

Efficient Algorithms and Programming

Week 5

The references to the textbook in parenthesis refer to the second edition of the book.

Reading before Monday September 24th

You should read Chapter 26 (chap. 25) excluding section 26.4 (this section has been eliminated in the second edition of the textbook) for Monday September 24th. The FLOYD-WARSHALL algorithm is the most important part, but you should also read about the JOHNSON algorithm since it is extremely elegant in the way it combines the algorithms BELLMAN-FORD and DIJKSTRA.

Exercises for Monday September 24th

- Exercises 26.2-2, 26.2-5, 26.2-7, 26.3-1, 26.3-2 (25.2-4, 25.2-6, 25.2-8, 25.3-1, 25.3-2).

Programming assignment for Friday October 5th

Write a program (in C, C++, Java, ML or . . .) that implements either Floyd-Warshalls or Johnsons algorithm for computing all-pairs shortest paths.

Test your implementation on some of the graphs available from the course Web-page. For each graph with n vertices, plot the runtimes as a function of n . Do your experiments correspond to what you would expect ?

Hand in a print-out of the program, the shortest path matrix for `de10` and `sp10`, the plots, and your comments to the plots.

Reading for next week

You should read Section 12.1 to 12.3 (sec. 11.1 to 11.3) and section 16.1 and 16.2 for Monday October 1st(sec. 15.1 to 15.3). This material might be repetition for some of you, but it is used heavily in the BDD data structure (following) so it is important that you are all up to speed on hashing and dynamic programming.