

CSc4710 / CSc6710
Fall 2006
Assignment 5
Due Date: December 7, 2006 @ 5:30PM

Problem 1 (10 points)

What is the difference between the Basic Timestamp Ordering algorithm and the Strict Timestamp Ordering algorithm? What is the Thomas's Write Rule?

Problem 2 (20 points)

Consider the following schedules. Determine whether each schedule is strict, cascadeless, or recoverable. (ri(x): Ti reads x; wi(x): Ti writes x; ci: commit Ti)

S1: r1(x); r2(z); r1(z); r3(x); r3(y); w1(x); c1; w3(y); c3; r2(y); w2(z); w2(y); c2

S2: r1(x); r2(z); r3(x); r1(z); r2(y); r3(y); w1(x); w2(z); w3(y); w2(y); c3; c2;

Problem 3 (30 points)

Consider the schedule *S*: *R1(X)*, *W2(Y)*, *W2(X)*, *W3(Y)*, *W1(Y)*, *Commit T1*, *Commit T2*, *Commit T3*.

(i) Determine whether *S* is: conflict-serializable, recoverable, avoid-cascading-aborts, and strict.

(ii) For each of the following concurrency control mechanisms, describe how the concurrency control mechanism handles *S*.

- (a) Strict 2PL with Wait-Die policy for deadlock prevention.
- (b) Strict 2PL with deadlock detection. (Show the waits-for graph).
- (c) Conservative 2PL.
- (d) Optimistic concurrency control.
- (e) Timestamp concurrency control with the Thomas Write Rule.

Problem 4 (20 points)

Consider the relation shown below.

<i>carid</i>	<i>timeid</i>	<i>locid</i>	<i>sales</i>
11	1	1	20
11	2	1	10
11	3	1	11
12	1	1	32
12	2	1	26
12	3	1	40
13	1	1	8
13	2	1	20
13	3	1	16

11	1	2	32
11	2	2	25
11	3	2	11
12	1	2	27
12	2	2	43
12	3	2	20
13	1	2	30
13	2	2	20
13	3	2	25

- (a) Show the result of pivoting the relation on *carid* and *timeid*.
 (b) Write a collection of SQL queries to obtain the same result as in the previous part.
 (c) Show the result of pivoting the relation on *carid* and *locid*.

Problem 5 (20 points)

Consider the relation shown below. It contains information about the marketing campaign of a car dealer.

age	salary	Purchase
38	40k	No
39	70k	Yes
55	50k	Yes
51	42k	Yes
36	90k	Yes
33	54k	No
40	57k	No
56	82k	Yes
43	68k	Yes

- (a) Construct the AVC-group of the root node of the tree.
 (b) Assume that the splitting predicate at the root node is $\text{age} \leq 50$. Construct the AVC groups of the two children nodes of the root node.
 (c) Construct a decision tree that helps predict whether a person will purchase the car.