KTH ROYAL INSTITUTE
OF TECHNOLOGY

Course overview

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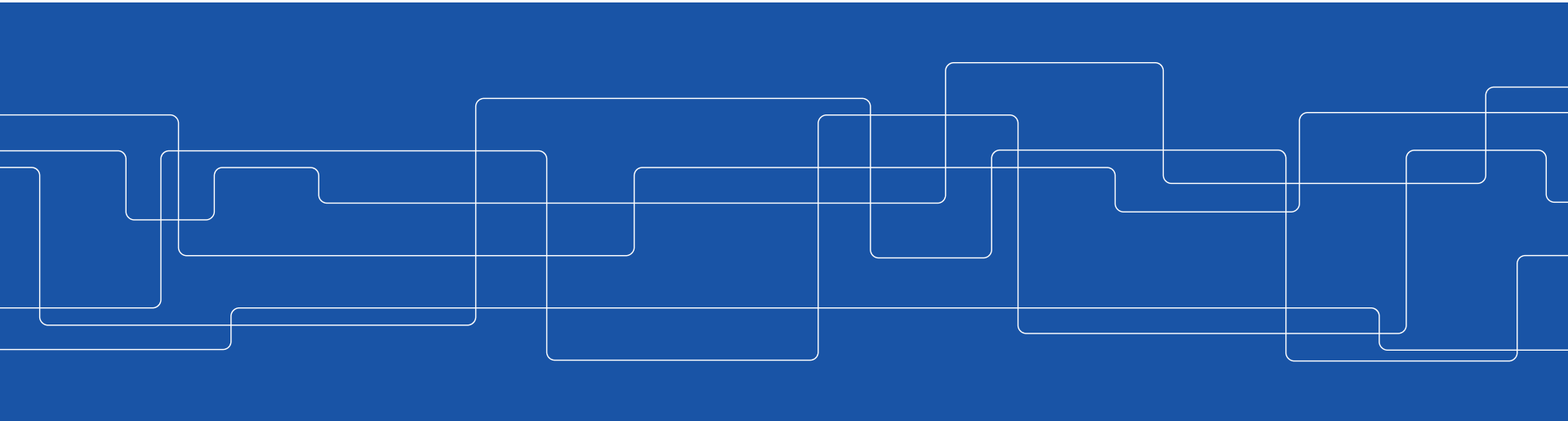


Registration

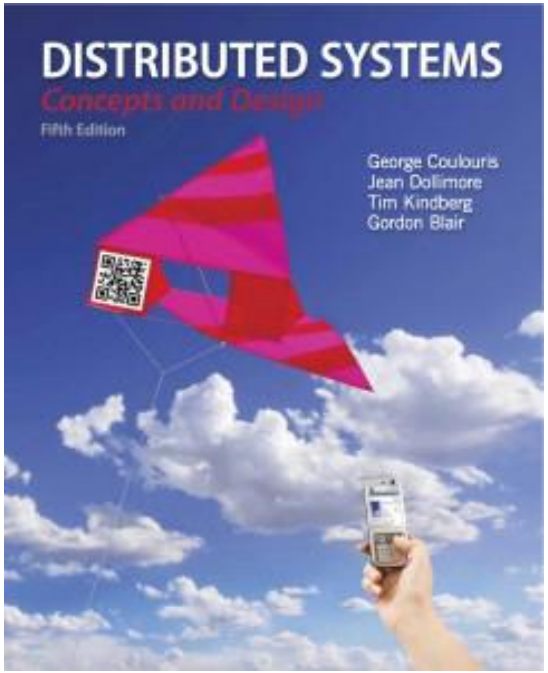
- Register by signing your name on the list, this or next week.
- *If your name is not on the list*, one of the following is true
  - you have not done course selection;
  - you have not done registration for the semester (terminsregistrering);
  - they have not registered you for the the program (programregistrering);
  - something else.
- *If your name is not on the list*, you can add your name and your KTH email address to the list in order to be registered later
  - You will be registered only if you fix ASAP the above that applies to you.

