Database Management System – cs422 DE

Lab 5 – Week 10 & 11

This Lab is based on Transaction Management.

- Submit your *own work* on time. No credit will be given if the lab is submitted after the due date.
- Note that the completed lab should be submitted in .doc, .docx, .rtf, .pdf or .zip format only.

Solve the following Exercises from the course text book.

1. 22.18/20.18 (a, c, d, e) (5^{th}/4^{th} edition) – only do conflict serializable

(a) r1(x), r2(x), w1(x), w2(x), c1, c2

r2(x) before w1(x) ⇒ T2 → T1
r1(x) before w2(x) and w1(x) before w2(x) ⇒ T1 → T2
Cycle T1 ↔ T2 ⇒ NOT conflict-serializable

(b) r1(x), r2(x), w3(x), r2(x), r1(x), c1, c2, c3

r1(x) before w3(x) ⇒ T1 → T3
w3(x) before later r1(x) ⇒ T3 → T1
r2(x) before w3(x) ⇒ T2 → T3
w3(x) before later r2(x) ⇒ T3 → T2
Cycles T1 ↔ T3 and T2 ↔ T3 ⇒ NOT conflict-serializable

(c) r1(x), w2(x), w1(x), abort2, c1

r1(x) before w2(x) ⇒ T1 → T2
w2(x) before w1(x) ⇒ T2 → T1
Cycle T1 ↔ T2 ⇒ NOT conflict-serializable

(d) w1(x), r2(x), w1(x), c2, abort1

first w1(x) before r2(x) ⇒ T1 → T2
r2(x) before second w1(x) ⇒ T2 → T1
Cycle T1 ↔ T2 ⇒ NOT conflict-serializable

(e) r1(x), w2(x), w1(x), r3(x), c1, c2, c3

r1(x) before w2(x) ⇒ T1 → T2
w2(x) before w1(x) ⇒ T2 → T1
also w2(x) before r3(x) ⇒ T2 → T3, and w1(x) before r3(x) ⇒ T1 → T3
Cycle T1 ↔ T2 ⇒ NOT conflict-serializable

2. 22.19/20.19 (a, c, d, e) (5^{th}/4^{th} edition)

(a)

Nodes: T1, T2
Edges: T1 → T2, T2 → T1

(b)

Nodes: T1, T2, T3
Edges: T1 → T3, T3 → T1, T2 → T3, T3 → T2

(c)

Nodes: T1, T2
Edges: T1 → T2, T2 → T1

(d)

Nodes: T1, T2
Edges: T1 → T2, T2 → T1

(e)

Nodes: T1, T2, T3
Edges: T1 → T2, T2 → T1, T1 → T3, T2 → T3

3. 22.22/20.22 (5^{th}/4^{th} edition)

Wait-for graph:

T1 → T5 (waiting for x1)
T1 → T2 (waiting for x3)
T2 → T4 (waiting for x7)
T2 → T3 (waiting for x8)
T3 → T6 (waiting for x4)
T3 → T5 (waiting for x5)
T4 → T5 (waiting for x1)
T5 → T2 (waiting for x3)
T6 → T7 (waiting for x6)
T7 → T5 (waiting for x5)

Deadlock exists

Cycle example:

T5 → T2 → T4 → T5