

CS 211 Homework #1

Please complete the homework problems. Note that this is an individual assignment and all work must be your own. Be sure to show your work when appropriate. This assignment is due in class on Tuesday, February 20, 2017.

1. [3] Given the following pre-order and in-order traversals, reconstruct the appropriate binary tree. **NOTE: You must draw a single tree that works for both traversals.**

Pre-order: A, E, D, G, B, F, I, C

In-order: D, E, B, G, A, F, I, C

2. [3] Starting with an empty BST, draw each step in the following operation sequence. Assume that all removals come from the left subtree when the node to remove is full.

Insert(5), Insert(10), Insert(2), Insert(9), Insert(1), Insert(3), Remove(5).

3. [3] Starting with an empty BST, draw each step in the following operation sequence. Assume that all removals come from the right subtree when the node to remove is full.

Insert(10), Insert(5), Insert(23), Insert(4), Insert(19), Insert(7),
Insert(9), Insert(6), Remove(5).

4. [1] Are Pre, In, and Post Order tree traversals examples of depth-first or breadth-first searching?

5. [2] Perform a breadth-first search on the following array starting at index location 5 in the array below. List the order visited (e.g. 1->2->3...)

0	1	2	3	4	5	6	7	8	9
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6. [2] Assume that we have two algorithms that accomplish the same task. Algorithm A has a non-simplified runtime of $O(n^2 + 5n)$ and Algorithm B has a runtime of $O(n^3)$. Which should we use? Why?

7. [3] Provided are counts of computation for various series. Indicate the most likely runtime complexity for each:

	N = 1	N = 2	N = 3	N = 4	N = 5	N = 6	N = 7	N = 8
Alg. A	6	14	24	36	50	66	85	104
Alg. B	2	8	18	32	50	70	99	128
Alg. C	1	4	9	16	23	31	39	48
Alg. D	1	7	11	14	17	19	21	22
Alg. E	2	4	6	8	10	12	14	16