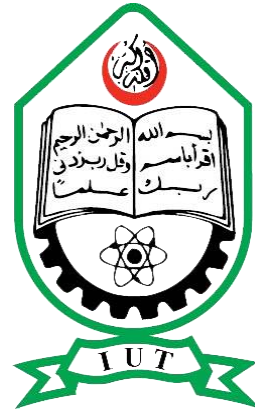


CSE 4308

Database Management Systems Lab

Lab 08

“Cascading Delete”, “Views” and “Roles”



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Cascading Delete

A foreign key with cascade delete means that if a record in the parent table is deleted, then the corresponding records in the child table will automatically be deleted.

Phone_Number

Customer

Foreign key referencing Cust_ID

<u>Phone_No</u>	Opened	Outgoing	Customer
02134	12-06-2018	50,000	2
05468	21-01-2010	12,500	1
05698	01-12-2019	25,520	3
01234	22-04-2014	6,120	4

<u>Cust_ID</u>	Name	Age	Gender	Occu.
1	A	123	M	Doctor
2	B	213	F	Teacher
3	C	321	O	Engineer
4	D	221	M	-----

Cascading Delete Syntax

--General Syntax

CREATE TABLE TABLE_NAME

(... .. ,

... .. ,

CONSTRAINT constraint_name FOREIGN KEY(...) REFERENCES REFERENCED_TABLE(...) ON DELETE CASCADE

);

CONNECT Owner/test123;

CREATE TABLE CUSTOMER

(

Cust_ID INT,

Name VARCHAR2(20),

Age INT,

Gender VARCHAR2(1),

Occupation VARCHAR2(10),

CONSTRAINT customer_pk PRIMARY KEY(Cust_ID)

);

CREATE TABLE PHONE_NUMBER

(

Phone_No INT,

Opened DATE,

Outgoing NUMBER(10,5),

Customer INT,

CONSTRAINT phone_number_pk PRIMARY KEY(Phone_No),

CONSTRAINT phone_number_fk1 FOREIGN KEY(Customer) REFERENCES CUSTOMER(Cust_ID) ON DELETE CASCADE

);

Cascading Delete Demonstration

The CUSTOMER Table

```
SQL> CREATE TABLE CUSTOMER
2  (
3  Cust_ID INT,
4  Name VARCHAR2(20),
5  Age INT,
6  Gender VARCHAR2(1),
7  Occupation VARCHAR2(10),
8  CONSTRAINT customer_pk PRIMARY KEY(Cust_ID)
9  );
```

Table created.

```
SQL> INSERT INTO CUSTOMER VALUES(1,'A',25,'M','Doctor');
```

1 row created.

```
SQL> INSERT INTO CUSTOMER VALUES(2,'B',30,'F','Teacher');
```

1 row created.

```
SQL> INSERT INTO CUSTOMER VALUES(3,'C',35,'0','Engineer');
```

1 row created.

```
SQL> INSERT INTO CUSTOMER VALUES(4,'D',18,'M',NULL);
```

1 row created.

Cascading Delete Demonstration

The PHONE_NUMBER Table

```
SQL> CREATE TABLE PHONE_NUMBER
2  (
3  Phone_No INT,
4  Opened DATE,
5  Outgoing NUMBER(10,5),
6  Customer INT,
7  CONSTRAINT phone_number_pk PRIMARY KEY(Phone_No),
8  CONSTRAINT phone_number_fk1 FOREIGN KEY(Customer) REFERENCES CUSTOMER(Cust_ID) ON DELETE CASCADE
9  );
```

Table created.

```
SQL> INSERT INTO PHONE_NUMBER VALUES(2134,TO_DATE( '12_Jun_2018' , 'DD_MON_YYYY' ),50000,2);
```

1 row created.

```
SQL> INSERT INTO PHONE_NUMBER VALUES(5468,TO_DATE( '21_Jan_2010' , 'DD_MON_YYYY' ),12500,1);
```

1 row created.

```
SQL> INSERT INTO PHONE_NUMBER VALUES(5698,TO_DATE( '01_Dec_2019' , 'DD_MON_YYYY' ),25520,3);
```

1 row created.

```
SQL> INSERT INTO PHONE_NUMBER VALUES(1234,TO_DATE( '22_Apr_2014' , 'DD_MON_YYYY' ),6120,4);
```

1 row created.

