546 Image Recognizer

Consider an Image represented by a matrix of digits, each digit represents the brightness of a pixel, as shown below. In early image processing, one could detect a particular feature in the image by finding the location where the feature (template) best matches the image.

```
Image:  0 1 0 1 1 0 0          Template:  0 0 1 1 1 1
        0 0 0 0 1 1 1                     0 2 0 0 2 0
        0 1 2 0 1 2 0                     3 3 3 3 0 0
        0 3 3 2 3 3 0
        0 1 1 1 0 0 1
```

To do this, you have to calculate, for each point y in the image where the template can fit entirely within the image, the cross-correlation

$$S_x i(x)t(x-y)$$

where i and t are the image and template light function respectively and x runs over all points in the image. The point with maximum cross-correlation is accepted as the location of the feature in the image.

Input and Output

Develop a program that takes pairs of images. For each pair, use the algorithm above and deliver the point of location (which is the pixel (x, y) in i where t has maximum cross-correlation) Give one answer per line. The Image starts al location (0,0) which is the upper-left corner. In the example below, the feature is detected at point of location (1,1). Which is The only output line.

Notes: The image and templates sizes are variable and never will be greater than 50 by 50 points. The x-axis is horizontal and the y-axis is vertical. A character `F` in the input file indicates the end of pairs of images. If a template fits equally in more than one place, the correct answer will be the closest to the upper-left corner. You can take the exact format from the example below.

Sample Input

```
I
0 1 0 1 1 0 0
0 0 0 0 1 1 1
0 1 2 0 1 2 0
0 3 3 2 3 3 0
0 1 1 0 0 0 1
T
0 0 1 1 1 1
0 2 0 0 2 0
3 3 3 3 0 0
F
```

Sample Output

```
(1,1)
```