

Database Systems Project

- CSE 333 -

Car Agency

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Introduction

The Database required manages the data of a car agency that sells both new and used cars and provides repair services for the car owners. The database should keep the data of each individual car including but not limited to the vehicle ID, car model, car license plate, price of the car and its color and the manufacturer of the car. It also should have the data of all the contracts made by the agency with the payment info and data about the customer. The database should also have all the data related to the services it provides and the employees that work in the agency whether they were technicians or general employees.

Entities definition

The entity creation process and the data type of their data is shown in the SQL section

1. Employees:

- Subclass (technicians, salesperson)
- Attributes (Emp_ID, sex, salary, address, name (FirstName, LastName), phoneNumber)

2. Cars:

- Subclass (used, new)
- Attributes (model, manufacturer, year, color, license_plate, price, vehicle_id)

3. Services:

- Attributes (price, provider, name, service_no)

4. Contracts:

- Attributes (vehicle_id, date, contract_no, customer ID, payment info)

5. Customer:

- Attributes (customer ID, customer name, phone_no)

Reports:

- Get the contracts of the services provided to the customers
- Get the number of cars per unique customer
- Get the name of the highest paid employee
- Get the names of the employees that have an address that start with "Sh"
- Get a view of the commission of employees who sold more than 50 cars
- Report containing all contract info: vehicle ID and customer ID, along with payment info, contract number, provider's name and the service name. Get the number of contracts per customer
- Get all the employees names and for the technicians get also their specialization
- Get the average salary of the employees under each supervisor

EER Assumptions:

New_car is assumed to have a special attribute called quantity to indicate the number available.

Used_car is assumed to have a special attribute odometer to indicate the distance travelled by the car.

Salesperson is assumed to have a commission attribute that is to be determined upon each sale and attribute sales that records the sales made by each employee.

Technician is assumed to have a certain specialization in car fixing.

A technician must do one service only, but a service may be done by many technicians.

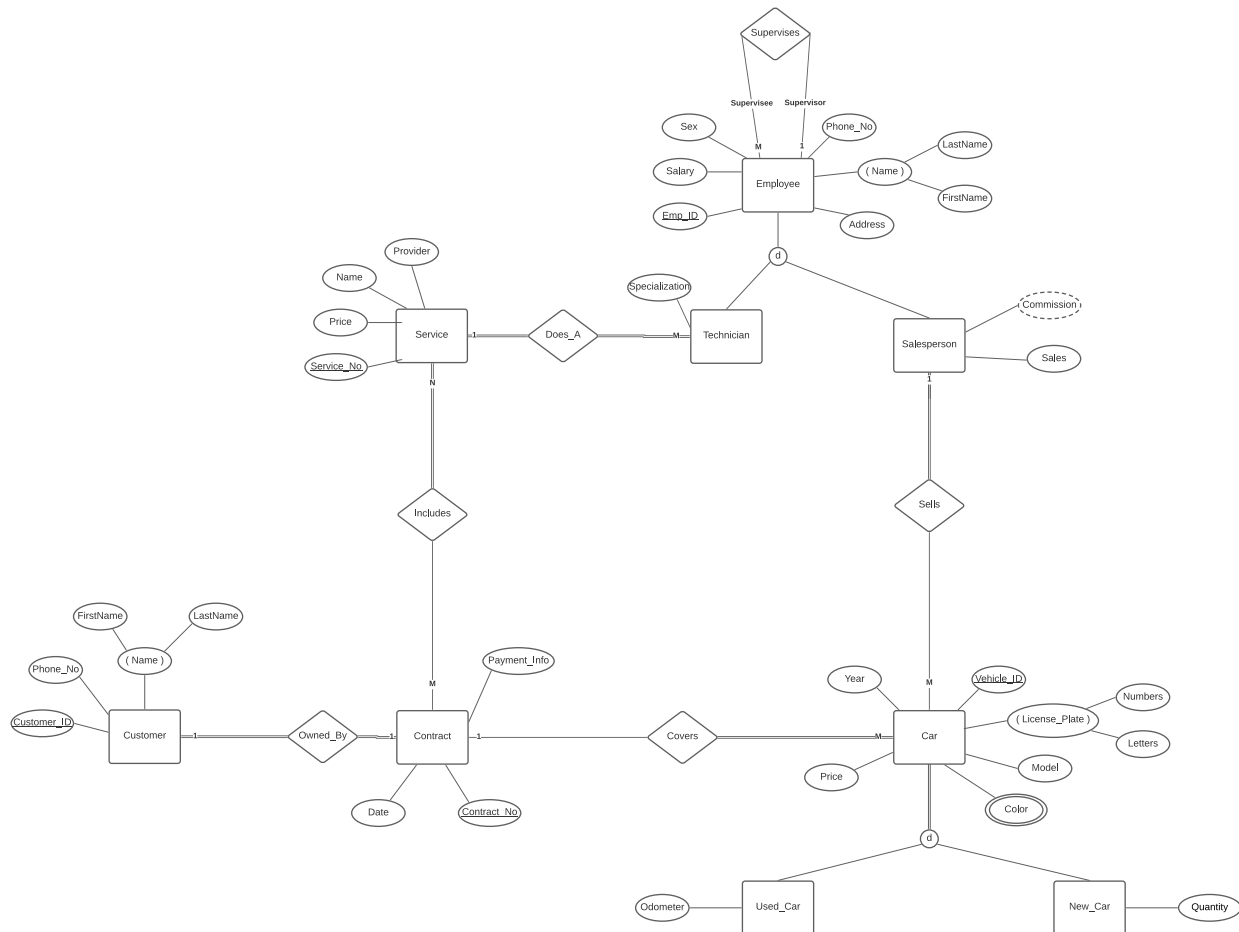
Employees can have one supervisor only and many employees can be supervisee.

