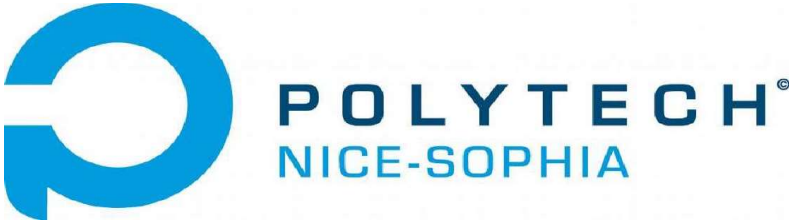

Algorithms & Data Structures

Course Presentation

Marc Gaetano

Edition 2017-2018

Welcome!

In this course we will learn *fundamental data structures and algorithms for organizing and processing information*

- "Classic" data structures / algorithms
- How to rigorously analyze their efficiency
- How to decide when to use them
- Stacks, Queues, trees, sorting, etc.

Goals

- Understand basic algorithms and data structures
- Understand/Analyze their complexity
- Be able to code them in a programming language (Python)
- Be able to make good design choices as a developer, project manager, etc.
- Be able to justify and communicate your design decisions

You will learn the key abstractions used almost every day in just about anything related to computing and software.

This is not a course about Python! We use Python as a tool, but the data structures you learn about can be implemented in any language.

Course organization

- **Course web page**

  `http://users.polytech.unice.fr/~gaetano/ads`

  login: **`si3`** **password:** **`ADS1718`**

- **Course duration**
  - 13 weeks
- **Lectures/Labs**
  - 4 hours every Wednesday afternoon
  - You should review the slides before coming to class
  - Exercises to be done during the lab and to complete by yourself

Staff

- **Marc Gaetano**
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  - G1 & G2
- **Christophe Papazian**
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Course materials

- We'll be using Python for the programming assignments
  - Python 3.x
  - IDLE (or any Python IDE)

- Textbook:

  Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein, MIT Press, July 2009

  A PDF copy is available on the course web pabe

- A good Python reference of your choosing

  Don't struggle **Google**ing for features you don't understand, just link to a reference page you like and stick to it!

Grading system

- **3 exams**
  - At about 1/3, 2/3 and end of the course
  - Paper-based
  - Closed everything
- **Final grade**
  - Average of the 3 exams

What this course will cover

- Introduction to Algorithm Analysis
- Lists, Stacks, Queues
- Binary Search Trees
- Heaps, Priority Queues
- Sorting
- Disjoint Sets
- Graphs implementations
- Graphs algorithms