

# BIL105E - Introduction to Scientific and Engineering Computing

## Homework-2

Assignment Date : 11.03.2010 (Corrections: 16.03.2010)  
Due Date : 01.04.2010 at 22:00

- Submit two files to Ninova. File names must be your İTÜ student number.
  - 1) Your C source file (Example: 040090123.c)
  - 2) Your MS Word report file (Example: 040090123.doc)
- You should use the standard report format (Yazılım Ödevleri Klavuzu) which is available at Ninova.
- Make sure gcc compiles your code successfully on Unix/Linux.
- Cheating is unacceptable and subject to disciplinary actions. All submitted programs will be cross-checked by using an automatic detection system.
- Late submissions through email are not accepted.

### IMPORTANT

The following information must be added at the beginning of your C source code, otherwise 10 points will be deducted as penalty from your homework grade.

```
/*  
Course      : Bil105e  
Term       : 2010 Spring  
Homework   : #2  
Student Name : Aaa Bbb  
Student Number : 123456789  
*/
```

### HOMEWORK DEFINITION

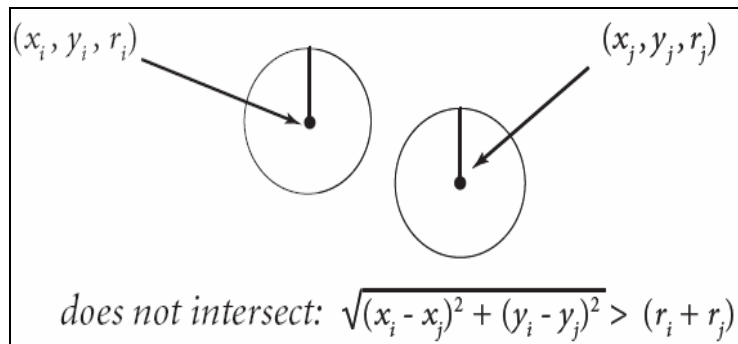
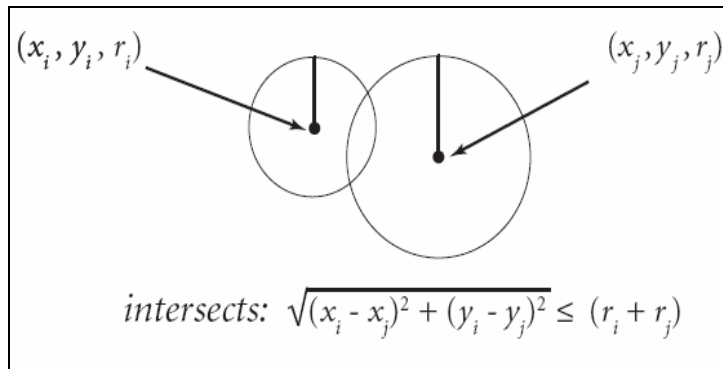
Draw a **Flow Chart** (in your report) and write a **C program** that reads in a sequence of several circles from standard input (KEYBOARD), then does the followings:

- 1) Find the circle that **intersects** with the most other circles, and print to standard output (SCREEN) the circle info and the number of circles that it intersects. If there is no intersection, then program should print "There is no intersection" message.
- 2) Find the circle that **contains** the most other circles, and print to standard output (SCREEN) the circle info and the number of circles that it contains. If there is no containment, then program should print "There is no containment" message.

A circle is specified in the coordinate system by its center (x , y) and its radius r.

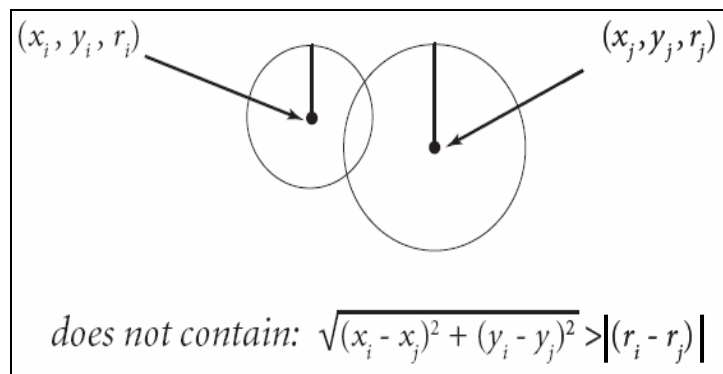
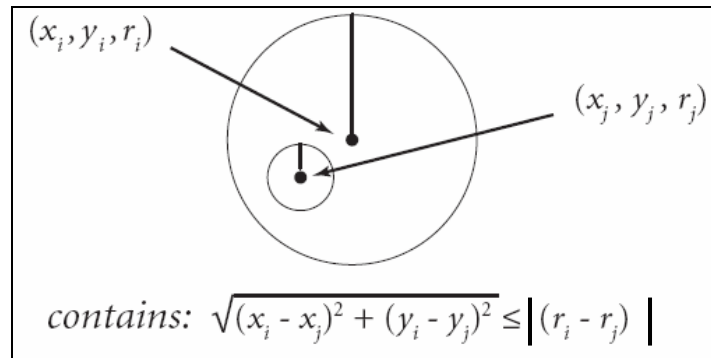
## INTERSECTION

Circle  $i$  intersects circle  $j$  if the Euclidean distance between their centers is less than or equal to the sum of their radii.



## CONTAINMENT

Circle  $i$  contains circle  $j$  if the Euclidean distance between their centers is less than or equal to the radius of circle  $i$  minus the radius of circle  $j$ .



### SAMPLE INPUT

The input will consist of an integer N, followed by N triples of float numbers (the x and y coordinates of the center of the circle, followed by its radius r).

```
20
.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
.8 .3 .15
.5 .5 .20
.3 .5 .15
.5 .3 .10
.5 .5 .05
.4 .5 .35
.4 .6 .05
.5 .5 .02
.1 .6 .05
.9 .3 .02
```

### SAMPLE OUTPUT

```
Circle with most intersections is (x y r) : (0.30 0.40 0.20) Circle #1
Count of Intersections : 7

Circle with most containments is (x y r) : (0.40 0.50 0.35) Circle #16
Count of Containments : 10
```

### TESTING YOUR PROGRAM

To make testing easy, you can use the command-line window to run your program.

**Step 1)** Open a comand-line window (In Unix/Linux, this step is not needed).

- Click Start, then click Run
- Type “cmd” and hit ENTER key
- Type “cd Documents” for going to the directory where your executable program is.

**Step 2)** Run the program with the following Input Redirection method.

**Myprog.exe <circles.txt**

With this method, your program will read the data values from the “circles.txt” file, instead of the actual keyboard. (Both the executable file and the data file must be in same directory.)

If you also want to save the outputs to a file, instead of displaying on screen, then you can run the program with the following Input/Output Redirection method.

**Myprog.exe <circles.txt >sonuclar.txt**

### NOTICES:

1. You can assume that the maximum number of circles can be 100.
2. Identical circles should not be compared.