Lab: Java Advanced Sets and Maps

Problems for exercises and homework for the [“Java Advanced” course @ SoftUni](https://softuni.bg).

You can check your solutions here: https://judge.softuni.bg/Contests/1029/Sets-And-Maps-Lab

I. Sets

1. Parking Lot

Write program that:

- Record **car number** for every car that enter in **parking lot**
- Remove **car number** when the car go out
- Input will be string in format **`[direction, carNumber]`**
- input end with string **"END"**

Print the output with all car numbers which are in parking lot

Examples

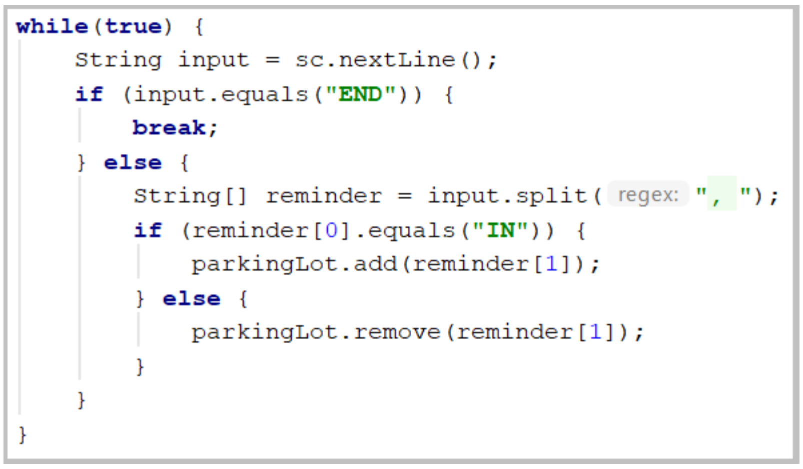
Input	Output
IN, CA2844AA IN, CA1234TA OUT, CA2844AA IN, CA9999TT IN, CA2866HI OUT, CA1234TA IN, CA2844AA OUT, CA2866HI IN, CA9876HH IN, CA2822UU END	CA2822UU CA2844AA CA9999TT CA9876HH
IN, CA2844AA IN, CA1234TA OUT, CA2844AA OUT, CA1234TA END	`Parking Lot is Empty`

Hints

- Car numbers are **unique**
- Use the methods **`isEmpty()`**

Solution

You might help yourself with the code below:



```
while(true) {
    String input = sc.nextLine();
    if (input.equals("END")) {
        break;
    } else {
        String[] reminder = input.split( regex: ", ");
        if (reminder[0].equals("IN")) {
            parkingLot.add(reminder[1]);
        } else {
            parkingLot.remove(reminder[1]);
        }
    }
}
```

2. SoftUni Party

There is a party in SoftUni. Many guests are invited and they are two type: VIP and regular. When guest come check if he/she exist in any of two reservation lists

All reservation numbers will be with 8 chars

All VIP numbers start with digit

There will be 2 command lines. First is "PARTY" - party is on and guests start coming. Second is "END" – then party is over and no more guest will come

Output have to all guest, who didn't come to the party (VIP must be first)

Examples

Input	Output	Input	Output
7IK9Yo0h 9NoBUajQ Ce8vwPmE SVQXQCbc tSzE5t0p PARTY 9NoBUajQ Ce8vwPmE SVQXQCbc END	2 7IK9Yo0h tSzE5t0p	m8rfQBvl fc1oZCE0 UgffRkOn 7ugX7bm0 9CQBGUeJ 2FQZT3uC dziNz78I mdSGyQCJ LjcVpmDL fPXNHpm1 HTTbwRmM B5yTkMQi 8N0FThqG xys2FYzn MDzcM9ZK PARTY 2FQZT3uC dziNz78I mdSGyQCJ LjcVpmDL fPXNHpm1 HTTbwRmM	2 MDzcM9ZK xys2FYzn

		B5yTkMQi 8N0FThqG m8rfQBvl fc1oZCE0 UgffRkOn 7ugX7bm0 9CQBGUeJ END	

3. "Voina" - Number game

Write program that:

- Read 20 numbers for both players
- Numbers will be **`Integer`**, separated with **" " (single space).**
- Every player can hold only **unique** numbers
- Each Round both players get **top number** from their own. Player with bigger number get both numbers and add it on the **bottom** of his own numbers
- Game end after **50 rounds** or if any player **lose all** of his numbers
- Output must be **"First Player Win!"**, **"Second Player Win!"** or **"Draw!"**

Examples

Input	Output

`26 58 16 92 44 65 65 77 57 23 71 57 7 52 85 44 32 70 38 23`
`43 95 33 51 62 93 57 55 0 31 32 95 68 34 30 51 37 32 11 97`
	`Second player win!`

`74 78 82 42 19 39 29 69 20 42 31 77 57 36 76 26 4 9 83 42`
`15 43 80 71 22 88 78 35 28 30 46 41 76 51 76 18 14 52 47 38`
	`First player win!`

Hints

- Use `Iterator<E>` and `.next()` for finding top number in decks
- Think where to check if any player is without cards
- When you find top number, be sure to remove it immediately

Solution

You might help yourself with the code below:

```
Iterator<Integer> it = firstPlayer.iterator();
int firstNumber = firstPlayer.iterator().next();
firstPlayer.remove(firstNumber);
```

II.Sets

4. Count Same Values in Array

Write a program that counts in a given array of double values the number of occurrences of each value.

