

NP Assignment.

① Convert the following FOL into CNF
 $\forall x (\exists z \text{ Animal}(z) \wedge \text{kills}(x, z)) \Rightarrow [\forall y \neg \text{Loves}(y, x)]$

i) Eliminate implication: $A \Rightarrow B = \neg A \vee B$
 $\forall x [\neg \exists z \text{ Animal}(z) \wedge \text{kills}(x, z)] \vee \forall y \neg \text{Loves}(y, x)$

ii) Move \neg : $\neg \exists x p = \forall x \neg p$
 $\forall x [\forall z \neg (\text{Animal}(z) \wedge \text{kills}(x, z))] \vee \forall y \neg \text{Loves}(y, x)$

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

iii) Drop universal quantifiers:
 $[\neg \text{Animal}(z) \vee \neg \text{kills}(x, z)] \vee \neg \text{Loves}(y, x)$

iv) CNF:
 $\neg \text{Animal}(z) \vee \neg \text{kills}(x, z) \vee \neg \text{Loves}(y, x)$

②

general

Rules

facts

→ cold + precipitation → snow
¬ cold ∨ ¬ precipitation ∨ snow

January, clouds.

→ January → cold
¬ January ∨ cold

→ clouds → precipitation
¬ clouds ∨ precipitation

¬ snow ¬ cold ∨ ¬ precipitation ∨ snow

