Data Bases II

Hierarchical Locking

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Exercise H.1

Consider the following schedule occurring on a system with hierarchical lock over a hierarchy where Pag_A contains tuples T_1 and T_2:

$$r_1(\mathrm{Pag}_A)w_2(T_1)w_1(T_2)$$

Show the sequence of lock, unlock, lock escalation, and lock downgrade requests for transactions t_1 and t_2, taking into account that the schedule has to be 2PL.

Hint: t_1 should immediately acquire all locks.

Exercise H.2

Given the schedule:

$$r_1(X)r_2(X)r_3(Y)w_3(Y)w_1(X)w_2(Y)$$

show the sequence of lock and unlock requests produced by the transactions in a 2PL execution, in a system providing the locks SL, UL and XL (where UL is the Update Lock).

NB: A convenient notation (to avoid ambiguity) could be

- $\mathrm{SL}_i(X)$ to state that transaction T_i requires a shared lock on resource X
- $\mathrm{rel}(\mathrm{SL}_i)$ to state that the same lock is released