Computer Networks

About

Prof. Dr. Oliver Hahm

2024-10-21

Agenda

About me and this lecture

Interaction in this Lecture

- Participate lively
- Ask questions!
- A key attribute for science is scepticism

Rules for this Course

- Be respectful
- There are no stupid questions or comments
- You can interrupt me at any point

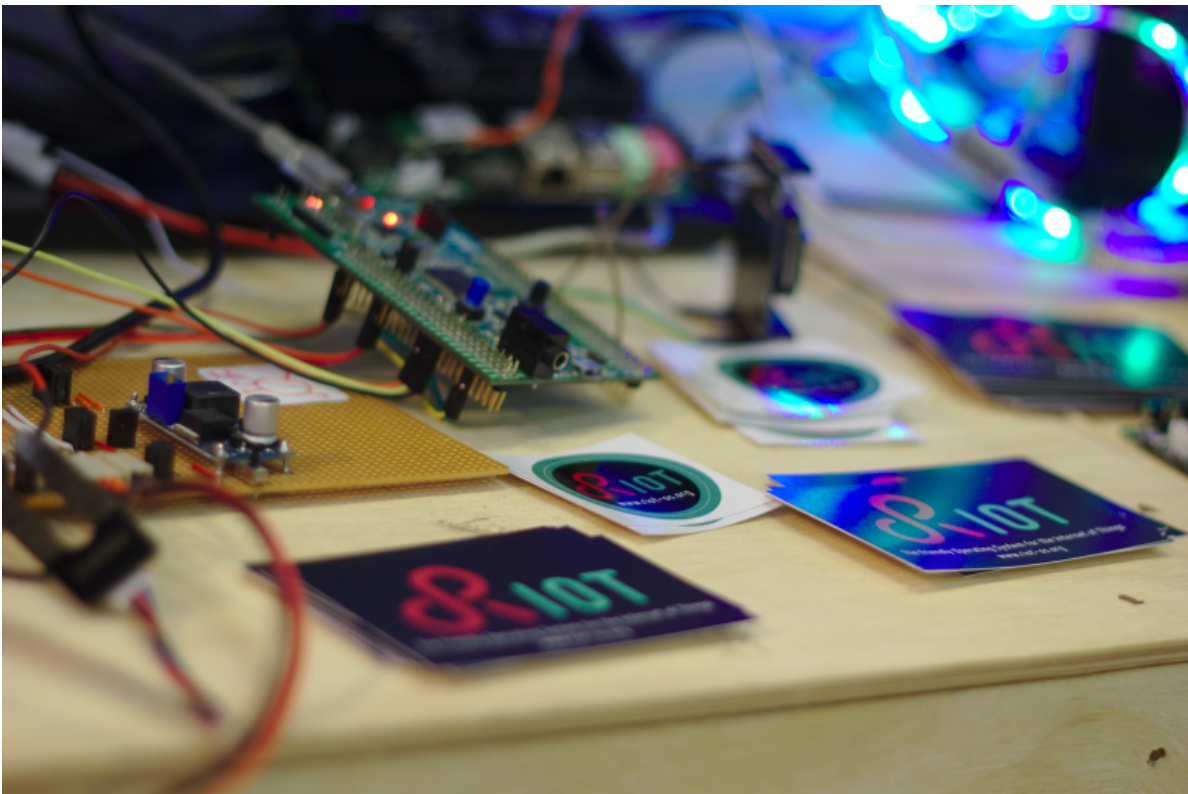Do not ask! Everything is relevant for the exam.

About me

- Study of Computer Science at
  Freie Universität Berlin
- Software Developer for ScatterWeb and Zühlke Engineering
- Research on IoT and Operating Systems

Contact

E-mail: oliver.hahm@fb2.fra-uas.de
Appointments: via e-mail, room 1-212

Join the RIOT!

RIOT is the friendly operating system for the IoT!

You're interested in . . .

- . . . programming the IoT?
- . . . collaborate with hundreds of people from all over the world?
- . . . contribute to a big FLOSS project?

Get in touch and do some hacking at the *All RIOT* event at the university! Usually every second Wednesday at 2pm in room 1-237.

First meeting: November 06, 2024.

All information on https://allriot.dahahm.de

About my setup

- **Operating System:** Linux (Arch Linux)
- **Graphical Environment:** sway (Wayland compositor)
- Working mostly with the shell (and vim as an editor)
- Using multiple workspaces

Organizational

Organizational

- **Lecture**: Thursday 11:45 – 13:15, room 1-131
- **Exercises** (starting from next week)

    - Wednesday 10:00 – 11:30, room 1-237
    - Wednesday 11:45 – 13:15, room 1-237

- Written **exam**

campUAS Enrolment Key:
`HahmCompNet`

Please note!

- There is no registration for the exercises, but the room size is limited!
- First come, first serve!

Further Information

All material regarding this course can be found at https://teaching.dahahm.de.