Final Outcome

```
SQL> SELECT * FROM CUSTOMER;
```

CUST_ID	NAME	AGE	G	OCCUPATION
1	A	25	M	Doctor
2	B	30	F	Teacher
3	C	35	0	Engineer
4	D	18	M	

```
SQL> SELECT * FROM PHONE_NUMBER;
```

PHONE_NO	OPENED	OUTGOING	CUSTOMER
2134	12-JUN-18	50000	2
5468	21-JAN-10	12500	1
5698	01-DEC-19	25520	3
1234	22-APR-14	6120	4

```
SQL> DELETE FROM CUSTOMER WHERE CUST_ID=4;
```

```
1 row deleted.
```

```
SQL> SELECT * FROM CUSTOMER;
```

CUST_ID	NAME	AGE	G	OCCUPATION
1	A	25	M	Doctor
2	B	30	F	Teacher
3	C	35	0	Engineer

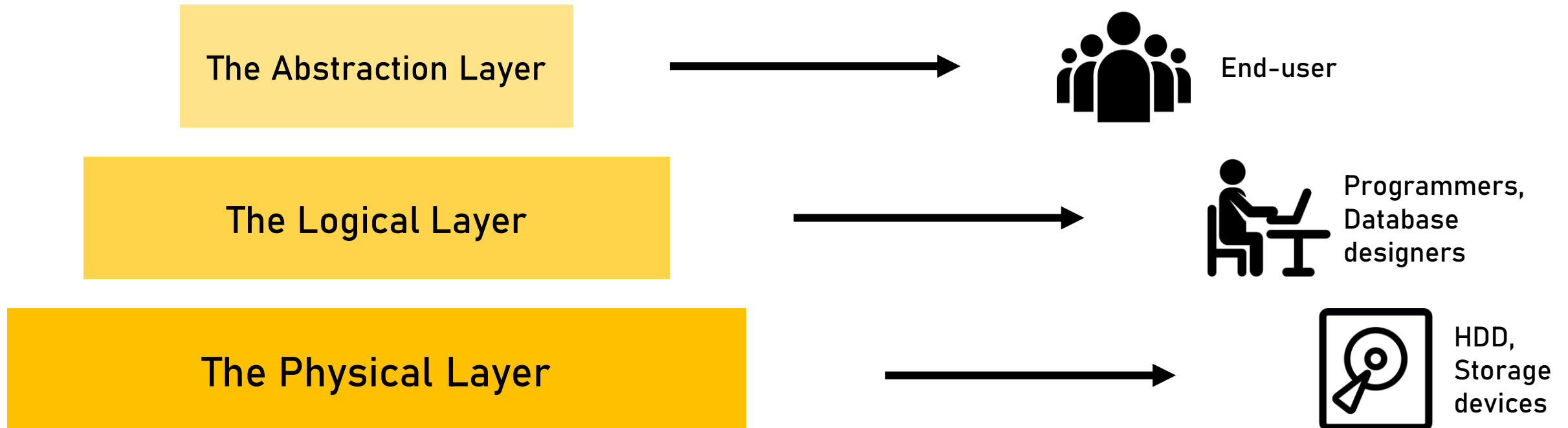
```
SQL> SELECT * FROM PHONE_NUMBER;
```

