



Context in Programming: An Investigation of How Programmers Create Context

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Context affects how we see a problem

Campus map showing 5 architectural buildings.



Banner ad for 'life'

Context affects how we see a problem

“New Vaccine Contains Rabies”

CDC releases Great New Vaccine

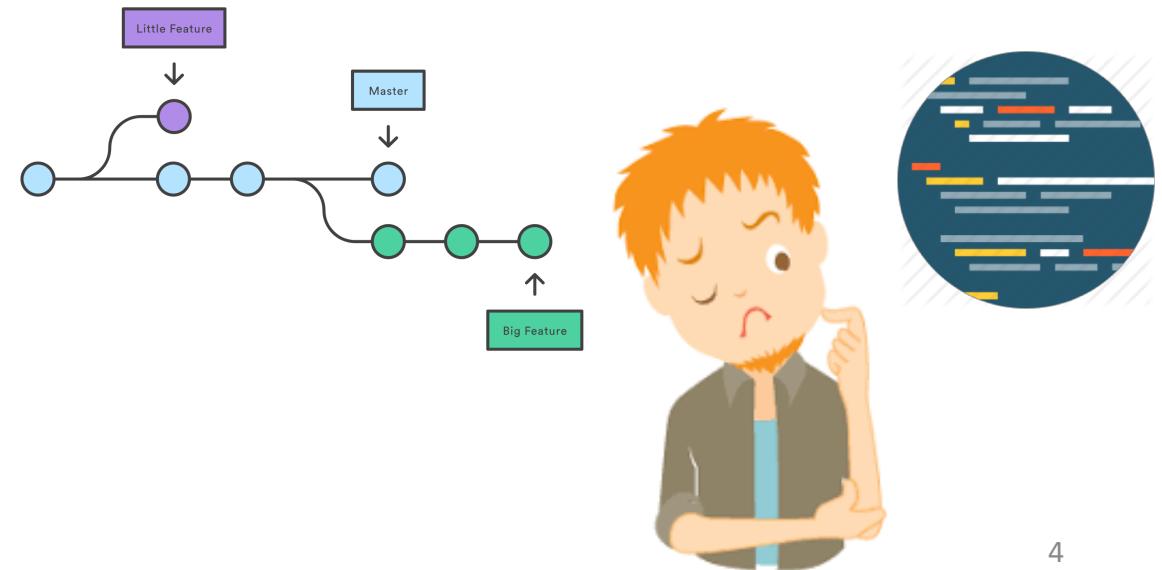
OR

CDC Fails to Maintain Standards

Context in Programming

Based on the context

- Interpret code differently
- Relevancy of artifacts vary
- Interactions vary



Context, so far...

- **Representational view :**

[Abowd et. al. 1999]

- stable
- artifacts
- tasks
- environmental factors



WHO?

WHAT?

WHEN?

WHERE?

[Gasparic et al. 2017, JSS]

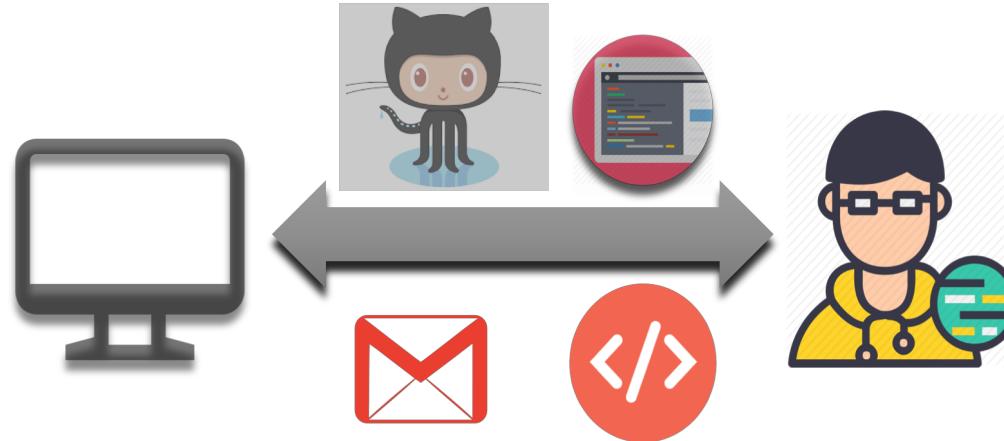


Context, so far...

