TK1: Distributed Systems - Programming & Algorithms

Chapter 0: Organizational issues
Lecturer: Prof. Dr. M. Mühlhäuser, Dr. A. Hadjakos, I. Schweizer
Contributors: I. Schweizer, S. Borgert, E. Aitenbichler (now @Google)
Exercises: Dr. A. Hadjakos, J. Huber

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General Remarks

- **TK1 general format**
  - lecture changed to V2+Ü2 format (actually, IV4)
    - hope: more bearable than “135 minute lectures” 😊
  - in case of problems (e.g., ‘Studienplan’ requiring 5 SWS/7.5 CP):
    - please contact us (initial poll in lecture #1, others: pls. send E-Mail)!
    - TK0 may be offered as 1SWS / 1.5 CP ‘block’ at the end of winter semester (option)

- **TK1 grading**
  - grade determined by a single exam (see below) – used to be different ...
  - good news: exercises (if passed) lead to bonus points
    - bonus points account for up to 1,0 improvement in grade
    - yet, “fail→pass” is not possible based on bonus points: cf. new general rule (Prüfungsordnung)

- **TK1 exams**
  - regular exam at the end of semester: February 18, 16.00 h @ lecture hall C205
  - secondary option (‘Nachklausur’): summer 2013 (advise: take regular exam if ever possible)
  - bonus points are valid for these two exams only!
  - important: register for exam in time!
    - via TUCaN between Nov. 15 and Dec 17*
    - cancellation until 1 week before exam*

*: no warranty
Exercises

**Content**

- theory assignments: for repetition, deepening, practicing
  - designed en view of exam
  - not graded
  - solutions presented by TA team
- programming assignments: complement theory with actual, practical experience
  - graded, lead to bonus points

**Dates**

- next Monday: general introduction, details

**TA team**

- Dr. Aristotelis (Telis') Hadjakos, Jochen Huber, ...
  (telis|jhuber@tk.informatik.tu-darmstadt.de)
Web Site, Material, Language

- **TK home page** ([www.tk.informatik.tu-darmstadt.de](http://www.tk.informatik.tu-darmstadt.de))
  - click teaching, current semester, TK1
  - slides in pdf format
  - lecture recordings

- **Moodle in support of exercises**
  - submission of assignments
  - discussion forum
  - details Monday

- **Language**: Web Site says „German“, slides are in English (standard @TK)
  - English *is* an option indeed; **however**
    - requires sustained & substantial majority of non German speaking participants
    - majority means: in the mid term, the following inequality holds:
      - drop-outs due to English $<<$ drop-outs of non German speaking students
    - therefore: we will decide at the beginning of next week’s lecture
  - Please!! Make up your mind as far as possible
    - Next week: voting (be present!); three choices: you ...
      - will only follow if English
      - accept-both
      - will only follow if German
Literature

- G. Bengel: *Grundkurs Verteilte Systeme*, vieweg Verlag, 3rd Ed. 2004
- G. Tel: *Introduction to Distributed Algorithms*, 2nd Ed 2000, Cambridge University Press,
- J. Kurose, K. Ross: *Computer Networking*, Adison-Wesley
- L. Peterson, B. Davie, *Computernetze*, dpunkt Heidelberg
Today: organizational issues, introduction

(basically,) until Christmas: Distributed Programming
- Mainstream Paradigms
- Advanced Paradigms
- Extras: Cloud Computing, Formal Approaches

(basically,) in 2013: Distributed Algorithms
- Foundation
- Synchronization
- Coordination
- Local Algorithms

slides: due to new format, we have to provide slides ‘just in time’
Questions, Feedback, etc.

E-Mail to
{telis,max}@tk.informatik.tu-darmstadt.de

or use the forum

Thank you!
(Core) Professors

- Prof. Dr. Max Mühlhäuser (TK, TK Lab)
- Prof. Dr. (jun.) Thorsten Strufe (P2P, TK Lab)
- Prof. Dr. Ralf Steinmetz (KOM/FB 18)
Teaching

- 'classical disciplines' with major impact on NCS
**NCS: “canonical”, mandatory (SS, IV3)**
- turn-taking Strufe / Mühlhäuser / Steinmetz
- Basics: compression, routing, protocols, queuing theory, ...

