

CSc445 — Introduction to algorithms

General Info

January 10, 2007

Syllabus

1. Review — asymptotic running time — $O(\cdot)$, $\Omega(\cdot)$ and $\Theta(\cdot)$. Recursion formulas
2. Stable Marriage
3. Skip Lists
4. Sorting in Linear Time
5. A Lower Bound on Sorting.
6. The “Greedy” paradigm. Example of greedy algorithm.
7. Graphs and Minimum Spanning Trees — review (briefly).
8. Shortest Paths in Graphs with Positive Weights
9. Shortest Paths (Negative Weights)
10. All-Pairs Shortest Paths - Johnson algorithm
11. Dynamic-Programming
12. Network Flow
13. Computational Geometry
14. Approximation Algorithms
15. Whichever-we-feel-like — internet routing related algorithms, AI algorithms....
to be decided later.

Answers to FAQ

Review of material familiar to you You may have seen some of the materials in previous courses. The reason this material is re-taught is because 1) The students in this class come from different backgrounds, so it might be new to many, and 2) Even if you have seen the algorithms before, the data structures, analysis and correctness might be new to you.

Homework duration Most of the homeworks will be given for 2 weeks, but some are only for a single week, to accommodate the midterm/final. The weights of all the homeworks are the same.

Homework Policy Only the weight of the better $k-1$ homeworks will influence the final grade, where k is the total number of homeworks given (i.e., the worst homework grade will be dropped from the final grade calculation).

“Proofs” ? We don’t need no fring Proofs!** People sometimes feel that there is no need to teach proofs, since they are not going to work on generating proofs once they graduate. I (Alon) feel that this is the wrong approach. For the algorithms studied in this course, there is a complete correlation between understanding why the algorithm works (or how the algorithm works) and being able to generate a proof of its correctness. Once we understand how the algorithm works, we can modify its behavior to solve other problems beyond the one it was originally intended to solve.

About cheating. Even when ignoring the moral aspect, using other people’s solutions in the homework might not be a good idea. Firstly, the course’s staff is instructed to report any suspicious of cheating. In addition, in the exams, mistakes in an answer to a questions which is similar to a homework question would be graded much more severally than mistakes in other questions.