Assignment 2(subject:DBMS)

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Aim: Study of Views, types of views and with check option in SQL

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1. Study of Views
2. Operation on views
3. Materialized Views
4. Validating new data

Tools: MariaDB

Programming Language: Structured Query Language (SQL)

Theory:

1. **Views:**

   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.
   - Views in SQL are kind of virtual tables
   - We can create a view by selecting fields from one or more tables present in the database.
   - A view can either have all rows of a table or specific rows based on certain condition

2. **Uses of Views:**
   - Restricting data access
   - Holding data complexity
   - Simplify commands for user
   - Store complex queries
   - Multiple view facility

Types of Views:

Simple	Complex	Materialized
Logical table created from a single base table	Logical table created from multiple base table	A physical table that stores queries output or intermediate results in oracle
Does not hold data	Does not hold data	Holds data in data warehouses to store data of a complex query.

Materialized view:

A materialized view is a view that stores the result of a view query.Whenever you query the materialized view, it returns data stored in the view.It doesn't run the view query against underlying tables.

Benefits of materialized view:

1.Improved Query efficiency

Disadvantages of materialized view:

1.Updates to data need to be set up

2.Data may be inconsistent-because data is stored in different tables

Syntax of materialized view:

CREATE MATERIALIZED VIEW viewname

[REFRESH|FAST|COMPLETE|FORCE|ON DEMAND|ON COMMIT]

[BUILD IMMEDIATE|BUILT DEFERRED]

AS

select_query;

This includes:

CREATE MATERIALIZED VIEW: specify what's being created

viewname: the name of the new materialized view

REFRESH FAST: uses an incremental method which uses changes made to underlying tables in a log file. (what part of the database the refresh occurs)

REFRESH COMPLETE: uses a complete refresh by re-running the query in the materialized view

REFRESH FORCE: indicates that a fast refresh should be performed if possible, but if not, a complete refresh is performed. Force is the default (between Fast , Forces , and Complete)

REFRESH ON DEMAND: indicates that a refresh will occur manually whenever specific package functions are called On demand is the default.

REFRESH ON COMMIT: indicates that a fast refresh occurs whenever a transaction commit makes changes to any underlying tables.

****

(How the refresh should update the view)

BUILD IMMEDIATE: The materialized view will be populated immediately. This is the default.

BUILD DEFERRED: The materialized view is populated on the next refresh operation.

AS select_query: The query that is run , with the results stored in the materialized view

Difference between views

Component	View	Materialized View

Stored on database	SQL query definition	SQL query definition and data that is returned by it
Data Storage	None-remains in underlying tables	Stored within the view
Refresh	Latest data is is returned whenever the query is run	Data stored in a view may not be the most up-to-date. Options can be set to update the materialized view data periodically
Performance	Same as underlying query	Usually faster than a view
Indexes	None - uses same indexes as underlying query	Can be created on materialized view itself
Space Used	Small as it is only the SQL query definition	Can be large, as the data is stored with the object

VALIDATING NEW DATA USING "WITH CHECK OPTION"

WITH CHECK OPTION is a keyword you can add when creating a view. If you specify it when creating a view, then all inserted/updated data should meet the criteria in the view. If the criteria is not met, insert or update will fail.

For example we could create a view that shows all employee with salary greater than 50K

```sql
CREATE VIEW emp_highsal AS
SELECT emp_id
Last_name
Salary
FROM employee
WHERE salary > 50000;
WITH CHECK OPTION;
```

INSERT or UPDATE into employee table will fail for records with salary less than 50000

Output:

```
~$ mysql -u root -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 32
Server version: 10.6.16-MariaDB-0ubuntu0.22.04.1 Ubuntu 22.04
```

