



Logic, Information flow and Argumentation

Homework exercises, Week 7, part a (due Friday 23 March).

1. Translations (from the slides for week 7 entitled 'Translations').
 - (a) Translate the following sentences from natural language to the language of predicate logic.
 - i. If John loves Mary then Mary loves John too.
 - ii. John and Mary love each other.
 - iii. John and Mary don't love each other.
 - iv. Every boy loves Mary.
 - v. Not all girls love themselves.
 - vi. No boy or girl loves Peter.
 - vii. Peter loves some girl who loves John.
 - viii. No PC is a real computer.
 - ix. If something is a PC then its not a real computer.
 - x. Every apple is either green or yellow.
 - xi. There is an apple that is neither green nor yellow.
 - xii. No apple is blue.
 - xiii. Every man likes every tasty apple.
 - xiv. Everybody is walking and talking.
 - xv. Somebody is sleeping but somebody is not sleeping.
 - xvi. All animals are mortal.
 - xvii. If some student is bothering Mary, she gets annoyed.
 - xviii. Everyone who talks will be sent out.
 - xix. If John is right, somebody took his pen.
 - xx. If someone is rich, everyone is jealous.
 - xxi. Everyone who is a doctor should come forward, the rest should remain seated.
 - xxii. Every human is male or female, but there is an animal that is neither male nor female.

- (b) For each one of the sentences you translated sketch a situation that makes the sentence true and one that makes the sentence false.
- (c) i. Write the sentence “*Some presidents were great*” in the language of predicate logic.
- ii. Write the sentence “*Some presidents were not great*” in the language of predicate logic.
- iii. Assume S stands for “*smarter than*”. What do the following formulas say in natural language?
- A. $\neg\exists x(Sxx)$
- B. $\forall x\exists y(Syx)$
- C. $\forall x\neg\exists y(Sxy)$
- iv. Write a formula that expresses “*There is no smartest person*”.