Developer-Centric Test Amplification

Carolin Brandt, Andy Zaidman

Empirical Software Engineering, May 2022

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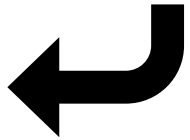
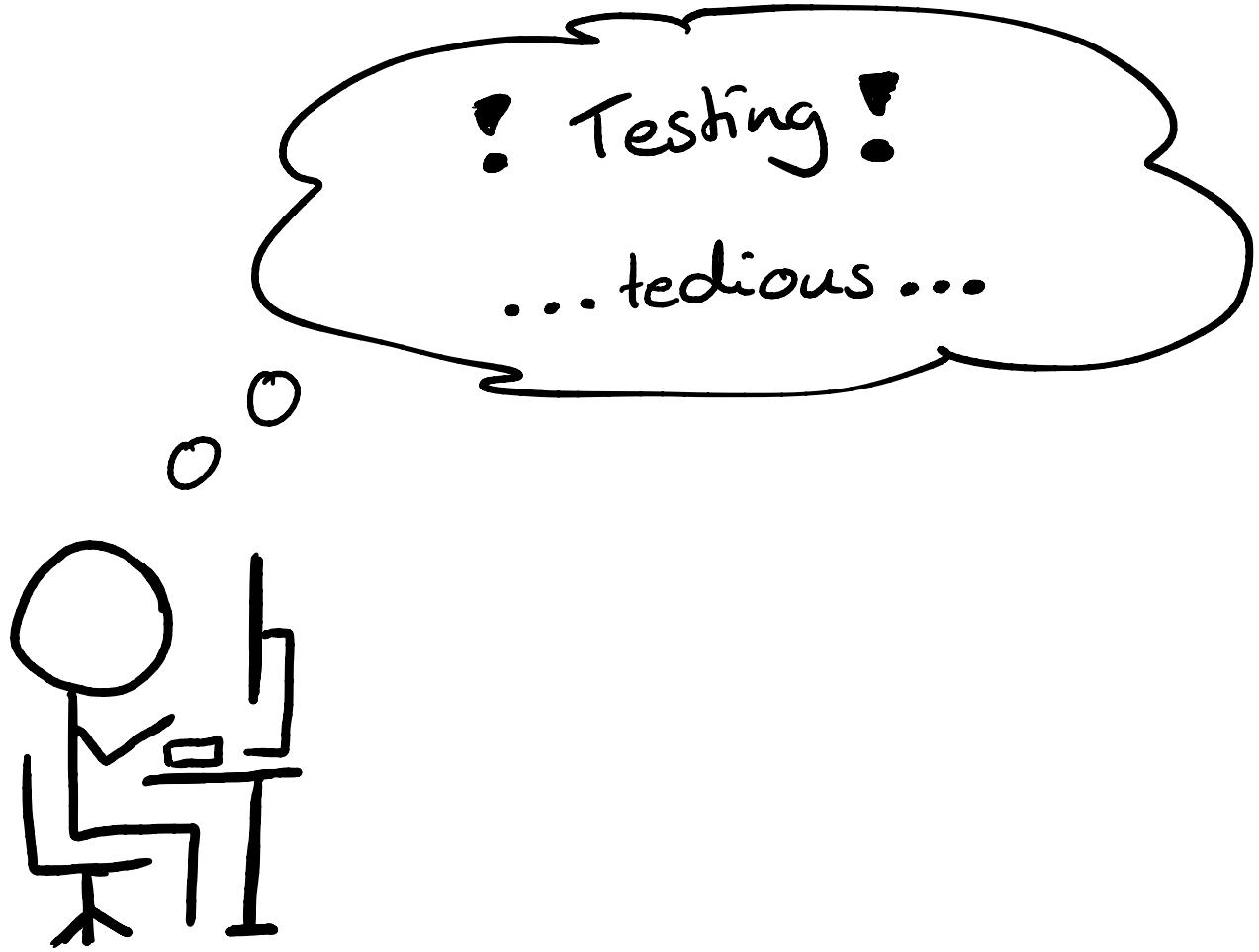
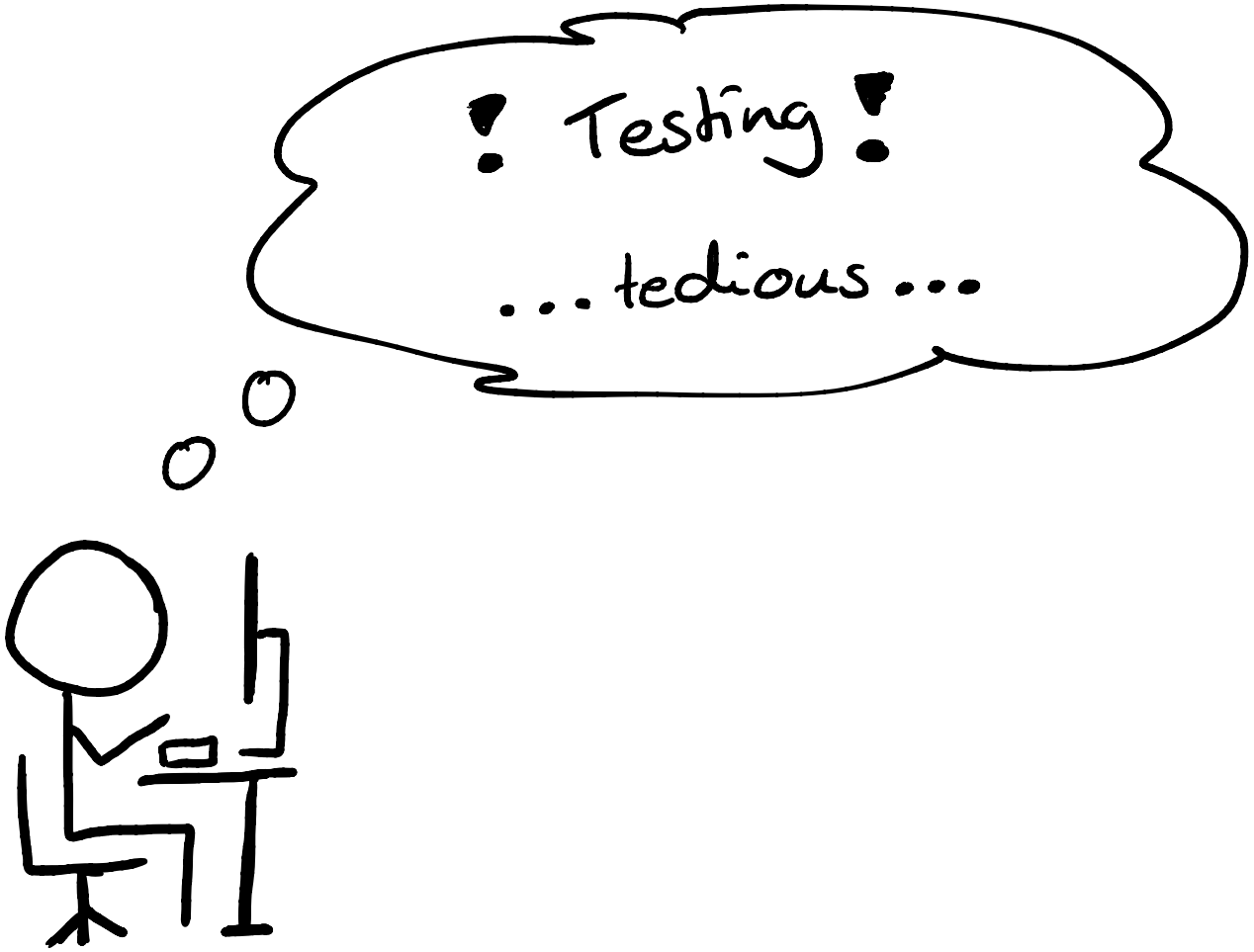



