



Automated Exercises & Software Development Data





Christoph Matthies 

Hasso Plattner Institute, University of Potsdam, Germany 

christoph.matthies@hpi.de 
@chrisma0 



**1st Workshop on Modern
Software Engineering Education
(WMSEE 23)**

London 
June 2023 

An Automated Introduction

Prof. CI: Similar in concept to the “Extreme Startup” Exercise [Cha2011]

- Alternative to Ruby on Rails Guide self-study
- **Goal:** Use (& install) **actual dev tools** on your machine
 - IDE, CLI tools & test frameworks, Git(Hub)

New author page should exist #1

Closed swt2public opened this issue on Oct 26, 2022 · 0 comments

swt2public commented on Oct 26, 2022

Scenario

When a user visits the new author page
Then the page should be available at the `new_author_path` route and should render without errors

[Cha2011]
<http://chatley.com/posts/05-27-2011/extreme-startup/>

An Automated Introduction

As simple as possible using GitHub Actions to make everything go

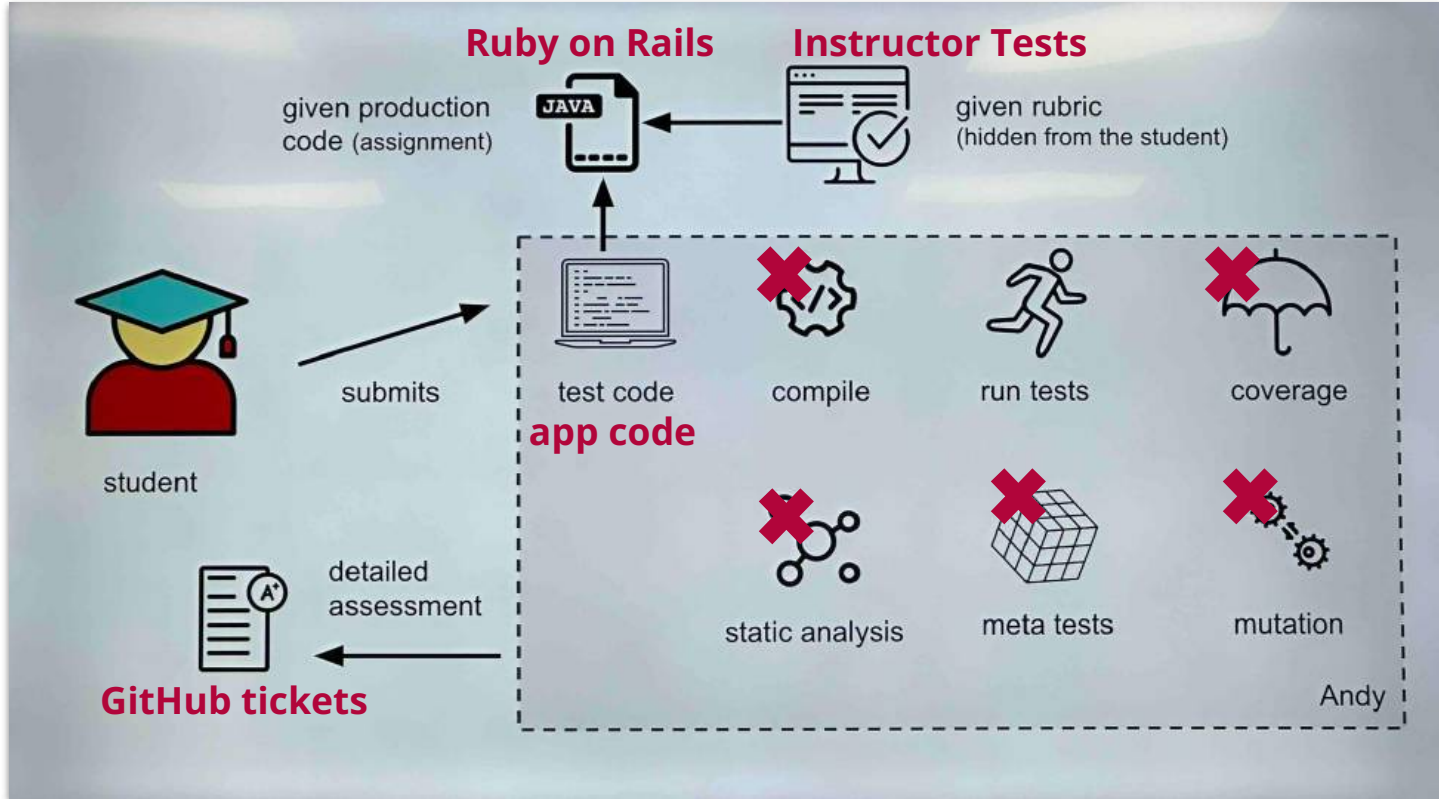


Image source:
Mauricio Aniche,
WMSEE'23

An Automated Introduction

Getting Started using GitHub Classroom [SSE23]

