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Question-45

- a) Top-down (SLD) derivation of the query accepted(chris) applied to the knowledge base:
1. Query: accepted(chris)
 2. Rule: accepted(student) \leftarrow returning(student) \wedge goodstanding(student) \wedge clearBalance(student)
- substituting student with chris in the rule, we get:
returning(chris) \wedge goodstanding(chris) \wedge clearBalance(chris)
→ we need to find support for these three sub-goals
 3. Rule: Qualified(student) \leftarrow legacystudent(student)
→ substituting student with chris in the rule, we get:
Qualified(chris)
 4. Rule: legacystudent(student) \leftarrow child(student, parent) \wedge graduate(parent)
→ substituting student with chris, and parent with sam in the rule we get:
legacystudent(chris) \leftarrow child(chris, sam) \wedge graduate(sam)
 5. Fact: child(chris, sam)
 6. Fact: graduate(sam)
 7. we have found support for all the sub-goals of the original rule so, chris is qualified
 8. Rule: Qualified(student) \leftarrow highSAT(student) \wedge goodHS(student)
→ substituting student with chris in the rule
Qualified(chris) \leftarrow highSAT(chris) \wedge goodHS(chris)
→ we need to find support for two sub-goals
 9. Fact: goodHS(chris)
 10. we have found support for all the sub-goals of the original rule so, chris is qualified
 11. Rule: accepted(student) \leftarrow allcomplete(student) \wedge qualified(student)
→ substituting student with chris in the rule
accepted(chris) \leftarrow allcomplete(chris) \wedge qualified(chris)
 12. Fact: allcomplete(chris)
 13. we already established that chris is qualified in step 10

14. we have found support for all the sub goals of the original rule
so, Chris is accepted

b) one of the failing top-down (SLD) derivations of the query accepted (laura) applied to the KB

1. query: accepted (laura)

2. Rule: accepted (student) \leftarrow returning (student) \wedge goodstanding (student) \wedge clearBalance (student)

\rightarrow substituting student with laura in the rule

returning (laura) \wedge goodstanding (laura) \wedge clearBalance (laura)

we need to find support for these three sub-goals

3. fact: returning (laura)

4. we need to find support for the remaining two sub-goals, goodstanding (laura), and clearBalance (laura)

\rightarrow However, there are no facts or rules in the knowledge base that provides support for these sub-goals since there is no support for the sub goals
The top-down derivation for accepted (laura) fails