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LAB WORK 12

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Objectives:

- The Hash Table, Map ADT

The Hash table data structure stores elements in key-value pairs where. Key- unique integer that is used for indexing the values. Value - data that are associated with keys. Hash function is used by hash table to compute an index into an array in which an element will be inserted or searched.

std::map (Map) is an associative container that store elements in key-value pair. It stores only unique keys and that too in sorted order based on its assigned sorting criteria. As keys are in sorted order therefore searching element in map through key is very fast i.e. it takes logarithmic time.

Question 1. You are expected to perform the following steps regarding the hash table.

Step 1. Initialize the table size table_size to some integer value (for example const int table_size = 200).

Step 2. Create a structure hashTableEntry to declare key k and value v.

Step 3. Create a class hashMapTable.

Step 4. Create a constructor hashMapTable to create the table.

Step 5. Create a hashFunc() function which return key mod table_size.

Step 6. Create a function Insert() to insert element at a key.

Step 7. Create a function SearchKey() to search element at a key.

Step 8. Create a function Remove() to remove element at a key.

Step 9. Call a destructor hashMapTable to destroy the objects created by the constructor.

Step 10. In main, perform switch operation and enter input as per choice.

Step 11. To insert key and values, call insert().

Step 12. To search element, call SearchKey().

Step 13. To remove element, call Remove().

Example Output:

```
1.Insert element into the table
2.Search element from the key
3.Delete element at a key
4.Exit
Enter your choice: 1
Enter element to be inserted: 1
Enter key at which element to be inserted: 1


1.Insert element into the table
2.Search element from the key
```

3.Delete element at a key
4.Exit
Enter your choice: 1
Enter element to be inserted: 2
Enter key at which element to be inserted: 2

1.Insert element into the table
2.Search element from the key
3.Delete element at a key
4.Exit
Enter your choice: 1
Enter element to be inserted: 4
Enter key at which element to be inserted: 5

1.Insert element into the table
2.Search element from the key
3.Delete element at a key
4.Exit
…

Question 2.

Step 1. Define mapOfWords

Step 2. Insert element in mapOfWords

Step 3. Try adding an element that was added to mapOfWords before and check the result.

Step 4. Find an element in mapOfWord.

Step 5. Show outputs.

Example Output:

earth :: 4
moon :: 2
sun :: 3

Element with key ‘earth’ not inserted because already existed.

word ‘sun’ found.

word ‘mars’ not found.

Good Luck!