Advanced Programming and Algorithmic Design

Module II

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a.a. 2018/2019

Who am I?

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What is this course about?

Program "efficiency"

- abstract the notion of program
- define a measure of efficiency/complexity
- show techniques to compute this measure
- present some widespread problems and some solutions

Why learning algorithmic design?

- to discriminate feasible and unfeasible problem solutions
- to identify the “best” solutions for a specific problem
- to unravel the real nature of a problem

How will we learn?

- Lessons
- Exercises
- Homework (implementation)

How much time?

The most demanding tasks will be homework.

You will implement **some** of the course topics in plain C.

Studying + Homework take a couple of hours per lesson at most

(if this is not the case, let me know!!!)

When?

Usually, from 9.15 to 11, on

- Monday
- Tuesday
- Thursday

See a complete schedule of all the courses at

`https://dssc.units.it/lecture-plan-0`.

What kind of course is this?

You have really different backgrounds

- mathematics
- physics
- biological studies
- engineering
- economic studies
- ...

Many of you need an introduction to the topic...

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The course consists in two (not disjoint) parts...

Topics

Preliminaries

- Asymptotic complexity
- Matrix multiplication
- Sorting algorithms
- Binary Search Trees and Red Black Trees
- Graph Browsing and Strongly Connected Components
- Shortest Path Problems
- Transitive Closure of a Graph
- String Matching
- Longest Common Sub-sequence
- Suffix Trees and Suffix Arrays
- Routing Problem: Highway Hierarchy

Topics

Less "usual" topics

- Asymptotic complexity
- Matrix multiplication
- Sorting algorithms
- Binary Search Trees and Red Black Trees
- Graph Browsing and Strongly Connected Components
- Shortest Path Problems
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Attendance is not mandatory

However. . .

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it may help in "unusual" topics.

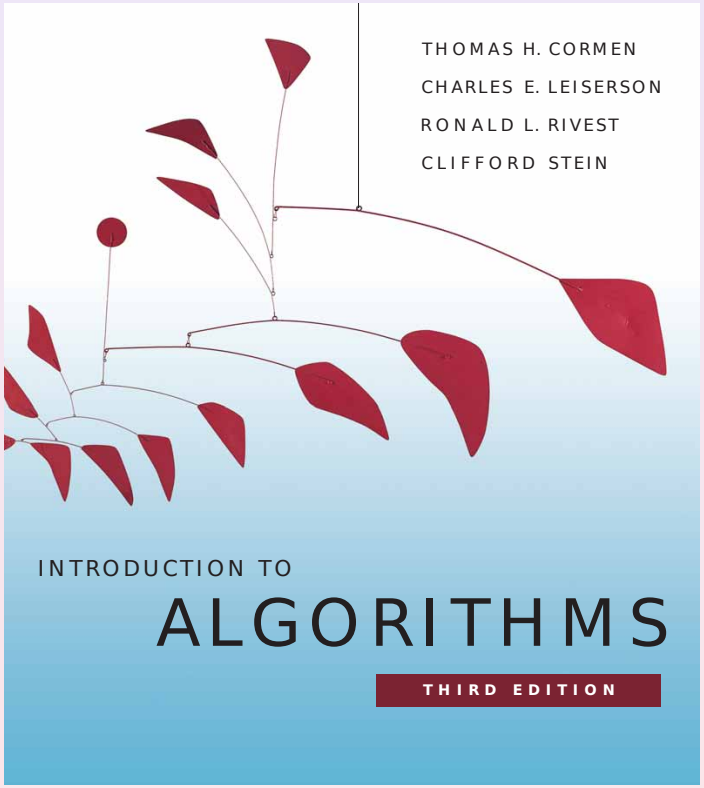
My suggestion: follow the course in any case.

Textbook

Introduction to Algorithms, (3rd Edition)

Cormen, Leiserson, Rivest, Stein

MIT Press



Course material

You can find it on Moodle as soon as released

`https://moodle2.units.it/course/view.php?id=4116`

The password is `fM20$19`

What about the exam?

Homework during the course

+

Public presentation of an agreed research paper

Question time

Any question?