



Verteilte Algorithmen

Wintersemester 2007/08

Serie 12 (EST)

Montag, 28. Januar 2008

Thema: Endsemestertest

Ausgabetermin: Montag, 28. Januar 2008

Abgabe: Montag, 11. Februar 2008 (12:00)

Endsemestertest: Diese Aufgabenserie ist von jedem *allein* zu bearbeiten! Die Aufgaben sind etwas breiter gestreut und die erreichten Punkte in dieser Serie gehen verstärkt in die Endnote ein. Bitte beachten Sie den Abgabetermin, der vom üblichen Turnus abweicht. *Jede Aufgabe bitte auf einer neuen Seite beginnen!* Viel Erfolg!

Aufgabe 1 (Leader election using MST (4 Punkte)) Give a formal description of the leader-election strategy described in Section 15.5.9, as a composition of I/O automata that produce an MST and I/O automata that use an MST to elect a leader. Describe the interactions between these two sets of automata carefully, identifying what actions are used for communication between the two sets of automata and identifying exactly what behavior each set of automata required of the other set.

(Aufgabe 15.40)

Aufgabe 2 (Banking system (6 Punkte)) The *CountMoney* algorithm is formulated as a double algorithm transformation applied to the underlying banking system A , which may make it difficult to see what is going on. For this exercise, you will combine the various pieces into a single algorithm.

- Write precondition-effect code for any specific banking system A of the type allowed in Section 18.3.1. That is, you need to specify the initial amounts of money at all the processes, plus some rules determining when and to whom money is transferred, and how much is sent.
- Write precondition-effect code for a modified version of your algorithm A from part (a) that includes logical times. You may choose your favorite algorithm for generating logical times.
- Write precondition-effect code for a modification of your algorithm from part (b) that uses the strategy of *CountMoney* to produce the required balances. Be sure to include a mechanism for determining an appropriate logical time t .

(Aufgabe 18.5)

Aufgabe 3 (*DijkstraScholten* (6 Punkte)) Prove Lemma 19.1.

(Aufgabe 19.2)