

CS 2100: Data Structures, Spring 2018

Homework 5

Please submit as usual *via git*

For this program, you'll modify the `Vector.h` and `testVector.cpp` files that are posted on the schedule page; *all* of the problems are designed to be added to that class. Please don't forget to add appropriate comments to the functions and to the main, as well.

1. Finish the function `void erase(int index)`. This is actually the same as our current `erase` function, expect for one difference. You will rewrite the function `erase` from our implementation of vectors so that if the number of elements gets below `capacity/4`, you shrink the array capacity by half. If this happens, all the elements copied into a new array of the appropriate size.
2. Write the function `void remove(Object val)` which takes as input a value of the correct type and removes the earliest occurrence of `val` in the vector. Note that this function does change the size.
3. Write the function `void replace(Object val1, Object val2)` which replaces all instances of `val1` in the vector with `val2`. Note that this function should replace ALL of the instances, not just the first one!
4. Write the function `void reverse()` which reverses the order of the vector's elements.
5. Finally, write a main function to test all of your functions. Please comment and output appropriately, so that by looking at your code and running your main, we can see exactly where and how you are testing each problem.
6. Extra credit: Write the function `void resize (int sz, Object c)`, which resizes the vector to contain exactly `sz` elements. If `sz` is smaller than the current vector size, the content is reduced to its first `sz` elements, the rest being dropped. If `sz` is greater than the current vector size, the content is expanded by inserting at the end as many copies of `c` as needed to reach a size of `sz` elements. This may cause a reallocation.

Notice that this function changes the actual content of the vector by inserting or erasing elements from the vector; it does not only change its storage capacity.