UNIVERSITÄT DES SAARLANDES
Fachrichtung 6.2 – Informatik
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3. Übung zur Vorlesung *Transaktionsorientierte Informationssysteme* im Sommersemester 2000

3.1. Show that the O2PL protocol with lock table LT8 is not deadlock-free.

3.2. For the following three histories, check whether they are monoversion histories, or members of MVSR or MCSR:

$m_1 = w_0(x_0)\ w_0(y_0)\ w_0(z_0)\ c_0\ r_3(x_0)\ w_3(x_3)\ c_3\ w_1(x_1)\ c_1\ r_2(x_1)\ w_2(y_2)\ w_2(z_2)\ c_2$
$m_2 = w_0(x_0)\ w_0(y_0)\ c_0\ w_1(x_1)\ c_1\ r_3(x_1)\ w_3(x_3)\ r_2(x_1)\ c_3\ w_2(y_2)\ c_2$
$m_3 = w_0(x_0)\ w_0(y_0)\ c_0\ w_1(x_1)\ c_1\ r_2(x_1)\ w_2(y_2)\ c_2\ r_3(y_0)\ w_3(x_3)\ c_3$

3.3. For the multiversion schedule

$m = w_0(x_0)\ w_0(y_0)\ c_0\ r_1(x_0)\ w_1(x_1)\ r_2(x_1)\ w_2(y_2)\ w_1(y_1)\ w_3(x_3)$

test whether there exists a version order $\ll$ s.t. MVSG($m,\ll$) is acyclic.

3.4. Consider the following schedule, given in the monoversion form:

$$r_1(x)\ r_2(x)\ r_3(y)\ w_2(x)\ w_1(y)\ c_1\ w_2(z)\ w_3(z)\ r_3(x)\ c_3\ r_2(y)\ c_2$$

Show that this schedule is multiversion serializable, i.e., could be allowed by a multiversion concurrency control. Give a feasible version function, and also a feasible version order. How do the resulting executions (i.e., output schedules) under the MVTO and the 2V2PL protocols look like?

3.5. Consider the input schedule

$$w_1(x)\ c_1\ r_2(x)\ r_3(x)\ c_2\ r_4(x)\ w_3(x)\ c_4\ c_3$$

Give the resulting output schedule under the MVTO protocol.

3.6. Reconsider the ROMV protocol that has been specifically geared for read-only transactions. What happens if the protocol is relaxed in such a way that update transactions use the timestamp-based version selection for their read steps? That is, update transactions would still use conventional exclusive locks for writes, but would exploit versioning for reads by selecting the most recent version that was committed at the time for the update transaction's begin. Is this protocol still correct in that it guarantees MVSR schedules?