

## Database Management System – cs422 DE

### Assignment 3 – Week 3 & 4

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**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: The restrictions apply to the use of the aggregate functions within the SELECT statement are below properties:**

- **Grouping Requirement:** When using aggregate functions in the SELECT statement, you typically need to include a GROUP BY clause to specify how the data should be grouped before applying the aggregation.
- **Single-row result:** If the SELECT statement includes aggregate functions without a GROUP BY clause, the query will return a single row, representing the aggregation of all the rows in the result set.
- **Column Restrictions:** In most database systems, aggregate functions cannot be used in WHERE, HAVING, or ORDER BY clauses directly. Instead, you typically use aggregate functions in the SELECT list or in conjunction with the GROUP BY clause.

In SUM and AVG, Null values are ignored when calculating the sum or average. In COUNT, Null values are generally excluded from the count. In Max and Min, Null values are typically ignored when determining the maximum or minimum value.

**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: WHERE, then GROUP BY, then HAVING**

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

**ANS:**

The GROUP BY clause in SQL is used to group rows that have the same values into summary rows, typically to apply aggregate functions like SUM(), COUNT(), AVG(), MAX(), or MIN() to each group. GROUP BY can be used to grouping rows, aggregate functions and result set.

The difference between WHERE and HAVING:

- **WHERE:** used to filter rows before groups are formed or before aggregate functions are applied. It operates on individual rows before they are grouped.
- **HAVING:** The HAVING clause is used to filter groups after the groups have been formed and aggregate functions have been applied. It operates on groups of rows.

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

**ANS: Yes**

**SELECT \***

**FROM orders**

**WHERE order\_date >= ANY (SELECT DISTINCT shipping\_date FROM shipping);**

**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, there would be a problem with this query if there is more than one branch located at '163 Main St'. The issue arises because the subquery (SELECT branchNo FROM Branch WHERE street = '163 Main St') returns multiple branch numbers, and the main query expects a single value to compare against the branchNo column in the Staff table.

**12) What is Referential integrity constraint?**

ANS: Referential integrity is a concept in database management that ensures relationships between tables remain consistent. A referential integrity constraint is a rule that enforces these relationships.

**13) What is the difference between primary key and unique key?**

ANS:

PRIMARY key	UNIQUE key
Uniquely identifies a row	Uniquely identifies a row
Cannot accept NULL values	Can accept NULL values
Creates clustered index	Creates non-clustered index

**14) Solve the question 7.10 from the course text book (5<sup>th</sup> edition).**

ANS:

```
CREATE TABLE hotel (  
  hotelNo int NOT NULL,  
  city varchar(128) DEFAULT NULL,  
  hotelName varchar(128) DEFAULT NULL,  
  PRIMARY KEY (hotelNo))
```

**15) Solve the question 7.12 from the course text book (5<sup>th</sup> edition).**

ANS:

```
CREATE TABLE booking_arc (  
  hotelNo int NOT NULL,  
  guestNo int NOT NULL,  
  dateFrom date NOT NULL,  
  dateTo date DEFAULT NULL,  
  roomNo varchar(16) DEFAULT NULL,  
  PRIMARY KEY (hotelNo,guestNo,dateFrom),  
  CONSTRAINT ba_guestNo FOREIGN KEY (guestNo) REFERENCES guest (guestNo),  
  CONSTRAINT ba_hotelNo FOREIGN KEY (hotelNo) REFERENCES hotel (hotelNo));
```

```
insert into booking_arc  
select * from booking where dateFrom < '2013-01-01'
```