T-79.5103 Computational Complexity Theory (5 cr) P

Autumn 2006

Weekly Sessions and Course Personnel

Lectures: Tuesdays 10-12 and Wednesdays 10-12, TB353 (*See exceptions in the program*).

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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

Prerequisites: T-79.1001 Introduction to Theoretical Computer Science

Course Requirements

In order to pass the course one is supposed to

1. pass the first quarter exam (Oct 3).
2. do homework (11 rounds, 2 assignments/round; 1st round Oct 13)
3. give a seminar talk.

Please note the following details:

- There is **no final exam**.
- The grade of the course (0–5) is determined by the respective grades of (i) the first quarter exam (15%), (ii) homework (70%) and (iii) for the seminar talk (15%).
- Homework points are translated into grades as follows:

Grade:	1	2	3	4	5
Lower bound:	50%	58%	66%	74%	82%

Homework Practice

- The homework assignment schedule published after the first quarter exam.
- The deadline for the first homework round is Oct 13.
- The schedule is based roughly on the following pattern:
  1. The background is given in some lecture / seminar talk and there is approx. one week to do the related exercises.
  2. It is possible to get feedback at the tutorial after the deadline.
  3. Thereafter if you wish to revise your answer, revisions are accepted for a couple of days.
- Each exercise is graded using the scale 0–2 at first.
- There is a non-negotiable fall-back deadline for all homework: **Jan 12, 2007**.
- 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.