

National University of Computer and Emerging Sciences



Lab Manual 5.2

“Views”

Database Systems

Spring 2022

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1 Views

In previous lab manuals you learned how to write select query to retrieve data. While some select queries you write might be used only for one time activity, some select queries are used again and again within your application/environment. Some of these queries that you reuse within your environment contain complex logic, and you would not want to rewrite them every time you use them. SQL server allows you to store a SELECT statement within a database using an object called a view. In this section you will learn how to CREATE a view, modify data through a view, how to ALTER a view, and how to use a view.

We will use the Student schema for all the examples (given in last lab)

| | | | | |
|----------------------|--------------|-----------------------|-------------------|--------------|
| Students | StudentID | StudentName | StudentBatch | CGPA |
| | 1 | Ali | 2013 | 2.625 |
| | 2 | Aysha | 2013 | 4 |
| | 3 | Ahmed | 2013 | 2.2 |
| | 4 | Bilal | 2012 | 2.5 |
| | 5 | Zafar | 2012 | 3.5 |
| Instructors | InstructorID | InstructorsName | | |
| | 1 | Zafar | | |
| | 2 | Sadia | | |
| | 3 | Saima | | |
| Courses | CourseID | CourseName | CourseCreditHours | InstructorID |
| | 1 | Computer Programming | 3 | 1 |
| | 2 | Computer Organization | 3 | 2 |
| | 3 | Computer Programmi... | 1 | NULL |
| | 4 | Database | 3 | 2 |
| | 5 | Database Lab | 1 | 1 |
| Registrations | StudentID | CourseID | GPA | |
| | 1 | 1 | 3 | |
| | 1 | 3 | 3 | |
| | 1 | 4 | 2 | |
| | 1 | 5 | 3 | |
| | 2 | 1 | 2.5 | |
| | 2 | 2 | 0 | |
| | 2 | 4 | 3 | |

1.1 Create a View

View is simple a select statement that has been given a name and stored in dataset. View is also called a virtual table, because there is no data in the view itself, it's just a select query that get data from base tables

`create View <ViewName>`

`AS`

`<Select Query>`

When you execute a create view statement you should get command successful notification, just like when you created a table.

TRY IT

```
--CREATE A VIEW THAT GIVE NAMES OF ALL THE STUDENTS WITH GPA=3 IN ANY SUBJECT
Create View [3GPASStudents]
AS
Select S.StudentName
from Students S inner join Registration R on S.StudentID=R.StudentID
where R.GPA=3
```

Here the base tables are Student and Registration

TRY THIS

```
--Create a view to given Student Name, Roll Number and His CGPA (calculate CGPA using Aggregation)
Create View StudentCGPA
as
Select S.StudentName,S.StudentID , SUM(C.CourseCreditHours* R.GPA) / SUM(C.CourseCreditHours) AS [CGPA]
From Students S inner join Registration R on R.StudentID=S.StudentID
inner join Courses C on C.CourseID=R.CourseID
Group by S.StudentName,S.StudentID
go
```

Messages

Command(s) completed successfully.

Here the base tables are Students, Registration and Courses.

****NOTE: EVERY COLUMN RETURNED BY SELECT QUERY OF VIEW SHOULD HAVE UNIQUE NAME, DERIVED COLUMNS SHOULD BE GIVEN ALIAS. COLUMNS WITH SAME NAMES SHOULD ALSO BE GIVEN DISTINCT ALIAS**

1.2 Use a View

As already told view are virtual tables. You can use them as regular tables in SELECT statement.

TRY IT

```
select * from StudentCGPA
```

| Results Messages | | |
|------------------|-----------|------------------|
| StudentName | StudentID | CGPA |
| Ali | 1 | 2.625 |
| Aysha | 2 | 1.83333333333333 |

****NOTE:** this data was not present in StudentCGPA view, rather when you select a view, the Select query in body of view is executed and result is returned.

