CS 3510: Advanced Algorithms/Data Structures

Spring 2019 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.

Assignment 0a, Due Jan 10

- 0.1(a, b, c, d, e, f) In each case show your derivation.
- 0.2(b) Show your derivation.

Assignment 0b, Due Jan 12

- 0.1(g, h, i, j, k, l) In each case show your 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 of your results for the algorithm.

Assignment 0c, Due Jan 15

- 0.1(m, n, o, p, q) In each case show your 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 of results for the \( \text{fib1} \) algorithm. Add a graph displaying sample theoretical limits and the \( \text{fib1} \) and \( \text{fib2} \) complexities, normalized for comparison. 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. Use log-scale on the y-axis.

Submission

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