

COP 5536
Advanced Data Structures
Spring 2018
Exam 2
CLOSED BOOK
60 Minutes

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. For all problems, use only the algorithms discussed in class/text.
2. Write your answers directly on the exam question sheet. You may use scrap paper (supplied by your proctor) for work, but these will not be graded.
3. All answers will be graded on correctness, efficiency, clarity, elegance and other normal criteria that determine quality.
4. You may use only a pen or a pencil. No calculators allowed.

Note. All answers will be graded on correctness, efficiency, clarity, elegance and other normal criteria that determine quality. The points assigned to each question are provided in parentheses.

Last Name: _____

First Name: _____

UFID: _____

Q. 1 (12)	Q. 2 (12)	Q. 3 (12)	Q. 4 (14)	Total (50)

Question.1 (12):

Start with an empty AVL tree and perform insert operations using the following sequence of keys: 21, 23, 27, 26, 24, 25, and 22. Show each step.

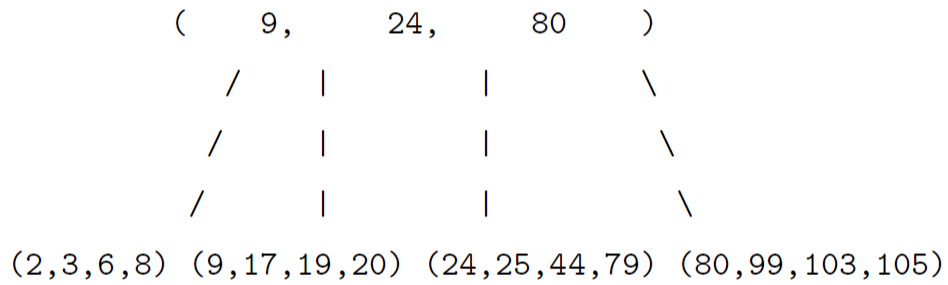
Continue work here if necessary.

Continue work here if necessary.

Question 3 (12):

(a) (6) Suppose that n keys are inserted into an empty B-tree of order m . What is the maximum height h in terms of n and m in the final B-tree? Show how you derive your answer.

(b) (6) Given the following 5-way B+-tree, insert 40 and 100 in this order. Show each step and the resulting tree.



Continue work here if necessary.

Question 4 (14):

(a) (7) Insert the following keys into an initially empty instance of a splay tree, assuming that this is a *bottom-up* splay tree:

4, 1, 5, 9, 3, 8, 2

(b) (7) Consider the following *top-down* splay tree:



Perform a *split* operation with respect to the node with the key 5, showing each step

Continue work here if necessary.