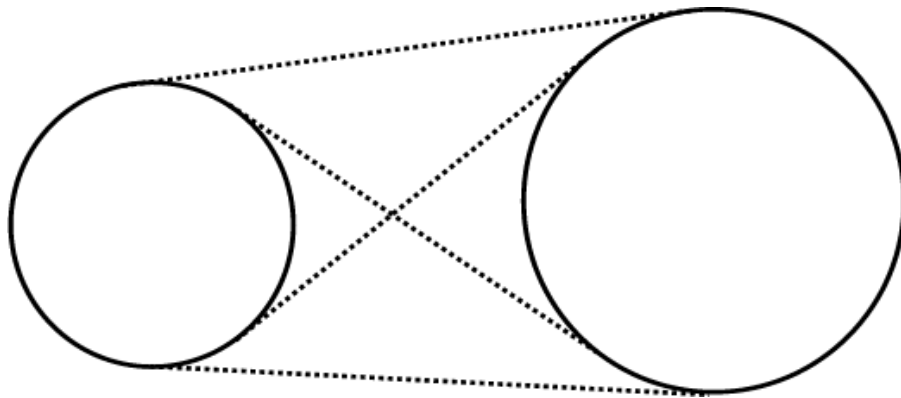


# Problem B

## Tangents

**Input:** standard input  
**Output:** standard output  
**Time Limit:** 2 seconds

You can see in the pictures below that two different circles can have at most four common tangents. Given the center and radius of two circles your job is to find the length of their common tangents and also the points where they touch the two circles.



### Input

The input file contains several lines of inputs.

Each line contains six integers  $x_1$  ( $-100 \leq x_1 \leq 100$ ),  $y_1$  ( $-100 \leq y_1 \leq 100$ ),  $r_1$  ( $0 < r_1 \leq 200$ ),  $x_2$  ( $-100 \leq x_2 \leq 100$ ),  $y_2$  ( $-100 \leq y_2 \leq 100$ ),  $r_2$  ( $0 < r_2 \leq 200$ ). Here  $(x_1, y_1)$  and  $(x_2, y_2)$  are the coordinates of the center of the first circle and second circle respectively,  $r_1$  is the radius of the first circle and  $r_2$  is the radius of the second circle.

Input is terminated by a line containing six zeroes.

### Output

For each line of input you should produce one or more lines of output. The description of this output is given below.

First line of the output for each line of input contains an integer  $n$ , which denotes the number of different tangents between the two circles. If there is infinite number of tangents between the two circles then the value of  $n$  should be  $-1$ . If  $n$  is positive then next  $n$  lines contain the description of each tangent. The description of the tangent contains five floating-point numbers  $S_x, S_y, T_x, T_y, L$  in a single line. Here  $(S_x, S_y)$  is the point at which the tangent touches the first circle and  $(T_x, T_y)$  is the point where the tangent touches the second circle and  $L$  is the length of the tangent. All the floating-point numbers have five digits after the decimal point. Errors less than

$2 \cdot 10^{-5}$  will be ignored. The tangents should be printed in ascending order of  $S_x$  and in case of a tie they should be printed in ascending order of  $S_y$ .

### Sample Input

```
10 10 5 20 20 5
10 10 10 20 20 10
10 10 5 20 10 5
0 0 0 0 0 0
```

### Output for Sample Input

```
4
6.46447 13.53553 16.46447 23.53553 14.14214
10.00000 15.00000 20.00000 15.00000 10.00000
13.53553 6.46447 23.53553 16.46447 14.14214
15.00000 10.00000 15.00000 20.00000 10.00000
2
2.92893 17.07107 12.92893 27.07107 14.14214
17.07107 2.92893 27.07107 12.92893 14.14214
3
10.00000 5.00000 20.00000 5.00000 10.00000
10.00000 15.00000 20.00000 15.00000 10.00000
15.00000 10.00000 15.00000 10.00000 0.00000
```

**Problem setter: Shahriar Manzoor. Member of Elite Problem Setters' Panel**

**Special Thanks: Derek Kisman, Member of Elite Problem Setters' Panel**