# Exercise: Associative Arrays, Lambda and Stream API

Problems with exercises and homework for the ["Programming Fundamentals" course @ SoftUni.](https://softuni.bg/trainings/4381/programming-fundamentals-with-java-january-2024)

You can check your solutions in [Judge.](https://judge.softuni.org/Contests/1312)

## Count Chars in a String

Write a program that **counts all characters** in a string **except space (' ')**.

**Print all occurrences in the following format:**

**"{char} -> {occurrences}"**

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| text | t -> 2  e -> 1  x -> 1 |
| text text text | t -> 6  e -> 3  x -> 3 |

## A Miner Task

Until you receive the **"stop"** command, you will be given a sequence of strings, each on a new line. Every **odd** line on the console represents a **resource** (e.g., Gold, Silver, Copper, etc.) and every **even** - **quantity**. Your task is to collect the resources and print them on a new line.

**Print the resources and their quantities in the format: "{resource} –> {quantity}".**

The quantities inputs will be in the range **[1 … 2 000 000 000].**

### Examples

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Input** | **Output** |  | **Input** | **Output** |
| Gold  155  Silver  10  Copper  17  stop | Gold -> 155  Silver -> 10  Copper -> 17 |  | gold  155  silver  10  copper  17  gold  15  stop | gold -> 170  silver -> 10  copper -> 17 |

## Orders

Write a program which keeps the information about **products** and their **prices**. Each product has a **name**, a **price,** and its **quantity**. If the product **doesn't exist** yet, **add** it with its **starting quantity**.

If you receive a product that **already exists,** **increases** its quantity by the input quantity and if its **price is different**, **replace** the price as well.

You will receive products' **names**, **prices,** and **quantities** on **new lines**.Until you receive the command "**buy**", keep adding items. When you do receive the command "**buy**", print the items with their **names** and the **total price** of all the products with that name.

**Input**

* Until you receive "**buy**", the products come in the format: "**{name} {price} {quantity}**".
* The product data is **always** delimited by a **single space.**

**Output**

* Print information about **each** **product**, following the format:   
  "**{productName} -> {totalPrice}**"
* **Format** the average total price to the **2nd decimal place.**

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| Beer 2.20 100  IceTea 1.50 50  NukaCola 3.30 80  Water 1.00 500  buy | Beer -> 220.00  IceTea -> 75.00  NukaCola -> 264.00  Water -> 500.00 |
| Beer 2.40 350  Water 1.25 200  IceTea 5.20 100  Beer 1.20 200  IceTea 0.50 120  buy | Beer -> 660.00  Water -> 250.00  IceTea -> 110.00 |
| CesarSalad 10.20 25  SuperEnergy 0.80 400  Beer 1.35 350  IceCream 1.50 25  buy | CesarSalad -> 255.00  SuperEnergy -> 320.00  Beer -> 472.50  IceCream -> 37.50 |

## SoftUni Parking

*SoftUni just got a new* ***parking lot****. It's so fancy, it even has online* ***parking validation****. Except, the online service doesn't work. It can only receive users' data but doesn't know what to do with it. Good thing you're on the dev team and know how to fix it, right?*

Write a program that validates parking for an online service. Users can **register** to park and **unregister** to leave.

The program **receives 2 commands**:

* "register {username} {licensePlateNumber}":
  + The system only supports **one car per user** at the moment, so if a user tries to register **another license plate** using the **same username**, the system should print:  
    "ERROR: already registered with plate number {licensePlateNumber}"
  + If the aforementioned checks pass successfully, the plate can be registered, so the system should print:  
    "{username} registered {licensePlateNumber} successfully"
* "unregister {username}":
  + If the user is **not present** in the database, the system should print:  
    "ERROR: user {username} not found"
  + If the aforementioned check passes successfully, the system should print:  
    "{username} unregistered successfully"

After you execute all of the commands, **print** all the currently **registered users** and their **license plates** in the format:

* "{username} => {licensePlateNumber}"

### Input

* First line: **n** - **number of commands** – **integer.**
* Next **n** lines: **commands** in one of **two** possible formats:
  + Register: "register {username} {licensePlateNumber}"
  + Unregister: "unregister {username}"

The input will **always** be **valid,** and you **do not need** to check it explicitly.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 5  register John CS1234JS  register George JAVA123S  register Andy AB4142CD  register Jesica VR1223EE  unregister Andy | John registered CS1234JS successfully  George registered JAVA123S successfully  Andy registered AB4142CD successfully  Jesica registered VR1223EE successfully  Andy unregistered successfully  John => CS1234JS  George => JAVA123S  Jesica => VR1223EE |
| 4  register Jony AA4132BB  register Jony AA4132BB  register Linda AA9999BB  unregister Jony | Jony registered AA4132BB successfully  ERROR: already registered with plate number AA4132BB  Linda registered AA9999BB successfully  Jony unregistered successfully  Linda => AA9999BB |
| 6  register Jacob MM1111XX  register Anthony AB1111XX  unregister Jacob  register Joshua DD1111XX  unregister Lily  register Samantha AA9999BB | Jacob registered MM1111XX successfully  Anthony registered AB1111XX successfully  Jacob unregistered successfully  Joshua registered DD1111XX successfully  ERROR: user Lily not found  Samantha registered AA9999BB successfully  Anthony => AB1111XX  Joshua => DD1111XX  Samantha => AA9999BB |

## Courses

Write a program which keeps the information about **courses**. Each course has a **name** and **registered students**.

