



Software Evolution & Developer Productivity Seminar KICK-OFF

Seminar, HS24, hasel.dev/hs24-sedp

Dr. André Meyer (ameyer@ifi.uzh.ch)

Alexander Lill (lill@ifi.uzh.ch)

Prof. Dr. Thomas Fritz (fritz@ifi.uzh.ch)

Table of Contents

Overview:

- **What** is this seminar about?
- **Why** should I take this seminar?
- **Who** is teaching this seminar?
- **Who else** is attending this seminar?

Seminar Organization:

- Requirements, Registration
- Seminar Structure
- Grading
- Seminar Topics
- Next steps & deadlines

Introduction: How to perform a Literature Review and write a Research Proposal

Course infos, slides, guidelines, examples, and more:
hasel.dev/hs24-sedp

What is this «Software Evolution and Developer Productivity» seminar about?

- **Research in software engineering (SE)**
 - Software evolution
 - Developer productivity and experience
- Identifying a research question and **determining how to address it**



Learning Objectives

By the end of this seminar, you should...

- have gained a **deeper and broader understanding of SE research** by reading, analyzing, reflecting and discussing current and classic literature;
- be able to identify and **discuss research problems** and research questions as well as **identify relevant related work**;
- be able to **write a research proposal** in the form of a scientific report, and present and discuss ideas on an advanced topic in SE research with a focus on software evolution and developer productivity;
- be able to provide constructive **feedback on a research proposal**.

Course infos, slides, guidelines, examples, and more:
hasel.dev/hs24-sedp

Who is teaching this seminar?



André N. Meyer, Dr.

Senior Research Assistant

ameyer@ifi.uzh.ch

BIN 2.B.20

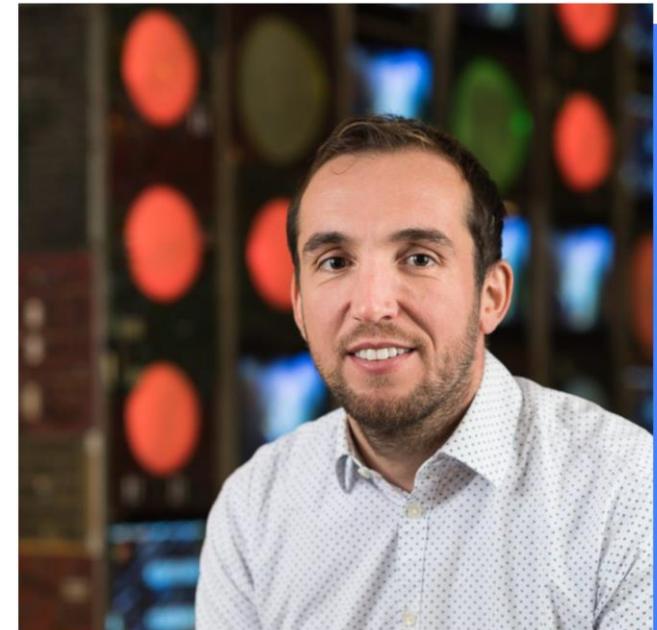


Alexander Lill

Research Assistant

lill@ifi.uzh.ch

BIN 2.B.17



Thomas Fritz, Prof. Dr.

Associate Professor

fritz@ifi.uzh.ch

BIN 2.B.21

Thomas Fritz



Thomas Fritz, Prof. Dr.

Associate Professor

fritz@ifi.uzh.ch

BIN 2.B.21

Associate Professor

at Human Aspects of Software Engineering Lab at UZH

Research

Developer Productivity and Wellbeing

- Understanding human and social aspects of developers at work
- (Biometric) sensing of cognitive and emotional states
- Supporting information needs and reducing distractions
- Developing approaches to foster productivity and well-being



Alexander Lill



Alexander Lill

Research Assistant

lill@ifi.uzh.ch

BIN 2.B.17

PhD Candidate @ HASEL



Research: developer **information needs**
(focusing on question asking and answering)



Interested in
communication and **knowledge management**



TV series, books & whisky, coding & pizza



University of
Zurich^{UZH}

André Meyer



André N. Meyer, Dr.

Senior Research Assistant

ameyer@ifi.uzh.ch

BIN 2.B.20

Senior Researcher @ HASEL



Research: software developer and knowledge worker **productivity and well-being**



Interested in **research to industry transfer** (prev. SaaS, AI-MedTech startups)



