Imam Mohammad Ibn Saud Islamic University
College of Computer and Information Sciences

Information Systems Department

Project

Course Title:	Introduction to Databases
Course Code:	IS 220
Course Instructor:	**Female:** Dr. Hala Alrumaih **Male:** Dr. Yasser Kotb
Semester:	Spring 2022
Due Date:	22-05-2022

Instructions:

1. Submission date is on **18-04-2022** via *IMAMU LMS Blackboard* before **10 a.m.**
2. Any attempt to cheat from any of your classmates or form the Internet the whole assignment/project will be marked as **Zero**. Be aware that Blackboard uses plagiarism check tool! (Read and sign **Plagiarism Declaration**)
3. There will be no extension in the submission deadline.
4. No hand writing is accepted.
5. Use this cover page.

Project Title	**Law firm database**		
Section No.	**172**	**Group No.**	

Students Names	Students IDs	Read and accept (Plagiarism Declaration)	Mark out of 15
Nawaf Khalid Almane	441017320	I declare that the proposed document is my own work and I own the copy right of it with no copy rights violation or plagiarism from other resources	
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Project Evaluation's Sheet

Criteria	Deserved Points	Criteria's Points
Part # 1: Conceptual Part	**3**	
• Short description (about one paragraph) of the database application		0.5
• Clear data requirement that describes the entities (7)		0.5
• EER (Entities, Relationship, Attributes, Cardinality, Multiplicity)		2
Part # 2: Logical part	**3**	
• Map EER model to a relational database schema		2
• Normalize your schema to the third normal form		1
Part # 3: Physical Part (implementation)	**6**	
Schema Implementation	**2.5**	
• Use appropriate naming conventions for all of your tables and attributes		0.5
• SQL DDL statements to create database, primary key and foreign keys must be defined		0.5
• Define attributes, data types, constraints e.g. NOT NULL/UNIQUE		0.5
• Explain where and how referential integrity constraints have been incorporated		0.5
• Insert at least 5 rows into each table		0.5
Query implementations	**3.5**	
• 2 different update queries		0.5
• 2 different delete queries		0.5
• 2 simple select queries related to your tables		0.5
• 2 nested queries related to your tables		0.5
• 2 simple join queries related to your tables		0.5
• 2 simple retrieval queries using group by, having clause, and aggregation functions related to your tables		0.5
• 2 different views, give SQL translations of them, and indicate their implementation and solutions		0.5
Report format and overall adherence	**1**	
• Report format		0.5
• Project run and overall adherence to project specification.		0.5
Subtotal#1 (CLO 2.4)		**13**

Presentation	**2**	
• Slides **(CLO 3.2)**		1
• Discussion **(CLO 3.1)**		1
Subtotal#2		**2**

