

# Objects and Classes - Lab

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

Please try to solve the problems using **classes and objects**.

Keep in mind that the type of submission is **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 which 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 (capital letters before lowercase letters), without duplicates – if no words contain that letter, print " - - - " (three dashes)

## Examples

Input (NOTE: the <i>italic</i> text is on a single line)
<i>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 <b>same</b> letter.</i> 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) 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) character will be entered.

## Examples

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

40.6976701 -74.2598732 42.70 23.33 .	
--	--