Lab: Dictionaries, Lambda and LINQ

Problems for in-class lab for the "C# Fundamentals" course @ SoftUni
You can check your solutions in Judge

I. Associative Arrays

1. Count Real Numbers

Read a **list of integers** and **print them in ascending order,** along with their **number of occurrences**.

Examples

Input	Output
8 2 2 8 2	2 -> 3 8 -> 2

Input	Output
1 5 1 3	1 -> 2 3 -> 1 5 -> 1

Input	Output
-2 0 0 2	-2 -> 1 0 -> 2 2 -> 1

Hints

Read an array of doubles:

```
double[] numbers = Console.ReadLine()
    .Split()
    .Select(double.Parse)
    .ToArray();
```

Use **`SortedDictionary<double, int>`** named **`counts`**.

```
SortedDictionary<double, int> counts = new SortedDictionary<double, int>();
```

Pass through each of the numbers and increase their count - **`counts[num]`**, if **`num`** exists in the dictionary, or assign **`counts[num] = 1`**, if the number does not exist in the dictionary. We are assigning it that value, because it is its first occurrence. The count represents the occurrences.

```
foreach (int number in numbers)
{
    if (counts.ContainsKey(number))
    {
        counts[number]++;
    }
    else
    {
        counts.Add(number, 1);
    }
}
```

Pass through all of the numbers in the dictionary and print the number **`num`** and its count of occurrences.

```
foreach (var number in counts)
{
    Console.WriteLine($"{number.Key} -> {number.Value}");
}
```

2. Odd Occurrences

Create a program that extracts all elements from a given sequence of words that are present in it an **odd number of times** (case-insensitive).

- Words are given on a single line, space-separated.
- Print the result elements in lowercase, in their order of appearance.

Examples

Input	Output
Java C# PHP PHP JAVA C java	java c# c
3 5 5 hi pi HO Hi 5 ho 3 hi pi	5 hi
a a A SQL xx a xx a A a XX c	a sql xx c

Hints

Read a line from the console and split it by a space.

```
string[] words = Console.ReadLine().Split();
```

Use a **dictionary** (**`string` → `int`**) to count the occurrences of each word.

```
Dictionary<string, int> counts = new Dictionary<string, int>();
```

Pass through each of the elements in the array and count each word.

```
foreach (string word in words)
{
    string wordInLowerCase = word.ToLower();
    if (counts.ContainsKey(wordInLowerCase))
    {
        counts[wordInLowerCase]++;
    }
    else
    {
        counts.Add(wordInLowerCase, 1);
    }
}
```

Pass through the dictionary and print words that occur at odd times.

```
foreach (var count in counts)
{
    if (count.Value % 2 != 0)
    {
        Console.WriteLine(count.Key + " ");
    }
}
```

3. Word Synonyms

Create a program, which keeps a dictionary with synonyms. The **key** of the dictionary will be the **word**. The **value** will be a **list of all the synonyms of that word**. You will be given a number **n – the count of the words**. After each word, you will be given a synonym, so the count of lines you have to read from the console is **2 * n.** You will be receiving a **word** and a **synonym** each on a separate line like this:

- {word}
- {synonym}

If you get the same word twice, just add the new synonym to the list.

Print the words in the following format:

"{word} - {synonym1, synonym2, …, synonymN}"

Examples

Input	Output
3 cute adorable cute charming smart clever	cute - adorable, charming smart - clever
2 task problem task assignment	task – problem, assignment

Hints

- Use a **Dictionary (string → List<string>)** to keep all of the synonyms.

```
var words = new Dictionary<string, List<string>>();
```

- **Read n * 2 lines**
- **Add the word in the dictionary, if it is not present**

```
if (words.ContainsKey(word) == false)
{
    words.Add(word, new List<string>());
}
```

- **Add the synonym as a value to the given word**

```
words[word].Add(synonym);
```

- Print each word with the synonyms in the required format

II. LINQ

4. Word Filter

Read an array of strings and take only words, whose length is an even number. Print each word on a new line.

Examples

Input	Output
kiwi orange banana apple	kiwi

	orange banana
pizza cake pasta chips	cake

- Read an array of strings
- Filter those, whose length is even

```
string[] words = Console.ReadLine()
    .Split()
    .Where(w => w.Length % 2 == 0)
    .ToArray();
```

- Print each word on a new line