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Implement unification in first order logic

ALGORITHM unify (ψ_1, ψ_2):

Step 1: If ψ_1 or ψ_2 is a variable or a constant, then:

a) If they are identical \rightarrow return nil

b) If they are variable

i) ψ_1 is variable

ψ_1 occurs in ψ_2

- return failure

ψ_1 doesn't occur in ψ_2 - return ψ_2/ψ_1

ii) ψ_2 is variable

ψ_2 occurs in ψ_1

return failure

ψ_2 doesn't occur in ψ_1

return ψ_1/ψ_2

b) If neither return failure.

Step 2: If predicate symbols are not same in ψ_1, ψ_2 \rightarrow return failure

Step 3: If no. of arguments are different

\rightarrow return failure

Step 4: set substitution set (SUBST) to NIL

Step 5: For all elements in ψ_1

a) call the unify function with i th element of ψ_1 and i th element of ψ_2 and return result to S

b) If S = FAILURE return failure

c) else

i) Apply S to remainder of both

ii) Use subst function to solve it as

SUBST = (APPEND (S, subst))

Step 6: return SUBST

Step 7: End

Output

Enter the first expression (e.g., 'P x y'): P x y
 Enter the second expression (e.g., 'P a y'): P a y
 Unification successful!
 Substitution: { 'x': 'a', 'y': 'y' }

Enter the first expression (e.g., 'P x y'): P x y
 Enter the second expression (e.g., 'P a y'): P a y
 The expression cannot be used.