CSC-421 Applied Algorithms and Structures
Spring 2017

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Assignment #2
(Due April 19)

Please upload your submission as a single PDF file on D2L. If your submission consists of more than one file, convert all your files into a single PDF file and upload it.

1. Illustrate the execution of Merge Sort on the array $A = \langle 6, 4, 9, 8, 5, 10, 1, 3 \rangle$.
2. Illustrate the execution of Quick Sort on the array $A = \langle 6, 4, 9, 8, 5, 10, 1, 3 \rangle$.
3. Let $A[1..n]$ be an array of points in the plane, where $A[i]$ contains the coordinates (x_i, y_i) of a point p_i, for $i = 1, \ldots, n$. Give an $O(n \lg n)$ time algorithm that determines whether any two points in A are identical (that is, have the same x and y coordinates).
4. Textbook, page 1020, exercise 33.1-4.
5. Give a recursive version of the algorithm **Insertion-Sort** (refer to page 18 in the textbook) that works as follows: To sort $A[1..n]$, we sort $A[1..n-1]$ recursively and then insert $A[n]$ in its appropriate position. Write a pseudocode for this recursive version of **Insertion-Sort** and analyze its running time by giving a recurrence relation and solving it.
6. Textbook, pages 39-40, problem 2-1, parts a, b, and c.
7. Textbook, page 1045, problem 33-3.