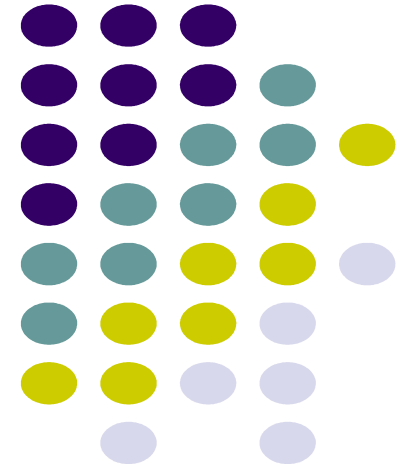
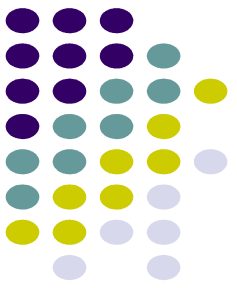




# Views in SQL

CS345

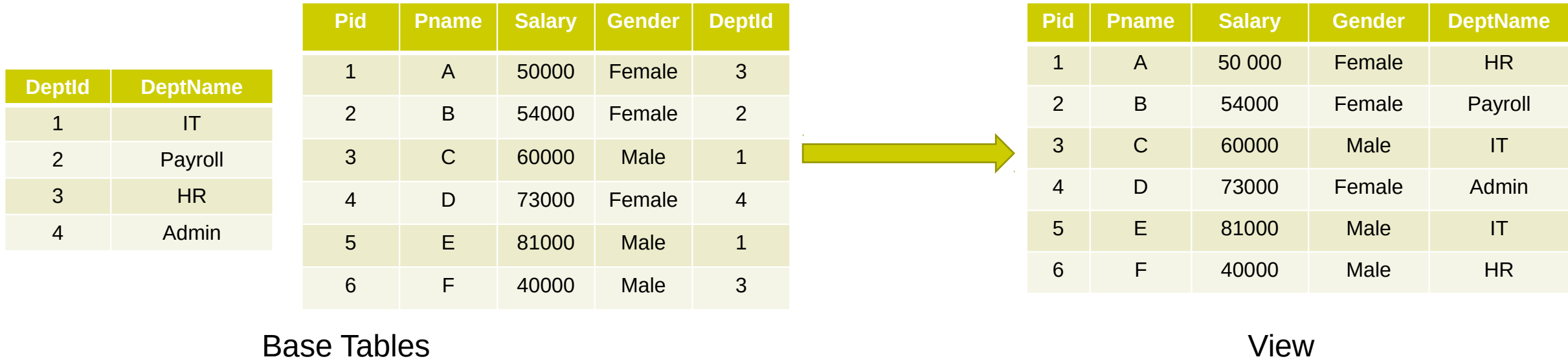
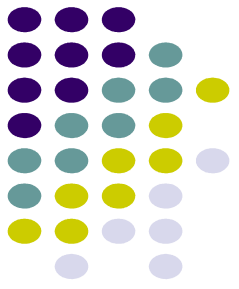




# What is a View?

- A View is a virtual table based on the result-set of an SQL statement.
- It can also be considered as a saved SQL query.

# Views in SQL

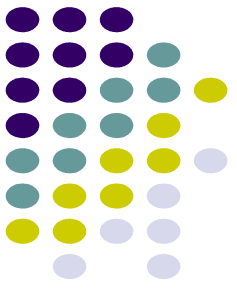


select Pid, Name, Salary, Gender, DeptName  
from Employees natural join Department;

create view v1

as  
select Pid, Name, Salary, Gender, DeptName  
from Employees natural join Department;

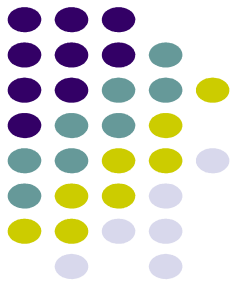
# Alter or Drop a View



- Alter: ALTER VIEW <statement>;
- Drop: DROP VIEW <view\_name>;



