BIRZEIT UNIVERSITY
COMP231 – Advanced Programming
Assignment # 1

Objectives:

1. To understand basic problem solving techniques using Java Programming Language.
2. To declare Java primitive data types. Also to obtain input and display output.
3. To be able to use arithmetic and use different control structures (Decision making and Loops).
4. To be able to use and manipulate Arrays in Java.

Specification

Submission: Online **through Ritaj**.

What to submit: Your **OWN** well-structured and **well-commented** JAVA files (**.java**) (compressed into a **studentId_sec#.rar** file, e.g. 1234567_sec1.rar).

Deadline: **01/10/2015** by midnight.   (The online submission will be disabled after this time).

Tasks

Task 1:

(*Display numbers in a pyramid pattern*) Write a nested **for** loop that prints the following output:

```
                              1
                        1     2     1
                  1     2     4     2     1
            1     2     4     8     4     2     1
      1     2     4     8    16     8     4     2     1
   1     2     4     8    16    32    16     8     4     2     1
 1     2     4     8    16    32    64    32    16     8     4     2     1
1  2    4     8    16    32    64   128    64    32    16     8     4     2     1
```

Task 2:

(*Geometry: two circles*) Write a program that prompts the user to enter the center coordinates and radii of two circles and determines whether the second circle is inside the first or overlaps with the first, as shown in Figure 3.10. (*Hint:* circle2 is inside circle1 if the distance between the two centers $<= |r1 - r2|$ and circle2 overlaps circle1 if the distance between the two centers $<= r1 + r2$. Test your program to cover all cases.)

Here are the sample runs:

```
Enter circle1's center x-, y-coordinates, and radius: 0.5 5.1 13  ↵Enter
Enter circle2's center x-, y-coordinates, and radius: 1 1.7 4.5  ↵Enter
circle2 is inside circle1
```
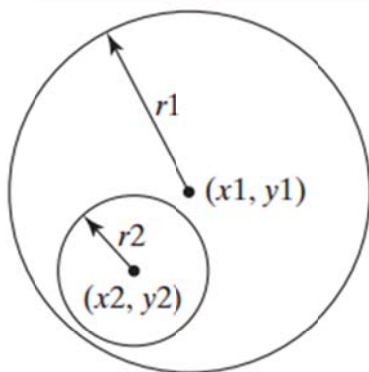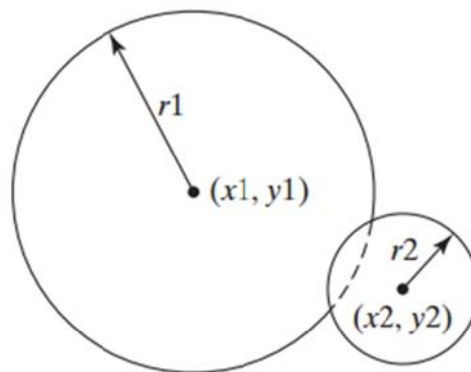

(a) A circle is inside another circle. (b) A circle overlaps another circle.

Task 3:

(*Identical arrays*) The arrays **list1** and **list2** are *identical* if they have the same contents. Write a method that returns **true** if **list1** and **list2** are identical, using the following header:

```
public static boolean equals(int[] list1, int[] list2)
```

Write a test program that prompts the user to enter two lists of integers and displays whether the two are identical. Here are the sample runs. Note that the first number in the input indicates the number of the elements in the list. This number is not part of the list.

```
Enter list1: 5 2 5 6 6 1  ⏎ Enter
Enter list2: 5 5 2 6 1 6  ⏎ Enter
Two lists are identical
```

```
Enter list1: 5 5 5 6 6 1  ⏎ Enter
Enter list2: 5 2 5 6 1 6  ⏎ Enter
Two lists are not identical
```

Good Luck!