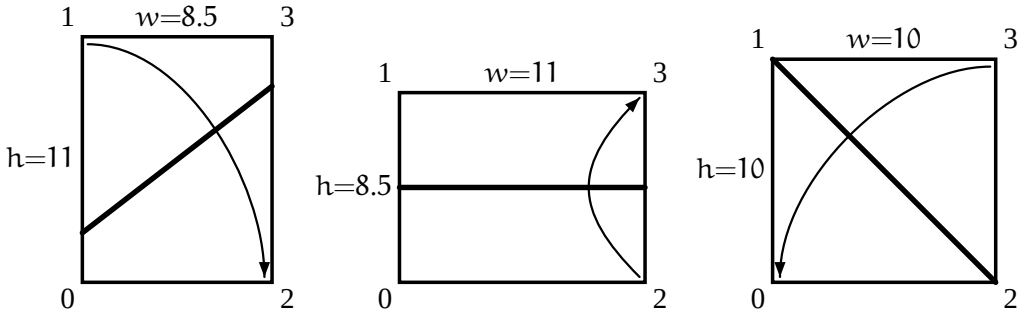
Fold 'em

Computer Science Society
Programming Contest
Winter 2007

If you take a rectangular piece of paper and fold it so that one of its corners exactly meets one of its other corners, then there will be a horizontal, vertical or diagonal crease depending on which corners meet. How long is the crease? In this problem, you're given the dimensions of the paper and which corners meet when folded, and you must compute the length of the crease.



Input Format

Each line of the input contains four numbers separated by one or more blanks. The first two are positive real numbers—the width w and height h of a rectangular piece of paper. The second two are integer numbers between 0 and 3, specifying the two corners of the paper that meet when it is folded. The numbers 0, 1, 2 and 3 represent the lower left, upper left, lower right and upper right corners of the paper, respectively.

Output Format

For each line of the input, compute the length of crease that results when the paper is folded so the specified corners meet. The length should be reported accurate to four decimal places, as shown in the output sample below. If the two corners are the same, report that the fold is invalid.

Input Sample

```
8.5 11   1 2
11 8.5   2 3
10 10    3 0
4 6      2 2
11 14    0 2
```

Output Sample

```
fold length: 10.7420
fold length: 11.0000
fold length: 14.1421
fold invalid
fold length: 14.0000
```