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function UNIFY(x, y) returns a substitution to make x and y identical, if possible

  UNIFY-INTERNAL(x, y, {})

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function UNIFY-INTERNAL(x, y, θ) returns a substitution to make x and y identical (given θ)
  inputs: x, a variable, constant, list, or compound
          y, a variable, constant, list, or compound
          θ, the substitution built up so far

  if θ = failure then return failure
  else if x = y then return θ
  else if VARIABLE?(x) then return UNIFY-VAR(x, y, θ)
  else if VARIABLE?(y) then return UNIFY-VAR(y, x, θ)
  else if COMPOUND?(x) and COMPOUND?(y) then
      return UNIFY-INTERNAL(ARGS[x], ARGS[y], UNIFY-INTERNAL(OP[x], OP[y], θ)
  else if LIST?(x) and LIST?(y) then
      return UNIFY-INTERNAL(REST[x], REST[y], UNIFY-INTERNAL(FIRST[x], FIRST[y], θ))
  else return failure

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function UNIFY-VAR(var, x, θ) returns a substitution
  inputs: var, a variable
          x, any expression
          θ, the substitution built up so far

  if {var/val} ∈ θ
     then return UNIFY-INTERNAL(val, x, θ)
  else if {x/val} ∈ θ
     then return UNIFY-INTERNAL(var, val, θ)
  else if var occurs anywhere in x /* occur-check */
     then return failure
  else return add {x/var} to θ
```