DM553 – Complexity and Computability – 2018 Lecture 1

Textbooks and notes

Introduction to the Theory of Computation, 3rd edition, by Michael Sipser, Cengage Learning, 2013. This is for the first half of the course, and it is available in the bookstore.

Introduction to Algorithms, 3rd edition, by T. Cormen, C. Leiserson, R. Rivest, and C. Stein, MIT Press, 2009. This and the extra notes will be used in the second half of the course.

Extra notes (available from Course Materials in Blackboard): These are a subset of the notes for DM508 and the same as those for DM553 in 2015 and 2016. It is from the following source:

- *Computer Algorithms: Introduction to Design and Analysis*, second edition, by S. Baase, Addison-Wesley, 1987.

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 lectures will be in U154 or U156, as will many discussion sections.

The "instruktor" for the course is David Hammer: daham12@student.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 3 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 and third assignments if you wish (this is encouraged). These 3 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 David 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:

$$\text{http://www.imada.sdu.dk/}{\sim}\text{joan/dm553/index.html}$$

Note that any students who are taking only part of this course as an individual study activity should contact Joan Boyar as soon as possible. You will need to have Blackboard access to this course. Also, if any students did not take DM507 at SDU, please contact Joan Boyar to see if you have the required background.

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

There will be an oral exam in June. 24. The set of exam questions will be available later in the course, but will probably be the same as in 2016, which is 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, February 6

Canceled.

Lecture, February 8

We will begin with an introduction to the course. We will not cover chapter 0 of the textbook by Sipser, but you are advised to read parts which you are unfamiliar with or do not remember. We will cover section 1.1 (fairly quickly) and most of section 1.2 in chapter 1.

Lecture, February 9

The discussion will be converted to lecture. We will finish section 1.2 and cover section 1.3.

Problems to be discussed on February 13

1. Page 83: 1.4.c.

2. Page 84: 1.5.d, .

3. Page 83: 1.6.c,g,j.

4. Use the construction in Theorem 1.45 to give the state diagrams of an NFA recognizing the union of the languages described in exercises 1.6.c and 1.6.g.

5. Use the construction in Theorem 1.47 to give the state diagrams of an NFA recognizing the concatenation of the languages described in exercises 1.6.c and 1.6.g.

6. Page 88: 1.31, 1.32, 1.33.