

Lab - 09

$\neg \exists x \forall y (y \neq x \rightarrow \neg Sells(x, y)) \Rightarrow \neg \exists x \forall y \neg Sells(x, y)$

FOL  $\rightarrow$  Forward Chaining:  $\neg \exists x \forall y \neg Sells(x, y) \Rightarrow \neg Sells(x, y)$  is valid

↓  
is one of the two methodologies using an inference engine,  
the other

Consider the following problem :-

As per the law, it is a crime for an American to sell weapons to hostile nations. Country A, an enemy of America, has some missiles, and all the missiles were sold to it by Robert, who is an American citizen.

$\rightarrow$  Prove that "Robert is Criminal".

Representation in FOL :-

① American (P)  $\wedge$  Weapon (V)  $\wedge$  Sells (P, V, A)  $\wedge$  Hostile (A)

$\Rightarrow$  Criminal (P)

② Country A has some missiles

$\exists x \text{Owens}(A, x) \wedge \text{Missile}(x)$

$\text{Owens}(A, T_1) \quad \} \text{Missile}(T_1)$

Missile (T<sub>1</sub>)

③ All of missiles were sold to country A by Robert

$\forall x \text{Missile}(x) \wedge \text{Owens}(A, x) \Rightarrow \text{Sells}(\text{Robert}, x, A)$

④ Missiles are weapons

Missile (x)  $\Rightarrow$  Weapon (x)

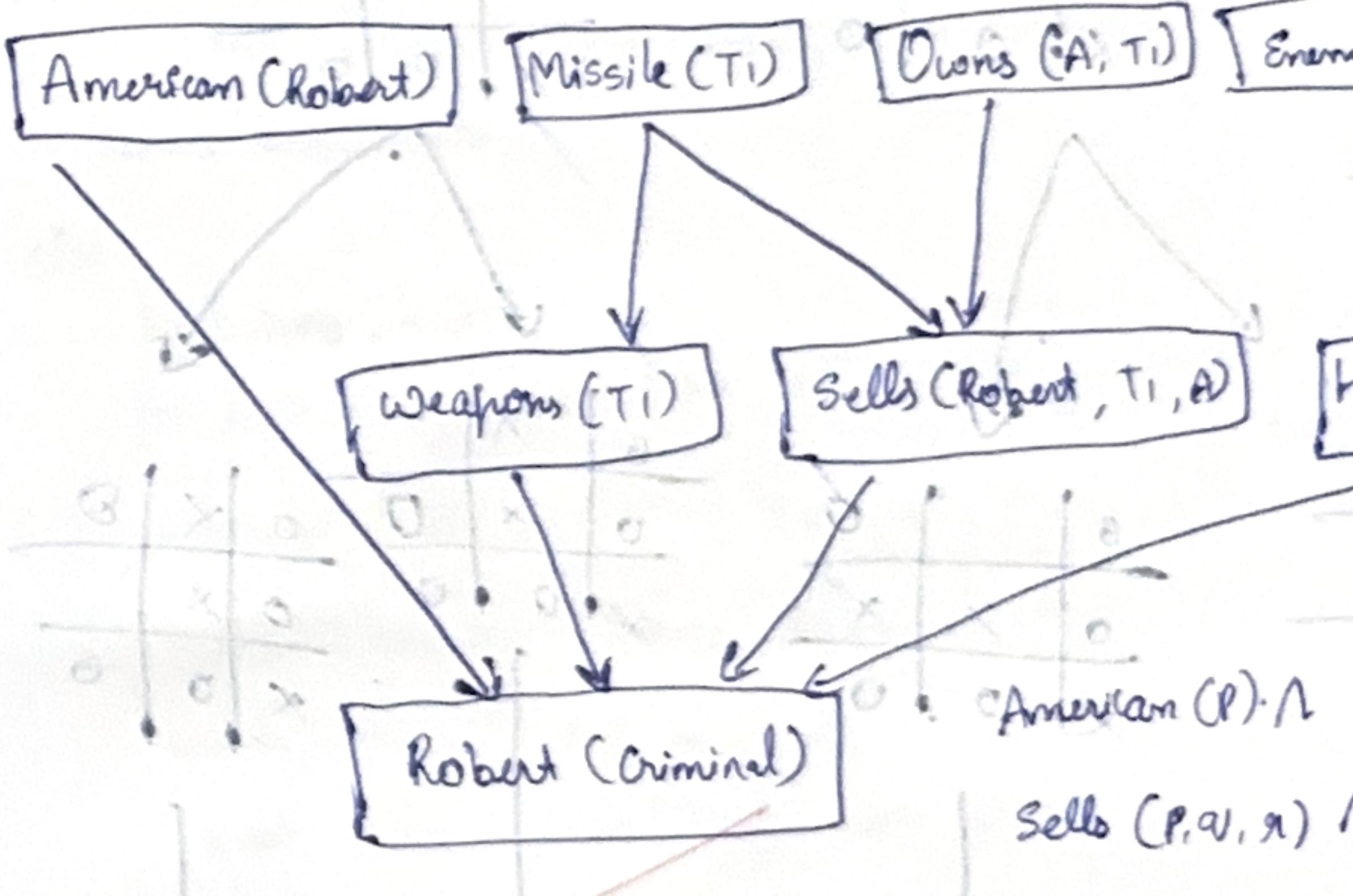
⑤ Enemy of America is known as hostile

$\forall x \text{Enemy}(x, \text{America}) \Rightarrow \text{Hostile}(x)$

⑥ Robert is an American  
American (Robert)

⑦ The Country A, an enemy of America  
Enemy (A, America)

Forward Chaining Proof :-



American (P)  $\wedge$

Sells (P, V, A)  $\Rightarrow$  Criminal (P)

⑥ Enemy of America is known as hostile

$\forall x \text{Enemy}(x, \text{America}) \Rightarrow \text{Hostile}(x)$

⑦ Robert is an American

American(Robert)

⑧ The country A, an enemy of America

Enemy(A, America)

Forward Chaining Proof

