

# Quiz

CSC301 Algorithms and Data Structures

23 March 2015

1. The choice to implement an interface obliges a programmer to define the methods of the interface within the class. Which methods must the program define in these cases?
  - (a) **public class** Bag<ElementType> **implements** Iterable<ElementType> { }
  - (b) **public class** BagIterator<ElementType> **implements** Iterator<ElementType> { }
2. The complexity of the shell sort lies somewhere between  $N \log N$  and  $N^2$ . Give one of the expressions that the authors of our textbook gave us to describe the complexity of the shell sort.
3. This list is H-sorted: [1 2 3 3 6 5 10 7 15 11 21 13 28 17]. In this case,  $H = 2$ . What does H-sorted mean?
4. Write a method whose one parameter is an integer  $n$  and whose return type is List<Double>. This method will return to its caller a list of  $n$  random floating point values that are sorted in ascending order.

Suggestion: Find a method in the java.util.Random class that will generate random floating point values. Find a method in the java.util.Collections class that will sort the elements of a list.
5. Write a method whose two parameters are both sorted lists of floating point values. This method will merge the two lists—it will return to its caller a sorted list of floating point values that contains all the values that it finds in the two given lists.

Suggestion: Declare three integer variables in the method. Each integer will serve as an index into one of the three lists (the two parameters and the list that is returned) on which the method works. Use three **while** loops. One will do most of the work. The other two are needed to “clean up” at the end.