Database Management System – cs422 DE

Assignment 3 – Week 3 & 4

This assignment is based on lecture 3 & 4 (chapter 6 & 7).

- Submit your *own work* on time. No credit will be given if the assignment is submitted after the due date.
- Note that the completed assignment should be submitted in .doc, .docx, .rtf or .pdf format only.
- In MCQs, if you think that your answer needs explanation to get credit then please write it down.
- You are encouraged to discuss these questions in the Sakai forum.

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1) The database schema is written in

(A) HLL (B) DML (C) DDL (D) DCL

ANS: C

2) The language used in application programs to request data from the DBMS is referred to as

(A) DML (B) DDL (C) VDL (D) SDL

ANS: A

3) Count function in SQL returns the number of

(A) values (B) distinct values (C) groups (D) columns

ANS: A

4) 'AS' clause is used in SQL for

(A) Selection (B) Rename (C) Join (D) Projection

ANS: B

5) Which is not a DDL statement ?

(A) Create (B) Alter (C) Delete (D) Drop

ANS: C

6) The statement in SQL which allows to change the definition of a table is

(A) Alter (B) Update (C) Create (D) Select

ANS: A

7) What restrictions apply to the use of the aggregate functions within the SELECT statement? How do nulls affect the aggregate functions?

ANS:

An aggregate function can be used only in SELECT and in HAVING clauses and operates on a single column of a table and returns a single value. Each aggregate function eliminates nulls first and

operates only on the remaining non-null values. Aggregate functions count all the rows of a table, regardless of whether nulls or duplicate values occur.

8) **List the order in which the WHERE, GROUP BY, and HAVING clauses are executed by the database in the following SQL statement.**

```
SELECT section_id, COUNT(*), final_grade
FROM enrollment
WHERE TRUNC(enroll_date) > TO_DATE('2/16/2003', 'MM/DD/YYYY')
GROUP BY section_id, final_grade HAVING COUNT(*) > 5
```

ANS:

Execution steps:

1. **The WHERE with the filter criteria**
2. **GROUP BY - combines the selected rows into groups**
3. **HAVING – filters will finally filter the groups**

9) **Explain how the GROUP BY clause works. What is the difference between WHERE and HAVING clauses?**

ANS:

GROUP BY works by forming groups of rows with a same column value. It groups rows with identical values using some aggregate functions.

The difference between WHERE and HAVING clauses is that the WHERE clause filters rows while HAVING filters groups.

10) **Can the ANY and ALL operators be used on the DATE data type? Write a simple query to prove your answer.**

ANS: YES

We can use to ANY and ALL to DATE data type the same way we use it for other types.

Example:

```
SELECT * FROM Student
WHERE registrationDate < ANY
(SELECT courseOfferDate FROM COURSE WHERE courseName = "DB")
```

11) **The following SQL lists staffs who work in branch at '163 Main St'.**

```
SELECT staffNo, fName, lName, position
FROM Staff
WHERE branchNo =
      (SELECT branchNo
      FROM Branch
      WHERE street = '163 Main St');
```

Will there be any problem with this query if there is more than one branch at '163 Main St'? If yes, then explain the problem and right down the correct query.

ANS: YES

In case there are more than one branches at the specified address, the subquery will return more than one branchNo making the WHERE clause to fail. The correct way could be to use ANY, ALL or IN.

using ANY

```
SELECT staffNo, fName, lName, position
FROM Staff
WHERE branchNo = ANY
      (SELECT branchNo
      FROM Branch
      WHERE street = '163 Main St');
```

12) What is Referential integrity constraint?

ANS:

Referential integrity refers to the accuracy and consistency of data within a relationship of database tables. If a foreign key in Table A refers to the Primary Key of Table B, then every value of the foreign key in Table A must be null or be available in Table B.

What is the difference between primary key and unique key?

ANS:

The purpose of a primary is to uniquely identify a row. However, we use unique keys to prevent duplicate values in a column; with the exception of null.

13) Solve the question 7.10 from the course text book (5th edition).

ANS:

```
CREATE DOMAIN HotelNumber   AS INT;
CREATE TABLE Hotel(
hotelNo          HotelNumber          NOT NULL,
hotelName        VARCHAR(20)          NOT NULL,
city             VARCHAR(50)          NOT NULL,
PRIMARY KEY (hotelNo));
```


14) Solve the question 7.12 from the course text book (5th edition).

ANS:

```
CREATE TABLE Booking
(hotelNo         INT          NOT NULL,
 guestNo         INT          NOT NULL,
 dateFrom        DATE,
 dateTo          DATE,
 roomNo          INT          NOT NULL,

CONSTRAINT pkbhh PRIMARY KEY (hotelNo, guestNo, dateFrom),
CONSTRAINT fkbh FOREGN KEY (hotelNo) REFERENCES hotel (hotelNo),
CONSTRAINT fkbg FOREIGN KEY (guestNo) REFERENCES guest (guestNo),
CONSTRAINT fkbr FOREIGN KEY (roomNo, hotelNo)
REFERENCES room (roomNo, hotelNo));

INSERT INTO Booking (hotelNo, guestNo, dateFrom, dateTo, roomNo)
VALUES
  (SELECT * FROM booking
    WHERE dateTo < '1/1/2007');

DELETE FROM booking
    WHERE dateTo < '1/1/2007';
```