

Section 2: Short answer questions

1. Define these terms: ACID - atomicity, consistency, isolation, durability

ACID Properties:

Atomicity: Atomicity means a transaction executes when all actions of the transaction are completed fully, or none are.

Consistency: Consistency involves beginning a transaction with a 'consistent' database, and finishing with a 'consistent' database

Isolation: A transaction appears as a unit to other transactions. Isolation ensures that a transaction can run independently, without considering any side effects that other concurrently running transactions might have.

Durability: Durability defines the persistence of committed data: once a transaction commits, the data should persist in the database even if the system crashes before the data is written to nonvolatile storage.

2. Consider the following schema:

STUDENT (STU_ID, STU_Name)

Write trigger prints a message every time anyone tries to insert, delete, or update data in the Student table:

```
create trigger tl
on student
for insert, update, delete
as
print "Now modify the student table the same way."
```

18. What are the benefits of Triggers?

- Generating some derived column values automatically
- Enforcing referential integrity
- Synchronous replication of tables
- Imposing security authorizations
- Preventing invalid transactions

19. Emp(eid, ename, age, salary)

Works(eid, did, pct time)

Dept(did, dname, budget, managerid)

Creates the login ABC with password '123'. Creates a database user for the login created above

```
CREATE LOGIN ABC WITH PASSWORD='123';
CREATE USER ABC FOR LOGIN ABC;
```

20. (0.300 Point) Discuss the strength and weakness of the trigger mechanism strengths:

Precision and Control: Ensures precise control in the system.

Safety: Integrates safety features to prevent unintended activation, especially in firearms.

Automation and Functionality: Enables automatic activation and specific functions in electronic devices.

Quick Response: Guarantees a swift response to specific stimuli in mechanical systems.

weakness:

Accidental Activation: Risk of unintended activation.

Reliability Issues: Potential for reliability problems, especially in harsh conditions.

Complexity: Complexity may pose challenges in maintenance.

Vulnerability to Attacks: Susceptibility to attacks or hacking in security systems.

User Error: Reliability can be affected by user errors, including design and operational mistakes.

21. (0.300 Point) Consider the following relational schema and briefly answer the questions that follow:

Emp(eid: integer, ename: string, age: integer, salary: real)

Works(eid: integer, did: integer, pct time: integer)

Dept(did: integer, budget: real, managerid: integer)

Define a table constraint on Emp that will ensure that every employee makes at least \$10,000.

```
CREATE TABLE Emp (eid INTEGER, ename CHAR(10), age INTEGER, salary REAL,  
PRIMARY KEY (eid).
```

```
CHECK (salary >= 10000 ))
```

22. (0.300 Point) Consider the following schema:

SUPPLIERS(SupplierID, SupplierName, Address)

3 No-1.1

PARTS(PartID, PartName, Color)

CATALOG(SupplierId, PartID, Cost)

For each of the following reports, indicate any indexes that you feel would help the report run faster as well as the type of index. Write SQL commands to create indexes for each attribute you identified

```
CREATE INDEX Index CATALOG  
ON CATALOG(SupplierID)
```

23. (0.300 Point) What are the four transaction isolation levels?

- Read Uncommittted
- Read Committed
- Repeatable Read
- Serializable

24. (0.300 Point) User Petter, who is the owner of the MovieSchema schema that contains tables

MOVIE(Title, Year, Length, InColor, StudioName, ProducerID)

STUDIO (Name, Address, PresID)

Grant the INSERT and SELECT privileges on table STUDIO and privileges SELECT, DELETE on MOVIE to users Mary and Kird. Moreover, she includes the grant option with these privileges

```
GRANT SELECT, INSERT ON Studio TO Mary, Kird
```

```
WITH GRANT OPTION:
```

```
GRANT SELECT, DELETE ON Movie TO Mary, Kird
```

WITH GRANT OPTION;

25. What is a transaction? In what ways is it different from an ordinary program (in a language such as C#)?

A transaction is an execution of a user program, seen by the Database Management Systems (DBMS) as a series or list of action operations. The actions that can be executed by a transaction include reads and writes of database objects, whereas actions in an ordinary program could involve user input, access to network devices, user interface drawing.

Section 3: Short Essay Question- [4 points]

26.

a. (1 point) Consider the following schema:

KHACH(MAKHACH, TENKHACH, DIACHI

PHONG(MAPHONG, TENPHONG, LOAIPHONG)

PHIEUDATPHONG(SOPHIEU, NGAYDATPHONG, MAKHACH, SOPHONG)

CHITIETDATPHONG(SOPHIEU, MAPHONG, NGAYDEN, NGAYDI, GIA)

Write a transaction to aggregate amount for each customer (Have use Isolation level)

Begin Transaction

Set transaction Isolation level Serializable

Select K.MaKhach, TenKhach, sum(datediff(day, C.NgayDen, c.NgayDi)*gia*SoPhong) as tongtien
From ChiTietDatPhong C, Khach K, phieuDatphong D

Where K.Makhach= D.Makhach and C.Sophieu = D.Sophieu

Group by K.MaKhach, Tenkhach

Commit Transaction

b. (1 point) Consider the following schema:

Publishers (P ID, P_Name)

Write trigger prints a message every time anyone tries to insert, delete, or update data in the publishers table:

```
create trigger t
on student
for insert, update, delete
as
print "Now modify the student table the same way."
```

c. (2 points) Consider the following schema: booking air ticket online Write a stored procedure (without parameter) for cancelling a ticket, set the appropriate isolation level.

DB: Booking

Table KhachHang: SOCMND, TENKH, DIACHI, SOTAIKHOAN

Table_ChuyenBay: MACHUYENBAY, NGAYBAY, NOIDI, NOIDEN, SOGHEDAT, SOGHE

Table ChuyenBay_Khach: MACHUYENBAY, SOCMND, NGAYDATVE, GHICHU

```
CREATE PROCEDURE p_Huy Ve
    @SoCMND varchar(10),
    @MaCB varchar(10)
```

AS

SET TRANSACTION ISOLATION LEVEL SERIALIZABLE
BEGIN

IF NOT EXISTS (SELECT SOCMND FROM KHACHHANG WHERE
SOCMND=@SOCMND)

BEGIN

PRINT N'Khách hàng không tồn tại. Không thể hủy vé
Rollback Transaction

END

ELSE IF NOT EXISTS (SELECT MaCB FROM CHUYENBAY WHERE
MACB=@MACB)

BEGIN

PRINT N'Chuyến bay không tồn tại
Rollback Transaction

END

ELSE

UPDATE CHUYENBAY SET SLGhedat =SLGhedat - 1

WHERE MACB = @MaCB

IF (@@ERROR>0)

Rollback Transaction

DELETE FROM CHUYENBAY_KHACH WHERE SOCMND=@SoCMND
AND MaCB= @MaCB

IF(@@ ERROR<>0)

Rollback Transaction

ELSE

BEGIN

PRINT 'Hủy vé thành công'
COMMIT TRANSACTION

END

END