

CS323 notes for January 20 (second meeting).

In about a week, we'll have a course website here:

<http://mathcs.emory.edu/~cs323000/>

5 Until then, a few things are available here:

<http://mathcs.emory.edu/~mic/cs323/>

In particular, today's files are under share/0120/.

60 We'll make a short "group visit" to the lab on Friday (2/2) rather than Wednesday (1/25), since another class has reserved Wednesday. We'll check that you can all login, and find the tools you need.

Before visiting the lab, please do the following:

- * Visit enid.emory.edu
- * Click "ENID Access", and login with your Emory NetID (ENID).
- 15 * Click "Select UNIX/Linux Login Shell", and make sure "bash" is selected (not "csh" or "ksh"). Save.
- * [optional] Setup your email forwarding, too.

20 No homework or formal syllabus yet. Just based on our discussion last time, I propose this informal list:

- * union-find (Section 1.5, today)
- * sorting lower bound, binary heap (review)
- * applications: heapsort, multiway merge
- 25 * balanced binary search trees (review, 2-3, red-black)
- * simple hashing (chaining), perfect hashing (cuckoo, outside book)
- * DFS/BFS review and applications (strong connectivity, cycle detection)
- * MST algorithms (Kruskal and Prim)
- * shortest paths (Dijkstra review, Bellman-Ford)
- 30 * LSD and MSD radix sort for strings (beating the lower bound)
- * tries (in particular TSTs)
- * substring search (at least Knuth-Morris-Pratt, maybe the others)
- * B-trees (search trees optimized for on-disk storage)
- * network flow problems (optimization)

35 Optional (if we have enough time):

- * compression, regular expressions
- * event-driven simulations
- * suffix arrays
- 40 * persistent data structures (outside book)
- * multi-threading issues (outside book, Java libs)
- * linear programming (LP reductions, outside the book)

Note our textbook has an excellent website:

45 <http://algs4.cs.princeton.edu/home/>

We'll use these materials to discuss union-find today:

15DemoQuickUnion.mov -- demo of quick-union

15UnionFind.pdf -- book-based lecture slides

50 Both are in today's directory (share/0120/). We can also run the book code examples locally, but it is a bit tricky for now:

```
mic@caribou:~/http/cs323/share/book$ java -cp stdlib.jar:. UF < tinyUF.txt
4 3
55 3 8
6 5
9 4
2 1
5 0
60 7 2
6 1
# components: 2
mic@caribou:~/http/cs323/share/book$
```