

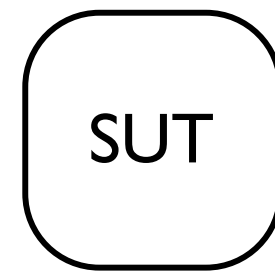
A Generic Approach to Run Mutation Analysis

Siamak Haschemi and Stephan Weißleder
Humboldt-Universität zu Berlin
METRIK Research Training Group
TAIC-PART 2010

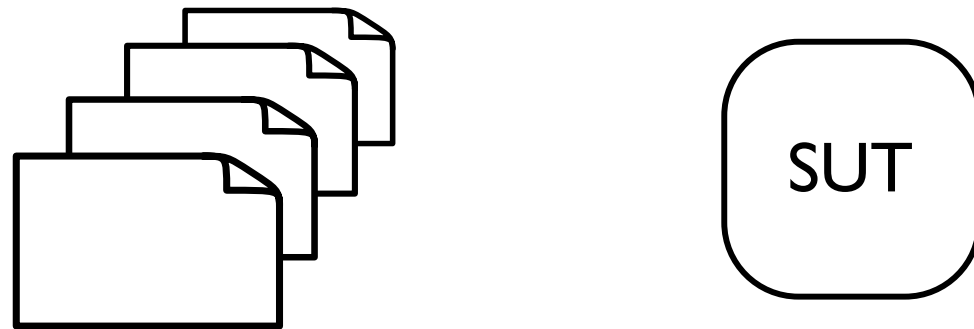


Mutation Analysis

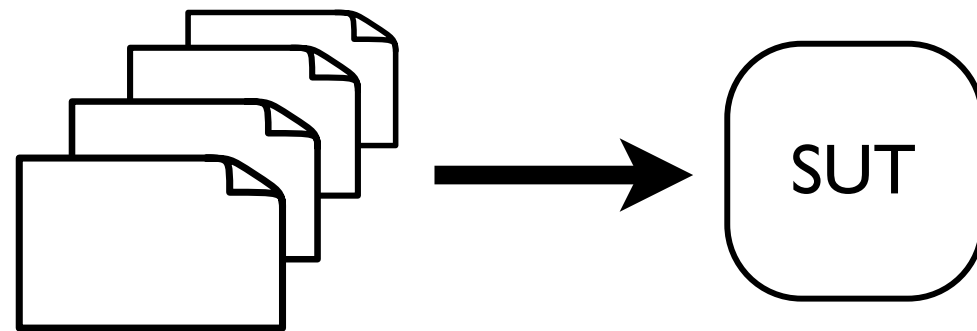
Mutation Analysis



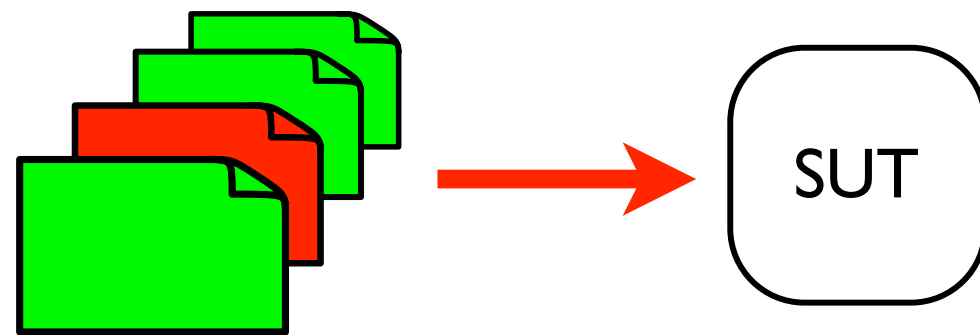
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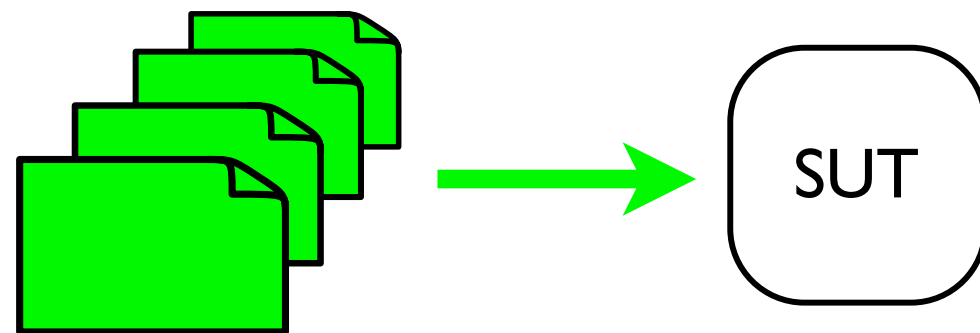
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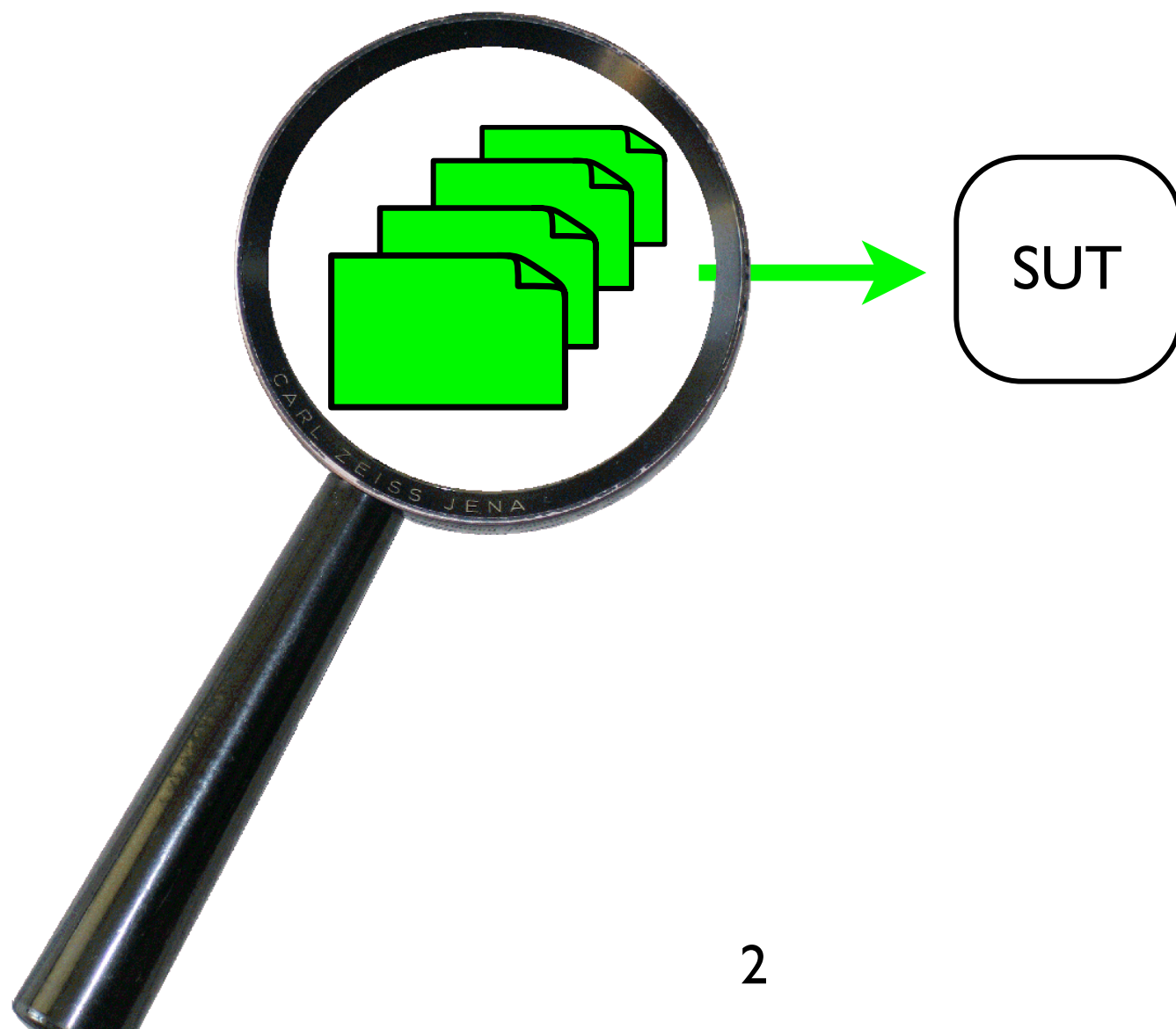
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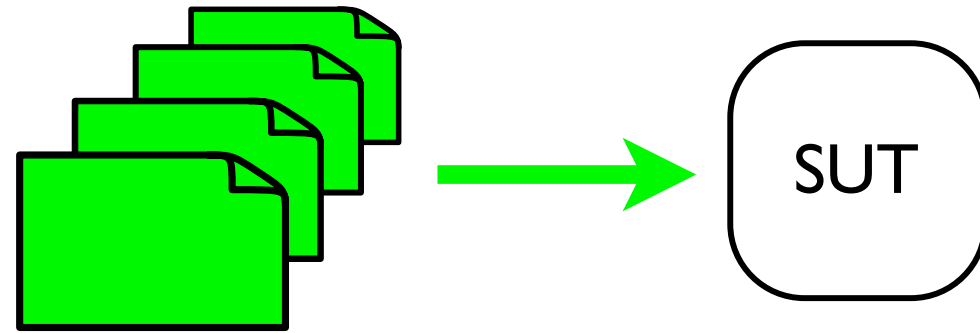
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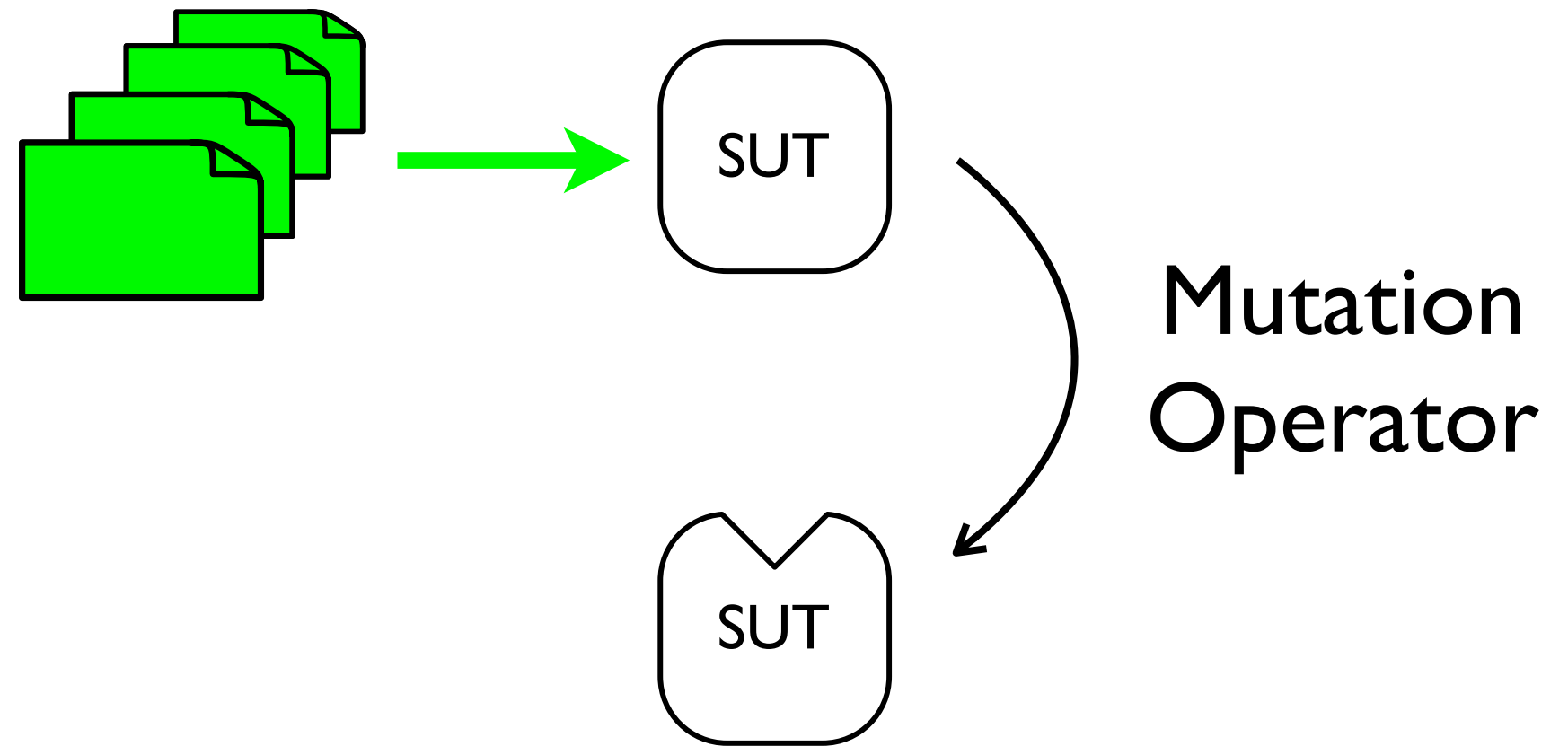
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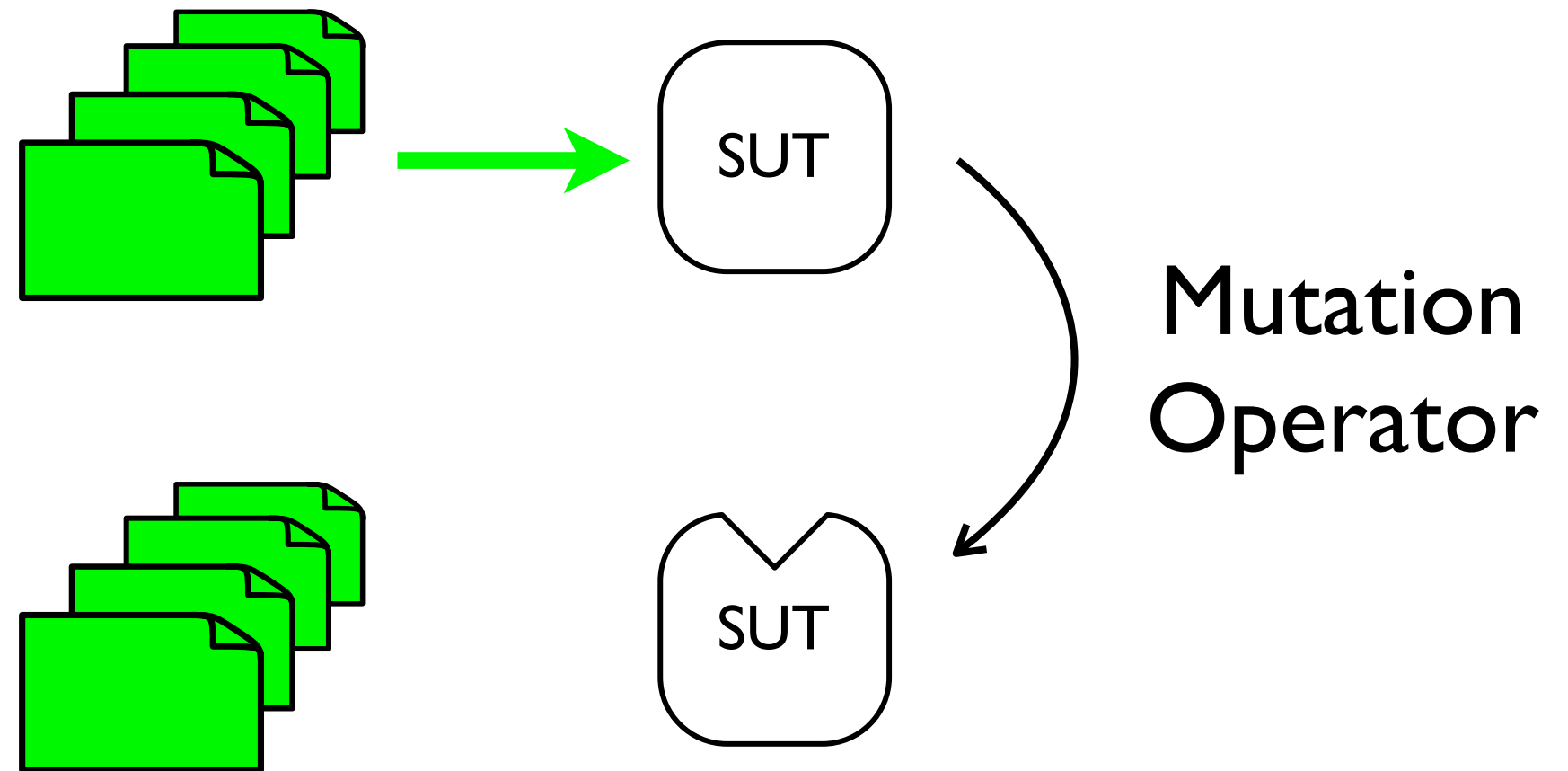
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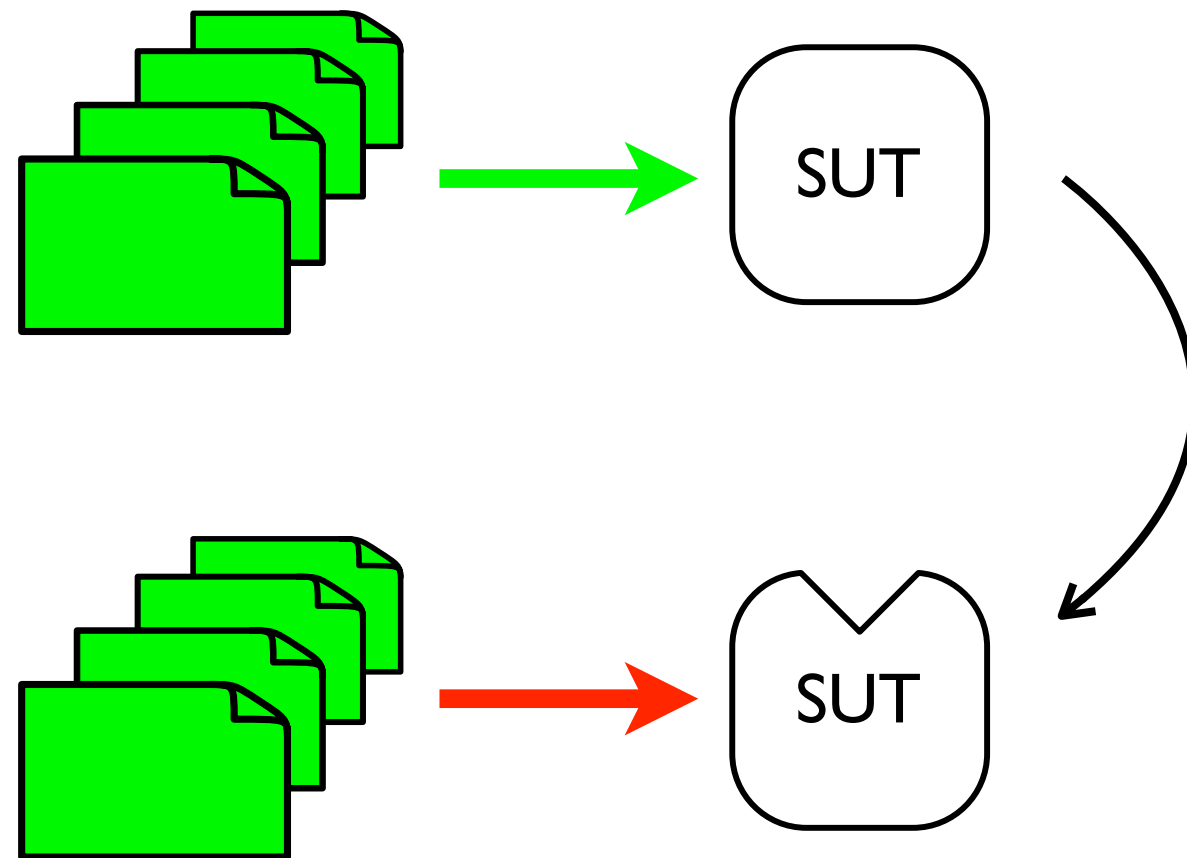
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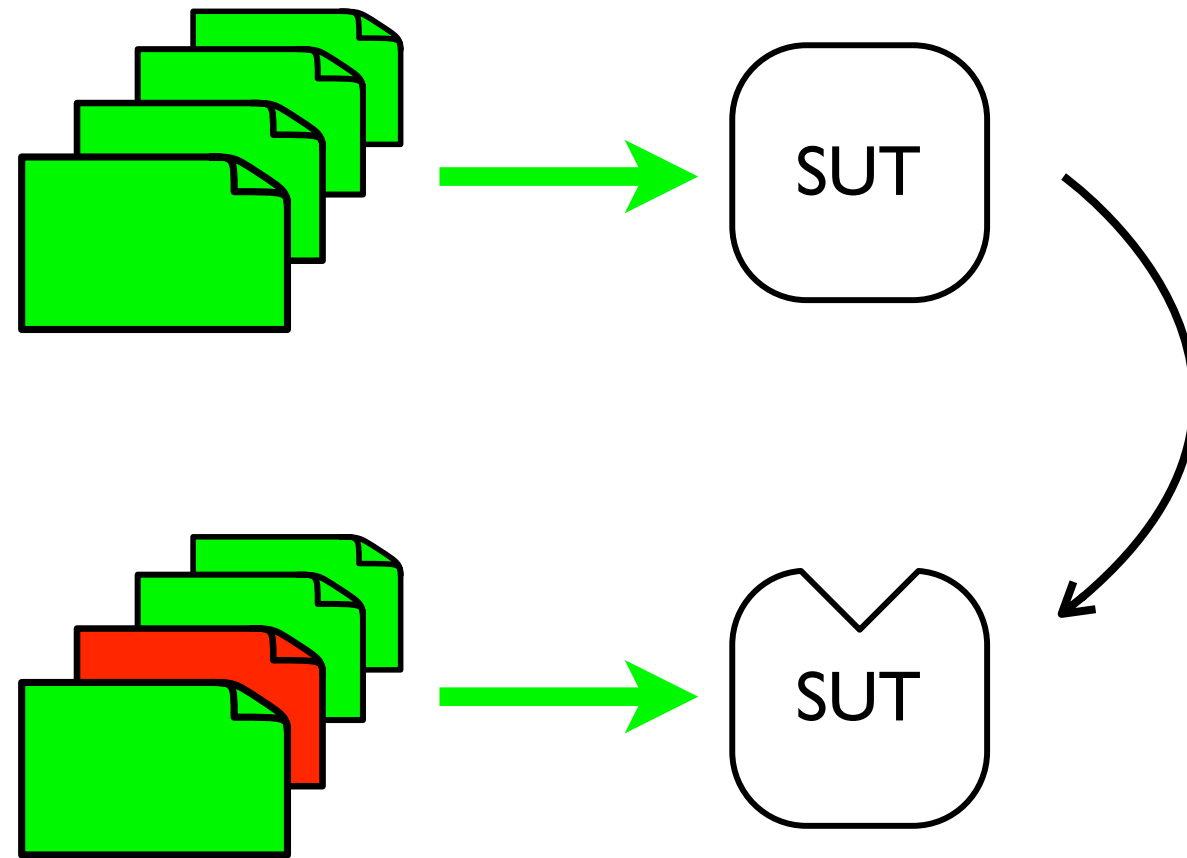
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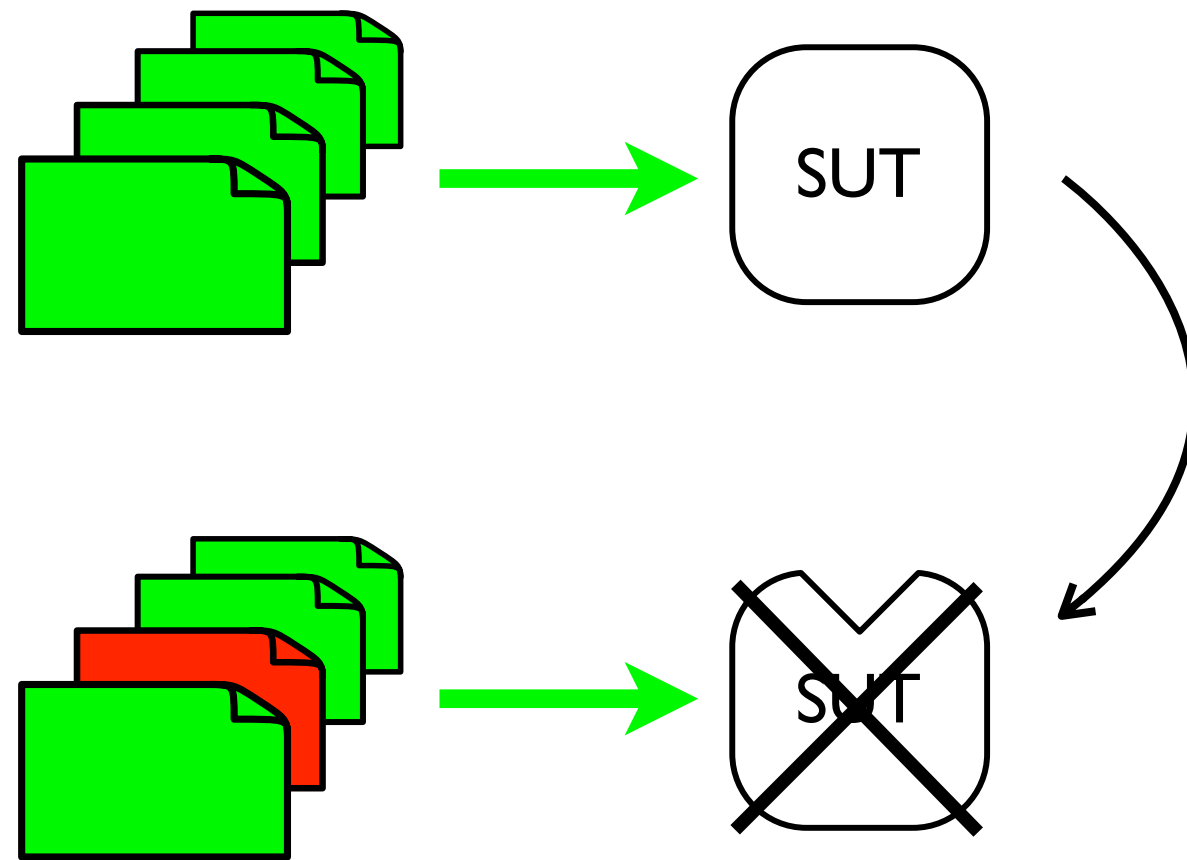
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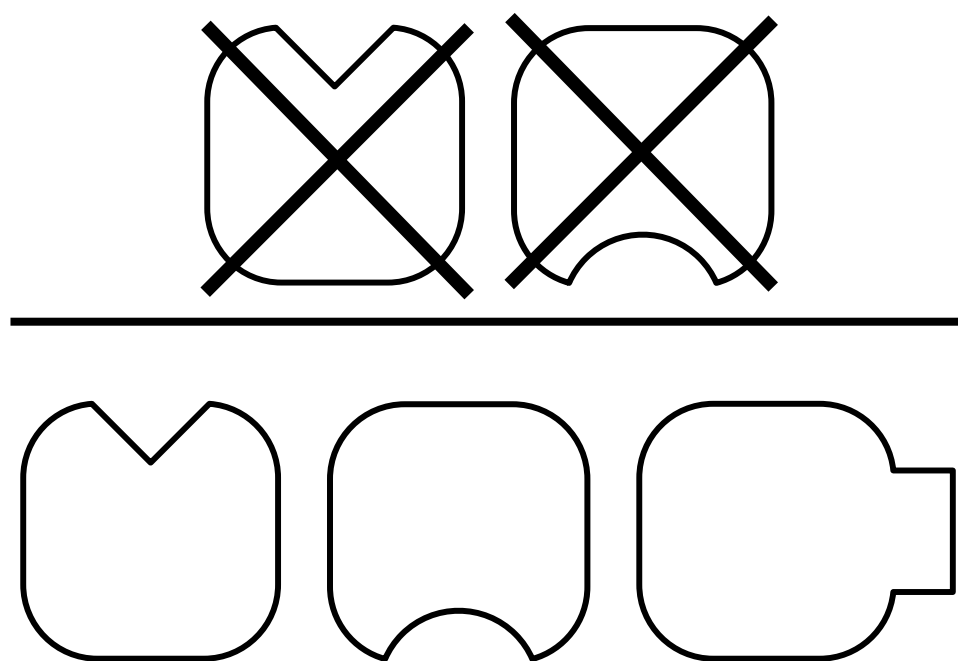
Mutation Analysis



