

UCF “Practice” Local Contest — August 19-23, 2024

Circle Meets Square

filename: circlesquare

Difficulty Level: Medium

Time Limit: 2 seconds

We all know that you can’t put a round peg in a square hole. Asking you to do so in this contest would be cruel and unusual punishment, which is banned by the Eighth Amendment to the United States Constitution. But, perhaps a more reasonable problem that the Framers of the Constitution never thought about is determining if a given circle and square have an intersection of positive area (overlap), or touch (share a point in common), or don’t touch at all.

The Framers of the US Constitution and the UCF Programming Team coaches would like to know, given a circle and a square, do the two overlap in some positive area, touch, or don’t touch at all. Help them out by writing a program to solve the problem!

The Problem:

Given the description of a square and circle in the Cartesian plane, determine if the intersection between the two has positive area (overlap), is a single point (touches) or doesn’t exist.

The Input:

The first input line contains three integers: x ($-1,000 \leq x \leq 1,000$), y ($-1,000 \leq y \leq 1,000$), and r ($0 < r \leq 1,000$), representing (respectively) the x and y coordinates and radius of the circle.

The second input line contains three integers: t_x ($-1,000 \leq t_x \leq 1,000$), t_y ($-1,000 \leq t_y \leq 1,000$), and s ($0 < s \leq 1,000$), where (t_x, t_y) represents the coordinates of the bottom left corner of the square and s represents the side length of the square. The square’s top right corner is (t_x+s, t_y+s) , so that its sides are parallel to the x and y axes.

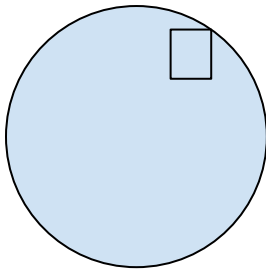
The Output:

If the circle and square *don’t touch*, output 0 (zero). If they *touch* at a single point, output 1 (one). If they *overlap* in positive area, output 2 (two).

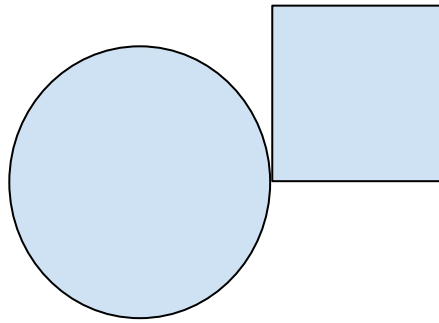
Sample Input**Sample Output**

0 0 5 2 3 1	2
0 0 5 5 0 6	1
0 5 4 -1 -1 1	0

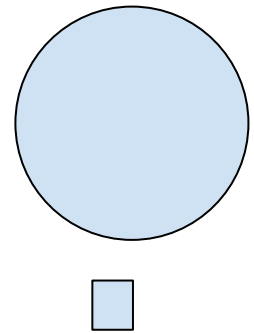
Pictures of the Sample Input:



First Sample



Second Sample



Third Sample