PHONE_NO	OPENED	OUTGOING	CUSTOMER
2134	12-JUN-18	50000	2
5468	21-JAN-10	12500	1
5698	01-DEC-19	25520	3

```
SQL>
```

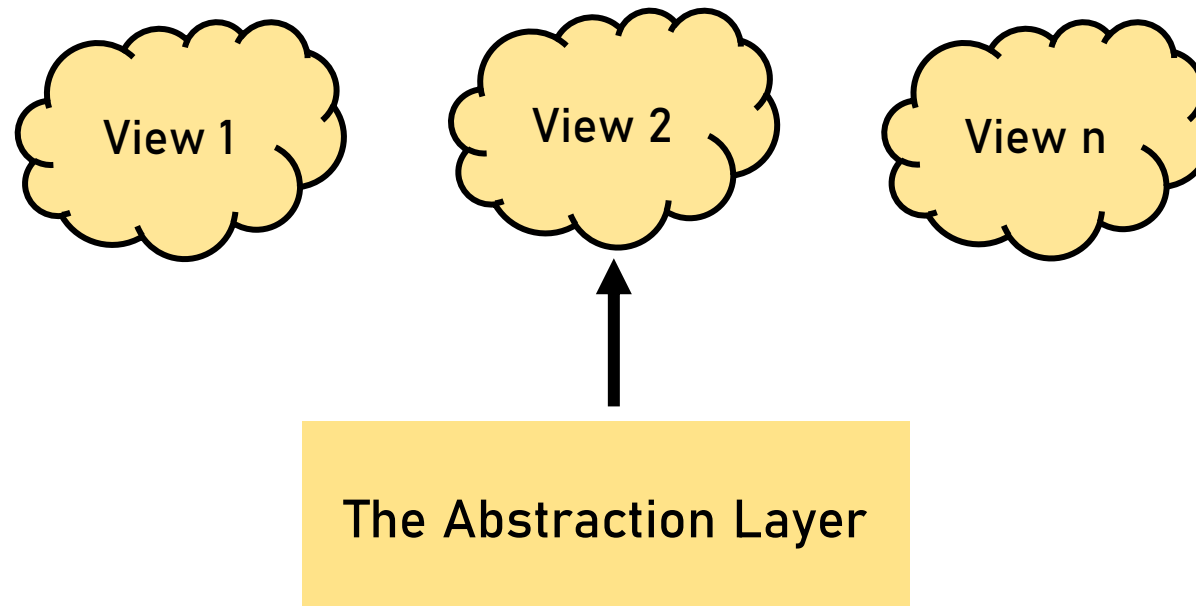
Views

- A virtual relation or table defined by a query, that essentially contains the results of the query.
- NOT precomputed and stored, rather, the view is computed by executing the query every time the view is used.



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- NOT precomputed and stored, rather, the view is computed by executing the query every time the view is used.



Views Syntax

Phone_Number

<u>Phone_No</u>	<u>Opened</u>	Outgoing	Customer
02134	12-06-2018	50,000	2
05468	21-01-2010	12,500	1
05698	01-12-2019	25,520	3
01234	22-04-2014	6,120	4

Customer

<u>Cust_ID</u>	<u>Name</u>	Age	<u>Gender</u>	<u>Occu.</u>
1	A	123	M	Doctor
2	B	213	F	Teacher
3	C	321	O	Engineer
4	D	221	M	-----

Views Syntax

--General Syntax for dropping a View

```
DROP VIEW VIEW_NAME;
```

--General Syntax for creating a View

```
CREATE OR REPLACE VIEW VIEW_NAME AS  
<query>
```

```
CREATE VIEW VIEW_NAME AS  
<query>
```

--Create a new view named CUSTOMER_INFO

```
CREATE OR REPLACE VIEW CUSTOMER_INFO AS  
SELECT Name, Gender, Occupation, Phone_No, Opened FROM CUSTOMER, PHONE_NUMBER  
WHERE PHONE_NUMBER.Customer = CUSTOMER.Cust_ID;
```

--Example query on views

```
SELECT NAME, OCCUPATION FROM CUSTOMER_INFO;
```

Views Demonstration

```
SQL> CREATE OR REPLACE VIEW CUSTOMER_INFO AS
 2  SELECT Name, Gender, Occupation, Phone_No, Opened FROM CUSTOMER, PHONE_NUMBER
 3  WHERE PHONE_NUMBER.Customer = CUSTOMER.Cust_ID;
```

View created.

```
SQL> SELECT * FROM CUSTOMER_INFO;
```

NAME	G	OCCUPATION	PHONE_NO	OPENED
B	F	Teacher	2134	12-JUN-18
A	M	Doctor	5468	21-JAN-10
C	0	Engineer	5698	01-DEC-19

```
SQL> SELECT NAME, OCCUPATION FROM CUSTOMER_INFO;
```

NAME	OCCUPATION
A	Doctor
B	Teacher
C	Engineer

```
SQL> UPDATE CUSTOMER
 2  SET NAME = 'X'
 3  WHERE CUST_ID = 1;
```

1 row updated.

```
SQL> SELECT * FROM CUSTOMER_INFO;
```

NAME	G	OCCUPATION	PHONE_NO	OPENED
B	F	Teacher	2134	12-JUN-18
X	M	Doctor	5468	21-JAN-10
C	0	Engineer	5698	01-DEC-19

```
SQL>
```

Role-Based Access Control

- Create roles
- Grant specific privileges to those roles
- Grant roles to other roles
- Grant roles to specific users

Requirements

1. Customers should be able to view their information.
2. An operator should be able to update customer information.

Phone_Number

<u>Phone_No</u>	Opened	Outgoing	Customer
02134	12-06-2018	50,000	2
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Customer

<u>Cust_ID</u>	Name	Age	Gender	Occu.
1	A	123	M	Doctor
2	B	213	F	Teacher
3	C	321	O	Engineer
4	D	221	M	-----

Role-based Access Control Syntax

--General Syntax for creating and deleting a role

```
CREATE ROLE ROLE_NAME;  
DROP ROLE ROLE_NAME;
```

--General Syntax for granting privileges on a specific table to a role

```
GRANT PRIVILEGE_NAME ON TABLE_NAME TO ROLE_NAME;
```

