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Developer-Centric Test Amplification

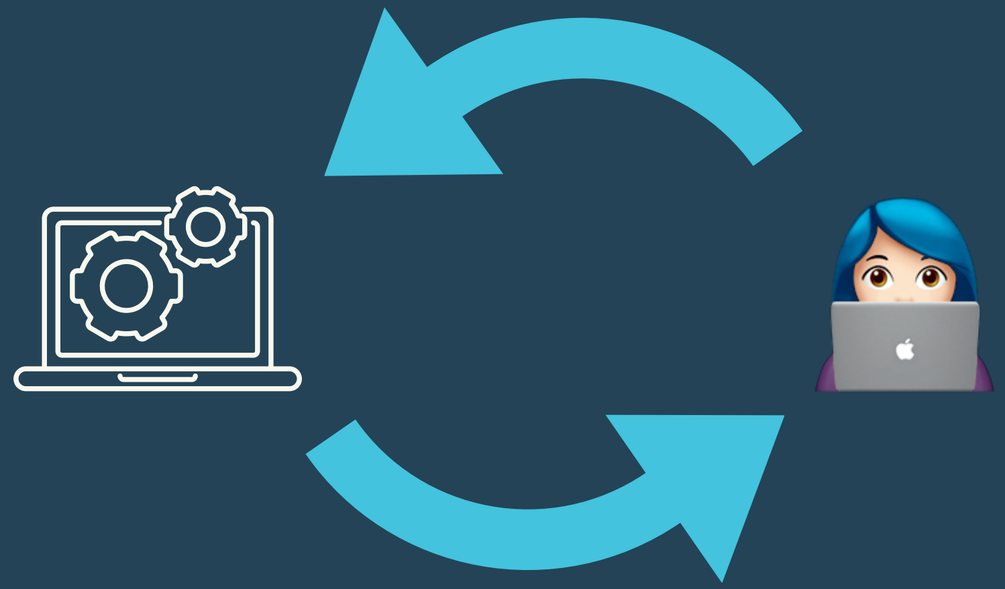
The Interplay Between
Automatic Generation and Human Exploration

Test Generation

Fully automatic → what about the developer's expertise?

Test Generation

Fully automatic → what about the developer's expertise?



Developer-Centric Test Generation

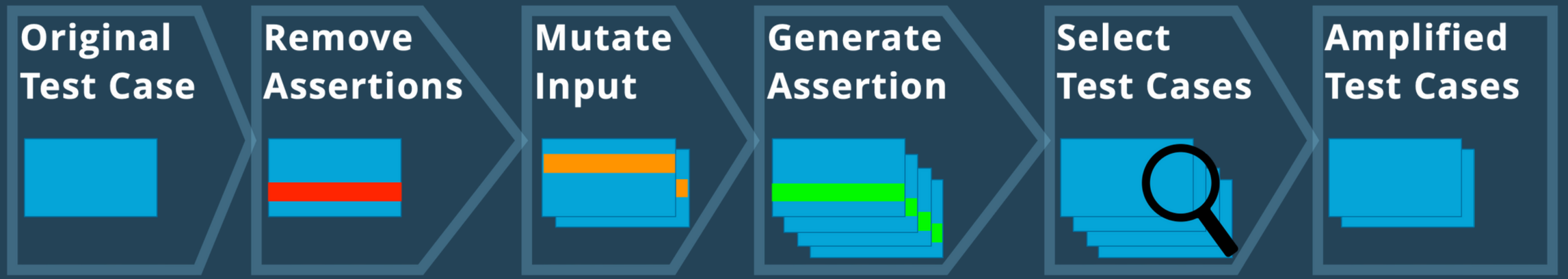
Developer accepts test case into maintained test suite

