

# **DBMS LAB ASSIGNMENT 3 & 4**

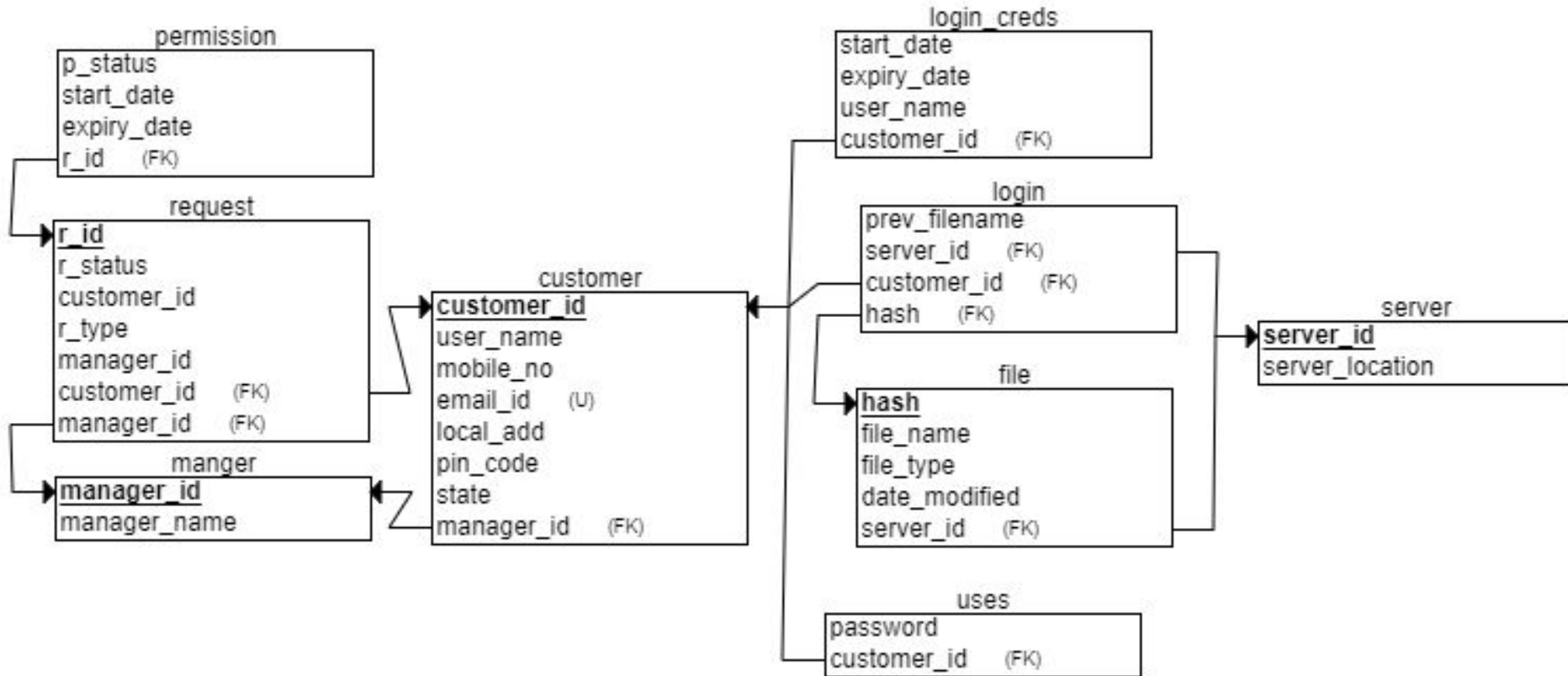
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(Here I have made some changes to my ER model by adding attributes server\_id and server\_location to the entity server. No changes were suggested to me during the last evaluation, I have made the changes myself to make the model more precise.)

