

Experiment No 17: Create and manage Views for faster access on relations.

I. Practical Significance:

This practical will help students to understand Views, Sequences and Indexes used in SQL. A view is a virtual table based on the result-set of an SQL statement. A view contains rows and columns, just like a real table. The fields in a view are fields from one or more real tables in the database. You can add SQL statements and functions to a view and present the data as if the data were coming from one single table. A sequence is a user-defined schema-bound object that generates a series of numeric values. Indexes are used to retrieve data from the database more quickly than otherwise. The users cannot see the indexes, they are just used to speed up searches/queries.

II. INDUSTRY / EMPLOYER EXPECTED OUTCOME:

To execute queries using Views, Sequences, Indexes to perform advance calculations.

III. COURSE LEVEL LEARNING OUTCOMES (COS):CO3

- Manage database using SQL.

IV. LABORATORY LEARNING OUTCOME:

- i. Create, Update, drop/ Delete views.
- ii. Create and execute Sequences.
- iii. Create and execute indexes.

V. Relevant Affective Domain related outcome(s)

- a. Follow precautionary measures.
- b. Follow installation steps.
- c. Follow ethical practices.

VI. Relevant Theoretical Background

a. Views:

A view is created with the CREATE VIEW statement. View can hide complexity and can be used as a security mechanism. View can be a virtual table which is derived from one or more than one table. View is created using tables of same database or different database. It is used for security purposes because they provide encapsulation of the name of the table. View has several benefits:

1. Complexity: Views help to reduce complexity. Different views can be created on the

same base table for different users.

2. Security: It increases security by excluding the sensitive information from the view.
3. Query Simplicity: It helps to simplify commands from the user. A view can draw data from several different tables and present it as a single table.
4. Consistency: A view can present a consistent, unchanged image of the structure of the database. Views can be used to rename the columns without affecting the base table.
5. Data Integrity: If data is accessed and entered through a view, the DBMS can automatically check the data to ensure that it meets the specified integrity constraints.
6. Storage Capacity: Views take very little space to store the data.
7. Logical Data Independence: View can make the application and database tables to a certain extent independent.

Syntax

```
CREATE VIEW view_name AS  
SELECT column1, column2, ...  
FROM table_name
```

WHERE condition;

b. SEQUENCE

The sequence of numeric values is generated in an ascending or descending order at defined intervals and can be configured to restart when it exceeds maximum value. A sequence is a set of integers that are generated in order of demand. Sequences are commonly used in databases because many applications require each row in a table to contain a unique value and sequence provides an easy way to generate them.

SYNTAX:

```
CREATE SEQUENCE sequence_name  
START WITH initial_value  
INCREMENT BY increment_value MINVALUE minimum value  
MAXVALUE maximum value  
CYCLE|NOCYCLE;
```

c. INDEX

The Index in SQL is a special table used to speed up the searching of the data in the database tables. Index provides a fast access path to column that is indexed. Indexes are stored independently from actual data. It is mostly useful on large tables and on columns that frequently appear in WHERE clause. When the table is dropped, index will also

automatically drop. More than one index is allowed in one table.

SYNTAX:

CREATE INDEX Index_Name ON Table_Name (Column_Name);

VII. Required Resources/apparatus/equipment with specifications

Sr. No	Equipment Name with Broad Specifications	Relevant LLO Number
i	Computer system with all necessary components like; motherboard, random access memory (RAM), read-only memory (ROM), internal hard disk drives, Mouse, Keyboard, and RDBMS applications such as Oracle Express Edition, MySQL, SQLite, Oracle Live SQL etc.	All

VIII. Procedure

- Write and execute query for view.
- Write and execute query to insert, modify and delete records through views
- Write and execute query to delete view.
- Write and execute query for creating altering and dropping sequence.
- Write and execute query for simple and composite index.

IX. Result(s)

In this practice we learn to create & manage view for faster access on relations.

X. Practical related questions (Provide space for answers)

- Note: Below are a few sample questions for reference. Teacher must design more such questions so as to ensure the achievement of identified CO.
- What are synonyms, write its syntax and advantages.
 - What is the difference between simple and composite index?
 - What are the disadvantages of views?
 - Write the syntax to delete view.

(Space for answer)

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* practical-related questions.

1] →

The synonym is the alternative name or the alias name for the database object so the same database object can be referred by different names without using the complex names that are defined before. The synonyms can be created for the tables, stored procedure, user defined functions or any database object.

The synonyms become invalid when:

- The base table is dropped
- The name of the base table is changed.

Syntax: `CREATE SYNONYM [Schema_name]
SYNONYM_name FOR target_object.`

⇒ Advantage of using synonym

i] Synonyms reduce the efforts by helping us keep the length reduced alias.

ii] All the changes made in the base table will be reflected here & the changes made in the

Synonym also change in the base table,

iii) Creates & abstraction the base table

ii) →

① Simple Index:

- A simple index also known as a single-column index is created on a single column of a table.

- It helps speed up queries that filter or sort data based on that single column.

Ex:

```
CREATE INDEX idx_customer_lastname ON  
customer (last_name);
```

② Composite Index:

- A composite index also known as a multi-column index is created on two or more columns of a table.

- It helps speed up queries that filter or sort data based on multiple columns.

- The order of column in a Composite index is important because it affects how the index is used in queries.

ex:

Create Index id_customer_name ON Customers (last_name, first_name);

iii] →

→ Disadvantages of view.

1] Increased Complexity:

Views can make SQL queries more complex and harder to understand, especially when dealing with large or intricate datasets.

2] Reduced Performance:

Views can slow down query performance, particularly when they involve large datasets or complex calculations.

3] Limited Functionality:

Views have limitations compared to tables.

ex: you cannot use views for certain tasks like inserting or updating data directly.

4] Maintenance Issue:

Maintaining view can be challenging especially if they are based on multiple tables or used in complex queries.

5] Security concerns:

If not properly secured views can expose sensitive data.

6] Dependency on Base table:

If a base table is dropped or altered the view may become invalid or irrelevant.

IV] →

⇒ Drop View <view_name> (Restrict) (Cascade)

* Exercise

ii →

ii Create View emp_view as select emp_no, ename, Salary from emp;

→ View "emp_view" created successfully

iii update emp_view set e_name = 'Jay' where emp_no = 101;

→ 1 row updated successfully.

iv Delete from emp_view where emp_no = 105;

→ 1 row delete successfully

v Drop view emp_view;

→ View "emp_view" dropped successfully

vi Modify location of dept_no of dept_view;

→ Error - Cannot modify a view column location.

vii Create simple index dept_simple_index on dept table

→ Index "dept_simple_index" created successfully

viii Create composite index dept_composite_index on dept table;

→ Index "dept_composite_index" ~~is~~ created successfully.

VIII Drop index dept-simple & dept-composite-index
→ indexes "dept-simple-index" and "dept-composite-index" dropped successfully.

ix) Create index Eas on emp (empno, ename).
→ Index "Eas" created successfully.

2) →

a) Create Sequence emp-sequence incremented by 2
Start with 1 NoMaxValue NoCycle Cache 10;
→ Sequence "emp-sequence" created successfully

• Current properties of emp-sequence

increment: 2, Startwith: 1, minvalue: 1

Max Value: No maximum Value, Cycle: NoCycle.

b) Alter Sequence emp-sequence incremented by 15
Cycle max Value 1000 Cache 20;

→ Sequence "emp-sequence" altered successfully

• Current properties

increment: 15, Startwith: 1, maxvalue: 1000
cycle: cycle-enabled, Cache: 20

c) Drop Sequence emp-sequence;

→ Sequence "emp-sequence" dropped successfully.