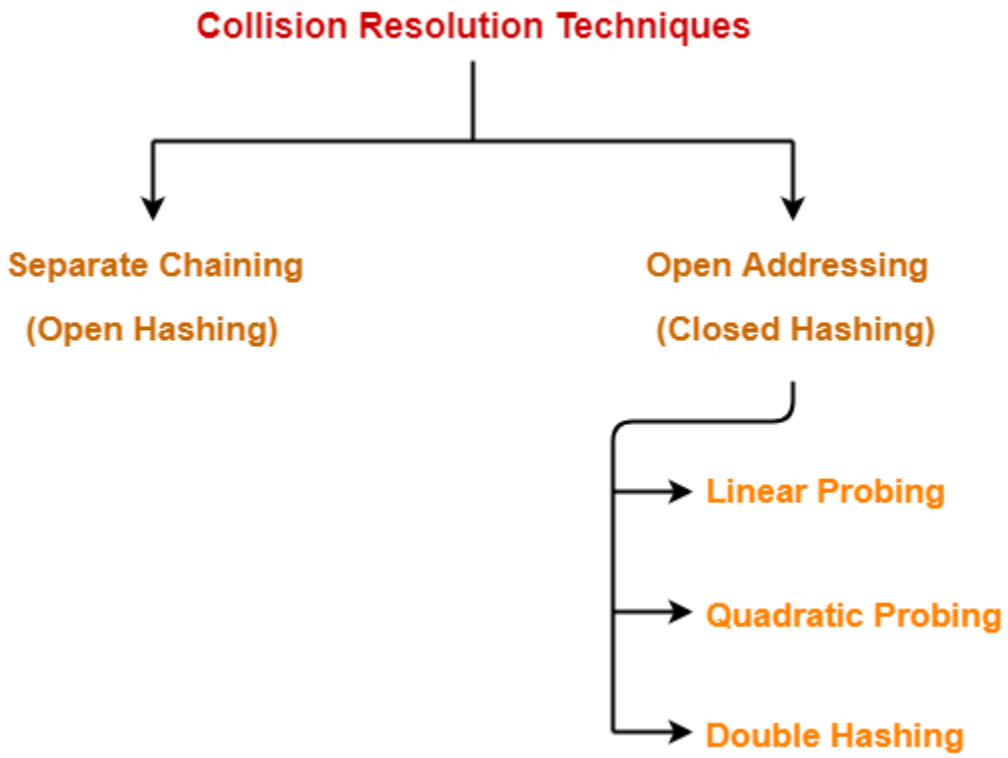
Hashing Collision

- Hash function may return the same hash value for two or more keys.
- When the hash value of a key maps to an already occupied slot of the hash table, it is called as a Collision.

Collision Resolution Techniques-

Collision Resolution Techniques are the techniques used for resolving or handling the collision.