# Relational Model



# CREATE DATABASE

```
mysql> create database assg3;  
Query OK, 1 row affected (0.01 sec)
```

✓ MySQL returned an empty result set (i.e. zero rows). (Query took 0.0039 seconds.)

```
CREATE DATABASE assg4;
```

# DROP DATABASE

✓ MySQL returned an empty result set (i.e. zero rows). (Query took 0.0067 seconds.)

```
DROP DATABASE assg4;
```

# DROP DATABASE

```
$ mysqldump -u root -p assg3 > assg3.sql
```



# CREATE TABLE customer

Using constraints PRIMARY & UNIQUE & NOT NULL (using query ALTER TABLE)

```
CREATE TABLE `assg3`.`customer`  
( `user_name` VARCHAR(50) NOT NULL , `customer_id` INT(6) NOT NULL AUTO_INCREMENT ,  
  `manager_id` INT(4) NOT NULL , `mobile_no` BIGINT(10) NOT NULL ,  
  `email_id` VARCHAR(50) NULL , `local_add` VARCHAR(100) NULL ,  
  `pin_code` INT(6) NOT NULL , `state` TEXT NULL , PRIMARY KEY (customer_id) );  
  
DESCRIBE `assg3`.`customer`;
```

```
1 ALTER TABLE `customer` ADD UNIQUE(`email_id`);
```

Primary Key = customer\_id; Unique Key = email\_id;  
customer\_id has been set to AUTO-INCREMENT

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra
1	user_name	varchar(50)	utf8mb4_general_ci		No	None		
2	customer_id 	int(6)			No	None		AUTO_INCREMENT
3	manager_id	int(4)			No	None		
4	mobile_no	bigint(10)			No	None		
5	email_id 	varchar(50)	utf8mb4_general_ci		Yes	NULL		
6	local_add	varchar(100)	utf8mb4_general_ci		Yes	NULL		
7	pin_code	int(6)			No	None		
8	state	text	utf8mb4_general_ci		Yes	NULL		

# DELETE Query (using WHERE clause)

BEFORE

user_name	customer_id	manager_id	mobile_no	email_id	local_add	pin_code	state
esha	100001	1010	9166845362	ayup@gmail.com	Golflinks Palava	421204	Maharashtra
ayu	100002	1010	9867024604	esha@gmail.com	Palava	421203	Rajasthan
jheel	100003	1011	8169319678	piyu@yahoo.com	Ishan CHS	421201	Gujarat
piyu	100004	1012	9619398163	jheel@hotmail.com	MIDC	421202	Kerala
leo	100005	1012	8655713460	leo@gmail.com	Romano	421204	Maharashtra
dummy	100006	1011	9999988888	dummy@gmail.com	car	421201	Maharashtra

✓ 1 row affected. (Query took 0.0079 seconds.)

```
DELETE FROM `customer` WHERE customer_id = 100006;
```

AFTER

user_name	customer_id	manager_id	mobile_no	email_id	local_add	pin_code	state
esha	100001	1010	9166845362	ayup@gmail.com	Golflinks Palava	421204	Maharashtra
ayu	100002	1010	9867024604	esha@gmail.com	Palava	421203	Rajasthan
jheel	100003	1011	8169319678	piyu@yahoo.com	Ishan CHS	421201	Gujarat
piyu	100004	1012	9619398163	jheel@hotmail.com	MIDC	421202	Kerala
leo	100005	1012	8655713460	leo@gmail.com	Romano	421204	Maharashtra

# UPDATE Query (using WHERE clause)

Before

r_status	r_id	r_type	customer_id	manager_id
viewed	1	access	100002	1010
not_viewed	2	renew	100004	1012
viewed	3	renew	100003	1011
not_viewed	4	access	100005	1012
not_viewed	5	access	100001	1010

After

r_status	r_id	r_type	customer_id	manager_id
viewed	1	access	100002	1010
viewed	2	renew	100004	1012
viewed	3	renew	100003	1011
not_viewed	4	access	100005	1012
not_viewed	5	access	100001	1010

TABLE = request

```
1 UPDATE request
2 SET r_status = 'viewed'
3 WHERE r_id = 2;
```



