

Hashing Exercise

Given a hash table with size $m = 13$ buckets and the hash function $h(\text{string}) = \text{the number of characters times two}$. For example:

$$h(\text{"hat"}) = 3 \times 2 = 6.$$

With i equals to the number of collisions, perform hashing with linear probing for the key x with the probing, namely,

$$(h(x) + i) \bmod m,$$

—quadratic probing
→ $(h(x) + i^2) \bmod m$

with open addressing.

Update the hash table on the right according to the commands on the left :

Commands:

```
insert("apple")
insert("orange")
insert("durian")
insert("mango")
insert("salt")
insert("milk")
insert("cake");
delete("orange")
insert("tart")
delete("durian")
insert("pineapple")
delete("tart")
delete("milk")
```

Index	Hash Table Contents					
0	Null	~durian				
1	Null	cake				
2	Null					
3	Null					
4	Null					
5	Null	pineapple				
6	Null					
7	Null					
8	Null	salt				
9	Null	~milk				
10	Null	apple				
11	Null	mango				
12	Null	~orange ~+tart				

Note that it is not chaining. The space on the "right" of "Null" is just for your "replacement"/keeping track of the contents. You just need to cross out a word if it's deleted.

After all the above operations, if we search for "rice", what is the index of the last hash table entry that the searching visited before telling us that "item not found"?

The index of the last hash table entry = 2.