Skiing, burgers, sushi, craft beers



University of Zurich^{UZH}



THE UNIVERSITY OF BRITISH COLUMBIA



Microsoft



OKOMO



Contact me for theses or student projects: hasel.dev/andre

Our research: Examining Developer Productivity and Work

Study 1: **Developers' Perceptions of Productivity**

Survey: 379 participants, Observations: 11 participants



FSE'14

Study 2: **Workdays, Activities & Productivity**

Field study, 20 participants, 2 weeks



TSE'17

Study 3: **Productivity Personas**

Survey, 413 participants



ESEM'17

Study 4: **Good & Typical Workdays**

Survey, 5971 responses

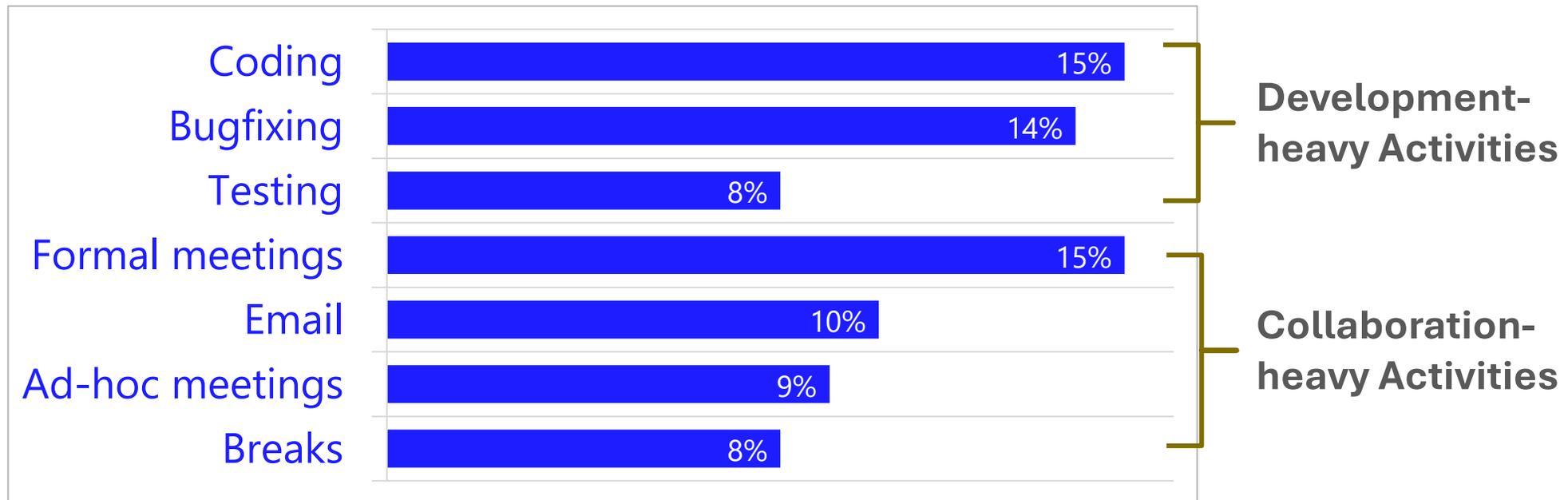


TSE'19

Our Research: Developers' Work and Productivity

Multi-faceted work with a broad variety of complex tasks

e.g. implementing new features, fixing bugs, reviewing code, testing, building and deploying changes, meetings, helping co-workers, ...



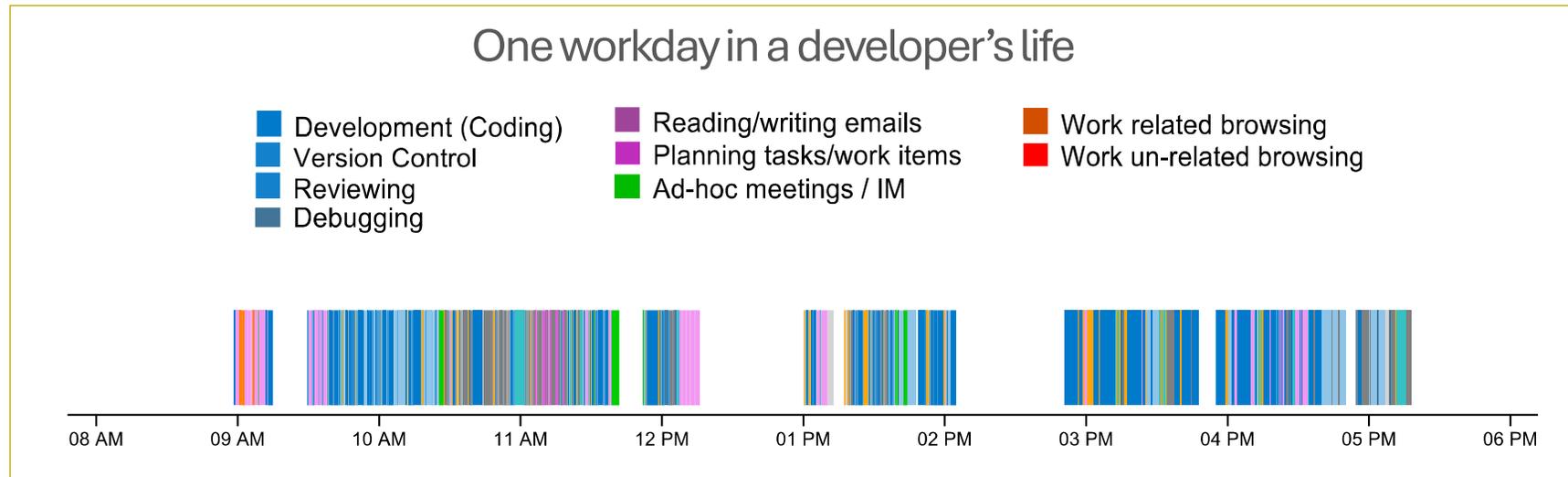
Data from surveying 5900+ developers [Meyer'19]

