

CSC 2201: Computer Science II – Lab Lab10

Description:

You will implement Hash Tables.

Goals:

Learn how to implement Hash Table ADT with linked data structures using C++ pointers.

Book Reference:

Please read chapter 10 on the lab book carefully.

Where to Start:

1. Download Lab10_Work.zip from Blackboard
2. Unzip the file
3. Open the solution in Microsoft Visual Studio
4. Make sure that the project does not show any compile errors.
5. Implement methods and operations of the HashTable class:

```
5.1 Implement HashTable<DataType, KeyType>::HashTable(int initTableSize)
    // Constructor of the class
    // Initiate a size of the hash table and assign it
```

```
5.2 Implement HashTable<DataType, KeyType>::HashTable(const HashTable&
source)
    // Copy Constructor
    // Use copyTable() function to do this one
```

```
5.3 Implement HashTable<DataType, KeyType>::operator=(const HashTable&
source)
    // Assignment operator
    // Use copyTable() function to do this one
```

```
5.4 Implement void HashTable<DataType, KeyType>::copyTable(const
HashTable& source)
    // Copy the hash table 'source' into hash table 'this'
```

```
5.5 Implement HashTable<DataType, KeyType>::~~HashTable()
    // Frees the memory used by a tree.
```

5.6 Implement `void HashTable<DataType, KeyType>::insert(const DataType& newDataItem)`
// Inserts newDataItem into a hash table

5.7 Implement `bool HashTable<DataType, KeyType>::remove(const KeyType& deleteKey)`
// Remove the dataitem marked by the deletekey from the hash talbe
// Return true/false accordingly

5.8 Implement `bool HashTable<DataType, KeyType>::retrieve(const KeyType& searchKey, DataType& returnItem) const`
// Search for the dataitem marked by the searchkey
// Return true/false accordingly

5.9 Implement `void HashTable<DataType, KeyType>::clear()`
// Clear the hash table and free the memory

5.10 Implement `bool HashTable<DataType, KeyType>::isEmpty() const`
// Returns true if a tree is empty. Otherwise returns false.

6. Test your implementation using the program in the file test9.cpp.

7. Output:

```
Commands:
H : Help <displays this message>
+x : Insert (or update) data item with key x
-x : Remove the data element with the key x
?x : Retrieve the data element with the key x
E : Empty table?
C : Clear the table
Q : Quit the test program

0:
1:
2:
3:
4:
5:
6:

Command: +1
Inserted data item with key <1> and value <1>
0: 1
1:
2:
3:
4:
5:
6:

Command: +2
Inserted data item with key <2> and value <2>
0: 1
1: 2
2:
3:
4:
5:
6:

Command: +3
Inserted data item with key <3> and value <3>
0: 1
1: 2
2: 3
3:
4:
5:
6:

Command:
```

```
Command: +3
Inserted data item with key <3> and value <3>
0: 1
1: 2
2: 3
3:
4:
5:
6:

Command: -1
Removed data item with key <1>
0:
1: 2
2: 3
3:
4:
5:
6:

Command: -2
Removed data item with key <2>
0:
1:
2: 3
3:
4:
5:
6:
```

Create a Zip file of your solution:

1. Right click on your solution in Solution Explorer
2. Click on "Open Folder in File Explorer"
3. Go one level up in file explorer
4. Right click on your solution folder
5. Add it to archive by creating a zip file

Upload the zipped file on Blackboard:

1. Go to Blackboard
2. Click on this course (CSC 2201: Computer Science II Lab)
3. Go to the folder "Labs"
4. Click on the "Lab9_Work" assignment
5. Upload your zipped file