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
Teacher: Prof. (pro tem) Tomi Janhunen, tel. 451 3255, e-mail: Tomi.Janhunen@tkk.fi
Tutorials: Mondays 14-16, TB353
Assistant: M.Sc. (Tech.) Matti Järvisalo, e-mail: mjj@tcs.hut.fi
Web: http://www.tcs.hut.fi/Studies/T-79.5103/

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

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:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Lower bound</th>
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<tbody>
<tr>
<td>1</td>
<td>26</td>
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<tr>
<td>2</td>
<td>30</td>
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<tr>
<td>3</td>
<td>34</td>
</tr>
<tr>
<td>4</td>
<td>38</td>
</tr>
<tr>
<td>5</td>
<td>42</td>
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</tbody>
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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.

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:
➤ A reduced scale 0–1.5 is used for delayed and revised exercises.