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CS 440

1. $(\sim stench(m) \vee Adjacent\left(x, f(x)\right)) \wedge (\sim stench(m) \vee At\left(wumpus, f(x)\right))$
2.
    a. $\forall x,\ Likes(x, Apples) \rightarrow Plays(x, Chess)$
    b. $\forall x, Likes(x, Oranges) \rightarrow Plays(x, Go)$
    c. $\forall x, \left(Likes(x, Oranges) \vee Likes(x, Apples)\right) \rightarrow \sim (Likes(x, Oranges) \wedge Likes(x, Apples))$
    d. $Likes(John, Apples)$
    e. $\forall x, y, \text{Marry}(y) \wedge \text{John}(x) \wedge \text{Likes}(x, F) \rightarrow \sim Likes\ (y, F)$
3. ∃,∀
    a. $C1: \sim Likes(x, Apples) \vee Plays(x, Chess)$
    b. $C2: \sim Likes(x, Oranges) \vee Plays(x, Go)$
    c. $C3: (\sim Likes(x, Oranges) \wedge Likes(x, Apples)) \vee (\sim Likes(x, Apples) \wedge Likes(x, Oranges))$
    d. $C4: Likes(John, Apples)$
    e. $C5: \left(\sim \text{Likes}(f(x), F)\right) \vee Likes\ (x, F)$
4.

    C6: ~Plays(Mary,Go)

    C7: Plays(Mary, Go)

    $\sim\left(Likes(Mary, Oranges)\right)\ C2$

    $Likes(Mary, Apples)$ C3

    Likes (John, Apples) C4

    ~Likes(Mary, Apples) C5

    Contradiction: $Likes(Mary, Apples) \wedge \sim \text{Likes}(\text{Mary}, \text{Apples})$

    $Therefore, C6\ is\ wrong, and\ Plays(Mary, Go)\ is\ true.$

    $Conclusion:\ Based\ on\ the\ proof, the\ query\ Plays(Mary, Go)\ is\ true.$