

Artificial Intelligence – Exercise 4

Task 1: DPLL

The following formula is specified in CNF. Use the DPLL algorithm to prove or disprove the formula.

$$(B \vee \overline{D}) \wedge (\overline{A} \vee \overline{C}) \wedge (C \vee B \vee A) \wedge \overline{A} \wedge (\overline{B} \vee D) \wedge (A \vee B \vee D) \wedge (\overline{B} \vee \overline{D})$$

Task 2: Unification

Determine the most general unifier (if available) for the following sets.

1. $\{Father(a, Tim), Father(Jakob, b)\}$
2. $\{Knows(Father(y), y), Knows(x, x)\}$
3. $\{f(g(a, x), g(y, b)); f(z, g(v, w)); f(g(x, a), g(v, b))\}$

Task 3: Resolution in First-Order Logic

Translate the following statements individually using formulas in first-order-logic with suitable predicates. Based on your formalization prove the goal $HasFun(Alfons)$. Indicate all intermediate steps.

1. “All children have a kite.”
2. “If a child has a kite and goes outside, then it also has fun.”
3. “A child goes outside, if it is not ill.”
4. “Alfons is not ill.”
5. “Alfons is a child.”

For this use the following predicates:

Predicates: $Child(x)$ (x is a child), $outside(x)$ (x goes outside), $hasDragon(x)$ (x has a dragon), $hasFun(x)$ (x has fun), $isIll(x)$ (x is ill)