

Sl. 52

Italian \subseteq Person
 English \subseteq Person

English $\subseteq \neg(\text{Italian})$
 Italian $\subseteq \neg(\text{English})$

English \cap Italian = \emptyset

Lazy \subseteq Italian
 LL \subseteq Italian

Lazy $\subseteq \neg LL$
 LL $\subseteq \neg \text{Lazy}$

Italian \subseteq Lazy \cup LL coherent

gentleman \subseteq English
 hoodlum \subseteq English

LL \subseteq gentleman

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FOL: every class is a unary predicate
 symbol

$\forall x: \text{Italian}(x) \rightarrow \text{Person}(x)$

$\forall x: \text{English}(x) \rightarrow \text{Person}(x)$

$\forall x: \text{English}(x) \rightarrow \neg \text{Italian}(x)$

$\forall x: \text{Italian}(x) \rightarrow \neg \text{English}(x)$

(*4*)

$\forall x: \text{Italian}(x) \rightarrow \text{Lazy}(x) \vee \text{LL}(x)$

(*)

$\forall x: \text{LL}(x) \rightarrow \text{gentleman}(x)$

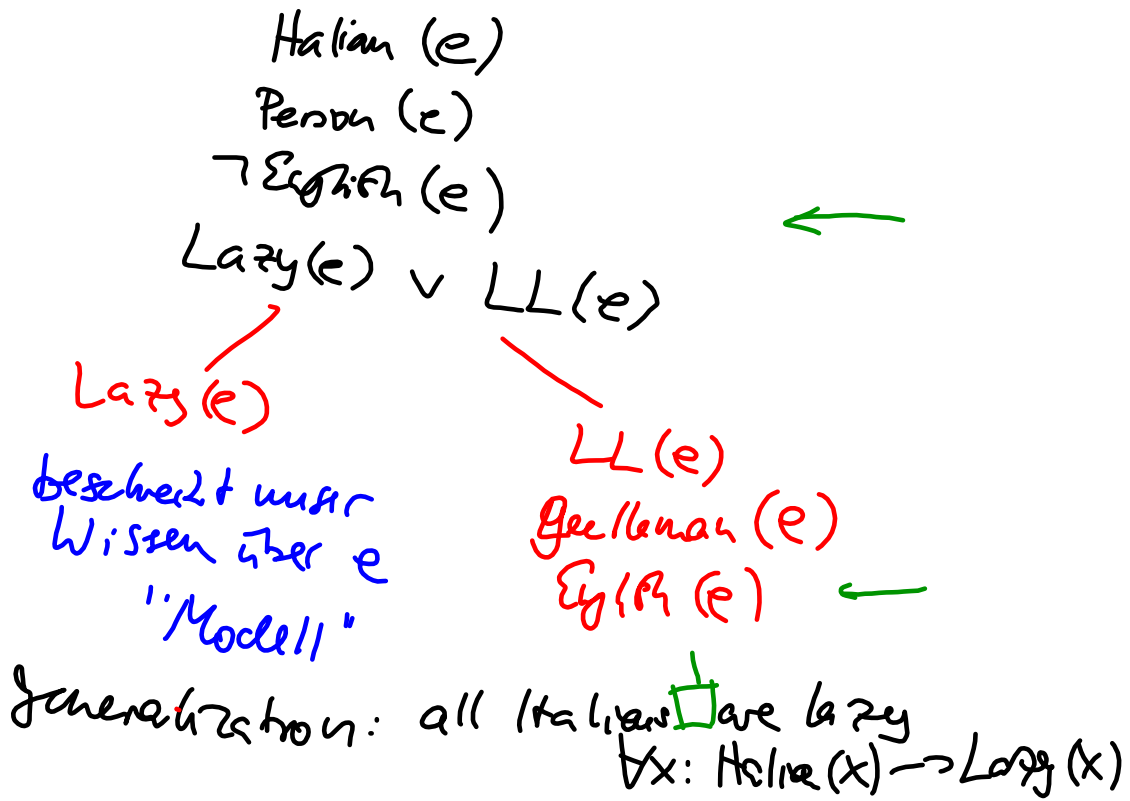
(**)

$\forall x: \text{gentleman}(x) \rightarrow \text{English}(x)$

(***)

