Institut for Matematik og Datalogi

Syddansk Universitet

November 13, 2009

Peter Schneider-Kamp

Introduction to Computer Science
E09 – Week 9

Lecture: Monday, November 9

Lone Borgersen gave an introduction to software engineering.

Lecture: Monday, November 16, 12-14 (U140)

Jœrgen Bang-Jensen will start to lecture on the theory of computation based on Chapter 12.1 to 12.5.

Lecture: Wednesday, November 18, 14-16, (U28)

Jœrgen Bang-Jensen will finish lecturing on computability and continue with NP-complete problems and combinatorial optimization. The later will be based on the notes "Algorithmisk Kombinatorik - et datalogisk emne i matematik" by Bjarne Toft (IMADA). These notes are available from Blackboard.

Lecture: Monday, November 23, 12-14

Jœrgen Bang-Jensen will continue lecturing on combinatorial optimization based on the notes of Bjarne Toft.

Discussion section: November 17, 10:15-12 (U37)

Do Problem 15 on Page 608 before coming to the discussion section, so that you can compare solutions. Discuss the following problems in groups of three or four.

1. Questions 2, 3 and 5 on Page 580.

2. Question 3 on Page 587.

3. Compare your solutions to Problem 15 from Page 608.

4. Problems 6, 12, 13, 18, 19, 20, 25, 27, 29, 31, 32, and 33 from Page 607-609.

Assignment due 14:15, November 26

Late assignments will not be accepted. Working together is not allowed. You may write this either in English or Danish. Write clearly if you do it by hand. Even better, use LaTeX.

1. Problem 5 on Page 607.

2. Problem 14 on Page 608. Call this Turing machine Moveleft.

3. Describe in words the main steps of a Turing machine COPY which given a string w of zeros and ones between two asterisks makes a copy of w to the right of the right asterisk, for example it transforms the string $*1010*$ into $*1010 * 1010*$. Assume that COPY starts with the reading head on the right asterisk and design it so that it ends with the head on the asterisk at the right end of the second string (both copies to the left of this asterisk). You should only describe the main steps and not give all the states and transitions.

4. Explain what happens (and why) if you apply COPY twice (that is run COPY and then run it again on the resulting tape) to the following tape content with the reading head at the rightmost asterisk: $*1010*$.