Our Research: Developers' Work and Productivity

Multi-faceted work with a broad variety of complex tasks

High work fragmentation (e.g., from multi-tasking and interruptions)

switching activities every 0.3 to 2 mins, and tasks every 4.4 mins



Data from a study with 20 developers over 220 days [Meyer'17]

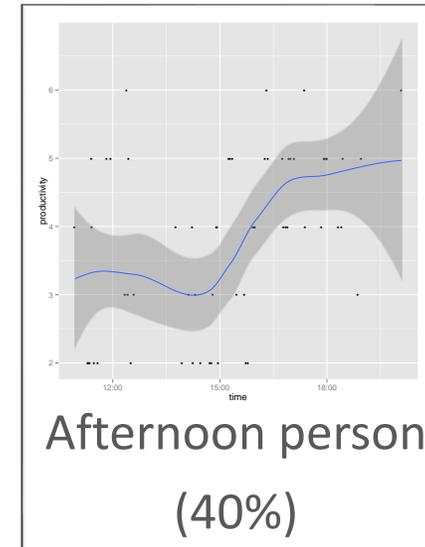
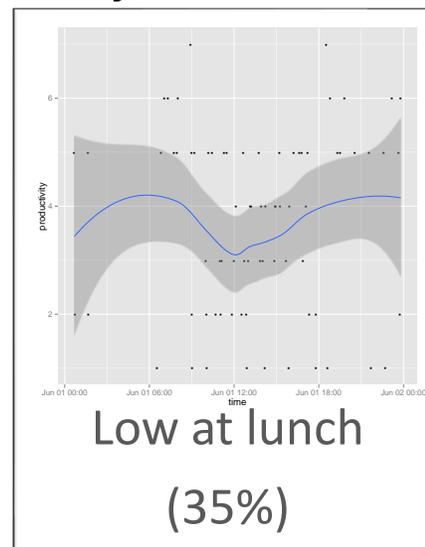
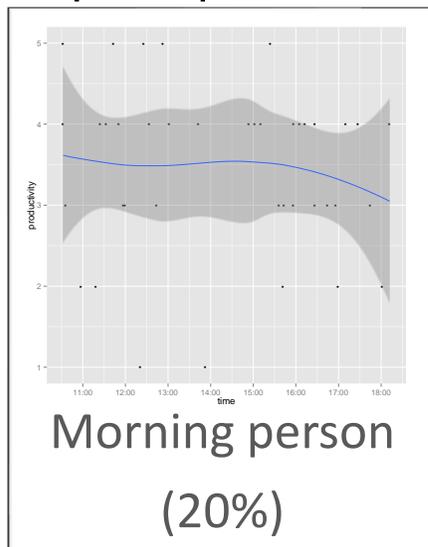
Our Research: Developers' Work and Productivity

Multi-faceted work with a broad variety of complex tasks

High work fragmentation (e.g., from multi-tasking and interruptions)

