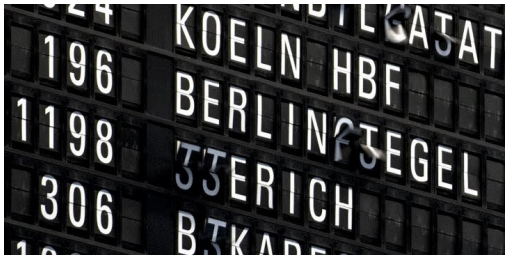
Problem F

Flipping Flaps

Problem ID: flapdisplay

Time limit: 1 second



A *flap display* is an electromechanical display device that presents changeable alphanumeric text. The airport uses flap displays to present information about departing and arriving flights, and it is your job to write the software that automatically changes the display.

The display can be described as a grid of character positions with R rows and C columns. Each position has a collection of flaps on which characters are painted. The flaps can be precisely rotated using a number of flips to display a desired charater. Flaps can only be flipped forwards.

The characters painted on each of the flaps can be described by the following *circular array* of characters: `"ABCDEFGHIJKLMNOPQRSTUVWXYZ1234567890 "` (note the last character is a blank space). If a position were currently displaying `"A"`, one flip forwards would make it display `"B"`. And if a position were currently displaying `" "` (a blank space), one flip forwards would make it display `"A"` again.

For each position in the grid, you need to determine the minimum number of times to flip it.

Input

The first line contains two integers: R and C ($1 \leq R, C \leq 1000$), the number of rows and columns in the grid, respectively.

The next R lines describe the current state of the grid.

The next R lines describe the text to be displayed.

Each of the last $2R$ lines contains exactly C characters. Each character is from the circular array above.

Output

Display the minimum number of flips needed at each position to display the text. Diplay the answer as R lines of C space-seperated integers.

Sample Input 1	Sample Output 1
1 20 MELBOURNE 1000 MANCHESTER 1430	0 33 2 1 30 21 1 6 0 18 0 0 0 0 0 0 0 31 30 0

Sample Input 2

```
2 20
MELBOURNE        1000
SYDNEY           1030
MANCHESTER       1430
KUALA LUMPUR     0945
```

Sample Output 2

```
0 33 2 1 30 21 1 6 0 18 0 0 0 0 0 0 0 31 30 0
29 33 34 35 33 12 12 21 13 16 21 18 0 0 0 0 9 36 1 32
```