LAB - (7)

Entailment:

Knowledge Base:

1. Alice is the mother of Bob — M(Alice, Bob) — 1, 4
2. Bob is the father of Charlie — F(Bob, Charlie) — 2, 3
3. A father is a parent — $\forall x (Father(x,y) \rightarrow Parent(x,y))$ — 6, 1, 2
4. A mother is a parent — $\forall x (Mother(x,y) \rightarrow Parent(x,y))$
5. All parents have children — $\forall x (Parent(x,y) \rightarrow Child(y,x))$
6. If someone is a parent, their children are siblings $\Rightarrow$ $(Parent(x,y) \wedge Parent(x,z) \wedge (y \neq z) \rightarrow Sibling(y,z))$
7. Alice is married to David. • Married(Alice, David)

Step by step Solution

1. Hypothesis: "Charlie is a sibling of Bob"

2. Entailment Process:

→ Considering statements 1 & 4, we can conclude that Alice is a parent of Bob $\Rightarrow$ Parent(Alice, Bob)

→ Considering statements 2 & 3, we can conclude that Bob is a parent of Charlie. $\Rightarrow$ Parent(Bob, Charlie)

→ Considering statement 6, we say that if children are siblings then they must have a common parent.

→ Considering statement 1 & 2, (Alice is a parent of Bob & Bob is a parent of Charlie), we can say that Bob and Charlie dont have a some parent.

→ Therefore, Charlie & Bob are not siblings.

3. Conclusion:

The hypothesis "Charlie is a sibling of Bob" is not entailed by the knowledge base.

19/11/24