6^{th} Seminar – Verification & Validation

1 Specification-based test design

1.1 Age discount

Our marketing department launched a campaign for our long-time customers in our online liquor store. Customers older than 20 years receive a 2%, those older than 30 years receive a 3%, while those older than 50 years receive a 5% discount on their purchase. All they have to do is to select a liquor on a special form, enter the requested quantity and their birth date, and they would benefit for the special promotional price.

The developers were in a hurry, but finished the implementation. They also tried it with the following test data: selecting two bottles from a €100 whiskey and entering 1950-01-01 as birth date. They received €190 as the final price, thus they are confident that the implementation works correctly.

- Point out important parts of the specification that they missed to test (try to create equivalence partitions or define boundary values for the parameters)!
- Design test cases (input values, expected outcome) for the above specification!

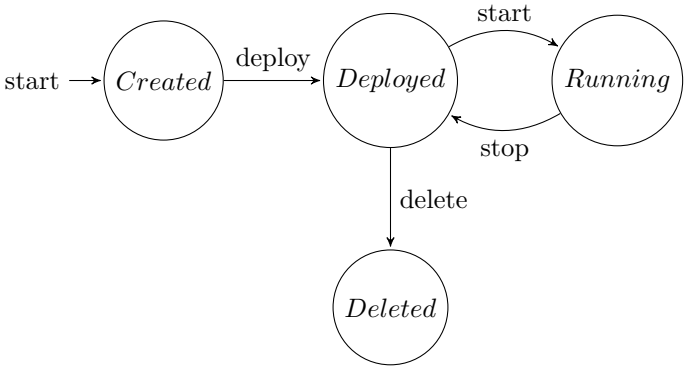
1.2 Flight price calculation

We are testing a module calculating the prices of extras for a flight ticket. A 15 kg baggage costs €10, the 20 kg baggage €20. A customer can buy at most two baggages. A €15 excess fee is added if the baggage is purchased at the airport. Seats can be reserved for an extra price of €8. Priority seats (rows 1–3) cost €13. Customers can buy a "leisure" pack for €15, which includes a 15 kg baggage and a reserved seat.

- Design test cases (input values, expected outcome) for the above specification!

2 Model-based testing

We are testing a cloud controller system that can manage the lifecycle of virtual machines. When a VM is created its disk is allocated on a shared storage. When the VM is deployed its disk and configuration files are copied to a virtualization host. A deployed VM can be started, and a running VM can be stopped. If the VM is not needed any more it can be deleted. To help the test design a member of the team has created the following finite state machine, which represent the lifecycle of a virtual machine.



- Is the state machine correct with respect to the specification?
- Is the state machine complete? (Note: For FSMs completeness means that in every state for every event the behavior is specified.)
- Select a set of test input sequences that provide 100% state coverage!
- Select a set of test input sequences that provide 100% transition coverage!