# Exercises: Advanced Collections

Problems for exercises and homework for the [“Programming Fundamentals” course @ SoftUni](https://softuni.bg/courses/programming-fundamentals).

Check your solutions here: [https://judge.softuni.bg/Contests/433/Advanced-Collections-Exercises](https://judge.softuni.bg/Contests/433).

## Wardrobe

You just bought a new wardrobe. The weird thing about it is that it came prepackaged with a big box of clothes (just like those refrigerators, which ship with free beer inside them)! So, you’ll need to find something to wear.

### Input

On the first line of the input, you will receive n – the **number of lines** of clothes, which came prepackaged for the wardrobe.

On the next n lines, you will receive the clothes for each color in the format:

* “{color} -> {item1},{item2},{item3}…”

If a color is added a **second** time, **add** **all items** from it and count the duplicates.

Finally, you will receive the **color** and **item** of the clothing, that you need to look for.

### Output

Go through all the **colors** of the clothes and print them in the following format:

|  |
| --- |
| **{color}** clothes:  \* **{item1}** - **{count}**  \* **{item2}** - **{count}**  \* **{item3}** - **{count}**  …  \* **{itemN}** - **{count}** |

If the **color** lines up with the **clothing item**, print “(found!)” alongside the item. See the examples to better understand the output.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 4  Blue -> dress,jeans,hat  Gold -> dress,t-shirt,boxers  White -> briefs,tanktop  Blue -> gloves  Blue dress | Blue clothes:  \* dress - 1 (found!)  \* jeans - 1  \* hat - 1  \* gloves - 1  Gold clothes:  \* dress - 1  \* t-shirt - 1  \* boxers - 1  White clothes:  \* briefs - 1  \* tanktop - 1 |

|  |  |
| --- | --- |
| **Input** | **Output** |
| 4  Red -> hat  Red -> dress,t-shirt,boxers  White -> briefs,tanktop  Blue -> gloves  White tanktop | Red clothes:  \* hat - 1  \* dress - 1  \* t-shirt - 1  \* boxers - 1  White clothes:  \* briefs - 1  \* tanktop - 1 (found!)  Blue clothes:  \* gloves - 1 |

|  |  |
| --- | --- |
| **Input** | **Output** |
| 5  Blue -> shoes  Blue -> shoes,shoes,shoes  Blue -> shoes,shoes  Blue -> shoes  Blue -> shoes,shoes  Red tanktop | Blue clothes:  \* shoes - 9 |

## Key-Key Value-Value

Write a program, which searches for a **key** and **value** inside of several **key-value** pairs.

### Input

On the first line, you will receive a **key**. On the second line, you will receive a **value**. On the third line, you will receive **N**. On the next **N** lines, you will receive strings in the following format:

“key => {value 1};{value 2};…{value X}”

After you receive **N** **key -> values** pairs, your task is to go through them and print **only** the **keys**, which contain the **key** and the **values**, which contain the **value**. Print them in the following format:

|  |
| --- |
| **{key}**:  -**{value1}**  -**{value2}**  …  -**{valueN}** |

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| bug  X  3  invalidkey => testval;x;y  debug => XUL;ccx;XC  buggy => testX;testY;XtestZ | debug:  -XUL  -XC  buggy:  -testX  -XtestZ |
| key  valu  2  xkeyc => value;value;valio  keyhole => valuable;x;values | xkeyc:  -value  -value  keyhole:  -valuable  -values |

## Travel Company

Write a program, which categorizes information about a travel company.

Companies have various vehicles planned for different cities. Every city has prepared several **types of vehicles**. Each vehicle type has a different **capacity**.

Until you receive the command “ready”, you will receive all the **cities** the company offers holiday packages for, and their respective **vehicle types** + **capacities** in the format:

* “{city}:{type}-{capacity},{type}-{capacity}…”

An example city with its transportation options would look like this:

* “Athens:bus-40,airplane-300,train-150”

If a city is entered a **second time**, add all transport which **hasn’t already been added** and **replace** **existing** transports’ capacities with the new ones.

