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Verifikation nebenläufiger Programme

Sommersemester 2004 — **Serie 4** — 10. Mai 2004

Thema: Symbolic Model Checking

Ausgabetermin: 10. Mai 2004

Abgabe: 17. Mai 2004 (vor der Vorlesung im Schrein oder in der Vorlesung)

Aufgabe 1 (4 Punkte) Show the correctness of the SMC-INV algorithm.

Aufgabe 2 (4 Punkte) Consider the following BDD data structure T:

u	var	low	$high$
0	∞		
1	∞		
2	4	0	1
3	3	1	0
4	3	1	2
5	2	3	2
6	2	0	4
7	1	6	4

1. Draw the corresponding BDD graph. Give two formulae that correspond to node 5, respectively, node 7.
2. Calculate Apply$(\rightarrow; 5, 7)$. Write down the sequence of graph modifications and denote the returned node. Assume that arguments of function calls are calculated from left to right.

Aufgabe 3 (6 Punkte) SET-FEASIBLE algorithm:

1. In order to argue that the number of states described by the variable new in the SET-FEASIBLE algorithm is monotonously decreasing (not necessarily strong), show that

$$((new \wedge \rho)^\star \diamond (new \wedge J)) \rightarrow new$$

holds.

2. How can $(new \wedge \rho)^\star \diamond (new \wedge J)$ be computed? Write an algorithm, explain its correctness, and discuss its complexity.