CS 5200 Fall 2019 HW 03

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Due Thursday,October 03, 2019, 11:59PM

Submit your HW as a single PDF file that contains all the answers to the individual questions, all code, and all code output. Do not submit scans of handwritten materials or screenshots. This should all be well-organized and attractively laid out. This file will contain all the grading feedback after your work is graded.

Problems

All the problems are from the Cormen, Leiserson, Rivest, and Stein book.

1. (15 points) Show that if L $\geq$ 2, then every binary tree with L leaves contains a subtree having between L/3 and 2L/3 leaves, inclusive.

2. (15 points) Let us associate a "weight" w(q) = $2^{-depth(q)}$ with each leaf in a binary tree T. Prove that $\Sigma_q w(q) \leq 1$, where the sum is taken over all leaves q in T.

3. (15 points) Do Problem 5.2-4 on p. 122.

4. (15 points) Do Problem 5.2-5 on p. 122.

5. (15 points) Do Problem 5.4-1 on p. 142.

6. (15 points) Do Problem 6.5-9 on p. 166. Please implement your algorithm in Python and submit some output to support your claim of performance.

7. (10 points) Do Problem 9.3-1 on p. 223.