A salesperson can sell many cars, but each car can be sold by only one salesperson.

A contract must be owned by one customer only and a customer must own one contract only.

A contract can cover many cars, but a car must be covered by only one contract.

A contract can include many services and services may be included in many contracts.



Tools used to draw the EERD:

ERD+ tool: this app was used to draw the ERD without the inheritance relations, it is used to create Entity Relationship Diagrams, Relational Schemas, Star Schemas, and SQL DDL statements. It is a web-based database modeling tool that lets you quickly and easily create these diagrams. It also helps in creating the initial SQL code of the database

Lucid charts: is a web-based proprietary platform that allows users to collaborate on drawing, revising and sharing charts and diagrams, it helped us create the EERD with the inheritance relations.

Relational Model:

Service(Service_No (PK), Price, Name, Provider)

Includes (Service_No (FK), Contract_No (FK) (Composite key))

Car(Vehicle_id (PK), Model, Year, Price, Numbers, Letters, Emp_ID (FK), Contract_No (FK))

New_Car(Quantity, Vehicle_id (FK))

Used_Car(Odometer , Vehicle_id (FK))

Car_Color(Vehicle_id (FK), Color (Composite Key))

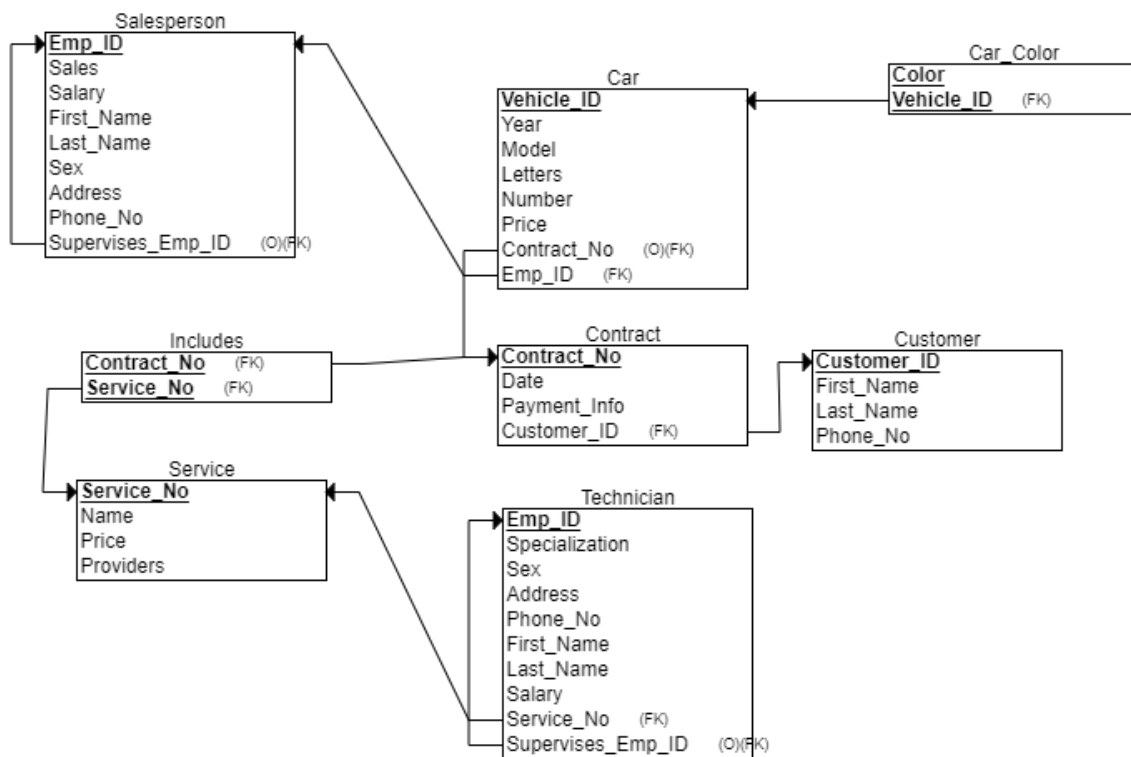
Employee(Emp_ID (PK), Sex, Salary, Address, First_Name, Last_Name, Phone_No, SupervisorID)

