CS 3510: Advanced Algorithms/Data Structures

Spring 2017 Assignment 2

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 Feb 7

- 2.5(a, b, c, d, e) Use the master theorem, show comparison.

Due Feb 9

- 2.16 Find an algorithm, prove the runtime is \( O \log(n) \). The values stored are integers, not necessarily positive. Hint: You should know how to find items in a sorted array in \( O \log(n) \).
- 2.12 Write down the recurrence relation and solve it.
- 2.5(f, g, h) Use the substitution method. Show the pattern and determination of \( k_{\text{max}} \).

Due Feb 14

- 2.22 Find an algorithm, prove the runtime is \( O \log(m) + \log(n) \). Your algorithm might be \( O \log(m+n) \). Is this better than, worse than, or the same as \( O \log(m) + \log(n) \)?
- 2.25(a) Fill in the missing code, give a recurrence relation, and solve it.
- 2.5(i, j, k) Use the substitution method. Show the pattern and determination of \( k_{\text{max}} \).

Due Feb 16

- (NOT) 2.14 Find a divide-and-conquer algorithm, write the recurrence relation, solve it.
- (NOT) 2.25(b) Fill in the missing code, give a recurrence relation, and solve it.
- 2.4(A, B, C) Write down the recurrence relations. Solve each one by an appropriate method. Then, choose.
- 2.17 Find an algorithm, prove the runtime is \( O \log(n) \).

Submission

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