DigiPen
INSTITUTE OF TECHNOLOGY

Dr Memory | Instructions

CS185

Downloading Dr Memory

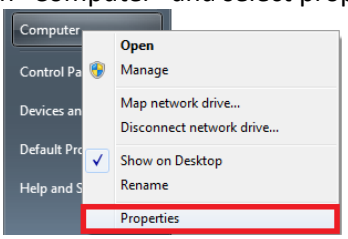
Official Website: http://www.drmemory.org/

Easy access (From professor Mead's website):

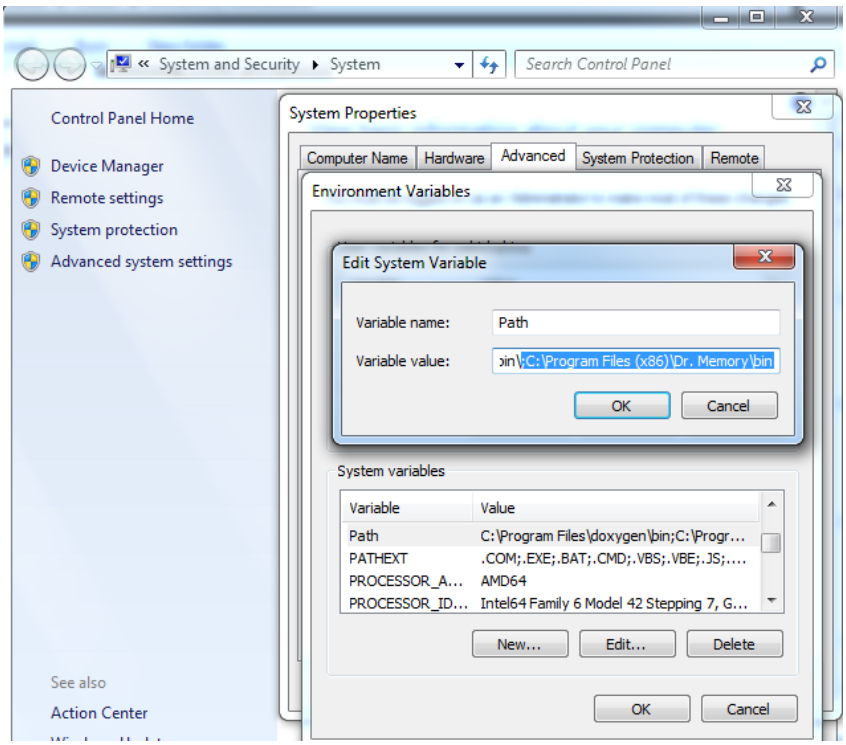
http://azrael.digipen.edu/~mmead/www/public/Files/preinstalls/drmemory-preinstalled.zip

Installing Dr Memory

1. Extract the downloaded zip file.
2. Take the "Dr. Memory" folder and place it in the "C:\Program Files (x86)" directory
3. In the start menu, right click on "Computer" and select properties



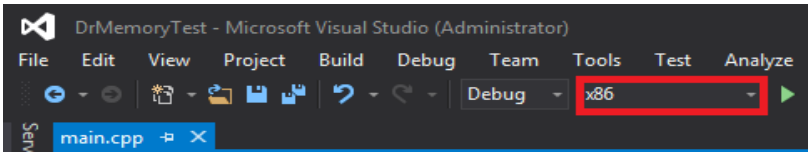
4. On the left, click on "Advanced system settings" which will open the "System Properties" dialog
5. Click on "Environment Variables..." which will open the "Environment Variables" dialog
6. Under "System variables", locate and select the "Path" and click on "Edit..."
7. The "Edit System Variable" dialog will open. In the "Variable value" edit box add the following at the end: ***;C:\Program Files (x86)\Dr. Memory\bin***



Setting up Visual Studio

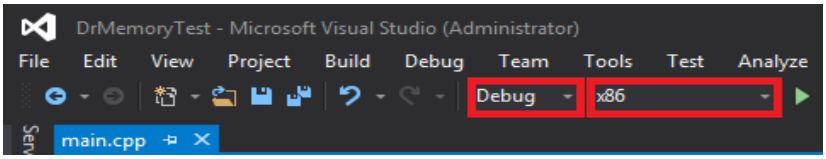
Step 1: 32-bit application

Visual Studio builds 32-bit applications by default, so no action is required on that front.
To check if you are building a 32-bit or 64 bit application, look at the following configuration in the IDE:



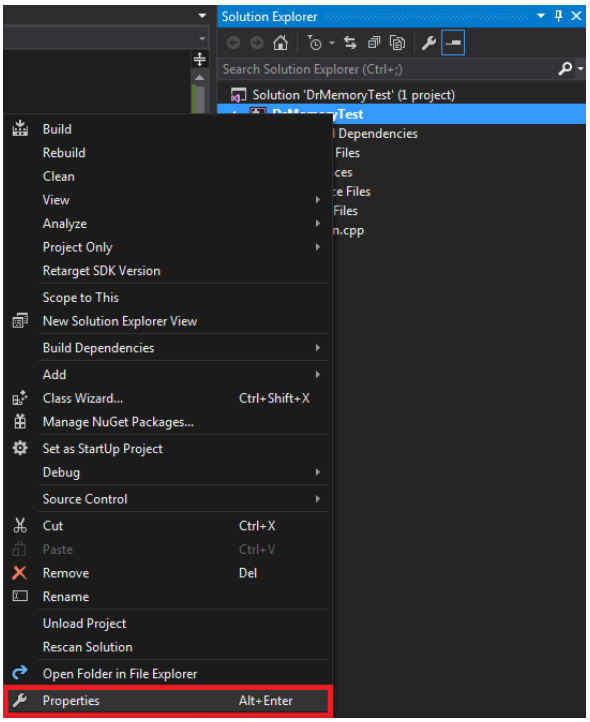
- x86 means that your application is a 32-bit application.
- x64 means that your application is a 64-bit application.

Also, I would set my application to run in "Debug" mode in order to get more information while running Dr. Memory on the executable.

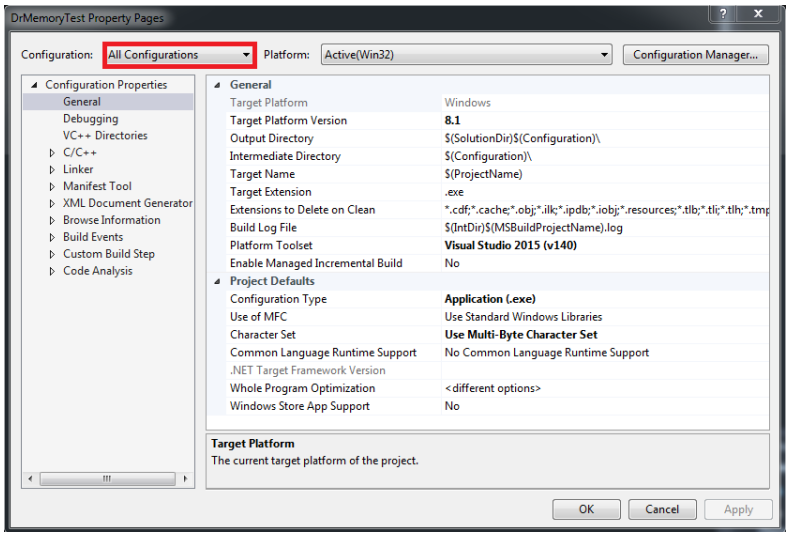


Step 2: Configuration Properties

- In your project's "Solution Explorer", right click on the project node and select "Properties"



- Make sure you set the Configuration to "All Configurations". By doing that, you will be setting the configurations of "Debug" and "Release" projects.



- To include debug information, use the /Zi flag to the Visual Studio compiler.
  - Under "Configuration Properties | C/C++ | General", the "Debug Information Format" entry should either say "Program Database (/Zi)" or "Program Database for Edit and Continue (/ZI)".
  - For Visual Studio 2015, under "Configuration Properties | Linker | Debugging", the "Generate Debug Info" entry should say "Optimize for debugging (/DEBUG)" – it should *not* say "Optimize for faster linking (/DEBUG:FASTLINK)".
    PS: Prior to VS2015 it should say "Yes (/DEBUG)".

- To disable inlining as recommended above, use the /Ob0 parameter.
  - Under "Configuration Properties | C/C++ | Optimization" ensure "Inline Function Expansion" says "Disabled (/Ob0)".

- To disable frame pointer optimization as recommended above, use the Oy- parameter.
  - Under "Configuration Properties | C/C++ | Optimization" ensure "Omit Frame Pointers" says "No (/Oy-)".

- The Visual Studio compiler's /RTC1 flag can prevent Dr. Memory from reporting uninitialized reads of local variables, and the /RTC1 checks for uninitialized reads themselves may not catch everything that Dr. Memory finds. However,/RTC1 does perform additional stack checks that Dr. Memory does not, so for best results, your application should be run under Dr. Memory without /RTC1, and run natively with /RTC1.
  - Under "Configuration Properties | C/C++ | Code Generation" ensure "Basic Runtime Checks" says "Default".