You will receive the **course** **name** and **student** **name** until you receive the command "**end**". **Check if such a course already exists and if not - add the course.** Register the user into the course. When you do receive the command "**end**", print the courses with their **names** and **total registered users**. For each contest, print the registered users.

**Input**

* Until you receive "**end**", the input come in the format: "**{courseName} : {studentName}**".
* The product data is **always** delimited by " **:** ".

**Output**

* Print information about **each** **course**, following the format:   
  **"{courseName}: {registeredStudents}"**
* Print information about each student, following the format:  
  **"-- {studentName}"**

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| Programming Fundamentals : John Smith  Programming Fundamentals : Linda Johnson  JS Core : Will Wilson  Java Advanced : Harrison White  end | Programming Fundamentals: 2  -- John Smith  -- Linda Johnson  JS Core: 1  -- Will Wilson  Java Advanced: 1  -- Harrison White |
| Algorithms : Jay Moore  Programming Basics : Martin Taylor  Python Fundamentals : John Anderson  Python Fundamentals : Andrew Robinson  Algorithms : Bob Jackson  Python Fundamentals : Clark Lewis  end | Algorithms: 2  -- Jay Moore  -- Bob Jackson  Programming Basics: 1  -- Martin Taylor  Python Fundamentals: 3  -- John Anderson  -- Andrew Robinson  -- Clark Lewis |

## Student Academy

Write a program that keeps the information about **students** and **their grades**.

On the first line, you will receive number **n**. After that, you will receive **n pair of rows**. First, you will receive the **student's name, after that, you will receive his grade. Check if the student already exists and if not - add him**. Keep track of all grades for each student.

When you finish reading data, keep students with an **average grade higher or equal to 4.50**.

**Print the students and their average grade in the format:**

**"{name} –> {averageGrade}"**

**Format** the average grade to the **2nd decimal place**.

### Examples

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Input** | **Output** |  | **Input** | **Output** |
| 5  John  5.5  John  4.5  Alice  6  Alice  3  George  5 | John -> 5.00  Alice -> 4.50  George -> 5.00 |  | 5  Amanda  3.5  Amanda  4  Rob  5.5  Christian  5  Robert  6 | Rob -> 5.50  Christian -> 5.00  Robert -> 6.00 |

## Legendary Farming

You are playing a game, and your goal is to **win a** **legendary item** -any legendary item will be good enough. However, it's a tedious process and requires quite a bit of farming. The possible **items** are:

* **"Shadowmourne"** - requires **250 Shards**
* **"Valanyr"** - requires **250 Fragments**
* **"Dragonwrath"** - requires **250 Motes**

**"Shards"**, **"Fragments"**,and **"Motes"** are the **key materials** (**case-insensitive**), and everything else is **junk.**

You will be given lines of input in the format:

**"{quantity1} {material1} {quantity2} {material2} … {quantityN} {materialN}"**

Keep track of the **key materials -** the **first** one that reaches **250,** **wins** the **race**. At that point, you have to print that the corresponding legendary item is obtained.

In the end, print the **remaining** **shards, fragments, and motes** in the format:

**"shards: {numberOfShards}**

**fragments: {numberOfFragments}**

**motes: {numberOfMotes}"**

Finally, **print** the collected **junk** items in the order of appearance.

### Input

* Each line comes in the following format: **"{quantity1} {material1} {quantity2} {material2} … {quantityN} {materialN}"**

### Output

* On **the** **first line**, print the obtained item in the format: "**{Legendary item} obtained!"** .
* On **the next three lines**, print the remaining key materials.
* On the **several final lines**, print the **junk** items.
* All materials should be printed in the format: **"{material}: {quantity}"**.
* The output should be **lowercase**, except for the first letter of the legendary.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 3 Motes 5 stones 5 Shards  6 leathers 255 fragments 7 Shards | Valanyr obtained!  shards: 5  fragments: 5  motes: 3  stones: 5  leathers: 6 |
| 123 silver 6 shards 8 shards 5 motes  9 fangs 75 motes 103 MOTES 8 Shards  86 Motes 7 stones 19 silver | Dragonwrath obtained!  shards: 22  fragments: 0  motes: 19  silver: 123  fangs: 9 |

## Company Users

Write a program which keeps the information about companies and their employees.

You will receive company names and an employees' id until you receive the "**End**" command. **Add** **each employee** to the given company. Keep in mind that a **company cannot have two employees with the** **same id**.