! Testing !
... tedious ...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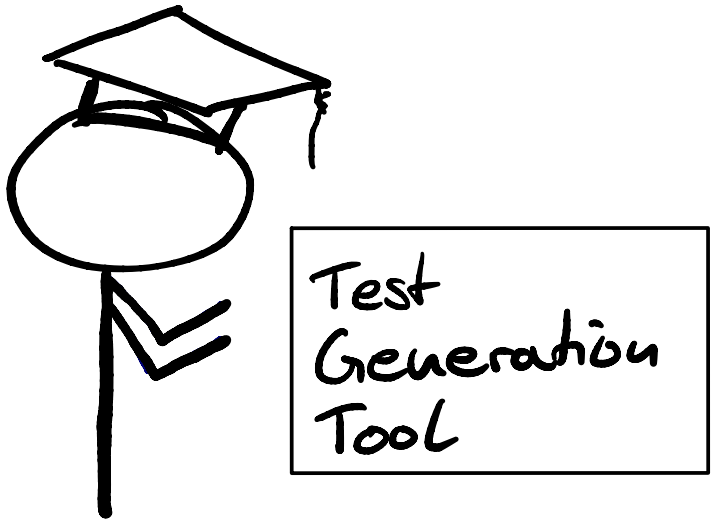
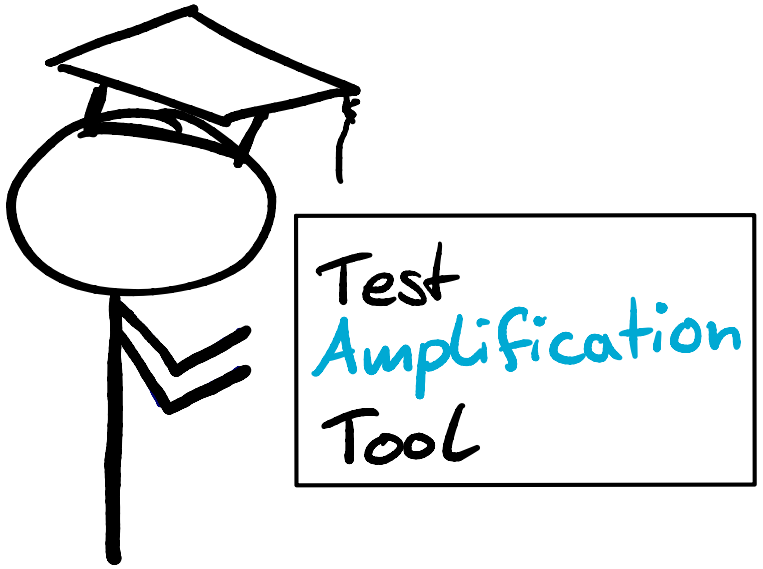

Test
Generation
Tool

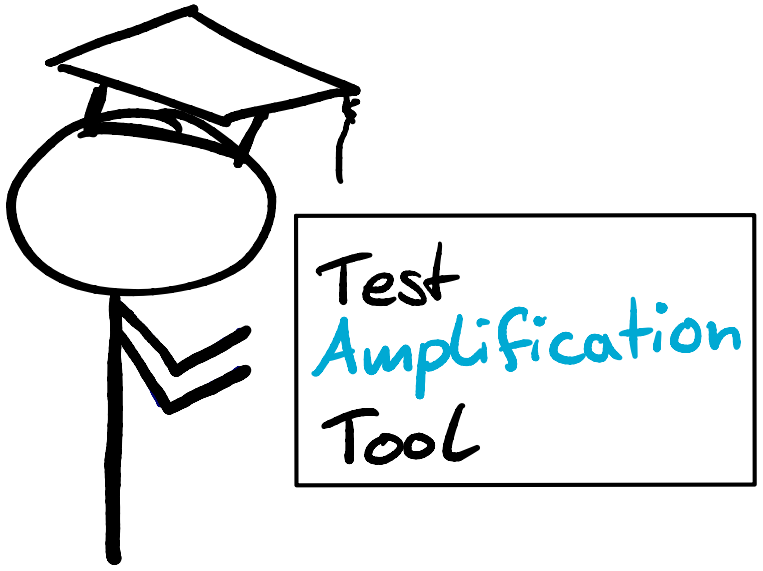
! Testing !
... tedious ...
Test Generation Tool
... !
... ?
... ?
... !
Test Generation Tool



