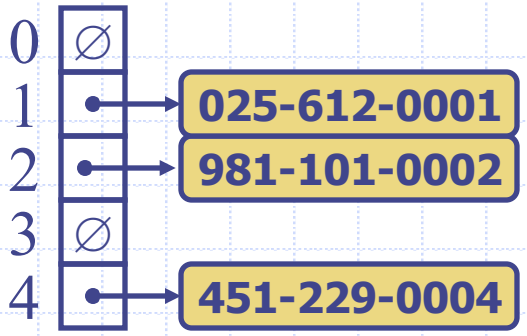
Hash Tables 3



Collision Handling
Concept

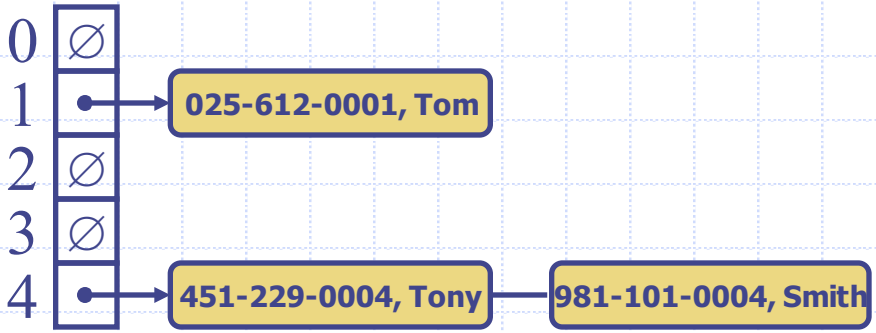
- What if two records (k1, v1) and (k2, v2) have the same hash value,
  - i.e. h(k1) == h(k2) = **i**
- We have collisions when different records are mapped to the same location.
  - In this case, record(k1,v1) and record(k2, v2) both want to be stored at the index **i** in the container array.

First Approach to Handling Collision

- Separate Chaining: let each cell in the array point to a linked list of records that map there.
- Separate chaining is simple, but requires additional memory outside the table

Collision Handling

1 Separate Chaining



- Each element in the array is a linked list object.
- In the example above,
- If hash value is the last 4 digit of SSN(the keys), then
  - Record (451-229-0004, Tony) and record(981-101-0004, Smith) both have hash value of 4.
  - Then we store these two records in a linked list, and save the linked list object at the index 4 of the array.

Collision Handling

1 Separate Chaining

- First let us talk about the logic ideas about how to add a new record into the Hash table, and how to delete an existing record from the table, and how to retrieve the value associated with a given key.
- Then let us look at the implementation using Separate Chaining.
- The demo code has been posted on canvas under Files→Demo→D17_HashTableImplementation.zip