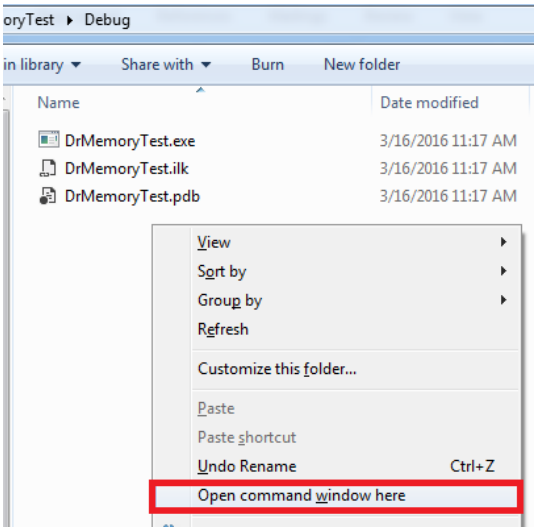
- Click "Ok" to save your changes.

Note: ***Here is a link that allows you to setup and use Dr. Memory on all platforms:*** http://drmemory.org/docs/page_prep.html

Testing for memory leaks

Once you are done with your project:

- Go to the "Debug" folder found in your project folder. You should find the executable there.
- Press Shift then Right click anywhere in that folder.
- Select "Open command window here"



- Run the following command:

drmemory -batch -- WhateverExeName.exe

- No memory leak test

```
int main(void)
{
	int * array = new int[10];

	delete[] array;
	return 0;
}
```

```
~~Dr.M~~ Dr. Memory version 1.7.0
~~Dr.M~~ Running "DrMemoryTest.exe"
~~Dr.M~~
~~Dr.M~~ NO ERRORS FOUND:
~~Dr.M~~      0 unique,    0 total unaddressable access(es)
~~Dr.M~~      0 unique,    0 total uninitialized access(es)
~~Dr.M~~      0 unique,    0 total invalid heap argument(s)
~~Dr.M~~      0 unique,    0 total GDI usage error(s)
~~Dr.M~~      0 unique,    0 total handle leak(s)
~~Dr.M~~      0 unique,    0 total warning(s)
```

```
~~Dr.M~~      0 unique,    0 total,     0 byte(s) of leak(s)
~~Dr.M~~      0 unique,    0 total,     0 byte(s) of possible leak(s)
~~Dr.M~~ ERRORS IGNORED:
~~Dr.M~~      6 potential error(s) (suspected false positives)
~~Dr.M~~                              (details:    C:\Users\eabichahine\AppData\Roaming\Dr.
Memory\DrMemory-DrMemoryTest.exe.10412.000\potential_errors.txt)
~~Dr.M~~      0 unique,    0 total,     0 byte(s) of still-reachable allocation(s)
~~Dr.M~~        (re-run with "-show_reachable" for details)
~~Dr.M~~  Details:  C:\Users\eabichahine\AppData\Roaming\Dr.  Memory\DrMemory-
DrMemoryTest.exe.10412.000\results.txt
```

- Memory leak test

```
int main(void)
{
	int * array = new int[10];

	return 0;
}
```

```
~~Dr.M~~ Dr. Memory version 1.7.0
~~Dr.M~~ Running "DrMemoryTest.exe"
~~Dr.M~~
~~Dr.M~~ Error #1: LEAK 40 direct bytes 0x00f600f8-0x00f60120 + 0 indirect bytes
~~Dr.M~~                #                0                replace_operator_new_array
[d:\drmemory_package\common\alloc_replace.c:2478]
~~Dr.M~~                                 #                              1                              main
[c:\users\eabichahine\desktop\drmemorytest\drmemorytest\main.cpp:5]
~~Dr.M~~
~~Dr.M~~ ERRORS FOUND:
~~Dr.M~~      0 unique,    0 total unaddressable access(es)
~~Dr.M~~      0 unique,    0 total uninitialized access(es)
~~Dr.M~~      0 unique,    0 total invalid heap argument(s)
~~Dr.M~~      0 unique,    0 total GDI usage error(s)
~~Dr.M~~      0 unique,    0 total handle leak(s)
~~Dr.M~~      0 unique,    0 total warning(s)
~~Dr.M~~      1 unique,    1 total,     40 byte(s) of leak(s)
~~Dr.M~~      0 unique,    0 total,     0 byte(s) of possible leak(s)
~~Dr.M~~ ERRORS IGNORED:
~~Dr.M~~      6 potential error(s) (suspected false positives)
~~Dr.M~~                              (details:    C:\Users\eabichahine\AppData\Roaming\Dr.
Memory\DrMemory-DrMemoryTest.exe.700.000\potential_errors.txt)
~~Dr.M~~      0 unique,    0 total,     0 byte(s) of still-reachable allocation(s)
~~Dr.M~~        (re-run with "-show_reachable" for details)
~~Dr.M~~  Details:  C:\Users\eabichahine\AppData\Roaming\Dr.  Memory\DrMemory-
DrMemoryTest.exe.700.000\results.txt
```