Code

```
public static void main(String[] args) {
    HashMap<String, Integer> map = new HashMap<>();
    map.put("abc", 2);
    map.put("efg", 3);
    map.put("xyz", 4);

    System.out.println(map.get("abd"));
}
```

→ null

Word Meaning

```java
public static void main(String[] args) {
    Scanner scn = new Scanner(System.in);
    HashMap<String, String> map = new HashMap<>();
    while (true) {
        int n = scn.nextInt();
        if (n == 1) {
            String word = scn.next();
            String meaning = scn.next();
            addPair(map, word, meaning);
        } else if (n == 2) {
            String word = scn.next();
            printMeaning(map, word);
        } else if (n == 3) {
            String word = scn.next();
            deletePair(map, word);
        } else if (n == 4) {
            break;
        }
    }
}

public static void addPair(HashMap<String, String> map, String word, String meaning) {
    map.put(word, meaning);
}

public static void printMeaning(HashMap<String, String> map, String word) {
    if (map.containsKey(word)) {
        System.out.println(map.get(word));
    } else {
        System.out.println("-1");
    }
}

public static void deletePair(HashMap<String, String> map, String word) {
    map.remove(word);
}
```

Code

T.C = O(n)

S.C = O(n)

⇒ How to traverse on a map

↳ because map doesn't have any indexing that is why for loop doesn't work here.

⇒ for each loop

syntax

```
for(Map.Entry<KeyDataType, ValueDataType> e : map.entrySet()){
    e.getKey(); // access key
    e.getValue(); // access value
}
```

for each loop for a map

```java
public static void main(String[] args) {
    HashMap<String, Integer> map = new HashMap<>();
    map.put("abc", 2);
    map.put("efg", 3);
    map.put("xyz", 4);

    for (Map.Entry<String, Integer> e : map.entrySet()) {
        String key = e.getKey();
        Integer val = e.getValue();

        System.out.println(key + "->" + val);
    }
}
```

Same Number Same Frequency

$n = 5$

$arr = [\ 3\ (0),\ -2\ (1),\ 1\ (2),\ 3\ (3),\ -2\ (4)\ ]$

Note:- best data structure to capture freq is hashmap

map — Integer vs Integer

3	2
-2	2
1	1

freq

ans = |key| == freq

|1| == 1

|-2| == 2

psudo code

1) check if element is appearing for first time
   then map.put(val, 1);

2) else
   old freq = map.get(val);
   map.put(val, oldfreq+1);

Code

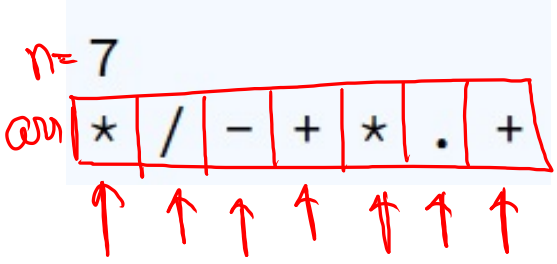
```java
public static void sameNumberSameFreq(int[] arr, int n) {
    HashMap<Integer, Integer> map = new HashMap<>();
    for (int i = 0; i < n; i++) {
        int curr = arr[i];
        if ( map.containsKey(curr) == false ) {
            map.put(curr, 1);
        } else {
            int oldFreq = map.get(curr);
            map.put(curr, oldFreq + 1);
        }
    }

    ArrayList<Integer> ans = new ArrayList<>();
    for (Map.Entry<Integer, Integer> e : map.entrySet()) {
        int key = e.getKey();
        int val = e.getValue();
        if (Math.abs(key) == val) {
            ans.add(key);
        }
    }

    Collections.sort(ans);
    for (int i : ans) {
        System.out.println(i);
    }
}
```

map.put(curr, map.getOrDefault(curr, 0) + 1);

Character and it's Frequency



map

* → 2
/ → 1
- → 1
+ → 2
. → 1

psudo code

1) check if element is appearing for first time
   then map.put(val, 1);
2) else
   old freq = map.get(val);
   map.put(val, oldfreq+1);

code

```java
public static void charByFreq(char[] arr, int n) {
    HashMap<Character, Integer> map = new HashMap<>();
    for (int i = 0; i < n; i++) {
        if (map.containsKey(arr[i]) == false) {
            map.put(arr[i], 1);
        } else {
            int oldFreq = map.get(arr[i]);
            map.put(arr[i], oldFreq + 1);
        }
    }

    ArrayList<Character> ans = new ArrayList<>();
    for (Map.Entry<Character, Integer> e : map.entrySet()) {
        char key = e.getKey();
        int val = e.getValue();

        ans.add(key);
    }

    Collections.sort(ans);
    for (char c : ans) {
        System.out.println( c + " " + map.get(c) );
    }
}
```

T.C = O(n)

S.C = O(n)

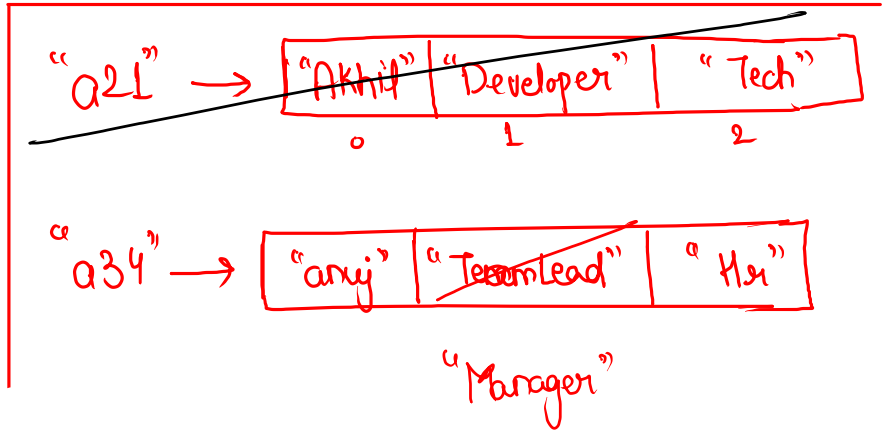
faith

name	desig	department
0	1	2

employee management

```
n = 5
add a21 Akhil Developer Tech
add a34 anuj TeamLead Hr
update a34 Manager
delete a21
show a34
```

map String vs ArrayList



Code

```
public static void main(String[] args) {
    Scanner scn = new Scanner(System.in);
    int t = scn.nextInt();
    HashMap<String, ArrayList<String>> map = new HashMap<>();
    for (int i = 0; i < t; i++) {
        String operation = scn.next();
        if (operation.equals("add")) {
            String empId = scn.next();
            String name = scn.next();
            String design = scn.next();
            String department = scn.next();

            ArrayList<String> arr = new ArrayList<>();
            arr.add(name);
            arr.add(design);
            arr.add(department);

            map.put(empId, arr);
        } else if (operation.equals("update")) {

            String empId = scn.next();
            String design = scn.next();

            ArrayList<String> arr = map.get(empId);
            arr.set(1, design);

            map.put(empId, arr);

        } else if (operation.equals("delete")) {

            String empId = scn.next();
            map.remove(empId);

        } else if (operation.equals("show")) {

            String empId = scn.next();
            ArrayList<String> arr = map.get(empId);

            for (String s : arr) {
                System.out.print(s + " ");
            }

        }
    }
}
```