

CS360 – Homework #3

Resolution with Propositional Logic

- 1) When asked for the ages of her three children, Mrs. Baker says that Alice is her youngest child if Bill is not her youngest child, and that Alice is not her youngest child if Carl is not her youngest child. Write down a knowledge base that describes this riddle and the necessary background knowledge that only one of the three children can be her youngest child. Show with resolution that Bill is her youngest child.
- 2) A boy and a girl are talking. “I am a boy” said the child with black hair. “I am a girl” said the child with white hair. At least one of them is lying. Write down a knowledge base that describes this riddle. Show with resolution that both of them are lying.

Backward Chaining

- 3) The rule base for a production system is given below:
 - If Horse(X) and Offspring (Y,X) then Horse(Y).
 - If Parent(X,Y) then Offspring(Y,X).
 - If Offspring(X,Y) then Parent(Y,X).
 - Horse(Bluebeard).
 - Parent(Bluebeard, Charlie).

Use backward chaining to show that Horse(Charlie) is true.

Semantic Networks

- 4) Exactly how can a computer determine that the sentence “I keep my money in the bank” refers to a financial institution rather than the land alongside a river. In this context, explain also what spreading activation is.
- 5) What are advantages and disadvantages of using semantic networks for knowledge representation over using first-order logic?