# customer, manager, request tables

user_name	customer_id	manager_id	mobile_no	email_id	local_add	pin_code	state
esha	100001	1010	9166845362	ayup@gmail.com	Golflinks Palava	421204	Maharashtra
ayu	100002	1010	9867024604	esha@gmail.com	Palava	421203	Rajasthan
jheel	100003	1011	8169319678	piyu@yahoo.com	Ishan CHS	421201	Gujarat
piyu	100004	1012	9619398163	jheel@hotmail.com	MIDC	421202	Kerala
leo	100005	1012	8655713460	leo@gmail.com	Romano	421204	Maharashtra

manager_name	manager_id
kams	1010
hasm	1011
kirti	1012
manv	1013
madh	1014

r_status	r_id	r_type	customer_id	manager_id
viewed	1	access	100002	1010
not_viewed	2	renew	100004	1012
viewed	3	renew	100003	1011
not_viewed	4	access	100005	1012
not_viewed	5	access	100001	1010



# VIEW

```
1 CREATE VIEW access_requests AS
2 SELECT request.customer_id, request.r_id, request.r_status
3 FROM request
4 WHERE r_type = 'access';
```

✓ Showing rows 0 - 2 (3 total, Query took 0.0021 seconds.)

```
SELECT * FROM access_requests;
```

customer_id	r_id	r_status
100002	1	viewed
100005	4	not_viewed
100001	5	not_viewed

# Foreign Key Constraints

```
1 ALTER TABLE request
2 ADD FOREIGN KEY (customer_id) REFERENCES customer(customer_id);
```

✔ MySQL returned an empty result set (i.e. zero rows). (Query took 0.0818 seconds.)

```
ALTER TABLE request ADD FOREIGN KEY (customer_id) REFERENCES customer(customer_id);
```

```
1 ALTER TABLE request
2 ADD FOREIGN KEY (manager_id) REFERENCES manager(manager_id);
_
```

✔ MySQL returned an empty result set (i.e. zero rows). (Query took 0.0903 seconds.)

```
ALTER TABLE request ADD FOREIGN KEY (manager_id) REFERENCES manager(manager_id);
```

# SQL INJECTION

```
1 SELECT * FROM `customer`  
2 WHERE customer_id = 12222345 or 1 = 1;
```

✓ Showing rows 0 - 4 (5 total, Query took 0.0028 seconds.)

```
.....  
SELECT * FROM `customer` WHERE customer_id = 12222345 or 1 = 1;  
.....
```

user_name	customer_id	manager_id	mobile_no	email_id	local_add	pin_code	state
esha	100001	1010	9166845362	ayup@gmail.com	Golflinks Palava	421204	Maharashtra
ayu	100002	1010	9867024604	esha@gmail.com	Palava	421203	Rajasthan
jheel	100003	1011	8169319678	piyu@yahoo.com	Ishan CHS	421201	Gujarat
piyu	100004	1012	9619398163	jheel@hotmail.com	MIDC	421202	Kerala
leo	100005	1012	8655713460	leo@gmail.com	Romano	421204	Maharashtra

We can see here clearly how a user can gain access to other peoples' data. This is a major security concern and cause of many malicious activities. Because in a page where I ask a User just for fetching his details, he can enter code using other operators to gain access to the entire database. This can be used to destroy the database or gain access to hidden company data.

user_name	manager_id	mobile_no	r_type
esha	1010	9166845362	access
ayu	1010	9867024604	access
jheel	1011	8169319678	access
piyu	1012	9619398163	access
leo	1012	8655713460	access
esha	1010	9166845362	renew
ayu	1010	9867024604	renew
jheel	1011	8169319678	renew
piyu	1012	9619398163	renew
leo	1012	8655713460	renew
esha	1010	9166845362	renew
ayu	1010	9867024604	renew
jheel	1011	8169319678	renew
piyu	1012	9619398163	renew
leo	1012	8655713460	renew
esha	1010	9166845362	access
ayu	1010	9867024604	access
jheel	1011	8169319678	access
piyu	1012	9619398163	access
leo	1012	8655713460	access
esha	1010	9166845362	access
ayu	1010	9867024604	access
jheel	1011	8169319678	access
piyu	1012	9619398163	access
leo	1012	8655713460	access

```

1 SELECT customer.user_name, customer.manager_id, customer.mobile_no, request.r_type
2 FROM customer
3 CROSS JOIN request;

