MUTATION TESTING FOR DSLS TOOL DEMO

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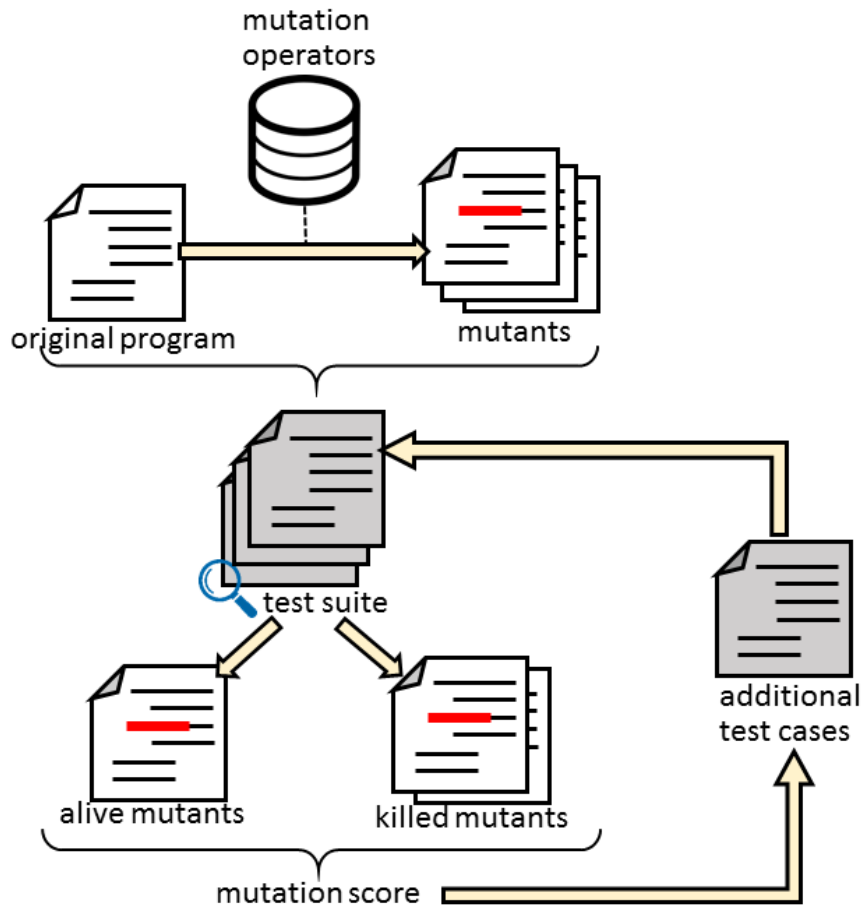*http://antares.sip.ucm.es/testing*
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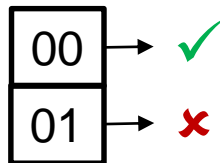# WHAT IS MUTATION TESTING?

- Approach of software testing to assess the quality of test suites

- Injection of syntax changes in a program by using mutation operators

- The mutations introduced simulate common programming faults

- Facilitates to improve the quality of the test-suites and the mutation operators set
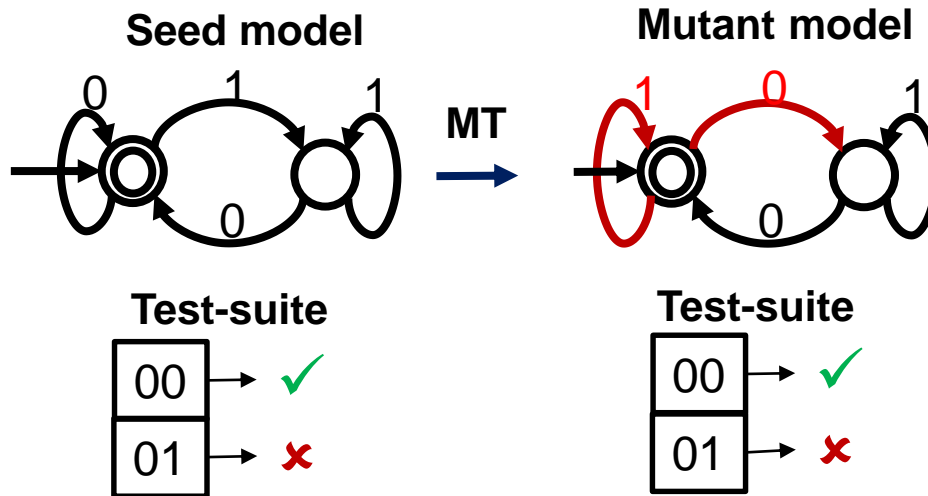
MUTATION TESTING FOR FA
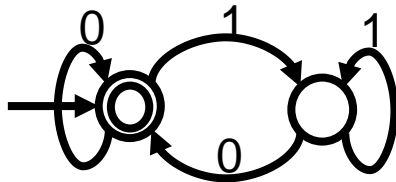
Seed model

