POAlexp6.py - C:/Users/welcome/AppData/Local/Programs/Python/Python311/POAlexp6.py (3.11.5)

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```
def unify(x, y, theta={}):
    if theta is None:
        return None
    elif x == y:
        return theta
    elif isinstance(x, str) and x.islower():
        return unify_var(x, y, theta)
    elif isinstance(y, str) and y.islower():
        return unify_var(y, x, theta)
    elif isinstance(x, list) and isinstance(y, list) and len(x) == len(y):
        return unify(x[1:], y[1:], unify(x[0], y[0], theta))
    else:
        return None
def unify_var(var, x, theta):
    if var in theta:
        return unify(theta[var], x, theta)
    elif x in theta:
        return unify(var, theta[x], theta)
    else:
        theta[var] = x
        return theta
def resolution(kb, facts, query):
    for clause in kb:
        premise, conclusion = clause
        for fact in facts:
            theta = unify(premise, fact, {})
            if theta is not None:
                inferred = substitute(conclusion, theta)
                if inferred == query:
                    return True
    return False
def substitute(predicate, theta):
    return [theta.get(x, x) for x in predicate]
knowledge_base = [
    [["Human", "x"], ["Mortal", "x"]]
]
facts = [["Human", "John"]]
query = ["Mortal", "John"]
if resolution(knowledge_base, facts, query):
    print("Query is resolved: John is Mortal")
else:
```

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```
        return None
    elif x == y:
        return theta
    elif isinstance(x, str) and x.islower():
        return unify_var(x, y, theta)
    elif isinstance(y, str) and y.islower():
        return unify_var(y, x, theta)
    elif isinstance(x, list) and isinstance(y, list) and len(x) == len(y):
        return unify(x[1:], y[1:], unify(x[0], y[0], theta))
    else:
        return None
def unify_var(var, x, theta):
    if var in theta:
        return unify(theta[var], x, theta)
    elif x in theta:
        return unify(var, theta[x], theta)
    else:
        theta[var] = x
        return theta
def resolution(kb, facts, query):
    for clause in kb:
        premise, conclusion = clause
        for fact in facts:
            theta = unify(premise, fact, {})
            if theta is not None:
                inferred = substitute(conclusion, theta)
                if inferred == query:
                    return True
    return False
def substitute(predicate, theta):
    return [theta.get(x, x) for x in predicate]
knowledge_base = [
    [["Human", "x"], ["Mortal", "x"]]
]
facts = [["Human", "John"]]
query = ["Mortal", "John"]
if resolution(knowledge_base, facts, query):
    print("Query is resolved: John is Mortal")
else:
    print("Query could not be resolved")
```


IDLE Shell 3.11.5
File Edit Shell Debug Options Window Help
Python 3.11.5 (tags/v3.11.5:cce6ba9, Aug 24 2023, 14:38:34) [MSC v.1936 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
= RESTART: C:/Users/welcome/AppData/Local/Programs/Python/Python311/POAIexp6.py
Query is resolved: John is Mortal
>>>