Original Test

Amplified Test

```
@Test
void text_escape () {
    A a = new A ("text");
    B b = a.escape()
    assertEquals (b.toString(), "text");
}
```

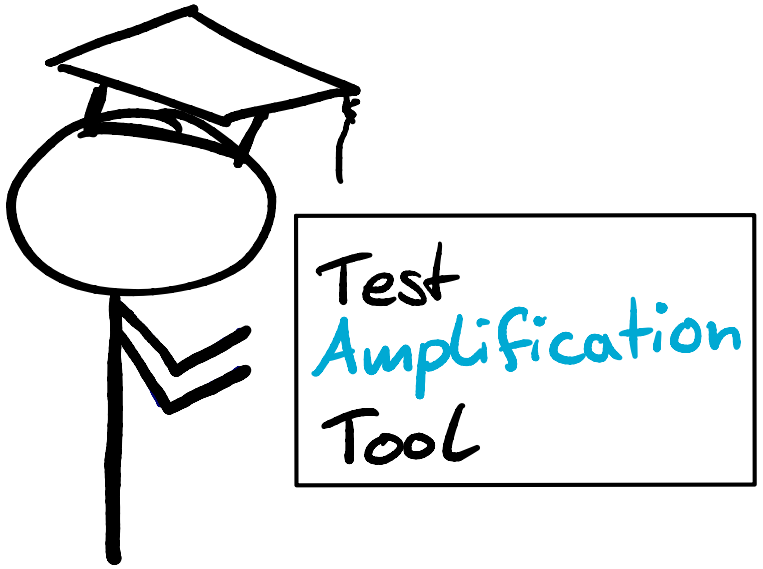


Original Test

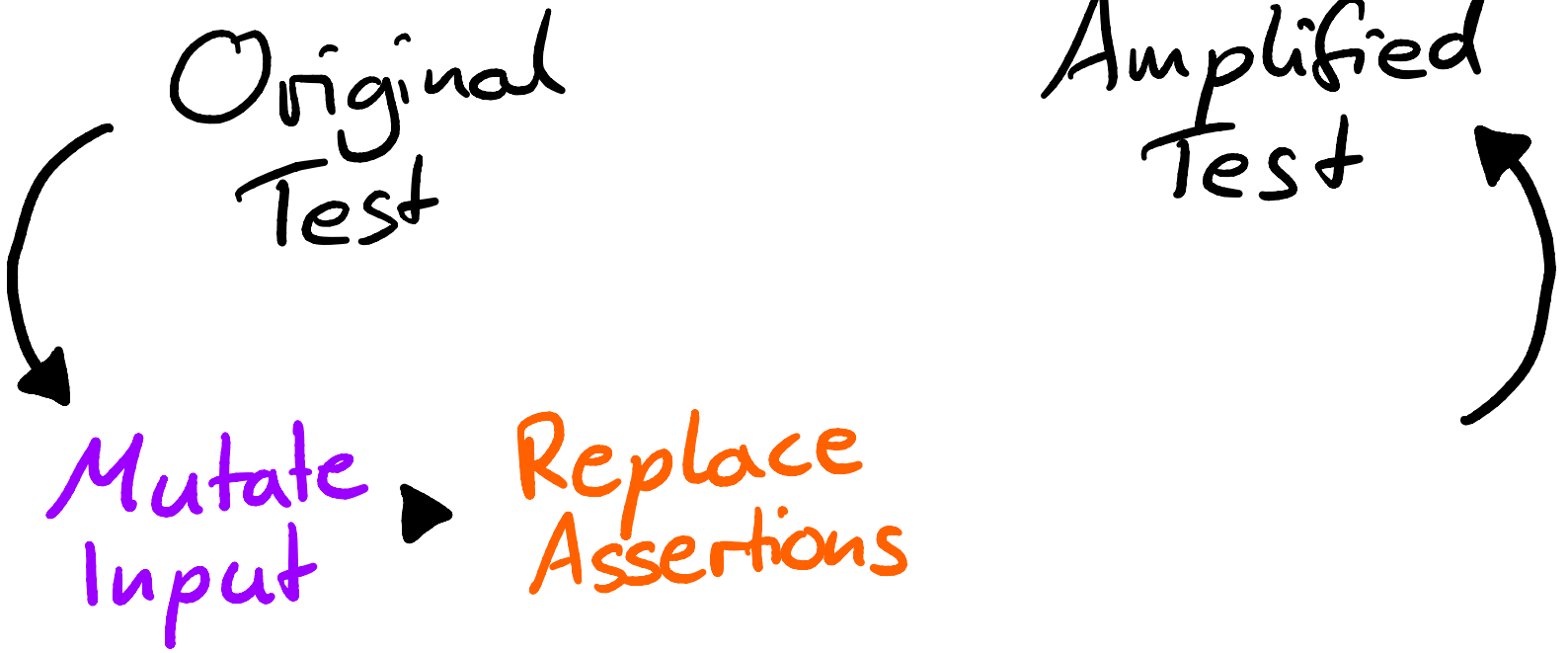
Mutate Input

Amplified Test

```
@Test
void text_escape (){
    A a = new A("text"); → "text $//"
    B b = a.escape()
    assertEquals(b.toString(), "text");
}
```