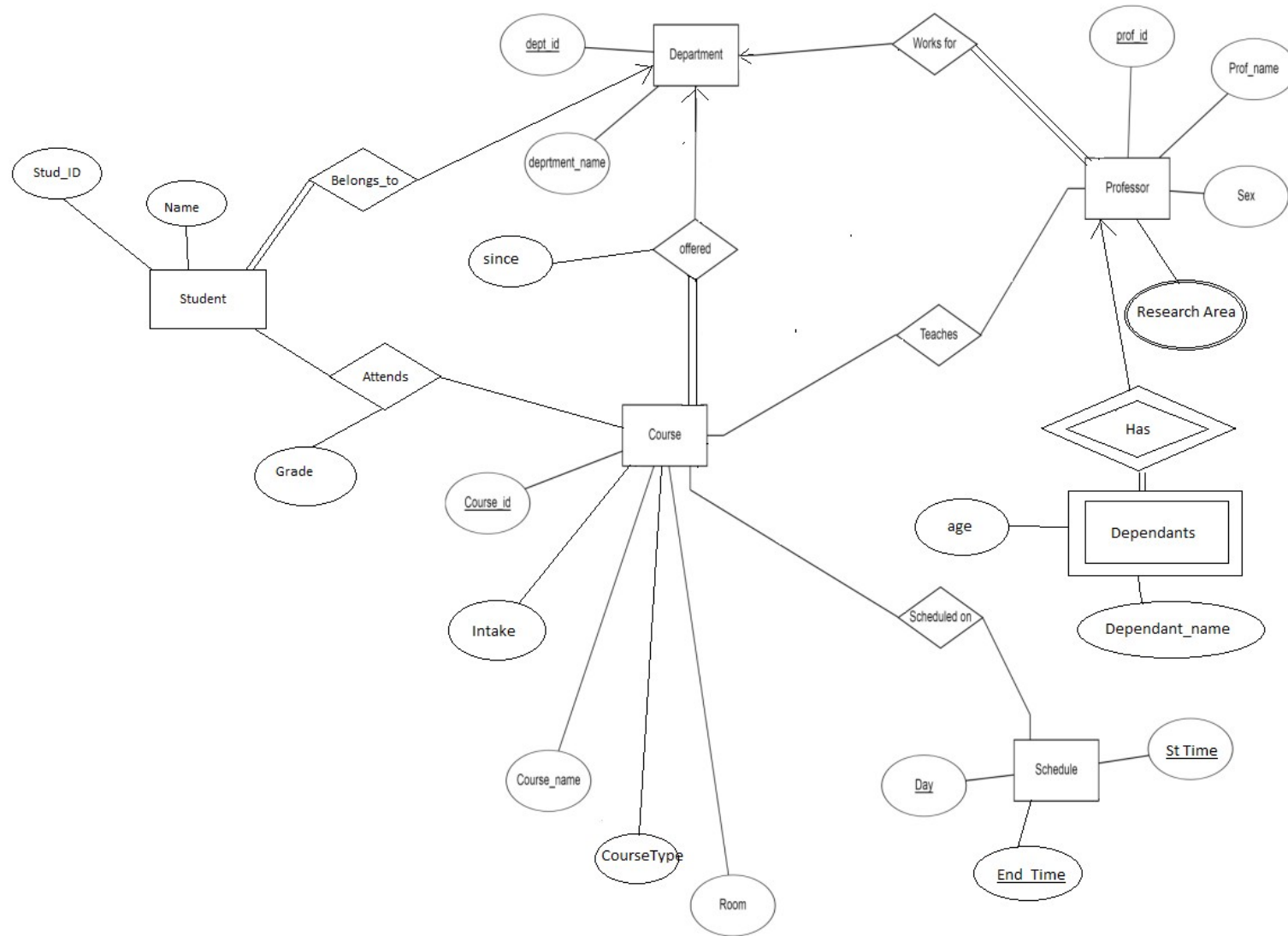
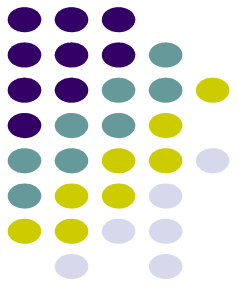
# Advantages of Views

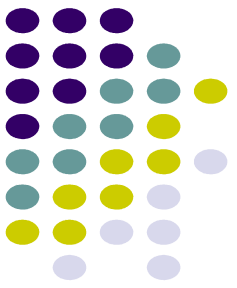


- Views can be used to reduce the complexity of the database schema



# Views can model complex joins easily



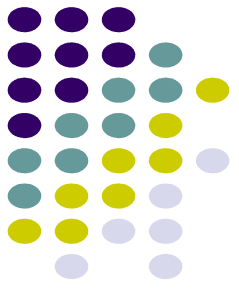


# Advantages of Views

- Views can be used to reduce the complexity of the database schema
- Views can be used as a mechanism to implement row and column level security



# Row-level security



DeptId	DeptName
1	IT
2	Payroll
3	HR
4	Admin

Pid	Pname	Salary	Gender	DeptId
1	A	50 000	Female	3
2	B	54000	Female	2
3	C	60000	Male	1
4	D	73000	Female	4
5	E	81000	Male	1
6	F	40000	Male	3

