ESO207: Data Structures and Algorithm, 2015-16 I

Class Schedule

Classes: 10:00-10:50 MWF in lecture hall L17.
Request: Please note that the class duration has been reduced to 50 minutes. Hence you will have sufficient time to move between the class-rooms. I hope you will settle down in you seat at the top of the hour so that we can optimally utilize the 50 minutes of the class without disturbance. Also remember to turn-off your cell-phone during the class.

Course Content

The objectives of this course are to study (i) abstract data-structures (ii) techniques of algorithm analysis (to judge the quality of an algorithm), and (iii) algorithm design paradigms. This should help develop the ability to design efficient algorithms to solve problems in diverse domains. The list of the topics, not necessarily in any order, is as follows.

- Random-access-machine model, concept of problem size, and asymptotic behaviour of time/space complexity.
- Estimation of time/space complexity by smooth function and order notations.
- A simple example of worst-case time/space complexity analysis.
- Elementary data-structures: arrays, lists, queues, stacks and their applications.
- Binary search algorithm, binary trees, binary-search-tree data-structure.
- Balanced binary-search-tree: Red-Black trees.
- Hashing.
- Heaps.
- Average case analysis.
- Linear-time sorting algorithms.
- Greedy paradigm as an exact solution and as a heuristic.
- Divide and conquer paradigm.
- Dynamic-programming paradigm.
- Lower bound for sorting algorithms which only use comparison.
- Basic graph algorithms.

Reference Books

1. "Data Structures and Algorithms", A. V. Aho, J. E. Hopcroft, J. D. Ullman,
2. "Introduction to Algorithms", T. H. Corman, C. E. Leiserson, R. L. Rivest, C. Stein.
3. "The Design and Analysis of Computer Algorithms", A. V. Aho, J. E. Hopcroft and J. D. Ullman.

Some books with programming insight

1. Data Structures and Algorithm Analysis in C++ -Mark A Weiss,
2. Data Structures and Algorithms in Java -M. T. Goodrich and R. Tamassia,
3. Data Structures in Java -Thomas A. Standish,

Assignments and Tests

There will be one mid-semester and one end-semester examination. In addition, assignments and quizzes will be given. The weightage of the examinations will be 35% and 45% respectively. Remaining 20% weight will be associated with the assignments and the quizzes. We might make slight changes in these weights.

Teaching Staff

Instructor:
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Teaching Assistants:
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Please always mention "ESO207" in the subject line in your emails.