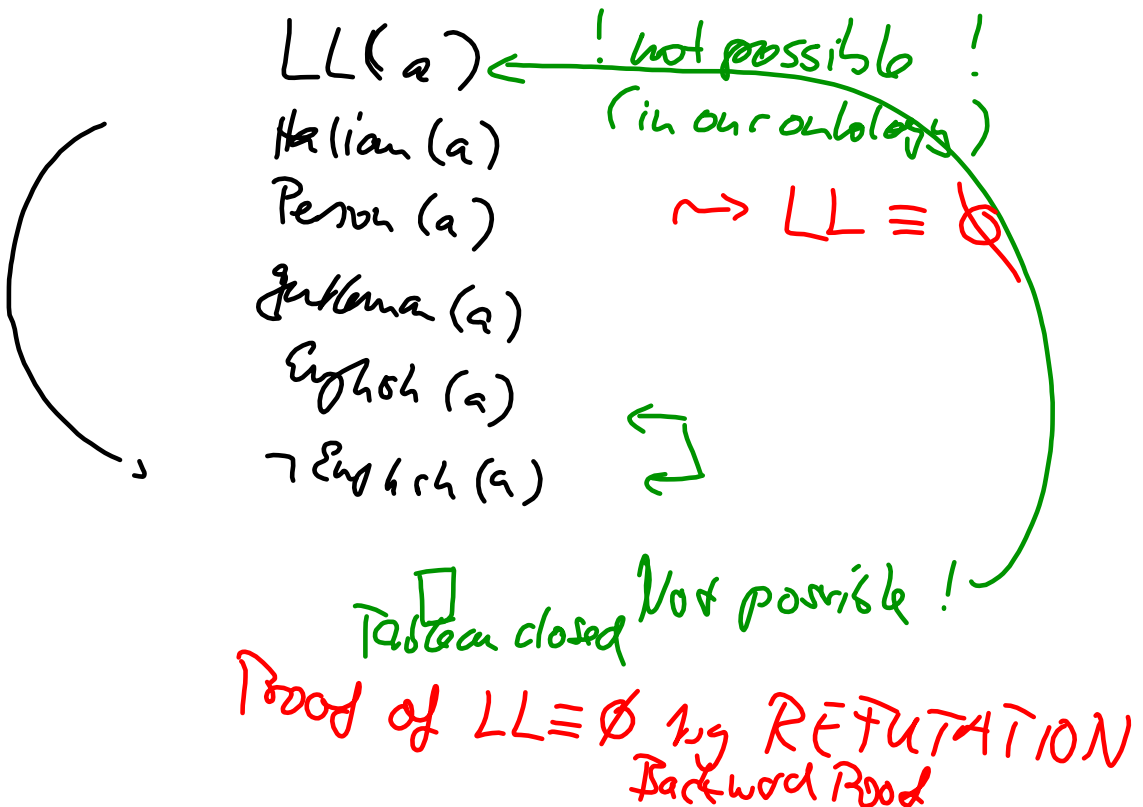
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Forward Proof, informal

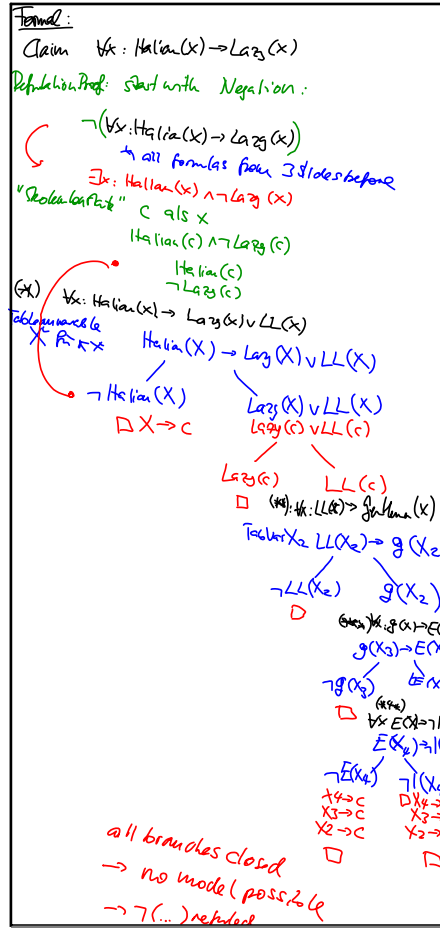


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other example:



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(Aside:)

$\neg(a \rightarrow b)$
 a
 $\neg b$

$\neg(\text{regret} \rightarrow \text{Schirm})$
 regret
 $\neg \text{Schirm}$

Def: $a \rightarrow b \equiv \neg a \vee b$
 $\neg(a \rightarrow b) \equiv \neg(\neg a \vee b)$
 $a \wedge \neg b$

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\mathbb{Z}_3 : 0, 1, 2 Restklassenkörper modulo 3

$+/2$

$a + b := (a +_N b) \bmod 3$

$0 + 1 = 1$

$1 + 2 = 3 \bmod 3 = 0$

$2 + 2 = 4 \bmod 3 = 1$

$*/2$

$a * b := (a *_N b) \bmod 3$

$0 * 2 = 0$

$1 * 2 = 2$

$2 * 2 = 4 \bmod 3 = 1$

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Person(Alice)
Person(John)

