaded programs. It displays the info of Win32 APIs called by running threads, such as the method's name, the invoking thread ID, and the calling time. It also provides a visual view of running threads by drawing the track of each running threads.

This project is based on a Microsoft-research technology called Detours. The implementation of the interception of Win32 API function calls is developed with C++, while the user interface of the project is with C#.net.

2. Installation

2.1 System Requirements

- ♦ Windows 2000/XP based on x86 machines
- Microsoft Visual Studio 2005 installed

2.2 Setup

The files needed for installation are under the directory /setup.

- ◆ First, copy the folder *Addins/* to the installation directory of add-ins for Visual Studio 2005(VS2005). The directory is something like *C:\Documents and Settings\Jessie\My Documents\Visual Studio 2005\Addins*
- ◆ Second, copy the folder *MultithreadDebugAddIn/* to the directory C:/

After you are finished with these two steps, the setup of the project is done.

2.3 Starting up and shutting down

2.3.1 Starting Up

◆ After starting up VS2005, go to the *tools* menu, and then the *add-in manager* menu. (Figure. 2-1) You will see a dialog box named *Add-in Manager* pop up. (Figure. 2-2)

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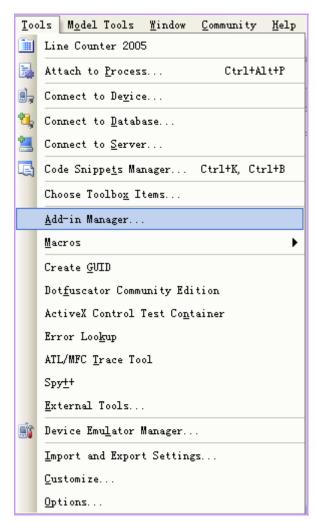


Figure.2-1 Tools Menu

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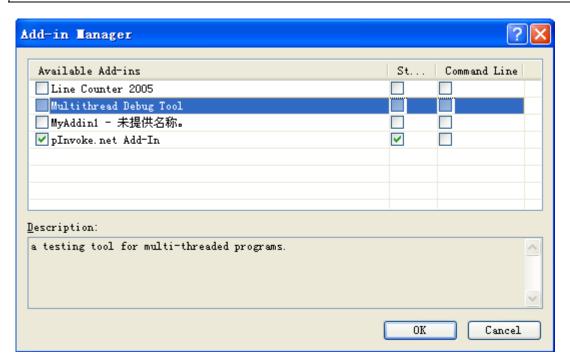


Figure. 2-2 Add-in Manager

- In Figure 2-2, *Multithread Debug Tool* is among the available Add-ins. Check the box before *Multithread Debug Tool*.
- ♦ You do NOT need to restart the VS2005.

Go to the *Debug* menu, a menu named *Run Multithread Debug Helper* will appear. (Figure 2-3)

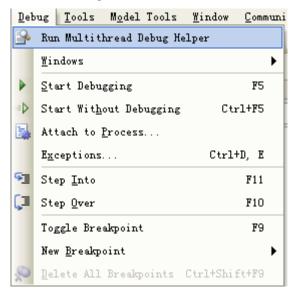


Figure. 2-3 Debug Menu

If the menu appears, the starting up of the project is successful.

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2.3.2 Shutting Down

◆ Again, go to the tools menu, and then the *add-in manager* menu. (Figure. 2-1) You will see a dialog box named *Add-in Manager* pop up. (Figure. 2-4)

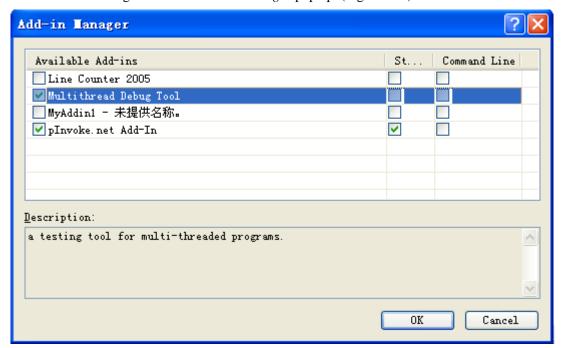


Figure. 2-4 Add-in Manager

- ◆ In Figure 2-2, *Multithread Debug Tool* is among the available Add-ins, and the box before *Multithread Debug Tool* is checked. Uncheck the box.
- ◆ Also, go to the Debug menu, You will see the menu called *Run Multithread Debug Helper* disappears. (Figure 2-5)



Figure. 2-5 Debug Menu

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The add-in is successfully uninstalled.

