Curriculum forINF4130/9135, 2013

In addition to what is listed below, we expect that the weekly exercises and the obligatory exercises are well understood. The same is true for the slides used during lectures, but note that some of the slides are explicitly mentioned as curriculum below.

Note that you can bring any printed or written material to the exam.

Fra Berman & Paul: *Algorithms: Sequential, Parallel, and Distributed*

(Remember to study the list of misprints. Some of these may have been corrected in later editions)

Chapter 8 (Divide-and-conquer):
- The introduction to the chapter and section 8.1 give some background for top-down-recursion and for memoization
- Section 8.6.2

Chapter 9 (Dynamic programming):
- Everything, except 9.3 and 9.4

Chapter 10: (Backtracking and branch-and-bound):
- We used this chapter to sum up some straight-away methods for exhaustive search: Depth-first search (DFS, *Backtracking*) with LIFO, FIFO and priority queues (and this was to a large extent repetition from INF 2220/1020). One should know the main points from this chapter, but one need not study the examples, etc.

Chapter 14 (Matching and flow in network):
- Everything except 14.1.3 and 14.2.6.
- The book to some extent uses terminology and formalisms that we did not use at the lectures (see the slides), and one need not know the details of this.
- Concerning the slides: The three slides about “Matchings in graphs that are not bipartite” and “The extended Hungarian algorithm” are explicitly part of the curriculum. You should know the algorithm itself and that it will always find a matching with as many edges as possible.

Chapter 20 (String search):
- The whole chapter

Chapter 23 (A*-search and game trees):
- Everything, except:
- The *proof* of proposition 23.3.2 (page 724, and some of the slides)
- Section 23.4

About triangulation:

- The curriculum is the slides from lecture.
- Interested students may also read background stuff by following the web-address at the list of lectures (“undervisningsplan”). If you want to look the compendium from where this is taken, it can be fetched from:

http://www.cs.umd.edu/~mount/754/Lects/754lects.pdf 2

From M.A.Weiss: *Data Structures and Algorithm Analysis in Java*

(The relevant pages can be fetched from the web-address in the list of lectures ("undervisningsplan"), if you don't have the book from INF2220)

Chapter 6 (Priority queues):
- Everything except 6.5 and 6.7.

Chapter 11:
- 11.4 (Fibonacci-heaper): In addition to the algorithm itself, one must understand and know the execution times that are given, but you don't have to know the proofs for these.

Fra Karabeg and Djurhuus: *Compendium 51 (originally written for IN210):*

www.uio.no/studier/emner/matnat/ifi/INF4130/h10/undervisningsmateriale/in210_komp99.pdf
Note that Lecture 1 corresponds to chapter 3.1, Lecture 2 corresponds to chapter 3.2, etc.

- From Lecture 1. page 17 – 29
- From Lecture 2. page 37-39, 46-55
- From Lecture 3. page 56-71 main ideas, page 72-78
- From Lecture 4. Page 82-83
- From Lecture 5. page 106-131
- From Lecture 6. page 132-142 + Cooks theorem and the proof idea, 148-159
- From Lecture 7. page 160-183
- From Lecture 10. page 236-261
- From Lecture 11. page 274-287 + only the idea of the Hamiltonicity algorithm on page 288
- From Lecture 12. page 290-295 + only main ideas from pages 308 and 314

(On www.uio.no/studier/emner/matnat/ifi/INF4130/h10/undervisningsmateriale/in210_extract.pdf you will find the most important pages)

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