Mutation Analysis



Mutation Analysis

$$\text{Mutation Score} = \frac{\text{Number of Killed Mutations}}{\text{Total Number of Mutations}}$$


The diagram illustrates mutation analysis using shapes. The numerator of the fraction shows two shapes with a large 'X' over them, indicating they are 'killed' mutations. The denominator shows three original shapes: a shape with a V-shaped notch at the top, a shape with a semi-circular notch at the bottom, and a shape with a rectangular protrusion on the right side.

Mutation Analysis

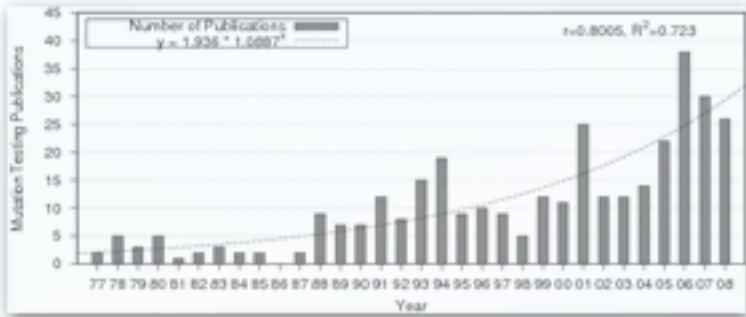
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Mutation Testing Repository

Publications on Mutation Testing



Mutation Testing remains an active research area with growing interest...

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Repository News

Welcome to Mutation Testing repository

Mutation Testing is a fault-based software testing technique that has been widely studied for over three decades. The literature on mutation testing has contributed a set of **approaches**, tools and empirical studies. This repository aims to provide a full coverage of the publications in the literature on Mutation Testing.

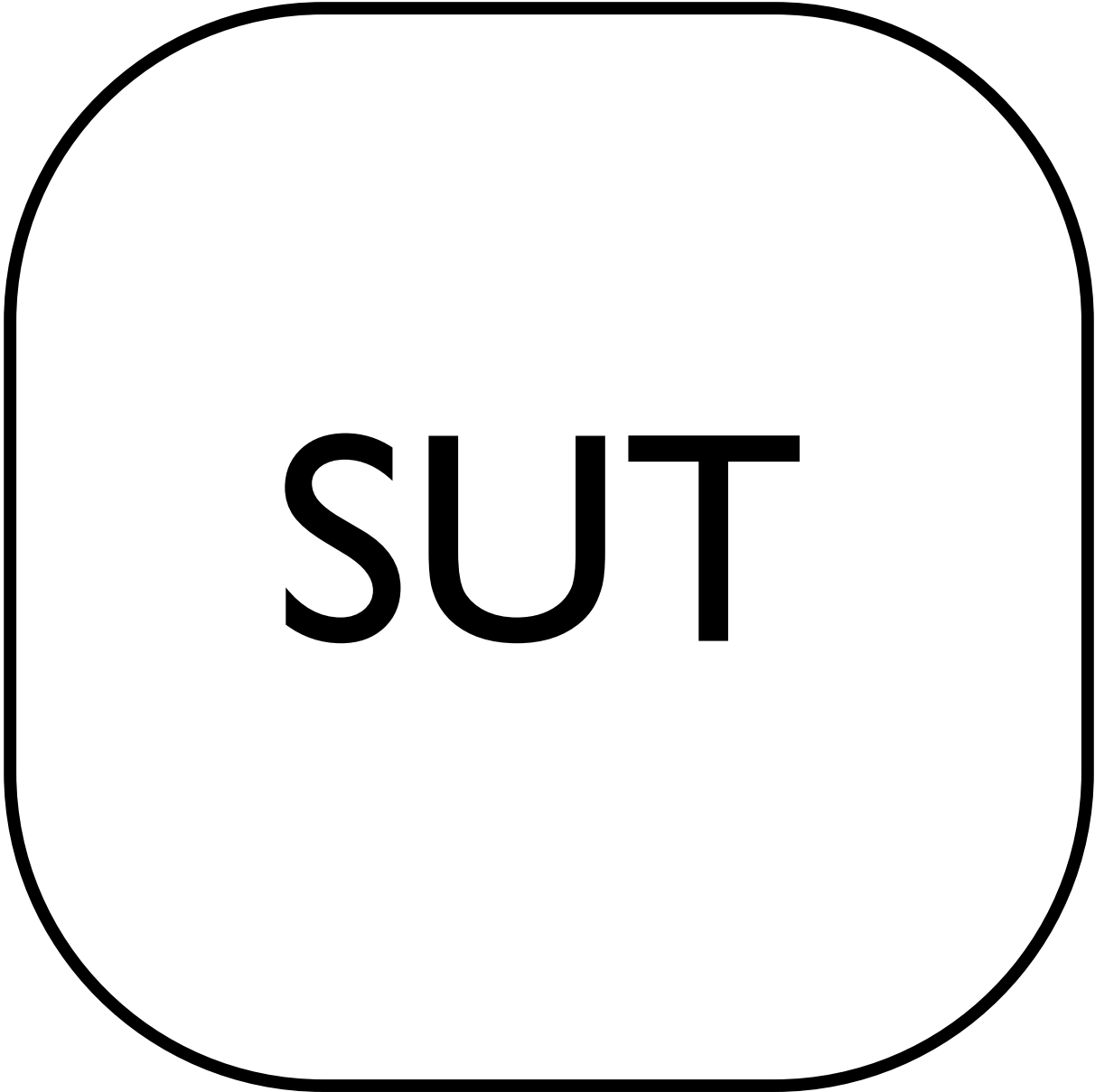
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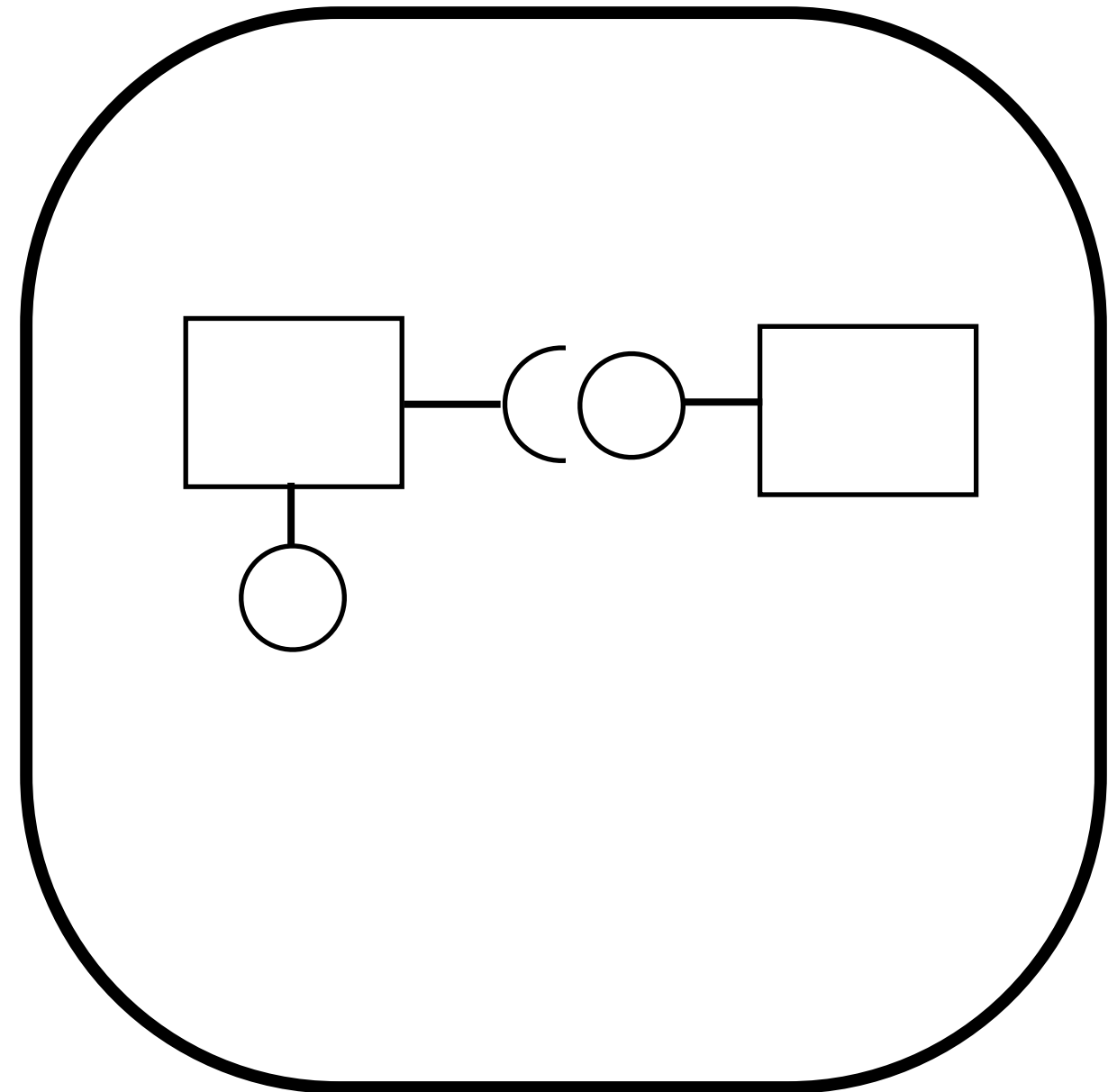
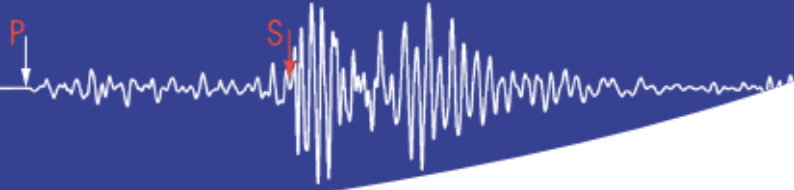


