Universiteit van Amsterdam
Institute for Logic, Language and Computation

Reasoning and Formal Modelling for Forensic Science

2010/2011; 2nd Semester

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Werkcollege Exercises # 3

Please start thinking about these exercises before the next *werkcollege* on Tuesday, 22 February, 11am, room A1.04. The exercises will be discussed in class with active student participation: you will get some extra time to think about them, and then present the solutions in front of the class.

Exercise 8.

The following arguments are invalid. Show that they are invalid by following the algorithm from the lecture:

$$\frac{\text{Some } A \text{ is not } B. \quad \text{Some } C \text{ is not } B.}{\text{No } A \text{ is } C.} \qquad \frac{\text{Some } B \text{ is } A. \quad \text{Some } C \text{ is not } B.}{\text{No } A \text{ is } C.}$$

Exercise 9.

Consider the following valid syllogism:

$$\begin{array}{ll} (1) & \text{No } B \text{ is } A. \\ (2) & \underline{\text{All } C \text{ are } B.} \\ (3) & \text{No } C \text{ is } A. \end{array}$$

There are $2^3 = 8$ possible assignments of truth values to the three sentences (1), (2) and (3). One of them is logically impossible. Which one? The following is an instance of the assignment "true / false / true":

$$\begin{array}{ll} (1) & \text{No murderer is innocent.} \\ (2) & \underline{\text{All thieves are murderers.}} \\ (3) & \text{No thief is innocent.} \end{array}$$

Give instances of the remaining six truth value assignments.

Exercise 10.

Show that the following formula is not valid by finding a controlled situation in which it is not true:

$$(\forall x P(x,x) \to \forall x \exists y P(x,y)) \wedge \exists x \forall y P(y,x).$$