Homework 6 – Hash Map

C++ II

Description

For this assignment we will repeat homework 5 using a hash table.

Specifications

You will need to complete the following:

1. Write an implementation of the hash_map class using a hash table.
2. Use the hash_table we created in class as a starting point.
3. This implementation of the hash_map should have the same behavior as the map class created in homework 5 except for the iterators. The hash_map class will not have iterators.
    a. The struct will need to templated values a K key and a V value.
    b. You will need the following methods (same as the map class)
    c. remove(k key)
    d. The contains methods
        i. contains_key(K key) which return true if the key exists in the map, otherwise false.
        ii. contains_value(V value) which returns true if the value exists in the map, otherwise false.
    e. insert(K key, V value) if the key is already in the map, then replace its values with the one given.
    f. get(K key) which returns the value associated with the key. If the key does not exists in the tree, then throw an exception – length_error would be fine in the case (included in <stdexcept>)
    g. Override the subscript [] operator so that it can be used to change a value or get a value. Something like map_identifer[key_value] = value or V value = map_identifier[key_value];
4. In the main method, instantiate your hash_map class and fill it with 50 random char and double values (map<char, double> values; Test all the methods (including the subscript operator) to show they work as expected. When you pass the hash_map to the stream insertion operator, it should display the key value pairs in the order they are stored in the backing array skipping all empty places.

Documentation

You will create a document (.docx, .rtf, .pdf) which contains the following:

- Your name and assignment.
- A screenshot of your code output.
- Explain in detail the different use cases for our map vs hash_map. When would we use one over the other?

- What does the hash_map class not have iterators?
- In class we discussed quadratic probing. Do a bit of research and explain linear probing and separate chaining.

What to Submit

You need to submit your C++ code files along with your document. Make sure your document is in the correct format and all your files include your name and assignment. ***ZIP*** your C++ code, but **DO NOT** zip your document file.