After the “ready” command, you will start receiving **groups** for various cities in the format: “{city} {peopleCount}” until you receive “travel time!”.

After that, calculate whether the **group** will have **enough seats** to accommodate the passengers and print the status per these conditions:

If the group’s size is **smaller than or equal to** the **combines seats** in all the vehicles, print:

* “{city} -> all {peopleCount} accommodated”

If the group’s size is **larger than** the **combines seats** in all the vehicles, print:

* “{city} -> all except {peopleCount - transportCapacities} accommodated”

### Constraints

* There will be **no redundant whitespaces** anywhere in the input.
* The input will **always** be in the **format specified**.
* The **group cities** will **always** be **existing** cities.
* The **group sizes** will **always** be **positive**.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| Athens:bus-40,airplane-300,train-150  Athens:minibus-8,airplane-350  Warsaw:bus-30,train-150,airplane-120  ready  Athens 400  Warsaw 500  travel time! | Athens -> all 400 accommodated  Warsaw -> all except 200 accommodated |

|  |  |
| --- | --- |
| **Input** | **Output** |
| Sofia:bus-30,airplane-150,train-25  Istanbul:minibus-6,train-80  Sofia:bus-45  Sofia:bus-50  Berlin:airplane-120  ready  Berlin 115  Istanbul 200  Sofia 200  travel time! | Berlin -> all 115 accommodated  Istanbul -> all except 114 accommodated  Sofia -> all 200 accommodated |

## Shellbound

Vladi is a crab. Crabs are scared of almost anything, which is why they usually hide in their shells. Vladi is a rich crab though. He has acquired many outer shells, in different regions, in which he can hide – each with a different size.

However, it is really annoying to look after all your shells when they are so spread out. That is why Vladi decided to merge all shells in each region, so that he has one big shell for every region. He needs your help to do that.

You will be given several input lines containing a **string** and an **integer**, **separated** by a **space**. The **string** will represent the **region’s name**, and the **integer** – the shell in the **given region**, **size**.

You must store all shells in their corresponding regions.  
If the region **already exists**, **add** the **new shell** to it. Make sure you have **NO** duplicate shells (shells with **same size**). Vladi doesn’t like shells to have the same size.

When you receive the command “Aggregate”, you must stop reading input lines, and you must print **every region**, **all of the shells** in that region, and the **size** of the **giant shell** after you’ve merged them in the following format:

{regionName} -> {shell 1, shell 2…, shell n…} ({giantShell})

The giant shell size is calculated when you **subtract** the **average** of the shells from the **sum** of the shells.  
Or in other words: (sum of shells) – ((sum of shells) / (count of shells)).

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| Sofia 50  Sofia 20  Sofia 30  Varna 10  Varna 20  Aggregate | Sofia -> 50, 20, 30 (67)  Varna -> 10, 20 (15) |
| Sofia 2  Sofia 1  Plovdiv 100  Plovdiv 50  Aggregate | Sofia -> 2, 1 (2)  Plovdiv -> 100, 50 (75) |

### Constraints

* All numeric data will be represented with **integer** variables in **range [0, 1.000.000.000]**.

## Dict-Ref-Advanced

Remember the Dict-Ref Problem from the previous exercise? Well this one is an Advanced Version.

You will begin receiving input lines containing information in one of the following formats:

* {key} -> {value 1, value 2, …, value n}
* {key} -> {otherKey}

The **keys** will always be **strings**, and the **values** will always be **integers**, **separated** by a **comma** and a **space**.

If you are **given a key** and **values**, you must **store** the **values** to the **given key**. If the **key** already **exists**, you must **add** the **given values** to the old ones.

If you are **given a key** and **another key**, you must **copy** the **values** of the **other key** to the **first one**. If the **other key** **does not exist**, this input line must be **IGNORED**.

