

301AA - Advanced Programming

[AP-2018]

Lecturer: **Andrea Corradini**

andrea@di.unipi.it

<http://pages.di.unipi.it/corradini/>

Assistant: **Matteo Busi**

matteo.busi@di.unipi.it

Course pages: <http://pages.di.unipi.it/corradini/Didattica/AP-18/>

Department of Computer Science, Pisa
Academic Year 2018/19

AP-01: Overview and Admins

Goals

- To provide the students with a deep understanding of how ***high level programming concepts*** and ***metaphors*** map into ***executable systems*** and which are ***their costs and limitations***
- To gain familiarity with modern principles, techniques, and best practices of software construction
- To introduce the students to techniques of programming at higher abstraction levels, in particular ***component programming*** and ***functional programming***
- To present ***state-of-the-art frameworks*** incorporating these techniques.

Prerequisites

- Undergraduate level knowledge of
 - at least one object-oriented programming language (like Java, C++, C# or others)
 - at least one functional programming language (like Haskell, OCaml, Scheme or others)
- ➔ Informal test soon: Thursday
- ➔ Suggestions to fill possible gaps will be given

Programme

- Run Time Support and Execution Environments
- Component Based Programming
- Software and Application Frameworks
- Polymorphism & Generic Programming
- Functional aspects of programming languages
- Scripting languages
- Advanced concepts in programming languages

Organization of the course

- An **entry test** will be proposed at the beginning of the course. Students who will not pass the test will be instructed on how to fill the identified gaps
- **Frontal lessons** are performed using slides and blackboard
- **Practical sessions** will take place in the classroom, under supervision of the lecturer and of the tutor. Students are invited to bring their own laptops
- Interaction with the teacher is done through interviews (on fixed office hours or by appointment) and by e-mail.
- On the **web page of the course**, the slides presented in each lesson are published progressively, with references to corresponding topics in the reading material.
- → see <http://pages.di.unipi.it/corradini/Didattica/AP-17/>

Evaluation and other things...

Evaluation

- Some (three?) programming assignments during the course
- Final oral exam

Attendance to the course is strongly encouraged

- If you miss a lesson, you can find on the course web page the list of topics presented for each lesson, with the projected slides and references to the relevant teaching material.
- Examination methods for non-attending students are identical to those for attending students.

Reading material

- Will be suggested progressively along the course
- Mostly material accessible on-line

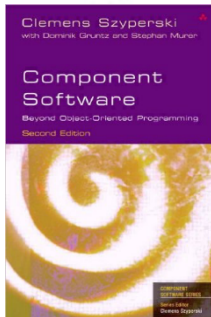
Credits

- Slides of the course freely taken and elaborated from a number of sources:
 - **Giuseppe Attardi** (DIP), Advanced Programming
 - **Gianluigi Ferrari** (DIP), Advanced Programming
 - **Antonio Cisternino** (DIP)
 - and others that will be indicated along the course

Some Suggested Readings



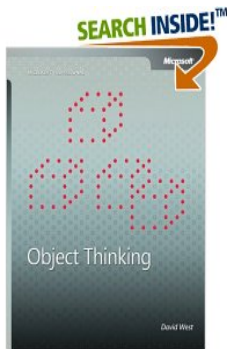
Programming Language Pragmatics, third ed..
Michael L. Scott, Morgan-Kaufmann, 2009.



Component Software: Beyond Object-Oriented
Programming. C. Szyperski, D. Gruntz, S.
Murer, Addison-Wesley, 2002.



Generative Programming: Methods, Tools, and
Applications. K. Czarnecki, U. Eisenecker,
Addison-Wesley, 2000.



Object Thinking. D. West, Microsoft Press, 2004.

Admins...

- Web page of the course:

<http://pages.di.unipi.it/corradini/Didattica/AP-18/>

(permanently under construction...)

- Office Hours: **Friday, 4-7 pm**

– Also: by appointment, sending an email to

andrea@di.unipi.it

Other infos

- Italian language courses, organized by CLI (Centro Linguistico Interdipartimentale)
 - <http://www.cli.unipi.it/corsi/test-dingresso>
- List of courses offered by the Master Programmes, Timetables, ...
- Erasmus -- next call: **27/09/2018** deadline: **12/10/2018**
- Double Degree with "Master Degree in Computer Engineering" of University of Malaga
 - https://www.uma.es/master-en-ingenieria-informatica?set_language=en
- → for info send an email to erasmus@di.unipi.it
- **BANDO PER INCARICHI, PRESSO IL DIPARTIMENTO DI INFORMATICA – UNIVERSITA' DI PISA, DI COLLABORAZIONE PART-TIME COUNSELING – SCADENZA 21/09/2018 & 28/09/2018**