

COS 126	General Computer Science	Spring 2009
Programming Exam 1		

This test has 1 question. You have 50 minutes. The exam is open book, open note, and open web. You may use code from your programming assignments or the Introduction to Programming in Java booksite. No communication with any non-staff members is permitted. Submit your solution via Moodle. **Write out and sign the Honor Code pledge before turning in the test.**

“I pledge my honor that I have not violated the Honor Code during this examination.”

Name:

Signature

NetID:

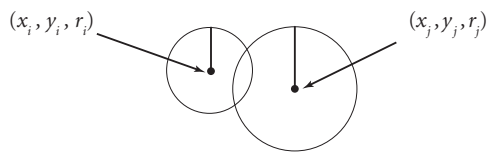
Total	
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- P01 TTh 1:30 Will
- P01A TTh 1:30 Rob
- P01B TTh 1:30 Aditya
- P01C TTh 1:30 Michael
- P02 TTh 2:30 Will
- P03 TTh 3:30 Rob
- P04 TTh 7:30 Chris
- P05 WF 10 JP
- P06 WF 1:30 Chris
- P06A WF 1:30 Thomas
- P06B WF 1:30 Donna
- P06C WF 1:30 Michael

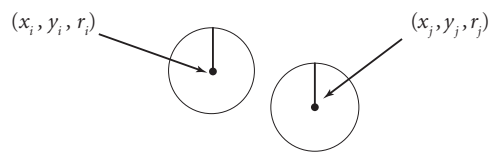
Problem. Write a program `Intersects.java` that reads in a sequence of circles from standard input, plots them using standard drawing, computes the circle that intersects with the most other circles, plots that circle in red, and prints to standard output the circle and the number of circles that it intersects.

Your program will be graded on correctness and clarity (including comments). You will earn more partial credit for a program that solves part of the problem (e.g., reads in the input and plots the circles) than one that does not compile.

Geometry. We specify a circle in the plane by its center (x, y) and its radius r . Circle i intersects circle j if the Euclidean distance between their centers is less than or equal to the sum of their radii. We consider two nested circles (one circle is completely contained inside the other) to intersect.



intersects: $\sqrt{(x_i - x_j)^2 + (y_i - y_j)^2} \leq (r_i + r_j)$

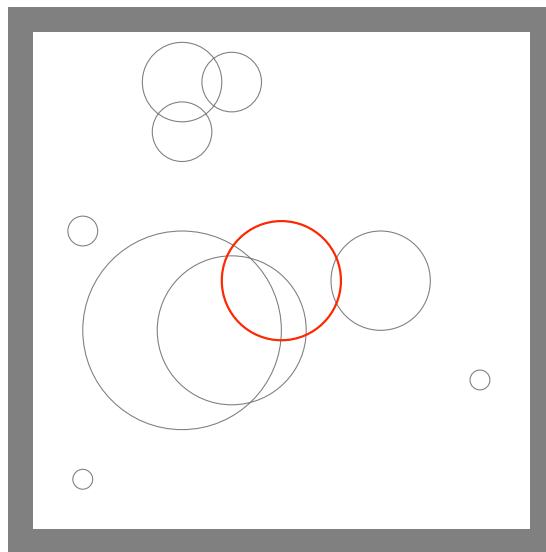


does not intersect: $\sqrt{(x_i - x_j)^2 + (y_i - y_j)^2} > (r_i + r_j)$

Input and output formats. The input consists of an integer N followed by N triples of real numbers (the x - and y -coordinates of the center of the circle, followed by its radius r). Plot the N circles using standard drawing. Plot the circle that intersects the most other circles in red. If there is a tie, plot the first circle in the input that has this property. Finally, print the circle and the number of other circles it intersects.

```
% more intersects10.txt
10
.3 .4 .20
.1 .1 .02
.7 .5 .10
.3 .9 .08
.3 .8 .06
.4 .9 .06
.1 .6 .03
.5 .5 .12
.4 .4 .15
.9 .3 .02
```

```
% java Intersects < intersects10.txt
(0.5, 0.5, 0.12)
3
```



Submission. Submit `Intersects.java` via Moodle.