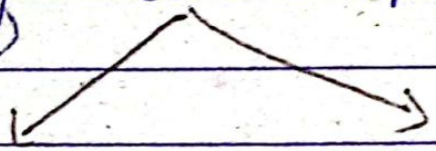
HashMap

→ It is a type of Data Structure which stores <key, value> pair data.

→ In C++, we have two types of HashMap



Ordered map

Take O(log n) TC for Insertion, deletion, searching

Unordered Map.

Take O(1) TC for Insertion, Deletion Searching

cout << mpp[" "] << endl

↓

If element not exist in hashmap, But we try to print corresponding value,

So it creat entry into map. Add 0 corresponding its key.

Unordered Map → Implement via BST

Implementation

→ Linked list → O(n)

→ BST → O(logn) Average case TC

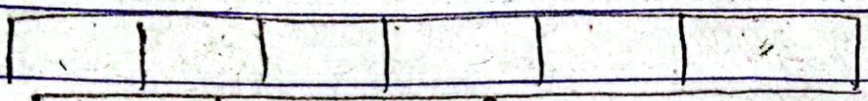
→ Balanced BST → for sure O(logn)

→ Array → If i know value, so go at O(1) TC

↓

Bucket Array

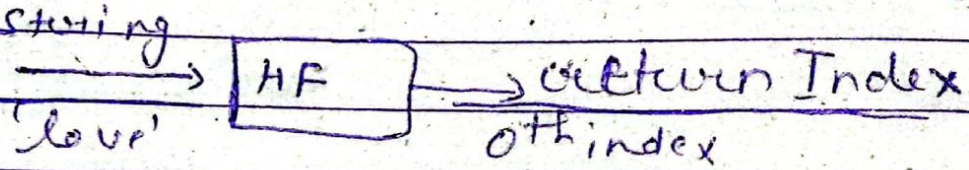
love hello Ak → How we can map this sting to index



'a' 'b' 'c' 'd'

