Chair of Connected Mobility
TUM School of Computation, Information and Technology
Technical University of Munich

Open Source Lab

Introduction

Fabian Sauter, Christian Menges, Alexander Stephan

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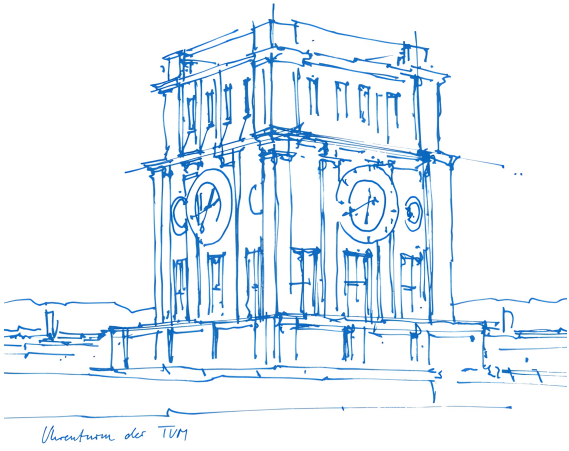
Technical University of Munich

Garching, October 16, 2023



Important Information

- **Website:** https://www.ce.cit.tum.de/cm/teaching/winter-term-2023-24/open-source-lab/
- **Duration:**
  - Weekly theory lectures at the beginning.
  - Later biweekly meetings to check students' practical progress.
  - Time slots will be decided in cooperation with the participants.
  - **All lectures and meetings will be held online (virtual) using BBB, attendance is mandatory!**
- **Module ID:** IN0012 / IN2106 (Bachelor and Master practical course)
- **ECTS:** 10
- **Capacity:** 20 students
- **Language:** English

Team

Fabian Sauter

- fabian.sauter@in.tum.de
- R&D Embedded Software Engineer at APSensing
- https://github.com/com8
- https://gitlab.com/COM8
- Popular Programming Languages
  - C/C++
  - C#, Python, Go
- Misc
  - GTK, Bluetooth
  - Reverse Engineering
  - Linux Distro Development
  - IT Security

Christian Menges

- christian.menges@tum.de
- Cloud Software Engineer at SAP
- https://github.com/Garfield96
- https://gitlab.com/Garfield96
- Popular Programming Languages
  - C/C++
  - Go
  - Rust
  - Python
  - Ruby
- Misc
  - Kubernetes
  - Performance Engineering

Alexander Stephan

- alexander.stephan@tum.de
- Master Informatik
- https://github.com/alexanderstephan
- https://gitlab.lrz.de/alexanderstephan
- Popular Programming Languages
  - C/C++
  - Go
- Misc
  - TUM-Live
  - Cloud / DevOps

Thanks to **Sebastian Kappes** and **Martin Uhl** for their help with this course!

Outline

Course Goals

Understand Open Source:

- What is FOSS?
- How to start?
- How to maintain?
- Is GitHub supporting Open Source?

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- Choosing a license.
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Have fun contributing to your favorite Open Source project while getting paid for it with 10 ECTS :)

Roadmap

Course duration: 16.10.2023 - 09.02.2024

[1] https://www.ma.tum.de/en/studies-information/study-programs-mathematics/Calculation-credits-grades.html

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Lectures

- **Week 1:** Introduction, Git Basics and Getting Started
- **Week 2:** Open Source, FOSS and Advanced Git
- **Week 3:** First Presentation Session
- **Week 4:** Open Source Platforms (e.g., GitHub, GitLab) and Licenses
- **Week 5:** Second Presentation Session
- **Week 6:** Utilities and CI/CD
- **Week 7 until the end:** Biweekly Progress Report Presentations

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Reports

- Starting at week 3, biweekly
- **No** slides needed.
- Show us what **you** have done in the last two weeks and what your plans are for the next two weeks.
- **Max.** 6 minutes. We will interrupt you!
- Please keep the PR selection in the Nextcloud up to date.
- Zulip reports start next week.

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1 ECTS $\widehat{=}$ 30 working hours[1]
300 working hours for this course / 15 weeks = 20 hours per week

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Grading

- No final report required.
- All interesting topics should be described in the documentation of the projects or the corresponding PR.
- LOC not relevant - most of the time.
- Intermediate presentation (no fancy slides required).
- Code quality.
- Interaction with the community.
- Interaction with the advisors.

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Note: Spamming or creating other unnecessary burdens to the community will result in failing the course immediately. Remember, **you are representing TUM.**

Grading

- Reports and Amount 50%
  - Your biweekly reports.
  - Communication with us in case something goes wrong.
  - Are you able to keep your report below **max.** 6 minutes?
  - The amount is only relevant in case the amount of code you produce is far less than we expect (compared to other students).
  - Default: 50% Reports and 0% Amount but can shift to 20% Reports and 30% Amount. (Amount $\approx$ LOC)

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- Code Quality 30%
  - Linting, formatting, . . .
  - Dead code?
  - Commented out “TODO” code.
  - Correct license for used resources e.g. icons.

