Homework 2

The homework till Monday, April 23 is to hand in exercises A, B.

A. Run SPIN on the small example of (flawed) mutual exclusion in the paper:

G.J. Holzmann: *Protocol Design: Redefining the State of the Art*

Model the algorithm, put a specification which states that the algorithm implements mutual exclusion. Then use SPIN to find short traces that violate this specification. Finally, give a short explanation (in text) of what is wrong.

B. Solve the Hippies problem using SPIN:

Four hippies must cross a bridge. It is dark, and the bridge is very fragile. To cross it, one must have a torch, and the bridge can carry at most two persons simultaneously. The hippies have only one torch, meaning that the torch must follow the hippies back and forth across the bridge. The four hippies are differently fast, it takes them 5, 10, 20, and 25 minutes to cross the bridge, respectively. As said, at most two hippies can cross in one “move”, and the time it takes is equal to that which is needed by the slower hippie. E.g., if the first move is that the 10-minute hippie and the 20-minute hippie cross, then that move takes 20 minutes. Thereafter one of them must go back with the torch, etc. Can all four cross the bridge in at most 60 minutes?

Make a **beautiful** Promal model, by which SPIN can find a best solution to this problem. This means that your model should **not** give any hint about what is the solution. You model should have two parts:

- one part which just allows crossing and time recording,

- a condition, which SPIN interprets as an error, thereby generating an error trace, which is the solution (if one exists).