

Model Checking

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Exercise for the GLOBAN PhD school Modelling & Verification of an Elevator System Using UPPAAL

Model and analyze using UPPAAL at least two types of control programs for an elevator-system of your own design serving a number of floors (say 4 or 5) and with a number of lifts (say 2 or 3) and with a number of users being on individual floors and with individual wishes for getting to different floors. The system may:

- allow the user to indicate that a lift is required at a certain floor, and/or needs to go up or down and/or is requested to go to a certain floor
- or the user may -- once inside the lift -- request actual floor.
- in order to move the doors must be closed.
- floors may or may not be skipped taking into account whether there are users waiting

In modelling the elevator system you should also take into account the time to get from one floor to another (say between 30 and 45 seconds). Also models of the various users including timing assumptions as to the arrival should be included. Formulate and verify various safety and (time-bounded) liveness properties for the overall system and determine the longest time a user of the lift system will have to wait until a desired floor is reached. Are there any difference in performance of the control programs?

Your solution should describe in sufficient details the models, lessons learnt from simulation and results obtained from verification of logical properties.

For downloading UPPAAL see www.uppaal.com.