SUT

SAFER



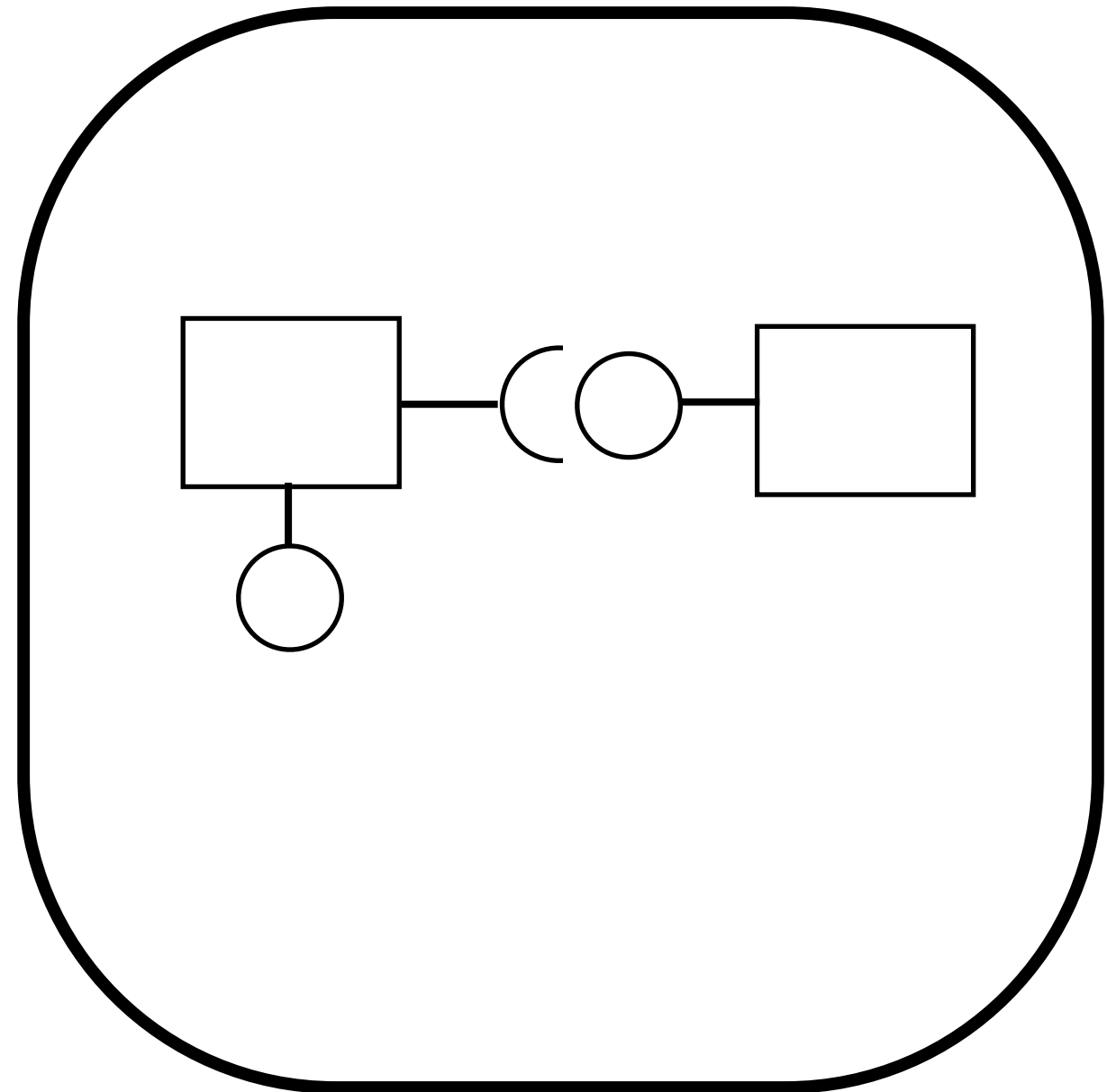
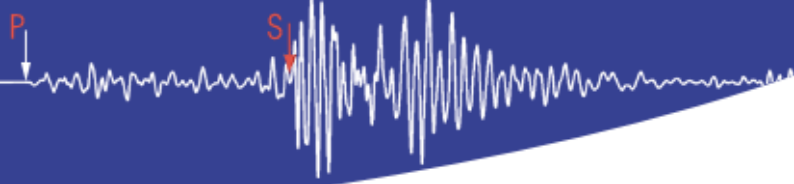
Seismic eArly warning For EuRope



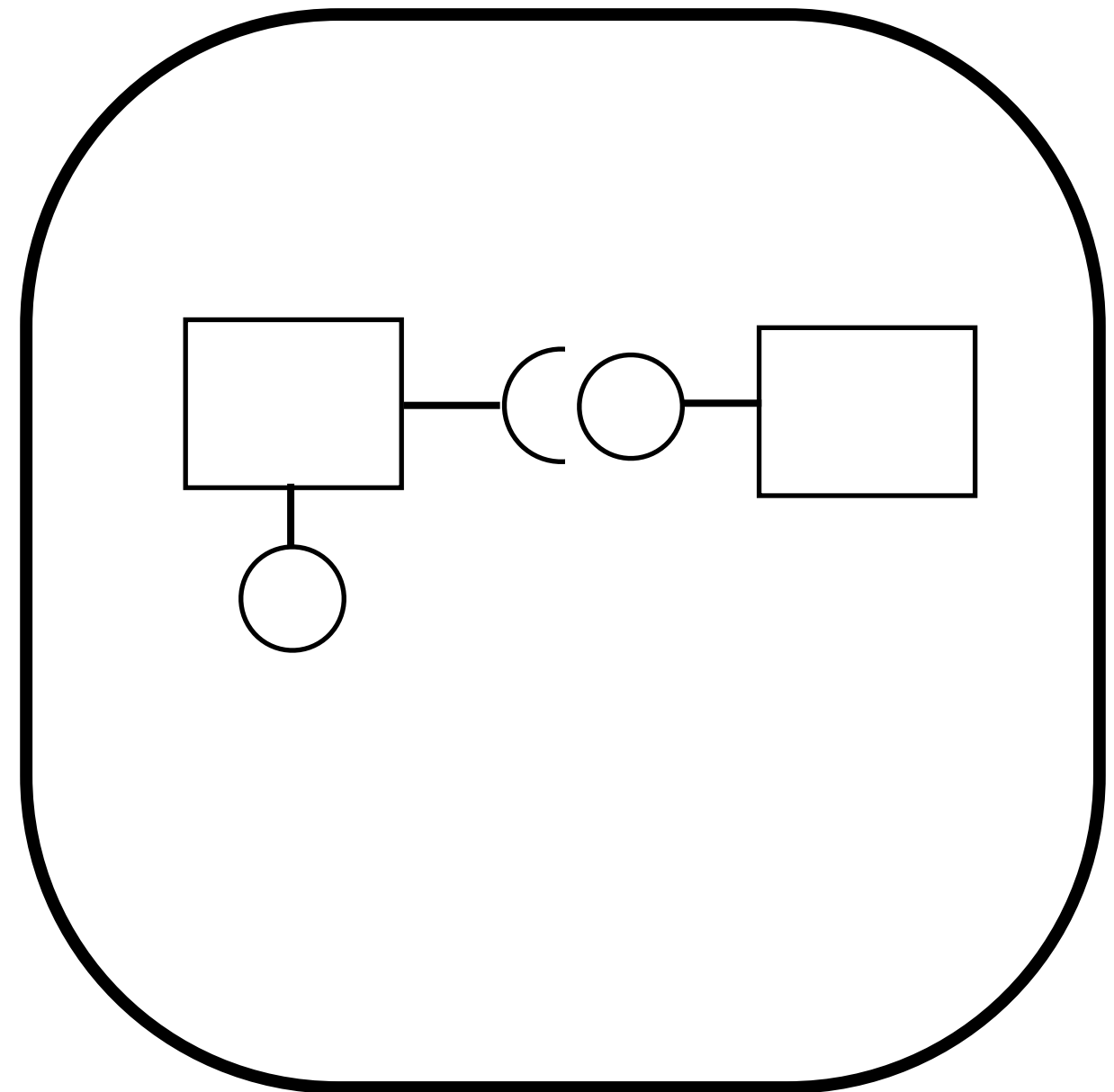
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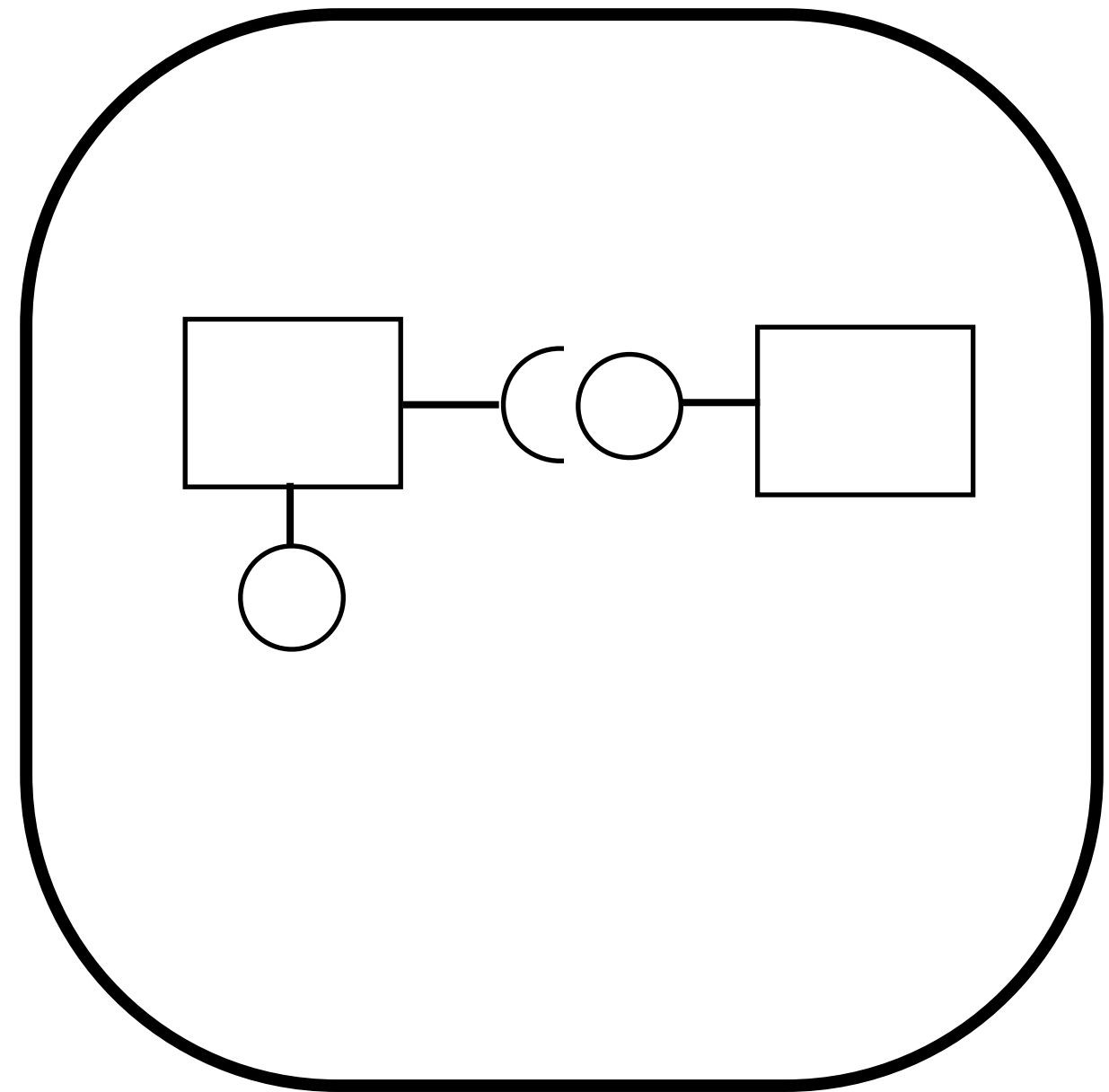


Seismic eArly warning For EuRope



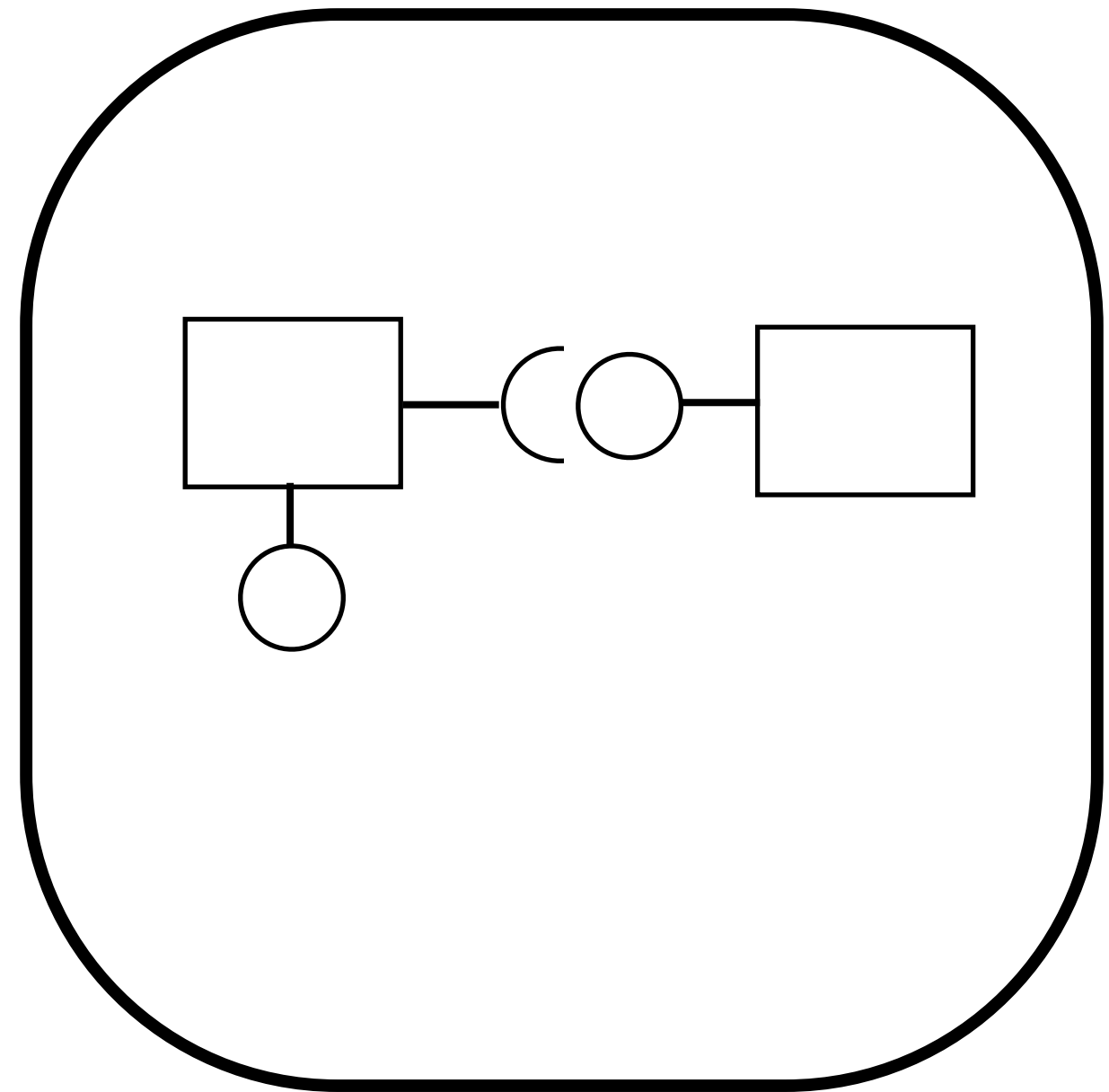
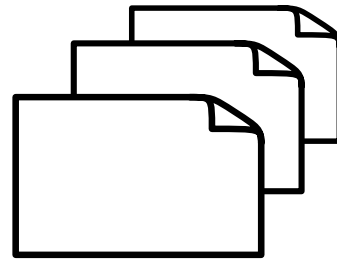
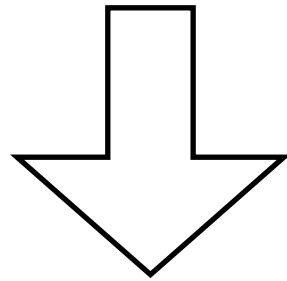