- **Interactional view :**

[Dourish 2004]

- dynamic
- relational property
- objects or activities
- vary for each activity



Why do developers *do what they do?*

? HOW?
WHY?

Methodology

Task and Participants

Task

Traffic Simulator App

[Mangano et. al 2012]

- Design & Implement
- Simulate a traffic signal

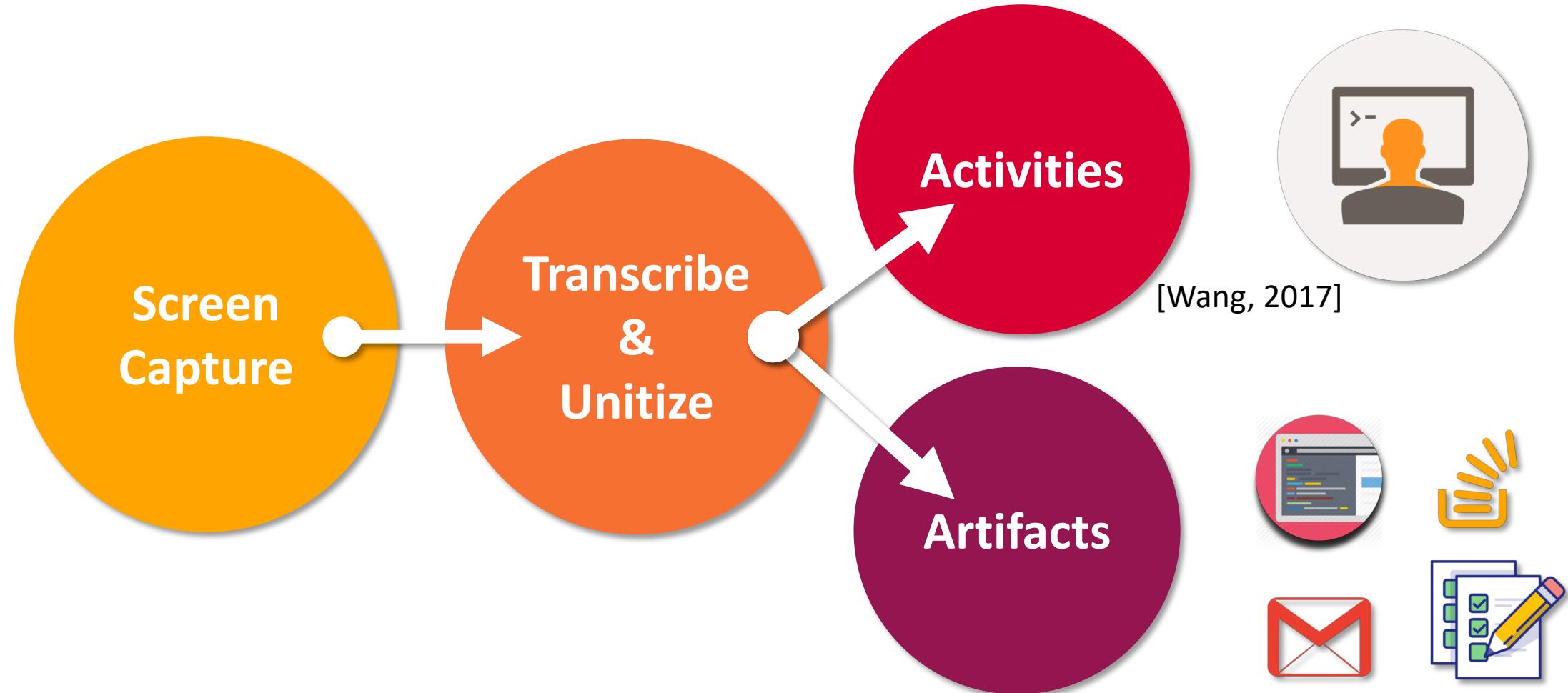
Participants

6 Graduate students

- Professional Development Experience
- Think aloud



Data Collection and Processing



Results

Artifacts span heterogeneous medium

Activity

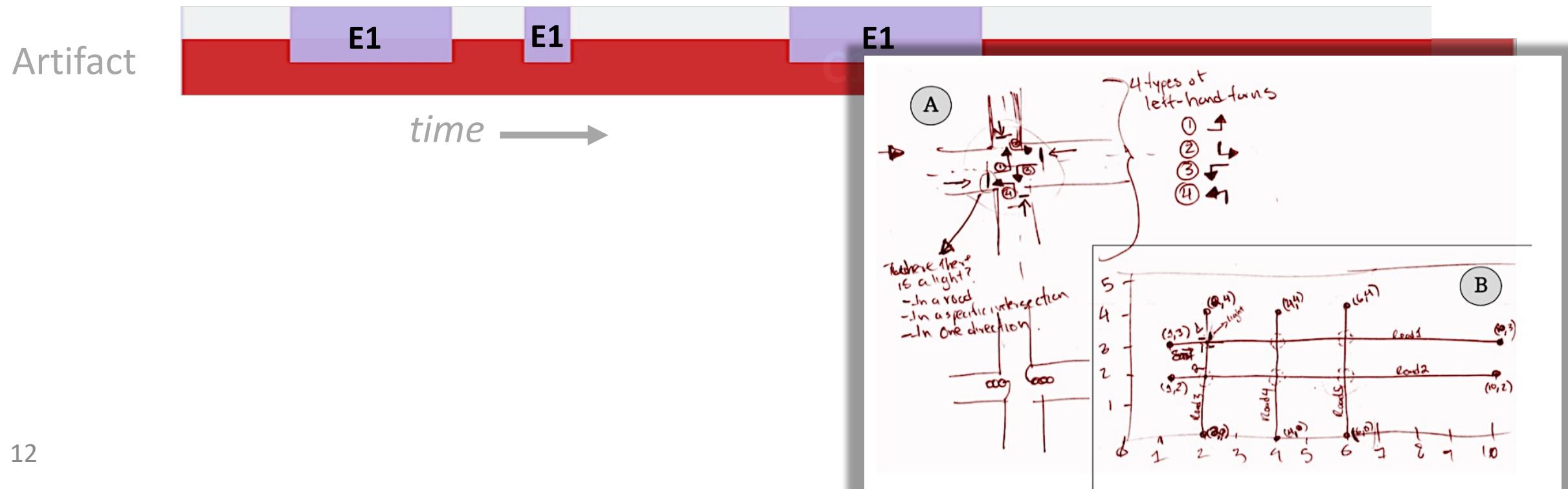
Snapshot:

