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# AIML
## Tutorial 10

**Ans 1:** Given,

$R = \{Rabbit\}$

$u \in R$

$T = \{Tortoises\}$

$y \in T$.

$C(u,y) = $ "Rabbit u is faster than tortoise y."

1. $\forall u \in R, \forall y \in T, C(u,y)$ is true.

2. $\forall u \in R, \exists y \in T, C(u,y)$ is true.

3. $\exists u \in R, \forall y \in T, C(u,y)$ is true.

**Ans 2:**

Given,

① Brothers are siblings

② "Sibling" is symmetric.

A first cousin is a child of parent's sibling.

1. $\forall u,y \quad Brothers(u,y) \Rightarrow Sibling(u,y)$

2. $\forall u,y \quad Sibling(u,y) \Leftrightarrow Sibling(y,u)$

3. $\forall u,y \quad FirstCousin(u,y) \Leftrightarrow \exists a,b \; Parent(a,u) \wedge Parent(b,y)$
   $\wedge Sibling(a,b)$

**Ans:**

Given,

It is crime for American to sell weapon in hostile nations:-

$$American(x) \wedge Weapon(y) \wedge Hostile(z) \wedge Sells(x,y,z)$$
$$\Rightarrow Criminal(x)$$

The country Nono, an enemy of America has some missiles, $\exists y$ & Missiles, $Owns(Nono, y)$ is true.

$$Missiles(y) \Rightarrow Weapon(y)$$

All missiles of Nono were sold by Colonel west.

$$Missile(x) \wedge Owns(Nono, x) \Rightarrow Sells(West, x, Nono)$$

Hence, combining all above statement,

$$America(West) \wedge Weapon(y) \wedge Hostile(Nono)$$
$$\wedge Sells(West, y, None)$$
$$\Rightarrow Criminal(West).$$

Hence, Colonel West is a criminal.

Criminal(West)

Weapon(Me)    Sells(West, Me, Nono)    Hostile(Nono)

American(West)    Missile(Me)    Owns(Nono, Me)    Enemy(Nono, America)

Parent(b, y)