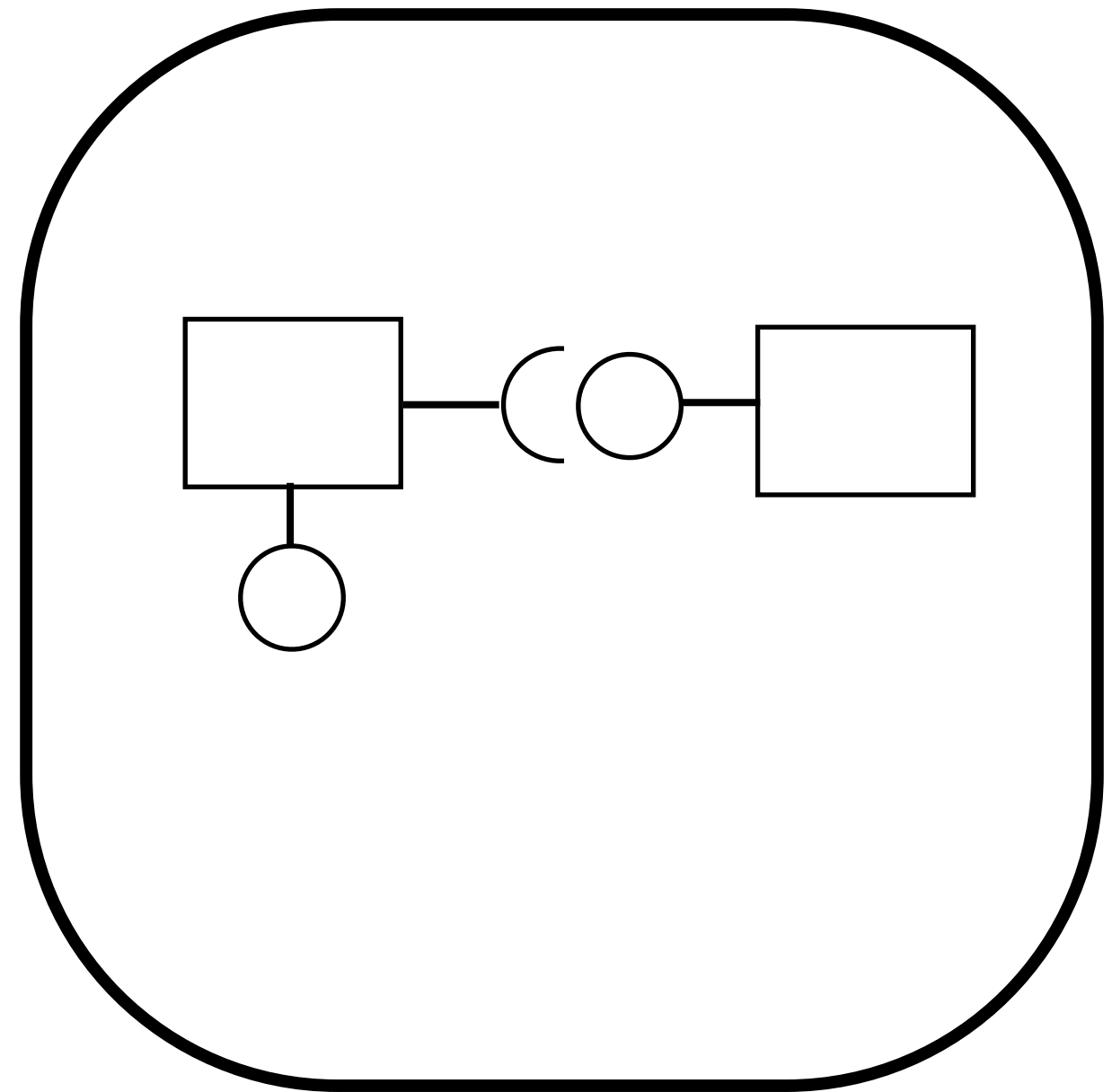
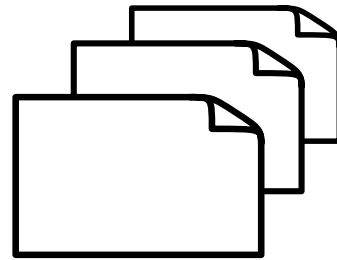


OSGi
(modularization for Java)

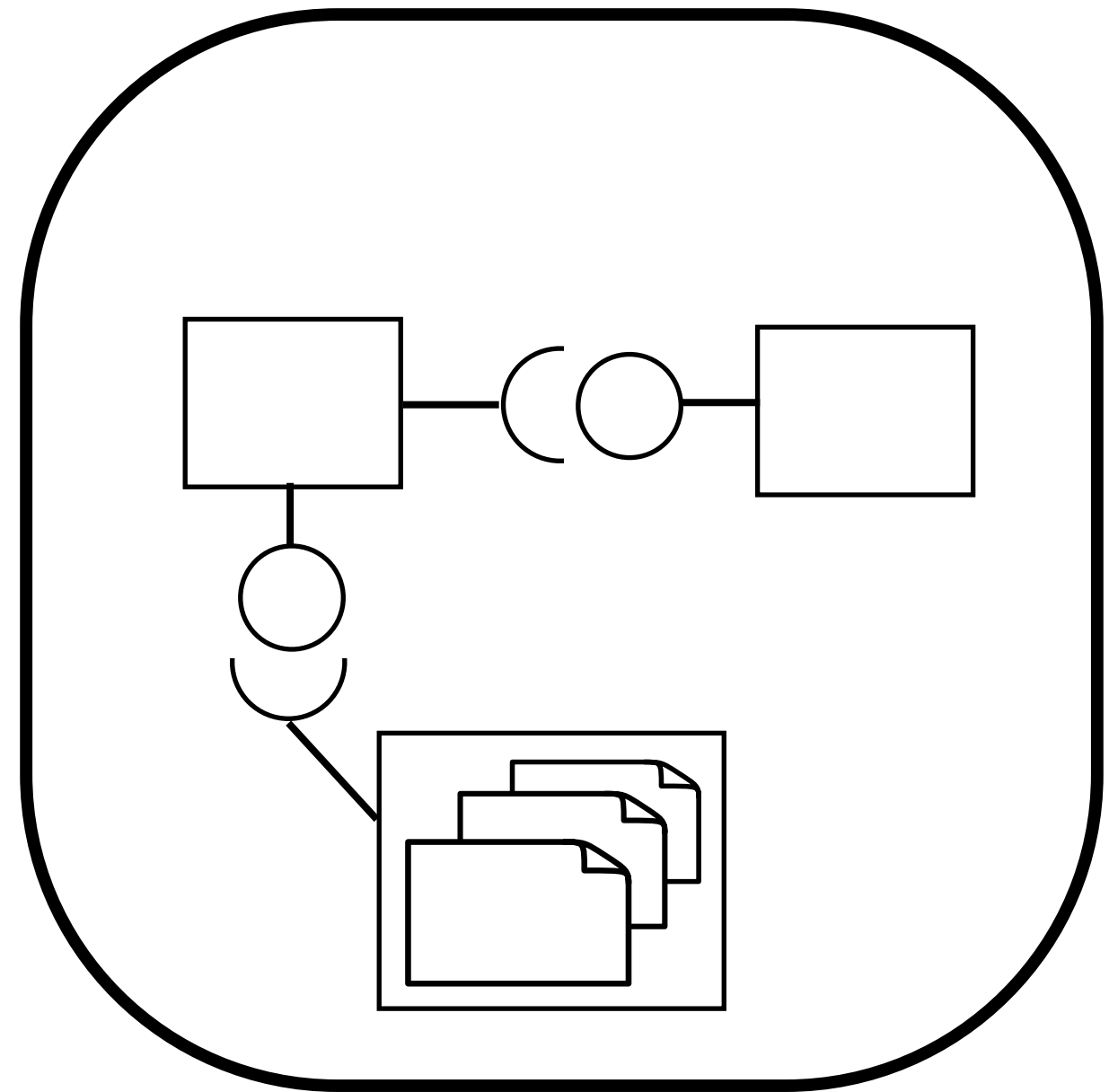
MTF



OSGi
(modularization for Java)

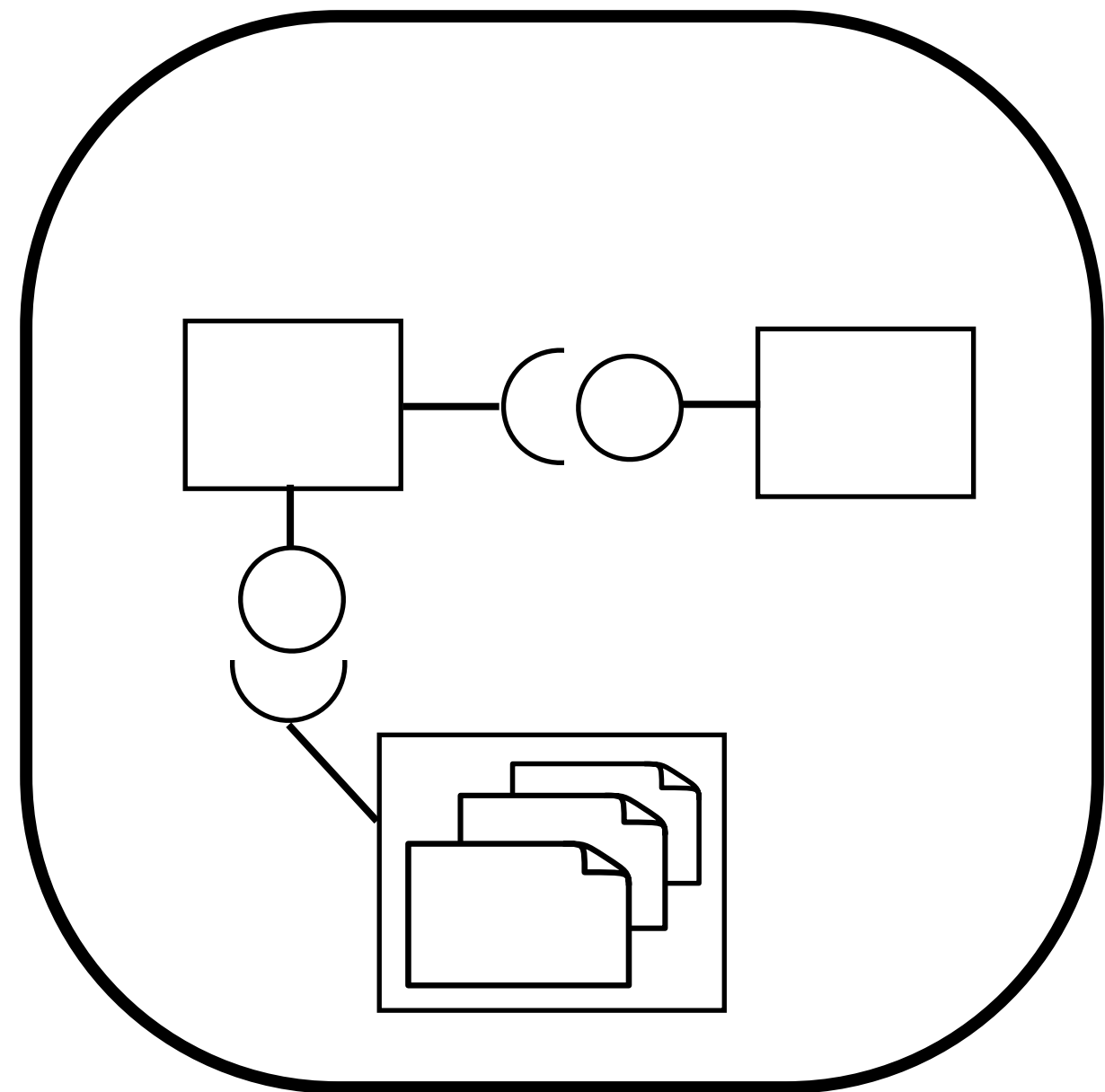


OSGi
(modularization for Java)



OSGi
(modularization for Java)

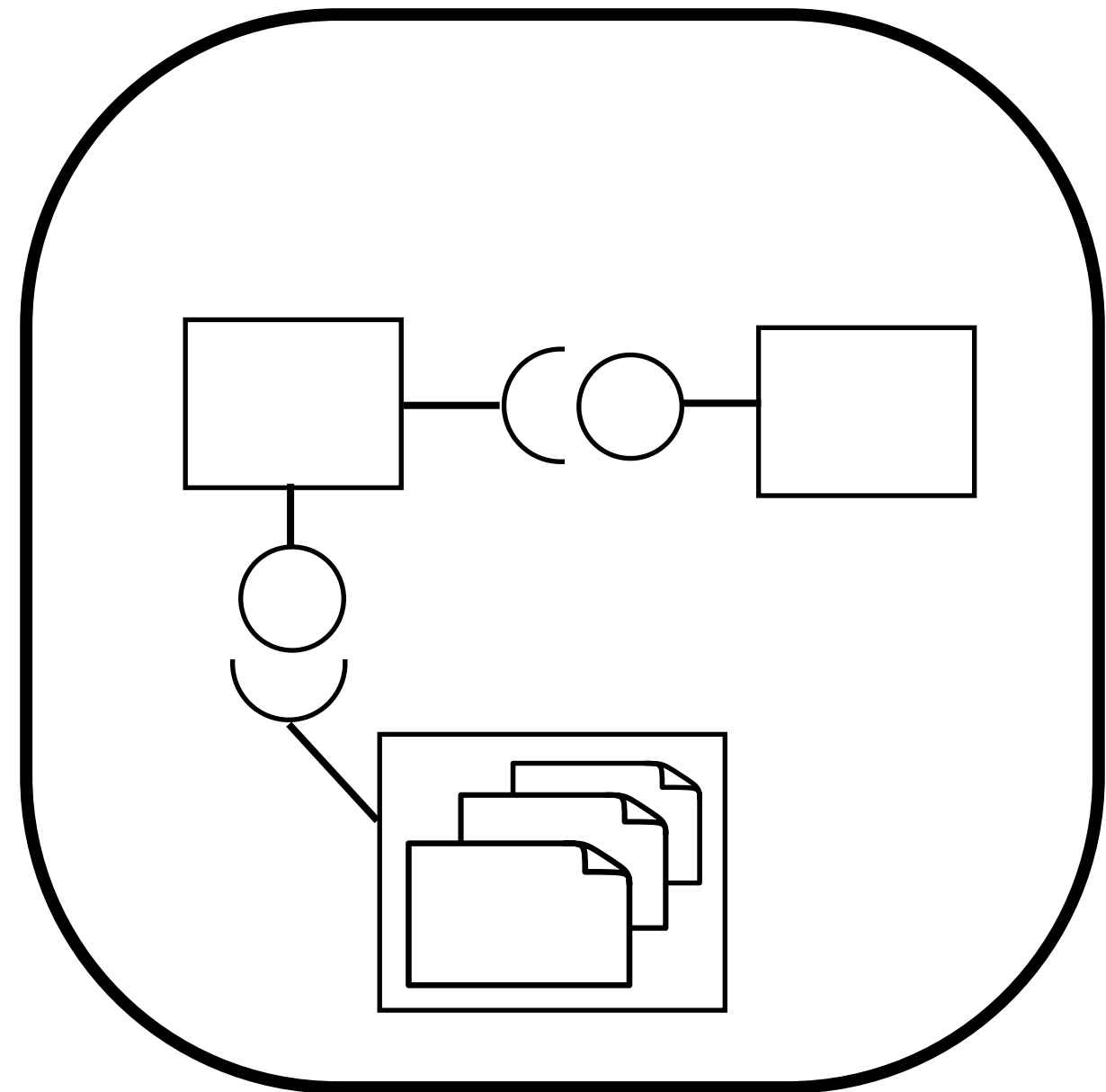
Jumble
Javalanche



OSGi
(modularization for Java)

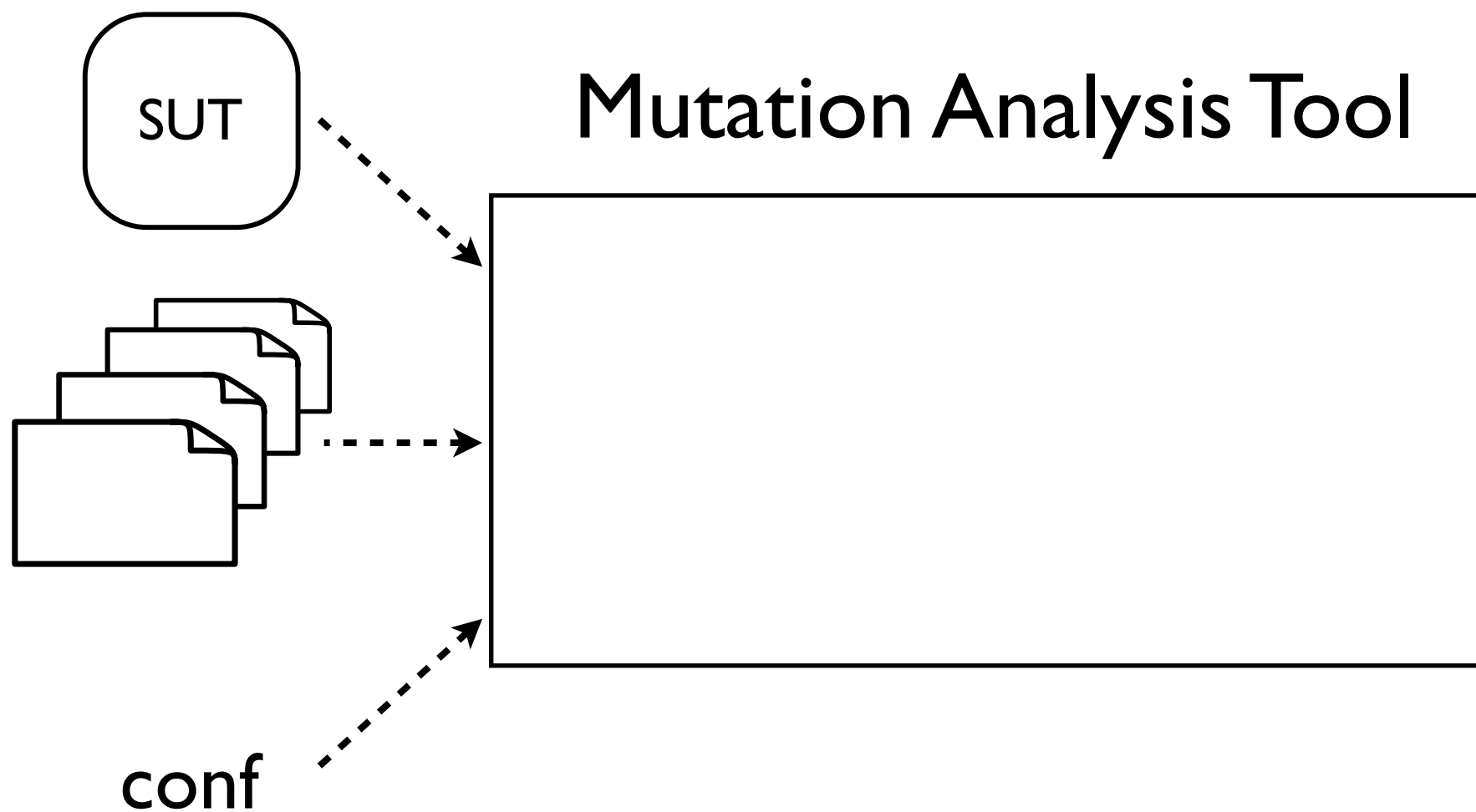
Jumble
Javalanche

?

