National University of Computer and Emerging Sciences

Lab Manual 5.2

"Views"

Database Systems

Spring 2024

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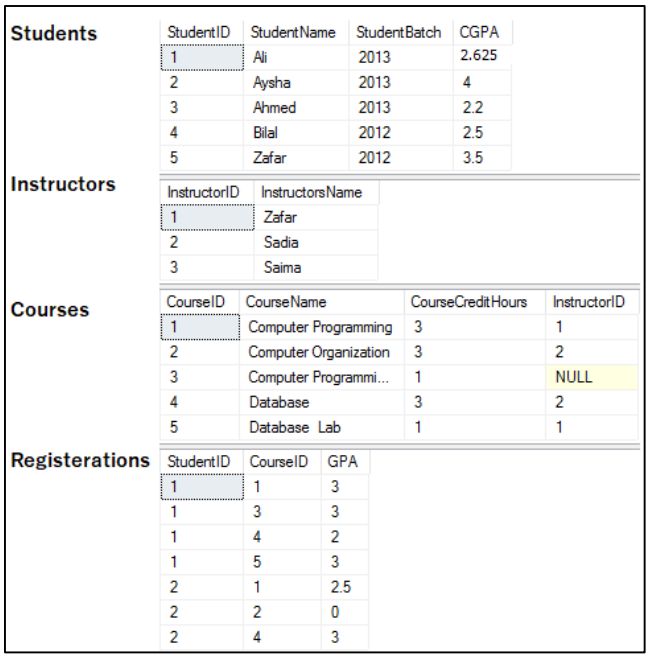
1 Views

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 as 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

Registerations

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 excute 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 [3GPAStudents]
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 (calcualte 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
ommand(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 [3GPAStudents] view, now it should given student name and subject name in which student got 3 GPA
ALTER View [3GPAStudents]
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
ommand(s) completed successfully.
```

Now retrived the data from view

```
select * from  [3GPAStudents]
```

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 though that view.

In previous example the XYZ student we added though the view, was not retrievable thought view. If we add with check option that insertion would not have been possible though 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 | 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
13	ABC	2014	3

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

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

TRY IT

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

Messages

```
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 an
The statement has been terminated.
```