

DM19 – Algorithms and Complexity – E04 – 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 2004*. 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 Mondays, 14:15–16, in U2, in English. Please read the appropriate sections in the textbook or notes before coming to class and bring your textbook with you. There will be weekly assignments (which are not obligatory) which you should be prepared to discuss in the discussion sections (øvelserne) in the same week as the relevant lecture. Since the discussion

sections begin in the week before the first lecture, Klaus Meer will lecture (in my place) at the beginning of the Thursday section and I will lecture at the beginning of both the Friday section in week 36. Then you will discuss the first set of problems below. The second set of problems below is for week 37, after the first “real” lecture. The instructor for the Thursday section is Fiona Nielsen, and that section will be mostly in English since there are some foreign exchange students in the class. The instructor for the Friday section is Uffe Flarup Hansen, and that section is expected to be in Danish. Both discussion sections will be in U29, from 10:15 to 12.

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

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

There will be an oral exam, January 3 and 4, 2005. The exam questions from last year are available in Danish, and are available on DM19’s homepage. There are other earlier exam questions there also, but these are the most relevant. Some changes may be made for this year. You may do your exam in Danish if you wish.

I have office hours on Tuesdays and Wednesdays from 10:45 to 11:30.

Discussion sections, September 2 and 3

Probability from Appendix C, sections C.2, C.3, and C.4 will be covered. The slides used to present this are available on the course’s Web page.

Lecture, September 6

We will begin with an introduction to the course. Randomized Quicksort, from sections 7.3 to 7.4 in the textbook, will be presented. Randomized Quicksort is also presented in the course notes, those by Motwani and Raghavan. Counting sort and radix sort from sections 8.2 and 8.3 will also be presented.

Lecture, September 13

Radix sort and counting sort will be presented. Then lower bounds from section 2.4 of the first set of notes will be discussed (part of this is also in section 8.1 of the textbook).

Problems to be discussed in week 36

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.

Unfinished problems will be discussed in the following week.

Problems to be discussed in week 37

Do problems:

(As review of Quicksort) 7.1-2, 7.1-4, 7.2-1, 7.2-2, 7.2-4, 7.2-5.

7.3-1, 7.3-2, 7.4-2, 7.4-3, 7.4-6.