Test Amplification Tool

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void text_escape () {
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    B b = a.escape()
    assertEquals (b.toString(), "text"); → "text\$\//"
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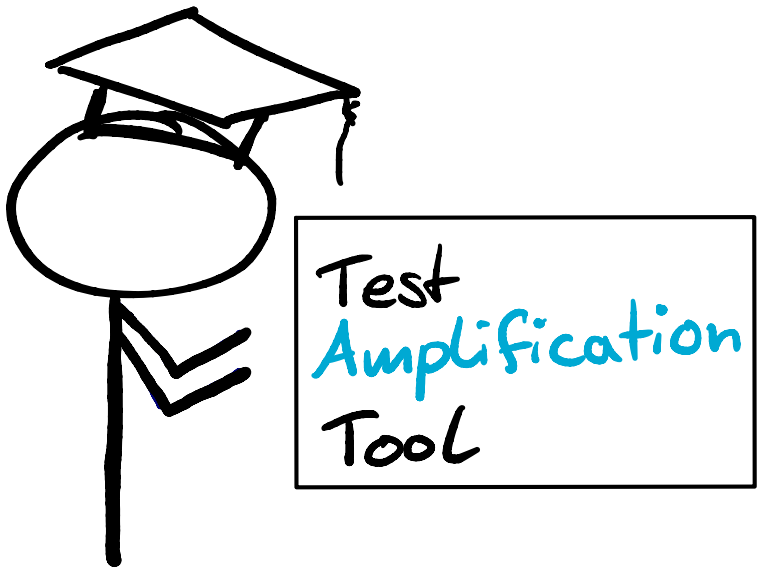

