⇒ Hashmap (most widely used)

↳ It is a data structure which stores information in the form of key and value pair

Hashmap

key ⟶ value

"India" ⟶ 233

"SA" ⟶ 174

"SriLanka" ⟶ 125

"Zimb" ⟶ 100

"Pak" ⟶ 0

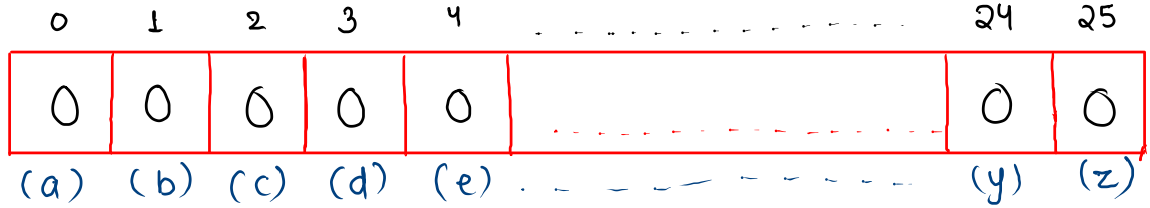
⇒ Arrays as Hashmap

↳ **Note :-** arrays as hashmap can be used only for a short range

Ex :-

String str = " a a b a c d a b a d ";
0 1 2 3 4 5 6 7 8 9

freq = (int)



max array size can 10^5 → 1 lakh

String str = " a a b a c d a b a d ";

0 1 2 3 4 5 6 7 8 9

i

given ch

find idx = ch - 'a' ;

'a' → 97

'b' → 98

'c' → 99

'd' → 100

'e' → 101

⋮

'z' → 122

i = 0, ch = 'a'

idx = 'a' - 'a' = 0 ✓

i = 1, ch = 'a'

idx = 'a' - 'a' = 0

i = 2, ch = 'b'

idx = 'b' - 'a' = 1 ✓

i = 4, ch = 'c'

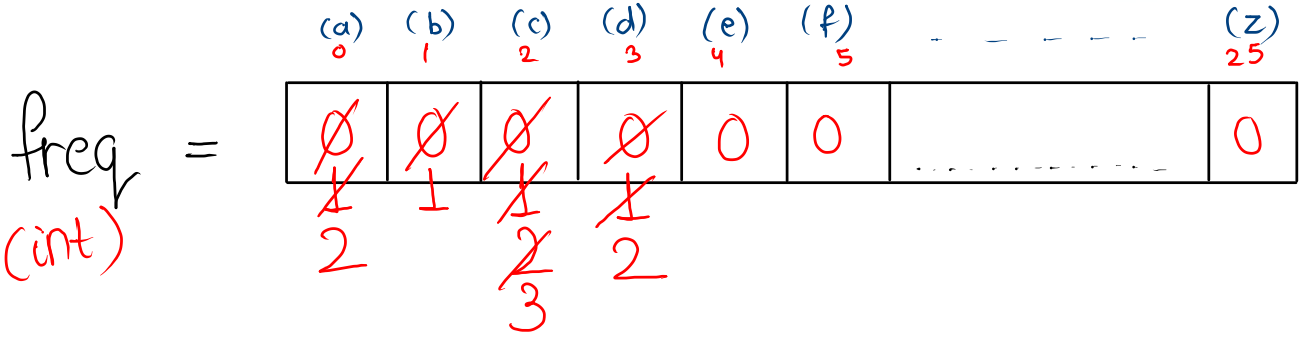
idx = 'c' - 'a' = 2 ✓

random chars

ch = 'z'

idx = 'z' - 'a' = 25 ✓

Print Freq of Alphabet in String



str = "abcdaccd"

0 1 2 3 4 5 6 7

i

inside a loop (i)

```
char ch = str.charAt(i);
int idx = ch - 'a';
freq[idx]++;
```

i = 0, ch = 'a'
idx = 'a' - 'a' = 0

i = 1, ch = 'b'
idx = 'b' - 'a' = 1

i = 2, ch = 'c'
idx = 'c' - 'a' = 2

i = 3, ch = 'd'
idx = 'd' - 'a' = 3

i = 4, ch = 'a'
idx = 'a' - 'a' = 0

i = 5, ch = 'c'
idx = 'c' - 'a' = 2

i = 6, ch = 'c'
idx = 'c' - 'a' = 2

i = 7, ch = 'd'
idx = 'd' - 'a' = 3

Code

```java
public static void main(String[] args) {
    Scanner scn = new Scanner(System.in);
    String str = scn.nextLine();

    printFreq(str);
}
public static void printFreq(String str) {
    int[] freq = new int[26];
    for (int i = 0; i < str.length(); i++) {
        char ch = str.charAt(i);
        int idx = ch - 'a';
        freq[idx]++;
    }

    for (int i = 0; i < str.length(); i++) {
        char ch = str.charAt(i);
        int idx = ch - 'a';
        if ( freq[idx] > 0 ) {
            System.out.println( ch + "-" + freq[idx]);
            freq[idx] = 0;
        }
    }
}
```

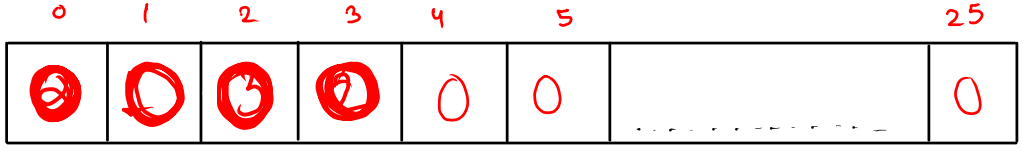
T.C = O(n)

S.C = O(1)

a - 2
b - 1
c - 3
d - 2

abcdaccd

freq (int) =



Int with Maximum Freq

$n = 7$

arr = [3 , 2 , 1 , 3 , 3 , 2 , 0]

0 1 2 3 4 5 6

freq = (int)