Prof. Lichter

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SWC | RWTH AACHEN UNIVERSITY

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Exercise 4

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3.1. Task: Combinatorial Testing

In the last exercise, you've created equivalence classes for the DHL price function. Unfortunately, strong equivalence class testing can be considered to be infeasible for all the options offered by DHL. Combinatorial testing is a promising approach to reduce the number of test cases while still preserving a certain level of coverage.

a) Therefore, please transform the equivalence class model into an input parameter model. You can use your equivalence class model or the one presented in the exercise. Either use the formal Set notation as shown in the lecture or use the syntax of the PICT/ACTS/CTWedge tool. Once modelled, please generate two test suits that satisfy each-choice and pairwise interaction coverage, respectively.

b) You can infer certain conflicts from the DHL price model. For instance, a "Paket S" can only be ordered online and not offline. Infer those restrictions with respect to your input parameter model and list them in propositional logic. At least you will find 10 conflicts.

$$\text{For instance, if } ParcelType = \text{"Paket S"} \rightarrow PointOfSale = \text{"}Online\text{"}$$

Please note that the logical expressions are written in a "positive" way, i.e. they must be true for all valid test cases. An interaction such as `(ParcelType:Paket S, PointOfSale: Offline)` is a conflict because it does not satisfy the formula.

c) With respect to your identified conflicts, please analyze your previously generate test suites. Can you identify problems related to the masking effect? Please elaborate on the identified problems.

d) Select 1 of the conflicts and solve it by applying the "Abstract Parameters" strategy. Please explain all steps and decisions.

e) Select another 1 conflict and solve it by applying the "Sub-Model" strategy. Please explain all steps and decisions.

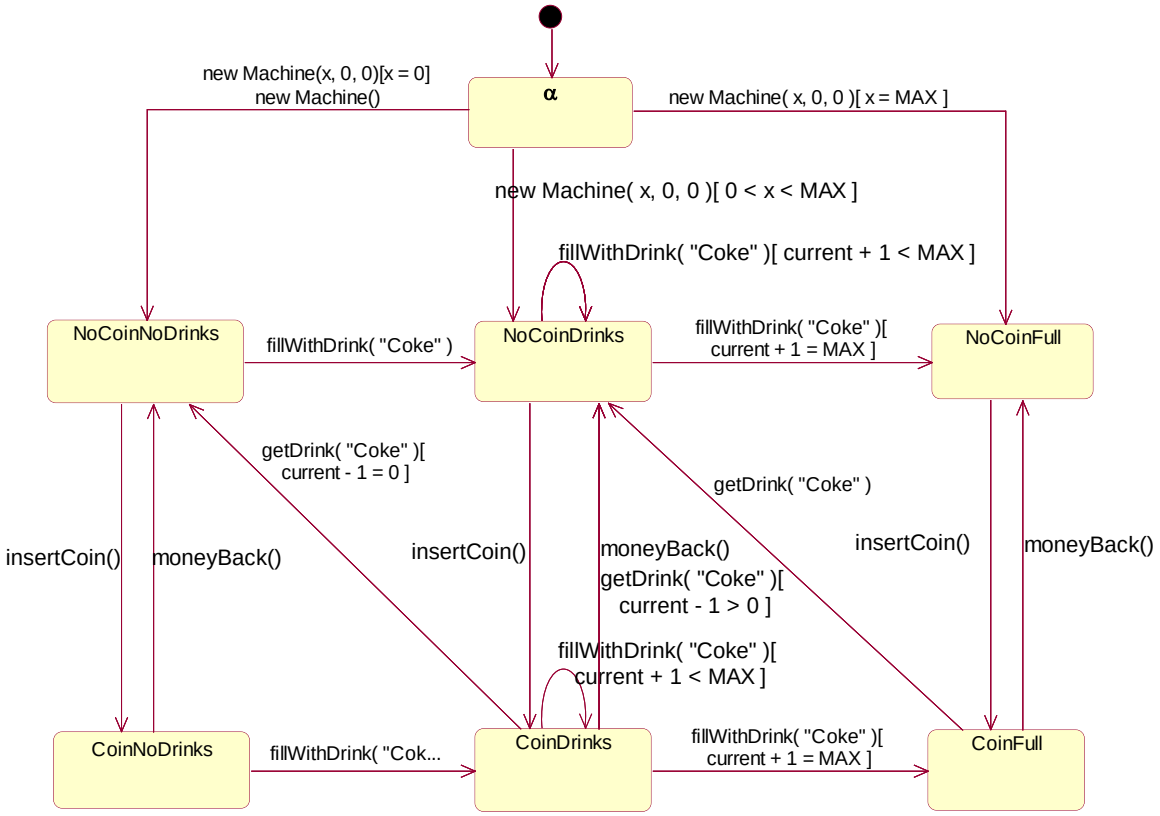
f) Select another 1 conflict and solve it by applying the "Replacement" strategy. Please explain all steps and decisions.

g) Solve all conflicts by applying the "Avoidance" strategy with PICT/ACTS/CTWedge. Compare the test cases of the original version (which was unaware of conflicts) to the test cases of the updated (conflict-aware) version of the IPM. Can you observe anything with regards to the size of the test suite and the coverage?

3.2. Task: State-based Testing with N+

A software for a drink vending machine was developed. Your task as a quality engineer is to test if the software is working correct. You choose to use state base testing with the N+ testing strategy.

The Developers provide the source code of the application and a state machine diagram describing the possible states of the software.



a) Check if the provided State Machine is really describing the possible states. If you may think something may be wrong, adapt the state diagram.
b) Create the State Transition Tree using the state machine above.
c) Create ALL Round-Trip Testcases for the vending machine software.
d) Identify possible Sneak Paths
e) Provide a complete Event Response Matrix **(provide a legend for your answers (+,-,x, …).**
f) Implement ALL test cases using JUNIT5.
g) Combine the N+ Test Strategy with the Robustness Worst Case Boundary Value Testing. Extend your implementation accordingly. Ease your development effort by using generators and parameterized tests. Provide the input data as a CSV file.

We would like to ask you to use the templates provided in the L²P room for answering the exercises.

Your results must be handed in as a single PDF file or as a compressed ZIP file containing all necessary files and data named „**SQA2019_AssignmentX_GroupX.zip**“; replace the **X** with your group identifier. Your submission should be submitted via L2P Learning Room.