This includes

- Announcements
- Slides
- Exercises

Slides

- The creation of the slide sets is work in progress
- They cover all topics of the lecture
- **BUT** they are no book and, hence, do not comprise

  – all details
  – all derivations
  – all thoughts and discussions which are part
    of the lecture and exercises

- participate
- ask questions
- take notes
- do your own research (e.g., use the books)

Exercises

The exercises are no legal precondition for participating in the exam, **BUT** they. . .

- . . . are very important to recap the content.
- . . . are a good opportunity to check your understanding.
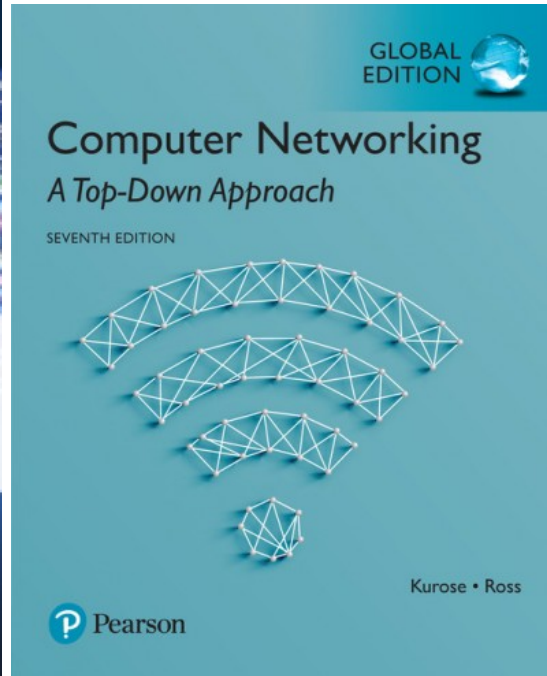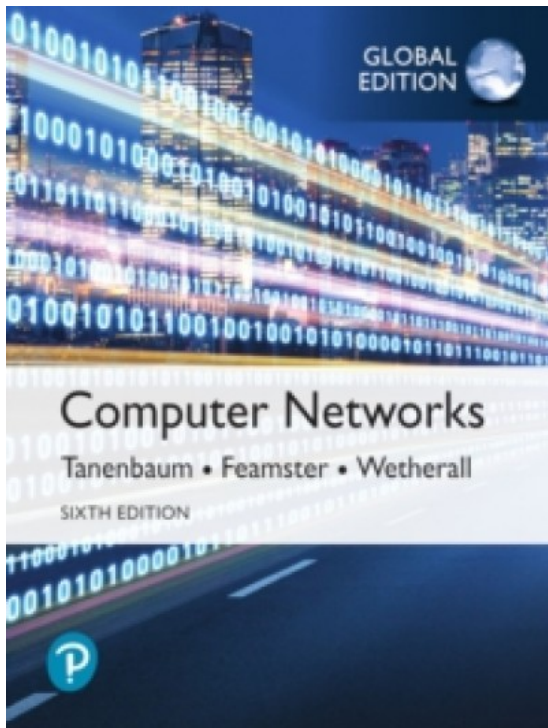- . . . provide the chance to ask me all your questions.

Exam

What is necessary to pass the exam?

You should be able to . . .

- explain main concepts and ideas with your own words,
- select a suitable solution for a given problem,
- analyze a given solution and detect (potential) problems, and
- explain your answers.

Literature

- Andrew Tanenbaum, David Wetherall:
  "Computer Networks", 6th Ed.,
  Pearson, 2021.
- James F. Kurose, Keith Ross:
  "Computer Networking", 7th Ed.,
  Pearson, 2016.

You can borrow both of these books from the library or access them online for free (see links above).

More Literature

- Parts of the slide sets are closely related to the books.
- The two-column layout (English/German) of the bilingual book is quite useful for this course

Digital versions of these books can also be found at the library to be downloaded online for free.

Computer Networks

The Relevance of Computer Networks

What are applications for computer networks?

- Video streaming

- Online gaming

- Instance messengers

- Video conferences ($\rightarrow$ home office)

- Mobile communication

- Smart home ($\rightarrow$ IoT)

- Car infotainment

The most popular network?

The Internet

Related questions

- How do you access videos on YouTube?

- What's the deal with a *lag* in online gaming?

- Who can read my mails?

- How can we transmit data through the air (aka wireless networking)?

Objective

At the end of this course, you should . . .

- understand what the term *"online"* means,
- be able to explain what the *Internet* is,
- know how computers communicate,
- know what protocols are,
- be familiar with the layers of a network stack,
- understand how the data finds its way, and
- be conscious of security and privacy concerns of computer networks.

Motivation

- Your motivation

    - Good case: curiosity and willingness to learn
    - Best case: already interested in Computer Networks
    - Pass the exam

- My motivation

    - Like to teach
    - Computer Networks are of utter importance
      (and super interesting)

    - Prepare you for your job

Summary

- At the end of each chapter the last slide summarizes the most important take-away messages
- Now is a good moment to recapitulate whether there are any open questions
- When preparing for the exam these summaries can help you