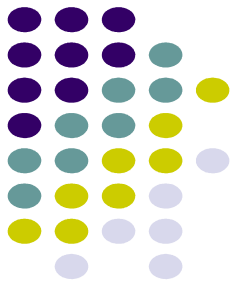


Pid	Pname	Salary	Gender	DeptName
3	C	60000	Male	IT
5	E	81000	Male	IT

```
create view v2
as
select Pid, Name, Salary, Gender, DeptName
from Employees natural join Department
where DeptName='IT';
```



# Column-level security



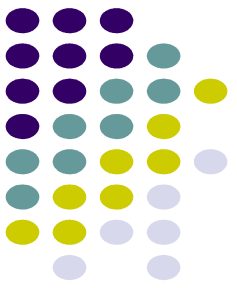
DeptId	DeptName
1	IT
2	Payroll
3	HR
4	Admin

Pid	Pname	Salary	Gender	DeptId
1	A	50000	Female	3
2	B	54000	Female	2
3	C	60000	Male	1
4	D	73000	Female	4
5	E	81000	Male	1
6	F	40000	Male	3



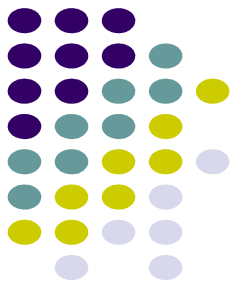
Pid	Pname	Gender	DeptName
1	A	Female	HR
2	B	Female	Payroll
3	C	Male	IT
4	D	Female	Admin
5	E	Male	IT
6	F	Male	HR

create view v3  
as  
select Pid, Name, Gender, DeptName  
from Employees natural join Department;



# Advantages of Views

- Views can be used to reduce the complexity of the database schema
- Views can be used as a mechanism to implement row and column level security
- Views can be used to present aggregated data and hide detailed data, in this way it provides abstraction over tables



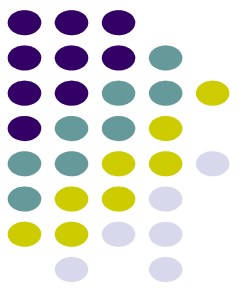
# Views with Aggregate Functions

DeptId	DeptName
1	IT
2	Payroll
3	HR
4	Admin

Pid	Pname	Salary	Gender	DeptId
1	A	50000	Female	3
2	B	54000	Female	2
3	C	60000	Male	1
4	D	73000	Female	4
5	E	81000	Male	1
6	F	40000	Male	3

DeptName	TotalEmp
Admin	1
HR	2
IT	2
Payroll	1

```
create view v4
as
select DeptName, COUNT(Pid) as TotalEmp
from Employees natural join Department
group by DeptName;
```



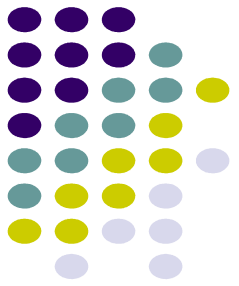
# Advantages of Views

- Views can be used to reduce the complexity of the database schema
- Views can be used as a mechanism to implement row and column level security
- Views can be used to present aggregated data and hide detailed data, in this way it provides abstraction over tables.

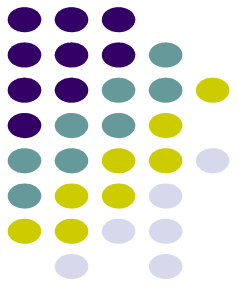


# Updateable Views

- Update values in Views
- Delete rows from Views
- Insert rows into Views



# Update Views



Pid	Pname	Gender	DeptId
1	A	Female	3
2	B	Female	2
3	C	Male	1
4	D	Female	4
5	E	Male	1
6	F	Male	3

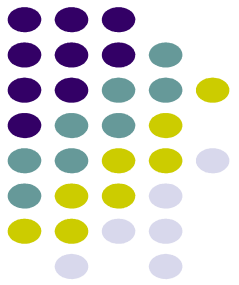


Pid	Pname	Gender	DeptId
1	A	Female	3
2	G	Female	2
3	C	Male	1
4	D	Female	4
5	E	Male	1
6	F	Male	3

```
create view view_except_salary
as
select Pid, Name, Gender, DeptId
from Employees;
```

```
update view_except_salary
set Pname='G' where Pid=2;
```

# Delete from Views



Pid	Pname	Gender	DeptId
1	A	Female	3
2	B	Female	2
3	C	Male	1
4	D	Female	4
5	E	Male	1
6	F	Male	3

