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IBM18CS079

AI Assignment

1) Convert FOL to CNF

$\forall x [\exists z \, animal(z) \wedge kills(x, z)] \Rightarrow [\forall y \neg loves(y, x)]$

2) Eliminate implication: $A \Rightarrow B \equiv \neg A \vee B$

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

3) Move $\neg$ inwards: $\neg \exists x \, p \equiv \forall x \neg p$

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

4) Drop universal quantifiers:

$[\neg Animal(z) \vee \neg kills(x, z)] \vee \neg loves(y, x)$

5) CNF:

$\neg Animal(z) \vee \neg kills(x, z) \vee \neg loves(y, z)$

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Right..

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II) convert to FOL & prove using resolution

→ cold & precipitation → snow

$cold(x) \wedge precipitation(x) \Rightarrow snow(x)$

$\neg cold(x) \wedge precipitation(x) \vee snow(x)$

$\neg cold(x) \vee \neg precipitation(x) \vee snow(x)$

ii) → January → cold

$January(x) \Rightarrow cold(x)$

$\neg January(x) \vee cold(x)$

iii) clouds → ppt

$clouds(x) \Rightarrow ppt(x)$

$\neg clouds(x) \vee ppt(x)$

iv) $January(x)$

v) $\neg clouds(x)$

To prove : $snow(x)$

→ Resolution of (i) & (ii)

vi) $\neg ppt(x) \vee snow(x) \vee \neg January(x)$

→ Resolution (vi) & (iv)

(vii) $\neg ppt(x) \vee snow(x)$

(2)

Scanned with CamScanner

→ Resolution of (VII) & (III)

(VIII) snow(x) V ¬ clouds

→ Resolution of (VIII) & (V)

★ snow(x)

Proved