Developers are human with individual work styles and patterns

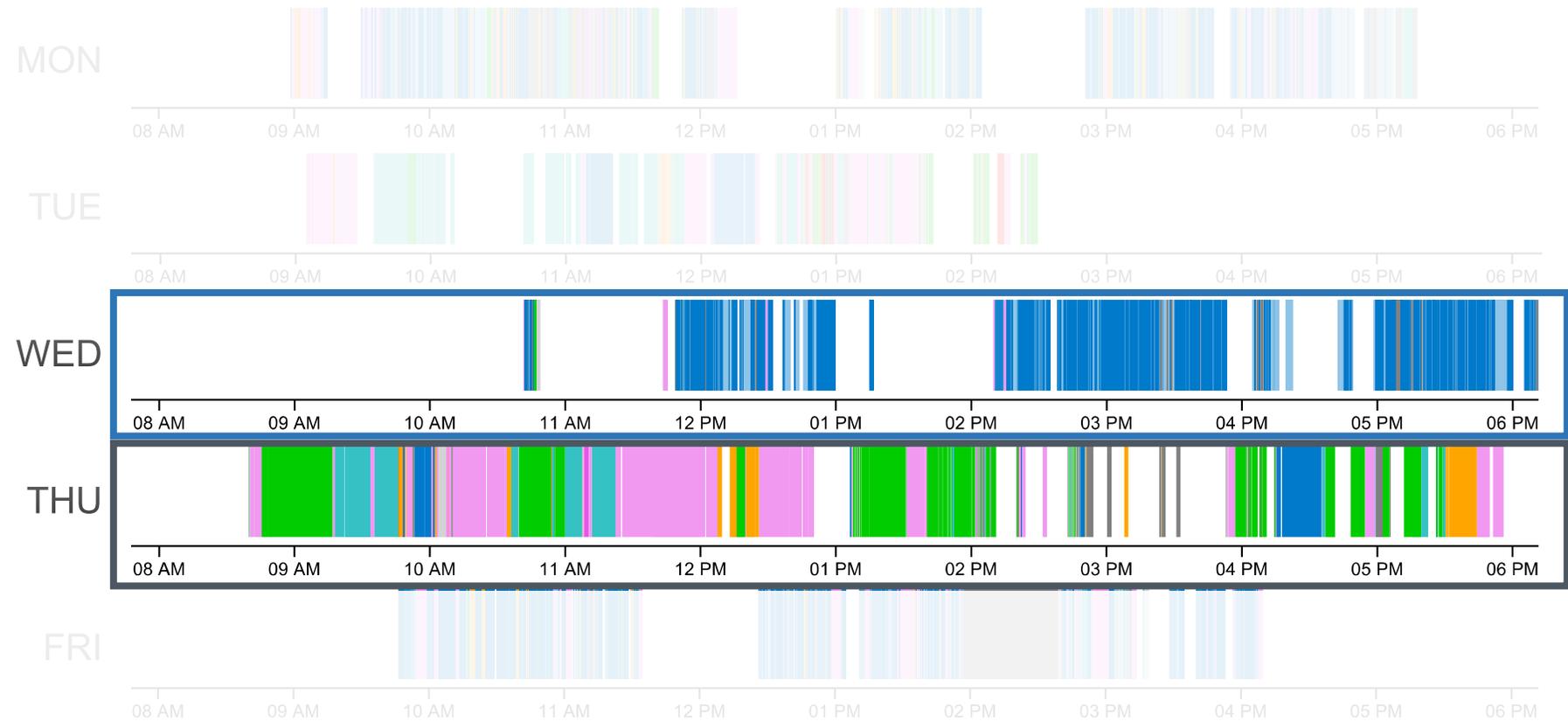
e.g., developers' perceived productivity follows habitual patterns



Developers' Habitual Patterns

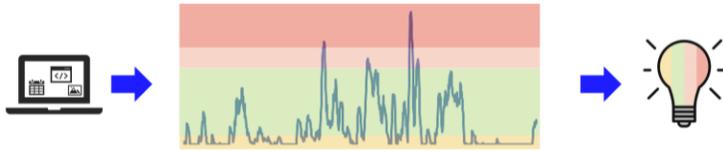
Structuring workdays into **development-heavy** and **collaboration-heavy** days

- Development (Coding)
- Version Control
- Reviewing
- Debugging
- Reading/writing emails
- Planning tasks/work items
- Ad-hoc meetings / IM
- Work related browsing
- Work un-related browsing



Our research: Balancing Focused Work & Teamwork

FlowAI automatically senses your **current Flow Status**

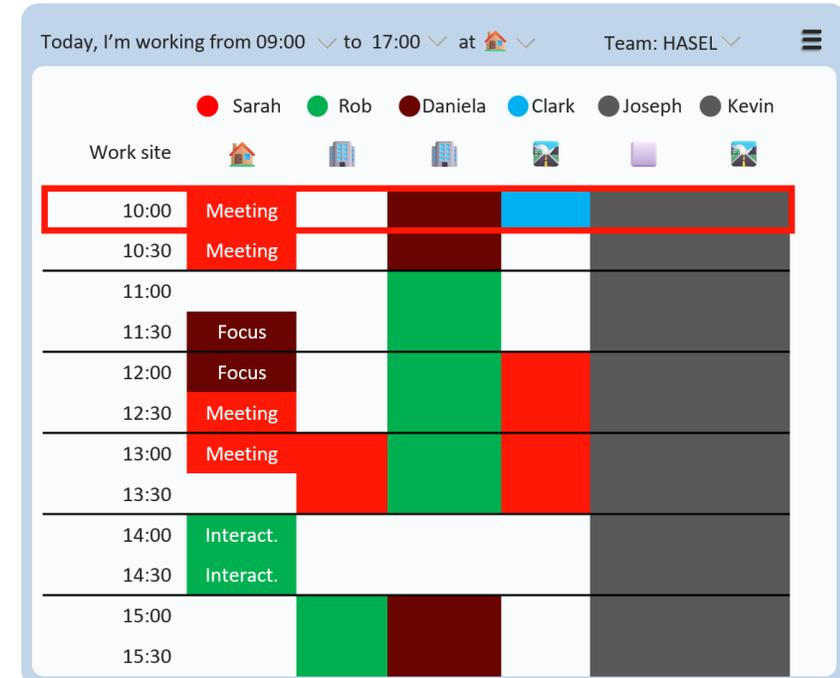


Your Flow Status is visualized to co-workers **in the office**

What does the Flow Status mean?

- Focused work, please do not disturb
- Busy, such as in a meeting
- Available for interactions
- Away from the computer during work hours
- Not working (i.e. outside work hours)

Pre-schedule focus and interaction time and align with team



Sync with Teams, Slack, Zoom & Calendars



Our research: Supporting Task Switching & Resumption

TaskSnap – Task Context Capturing & Resumption

Curate Snapshot

Making UI more responsive

8 Jul 23, 12:03 8 Jul 23, 12:10

Now what was I doing? Clear

Just edited line 103-107 in [Snapshot - Snapshot.tsx]. Recently committed "Adjust width dynamically". Uncommitted changes.