Examples

Input	Output

`-2.5 4 3 -2.5 -5.5 4 3 3 -2.5 3`	`3 - 4 times`
	`4 - 2 times`
	`-2.5 - 3 times`
	`-5.5 - 1 times`

`2 4 4 5 5 2 3 3 4 4 3 3 4 3 5 3 2 5 4 3`	`2 - 3 times`
	`3 - 7 times`
	`4 - 6 times`
	`5 - 4 times`

Hints

- Use `HashMap<K, V>`

Solution

You might help yourself with the code below:

```
HashMap<String, Integer> result = new HashMap<>();
for (String number : input) {
    if (!result.containsKey(number)) {
        result.put(number, 1);
    } else {
        result.put(number, result.get(number) + 1);
    }
}

//TODO Print the elements from the HashMap<K, V>
```

5. Academy Graduation

Write a program that:

- Read from console **number** of student for a track
- Read on **pair of rows**:
  - First line is **name** of student
  - Second line is his **score** for different number of courses
- Print on console "**{name}** is graduated with **{average scores}**"

Examples

Input	Output

`3`
`Gosho`
`3.75 5`
`Mara`
`4.25 6`
`Pesho`
`6 4.5`
	`Gosho is graduated with 4.375`
	`Mara is graduated with 5.125`
	`Pesho is graduated with 5.25`

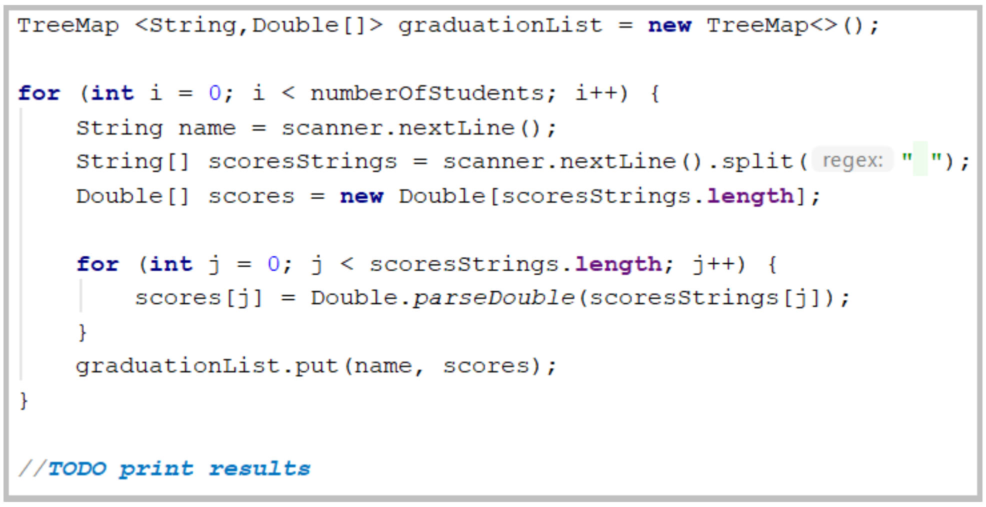
5 Gruio 4.36 5.50 3.30 5.63 2.57 5.75 2.81 4.89 Trendafilka 3.10 5.35 3.30 3.35 5.64 4.99 2.75 4.68 Mite 3.45 3.23 3.03 5.42 5.46 4.15 2.26 5.95 Roza 2.08 3.48 3.36 2.73 2.96 4.54 3.70 3.85 Ganio 4.75 4.92 3.78 4.79 4.82 4.75 2.81 2.13	Ganio is graduated with 4.09375 Gruio is graduated with 4.351249999999999 Mite is graduated with 4.11875 Roza is graduated with 3.3375 Trendafilka is graduated with 4.145

Hints

- Think about **proper type** of map
- **Value** can be **array**
- **Nested loop** and one more **variable** will be need for average score

Solution

You might help yourself with the code below:



```java
TreeMap <String,Double[]> graduationList = new TreeMap<>();

for (int i = 0; i < numberOfStudents; i++) {
    String name = scanner.nextLine();
    String[] scoresStrings = scanner.nextLine().split( regex: " ");
    Double[] scores = new Double[scoresStrings.length];

    for (int j = 0; j < scoresStrings.length; j++) {
        scores[j] = Double.parseDouble(scoresStrings[j]);
    }
    graduationList.put(name, scores);
}

//TODO print results
```