Institut for Matematik og Datalogi
Syddansk Universitet

January 19, 2015
JFB

DM553 – Complexity and Computability – 2015
Lecture 1

Textbook and notes

Introduction to the Theory of Computation, 3rd edition, by Michael Sipser, Cengage Learning. 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, which will be co-taught with DM508.

Extra notes (available in the bookstore later): *DM553/DM508 Kompleksitet og bergnelighed / Algoritmer og kompleksitet, Noter forår 2015*. This is a subset of the notes for DM508 from 2010, 2011, 2012, 2014, and 2014 and is from the following source:

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

Format

Lectures (and the discussion sections during the first part of the course) 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. For example, I will be changing the discussion seciton on Friday in week 10 to some other time.

The "instruktor" for the second half of the course is Christian Nørskov.

The required assignments will be graded on a Pass/Fail basis, and satisfactory completion of all 4 assignments is required for a Pass. The assignments must all 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 if you wish. These 4 assignments must be approved in order for you to take the oral exam, 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. (You can, however, talk with Christian 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. You will be allowed to redo two of the first three assignments if they are not approved the first time (if one of your assignments is late, then you will have used up one chance to redo an assignment).

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

http://www.imada.sdu.dk/∼joan/dm553/index15.html

I have office hours 13:15–14:00 on Mondays and 8:15–9:00 on Thursdays.

There will be an oral exam on June 30. The set of exam questions will be available later in the course. You may do your exam in Danish if you wish (in most cases it is advisable to do it in Danish).

Lecture, February 2

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 4

We will finish section 1.2, cover section 1.3, and start on section 1.4.

Problems to be discussed in U142 on February 3

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 union of the languages described in exercises 1.6.c and 1.6.g.
6. Page 88: 1.31, 1.32, 1.33.