

Automatic and Interactive Reasoning

Exercise Sheet, Week 5

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Exercise Sheet

Paper Exercises (please do not use AI to solve these exercises)

1. Explain a run of DPLL(LIA) on the following formula:

$$((x + y \leq 5) \vee (x < 0)) \wedge ((y \geq 10) \vee (z \leq 3)) \wedge (x \geq 0)$$

2. Explain a run of DPLL(DT) on the following formula:

$$\text{cons}(x, y) = \text{cons}(z, \text{nil}) \wedge (y = \text{cons}(\text{green}, \text{nil}) \vee z == \text{green})$$

3. Explain DPLL(T) on the following LIA+DT example:

$$((\text{head}(x) + 3 = y) \vee (x = \text{cons}(y * 2, z))) \wedge x = \text{cons}(y, \text{nil})$$

Practical Exercise (you may use AI)

1. Create an SMT-LIB file that makes Z3 enter a matching loop.