Technician(EMP_ID (FK), Specialization, Service_No (FK))

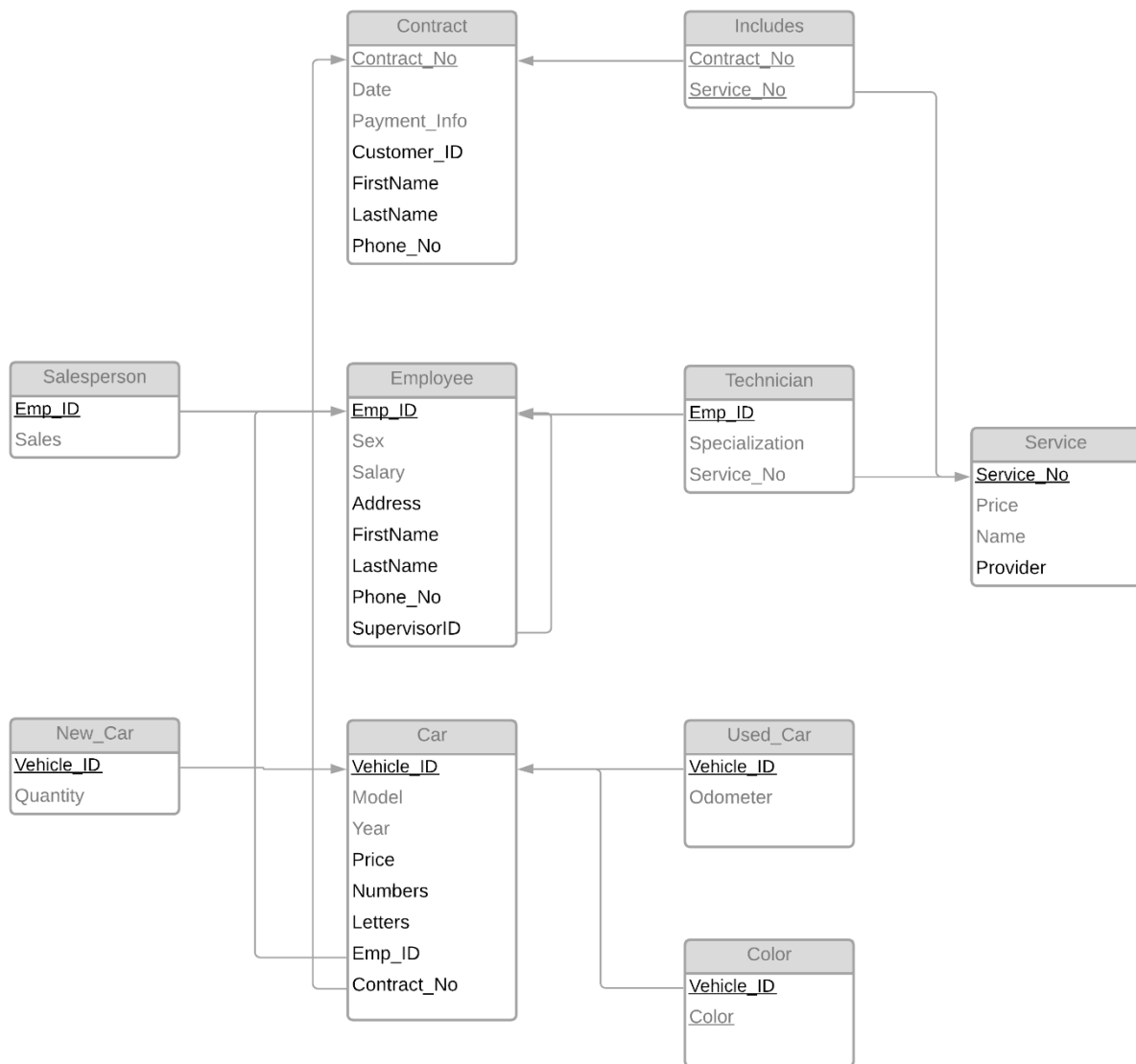
Salesperson(EMP_ID (FK), Sales)