The image shows a composite of two screenshots. On the left is the Hasso-Plattner-Institut website, and on the right is a GitHub Classroom notification.

Hasso-Plattner-Institut Website:

- Header: Hasso-Plattner-Institut
- Prof. Dr. h.c. mult. Hasso Plattner
- Navigation: HOME | PEOPLE | **TEACHING** | RESEARCH | PROJECTS | PUBL...
- Breadcrumbs: HOME > TEACHING > ARCHIVE > WINTER TERM 2022/23 > SCALABLE SOF...
- Section: **Scalable Software Engineering**
- Sub-section: **Skalierbare Softwareentwicklung**
- Lecturers: Dr. Michael Perscheid, Christoph Matthies, Dr. Ralf Teusner, Lukas Böhme
- ECTS: 6
- Specialization Areas: Softwareprojektätigkeit, Projektentwicklung und -management
- Time Slots:
 - Monday 09:15-10:45 & 11:00-12:30 (lecture)
 - Wednesday 13:30-15:00 (exercise, when required)

GitHub Classroom Notification:

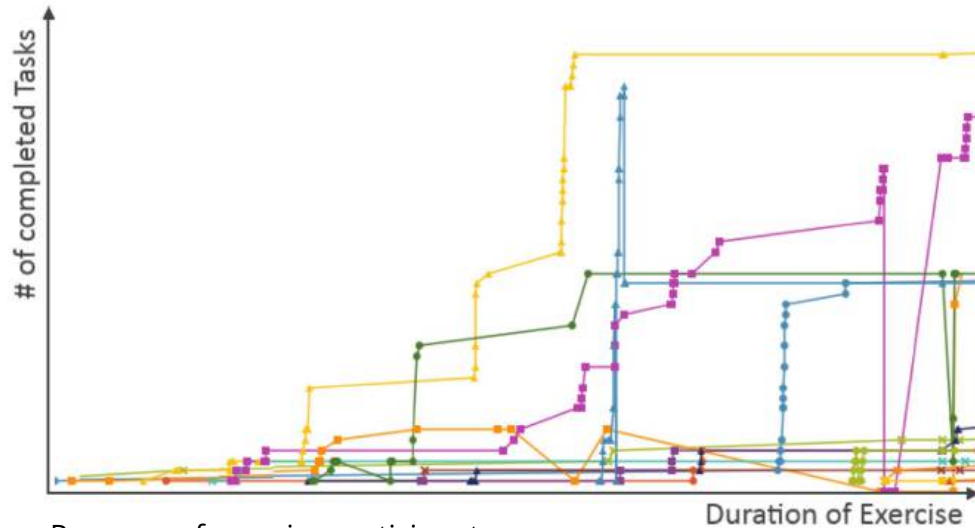
- Organization: swt2-intro-exercise
- Assignment: **Accept the assignment — Rails Exercise '22**
- Text: Once you accept this assignment, you will be granted access to the rails-exercise-22-chrisma repository in the swt2-intro-exercise organization on GitHub.
- Button: **Accept this assignment**
- Repository List (highlighted in red):
 - https://github.com/hpi-sw2/bookkeeper-portal-blue
 - https://github.com/hpi-sw2/bookkeeper-portal-red
- Introductory Exercise:
- SLIDES: SSE_01a_Introduction_and_Organization.pdf

[SSE23] <https://hpi.de/plattner/teaching/archive/winter-term-2022-23/scalable-software-engineering.html>

Detailed Development Data

Providing data to counter the curse of knowledge [MTU17]

- **2nd goal:** Understand **struggles**, improve instruction



Progress of exercise participants.

