T-79.5103 Computational Complexity Theory (5 cr) P

Autumn 2005

Weekly Sessions and Course Personnel

Lectures: Wednesdays 10-12 and Thursdays 10-12 *or not*, TB353

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Tutorials: Mondays 14-16, TB353

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General Goals

- Identification of computationally hard problems
- Classification of problems according to their complexity
- Choosing appropriate algorithmic approach w.r.t. complexity of the problem

Topics

- Central complexity classes (P, NP, PSPACE, NC, polynomial hierarchy, ...) and related methods for complexity analysis
- Randomized computation
- Parallel computation
- Cryptography

Material: C. Papadimitriou, *Computational Complexity*, Addison-Wesley, 1994. Ch. 1–4, 7–20

Course Requirements

In order to pass the course one is supposed to

1. give a seminar talk and
2. to do homework (2 exercises/week).

Please note the following details:

- There is **no final exam**.
- The grade of the course (0–5) is determined by the respective grades for the seminar talk (20%) and homework (80%).
- Homework points are translated into grades as follows:

Grade:	1	2	3	4	5
Lower bound:	26	30	34	38	42

Homework Practice

- The list of homework exercises has already been published.
- Each exercise is graded using the scale 0–2 at first.
- The schedule is based roughly on the following pattern:
  1. The background is given in some lecture / seminar talk.
  2. There is approx. one week to do the related exercises.
  3. It is possible to get feedback at next tutorial.
  4. Thereafter revisions are accepted for a week.
- There is a non-negotiable fall-back deadline for all homework:

  Jan 16, 2006.
- A reduced scale 0–1.5 is used for delayed and revised exercises.

Seminar Practice

- Seminar talks last 45 minutes each.
- No written report or resume is required, but you are supposed to hand a copy of your slides to the lecturer.
- Talks will be evaluated by other students and the lecturer (a special form will be used for this purpose).
- The grade (0–5) is the arithmetic mean of individual grades except that the lecturer may adjust the outcome by one.