Student Name: _____
Student ID: _____

# In-Class Exercise 06 – Transaction Management

Q1. Given the following schedules, please answer the following questions:

$H_1$:

| | | | | | | |
|---|---|---|---|---|---|---|
| $T_1$: | R(A) | W(D) | R(B) | | | |
| $T_2$: | | | | W(A) | W(D) | W(B) |

$H_2$:

| | | | | | | |
|---|---|---|---|---|---|---|
| $T_1$: | | R(A) | | W(D) | R(B) | |
| $T_2$: | W(A) | | W(D) | | | W(B) |

$H_3$:

| | | | | | | |
|---|---|---|---|---|---|---|
| $T_1$: | R(A) | | W(D) | | R(B) | |
| $T_2$: | | W(A) | | W(D) | | W(B) |

(1) Which schedule(s) are serial schedules?

Solution: $H_1$ is serial schedule

(2) Which schedule(s) are serializable schedule? If so, please give the equivalent serial schedule of the serializable schedule.

Solution:

$H_1$ itself is a serializable schedule, since it is a serial schedule

$H_3$ is a serializable schedule whose serial schedule is $T_1T_2$.

(3) Between schedules $H_2$ and $H_3$, which one is conflict equivalent to the schedule $H_1$?

Solution:

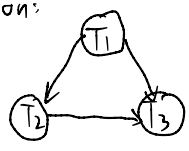
$H_3$ is conflict equivalent to the schedule $H_1$.

Q2. Consider the following schedule:

| | | | | |
|---|---|---|---|---|
| $T_1$: | W(B) | | | |
| $T_2$: | R(A) | | R(B) | |
| $T_3$: | | | | W(A) W(B) |

(a) Draw the precedence graph of the above schedule.

Solution:




(b) Is the schedule conflict serializable? Why? Please state the corresponding serial schedule if it is conflict serializable.

Solution:

This schedule is conflict serializable.

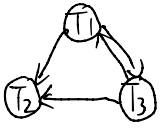
The corresponding serial schedule is $T_1 T_2 T_3$

Q3. Consider the following schedule:

| | | | | | | |
|---|---|---|---|---|---|---|
| $T_1$: | | R(B) | | W(A) | | |
| $T_2$: | | | R(B) | | | W(A) |
| $T_3$: | R(B) | W(B) | | | W(A) | |

(a) Draw the precedence graph of the above schedule.

Solution:



(b) Is the schedule conflict serializable? Why? Please state the corresponding serial schedule if it is conflict serializable.

Solution:

This schedule is not conflict serializable,
since there is a cycle between $T_1$ and $T_3$ in the graph.

(c) Is the schedule view serializable? Why? Please state the corresponding serial schedule if it is view serializable.

Solution:

This schedule is view serializable with
an equivalent serial schedule $T_3 T_1 T_2$
let the given schedule be $S_1$, and $S_2 = T_3 T_1 T_2$.
Draw $S_1$ and $S_2$, respectively.

$S_1$

| | | | | |
|---|---|---|---|---|
| $T_1$: | | R(B) | W(A) | |
| $T_2$: | | R(B) | | W(A) |
| $T_3$: | R(B) W(B) | | W(A) | |

$S_2$

| | | | | |
|---|---|---|---|---|
| $T_1$: | | R(B) | W(A) | |
| $T_2$: | | | R(B) | W(A) |
| $T_3$: | R(B) W(B) | W(A) | | |

Read:
For $T_1$: Both R(B) in $S_1$ and $S_2$ are read from $T_3$
For $T_2$: Both R(B) in $S_1$ and $S_2$ are read from $T_3$
For $T_3$: Both R(B) in $S_1$ and $S_2$ are read from initial value

Write:
For both W(B) in $S_1$ and $S_2$, the value produced by $T_3$ is write to database
For both W(A) in $S_1$ and $S_2$, the value produced by $T_2$ is write to database.