

DM19 – Fall06 – Lecture 1

Textbook and notes

Introduction to Algorithms, 2nd edition, by T. Cormen, C. Leiserson, R. Rivest, and C. Stein, MIT Press, 2001.

Extra notes (available in the bookstore): *Noter til DM19, Efterårssemestret 2006*. (These are identical to those from 2005.) From the following sources:

- *Computer Algorithms: Introduction to Design and Analysis*, second edition, by S. Baase, Addison-Wesley, 1987.
- *Randomized Algorithms*, by Motwani and Raghavan, Cambridge University Press, 2000.
- *Combinatorial Optimization: Algorithms and Complexity*, by C.H. Papadimitriou and K. Steiglitz, Prentice-Hall, 1982.
- *Complexity and Approximation*, by G. Ausillo, P. Crescenzi, G. Gambosi, V. Kann, A. Marchetti-Spaccamela, M. Protasi, Springer-Verlag, 1999.
- “Branch and Bound Algorithms — Principles and Examples”, by Jens Clausen.
- “Competitive Online Algorithms”, BRICS Lecture Series LS-96-2, 1996.

Format

- Lectures will be on Wednesdays, 12:15–14, in U9 in weeks 36-41,43-45 and 47-51. They will be in English provided there are non-danish participants.
- There are two extra lectures. **The first is Monday, September 4 at 08.15-10 in U2.** The second is Thursday, November 16 at 12.15-14 in U9.
- You should read the appropriate sections in the textbook or notes before coming to class and bring your textbook with you as I will be referring to things in the book/notes.
- There will be weekly assignments (which are not obligatory, but part of the exam curriculum, so do look at them!) which you should be prepared to discuss in the discussion sections (øvelserne), usually in the week after the relevant lecture.

- The “instruktør” is Uffe Flarup Hansen. Although two different sections are listed in the schedule, we will only run one of those, the one called S2. The classes are Tuesdays at 12.15-14 in U20 for the weeks 37-41, 45-51 and in U52 for week 43-44. There is an extra class on Thursday, December 21 at 12.15-14 in U49B.
- There will be no exercise classes in the first week. Instead there are two lectures. In the second week there will be no lecture as I am away. **Instead Uffe will also take my lecture on September 13 and use it for exercises.**

The weekly notes and other information about the course are available through the World-WideWeb. Use the URL:

<http://www.imada.sdu.dk/Courses/DM19/>

There will be an oral exam in January, 2006. The exam questions from last year will be made available available on DM19’s homepage. You may do your exam in Danish if you wish.

I have office hours on Wednesdays from 14.15 to 15.15.

Lecture, September 4

We will begin with an introduction to the course. Then I will cover the notes on Hamiltonian paths in tournaments (you should copy these from the course page and preferably read them in advance). Finally we will cover Section 8.1 in Cormen and pages 66-70 from Baase in “Noter til DM19” on lower bounds for sorting.

Lecture, September 6

We will continue with lower bounds for maximum and minimum element as well as the second largest element. You should read both the pages 124-133 from Baase in “Noter til DM19” and pages 1-8 in my notes on lower bounds from the course page. I will use the graph model at the lecture (that is, the one used in my notes).

Problems for September 12

These will be a repetition of probability – a topic which is important for understanding randomized algorithms which we will cover several times in the course. Read Appendix C in the textbook.

Do problems:

C.1-2, C.1-7, C.1-8.

What is the coefficient of x^8y^9 in the expansion of $(3x + 2y)^{17}$?

C.2-3, C.2-5, C.2-9.

C.3-1, C.3-2, C.3-6, C.3-8

C.4-2, C.4-5

C-1a and C-1d.

Problems for September 13

This will replace the lecture and will be at 12.15-14.00 in U9.

Do the exercises from the notes on hamiltonian paths.

Read Section 8.2 on Counting sort and do exercises 8.2-1, 8.2-2