

Advanced Programming and Algorithmic Design

Module II

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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 C or C++
(no external libraries, no STL, no Boost).

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>.

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
- The Routing Problem
- String Matching
- Suffix Trees and Suffix Arrays

Topics

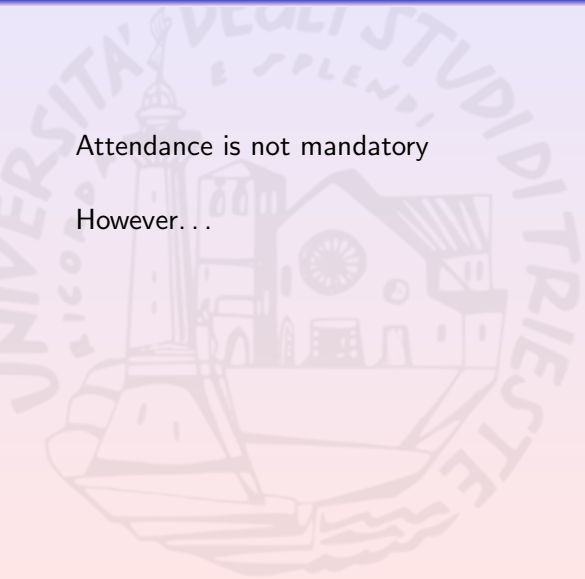
Less “usual” topics

- Asymptotic complexity
- Matrix multiplication
- Sorting algorithms
- Binary Search Trees and Red Black Trees
- Graph Browsing and Strongly Connected Components
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Must I attend the course?

Attendance is not mandatory

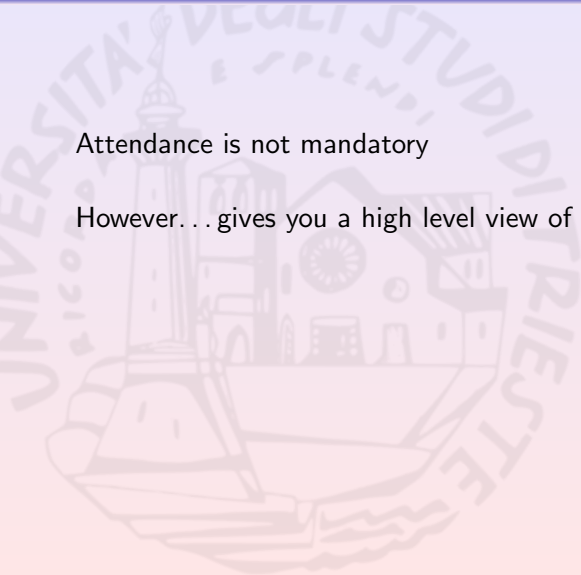
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If you are not a “novice”, you do not need Preliminaries, but ...

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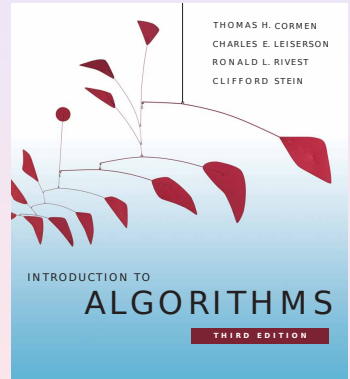
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it may help in “unusual” topics.

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=5499>

The password is **Dijkstra\$**

What about the exam?

Homework during the course

+

A final written exam

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Homework during the course

+

A final written exam

Not sure and depends on the evolution of the ban

Written Exam Dates

In Room 4C, Building H2bis (hopefully)

- June 17, 2020, 9AM-12PM
- July 8, 2020, 9AM-12PM
- July 24, 2020, 9AM-12PM
- September 9, 2020, 9AM-12PM
- September 30, 2020, 9AM-12PM
- January 25, 2021, 9AM-12PM
- February 15, 2021, 9AM-12PM

Registration is mandatory.

Question time

Any question?

