WEEK 11 SET,MAPS

Java HashSet class implements the Set interface, backed by a hash table which is actually a HashMap instance.

No guarantee is made as to the iteration order of the hash sets which means that the class does not guarantee the constant order of elements over time.

This class permits the null element.

The class also offers constant time performance for the basic operations like add, remove, contains, and size assuming the hash function disperses the elements properly among the buckets.

Java HashSet Features

A few important features of HashSet are mentioned below:

- Implements Set Interface.
- The underlying data structure for HashSet is Hashtable.
- As it implements the Set Interface, duplicate values are not allowed.
- Objects that you insert in HashSet are not guaranteed to be inserted in the same order. Objects are inserted based on their hash code.
- NULL elements are allowed in HashSet.
- HashSet also implements **Serializable** and **Cloneable** interfaces.
- ```
  public class HashSet<E> extends AbstractSet<E> implements Set<E>,
  Cloneable, Serializable
  Sample Input and Output:
  5
  90
  56
  45
  78
  25
  78
  Sample Output:
  78 was found in the set.
  Sample Input and output:
  3
  2
  7
  9
  5
  Sample Input and output:
  5 was not found in the set.
  ```

import java.util.HashSet;
  ```

```
import java.util.Scanner;
public  class prog {
  public static void main(String[] args) {
    Scanner sc= new Scanner(System.in);
    int n = sc.nextInt();
    // Create a HashSet object called numbers
    HashSet<Integer> numbers =new HashSet <> ();

    // Add values to the set
    for(int i=0;i<n;i++)
    numbers.add(sc.nextInt());

  int skey=sc.nextInt();

    // Show which numbers between 1 and 10 are in the set

    if (numbers.contains(skey)) {
        System.out.println( skey+ " was found in the set.");
      } else {
        System.out.println(skey + " was not found in the set.");
      }
    }
  }
```

	Test	Input	Expected	Got	
✓	1	5 90 56 45 78 25 78	78 was found in the set.	78 was found in the set.	✓
✓	2	3 -1 2 4 5	5 was not found in the set.	5 was not found in the set.	✓

Passed all tests! ✓

Write a Java program to compare two sets and retain elements that are the same.

Sample Input and Output:

5

Football

Hockey

Cricket

Volleyball

Basketball

7 // **HashSet 2:**

Golf

Cricket

Badminton

Football

Hockey

Volleyball

Handball

SAMPLE OUTPUT:

Football

Hockey

Cricket

Volleyball

Basketball

import java.util.*;

```
public class Main {
    public static void main (String [] args ){
        Scanner sc= new Scanner (System.in);
        int n =sc.nextInt ();
        sc.nextLine();
        HashSet <String > hash1= new HashSet <>();
        for (int i=0;i<n;i++){
         hash1.add(sc.nextLine());
        }
        // sc.nextLine();
         int m=sc.nextInt();
         HashSet<String> hash2=new HashSet<>();
         for (int i=0;i<m;i++){
            hash2.add(sc.nextLine());
         }
         HashSet <String > hash3=new HashSet<> (hash1);
         hash3.retainAll(hash2);
         for (String str : hash3){
            System.out.println(str);
         }
    }
}
```

	Test	Input	Expected	Got	
✓	1	5 Football Hockey Cricket Volleyball Basketball 7 Golf Cricket Badminton Football Hockey Volleyball Throwball	Cricket Hockey Volleyball Football	Cricket Hockey Volleyball Football	✓
✓	2	4 Toy Bus Car Auto 3 Car Bus Lorry	Bus Car	Bus Car	✓

Passed all tests! ✓

Java HashMap Methods

containsKey() Indicate if an entry with the specified key exists in the map

containsValue() Indicate if an entry with the specified value exists in the map

putIfAbsent() Write an entry into the map but only if an entry with the same key does not already exist

remove() Remove an entry from the map

replace() Write to an entry in the map only if it exists

size() Return the number of entries in the map

Your task is to fill the incomplete code to get desired output

```
import java.util.HashMap;

import java.util.Map.Entry;

import java.util.Set;

import java.util.Scanner;

 class prog

{
```

```
public static void main(String[] args)
{
   //Creating HashMap with default initial capacity and load factor
   HashMap<String, Integer> map = new HashMap<String, Integer>();

   String name;
   int num;
   Scanner sc= new Scanner(System.in);
   int n=sc.nextInt();
    for(int i =0;i<n;i++)
    {
        name=sc.next();
        num= sc.nextInt();
        map.put(name,num);
    }

   //Printing key-value pairs

   Set<Entry<String, Integer>> entrySet = map.entrySet();

   for (Entry<String, Integer> entry : entrySet)
   {
      System.out.println(entry.getKey()+" : "+entry.getValue());
   }
    System.out.println("----------");
   //Creating another HashMap
```

```
HashMap<String, Integer> anotherMap = new HashMap<String, Integer>();

//Inserting key-value pairs to anotherMap using put() method

anotherMap.put("SIX", 6);

anotherMap.put("SEVEN", 7);

//Inserting key-value pairs of map to anotherMap using putAll() method

anotherMap.putAll (map);  // code here

//Printing key-value pairs of anotherMap

entrySet = anotherMap.entrySet();

for (Entry<String, Integer> entry : entrySet)
{
   System.out.println(entry.getKey()+" : "+entry.getValue());
}

//Adds key-value pair 'FIVE-5' only if it is not present in map

map.putIfAbsent("FIVE", 5);
```

```
        //Retrieving a value associated with key 'TWO'

        int value = map.get("TWO");
        System.out.println(value);

         //Checking whether key 'ONE' exist in map

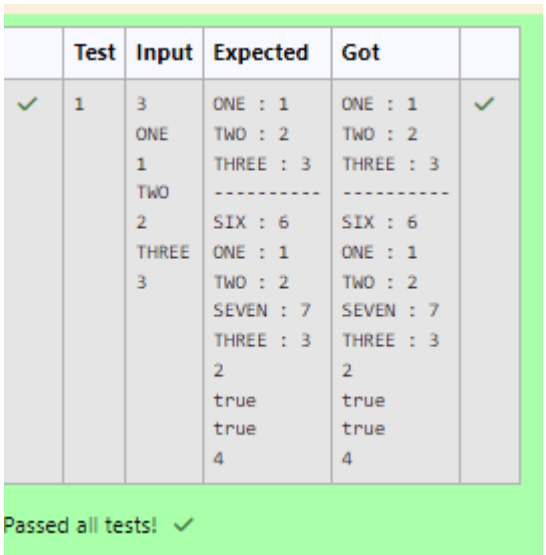
        System.out.println( map.containsKey("ONE"));

        //Checking whether value '3' exist in map

        System.out.println(map.containsValue(3) );

        //Retrieving the number of key-value pairs present in map

       System.out.println( map.size() );
    }
}
```



	Test	Input	Expected	Got	
✓	1	3 ONE 1 TWO 2 THREE 3	ONE : 1 TWO : 2 THREE : 3 ---------- SIX : 6 ONE : 1 TWO : 2 SEVEN : 7 THREE : 3 2 true true 4	ONE : 1 TWO : 2 THREE : 3 ---------- SIX : 6 ONE : 1 TWO : 2 SEVEN : 7 THREE : 3 2 true true 4	✓

Passed all tests! ✓