## CS 3510: Advanced Algorithms/Data Structures

### Spring 2017 Assignment 0

Problems due as noted.

**Assignment**

Problems identified by x.y(z) denote the problem “y”, in chapter “x” of the textbook, with part “z”. If “z” is not noted, then the entire problem is required.

**Due Jan 12**

- 0.1(a, b, c, d, e, f) In each case, quote the rule that applies, or show derivation.
- 0.2(b) Show your derivation.

**Due Jan 17**

- 0.1(g, h, i, j, k, l) In each case, quote the rule that applies, or show derivation.
- 0.2(a) Show your derivation.
- Experimentally determine the running time of the \texttt{fib1} algorithm for calculating the Fibonacci sequence. Time the calculation of each number from the 1st through the 40th. Create a table and a graph of your results for the algorithm. The x-axis of the graph should be which Fibonacci number (1-40), and the y-axis of the graph should be the number of seconds to calculate the number. In the graph, also display sample theoretical limits, normalized for comparison.

**Due Jan 19**

- 0.1(m, n, o, p, q) In each case, quote the rule that applies, or show derivation. Prove o, don’t just quote the known result. Don’t spend too much time on q.
- 0.2© Show your derivation.
- Experimentally determine the running time of the \texttt{fib2} algorithm for calculating the Fibonacci sequence. Add the \texttt{fib2} data to the table and graph of results for the \texttt{fib1} algorithm. In the graph, display sample theoretical limits, normalized for comparison.

**Submission**

- At the beginning of class on the due dates, submit paper copies of your solutions, tables and graphs.