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

```
MariaDB [(none)]> create database dbassn2;
Query OK, 1 row affected (0.000 sec)

MariaDB [(none)]> use database dbassn2;
ERROR 1049 (42000): Unknown database 'database'
MariaDB [(none)]> use dbassn2;
Database changed
MariaDB [dbassn2]> create table student(sid int , sname char(100) ,
saddress varchar(100) );
Query OK, 0 rows affected (0.019 sec)

MariaDB [dbassn2]> insert into student values(1 , 'AAA' , 'pune');
Query OK, 1 row affected (0.038 sec)

MariaDB [dbassn2]> insert into student values(2 , 'BBB' , 'mumbai'),(3 ,
'CCC' , 'Nashik');
Query OK, 2 rows affected (0.005 sec)
Records: 2  Duplicates: 0  Warnings: 0

MariaDB [dbassn2]> select * from student;
+------+-------+----------+
| sid  | sname | saddress |
+------+-------+----------+
|    1 | AAA   | pune     |
|    2 | BBB   | mumbai   |
|    3 | CCC   | Nashik   |
+------+-------+----------+
3 rows in set (0.000 sec)

MariaDB [dbassn2]> create view name as select sid , sname from
student;
Query OK, 0 rows affected (0.012 sec)
```

```
MariaDB [dbassn2]> show tables;
+-------------------+
| Tables_in_dbassn2 |
+-------------------+
| name              |
| student           |
+-------------------+
2 rows in set (0.000 sec)

MariaDB [dbassn2]> create view address as select sname , saddress
from student;
Query OK, 0 rows affected (0.013 sec)

MariaDB [dbassn2]> show tables;
+-------------------+
| Tables_in_dbassn2 |
+-------------------+
| address           |
| name              |
| student           |
+-------------------+
3 rows in set (0.000 sec)

MariaDB [dbassn2]> desc name;
+-------+-----------+------+-----+---------+-------+
| Field | Type      | Null | Key | Default | Extra |
+-------+-----------+------+-----+---------+-------+
| sid   | int(11)   | YES  |     | NULL    |       |
| sname | char(100) | YES  |     | NULL    |       |
+-------+-----------+------+-----+---------+-------+
2 rows in set (0.001 sec)

MariaDB [dbassn2]> select * from name;
+------+-------+
| sid  | sname |
+------+-------+
|    1 | AAA   |
```

```
|      2 | BBB   |
|      3 | CCC   |
+------+-------+
3 rows in set (0.000 sec)

MariaDB [dbassn2]> show create table student ;
+---------+--------------------------------------------------------------------------------
----------------------------------------------------------------------------------------
----------------+
| Table   | Create Table
      |
+---------+--------------------------------------------------------------------------------
----------------------------------------------------------------------------------------
----------------+
| student | CREATE TABLE `student` (
  `sid` int(11) DEFAULT NULL,
  `sname` char(100) DEFAULT NULL,
  `saddress` varchar(100) DEFAULT NULL
) ENGINE=InnoDB DEFAULT CHARSET=utf8mb4
COLLATE=utf8mb4_general_ci |
+---------+--------------------------------------------------------------------------------
----------------------------------------------------------------------------------------
----------------+
1 row in set (0.000 sec)

MariaDB [dbassn2]> show create table view name ;
ERROR 1064 (42000): You have an error in your SQL syntax; check the
manual that corresponds to your MariaDB server version for the right
syntax to use near 'name' at line 1
MariaDB [dbassn2]> show create view name;
+------+--------------------------------------------------------------------------------
----------------------------------------------------------------------------+--------------
-------+---------------------+
| View | Create View
      | character_set_client | collation_connection |
```

```
+------+------------------------------------------------------------------------
-----------------------------------------------------------------------+--------------
-------+--------------------+
| name | CREATE ALGORITHM=UNDEFINED
DEFINER=`root`@`localhost` SQL SECURITY DEFINER VIEW `name`
AS select `student`.`sid` AS `sid`,`student`.`sname` AS `sname` from
`student` | utf8mb3              | utf8mb3_general_ci   |
+------+------------------------------------------------------------------------
-----------------------------------------------------------------------+--------------
-------+--------------------+
1 row in set (0.000 sec)
```