Recently, I was working in Code and visited "html - How to use Flexbox? - Stack Overflow" in the browser.

What was I about to do? Clear

[Snapshot.tsx] setApplicationMap(applicationMap); // TODO refactor

Next: Test UI on small screens.

Artifacts that I consider relevant for this task snapshot

- BrowserWindow | Electron
- HASEL-UZH/TaskSnap
- html - H dev Adjust width dynamically TaskSnap
- Snapshot.tsx — TaskSnap
- Snapshot.module.scss Snapshot.tsx api.ts
- arbeitszeit
- arbeitszeit.xlsx
- Notes
- File System
- TaskSnap
- TaskSnap — zsh — 80x24

Postpone Curation Open Selection Snapshot & Close Applications Snapshot

TACOS – Task Context Summaries

[Extension Development Host] PA.FlowTeams

Summary Timeline Settings

Generate Summary

To implement location-based logic that checks and compares planned work locations with actual locations based on WiFi information, prompting users for updates if necessary, the following changes have been done:

- The import of `getCurrentLocation` function has been added in `FlowTeams.ts` to get the current location.
- In `FlowTeams.ts`, a new method `determineFlowStatus()` has been modified to include logic for checking planned and actual locations. It retrieves the planned location from the `_workScheduleManager` and the actual location using `getCurrentLocation()`.
- The import of `StudySettings` has been commented out in `FlowTeams.ts` as per Alexander's comment.
- TODO comments have been added in `FlowTeams.ts` and `main.ts` to remind the developer to implement checks for planned work location vs actual work location and WIFI name, respectively.

```
3 * Proprietary and confidential
4 * Written by Alexander Lill <lill@ifi.uzh.ch>, March 20
5 */
6
7
8 enum WifiLocationSettings {
9   Office = "office",
10  HomeOffice = "home-office",
11  Remote = "remote",
12  AlwaysIgnore = "always-ignore",
13  AlwaysAsk = "always-ask",
14 }
15
16 export default WifiLocationSettings;
17
```

PROBLEMS 1 OUTPUT TERMINAL ...

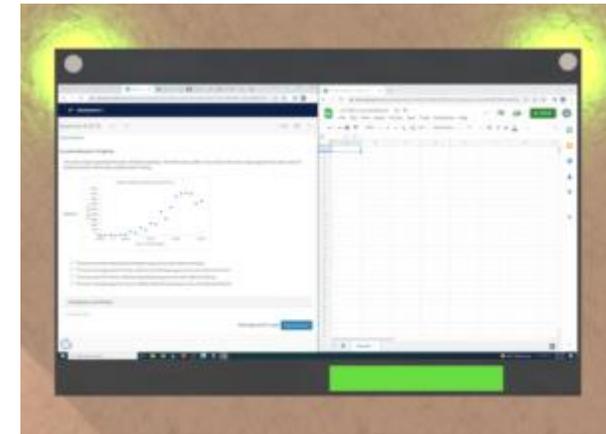
PA.FlowTeams git:(wifi-location) x



And a lot more ...

The image shows a Zoom meeting window with a video feed of a woman. To the right is a control panel with the following items:

- Leaning sideways from target
- Gaze is away from target
- Last smile was 0 minute(s) ago
- Last nod was 2 minute(s) ago
- Sensing (with a Collapse button)
- Enter Screen Share Mode
- Pause Session
- End Session



Talk to us in case you're interested in a thesis or project

The image shows a 'Daily Retrospection' application interface. It includes sections for:

- Your day in review:** Take a moment to reflect on your workday.
- Your task activity during the day:** You have switched 6 times between the tasks. Includes a bar chart for Data Analysis, Social Media Campaigning, Coordination Meeting, and Unassigned time.
- Your window activity while working on Data Analysis:** You have switched 1721 times between websites and applications. Includes a bar chart for various activities like ReadWriteDocument, InstantMessaging, Email, etc.
- Most used websites and applications (total: 251):** A table with columns for Category, Name, Duration, and In %.
- What helped you to complete Data Analysis?** A text input field with a 'Next' button.



The image shows a Discord message from alexanderlill. The message includes a greeting, a bio, and a list of links with feedback emojis.

alexanderlill 28.01.2023 09:46
 Hi [redacted], I'm Alexander Lill (not a bot!), a researcher at the University of Zurich. I'm trying to help people receive answers faster on Discord. If you are ok with me trying to help you, please read on, otherwise click the [red] symbol, and I will delete this message and apologize for the inconvenience.

Based on your question, I suggest the following links. Please click the emojis below each link to let me know if the link was helpful [green] or not helpful [red].