char[ch-'a']++

There is a term called Hash function



Hash function

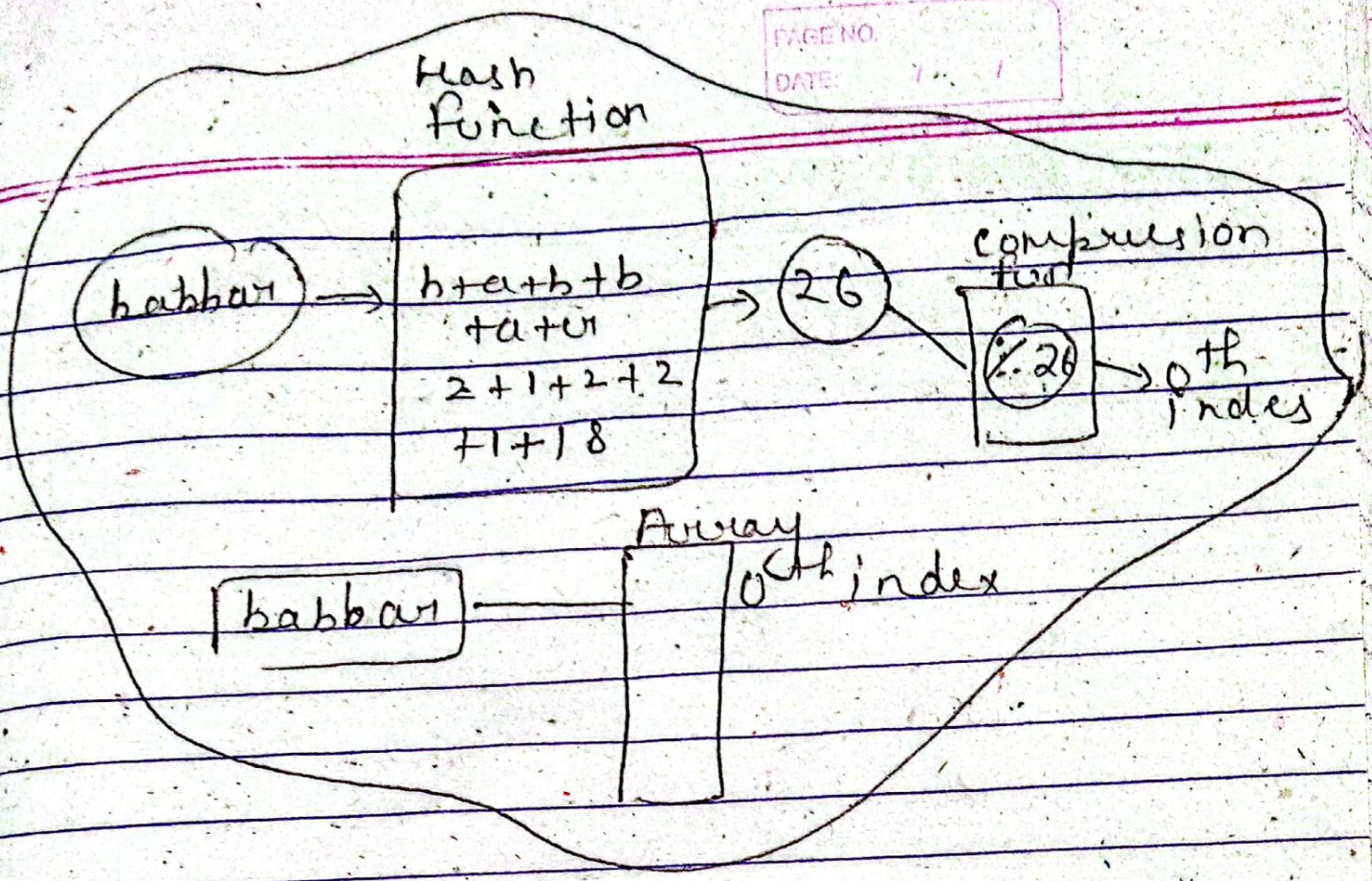
for conversion into numeric value

- Hash code
- Compression fun

This for making Range.

let's say love → 56

56 % 26 = [0 ↔ 25] range.



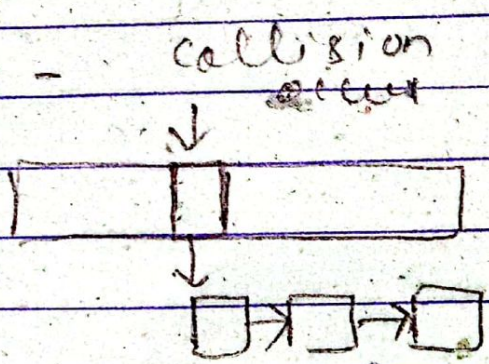
babbar
baabbb
→ HF → 26 → %26 = 0th index
26 → %26 = 0th index

This is collision

Make a hash function which has less no. of collision

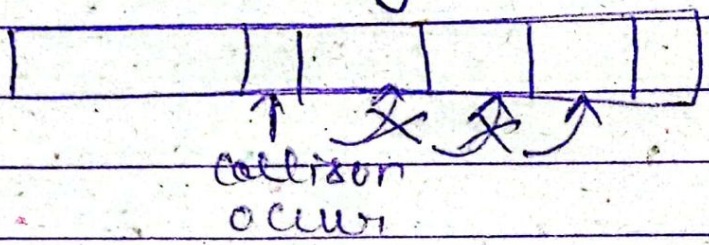
Collision Handling -

1) open Hashing



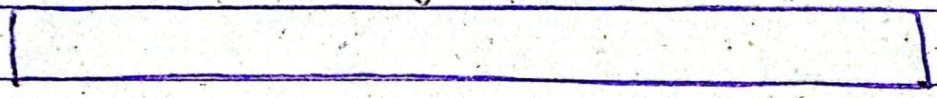
2) Closed Hashing → find next free space.

→ Linear Probing $f(i) \rightarrow i$



→ Quadratic Probing $f(i) = i^2$

How Make a good Hash function



no. of element ⇒ n
free boxes → b