13/10/25

Week - 7.

Q. Find Most General (MGU) of $\{Q(a, g(x,a), f(y))$ & $Q(a, g(f(b), a), x)\}$

$\Rightarrow$ $Q(a, g(x,a), f(y))$
$Q(a, g(f(b), a), x)$

$a = a$
$g(x,a) = g(f(b), a) \Rightarrow x = f(b)$
$f(y) = x \Rightarrow y = b \Rightarrow f(y) = f(b) \Rightarrow y = b$
$MGU = \{x \rightarrow f(b), y \rightarrow b\}$

Q. Find MGU of $\{P(f(a), g(y)), P(x, x)\}$
$\Rightarrow$ $P(f(a), g(y))$
$P(x, x)$

$f(a) = x$
$g(y) = x$
$\Rightarrow f(a) \neq g(y)$
bec f & g are two different functions
Not MGU $\Rightarrow$ NO unifier

Q. Unify $\{prime(11)$ & $prime(y)\}$
$\Rightarrow$ $prime(11)$
$prime(y)$

$11 = y$
$MGU = \{y \rightarrow 11\}$

Q. Unify $\{knows(John, x), knows(y, mother(y))\}$
$\Rightarrow$ $knows(John, x)$
$knows(y, mother(y))$

$John = y$
$x = mother(y) \Rightarrow x = mother(John)$

MGU = { y → John, x → mother(John) }

Q. Unify { knows(John, x), knows(y, Bill) }

⇒ knows(John, x)

knows(y, Bill)

John = y

x = Bill

MGU = { y → John, x → Bill }

Q. Find Most General Unifier (MGU) of { P(b, x, f(g(z))) & P(z, f(y), f(y)) }

⇒ P(b, x, f(g(z)))

P(z, f(y), f(y))

b = z

x = f(y)

f(g(z)) = f(y) → g(z) = y

MGU = { z → b, x → f(g(z)), y → g(z) }

Unification_Algo.

Algo: Unif(φ_1, φ_2)

Step 1: If φ_1 or φ_2 is a variable or constant, then:

a). If φ_1 or φ_2 are identical, then return NIL.

b). Else if φ_1 is a variable,

a. then if φ_1 occurs in φ_2, then return FAILURE

b. Else return $\{(\varphi_2/\varphi_2)\}$.

c). Else if φ_2 is a variable,

a. If φ_2 occurs in φ_1 then return FAILURE,
b. Else return $\{(\varphi_1/\varphi_2)\}$.

d). Else return ~~$\{(\varphi_1/\varphi_2)\}$~~ FAILURE

Step 2 : If the initial Predict symbol in φ_1 & φ_2 are not same, then return FAILURE

Step 3 : If φ_1 & φ_2 have a different number of arguments, then return FAILURE.

Step 4 : Set substitution set(SUBST) to Nil.

Step 5 : For i=1 to the no. of ele in φ_1.

a). Call Unify function with the ith ele. of φ_1 & ith ele of φ_2 & put the res into S.

b). If S = failure then returns failure

c). If S ≠ NIL then do,

a. Apply S to the remainder of both L1 & L2.

b. SUBSET = APPEND(S, SUBSET).

Step 6 : Return SUBSET).

~~Output: MGU = {'b' : 'z', 'x' : ('f', 'y')}~~.

output MGU = $\{ z \to b,\ x \to f(g(z)),\ y \to g(z) \}$