COMP3211 Tutorial 8: Propositional Logic

Fengming ZHU

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Department of CSE
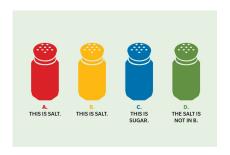HKUST

Declarative Problem Solving

1. Represent the problem in a formal language, e.g., Propositional Logic, Firsr-Order Logic, PDDL, ASP, etc..

2. Give it to a solver, e.g., Z3 [1] , FF-planer, clingo, etc., to get a model.

3. Convert the model back to a solution to the original problem.

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[1]https://ericpony.github.io/z3py-tutorial/guide-examples.htm

A.
THIS IS SALT.

B.
THIS IS SALT.

C.
THIS IS SUGAR.

D.
THE SALT IS NOT IN B.

On April Fool's Day, your kid replaces the salt in three out of your four salt shakers with sugar. But he also left messages on each. Only one of these notes is true, which one contains salt. [2]

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[2]Question 9 from https://www.rd.com/article/logic-puzzles/

George, William, John, Abe, and Millard have their birthdays on consecutive days, all between Monday and Friday.

- George's birthday is as many days before Millard's and William's is after Abe's.
- John is two days older than Abe.
- Millard's birthday is on Thursday.

Figure out whose birthday is on which day. [3]

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[3]Question 3 from https://www.rd.com/article/logic-puzzles/

Who Took Drugs

Determine who out of the following is guilty of doping. [4] The suspects are: Sam, Michael, Bill, Richard, Matt.

1) Sam said: Michael or Bill took drugs, but not both.

2) Michael said: Richard or Sam took drugs, but not both.

3) Bill said: Matt or Michael took drugs, but not both.

4) Richard said: Bill or Matt took drugs, but not both.

5) Matt said: Bill or Richard took drugs, but not both.

Of the aobve 5 statements, 4 are true, one is false.

6) Tom said: If Richard took drugs, then Bill took drugs.

[4]https://math.stackexchange.com/questions/396264/propositional-logic-riddle-puzzle

Thanks!