3. Quick Start Guide

• First, open a VS2005 solution. (Figure 3-1)

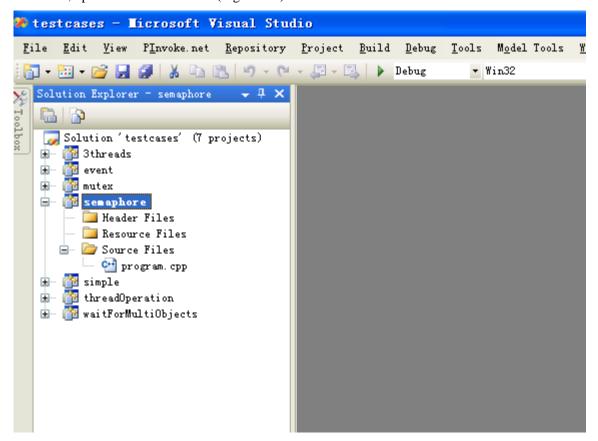


Figure. 3-1 solution

• Open the file that you want to debug with the add-in.(Figure 3-2)

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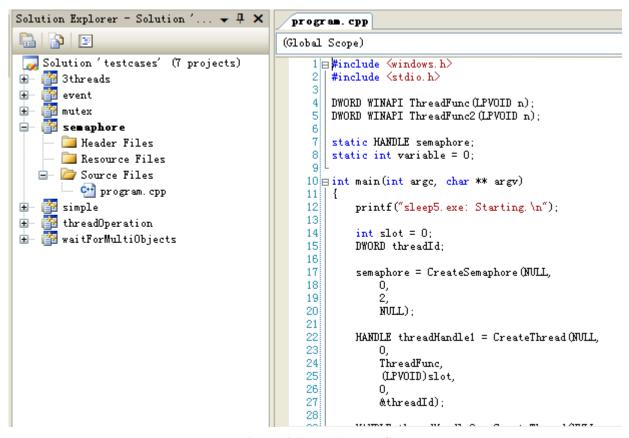


Figure. 3-2 opening one file

◆ Third, run the add-in.(Figure 3-2)

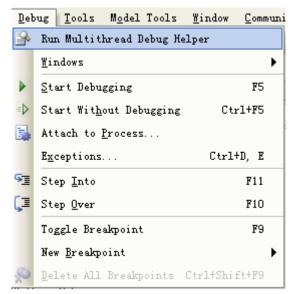


Figure. 3-2 Debug Menu

Click the Run Multithread Debug Helper to run the add-in, and you will see a panel pop up.(Figure 3-3)

