Design of Software Systems

Fall 2017

Course Introduction

Assist. Prof. Dr. Ronald Jabangwe

Credits:

- Credit to:
- **Dr. Marco Kuhrmann**
- for structure and some of the lectures

Agenda

- Team
- Schedule and Organization
- Labs and Assignments

- Goals and Content of the Course

Team

Lecture

- Ronald Jabangwe rja@mmmi.sdu.dk

Labs and Exercise

- Sarah Hayssam Gheith saghe10@student.sdu.dk
- Morten Dreier modre14@student.sdu.dk
- Elena Markoska elma@mmmi.sdu.dk
- Sune Chung Jepsen sujep06@student.sdu.dk
- Van Nam Pham vapha15@student.sdu.dk

Consultation hours

- on arrangement

Schedule and Organization

- Lecture: Friday, 12:15-14:00 , room: U150
- Labs: Friday, 14:15-16:00 , room: U150, U30, U8, U21, U165
- Further information
  - Blackboard and other news
  - Lecture slides will be made available on Blackboard at the end of the day/next day
  - Other information, e.g., literature, etc. also on Blackboard

Schedule and Organization: Plan for Each Week

Week 36: Course introduction
**Week 37: Fundamentals (What is software architecture)
Week 38: Guest lecture: Software Architecture
Week 39: Guest lecture: Agile (focus on requirements and testing)
Week 40: Importance and Contexts of Software Architecture
**Week 41: Quality
Week 42: No Lecture and Lab
Week 43: No Lecture and Lab - SDU årsfest
Week 44: Architecture levels and views
**Week 45: Lab only
Week 46: Design principles, patterns, and distributed systems
Week 47: Guest Lecture: Architecture and requirements
Week 48: Documentation and Architecture evaluation
Week 49: Reconstructing, re-Documenting the architecture/ Closing: sum-up and reflection

NOTE: Labs are every week. The format is Lecture followed by lab unless stated as shown for Week 45.

Schedule and Organization: Labs and Assignments

- Labs
  - Each week
  - Run by the TA's
  - Participation is highly recommended

- Qualify for the exam
  - Approval for 3 assignments is required
  - Grading: pass/fail

- Assignments - Total 3 (individual/group assignment)
  - Assignment_1 Available Week 37 (due Week 38)
  - Assignment_2 Available Week 41 (due in class)
  - Assignment_3 Available Week 45 (due Week 46)
  - All hand-ins will be in PDF

Schedule and Organization

Lab/Exercise Plan

- Major Exercise Topics:
  - Basic UML modelling
  - Basic C#
  - Primarily: Architecture design, analysis, documentation and implementation
  - This not a course dedicated to teaching how to code, but to teach you the idiosyncrasies of designing software systems

- Purpose of the exercises/labs
  - practical exercises
  - on modelling
  - on architectural designs and reasoning for their selection
  - on architecture evaluation

Schedule and Organization: Overview

- Course pattern: 2h lecture + 2h lab/exercise/discuss assignments

- For the lab/exercise session
  - NOTE: The only programming language used is C#
  - NOTE: Tools: IDE – any.
  - NOTE: Tools: UML – any.

Exam

- Exam:
  - Type: Written Exam, 120 Minutes, 7-point scale
  - Date and time: to be announced

- Exam qualification:
  - 3 qualification assignments
  - Submission is mandatory

Agenda

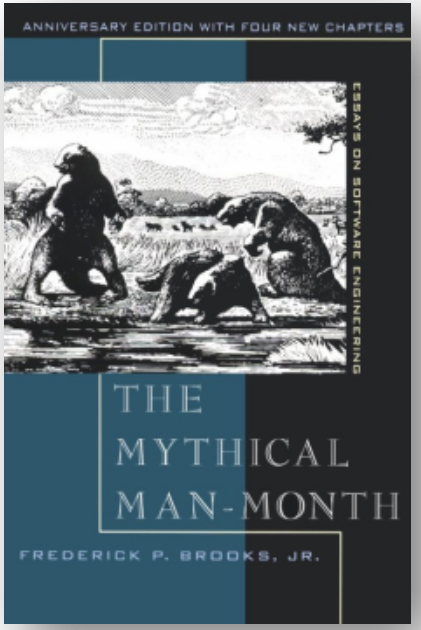
- Metadata
- Team
- Schedule and Organization
- Exams