Participant was trying to **build data structure** for the cross-roads

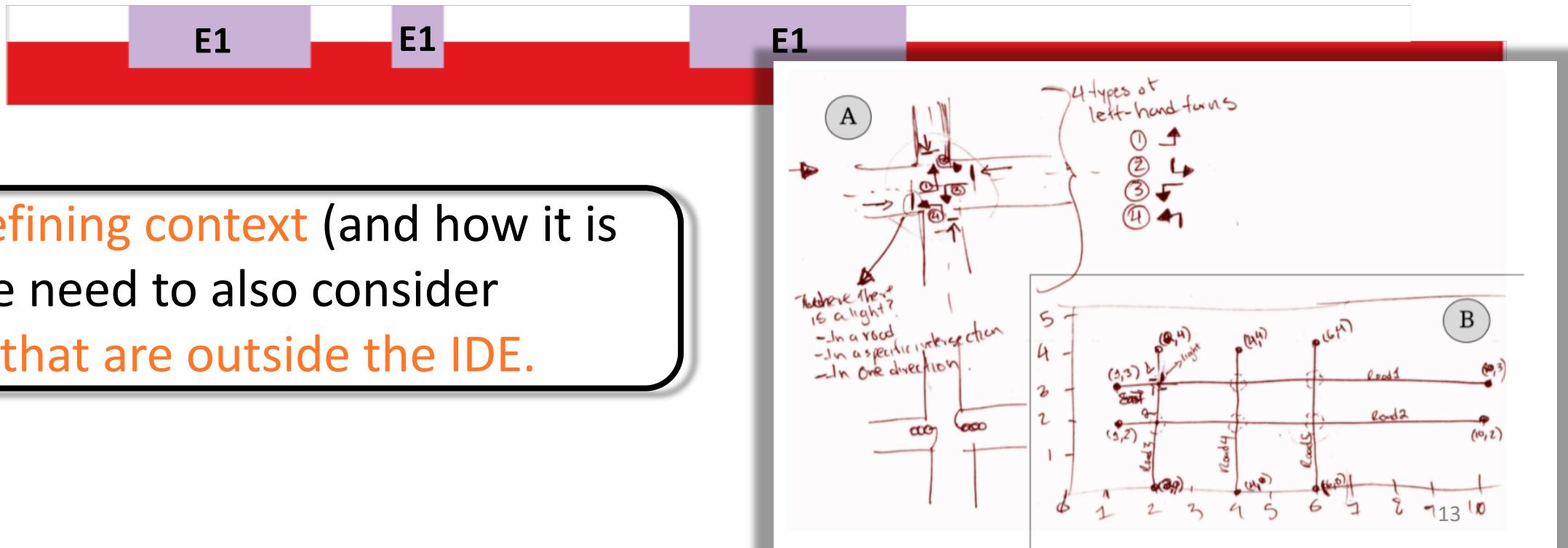
Artifact

time →

Artifacts span heterogeneous medium



