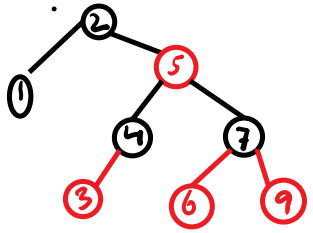

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CS 201 Data Structure II (L2 / L5)

Quadratic Probing

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Quadratic Probing

- h(x) = x mod size

- Elements: {14, 82, 44, 3, 89, 76, 4, 64, 84, 45}
- Size = 20

- Identify index of each element using linear probing
  - h’(x,i) = h(x) + i

- Identify index of each element using quadratic probing
  - h(x, i) = (h(x) + i^2) mod size

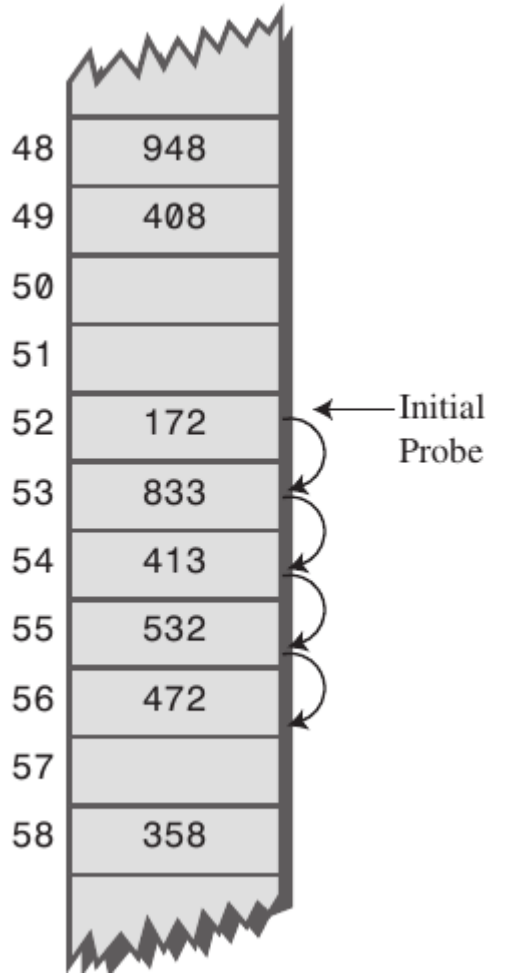
Quadratic Probing

- Elements: {14, 82, 44, 3, 89, 76, 4, 64, 84, 45}
- Size = 20
- h(x) = x mod size
- h(x, i) = (h(x) + i^2) mod size

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Linear		82	3	44	4	64	84	45	89					14		76				
Quad		82	3	44	4	45		64	89				84	14		76				

Primary Clustering

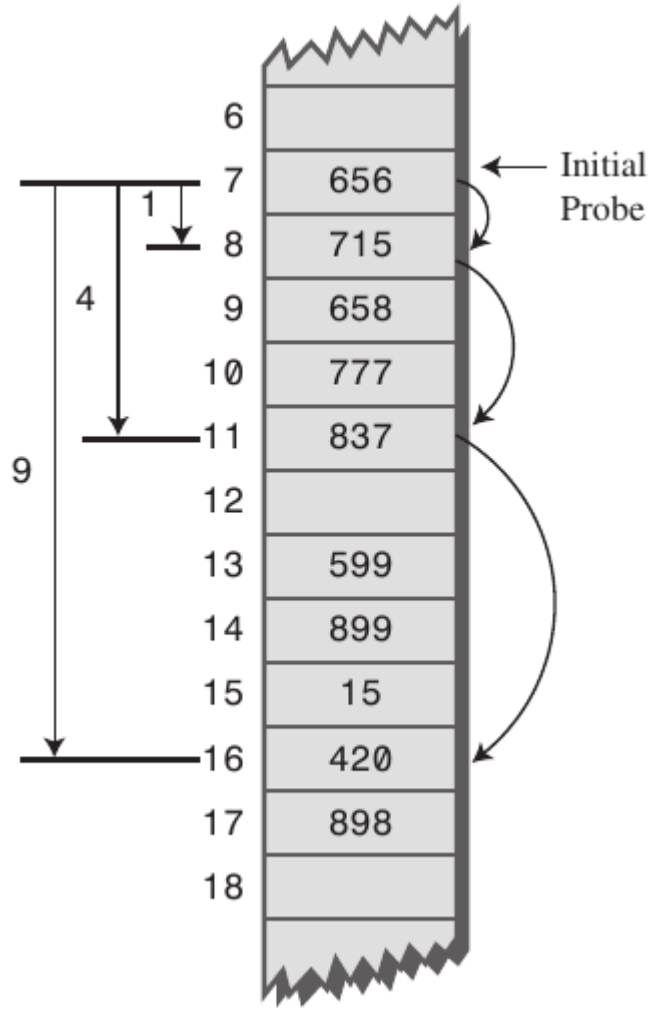
- Primary clustering is the tendency for a collision resolution scheme such as linear probing to create long runs of filled slots near the hash position of keys.
- If the primary hash index is x, subsequent probes go to x+1, x+2, x+3 and so on, this results in Primary Clustering.
- Once the primary cluster forms, the bigger the cluster gets, the faster it grows. And it reduces the performance.



https://stackoverflow.com/questions/27742285/what-is-primary-and-secondary-clustering-in-hash

Secondary Clustering

- Secondary clustering is the tendency for a collision resolution scheme such as quadratic probing to create long runs of filled slots away from the hash position of keys.
- If the primary hash index is x, probes go to x+1, x+4, x+9, x+16, x+25 and so on, this results in Secondary Clustering.
- Secondary clustering is less severe in terms of performance hit than primary clustering, and is an attempt to keep clusters from forming by using Quadratic Probing. The idea is to probe more widely separated cells, instead of those adjacent to the primary hash site.



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