C++ Fundamentals – Retake Exam – 17 February 2024

Please submit your source code to all below-described problem in Judge.

2. Fishes

You're a fisherman! You got **three fishing poles**, each one catching some fish.

You also have **three bags**, where you store the fish from each pole. The fish from pole 1 always goes to bag 1, the fish from pole 2 – to bag 2, and the fish from pole 3 – to bag 3. Each fish you put in a bag is put on top of all other fishes, if there are such already in the bag. If you decide to takea fish from a bag, you can only pick the topmost fish, the one you put last.

Each time, when a fishing pole catches a fish, you will get a line in your input, which gives you the pole number (1 to 3) and the kind of the fish it caught. For example "**`1 Sea Bass`**" (please note: the name of the fish may contain space).

Also, there're two special input rows:

1. The input row "**END**" indicates that you're done with catching fishes and you move to the second stage of your task.
2. If you get a row with the special fish name "**`THROW`**", it means that you must throw out a fish at the top of the corresponding bag (the bag number will come with the command). For example: an input row "2 `THROW`" tells you to throw away a fish from bag 2.
   If bag 2 is empty, you just ignore the command.

Once you're done with catching and throwing fishes, you must print all contents of your bags. Although you can pick up only the top-most fish from a bag, you must print the contents of each bag ***in the order you added the fish to the bag***! Each bag contents are printed on a single row in the following format:

"**`1: Sea Bass, Swordfish, Swordfish`**"

If a bag is empty, we print **"`<empty>`"** for its contents.

After you print out the contents, you must sort your catch and decide which fish to keep for delivery to restaurants, and which fish to deliver for **"fish pâté"**. To make this distribution, you will get a list of fish names: each one on a separate line, the list ends with "**END**".

Each fish name you get tells you that all fishes from this kind in all your bags will go for "Restaurant" delivery.

After the list of fishes for the restaurant ends, you must put all the remaining fishes from your bags for "fish pâté".

Then you must print both inventories, each fish inventory containing the names of the fishes in alphabetical order, and then the quantity of each fish. The first line contains all fishes for the restaurants, the second line is all fish for pâté. Here's example printout of both inventories:

```
Restaurant: <Fish Name1>: <quantity1>, <Fish Name2>: <quantity2>, <Fish Name3>: <quantity3>

Pate: <Fish Name1>: <quantity1>, <Fish Name2>: <quantity2>, <Fish Name3>: <quantity3>
```

If there's no delivery for the restaurant or the pate, print **"<nothing>"** instead of fish list, for example:

```
Restaurant: <Fish Name1>: <quantity1>, <Fish Name2>: <quantity2>, <Fish Name3>: <quantity3>
Pate: <nothing>
```

Hints:

1. If you manually transfer all elements from one stack to another stack, you reverse the elements from the first stack.
2. If you have a line like "`5 Some Text Here`" in your `istringstream istr`, you can read the number with the >> operator, and after that you can get the rest of the contents of the current line by using the `getline` like that: `getline(std::ws(istr), theRestOfTheTextWithoutWhitespace)`. In this case, the first parameter of getline "eats" the whitespace before the text.
   Or, you can decide to handle the whitespace differently.

Example 1

Input	Output	Explanation
1 Mackerel 3 Salmon 1 Tuna 1 Sea Bass	First pole 1 catches Mackerel, then pole 3 catches Salmon, then pole 1 catches Tuna, then pole 1 catches Sea Bass. So far, the contents of each bags is as follows: Bag 1: Sea Bass, Tuna, Mackerel Bag 2: <empty> Bag 3: Salmon Please note: at the top of bag 1 we have Sea Bass, because it's the last caught fish!	
3 THROW	The THROW command throws the fish at the top of bag 3. The contents of bags now is: Bag 1: Sea Bass, Tuna, Mackerel Bag 2: <empty> Bag 3: <empty>	
2 Salmon 2 Haddock 3 Cod 3 Salmon 3 Sea Bass	Pole 2 catches Salmon and Haddock, then pole 3 catches Cod, Salmon, and Sea Bass. The contents of the bags now is: Bag 1: Sea Bass, Tuna, Mackerel Bag 2: Haddock, Salmon Bag 3: Sea Bass, Salmon, Cod	
2 THROW	The THROW command instructs us to throw the fish at the top of bag 2. After the command, the contents of the bags is as follows: Bag 1: Sea Bass, Tuna, Mackerel Bag 2: Salmon Bag 3: Sea Bass, Salmon, Cod	
END	1: Mackerel, Tuna, Sea Bass 2: Salmon 3: Cod, Salmon, Sea Bass	The END command tells us that we're done fishing. Now it's time to print the contents of all bags, in the order the fish was caught.
Mackerel Haddock Sea Bass	Restaurant: Mackerel: 1, Sea Bass: 2 Pate: Cod: 1, Salmon: 2, Tuna: 1	The restaurants need Mackerel, Haddock and Salmon. Based on this list, the Restaurants list will have one Mackerel, no Haddocks (we

END		don’t have that fish in our bags), and two Sea Bass. All the rest goes for pâté. We print both lists, with fishes in there in alphabetical order.

Example 2

Input	Explanation
3 Salmon 2 THROW 1 Sea Bass 2 Trout 1 Swordfish 2 Haddock 2 THROW 3 THROW 3 Pike 3 THROW 1 Cod END Pike Mackerel Salmon END	First we catch salmon in bag 3. Then we throw nothing, as bag 2 is empty. Sea Bass to bag 1. Trout to bag 2. Swordfish to bag 1. Haddock to bag 2. We throw the Haddock we just causht. We throw the Salmon from bag 3. We catch a Pike in bag 3. We throw the top of bag 3, which is the Pike we just caught. We catch a Cod in bag 1. Now, we print all the contents of our bags: 1: Sea Bass, Swordfish, Cod 2: Trout 3: <empty> The restaurant requires Pike, Mackerel, and Salmon. Since we have nothing of those, we print “<nothing>” for the restaurant order, and all the rest goes to pate: Restaurant: <nothing> Pate: Cod: 1, Sea Bass: 1, Swordfish: 1, Trout: 1

Example 3

Input	Output
3 Tuna 2 Trout 2 Salmon 2 Salmon 2 Mackerel 2 Halibut 3 Halibut 2 Tuna 1 Halibut 1 Tuna 1 THROW 3 Salmon 2 Halibut 2 Tuna	1: Halibut, Halibut, Halibut 2: Trout, Salmon, Salmon, Mackerel, Halibut, Tuna, Halibut 3: Tuna, Halibut Restaurant: Tuna: 2 Pate: Halibut: 6, Mackerel: 1, Salmon: 2, Trout: 1

1 Halibut 1 Halibut 2 THROW 3 Salmon 3 THROW 3 THROW END Swordfish Tuna Sea Bass END	