

LAB 7

Unification

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•[1]: def unify(x, y, substitutions=None):
    if substitutions is None:
        substitutions = {}
    if x == y:
        return substitutions
    if isinstance(x, str) and x.islower():
        return unify_var(x, y, substitutions)
    if isinstance(y, str) and y.islower():
        return unify_var(y, x, substitutions)
    if isinstance(x, tuple) and isinstance(y, tuple):
        if x[0] != y[0] or len(x) != len(y):
            return None
        for a, b in zip(x[1:], y[1:]):
            substitutions = unify(a, b, substitutions)
            if substitutions is None:
                return None
        return substitutions

    return None

def unify_var(var, x, substitutions):
    if var in substitutions:
        return unify(substitutions[var], x, substitutions)
    elif x in substitutions:
        return unify(var, substitutions[x], substitutions)
    elif occurs_check(var, x, substitutions):
        return None
    else:
        substitutions[var] = x
        return substitutions

def occurs_check(var, x, substitutions):
    if var == x:
        return True
    elif isinstance(x, tuple):
        return any(occurs_check(var, arg, substitutions) for arg in x[1:])
    elif isinstance(x, str) and x in substitutions:
        return occurs_check(var, substitutions[x], substitutions)
    return False

expr1 = ("Eats", "x", "Apple")
expr2 = ("Eats", "Riya", "y")
result = unify(expr1, expr2)
print("Unification:", result)
```

Unification: {'x': 'Riya', 'y': 'Apple'}