$\forall x: \text{Person}(x) \rightarrow \exists y: \text{hasParent}(x, y)$

$\text{Person}(X_1) \rightarrow \exists y: \text{hasParent}(X_1, y)$

$\neg \text{Person}(X_1)$
 \Downarrow
 $X_1 \rightarrow \text{Alice}$

$\exists y: \text{hasParent}(X_1, y)$

$\text{Person}(X_2) \rightarrow \exists y: \text{hasParent}(X_2, y)$

$\neg \text{Person}(X_2)$
 \Downarrow
 $X_2 \rightarrow \text{John}$

$\exists y: \text{hasParent}(X_2, y)$

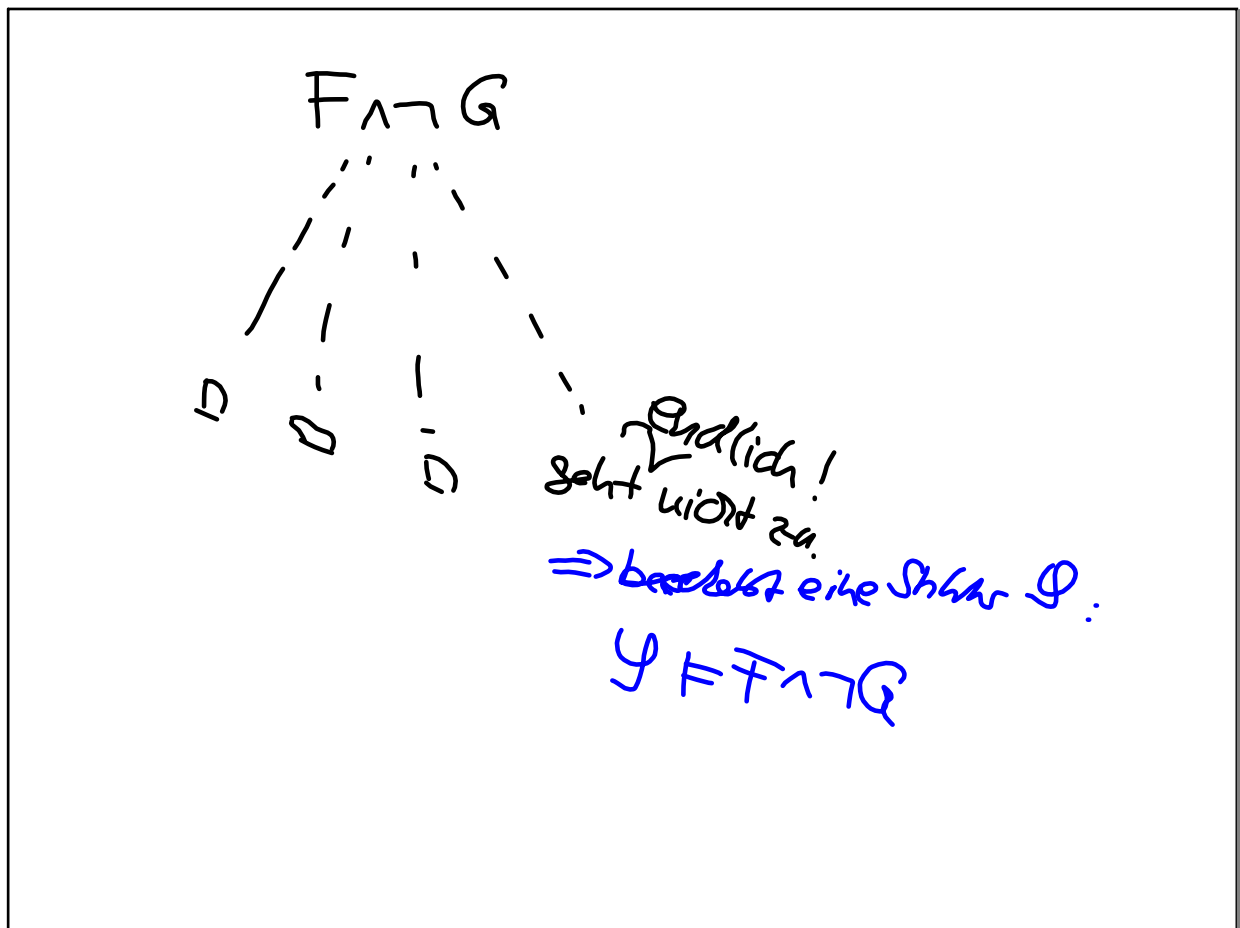
$\text{hasParent}(X_1, \text{Person}(X_1))$

$\text{hasParent}(X_2, \text{Person}(X_2))$

$\text{hasParent}(\text{Alice}, \text{Frank}(\text{Alice}))$

$\text{hasParent}(\text{John}, \text{Frank}(\text{John}))$

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