- Goals and Content of the Course

Overall Goals and Content

- Purpose: **Knowledge** and **Awareness**
- "There is no silver bullet" → we have plenty of
  - General approaches
  - Methods
  - Tools
  - Skills and so on

- In this course
  - Selection of topics
  - In-depth discussion of some topics
  - Hands-on for selected aspects
  - Awareness for some not so "prominent" topics

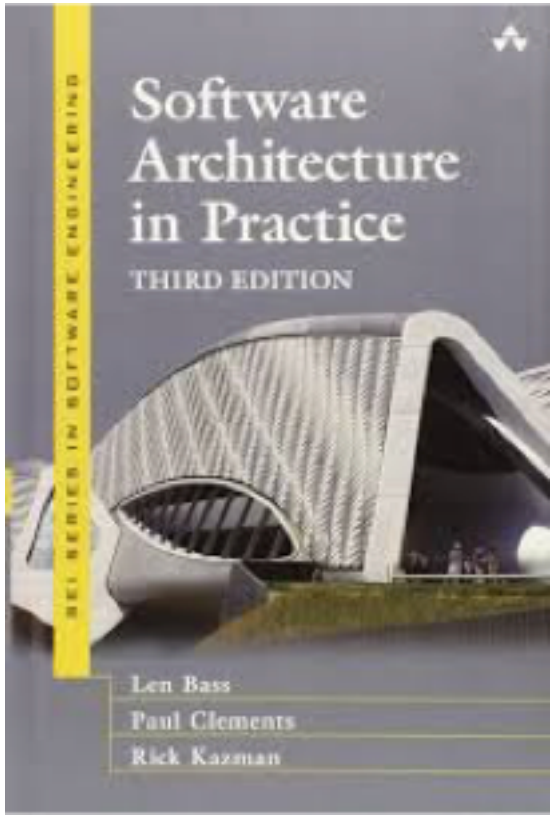


F. P. Brooks,
The Mythical Man-Month

Overall Goals and Content

Software Architecture in Practice

by Len Bass, Paul Clements and Rick Kazman



- In terms of content, this is the major reference for the course

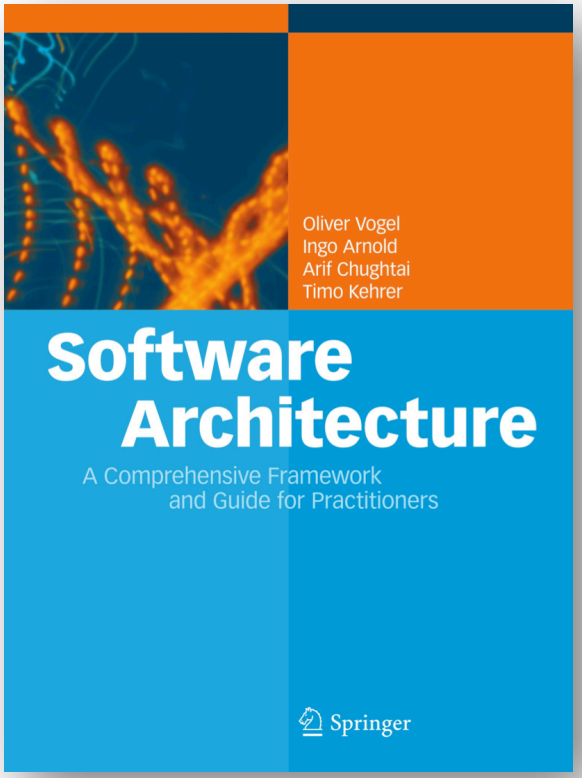
  but:

- You should study further literature that is listed in the reference list
- Literature is available
  - Library
  - Online (free)
  - Online (scientific libraries with SDU access)

Overall Goals and Content

Software Architecture

Vogel et al.; 2015



- In terms of structure of the course, this is the major reference for the course

  but:

