

Assignment - 1

1) Convert the FOL into NF

$$\forall x [\exists z \text{ Animal}(z) \wedge \text{kills}(x, z)] \Rightarrow [\forall y \neg \text{loves}(y, x)]$$

→ (i) Eliminate implications:

$$\forall x [\neg \exists z \neg \text{Animal}(z) \vee \text{kills}(x, z)] \vee [\forall y \neg \text{loves}(y, x)]$$

(ii) Move \neg inwards

$$\forall x [\forall z \text{ Animal}(z) \wedge \neg \text{kills}(x, z)] \vee [\forall y \neg \text{loves}(y, x)]$$

(iii) Change quantifier

$$\forall x [\forall z \text{ Animal}(z) \wedge \neg \text{kills}(x, z)] \vee [\forall z \neg \text{loves}(z, x)]$$

(iv) Skolemization

$$\forall x [\text{Animal}(f(x)) \wedge \neg \text{kills}(x, f(x))] \vee \neg \text{loves}(g(x), x)$$

(v) Drop universal quantifier

$$[\text{Animal}(f(x)) \wedge \neg \text{kills}(x, f(x))] \vee \neg \text{loves}(g(x), x)$$

(vi) Distribute \vee over \wedge

$$[\text{Animal}(f(x)) \vee \neg \text{loves}(g(x), x)] \wedge [\neg \text{kills}(x, f(x)) \vee \neg \text{loves}(g(x), x)]$$

2) Convert the statement into FLO & prove the query using resolution.

Rules:

Cold and precipitation \rightarrow snow.

January \rightarrow cold.

clouds \rightarrow precipitation

Facts:

January, clouds

Prove

snow

→ cold & precipitation → snow
¬ cold ∨ ¬ precipitation ∨ snow

January → cold
¬ January ∨ cold
clouds → precipitation
¬ clouds ∨ precipitation

¬ snow ¬ cold ∨ ¬ precipitation ∨ snow

¬ cold ∨ ¬ precipitation ¬ January ∨ cold

¬ January ∨ ¬ precipitation ¬ clouds ∨ precipitation

January ¬ January ∨ ¬ clouds

¬ clouds clouds



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