S.Y.B.Sc(Computer Science)( Semester –I), 2010-2011

Relational Database Management System(RDBMS)

**Chapter 1. MYSQL**

1. What is a RDBMS?
2. What is the output of the following command?

Select replace(‘Lotus is a beautiful flower’, ‘Lotus’,’Rose’);

1. What is the significance of cursor FETCH statement of MySQL?
2. Write a procedure in MySQL which will accept employee number as input and delete the record of specified employee from the employee table whose fields are (employeenumber, name, salary.
3. What are cursors? How do you declare, open, fetch and close a cursor?
4. What are triggers and when are they fired?
5. What is exception handling?
6. Consider a table emp(emp\_no, name, salary). Write a trigger in MySQL to check salary when record is added or modified such that if salary < 0, it is set to zero or if it is greater than 25,000, then set it to 25,000.
7. What is the output of following MYSQL statement:

Select Lpad(‘Samarth’, 10,’\*’);

1. Write a Mysql statement to display only the day from the current date.
2. Write a function in MYSQL which will take your name xyz as a input and return a message ‘ GOOD MORNING XYZ’ as a output.
3. Give the command in MYSQL to load data of table student into a text file ‘data.txt’
4. Consider a table employee(eno,ename,salary) and emplog(eno,ename,old salary, new salary). Write a trigger which will activated when the employee record is modified, its changes should automatically entered into emplog table.
5. What is the output of following?

SELECT CEILING (6.89);

1. What is the output of following command? Select Replace (‘Lotus is beautiful flower’,’Lotus’,’Rose’);
2. What is the significance of cursor FETCH statement of MYSQL?
3. What is the usage of REVOKE command of MYSQL?
4. Write a procedure in MYSQL which will accept employee number as input and delete the record of specified employee form the employee table whose fields are --

(emp\_no, name, and salary).

1. Write a MYSQL query to get the names of three employees earning highest salary from employee table.
2. Write a MYSQL statement of display only the day from the current data.
3. Give the command in MYSQL to load data of table student into a text file’data.txt’.
4. How and when a user will grant privileges to other users?
5. Describe all levels of SHOW Command.
6. Consider a table emp(emp\_no,name,salary).Write a trigger in MYSQL to check salary when record is added or modified such that if salary < 0,it is set to zero or if it is greater than 25,000 then set it to 25,000.
7. Consider a table employee(eno,ename,salary) and emplog(eno,ename,oldsalary).Write a trigger which will be activated when the employee record is modified, its change should automatically entered into emplog table.
8. Write down the two differences between DBMS & RDBMS?
9. Explain any 4 string functions.
10. Consider the following database maintained by school.

STUDENT (SREG\_NO INT, NAME CHAR(30), CLASS (10))

COMPETITION(\_NO INT, NAME CHAR(20), TYPE CHAR(15) )

The relationship is as follows:

STUDENT – COMPETITIO : M-M with described attributes rank and year.

Create the above database in MySQL.

A) Write a stored procedure which accepts year as input and gives a list of all competitions held in that year.

B) Create a view over the competition table which contains only competition name and its type and it should be sorted on type.

**Chapter 2. Transaction Concepts**

1. What is a transaction? Explain the properties of a transaction.
2. Explain with a neat diagram the state transition diagram or transaction states.
3. What is an inconsistent state.
4. What are concurrent transactions? Explain the problems in concurrent transaction.
5. What is dirty read? Explain with example.
6. What are unrepeatable read?
7. What are schedules? Explain the types of schedules.
8. What are serial schedules?
9. What is a recoverable schedule?
10. Define non-recoverable schedule.
11. What is conflict serializability?
12. Explain precedence graph of serializability?
13. What are Lock based protocols? Explain the types of locks.
14. What are binary locks?
15. What are shared and Exclusive locks?
16. What is two-phase locking protocol?
17. Explain Time-stamps based protocols.
18. Explain Multiple Granularity protocol.
19. Define deadlock.
20. What is meant by transaction rollback? Why is it necessary to check for cascading rollback?
21. Compare binary locks to exclusive /shared locks.
22. Define the following:
    * Timestamp
    * Starvation
    * Phantom read.
23. Describe wound-wait protocol for deadlock prevention.
24. Write a note on Thomas write rule.
25. Consider the following two transactions:

T1 T2

Read(A); Read(A);

A:=a-100; T:=A\*0.1;

Write(A); A:=A-T;

Read(B); write(A);

B:=B+100; read(B);

Write(B); B=B+T;

Write(B);

Give two schedules which are serializable to serial schedule <T1,T2>

26.Consider the following schedule with two transactions T1 and T2.

