

COP 5536
Advanced Data Structures
Spring 2018
Exam 3
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 (14)	Q. 3 (12)	Q. 4 (12)	Total (50)

Question.1 (12):

Draw a clearly labeled suffix tree for the string *addaadd#*.

Continue work here if necessary.

Question 2 (14):

Consider a segment tree with range $[0, \dots, k]$, where k is an integer.

(a)(7) Describe how a horizontal line segment is inserted into a segment tree. What is the time complexity? Show how you derive it. Assume that the two endpoints of the horizontal line segment are integers within the range $[0, \dots, k]$ and each leaf node of the segment tree covers an integer range.

(b)(7) If a segment tree contains n horizontal line segments, describe how to report all horizontal line segments that intersect a given vertical line. What is the time complexity? Show how you derive it.

Continue work here if necessary.

Question 3 (12):

For the min radix priority search tree (RPST) with range $[0,63)$,

(a) (9) Perform insert operations into an initially empty RPST in sequence with the following keys: $(9,50)$, $(33,10)$, $(20,1)$, $(60,12)$, $(22,61)$, $(10,37)$.

Show each step. (Note: The elements x and y of a key (x, y) represents the search and priority key values, respectively.)

(b) (3) Delete key $(10,37)$ from the result RPST of Part (a). Show the resulting RPST.

Continue work here if necessary.

Question 4 (12):

With a clear diagram explain how a bloom filter is used with differential files and what are its advantages vs the naïve mode of operation?

Continue work here if necessary.