Course Overview

Distributed Algorithms

Sebastian Forster

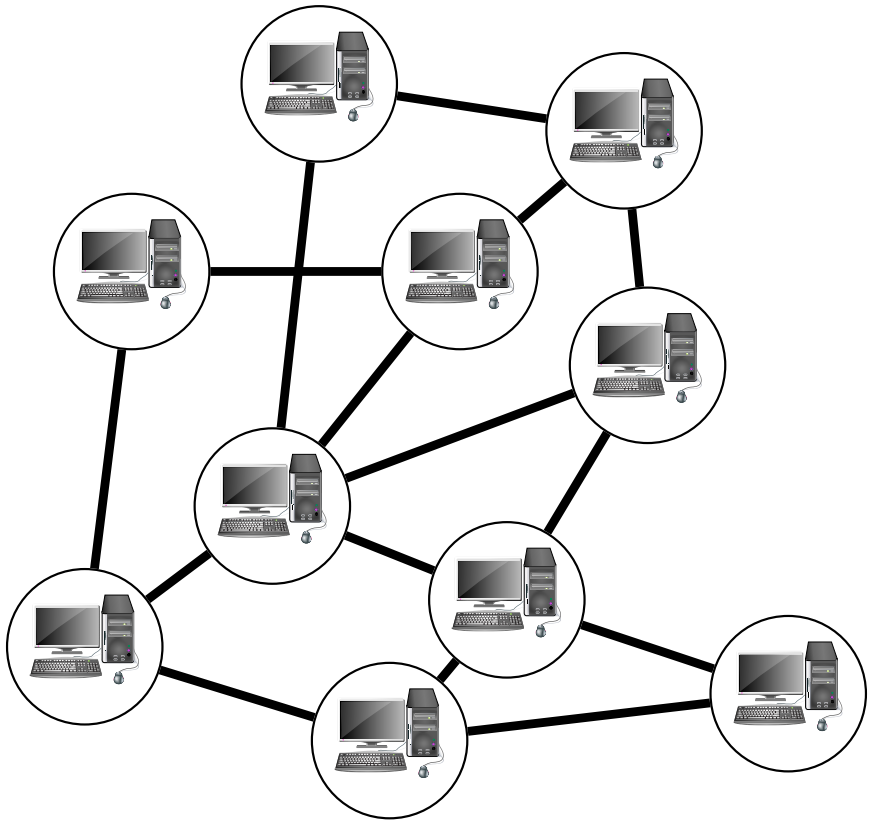
University of Salzburg



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Paradigm

- Relevant information is **distributed** among processors in the network
- Each processor has only a **local** view of the network
- Goal: Coordination of **global** behavior



Motivation

Abstract model for

- Computer networks
- Sensor networks
- Social networks
- Biological processes
- ...

Problems:

- Leader Election
- Information dissemination
- Local and global problems and algorithms
- ...

Preliminary Considerations

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- Techniques and analysis tools **complementary** to the introductory Algorithms and Data Structures course
- Qualification objective: Preparation for a thesis on the subject

Contents

Topics:

- Leader Election
- CONGEST Model
- Synchronization
- Maximal Independent Set
- Graph Spanners
- Shortest-path computation
- Epidemic information dissemination

$\Rightarrow$ approx. 10 classes

Cross-Cutting Themes

Communication as Computation

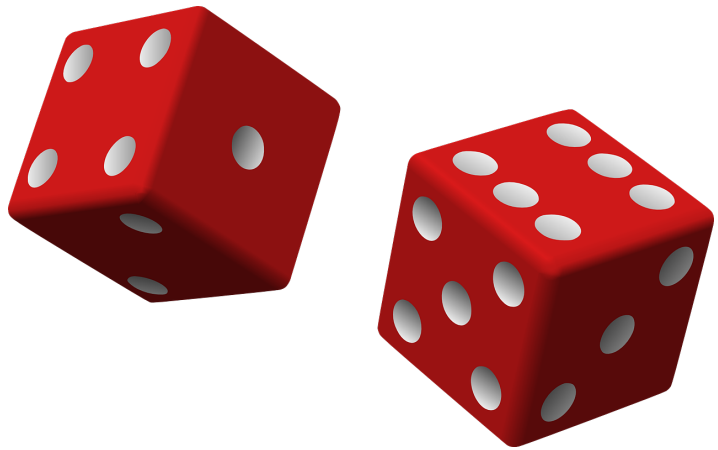


Cross-Cutting Themes

Communication as Computation



Randomized Algorithms



Relation to „Big Data“

- Large data sets cannot be stored centrally
- The models in this course focus on the „distributed“ aspect of large data sets
- Other models address other aspects:
  - External Memory
  - Streaming
  - Massively Parallel Computation
  - Property Testing
  - ...

Organization

Schedule:

- Lecture: Mon, 13:15-14:45 (T03)
- Group 1 (Forster): Mon, 15:00-15:45 (T03)
- Group 2 (Grösbacher): Mon, 15:00-15:45 (T03)

Grading:

- Written exam: 50 % of the grade
  - 3 exam dates
  - First exam on Jan 25 (instead of lecture)
- Theory exercises: 25 % of the grade
  One spotlight presentation per student (register by email)
- Programming exercises: 25 % of the grade
- Mandatory attendance rate: 70 %

Course Materials:

- Slides, exercises, further information
- Course website: https://bda.cs.sbg.ac.at/ *(Ready by tomorrow)*

ECTS Breakdown

5 credit points $\widehat{=}$ 125 full working hours

- Attendance: 25 hours
- Preparation for exam: 40 hours
- Theory exercises: 30 hours
- Programming exercises: 30 hours

Reasonable Accommodation ("Nachteilsausgleich")

Students with disabilities or chronic illnesses have the right to receive reasonable accommodation

Organization:

- To organize reasonable accommodation, please contact the FGDD department (disability@plus.ac.at)
- Please do not contact the instructors directly

Questions?