# Scoreboard – Data Structures Exam

A **scoreboard** system keeps a set of **users**, **games** and **score** achieved by users playing the games. Each **user** has **username** and **password**. Each **game** has **game name** and **game** **password**. **Scoreboard** hold sets of score achieved in set of games. Your task is to model the scoreboard system and design a **data structure to hold the scoreboard**. Write a program that executes a sequence of commands, given in the input (a single command at a line):

* RegisterUser username password– registers a user into the system. Usernames are unique so duplicates are not allowed. As a result the command prints “**User registered**” in case of success or “**Duplicated user**” in case the username already exists.
* RegisterGame gameName password– registers a game into the system. Game names are unique so duplicates are not allowed. As a result the command prints “**Game registered**” in case of success or “**Duplicated game**” in case the game name already exists.
* AddScore username userPassword gameName gamePassword score– adds given score (integer number) to given game for given user. In case of success, adds the score and prints “**Score added**” as command result. In case the user or game does not exists or the passwords do not match, the command prints “**Cannot add score**”. A user can have **multiple scores** achieved in the same game.
* ShowScoreboard game– shows the **top 10 highest score** for the specified game in the following format:

#1 peter 1560

#2 yavor 1560

#3 maria 1400

…

* When multiple users have the same score, order them by username.
* When less than 10 score exist in the specified game, show them all.
* When more than 10 score exist in the specified game, show the first 10 top score.
* Always show no more than 10 score. Even when more than 10 users have the same highest score, show the first 10 of them (this might look unfair, but that’s the life).
* When no score exist for the specified game, show “**No score**” as result.
* When the game does not exist, show “**Game not found**” as result.
* ListGamesByPrefix namePrefix – shows the **first 10 games** in the alphabetical order that **match the specified prefix**. E.g. the prefix “**ch**” matches the games “**chess**” and “**chicken**” but does not match the game “**bosch**”. The games should be printed on a single line **separated by comma + space**, in **alphabetical order**. If more than 10 games match the specified prefix, print the first 10 from all matches in the alphabetical order. If no games match the specified prefix, print “**No matches**” as command result.
* DeleteGame gameName password– deletes a game from the system. When a game is deleted, all of its score are also deleted. As a result the command prints “**Game deleted**” in case of success or “**Cannot delete game**” is case the game does not exists.
* End – this is the last line in the input. Indicates the end of the command sequence. Prints nothing.

### Input

The input data should be read from the console. The input data consists of several commands, each on separate line, ending with the command “End”. Empty lines in the input should be ignored.

The input data will consist of valid commands in the above described format. There is no need to check its validity.

### Output

The output should be printed on the console. It should hold the output from each command from the input.

### Constraints

* All usernames, passwords, game names and name prefixes:
  + Consist of **Latin letters and digits**.
  + Have length in the range [1...100].
* All **score** are integers in range [0…10 000 000].
* All string matching operations are **case-sensitive**.
* Allowed working time for your program: **1.00 seconds** (at the judge environment).
* Allowed memory: **32 MB**.

### Examples

|  |  |
| --- | --- |
| **Input Example** | **Output Example** |
| RegisterUser peter p123  RegisterUser maria m123  RegisterUser maria DuplicatedMaria  RegisterGame AngryBirds a123  RegisterGame chess c123  RegisterGame Chess c123  RegisterGame AngryBirds DuplicatedAngryBirds  AddScore peter p123 AngryBirds a123 15000  AddScore peter p123 AngryBirds a123 160  AddScore peter p123 AngryBirds a123 15000  AddScore peter p123 AngryBirds a123 12700  AddScore peter p123 AngryBirds a123 8300  AddScore peter p123 AngryBirds a123 60  AddScore peter p123 AngryBirds a123 30  AddScore maria m123 AngryBirds a123 15000  AddScore maria m123 AngryBirds a123 8000  AddScore maria m123 AngryBirds a123 450  AddScore maria m123 AngryBirds a123 60  AddScore maria m123 AngryBirds a123 8000  AddScore maria invalidUserPass AngryBirds a123 1000  AddScore maria m123 AngryBirds invalidGamePass 1000  AddScore invalidUser m123 AngryBirds a123 1000  AddScore maria m123 InvalidGame f123 1000  ShowScoreboard AngryBirds  AddScore peter p123 chess c123 200  AddScore maria m123 chess c123 600  AddScore maria m123 chess c123 200  ShowScoreboard chess  ShowScoreboard InvalidGame  RegisterGame Chain c123  RegisterGame Chaconne c123  ListGamesByPrefix Ch  ListGamesByPrefix ch  ListGamesByPrefix a  ListGamesByPrefix Cha  ListGamesByPrefix An  DeleteGame InvalidGame pass123  DeleteGame AngryBirds invalidPass  DeleteGame AngryBirds a123  ShowScoreboard AngryBirds  ListGamesByPrefix An  ShowScoreboard chess  ShowScoreboard Chess  RegisterGame AngryBirds a123  ShowScoreboard AngryBirds  End | User registered  User registered  Duplicated user  Game registered  Game registered  Game registered  Duplicated game  Score added  Score added  Score added  Score added  Score added  Score added  Score added  Score added  Score added  Score added  Score added  Score added  Cannot add score  Cannot add score  Cannot add score  Cannot add score  #1 maria 15000  #2 peter 15000  #3 peter 15000  #4 peter 12700  #5 peter 8300  #6 maria 8000  #7 maria 8000  #8 maria 450  #9 peter 160  #10 maria 60  Score added  Score added  Score added  #1 maria 600  #2 maria 200  #3 peter 200  Game not found  Game registered  Game registered  Chaconne, Chain, Chess  chess  No matches  Chaconne, Chain  AngryBirds  Cannot delete game  Cannot delete game  Game deleted  Game not found  No matches  #1 maria 600  #2 maria 200  #3 peter 200  No score  Game registered  No score |

### Evaluation

* **Passed tests** give **50%** of the score for this problem.
* When **all tests pass** (with no exception), this gives the other **50%** of the score.