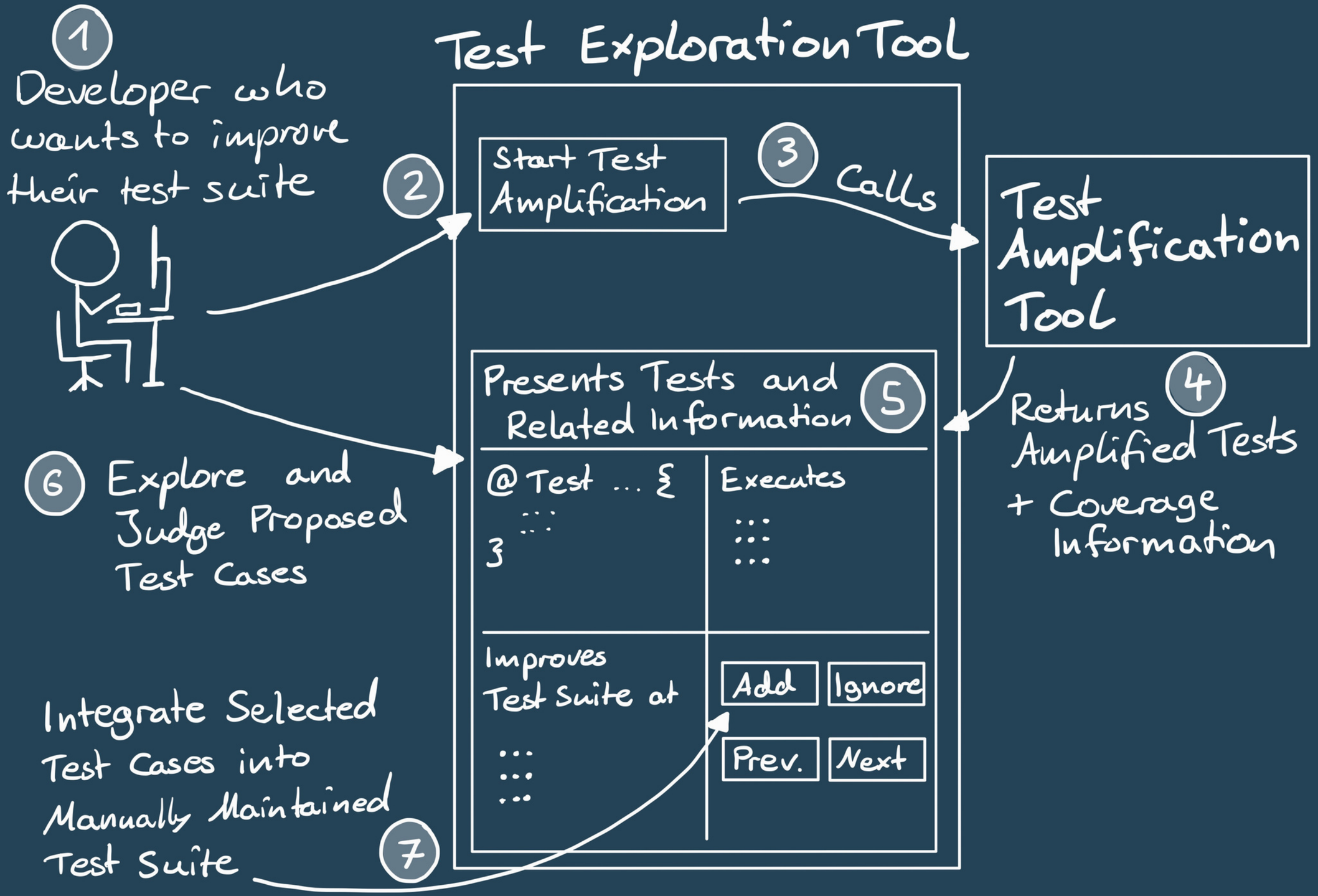
Developer-Centric Test Amplification

Generate new tests....
- that improve the test suite
- based on existing ones

Developer accepts test case into maintained test suite

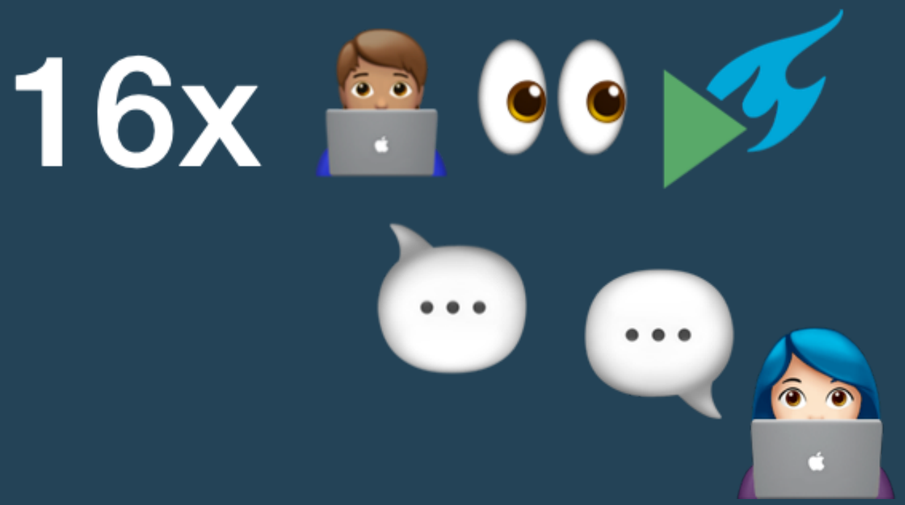
Test Amplification




1
Developer who wants to improve their test suite
Test Exploration Tool
2
Start Test Amplification
3
Calls
Test Amplification Tool
4
Returns Amplified Tests + Coverage Information
Presents Tests and Related Information
5
@Test ... {
}
Executes
6
Explore and Judge Proposed Test Cases
Improves Test Suite at
Add
Ignore
Prev.
Next
Integrate Selected Test Cases into Manually Maintained Test Suite
7

Study

Adapt Amplification Tool DSpot + Exploration IntelliJ Plugin TestCube



What are the important factors to realize developer-centric test amplification?

(selected)

Observations

TEST CASES	EXPLORATION TOOLS	INFORMATION	VALUE
Consistent	Ease of Use	Outcome, Runtime	Eases Testing
Revelant	Information & Expectation Management	CUT Coverage	Learning
		Original Test	Confidence

Recommendation 1

Consider interaction developers ↔ test cases.

Test Exploration Tool:

- easily accessible
- effectively communicate impact

Recommendation 2

Main goal: developers accept a test case

understandable & relevant

more important than

coverage impact

Take-Away

Building an automated tool? → How do your users discover it?

Understandability could be more important than the optimal result.

Brandt, C., & Zaidman, A. (2021). Developer-Centric Test Amplification: The Interplay Between Automatic Generation and Human Exploration. Accepted at EMSE, arXiv:2108.12249.

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