



## Questionnaire

1. What are the basic elements of a protocol?
2. On which design principles are the Internet protocols based?
3. Give two examples where Internet design principles are violated.
4. Can protocols be described by finite state machines?
5. What are the limitations of the finite state machine model?
6. How are SDL and UML related?
7. What are constructive and what are reflective descriptions?
8. How can a state machine be transformed into program code? Describe two techniques.
9. What is the difference between timer events and input signals in SDL?
10. What is required to transform a MSC into a state machine?
11. What is the difference of MSCs and LSCs? What is the purpose of unwinding?
12. What are the limitations of tabular message format specifications? Name alternatives.
13. What are the three elements of a BER encoding?
14. Does PER encoding always yield the most compact encoding?
15. In which stage of the development process does Model Checking take place?
16. What is the principle of model checking with SPIN? Can SPIN directly prove correctness?
17. Give examples for safety and liveness properties.
18. Which kind of properties can be checked with never claims?
19. How can the absence of deadlocks and livelocks be checked in a Promela model?
20. Why does SPIN check for negated claims (never claims) instead of positive ones?
21. What is priority inversion (the pathfinder problem, exercise)?
22. Describe the concept of fairness (in the context of validation models).
23. Can every never claim be transformed into a LTL formula?
24. What is a Büchi automaton?
25. What is "soft state"?
26. Soft state is meant to increase robustness. Which other methods do you know?
27. Name the basic elements (objects, data structures, algorithms) of discrete event simulation.
28. What are parameters and metrics?
29. What kind of processes can be used to generate events?
30. How can one use empirical data of (real) event occurrences in simulations?
31. What are the pitfalls when using pseudo random number generators?
32. What is the difference between a simulation model and a validation model?
33. How are wireless channels and mobile hosts modeled in simulation?
34. Is the ALOHA protocol stable? How can stability be described?

Are you able to...

- specify a protocol in UML or SDL?
- understand specifications given in UML, SDL, MSC?
- draw a message sequence chart for a given state machine specification?
- transform a message sequence chart into a state machine?
- implement a state machine (using a table-driven approach or the state pattern)?
- specify a data format in ABNF, ASN.1 or CSN.1?
- write (or extend) a Promela model?
- check for deadlocks, livelocks, or other correctness properties in Promela using meta-labels and never claims?
- construct the state space of a validation model and match it with a never-claim automaton (manually)?
- specify simple correctness properties in LTL?
- write and execute a discrete-event simulation?
- aggregate statistical data, plot and interpret simulation results?
- generate an empirical distribution from measured empirical data?
- approximate an empirical distribution by an analytical one and analyze the goodness of fit?
- ... solve all the exercises?