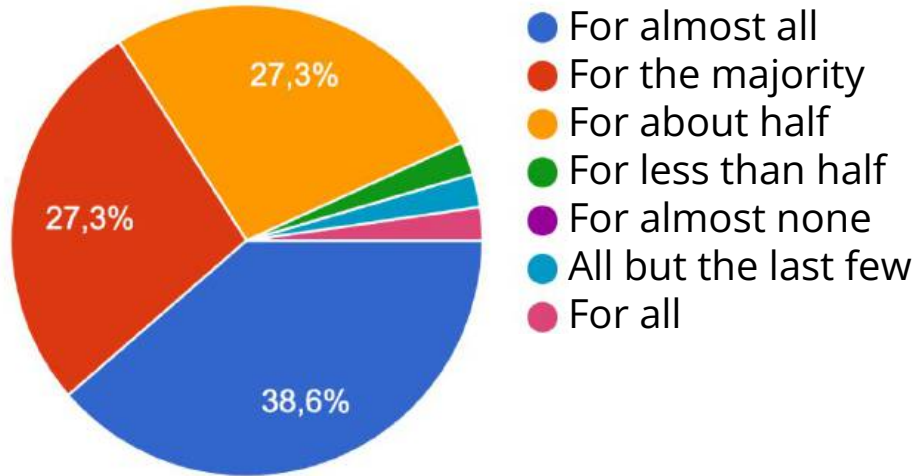
Every line represents the amount of completed tasks.

Student	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	0.0	0.2	0.2	0.2	0.5		0.2	0.5	0.1		0.1	0.1		0.1
2	0.0	0.8	0.1	0.4	0.8	0.4		0.7	0.2	0.3	0.1	0.4	1.9	0.1
3	0.8	0.7	0.1	0.9	0.2	0.2	0.4	1.2	0.8	0.5		0.3		0.3
4	0.0	0.2	2.3	0.1	0.5	2.3		0.4	0.2			0.2		0.4
5	0.0	0.7	0.1	0.1	0.3	1.0	0.5	0.5	0.6	0.2	0.2	0.1		0.2
6	0.2	1.0	0.6	0.1	0.2	0.2			0.2	1.1		0.2	0.4	0.6
7	0.0	0.9	1.5	0.1	0.7	0.7				0.3	0.2	0.3		0.1
8	0.2	0.3	0.1	0.4	0.2	0.2	0.7	1.8	0.0	0.4		0.4	0.2	0.1
9	0.8	0.2	0.3	0.7	0.2	0.6	0.3	0.4	0.1		0.2	0.4	0.1	0.1
10	0.8		0.2	0.1	1.2			0.8						0.1
Avg	0.5	0.4	0.6	0.4	0.3	0.4	0.1	0.6	0.2	0.3	0.0	0.4	0.2	0.2

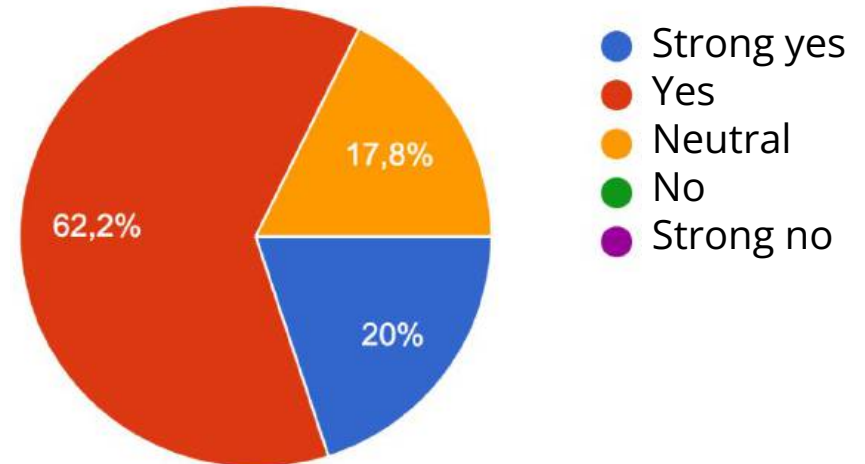
Student Self-Assessments

Collected via link in the last ticket (high response rate!), 2023 course data

I wrote tests for the provided requirements (n=44)



I would recommend the exercise to others learning Ruby on Rails and TDD (n=45)



