

## T-106.5250 Distributed systems

### Examination 2013-03-07

Only writing tools are allowed in this exam. In each separate answer paper, write the name of the course, the date of the exam, the number of the answer paper and the total number of answer papers (in the form 'paper 1/2'), and your own name, study program, and student number.

**Tell also, which edition of the course textbook you have studied (fifth, fourth, or third).**

Try to answer clearly. When preparing the answer for an essay, think first what you know about the subject and make some notes. Remember that the subject may have been described in several chapters of the book. Design an outline for your answer and only after that start writing. You can use subsection headers to make your answer clearer.

1. (12p) Give a short answer to following questions (max. 100 words per question):
  - (a) Which two interaction models the course text book presents and how do they differ from each other?
  - (b) How can we sign digital documents?
  - (c) What are the ACID properties of transactions?
  - (d) What are volatile systems?
  - (e) In what circumstances can the byzantine generals problem be solved?
  - (f) Why do we need middleware?
2. (6p) Essay: Routing in peer-to-peer systems.
3. (6p) Essay: Failures in distributed systems.
4. (6p) Essay: Distributed event-based systems.