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# Assignment 11

**9.4 For each pair of atomic sentences, give the most general unifier if it exists:**
**a. P(A,B,B), P(x,y,z).**
**Answer:**
{x / A, y / B, z / B}(or some permutation of this).

**b. Q(y,G(A,B)), Q(G(x,x),y).**
**Answer:**
Nou nifier( x cannot bind to both A and B).

**c. Older(Father (y),y), Older(Father (x),John).**
**Answer:**
{y/John,x/John}.

**d. Knows(Father (y),y), Knows(x,x).**
**Answer:**
No unifier (because the occurs-check prevents unification of y with Father(y)).

**9.6 Write down logical representations for the following sentences, suitable for use with Generalized Modus Ponens:**

**a. Horses, cows, and pigs are mammals.**

**Answer:**

Horse(x) ⇒ Mammal(x)

Cow(x) ⇒ Mammal(x)

Pig(x) ⇒ Mammal(x).

**b. An offspring of a horse is a horse.**

**Answer:**

Offspring(x, y)∧Horse(y) ⇒ Horse(x).

**c. Bluebeard is a horse.**

**Answer:**

Horse(Bluebeard).

**d. Bluebeard is Charlie's parent.**

**Answer:**

Parent (Bluebeard,Charlie).

**e. Offspring and parent are inverse relations.**

**Answer:**

Offspring(x, y) ⇒ Parent(y, x)

Parent (x, y) ⇒ Offspring(y, x).

(Note we couldn't do Offspring (x, y) ⇔ Parent (y, x) because that is not in the form expected by Generalized Modus Ponens.)

**f. Every mammal has a parent.**

**Answer:**

Mammal(x) ⇒ Parent(G(x),x)(here G is a Skolem function).