Project 2. Object-Oriented C

In directory /comp/150C++/project2/ are some source files that implement a “rope” data type, which is intended to hold very long sequences of characters. They define a class Rope which supports the following operations:

- a constructor to create a rope from a char array;
- a constructor to create a rope from a literal string;
- a method to append one rope to another;
- a method to count the number of characters in a rope;
- a method to extract a subsequence of characters from a rope.

The source code for everything but the extraction method is present. Your job is to write the missing code.

Project 2 is a very much scaled-down, partial implementation of the “rope” idea, intended only to illustrate the use of “action elements” or “operations” in data structures. When methods operate on individual instances of Rope, the exact steps they perform depend on what kind of instance is at hand. All the possible steps to be performed are represented as distinct functions. Each object incorporates a set of pointers to the functions or methods that are appropriate to itself. To perform an action on a node, one makes an indirect function call through the appropriate pointer. Whenever a node undergoes a structural change, any of those pointers that need to be different are changed.

Your main task in this project is to study the source code and understand how it works. Then write the bodies for the functions “get_chars_direct,” “get_chars_indirect,” and “get_chars_recursive.”

Store your code in a file “rope2.cc” and use the Makefile supplied to compile it into one or more test programs. The test program “decode.cc” is internally documented. There is also a smaller demonstration program “demo.cc” to help you get started.

You should use an approach that is consistent with the code that is provided, and you should rely on the provided routines wherever you can. And of course you are expected to produce code that is completely correct.

Submit your file by Tuesday, March 2 at 5:00 p.m. using this command:

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provide 150C++ project2 rope2.cc
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