DM551 – Algorithms and Probability – 2018
Lecture 1

Textbooks and notes

Discrete Mathematics and Its Applications 7th edition, by K. Rosen, McGraw Hill, 2013. Same textbook as used for Discrete Methods. This textbook will be used most, and we start with it.

Introduction to Algorithms, 3rd edition, by T. Cormen, C. Leiserson, R. Rivest, and C. Stein, MIT Press, 2009. Same textbook as used for Algorithms and Data Structures.

Extra notes (available from Course Materials in Blackboard): This includes chapter 13 from *Algorithm Design*, by J. Kleinberg and É. Tardos, Addison Wesley, 2005.

Format

Lectures will be in English. Please read the appropriate sections in the textbook or notes before coming to class and bring your textbook with you. There will both be assignments which you are required to turn in and other problems and exercises which you should be prepared to discuss in the discussion sections (øvelserne/træningstimerne), usually shortly after the relevant lecture.

Check the electronic schedule regularly, since changes can occur. Most classes (lectures and discussion sections) will be on Mondays in U24, 12:15-14, Tuesdays in U154, 8:15-10, and Wednesdays in U24, 12:15-14, though there are exceptions, particularly the first two lectures. The first lecture is Monday, September 3, 12:15-14, in U31. The second is September 4, 12:15-14, in U155.

The "instruktor" for the course is Kristine Knudsen: klinkby@imada.sdu.dk.

The results from your required assignments will be considered along with your performance at the oral exam for your grade in the course, though the performance at the oral exam will count much more. There will be 2 assignments. The assignments must be turned in on time using the Blackboard system, submitted via the menu item "SDU Assignment". Turn in each assignment as a single PDF file. Do not use any Danish letters or other non-ASCII symbols in the name of the file. Keep the receipt it gives you proving that you turned your assignment in on time. You may work in groups of 2 to 3 students on the first assignment if you wish (this is encouraged). These 2 assignments are considered part of the exam and will affect your final grade, so cheating on these assignments is viewed as cheating on an exam. You are allowed to talk about course material with your fellow students, but working together on assignments with students not in your group is cheating, as is allowing other students not in your group to see your solutions. (You can, however,

talk with Kristine or me.) Using solutions you find elsewhere, such as on the Internet, is also cheating. You may do the assignments in either English or Danish, but if you write them by hand, please do so very neatly.

The weekly notes and other information about the course are available through the World-wide Web. Use Blackboard or the URL:

$$\text{http://www.imada.sdu.dk/}\sim\text{joan/dm551/index.html}$$

I have office hours 9:00–9:45 on Mondays and Thursdays.

There will be an oral exam in January. The set of exam questions will be available later in the course, but will probably be somewhat similar to that in 2017, when Jørgen Bang-Jensen taught the course. Those topics are available on the course Web page. You may do your exam in Danish if you wish (in most cases it is advisable to do it in Danish).

Lecture, September 3

We will begin with an introduction to the course. Starting in the textbook by Rosen (all sections refer to this textbook until some other textbook is mentioned), we will cover sections 6.1 (fairly quickly) and 6.2 in chapter 6, probably starting on section 6.3.

Lecture, September 4

We will finish section 6.3 and cover sections 6.4 and possibly 6.5.

Problems to be discussed on September 5

In Rosen, do the following problems from Rosen's textbook yourself. They may not all be covered, though the more interesting ones probably will be. If there is a particular problem you would like explained, please tell Kristine at the beginning of class.

In general, if the answer is going to involve very large numbers, you do not need to compute it; just write a formula for it, such as 2^{12} or $\frac{12!}{6!}$. This applies throughout the course.

1. Section 6.1: 1, 3, 18, 25, 28, 32, 34, 42, 44, 48 (write out a proof from this last one at home and bring it with you – you will critique each other's proofs – see http://imada.sdu.dk/$\sim$joan/dm553/proofs.pdf).

2. Section 6.2: 4, 6, 14, 18, 20, 26, 28.

Problems to be discussed on September 12

1. Section 6.3: 10, 12, 20, 24.

2. Section 6.4: 4, 8, 14, 16, 20, 22.

3. Section 6.5: 6, 10, 12, 14, 20.