

## HASHING SOLUTIONS

### Solution 1:

Using the concept of Horizontal Distance (HD), as discussed in Top View of a Binary Tree Question in the Trees chapter.

```
import java.util.*;

class Solution {
    static class Node {
        int data;
        int hd;
        Node left, right;

        public Node(int key) {
            this.data = key;
            this.hd = Integer.MAX_VALUE;
            this.left = this.right = null;
        }
    }

    public static void bottomViewHelper(Node root, int curr, int hd,
    TreeMap<Integer, int[]> m) {
        if (root == null)
            return;

        // If node for a particular HD is not present, add to the map.
        if (!m.containsKey(hd)) {
            m.put(hd, new int[]{ root.data, curr });
        }

        // Compare height for already
        // present node at similar horizontal
        // distance
        else {
            int[] p = m.get(hd);
            if (p[1] <= curr) {
                p[1] = curr;
            }
        }
    }
}
```

```
        p[0] = root.data;
    }
    m.put(hd, p);
}

// call for left subtree
bottomViewHelper(root.left, curr + 1, hd - 1, m);

// call for right subtree
bottomViewHelper(root.right, curr + 1, hd + 1, m);
}

public static void printBottomView(Node root) {
    // Map to store Horizontal Distance, Height and Data.
    TreeMap<Integer, int[]> m = new TreeMap<>();

    bottomViewHelper(root, 0, 0, m);

    // Prints the values stored by printBottomViewUtil()
    for(int val[] : m.values())
    {
        System.out.print(val[0] + " ");
    }
}

public static void main(String[] args) {
    Node root = new Node(20);
    root.left = new Node(8);
    root.right = new Node(22);
    root.left.left = new Node(5);
    root.left.right = new Node(3);
    root.right.left = new Node(4);
    root.right.right = new Node(25);
    root.left.right.left = new Node(10);
    root.left.right.right = new Node(14);

    System.out.println(
        "Bottom view of the given binary tree:");

    printBottomView(root);
}
```

```
}  
}
```

### Solution 2:

```
public int[] twoSum(int[] arr, int target) {  
    Map<Integer, Integer> visited = new HashMap<>();  
    for(int i = 0; i<arr.length; i++) {  
        //diff = given target - number given at ith index  
        int diff = target - arr[i];  
  
        // check if found difference is present in the MAP list  
        if(visited.containsKey(diff)) {  
            //if difference in map matches with the ith index element in array  
            return new int[] { i, visited.get(diff) };  
        }  
        //add arr element in map to match with future element if forms a pair  
        visited.put(arr[i],i);  
    }  
    //if no matches are found  
    return new int[] {0, 0};  
}
```

### Solution 3 :

```
public String frequencySort(String s) {  
    HashMap<Character , Integer>map = new HashMap<>();  
    for(int i=0;i<s.length();++i)  
        map.put(s.charAt(i),map.getOrDefault(s.charAt(i),0)+1);  
  
    PriorityQueue<Map.Entry<Character,Integer>> pq =  
        new PriorityQueue<>((a,b)->a.getValue()== b.getValue()?  
            a.getKey()-b.getKey(): b.getValue()-a.getValue());  
  
    for(Map.Entry<Character,Integer>e:map.entrySet())    pq.add(e);  
}
```

```
StringBuilder res = new StringBuilder();  
while(pq.size()!=0){  
    char ch = pq.poll().getKey();  
    int val = map.get(ch);  
    while(val!=0){  
        res.append(ch);  
        val--;  
    }  
}  
return res.toString();  
}
```

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