CS111 Introduction to Computer Science
Recitation 8

Exercise 1: Writing methods
i) We wish to create a module called MathUtilities that provides *methods* for performing various mathematical operations. We will break up into groups, and your peer leader will assign each group one problem from the following list, to solve by writing a Java method (not a complete program).

- Find the Greatest Common Factor of two numbers (the largest number that divides evenly into both).
- Round a number to a specified number of decimal places.
- Determine whether two circles overlap, given their center coordinates (in 2D space) and radii.
- Find the lowest grade in an array (double) of a student's grades, and replace it with -1.

ii) Now, each group will be assigned to write a *program* to solve one the following problems. Your program should use (call) one or more of the methods written in part (i). Problems will be assigned such that you will have to use a method written *by a different group*.

1. Simplify a fraction (e.g., 90/120 is simplified to 3/4). [uses method #1 from part (i)]
2. Print a number in scientific notation (e.g., 0.000838423 is 8.38×10^{-4} in scientific notation with 3 significant digits). [uses method #2 from part (i)]
3. Determine if any of four circles overlap, given their center coordinates (in 2D space) and radii. [uses method #3 from part (i)]
4. Calculate and print the final (average) grade for each student in a class (double[student][grades]), ignoring the dropped grade (with a value of -1). [uses method #4 from part (i)]

Exercise 2: Ordering
Say you want to put an unordered array of integers in order.

i) Write a method that takes in an integer array and a starting index. The method should find the lowest number from the index to the end of the array and swap it with the element at the index.
e.g. {1, 9, 10, 3} with index=1 takes the lowest number from {9, 10, 3} and swaps it with 9: {1, 3, 10, 9}

ii) Use the method in (i) to put an array of integers in order.