When you receive the command “**end**”, you must stop reading input lines, and you must print all keys with their values, in the following format:

* {key} === {value1, value2, value3. . .}

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| Isacc -> 5, 4, 3  Peter -> 6, 3, 3  Derek -> 2, 2, 2  end | Isacc === 5, 4, 3  Peter === 6, 3, 3  Derek === 2, 2, 2 |
| Donald -> 2, 2, 2  Isacc -> 1  George -> John  John -> Isacc  end | Donald === 2, 2, 2  Isacc === 1  John === 1 |

## Forum Topics

You have been tasked to store a few forum topics, and filter them by several given tags.  
You will be given several input lines, containing data about topics in the following format:

{topic} -> {tag1, tag2, tag3...}

**The topic and tags will be strings. They will NOT contain spaces or ‘**-**’, ‘**>**’ symbols.**

**If you receive an existing topic, you must add the new tags to it. There should be NO duplicate tags.**

**When you receive the command “**filter**”, you must end the input sequence. On the next line (after “**filter**”), you will receive a sequence of tags, separated by a comma and a space. You must print ONLY those topics, which contain all tags in the given sequence.**

**The topics must be printed in the following format:**{topic} | {#tag1, #tag2, …, #tagN}

**NOTE: The tags have a number sign (‘**#**’) as a prefix.**

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| HelloWorld -> hello, forum, topic  HelpWithHomework -> homework, forum, topic  filter  forum, topic | HelloWorld | #hello, #forum, #topic  HelpWithHomework | #homework, #forum, #topic |
| First -> this  First -> that  First -> who  Second -> this, what, why  First -> this  Third -> this, third  Third -> that  filter  that, this | First | #this, #that, #who  Third | #this, #third, #that |

## ****Social Media Posts****

You have been tasked to create a Console Social Media Database.

You will receive several input lines in one of the following formats:

* post {postName}
* like {postName}
* dislike {postName}
* comment {postName} {commenterName} {content}

If you receive the **post** command, you must **create** a **post** with the **given name**.

If you receive the **like** command you must **add** a **like** to the **given post**.

If you receive the **dislike** command you must add a **dislike** to the **given post**.

If you receive the **comment** command, you must **add** a **comment** to the **given post**. The **comment’s** **writer** must be the **given commentator name**, and the **content** of the **comment** must be the **given content**.

By default, the posts have **0 likes**, **0 dislikes** and **0 comments** when created.

When you receive the command “drop the media”, you must end the input sequence, and you must print **every post** with its **likes**, **dislikes** and **comments** in the following format:

|  |
| --- |
| Post: {postName} | Likes: {likes} | Dislikes {dislikes} Comments: \* {commentator1}: {comment1} \* {commentator2}: {comment2} . . . |

If a certain **post** does **not** have **any** comments, you should just print “**None**”.

The comments have a **prefix** of a **single** **asterisk** (‘**\***’) and **2 spaces**.

There is **NO space** between the **commentator’s name** and the **colon**.

### Constraints

* The **post name** will be a **string** of **letters** and **digits**.
* The **commentator’s name** will be a **string** of **letters**.
* The comment’s **CONTENT**, may contain **ANY ASCII** character.
* There will be **NO invalid** input data.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| post FirstPost  like FirstPost  like FirstPost  dislike FirstPost  post SecondPost  comment FirstPost Isacc Cool  comment SecondPost Isacc Lol  like SecondPost  drop the media | Post: FirstPost | Likes: 2 | Dislikes: 1  Comments:  \* Isacc: Cool  Post: SecondPost | Likes: 1 | Dislikes: 0  Comments:  \* Isacc: Lol |
| post SomePost  like SomePost  like SomePost  dislike SomePost  post OtherPost  comment OtherPost Isacc Naaais  comment OtherPost Peter GoodPost  comment OtherPost John Meh...  drop the media | Post: SomePost | Likes: 2 | Dislikes: 1  Comments:  None  Post: OtherPost | Likes: 0 | Dislikes: 0  Comments:  \* Isacc: Naaais  \* Peter: GoodPost  \* John: Meh... |