

Hashing Lab

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1. Given the following key values, show what the data structures would look like after insertions 27 53 13 10 138 109 49 174 26 24

(no preprocessing necessary: $p_k = key$)

a. Linear array of 10 elements using division hashing and the linear-quotient collision path algorithm

$$N = 13, 4k+3 \text{ prime} = 19$$

LQHashing:

- 1. $i_p = pk \% N$
- 2. q=pk/N

if (q%N != 0)

offset = q

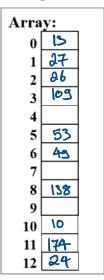
else

offset = 4k+3 prime

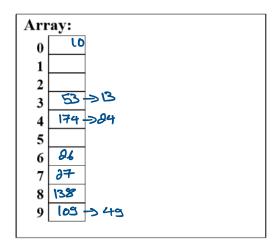
3. While collisions:

$$ip' = (ip + offset) \% N$$

4. Set Array[ip]=key



b. Bucket hashing of 10 elements (N=10) $i_p = (p_k) \% N$



2. Fill in the table based on exercise 1

Number of comparisons to retrieve this element

Key	Linear array - (Length of Collision Path +1)	Buckets - (# of elements in linked list compared)
53	2	O
138	1	0
109	4	0
49	4	1
174	2	0
26	2	0