Exercises for *Transaction Systems*, summer term 2016
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http://www-db.in.tum.de/teaching/ss16/transactions/

Sheet No. 8

Info
- Due date: Friday, June 17, 3pm.
- Please send your solution via e-mail, and prefix the subject with [transactions].
- Please include your Matrikelnummer and your name.
- Please submit a PDF.

**Exercise 1 (5 points)**  Prove: In the “no blind writes” model, where each data item written by a transaction must have been read before in the same transaction, MVSR = MCSR.

**Exercise 2 (5 points)**  Prove: In the “action” model, where each step is a combination of a read operation immediately followed by a write operation on the same data, MVSR = VSR.

**Exercise 3 (10 points)**  Consider a database with a person table (unique name, city). Two operations:
- select(c): select * from person where city = c;
- update(n,c): update person set city = c where name = n;

A B+-tree for both attributes exists. It has height 2 (i.e., root and leaves). The operations are: lookup (search(key)), record fetch (fetch(rid)), record modification (modify(rid)), index maintenance (insert(key,rid) and delete(key,rid)). All operations are transformed into page reads and writes.

We consider two transactions:
- \( T_1 \) finds all persons from Munich and Garching.
- \( T_2 \) moves a couple (John and Jane Doe) from Munich to Garching.

Model them as 3-level transactions. Give a non-serial example for a 3-level schedule that is
(a) tree-reducible
(b) *not* tree-reducible