Practice Arena

Practice problems aimed to improve your coding skills.

- PRACTICE-02_SCAN-PRINT
- PRACTICE-03_TYPES
- LAB-PRAC-02_SCAN-PRINT
- LAB-PRAC-01
- PRACTICE-04_COND
- BONUS-PRAC-02
- LAB-PRAC-03_TYPES
- PRACTICE-05_COND-LOOPS
- LAB-PRAC-04_COND
- LAB-PRAC-05_CONDLOOPS
- PRACTICE-07_LOOPS-ARR
- LAB-PRAC-06_LOOPS
- LAB-PRAC-07_LOOPS-ARR
- LABEXAM-PRAC-01_MIDSEM
- PRACTICE-09_PTR-MAT
- LAB-PRAC-08_ARR-STR
- PRACTICE-10_MAT-FUN
- LAB-PRAC-09_PTR-MAT
- LAB-PRAC-10_MAT-FUN
- PRACTICE-11_FUN-PTR
- LAB-PRAC-11_FUN-PTR
- LAB-PRAC-12_FUN-STRUC
- LABEXAM-PRAC-02_ENDSEM
- LAB-PRAC-13_STRUC-NUM
    - Too tired to create a story - part I
    - Too tired to create a story - part II
    - Too tired to create a story - part III
    - Point Proximity
    - The Bisection Method
    - The pace is too fast
    - A Question on Quadrilaterals
    - The Trapezoidal Technique
    - Constrained Candy Crush
    - Major Mobile Madness
    - The Newton Raphson Method
    - The Palindrome Decomposition
- LAB-PRAC-14_SORT-MISC

A Question on Quadrilaterals

LAB-PRAC-13_STRUC-NUM

A Question on Quadrilaterals [20 marks]

Problem Statement
In the input, you will be give you the coordinates of 4 points on the 2D plane. The coordinates will be all be integers and will be separated by a space. The format is given below
x1 y1 x2 y2 x3 y3 x4 y4
These form the points p1 = (x1, y1), p2 = (x2, y2), p3 = (x3, y3) and p4 = (x4, y4). The four points will form either a square or a rectangle or a parallelogram or a trapezium.

In the first line of the output, tell us whether both pairs of opposite sides are parallel (print "2" without quotes in this case) or is only one pair of opposite sides of this quadrilateral parallel (print "1" without quotes in this case). In the second line of the input, print whether any angle of the quadrilateral is a right angle or not. If any one of the four angles is 90 degrees, print "YES" (without quotes) else if none of the angles is 90 degrees, print "NO" (without quotes). In the last line of the output, print the following

1. If the quadrilateral is a square, print "SQUARE" (without quotes)
2. If the quadrilateral is not a square but is a rectangle, print "RECTANGLE" (without quotes)
3. If the quadrilateral is not a rectangle but is a parallelogram, print "PARALLELOGRAM" (without quotes)
4. If the quadrilateral is not a parallelogram, print "TRAPEZIUM" (without quotes)

We assure you that the points will be given to you in counterclockwise order i.e. starting from p1 if you move around the quadrilateral in a counter clockwise manner, you will encounter first p2, then p3, then p4 and then back to p1. This hint is very important as it will help you figure out the edges of the quadrilateral. Since points are given in counter clockwise order (p1 p2) will be an edge of the quadrilateral, as will be (p2 p3) but (p1 p3) will be a diagonal of the quadrilateral.

Caution

1. The squares, rectangles etc may be rotated and not be axis aligned.
2. Coordinates will be integers but may be negative or zero.
3. Be careful of vertical and horizontal lines
4. The question may require you to compare floating point numbers like slopes etc. Since comparing floating point numbers for equality is dangerous, we will consider two floating point numbers to be the same if their difference in absolute terms is less than 0.0001. Use the fabs() function from math.h to get the absolute value of floating point numbers.
5. We will never give you a test case where any three points are collinear or where the quadrilateral is a scalene quadrilateral (i.e. neither of the cases mentioned above).
6. Be careful not to have any missing spaces or extra newlines in your output.

HINTS:
Write functions to check whether two lines are parallel to each other and whether two lines are perpendicular to each other. Lines are represented using two Point variables (see below). Also write a function to compute the Euclidean distance between two Point variables. Use these functions to decide which type of quadrilateral we have given you.

```
struct Point{
    int x, y;
};
```

EXAMPLE:
INPUT
1 4 10 4 20 5 7 5

OUTPUT:
1
NO
TRAPEZIUM

Explanation: Only one pair of opposite sides is parallel, no corner angle is 90 degrees and the quadrilateral is a trapezium.

Grading Scheme:
Total marks: **[20 Points]**

There will be partial grading in this question. There are three lines in your output. Printing each line correctly, in the correct order, carries 33% weightage. Each visible test case is worth 2 points and each hidden test case is worth 4 points. There are 2 visible and 4 hidden test cases.

Please remember, however, that when you press Submit/Evaluate, you will get a green bar only if all parts of your answer are correct. Thus, if your answer is only partly correct, Prutor will say that you have not passed that test case completely, but when we do autograding afterwards, you will get partial marks.

Start Solving! (/editor/practice/6261)