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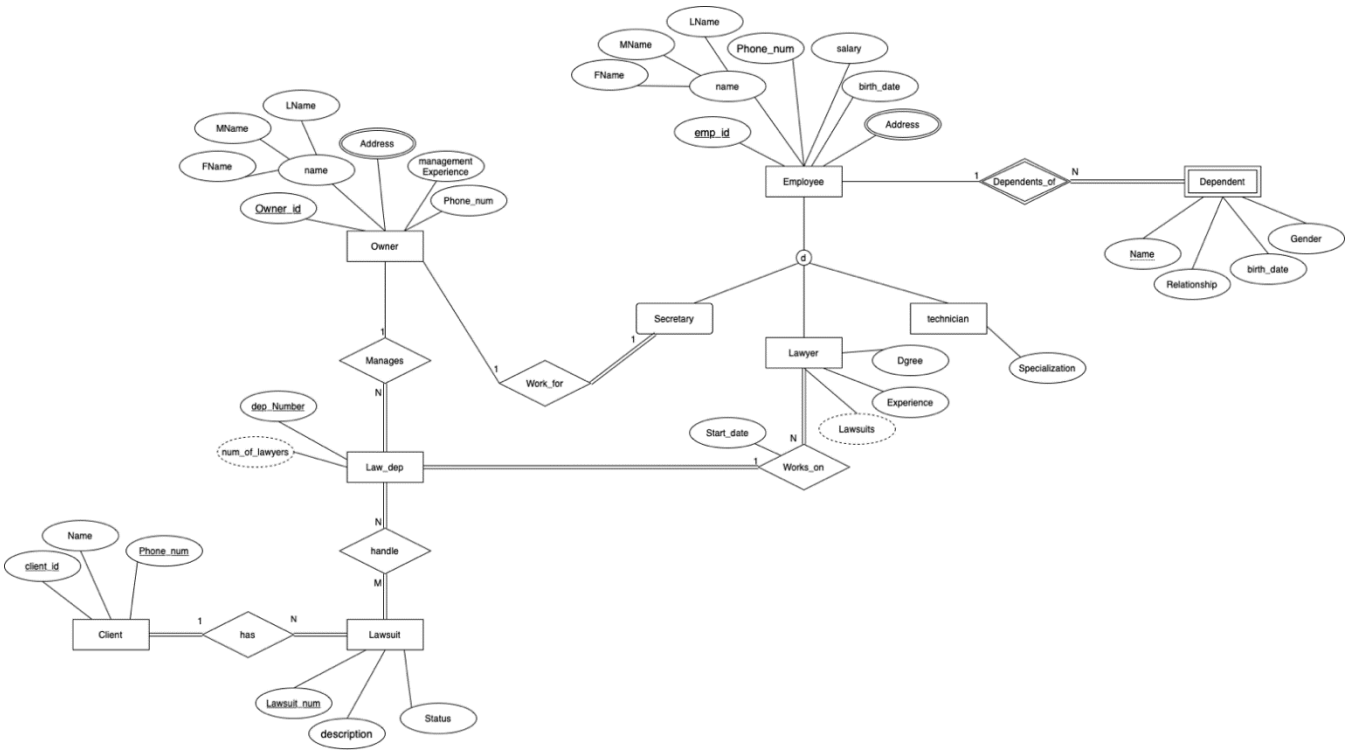
Part # 1: Conceptual Part:

Description:

A law firm has an owner is identified by SSN and has name, address, lawsuit, management experience
And employee **identified** by emp_id and has name, address, phone_num, salary and birth_date
The employee can be a lawyer, secretary or technical
A lawyer degree and Experience
A technician has a specialization
A client **identified** by client_id and has name, phone_num
A lawsuit **identified by** lawsuit_num, and has description and status
An employee may have dependence **identified by** name, gender, relationship to the employee, birth_date