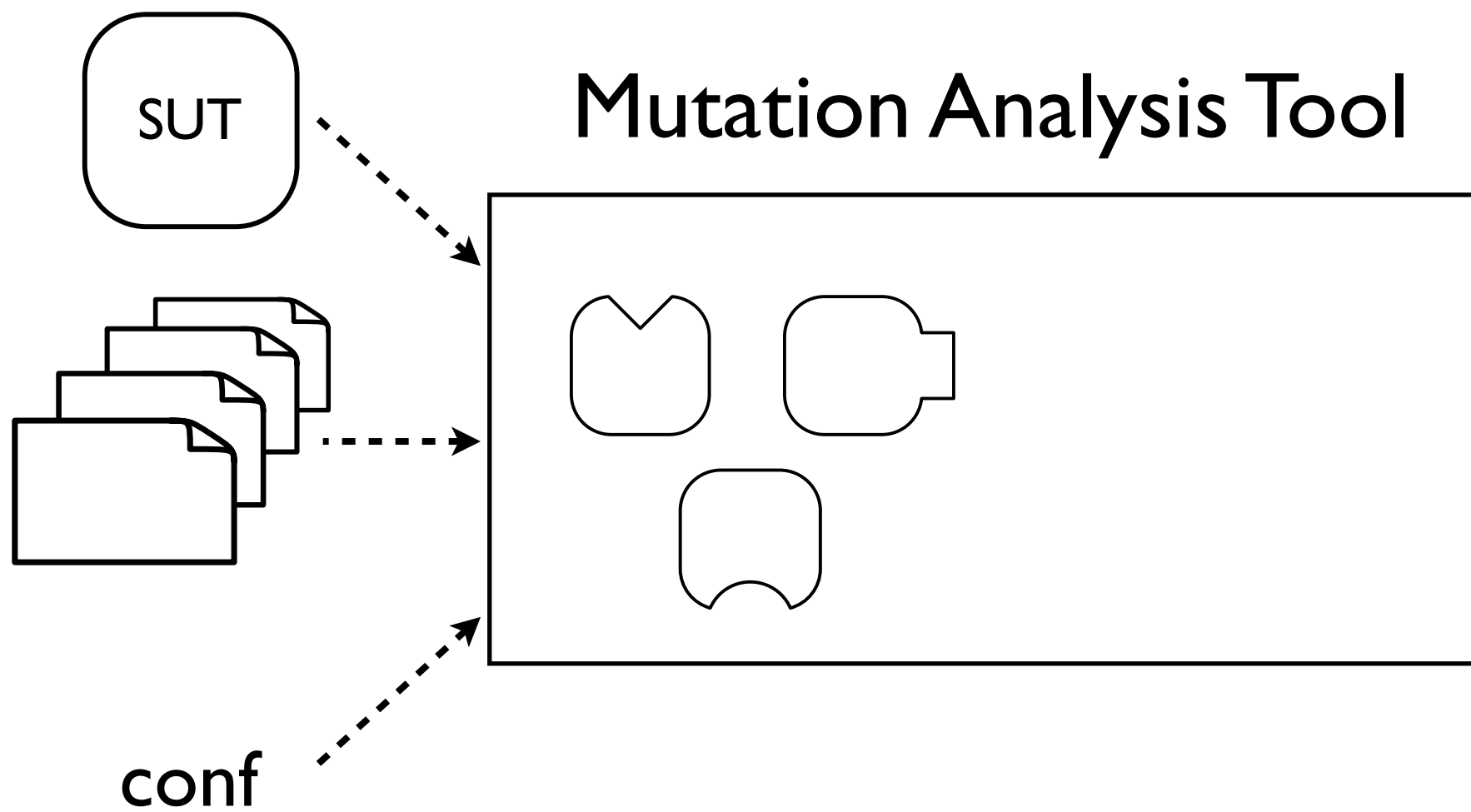


OSGi
(modularization for Java)

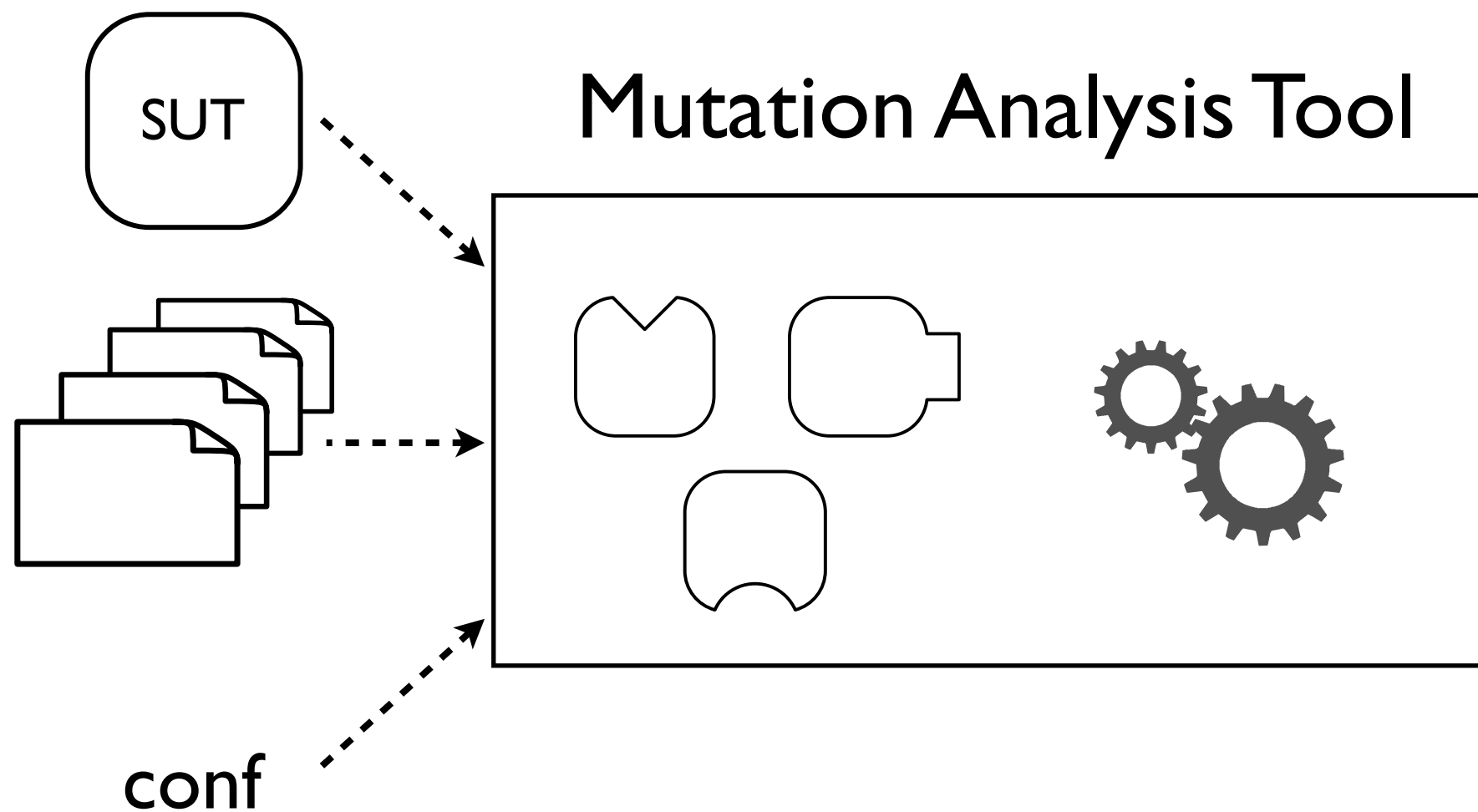
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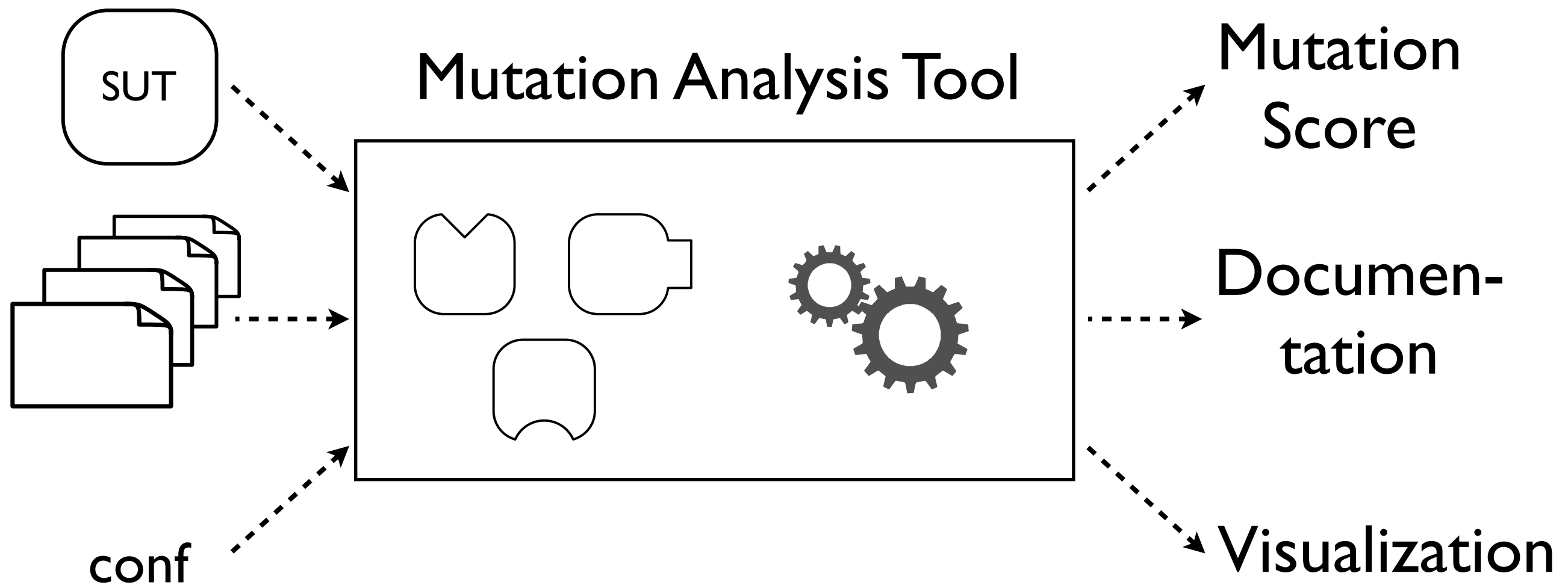
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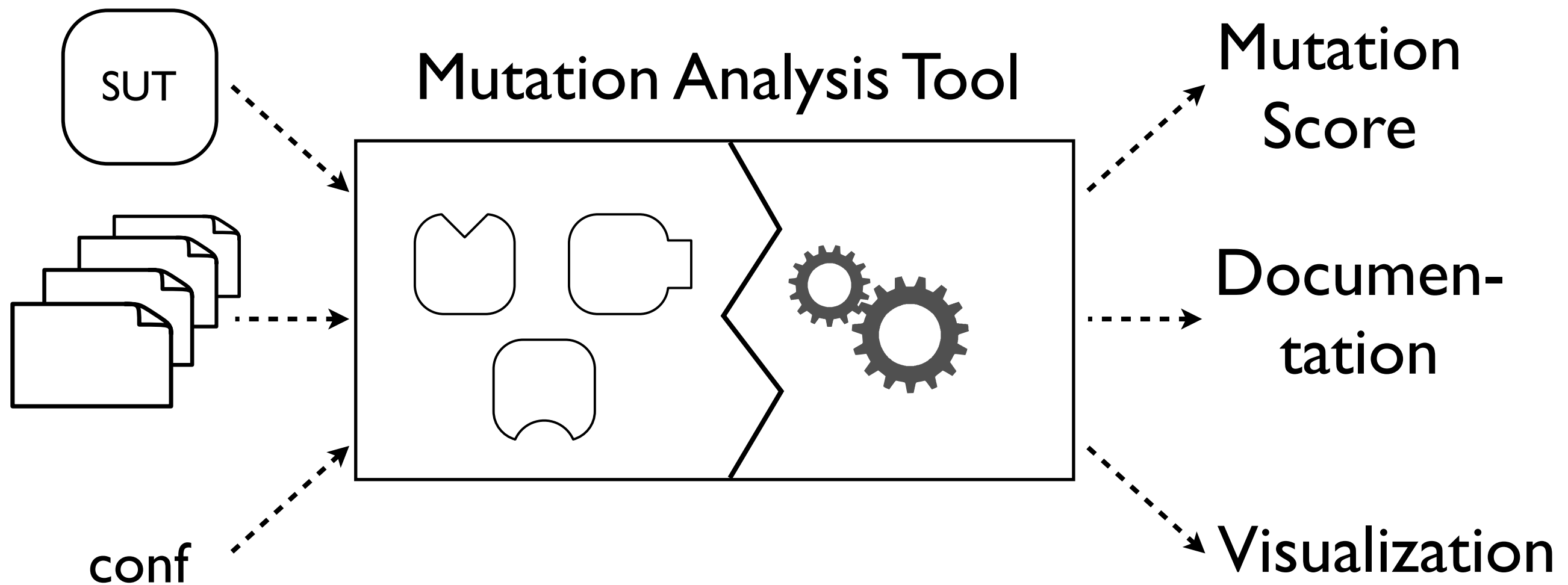
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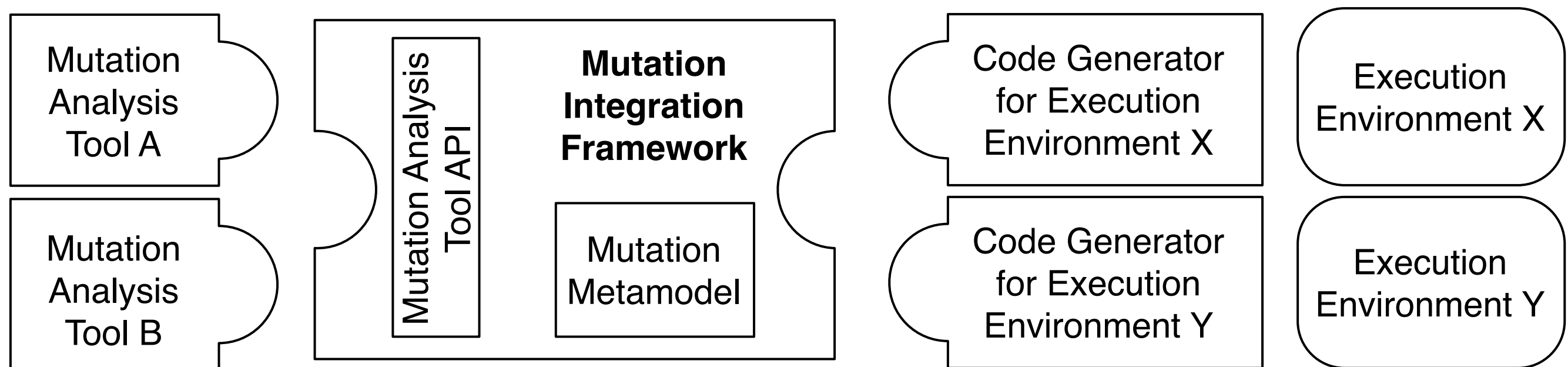
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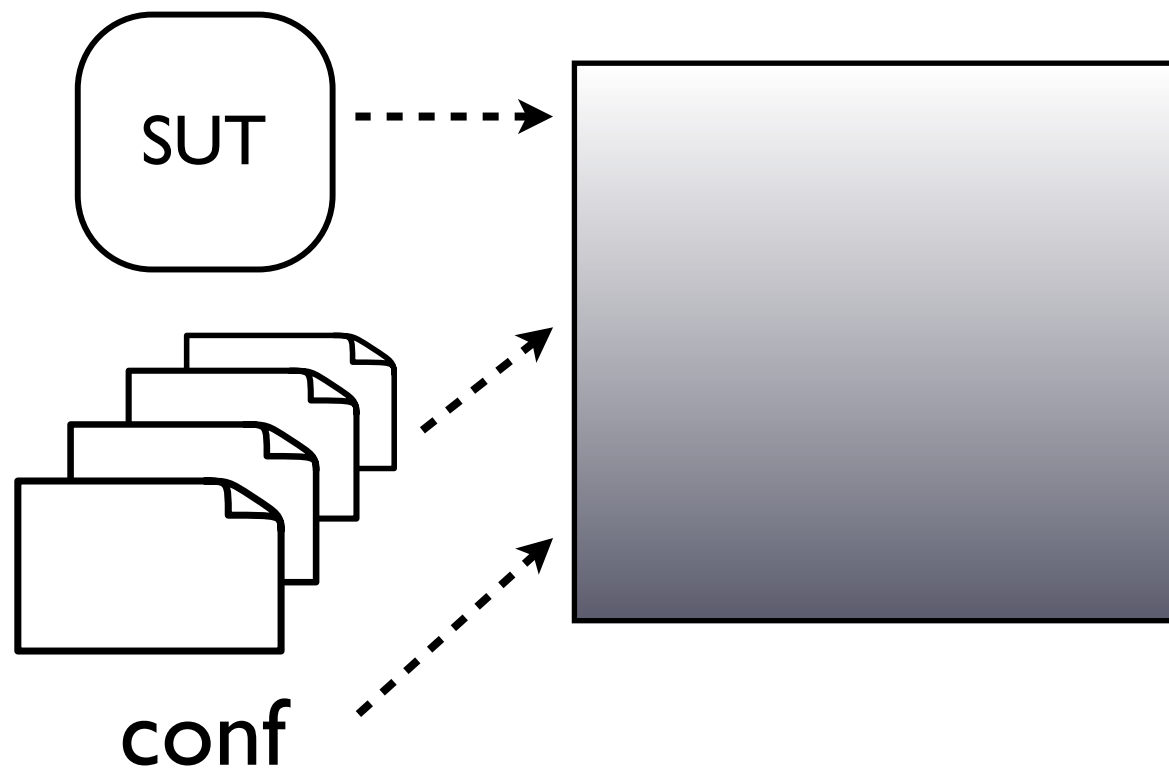
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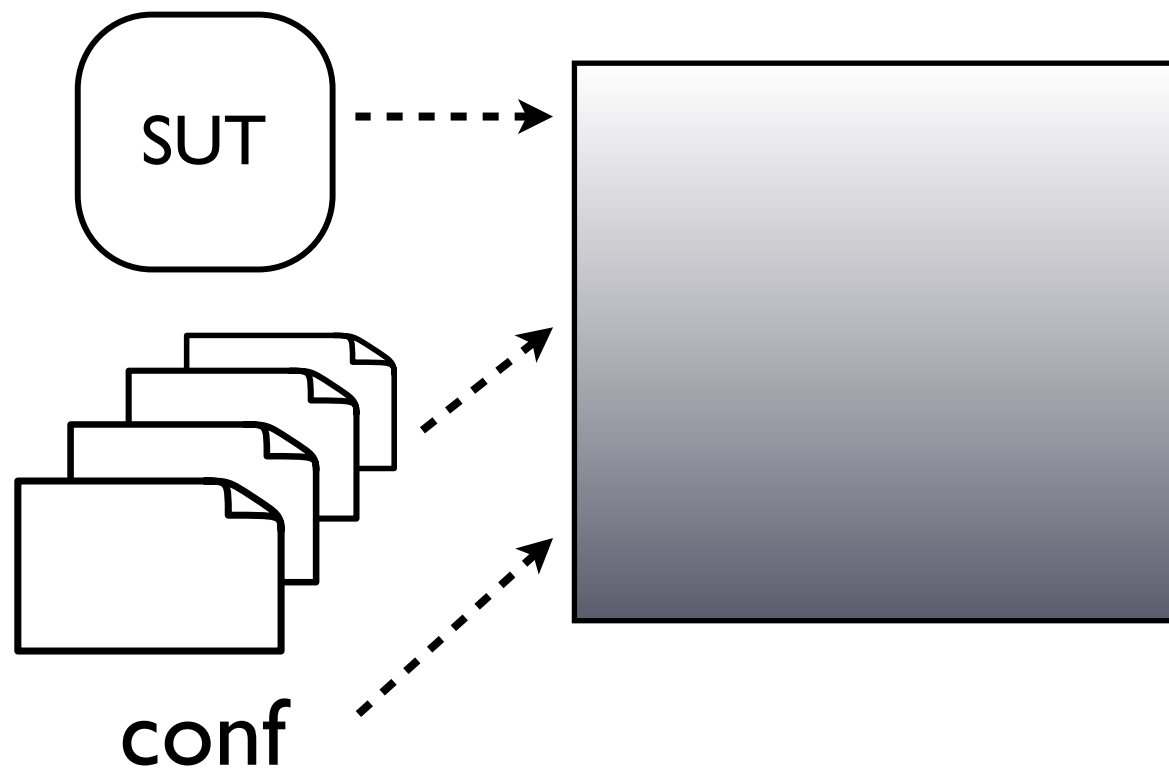
Approach