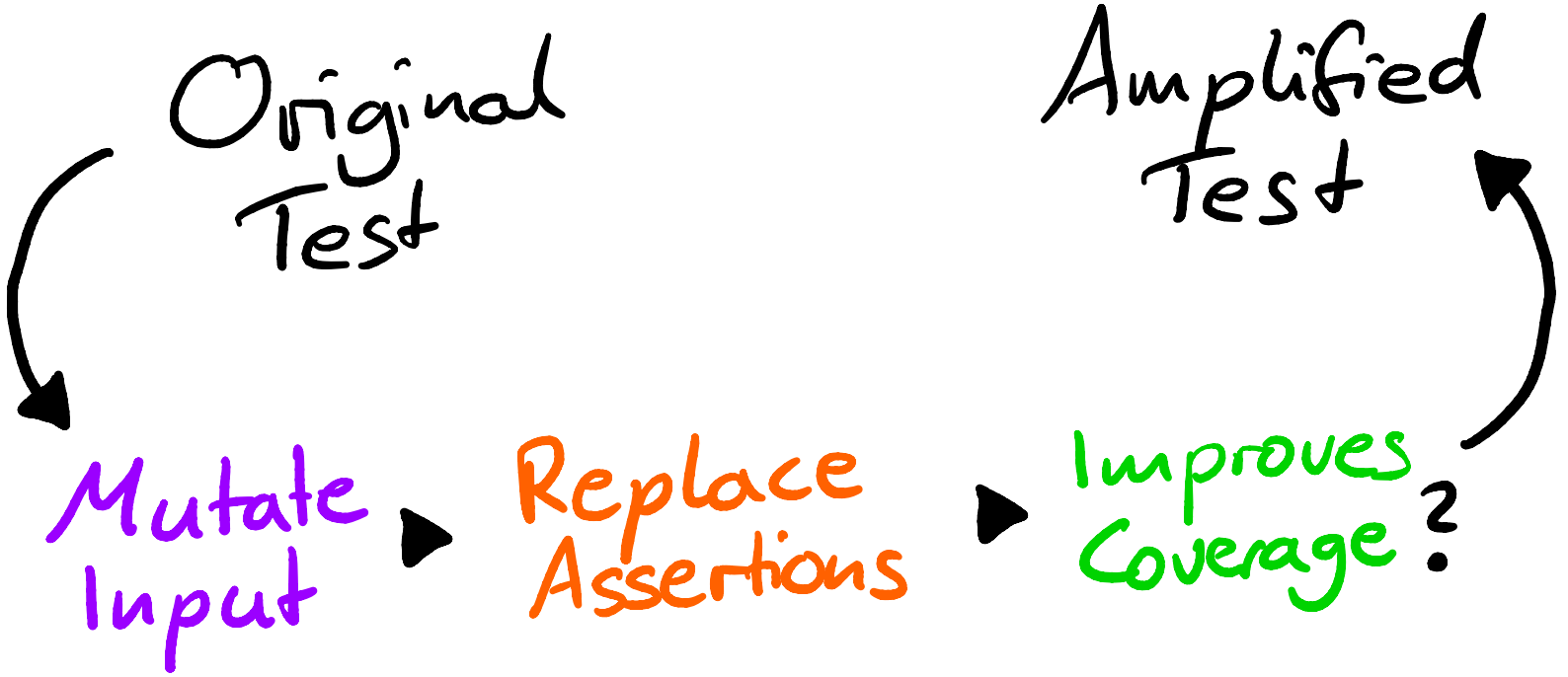


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    B b = a.escape()
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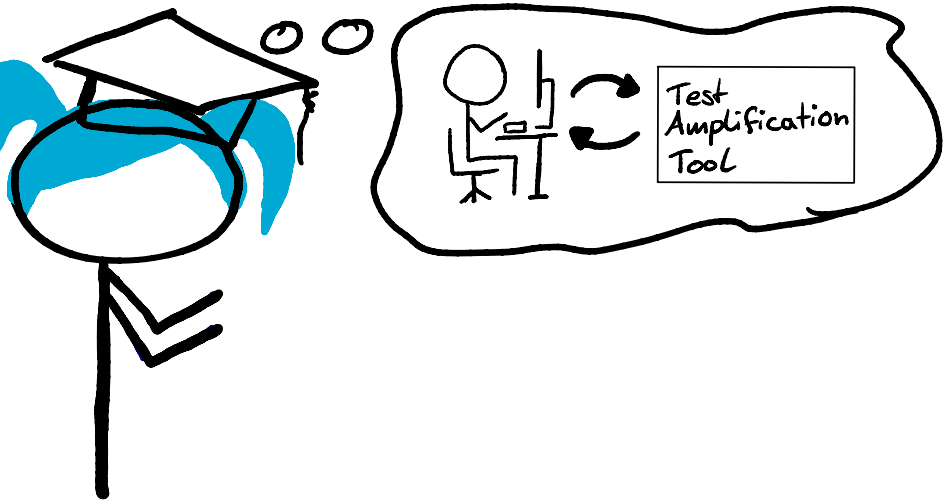
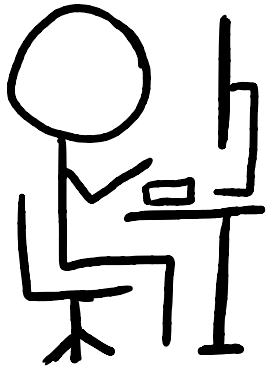
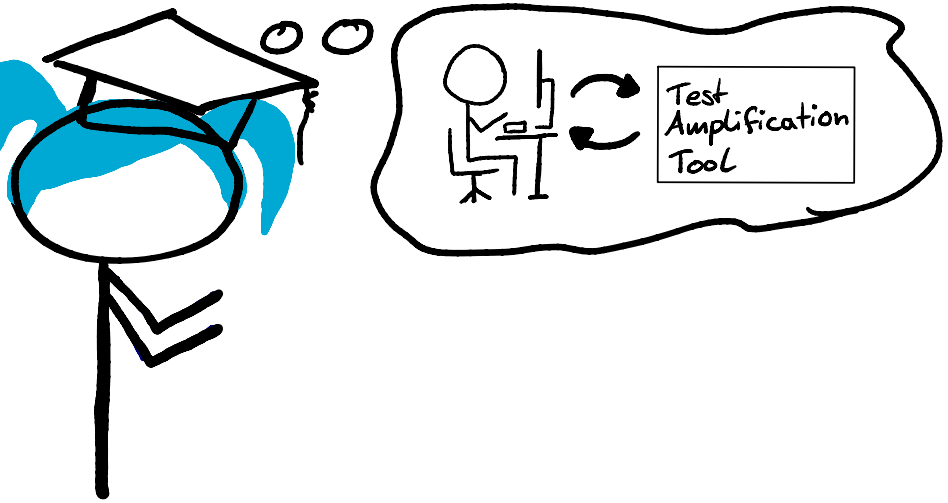
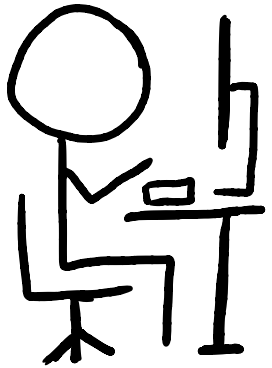


