Name:

Course:	CS 355	Assignment Number:	8
Semester:	Fall 2012	Assignment Type:	Homework 6

Assignment Description:	You will create a template Hash Table
Assignment Due Date:	Tuesday, October 23, 2012 (first half of class)
To Be Included in Portfolio:	YES

Total Grade: Implementation (60), Test Cases (20), and Analysis (20)

Write a template Hash Table. This hash table should have the following operations:

1. Constructor: The constructor should take in as a parameter the number of keys to be stored in the hash table. You should dynamically create your array such that the size of the hash table is roughly twice the size of the parameter and is prime.
2. Dynamic Memory Methods: Copy constructor, Assignment Operator, and Destructor to handle dynamic array
3. Show Fill: Print a "picture" of the table to demonstrate how the table is filled. You may simply print X's where slots are taken as opposed to the actual data values.
   void ShowFill()const;
4. Print: Print the location values and data of slots taken.
   void ShowContents()const;
5. Insert: Insert a key by h(x) = x % tablesize; Return the number of slots hit before a slot is found. Should return 1 if hits actual hashed slot.
   int Insert(T key);
6. Remove: Remove a key. Return the number of slots hit before finding the slot to remove. If not found, return 0 or the negative of the number of slots that had to be searched before removing.
   int Remove (T key);
7. Search: Search for a key. Return the number of slots hit before finding the slot of the key. If not found, return 0 or the negative of the number of slots that had to be searched before removing.
   int Search(T key);
8. Collision: Taking in the original hashed slot, and the number of times you have tried to find a slot, determine the next slot for the new key. Use linear probing for collision handling.
   int NewSlot(T HashVal, int trynumber)

Write a driver that mimics the driver I gave you for the BST. Remove any items that no longer make sense. The Collision method will be tested through Insert and no extra call is needed in the driver. Add 'Z' to the menu for ShowFill. There can be a private method called IsPrime written for use in the constructor.

Test Case Requirements Met:
____ created at least one test case for each method
____ test cases showed methods were correct

Analysis Requirements Met:
____ Clear and correct communication
____ Reasonable/correct answers and justifications

Name:

Course: CS 355

Semester: Fall 2012

Assignment Number: 8

Assignment Type: Homework 6 – Test Cases

Assignment Description: Create Test cases for each of the methods. You should show enough test cases to demonstrate the method works. Be sure to think about special cases. Try to break your code.

Assignment Due Date: Tuesday, October 23, 2012 (first half of class)

To Be Included in Portfolio: YES

Test Case 1

Date/Time:	Expected Result	Actual Result	Action needed (Yes/No)

Test Case 2

Date/Time:	Expected Result	Actual Result	Action needed (Yes/No)

Name:

Course: CS 355

Semester: Fall 2012

Assignment Number: 8

Assignment Type: Homework 6 - Analysis

Assignment Description: Carefully answer the questions below. Be sure you answer in complete sentences and with correct grammar. The space provided is not an indicator for the space needed to answer the question.

Assignment Due Date: Tuesday, October 30, 2012 (beginning of class)

To Be Included in Portfolio: YES

Question 1: Create a separate driver that tests your Hash Table with a data set of size 10, 50, 100, 1000, 10,000. Making use of the integer values returned from the insert, remove, and search methods, justify that those routines have runtimes of O(1). Feel free to show tables in Excel or generate them with your new statistical driver.