T1 T2

Lock\_X(B);

Read(B);

B=B-50

Write(B); lock\_S(A);

Read(A);

Lock\_s(B);

Lock\_x(A);

Is the system in a deadlock state? If yes, what is the solution?Justify.

1. What is deadlock? Explain deadlock prevention schemes.
2. Consider the following transaction:

T1: T2:

Read(X); Read(Y);

X:=X-70; Y:=Y+10;

Write(X); Write(Y);

Read(Y); Read(Z);

b:=b+70; Z=Z-5;

Write(Y); Read(X)

Write(Z)

X=X-15

Write(X)

Give at least 2 non serial schedules that are serializable.

1. Consider the following non serial schedule:

T1 T2

Read(X)

X:=X-N

Read(X)

X=X+N

Write(X);

Read(Y);

Write(X)

Y:=Y+N;

Write(Y);

Is this schedule serializable to a serial schedule <T1,T2>

1. Consider the following transactions:

T1: T2: T3:

Read(X) Read(Z) Read(Y)

X:=X+100 Read(Y) Read(Z)

Write(X) Y=Y+Z Y=Y+50;

Read(Y) Write(Y) write(Y)

Y:=Y-100 Read(X) Z=Z+Y

Write(Y) X=N-Z Write(Y)

Write(X)

Find the two schedule to serial schedulr <T1,T2,T3>

1. The following is the list representing the sequence of events in an interleaved execution of set of transactions T1, T2 and T3 with two phase locking protocol (Locks are realesed when Transaction commits)

Time Transaction Code

t1 T1 Lock(A,S)

t2 T2 Lock(B,X)

t3 T3 Lock(A,X)

t4 T1 Lock(C,S)

t5 T2 Lock(A,S)

t6 T3 Lock(D,s)

t7 T1 Disp(A-C)

t8 T2 Lock(D,S)

t9 T3 Lock(C,X)

t10 T1 Commit

t11 T2 Lock(C,S)

is there a deadlock situations? Justify.

1. Consider the following non serial schedule.

T0 T1

Read(X)

X:=X-m

Read(X)

X=X+N

Write(X)

Read(Y)

Write(X)

Y:=Y+m

Write(Y)

Give two schedule to serial schedule <T0,T1>

1. The following is thye list of events in an interleaved execution of set of transaction T1,T2,T3 with two phase locking protocol.

Time Transaction Code

t1 T1 Lock(A,S)

t2 T2 Lock(B,S)

t3 T3 Lock(A,X)

t4 T1 Lock(C,S)

t5 T2 Lock(A,X)

t6 T3 Lock(D,X)

t7 T1 Lock(A-C)

t8 T2 Lock(D,S)

t9 T3 Lock(C,X)

t10 t1 Commit

t11 T2 lock(C,S)

Construct a graph according to above request. Is there dead lock at any instance? Justify.

1. Consider the following transaction

T1 T2

Read(A) Read(X)

A:=A+5 X:=X-10

Write(A) write(X)

Read(B) Read(B)

Read(C ) B=B-20

B:=B+10 Write(B)

Write(B)

C=C+15

Write(C)

Give at least two non-serial schedule that are serializable.

1. Consider the following transaction

T1: T2: T3:

Read(X) Read(X) Read(Z)

Read(Y) Read(Z) Read(Y)

Y=Y-X X=N+Z Y=Y+Z

Write(Y) Write(X) Write(Z)

Write(X) Write(Y)

Give at least two non serial schedules that are serializable.

1. Given the following schedules, state whether it is serializable schedule using precedence graph.

T1 T2 T3

Read(C )

Read(B)

Read(A)

Write(A)

Write(B)

Write(C )

Read(C)

Read(B)

Write(B)

Read(B)

Write(B)

Read(A)

Write(A)

1. Consider the following non-serial schedule:

T1 T2

Read(A)

A:=A-m

Read(A)

A:=A+n

Write(A)

Read(B)

B:=B+m

Write(B)

Give two schedule which are serializable.

