Homework 4, by Tomas Kaljevic

1. The single argument insert method uses the > comparison operator to compare the value being inserted to other values in the sequence. Since the Coord class does not overload the > operator, the compiler does not have a way of knowing how to compare the Coord being inserted to other Coord values in the sequence, so there is a compilation error.
   1. This problem cannot be solved recursively using the one-parameter listAll because the method would not know which path to follow to list all the files in that directory. The two-parameter listAll fixes this because one of the parameters is a string for the path that the method needs to follow.
2. The time complexity of this algorithm is O(N^3) because there are three nested for loops, each of which go from 0 to N-1 (i.e. looping N times). The statements inside each loop are of constant time so they are negligible to the overall time complexity.
3. The time complexity of this algorithm is still O(N^3) because the first inner loop will still loop a maximum number of N times. Even though there will be less total calls made by this algorithm, the coefficient in front of N^3 is dropped and the statements that are of constant time are still negligible to the overall time complexity.
4. In terms of the number of linked list nodes visited, the time complexity of the non-member interleave function is O(N). Within the loop, the calls to get and insert will, in the worst case, visit N nodes, so they are O(N) each, putting the time complexity at O(2N). Since both Sequences are of the same size, the second loop won’t do anything. The call to swap is of constant time so that is negligible to the overall time complexity. Dropping the coefficient, the overall time complexity in terms of nodes visited is O(N).
5. In terms of the number of linked list nodes visited, the time complexity of the member interleave function is O(N). The two loops will each visit each node in each linked list, putting the time complexity at O(2N). The call to swap is of constant time so that is negligible to the overall time complexity. Dropping the coefficient, the overall time complexity in terms of nodes visited is O(N).