

Dictionary

- If **N==1**, take **Name** and **Phone Number** as input from user and **add** it to the Phone Directory.
- If **N==2**, take a **Name** as input from the user and print corresponding **Phone Number**, if the **Name** is not found print -1.
- If **N==3**, take a **Name** as input from the user and delete it from the Phone Directory.
- If **N==4**, **Close** the Directory(**Exit** the program).

Geekster 9876543210

~~Geeku 0123456789~~

```

1
Geekster
9876543210
1
Geeku
0123456789
2
Geeku
2
Geekster
3
Geeku
2
Geeku
2
Geekster
4

```

0123456789
9876543210

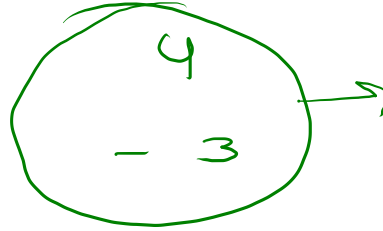
-}
9876543210

Phone Directory By Name

```
public class Solution {  
  
    public static void main(String[] args) {  
        /* Enter your code here. Read input from STDIN. Print output to STDOUT. Your class should be named Solution. */  
        Scanner sc = new Scanner(System.in);  
        int n;  
        HashMap<String,String> hm = new HashMap<>();  
        do{  
            n=sc.nextInt();  
            if(n==1){  
                String name = sc.next();  
                String phone = sc.next();  
                hm.put(name,phone);  
            }else if(n==2){  
                String name = sc.next();  
                if(hm.containsKey(name)){  
                    System.out.println(hm.get(name));  
                }else{  
                    System.out.println(-1);  
                }  
            }  
            else if(n==3){  
                String name = sc.next();  
                hm.remove(name);  
            }  
        }while(n!=4);  
    }  
}
```

10

4 5 -3 8 -3 4 4 -3 6 4

key $\boxed{4 \rightarrow 4}$ value5 \rightarrow 1 -X-3 \rightarrow 3 -8 \rightarrow 1 -X6 \rightarrow 1 -X $S == 1 - X$ \downarrow
 $-3 == 3$ $\boxed{3 == 3}$ Array list
 \downarrow $\boxed{4 \mid -3}$ \downarrow
 \boxed{sort} $\boxed{-3, 4}$ $\boxed{8 == 1} \times$ $\boxed{6 == 1} \times$ $\boxed{-3, 4}$

```

public static void frequency(int[] arr, int n){
    HashMap<Integer, Integer> hm = new HashMap<>();
    ArrayList<Integer> list = new ArrayList<>();
    for(int i=0; i<n; i++){
        int key = arr[i];
        if(hm.containsKey(key)){
            int val = hm.get(key)+1;
            hm.put(key, val);
        }else{
            hm.put(key, 1);
        }
    }
    for(int x: hm.keySet()){
        int freq = hm.get(x);
        if(Math.abs(x) == freq){
            list.add(x);
        }
    }
    Collections.sort(list);
    for(int i=0; i<list.size(); i++){
        System.out.println(list.get(i));
    }
}

```

4

-3

10
4 5 -3 8 -3 4 4 -3 6 4

~~4 5 -3 8 -3 4 4 -3 6 4~~

$$4 \neq 4 \quad 1 \neq 3$$

4, 2

4: 2
5: 1
-3: 3
8: 1

9

↓

4 | -3

-3 | 4

-3
4

Same Number Same Frequency

```
public static void main(String[] args) {
    /* Enter your code here. Read input from STDIN. Print output to STDOUT. Your class should be named Solu
    Scanner sc = new Scanner(System.in);
    int n = sc.nextInt();
    int[] arr = new int[n];
    for(int i=0;i<n;i++){
        arr[i]=sc.nextInt();
    }
    frequency(arr,n);
}
public static void frequency(int[] arr,int n){
    HashMap<Integer,Integer> hm = new HashMap<>();
    ArrayList<Integer> list = new ArrayList<>();
    for(int i=0;i<n;i++){
        int key = arr[i];
        if(hm.containsKey(key)){
            int val = hm.get(key)+1;
            hm.put(key,val);
        }else{
            hm.put(key,1);
        }
    }
    for(int x:hm.keySet()){
        int freq = hm.get(x);
        if(Math.abs(x)==freq){
            list.add(x);
        }
    }
    Collections.sort(list);
    for(int i=0;i<list.size();i++){
        System.out.println(list.get(i));
    }
}
```