```

## CROSS JOIN

✓ Showing rows 0 - 24 (25 total, Query took 0.0052 seconds.)

```

SELECT customer.user_name, customer.manager_id, customer.mobile_no, request.r_type FROM customer CROSS JOIN request;

```

# INNER JOIN

```
1 SELECT customer.user_name, customer.mobile_no, customer.state, manager.manager_name
2 FROM customer
3 INNER JOIN manager
4 ON manager.manager_id = customer.manager_id;
```

✓ Showing rows 0 - 4 (5 total, Query took 0.0048 seconds.)

SELECT customer.user\_name, customer.mobile\_no, customer.state, manager.manager\_name FROM customer INNER JOIN manager ON manager.manager\_id = customer.manager\_id;

user_name	mobile_no	state	manager_name
esha	9168845382	Maharashtra	kams
ayu	9887024604	Rajasthan	kams
jheel	8168319678	Gujarat	hasm
piyu	9618398163	Kerala	kirti
leo	8655713460	Maharashtra	kirti



# OUTER JOIN

FULL OUTER JOIN

```
1 SELECT customer.user_name, customer.manager_id, customer.mobile_no, request.r_type
2 FROM customer
3 FULL OUTER JOIN request
4 ON customer.customer_id = request.customer_id;
```

LEFT OUTER JOIN

```
1 SELECT customer.user_name, customer.manager_id, customer.mobile_no, request.r_type
2 FROM customer
3 LEFT JOIN request
4 ON customer.customer_id = request.customer_id;
```

RIGHT OUTER JOIN

```
1 SELECT customer.user_name, customer.manager_id, customer.mobile_no, request.r_type
2 FROM customer
3 RIGHT JOIN request
4 ON request.customer_id = customer.customer_id ;
```



## FULL OUTER JOIN

user_name	manager_id	mobile_no	r_type
ayu	1010	9867024604	access
piyu	1012	9619398163	renew
jheel	1011	8169319678	renew
leo	1012	8655713460	access
esha	1010	9166845362	access

## LEFT OUTER JOIN

user_name	manager_id	mobile_no	r_type
ayu	1010	9867024604	access
piyu	1012	9619398163	renew
esha	1010	9166845362	access
jheel	1011	8169319678	NULL
leo	1012	8655713460	NULL

## RIGHT OUTER JOIN

user_name	manager_id	mobile_no	r_type
ayu	1010	9867024604	access
piyu	1012	9619398163	renew
esha	1010	9166845362	access

# GROUP BY / HAVING Clause

```
1 SELECT user_name
2 from customer
3 GROUP BY(user_name)
4 HAVING SUM(customer_id) > 100002;
```

✓ Showing rows 0 - 2 (3 total, Query took 0.0026 seconds.)

```
SELECT user_name from customer GROUP BY(user_name) HAVING SUM(customer_id) > 100002;
```

user\_name

jheel

leo

piyu

# UNION

```
1 SELECT manager_id FROM customer
2 UNION
3 SELECT manager_id FROM manager;
```

✓ Showing rows 0 - 4 (5 total, Query took 0.0022 seconds.)

```
.....SELECT manager_id FROM customer UNION .....SELECT manager_id FROM manager;
```

**manager\_id**

1010

1011

1012

1013

1014

# UNION ALL

```
1 SELECT manager_id FROM customer
2 UNION ALL
3 SELECT manager_id FROM manager;
```

✓ Showing rows 0 - 9 (10 total, Query took 0.0019 seconds.)

```
.....SELECT manager_id FROM customer UNION ALL .....SELECT manager_id FROM manager;
```