Extract of Free-Form Feedback

What students noted about the exercise

“ Note to myself: **Don't install Github Copilot** beforehand. I felt I didn't have to understand Ruby to solve issues [...]
Maybe it's sensible to force pushing tests before implementation? **I caught myself** writing tests afterwards... ”

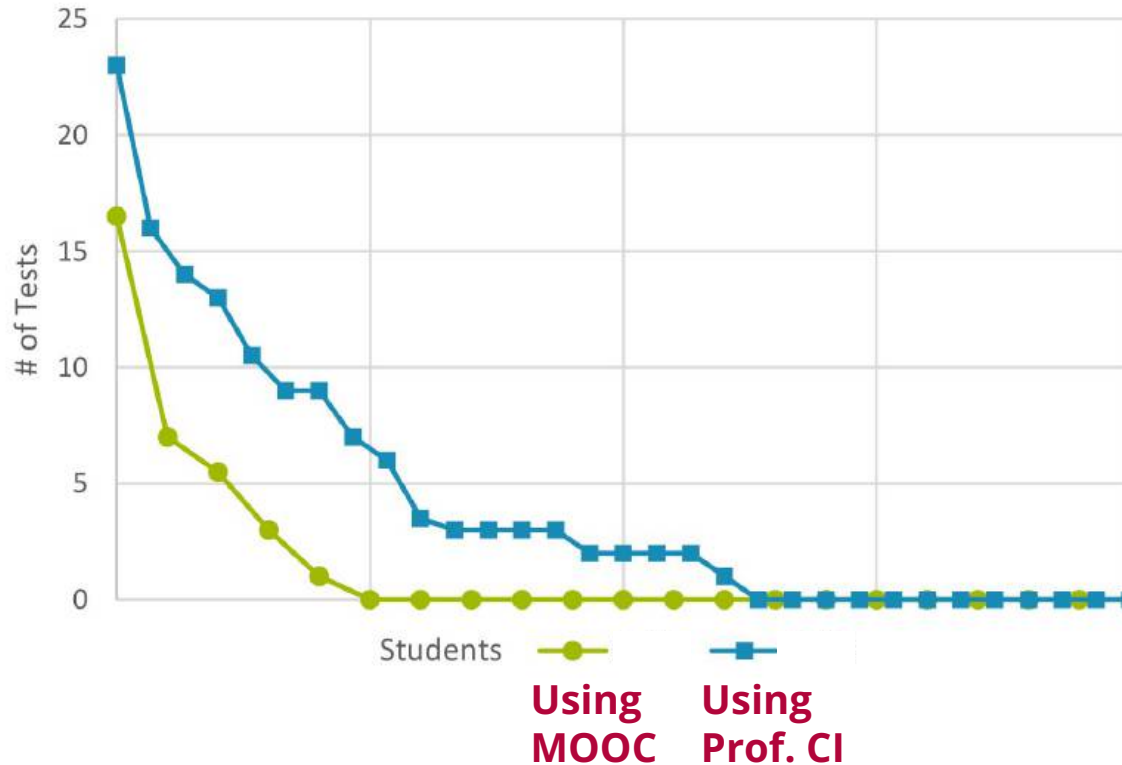
Extract of Free-Form Feedback

What students noted about the exercise

“ I would appreciate some more **hand-holding regarding the tests**. It's sometimes unclear which functions are available. Otherwise a great exercise :) ”