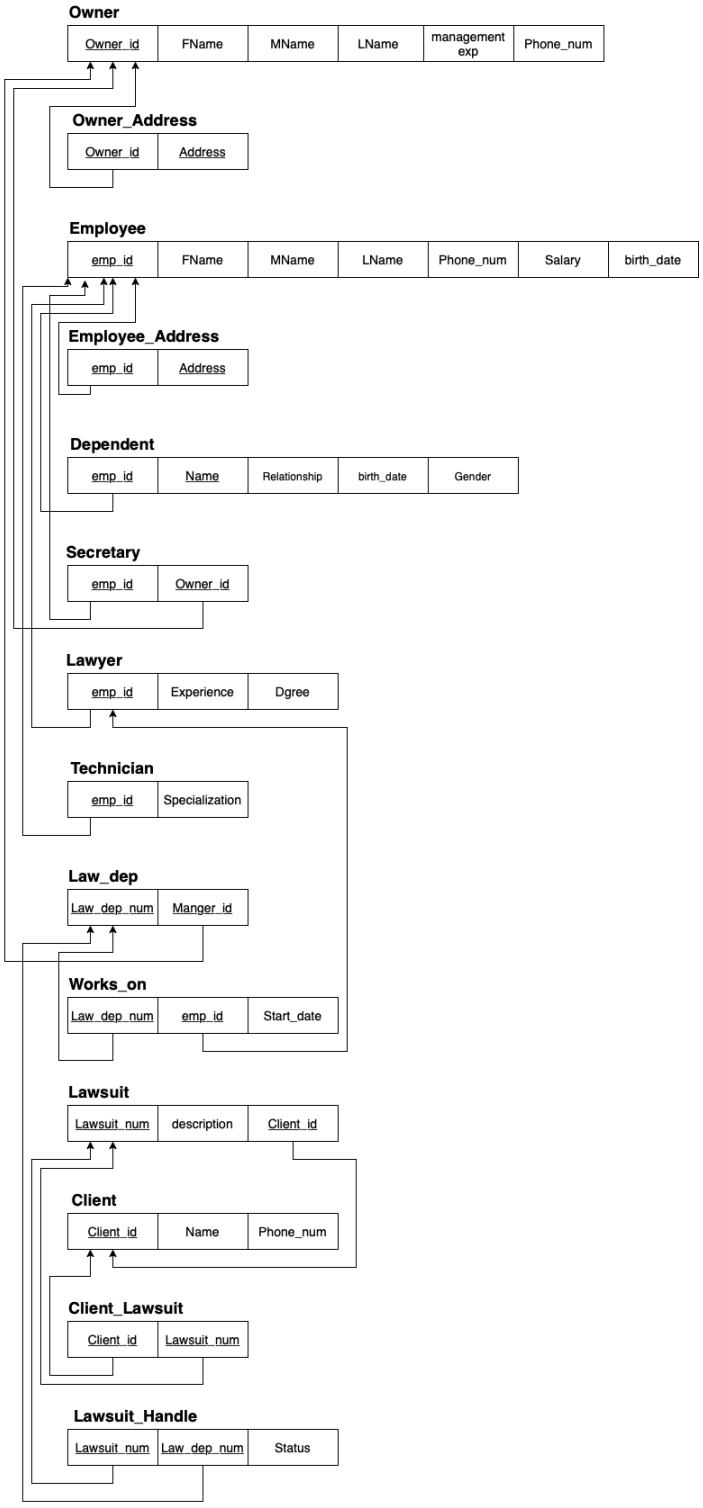
The law department has number managed one of the owners and lawyers working at it and handle the clint's lawsuits.
The owner may have a secretary

EERD:



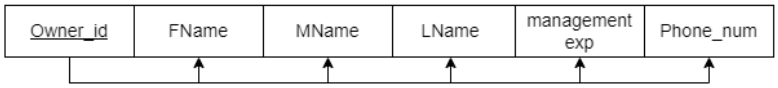
Part # 2: Logical part:

A. Mapping



B. Normalization:

Owner



1NF: in 1nf Normal form

because there isn't composite

attribute ,multi valued attribute and nested relation

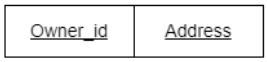
2NF: in 2nf Normal form

Because all are fully functionally dependent.

3NF: in 3rd Normal form

because there is no non-key give non-key. No transitive dependency.

Owner_Address



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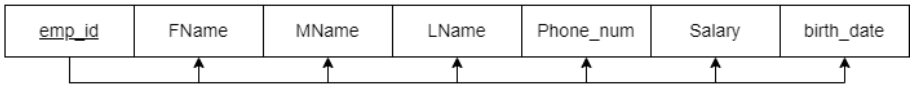
Employee



1NF: in 1nf Normal form

because there isn't composite

attribute ,multi valued attribute and nested relation

2NF: in 2nf Normal form

Because all are fully functionally dependent.

3NF: in 3rd Normal form

Employee_Address

emp_id	Address

1NF: in 1nf Normal form

because there isn't composite

attribute ,multi valued attribute and nested relation

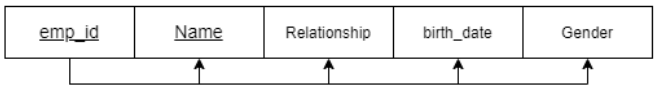
2NF: in 2nf Normal form

Because all are fully functionally dependent.

3NF: in 3rd Normal form

because there is no non-key give non-key. No transitive dependency.

Dependent



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attribute ,multi valued attribute and nested relation

2NF: in 2nf Normal form

Because all are fully functionally dependent.

3NF: in 3rd Normal form

because there is no non-key give non-key. No transitive dependency.

Secretary

emp_id	Owner_id

1NF: in 1nf Normal form

because there isn't composite

attribute ,multi valued attribute and nested relation

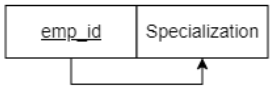
2NF: in 2nf Normal form

Because all are fully functionally dependent.

