This is a collection of 110 (in binary) 2D geometry problems.

**CircumscribedCircle** x_1 y_1 x_2 y_2 x_3 y_3
   Find out the circumscribed circle of triangle $(x_1, y_1) - (x_2, y_2) - (x_3, y_3)$. These three points are guaranteed to be non-collinear. The circle is formatted as (x, y, r) where (x, y) is the center of circle, r is the radius.

InscribedCircle x_1 y_1 x_2 y_2 x_3 y_3
   Find out the inscribed circle of triangle $(x_1, y_1) - (x_2, y_2) - (x_3, y_3)$. These three points are guaranteed to be non-collinear. The circle is formatted as (x, y, r) where (x, y) is the center of circle, r is the radius.

TangentLineThroughPoint x_c y_c r x_p y_p
   Find out the list of tangent lines of circle centered (x_c, y_c) with radius r that pass through point (x_p, y_p). Each tangent line is formatted as a single real number 'angle' (in degrees), the angle of the line ($0 \le angle < 180$). Note that the answer should be formatted as a list (see below for details).
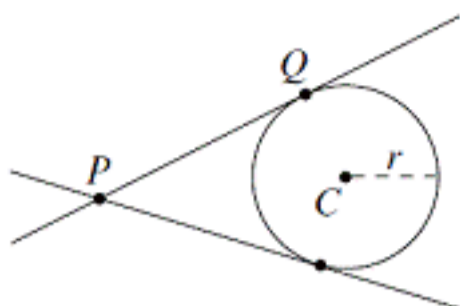
**CircleThroughAPointAndTangentToALineWithRadius** x_p y_p x_1 y_1 x_2 y_2 r
   Find out the list of circles passing through point (x_p, y_p) that is tangent to a line $(x_1, y_1) - (x_2, y_2)$ with radius r. Each circle is formatted as (x, y), since the radius is already given. Note that the answer should be formatted as a list. If there is no answer, you should print an empty list.
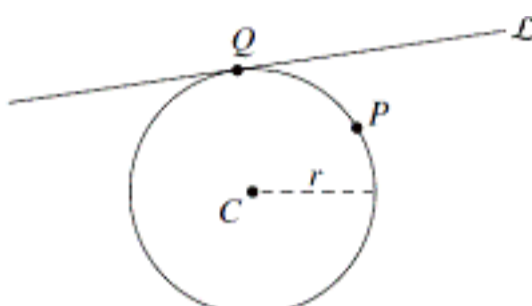
CircleTangentToTwoLinesWithRadius x_1 y_1 x_2 y_2 x_3 y_3 x_4 y_4 r
   Find out the list of circles tangent to two *non-parallel* lines $(x_1, y_1) - (x_2, y_2)$ and $(x_3, y_3) - (x_4, y_4)$, having radius r. Each circle is formatted as (x, y), since the radius is already given. Note that the answer should be formatted as a list. If there is no answer, you should print an empty list.
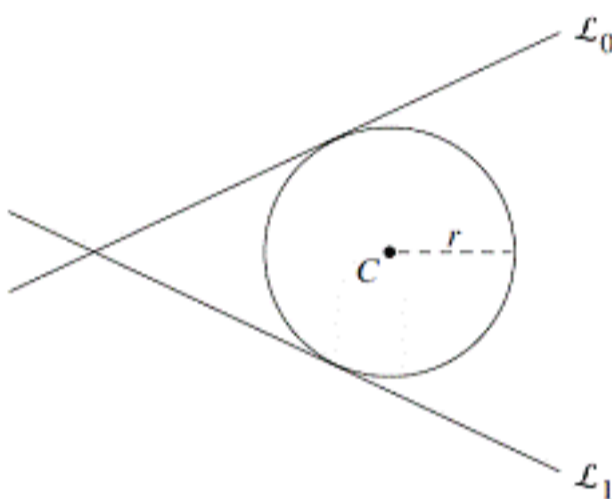

CircleTangentToTwoDisjointCirclesWithRadius x_1 y_1 r_1 x_2 y_2 r_2 r
   Find out the list of circles externally tangent to two disjoint circles (x_1, y_1, r_1) and (x_2, y_2, r_2), having radius r. By "*externally*" we mean it should not enclose the two given circles. Each circle is formatted as (x, y), since the radius is already given. Note that the answer should be formatted as a list. If there is no answer, you should print an empty list.
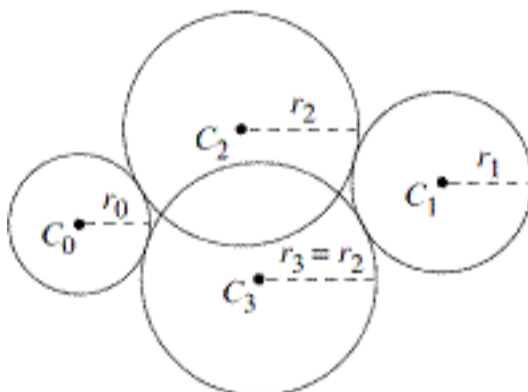
   For each line described above, the two endpoints will not be equal. When formatting a list of real numbers, the numbers should be sorted in increasing order; when formatting a list of (x, y) pairs, the pairs should be sorted in increasing order of x. In case of tie, smaller y comes first.

Input

There will be at most 1000 sub-problems, one in each line, formatted as above. The coordinates will be integers with absolute value not greater than 1000. The input is terminated by end of file (EOF).

Output

For each input line, print out your answer formatted as stated in the problem description. Each number in the output should be rounded to six digits after the decimal point. Note that the list should be enclosed by square brackets, and tuples should be enclosed by brackets. There should be no space characters in each line of your output.

Sample Input

```
CircumscribedCircle 0 0 20 1 8 17
InscribedCircle 0 0 20 1 8 17
TangentLineThroughPoint 200 200 100 40 150
TangentLineThroughPoint 200 200 100 200 100
TangentLineThroughPoint 200 200 100 270 210
CircleThroughAPointAndTangentToALineWithRadius 100 200 75 190 185 65 100
CircleThroughAPointAndTangentToALineWithRadius 75 190 75 190 185 65 100
CircleThroughAPointAndTangentToALineWithRadius 100 300 100 100 200 100 100
CircleThroughAPointAndTangentToALineWithRadius 100 300 100 100 200 100 99
CircleTangentToTwoLinesWithRadius 50 80 320 190 85 190 125 40 30
CircleTangentToTwoDisjointCirclesWithRadius 120 200 50 210 150 30 25
CircleTangentToTwoDisjointCirclesWithRadius 100 100 80 300 250 70 50
```

Sample Output

```
(9.734940,5.801205,11.332389)
(9.113006,6.107686,5.644984)
[53.977231,160.730818]
[0.000000]
[]
[(112.047575,299.271627),(199.997744,199.328253)]
[(-0.071352,123.937211),(150.071352,256.062789)]
[(100.000000,200.000000)]
[]
[(72.231286,121.451368),(87.815122,63.011983),(128.242785,144.270867),(143.826621,85.831483)]
[(157.131525,134.836744),(194.943947,202.899105)]
[(204.000000,178.000000)]
```