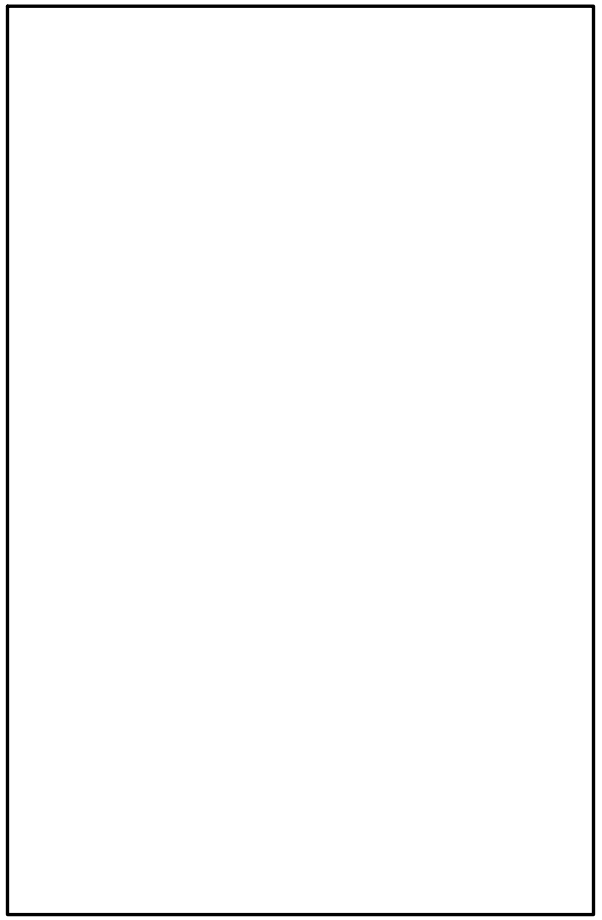


Test
Amplification
Tool

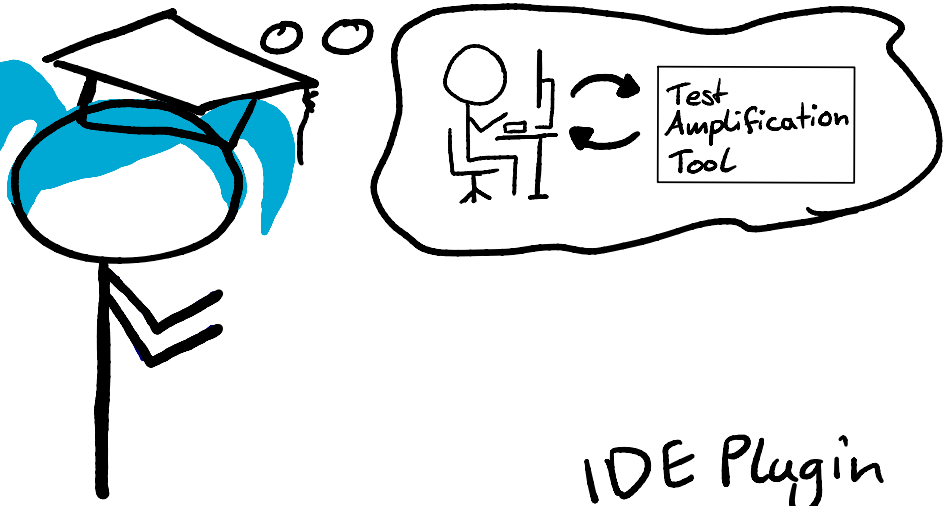




Test ExplorationTool



Test
Amplification
Tool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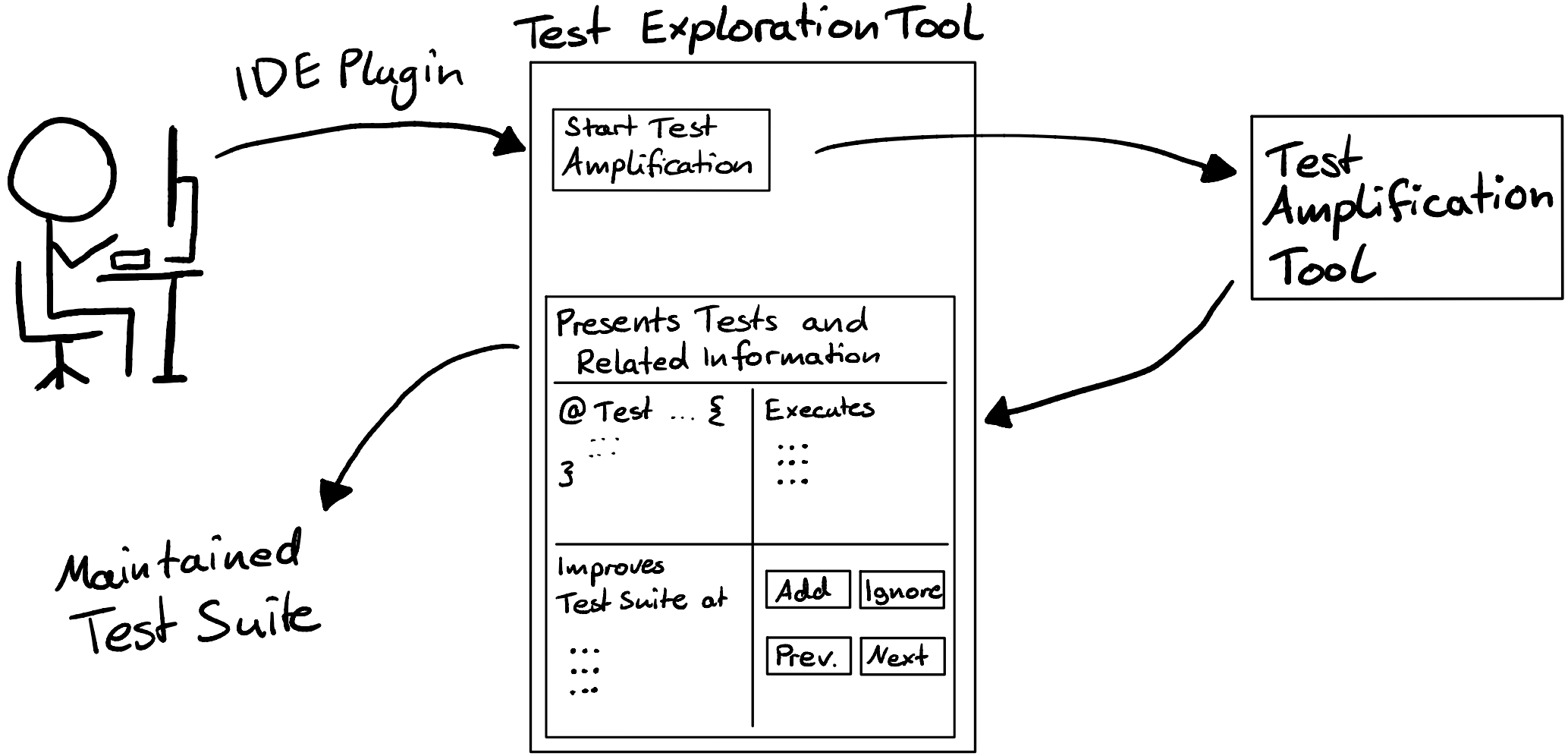
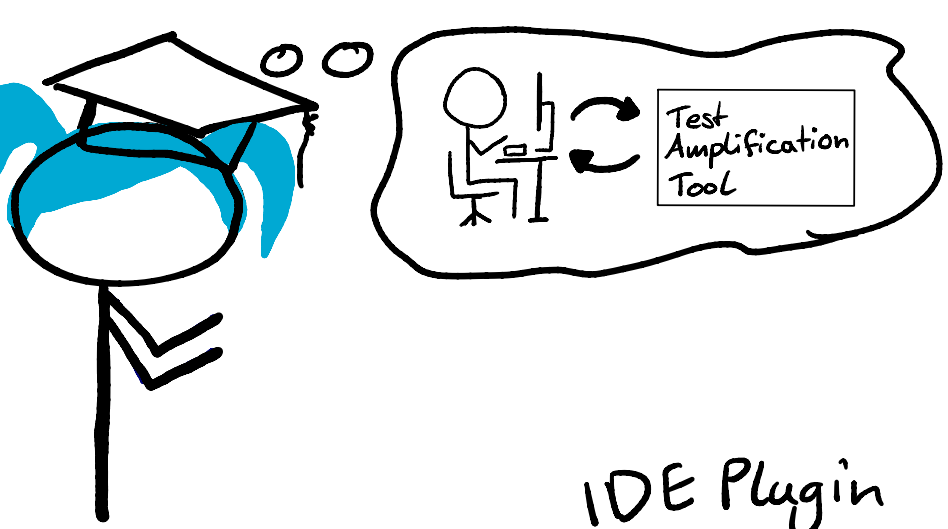

IDE Plugin
Test ExplorationTool
Start Test
Amplification
Test
Amplification
Tool
Presents Tests and
Related Information
@Test ... {
}
Executes
Improves
Test Suite at
Add
Ignore
Prev.
Next
Maintained
Test Suite