3NF: in 3rd Normal form

because there is no non-key give non-key. No transitive dependency.

Technician



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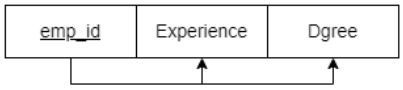
Lawyer



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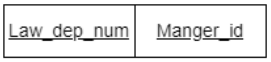
2NF: in 2nf Normal form

Because all are fully functionally dependent.

3NF: in 3rd Normal form

because there is no non-key give non-key. No transitive dependency.

Law_dep



1NF: in 1nf Normal form

because there isn't composite

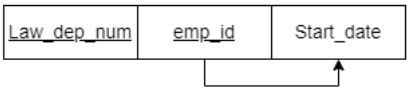
attribute ,multi valued attribute and nested relation

2NF: in 2nf Normal form

Because all are fully functionally dependent.

3NF: in 3rd Normal form

Works_on



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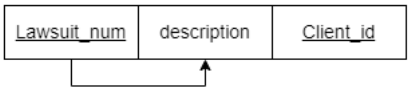
Lawsuit



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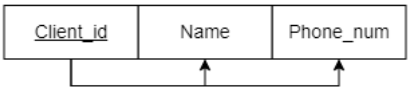
Client



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because there isn't composite

attribute ,multi valued attribute and nested relation

2NF: in 2nf Normal form

Because all are fully functionally dependent.

3NF: in 3rd Normal form

because there is no non-key give non-key. No transitive dependency.

Client_Lawsuit

Client_id	Lawsuit_num

1NF: in 1nf Normal form

because there isn't composite

attribute ,multi valued attribute and nested relation

2NF: in 2nf Normal form

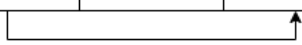
Because all are fully functionally dependent.

3NF: in 3rd Normal form

because there is no non-key give non-key. No transitive dependency.

Lawsuit_Handle

Lawsuit_num	Law_dep_num	Status



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2NF: in 2nf Normal form

Because all are fully functionally dependent.

3NF: in 3rd Normal form

because there is no non-key give non-key. No transitive dependency.

