

Subquery - join Operations on Relational Scheme

Write Up:-

1. **DBMS Architecture** :- The DBMS design depend upon its architecture. The basic client/server architecture is used to deal with large number of PCs, web server, database servers and other components that are connected with network. The client/server architecture consist of PCs. DBMS architecture depend upon how users are connected to the database to get their request done.

DBMS Architecture.

- ii. **1-tier architecture**, the database is directly available to the user. It means the user can directly sit on the DBMS and use it.
- iii. **2-tier architecture** is same as basic client/server. In the two-tier architecture, application on the client end can directly communicate with the database at the server side. For interaction API like ODBC, JDBC are used.
- iv. **3-tier Architecture** contain another layer between the client and server. In this architecture client can't directly communicate with the server. 3-tier architecture is used in case of large web application.

II DML

i] DML stands for Data Manipulation Language. The DML command in sql change the data present in sql database. we can easily access, store, modify, update and delete the existing records from the database using DML commands.

ii] SELECT: The select command show records of the specified table. It show the particular record of a particular column by using where clause.

eg: `SELECT * from Student;`

b] INSERT: Insert is another most important data manipulation command in sql, which allow user to insert data in database table.

eg: `Insert into Student (stu-id, stu-Name, stu-Marks, stu-Age) VALUES (104, Anmol, 89, 19);`

c] update command: The update command in sql, which allows users to update or modify the existing data in database table.

eg: `UPDATE Student SET stu-Marks = 80 stu-Age = 21 where stu-Id = 103;`

d] DELETE Command: Delete is a DML command which allow sql user to remove single or multiple existing records from the database table.

This command doesn't delete the store data permanently from the database.

eg: `DELETE from Student where stu-Marks > 100;`

III DCL

i

DCL stands for Data Control Language. DCL commands are used to control privileges in the database. The privileges (right to access the data) are required for performing all the database operations, like creating tables, views or sequences.

ii

DCL statements are used to perform the work related to right, permission, and other control of the database system.

iii

The two most important DCL commands are GRANT and REVOKE.

a]

GRANT: This command is used to grant permission to the user to perform a particular operation on a particular object. If we are database administrator and we want to restrict user accessibility such as one who only views the data or may only update the data we can give the privilege permission to the user according to our wish.

Syntax: GRANT privilege list ON Object name TO user name,

b]

REVOKE: This command is used to take permission/access back from the user. If we want to return permission from the database then we need to run REVOKE command.

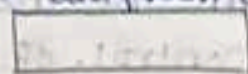
Syntax: REVOKE privilege list ON Object name FROM user name,

i] ER model stands for an Entity-Relationship model. It is a high level data model. This model is used to define the data elements and relationship for specified system. In ER modeling, the database structure is portrayed as a diagram called an entity-relationship diagram.

ii] The component of ERD diagram

a] Entity: An entity may be an object, class, person or place.

In ER diagram an entity can be represented as rectangle.



b] Attribute: The attribute is used to describe the property of an entity. Ellipse is used to represent an attribute.

c] Relationship: A relationship is used to describe the relation between entities. Diamond, or rhombus is used to represent the relationship.



a] One-to-One Relationship: When only one instance of an entity is associated with the relationship then it is known as one to one relationship.

b] One-to-Many Relationship: When only one instance of the entity on the left, and more than one instance of an entity on the right associated with the relationship then it is known as one-to-many.

c] Many-to-One Relationship: When more than one instance of the entity on the left, and only one instance of an entity on the right associated with the relationship then it is known as many-to-one.

d] Many-to-Many relationship: When more than one instance of the entity on the left, and more than one instance of an entity on the right associate with the relationship then it is known as many-to-many.

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V Subquery and Types of Subqueries

- i. The Subquery or Inner query is an sql query placed inside another sql query. It is embedded in the having or where clause of the sql statements.
- ii. The characteristic of Subqueries :
 - a] Nested Structured: A subquery is executed within the context of an outer query
 - b] Parentheses: Subqueries must always be enclosed in parentheses.
 - c] Comparison Operators: Subqueries can be used with operators like =, >, <, IN, NOT IN, LIKE etc.
 - d] Single-Row vs Multi-Row Subqueries: Subqueries may return a single value (e.g. a single row) or multiple values.
- iii. Types of Subqueries:
 - a] Single-Row Subquery: Return one row
eg: `Select Name from Employee where Salary Count > (select avg (salary) from Employee);`
 - b] Multi-Row Subquery: Return multiple rows:
eg: `Select Name from Employee where DepartmentID (Select departmentID from Department);`
 - c] Correlated Subquery: Dependent on the outer query
eg: `Select Name from Employee e where Exists (Select 1 from department d where e.DepartmentID = d.departmentID)`
 - d] Nested Subquery: A subquery within another subquery.

