Mutation-based Testing of Model Transformations Using HOT

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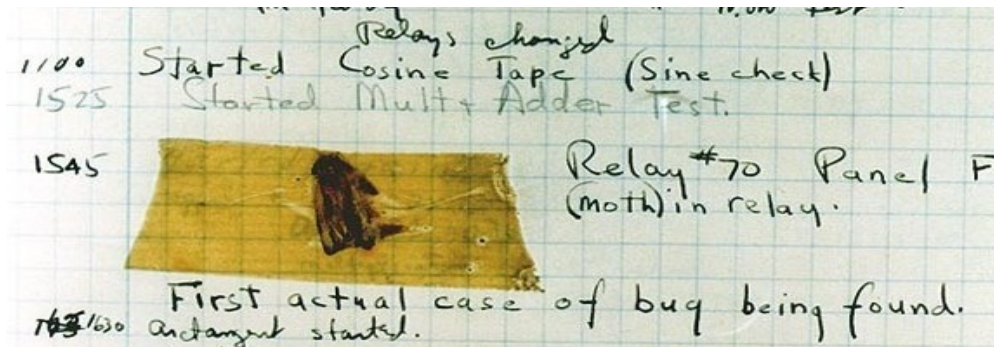
Model-Driven Engineering 2013-2014

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Testing

- Software has bugs.
- Testing improves reliability.
- Testing makes sure software works as intended.
- Cuts maintenance costs.

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Testing in Model-Driven Engineering

- Classical point of view:
  - Unit testing
  - Integration testing
  - System testing
- It is not enough.
- We need something new.

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Testing Model Transformations

- Problems occur in semantics rather than syntax.
- Input and output must conform to their meta-models.

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Quality of Test-Suite

- Quantifiable factor for the quality of test-suite.
- It should represent the real-life situations. *

* J.H. Andrews, L.C. Briand, and Y. Labiche. Is mutation an appropriate tool for testing experiments? [software testing]. In Software Engineering, 2005. ICSE 2005. Proceedings. 27Th International Conference on, pages 402–411, 2005.

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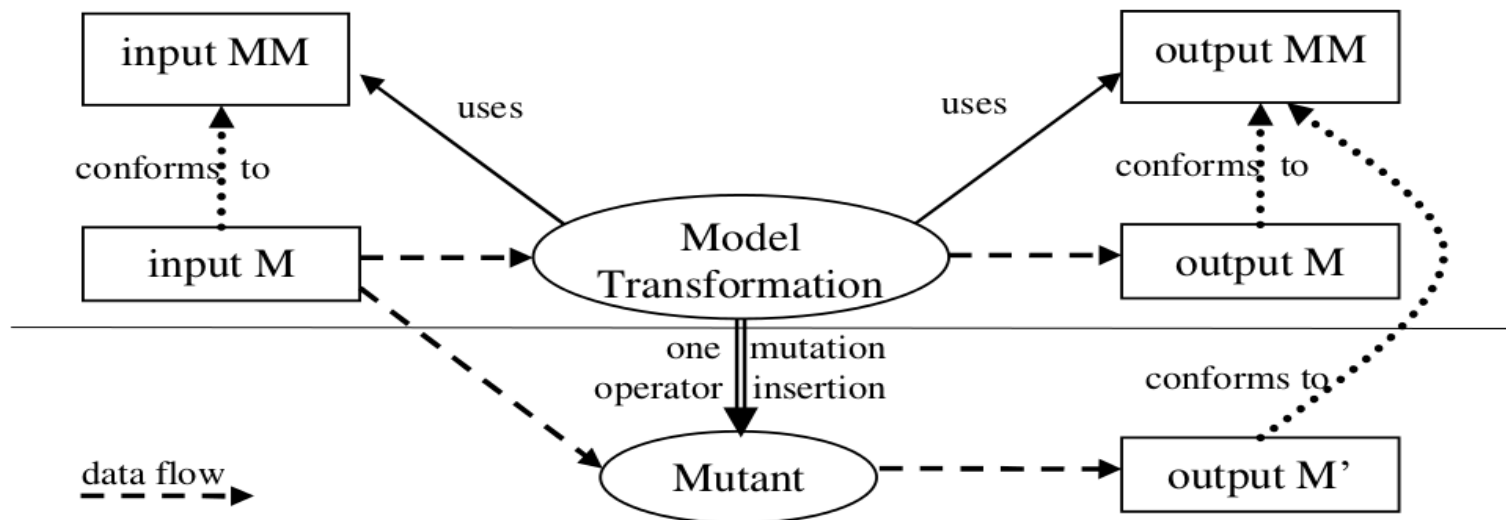
Mutation Testing
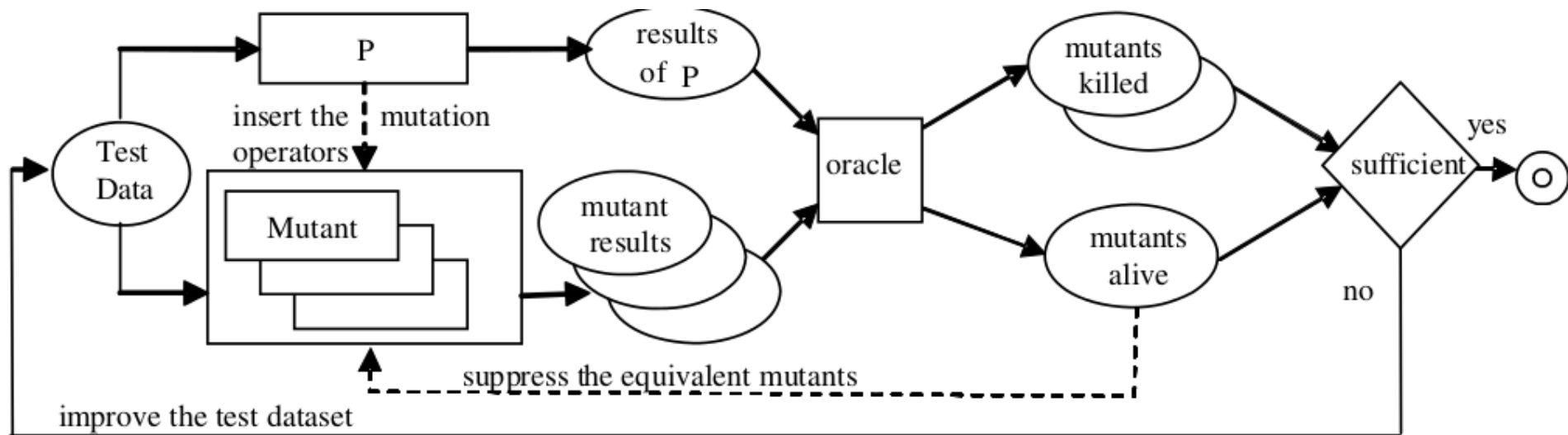
- Inject deliberate bugs.
- Count how many are detected.