Similarly you can join views with tables of views, you can take aggregates of view.

TRY IT

```
--Give total number of students with CGPA >2  
select COUNT(*) from StudentCGPA  
where CGPA>2  
|
```

| Results Messages | |
|------------------|--|
| (No column name) | |
| 1 | |

1.3 Alter a View

You can change the select query of your view by using following syntax

Alter View <ViewName>

AS

<Select Query>

TRY IT

```
--Change you [3GPASStudents] view, now it should given student name and subject name in which student got 3 GPA
ALTER View [3GPASStudents]
AS
Select S.StudentName, C.CourseName
from Students S inner join Registration R on S.StudentID=R.StudentID
inner join Courses C on C.CourseID=R.CourseID
where R.GPA=3
```

Messages

Command(s) completed successfully.

Now retrived the data from view

```
select * from [3GPASStudents]
```

| Results | | Messages |
|-------------|--------------------------|----------|
| StudentName | CourseName | |
| Ali | Computer Programming | |
| Ali | Computer Programming Lab | |
| Ali | Database Lab | |
| Aysha | Database | |

1.4 Insert Update Delete Data Through View

As view is a virtual table and has no data of its own, if you run delete insert or update query on view, the data in base table will change (if the change is feasible and is not violating any constraint). If the select query in View has joins and aggregates then delete insert or update would not work.

Read Elmasri Chapter 5 for more details.

TRY IT

```
Create View Students2013Batch
AS
Select *
From Students
where StudentBatch=2013
go

insert into Students2013Batch
Values (12, 'xyz', 2014, 3)
go

Select * from students
select * from Students2013Batch
go
```

| Results | | | |
|-----------|-------------|--------------|-------|
| Messages | | | |
| StudentID | StudentName | StudentBatch | CGPA |
| 1 | Ali | 2013 | 2.625 |
| 2 | Aysha | 2013 | 4 |
| 3 | Ahmed | 2013 | 2.2 |
| 4 | Bilal | 2012 | 2.5 |
| 5 | Zafar | 2012 | 3.5 |
| 12 | xyz | 2014 | 3 |

| StudentID | StudentName | StudentBatch | CGPA |
|-----------|-------------|--------------|-------|
| 1 | Ali | 2013 | 2.625 |
| 2 | Aysha | 2013 | 4 |
| 3 | Ahmed | 2013 | 2.2 |

1.5 With Check Option

With check option ensures that the only data manipulation that can occur through view also must be retrievable through that view.

In previous example the XYZ student we added through the view, was not retrievable through view. If we add with check option that insertion would not have been possible through view.

TRY IT

```
Create View Students2014Batch
AS
Select *
From Students
where StudentBatch=2014
with check option
go

insert into Students2014Batch
Values (13, 'ABC', 2014, 3)
go

Select * from students
select * from Students2014Batch
go
```

| Results | | | |
|-----------|-------------|--------------|-------|
| StudentID | StudentName | StudentBatch | CGPA |
| 1 | Ali | 2013 | 2.625 |
| 2 | Aysha | 2013 | 4 |
| 3 | Ahmed | 2013 | 2.2 |
| 4 | Bilal | 2012 | 2.5 |
| 5 | Zafar | 2012 | 3.5 |
| 12 | xyz | 2014 | 3 |
| 13 | ABC | 2014 | 3 |

| StudentID | StudentName | StudentBatch | CGPA |
|-----------|-------------|--------------|------|
| 12 | xyz | 2014 | 3 |
| 13 | ABC | 2014 | 3 |

Now try adding a row that through Student2014Batch that will not be retrievable through it

TRY IT

```
insert into Students2014Batch
Values (15, 'ABC', 2013, 3)
go
```

Msg 550, Level 16, State 1, Line 1
The attempted insert or update failed because the target view either specifies WITH CHECK OPTION or spans a view that specifies WITH CHECK OPTION and the statement has been terminated.