**TDDD05**  
**Component-Based Software**  
**2013**  
**Organizational Issues**

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**Main Goals**

- Understand the concept of a component
- Understand limitations of OOP
- Understand static and dynamic metaprogramming
- Understand black-box, gray-box, white-box composition
- Know principles, potential, and limitations of some existing component and composition systems  
  - Classify by Component model, Composition technique, Composition language  
  - Classify by Adaptability, Mismatch Glueing, Variability, Extensibility, …

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**NB**

This is, in the first hand, NOT a programming course.

- We teach ideas and concepts, not details of specific systems.  
  - However, some systems (e.g. CORBA, EJB, AspectJ) considered in more detail than others, as case study  
- The labs (Java Reflection, EJB, AspectJ) are optional.

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**Optional Lab Series**

- 3 lab assignments: Java Reflection, EJB, AspectJ  
  - each with its introductory lecture and lesson – mandatory!  
- Help understanding the theory  
- Esp. EJB important for employability
- Passed lab series will appear on your Ladok statement  
  - UPG1 moment, 5p
- Only for students first-time registered on TDDD05 in 2013  
- Bonus of 4p for the three 2013/14 exams  
  - Each lab assignment completely and correctly solved by its deadline (see course homepage)  
  - No bonus for partial results!
- Lab hours in computer rooms, two groups at 16 in parallel  
  - Can also work on laptop or at home on your own computer
- Sign up by 8/4 via webreg, in pairs — limited #places!  
  - Commitment to (try to) do the entire lab suite
- Both be able to explain and demonstrate your code  
- No copying! Cheating will be taken seriously.

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**More Practical Exercises?**

- Further optional programming exercises are suggested on the course homepage  
  - Do them at home, or in IDA PULs during non-scheduled hours  
  - No supervision, no submission, no correction, no points.  
  - Suggestions: Create informal working groups so you can help each other.
Written Exam

Allowed aids at the exam:
- Dictionary from English to your native language.
- No other books, no notes, no calculators.

Overall Structure

Part I: Basics
- Component and Composition Systems Overview
- Components, Contracts, and Interfaces
- Reflection and Metaprogramming

Part II: Black-Box Composition Systems
- Classical Components-off-the-shelf (COTS) systems: JavaBeans, CORBA, EJB, COM, .NET, Web Services
- Software Architecture Systems

Part III: Gray-Box Composition Systems
- Invasive Software Composition
- Aspect-Oriented Programming
- Static Metaprogramming with Templates

Advanced Topics
- Model-Driven Architecture (MDA)
- Composition of parallel programs

Schedule (1)
(for times and rooms see the web schedule on the course homepage)
- Introduction and Overview Christoph Kessler (CK)
- OO Technology: Properties and limitations for component based design (CK)
- Metamodeling and Metaprogramming (CK)
- Lesson: Java Reflection (45min only) Lu Li (LL) (lesson attendance mandatory if you take the labs)
- Problems and solutions in classical component systems (CK)
- Lab 1: Java Reflection (LL)
- Problems and solutions in classical ... (cont.) CORBA (1) (CK)

Schedule (2)
- CORBA (2), (CK)
- CORBA component model
- Java Beans (CK)
- mid-term evaluation;
- Enterprise Java Beans (EJB) (LL)
- Lesson: Enterprise Java Beans (EJB) (LL)
- Lab 2: EJB (2 supervised sessions) (LL)
- (COM, DCOM, .NET – not lectured, self-study)
- SOA / Web Services (CK)
- Web Services orchestration / choreography COTS Evaluation
- Software Architecture Systems (CK)

Schedule (3)
- Aspect-Oriented Programming and Aspect-J (CK)
- Lesson: AspectJ (LL)
- Invasive Software Composition; Static metaprogramming with C++ templates (CK)
- Lab 3: Aspect-J (LL)
- Introduction Model-Driven Architecture (MDA) (CK)
- Optimized composition of parallel programs (CK)

Literature

Mandatory:
  - Covers most of Lectures 1 – 10
  - Reading directions on the course homepage

Optional and background literature:
- see the course homepage, http://www.ida.liu.se/~TDDD05