

**Subject: ADBMS**

**Assignment: 2**

**Release Date: Nov. 16, 2018**

**Submission Date: Nov. 21, 2018**

**MM-20**

**1. Give brief answers to the following questions:**

- a) What is a transaction? In what ways is it different from an ordinary program (in a language such as C)?
- b) Define these terms: atomicity, consistency, isolation, durability, schedule, blind write, dirty read, unrepeatable read, serializable schedule, recoverable schedule, avoids-cascading-aborts schedule.
- c) Describe Strict 2PL.
- d) Define multiple granularity with the help of an example.
- e) Differentiate between redo and undo with an example.

**2. Consider a database with objects X and Y and assume that there are two transactions T1 and T2. Transaction T1 reads objects X and Y and then writes object X. Transaction T2 reads objects X and Y and then writes objects X and Y**

- a) Give an example schedule with actions of transactions T1 and T2 on on objects X and Y that results in a write-read conflict.
- b) Give an example schedule with actions of transactions T1 and T2 on objects X and Y that results in a read-write conflict.
- c) Give an example schedule with actions of transactions T1 and T2 on objects X and Y that results in a write-write conflict

d) For each of the three schedules, show that Strict 2PL disallows the schedule.

### 3. Answer the following questions:

a) Describe how a typical lock manager is implemented. Why must lock and unlock be atomic operations? What is the difference between a lock and a latch? What are convoys and how should a lock manager handle them?

b) Compare lock downgrades with upgrades. Explain why downgrades violate 2PL but are nonetheless acceptable. Discuss the use of update locks in conjunction with lock downgrades.

c) Contrast the timestamps assigned to restarted transactions when timestamps are used for deadlock prevention versus when timestamps are used for concurrency control.

d) Show that, if two schedules are conflict equivalent, then they are view equivalent.

e) Give an example of a serializable schedule that is not strict.

g) Give an example of a strict schedule that is not serializable.

f) Motivate and describe the use of locks for improved conflict resolution in Optimistic Concurrency Control.

4. How to show process of horizontal, vertical fragmentation derived horizontal fragmentation including clustering process in vertical fragmentation?