Collision resolution techniques are classified as-

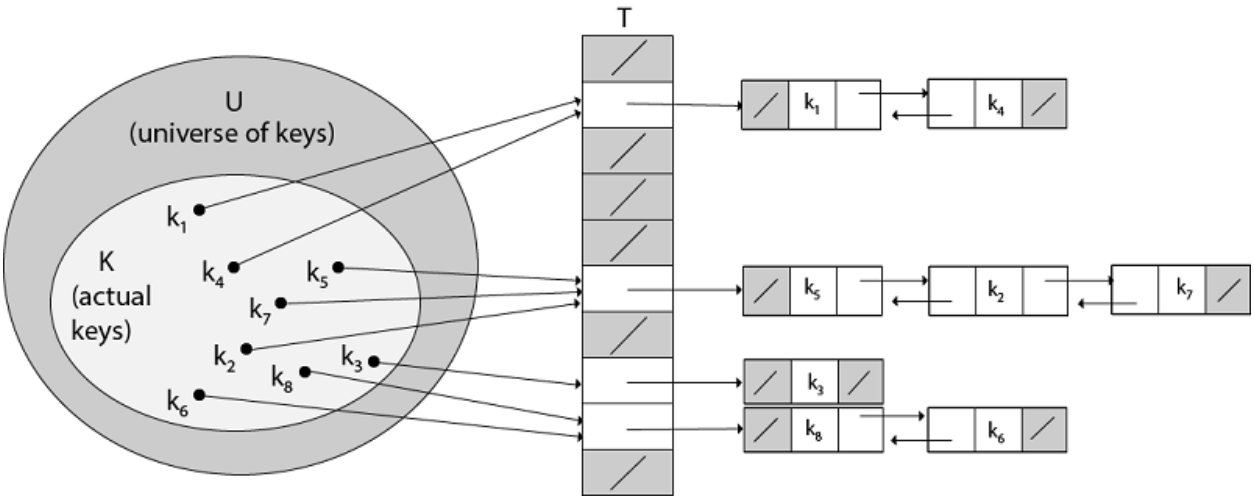


1. **Separate Chaining:**

- This technique creates a linked list to the slot for which collision occurs.

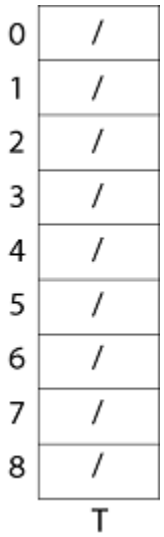
- The new key is then inserted in the linked list.
- These linked lists to the slots appear like chains.
- That is why, this technique is called as **separate chaining**.

In chaining, we place all the elements that hash to the same slot into the same linked list, As fig shows that Slot j contains a pointer to the head of the list of all stored elements that hash to j ; if there are no such elements, slot j contains NIL.



Example: let us consider the insertion of elements 5, 28, 19,15,20,33,12,17,10 into a chained hash table. Let us suppose the hash table has 9 slots and the hash function be h (k) =k mod 9.

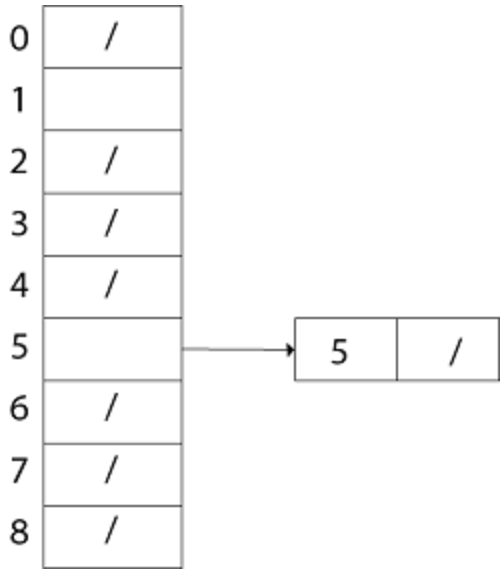
Solution: The initial state of chained-hash table



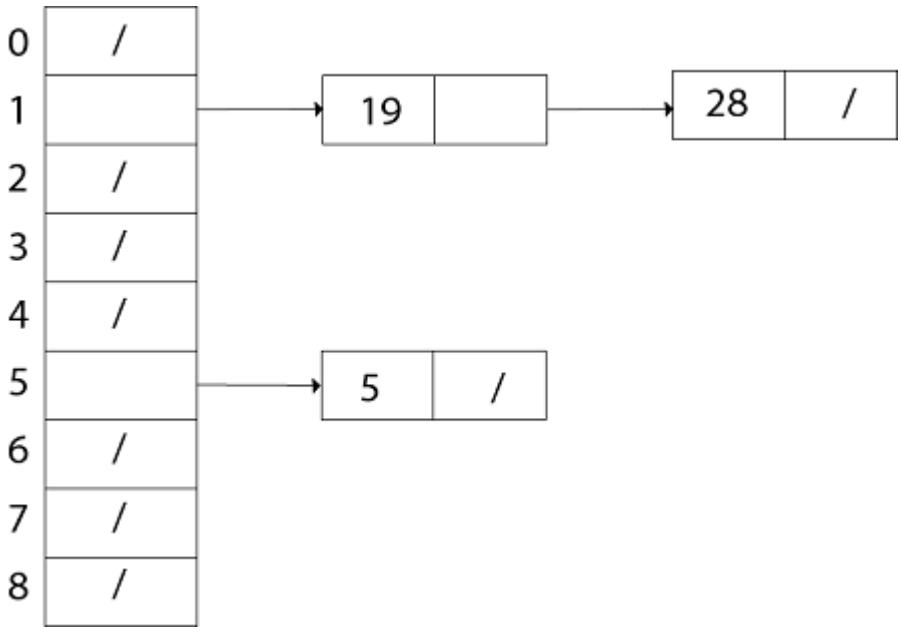
Insert 5:

1. h (5) = 5 mod 9 =5

   Create a linked list for T [5] and store value 5 in it.



Similarly, insert 28. h (28) = 28 mod 9 =1. Create a Linked List for T [1] and store value 28 in it. Now insert 19 h (19) = 19 mod 9 = 1. Insert value 19 in the slot T [1] at the beginning of the linked-list.



Now insert h 15, h (15) = 15 mod 9 = 6. Create a link list **for** T [6] and store value 15 in it.

Similarly, insert 20, h (20) = 20 mod 9 = 2 in T [2].

Insert 33, h (33) = 33 mod 9 = 6

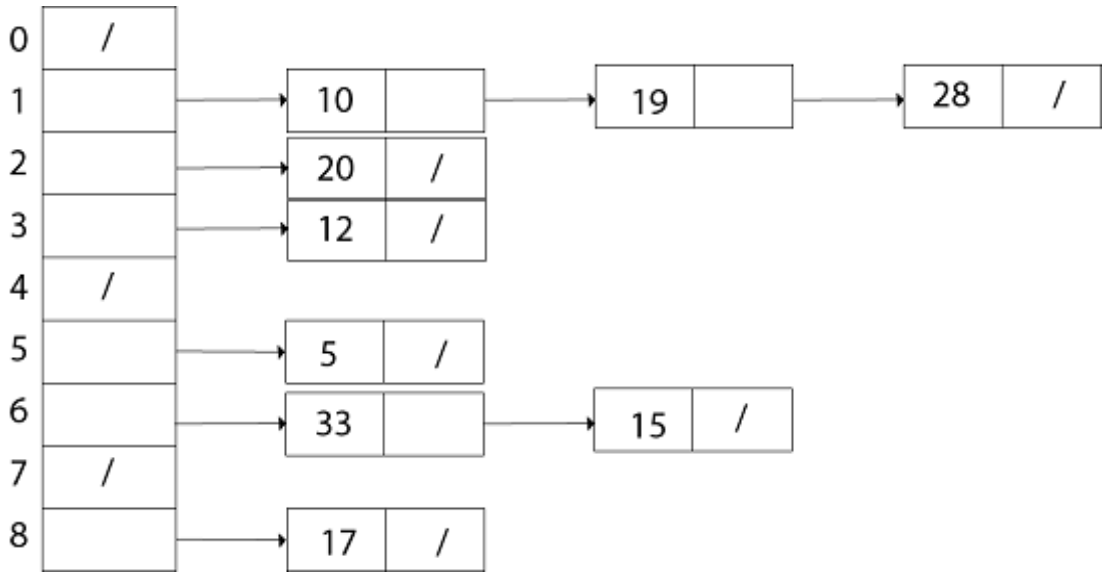
In the beginning of the linked list T [6]. Then,

Insert 12, h (12) = 12 mod 9 = 3 in T [3].

Insert 17, h (17) = 17 mod 9 = 8 in T [8].

Insert 10, h (10) = 10 mod 9 = 1 in T [1].

Thus the chained- hash- table after inserting key 10 is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