Exercises for *Transaction Systems*, summer term 2017
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http://www-db.in.tum.de/teaching/ss17/transactions/

Sheet No. 7

**Info**
- Due date: Friday, July 7, 3pm.
- Please send your solution via e-mail, and prefix the subject with `[transactions]`.
- Please include your Matrikelnummer and your name.

**Exercise 1 (6 points)** For the following histories test if they are MVSR or MCSR.

\[
\begin{align*}
    s_1 &= w_0(x_0) w_0(y_0) w_0(z_0) c_0 r_3(x_0) w_3(x_3) c_3 w_1(x_1) c_1 r_2(x_1) w_2(y_2) w_2(z_2) c_2 \\
    s_2 &= w_0(x_0) w_0(y_0) c_0 w_1(x_1) c_1 r_3(x_1) w_3(x_3) r_2(x_1) c_3 w_2(y_2) c_2 \\
    s_3 &= w_0(x_0) w_0(y_0) c_0 w_1(x_1) c_1 r_2(x_1) w_2(y_2) c_2 r_3(y_0) w_3(x_3) c_3
\end{align*}
\]

**Exercise 2 (5 points)** For the schedule

\[
m = w_0(x_0) w_0(y_0) c_0 r_1(x_0) w_1(x_1) r_2(x_1) w_2(y_2) w_1(y_1) w_3(y_3)
\]

test whether there exists an order \(<<\) such that \(MVSG(m,<<)\) is acyclic. If there is an acyclic graph, find an appropriate version function for a final transaction \(t_\infty\) (\(t_\infty\) reads all data items) such that the graph remains acyclic.

**Exercise 3 (5 points)** For the schedule

\[
s = w_1(x) c_1 r_2(x) r_3(x) c_2 r_4(x) w_3(x) c_4 c_3
\]

give the resulting schedule under the MVTO protocol.

**Exercise 4 (5 points)** For the schedule

\[
s = r_1(x) w_1(x) r_2(x) w_2(y) r_1(y) w_2(x) c_2 w_1(y) c_1
\]

give the resulting schedule under the 2V2PL protocol.

**Exercise 5 (optional, 5 bonus points)** Design an "exam question" that covers properties of multi-version concurrency control algorithms, and give a short answer. I will publish the questions and answers on the website. Let me know whether you want to stay anonymous or not.