VI Group By and Having:

15

- i] In sql the group by statement is used for organizing similar data into group. The data is further organized with the help of equivalent function. It means, if different rows in a precise column have the same values, it will arrange those rows in a group.
- ii] The SELECT statement is used with the GROUP BY clause in the sql query.
- iii] where clause is placed before the Group By clause in SQL.
- iv] ORDER BY clause is placed after the GROUP BY clause in SQL.

HAVING IN SQL:

- i] The HAVING clause places the condition in the groups defined by the group By clause in the SELECT statement.
- ii] This SQL clause is implement after the 'GROUP BY' clause in the 'SELECT' statement.
- iii] The HAVING clause can include SQL aggregate function in a query or statement.
- iv] We can only use SELECT statement with HAVING clause for filtering the records.
- v] We can implements this SQL clause in column operations.

VII Join and Types of Join:

- i] SQL JOIN clause is used to query and access data from multiple tables by establishing logical relationship between them. It can access data from multiple tables simultaneously using common key values shared across different tables.
- ii] There are many types of joins in SQL. Depending on the use cases, we can use different type of SQL JOIN S clause.
 - a] INNER JOIN: The inner join keyword select all rows from both the tables as long as the condition is satisfied.
 - b] LEFT JOIN: Left join returns all the rows of the table on the left side of the join and matches rows for the tables on the right side of the join.

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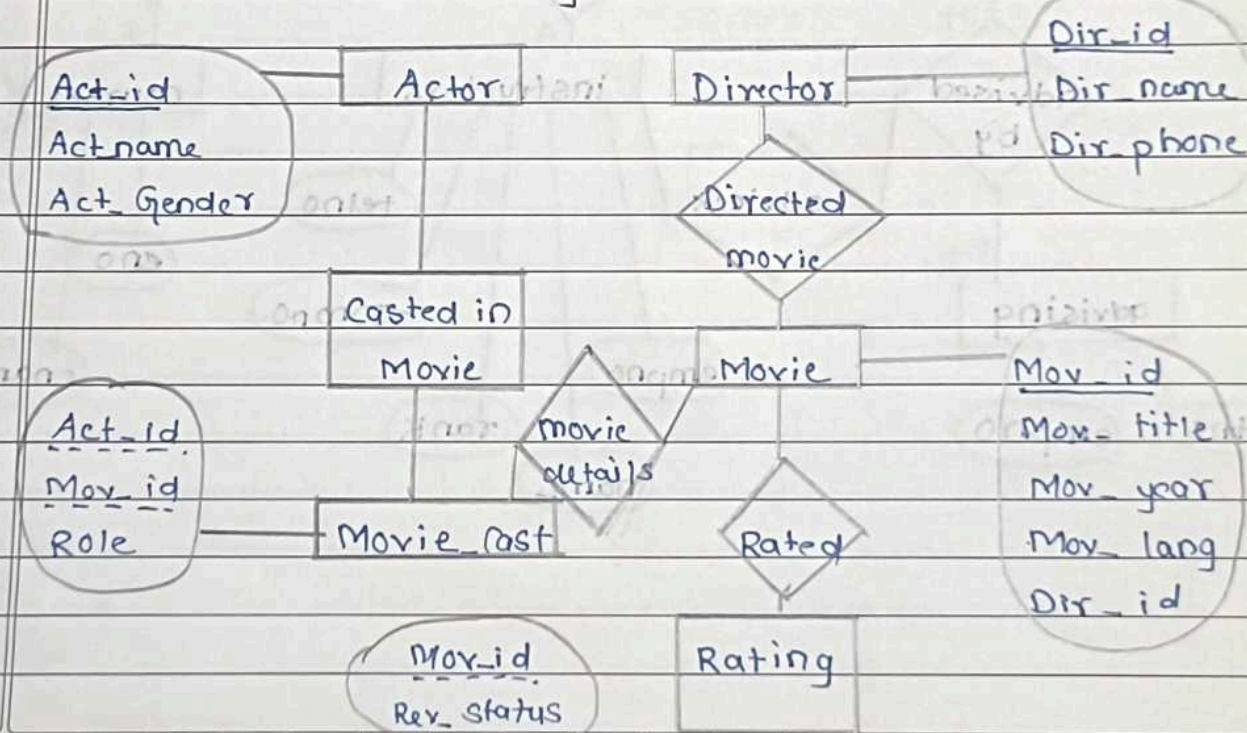
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c7] **RIGHT JOIN**: Right join return all the rows of the table on the right side of the join and matching row for the table on the left side of the join. It is very similar to left join for the rows for which there is no matching row on the left side.

d] **FULL JOIN**: Full join creates the result-set by combining result of both left join and Right join. The result-set will contain all the rows from both tables.

e] **Natural Join**: Natural join can join tables based on the common columns in the tables being joined. A natural join return all rows by matching values in common columns having same name and data type of columns and that column should be present in both tables.

Q2 Practical 2 ERD diagram Solution.



3] ERD Diagram.