Print the **company name** and **each employee's id** in the following format:

**"{company\_name}**

**-- {id1}**

**-- {id2}**

**…**

**-- {idN}"**

**Input / Constraints**

* Until you receive "**End**", the input come in the format: "**{companyName} -> {employeeId}**".
* The input **always** will be valid.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| SoftUni -> AA12345  SoftUni -> BB12345  Microsoft -> CC12345  HP -> BB12345  End | SoftUni  -- AA12345  -- BB12345  Microsoft  -- CC12345  HP  -- BB12345 |
| SoftUni -> AA12345  SoftUni -> CC12344  Lenovo -> XX23456  SoftUni -> AA12345  Movement -> DD11111  End | SoftUni  -- AA12345  -- CC12344  Lenovo  -- XX23456  Movement  -- DD11111 |

## \*ForceBook

*The force users are struggling to remember which side is the different forceUsers from because they switch them too often. So you are tasked to create a web application to manage their profiles.*

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

"{force\_side} | {force\_user}"

"{force\_user} -> {force\_side}"

The "force\_user" and **"force\_side"** are strings containing any character.

If you receive "force\_side | force\_user":

* If there is **no such force user** and **no such** **force side -> create a new force side** and **add** the **force user** to the corresponding side.
* Only **if there is no such force user** on any **force side** -> **add** the **force user** to the corresponding side.
* If there is such **force user** already -> **skip** the command and continue to the next operation.

If you receive a **"**force\_user -> force\_side":

* If there is such **force user** already -> **change their side**.
* If there is no such **force user** on any **force side** -> add the **force user** to the corresponding **force side**.
* If there is no such **force user** and no such **force side -> create a new force side** and **add** the **force user** to the corresponding side.
* Then you should print on the console: "{force\_user} joins the {force\_side} side!".

You should **end your program** when you receive the command "Lumpawaroo". At that point, you should print each force side. For each side, print the **force users**.

In case there are **no force users on a side**, you **shouldn't print** the side information.

### Input / Constraints

* The input comes in the form of commands in one of the formats specified above.
* The input ends when you receive the command "Lumpawaroo".

### Output

* As output for each force side, you must print all the force users.
* The output format is:

"Side: {forceSide}, Members: {forceUsers.Count}

! {forceUser}

! {forceUser}

! {forceUser}"

* In case there are **NO** forceUsers, don't print this side.

### Examples

|  |  |  |
| --- | --- | --- |
| **Input** | **Output** | **Comments** |
| Light | Peter  Dark | Kim  Lumpawaroo | Side: Light, Members: 1  ! Peter  Side: Dark, Members: 1  ! Kim | We register Peter on the Light side and Kim on the Dark side. After receiving "Lumpawaroo", we print both sides. |
| Lighter | Royal  Darker | DCay  Ivan Ivanov -> Lighter  DCay -> Lighter  Lumpawaroo | Ivan Ivanov joins the Lighter side!  DCay joins the Lighter side!  Side: Lighter, Members: 3  ! Royal  ! Ivan Ivanov  ! DCay | Although Ivan Ivanov doesn't have a profile, we **registered** him and added him to the Lighter side.  We **remove DCay** from the Darker side and add him to the Lighter side.  We print only the Lighter side because the Darker side **has no members.** |

## \*SoftUni Exam Results

Judge statistics on the last Programming Fundamentals exam were not working correctly, so you have the task to take all the submissions and analyze them properly. You should collect all the submissions and print the final results and statistics about each language in which the participants submitted their solutions.

You will be receiving lines in the following format: "{username}-{language}-{points}" **until you receive** "exam finished".You should store each username and their submissions and points.   
You can receive a **command to ban** a user for cheating in the following format: "{username}-banned". In that case, you should **remove** the user from the contest but **preserve his submissions in the total count of submissions for each language**.

After receiving "exam finished", print each of the participants in the following format:

"Results:

{username} | {points}

{username2} | {points}

…

{usernameN} | {points}"

After that, print each language used in the exam in the following format:

"Submissions:

{language1} - {submissions\_count}

{language2} - {submissions\_count}

…

{language3} - {submissions\_count}"

### Input / Constraints

Until you receive **"exam finished**", you will be receiving participant submissions in the following format: "**{username}-{language}-{points}**"

You can receive a ban command -> "**{username}-banned**".

The participant's points will always be a **valid integer in the range [0-100].**

### Output

* Print the exam results for each participant.
* After that, print each language in the format shown above.
* Allowed working **time** / **memory**: **100ms** / **16MB.**

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| Peter-Java-84  George-C#-84  George-C#-70  Katy-C#-94  exam finished | Results:  Peter | 84  George | 84  Katy | 94  Submissions:  Java - 1  C# - 3 |
| Peter-Java-91  George-C#-84  Katy-Java-90  Katy-C#-50  Katy-banned  exam finished | Results:  Peter | 91  George | 84  Submissions:  Java - 2  C# - 2 |