Approach

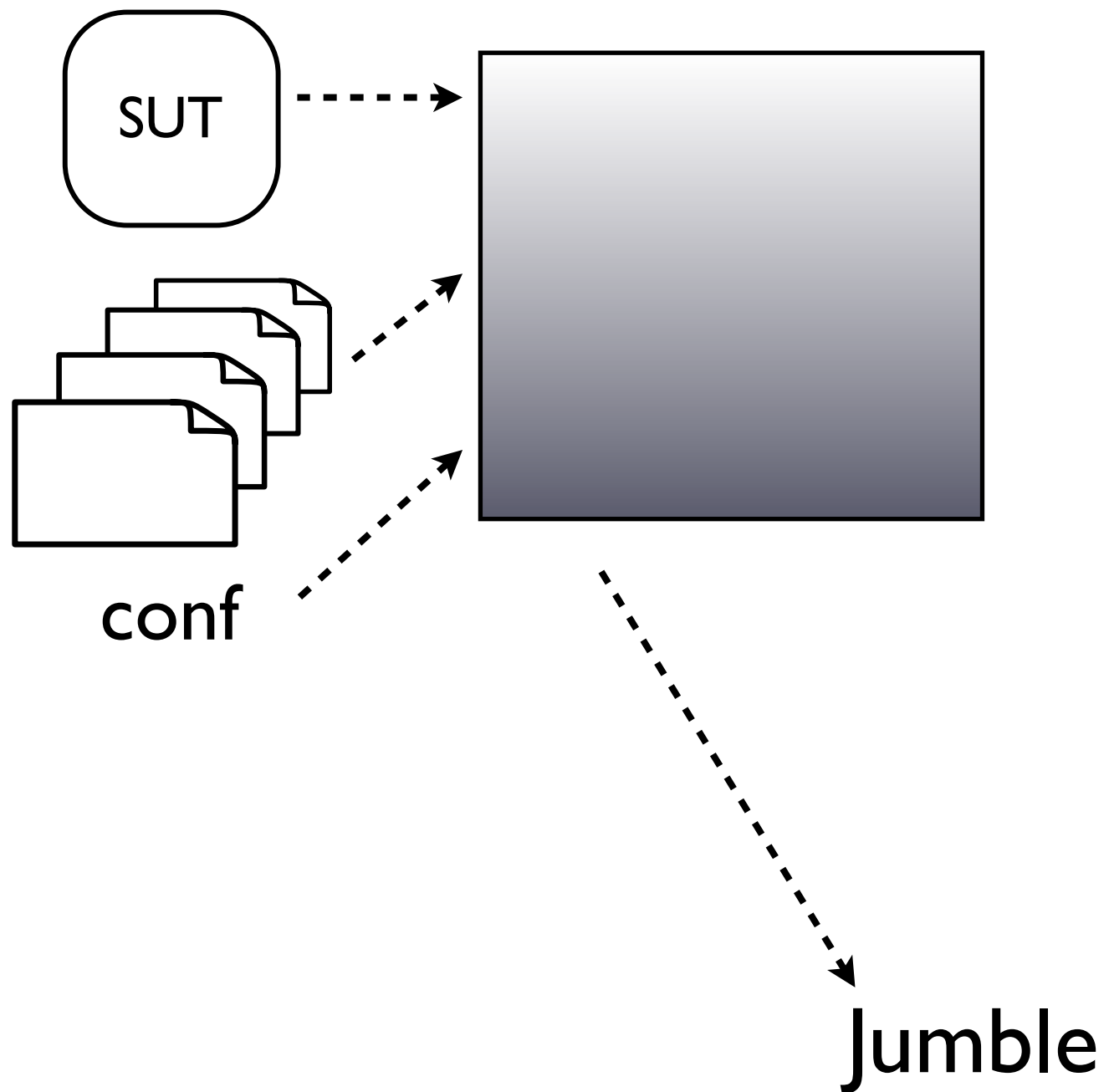


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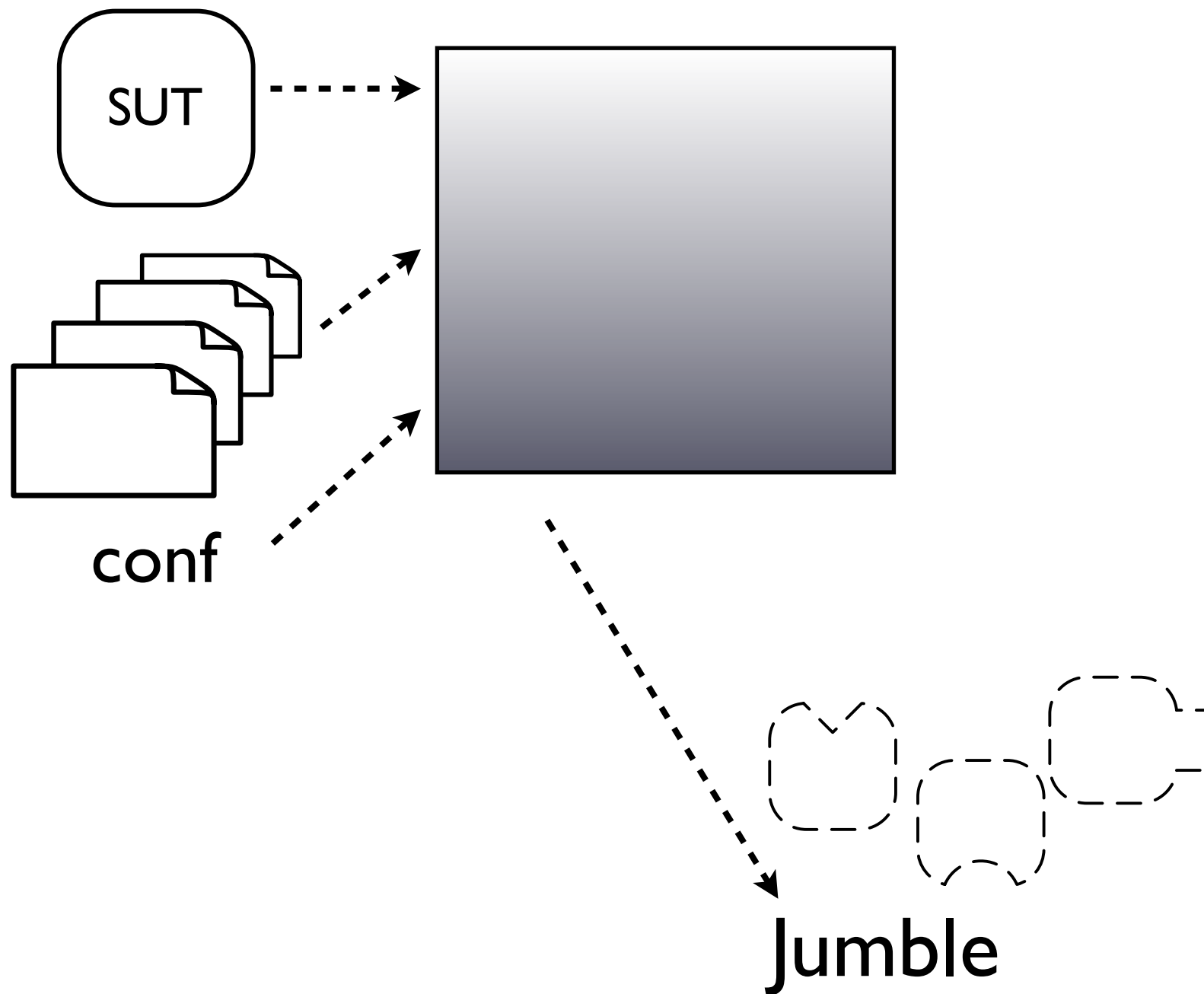


