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1BM22CS275
5-E

LAB-10 First order logic statement into resolution.

```
# Knowledge Base (KB)
kb = {
    "food": {"apple", "vegetables"},  # Initial foods
    "eats": {"anil": {"peanuts"}},  # What Anil eats
    "alive": {"peanuts"},  # Peanuts are alive
    "likes": {},  # Likes will be inferred
    "not_killed": set(),  # Not killed entities
}

# Derived rules
rules = [
    # If alive, then not killed
    lambda x: kb["not_killed"].add(x) if x in kb["alive"] else None,

    # Anything eaten and not killed is food
    lambda x: kb["food"].add(x)
    if any(x in kb["eats"][person] for person in kb["eats"]) and x in kb["not_ki
    else None,

    # Harry eats everything that Anil eats
    lambda x: kb["eats"].setdefault("harry", set()).update(kb["eats"]["anil"]),

    # John likes all kinds of food
    lambda x: kb["likes"].setdefault("john", set()).update(kb["food"]),
```

```
    lambda x: kb["likes"].setdefault("john", set()).update(kb["food"]),
]

# Apply rules iteratively until no more changes occur
def apply_rules():
    changed = True
    while changed:
        changed = False
        for entity in list(kb["alive"] | kb["food"] | set(kb["eats"].keys())):
            for rule in rules:
                before = {k: set(v) for k, v in kb.items()}  # Snapshot of KB
                rule(entity)  # Apply a rule
                after = {k: set(v) for k, v in kb.items()}  # Snapshot after rul
                if before != after:
                    changed = True  # A change was made

# Negated conclusion to check resolution
def prove(conclusion):
    # Apply rules first
    apply_rules()
    # Check if the conclusion is in the KB
    return conclusion in kb["likes"].get("john", set())

# Add initial entities to "not kil" (derived from alive)
kb["not_killed"].update(kb["alive"])
```

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kb["not_killed"].update(kb["alive"])

# Prove "John likes peanuts"
if prove("peanuts"):
    print("John likes peanuts: PROVED")
else:
    print("John likes peanuts: NOT PROVED")
```

OUTPUT:


John likes peanuts: PROVED
...Program finished with exit code 0
Press ENTER to exit console.