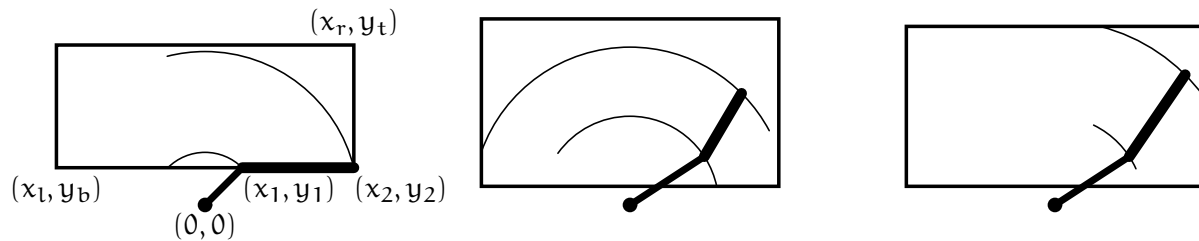


Wiper Swipe

Computer Science Society
Programming Contest
Fall 2006

A rectangular windshield is swiped by a wiper consisting of a wiper blade attached to a wiper arm attached to a pivot point, around which the wiper rotates. The rotation is constrained so that once any part of the wiper blade touches the windshield boundary, it reverse rotation and swipes the opposite direction. In this problem, we are given the dimensions of the windshield and initial position of the wiper, and compute the angular range of the wiper arm as it swipes back and forth.



Input Format

Each line of the input contains eight integers $x_l, y_b, x_r, y_t, x_1, y_1, x_2, y_2$ separated by one or more spaces. The integers are the coordinates (x_l, y_b) and (x_r, y_t) of the bottom left and top right corners of a windshield, respectively, and the coordinates (x_1, y_1) and (x_2, y_2) of the near and far endpoints of a wiper blade's initial position, respectively. The pivot is assumed to be at coordinate $(0, 0)$, and the coordinates on each line satisfy the following conditions:

$$\begin{aligned}x_l < 0 < x_r, \quad x_l = -x_r, \quad 0 < y_b < y_t \\0 < x_1 \leq x_r, \quad y_b \leq y_1 \leq y_t \\0 < x_2 \leq x_r, \quad y_b \leq y_2 \leq y_t \\(x_1, y_1) \text{ is closer to } (0, 0) \text{ than } (x_2, y_2) \text{ is to } (0, 0)\end{aligned}$$

Output Format

For each line of input, determine the angular range of the wiper arm (i.e. the near endpoint of the wiper blade, *not* the far endpoint) as it sweeps counterclockwise from its rightmost extent to its leftmost extent. Give the angle extents in degrees accurate to two decimal places, assuming 0 degrees is pointing straight right and 90 degrees is pointing straight up. Format the output as shown in the output sample.

Input Sample

```
-40 10    40 43    10 10    40 10
-40  5    40 50    20 13    28 32
-40  5    40 48    20 13    35 35
```

Output Sample

```
wiper arm swipes from 45.00 to 135.00 degrees
wiper arm swipes from 12.10 to 144.38 degrees
wiper arm swipes from 24.11 to 63.89 degrees
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