Contract (Contract_No (PK), Date, Payment_Info, Customer_ID (FK), First_Name, Last_Name, Phone_No)

First Iteration (EER - using ERD+ Tool):



Second Iteration (EERD - manually):



ERDPlus Generated SQL:

```
CREATE TABLE Service
(
    Name INT NOT NULL,
    Price INT NOT NULL,
    Service_No INT NOT NULL,
    Providers INT NOT NULL,
    PRIMARY KEY (Service_No)
);

CREATE TABLE Customer
(
    First_Name INT NOT NULL,
    Last_Name INT NOT NULL,
    Customer_ID INT NOT NULL,
    Phone_No INT NOT NULL,
    PRIMARY KEY (Customer_ID)
);

CREATE TABLE Contract
(
    Date INT NOT NULL,
    Payment_Info INT NOT NULL,
    Contract_No INT NOT NULL,
    Customer_ID INT NOT NULL,
    PRIMARY KEY (Contract_No),
    FOREIGN KEY (Customer_ID) REFERENCES Customer(Customer_ID)
);

CREATE TABLE Includes
(
    Contract_No INT NOT NULL,
    Service_No INT NOT NULL,
    PRIMARY KEY (Contract_No, Service_No),
    FOREIGN KEY (Contract_No) REFERENCES Contract(Contract_No),
    FOREIGN KEY (Service_No) REFERENCES Service(Service_No)
);

CREATE TABLE Salesperson
(
    Sales INT NOT NULL,
    Emp_ID INT NOT NULL,
    Salary INT NOT NULL,
    First_Name INT NOT NULL,
    Last_Name INT NOT NULL,
    Sex INT NOT NULL,
    Address INT NOT NULL,
    Phone_No INT NOT NULL,
    Supervises_Emp_ID INT,
    PRIMARY KEY (Emp_ID),
    FOREIGN KEY (Supervises_Emp_ID) REFERENCES Salesperson(Emp_ID)
);
```

```

CREATE TABLE Technician
(
    Specialization INT NOT NULL,
    Sex INT NOT NULL,
    Emp_ID INT NOT NULL,
    Address INT NOT NULL,
    Phone_No INT NOT NULL,
    First_Name INT NOT NULL,
    Last_Name INT NOT NULL,
    Salary INT NOT NULL,
    Service_No INT NOT NULL,
    Supervises_Emp_ID INT,
    PRIMARY KEY (Emp_ID),
    FOREIGN KEY (Service_No) REFERENCES Service(Service_No),
    FOREIGN KEY (Supervises_Emp_ID) REFERENCES Technician(Emp_ID)
);

```

```

CREATE TABLE Car
(
    Year INT NOT NULL,
    Vehicle_ID INT NOT NULL,
    Model INT NOT NULL,
    Letters INT NOT NULL,
    Number INT NOT NULL,
    Price INT NOT NULL,
    Contract_No INT,
    Emp_ID INT NOT NULL,
    PRIMARY KEY (Vehicle_ID),
    FOREIGN KEY (Contract_No) REFERENCES Contract(Contract_No),
    FOREIGN KEY (Emp_ID) REFERENCES Salesperson(Emp_ID)
);

```

```

CREATE TABLE Car_Color
(
    Color INT NOT NULL,
    Vehicle_ID INT NOT NULL,
    PRIMARY KEY (Color, Vehicle_ID),
    FOREIGN KEY (Vehicle_ID) REFERENCES Car(Vehicle_ID)
);

```


SQL:

Code to create the tables:

