

Introduction and Python

Dr. Antonio Di Maio
Computational Thinking HS2026
17.09.2026



People

- **Lecturers**

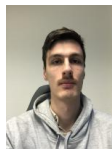


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- **Head Teaching Assistant**



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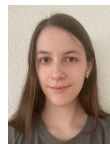
- **Student Assistants**



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Sarina Schenker
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Lectures: Flipped Classroom

- Two weeks to **self-study** each chapter content using the resources on DISCO website 
- Read the **lecture notes**
 - Watch lecture **videos**
 - Solve the **exercises**
 - Study the **notebooks**
- Every two weeks on Thursday: in-class sessions at 12:15 in ETF E1 
- In-class session recordings 

Week	Date	Topic
1	17.09.2025	Introduction & Python
3	01.10.2025	Chapter 1: Algorithms
5	15.10.2025	Chapter 2: Complexity
7	29.10.2025	Chapter 3: Cryptography
9	12.11.2025	Chapter 4: Databases
11	26.11.2025	Chapter 5: Machine Learning
13	10.12.2025	Chapter 6: Neural Networks
14	17.12.2025	Chapter 7: Computability



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Computational Thinking (HS 2026)

Course catalogue Previous year

Computation is everywhere, but what is computation actually? In this lecture we will discuss the power and limitations of computation. Computational thinking is about understanding machine intelligence. What is computable, and how efficiently?

Understanding computation lies at the heart of many exciting scientific, social and even philosophical developments. Computational thinking is more than programming a computer, it means thinking in abstractions. Consequently, computational thinking has become a fundamental skill for everyone, not just computer scientists. For example, functions which can easily be computed but not inverted are at the heart of understanding data security and privacy. The design of efficient electronic circuits is related to computational complexity. Machine learning on the other hand has given us fascinating new tools to learn from data. We will study various problems together with the fundamental theory of computation.

The course uses Python as a programming language. Python is popular and intuitive, a programming language that looks and feels a bit like human instructions.

Organization

This course follows the **flipped classroom** paradigm. You (the student) will self-study all important concepts by

- Reading a script chapter
- Watching a few short video clips
- Solving the exercises

We have **weekly paper exercise** sessions to learn all the important concepts, with questions on the level of exam questions.

- Weekly paper exercises are managed by [Anton Paronow](#)
- In each exercise session the assistant is going to recap of the relevant parts of the script/video
- Subsequently there will be free time to solve the exercises with a helpful assistant being present
- You can choose any of three session (room, zoom, or recorded) below, no registration needed
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- Friday 10-12 in ETZ G01 by [Samuel Baumgartner](#)
- Monday 12-14 in ETZ F01 by [Benedikt Wessling](#)
- Tuesday 9-10 (short session) in HG E 33.3 and on Zoom (link will be added soon) by [Sarina Schenker](#)

For each topic, the whole class meets every **two weeks** on Thursday. Each class meeting is organized as follows:

- We are going to have a quiz on the current subject
- And you can ask remaining questions about the subject
- These general meetings are happening only in semester weeks 1, 3, 5, 7, 9, 11, 13 and 14
- The class meetings are organized by [Antonio Di Maio](#) (standing in for [Roger Wattenhofer](#)), on Thursday 12:00-14:00 in ETF E1
- The class meetings are going to be recorded.

News

- Thursday, 17.09.2026: The first class meeting. Please study the [Python Cheat Sheet](#) before this meeting, so that you can score high in the first quiz.
- The exercises start right after the first class meeting, i.e. on Friday, 18.09.2026.

Exam

- The exam questions are in English, answers can be in German, English, or a combination of both
- You are allowed to bring any written material you like (lecture notes, books, personal notes, ...), but no electronic devices whatsoever (no calculator, phone, laptop, headphones, ...)
- The exam will last **120 minutes** and consist of **120 points**
- Here is an overview of what you can expect at the exam
- Old exam questions (with solutions): HS 2025, FS 2025, FS 2026, FS 2024, FS 2023, FS 2022, HS 2021, FS 2021, HS 2020.

Lecture Material

Lecture videos are also available (and downloadable) at [this Polybox Repository](#).

Chapter Title	Lecture Notes	Lecture Videos	Exercises & Solutions	3rd Party Tutorials
Introduction & Python 17.09.2026	PDF Python Cheat Sheet Notebook	Python Playlist Python Basics (Page 1) Python Advanced (Page 2)		Python for Programmers
Chapter 1 Algorithms 01.10.2026	PDF 1:1 Notebook	Algorithms Playlist Recursion etc. (1.1-1.3) Dynamic Programming (1.4) O-Notation (in 1.1) Linear Programming (1.5) Linear Relaxation (1.6) Flows (1.7) Summary Chapter 1		Recursion and Backtracking [a] Dynamic Programming Linear Programming [a][b]

In-class sessions

- Agenda
 - Q&A (on quizzes or study material)
 - Kahoot quizzes
 - Continuous Feedback 
- Communication
 - Via email (please submit your questions **>24h before** the Q&A session)
 - Office hours (by appointment)
 - During Q&A
- Kahoot quizzes
 - Each student participates to quizzes with a **pseudonym** (fixed throughout the course)
 - e.g., pseudonym = student **Legi** number
 - There will be prizes for the **highest score**

Weekly exercise sessions

- Weekly exercise sessions with tutors (no registration required)

Day	Hours	Location	Tutor
Fridays	10:00-12:00	ETZ G91	Samuel Baumgartner 
Mondays	12:00-14:00	ETZ F91	Dominique Wasescha 
Tuesdays	9:00-10:00	HG E 33.3 + Zoom 	Sarina Schenker 

- Exercise sessions are recorded 

Final Exam

- Written exam
- Duration 120 minutes = 120 points
- Open book (only printed/handwritten paper material, no electronics)
- Can answer in German or English
- Old exams [!\[\]\(849840539e55921a3851a4ff96d7400d_img.jpg\)](#)
- Location, Date, Time: TBD (will be announced)

Distributed Computing

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