MariaDB [dbassn2]> create view address1 as select sname , saddress
from student where saddress='pune';
Query OK, 0 rows affected (0.011 sec)

MariaDB [dbassn2]> insert into name values(4 , 'DDD');
Query OK, 1 row affected (0.005 sec)

MariaDB [dbassn2]> select * from name;
```
+------+-------+
| sid  | sname |
+------+-------+
|    1 | AAA   |
|    2 | BBB   |
|    3 | CCC   |
|    4 | DDD   |
+------+-------+
```
4 rows in set (0.000 sec)

MariaDB [dbassn2]> select * from student;
```
+------+-------+----------+
| sid  | sname | saddress |
+------+-------+----------+
|    1 | AAA   | pune     |
|    2 | BBB   | mumbai   |
|    3 | CCC   | Nashik   |
```

```
|      4 | DDD   | NULL      |
+------+-------+----------+
4 rows in set (0.000 sec)

MariaDB [dbassn2]> update address set sname='EEE' where saddress
= 'mumbai';
Query OK, 1 row affected (0.006 sec)
Rows matched: 1  Changed: 1  Warnings: 0

MariaDB [dbassn2]> select * from student;
+------+-------+----------+
| sid  | sname | saddress |
+------+-------+----------+
|      1 | AAA   | pune     |
|      2 | EEE   | mumbai   |
|      3 | CCC   | Nashik   |
|      4 | DDD   | NULL     |
+------+-------+----------+
4 rows in set (0.000 sec)

MariaDB [dbassn2]> select * from address;
+-------+----------+
| sname | saddress |
+-------+----------+
| AAA   | pune     |
| EEE   | mumbai   |
| CCC   | Nashik   |
| DDD   | NULL     |
+-------+----------+
4 rows in set (0.000 sec)

MariaDB [dbassn2]> delete from name where sid=1;
Query OK, 1 row affected (0.004 sec)

MariaDB [dbassn2]> select * from student;
+------+-------+----------+
| sid  | sname | saddress |
```

```
+------+-------+----------+
|    2 | EEE   | mumbai   |
|    3 | CCC   | Nashik   |
|    4 | DDD   | NULL     |
+------+-------+----------+
3 rows in set (0.000 sec)
```

MariaDB [dbassn2]> select * from name;

```
+------+-------+
| sid  | sname |
+------+-------+
|    2 | EEE   |
|    3 | CCC   |
|    4 | DDD   |
+------+-------+
3 rows in set (0.000 sec)
```

MariaDB [dbassn2]> truncate name;
ERROR 1146 (42S02): Table 'dbassn2.name' doesn't exist
MariaDB [dbassn2]> drop view address;
Query OK, 0 rows affected (0.012 sec)

MariaDB [dbassn2]> show tables;

```
+-------------------+
| Tables_in_dbassn2 |
+-------------------+
| address1          |
| name              |
| student           |
+-------------------+
3 rows in set (0.000 sec)
```

MariaDB [dbassn2]> rename table name to id;
Query OK, 0 rows affected (0.013 sec)

