

CS 284: Endterm – T1 – Spring 2019

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Student Name:

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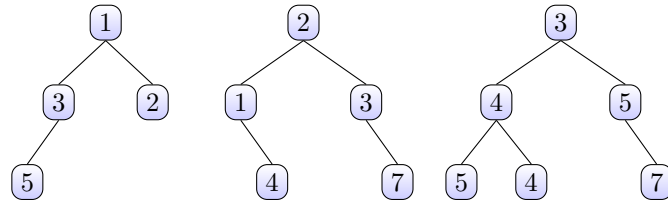
Grade sheet:

Problem 1 (20 points)	
Problem 2.1 (10 points)	
Problem 2.2 (10 points)	
Problem 3 (20 points)	
Problem 4 (20 points)	
Problem 5 (10 points)	
Problem 6 (10 points)	

Problems

Exercise 1 (*Trees*)

Implement a method `public BTree<Integer> sumTree(BTree<Integer> t2)` that returns a new binary tree resulting from adding the tree recipient of the message (i.e. the one referred to by `this`) and `t2`. For example, the sum of the first two trees below is the third one:



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Exercise 2 (*Heaps*)

1. Build the max heap that would result from inserting the following elements in the order in which they are presented. Show the intermediate heaps resulting from each individual insertion.

18, 10, 90, 82, 55, 33, 15, 47, 25

2. Show the heap resulting from performing a deletion.

Exercise 3 (*Sorting*)

Sort the following list using quicksort sort

72, 35, 18, 22, 43, 12, 52, 21, 12

Exhibit the list resulting from each pass.

Exercise 4 (*Trees*)

Suppose we have int values between 1 and 1000 in a BST and search for 363. Which of the following cannot be the sequence of keys examined? Why?

1. 2 252 401 398 330 363
2. 3 923 220 911 244 898 258 362 363
3. 4 924 278 347 621 299 392 358 363
4. 5 925 202 910 245 363

Exercise 5 (*Hashing*)

Insert the items in the following table

Key	Hashcode
A	12
B	15
C	16
D	21
E	16
F	13
G	12
H	21
I	12

into the hash table below. Resolve collisions using chaining.

0	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Exercise 6

1. Construct the AVL tree resulting from inserting the following items: 50, 25, 10, 5, 7, 3, 30, 20, 8, 15. Show the intermediate AVL trees that are obtained after each individual insertion.
2. Remove the key 10

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