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# AI-ASSIGNMENT-01

1)   FOL into CNF

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

(i) Eliminate implication :- $(A \Rightarrow B \equiv \neg A \vee B)$

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

(ii) Move $\neg$ Inwards :- $\neg \exists x P \equiv \forall x \neg P$

$$\forall x \left[ \forall z \, \neg (Animal(z) \wedge kills(a,z)) \right] \vee \forall y \, \neg Loves(y,x)$$

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

(iii) Drop Universal Quantitiers :-

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

(iv) CNF :-

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

(2)  Convert the Sentences into FoL & proove using resolution.

i) cold and 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

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

(iii) Clouds → Precipitation

$$clouds(x) \Rightarrow precipitation(x) \qquad \neg clouds(x) \vee precipitation$$

(iv) January(x)          (v) clouds(x)

(01)      Rudra

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TO Prove :- Snow $(x)$

→ Resolution Of (i) & (ii)

vi) → Precipitation$(x)$ ∨ Snow$(x)$ ∨ → January $(x)$

→ Resolution Of (vi) & (iv)

vii) ⊘ → Precipitation$(x)$ ∨ Snow $(x)$

→ Resolution Of (vii) & (iii)

viii) Snow$(x)$ ∨ ¬Clouds$(x)$

→ Resolution Of (viii) & (v)

Snow $(x)$.

Hence Proved

02   Rudra