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  - Dead code?
  - Commented out “TODO” code.
  - Correct license for used resources e.g. icons.
- General PR Quality 20%
  - Interaction with the community.
  - Do you react to suggestions/reviews in time?

Outline

Project Requirements

- Open Source (must be open-contribution)
- No “personal” projects
- Active user base
- At least 10 active users (1000+ recommended)
- Contributions can be new features, bug fixes, or performance improvements (PRs fixing typos are not accepted by us)
- Without previous experience working on extremely large and complex projects, such as GCC, Linux Kernel, Postgres, etc. is not recommended.
- We recommend picking one of the projects listed below since these projects are in widespread use and we can help you in case of problems.

Project suggestions: https://www.moodle.tum.de/mod/page/view.php?id=2751671

Outline

Idea of Open Source

The term open source refers to something people can modify and share because its design is publicly accessible.[2]

[2] https://opensource.com/resources/what-open-source

Is It Just Software?

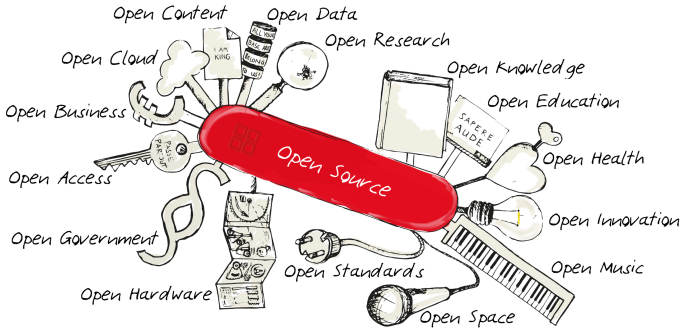

Figure 1 Open Source Swiss Knife[3]

[3] https://upload.wikimedia.org/wikipedia/commons/c/c7/121212_2_OpenSwissKnife.png

OSS in a Nutshell

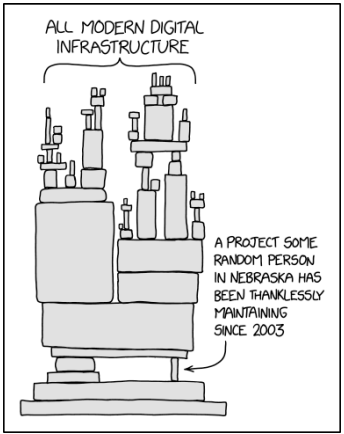

Figure 2 Cartoon about OSS[4]

[4] https://xkcd.com/2347/

Role of Open Source in Industry

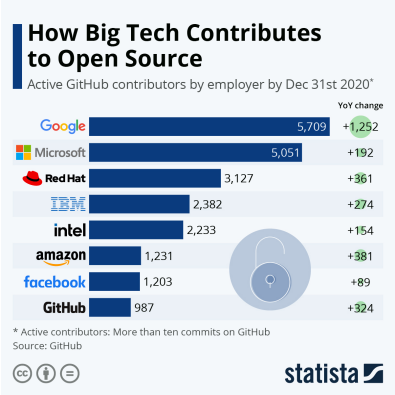

Figure 3 Statistic about OSS contributions by big companies[5]

[5] https://www.statista.com/chart/25795/active-github-contributors-by-employer/

Outline

Origins of the “Open Source Idea”

- **Patent for Two-Stroke-Engines** by George B. Selden in the 19th century
- Emergence of a **monopoly**
- 1911 Henry Ford challenged the patent successfully
- Foundation of the *Automobile Manufacturers Association*
- Members agreed to share patents from now on

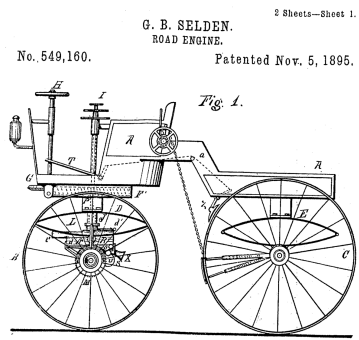

Figure 4 Road Engine Patent

Computer Age

- Software and hardware was primarily developed by research facilities (strong emphasis of **Openness** und **Exchange**)
- Hacker and DIY scene (users were also developers)
- **Milestone**: First operating systems, e.g., `UNIX`

Figure 5
Brian Kernighan demonstrates UNIX

Source: https://youtu.be/tc4ROCJYbm0

Commercialization of Software

Who can afford to do professional work for nothing? [6]

- Bill Gates

- **Emergence of a software industry** due to cheaper and more flexible hardware
- **An open letter to hobbyists**: *Altair BASIC* was copied
- Different concepts emerged:
  - **Proprietary Software**: property of a company, source code not publicly available, distribution and modification is prohibited, e.g., EULA license for Microsoft XP
  - **Open Source Software**: property of the community, source code is publicly available, distribution and modification is allowed, e.g., GPL license for Linux

[6] http://www.blinkenlights.com/classiccmp/gateswhine.html