Programming Assignment Report

Assignment 08

Resolution By Refutation

Solutions

1. The person who used the revolver was seen in the ballroom.
   1. FOL: ∃x (Used(x, Revolver) ∧ InRoom(x, Ballroom))
   2. CLF: Used(x, Revolver) ∧ InRoom(x, Ballroom)
2. Miss Scarlet was in the library.
   1. FOL: InRoom(MissScarlet, Library)
   2. CLF: InRoom(MissScarlet, Library)
3. The crime did not happen in the same room where Professor Plum was.
   1. FOL: ∃r (InRoom(ProfPlum, r) ∧ ¬CrimeRoom(r))
   2. CLF: CrimeRoom(r) ∧ ¬InRoom(ProfPlum, r)
4. The rope was found in the kitchen.
   1. FOL: WeaponInRoom(Rope, Kitchen)
   2. CLF: WeaponInRoom(Rope, Kitchen)
5. Colonel Mustard did not use the knife.
   1. FOL: ¬Used(ColMustard, Knife)
   2. CLF: ¬Used(ColMustard, Knife)
6. The suspect was seen in the same room as the weapon they used.
   1. FOL: ∃ r, w, x (Used(x,w) → (¬WeaponInRoom(w,r) ∨ InRoom(x,r)
   2. CLF: ¬Used(x, w) ∨ WeaponInRoom(w,r) V InRoom(x,r)
7. The crime happened in the room where the suspect was seen.
   1. FOL: ∃x, r ((Suspect(x) ∧ InRoom(x, r)) → CrimeRoom(r))
   2. CLF: ¬Suspect(x) ∨ ¬InRoom(x, r) ∨ CrimeRoom(r)
8. GOAL
   1. ¬Used(ColonelMustard, Revolver)
   2. ¬Used(ColonelMustard, Revolver)

**GOAL:** Colonel Mustard is the killer and used the revolver -> Used(ColonelMustard, Revolver)

~~R1. Used(x, Revolver) ∧ InRoom(x, Ballroom)~~ Separated in R9

R2. InRoom(MissScarlet, Library)

R3. CrimeRoom(r) ∧ ¬InRoom(ProfPlum, r)

R4. WeaponInRoom(Rope, Kitchen)

R5. ¬Used(ColMustard, Knife)

R6. ¬Used(x, w) ∨ WeaponInRoom(w,r) V InRoom(x,r)

R7. ¬Suspect(x) ∨ ¬InRoom(x, r) ∨ CrimeRoom(r)

R8. ¬Used(ColonelMustard, Revolver) <- GOAL NEGATED

Separate R1

R9. Used(x, Revolver)

R10. InRoom(x, Ballroom)

Resolve with R9

R11. NULL

Since the Resolution showed NULL, therefore Colonel Mustard is the killer