Test-suite

| 00 | → | ✓ |
| 01 | → | ✗ |

MUTATION TESTING FOR FA

Seed model

MT

Mutant model

Test-suite

| 00 | ✓ |
| 01 | ✗ |

Test-suite

| 00 | ✓ |
| 01 | ✗ |

MUTATION TESTING FOR FA
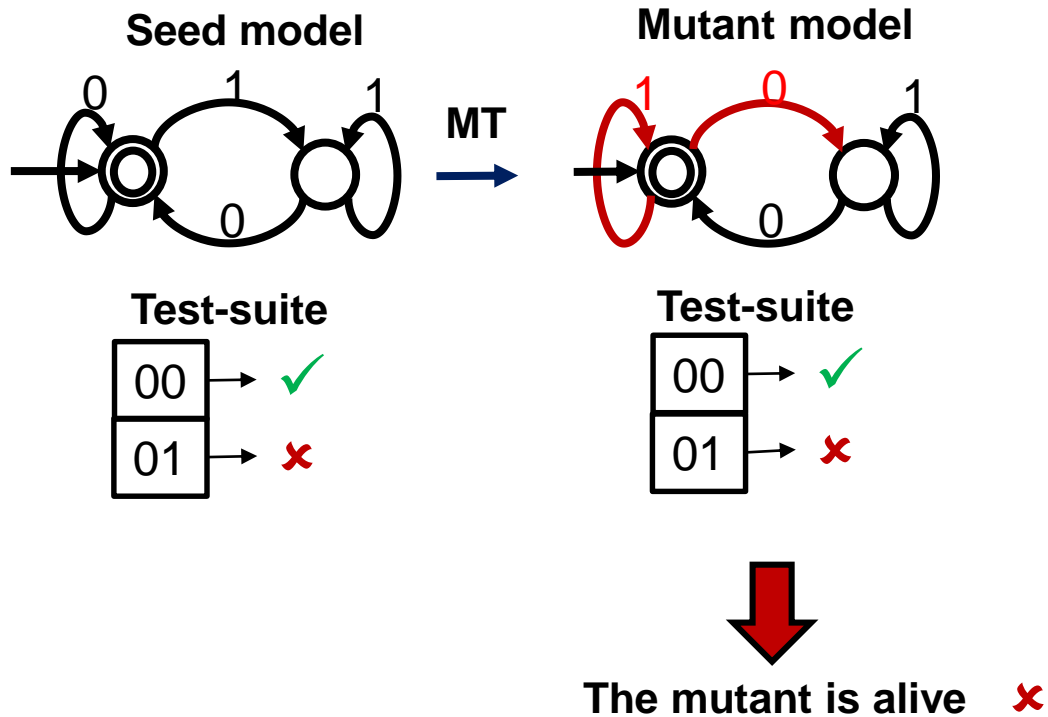
MUTATION TESTING FOR FA

