IMPLEMENTATION OF UNIFICATION AND RESOLUTION ALGORITHM

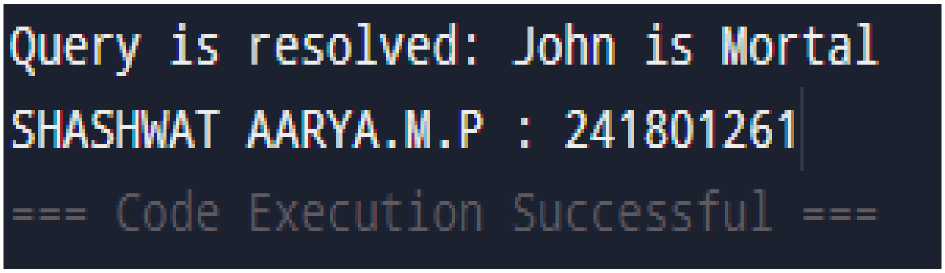
NAME : SHASHWATAARYA.M.P **ROLL NO :** 241801261

Program:

```
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, query):
    for clause in kb:
        theta = unify(clause[0], query, {})
        if theta is not None:
            new_kb = [substitute(c, theta) for c in clause[1:]]
            if not new_kb:
                return True
            return resolution(kb, new_kb[0])
    return False

def substitute(predicate, theta):
    return [theta.get(arg, arg) for arg in predicate]

knowledge_base = [
    [["Human", "John"], ["Mortal", "John"]]
]
```

```
fact = ["Human", "John"]
query = ["Mortal", "John"]

if resolution(knowledge_base, query):
    print("Query is resolved: John is Mortal")
else:
    print("Query could not be resolved")
```

Output :



```
Query is resolved: John is Mortal
SHASHWAT AARYA.M.P : 241801261
=== Code Execution Successful ===
```