

## # COMP9315 21T1 Final Exam Q8

Type your answer(s) to replace the xxx's  
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## a. Validation for T1

During the reading phase, no other transactions are validating,  
so no transactions satisfy  $T_i \wedge V \ \& \ V(T_i) < S(T) < F(T_i)$ .

During the validation phase, we notice that T2 started validating  
before us,  
so the condition  $T_1 \wedge V \ \& \ V(T_2) < V(T_1) < F(T_2)$  is satisfied.  
So, we need to check whether the "write set" intersection is empty.  
Write Set for T1 = {A,C}  
Write Set for T2 = {D}  
The intersection is empty, so this is ok.

Transaction T3 and T4 started after T1, so they are not considered.

Transaction T1 passes all checks, and commits.

## b. Validation for T2

During the reading phase, no other transactions are validating,  
so no transactions satisfy  $T_i \wedge V \ \& \ V(T_i) < S(T) < F(T_i)$ .

During the validation phase, no other transactions started validating  
before us,  
so no transactions satisfy  $T_i \wedge V \ \& \ V(T_i) < V(T_2) < F(T_i)$ .

T2 passes all checks, and commits.

## c. Validation for T3

During the reading phase, the start of T3 overlaps with the  
validation of T1 and T2  
(i.e. condition  $T_3 \wedge V \ \& \ V(T_1) < S(T_3) < F(T_1)$  is satisfied for T1  
and T2)  
We need to check that the Read Set of T3 doesn't intersect the write  
sets  
of T1 and T2.  
Read Set for T3: {B}  
Write Set for T1: {A,C}  
Write Set for T2: {D}

The intersections are empty, so this is OK.

During the validation phase, we notice that T3 starts validating

while T1 is still validating, i.e.  $T3 \hat{=} V \ \& \ V(T1) < V(T3) < F(T1)$ ,  
so we need to check whether the Write Sets of T3 and T1 intersect.  
Write Set for T3: {D,E}  
Write Set for T1: {A,C}

There is no intersection, so this is OK.

Thus, T3 passes all checks and commits.

#### d. Validation for T4

Since T4 started when T1 was still validating,  
the condition  $T4 \hat{=} V \ \& \ V(T1) < S(T4) < F(T1)$  holds,  
so we need to check if WS(T1) and RS(T4) don't intersect.  
Read Set for T4: {A,D}  
Write Set for T1: {A,C}  
Since T4 read A, and T1 modified A, validation fails.

T4 needs to roll back.