# Programming Fundamentals Final Exam Preparation 1

## Problem 1. World Tour

**Link:** [https://judge.softuni.org/Contests/Practice/Index/2518#0](https://judge.softuni.org/Contests/Practice/Index/2518" \l "0)

*You are a world traveler, and your next goal is to make a world tour. To do that, you have to plan out everything first. To start with, you would like to plan out all of your stops where you will have a break.*

On the **first line,** you will be given a string containing all of your **stops**. Until you receive the command **"Travel"**, you will be given some commands to **manipulate** that initial string. The **commands can be**:

* **"Add Stop:{index}:{string}"**:
  + **Insert** the given **string** at that **index** only if the index **is valid**
* **"Remove Stop:{start\_index}:{end\_index}"**:
  + **Remove** the elements of the string from the **starting index** to the **end index** (**inclusive**) if **both** indices are **valid**
* **"Switch:{old\_string}:{new\_string}"**:
  + If the **old string** is in the initial string, **replace** it with the **new one** (all **occurrences**)

***Note: After each command, print the current state of the string***

After the **"Travel"** command, print the following: **"Ready for world tour! Planned stops: {string}"**

### Input / Constraints

* **JavaScript**: you will receive a **list of strings**
* An **index is valid** if it is **between the first and the last element index (inclusive)** in the sequence**.**

### Output

* Print the proper output messages in the proper cases as described in the problem description

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| (["Hawai::Cyprys-Greece",  "Add Stop:7:Rome",  "Remove Stop:11:16",  "Switch:Hawai:Bulgaria",  "Travel"]) | Hawai::RomeCyprys-Greece  Hawai::Rome-Greece  Bulgaria::Rome-Greece  Ready for world tour! Planned stops: Bulgaria::Rome-Greece |

## Problem 2 – Fancy Barcode

**Link:** [https://judge.softuni.org/Contests/Practice/Index/2303#1](https://judge.softuni.org/Contests/Practice/Index/2303" \l "1)

Your first task is to determine if the given sequence of characters is a **valid** barcode or **not**.

**Each line must not contain anything else but a valid barcode**. A barcode is **valid** when:

* It is surrounded by a "@" followed by one or more "#"
* It is **at least 6 characters long** (without the surrounding "@" or "#")
* **It starts** with a **capital letter**
* It contains **only letters** (lower and upper case) **and digits**
* **It ends** with a **capital letter**

Examples of valid barcodes: @###Che46sE@##, @#FreshFisH@#, @###Brea0D@###, @##Che46sE@##

Examples of invalid barcodes: **##InvaliDiteM##**, **@InvalidIteM@**, **@#Invalid\_IteM@#**

Next, you have to determine the **product group** of the item from the **barcode**. The product group is obtained by **concatenating** **all the digits** found in the barcode. If there are **no digits** present in the barcode, the **default** product group is "00".

Examples:

@#FreshFisH@# -> product group: 00

@###Brea0D@### -> product group: 0

@##Che4s6E@## -> product group: 46

### Input

On the first line, you will be given an integer **n** – the count of barcodes that you will be receiving next.

On the following **n** lines, you will receive different strings.

### Output

For each barcode that you process, you need to print a message.

If the barcode is invalid:

* "Invalid barcode"

If the barcode is valid:

* "Product group: {product group}"

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| (["3",  "@#FreshFisH@#",  "@###Brea0D@###",  "@##Che4s6E@##"]) | Product group: 00  Product group: 0  Product group: 46 |
| **Input** | **Output** |
| (["6",  "@###Val1d1teM@###",  "@#ValidIteM@#",  "##InvaliDiteM##",  "@InvalidIteM@",  "@#Invalid\_IteM@#",  "@#ValiditeM@#"]) | Product group: 11  Product group: 00  Invalid barcode  Invalid barcode  Invalid barcode  Product group: 00 |

## Problem 3 – The Pianist

**Link:** [https://judge.softuni.org/Contests/Practice/Index/2525#2](https://judge.softuni.org/Contests/Practice/Index/2525" \l "2)

*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** 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 and print:

"{piece} by {composer} in {key} added to the collection!"

* + If the piece **is already in the collection**, print:

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

* "Remove|{piece}":
  + If the piece is in the collection, **remove it** and print:

"Successfully removed {piece}!"

* + Otherwise, 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}!"

* + Otherwise, print:

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

Upon receiving the "Stop" command, you need to print all pieces in your collection 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  Moonlight Sonata -> Composer: Beethoven, Key: C# Major  Sonata No.2 -> Composer: Chopin, Key: B Minor  Hungarian Rhapsody No.2 -> Composer: Liszt, Key: C# 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, 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  La Campanella -> Composer: Liszt, Key: G# Minor  Hungarian Dance No.5 -> Composer: Brahms, Key: G Minor  Spring -> Composer: Vivaldi, Key: C Major  Nocturne -> Composer: Chopin, Key: C# Minor |