Lab: Sets and Dictionaries Advanced

Problems for exercises and homework for the "C# Advanced" course @ SoftUni.

You can check your solutions in Judge.

I.Dictionaries

1. Count Same Values in Array

Create 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	-2.5 - 3 times 4 - 2 times 3 - 4 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 4 - 6 times 5 - 4 times 3 - 7 times

2. Average Student Grades

Create a program, which reads a **name** of a student and his/her **grades** and **adds** them to the **student record**, then **prints the** students' **names** with their **grades** and their **average grade**.

Examples

Input	Output
7 John 5.20 Maria 5.50 John 3.20 Maria 2.50 Sam 2.00 Maria 3.46 Sam 3.00	John -> 5.20 3.20 (avg: 4.20) Maria -> 5.50 2.50 3.46 (avg: 3.82) Sam -> 2.00 3.00 (avg: 2.50)
4 Vlad 4.50 Peter 3.00 Vlad 5.00 Peter 3.66	Vlad -> 4.50 5.00 (avg: 4.75) Peter -> 3.00 3.66 (avg: 3.33)
5 George 6.00 George 5.50 George 6.00 John 4.40 Peter 3.30	George -> 6.00 5.50 6.00 (avg: 5.83) John -> 4.40 (avg: 4.40) Peter -> 3.30 (avg: 3.30)

Hints

- Use a **dictionary** (`string` → `List<decimal>`)
- Check if the name **exists** before adding the grade. If it doesn't, add it to the dictionary.
- Pass through all **key-value pairs** in the dictionary and print the results. You can use the `.Average()` method to quickly calculate the average value from a list.

3. Largest 3 Numbers

Read a **list of integers** and **print the largest 3 of them**. If there are less than 3, print all of them.

Examples

Input	Output
10 30 15 20 50 5	50 30 20

Input	Output
20 30	30 20

Hints

- Read an array of integers
- **Order the array using a LINQ query**

```
int[] sorted = numbers.OrderByDescending(n => n)
    .ToArray();
```

- **Print top 3 numbers with for loop**

4. Product Shop

Create a program that prints information about **food shops** in Sofia and the **products** they **store**. Until the "`Revision`" command is received, you will be receiving input in the format: "`{shop}, {product}, {price}`". Keep in mind that if you receive a **shop** you already **have received**, you must **collect** its **product information**.

Your output must be **ordered** by shop **name** and must be in the format:

`"{shop}->`

`Product: {product}, Price: {price}"`

Note: The price **should not** be rounded or formatted.

Examples

Input	Output
lidl, juice, 2.30 fantastico, apple, 1.20 kaufland, banana, 1.10 fantastico, grape, 2.20 Revision	fantastico->` `Product: apple, Price: 1.2 `Product: grape, Price: 2.2 `kaufland->` `Product: banana, Price: 1.1 `lidl->` `Product: juice, Price: 2.3
tmarket, peanuts, 2.20 GoGrill, meatballs, 3.30 GoGrill, HotDog, 1.40 tmarket, sweets, 2.20	GoGrill->` `Product: meatballs, Price: 3.3 `Product: HotDog, Price: 1.4 `tmarket->

Revision	Product: peanuts, Price: 2.2 Product: sweets, Price: 2.2

5. Cities by Continent and Country

Create a program that reads **continents**, **countries,** and their **cities** put them in a **nested dictionary** and **prints** them.

Examples

Input	Output

9
Europe Bulgaria Sofia
Asia China Beijing
Asia Japan Tokyo
Europe Poland Warsaw
Europe Germany Berlin
Europe Poland Poznan
Europe Bulgaria Plovdiv
Africa Nigeria Abuja
Asia China Shanghai
	Europe:
	  Bulgaria -> Sofia, Plovdiv
	  Poland -> Warsaw, Poznan
	  Germany -> Berlin
	Asia:
	  China -> Beijing, Shanghai
	  Japan -> Tokyo
	Africa:
	  Nigeria -> Abuja

3
Europe Germany Berlin
Europe Bulgaria Varna
Africa Egypt Cairo
	Europe:
	  Germany -> Berlin
	  Bulgaria -> Varna
	Africa:
	  Egypt -> Cairo

8
Africa Somalia Mogadishu
Asia India Mumbai
Asia India Delhi
Europe France Paris
Asia India Nagpur
Europe Germany Hamburg
Europe Poland Gdansk
Europe Germany Danzig
	Africa:
	  Somalia -> Mogadishu
	Asia:
	  India -> Mumbai, Delhi, Nagpur
	Europe:
	  France -> Paris
	  Germany -> Hamburg, Danzig
	  Poland -> Gdansk

Hints

- Use a **nested dictionary** (`string` → (`Dictionary` → `List<string>`))
- Check if the continent exists before adding the country. If it doesn't, add it to the dictionary.
- Check if the country exists, before adding the city. If it doesn't, add it to the dictionary.
- Pass through all **key-value pairs** in the dictionary and the values' key-value pairs and print the results.

4 Sets

6. Record Unique Names

Create a program, which will take a list of **names** and print **only** the **unique** names in the list.

Examples

Input	Output

Input	Output

Input	Output

8 John Alex John Sam Alex Alice Peter Alex	John Alex Sam Alice Peter

7 Lyle Bruce Alice Easton Shawn Alice Shawn Peter	Lyle Bruce Alice Easton Shawn

6 Roki Roki Roki Roki Roki Roki	Roki

Hints

You can store the names in a **HashSet<string>** to extract only the unique ones.

7. Parking Lot

Create a program that:

- Records a **car number** for every car that enters the **parking lot**
- Removes a **car number** when the car leaves the **parking lot**

The input will be a string in the format: **"direction, carNumber".** You will be receiving commands until the **"END"** command is given.

Print the car numbers of the cars, which are still in the 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	CA9999TT CA2844AA CA9876HH CA2822UU
IN, CA2844AA IN, CA1234TA OUT, CA2844AA OUT, CA1234TA END	Parking Lot is Empty

Hints

- Car numbers are **unique**
- Before printing, **first, check** if the set has any elements

Solution

You can help yourself with the code below:

```
var input = Console.ReadLine();
var parking = new HashSet<string>();
while (input != "END")
{
    var inputParams = Regex.Split(input, ", ");
    if (inputParams[0] == "IN")
    {
        parking.Add(inputParams[1]);
    }
    else
    {
        parking.Remove(inputParams[1]);
    }

    input = Console.ReadLine();
}
```

8. SoftUni Party

There is a party in SoftUni. Many guests are invited and there are two types of them: VIP and Regular. When a guest comes, check if he/she exists in any of the two reservation lists.

All reservation numbers will be with the length of 8 chars.

All VIP numbers start with a digit.

First, you will be receiving the reservation numbers of the guests. You can also receive 2 possible commands:

- **"PARTY"** – After this command, you will begin receiving the reservation numbers of the people, who came to the party.
- **"END"** – The party is over and you have to stop the program and print the appropriate output.

In the end, print the count of the guests who didn't come to the party, and afterward, print their reservation numbers. the VIP guests 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	2 xys2FYzn MDzcM9ZK

		MDzcM9ZK PARTY 2FQZT3uC dziNz78I mdSGyQCJ LjcVpmDL fPXNHpm1 HTTbwRmM B5yTkMQi 8N0FThqG m8rfQBvl fc1oZCE0 UgffRkOn 7ugX7bm0 9CQBGUeJ END	