IDE Plugin

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DSpot

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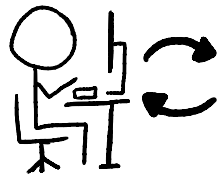
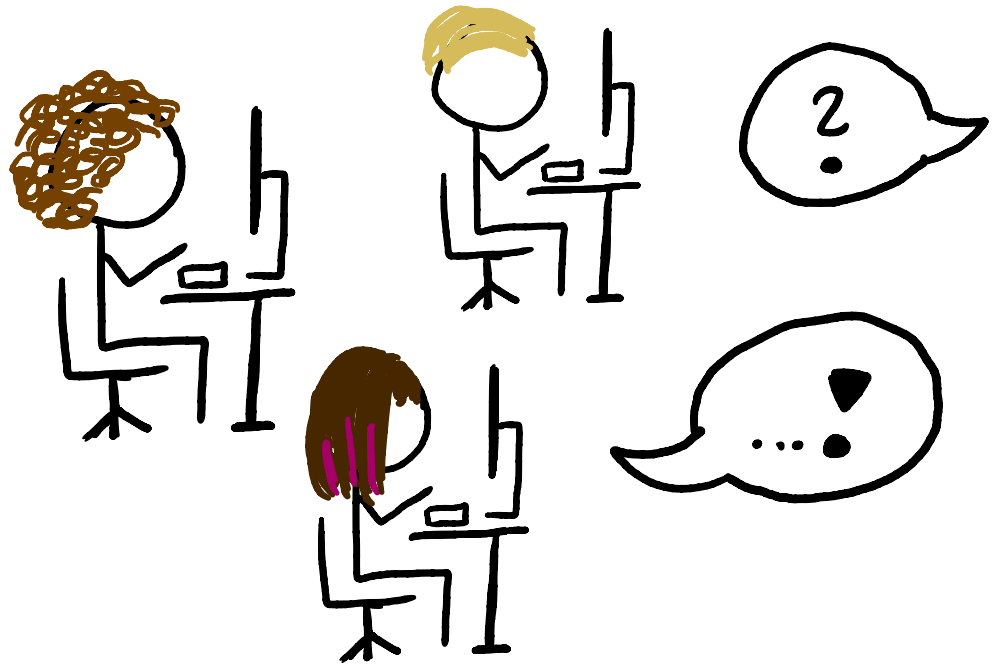
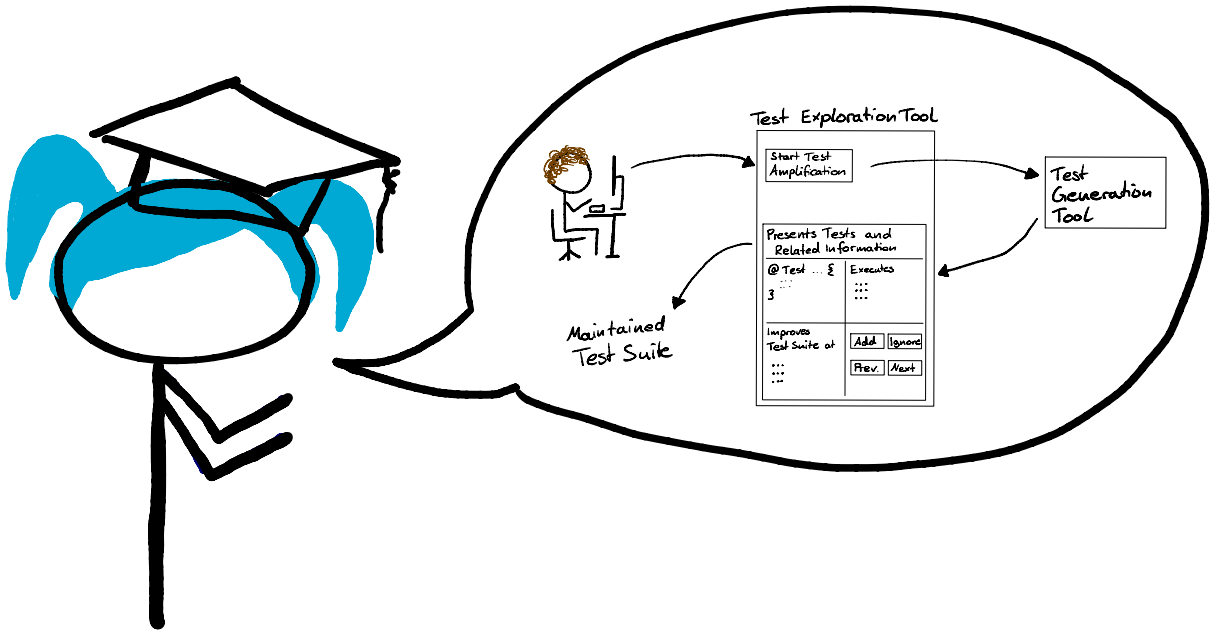
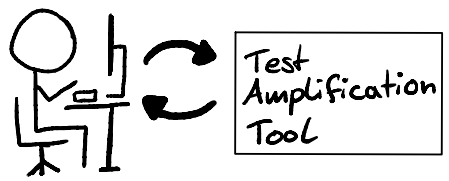


What are the important factors to make this work?