Table employee is missing supervisorID and was added using the Alter command.

```
CREATE TABLE Employee(  
    Emp_ID SMALLINT NOT NULL UNIQUE,  
    FirstName CHAR(16),  
    LastName CHAR(16),  
    Address VARCHAR(64),  
    Phone_No INT,  
    Salary FLOAT,  
    Sex char(1) CHECK (Sex="M" OR Sex="F"),  
    PRIMARY KEY (Emp_ID),  
);
```

```
CREATE TABLE Salesperson(  
    Emp_ID SMALLINT NOT NULL UNIQUE,  
    Sales int,  
    PRIMARY KEY (Emp_ID),  
    FOREIGN KEY (Emp_ID) REFERENCES employee(Emp_ID) ON UPDATE CASCADE ON  
DELETE RESTRICT) ;
```

```
CREATE TABLE service( Service_No int NOT NULL UNIQUE,  
    Price float,
```

```
        Name varchar(16),  
        Provider char(8));
```

```
CREATE Table Technician(  
    Emp_ID SMALLINT NOT NULL UNIQUE,  
    Specialization char(16),  
    service_no int,  
    PRIMARY KEY (Emp_ID),  
    FOREIGN KEY (Emp_ID) REFERENCES employee(Emp_ID) ON UPDATE CASCADE ON  
DELETE RESTRICT,  
    FOREIGN KEY (service_no) REFERENCES service(service_no) ON UPDATE  
CASCADE ON DELETE RESTRICT);
```

```
CREATE TABLE contract(  
    Contract_No SMALLINT NOT NULL UNIQUE,  
    Cdate DATETIME,  
    Payment_info VARCHAR(7) CHECK  
    (  
        Payment_info = "Credit" OR Payment_info = "Cash"  
    ),  
    Customer_ID INT NOT NULL UNIQUE,  
    FirstName CHAR(16),  
    LastName CHAR(16),  
    Phone_No INT,
```

```
        PRIMARY KEY(Contract_No)

);
```

```
CREATE TABLE includes(
```

```
    Contract_No SMALLINT NOT NULL,

    Service_no INT NOT NULL,

    PRIMARY KEY(contract_No, Service_No),

    FOREIGN KEY (Contract_no) REFERENCES contract(contract_No) ON UPDATE
CASCADE ON DELETE RESTRICT,

    FOREIGN KEY (Service_no) REFERENCES service(service_no) ON UPDATE CASCADE
ON DELETE RESTRICT

);
```

```
CREATE TABLE Car(
```

```
    Vehicle_ID CHAR(10) NOT NULL UNIQUE,

    Model VARCHAR(16),

    YEAR DATETIME,

    Price FLOAT,

    Numbers SMALLINT,

    Letters VARCHAR(4),

    Emp_ID SMALLINT NOT NULL,

    Contract_No SMALLINT NOT NULL,

    PRIMARY KEY(Vehicle_id),

    FOREIGN KEY(Contract_no) REFERENCES contract(contract_No) ON UPDATE
CASCADE ON DELETE RESTRICT,
```

```
        FOREIGN KEY(Emp_ID) REFERENCES employee(emp_id) ON UPDATE CASCADE ON  
DELETE RESTRICT  
);
```

```
CREATE TABLE New_Car(  
    Vehicle_ID CHAR(10) NOT NULL UNIQUE,  
    Quantity INT,  
    PRIMARY KEY(Vehicle_id),  
    FOREIGN KEY(vehicle_id) REFERENCES car(vehicle_id) ON UPDATE CASCADE ON  
DELETE RESTRICT  
);
```

```
CREATE TABLE Used_Car(  
    Vehicle_ID CHAR(10) NOT NULL UNIQUE,  
    Odometer INT,  
    PRIMARY KEY(Vehicle_id),  
    FOREIGN KEY(vehicle_id) REFERENCES car(vehicle_id) ON UPDATE CASCADE ON  
DELETE RESTRICT  
);
```

```
CREATE TABLE color(  
    Vehicle_ID CHAR(10) NOT NULL,  
    color VARCHAR(12),  
    PRIMARY KEY(Vehicle_id, color),
```

```
FOREIGN KEY(vehicle_id) REFERENCES car(vehicle_id) ON UPDATE CASCADE ON  
DELETE RESTRICT  
);
```

