Final Exam Review Sheet

Logistics

Review Tips

- Slides and your notes, clear browser cache and get new slides before the exam. There might be some changes that will not show if you do not clear cache and download a new copy of the slides.
- Textbook chapters, skip topics that was not discussed in class.
- Class activity exercises
- Lab assignments
- Midterm Exam, Quizzes

Exam Format

- Paper based
- Combination of multiple choice and textual answering questions.

Additional Details

- 05/08/2018 9.00 AM at Alden 109.
- I highly recommend you use a black pen (preferrably Pilot G-2) for writing your answers during the exam. Please note, it is very difficult for me to read the pencil writing and hence there might be a chance for inaccuracy while grading.
- Bring a red and black color pens, to clearly sketch and outline the Red Black Tree.
- It is better to give part of an answer than to leave a question blank. No partial credit can be given for wrong answers if there is no accompanying work. If you leave a question blank, then there will be no points awarded to the question.
- Add necessary justification to your answer, if your understanding of the question deviate from the actual question. This rule also applies to multiple choice questions. I may give you partial credit or even full credit, based on how good you have justified your answer.
- I would strongly encourage you to make use of my office hours, to discuss and/or clarify any topic related to the finals. I will need to cancel my office hours on Wednesday, May 2nd 2018. I will hold all other office hours as per the schedule in my syllabus until the finals.
Topics covered

ADT’s [slides 01 - 05], [textbook - chapter 01 64 - 172]

- Stack - operations, applications (time series), and Tower of Hanoi problem.
- Queues - operations, array, linked list implementation, doubly linked list implementation, circular list, and application (Josephus Problem)

Algorithmic Analysis [slides 06, 07], [textbook - chapter 01 172 - 216]

- Asymptotic analysis principles
- For example - Given some pseudo-code, measure asymptotic worst case time complexity
- Familiarize with the different classes of asymptotic running times such as logarithmic, linear, quadratic, polynomial, and exponential.

Sorting [slides 06 - slides 13], [textbook - chapter 02 243 - 336]

- Insertion sort [06]
- Selection sort [slide 07]
- Bubble sort [slide 08]
- Shell sort [slide 09]
- Quick sort [slide 10]
- Randomized quick sort and Merge sort [slide 11]
- Priority queue and heap [slide 12]
- Heap sort [slide 13]

- Review the running time for all the different sorting algorithms and do not forget to practice several examples to understand the technique used.

Search Algorithms [slides 14 - slides 18], [textbook - chapter 03 361 - 440, 458 - 486]

- Symbol Table [slide 14]
- Sequential search, Binary Search [slide 14] -
- Hash Tables [slide 15]
- Binary Search Trees [slide 16]
- Balanced Trees 2-3 Trees [slide 17]
- Red Black Trees Insertion, Deletion [slide 18, 19, 20]
Graph Algorithms [slides 21 - slides 25], [textbook - chapter 04: 518 - 542; pages 578 - 594; pages 604 - 629]

- Basic terminologies (lecture 21 slides)
- Traversal techniques: DFS, BFS, and the time complexity (lecture 22, 23 slides)
- Applications of Graph Traversal: Strong Components: Kosaraju Algorithm and its time complexity, Topological Sort (lecture 24 slides)
- MST, Prims and Kruskals algorithm, time complexity. (lecture 25 slides)
- Dijkstra’s Algorithm (Refer lecture notes on course webpage)

Review all examples discussed in class and practice well for this section. It is very important in the context of exam, you prepare and do well in all graph related algorithms.

Data Compression [slides 27], [textbook - Chapter 5: pages 826 - 839]

- Huffman construction and algorithm.

Review the example provided in the article provided in the course webpage.

Dynamic Programming [slides 28, 29, 30], [reading materials and slides in the course webpage]

- Dynamic programming basics
- Longest common subsequence
- Sumset sum problem
- 0/1 Knapsack problem
- Traveling Salesman problem

Review all examples discussed in class and practice well for this section. It is very important in the context of exam, you prepare and do well in dynamic programming.

ALL THE BEST IN YOUR EXAMS!!