CS201 Data Structures and Algorithms

Schedule

Daily preparation guide
Study the material listed in the preparation section prior to attending class that day. Try to formulate precise questions concerning the parts you don’t understand or the importance of the material. If you come across some really difficult material, try searching the web for alternative explanations.

Wednesday, August 22

Introduction:
- Classes begin
- Review of syllabus
- Review of order notation
- Review of logarithmic identities
- Review of sorting algorithms
- Example prerequisite material questions: http://beastie.cs.ua.edu/concepts/cs/ds/

Monday, August 27

Preparation:
- Chapter 3, Growth of Functions

Wednesday, August 29

- Chapter 6, Heapsort
- Chapter 7, Quicksort (optional: 7.4.2)
- Example questions: http://beastie.cs.ua.edu/concepts/cs/ds/sorting.html

Monday, September 3

Labor Day, no class

Wednesday, September 5

Preparation:
- Chapter 4, Divide-and-Conquer (optional 4.6)
- Example questions: http://beastie.cs.ua.edu/concepts/cs/al/recurrences.html

Monday, September 10

Preparation:
- Chapter 12, Binary Search Trees (optional 12.4)
- Chapter 13, Red-Black Trees (see the best red-black tree pseudocode ever)
- Problem 13-3, AVL trees (see the best AVL tree pseudocode ever)
- Example questions: http://beastie.cs.ua.edu/concepts/cs/al/sbtrees.html

Prerequisite exam

Wednesday, September 12

Self-balancing trees, continued
Friday, September 14

Programming assignment #0 due

Monday, September 17

Constitution Day!

Monday, September 17

Preparation:
- Web search, “Binomial Heaps”
- Sections 19.1 — 19.3, Fibonacci Heaps (postponed - amortized analysis of operations)
- Problem 19-2, Binomial Heaps (see the best binomial heap pseudocode ever)
- Example questions: http://beastie.cs.ua.edu/concepts/cs/al/heaps.html

Wednesday, September 19

Binomial and Fibonacci Heaps, continued

Monday, September 24

Preparation:
- Chapter 21, Disjoint Sets
- Example questions: http://beastie.cs.ua.edu/concepts/cs/al/disjoint.html

Wednesday, September 26

Preparation:
- Chapter 22, Elementary Graph Algorithms
- Example questions: http://beastie.cs.ua.edu/concepts/cs/al/graphs.html

Monday, October 1

First concept exam:
- Solving recurrences
- Self-balancing search trees
- Binomial and Fibonacci heaps
- Disjoint sets
- Graphs and graph exploration

Wednesday, October 3

Preparation:
- Chapter 23, Minimum Spanning Trees
- Example questions: http://beastie.cs.ua.edu/concepts/cs/al/graphs.html

Monday, October 8

Preparation:
- Section 24.3, Dijkstra’s Algorithm
- Example questions: http://beastie.cs.ua.edu/concepts/cs/al/graphs.html

Wednesday, October 10

Preparation:
- Web search: memoization
- Chapter 15, Dynamic Programming
- Example questions: http://beastie.cs.ua.edu/concepts/cs/al/dynamic.html
Friday, October 12
 Programming assignment #1 due

Monday, October 15
 Dynamic programming, continued

Wednesday, October 17
 Preparation:
 • Chapter 9, *Medians and Order Statistics*
 • Example questions: [http://beastie.cs.ua.edu/concepts/cs/al/lsort.html](http://beastie.cs.ua.edu/concepts/cs/al/lsort.html) (questions 1 - 10)

Monday, October 22
 Medians and order statistics, continued

Wednesday, October 24
 Fall break

Monday, October 29
 Preparation:
 • Section 8.1, *Lower bounds for sorting*

Wednesday, October 31
 Last day to drop a class

Second content exam:
 • Minimum spanning trees
 • Shortest paths
 • Dynamic programming (including memoization)
 • Linear time selection

Friday, November 2
 Programming assignment #2 due

Monday, November 5
 Preparation:
 • Section 8.2, *Counting Sort*
 • Example questions: [http://beastie.cs.ua.edu/concepts/cs/al/lsort.html](http://beastie.cs.ua.edu/concepts/cs/al/lsort.html)

Wednesday, November 7
 Preparation:
 • Section 8.3, *Radix Sort*
 • Section 8.4, *Bucket Sort*
 • Example questions: [http://beastie.cs.ua.edu/concepts/cs/al/lsort.html](http://beastie.cs.ua.edu/concepts/cs/al/lsort.html)

Friday, November 9
 Programming assignment #3 due
Monday, November 12

Preparation:
- Chapter 17, *Amortized Analysis*
- Example questions: http://beastie.cs.ua.edu/concepts/cs/al/amortized.html

Wednesday, November 14

Amortized analysis, continued
Programming assignment #2, resubmission #2 due
Programming assignment #3, resubmission #1 due

Monday, November 19

Preparation:
- Section 34.1 — 34.3, *P and NP*
- Example questions: http://beastie.cs.ua.edu/concepts/cs/al/pnp.html

Wednesday, November 21

Thanksgiving

Monday, November 26

Preparation:
- Section 34.4 — 34.5, *NPC proofs and problems*
- Example questions: http://beastie.cs.ua.edu/concepts/cs/al/pnp.html

Wednesday, November 28

*P, NP, and NP-completeness, continued*

Monday, December 3

Dead week

Wednesday, December 5

Dead week, last day of class

Friday, December 7

Last day to withdraw from the term

Wednesday, December 12

Final exam (cumulative), 11:30am to 2:00pm