

1. Define the following terms pertaining to hash tables:
  - (a) Bucket
  - (b) Hash function
  - (c) Table
  - (d) Collision
  - (e) Collision resolution strategy
2. Suppose you have an empty hash table with size 5. The hash function used simply adds the ASCII values of the characters in a string, then mods by the table size, i.e.,  $h(k) = \sum_{i=0}^n c_i \bmod 5$ , where  $c_i$  is the  $i^{\text{th}}$  character in the string, which has length  $n$ . Show the hash table after inserting the strings “quick”, “brown”, and “fox”, using the following collision resolution strategies:
  - (a) Open addressing with linear probing
  - (b) Chaining via linked lists

*Hint:* The ASCII value of lowercase ‘a’ is 97.

3. What is the runtime of each of the following C loops?

- (a) 

```
for(int i = 0; i < 10; i++) {  
  
}
```
- (b) 

```
for(int i = 0; i < n; i *= 2) {  
  
}
```
- (c) 

```
for(int i = 0; i < n; i++) {  
    for(int j = 0; j < n; j += 2) {  
  
    }  
}
```