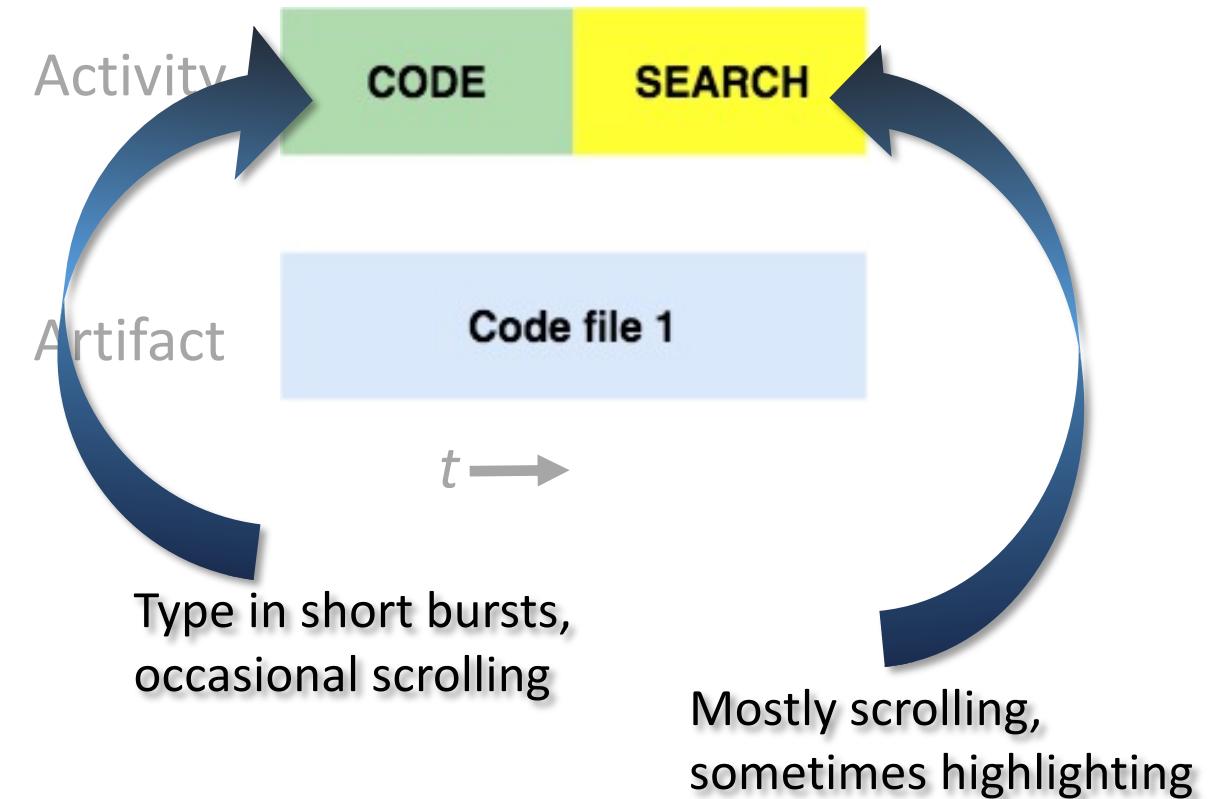
Artifacts span heterogeneous medium



Activity guides interaction

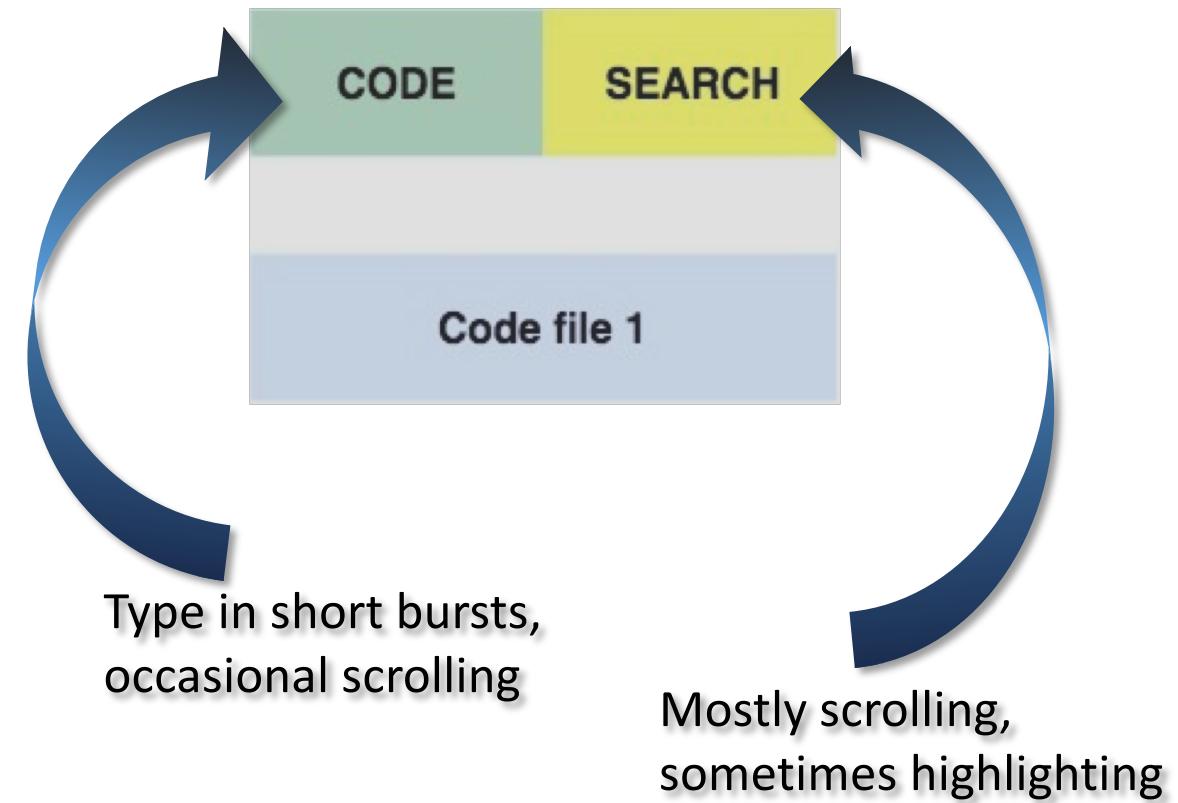
Snapshot:

