**Section 1, Task A:**

**Hash Tables**

A hash table is a type of data structure that employs key-value pairs. The key is a handle that is unique to each element (like a primary key in a database). A method to Add/Insert always requires the (key,value) pair to function. Get(key), Update(key,value), and Remove/Delete(key) are other methods that are required to have a working hash table. A Hash function accepts a key as input and tells where to look. All hashing methods use a hash code/hash function denoted by h. If k is a random key, then there will be no collisions, and h(k) is the address of a position in the hash table. An instance of a collision is when there is more than one record of h(k). This cannot happen and as a result a collision will occur [1].

**Collision Resolution**

There are two ways to handle a collision, chaining and open addressing.

**Chaining:** When an element in the table already contains that key, the second element is saved in the linked list which is found within that key. To retrieve the element, the linked list is traversed until the key is found.

**Open Addressing:** On the contrary to chaining, when there is a collision, with open addressing the item is moved to a different location in the table. To search an element, the table needs to be searched to find the key.

**Bibliography**

[1] W. D. Maurer and T. G. Lewis, “Hash table methods,” *ACM Computing Surveys*, vol. 7, no. 1, pp. 5–19, 1975.

Section 6: Code Screenshot