DM me if you have any questions. More info: #Suggestions Study

- [red] 1
- [blue] Variation of Return Types Based on a Const Object
<https://discord.com/channels/508357248330760243/762764001204502649/932992356842622977>
 [green] 2 [red] 1
- [blue] GetAttribs = GetAttribs(["matrix", "color"])
<https://discord.com/channels/508357248330760243/960001449629188127>
 [green] 1 [red] 2
- [blue] How to Type a Function's Return Object Dependent on the Contents of its Array Argument
<https://discord.com/channels/508357248330760243/1035273690809643028>
 [green] 1 [red] 2

Who else is attending this seminar?

Introduce yourself!

What is your name?

What is your degree and specialization?

Why did you choose to attend this seminar?

What are you hoping to learn?

Requirements for this Seminar

- Who is this seminar for?
 - For **bachelor and master students** (3rd year and later)
 - Prerequisite: *Content* of “Software Engineering and Programming” and “Software Construction”
- Course language: **English**
- Work style
 - **Independent work** on response papers and proposal feedbacks
 - **Teamwork** (teams of two) on moderation and proposal

Overview: Seminar Structure



- Reading, reviewing and **discussing papers** on 5 topics
- Individual work for 4 topics: 4 **response papers** (one each week)
- Individual work for 1 topic: presentation & **lead in-person group discussion**

3 ECTS (90h) → ca. 2/5 for this phase (40h)

- Teamwork: **draft** and present a research proposal
- Teamwork: **improve** proposal and submit final version
- Individual work: **peer review** of proposals
- Teamwork: **present** your proposal to the group

3 ECTS (90h) → ca. 3/5 for this phase (50h)

Overview: Response Paper & Discussion Phase (first 5 weeks)

- During the first five weeks: weekly reading and discussion
- **If you're the moderator of the topic [for 1 out of 5 topics]:**
 - Actively read and discuss the 1 assigned paper on Perusall
 - ~~Identify 1 additional, related paper~~
 - Prepare a presentation of the assigned ~~and identified~~ paper (max 10 minutes)
 - Prepare a discussion that you will moderate in class (30 minutes)
- **If you're not the moderator of the topic [for 4 out of 5 topics]:**
 - Actively read and discuss the 2 papers on Perusall
 - Write a short response paper (max 250 words, excluding references)
 - Identify 1 additional, related paper and describe why it's relevant (max 100 words)
 - Actively participate in the class discussions

You can find examples on:
hasel.dev/hs24-sedp

Overview: Research Proposal Phase (remaining 8 weeks)

In your team of two:

1. Identify a relevant research problem and open **research question** in the assigned topic area
2. Perform a **literature review** (main part)
3. Write a **draft proposal**
4. Present your draft proposal (+ receive feedback from us and class)
5. Adjust proposal based on feedback → write **final proposal**
6. Present your final proposal

Individual work:

- Give feedback to others' proposals (peer review)
- Actively participate in discussions

Note that we'll provide
additional details in
class on 10.10.2024

Seminar Topics

1. Productivity
2. SE with Generative AI
3. Socio-technical Nature of Software Development
4. Task Context
5. Developer Communication and Coordination

Seminar Topics: 1. Productivity

1. Productivity

- What affects productivity?
- How do developers perceive productivity?
- What impedes productivity, and how can we foster it?

2. SE with Generative AI

3. Socio-technical Nature of Software Development

4. Task Context

5. Developer Communication and Coordination



Source: Pexels.com

Seminar Topics: 2. Software Engineering with Generative AI

1. Productivity
- 2. SE with Generative AI**
 - How can generative AI support software engineering, and what are the chances and risks?
 - Will we soon no longer write code, but just use natural language?
3. Socio-technical Nature of Software Development
4. Task Context
5. Developer Communication and Coordination



