CS166 Syllabus

Below is a (tentative) syllabus for this quarter's offering of CS166. It might change a bit if we move through some of the topics faster or more slowly than anticipated or if people have suggestions for other topics to cover.

<table>
<thead>
<tr>
<th>Date</th>
<th>Topics</th>
<th>Assignments</th>
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</thead>
</table>
| **T** March 29 | Range Minimum Queries, Part I  
                      Why Study Data Structures? |  |
| **Th** March 31 | Range Minimum Queries, Part II  
                      Cartesian Trees  
                      The Method of Four Russians | Problem Set One Out |
| **T** April 5 | Tries  
                      Aho-Corasick String Matching  
                      Fast String Search with Fixed Patterns |  |
| **Th** April 7 | Suffix Trees  
                      Amazingly Simple String Algorithms  
                      Why RMQ Matters | Problem Set One Due |
| **T** April 12 | Suffix Arrays  
                      Constructing Suffix Trees  
                      The Return of the Cartesian Tree | Problem Set Two Out |
| **Th** April 14 | 2-3-4 Trees  
                      Red/Black Trees  
                      Data Structure Isometries |  |
| **T** April 19 | Augmented Binary Search Trees  
                      Tree Splits and Joins | Problem Set Two Due  
                                      Problem Set Three Out |
| **Th** April 21 | Amortized Analysis  
                      Two-Stack Queues  
                      A Better 2-3-4 Tree Analysis |  |
| **T** April 26 | Binomial Heaps  
                      Lazy Binomial Heaps |  |
| **Th** April 28 | Fibonacci Heaps  
                      Asymptotically Optimal Dijkstra's and Prim's Algorithms  
                      The Annoying Gap Between Theory and Practice | Problem Set Three Due |
| **T** May 3 | Splay Trees  
                      Static Optimality  
                      In Search of the Perfect BST | Problem Set Four Out |
| **Th** May 5 | Count[-Min] Sketches  
                      Universal and Pairwise-Independent Hashing  
                      More Uses for Hash Functions |  |
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| T May 10 | Hashing Strategies  
 Linear Probing                       |                                  |
| Th May 12 | Worst-Case Efficient Hash Tables  
 Cuckoo Hashing                         | Problem Set Four Due  
 Problem Set Five Out |
| T May 17 | Integer Data Structures  
 van Emde Boas Trees  
 Putting Logs in your Logs                |                                  |
| Th May 19 | x-Fast and y-Fast Tries  
 A Little Something of Everything         | Problem Set Five Due          |
| T May 24 | Disjoint-Set Forests  
 Slicing Forests for Fun and Profit         |                                  |
| **Midterm Exam** | **Covers topics from PS1 – PS5**  
 7:00PM – 10:00PM, Location TBA       |                                  |
| Th May 26 | Euler Tour Trees  
 Why All These Primitives Matter           |                                  |
| T May 31 | Where to Go from Here                        |                                  |