Two kids are walking in a $H \times W$ grid. Each square in the grid contains a character (whose ASCII code lies between 33 and 127). Both kids can move north, east, west and south each step. The first kid walked N steps, the second kid walked M steps. ($0 \leq N \leq M \leq 20000$).

If we write down all the characters each kid walks on, we get two strings S_A and S_B. your task is to delete as few characters as possible, so that the two new strings are the same.

Input

the first line contains a single integer t ($1 \leq t \leq 15$), the number of test cases. Each test case contains several lines. The first line contains two integers H and W ($1 \leq H, W \leq 20$), the next H lines contains the grid. Next line contains three integers N, X_0 and Y_0 ($1 \leq X_0 \leq H, 1 \leq Y_0 \leq W, X$ increases from North to South, while Y increases from West to East), indicating the first kinds walks from (X_0, Y_0), for N steps. The next line contains a string of N characters, N, E, W, S stands for North, West, South and East, respectively. The second kid's information follows, which is the same format.

You may assume the walk sequence is correct: they will never go outside the grid.

Output

For each case, print the case number and two integers X_A and X_B, indicating the number of characters deleted from S_A and S_B, respectively.

Note: In the first sample, $S_A = ABCDG$, $S_B = ADEB$, we must delete 3 characters from S_A and 2 from S_B, so that they are the same (both A_B or A_D)

Sample Input

```
2
3 4
ABCD
DEFG
ABCD
4 1 1
EEES
3 3 1
NES
3 4
ABCD
DEFG
ABCD
4 1 1
EEES
3 3 1
NES
```

Sample Output

```
Case 1: 3 2
Case 2: 3 2
```