CSE 332: Data Structures and Parallelism

Section 5: Hashing and Sorting

0. Hash... Browns?

For the following scenarios, insert the following elements in this order: 7, 9, 48, 8, 37, 57. For each table, TableSize = 10, and you should use the primary hash function $h(k) = k \bmod 10$. If an item cannot be inserted into the table, please indicate this and continue inserting the remaining values.

(a) Linear Probing

0	
1	
2	
3	
4	
5	
6	
7	
8	
9	

(b) Quadratic Probing

0	
1	
2	
3	
4	
5	
6	
7	
8	
9	

(c) Separate chaining hash table - Use a linked list for each bucket. Order elements within buckets in any way you wish.

0	
1	
2	
3	
4	
5	
6	
7	
8	
9	

1. Double Double Toil and Trouble

(a) Describe double hashing.

(b) List 2 cons of quadratic probing and describe how one of those is fixed by using double hashing.

2. Sorting Hat

Suppose we sort an array of numbers, but it turns out every element of the array is the same, e.g.,{17, 17, 17, ..., 17}. (So, in hindsight, the sorting is useless.)

(a) What is the asymptotic running time of insertion sort in this case?

(b) What is the asymptotic running time of selection sort in this case?

(c) What is the asymptotic running time of merge sort in this case?

(d) What is the asymptotic running time of quick sort in this case?