Writing Tests in Later Project

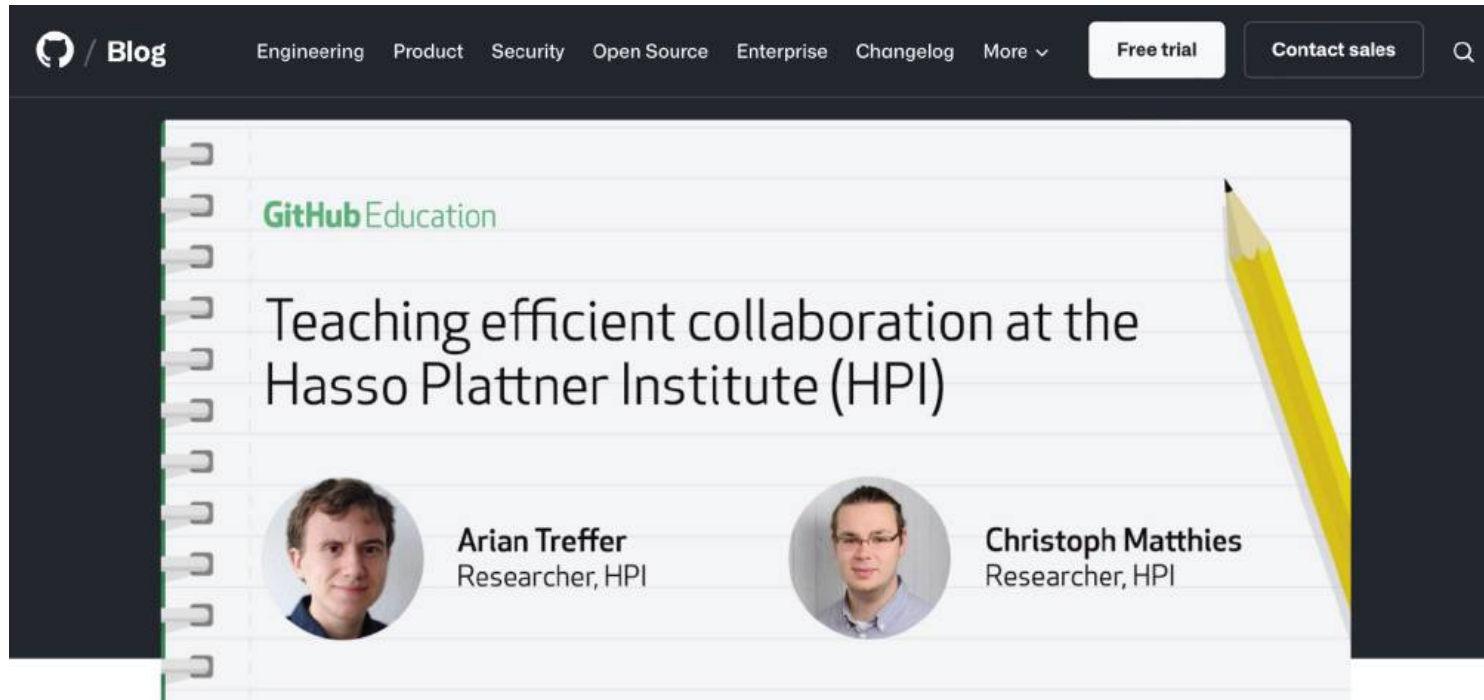
Amounts of tests written by students in subsequent dev. project



Prof. CI & Lecture Concept

GitHub Education blog entry on the topic:

<https://github.blog/2017-10-23-teaching-efficient-collaboration-at-the-hasso-plattner-institute/>



Summary

HPI Hasso Plattner Institut

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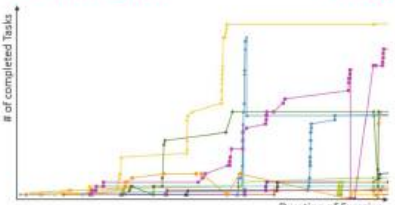
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4	0.0	0.2	2.0	0.1	0.5	2.3	0.4	0.2	0.2	0.4	0.2	0.2	0.4	0.4
5	0.0	0.7	0.1	0.1	0.3	1.0	0.5	0.5	0.6	0.2	0.2	0.1	0.1	0.1
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8	0.2	0.3	0.1	0.4	0.2	0.2	0.7	1.8	0.0	0.4	0.4	0.2	0.1	0.1
9	0.8	0.2	0.3	0.7	0.2	0.6	0.3	0.4	0.1	0.2	0.4	0.1	0.1	0.1
10	0.8	0.2	0.1	1.2	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Avg	0.5	0.4	0.6	0.4	0.3	0.4	0.1	0.6	0.2	0.3	0.0	0.4	0.2	0.2

[MTU17] C. Matthies, A. Treffer and M. Uffacker, "Prof. CI: Employing continuous integration services and Github workflows to teach test-driven development," 2017 IEEE Frontiers in Education Conference (FIE), Indianapolis, IN, USA, 2017, pp. 1-8, doi: 10.1109/FIE.2017.8190589.

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”

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Image Sources

In order of appearance

- **Archaeologist** by *Gan Khoon Lay* from the Noun Project (CC BY 3.0 US)
- **Scrum** by *M. Oki Orlando* from Noun Project (CC BY 3.0)