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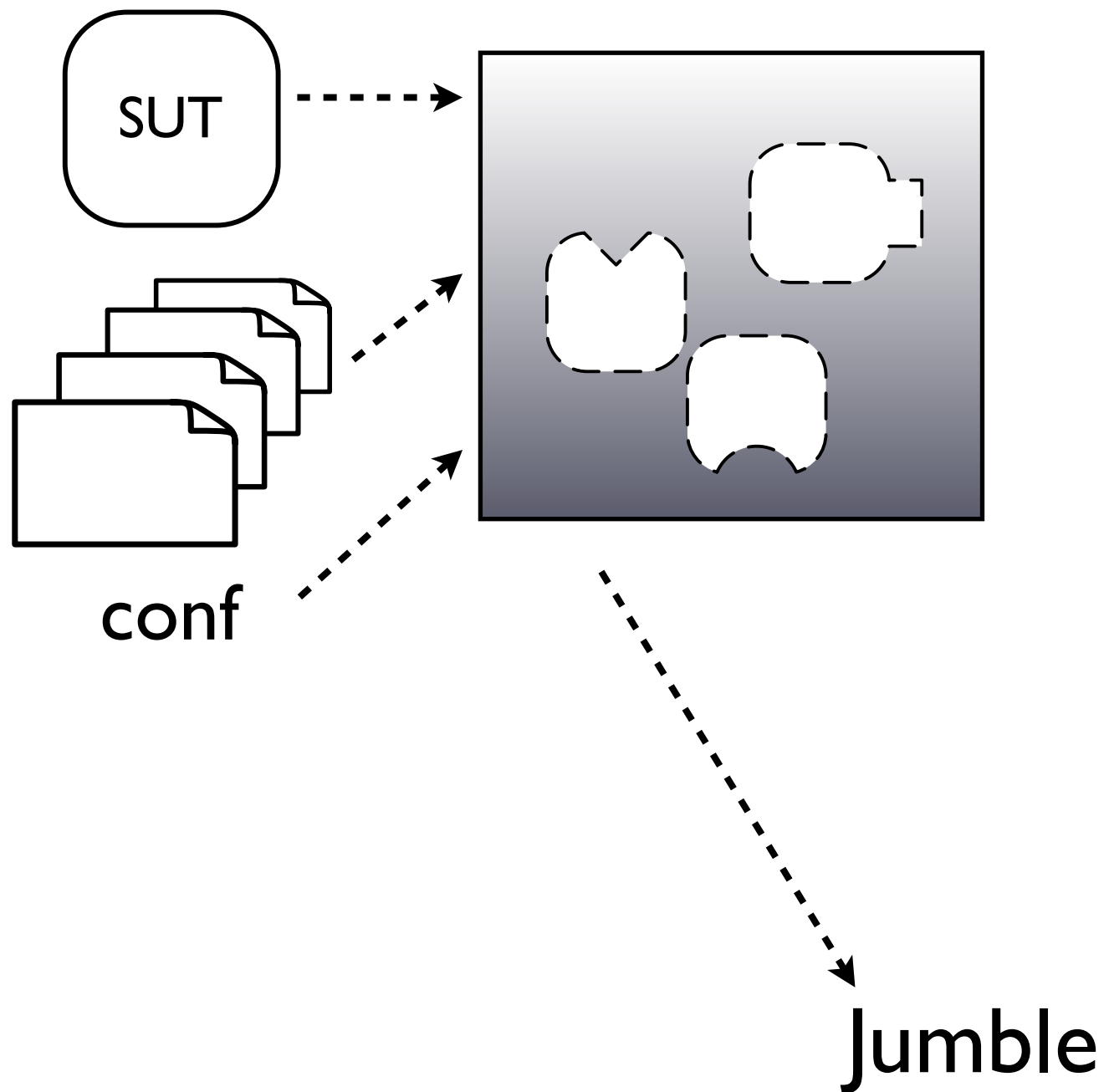
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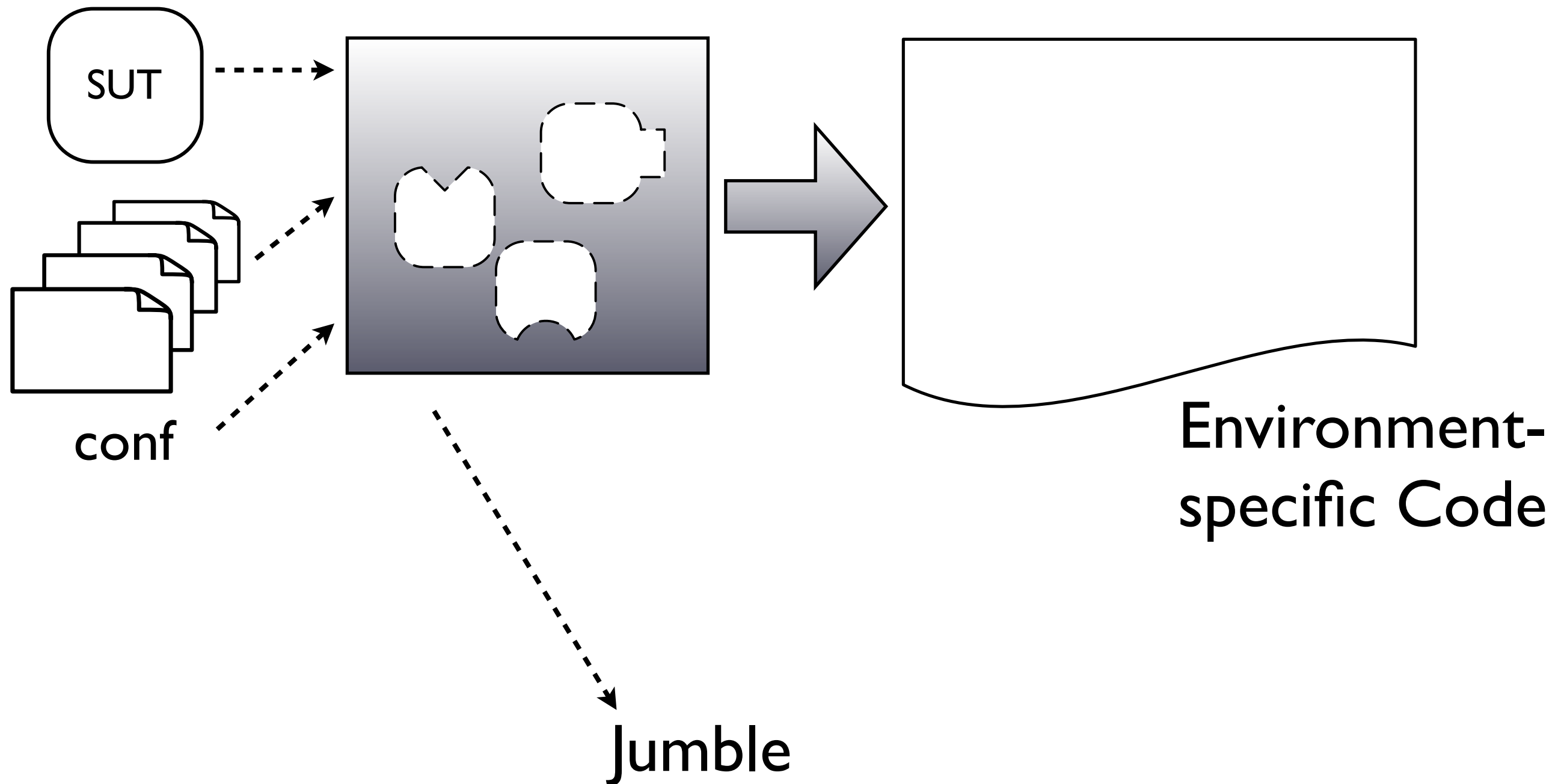
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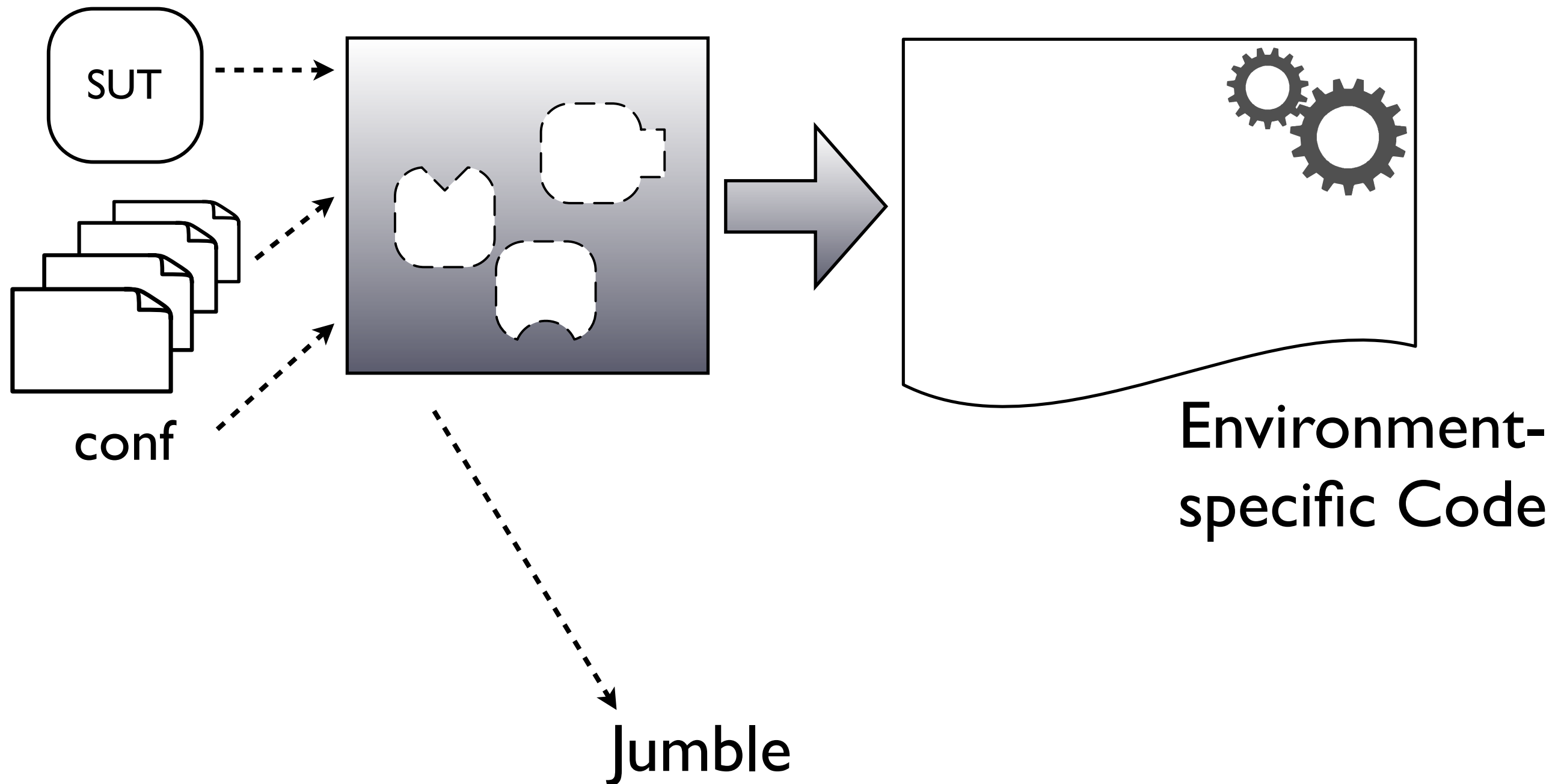
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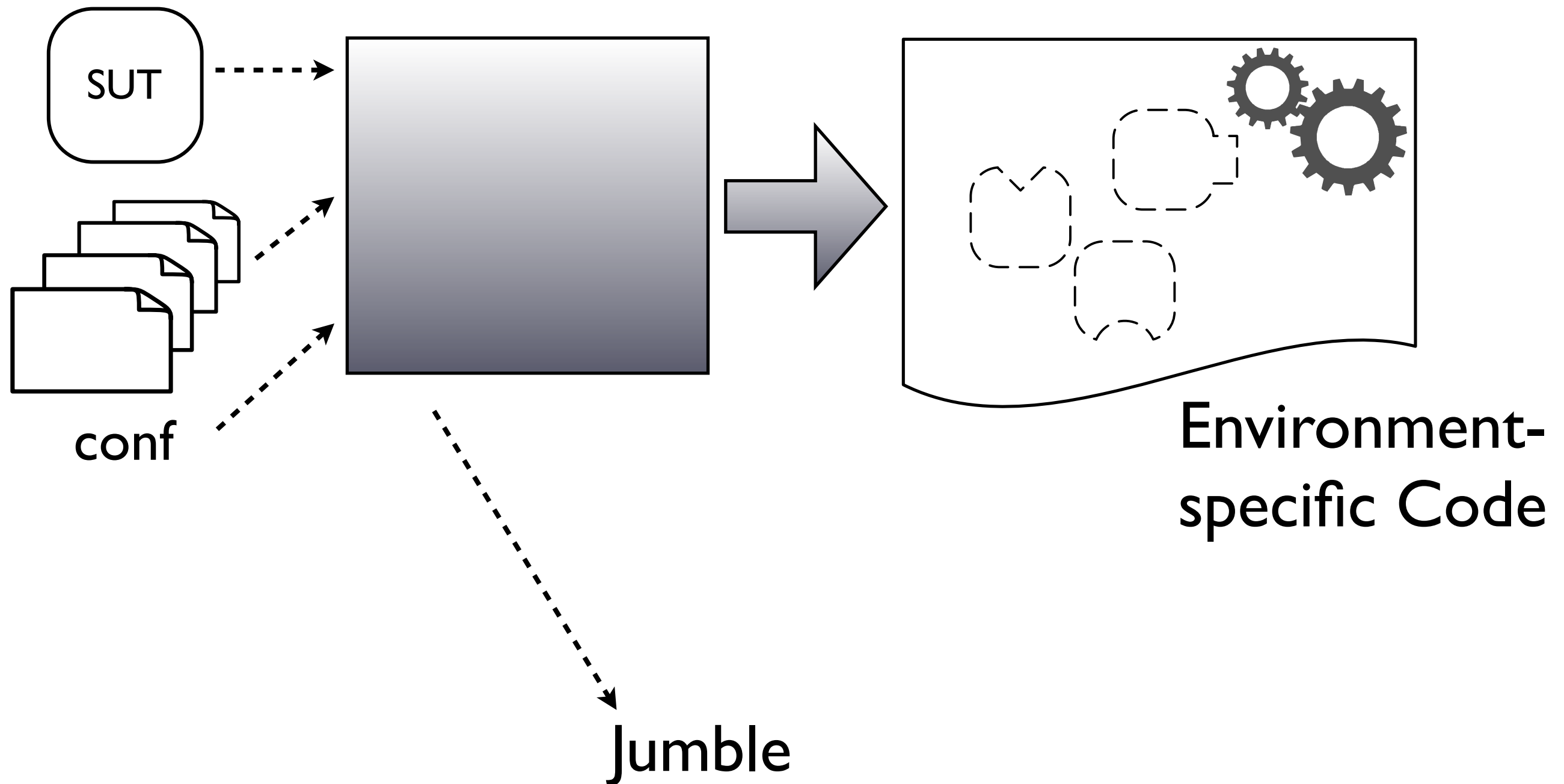
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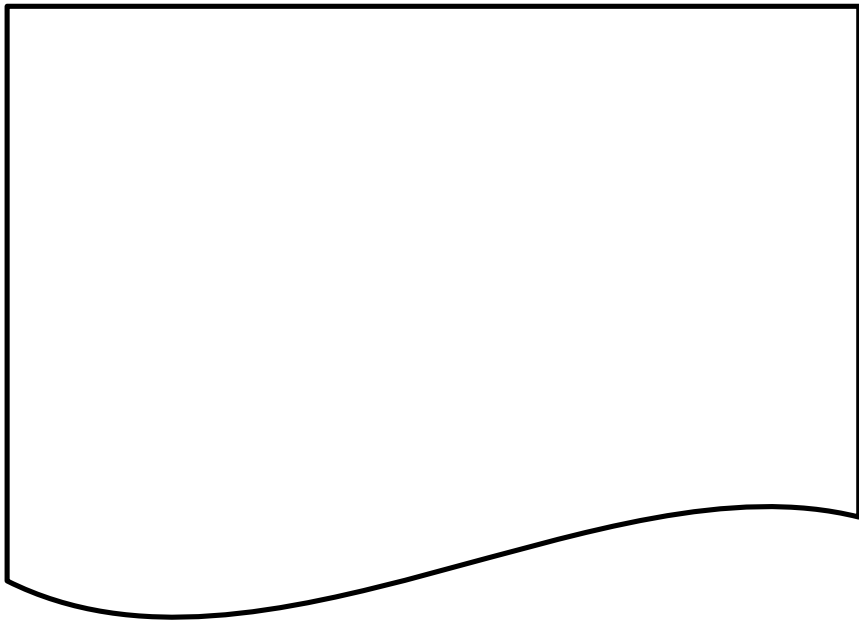
Approach