1. The following is the list representing the sequence of events in an interleaved execution of set transactions T1,T2,T3 and T4 assuming two phase locking protocol(X is exclusive, S is shared)

Time Transaction Code

t1 T1 Lock(A,X)

t2 T2 Lock(B,S)

t3 T3 Lock(A,S)

t4 T4 Lock(B,S)

t5 T1 Lock(B,X)

t6 T2 Lock(C,X)

t7 T3 Lock(D,S)

t8 T4 Lock(D,X)

is there a deadlock?if yes, which transaction are involved in deadlock?

1. Consider the following transaction:

T1 T2 T3

Read\_item(A) Read\_item(C ) Read\_item(B)

A:=A+200 Read\_item(B) Read\_item(C )

Write\_item(A) B:=B+C B:=B+100

Read\_item(B) write\_item(B) Write\_item(B)

B:=B-200 Read\_item(A) C:=C+B

Write\_item(B) A:=n-C Write\_item(C )

Write\_item(A)

Find two schedules serializable to serial schedule <T1,T2,T3>

1. The following is the list of events in an interleaved execution of set of transactions T1,T2,T3,T4 with two phase locking protocol.

Time Transaction Code

t1 T1 Lock(A,S)

t2 T2 Lock(B,X)

t3 T3 Lock(C,X)  
t4 T4 Lock(A,S)

t5 T1 Lock(C,X)

t6 T2 Lock(A,S)

t7 T3 Lock(D,S)

t8 T4 Lock(B,S)

construct a wait- for graph according to above request. Is there deadlock at any instance?Justify.

1. Consider the following transaction:

T1 T2 T3

Read(A) Read(C) Read(A)

Read(C ) C:=5+C Read(B)

A:=A+C Read(B) B:=B-A

Write(A) B:=B+C Write(B)

Write(C )

Write(B)

Give at least two non-serial schedules that are searlizable to serial schedule <T1,t2,t3>

1. The Following is the list of events in an interleaved execution of set of transaction T0,T1,T2 with two phase locking protocol

Time Transaction Code

t1 T0 Lock(A,X)

t2 T1 Lock(B,S)

t3 T2 Lock(A,S)

t4 T0 Lock(C,X)

t5 T1 Lock(D,X)

t6 T0 Lock(D,S)

t7 T1 Lock(C,S)

t8 T2 Lock(B,S)

construct a wait- for graph according to above request. Is there deadlock at any instance? Justify.

1. Consider the following transaction:

T0: T1:

X:=X+15 X:=X-20

Read(Y) Write(X)

Write(X) Read(Z)

Y:=Y+X Read(Y)

Write(Y) Y:=Y+Z

Write(Y)

Give at least two non-serial schedules that are serializable to serial schedule <T1,T0>

1. The following is the least representing the sequence of events in an interleaved execution of set of transaction T1,T2,t3,t4 with two phase locking protocol.

Time Transaction Code

t1 T1 Lock(B,X)

t2 T2 Lock(A,X)

t3 T3 Lock(C,S)

t4 T4 Lock(B,X)

t5 T1 Disp(A-C)

t6 T2 Lock(C,X)

t7 T3 Lock(A,X)

t8 T4 Lock(C,S)

Is there is a deadlock? If yes which transaction are involved in deadlock?

**Chapter 3. Database security systems:**

1. Comment and justify: “A DBA is responsible for handling database security”.
2. Who is a DBA? What are the responsibilities of a DBA?
3. Explain with suitable example mandatory access control?
4. Explain the various levels at which security measures are taken.
5. What is Discretionary Access control(DAC) Method?
6. What is the usage of REVOKE command in MYSQL?
7. What is Mandatory Access control(MAC) for multilevel security?
8. What is Polyinstantiation?

**Chapter 4.Crash Recovery**

1. What do you mean by crash recovery?
2. Define Backup & Storage Structure.
3. Enlist various types of failures.
4. Explain the term Log-based recovery
5. With neat diagram explain shadow paging.
6. What is a recovery.
7. Short note on Remote backup system
8. Explain storage structure in detail.
9. Explain the following terms:
   1. Recovery & Atomicity
   2. Failure with non-volatile storage
   3. Checkpoints
   4. Buffer management
10. Under what circumstances, the shadow paging recovery does not require a log?
11. How are catastrophic failures handled by the recovery manager?

