0 Administrativa

13 October 2025

Prof. Dr. Sebastian Wild

CS566 (Wintersemester 2025–26)
Philipps-Universität Marburg
version `2025-10-13 11:16`

Goals for Today

- give you some detail on **what** this module covers
- ⇝ so that you can decide whether to keep it

(if it is an elective module for you)

Efficient Algorithms / Effiziente Algorithmen

- inform you about **how** EA is run
- inform you about how EA is **assessed**

Welcome to CS 566 – Efficient Algorithms

- Dozent: Prof. Dr. Sebastian Wild
  Mehrzweckgebäude, Raum 05 D 16
  wild@informatik.uni-marburg.de

Betreuer: Tamio-Vesa Nakajima

Tutors: Finn Moltmann moltmann@students.uni-marburg.de
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- Module website: www.wild-inter.net/teaching/ea
  → your first address for any infos on CS 566

- *Campuswire:* collaborative Q&A (more on this later)
  also used for announcements
  → please register asap (link also on ILIAS)
  https://campuswire.com/p/G66349A19 PIN 1794

- *Slido:* student response system for formative feedback → bring a smart device to class!

- Final mark: 100% final exam (Klausur)
  Zulassungsvoraussetzungen zur Klausur: 50% of points from exercise sheets

A Note on Languages

- Module is mostly in German
  - in particular examinations
  - except as prerequisite for English M.Sc. admission
    If that's you, stay tuned.
    I'll come to that!
- some written material in English
  - in particular slides
- **Why?**
  - English is the *lingua franca* of our time
  - ⇝ you profit from exposure
  - people (=future employers!) will assume you can at least read English
  - in young computer science, technical terms are already English

- Also, it's 2025! AI tools bridge lots of language gaps 🤯
  DeepL, Google Translate, ChatGPT etc.

CS 566 for Credit vs. for Conditional Admission

- **(Normal / for-credit version of) CS 566:**
  - Taken by students in various undergrad or masters programs
  - Compulsory for German *B.Sc. Data Science*
  - ⇝ Offered in German (including exams)

- **CS 566 for conditional admission (into *M.Sc. Data Science*):**
  - full program in English, international students
  - ⇝ Separate English examinations
    - formally separate from CS 566
    - examination is pass/fail only
    - **If required for admission, you cannot also take CS 566 for credit.**
  - Examination based on English self-study materials (not full lectures) ⇝ module website
  - Welcome to attend lectures, and tutorials (space permitting)
  - Join the Campuswire Q&A and team up with others to study!

Audience Response System: *Slido*

- Goal: Collect immediate, formative feedback
  - Stay focused and engaged! ("active learning")
  - Quick feedback (for you individually) if you are on track.
  - Quick feedback (for me) whether (most of) you are on track.

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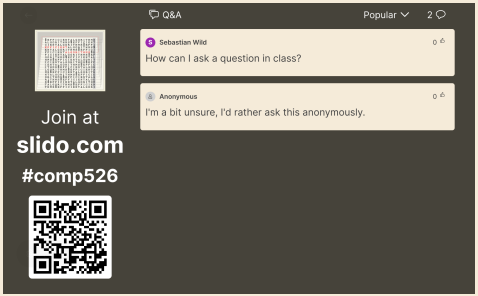
- Slido has 2 useful features:

1. Quick Polls

2. Audience Questions



Clicker Question

Have you used an audience response system (Slido or similar) in lectures before?

A Yes

B No

→ *sli.do/cs566*

My approach to lectures

My conclusions (from years of own experience, a pandemic, and observing others)

irrespective of the mode of delivery!

0. Good explanations (intuitions!) and well-structure material are the most important aspect.

1. **Synchronous (live) lectures** beat videos in keeping up with class. (but recordings are great!)

2. Only a small minority of students asks questions in class. ⇝ other backchannels

3. **Interaction** makes content memorable (and keeps brains awake!) ⇝ *Slido* tasks

Components of EA

Slido questions

immediate feedback
simple questions

Lectures

new material
discussions
big picture

Tutorials

get practice solving problems
solve deep questions

Campuswire

collaborative Q&A knowledge base

Exam Question Gallery

collaborative pool of potential and past exam problems

Final Exam

summative assessment
of your acquired skills

Overview of the module

Goals:

- build / enhance your toolbox of algorithmic methods and techniques
  - ⇝ here: focus on practical methods
- enable you to reason about and communicate algorithmic solutions
  - ⇝ level of abstraction, proofs, mathematical analysis, vocabulary
- enable you to apply, combine and extend methods

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Units: (***0.*** **Administrativa**)

1. Proof Techniques
2. Machines & Models
3. Fundamental Data Structures
4. Efficient Sorting
5. Divide & Conquer
6. String Matching
7. Text Compression
8. Clever Codes
9. Graph Algorithms
10. Parallel Algorithms
11. Greedy Algorithms
12. Dynamic Programming
13. Text Indexing
14. Range-Minimum Queries

Assessments

- **Module mark** = mark in final written exam
- **Final exam**
  - written examination
  - Dates tbd Likely: 18 Feb and 25 March
- To pass the module, you have to pass either of the exams
  - If you pass the first exam, you *cannot* take the second to improve you mark
- **Exam Material:** everything covered in lectures (except marked "$\notin$ exam")
  everything covered in **tutorials** and exercise sheets
- **Admission requirements to final exam**
  - ≤ 2 exercise sheets with 0 points in your group
    (not handing in implies 0 points)
  - $\geq 50\%$ of available points in sum over all exercise sheets
  - We plan with 12 marked exercise sheets in total

stay tuned . . .

