\{L_1, \ldots, L_n\} \text{ is unifiable} \text{ iff there is a } \sigma \text{ with } \sigma(L_1) = \ldots = \sigma(L_n).

\sigma \text{ is mgu} \text{ iff for every unifier } \sigma' \text{ there is a substitution } \delta \text{ with } \sigma' = \delta \circ \sigma.

**Unification Algorithm**

1. Let \( \sigma = \emptyset \) be the “identical” substitution.

2. If \(|\sigma(K)| = 1\), then stop and return \( \sigma \).

3. Otherwise, check all \( \sigma(L_i) \) in parallel from left to right, until there are different symbols in two literals.

4. If none of these symbols is a variable, then stop with clash failure.

5. Otherwise, let \( X \) be the variable and \( t \) be the subterm in the other literal. If \( X \) occurs in \( t \), then stop with occur failure.

6. Otherwise, let \( \sigma = \{X/t\} \circ \sigma \) und go back to step 2.
Resolution for Predicate Logic

*R* is a *resolvent* of *K*₁ and *K*₂ iff

- *ν*₁(*K*₁) and *ν*₂(*K*₂) are variable-disjoint

- *L*₁, ..., *L*ₙ ∈ *ν*₁(*K*₁), *L*′₁, ..., *L*′ₙ ∈ *ν*₂(*K*₂) with *n*, *m* ≥ 1 and 

{ *L*₁, ..., *L*ₙ, *L*′₁, ..., *L*′ₙ } has mgu *σ*

- *R* = *σ*((*ν*₁(*K*₁) \ { *L*₁, ..., *L*ₙ }) ∪ (*ν*₂(*K*₂) \ { *L*′₁, ..., *L*′ₙ }))

**Example**

\{ *p*(f(\(X\))), \neg q(Z), *p*(Z)\} \quad \{ \neg *p*(X), *r*(g(\(X\)))\}  

\{ \neg q(f(\(X\))), *r*(g(\(f(X)\)))\}  

\{ \neg q(f(\(X\))), *r*(g(\(f(X)\)))\}  

\nu_1 = \emptyset  

\nu_2 = \{ X/U, U/X \}  

\sigma = \{ Z/f(X), U/f(X) \}