Participant added new feature “toggle”,
which required updating the code



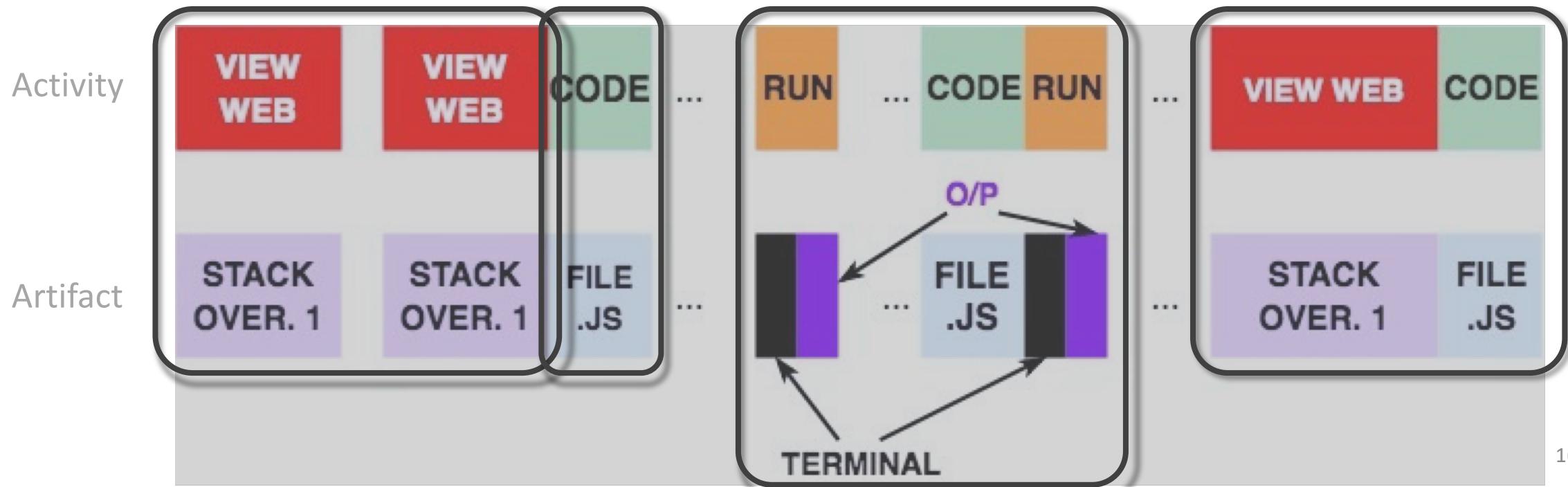
Activity guides interaction

Even in the **same artifact**,
activities and their interactions **vary**.