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Overall Goals and Content

Clean Code

Martin, R. C.; 2008

- Regarding code quality, major reference for the course

  but:

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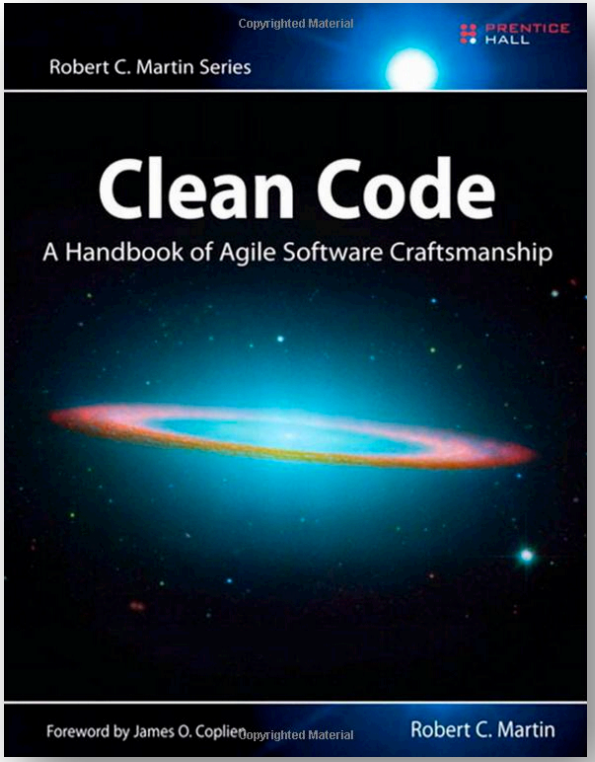


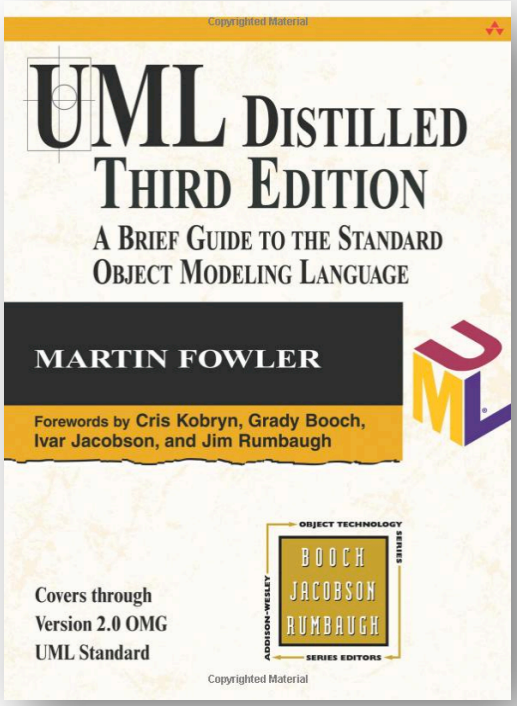
Further Complementing Literature

UML Distilled

Martin Fowler, Addison-Wesley Professional, 2003

- UML notations
- Examples
- Complements the book by Vogel et al.

- But there is plenty of material:
  - Library
  - Online (free)
  - Online (scientific libraries with SDU access)



General Comment…

There is NO general reading plan!

- Literature listed here is either
  - Major reference = directly linked in course
  - Complementing reference for support

- I will suggest reading certain book chapters
- Course outline gives you suggestions

But Note: This course is not a reading exercise. You take responsibility on your own learning.

Overall Goals and Content

- Major learning goals of this course
  - Background knowledge
  - Basics in understanding, modeling, and software architectures
  - Understanding of software lifecycle, management and quality

- Major topics
  - Architecture basics, analysis and design
  - Processes of developing software
  - Architecture and design pattern
  - Quality management

Overall Goals and Content

At the end of the course, you:

- Describe and rationalize the design of a software system
- Explain the importance and impact of software architecture to software (systems) development
- Explain architectural design decisions based on quality constraints
- Describe strategies for quality management and assurance
- Compare and evaluate different architecture styles