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Test Case Generation for Programming Language Metamodels

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Presentation Structure

1. Problem Description & Motivation
2. Proposed Solution
3. Current & Future Work
4. Conclusion

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1. Problem Description & Motivation

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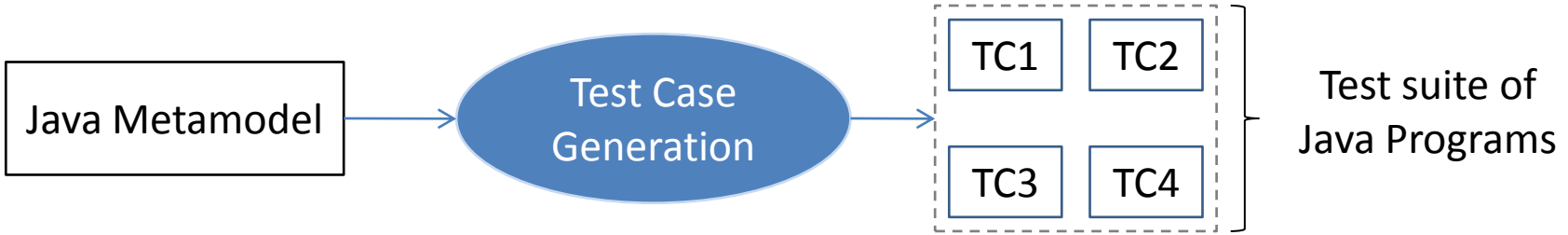
Problem Description

Given a programming language metamodel, how can we generate an ***appropriate*** test suite to show that it is valid?



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Why is this important?

- Help modeller's understanding of the metamodel.

  Increase confidence in its validity.

- Generated test cases are ***reusable*** for some other tools.

  Analysis tools, parsers, compilers, reverse engineering, software language engineering tools, etc.

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2. Proposed Solution

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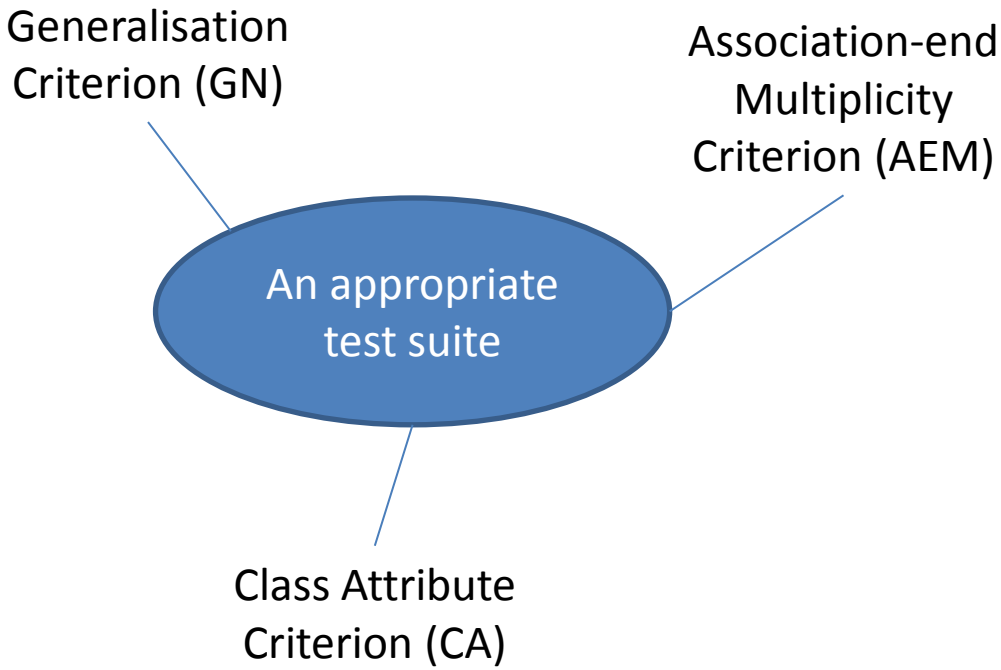
The Solution

Exploit Coverage Criteria for UML class diagrams:



Suitable for AST,
but what about language semantics?

