

DM508 – Algorithms and Complexity – 2014 Lecture 4

Announcement

My office hours on Monday, April 28, are moved to 13:00.

Lecture, April 22

We covered the algorithm for median finding from section 9.3 in the textbook. Then, we began on NP-completeness, from chapter 34 in the textbook and the section by Papadimitriou and Steiglitz from the course notes. We covered the definitions of P, NP, co-NP, and polynomial reductions.

Lecture, April 23

We will continue with NP-Completeness, looking more at reductions (section 34.3 in the textbook) and showing that 3-SAT and CLIQUE, are NP-Complete. The latter two reductions are in sections 34.4 and 34.5 in the textbook.

Lecture, April 29

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 in U157 on April 30, 12–14

Do problems:

1. 34.5-1, 34.5-2 (for 34.5.2, try a reduction from Vertex Cover, too).
2. 34.5-4. (you may check on pages 1228–1129 for a hint, which is 1044–1045 in the second edition).
3. 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.

4. 34-2, 34-3.

5. 34-1a, 34-1b, 34-1c.

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