# Exercise: Objects and Classes

Tasks for exercise in class and for homework to the course ["Programming Advanced for QA" @ SoftUni](https://softuni.bg/trainings/4257/programming-advanced-for-qa-november-2023)

Test your tasks in the Judge system: [https://judge.softuni.org/Contests/4487](https://judge.softuni.org/Contests/4487/Objects-and-Classes-Exercise)

## Students

Create a program that sorts some students by their grade in descending order. Each student should have:

* **First name** (string)
* **Last name** (string)
* **Grade** (a floating-point number)

### Input

* On the first line, you will receive a number **n** - the **count of all students.**
* On the next **n** lines, you will be receiving information about these students in the following format: **"{first name} {second name} {grade}".**

### Output

* Print out the information about each student in the following format: **"{first name} {second name}: {grade}".**

### Example

|  |  |
| --- | --- |
| **Input** | **Output** |
| 4  Lakia Eason 3.90  Prince Messing 5.49  Akiko Segers 4.85  Rocco Erben 6.00 | Rocco Erben: 6.00  Prince Messing: 5.49  Akiko Segers: 4.85  Lakia Eason: 3.90 |
| 3  Mary Elizabeth 4.22  Li Xiao 5.74  Liz Smith 4.87 | Li Xiao: 5.74  Liz Smith: 4.87  Mary Elizabeth: 4.22 |

## Articles

Create a **class** **Article** with the following properties:

* **Title** – a string
* **Content** – a string
* **Author** – a string

The class should have a constructor and the following methods:

* **Edit (new content**) – change the old content with the new one
* **ChangeAuthor (new author)** – change the author
* **Rename (new title)** – change the title of the article
* Override the **ToString** method – print the article in the following format:

**"{title} - {content}: {author}"**

Create a program that reads an article in the following format **"{title}, {content}, {author}"**. On the next line, you will receive a number **n,** representing the number of commands, which will follow after it. On the next **n lines,** you will be receiving the following commands:

* **"Edit: {new content}"**
* **"ChangeAuthor: {new author}"**
* **"Rename: {new title}"**

In the end, print the final state of the article.

### Example

|  |  |
| --- | --- |
| **Input** | **Output** |
| some title, some content, some author  3  Edit: better content  ChangeAuthor: better author  Rename: better title | better title - better content: better author |
| Fight club, love story, Martin Scorsese  2  Edit: underground fight club that evolves into much more  ChangeAuthor: Chuck Palahniuk | Fight club - underground fight club that evolves into much more: Chuck Palahniuk |

## \* Teamwork Projects

It's time for the teamwork projects and you are responsible for gathering the teams. First, you will receive an integer – the **count** of the **teams** you will have to **register**. You will be given a **user** and a **team**, separated with "-". The user is the **creator** of **the team**. For every newly created team you should **print** a message:

"Team {teamName} has been created by {user}!".

Next, you will receive а user with a team, separated with **"->"**, which means that the user wants to **join** that **team**. Upon receiving the command: "end of assignment", you should print **every team**, **ordered** by the **count** of its **members** (**descending**) and then by **name** (**ascending**). For each team, you have to print its members **sorted** by name (**ascending**). However, there are several **rules**:

* If а user tries to **create** a team more than once, a message should be displayed:
  + "Team {teamName} was already created!"
* A creator of a team **cannot** **create** another team – the following message should be thrown:
  + "{user} cannot create another team!"
* If а user tries to **join** a non-existent team, a message should be displayed:
  + "Team {teamName} does not exist!*"*
* A member of a team **cannot** **join** another team – the following message should be thrown:
  + "Member {user} cannot join team {team Name}!"
* In the end,teams with **zero** members (with **only a creator**) should **disband** and you have toprint them **ordered by name in ascending order**.
* Every **valid** team should be printed ordered by **name** (ascending) in the following format:

|  |
| --- |
| "{teamName}  - {creator}  -- {member}…" |

### Examples

|  |  |  |
| --- | --- | --- |
| **Input** | **Output** | **Comments** |
| 2  John-PowerPuffsCoders  Tony-Tony is the best  Peter->PowerPuffsCoders  Tony->Tony is the best  end of assignment | Team PowerPuffsCoders has been created by John!  Team Tony is the best has been created by Tony!  Member Tony cannot join team Tony is the best!  PowerPuffsCoders  - John  -- Peter  Teams to disband:  Tony is the best | Tony created a team, which he attempted to join later and this action resulted in throwing a certain message. Since nobody else tried to join his team, the team had to **disband**. |
| 3  Tanya-CloneClub  Helena-CloneClub  Tedy-SoftUni  George->softUni  George->SoftUni  Tatyana->Leda  John->SoftUni  Cossima->CloneClub  end of assignment | Team CloneClub has been created by Tanya!  Team CloneClub was already created!  Team SoftUni has been created by Tedy!  Team softUni does not exist!  Team Leda does not exist!  SoftUni  - Tedy  -- George  -- John  CloneClub  - Tanya  -- Cossima  Teams to disband: | Note that when a user joins a team, you should first check if the team exists and then check if the user is already in a team:  Tanya has created CloneClub, then she tried to join a non-existent team and the concrete message was displayed. |

## \* Pokemon Trainer

Define a class **Trainer** and a class **Pokemon**.

**Trainers** have:

* **Name**
* **Number of badges**
* **A collection of pokemon**

**Pokemon** have:

* **Name**
* **Element**
* **Health**

All values are **mandatory**. Every Trainer **starts with 0 badges**.

You will be receiving lines until you receive the command "**Tournament**". Each line will carry information about a pokemon and the trainer who caught it in the format:

**"{trainerName} {pokemonName} {pokemonElement} {pokemonHealth}"**

**TrainerName** is the name of the Trainer who caught the pokemon. Trainers' names are **unique**.  
After receiving the command "**Tournament**", you will start receiving commands until the "**End**" command is received. They can contain one of the following:

* **"Fire"**
* **"Water"**
* **"Electricity"**

For every command, you must check if a trainer has at least 1 pokemon with the given element. If he does, he receives 1 badge. Otherwise, all of his pokemon **lose 10 health**. If a pokemon falls **to 0 or less health**, **he dies** and must be deleted from the trainer's collection. In the end, you should print all of the trainers, **sorted by the number of badges they have in descending order** (if two trainers have the same amount of badges, they should be sorted by order of appearance in the input)in the format:

**"{trainerName} {badges} {numberOfPokemon}"**

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| Peter Charizard Fire 100  George Squirtle Water 38  Peter Pikachu Electricity 10  Tournament  Fire  Electricity  End | Peter 2 2  George 0 1 |
| Sam Blastoise Water 18  Narry Pikachu Electricity 22  John Kadabra Psychic 90  Tournament  Fire  Electricity  Fire  End | Narry 1 1  Sam 0 0  John 0 1 |