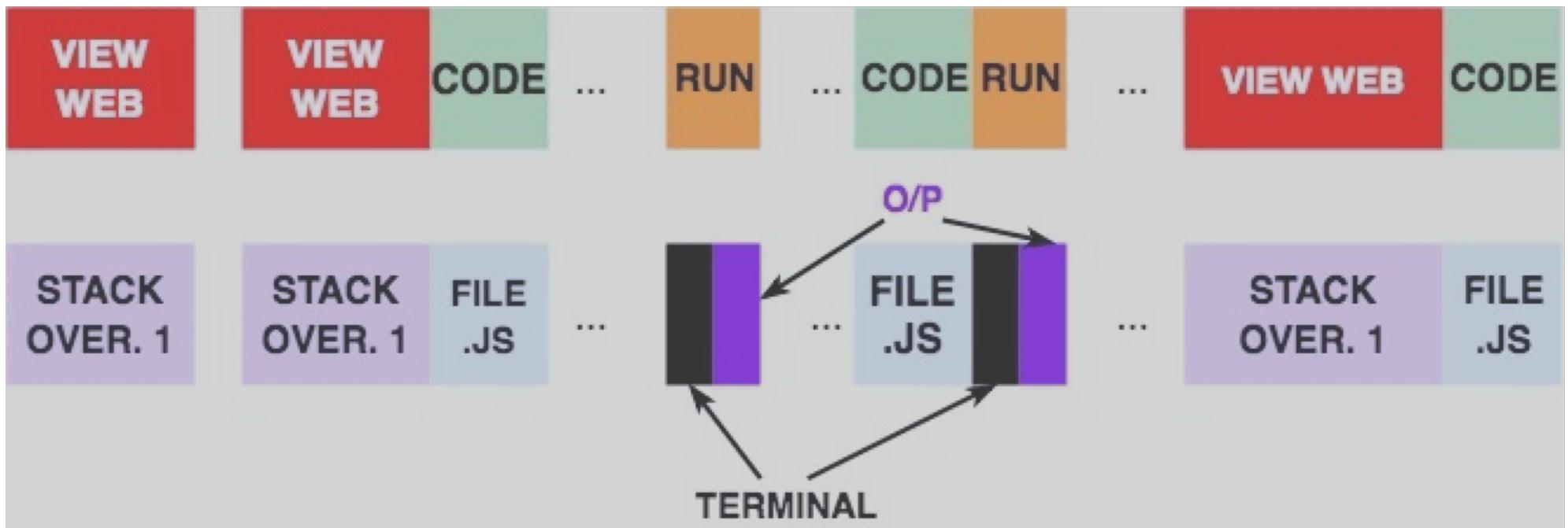
Activity guides interaction

Snapshot: Participant wants to implement “draggable” function in JavaScript

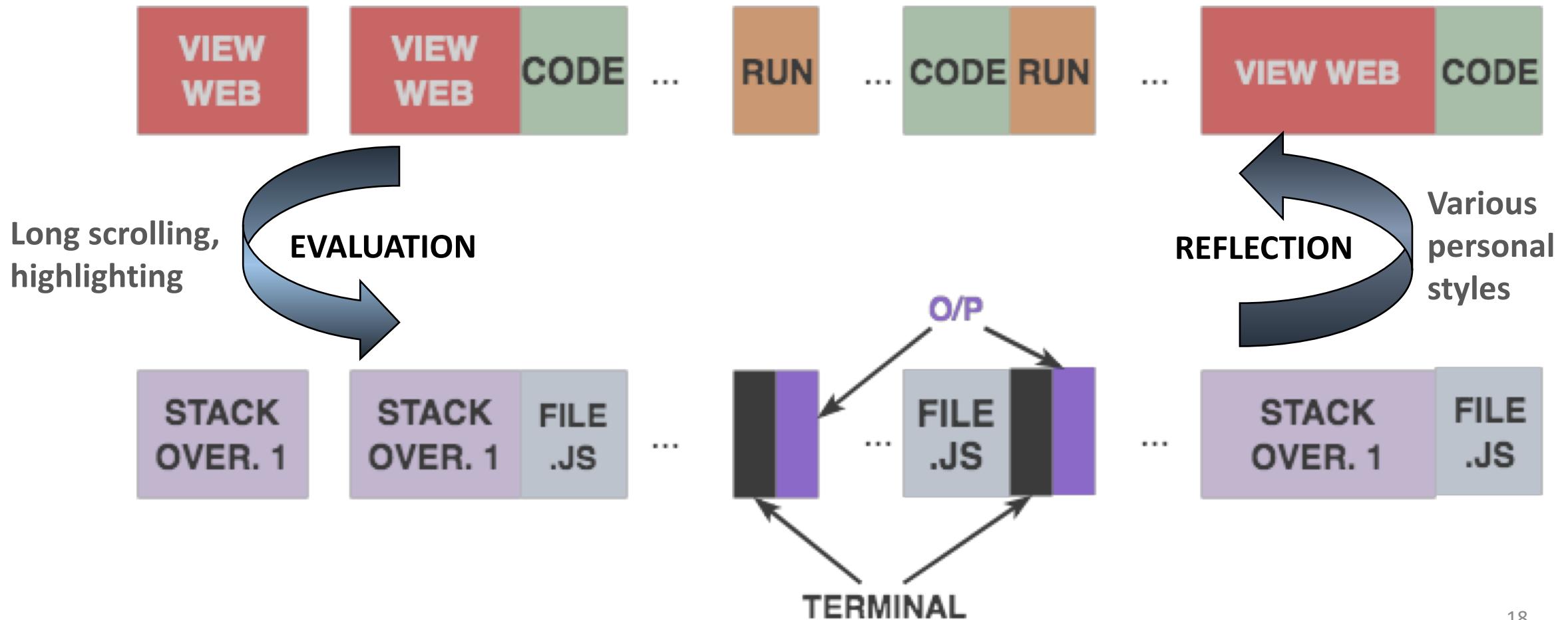


Activity guides interaction

What we find **now**, sets the **context** for what we do **next**



Evaluation-Reflection Loops



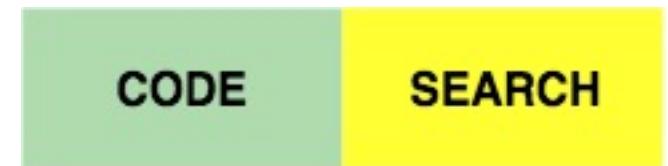
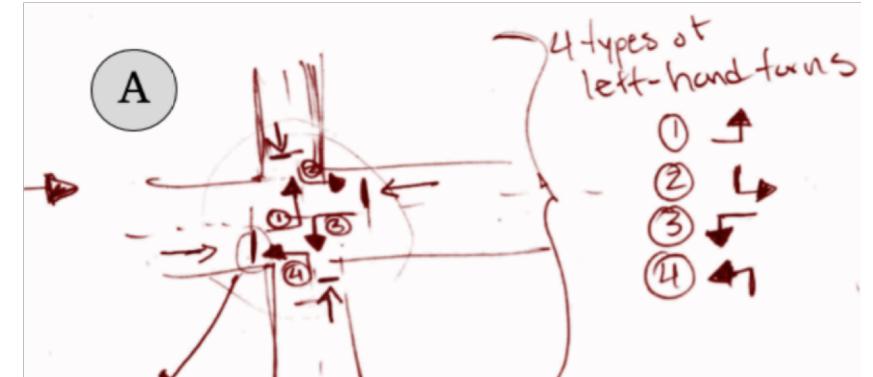
Summary

- Artifacts span **heterogeneous medium**