Seminar Topics: 3. Socio-technical Nature of Software Development

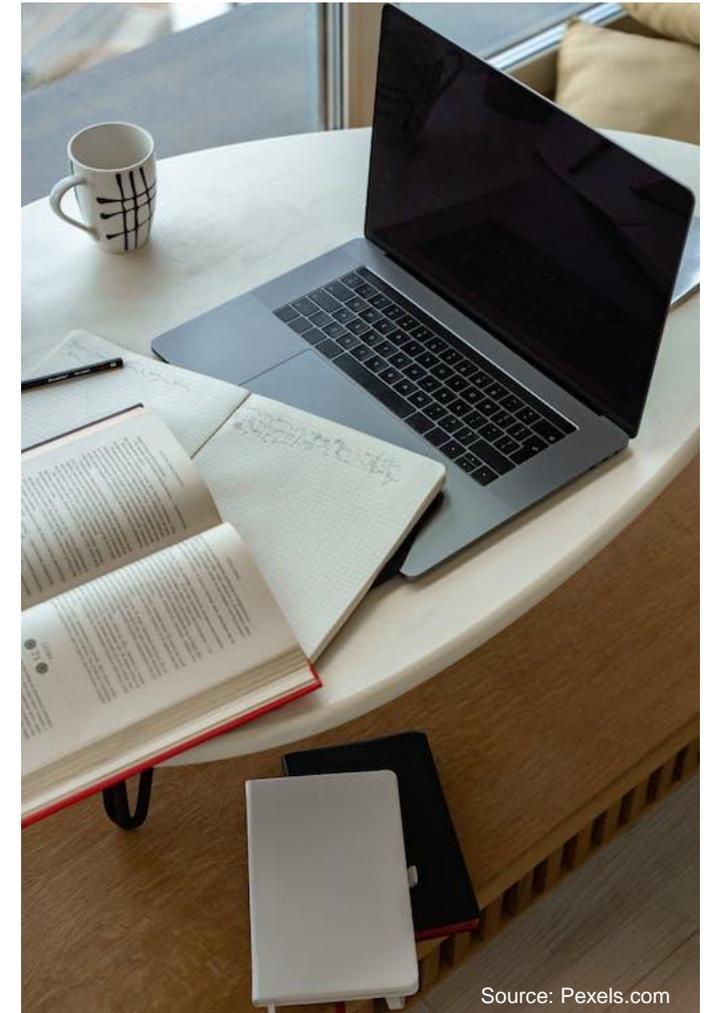
1. Productivity
2. SE with Generative AI
- 3. Socio-technical Nature of Software Development**
 - How is software split into components/modules to reduce dependencies between teams and the software?
 - How much do the social networks overlap with the technical ones, and how does this overlap affect productivity?
4. Task Context
5. Developer Communication and Coordination



Source: Pexels.com

Seminar Topics: 4. Task Context

1. Productivity
2. SE with Generative AI
3. Socio-technical Nature of Software Development
- 4. Task Context**
 - Which context is needed to perform code change tasks?
 - How to provide developers with access to task context?
 - How to detect task context switches?
5. Developer Communication and Coordination



Source: Pexels.com

Seminar Topics: 5. Developer Communication and Coordination

1. Productivity
2. SE with Generative AI
3. Socio-technical Nature of Software Development
4. Task Context
- 5. Developer Communication and Coordination**
 - How do developers communicate and what do they exchange on different means of communication?
 - What are communication challenges and how to address them?



Source: Pexels.com

Group Exercise

In **groups of two**, pick one of the following topics and **discuss the questions together** for 5-10 minutes.

1. Productivity
2. SE with Generative AI
3. Socio-technical Nature of Software Development
4. Task Context
5. Developer Communication and Coordination

Be prepared to share your **main insight per question**.

Slides:
hasel.dev/hs24-sedp

Hints for Successful Participation in the Seminar

Response Paper & Discussions (Phase 1)

Hint: Reading & Reflecting on a Research Paper

- Reading a paper is not about just summarizing it (ChatGPT can do that!)
- Instead, it's about **reflecting on the paper**:
 - Reading *critically*, e.g. are the authors solving the right problem?, what are limitations of the work?, are the assumptions reasonable?
 - Reading *creatively*, e.g. what are the good ideas?, how could the work be meaningfully extended?, how could the approach be applied in the field?
 - Comparing it to other publications, research, concepts, ideas, products, processes
 - Thinking about its contributions, implications, opportunities for improvement or extensions (but don't just say "it needs more participants"), how could future work look like?
- Therefore, **on Perusall**:
 - Add notes, comments and questions (can be seen by peers)
 - Comment on others' comments and questions
 - class discussions work better if everyone has read and reflected on the paper

Hint: Short Response Papers

- Write your **response paper** (max 250 words, excluding references):
 - Answer the topic-question (see website) using the 2 papers that you've read
 - In the scope of answering the topic-question, focus on the major contributions, connections between papers, possible extensions, what you find important/interesting, implications/applications, potential for improvement
 - Do NOT just provide a summary
(being asked about a movie you recently saw, you wouldn't just summarize it either)
 - Write it in your own words (without Generative AIs)
 - Grading is based on “thoughtfulness”
- After reading the research papers, **find one more related paper**
 - It should be related and relevant w.r.t. the topic and the two given papers
 - Skim the paper (no need to read it entirely)
 - Add a short (max 100 words) explanation of why the paper is relevant & fits the topic
 - Note: it has to be a peer-reviewed, full paper (min 9 pages) and from a top tier conference or journal (e.g. ICSE, FSE, CHI, CSCW, TSE, TOSEM, ToCHI)

Hint: Short Response Papers Continued

- Write your response paper (max 250 words, excluding references):
- After reading the research papers, find one more related paper (and explain relevance in 100 words)
- Finally, **submit it**
 - Due by **midnight before class**
 - Name the file in the following format: ResponsePaper_Topic[X]_[StudentId].pdf
 - Upload to [seafile drop-folder](#)
 - We will send you written feedback

Hint: Moderating a Discussion

Moderate a discussion on the assigned paper/topic in class:

- First, actively read the 1 assigned paper and ~~identify 1 additional, related one~~
- Prepare a **presentation** of the paper (max 10 minutes), make sure to discuss ...
 - ... the importance of the paper with respect to today's challenges in SE, applicability, etc.
 - ... the core ideas, novelty & contributions
 - ... the research approaches
 - Do *not* just summarize one paper after the other

