



Weidenbach

December 19, 2024

Tutorials for “Automated Reasoning WS24/25”
Exercise sheet 9

Exercise 9.1:

Consider the following logical puzzle:

Four people (Prof. W., Mr. L., Mr. K., Mrs. D.) are suspected to have committed a murder. Is Prof. W. innocent, then Mr. L. is not suspected and the guilt from Mr. K. would be un-doubtful. Mr. K. has an absolute secure alibi for the crime. Is Mr. L. guilty, then is Prof. W. also as well as Mr. K. Is Mr. K. innocent, then is Mrs. D. also innocent.
Who is the murderer?

Translate the sentences into propositional formulas, then create the corresponding DIMACS input file for the CNF transformation https://webpass.spass-prover.org/index_cnf.html and then you may provide this input file to the SAT solver https://webpass.spass-prover.org/index_sat.html and eventually answer the question.

Exercise 9.2:

Consider the following logical puzzle:

Three friends Pablo, Edvard, and Henri are talking to each other about the art collection of Leonardo. Pablo says: “Leonardo has at least four paintings of Rembrandt.” Edvard says: “No, he has less than four paintings of Rembrandt.” “According to me,” says Henri, “Leonardo has at least one Rembrandt.” Only one of the friends is right.

Formulate the puzzle in first-order logic with equality in the sense that any model of the respective first-order formula reveals the question about the number of Rembrandt paintings owned by Leonardo and then provide an input file to SPASS <https://webpass.spass-prover.org/> and eventually answer the question.

It is not encouraged to prepare joint solutions, because we do not support joint exams.