

CS360 Homework 3

First Order Logic

- 1) For each of the following sentences in first-order logic, specify whether it is valid, satisfiable, and/or unsatisfiable:
 - (a) $P(A) \Rightarrow \forall x P(x)$
 - (b) $P(A) \Rightarrow \forall x \neg P(x)$
 - (c) $P(A) \Rightarrow \exists x P(x)$
 - (d) $P(A) \Rightarrow \exists x \neg P(x)$
- 2) Solve Problem 9.23 on page 365 of our textbook.

Rule-Based Systems

- 3) The knowledge 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).
 - (a) Use forward chaining to show that Horse(Charlie) is true.
 - (b) Use backward chaining to show that Horse(Charlie) is true.