Tutorials

- *Exercise Sheet* (Übungsblatt)
  - released on module website every week
  - to be **handed in**
    - online on ILIAS
    - in **groups** of 3 students
    - roughly one week to work on it
  - practice problems (some old exam questions, too!)
  - enhancement problems
- in *tutorials*
  - discussion of solutions (in the week after hand-in)
  - work on **in-class exercises** (Präsenzaufgaben)
    - to prepare you for next marked exercise sheet
    - *not* handed in or marked

*Use the tutorials to **practice** your thinking!* = Don't cheat yourself!

"If I tell you to run 10km, it isn't because I want you to be 10km away from me."

Generative AI

We live in exciting times!

LLMs (ChatGPT etc.), Media generators (Midjourney etc.), GitHub CoPilot, . . .

- Generative Artificial Intelligence (GenAI) is amazing!
  - full of flaws (hallucination, bias, copyright, data privacy, cost, . . .)
  - and yet . . . often helpful, surprisingly versatile
- Why not use for everything?
  - Need for *deeply skilled* humans here to stay (for now anyways)

  ⇝ **Skill comes from practice!** (We still teach mental arithmetic in primary school!)

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Acceptable use:

- preparatory research (≈ Wikipedia)
- proof reading (spelling, grammar)

Unacceptable use: (not exhaustive!)

- use generated parts w/o acknowledgment & citation
- tools to paraphrase others' work to pass as own
- generated parts with inappropriate prompt, e. g., "write me a conclusion for this essay"

Clicker Question

What do you think is the **#1 predictor** of whether a student cheats in assessments?

→ *sli.do/cs566*

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Source: youtu.be/sMpC8QwWSbI

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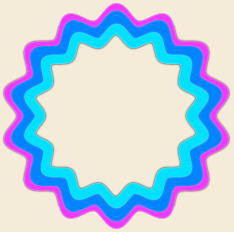
What is Campuswire?

Campuswire is an online space for lectures

1. ***Class Feed:*** questions on material
2. ***Chatrooms:*** structured social space
   similar to Slack or Discord



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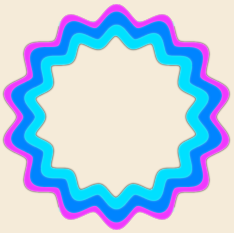

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We use Class Feed for **collaborative Q&A**

- Ask *public* questions
  - *"Why is* $\lg(n^3) = \Theta(\log n)$*?"*
  - *"Will there be classes on regional holiday X?"*
- ***Answer*** **your peers' questions!**
  - Know the answer? → put it in!
  - Know a partial answer? → Post it, others can build on it!
  - Found a helpful answer (or question)? → Vote it up!
- Ask *private* questions
  - if your question might contain "spoilers" for assessments
  - if you feel the answer is only relevant for you personally

How to Campuswire

- Our goals for Campuswire Q&A:
  1. **be fair** Same answers for everyone
  2. **learning by teaching** YOU will answer most questions!
  3. **be inclusive** posts can be anonymous; you can take your time to ask and answer

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- Therefore, we instructors will
  - redirect you to Class Feed for questions,
  - wait before answering, to give other students a chance to answer first,
  - explicitly mark good answers (and questions!) as such

ILIAS

- Official announcements
- Hand-in of exercise sheets
- Announcement of marks

. . . what can be on the public module website goes to the public module website!

Exam Question Gallery

- We jointly collect a **pool of exemplary exam questions**.
- ***You*** *add* ***your*** *questions to it.*
- I will give feedback which questions are realistic.
- *. . . and we will pick one if there's sufficiently many good ones!*

⇝ great resource for exam preparation

⇝ We will answer selected questions in recap session (last week of classes)

- Engage in this early and pose great questions
- Start today: `https://tiny.cc/ea-exam-question-gallery`

Philosophy of the module

CS 566 is part of a *scientific* course.

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Less . . .

https://imgur.com/gallery/vX118

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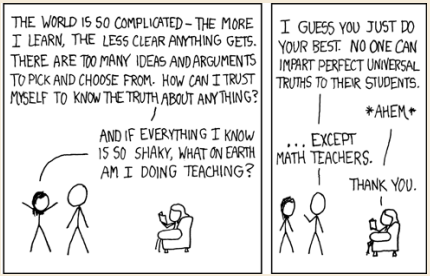

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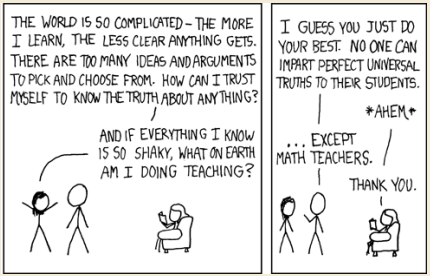

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- ⇝ Focus on *universal truths* of practical algorithms
  - model of reality (machines, programs, data)
  - quantitative predictions
  - validate model in experiments

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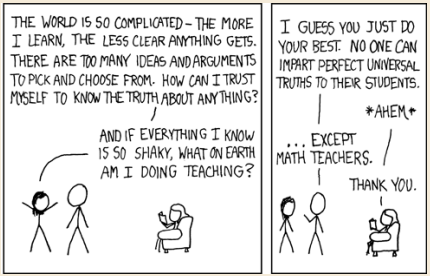

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  - model of reality (machines, programs, data)
  - quantitative predictions
  - validate model in experiments
- ⇝ Need some math techniques. (up next)