

## DM528: Combinatorics, Probability and Randomized Algorithms — Ugeseddel 1

### Welcome to DM528!

**Why English?** The weekly notes will be in English in order to allow potential guest students to read it also. Hvis der er noget som I ikke fortår, så spørg endelig.

**Teacher and instructor** The lectures will be given by Jørgen Bang-Jensen and the exercise classes by Magnus Find.

### Literature

**(ROA):** Kenneth Rosen, Discrete mathematics and Its Applications, 6th Edition. McGraw Hill, 2007. **I will assume that everyone has the book in front of him/her at each lecture.**

**(Notes):** Notes for DM528 Fall 2010

Possibly I will hand out a few papers or extra notes along the way.

**Exam** Written exam on January 3, 2011.

**Obligatory home work exercises** In order to attend the exam you must hand in two sets of obligatory assignments and have these approved. The plan is that these exercises will be posed in week 46 (return in week 48) and week 48-49 (return in week 50). Magnus will correct your homework and confer with me in case of doubt as to whether they should be approved.

**Exercises in general** As always you are strongly advised to try to do all exercises BEFORE seeing their solution in the classroom. This is the only way to make sure you understand the techniques and in particular, having tried the problems yourself you will know which ones you understood easily and for which ones you need extra help. There is a direct correlation between the number of exercises you did yourself and you chance of passing the written exam in January.

This course is (among other things) about combinatorial arguments. Often you will calculate something but the actual result is not as important as the way you apply the techniques. It may be difficult to see why your result is correct/wrong if you do not have the details that lead you to it. So at the exercises you will spend time discussing why a particular method can or cannot be applied to the problem at hand.

**Course schedule:** See the faculty web pages. **Note that the Friday exercise classes have been rescheduled from 10-12 to 12-14**

### Lecture Monday November 8, 2010:

- Short overview of the course.
- Rosen Sections 5.1-5.4

**Lecture Wednesday November 10, 2010:** We will cover the rest of Chapter 5 in Rosen

### Exercises Friday November 12, 2010:

- Section 5.1: 6, 8, 12, 16, 24, 34, 38, 46, 54, 60
- Section 5.2: 4, 10 hint: recall the formula for the midpoint and observe that the midpoint has non-integer coordinates if and only if either the parity of the two first coordinates is different or the parity of the two second coordinates is different or both. Now apply the pigeon hole principle.
- Section 5.2: 14, 22, 30, 40