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CS 2024: C++

Assignment 8: SimpleArray

CS 2024: Assignment 8 Report:

For this assignment we were asked to create a template class called SimpleArray that could be used to create arrays of various types. The requirements were that the template parameters would specify the types stored in the array and the size of the array. This way the size of the array would not change during the lifetime of the array. Also, the operator[] should be implemented to retrieve and store items at specified indexes in the SimpleArray. This operator[] function should also check whether the given index argument is valid, and if not, throw an exception.

This problem is solved by using a template class for SimpleArray. The SimpleArray class is defined by SimpleArray.cpp. SimpleArray uses a template that consists of a typename called StorageType and a size int to specify the size of the array. The SimpleArray class has a StorageType pointer that will store the array of StorageTypes. This is done to allow dynamic allocation of memory depending on what the size and type of the template is. Then we have the constructor which creates an array of StorageTypes whose size is specified in the template. This array is stored in the previously declared store variable. Finally, we have the operator[] function. The operator[] function returns the object found at a certain index in the array store of the SimpleArray instance. If the index is invalid, an exception is thrown within the function to print out that an error occurred.

To test my SimpleArray class, I created 3 instances of the SimpleArray class in the main method, each dedicated to ints, doubles, or chars. Then I store values in the arrays of the SimpleArray instances and then print out what is stored within. Finally, there is a test to see what happens if an invalid index is passed to the operator[] function.

This assignment taught me how template classes work. Template classes will prove useful in the future when working with multiple data types. In addition, it provided a small introduction into exceptions and exception handling. Finally, it provided more practice using pointers.