- Activity guides **interaction**

- Activity and interaction guide **future activity**

- Occurrence of **Evaluation-Reflection Loops**

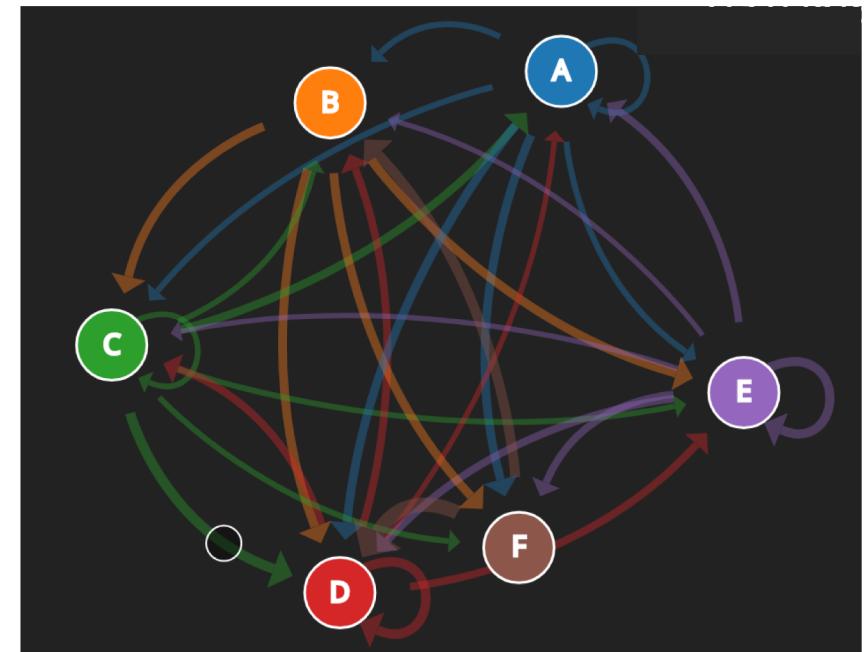


Code file 1

Future Directions

- How developers **decompose** their task
- How developers **reflect** on prior tasks
- Patterns that emerge
 - Problem solving stages
 - Types of task

Markov Chain Model



Summary

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