INSERT

```
INSERT INTO `employee` (`Emp_ID`, `FirstName`, `LastName`, `Address`,  
`Phone_No`, `Salary`, `Sex`) VALUES ('705', 'Seif', 'Elewa', 'Sheraton,  
Cairo, Egypt', '01203022939', '10', 'M');
```

```
INSERT INTO `employee` (`Emp_ID`, `FirstName`, `LastName`, `Address`,  
`Phone_No`, `Salary`, `Sex`) VALUES ('103', 'Youssef', 'Mansi', 'Nozha,  
Cairo, Egypt', '01023130820', '457382', 'M');
```

```
INSERT INTO `employee` (`Emp_ID`, `FirstName`, `LastName`, `Address`,  
`Phone_No`, `Salary`, `Sex`) VALUES ('2000', 'Maryam', 'Nouh', 'Sherouk,  
Cairo, Egypt', '01277337769', '8640240', 'F');
```

```
INSERT INTO `employee` (`Emp_ID`, `FirstName`, `LastName`, `Address`,  
`Phone_No`, `Salary`, `Sex`) VALUES ('470', 'Hana', 'Yasser', 'Nasr City,  
Cairo, Egypt', '01113040009', '190999', 'F');
```

```
INSERT INTO `employee` (`Emp_ID`, `FirstName`, `LastName`, `Address`,  
`Phone_No`, `Salary`, `Sex`) VALUES ('505', 'Abdel-Rahman', 'Megahed', 'The  
Fifth Settlement, Cairo, Egypt', '01227681101', '90986', 'M');
```

localhost / 127.0.0.1 / project / c +

localhost/phpmyadmin/index.php?route=/sql&server=1&db=project&table=employee&pos=0

PHPMYADMIN - Server: 127.0.0.1 - Database: project - Table: employee

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New
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employee
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insperson
service
technician
used_car
test

Showing row 0 - 4 (5 total, Query took 0.004 seconds)

SELECT * FROM `employee`

☐ Profiling ☐ Edit inline ☐ Edit ☐ Explain SQL ☐ Create PHP code ☐ Refresh

Show all Number of rows: 25 Filter rows: Search this table Sort by key: None

Options

	Emp_ID	Firstname	Lastname	Address	Phone_No	Salary	Sex
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	103	Youssef	Mans	Niciza, Cairo, Egypt	1023103820	497582	M
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	470	Hana	Yasser	Near City, Cairo, Egypt	1113040009	190999	F
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	505	Abdel-Rahman	Megahed	The Fifth Settlement, Cairo, Egypt	1227681101	90966	M
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	705	Self	Elena	Sheraton, Cairo, Egypt	1203022959	10	M
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	2000	Mariam	Noun	Sherouk, Cairo, Egypt	1277337769	8640240	F

☐ Check all ☐ With selected ☐ Sort ☐ Copy ☐ Delete ☐ Export

Show all Number of rows: 25 Filter rows: Search this table Sort by key: None

Query results operations

☐ Print ☐ Copy to clipboard ☐ Export ☐ Display chart ☐ Create view

Bookmark this SQL query

Label: ☐ Let every user access this bookmark

Console

```
INSERT INTO `contract` (`Contract_No`, `Cdate`, `Payment_info`,
`Customer_ID`, `FirstName`, `LastName`, `Phone_No`) VALUES ('980', '2021-06-19 17:35:19', 'Cash', '123923284', 'Ahmed', 'Osama', '01226548984');
```

localhost / 127.0.0.1 / project / c +

localhost/phpmyadmin/index.php?route=/sql&db=project&table=contract&pos=0

PHPMYADMIN - Server: 127.0.0.1 - Database: project - Table: contract

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color
contract
employee
includes
new_car
insperson
service
technician
used_car
test

Showing row 0 - 0 (1 total, Query took 0.004 seconds)

SELECT * FROM `contract`

☐ Profiling ☐ Edit inline ☐ Edit ☐ Explain SQL ☐ Create PHP code ☐ Refresh

Show all Number of rows: 25 Filter rows: Search this table

Options

	Contract_No	Cdate	Payment_info	Customer_ID	Firstname	Lastname	Phone_No
<input type="checkbox"/> Edit <input type="checkbox"/> Copy <input type="checkbox"/> Delete	980	2021-06-19 17:35:19	Cash	123923284	Ahmed	Osama	1226548984