Mutation Operators

- Input: main program
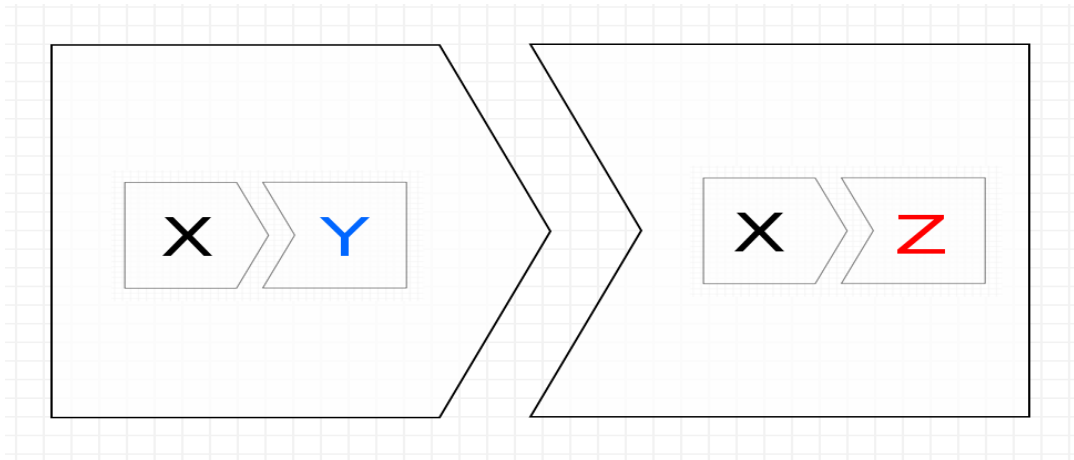- Output: buggy program

Mutation Operator Categories *

- Navigation
- Filtering
- Creation

* Jean-Marie Mottu, Benoit Baudry, and Yves Le Traon. Mutation analysis testing for model transformations. In Model Driven Architecture–Foundations and Applications, pages 376–390. Springer Berlin Heidelberg, 2006.

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Higher-Order Transformation *

- Transforms a transformation rule.

* Massimo Tisi, Frédéric Jouault, Piero Fraternali, Stefano Ceri, and Jean Bézivin. On the use of higher-order model transformations. In Model Driven Architecture-Foundations and Applications, pages 18–33. Springer, 2009.

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References

- Jean-Marie Mottu, Benoit Baudry, and Yves Le Traon. Mutation analysis testing for model transformations. In Model Driven Architecture – Foundations and Applications, pages 376–390. Springer Berlin Heidelberg, 2006.

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Questions?