16x







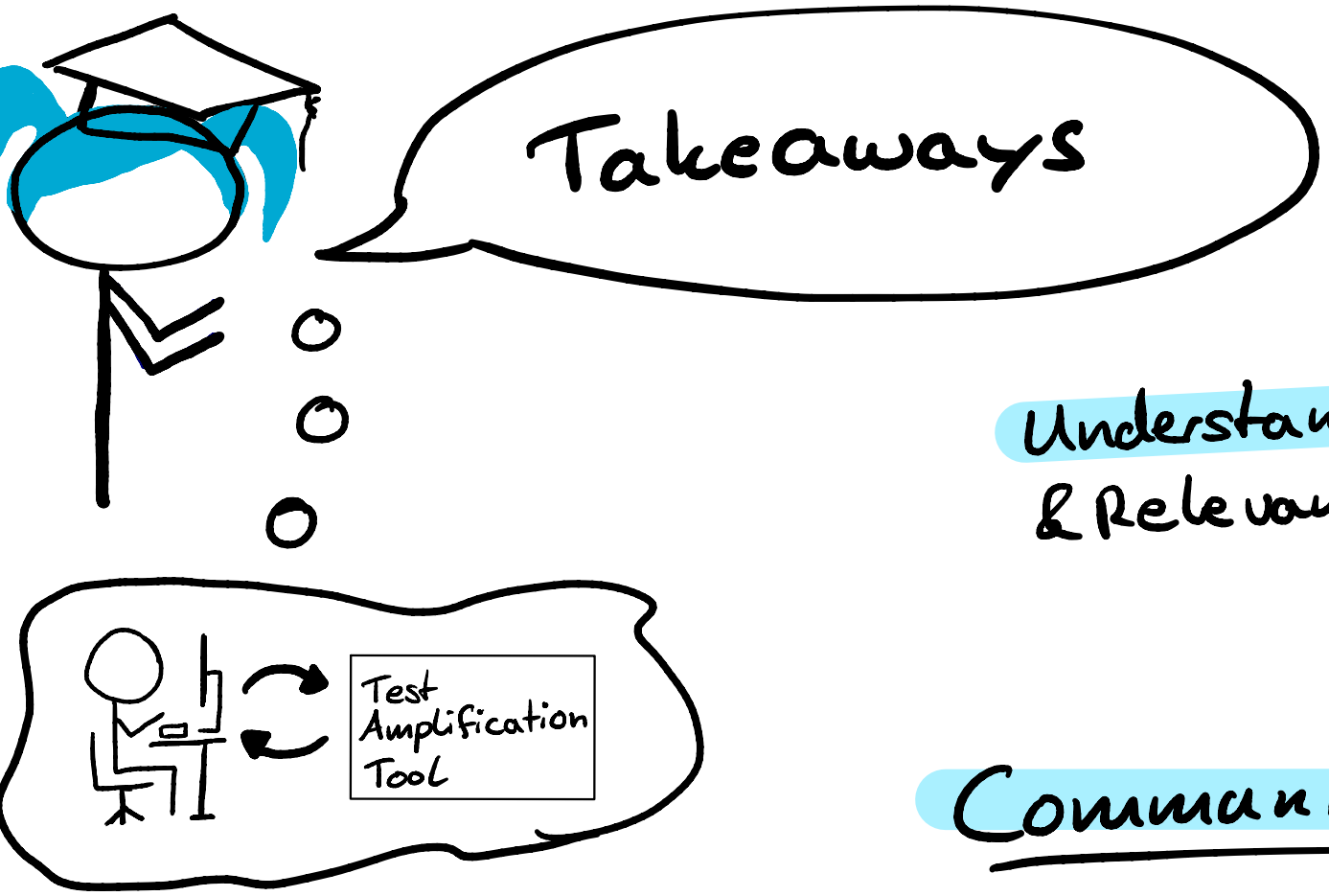
What are the important factors to make this work?

Test Code + Behavior

Information Needs

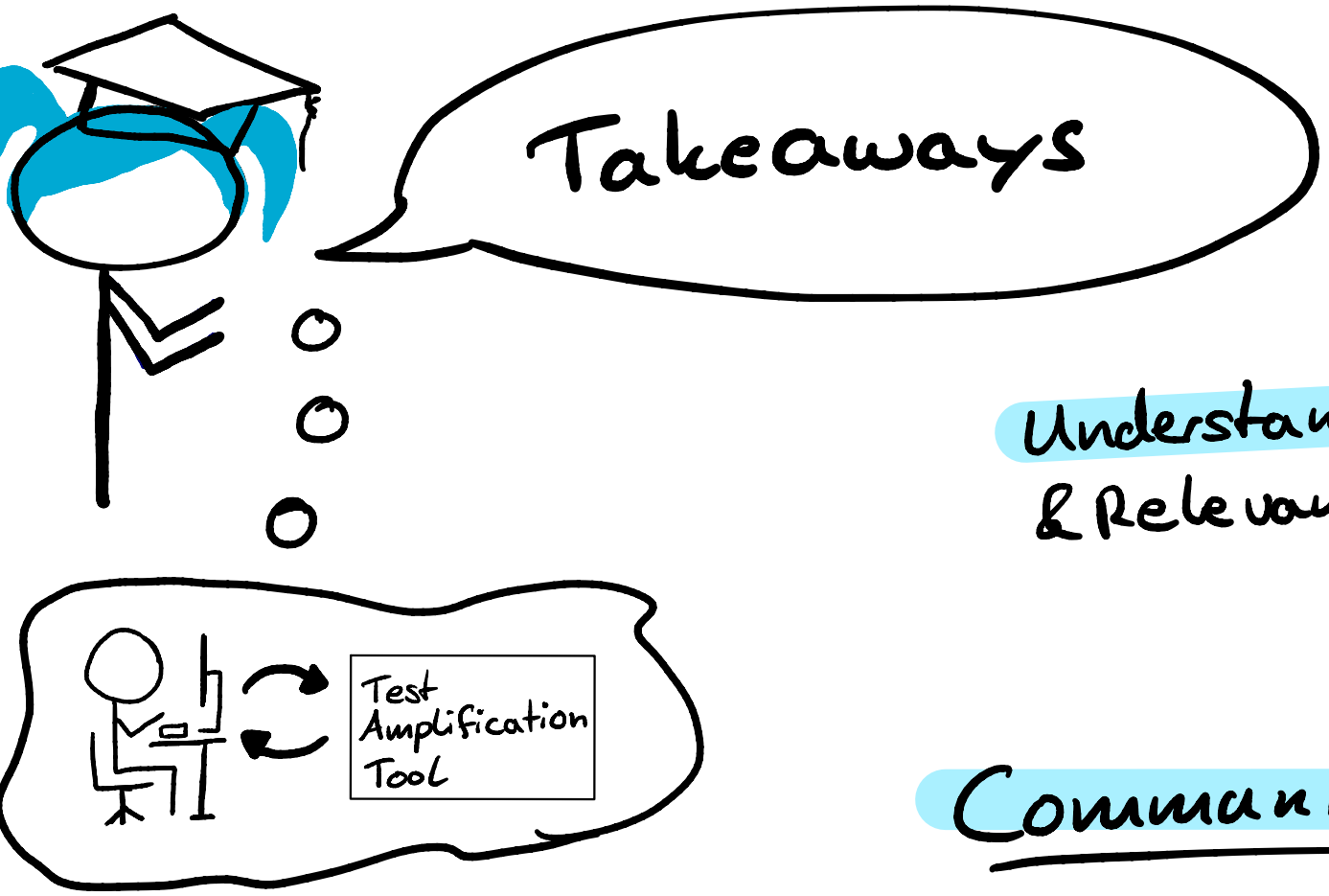
Exploration Tool

Value



Understandable & Relevant Test > Improving Coverage

Communicate Behavior + Impact of the proposed Tests



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