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.

Thursday, January 11

Introduction:
- Classes begin
- Review of syllabus
- Review of order notation (http://beastie.cs.ua.edu/cs201/order.html)
- Review of logarithmic identities
- Review of sorting algorithms
- Example prerequisite material questions: http://beastie.cs.ua.edu/concepts/cs/ds/

Tuesday, January 16

Preparation:
- Chapter 3, Growth of Functions

Thursday, January 18

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

Tuesday, January 23

Prerequisite exam

Thursday, January 25

Preparation:
- Web search, “Strong Induction”
- Notes: http://beastie.cs.ua.edu/cs201/summations.html
- Chapter 4, Divide-and-Conquer (optional section 4.6)
- Example questions: http://beastie.cs.ua.edu/concepts/cs/al/recurrences.html

Programming assignment #0 due

Tuesday, January 30

Preparation:
- Chapter 12, Binary Search Trees (optional section 12.4)
- Chapter 13, Red-Black Trees
- Notes: http://beastie.cs.ua.edu/red-black
- Problem 13-3, AVL trees
- Notes: http://beastie.cs.ua.edu/avl
- Example questions: http://beastie.cs.ua.edu/concepts/cs/al/sbtrees.html
Thursday, February 1
Self-balancing trees, continued

Programming assignment #0, resubmission #1 due

Tuesday, February 6
Preparation:
• Notes: http://beastie.cs.ua.edu/cs201/heaps.html
• Web search, “Binomial Heaps”
• Notes: http://beastie.cs.ua.edu/cs201/binomial.html
• Sections 19.1 — 19.3, Fibonacci Heaps
• Notes: http://beastie.cs.ua.edu/cs201/glossary-fibheap.html
• Example questions: http://beastie.cs.ua.edu/concepts/cs/al/heaps.html

Thursday, February 8
Binomial and Fibonacci Heaps, continued

Programming assignment #0, resubmission #2 due
Programming assignment #1 due

Tuesday, February 13
Preparation:
• Chapter 21, Disjoint Sets
• Example questions: http://beastie.cs.ua.edu/concepts/cs/al/disjoint.html

Thursday, February 15
Preparation:
• Chapter 22, Elementary Graph Algorithms
• Example questions: http://beastie.cs.ua.edu/concepts/cs/al/graphs.html

Programming assignment #0, resubmission #3 due
Programming assignment #1, resubmission #1 due

Tuesday, February 20
First concept exam:
• Solving recurrences
• Self-balancing search trees
• Binomial and Fibonacci heaps
• Disjoint sets
• Graphs and graph exploration

Thursday, February 22
Preparation:
• Chapter 23, Minimum Spanning Trees
• Example questions: http://beastie.cs.ua.edu/concepts/cs/al/graphs.html

Programming assignment #0, final resubmission due
Programming assignment #1, resubmission #2 due

Tuesday, February 27
Preparation:
• Section 24.3, Dijkstra’s Algorithm
• Example questions: http://beastie.cs.ua.edu/concepts/cs/al/graphs.html
Thursday, March 1
Preparation:
- Web search: memoization
- Chapter 15, Dynamic Programming
- Notes: http://beastie.cs.ua.edu/cs201/dynamic.html
- Notes: http://beastie.cs.ua.edu/cs201/dp.html
- Example questions: http://beastie.cs.ua.edu/concepts/cs/al/dynamic.html

Programming assignment #1, resubmission #3 due

Tuesday, March 6
Dynamic programming, continued

Thursday, March 8
Preparation:
- Chapter 9, Medians and Order Statistics
- Example questions: http://beastie.cs.ua.edu/concepts/cs/al/lsort.html (questions 1 - 10)

Programming assignment #1, final resubmission due
Programming assignment #2 due

Tuesday, March 13
Spring break

Thursday, March 15
Spring break

Tuesday, March 20
Medians and order statistics, continued

Thursday, March 22
Preparation:
- Section 8.1, Lower bounds for sorting
- Example questions: http://beastie.cs.ua.edu/concepts/cs/al/lsort.html (question 11 - 16)

Programming assignment #2, resubmission #1 due

Tuesday, March 27
Second content exam:
- Minimum spanning trees
- Shortest paths
- Dynamic programming (including memoization)
- Linear time selection

Wednesday, March 28
Last day to drop a class

Thursday, March 29
Preparation:
- Section 8.2, Counting Sort
- Example questions: http://beastie.cs.ua.edu/concepts/cs/al/lsort.html

Programming assignment #2, resubmission #2 due
Programming assignment #3 due
Tuesday, April 3
Preparation:

- Section 8.3, *Radix Sort*
- Section 8.4, *Bucket Sort*

Thursday, April 5
Preparation:

- Chapter 17, *Amortized Analysis*

Programming assignment #2, resubmission #3 due
Programming assignment #3, resubmission #1 due

Tuesday, April 10

Amortized analysis, continued

Thursday, April 12
Preparation:

- Section 34.1 — 34.3, *P and NP*
- [http://beastie.cs.ua.edu/cs201/npc.html](http://beastie.cs.ua.edu/cs201/npc.html)

Programming assignment #2, final resubmission due
Programming assignment #3, resubmission #2 due

Tuesday, April 17
Preparation:

- Section 34.4 — 34.5, *NPC proofs and problems*

Thursday, April 19

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

Programming assignment #3, resubmission #3 due

Tuesday, April 24

Dead week

Thursday, April 26

Dead week, last day of class

Programming assignment #3, final resubmission due

Friday, April 27

Last day to withdraw from the term