

# Efficient Algorithms and Programming

## Week 3

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

### Reading before Monday September 10th

You should have read Chapter 25 (chap. 24) before Monday September 10th.

### Exercises for Monday September 10th

1. Exercise 25.2-5 (24.2-4 and 24.3-56) and Problem 25-3 (24-3).

### Programming assignment for Friday September 21st

Write a program (in C, C++, ML, Java,...) that implements Dijkstra's single-source shortest path algorithm. Choose *one* of the following possible implementations of the priority queue:

- a linked list,
- a binary heap, or
- a Fibonacci-heap. (You should only do this if you already have an implementation of a Fibonacci heap!)

Test your implementation on the graphs that can be down-loaded from the web-page <http://www.itu.dk/courses/EAP/Graphs/>. State for each graph of  $n$  vertices, the length of the shortest path from vertex 0 to vertex  $n - 1$ . Plot the runtimes in a graph as a function of the number of vertices  $n$ . Does your experiments correspond to what you would expect?

Hand in a print out of the program, the shortest distances, the plots, and your comments to the plots.

### Reading for next week

You should read Chapter 21 excluding section 22.4 (21.4) and 24 (chap. 23) for Monday September 17th.