

## E.B.1.2 (FOL: Studenti ansiosi, inferenza)

- $\mathcal{P} = \{ \text{Studente}/1, \text{Corso}/1, \text{HaStudiato}/2, \text{Ansioso}/1, \text{Supera}/2 \}$
- $\forall X \forall C$ 

$$\begin{aligned}
 & ( \\
 & \quad \text{Studente}(X) \wedge \\
 & \quad \text{Corso}(C) \wedge \\
 & \quad (\text{Ansioso}(X) \vee \neg \text{HaStudiato}(X, C)) \\
 & ) \rightarrow \\
 & \quad \neg \text{Supera}(X, C)
 \end{aligned}$$

### 1.1 Inferenza A

- $\text{KB} = \{$ 

$$\begin{aligned}
 & \forall X \forall C \\
 & \quad \text{Studente}(X) \wedge \text{Corso}(C) \wedge (\text{Ansioso}(X) \vee \neg \text{HaStudiato}(X, C)) \\
 & \quad \rightarrow \neg \text{Supera}(X, C), \\
 & \exists X \text{Studente}(X) \wedge \text{Ansioso}(X), \\
 & \exists X \exists C \text{Studente}(X) \wedge \text{Corso}(C) \wedge \text{HaStudiato}(X, C) \\
 & \}
 \end{aligned}$$
- $\mathcal{F} = \{S_1/0, S_2/0, C_1/0\}$

$$\begin{aligned}
 & \text{Studente}(X) \wedge \text{Corso}(C) \wedge (\text{Ansioso}(X) \vee \neg \text{HaStudiato}(X, C)) \rightarrow \neg \text{Supera}(X, C) = \\
 \neg & \text{Studente}(X) \vee \neg \text{Corso}(C) \vee \neg (\text{Ansioso}(X) \vee \neg \text{HaStudiato}(X, C)) \vee \neg \text{Supera}(X, C) = \\
 \neg & \text{Studente}(X) \vee \neg \text{Corso}(C) \vee \neg \text{Supera}(X, C) \vee (\neg \text{Ansioso}(X) \wedge \text{HaStudiato}(X, C)) = \\
 & \neg \text{Studente}(X) \vee \neg \text{Corso}(C) \vee \\
 & ((\neg \text{Ansioso}(X) \vee \neg \text{Supera}(X, C)) \wedge (\text{HaStudiato}(X, C) \vee \neg \text{Supera}(X, C))) = \\
 & \neg \text{Studente}(X) \vee \\
 & ((\neg \text{Ansioso}(X) \vee \neg \text{Supera}(X, C)) \vee \neg \text{Corso}(C)) \wedge \\
 & (\text{HaStudiato}(X, C) \vee \neg \text{Supera}(X, C)) \vee \neg \text{Corso}(C) = \\
 & (\neg \text{Ansioso}(X) \vee \neg \text{Supera}(X, C) \vee \neg \text{Corso}(C) \vee \neg \text{Studente}(X)) \wedge \\
 & (\text{HaStudiato}(X, C) \vee \neg \text{Supera}(X, C)) \vee \neg \text{Corso}(C) \vee \neg \text{Studente}(X)
 \end{aligned}$$

- $KB_{CNF} = \{$ 
  - $\neg \text{Ansioso}(X) \vee \neg \text{Supera}(X, C) \vee \neg \text{Corso}(C) \vee \neg \text{Studiante}(X),$
  - $\text{HaStudiato}(X, C) \vee \neg \text{Supera}(X, C) \vee \neg \text{Corso}(C) \vee \neg \text{Studiante}(X),$
  - $\text{Studiante}(S_1),$
  - $\text{Ansioso}(S_1),$
  - $\text{Studiante}(S_2),$
  - $\text{Corso}(C_1),$
  - $\text{HaStudiato}(S_2, C_1)$
- $\}$
- $KB_{CNF} \models \neg (\exists X \exists C \text{Studiante}(X) \wedge \text{Corso}(C) \wedge \text{Supera}(X, C)) ?$

## 1.2 Inferenza B

- Non tutti gli studenti sono ansiosi
  - $\exists X \text{Studiante}(X) \wedge \neg \text{Ansioso}(X)$
- Ogni studente ha studiato per almeno un esame
  - $\forall X \text{Studiante}(X) \rightarrow \exists C (\text{Corso}(C) \wedge \text{HaStudiato}(X, C))$
- SI PUÒ INFERIRE: che tutti gli studenti supereranno almeno un esame?
  - $\forall X \text{Studiante}(X) \rightarrow \exists C (\text{Corso}(C) \wedge \text{Supera}(X, C))$