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```
program.cpp
(Global Scope)
    1 ≡ #include ⟨windows.h⟩
       #include <stdio.h>
       DWORD WINAPI ThreadFunc(LPVOID n);
       DWORD WINAPI ThreadFunc2(LPVOID n);
                                                                           The add-in panel
       static HANDLE semaphore;
    8 static int variable = 0;
                                                     Bulti thread Debug Tool
   10 mint main(int argc, char ** argv)
   11 | {
                                                                          Thread 1 4 >
           printf("sleep5.exe: Starting.\n");
   12
   13
                                                         Messag
                                                                            Thr€⊻
            int slot = 0;
   14
           DWORD threadId;
   15
   16
                                                                         Ready
            semaphore = CreateSemaphore (NVLL,
   17
   18
               0,
   19
               2,
               NULL);
   20
   21
   22
           HANDLE threadHandle1 = CreateThread(NULL,
   23
   24
               ThreadFunc,
   25
                (LPVOID) slot,
   26
               0,
   27
               athreadId);
   28
```

Figure. 3-3 panel

• Drag the panel to be docked at any side of the VS2005.(Figure 3-4, Figure 3-5)

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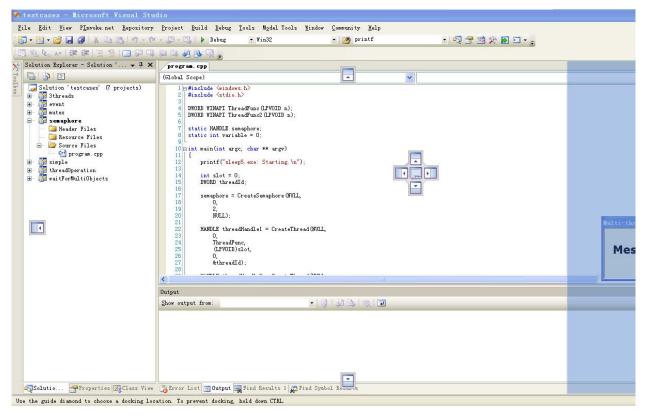


Figure. 3-4 dock the panel

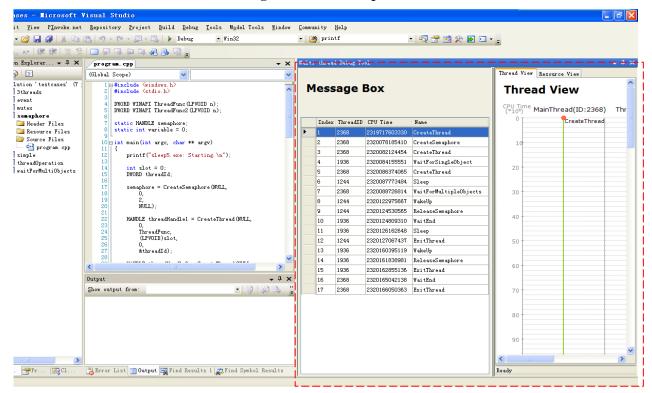


Figure. 3-5 panel

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In the Figure 3-5, on the left of the panel is the *message box*, which displays the Win32 APIs called by the running threads in the program; one the right of the panel is the *thread view*, which displays the track of each running threads.(Figure 3-6) Also, you can switch from the thread view to the resource view, which displays the resources(including semaphores, mutexes and events created in the program).(Figure 3-7)

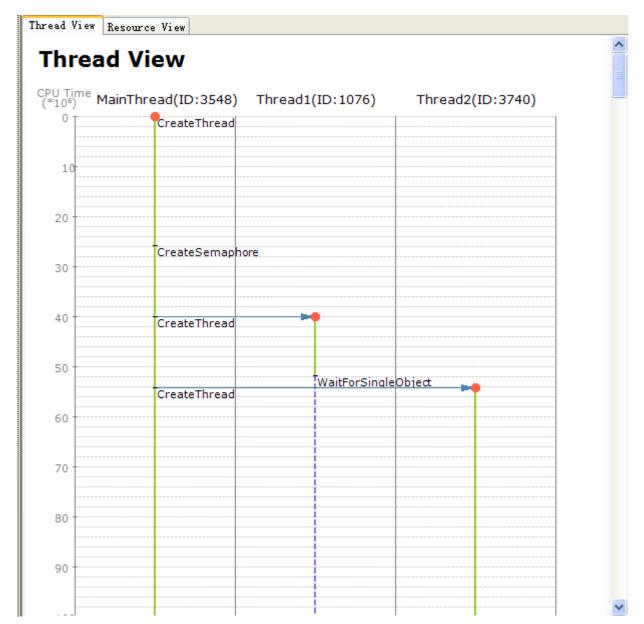


Figure. 3-6 thread view

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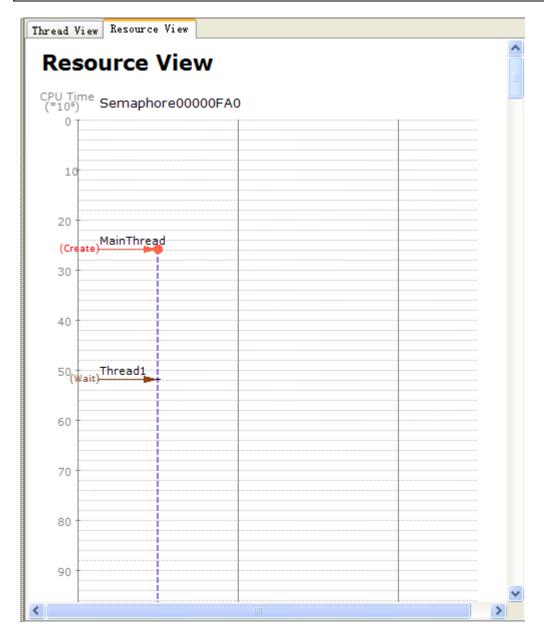


Figure. 3-7 Resource View

◆ Also, by clicking the message in the *message box* on the left, you can highlight the one in the *thread view*. (Figure 3-8)

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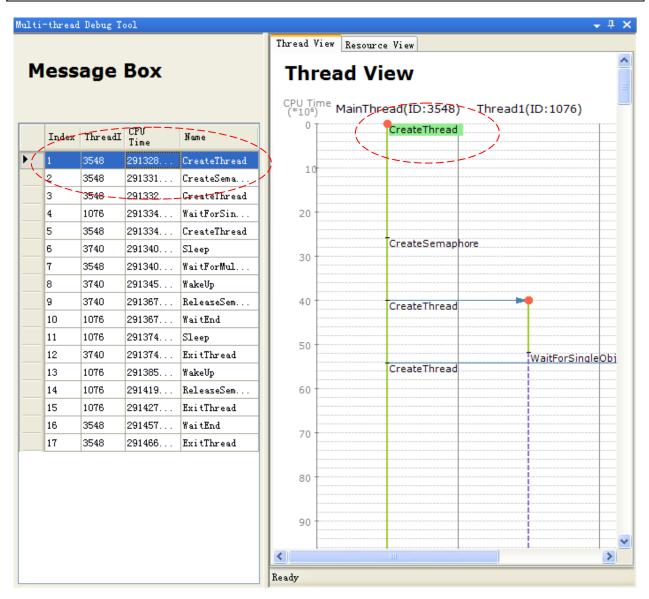


Figure 3-8 message highlight