## Hospital

Your task will be to prepare an electronic register for a hospital. In the hospital we have different departments:

* **Cardiology**
* [**Oncology**](https://en.wikipedia.org/wiki/Oncology)
* [**Emergency department**](https://en.wikipedia.org/wiki/Emergency_department)
* **etc.**

Each department has **20** rooms for patients and **each room has 3 beds**. When a new patient goes in the hospital, he/she is placed on the first free bed in the department. If there are no free beds, the patient should go in another hospital. Of course, in every hospital there are doctors. Each doctor can have patients in a different department. You will receive an information about the patients in the format **{Department} {Doctor} {Patient}**

After the **"Output"** command, you will receive some other commands about what kind of output you need to print. The commands are:

* **{Department}** - You need to **print all patients** in this department in the **order of receiving**.
* **{Department} {Room}** - You need to **print all patients** in this room in **alphabetical order**.
* **{Doctor}** - You need to **print all patients** for this doctor in **alphabetical order.**

The program ends when you receive command **"End"**.

### Input

On the first lines you will receive info for the hospital, department, doctors and patients in the following format:

**{Department} {Doctor} {Patient}**

When you read the **"Output"** line you will get one or more commands telling you what you need to print

Keep reading commands for printing untill you reach the command **"End"**.

### Output

* **{Department}** - print all patients in this department in order of receiving on a new line
* **{Department} {Room}** - print all patients in this room in alphabetical order each on new line
* **{Doctor}** - print all patients that are healed from doctor in alphabetical order on new line

### Constraints

* **{Department}** - single word with length **1 < n < 100**
* **{Doctor}** - name and surname, both with length **1 < n < 20**
* **{Patient}** - unique name with length **1 < n < 20**
* **{Room}** - integer **1 <= n <= 20**
* Time limit: 0.3 sec. Memory limit: 16 MB.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| Cardiology Petar Petrov Ventsi  Oncology Ivaylo Kenov Valio  Emergency Mariq Mircheva Simo  Cardiology Genka Shikerova Simon  Emergency Ivaylo Kenov NuPogodi  Cardiology Gosho Goshov Esmeralda  Oncology Gosho Goshov Cleopatra  Output  Cardiology  End | Ventsi  Simon  Esmeralda |

|  |  |
| --- | --- |
| **Input** | **Output** |
| Cardiology Petar Petrov Ventsi  Oncology Ivaylo Kenov Valio  Emergency Mariq Mircheva Simo  Cardiology Genka Shikerova Simon  Emergency Ivaylo Kenov NuPogodi  Cardiology Gosho Goshov Esmeralda  Oncology Gosho Goshov Cleopatra  Output  Cardiology 1  End | Esmeralda  Simon  Ventsi |

|  |  |
| --- | --- |
| **Input** | **Output** |
| Cardiology Petar Petrov Ventsi  Oncology Ivaylo Kenov Valio  Emergency Mariq Mircheva Simo  Cardiology Genka Shikerova Simon  Emergency Ivaylo Kenov NuPogodi  Cardiology Gosho Goshov Esmeralda  Oncology Gosho Goshov Cleopatra  Output  Ivaylo Kenov  End | NuPogodi  Valio |