

Exercises (2)

CABBAGE-GOAT-LION PUZZLE.

Use NuSMV to find a solution to the “famous” cabbage-goat-lion puzzle.

There are three items (a cabbage, a goat, and a lion) on a river bank, and a man with a boat. Initially all items and the man are on the right bank. The goal is to carry all items to the left bank using the boat. The man can carry at most one item at a time (the boat is small ...). Furthermore, the cabbage and the goat cannot be left together, unattended, on a river bank (otherwise the goat would eat the cabbage ...) and the goat and the lion cannot be left together, unattended, on a river bank (otherwise the lion would eat the goat).

Verify whether the solution you found is optimal (Hint: use quantitative characteristic computations).

Solve the same problem using bounded model checking instead of BDD-based model checking.

TOWERS OF HANOI.

Use NuSMV to find a solution to the classical AI problem of the Towers of Hanoi (e.g. fix $N=4$).

There are three poles and 4 discs of different size. Initially all discs are placed on the left pole. The goal is to move all discs to the right pole (using the middle pole), with the following constraints: only one move at a time is permitted; a disc must never be placed on top of a smaller one; a disc can only be moved if there are no other discs on top of it.

Verify whether the solution you found is optimal (Hint: use quantitative characteristic computations).

Solve the same problem using bounded model checking instead of BDD-based model checking.