ParTeG – Integrating Model-Based Testing and Model Transformations

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Improving test quality with ParTeG
- Combination of coverage criteria
- Model transformations

Tool demo
Model-Based Testing
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Introduction to Model-Based Testing

create -> S1 -> derive -> Oracle

compare -> SUT

execute

Tests

S2
Manual Test Creation
Manual Test Creation
Automatic Model-Based Test Generation

S1

S2

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Automatic Model-Based Test Generation
Automatic Model-Based Test Generation

- S1
- S2
- S3

Change
Combination of Coverage Criteria
Example of a Freight Elevator

- **idle**
  - ```removeWeight(w) / subtractFromWeight(w)```
  - ```insertWeight(w) / addToWeight(w)```

- **button pressed**
  - ```pressButton(b, r) [[b <> currentFloor] and (b > basement or r > minRank)]]```
  - ```setButton(b)```
  - **move fast**
  - **reachFloor**

- **start moving**
  - ```[actualWeight = minWeight]```
  - ```[actualWeight > minWeight]```
  - **move slow**
  - **reachFloor**

- **[actualWeight > maxWeight]**

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Combination of Coverage Criteria

Control-flow-based coverage → Abstract test cases

Boundary-based coverage → Input parameter
Combination of Coverage Criteria

Control-flow-based coverage → Abstract test cases +
Boundary-based coverage → Input parameter =
                        Concrete test cases
Combination of Coverage Criteria

Control-flow-based coverage + Boundary-based coverage = Combined Coverage Criteria

Abstract test cases + Input parameter = Concrete test cases
Results of Application – Industrial Cooperation

Java Mutation Analysis

Test Costs

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Model Transformations
Test Model Transformations

Scenario:
Coverage criteria are focussed on the structure of the test model
Test cases test the behavior of the SUT

Idea:
Transform the test model in a semantic-preserving manner
Partition Test Generator

- Combines Coverage Criteria
- Supports Model Transformations
- Eclipse-plugin EMF
- ParTeG
- JUnit 3.8/4.3, CppUnit 1.12, JMA
Tool Demo
Conclusion

Model-based testing
ParTeG – Partition Test Generator
Combination of coverage criteria
Support of model transformations
Advantages beyond the application of single coverage criteria

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Quality of Model-Based Testing
QuoMBaT @ ICST 2010 (April 6th)
www.model-based-testing.de/quombat10