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CS 440 Database Management Systems
7 February 2018

Assignment 4

Problem 1

The optimized logical query plan for the above query is the following. The plan first selects table *Product* according to the conditions on *production-year* and *rating*. It then projects *Product* on *company-name* and *p.name*. It also projects table *Company* on attributes *c.name* and *state*. Finally, it joins the projected *Product* and *Company* relations and projects the resulting table on attributes *p.name* and *state*.

Problem 2

Query	Size	Cost	Plan
RS	200	0	SR
SW	60,000	0	WS
RU	40,000	0	UR
RW	40,000	0	WR
UW	20,000	0	UW
RSW	4000	200	W(SR)
RSU	2000	200	U(SR)
RUW	8000	20,000	R(UW)
SWU	600,000	20,000	S(UW)
RSWU	800	4000	U(W(SR))

Problem 3

T1:R(X), T2:R(Y), T3:W(X), T2:R(X), T1:R(Y)

This is serializable because no cycles exist in the schedule. It also follows the rules of 2PL because there are no situations where a lock needs to disengage and then reengage.

T1:R(X), T1:R(Y), T1:W(X), T2:R(Y), T3:W(Y), T1:W(X), T2:R(Y)

This schedule is NOT serializable because there is a cycle between T2 and T3. This is the same reason it does not fit with 2PL either. In order to complete the W(Y) in T3 we have to disengage the lock on T2 but then we need to reengage the lock for the second R(Y) on T2.