Primary Clustering

primary clustering - this implies that all keys that collide at address b will extend the cluster that contains b

Problem: Give an example of primary clustering with the Linear Probing example

Secondary Clustering

secondary clustering - is when adjacent clusters join to form a composite cluster

Problem: Give an example of secondary clustering with the Linear Probing example

Problem

Let us consider the previous example where we inserted the keys M13, G7, Q17, Y25, R18, Z26, and F6.

Given a new key K to be inserted into the hash table using h(Kn) = n mod 11,

1) what is the chance of location 9 being filled with K?

2) What is the chance of location 0 being filled with K?

Collision Handling Analysis

In analyzing a given hash method and collision handling technique, it is good to compute the average number of probes necessary to find an arbitrary key K.

avg = (summation of the # of probes to locate each key in the table) / # of keys in the table

Problem: For the previous hash method and linear probing, compute the average number of probes to find an arbitrary key K

Chaining

Chaining - collisions are handled using chains (linked lists) when a collision happens at a particular address

i.e. we maintain M linked lists, one for each possible address in the hash table

More chaining

Given some key K hashes to address b (i.e. b = h(k)), key K is placed at the front of the linked list

Now if b=h(K'), then we place key K' at the front of the linked list so the list now contains K and K'

Problem

Hash the keys M13, G7, Q17, Y25, R18, Z26, and F6 using the hash formula h(Kn) = n mod 9 with the following collision handling technique: (a) linear probing, (b) chaining

Compute the average number of probes to find an arbitrary key K for both methods.