--General Syntax for granting a role to another role

```
GRANT ROLE_NAME_1 TO ROLE_NAME_2;
```

--Connect to the server as the owner of the whole database

```
CONNECT Owner/testPassword;
```

--Create an example customer and an example operator

```
CREATE USER EXAMPLE_CUSTOMER_1 IDENTIFIED BY PASSWORD;
```

```
CREATE USER OPERATOR_1 IDENTIFIED BY test123;
```

```
GRANT CREATE SESSION TO EXAMPLE_CUSTOMER_1;
```

```
GRANT CREATE SESSION TO OPERATOR_1;
```

--Create a read-only role and grant it permission to view the Customer table

```
CREATE ROLE ROLE_READ_ONLY_CUSTOMER;
```

```
GRANT SELECT ON CUSTOMER TO ROLE_READ_ONLY_CUSTOMER;
```

--Create a role that can modify Customer table information

```
CREATE ROLE ROLE_MODIFY_CUSTOMER;
```

```
GRANT ROLE_READ_ONLY_CUSTOMER TO ROLE_MODIFY_CUSTOMER;
```

```
GRANT INSERT ON CUSTOMER TO ROLE_MODIFY_CUSTOMER;
```

```
GRANT DELETE ON CUSTOMER TO ROLE_MODIFY_CUSTOMER;
```

```
GRANT UPDATE ON CUSTOMER TO ROLE_MODIFY_CUSTOMER;
```

--Grant the created roles to the users

```
GRANT ROLE_READ_ONLY_CUSTOMER TO EXAMPLE_CUSTOMER_1;
```

```
GRANT ROLE_MODIFY_CUSTOMER TO OPERATOR_1;
```

Demonstration

```
SQL> CREATE USER EXAMPLE_CUSTOMER_1 IDENTIFIED BY PASSWORD;
```

```
User created.
```

```
SQL> CREATE USER OPERATOR_1 IDENTIFIED BY test123;
```

```
User created.
```

```
SQL> GRANT CREATE SESSION TO OPERATOR_1;
```

```
Grant succeeded.
```

```
SQL> GRANT CREATE SESSION TO EXAMPLE_CUSTOMER_1;
```

```
Grant succeeded.
```

```
SQL> GRANT CREATE SESSION TO OPERATOR_1;
```

```
Grant succeeded.
```

```
SQL> CREATE ROLE ROLE_READ_ONLY_CUSTOMER;
```

```
Role created.
```

```
SQL> GRANT SELECT ON CUSTOMER TO ROLE_READ_ONLY_CUSTOMER;
```

```
Grant succeeded.
```

Demonstration

```
SQL> CREATE ROLE ROLE_MODIFY_CUSTOMER;
```

```
Role created.
```

```
SQL> GRANT ROLE_READ_ONLY TO ROLE_MODIFY_CUSTOMER;
```

```
Grant succeeded.
```

```
SQL> GRANT INSERT ON CUSTOMER TO ROLE_MODIFY_CUSTOMER;
```

```
Grant succeeded.
```

```
SQL> GRANT DELETE ON CUSTOMER TO ROLE_MODIFY_CUSTOMER;
```

```
Grant succeeded.
```

```
SQL> GRANT UPDATE ON CUSTOMER TO ROLE_MODIFY_CUSTOMER;
```

```
SQL> GRANT ROLE_READ_ONLY TO EXAMPLE_CUSTOMER_1;
```

```
Grant succeeded.
```

```
SQL> GRANT ROLE_MODIFY_CUSTOMER TO OPERATOR_1;
```

```
Grant succeeded.
```

Demonstration

```
SQL> CONNECT EXAMPLE_CUSTOMER_1/PASSWORD;  
Connected.
```

```
SQL> SELECT TABLE_NAME, OWNER FROM ALL_TABLES WHERE OWNER IN 'EXAMPLE_CUSTOMER_1';  
  
no rows selected
```

```
SQL> SELECT * FROM CUSTOMER;  
SELECT * FROM CUSTOMER  
      *  
ERROR at line 1:  
ORA-00942: table or view does not exist
```

```
SQL> SELECT * FROM Owner.CUSTOMER;
```

CUST_ID	NAME	AGE	G	OCCUPATION
1	X	25	M	Doctor
2	B	30	F	Teacher
3	C	35	Ø	Engineer

```
SQL> INSERT INTO Owner.CUSTOMER VALUES (4,'D',55,'F','Doctor');  
      *  
ERROR at line 1:  
ORA-01031: insufficient privileges
```


Thank You!