Part # 3: Physical Part (implementation):
Schema implementation:

```
CREATE TABLE owner(
owner_id NUMBER(10),
fname VARCHAR2(10) NOT NULL,
mname VARCHAR2(10) NOT NULL,
lname VARCHAR2(10) NOT NULL,
management_exp NUMBER(2) NOT NULL,
phone_num NUMBER(10) UNIQUE,
CONSTRAINT own_pk PRIMARY KEY(owner_id)
);


CREATE TABLE owner_address(
owner_id NUMBER(10) ,
address VARCHAR2(40) ,
CONSTRAINT own_fk FOREIGN KEY(owner_id) REFERENCES owner(owner_id),
CONSTRAINT add_pk PRIMARY KEY(address)
);


CREATE TABLE Employee(
emp_id NUMBER(10),
fname VARCHAR2(10) NOT NULL,
mname VARCHAR2(10) NOT NULL,
lname VARCHAR2(10) NOT NULL,
phone_num NUMBER(10),
salary NUMBER(7) NOT NULL,
birth_date DATE,
CONSTRAINT emp_pk PRIMARY KEY(emp_id)
);


CREATE TABLE Employee_address(
emp_id NUMBER(10),
address VARCHAR2(40) NOT NULL,
CONSTRAINT adde_pk PRIMARY KEY(address),
CONSTRAINT empid_fk FOREIGN KEY(emp_id) REFERENCES employee(emp_id)
);


CREATE TABLE dependent(
emp_id NUMBER(10),
name VARCHAR2(10) NOT NULL,
relationship varchar(10) NOT NULL,
birth_date date,
gender char,
CONSTRAINT depen_pk PRIMARY KEY(name),
CONSTRAINT depen_fk FOREIGN KEY(emp_id) REFERENCES employee(emp_id)
);
```

```
54
55  CREATE TABLE secretary(
56  emp_id NUMBER(10) ,
57  owner_id NUMBER(10),
58  CONSTRAINT secretary_ID FOREIGN KEY(emp_id) REFERENCES employee(emp_id) ,
59  CONSTRAINT sec_fk FOREIGN KEY(owner_id) REFERENCES owner(owner_id)
60  );
61
62
63  CREATE TABLE lawyer(
64  emp_id NUMBER(10) ,
65  experience NUMBER(2) NOT NULL,
66  dgree VARCHAR2(20),
67  CONSTRAINT lawyer_ID FOREIGN KEY(emp_id) REFERENCES employee(emp_id)
68  );
69
70
71  CREATE TABLE technician(
72  emp_id NUMBER(10) NOT NULL,
73  specialization VARCHAR2(15) NOT NULL,
74  CONSTRAINT technician_ID FOREIGN KEY(emp_id) REFERENCES employee(emp_id)
75  )  ;
76
77
78  CREATE TABLE law_dep(
79  law_dep_num NUMBER(4) ,
80  manager_id NUMBER(10),
81  CONSTRAINT lawdep_pk PRIMARY KEY(law_dep_num),
82  CONSTRAINT lawdep_fk FOREIGN KEY(manager_id) REFERENCES owner(owner_id)
83  );
84
85
86  CREATE TABLE works_on(
87  law_dep_num NUMBER(4),
88  emp_id NUMBER(10),
89  start_date DATE,
90  CONSTRAINT wdep_fk FOREIGN KEY(law_dep_num) REFERENCES law_dep(law_dep_num),
91  CONSTRAINT wemp_fk FOREIGN KEY(emp_id) REFERENCES Employee(emp_id)
92  );
```

```
94
95  CREATE TABLE client(
96  client_id NUMBER(10) ,
97  name VARCHAR2(12) NOT NULL,
98  phone_num NUMBER(10) NOT NULL,
99  CONSTRAINT cl_pk PRIMARY KEY(client_id)
100 )  ;
101
102
103 CREATE TABLE lawsuit(
104 lawsuit_num NUMBER(6) NOT NULL,
105 description VARCHAR2(30),
106 client_id NUMBER(10),
107 CONSTRAINT suit_pk PRIMARY KEY(lawsuit_num),
108 CONSTRAINT suit_fk FOREIGN KEY(client_id) REFERENCES client(client_id)
109 )  ;
110
111
112 CREATE TABLE client_lawsuit(
113 client_id NUMBER(10),
114 lawsuit_num NUMBER(6),
115 CONSTRAINT clawid_fk FOREIGN KEY(client_id) REFERENCES client(client_id),
116 CONSTRAINT clawnum_fk FOREIGN KEY(lawsuit_num) REFERENCES lawsuit(lawsuit_num)
117 )  ;
118
119
120 CREATE TABLE lawsuit_handle(
121 lawsuit_num NUMBER(6),
122 law_dep_num NUMBER(4),
123 CONSTRAINT lawhdep_fk FOREIGN KEY(law_dep_num) REFERENCES law_dep(law_dep_num),
124 CONSTRAINT lawhnum_fk FOREIGN KEY(lawsuit_num) REFERENCES lawsuit(lawsuit_num)
125 );
```

```sql
insert into owner
values(1112223334,'alex','james','daniel',20,0554336689);

insert into owner
values(2224448899,'jack','oscar','william',35,0552246589);

insert into owner
values(1244667777,'Michael','Oliver','William',25,0552246768);

insert into owner
values(5557788234,'Henry','Noah','William',26,0556699321);

insert into owner
values(4447779996,'Charlie','Charles','William',13,0553322791);

insert into owner_address
values (1244667777,'213 kirby road');

insert into owner_address
values (1244667777,'2567 Lark Lane');

insert into owner_address
values (4447779996,'432 Elgin Road');

insert into owner_address
values (5557788234,'9821 Fontana Lake');

insert into owner_address
values (1112223334,'5421 Bluebonnet Lane');

insert into owner_address
values (2224448899,'3214 Blane Road');
```

```
insert into Employee
values (3336668881,'Faris','Ahmed','Alnasser',Null,19000,TO_DATE('21/8/1990','DD/MM/YYYY'));

insert into Employee
values (6655444222,'Nawaf','Khalid','Alahmed',Null,15000,TO_DATE('19/1/1989','DD/MM/YYYY'));

insert into Employee
values (4442221116,'Noor','Khalid','Alnagem',Null,18000,TO_DATE('19/8/1995','DD/MM/YYYY'));

insert into Employee
values (779977442,'Lara','Ahmed','Almansour',Null,17000,TO_DATE('5/11/1998','DD/MM/YYYY'));

insert into Employee
values (2123334449,'Norah','Sami','Abanmi',0508633227,7000,TO_DATE('3/3/1992','DD/MM/YYYY'));

insert into Employee
values (4455778811,'Samiah','Jehad','Bajandoh',0559483227,15000,TO_DATE('3/3/1992','DD/MM/YYYY'));

insert into Employee
values (2223114446,'Kother','Majed','Alswikt',056385417,9000,TO_DATE('3/3/1992','DD/MM/YYYY'));

insert into Employee
values (6688899922,'Jwaher','Ahmed','Alfaiz',0508793244,10000,TO_DATE('3/3/1992','DD/MM/YYYY'));

insert into Employee
values (4455991133,'Ali','Mhomod','Khlil',0554784264,10000,TO_DATE('3/3/1992','DD/MM/YYYY'));

insert into Employee
values (4445566991,'Majed','Muhmmed','Zaghlol',0554433227,13000,TO_DATE('3/3/1992','DD/MM/YYYY'));

insert into Employee
values (6665554433,'Jamel','Fadi','Fuzi',0537004904,7000,TO_DATE('3/3/1992','DD/MM/YYYY'));


insert into Employee_address
values (2223334449,'2765 Boylston Road');

insert into Employee_address
values (779977442,'232 Alolya Road');

insert into Employee_address
values (6688899922,'56 As Safh Road');

insert into Employee_address
values (6665554433,'56 Al Barq');

insert into Employee_address
values (4455778811,'897 Al Safa');

insert into Employee_address
values (779977442,'645 Dijlah road');
```

```
insert into dependent
values(2223334449,'Norah','daughter',TO_DATE('22/7/2019','DD/MM/YYYY'),'F');

insert into dependent
values(779977442,'Khalid','son',TO_DATE('8/1/2016','DD/MM/YYYY'),'M');

insert into dependent
values(6688899922,'Feras','son',TO_DATE('23/9/2010','DD/MM/YYYY'),'M');

insert into dependent
values(6665554433,'Suha','daughter',TO_DATE('11/5/2012','DD/MM/YYYY'),'F');

insert into dependent
values(4455778811,'Sami','son',TO_DATE('12/12/2019','DD/MM/YYYY'),'M');

insert into secretary
values(2123334449,4447779996);

insert into secretary
values(2223114446,5557788234);

insert into secretary
values(4455778811,1112223334);

insert into secretary
values(6688899922,2224448899);

insert into secretary
values(4455991133,1244667777);

insert into lawyer
values(779977442,2,'Master');

insert into lawyer
values(3336668881,4,'Master');

insert into lawyer
values(6655444222,3,'Bachelor');

insert into lawyer
values(4442221116,4,'PHD');

insert into lawyer
values(779977442,2,'Bachelor');

insert into technician
values(4445566991,'maintenance');

insert into technician
values(6665554433,'maintenance');
```

```
insert into law_dep
values(1122,4447779996);

insert into law_dep
values(2233,5557788234);

insert into law_dep
values(4422,2224448899);

insert into law_dep
values(5511,1112223334);

insert into law_dep
values(7711,1244667777);

insert into works_on
values(1122,779977442,TO_DATE('20/9/2018','DD/MM/YYYY'));

insert into works_on
values(5511,3336668881,TO_DATE('3/7/2020','DD/MM/YYYY'));

insert into works_on
values(7711,6655444222,TO_DATE('18/6/2019','DD/MM/YYYY'));

insert into works_on
values(2233,4442221116,null);

insert into works_on
values(4422,779977442,null);

insert into client
values(2223338844,'Ahmed',0558877654);

insert into client
values(6656559877,'sarah',0553327786);

insert into client
values(4443229871,'mohammed',0556783229);

insert into client
values(3334425667,'huda',0556642318);

insert into client
values(5544672659,'Malek',0559933117);
```