☐ Check all ☐ With selected ☐ Sort ☐ Copy ☐ Delete ☐ Export

Show all Number of rows: 25 Filter rows: Search this table

Query results operations

☐ Print ☐ Copy to clipboard ☐ Export ☐ Display chart ☐ Create view

Bookmark this SQL query

Label: ☐ Let every user access this bookmark

Console

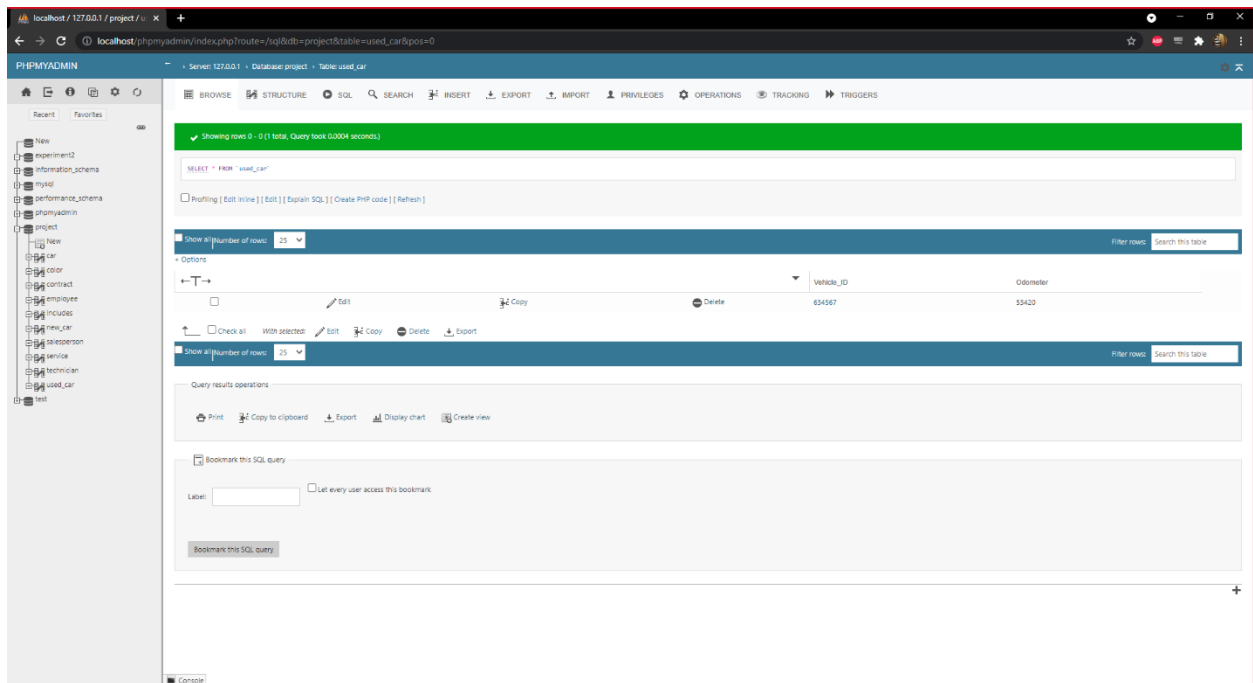
```
INSERT INTO `car` (`Vehicle_ID`, `Model`, `YEAR`, `Price`, `Numbers`,
`Letters`, `Emp_ID`, `Contract_No`) VALUES ('PA209254', 'Toyota', '2021-06-06
17:41:01.000000', '9345821', '277', 'MAF', '705', '980');
```

```
INSERT INTO `car` (`Vehicle_ID`, `Model`, `YEAR`, `Price`, `Numbers`,
`Letters`, `Emp_ID`, `Contract_No`) VALUES ('634567', 'Opel', '2021-06-06
17:45:09.000000', '289367', '823', 'SPAF', '505', '980');
```

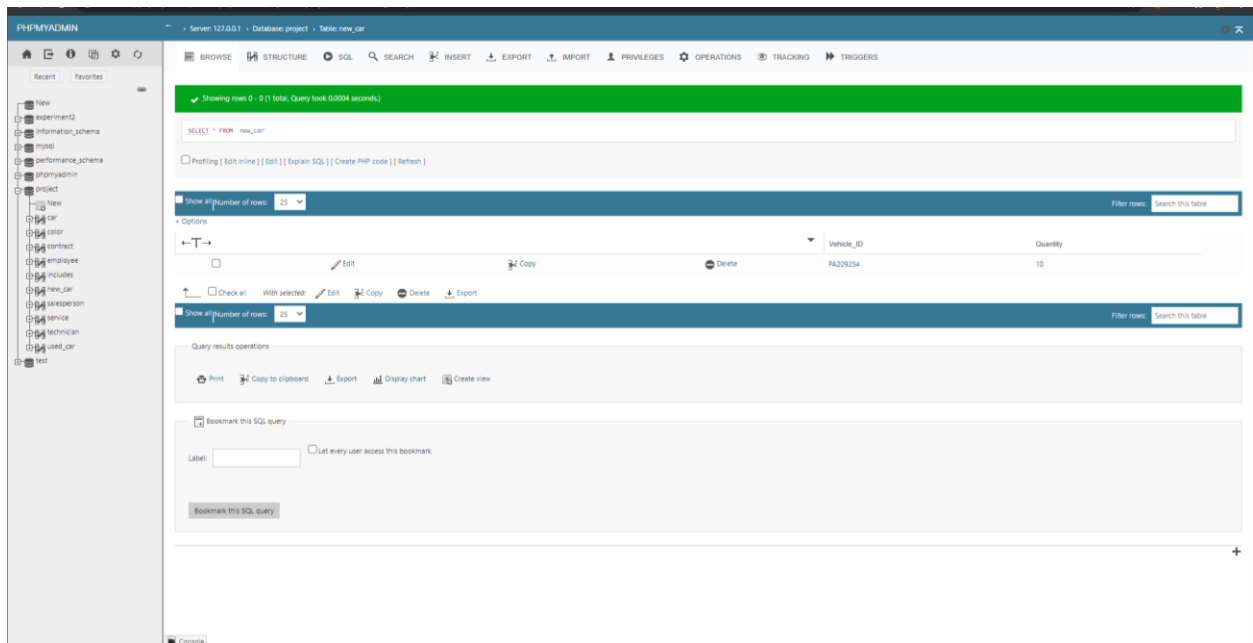
The screenshot shows the phpMyAdmin web interface. The left sidebar displays the database structure, including a 'project' database with a 'car' table. The main panel shows the 'car' table with two rows of data. A tooltip points to the 'Vehicle_ID' column header, indicating that clicking the dropdown arrow toggles column visibility. Below the table, there are options for query results operations like print, copy, export, and bookmarking the query.

