

CS 245: Database System Principles

Notes 11: View Serializability

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(Some modifications by Chris Olston)

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View Serializability

| | |
|-----------------------|-------------------|
| Conflict equivalent | View equivalent |
| Conflict serializable | View serializable |

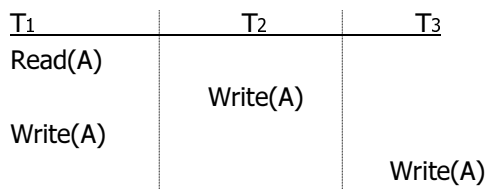
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Motivating example

Schedule Q



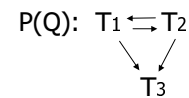
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Same as

$Q = r_1(A) w_2(A) w_1(A) w_3(A)$



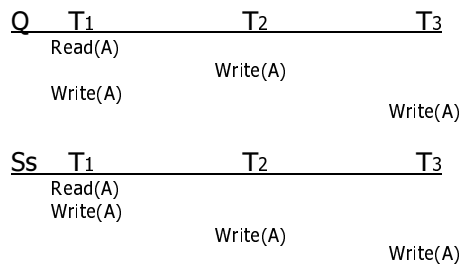
► Not conflict serializable!

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But now compare Q to Ss, a serial schedule:



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- T1 reads same thing in Q, Ss
- T2, T3 read same thing (nothing?)
- After Q or Ss, DB is left in same state

► So what is wrong with Q?

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Definition Schedules S_1, S_2 are View Equivalent if:

- (1) If in S_1 : $w_j(A) \Rightarrow r_i(A)$ then in S_2 : $w_j(A) \Rightarrow r_i(A)$
- (2) If in S_1 : $r_i(A)$ reads initial DB value, then in S_2 : $r_i(A)$ also reads initial DB value
- (3) If in S_1 : T_i does last write on A , then in S_2 : T_i also does last write on A

\Rightarrow means "reads value produced"

Definition

Schedule S_1 is View Serializable if it is view equivalent to some serial schedule

View Serializable $\xleftarrow{?}$ Conflict Serializable

- View Serializable $\not\Rightarrow$ Conflict Serializable
e.g., See Schedule Q
- Conflict Serializable $\stackrel{?}{\Rightarrow}$ View Serializable

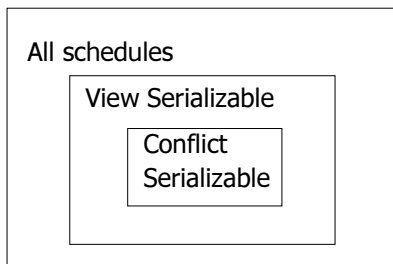
Lemma

Conflict Serializable \Rightarrow View Serializable

Proof:

Swapping non-conflicting actions does not change what transactions read nor final DB state

Venn Diagram



Note: All view serializable schedules that are not conflict serializable, involve a blind write

$S = \dots W_3(A) \dots$
no $R_3(A)$

How do we test for view-serializability?

⇒⇒ P(S) not good enough...
(see schedule Q)

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Testing for view-serializability is hard

- One problem: some swaps involving conflicting actions are OK... e.g.:

S = ...w₂(A).....r₁(A)....w₃(A).....w₄(A)

this action can move
if this write exists

See textbook for details ...

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In practice ...

- Blind writes not very common
- Checking for view serializability is expensive
- → In practice, schedulers enforce
conflict serializability

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