

## DM508 – Algorithms and Complexity – 2013

### Lecture 4

#### **Lecture, April 15**

We covered the lower bound on median finding from section 3.5 in the DM508 notes. We began on NP-completeness, from chapter 34 in the textbook and the section by Papadimitriou and Steiglitz from the course notes, defining P and NP.

#### **Lecture, April 17**

We will continue with NP-Completeness, defining reductions (section 34.3 in the textbook) and showing that 3-SAT, CLIQUE, and HAMILTONIAN CIRCUIT are NP-Complete problems. These reductions are in sections 34.4 and 34.5 in the textbook.

#### **Lecture, April 22**

We will cover Cook's Theorem, proving that SATISFIABILITY from the section by Papadimitriou and Steiglitz from the course notes. We will also show that VERTEX COVER and INDEPENDENT SET are NP-Complete. This is in section 34.5 in the textbook.

#### **Problems to be discussed on April 24**

Do problems:

1. 34.5-4. (you may check on pages 1228–1129 for a hint, which is 1044–1045 in the second edition).
2. 34.5-5 (Warning: it is tempting to think that this one is completely trivial; it is not. Also, to make this easier, you may redefine the Set Partition problem to allow the same value appearing more than once), 34.5-6.
3. 34-2, 34-3.
4. 34-1a, 34-1b, 34-1c.

If not all problems are finished, the most important ones missed will be done later.