CS142 **Assignment 10** Spring 2025

Given: Fri, Apr 11
Due: Thu, Apr 17, 3:00 p.m.

1. (100%) Create a class `string` similar to the standard class. To avoid conflicts with the standard class, put your class in the namespace `CS142`. Include the following operations in your class. These operations are described in Section 3.2 of the notes.

   (a) A default constructor.

   (b) A constructor that takes a C string as argument. The characters of the constructed string should be copies of the characters of the C string.

   (c) A copy constructor. The characters of the constructed string should be copies of the characters of the other string.

   (d) A destructor.

   (e) The method `length()`.

   (f) An indexing operator.

   (g) The method `clear()`.

   (h) An output operator.

   (i) The version of the operator `+` in which both operands are `string` objects.

   (j) An assignment operator. The characters of the string on the left should be copies of the characters of the string on the right.

(k) The method `c_str()`. (This method should return a pointer to a C string that belongs to the `string` object.)

The easiest way to implement this class is to use an STL `vector` to store the characters of the string. But for the purposes of this assignment, *you are not allowed to do that*. Instead, you have to directly use a dynamically allocated array.

Note that the C++ standard requires that the internal array used by the class `string` must always contain a valid C string. For example, if the string is "hello", then the internal array must contain those characters followed by a null character. Do the same for your class.

Tip: When implementing most of these operations, draw pictures!

Split your class into header and implementation file in the usual way. Submit your test driver. Make sure to test every operation.