Hint: Moderating a Discussion Continued

Moderate a discussion on the assigned paper/topic in class:

- First, actively read the 1 assigned paper and identify 1 additional, related one
- Prepare a presentation of the two papers (max 10 minutes)
- Prepare a **discussion** that you will moderate in class (30 minutes)
 - Try to focus on the audience, their responses, thoughts and questions
 - Try to involve everyone (not just a few students)
 - Avoid “defending your opinion”, instead focus on asking open questions
 - The discussion can also be guided by slides
 - There are different forms of moderations, you could also use interactive tools such as Mentimeter, or organize short breakout groups, etc.
 - It’s not about stating what is bad in a paper (remember they’re peer-reviewed), but what could be improved (e.g. in terms of research methods, additional analyses, applications, etc.)
 - The topic-question can serve as inspiration, but should not be the main focus of the discussion

Schedule Overview

Most updated version, always on:
hasel.dev/hs24-sedp

Date and time	Topic/deliverable
4:00 – 15.45 (BIN 1.D.29)	Kick-off
Response Paper & Discussion Phase	
20.09.2024 13:00	Submission of 3 paper preferences and partner via Mail to Dr. André Meyer and Alexander Lill
21.9.2024 EOD	Receive email about Topic and group assignment
26.09.2024 14:00 – 15.45 (BIN 1.D.29)	Topic 1: Productivity
03.10.2024 14:00 – 15.45 (BIN 1.D.29)	Topic 2: Software Engineering with Generative AI
10.10.2024 14:00 – 15.45 (BIN 1.D.29)	Topic 3: Developer Communication and Coordination
17.10.2024 14:00 – 15.45 (BIN 1.D.29)	Topic 4: Task Context
24.10.2024 14:00 – 15.45 (BIN 1.D.29)	Topic 5: Socio-technical nature of development
Research Proposal Phase	
05.11.2024 23:59	Submission of draft proposals on Seafire Dropfolder The proposal should be max. 3 pages double-column format plus max. 2 for references, ACM Overleaf Format see more details below
07.11.2024 14:00 – 15.45 (BIN 1.D.29)	Presentation of draft proposals (per team max. 5 minutes presentation + 3 minutes Q&A)
06.12.2024 23:59	Submission of final proposals on EasyChair The proposal should be max. 4 pages double-column format plus max. 2 for references, ACM Overleaf Format see more details below
12.12.2024 23:59	Peer Review due (also on EasyChair)
19.12.2024 14:00 – 16.30 (BIN 1.D.29)	Presentation of the proposals (per team max. 10 minutes presentation + 8 minutes Q&A)

Introduction to Research Proposal Phase

Attendance is **mandatory** for all events.

Grading & Assessment

- **Response Paper & Discussion Phase [25%]**
 - Active reading of assigned papers & interactive annotation and discussion on Perusall (individual)
 - Response papers & active class participation (individual)
 - Presentation and moderation of topics (individual)
- **Research Proposal Phase [75%]**
 - Proposal draft and presentation (team)
 - Final proposal and presentation (team)
 - Peer review of others' proposal drafts (individual)
- **Expectations of contributions are adjusted**
depending on study progression (bachelor or master)

Registration for this Seminar

- Formally: in **UZH Modulbuchung / Seminar Booking Tool**
 - You **need an approved spot** in the [Seminar Booking Tool](#)
 - If you decide to quit the seminar (after being approved), **cancel your booking asap** (so others on the waitlist can move up)
- **Register via email by 20.09.2024 1pm** to André and Alexander (submit preferences for topics and team)
 - Note that the course is **limited** to 16 students
 - **First teams who register both** get a spot. We'll let you know by 21.9.2024 EoD.
 - If you decide to **quit the seminar** (after registering), **let us know asap** (so others can join instead)!
 - If you **don't get a spot**, write a motivation letter (email to André and Alexander) and we will let you know in case a new spot becomes available.

Tools & Links

- Main Website: <https://hasel.dev/hs24-sedp>
- [VVZ BSc](#), [VVZ MsC](#)
- Submission of Response Papers and Research Proposal Draft: <https://seafire.ifi.uzh.ch/u/d/8af61032073142fc8aa3>
- Perusall (for paper reading, annotation and discussion): <https://app.perusall.com/join/lill-t34rn>
- EasyChair (for submitting proposals and reviews): <https://easychair.org/conferences/?conf=sedp-hs24>

Next Steps & Deadlines

- Check/update course registration in the [Seminar Booking Tool](#)
- **Send an email** to André and Alexander by 22.09.2024 1pm (each team member)
 - 3 topic preferences
 - Team Partner (let us know if you need help with finding a partner)
- **For Topic 1**
 - Read the assigned papers on Perusall, actively annotate and interact
 - Identify one more related paper
 - If you moderate: prepare a presentation and discussion
Hint: upload slides to [Seafile](#) before the start of the seminar
 - If you don't moderate: write a short response
Hint: upload the slides to [Seafile](#) in the specified format, latest by midnight before class