Approach

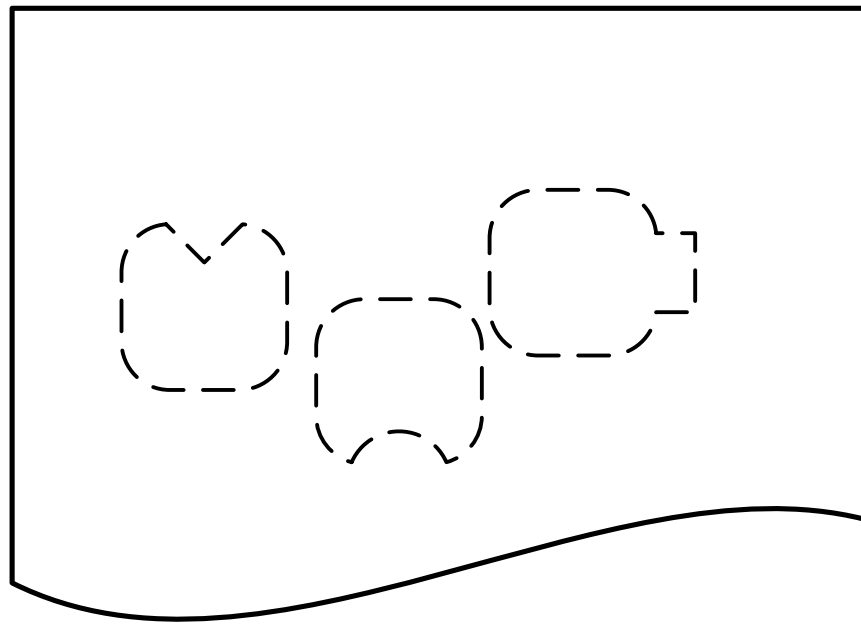


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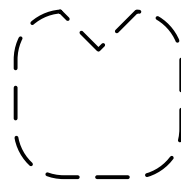
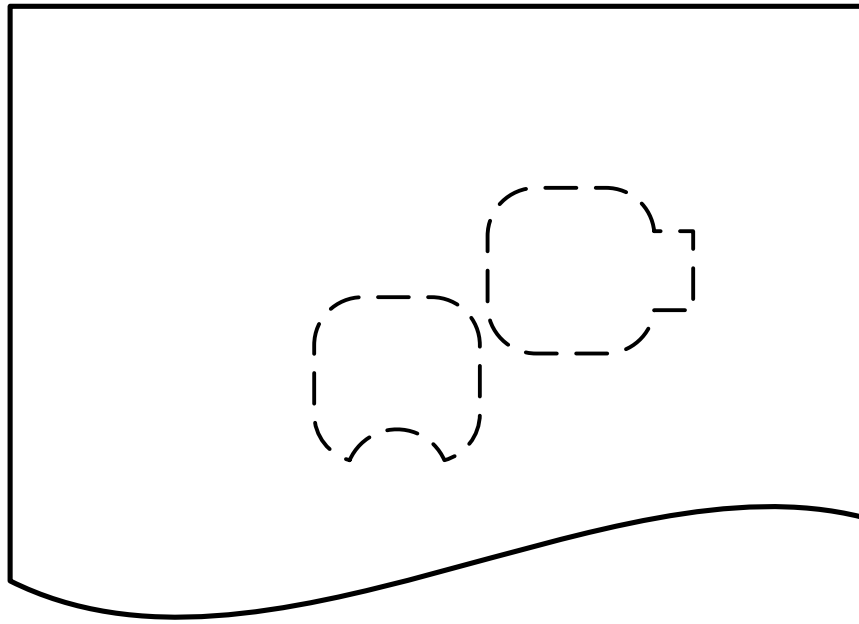
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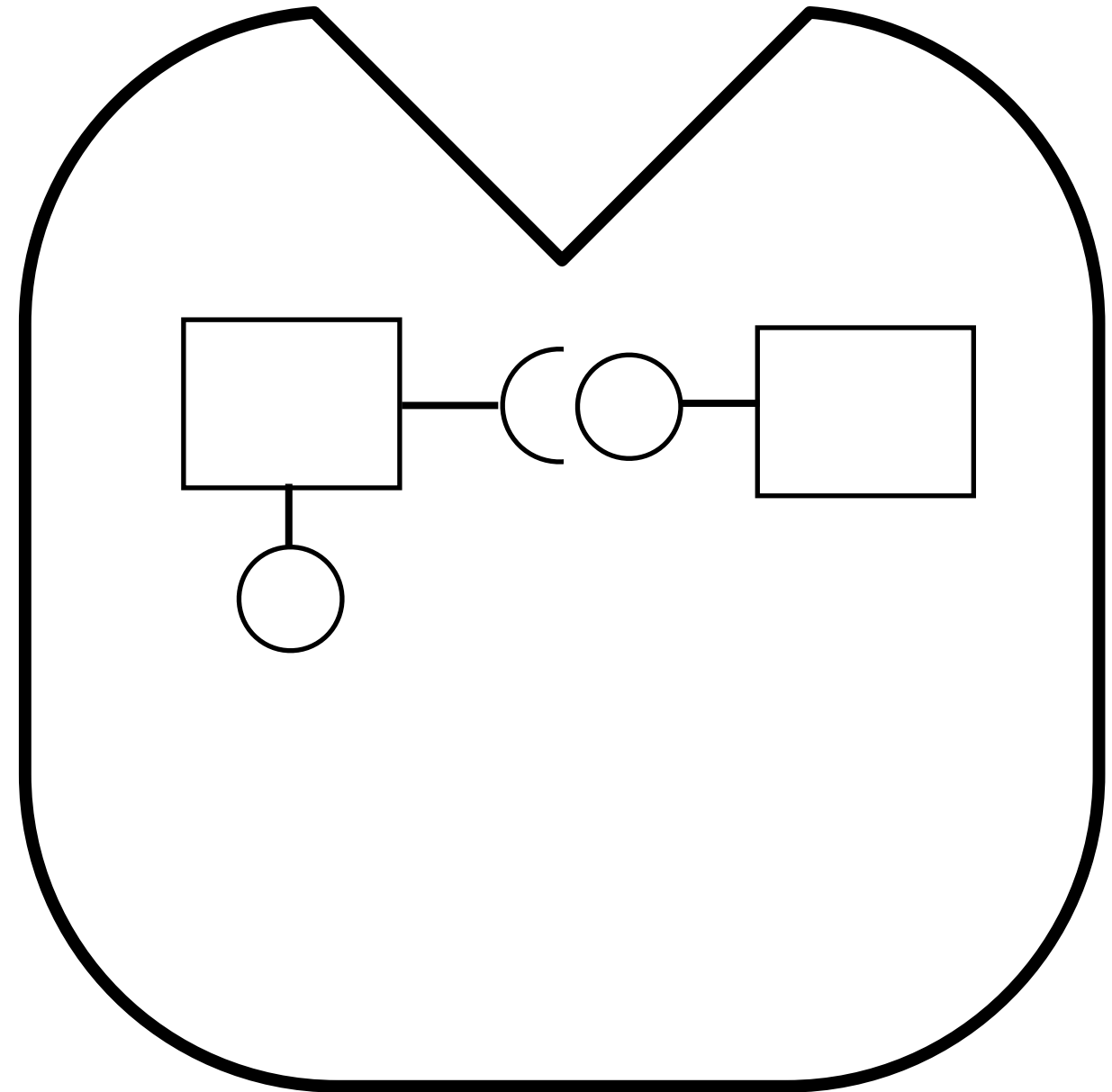
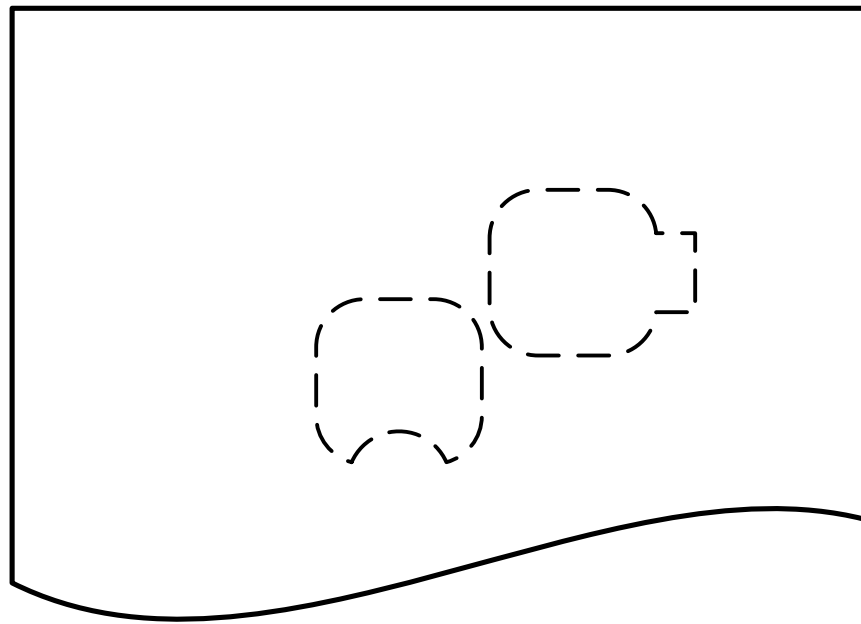
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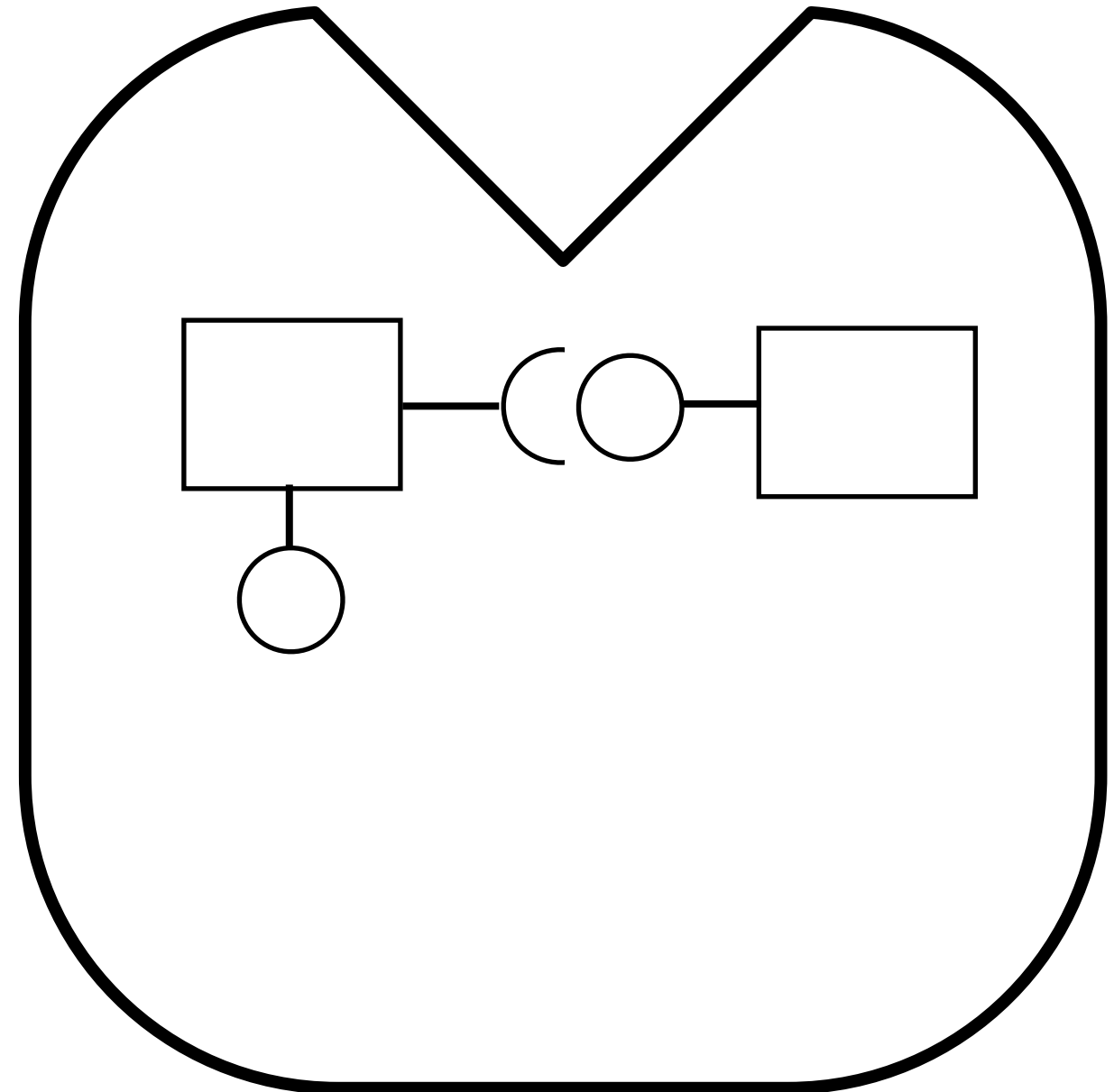
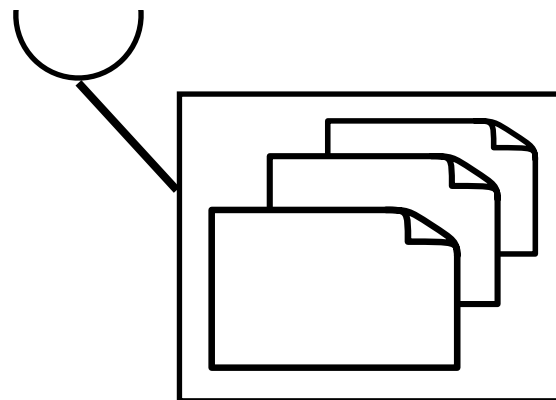
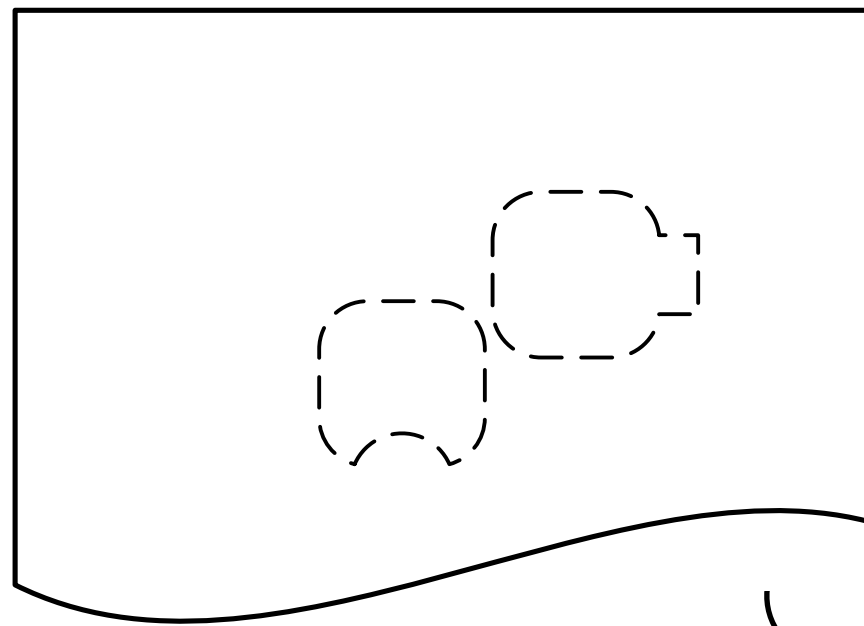
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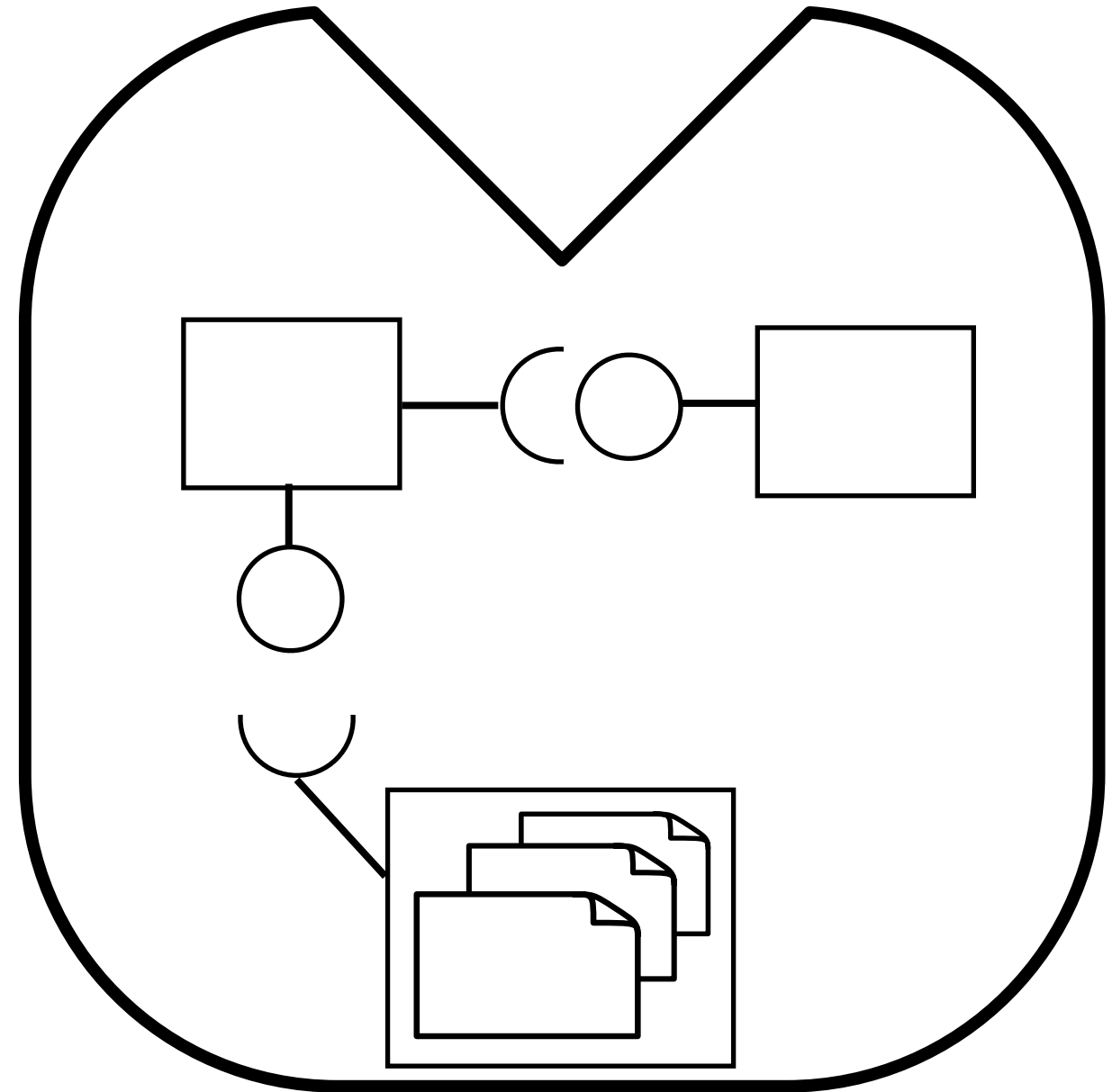
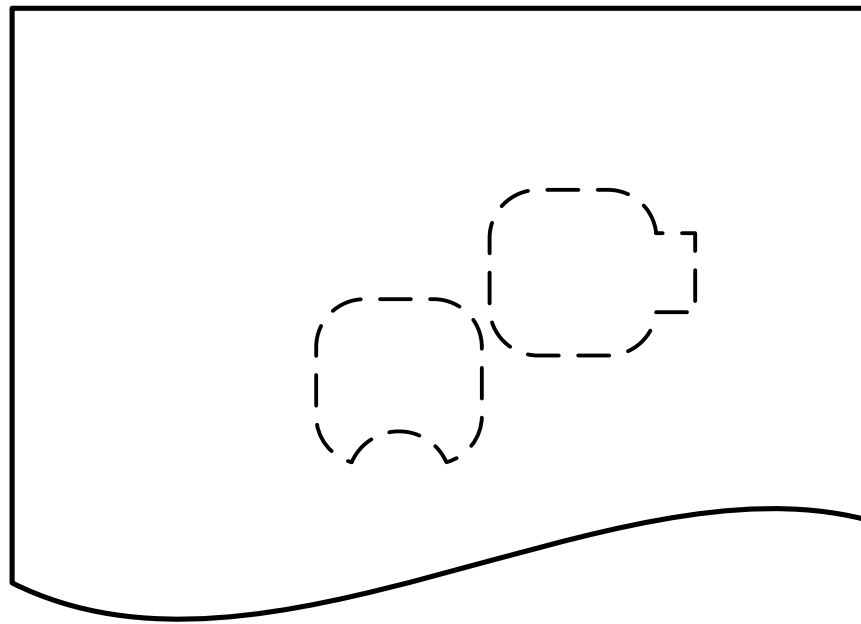
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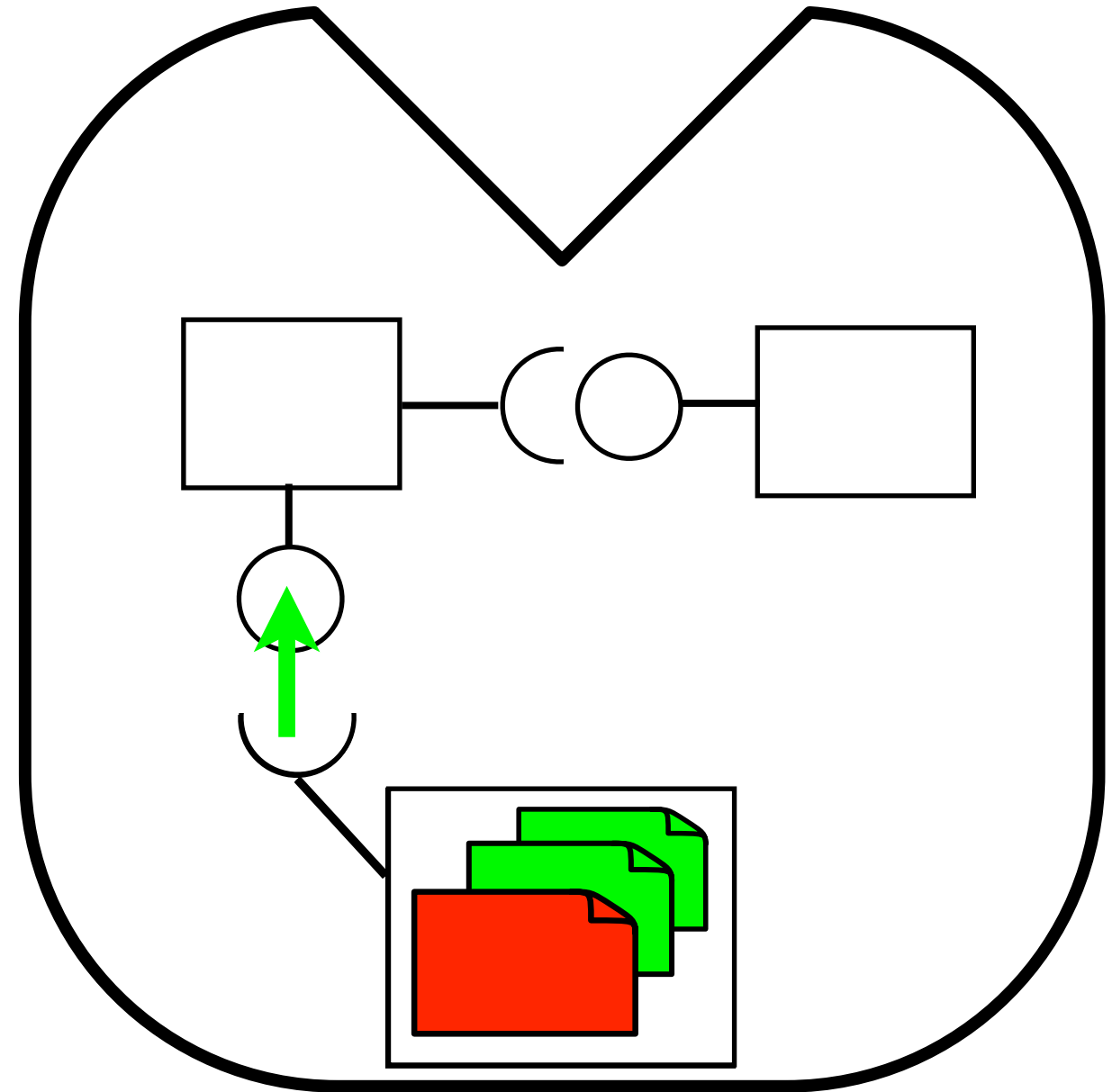
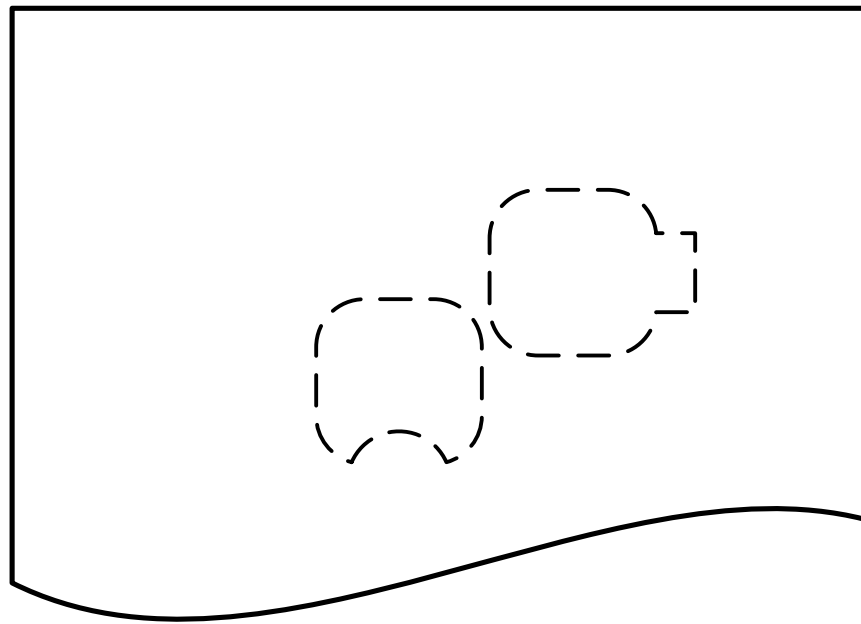
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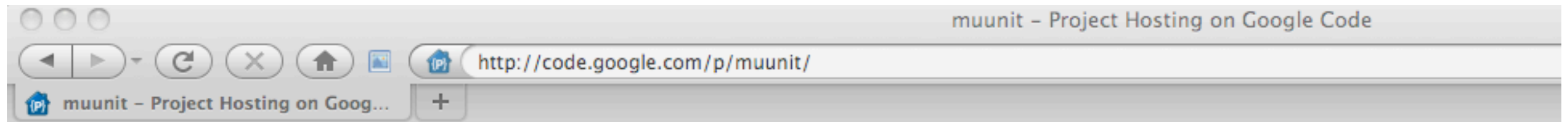
Jumble

Approach



Jumble

Demo



muunit

MuUnit - generate your mutants!

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MuUnit is a model-based mutation analysis framework. Its outstanding features are:

- extensible set of mutation analysis tools through the OSGi Services mechanism (currently [Jumble](#) and [Javalanche](#))
- independence of the test execution environment through code generation (using the [Eclipse Workflow Environment](#))

MuUnit is integrated with the Eclipse environment, which makes generation of mutation analysis code easy.

Conclusion

- Mutation Analysis to measure the fault detection ability of a test suite
- Mutation Analysis Tools have hard requirements on the execution environments
- We separate the calculation and creation of mutants to support any execution environment (by generating code)