Software Architecture

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Lecture 1: Introduction
Goal of the course

Enabling you to master techniques for building and enhancing successful software systems of large size and industrial quality

This includes in particular:

- The move from programming to software engineering
- Principles of software engineering and in particular software quality
- Object technology principles and methods; the practice of object-oriented analysis, design and implementation
- Design patterns
- Principles of building reusable software
Five key topics

- Abstract Data Types
- Advanced Object Technology techniques
- Design Patterns
- Component-Based Development
- Integrated Development Environments (IDEs)
Teaching staff
E-mail: Bertrand.Meyer@inf.ethz.ch
Office: RZ J6
Secretary: Claudia Günthart, (01) 632 83 46
Exercise sessions

All groups have one session a week:

- Tuesday, 14:00 - 15:00

Registration in a few moments
The assistants

Bernd Schoeller (Coordinating Assistant)

Volkan Arslan
  German

Till Bay
  German (French)

Ilinca Ciupa
  English

Martin Nordio
  English

Stephan Classen <classens@student.ethz.ch> (Hilfsassistent)
  German

Florian Geldmacher <florian@womaro.ch> (Hilfsassistent)
  German
Practical information
Course material

Course page:
http://se.inf.ethz.ch/teaching/ss2006/0050/  
→ Check it at least twice a week

Lecture material:
- Lecture slides
- Textbook:
  
  *Object-Oriented Software Construction, 2nd edition* -- Prentice Hall, 1997
  
  Available from Polybuchhandlung
  
  Sold during the break next week (≈ CHF 63 with Legi)

Exercise material:
- Exercise sheets
- Master solutions
Electronic forums

Discussion forums:
Inforum:
   http://forum.vis.ethz.ch

Mailing list for each group

Advice and rules:

Use the forums and mailing lists! Take advantage of every help you can get.
Don’t be shy. There are no stupid questions.

Criticism welcome, but always be polite to every participant and observe the etiquette.

To email the whole teaching team (professor and assistants):
   soft-arch-assi@se.inf.ethz.ch
Exercise sessions and project

Make sure to attend all sessions

Exercise sheets will be distributed by your assistant during the exercise session

Do all exercises and the project
Exercises, “Testat” regulations (tentative)

“Testat”: Needed for admittance to the exam.

Exercises:
- 6 project milestone exercises
- Project documentation
- Project presentation

To get the “Testat” you need to have done at least:
- 5 project milestone exercises
- Project documentation
- Project presentation
- Must show serious effort to address the questions
- Must have filled out questionnaire

Military services or illness ⇒ contact your assistant.
Programming environment

EiffelStudio download:
http://www.eiffel.com/downloads/

Free version available for Windows, Linux and MacOS
Exam: end of semester

Wednesday, 5 July 2006, 8-10 (normal class time)
2-hour exam
No material allowed

Covers all material in the semester
The project

Integral part of the course

Project is EiffelStudio-oriented

(Other possibility: Traffic-related project)

Public presentation: 28 June, main hall of HG

Large groups: two per assistant group
  - Must organize yourselves
  - All functions represented: developers, team leader, quality assurance, documentation, …
And now for the real news...

**EiffelStudio history:**

- **1986** First Eiffel compiler (Eiffel 1) by Eiffel Software
  - Command-line compiler
- **1988** Eiffel 2
  - Constrained genericity, exceptions, assignment attempt...
- **1990** First DOS implementation (Object Tools)
- **1993** Eiffel 3
  - Infix features, expanded classes...
  - Graphical environment: EiffelBench
  - *Eiffel: The Language*
- **1997** Eiffel 4
  - *Precursor* mechanism
  - EiffelBench becomes EiffelStudio
- **1999** Eiffel 5
  - Tuples, agents...
  - Free version
- **2005** ECMA standard 367
  - Attached types, ...
Other milestones

*Object-Oriented Software Construction*
  1st edition, 1988
  2nd edition, 1997

ECMA International, Standard 367
  Eiffel: Analysis, Design and Programming Language
  21 June 2005

ISO (International Standards Organization)
  Revision of ECMA standard
  Expected April 2006
Some Eiffel projects

Axa Rosenberg
Investment management: from $2 billion to >$40 billion
  2 million lines of Eiffel
Chicago Board of Trade
  Price reporting system
  Eiffel + CORBA +
  Solaris + Windows + ... 
Boeing (Xontech)
  Large-scale Eiffel
  simulations of missile defense system
Swedish social security: accident reporting & management
The news: Open-Source EiffelStudio

Full technology will be available in dual licensing

Open-Source version will be under GPL; applies to generated code as well

Will be hosted at ETH: Origo server

When and who?
The news: Origo

Till Bay

Environment under construction for distributed, cooperative, professional software development
Key URLs

http://eiffelsoftware.origo.ethz.ch
  -- Project web page

https://eiffelsoftware.origo.ethz.ch/svn/es
  -- Anonymous Subversion checkout
### The course projects

**EiffelStudio-related:**
- Build tool
- Mac OSX release and installer
- Port to new platforms (Mac OSX Intel, OpenBSD...)
- Integrated support for configuration management
- New refactoring support
- Unicode support/improvements
- IDE improvements (see assistant)
- Direct code checking (“red squiggly underlines”)
- Integrated learning support
- Extended static checking (difficult!)
- Others (see assistant)

**Traffic-related:**
- Streets and cars (traffic lights, speed limits...)
- People with schedules for their day and first person view for traveling
- Real buildings (Migros, Churches, Hauptbahnhof...)
- Schedules for buses, trams etc., read from the Internet
- Topological information: river, lake, mountains, boats, parks...
- ...

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*Chair of Software Engineering*
This is a software architecture project

Design quality is essential
Large-group projects: must be organized like an industrial project
Configuration management
Documentation
Quality standards (analysis, design, implementation)
Should be useful ("Eat your own dog food!")
The public presentation

June 29th, Hauptgebäude
All projects will be demonstrated
The best projects will be selected for presentation
The best of the best will be included in future releases of Open-Source EiffelStudio
Next week (12 April)

Emmanuel Stapf, EiffelSoftware

EiffelStudio code walkthrough!
The Big Red Button

http://origo.ethz.ch/unlock-eiffel/
End lecture 1