## Problem 3 – Online Market

You are given an online market. Products can be added and queried in the market. You are given a sequence of commands that must be implemented:

* **add PRODUCT\_NAME PRODUCT\_PRICE PRODUCT\_TYPE** – adds a new product to the market
  + **PRODUCT\_NAME** can be any unique sequence of 3 to 20 characters
  + **PRODUCT\_PRICE** can be any positive floating-point number, up to 5000
  + **PROCUCT\_TYPE** can be any sequence of 3 to 20 characters. Product type may not be unique
  + Print "**Ok: Product PRODUCT\_NAME added successfully**" if the product is added
  + Print "**Error: Product PRODUCT\_NAME already exists**" if the product already exists
* **filter by type PRODUCT\_TYPE** – lists the first 10 products that have the given PRODUCT\_TYPE
  + Print "**Error: Type PRODUCT\_TYPE does not exists**", if the given PRODUCT\_TYPE is non-existent
* **filter by price from MIN\_PRICE to MAX\_PRICE** – lists the first 10 products that have PRODUCT\_PRICE in the given range, inclusive
* **filter by price from MIN\_PRICE** – lists the first 10 products that have a greater PRODUCT\_PRICE than the given, inclusive
* **filter by price to MAX\_PRICE** – lists all products that have a smaller PRODUCT\_PRICE that the given, inclusive
* **end** – marks the end of the commands. No commands will follow

All products that are listed by the **filter** commands must be printed in the format   
"**Ok: LIST\_OF\_PRODUCTS**". LIST\_OF\_PRODUCTS contains the filtered products, separated by a space and a comma (", ") and each product is represented as "**PRODUCT\_NAME(PRODUCT\_PRICE)**". If no products are filtered, then print "**Ok:** ". They must also be sorted by the following criteria:

* First by PRODUCT\_PRICE, ascending
* Then by PRODUCT\_NAME, ascending
* Last by PRODUCT\_TYPE, ascending

### Input

The input data is given at the standard input. It consists of a sequence of commands, each at a separate line, ending by the command “end”. The commands will be valid (as described in the above list), in the specified format, within the constraints given below. There is no need to check the input data explicitly.

### Output

For each command from the input sequence print at the standard output its result as a single line.

### Constraints

* All **PRODUCT\_NAME and PRODUCT\_TYPE** will consist of letters and digits only. No spaces are allowed.
* All **filter by price \*** commands will occur no more than 100 times in any test, and approximately 2% of all commands
* The total number of lines in the input will be in the range [1 … 50 000]
* Allowed working time for your program: 0.5 seconds.
* Allowed memory: 16 MB.

### Example

|  |  |
| --- | --- |
| **Input** | **Output** |
| add Milk 1.90 dairy  add Yogurt 1.90 dairy  add Notebook 1111.90 technology  add Orbit 0.90 food  add Rakia 11.90 drinks  add Dress 121.90 clothes  add Jacket 49.90 clothes  add Milk 1.90 dairy  add Socks 2.90 clothes  filter by type dairy  filter by price from 1.00 to 2.00  filter by price from 1.50  filter by price to 2.00  filter by type clothes  end | Ok: Product Milk added successfully  Ok: Product Yogurt added successfully  Ok: Product Notebook added successfully  Ok: Product Orbit added successfully  Ok: Product Rakia added successfully  Ok: Product Dress added successfully  Ok: Product Jacket added successfully  Error: Product Milk already exists  Ok: Product Socks added successfully  Ok: Milk(1.9), Yogurt(1.9)  Ok: Milk(1.9), Yogurt(1.9)  Ok: Milk(1.9), Yogurt(1.9), Socks(2.9), Rakia(11.9), Jacket(49.9), Dress(121.9), Notebook(1111.9)  Ok: Orbit(0.9), Milk(1.9), Yogurt(1.9)  Ok: Socks(2.9), Jacket(49.9), Dress(121.9) |