MariaDB [dbassn2]> show tables;

```
+-------------------+
```

```
| Tables_in_dbassn2 |
+-------------------+
| address1          |
| id                |
| student           |
+-------------------+
3 rows in set (0.000 sec)

MariaDB [dbassn2]> create or replace view name as select sid ,
saddress from student;
Query OK, 0 rows affected (0.012 sec)

MariaDB [dbassn2]> select * from name;
+------+----------+
| sid  | saddress |
+------+----------+
|    2 | mumbai   |
|    3 | Nashik   |
|    4 | NULL     |
+------+----------+
3 rows in set (0.000 sec)

MariaDB [dbassn2]> alter table id add sage int ;
ERROR 1347 (HY000): 'dbassn2.id' is not of type 'BASE TABLE'
MariaDB [dbassn2]> alter table id drop sid;
ERROR 1347 (HY000): 'dbassn2.id' is not of type 'BASE TABLE'
MariaDB [dbassn2]> alter table id modify sname char(30);
ERROR 1347 (HY000): 'dbassn2.id' is not of type 'BASE TABLE'
MariaDB [dbassn2]> alter table id change sname s_name char(30);
ERROR 1347 (HY000): 'dbassn2.id' is not of type 'BASE TABLE'
MariaDB [dbassn2]> show tables;
+-------------------+
| Tables_in_dbassn2 |
+-------------------+
| address1          |
| id                |
| name              |
```

```
| student           |
+-------------------+
4 rows in set (0.000 sec)

MariaDB [dbassn2]> select * from name;
+------+----------+
| sid  | saddress |
+------+----------+
|    2 | mumbai   |
|    3 | Nashik   |
|    4 | NULL     |
+------+----------+
3 rows in set (0.000 sec)

MariaDB [dbassn2]> select * from student;
+------+-------+----------+
| sid  | sname | saddress |
+------+-------+----------+
|    2 | EEE   | mumbai   |
|    3 | CCC   | Nashik   |
|    4 | DDD   | NULL     |
+------+-------+----------+
3 rows in set (0.000 sec)

MariaDB [dbassn2]> insert into course values(111 , 'DBMS' , 2),(222 ,
'DSA' , 4);
ERROR 1146 (42S02): Table 'dbassn2.course' doesn't exist
MariaDB [dbassn2]> create table course(cid int , ename char(30) , sid
int);
Query OK, 0 rows affected (0.021 sec)

MariaDB [dbassn2]> insert into course values(111 , 'DBMS' , 2),(222 ,
'DSA' , 4);
Query OK, 2 rows affected (0.004 sec)
Records: 2  Duplicates: 0  Warnings: 0

MariaDB [dbassn2]> select * from course;
```

```
+------+-------+------+
| cid  | ename | sid  |
+------+-------+------+
|  111 | DBMS  |   2 |
|  222 | DSA   |   4 |
+------+-------+------+
2 rows in set (0.000 sec)

MariaDB [dbassn2]> create view v5 as select student,sid , sname , cid ,
ename from student , course ;
ERROR 1054 (42S22): Unknown column 'student' in 'field list'
MariaDB [dbassn2]> create view v5 as select student.sid , sname , cid ,
ename from student , course ;
Query OK, 0 rows affected (0.013 sec)

MariaDB [dbassn2]> select * from v5;
+------+-------+------+-------+
| sid  | sname | cid  | ename |
+------+-------+------+-------+
|    2 | EEE   |  111 | DBMS  |
|    2 | EEE   |  222 | DSA   |
|    3 | CCC   |  111 | DBMS  |
|    3 | CCC   |  222 | DSA   |
|    4 | DDD   |  111 | DBMS  |
|    4 | DDD   |  222 | DSA   |
+------+-------+------+-------+
6 rows in set (0.000 sec)

MariaDB [dbassn2]> create view v6 as select s.sid , s.sname , c.cid ,
c.ename from student as s , course as c ;
Query OK, 0 rows affected (0.013 sec)

MariaDB [dbassn2]> select * from v6;
+------+-------+------+-------+
| sid  | sname | cid  | ename |
+------+-------+------+-------+
|    2 | EEE   |  111 | DBMS  |
```

```
|      2 | EEE  |  222 | DSA  |
|      3 | CCC  |  111 | DBMS |
|      3 | CCC  |  222 | DSA  |
|      4 | DDD  |  111 | DBMS |
|      4 | DDD  |  222 | DSA  |
+------+-------+------+-------+
6 rows in set (0.000 sec)
```

