Additional Documentation Requirements

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Please include a description of your implementation. You should outline areas

1. in which you feel your solution could be improved given additional time and/or resources.
2. If you were unable to complete a valid solution in a reasonable amount of time (3-4 hours), list the areas you felt gave you the most trouble and some thoughts on what you've learned that you would apply to the problem on a second pass.
3. Be sure to include citations for any reference materials (including any discussions with other people regarding the problem) you used to assist you.

My code will be neater if I can use functions such as atoi(), itoa() or to\_string(). Unfortunately, there’s something wrong with my MinGW that keep warning “‘to\_string’ is not a member of 'std’”. I googled the problem but none of the solutions was useful. So I just implement simple versions of these functions myself. Meanwhile, I’m not sure whether we are allowed to add extra functions in the code so I didn’t wrap the duplicated codes in functions.

If I had more time, I’ll try to figure out whether it is a way to rearrange the memory pool after deallocate. I did try to do so but I found out that since the pointers in main() would not change automatically after defragment, therefore I set aside it.

I took around 3 hours to implement the basic function, and spent lots of time on testing and debugging for special cases. I was a little bit confused at the very beginning. When I first read the question, I thought I could use something like pages’ management to implement it since I’ve learnt the theory in my undergrad. But soon I found that we were not allowed to use global variables, and the pool was set to be a fixed array. Then I came up with an idea that I could store the size of the allocated memory in the first element of the array, but I noticed that the array is set to char, whose size of 1 element is not enough to store. Then I thought maybe I could store the size as a string, although it will be a little bit troublesome. But how do I know how much char should I take as the size after the allocate? I was a little bit stuck at that time, so I go through the MemoryManagerProblem.txt to find any hints. I’ve noticed that the output sample is 65530 and 65259. I was wondering why there is an offset of 6 from 65536 to 65530? When I looked at the number, I suddenly found out that “65536” is a 5-digit number. It means that the size of the allocated memory would not be larger than 5 digits. Hence, I could always use 5 elements to store the size. Considering the end of a string should always be 0, besides the original size of the allocated memory, it should be 6 more elements to store the extra information and make sure there’s an end of the string. Then I had the basic thought for implementation, and finally implemented it successfully. In addition, I took almost a night to input different test cases for testing and debugging. In this question there are lots of cases, while my first implement didn’t consider thoroughly. Most of the time I was be too greedy for the running speed, causing bugs eventually. I left all statements I used for testing and debugging as a comment in the code.

I didn’t understand the meaning of “\*int\_pointer = 0xDEADBEEF;”. I googled it and I guessed from this link: <http://stackoverflow.com/questions/5907614/0xdeadbeef-vs-null> that it’s going to set the element to Null. Since the size of the allocated data block is set to the 5 elements ahead of the memory, it won’t affect the function of free memory calculation.

I used to use VC++ 6.0 in my undergraduate, which is a really old version. When I got the question, I once tried to use VS 2015 to compile it. But soon I found out that I was using a sledgehammer to crack a nut. Therefore, I search another simpler way on Windows (Basically I used virtual machine of Linux to develop projects for CG course, but I’m still curious about other methods on Windows). Now I know how to run simple C++ codes on Windows without VC++ and VS. Below are several links I browsed:

<http://www.cnblogs.com/apollius/archive/2012/11/21/2781069.html>; <http://stackoverflow.com/questions/13958250/decltype-undeclared-in-mingw-g-4-7-2>; <http://stackoverflow.com/questions/16136142/c11-functionality-with-mingw>;