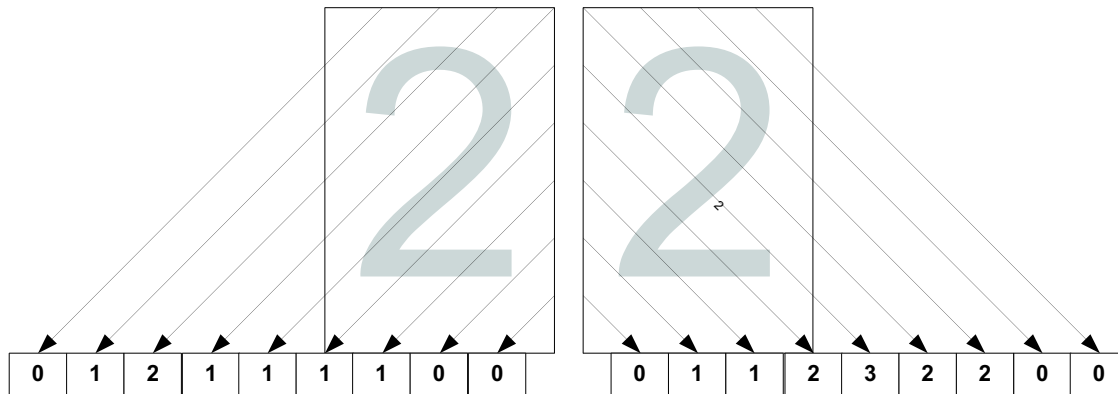


**Problem 2****Well Written****5 Points****Program Name: written.cpp****Input File: written.dat**

The company that you work for is manufacturing a new character recognition system for a calculator. The user writes numbers on a pad and the samples are normalized to a specific size. Diagonal lines are then drawn in parallel as shown in the figure below and the number of times each line crosses the figure is registered. It is the series of counts that form the “recognition template” that can be used to recognize what digit was written on the pad.



See the table below for a complete list of the recognition templates for the digits 0-9.

When a user writes a character on the pad, the image of the character is normalized to the size of the template and the diagonal line samples are then taken and fed to your program. Your program is to then use the “least squares method” to determine which character was written on the pad. In the least squares method, each count in a sample is subtracted from the corresponding counts in the template and the differences is squared. The squares are then summed up to compute the “fit” for the template. The fit is computed for each template and the digit with the best “fit” (closest to zero) is determined to be the correct one.

For example, if we received an image characterized by the values 011221100,001133200, we could compute the following fit values. Complete work is shown for the first template and the others are left for you to work out.

Digit	Template	Fit Value
0	002222100,001222200	002222100,001222200 Template 011221100,001133200 image under consideration 011001000,000111000 value-to-value corresponding differences squared. 6 is determined to be the fit by summing up the differences squared.
1	001111100,000122100	7
2	012111100,011233300	6
3	011222100,001132200	2
4	000221100,001323110	9
5	012222100,001222110	7
6	002222100,001232200	5
7	011111000,001112210	9
8	002222100,001222200	6
9	002232100,001132200	5

Therefore, you can see that we would determine this character to be a “3” because the it has a fit of 2 (the lowest of any).

## Input

Input to your program will consist of a series of keystrokes. Each keystroke will be on a line by itself and will start in column 1. Keystrokes are made up of 9 digits followed by a comma, followed by 9 more digits. The digits in the keystroke are limited to 0-9 and represent the number of times the corresponding diagonal crosses the image.

## Output

For each image in the input file, your program should compute the “fit” for each digit (0-9) as in the table above. Your program should then print the digit with the best fit on a line by itself in column 1. If there is a tie by 2 or more digits for the best fit, this is considered to be an unrecognizable character and your program should print the word “beep” in columns 1-4 instead of the best fitting digit.

### Example: Input File

```
011221100,001133200
001222000,011122100
000111000,001112210
```

### Output to screen

```
3
beep
7
```