**TK0: Internet (WS, 1+0/1)**
- optional i.e. irregular cycle; complements protocols taught in NCS

**TK1: Distributed Systems and Algorithms (WS, 2+2)**
- together with TK3, considered one of two pillars of TK lectures

**TK2: Web Engineering and more (WS, 2+0) [currently: Voelz et al.]**
- Design / Implementation technology for the Web

**TK3: Ubiquitous Computing (SS, 2+2)**
- Ubiquitous Computing (anytime-anywhere, networked embedded&worn computers)
- includes: Mobile Communications, Mobile Internet, Mobile Computing

**Human Computer Interaction (SS, 2+0/2) [Huber et al.]**
- Everything you need for building good User Interfaces

**Peer-to-Peer Networks (WS, 2+2) [Strufe]**
- P2P network overlays, grids, content distribution

**Ubiquitous Computing in Geschäftsprozessen (WS, 2+0) [Heuser, Nochta]**
- “Applications of TK3 within SAP & co.”

**Sprachkommunikationssysteme (WS, 2+2) [Schnelle-Walka]**
- Basics of speech recognition / perception / synthesis

**Voice User Interface Design (SS, 2+0) [Schnelle-Walka]**
- How to build good Voice User Interfaces

**Lectures offered by etit department (FB18), Profs Steinmetz, Santini, Klein, Hausheer**
TK Seminar Winter: S3 (4CP)
- topics ‘rotate’! In earlier terms students worked on P2P; Web; Ad-Hoc Nets, Mobile ...
- this semester: Security, Privacy, and Trust (in english)
- work on “the next big thing” – topics/technologies that are on the way from research to the end user
- result: written work plus presentation
- when? Tues. 14:00h; kickoff yesterday → if interested, contact florian.volk@cased.de

Seminar ‘Intelligent Cities’: S3 (4CP) -- by researchers from AGT Corp.
- Rapid urbanization presents cities with complex challenges, from socio-economic and environmental problems. This seminar addresses
  - analysis and visualization of urban data
  - interaction with urban management systems
  - traffic prediction/analysis
  - disaster preparation and management
- Kickoff: Thursday Oct 26 14.00h S2|02 A126

Potential Seminar: Security and Privacy in Online Social Networks
- (P2P Group Strufe): if interested, contact Prof. Strufe
**Seminars, Labs (Praktikum), ...**

*(Summer Term, usually: Innovation Seminar)*

- Imagine: you have to convince a venture capitalist
- We help students come up with innovative ideas, help evaluate them
- Last Time: Ambient Computing in Everyday Life
  - Pick your own idea or one of the suggested ideas
- Result: report&presentation as usual, + video/storyboard/“screenshots”... of idea

**Projektpraktikum TK (P6, 9CP)**

- groups of 3-5 work on a subject → software
- sample topics:
  - ubicomp: smart kitchen, smart products ...
  - future HCI: interactive table, augmented everyday objects, ...
  - ‘big data’ in sensor networks: visualization, simulation, ...
  - novel programming paradigms: subject oriented workflows, pseudocode lge., ...
  - security&trust: eCash based reputation systems, author recognition in documents, ...
- Kickoff: Monday, 22nd of October, 16:15, A126

**Forschungsprojekt TK (12CP):**

- Research-related open topics, Only MSc students!
Praktikum ‘Advanced User Interfaces’ (P4, 6CP)
- principles, methods, patterns of advanced UI design
- for multimodal, collaborative, adaptive Uis
- kickoff passed → contact Dr Schnelle-Walka (dirk@tk.informatik.tu...)

Internet Praktikum TK (P4, 6CP): our "best-seller"
- Hands-on experience about topics of NCS, TK1-3
- selected in-depth topics, “hot” issues
- Recommended: NCS or TK1 or similar as pre-requisite
- kickoff passed → contact Kai Höver (kai@tk.informatik.tu...)

And last, but not least – Theses!
- Bachelor/Master/Diploma Theses, Student Theses of all kinds!!!
- see our website and/or contact us!
Telecooperation Lab: Research

Interaction

UI Engineering
- Model Based UI Development
- Multi Device Interaction
- Context Based & Proactive Interaction
- Voice / Pen & Paper / Touch

Smart Interaction
- 'Future Hands & Eyes Devices' → UI Lab

Novel Interaction
- Large Networks: WSN, P2P, OSN
- Learning → Knowledge

Protection

Smart Spaces: Health, Fab, Work
- Smart Sensing
- Social Networks & Social Media / TV
- Middleware & Services for Smart Spaces
- Smart IoT Products → Smart IoS Services
- Peer2Peer Networks
- Learning & Knowledge Work

Cooperation

Trust
- Trust & Reputation Models
- Privacy for Ubicomp
- Resilient Infrastructures
- Public Security

Ubiquitous Privacy

Secure Infrastructures
More Information?

- See our website: http://www.tk.informatik.tu-darmstadt.de

- See us!