Instructor

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  WCH 325
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Grader (1/2)

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  WCH 110
  (or by appointment)

Grader (2/2)

• TBA
• Email: TBA@ucr.edu

• Office hours: TBA
  WCH 110
  (or by appointment)
Web

- Course homepage
  - http://www.cs.ucr.edu/~stelo/cs218spring17/
  - Schedule, slides, homework, exams (no grades)

- iLearn
  - http://www.ilearn.ucr.edu/
  - Only grades

Textbook

Cormen, Leiserson, Rivest, Stein, 
*Introduction to Algorithms*, 
MIT Press (“white book”), 2009
Reference (1/2)


Reference (2/2)

Course Format

• Eight homework, typed, posted on Thursdays, due a week later on Thursdays (hard copy) at the beginning of the class; no collaboration is allowed on homework: copying the solution from any source on-line/off-line is considered cheating.

• Exams (closed book, closed notes)
  – Entrance exam (Apr 11, one week from today, in class)
  – Midterm exam (May 18, in class)
  – Final exam (June 15, 8-11am, in class)

Grading

• Entrance exam \((e)\) – 5%

• Homework \((h)\) – 16% (2% each)

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Grade</th>
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<tbody>
<tr>
<td>100 – 90</td>
<td>A+</td>
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<tr>
<td>85 – 89.999</td>
<td>A</td>
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<td>80 – 84.999</td>
<td>A-</td>
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<td>75 – 79.999</td>
<td>B+</td>
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<td>70 – 74.999</td>
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<td>65 – 69.999</td>
<td>B-</td>
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<td>60 – 64.999</td>
<td>C</td>
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<tr>
<td>0 – 59.999</td>
<td>D/F</td>
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• Midterm exam \((m)\) – 30%

• Final exam \((f)\) – 49%
Tentative list of topics (1/2)

- Analysis of algorithms: worst-case time complexity, asymptotic notation, lower bounds, recurrence relations, amortized analysis
- Divide and conquer: linear time selection (randomized and deterministic), matrix multiplication (Strassen), fast Fourier transform, polynomial multiplication, integer multiplication (Karatsuba and FFT)
- Greedy: activity selection, single-source shortest path (Dijkstra), minimum spanning tree (Kruskal, Prim), Union-find

Tentative list of topics (2/2)

- Midterm
- Dynamic programming: 0-1 knapsack, longest common subsequence, single-source shortest path (Bellman-Ford), all-pairs shortest path (Floyd-Warshall)
- Flow & matching: flow networks, max flow (Ford-Fulkerson, Edmons-Karp), maximum bipartite matching
- Final
Prerequisites by topic (CS 141-equiv)

- Discrete Math: asymptotic notation, basic summation formulas, sets (operations on sets, relations, functions), counting (permutations, sets, combinations)
- Basic Data Structures: array, list, queue, stack, binary search trees, balanced search trees, heap
- Sorting and Searching: quicksort, mergesort, heapsort, radixsort, binary search
- Graph algorithms: DFS, BFS, connected components, biconnected components
- Digraph algorithms: DFS, BFS, strongly connected components, transitive closure, topological sorting

Entrance exam

- TBA – in class
- 35-40 minutes (closed book, closed notes)
- Three problems
  1. Decide on ten T/F questions
  2. Write four definitions
  3. Design one simple algorithm
Entrance exam: Examples of Qs

• T/F questions
  - \(\frac{6n \log n}{\sqrt{n}} \in \Omega(\sqrt{n})\)
  - BFS can be sometimes slower than \(O(n+m)\), where \(n\) is the number of nodes and \(m\) is the number of edges
  - Topological sorting runs in \(O(n+m)\) time, where \(n\) is the number of nodes and \(m\) is the number of edges
  - The transitive closure of a strongly connected directed graph is a complete directed graph

• Definitions (write a formal definition)
  - Worst-case time complexity
  - \(f(n) \text{ is } \Theta(g(n))\)
  - Strongly connected component of a directed graph