Screenshots:

```
MariaDB [dbassn2]> insert into student values(1 , 'AAA' , 'pune');
Query OK, 1 row affected (0.038 sec)

MariaDB [dbassn2]> insert into student values(2 , 'BBB' , 'mumbai'),(3 , 'CCC' , 'Nashik');
Query OK, 2 rows affected (0.005 sec)
Records: 2  Duplicates: 0  Warnings: 0

MariaDB [dbassn2]> select * from student;
+------+-------+----------+
| sid  | sname | saddress |
+------+-------+----------+
|    1 | AAA   | pune     |
|    2 | BBB   | mumbai   |
|    3 | CCC   | Nashik   |
+------+-------+----------+
3 rows in set (0.000 sec)

MariaDB [dbassn2]> create view name as select sid , sname from student;
Query OK, 0 rows affected (0.012 sec)

MariaDB [dbassn2]> show tables;
+-------------------+
| Tables_in_dbassn2 |
+-------------------+
| name              |
| student           |
+-------------------+
2 rows in set (0.000 sec)

MariaDB [dbassn2]> create view address as select sname , saddress from student;
Query OK, 0 rows affected (0.013 sec)

MariaDB [dbassn2]> show tables;
+-------------------+
| Tables_in_dbassn2 |
+-------------------+
| address           |
| name              |
| student           |
+-------------------+
3 rows in set (0.000 sec)

MariaDB [dbassn2]> desc name;
+-------+-----------+------+-----+---------+-------+
| Field | Type      | Null | Key | Default | Extra |
+-------+-----------+------+-----+---------+-------+
| sid   | int(11)   | YES  |     | NULL    |       |
| sname | char(100) | YES  |     | NULL    |       |
+-------+-----------+------+-----+---------+-------+
2 rows in set (0.001 sec)
```

```
3 rows in set (0.000 sec)

MariaDB [dbassn2]> insert into course values(111 , 'DBMS' , 2),(222 , 'DSA' , 4);
ERROR 1146 (42S02): Table 'dbassn2.course' doesn't exist
MariaDB [dbassn2]> create table course(cid int , ename char(30) , sid int);
Query OK, 0 rows affected (0.021 sec)

MariaDB [dbassn2]> insert into course values(111 , 'DBMS' , 2),(222 , 'DSA' , 4);
Query OK, 2 rows affected (0.004 sec)
Records: 2  Duplicates: 0  Warnings: 0

MariaDB [dbassn2]> select * from course;
+------+-------+------+
| cid  | ename | sid  |
+------+-------+------+
|  111 | DBMS  |    2 |
|  222 | DSA   |    4 |
+------+-------+------+
2 rows in set (0.000 sec)

MariaDB [dbassn2]> create view v5 as select student,sid , sname , cid , ename from student , course ;
ERROR 1054 (42S22): Unknown column 'student' in 'field list'
MariaDB [dbassn2]> create view v5 as select student.sid , sname , cid , ename from student , course ;
Query OK, 0 rows affected (0.013 sec)

MariaDB [dbassn2]> select * from v5;
+------+-------+------+-------+
| sid  | sname | cid  | ename |
+------+-------+------+-------+
|    2 | EEE   |  111 | DBMS  |
|    2 | EEE   |  222 | DSA   |
|    3 | CCC   |  111 | DBMS  |
|    3 | CCC   |  222 | DSA   |
|    4 | DDD   |  111 | DBMS  |
|    4 | DDD   |  222 | DSA   |
+------+-------+------+-------+
6 rows in set (0.000 sec)

MariaDB [dbassn2]> create view v6 as select s.sid , s.sname , c.cid , c.ename from student as s , course as c ;
Query OK, 0 rows affected (0.013 sec)

MariaDB [dbassn2]> select * from v6;
+------+-------+------+-------+
| sid  | sname | cid  | ename |
+------+-------+------+-------+
|    2 | EEE   |  111 | DBMS  |
|    2 | EEE   |  222 | DSA   |
|    3 | CCC   |  111 | DBMS  |
|    3 | CCC   |  222 | DSA   |
|    4 | DDD   |  111 | DBMS  |
|    4 | DDD   |  222 | DSA   |
```