12.what are different type of failures?

13. following are the log entries at the time of system crash:

[Start\_Transaction, T1]

[Write\_Item,T1,A,5]

[Commit,T1]

[Start\_Transaction, T2]

[Write\_Item,T2,B,10]

[Write\_Item,T2,B,15]

[Commit,T2]

[Checkpoint]

[Start\_Transaction, T3]

[Write\_Item,T3,B,20]

[Start\_Transaction, T4]

[Write\_Item,T4,C,10] <-System crash

If deferred update with checkpoint is used,What will be the recovery procedure?

14 .Define Rollback?

15. following are the log entries at the time of system crash:

[Start\_Transaction, T1]

[Read\_Item,T1,P]

[Write\_Item,T1,P,7]

[Commit,T1]

[Start\_Transaction, T2]

[Read\_Item,T2,Q]

[Write\_Item,T2,Q,10]

[Start\_Transaction, T3]

[Write\_Item,T3,C,40]

[Commit,T2]

[Read\_Item,T3,P]

[Write\_Item,T3,P,10] <-System crash

If Immediate update is used, What Will Be The Recovery Procedure?

16.State commit Point?

17. following are the log entries at the time of system crash:

[Start\_Transaction, T1]

[Read\_Item,T1,D]

[Write\_Item,T1,D,B]

[Commit,T1]

[Checkpoint]

[Start\_Transaction, T2]

[Read\_Item,T2,B]

[Write\_Item,T2,B,12]

[Start\_Transaction, T3]

[Write\_Item,T3,A,20]

[Read\_Item,T3,D]

[Write\_Item,T3,D,20] <-System crash

If deferred update with checkpoint is used ,What Will Be The Recovery Procedure?

18. What Is System Log?

19. What Is use Of Rollback Command?

20. Define Checkpoint?

21. following are the log entries at the time of system crash:

[Start\_Transaction, T1]

[Read\_Item,T1,A,50]

[Write\_Item,T1,D,B]

[Commit,T1]

[Start\_Transaction, T2]

[Write\_Item,T2,B,100]

[Write\_Item,T2,D,150]

[Commit,T2]

[Checkpoint]

[Start\_Transaction, T3]

[Write\_Item,T3,B,200]

[Start\_Transaction, T4]

[Write\_Item,T4,C,100] <-System crash

If deferred update with checkpoint is used ,What Will Be The Recovery Procedure?

22. What Is Force\_Write?

23.What Is System Log?

24.following are the log entries at the time of system crash:

[Start\_Transaction, T1]

[Write\_Item,T1,A,20]

[Commit,T1]

[Checkpoint]

[Start\_Transaction, T4]

[Write\_Item,T4,C,25]

[Write\_Item,T4,B,15]

[Commit,T4]

[Start\_Transaction, T2]

[Write\_Item,T2,C,20]

[Start\_Transaction, T3]

[Write\_Item,T3,A,30]

[Write\_Item,T2,D,25] <-System crash

If deferred update with checkpoint is used ,What Will Be The Recovery Procedure?

25.What Is System Log?

26.Define Rollback?

27.following are the log entries at the time of system crash:

[Start\_Transaction, T1]

[Write\_Item,T1,A,10]

[Commit,T1]

[Start\_Transaction, T2]

[Write\_Item,T2,B,20]

[Write\_Item,T2,D,60]

[Commit,T2]

[Checkpoint]

[Start\_Transaction, T3]

[Write\_Item,T3,C,30]

[Start\_Transaction, T5]

[Write\_Item,T5,E,30] <-System crash

If Immediate update with pointing is used ,What Will Be The Recovery Procedure?

**Chapter 5.Client-Server Technology**

1. What is Client & Server?
2. Explain how client-server computing model works.
3. Write short note on “Evolution of client-server information technology”
4. Difference between client-server based information system & mainframe-based information system.
5. What benefits can be expected from client-server system?
6. Explain client-server architecture.
7. Explain client-server architecture interaction with diagram
8. Explain client-server architectural principle
9. Describe the client component.
10. Explain communication middleware components functions
11. What are different database middleware components?
12. Short note on client-server database.