CS 3510: Advanced Algorithms/Data Structures

Spring 2016 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 14

- 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 19

- 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 \( \text{fib1} \) 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 21

- 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 \( \text{fib2} \) algorithm for calculating the Fibonacci sequence. Add the \( \text{fib2} \) data to the table and graph of results for the \( \text{fib1} \) 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.