

1BM22CS241

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Create a knowledge base consisting of first order logic statements and prove the given query using Resolution

Code:

```
KB = {  
    "food(Apple)": True,  
    "food(vegetables)": True,  
    "eats(Anil, Peanuts)": True,  
    "alive(Anil)": True,  
    "likes(John, X)": "food(X)", # Rule: John likes all food  
    "food(X)": "eats(Y, X) and not killed(Y)", # Rule: Anything eaten and not killed is food  
    "eats(Harry, X)": "eats(Anil, X)", # Rule: Harry eats what Anil eats  
    "alive(X)": "not killed(X)", # Rule: Alive implies not killed  
    "not killed(X)": "alive(X)", # Rule: Not killed implies alive  
}  
  
# Function to evaluate if a predicate is true based on the KB  
  
def resolve(predicate):  
    # If it's a direct fact in KB  
    if predicate in KB and isinstance(KB[predicate], bool):  
        return KB[predicate]  
    # If it's a derived rule  
    if predicate in KB:  
        rule = KB[predicate]  
        if " and " in rule: # Handle conjunction  
            sub_preds = rule.split(" and ")  
            return all(resolve(sub.strip()) for sub in sub_preds)
```

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elif " or " in rule: # Handle disjunction

sub_preds = rule.split(" or ")

return any(resolve(sub.strip()) for sub in sub_preds)

elif "not " in rule: # Handle negation

sub_pred = rule[4:] # Remove "not "

return not resolve(sub_pred.strip())

else: # Handle single predicate

return resolve(rule.strip())

# If the predicate is a specific query (e.g., likes(John, Peanuts))

if "(" in predicate:

func, args = predicate.split("(")

args = args.strip(")").split(", ")

if func == "food" and args[0] == "Peanuts":

return resolve("eats(Anil, Peanuts)") and not resolve("killed(Anil)")

if func == "likes" and args[0] == "John" and args[1] == "Peanuts":

return resolve("food(Peanuts)")

# Default to False if no rule or fact applies

return False

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# Query to prove: John likes Peanuts

query = "likes(John, Peanuts)"

result = resolve(query)

# Print the result

print(f"Does John like peanuts? {'Yes' if result else 'No'}")

```

Output:

Does John like peanuts? Yes