LAB-"07"

—: Propositional Logic :—

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P → Q (if P is true, then Q is true)
(we known P is true)

→ Knowledge Based :—

01 Alice is mother of Bob
02 Bob is the father of charlie.
03 A father is a parent
04 A mother is a parent.
05 All the parents have children
06 If someone is a parent, their children are not siblings
07 Alice is married to David

→ Hypothesis :—

"charlie is a siblings of Bob"

→ Proporitional Logic :—

1) M(A,B) : Alice is mother of Bob
2) F(B,C) : Bob is father of charlie.
3) Parent(x) : x is a parent
4) Child(y, x) : y is child of x
5) Siblings (x, y) x & y are siblings
6) Married (A, D) : Alice is married to David
07) Parent (x) has children (y) who are siblings (x & y).

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Logical Reasoning :-

(1) From Statement ① & ④
M(A,B) & (y,x) → Alice is parent

(2) From statement ② & ④
F(B,C) & (y,x) → Bob is a parent

(3) From Statement ① & ② & ⑦
M(A,B) & F(B,C) & (∂ & (x,y))
→ bob & charile are not siblings.

#Code :-

```
class Knowledge:
    def __init__(self):
        self.rules = []
        self.facts = set()

    def add_fact(self, fact):
        self.facts.add(fact)

    def add_rule(self, premise, conclusion):
        self.rules.append((premise, conclusion))

    def infer(self):
        new_inferum = True
        while new_inferum:

            if all(fact in self.facts for fact in premise)
            if conclusion not in self.facts:
                self.facts.add(conclusion)
```

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```
        new_inferences = True

def entails(self, hypothesis):
    return hypothesis in self.facts

kb = KnowledgeBase()

kb.add_fact("Alice is mother of Bob.")
kb.add_fact("Bob is the father of charlie.")
kb.add_fact("A father is a parent.")
kb.add_fact("A mother is a parent")
kb.add_fact("All the parents have children.")
kb.add_fact("if someone is parent, their
    children are not siblings.")
kb.add_rule(["Bob is father of charlie.",
"A father is a parent."], "Bob is a
parent.")
kb.add_rule(["Alice is mother of Bob.",
'A mother is parent.']; Alice is a parent.']
hypothesis = "charlie & Bob are siblings
if kb.ask(hypothesis):
    print("{hypothesis}", I entailed
by knowledge base.")
else:
    print("{hypothesis}", I not entailed
by kb.")
```