人工智能基础作业 7

张磊 2017K8009922027

9.6 解：

a. Horse(x) => Mammal(x);

   Cow(x) => Mammal(x);

   Pig(x) => Mammal(x);

b. Offspring(x, y) ∧ Horse(y) => Horse(x);

c. Horse(Bluebeard);

d. Parent(Bluebeard, Charlie);

e. Parent(x,y) => Offspring(y,x);

   Offspring(x,y) => Parent(y,x);

f. [Mammal(x) => Parent(G(x),x)]; G(x)是 skolem 函数；

9.7 解：

a. 假设 P(x,y)表示 y 是 x 的父亲，那么显然：

   $\forall x\ \exists y$ P(x,y)为真，$\exists q$ P(q,q)为假；

b. 将前提转化为 P(x,F(x))的形式，并将 P(q,q)转化为否定形式¬ P(q,q)；如果这两个公式可以合一，那么归结会产生空子句；

c. 在赋值{x/q,SK0/q}下，P(x,F(x))和¬ P(q,q)归结会产生空子句；

d. 假设前提为$\exists x$ Male(x)，我们要证明 Male(James)，我们把前提转化为 Male(SK1)的形式。如果 Male(James)和 Male(SK1)可以合一，那么同样，可以用¬ Male(James)归结出空子句；

附加题

解：

1. father (X,Y) ^ father (Y,Z) => grandfather (X,Z)

2. father (X,Y) ^ married (Y,Z) => father-in-law (X,Z)

3. father (X,Y) ^ mother (Y,Z) => grandfather (X,Z)

4. father (X,Y) ^ father (X,Z) => brother (Y,Z)

5. brother (X,Y) ^ grandfather (Z,Y) => grandfather (Z,X)

6. married (I,W)

7. married (F,D)

8. father (I,S1)

9. father (I,D)

10.father (F,S2)

11.father (F,I)

12.mother (D,S2)

13.grandfather(I,S2)

USING 3:

9 ^ 12 => grandfather (I, S2); (RESULT 1)

USING 4:

10 ^ 11 => brother (S2,I); (RESULT 2)

USING 5:

brother (X,Y) ^ grandfather (Z,Y) => grandfather (Z,X)

Result2 ^ Result1

brother (I , S2) ^ grandfather (I, S2) => grandfather (I, I)