

# Additional Exercises: Logics and Statistics for Language Modeling 2009-2010

## 1 Description Logics

- Use the tableaux method to prove that the following concept is inconsistent given the definition  $A \sqsubseteq \exists S.C$

$$A \wedge (\forall S.(\neg C \vee A) \wedge \forall S.\forall S.\neg C)$$

- Use the tableaux method to prove that the following concept is consistent

$$\forall R.((C \vee D) \wedge \exists S.E) \wedge \exists R.\neg C \wedge \exists R.\neg D$$

- Given de definitions

$$\begin{aligned} \text{Def1} \quad & (\neg A \wedge B) \sqsubseteq D \\ \text{Def2} \quad & (\exists R.A) \sqsubseteq \forall R.\neg D \end{aligned}$$

Prove that the following formula is inconsistent

$$a : \exists R.\neg A \wedge \exists R.\neg B \wedge \forall R.(A \vee B)$$