Exercise Sheet
Einführung in die Informatik
Knowledge and Belief

Exercise 1. (a) Using atomic propositions defined in the Consecutive Numbers Puzzle, write a formula that corresponds to the following natural language sentence:

> Both Anne and Bill know that Bill's number is not 0, but Anne does not know that Bill knows it.

(b) Demonstrate that the formula from 1(a) holds in the setting of the puzzle if Anne's number is 3 and Bill's one is 2.

Exercise 2. Demonstrate that the following formula is valid:

$$KA \to K(A \vee B)$$

for any formulas A and B.

Exercise 3. In the setting of the Consecutive Numbers Puzzle with Anne's number 3 and Bill's number 2, demonstrate that negative introspection holds for Bill:

$$\neg K_b A \to K_b \neg K_b A$$

for any formula A.