**manager\_id**

1010

1010

1011

1012

1012

1010

1011

1012

1013

1014

# INTERSECT CLAUSE

```
SELECT customer.user_name, customer.mobile_no, customer.state, manager.manager_name
FROM customer
LEFT JOIN manager
ON customer.manager_id = manager.manager_id
INTERSECT
SELECT customer.user_name, customer.mobile_no, customer.state, manager.manager_name
FROM customer
RIGHT JOIN manager
ON customer.manager_id = manager.manager_id
```

user_name	mobile_no	state	manager_name
esha	9166845362	Maharashtra	kams
ayu	9867024604	Rajasthan	kams
jheel	8169319678	Gujarat	hasm
piyu	9619398163	Kerala	kirti
leo	8655713460	Maharashtra	kirti

✓ Showing rows 0 - 4 (5 total, Query took 0.0210 seconds.)

```
SELECT customer.user_name, customer.mobile_no, customer.state, manager.manager_name FROM customer LEFT JOIN manager ON customer.manager_id = manager.manager_id INTERSECT
SELECT customer.user_name, customer.mobile_no, customer.state, manager.manager_name FROM customer RIGHT JOIN manager ON customer.manager_id = manager.manager_id;
```

# EXCEPT CLAUSE

```
SELECT customer.user_name, customer.mobile_no, customer.state, manager.manager_name
FROM customer
LEFT JOIN manager
ON customer.manager_id = manager.manager_id
EXCEPT
SELECT customer.user_name, customer.mobile_no, customer.state, manager.manager_name
FROM customer
RIGHT JOIN manager
ON customer.manager_id = manager.manager_id;
```

user_name	manager_id	mobile_no	r_type
jheel	1011	8169319678	NULL
leo	1012	8655713460	NULL

# LIKE CLAUSE

user\_name starting with 'a'

```
1 SELECT * FROM customer
2 WHERE user_name LIKE 'a%';
```

✓ Showing rows 0 - 0 (1 total, Query took 0.0017 seconds.)

```
SELECT * FROM customer WHERE user_name LIKE 'a%';
```

user_name	customer_id	manager_id	mobile_no	email_id	local_add	pin_code	state
ayu	100002	1010	9867024604	esha@gmail.com	Palava	421203	Rajasthan

user\_name ending with 'a'

```
1 SELECT * FROM customer
2 WHERE user_name LIKE '%a';
```

✓ Showing rows 0 - 0 (1 total, Query took 0.0023 seconds.)

```
SELECT * FROM customer WHERE user_name LIKE '%a';
```

user_name	customer_id	manager_id	mobile_no	email_id	local_add	pin_code	state
esha	100001	1010	9166845362	ayup@gmail.com	Golflinks Palava	421204	Maharashtra

# AGGREGATE OPERATORS

```
1 SELECT
2     AVG(customer_id)
3 FROM customer;
```

AVERAGE

✓ Showing rows 0 - 0 (1 total, Query took 0.0020 seconds.)

```
.....
SELECT AVG(customer_id) FROM customer;
```

AVG(customer\_id)

100003.0000

```
1 SELECT
2     MIN(customer_id)
3 FROM customer;
```

MIN

✓ Showing rows 0 - 0 (1 total, Query took 0.0019 seconds.)

```
.....
SELECT MIN(customer_id) FROM customer;
```

MIN(customer\_id)

100001

COUNT

```
1 SELECT
2     COUNT(*)
3 FROM customer;
```

Your SQL query has been executed successfully.

```
.....
SELECT COUNT(*) FROM customer;
```

COUNT(\*)

5

MAX

```
1 SELECT
2     MAX(customer_id)
3 FROM customer;
```

✓ Showing rows 0 - 0 (1 total, Query took 0.0027 seconds.)

```
.....
SELECT MAX(customer_id) FROM customer;
```

MAX(customer\_id)

100005