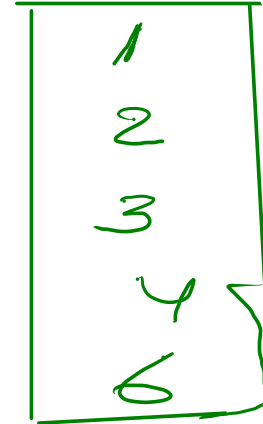
6

a b a d b c

key	value
a	2
b	2
a	2
d	1
b	2
c	1

a	→	2
b	→	2
c	→	1
d	→	1

HashSet (does not contain duplicates)
Set



{1, 1, 2, 3, 4, 6, 4, 3}

Insert / ~~add~~ $\rightarrow O(1)$

Search / contains $\rightarrow O(1)$

delete / remove $\rightarrow O(1)$

Array

$O(1)$

$O(n)$

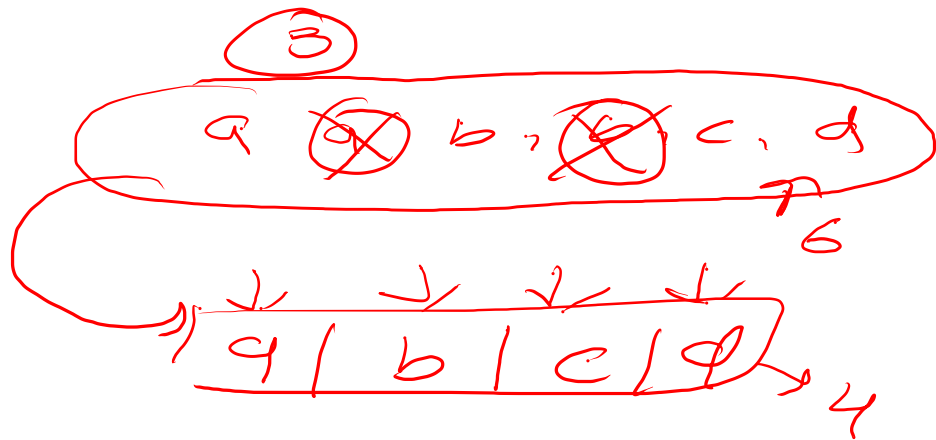
$O(n)$

HashSet < Integer > objName = new HashSet < > ();

$\{ \underline{1}, \textcircled{1}, 2, \textcircled{2}, 3, \textcircled{3} \}$

\Downarrow

$\{ 1, 2, \textcircled{3} \}$



```

public static void frequency(char[] ch, int n){
    HashMap<Character, Integer> hm = new HashMap<>();
    HashSet<Character> hs = new HashSet<>();
    ArrayList<Character> list = new ArrayList<>();
    for(int i=0; i<n; i++){
        char key = ch[i];
        if(hm.containsKey(key)){
            int val = hm.get(key)+1;
            hm.put(key, val);
        } else {
            hm.put(key, 1);
        }
    }

    for(int i=0; i<ch.length; i++){
        hs.add(ch[i]);
    }
    for(char x: hs){
        list.add(x);
    }
    Collections.sort(list);
    for(char i : list){
        int freq = hm.get(i);
        System.out.println(i+" "+freq);
    }
}

```

6

a, b, c, d

a b a d b c

a: 2
 b: 2
 d: 1
 c: 1

[a, b, c, d]

2 = hm.get('a')

Character and it's Frequency

```
7 public class Solution {
8
9     public static void main(String[] args) {
10         /* Enter your code here. Read input from STDIN. Print output to STDOUT. Your class should be named Solution. */
11         Scanner sc = new Scanner(System.in);
12         int n = sc.nextInt();
13         char[] ch = new char[n];
14         for(int i=0;i<n;i++){
15             ch[i]=sc.next().charAt(0);
16         }
17         frequency(ch,n);
18     }
19     public static void frequency(char[] ch, int n){
20         HashMap<Character,Integer> hm = new HashMap<>();
21         HashSet<Character> hs = new HashSet<>();
22         ArrayList<Character> list = new ArrayList<>();
23         for(int i=0;i<n;i++){
24             char key = ch[i];
25             if(hm.containsKey(key)){
26                 int val = hm.get(key)+1;
27                 hm.put(key,val);
28             }else{
29                 hm.put(key,1);
30             }
31         }
32
33         for(int i=0;i<ch.length;i++){
34             hs.add(ch[i]);
35         }
36         for(char x:hs){
37             list.add(x);
38         }
39         Collections.sort(list);
40         for(char i : list){
41             int freq = hm.get(i);
42             System.out.println(i+" "+freq);
43         }
44     }
45 }
```