Query implementations:

```
UPDATE owner_address SET address = '218 kirby road' WHERE address = '213 kirby road';
UPDATE owner SET fname = 'Alex' WHERE owner_id = 1112223334;

DELETE FROM secretary WHERE emp_id = 4455991133;
DELETE FROM Employee_address WHERE address = '2765 Boylston Road';

SELECT * FROM owner WHERE management_exp >20;
SELECT * FROM Employee WHERE salary>7000;



SELECT lawyer.emp_id,law_dep_num FROM lawyer join Works_on on Works_on.emp_id = lawyer.emp_id  WHERE experience > 2;
SELECT lawsuit_num,phone_num  FROM lawsuit join client on client.client_id= lawsuit.client_id;

SELECT Avg(salary) FROM Employee WHERE fname='Nawaf';
SELECT Avg(salary),emp_id FROM Employee group by emp_id;

SELECT max(salary) AS Highest_salary FROM Employee Group by salary HAVING salary > 10000;
SELECT Max(fname) FROM owner  Group by management_exp HAVING management_exp> 10 ORDER BY management_exp;

Create VIEW high_salary As SELECT * FROM Employee Where  salary > (select Avg(salary) from employee);
Create VIEW employee_IDs As SELECT emp_id FROM Employee Group by emp_id;



SELECT description FROM lawsuit
WHERE lawsuit_num=(
    SELECT lawsuit_num FROM client_lawsuit WHERE client_id=5544672659);


SELECT fname,lname FROM Employee
    WHERE Employee.emp_id in(SELECT secretary.emp_id from secretary);
```