Seed model
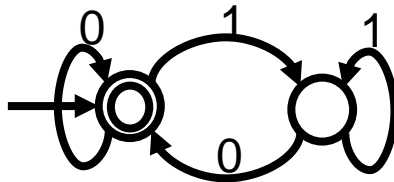
Test-suite

00	→ ✓
01	→ ✗
10	→ ✓

MUTATION TESTING FOR FA

MUTATION TESTING FOR FA

Seed model

MT

Mutant model

Test-suite

00	✓
01	✗
10	✓

Test-suite

00	✓
01	✗
10	✗

The mutant is killed ✓
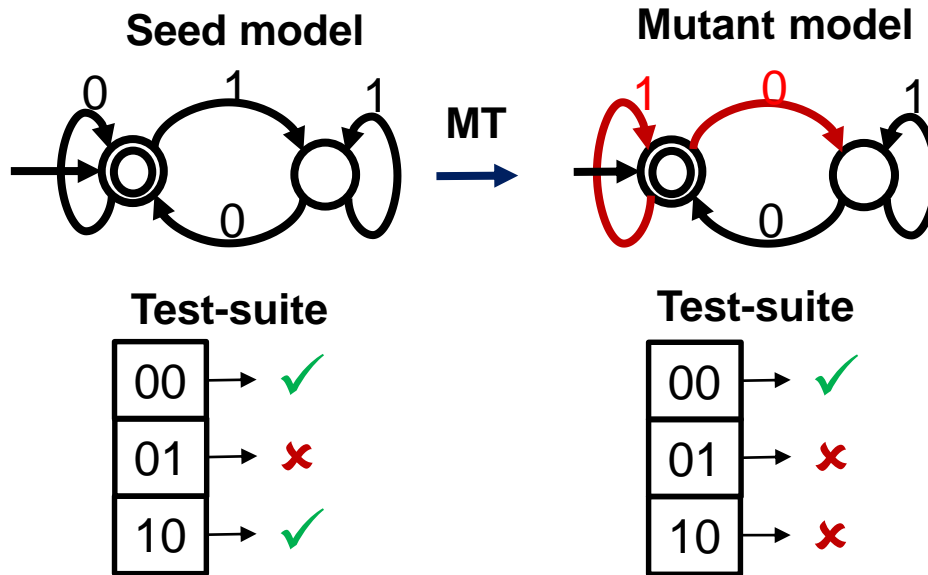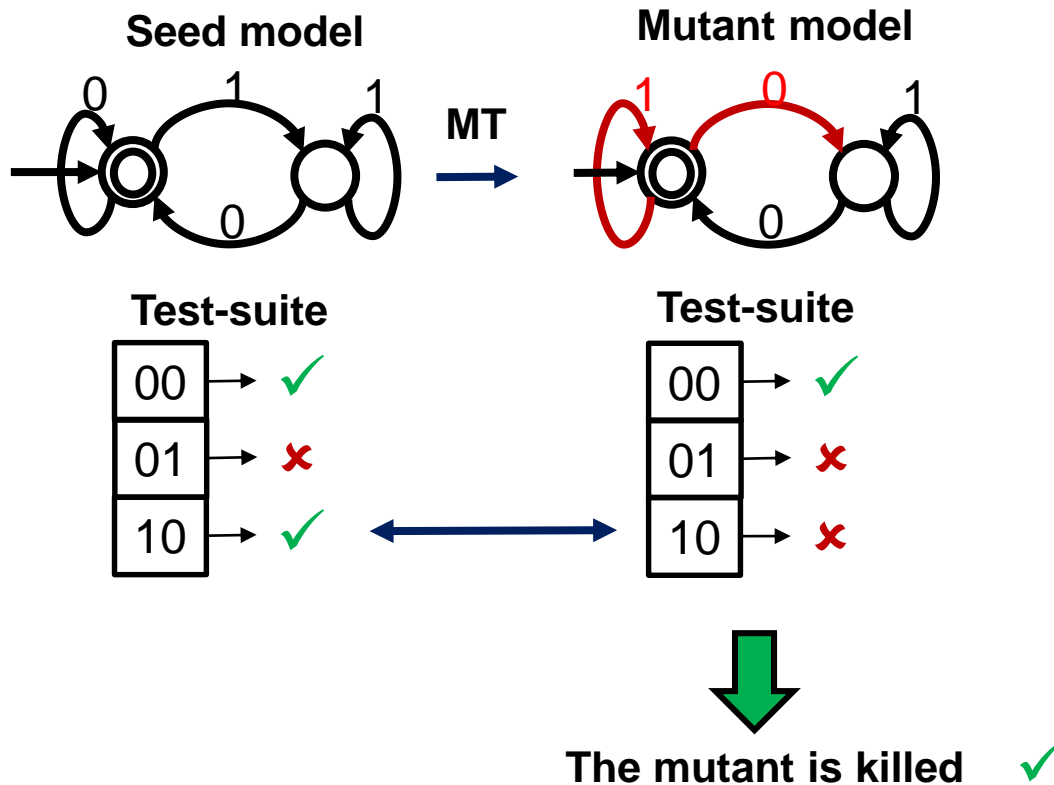
A SIMPLE WODEL PROGRAM

- Wodel: a DSL for model mutation

```
generate exhaustive mutants in "out/" from "model/"
metamodel "mm/fa.ecore"
description "Simple Wodel program"

with blocks {
  sts "Swap the symbols of two transitions" {
    t = select one Transition
            where {symbol <> null}
    modify one Transition
            where {symbol <> t->symbol}
            with {swap(symbol, t->symbol)}
  }
}
```

- Wodel tool extension for language independent MT ➡ **Wodel-Test**

WODEL-TEST PROCESS

MT tool specification

Language support
- Meta-model
- M2T transf.
- T2M transf.

