150015-Semester II - 5781

Data Structures I

**Homework Assignment #9**

**Question 1**

Run a bucket sort on the following array. Show the intermideate stages.

A= <0.19, 0.33, 0.1, 0.18, 0.65, 0.819, 0.22, 0.394, 0.799. 0.43, 0.5>

**Question2**

Run a radix sort on the following list of words. Show the intermideate stages.

“JOY” , “JUG”, “JOB”, ‘JOT”, “JEST”, “JOG”, ‘JAVA”

**Question 3**

Run a counting cort on the following array. Show the intermideate stages.

A= 〈6,0,3,0,6,4,3,7,6,4,0,0〉

**Question 4**

Draw the decision tree for a quick sort on an array containing 3 elements, given that at every stage the minimum value is chosen as the pivot.

**Question 5**

Given: n rational numbers. Explain in detail how to sort the numbers using bucket sort and additional actions.

You are not allowed to change the bucket sort algorithim. In addition to bucket sort yoy are allowed to actions that their run time complexity is O(n).

**Question 6**

1. What is the minimal depth of a leaf in a decision tree for a sorting algorithm for an array of size n? Explain.
2. What is the minimal number of nodes in a decision tree for a sorting algorithm for an array of size n? Explain.

**Question 7**

Given: An array A containing n numbers.

All the values in A are in the range of [10,10n]. All the numbers are natural numbers, except 20 of them which are rational numbers.

Suggest an algorithim in words, that accepts A and n and sorts the array in O(n) time. You must explain your algorithim.