

Object-Oriented Programming Language

10/17/2018

Homework Assignment No. 5

Due 11:59 am, Monday October 22, 2018

~~Late submission within 24 hours~~ No late submissions for this HW: score*0.9;

~~Late submission within one week~~ No late submissions for this HW: score*0.8.

The solutions will be posted after ~~one week of the due date~~ Monday noon.

(Total 100%)

Please see [submission details] in the back of this document, or you will not be graded for this assignment.

1. (50%): Please extend Problem 2 in Lab 6, as required by the following main method. Observe from your operating system's activity manager/monitor to see the memory usage.

On the server, you can connect to the server with another terminal. Then you can use the **top** command to see memory usage, (in **top** mode, hit **shift + M** to sort by memory usage).

```
int main(){
    RandomArray::setSeed();
    int n = 5;
    RandomArray ra(n);

    while( n > 0 ) {
        ra.loadArray();

        std::cout << "How many elements do you want in your array? ";
        std::cin >> n;
        //ra.freeArray();
        ra.setSize(n);
    }
}
```

Please observe how your memory (RAM) usage changes when you consecutively ask for an array of 1000,000,000 integers. If you do not free the memory for the array, will you be using more and more memory?

What if you uncomment the line and free the array for each iteration of the while loop? Will you be asking more and more memory?

2. (50%): Please rewrite problem 1 with a shared pointer. Observe the memory usage when you ask for consecutive array of 1000000000 integers. Do you need to free the memory?

To use shared pointers for arrays, you can take a look at the file "shared_ptrArray.cpp" and

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copy and paste some of the code.

For this assignment, you need to submit your codes, as well as a .pdf document describing what you have learned. You can also include screenshots of the memory usages to help discuss what you see for memory change.

[submission details]

For your homework submissions, please name the folder by your student ID, and archive the whole folder into a .zip file (DO NOT use .rar or other format).

For example, the folder name is r07521503-HW4, and the file you upload is r07521503-HW4.zip.

For arrangement of files and folder structure, we require you to put the files of a single problem in a folder, and name the main file by the homework number and problem number.

For example:

```
r07521503-HW4/  
hw4_1/  
  hw4_1.cpp  
  Person.h  
  Person.cpp  
  PersonVector.h  
  PersonVector.cpp  
hw4_2/  
  hw4_2.cpp  
  Rectangle.h  
  Rectangle.cpp  
  Square.h  
  Square.cpp
```

Another Example (Please follow the rule if you have to upload any lab.)

```
r07521503-Lab4/  
lab4_1/  
  lab4_1a.cpp  
  lab4_1b.cpp  
lab4_2/  
  lab4_2a.cpp  
  lab4_2b.cpp  
lab4_3/  
  lab4_3.cpp
```