AC21008 – Assignment 1 Report: Chained Hash Tables

**Problem Specification**

The chained hash tables will make use of the built in C++ arrays mechanism and the vector standard library. The table will be of length 100 and will store these 100 elements in an array, with each array element being a vector that can be independently resized to hold additional integer values with the default vector size being zero.

The chained hash table requires a hash function that will sort the hash value to the appropriate element of the array and then insert the value into the vector alongside incrementing the size by 1. The hash function is Value = key % 100

A new instance of the hash table is created by calling the constructor whenever the program is first run before the menu function is executed. The programs menu system runs on a continuous basis allowing the user to select a character from the keyboard and execute the appropriate function based on that input indefinitely until they choose to exit the program. In addition, it will prompt for further information when required such as input for a value as type integer.

**Code Overview**

The code was broken down into the following methods. The first set of methods belongs to the hash class and the second set belongs to the main.

CalculateHashValue*: Takes an integer value as a parameter, converts the value to a integer key and returns key*

Insertion: *Takes 2 integers, key and value and inserts the value into the table at key element.*

Deletion: *Takes 2 integers, key and element. Checks vector size of key is bigger than zero, if not then returns message with no element to delete else remove element and reduces size by 1.*

Lookup*: Takes integer element as parameter, then searches table for value and if value is present then returns true, else if it’s not present false is returned.*

SizeOfTable: *Calculates the size of the table and returns an integer of the table size.*

Print: *This is a void function which uses standard output to print the current state of the grid.*

Menu: *This function takes no parameters and returns and integer when program has ended successfully. It is the function that calls the other functions. It starts by initialising a new instance of hash and calls the menu in a do while loop that only exits when uses selects to exit.*

InputElement: *No parameters, uses standard input to read in an integer value and return it.*

**Analysis**

The program was easy to write after the initial difficulties of learning how to correctly write the syntax for an array of vectors and make it accessible across the scope of the class. To accomplish this I passed the hash table as a parameter whenever a method was called that was not in the scope of the table. Without doing this, the alternative would have been to code my menu and input methods inside the main function which would have resulted in additional repetition of code. The program can correctly evaluation upper and lower case characters when input is required from the main menu however only integers will be accepted whenever a value is to be input. Other than this I believe the code is all correct and working when any menu item is selected or integer is entered.