CSCI 3333 Homework: Hash Tables

1 Chaining

For Problems 2 and 3, assume that insertion into a linked list occurs at the tail, the hash function used is \( h(i) = i \mod l \), and that initially \( l = 4 \).

**Problem 1.** What is the load factor of the hash table seen in Figure 1?

![Figure 1: The hash table in Problem 1.](image)

**Problem 2.** Draw the chaining hash table that results from inserting the following elements: 3, 8, 2, 7, 40, 44, 50.

**Problem 3.** Draw the chaining hash table that results from the following operations: `insert(5)`, `insert(9)`, `erase(5)`, `insert(20)`, `insert(22)`, `insert(30)`, `erase(9)`, `erase(22)`, `erase(30)`, `insert(40)`, `insert(50)`.

2 Linear Probing

For Problems 5 and 6, assume that the hash function used is \( h(i) = (i + 1) \mod l \), and that initially \( l = 3 \).

**Problem 4.** What is the load factor of the hash table seen in Figure 2?

![Figure 2: The hash table in Problem 4.](image)

**Problem 5.** Draw the linear probing hash table that results from inserting the following elements: 3, 7, 11, 19, 40, 44, 50.

**Problem 6.** Draw the linear probing hash table that results from the following operations: `insert(5)`, `insert(9)`, `erase(5)`, `insert(20)`, `insert(22)`, `erase(9)`, `erase(22)`, `insert(30)`, `insert(32)`, `insert(50)`, `erase(20)`.