Mutation support
- Mutation operators (WODEL)
- Equivalence criteria

Execution support
- Program compilation
- Test execution

MT tool creator

Generates

MT tool

Tester

input
- Program under test
- Test cases

MT report
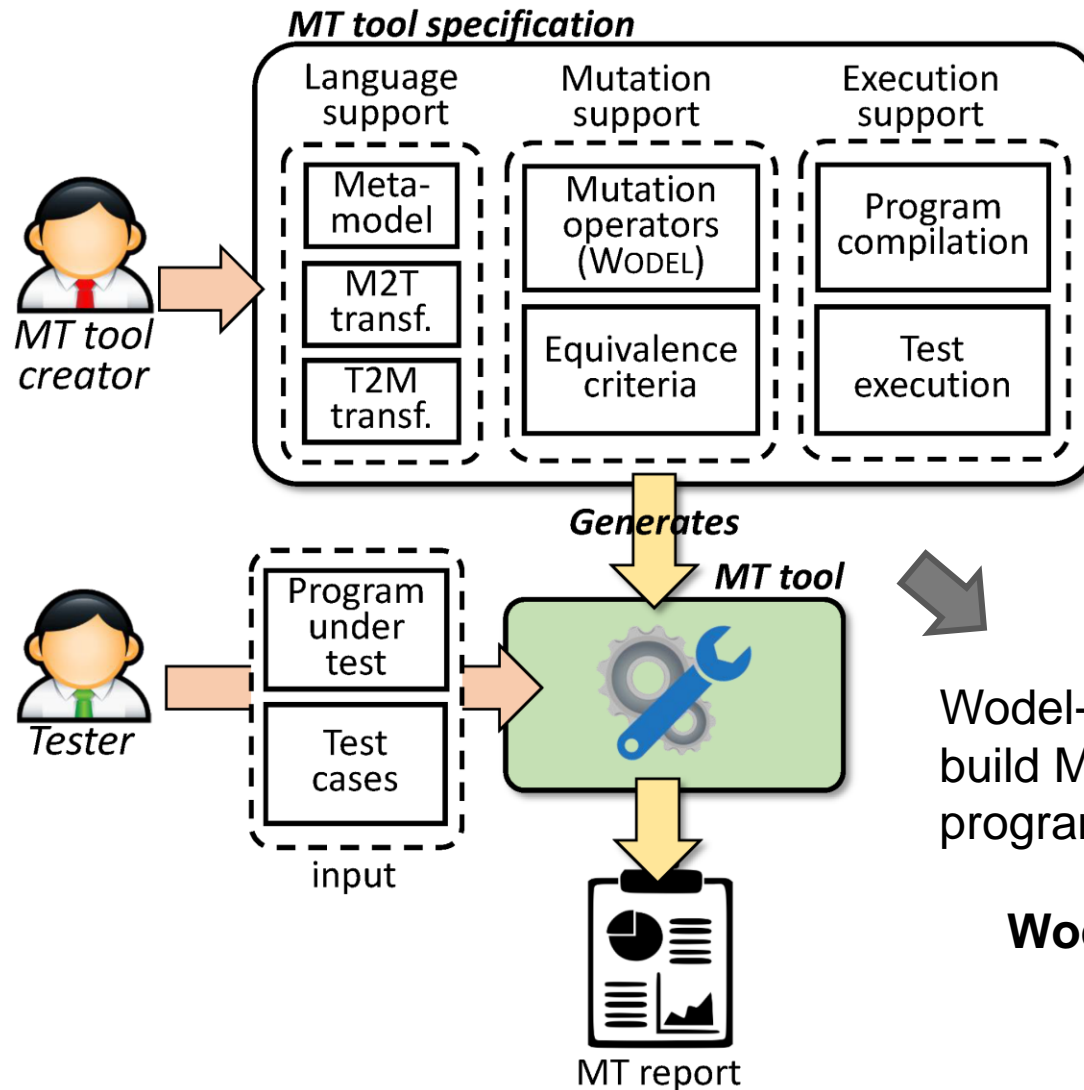
Wodel-Test is also useful to build MT tools for common programming languages:

Wodel-Test for Java

CONCLUSIONS

- Wodel-Test: automates the generation of MT tools for arbitrary languages
- Eases the creation of MT tools for the MDE community
- Implemented 3 MT tools: Wodel-Test for FA/Java/ATL

FUTURE WORK

- We plan to create MT tools for other DSLs
- Reuse of generic mutation operators across similar languages (e.g., Java and C++)
- Support for the definition of functions in the Wodel DSL

Thank you!!

Wodel & Wodel-Test project websites:

http://gomezabajo.github.io/Wodel/

http://gomezabajo.github.io/Wodel/Wodel-Test/

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WODEL-TEST ARCHITECTURE