# Programming Fundamentals Final Exam Retake 15.08.2020

## Problem 3. The Pianist

*You are a pianist and you like to keep a list of your favorite piano pieces. Create a program, to help you organize it and add, change, remove pieces from it!*

On the first line of the standard input you will receive an integer **n** – the **number of pieces** that you will initially have. On the next **n** lines the **pieces themselves** will follow with their **composer** and **key**, separated by "|" in the following format:

{piece}|{composer}|{key}

Then, you will be receiving different **commands**, each on a new line, separated by "|", until the "Stop" command is given:

* Add|{piece}|{composer}|{key}
  + You need to **add the given piece** with the information about it to the other pieces
  + If the piece **is already in the collection**, print:

"**{piece} is already in the collection!**"

* + If the piece is **not in the collection**, print:   
    "{piece} by {composer} in {key} added to the collection!"
* Remove|{piece}
  + If the piece is in the collection, **remove it** and print:

"Successfully removed {piece}!"

* + If the piece is **not in the collection**, print:

"Invalid operation! {piece} does not exist in the collection."

* ChangeKey|{piece}|{new key}
  + If the piece is in the collection, **change its key with the given one** and print:

"Changed the key of {piece} to {new key}!"

* + If the piece is **not in the collection**, print:

"Invalid operation! {piece} does not exist in the collection."

Upon receiving the "Stop" command you need to print all pieces in your collection, sorted by their **name and by the name of their composer in alphabetical order**, in the following format:  
"**{Piece} -> Composer: {composer}, Key: {key}**"

### Input/Constraints

* You will receive **a single integer** at first – **the initial number of pieces in the collection**
* For each piece you will receive a single line of text with information about it.
* Then you will receive multiple commands in the way described above, until the command "Stop".

### Output

* All the output messages with the appropriate formats are described in the problem description.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 3  Fur Elise|Beethoven|A Minor  Moonlight Sonata|Beethoven|C# Minor  Clair de Lune|Debussy|C# Minor  Add|Sonata No.2|Chopin|B Minor  Add|Hungarian Rhapsody No.2|Liszt|C# Minor  Add|Fur Elise|Beethoven|C# Minor  Remove|Clair de Lune  ChangeKey|Moonlight Sonata|C# Major  Stop | Sonata No.2 by Chopin in B Minor added to the collection!  Hungarian Rhapsody No.2 by Liszt in C# Minor added to the collection!  Fur Elise is already in the collection!  Successfully removed Clair de Lune!  Changed the key of Moonlight Sonata to C# Major!  Fur Elise -> Composer: Beethoven, Key: A Minor  Hungarian Rhapsody No.2 -> Composer: Liszt, Key: C# Minor  Moonlight Sonata -> Composer: Beethoven, Key: C# Major  Sonata No.2 -> Composer: Chopin, Key: B Minor |
| **Comments** | |
| After we receive the initial pieces with their info, we start receiving commands. The first two commands are to add a piece to the collection and since the pieces are not already added, we manage to add them. The third add command, however, **attempts to add a piece, which is already in the collection**, so we print a special message and don't add the piece. After that we receive the remove command and since the piece is in the collection, we remove it successfully. Finally, the last command says to change the key of a piece. Since the key is present in the collection, we modify its key.  We receive the Stop command, print the information about the pieces, sorted in the way described above, and the program ends. | |
| **Input** | **Output** |
| 4  Eine kleine Nachtmusik|Mozart|G Major  La Campanella|Liszt|G# Minor  The Marriage of Figaro|Mozart|G Major  Hungarian Dance No.5|Brahms|G Minor  Add|Spring|Vivaldi|E Major  Remove|The Marriage of Figaro  Remove|Turkish March  ChangeKey|Spring|C Major  Add|Nocturne|Chopin|C# Minor  Stop | Spring by Vivaldi in E Major added to the collection!  Successfully removed The Marriage of Figaro!  Invalid operation! Turkish March does not exist in the collection.  Changed the key of Spring to C Major!  Nocturne by Chopin in C# Minor added to the collection!  Eine kleine Nachtmusik -> Composer: Mozart, Key: G Major  Hungarian Dance No.5 -> Composer: Brahms, Key: G Minor  La Campanella -> Composer: Liszt, Key: G# Minor  Nocturne -> Composer: Chopin, Key: C# Minor  Spring -> Composer: Vivaldi, Key: C Major |

*Suggestion: Choose a piece from the ones here to listen while you are doing the problem!*

|  |  |
| --- | --- |
| **JavaScript Input** | **Output** |
| [  '3',  'Fur Elise|Beethoven|A Minor',  'Moonlight Sonata|Beethoven|C# Minor',  'Clair de Lune|Debussy|C# Minor',  'Add|Sonata No.2|Chopin|B Minor',  'Add|Hungarian Rhapsody No.2|Liszt|C# Minor',  'Add|Fur Elise|Beethoven|C# Minor',  'Remove|Clair de Lune',  'ChangeKey|Moonlight Sonata|C# Major',  'Stop'  ] | Sonata No.2 by Chopin in B Minor added to the collection!  Hungarian Rhapsody No.2 by Liszt in C# Minor added to the collection!  Fur Elise is already in the collection!  Successfully removed Clair de Lune!  Changed the key of Moonlight Sonata to C# Major!  Fur Elise -> Composer: Beethoven, Key: A Minor  Hungarian Rhapsody No.2 -> Composer: Liszt, Key: C# Minor  Moonlight Sonata -> Composer: Beethoven, Key: C# Major  Sonata No.2 -> Composer: Chopin, Key: B Minor |
| **Comments** | |
| After we receive the initial pieces with their info, we start receiving commands. The first two commands are to add a piece to the collection and since the pieces are not already added, we manage to add them. The third add command, however, **attempts to add a piece, which is already in the collection**, so we print a special message and don't add the piece. After that we receive the remove command and since the piece is in the collection, we remove it successfully.  Finally, the last command says to change the key of a piece. Since the key is present in the collection, we modify its key.   We receive the Stop command, print the information about the pieces, sorted in the way described above, and the program ends. | |
| **JavaScript Input** | **Output** |
| [  '4',  'Eine kleine Nachtmusik|Mozart|G Major',  'La Campanella|Liszt|G# Minor',  'The Marriage of Figaro|Mozart|G Major',  'Hungarian Dance No.5|Brahms|G Minor',  'Add|Spring|Vivaldi|E Major',  'Remove|The Marriage of Figaro',  'Remove|Turkish March',  'ChangeKey|Spring|C Major',  'Add|Nocturne|Chopin|C# Minor',  'Stop'  ] | Spring by Vivaldi in E Major added to the collection!  Successfully removed The Marriage of Figaro!  Invalid operation! Turkish March does not exist in the collection.  Changed the key of Spring to C Major!  Nocturne by Chopin in C# Minor added to the collection!  Eine kleine Nachtmusik -> Composer: Mozart, Key: G Major  Hungarian Dance No.5 -> Composer: Brahms, Key: G Minor  La Campanella -> Composer: Liszt, Key: G# Minor  Nocturne -> Composer: Chopin, Key: C# Minor  Spring -> Composer: Vivaldi, Key: C Major |