LAB - 8

First Order Logic - Implementation

Step 1: Ψ_1 or Ψ_2 is a variable or constant,

a) If Ψ_1 or Ψ_2 are identical, then return NIL.

b) Else if Ψ_1 is a variable,

- then if Ψ_1 occurs in Ψ_2, then return FAILURE
- else return $\{(\Psi_2 / \Psi_1)\}$.

c) Else if Ψ_2 is a variable

- If Ψ_2 occurs in Ψ_1 then return FAILURE,
- Else return $\{(\Psi_1 / \Psi_2)\}$.

d) Else return FAILURE

Step 2: If the initial Predicate symbol in Ψ_1 and Ψ_2 are not same, then FAILURE.

Step 3: If Ψ_1 and Ψ_2 have a different no. of arguments, then FAILURE

Step 4: Set substitution set to NIL

Step 5: For i=1 to the number of elements in Ψ_1

a) Call Unify function with the ith element of Ψ_1 and ith element of Ψ_2, and put the result into S.

b) If S = failure, then returns Failure

c) If S ≠ NIL then do,

a) Apply S to the remainder of both L1 and L2.

b) SUBST= APPEND (S, SUBST).

Step 6: Return SUBST

Example:

1) "John is a human"

$\rightarrow$ Human(John)

2) "Every human is mortal."

$\rightarrow \forall x\,(\text{Human}(x) \rightarrow \text{Mortal}(x))$

3) "John loves Mary"

$\rightarrow$ loves(John, mary)

4) "There is someone who loves Mary"

$\rightarrow \exists x\,(\text{loves}(x, \text{Mary}))$

5) "All dogs are animals"

$\rightarrow \forall x\,(\text{dogs}(x) \rightarrow \text{animal}(x))$

6) "Some dogs are brown"

$\rightarrow \exists x\,(\text{Dog}(x) \land \text{Brown}(x))$

Unification: Eats(x, Apple)

Eats(Riya, y)

- Eats(Riya, Apple)

Code -

Enter a sentence similar to unify :

1) John is a human

2) Every human is mortal

3) John loves Mary

4) There exists someone who loves Mary

Enter a sentence : john is mortal

First Order Logic Translation : M (john)

Enter : mary loves john

First Order Logic Translation: L (mary , john)

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