

Distributed Systems

Course Overview

Werner Nutt

Aims

- Introduce the **principles** and **concepts** involved in the design of distributed systems
- Familiarise students with **protocols** and **interfaces** used in the construction of distributed systems
- Enable students to **realise** themselves simple distributed systems

Outline (tentative)

- **Introduction** to Distributed Systems
 - Definition, Examples, Challenges
- **Networking** Foundations
 - Network characteristics relevant for DS
 - Network principles, Internet protocols (IP, UDP, TCP)
- System **Models**
 - Architectures, Interaction, Failures, Security
- Concurrent Programming
 - Threads in Java
- Interprocess **Communication**
 - APIs for Internet protocols, data marshalling
 - Communication models

Outline (tentative, order may change)

- Distributed **Objects**
 - Remote Method Invocation (RMI), RMI in Java
- **Naming**
 - Names, Addresses, Name Resolution
 - Internet DNS
- **Time** and Clocks
 - Clock synchronisation, logical clocks
- **Coordination**
 - Mutual exclusion, elections, multicasts
- **Fault Tolerance**
 - Two Phase Commit

Textbooks

- **Kurose, Ross.**
Computer Networking – A TopDown Approach
Pearson Education
- **Tanenbaum, van Steen.**
Distributed Systems. Principles and Paradigms.
Prentice Hall
- **Tanenbaum.**
Computer Networks.
Prentice Hall
Both books by Tanenbaum are written in a lively style and make for good reading
- **Coulouris, Dollimore, Kindberg.**
Distributed Systems. Concepts and Design. 3rd and 4th ed.
Addison Wesley
Used for chapters on interprocess communication and distributed objects.

Exam

- **Written exam** in January/February
 - conceptual questions
 - programming questions
- **Final mark**
 - either: 100% exam mark
 - or: 70% exam mark + 30% exercise markwhichever is higher

Labs

- Lab tutors: Paul Knoll, Werner Nutt
- Labs:
 - Introduction to technologies
 - Networking, routing with Cisco routers (29/11, 13/12, 20/12)
 - Interprocess communication
 - Remote Method Invocation
 - Threading and synchronization
 - Name services
 - etc.
 - Programming support for exercises
- Coursework:
 - Elaboration of networking and routing exercises
 - Little Programming projects (in groups of 2)

Coursework: Rules

- For the coursework you submit you will receive marks
- It is expected that the submissions represent your **own work**
 - This is not the case if parts of text or code are taken from sources on the web or from other students
 - Copying, e.g. from the web or from other students, will be considered as **plagiarism**
- Plagiarism will **not be tolerated**:
 - A single attempt will result in a **mark of 0** awarded to all coursework, that is, the entire work for the coursework will be invalidated by one incident of plagiarism
 - In more severe cases, students can be excluded from the exam in January/February

Schedule

	Mon	Tue	Wed	Thu	Fri
10:30 12:30	Lecture <i>Nutt</i>				
14:00 16:00		Office hour <i>Nutt</i>			
17:00 18:00	Lab Group A <i>Nutt</i>	Die Labs von Paul Knoll finden 16-18 Uhr und 18-20 Uhr statt			
18:00 19:00	Lab Group B <i>Nutt</i>				

Contact

- Office hours
Di, 14:00 – 16:00
- Email
nutt@inf.unibz.it
- Course web pages
<http://www.inf.unibz.it/~nutt/DSs1011.html>
- Labs: Knoll/Nutt