OWNER_ID	FNAME	MNAME	LNAME	MANAGEMENT_EXP	PHONE_NUM
1112223334	Alex	james	daniel	20	554336689
2224448899	jack	oscar	william	35	552246589
1244667777	Michael	Oliver	William	25	552246768
5557788234	Henry	Noah	William	26	556699321
4447779996	Charlie	Charles	William	13	553322791

Download CSV

5 rows selected.

EMP_ID	FNAME	MNAME	LNAME	PHONE_NUM	SALARY	BIRTH_DATE
3336668881	Faris	Ahmed	Alnasser	-	19000	21-AUG-90
6655444222	Nawaf	Khalid	Alahmed	-	15000	19-JAN-89
4442221116	Noor	Khalid	Alnagem	-	18000	19-AUG-95
779977442	Lara	Ahmed	Almansour	-	17000	05-NOV-98
4455778811	Samiah	Jehad	Bajandoh	559483227	15000	03-MAR-92
2223114446	Kother	Majed	Alswikt	56385417	9000	03-MAR-92
6688899922	Jwaher	Ahmed	Alfaiz	508793244	10000	03-MAR-92
4455991133	Ali	Mhomod	Khlil	554784264	10000	03-MAR-92
4445566991	Majed	Muhmmed	Zaghlol	554433227	13000	03-MAR-92

Download CSV

9 rows selected.

EMP_ID	LAW_DEP_NUM
3336668881	5511
6655444222	7711
4442221116	2233

Download CSV

3 rows selected.

LAWSUIT_NUM	PHONE_NUM
443213	558877654
223311	553327786
653211	556783229
445631	556642318
553241	559933117

Download CSV

5 rows selected.

AVG(SALARY)
15000

Download CSV

AVG(SALARY)	EMP_ID
7000	2223334449
19000	3336668881
15000	6655444222
18000	4442221116
17000	779977442
7000	2123334449
15000	4455778811
9000	2223114446
10000	6688899922
10000	4455991133
13000	4445566991
7000	6665554433

Download CSV
12 rows selected.

FNAME	LNAME
Norah	Abanmi
Kother	Alswikt
Samiah	Bajandoh
Jwaher	Alfaiz

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HIGHEST_SALARY
15000
18000
19000
17000
13000

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MAX(FNAME)
Charlie
Alex
Michael
Henry
jack

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View created.

View created.

DESCRIPTION
suit is about defamation

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