Our system can at least measure these levels of coverage. We are using these as a starting point.

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3. Current & Future work

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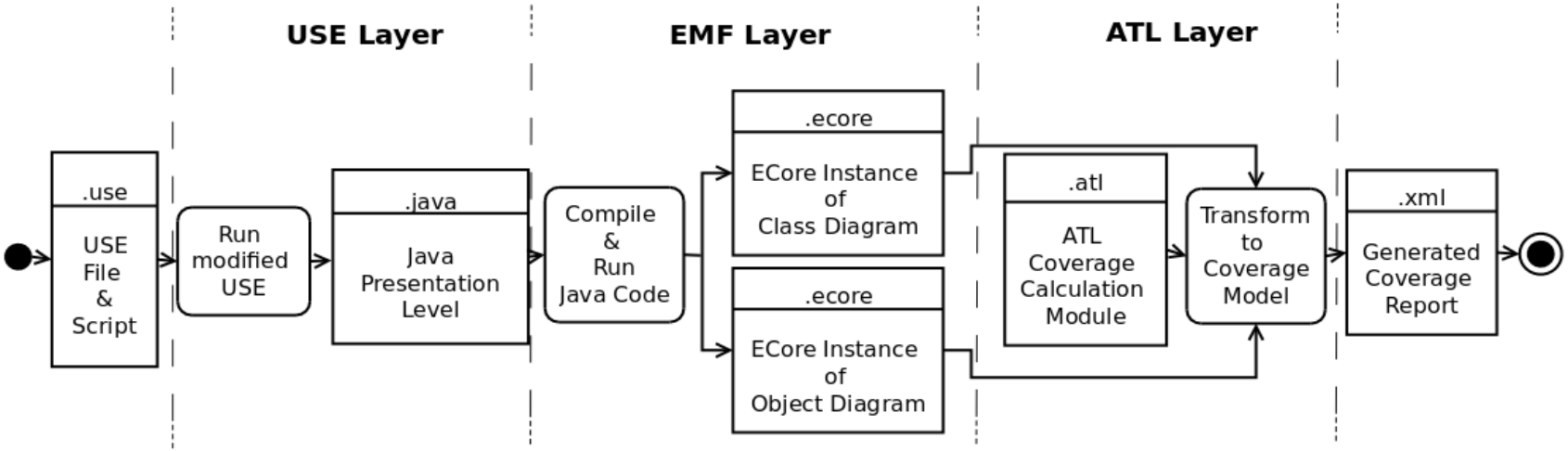
Our Tool-chain

We combine three tools to calculate coverage.



USE: A UML-based Specification Environment

EMF: Eclipse Modeling Framework

ATL: Atlas Transformation Language

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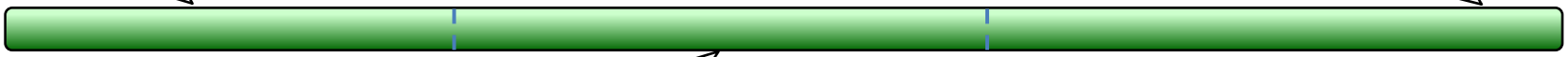
Research Plan

A system that can calculate coverage measures.

Studying Alloy's (http://alloy.mit.edu/community/) approach (exploiting SAT solvers) to control model generation

Using OCL-based queries to specify the kind of model to be generated.



A tool chain has been developed. It calculates GN,AEM & CA coverage for a given UML class diagram and object diagrams.

A mechanism that can generate valid models.

A user can specify the kind of programs that would be generated in the test suit.

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4. Conclusion

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Conclusion

We're developing a platform that can enhance the validity of a programming language metamodel. Providing the following features:

- calculating the degree to which a model covers its metamodel.
- generating models that achieve given coverage targets.
- generating models that match more general OCL specification.

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Thank You!!!

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Questions ?

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