Course goal

- explain important characteristics of distributed systems
- describe architectural and fundamental models of distributed systems
- explain and compare strategies for inter-process communication
- explain and compare middleware models
- explain and compare name services
- explain the concept of logical time
- use logical time to implement distributed algorithms

Literature

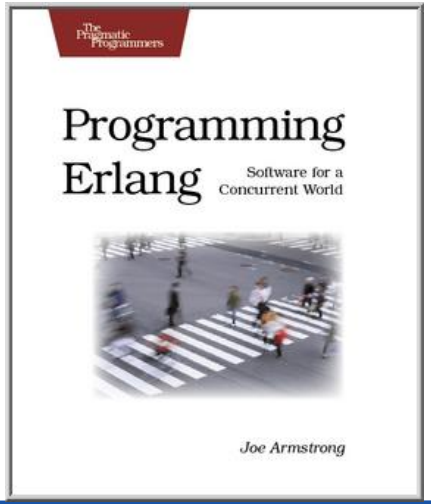
- "***Distributed Computing – Concepts and Design***",
- 5'th edition (4'th ok)
- Coulouris et al,
- Addison Wesley (www.cdk5.net)



Erlang

- “***Erlang Programming***”,
- Francesco Cesarini and Simon Thompson
- O’Reilly

- “***Programming Erlang***”
- Joe Armstrong
- Pragmatic Programmer



Lectures

Fourteen lectures that will mostly follow the course book.

Do read in advance!

Erlang is only given one lecture, you’re expected to pick up a new language on your own.

Slides will be available on the web.

Lectures

1: Introduction - what is a distributed systems and why is it different [Chapters 1 and 2]

2: Erlang - concurrent and distributed programming in Erlang.

3: Networks and process communication - things you might (or should) know but we'll go through them again [Chapters 3 and 4]

Lectures

4: Remote invocation - language constructs to program distributed systems [Chapter 5]

5: Indirect Communication - group communication, publish/subscribe and message queue systems [Chapter 6]

6: File systems and Name services - the problems of a distributed file system, performance, consistency [Chapters 12 and 13]

Lectures

7: Time - a simple thing that turns out to be very complex [Chapter 14.1-4]

8: Global state - can we describe the state of a distributed system and what can we determine[Chapter 14.5]

9: Coordination and agreement - how do we agree and how do we know that we do agree? [Chapter 15]

Lectures

10: Transactions - how can we make a set of operations behave as an atomic operation? [Chapter 16]

11: Distributed transactions - now how do we solve it if we have multiple servers [Chapter 17]

12: Replication - building fault tolerant systems [Chapter 18]

Lectures

13: Distributed Hash Tables - why do hashing? [Chapter 10]

14: Summary … and the price of olive oil

Homework and Seminars

You are to perform ***5 homework (HW)*** to be presented, demonstrated, discussed, and examined at ***5 corresponding seminars***

First seminar- help with completing the tasks. Not compulsory.

Following HW and seminars:

- submit your ***homework (code and written report) in a zip file to Bilda*** before a seminar
- hand in ***written report*** on how you solved the problem
- be prepared to ***present and demonstrate your solution***
- connect the systems and do some experiments

Select which group to join in Daisy.

Homework and Seminars

- ***Erlang*** – no HW, only helping seminar, not compulsory
- ***Rudy*** - a small web server
- ***Routy*** - message routing
- ***Loggy*** - logic time logger
- ***Groupy*** - group communication
- ***Chordy*** - a distributed hash table

Examination

- ***Approved five (5) programming assignments (HW) presented at seminars***
  - Complete tasks and submit to Bilda
  - Present and demonstrate at a seminar (report + code)
- ***Written examination***, closed book, of three parts I, II, III
  - I : declarative (multiple choice questions, 24p)
  - II : compare, describe (8 questions, short answers, 16p)
  - III : analytic, reflect (3 questions, essay answers, 12p)

Grading

- The ***first part*** of the exam will, scoring 16 or higher, give you an ***E***.
- Given a good result on the first part (approx. 20 points) the ***second part*** will give you a ***D or C***.
- Given a good result on the first and second part (approx. 22 and 12 points) the ***third part*** will give you a ***B or an A***.
- Final grade is based on written exam, written reports, presentation and demonstration of homework in seminar sessions.