PAGE NO :
DATE :

LAB-7

29/11/24

→ Create a knowledge base consisting of first order logic statements to prove the given query using forward chaining.

→ Algorithm :

function FOL-FC-ASK (KB, α) returns a substitution or false

inputs : KB, the knowledge base, a set of first-order definite clauses
α, the query, an atomic sentence

local variables: new, the new sentence inferred in each iteration

repeat until new is empty
new ← { }
for each rule in KB do
(p1 ∧ ... ∧ pn ⇒ q) ← Standardize-APART(rule)
for each θ such that SUBST(θ, p1 ∧ ... ∧ pn) = SUBST(θ, p1' ∧ ... ∧ pn')
for some p1' ... pn' in KB
q' ← SUBST(θ, q)
if q' does not unify with some sentence already in KB or new then
add q' to new
φ ← UNIFY(q', α)
if φ is not fail then return φ
add new to KB
return false

PAGE NO :
DATE :

O/P:
Criminal(Robert) is proven
Inferred facts:
Sells(Robert, T1, A)
Missile (T1)
Criminal (Robert)
Owns(A, T1)
American (Robert)
Weapon (T1)
Hostile (A)
Enemy (A, America)

→ FOL sentences

(a) Occupation(Emily, surgeon) ∨ Occupation (Emily, Lawyer)

(b) Occupation (Joe, Actor) ∧ ∃o (Occupation (Joe, o) ∧ o ≠ Actor)

(c) ∀p(Occupation (P, Surgeon) → Occupation (P, Doctor))

(d) ∀p(Occupation (P, Lawyer) → ¬ Customer (Joe, P))

(e) ∃p (Boss (P, Emily) ∧ Occupation (P, Lawyer))

(f) ∃p(Occupation (P, Lawyer) ∧ ∀c(Customer (C, P) → Occupation (C, Doctor)))

(g) ∀p(Occupation (P, Surgeon) → ∃q(Customer (P, q) Occupation (q, Lawyer)))