#Q1: Solved by hashing

```java
class Main {
    public static void countFrequency(int [] arr){
        int max = 0;
        for(int i =0;i<arr.length;i++){
            if(max < arr[i]){
                max = arr[i];
            }
        }
        int [] freq = new int[max+1];
        int index = 0;
        for(int j = 0; j<arr.length; j++ ){
            index = arr[j];
            freq[index]++;
        }
        System.out.print("{");
        for(int k=0;k<freq.length;k++){
            if(freq[k]!=0){
                System.out.print(k +" : "+freq[k] +" ,");
            }
        }
        System.out.print("}");
    }
    public static void main(String[] args) {
        int[] arr = {1, 2, 2, 3, 1, 4};
        countFrequency(arr);

```

Output

```
{1 : 2 ,2 : 2 ,3 : 1 ,4 : 1 ,}
=== Code Execution Successful ===
```

#Q2: Solved by hashing

```java
class Main {
    public static int countFrequency(int [] arr){
        int max = 0;
        for(int i =0;i<arr.length;i++){
            if(max < arr[i]){
                max = arr[i];
            }
        }
        int [] freq = new int[max+1];
        int index = 0;
        for(int j = 0; j<arr.length; j++ ){
            index = arr[j];
            freq[index]++;
        }
        int FirstRepeating = 0;
        for(int k=0;k<freq.length;k++){
            if(freq[arr[k]]==1){
                FirstRepeating =  arr[k];
                break;
            }
        }
        return FirstRepeating;
    }
    public static void main(String[] args) {
        int[] arr = {4, 5, 1, 2, 0, 4};
        System.out.print(countFrequency(arr));

    }
}
```

Output

```
5
=== Code Execution Successful ===
```

```java
class Main {
    public static String countFrequency(int [] arr){
        int max = 0;
        for(int i =0;i<arr.length;i++){
            if(max < arr[i]){
                max = arr[i];
            }
        }
        int [] freq = new int[max+1];
        int index = 0;
        for(int j = 0; j<arr.length; j++ ){
            index = arr[j];
            freq[index]++;
        }
        for(int k=0;k<freq.length;k++){
            if(freq[k]>1){
                return "Duplicate Found : "+ k;
            }
        }
        return "No Duplicate Found";
    }
    public static void main(String[] args) {
        int[] arr = {1, 2, 3, 4, 5};
        System.out.print(countFrequency(arr));

    }
```

Output

```
No Duplicate Found
=== Code Execution Successful ===
```

```java
// Question 1: Count Frequency of Elements
// Given an array of integers, use hashing to count the frequency of each element
import java.util.HashMap;
class Main {
    public static HashMap<Integer,Integer> countFrequency(int [] arr){
        HashMap<Integer,Integer> map = new HashMap<>();
        for(int i : arr){
            map.put(i,map.getOrDefault(i,0)+1);
        }
        return map;
    }
    public static void main(String[] args) {
        int[] arr = {5, 5, 5, 7, 7, 9};
        System.out.print(countFrequency(arr));

    }
}
```

Output

```
{5=3, 7=2, 9=1}
=== Code Execution Successful ===
```

```java
// Question 2: Find the First Non-Repeating Element
// Given an array, find the first element that occurs only once using hashing.
import java.util.HashMap;
class Main {
    public static int nonRepeating(int [] arr){
        HashMap<Integer,Integer> map = new HashMap<>();
        for(int i : arr){
            map.put(i,map.getOrDefault(i,0)+1);
        }
        for(int j : arr){
            if(map.get(j)==1){
                return j;
            }
        }
        return -1;
    }
    public static void main(String[] args) {
        int[] arr = {9, 4, 9, 6, 7, 4};
        System.out.print(nonRepeating(arr));

    }
}
```

Output

```
6
=== Code Execution Successful ===
```

```java
// Question 3:  Check for Duplicates in Array
// Given an array, use hashing to check whether it contains any duplicate element.
import java.util.HashMap;
class Main {
    public static String isDuplicate(int [] arr){
        HashMap<Integer,Integer> map = new HashMap<>();
        for(int i : arr){
            map.put(i,map.getOrDefault(i,0)+1);
        }
        for(int j : arr){
            if(map.get(j)>1){
                return "Duplicate Found : "+j;
            }
        }
        return "No Duplicate Found";
    }
    public static void main(String[] args) {
        int[] arr = {10, 20, 10, 30, 40};
        System.out.print(isDuplicate(arr));
    }
}
```

Output

```
Duplicate Found : 10
=== Code Execution Successful ===
```