

# Data Structures and Algorithms

Course at D-MATH (CSE) of ETH Zurich

Felix Friedrich

FS 2019

## Welcome!

Course homepage

<http://lec.inf.ethz.ch/DA/2019>

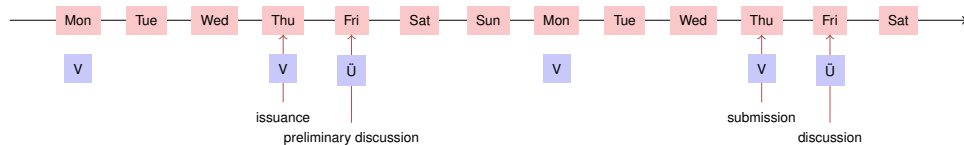
The team:

Assistants	Philippe Schlattner Jan Stratmann Robin Worreby Robin Vogtland
Back-Office	Aritra Dhar Pesho Ivanov
Lecturer	Felix Friedrich

1

2

## Exercises



- Exercises available at lectures.
- Preliminary discussion in the following recitation session
- Solution of the exercise until the day before the next recitation session.
- Discussion of the exercise in the next recitation session.

## Exercises

- The solution of the weekly exercises is thus voluntary but *strongly* recommended.

3

4

## It is so simple!

For the exercises we use an online development environment that requires only a browser, internet connection and your ETH login.

If you do not have access to a computer: there are a a lot of computers publicly accessible at ETH.

## literature

**Algorithmen und Datenstrukturen**, *T. Ottmann, P. Widmayer*, Spektrum-Verlag, 5. Auflage, 2011

**Algorithmen - Eine Einführung**, *T. Cormen, C. Leiserson, R. Rivest, C. Stein*, Oldenbourg, 2010

**Introduction to Algorithms**, *T. Cormen, C. Leiserson, R. Rivest, C. Stein*, 3rd ed., MIT Press, 2009

**The C++ Programming Language**, *B. Stroustrup*, 4th ed., Addison-Wesley, 2013.

**The Art of Multiprocessor Programming**, *M. Herlihy, N. Shavit*, Elsevier, 2012.

5

6

## Relevant for the exam

Material for the exam comprises

- Course content (lectures, handout)
- Exercises content (exercise sheets, recitation hours)

Written exam (120 min). Examination aids: four A4 pages (or two sheets of 2 A4 pages double sided) either hand written or with font size minimally 11 pt.

7

## Offer

- Doing the weekly exercise series → bonus of maximally 0.25 of a grade points for the exam.
- The bonus is proportional to the achieved points of **specially marked bonus-task**. The full number of points corresponds to a bonus of 0.25 of a grade point.
- The **admission** to the specially marked bonus tasks can depend on the successful completion of other exercise tasks. The achieved grade bonus expires as soon as the course has been given again.

8

## Offer (Concretely)

- 4 bonus exercises in total; 3/4 of the points suffice for the exam bonus of 0.25 marks
- You can, e.g. fully solve 3 bonus exercises, or solve 4 bonus exercises to 75% each, or ...
- Bonus exercises must be unlocked (→ experience points) by successfully completing the weekly exercises
- It is again not necessary to solve all weekly exercises completely in order to unlock a bonus exercise
- Details: exercise sessions, online exercise system (Code Expert)

## Academic integrity

**Rule:** You submit solutions that you have written yourself and that you have understood.

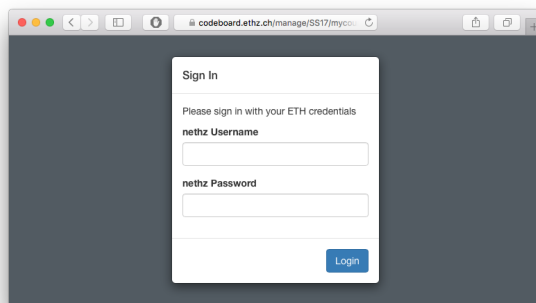
We check this (partially automatically) and reserve our rights to adopt disciplinary measures.

9

10

## Exercise group registration I

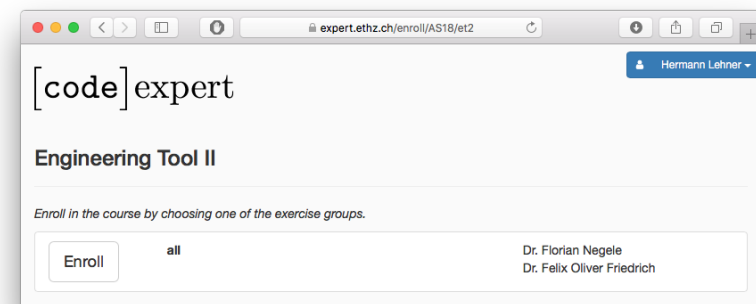
- Visit <http://expert.ethz.ch/enroll/SS19/da>
- Log in with your nethz account.



11

## Exercise group registration II

Register with the subsequent dialog for an exercise group.



12

# Overview

The screenshot shows the [code]expert interface. At the top, it says 'Enrolled Courses', 'My Exercise Groups', and 'My Courses'. Below that, it shows 'Demo Course' by 'Demo Group - Dr. Hermann Lehner'. A table lists 'Coding Demo Exercise' with 'Earned XP' of 1,000 / 1,000, 'Submissions' of 1,000 (100%), and 'Due Date' of 31. Dez. 2027 00:00. A 'Hand in now' button is visible. Below the table, there are links for 'Basic Markdown Syntax' and 'Code Blocks and Inline Code'.

# Programming Exercise

The screenshot shows an IDE with C++ code for a 'Minimax' exercise. The code includes `<iostream>`, `int main()`, and a loop for `int i = 0; i < 8; ++i`. Annotations include: 'D: description' pointing to the problem description on the right, 'E: History' pointing to the history button, and 'A: compile', 'B: run', 'C: test' pointing to the IDE's execution buttons.

13

14

# Test and Submit

The screenshot shows the IDE with test results. A 'Submission' button is highlighted at the top. Below, the 'Running tests' section shows 'min\_test passed', 'max\_middle passed', and 'unique passed'. The 'Tests result' shows 'passed 6 of 7 / score: 86%'.

15

# Where is the Save Button?

- The file system is transaction based and is saved permanently (“autosave”). When opening a project it is found in the most recent observed state.
- The current state can be saved as (named) *snapshot*. It is always possible to return to saved snapshot.
- The current state can be submitted (as snapshot). Additionally, each saved named snapshot can be submitted.

16

# Snapshots

# Should there be any Problems ...

```
1 #include <iostream>
2
3 int main () {
4     int min; int max;
5     std::cin >> min; std::cin >> max;
6     max = min;
7     for (int i = 0; i < 8; ++i) { // (there is a bug here)
8         int v;
9         std::cin >> v;
10        if (v < min) min = v;
11        if (v > max) max = v;
12    }
13    std::cout << min << "/" << max;
14 }
```

Running tests.....

```
min_first passed
min_last passed
min_middle passed
max_first passed
max_last passed
max_middle passed
unique passed

Tests result: passed 7 of 7 / score: 100%
```

Look at snapshot

Submission

Go Back

- with the course content
  - definitely attend all recitation sessions
  - ask questions there
  - and/or contact the assistant
- further problems
  - Email to lecturer (Felix Friedrich)
- We are willing to help.