

Übungen zur Modellierung, Wintersemester 2006/07

Andrea Ernst-Gerlach (LF 140), Ingo Frommholz (LF 138)

Sprechstunde abwechselnd Montag, 15-16 Uhr

modellierung@is.informatik.uni-duisburg.de

Übungsblatt 3

Abgabe bis **08.11.2006, 14:00 Uhr**

Aufgabe 6: Missionaries and Cannibals Riddle

Three cannibals and three missionaries must cross a river. They have only one boat and their boat can only hold two people. All of the three missionaries can row the boat, but only one cannibal can row. The cannibals are friendly journeymen in general, but if in any situation - be it for a moment - more cannibals than missionaries are there, their desire for human flesh overwhelms them and the missionaries will be eaten in nothing flat.

Give a solution - similar to the example of missionaries-cannibals problem dealt in the lecture - for three missionaries and three cannibals:

- (a) tabular
- (b) as diagram

8 Punkte

Aufgabe 7: DNF and KCNF

The two following formulas are given:

$$F_1 = ((A \longrightarrow B) \longrightarrow C)$$

$$F_2 = (A \wedge (B \longrightarrow (A \wedge C))).$$

- (a) Write down the formula F_1 only using \wedge , \vee und \neg . Determine for F_1 a semantically equivalent Formula in CNF by using equivalence conversions.
- (b) Indicate the truth table to F_2 .
- (c) Read a semantically equivalent formula in DNF for F_2 from the truth table.
- (d) Read a semantically equivalent formula in CNF for F_2 from the truth table..

8 Punkte

Aufgabe 8: Tautology and Satisfiability

F and G are formulas in propositional logic. Indicate for both of the following statements, whether they are true or false and motivate your answer.

- (a) Statement: $F \vee G$ is exactly a tautology if F or G is a tautology.
- (b) Statement: $F \vee G$ is exactly then satisfiable if F or G is satisfiable. .

4 Punkte