CS 251: Intermediate Software Design

Programming Assignment 2
Due Monday, Jan 28^{th}, 2008

The second assignment gives you an opportunity to use more advanced features of C++. In particular, a limitation of the `Array` class from the first assignment is that it only works on arrays of chars. To generalize this behavior, change the `Array` class to be a parameterized type by using C++ **templates**. Templates allow you to parameterize the class with the desired data type.

For this assignment, I would like everyone to ensure that your implementation of the `Array` class methods support strong exception handling guarantees, now that we've had a chance to discuss it a more. See `www.cs.wustl.edu/~schmidt/exceptions/` for good articles about C++ exception handling in general and strong exception guarantees in particular. Please let me know if you have any questions about how to use it properly in your program.

In addition, we'll now change the semantics of the array so that if you try to `set()` beyond the end of the array the array will grow automatically. We'll also add a `resize()` method that can be called to grow the array explicitly (I recommend using `resize()` in your implementation of `set()`.

I would like graduate students taking the class to implement STL-like iterators for the `Array` and to use STL algorithms to implement the methods in the `Array` class. Likewise, grad student solutions also need to ensure that the default value (if any) is used to initialize any new array elements when the `resize()` method is called. Support for these features are optional for undergraduate students taking the class.

You can get the "shells" for the program from `www.cs.wustl.edu/~schmidt/cs251/assignment2`. The Makefile, `main.cpp`, and `Array.h` files are written for you. All you need to do is edit the `Array.cpp` and `Array.i` files to add the methods that implement the Array ADT. Note that the definition of the methods in your `Array.cpp` and `Array.inl` files changed from assignment 1 to utilize the C++ template and exception syntax.

If you are enrolled in CS 251 as a graduate student please use the shells that are in the `grad` directory at the URL above. If you are enrolled in CS 251 as a undergraduate student please use the shells that are in the `ugrad` directory at the URL above.