CS203 Algorithms Mid-Semester Exam-2014

Note:- Answer according to order & all parts of question be together. Time: 2hrs MM:40

1. (a) Give an example of comparison-based-sorting having average case time O(nlogn) with stable property.(b)Illustrate with suitable example of Quick-sort of not satisfying stable property. [4]

2. (a) Define a universal hash function. (b) Prove that defined universal class of hash functions is universal. [6]

3. Prove that using Randomized-Partition Algorithm, the randomized-quicksort expected running time is O(n log n). [6]

4.Prove that the problem of selecting the i^{th} order statistics from a set of n numbers using Randomized-Select is done in O(n) expected running time [6]

5. Prove that Red-Black Tree with n internal nodes has height atmost 2 log(n+1). [5]

6. (a) Briefly describe Skip-lists. (b) What is the running time of search operation on Skip List? [5]

7. Write down short notes on following topics:-
(a) The problem of selecting the i^{th} order statistics from a set of n numbers in O(n) running time in worst case. (b) Perfect hashing [4+4]