

Section 5: Hashing & 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 $h(k) = k$.

a) Linear Probing -
Insertion

0	
1	
2	
3	
4	
5	
6	
7	
8	
9	

Linear Probing -
Delete 37, 7, 57

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 an unsorted linked list for each slot.

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.
- c) Compare open addressing and separate chaining.

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?