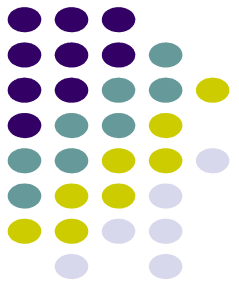


Pid	Pname	Gender	DeptId
1	A	Female	3
3	C	Male	1
4	D	Female	4
5	E	Male	1
6	F	Male	3

```
create view view_except_salary  
as  
select Pid, Name, Gender, DeptId  
from Employees;
```

```
Delete from view_except_salary  
where Pid=2;
```

# Insert into Views



Pid	Pname	Gender	DeptId
1	A	Female	3
2	B	Female	2
3	C	Male	1
4	D	Female	4
5	E	Male	1
6	F	Male	3



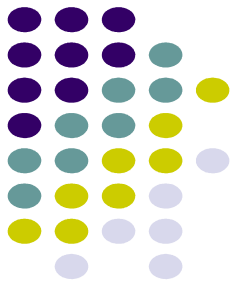
Pid	Pname	Gender	DeptId
1	A	Female	3
2	B	Female	2
3	C	Male	1
4	D	Female	4
5	E	Male	1
6	F	Male	3
7	G	Female	4

```
create view view_except_salary  
as  
select Pid, Name, Gender, DeptId  
from Employees;
```

Insert into view\_except\_salary  
values (7, 'G', 'Female', 4);



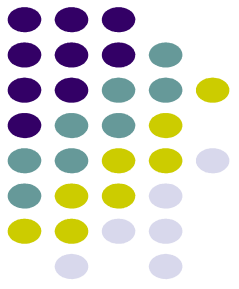
# Restrictions on Updateable Views



- A view is not a table and contains no data hence, the actual modification always takes place at the table level.
- Views cannot be used as a mechanism to override any constraints, rules, or referential integrity defined in the base tables.



# Update Views



Pid	Pname	Gender	DeptName
1	A	Female	HR
2	B	Female	Payroll
3	C	Male	IT
4	D	Female	Admin
5	E	Male	IT
6	F	Male	HR



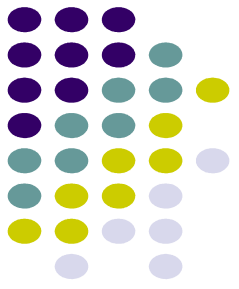
Pid	Pname	Gender	DeptName
1	A	Female	IT
2	B	Female	Payroll
3	C	Male	IT
4	D	Female	Admin
5	E	Male	IT
6	F	Male	IT

```
create view v3
as
select Pid, Name, Gender, DeptName
from Employees natural join Department;
```

```
update v3
set DeptName='IT' where Pname='A';
```



# Update Views



DeptId	DeptName
1	IT
2	Payroll
3	HR
4	Admin

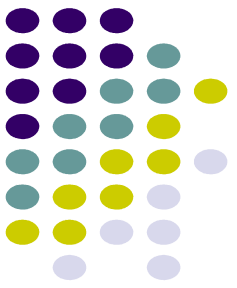
Pid	Pname	Salary	Gender	DeptId
1	A	50000	Female	3
2	B	54000	Female	2
3	C	60000	Male	1
4	D	73000	Female	4
5	E	81000	Male	1
6	F	40000	Male	3



DeptId	DeptName
1	IT
2	Payroll
3	IT
4	Admin

Pid	Pname	Salary	Gender	DeptId
1	A	50000	Female	3
2	B	54000	Female	2
3	C	60000	Male	1
4	D	73000	Female	4
5	E	81000	Male	1
6	F	40000	Male	3

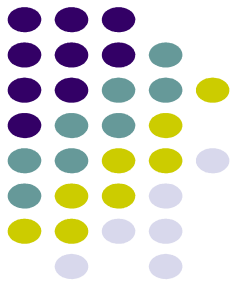
update v3  
set DeptName='IT' where Pname='A';



# Restrictions on Updateable Views

- Aggregate functions like SUM(), COUNT(), MAX() and MIN() cannot be used while updating a view.
- DISTINCT, GROUP BY, HAVING, UNION, UNION ALL or a sub-query in the select list also cannot be used while updating a view.

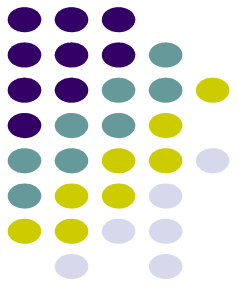
# With Check Option



- Forces all data modification statements executed against the view to follow a certain criteria set.
- When a row is modified through a view, the WITH CHECK OPTION makes sure the data remains visible through the view after the modification is committed.



# With Check Option



```
CREATE VIEW vwCustomersParis  
AS  
SELECT CompanyName, ContactName, Phone, City  
FROM Customers  
WHERE City = 'Paris'  
WITH CHECK OPTION;
```

```
UPDATE vwCustomersParis SET City = 'Delhi'
```

