Objects and Classes – Lab

Please submit your solutions to all below-described problems in Judge.

Write C++ code for solving the tasks on the following pages.

Please try to solve the problems using classes and objects.

Keep in mind the type of submission if file upload.

1. Letters

You are given a text in English. Let's define a word as any **sequence of alphabetical characters**. Each of those characters we will call a letter, but we will consider the **uppercase** and **lowercase** variant of a character in a word as the **same** letter.

Write a program that reads the text (a single line on the console) and then reads lines, each containing a single letter, until a line containing a `'.'` (dot) is entered.

For each of those lines, print all words that contain the letter, ordered alphabetically (capitals letters before lowercase letters), without duplicates – if no words contain that letter, print `"---"` (three dashes)

Examples

Input
*You are given a text in English. Let's define a word as any sequence of alphabetical characters. Each of those characters we'll call a letter, but we will consider the uppercase and lowercase variant of a character in a word as the **same** letter.* a Y h .

Output
Each a alphabetical and any are as call character characters lowercase same uppercase variant You any Each English alphabetical character characters the those

2. Rust

You are given a **10x10 matrix** representing a metal square, which has begun to rust. There are **3 types of symbols** in the matrix – a **.** (dot) means a healthy part of the metal, a **#** indicates a rust-resistant part, and a **!** indicates a part that has begun to rust.

There may be **0, 1 or more** parts that have begun to rust.

The rust spreads from a rusty cell to healthy cells by "infecting" adjacent cells directly above, to the right, below, and to the left of itself **(no diagonals)**, at the same time. The rust cannot infect cells that are indicated as **rust resistant**. Let's define the time it takes for all cells adjacent to a rusty cell to get infected as 1 unit.

After reading the matrix, **read a single integer** – the elapsed time in units (as defined above) – and print a matrix representing how the metal square will look after the rust has been acting on it for that amount of time.

Examples

Input	Output	Input	Output	Input	Output
....!..... 4	.!!!!!!!.. !!!!!!!!!. .!!!!!!!.. ..!!!!!... ...!!!.... ....!..... 	....!..... ...###.... 5	!!!!!!!!!. !!!!!!!!!! !!!###!!!. .!!!.!!!.. ..!...!... 	!........! .... !........! 5	!!!!!!!!!! !!!!!!!!!! !!!!..!!!! !!!....!!! !!......!! !!......!! !!!....!!! !!!!..!!!! !!!!!!!!!! !!!!!!!!!! 5

3. Matching Locations

Write a program that reads **names** of places and their geographical **coordinates** in the format **`name, latitude, longitude`** (where latitude and longitude are floating-point numbers). No two locations will have the same **`name`**. Some locations may have the same **coordinates**.

After all locations are entered, a single line containing the **`'.'`** (dot) the character will be entered.

After that, queries will be entered – the queries will either contain a **`name`** of a location or **`latitude`** and **`longitude`** coordinates (entered as two floating point numbers separated by a single space).

Print all locations that match the query in the same format that they were entered.

After all queries are entered, a single line containing the **`'.'`** (dot) the character will be entered.

Examples

Input	Output
Sofia,42.70,23.33 New York,40.6976701,-74.2598732 SoftUni,42.70,23.33 . Sofia	Sofia,42.70,23.33 New York,40.6976701,-74.2598732 Sofia,42.70,23.33 SoftUni,42.70,23.33

40.6976701 -74.2598732 42.70 23.33 .	