

**DWITE Online Computer Programming Contest
February 2005**

Problem 1

Bretschneider's Formula

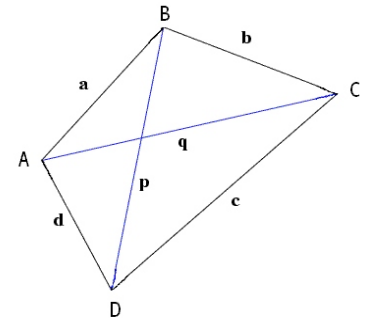
Given a general quadrilateral, that has the lengths of its four sides (a, b, c and d) and the lengths of the two diagonals (p and q), the area of the quadrilateral can be calculated using Bretschneider's Formula:

$$\frac{1}{4} \sqrt{4p^2q^2 - (b^2 + d^2 - a^2 - c^2)^2}$$

In this formula, side a is opposite side c, and side b is opposite side d.

Don't forget the length of a line segment between the points (x_1, y_1) and (x_2, y_2) is

$$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$



The input file (**DATA11.txt** for the first submission and **DATA12.txt** for the second submission) will contain 5 lines of data. Each line will contain a string of four upper case letters that represent the vertices of a quadrilateral in clockwise or counter-clockwise order. Each letter in the string refers to one of the following 20 points:

| | | | |
|---------|----------|-----------|----------|
| A (1,1) | B (-1,2) | C (-2,-1) | D (2,-2) |
| E (2,2) | F (-2,3) | G (-3,-3) | H (1,-3) |
| I (3,3) | J (-1,4) | K (-4,-2) | L (3,-5) |
| M (4,5) | N (-4,5) | O (-4,-5) | P (4,-5) |
| Q (2,4) | R (-4,1) | S (-2,-4) | T (1,-1) |

The output file (**OUT11.txt** for the first submission and **OUT12.txt** for the second submission) will contain five lines of data. Each line will contain the area of the quadrilateral, from the corresponding input line, rounded to the nearest tenth of a unit.

| <u>Sample Input (3 lines only)</u> | <u>Sample Output</u> |
|------------------------------------|----------------------|
| ABCD | 9.0 |
| CILS | 27.5 |
| EDHB | 9.5 |

<http://mathworld.wolfram.com/BretschneidersFormula.html>