Schedules

an ordering of operations
of a set of transactions

operations of transaction $T_i$
appear in the schedule in the
same order as in the transaction
Transfer: \( T_1 \)
- \( r_1(x) \)
- \( w_1(x) \)
- \( r_1(y) \)
- \( w_1(y) \)
- \( c_1 \)

Deposit: \( T_2 \)
- \( r_2(x) \)
- \( w_2(x) \)
- \( c_2 \)

Schedules
- \( S_A : [ r_1(x) r_2(x) w_2(x) w_1(x) r_1(y) w_1(y) ] \)
- \( S_B : [ r_1(x) w_1(x) r_2(x) w_2(x) a_1 ] \)

Conflict

\( T_1 \) aborts
Serializable schedule
-equiv. to some serial sched.

result equiv.

conflict equiv.
Locks
- table
- row
- cell
- column?

Two-phase lock
- phase 1: lock resources
- phase 2: unlock

T₁
Lock (x)
Lock (y)
unlock (y)
unlock (x)

T₂
Lock (y)
Lock (x)
unlock (x)
unlock (y)

S₁:
L₁(x)
L₂(y)
L₁(y) - wait
L₂(x) - wait

} deadlock
SQL Transactions

START TRANSACTION

COMMIT

ROLLBACK