Vehicle_ID	Model	YEAR	Price	Numbers	Letters	Emp_ID	Contract_No
634567	Opel	2021-06-06 17:45:09	289367	823	SPAF	505	980
PA209254	Toyota	2021-06-06 17:41:01	9345821	277	MAF	705	980

```
INSERT INTO `used_car` (`Vehicle_ID`, `Odometer`) VALUES ('634567', '53420');
```

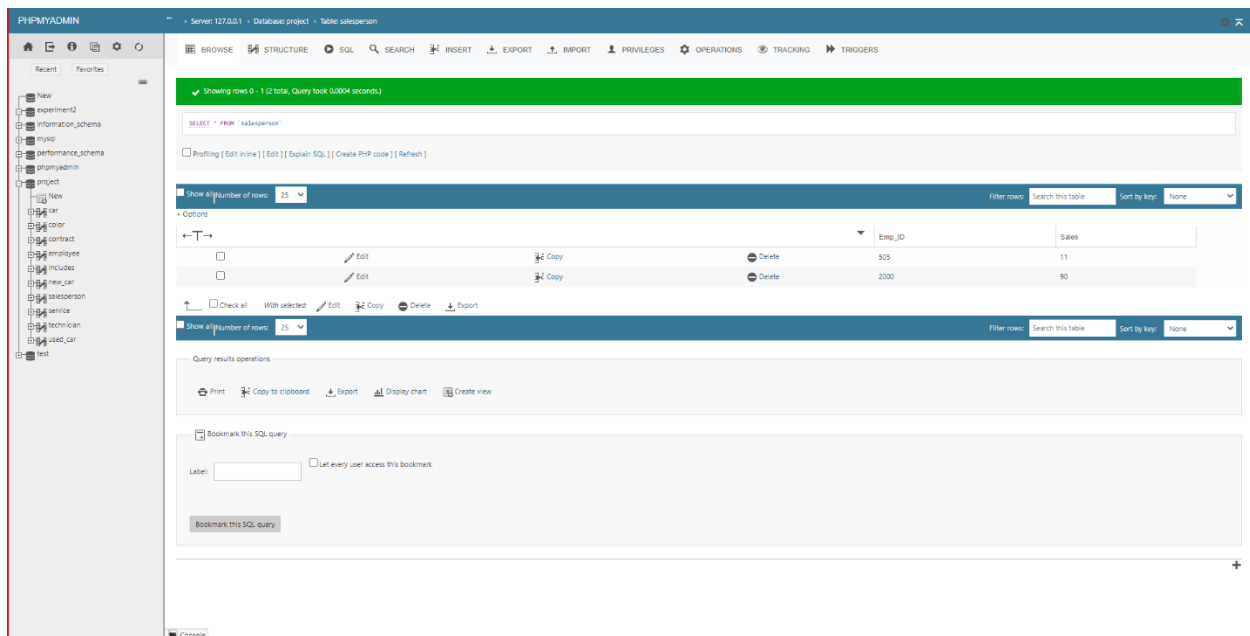


```
INSERT INTO `new_car` (`Vehicle_ID`, `Quantity`) VALUES ('PA209254', '10');
```

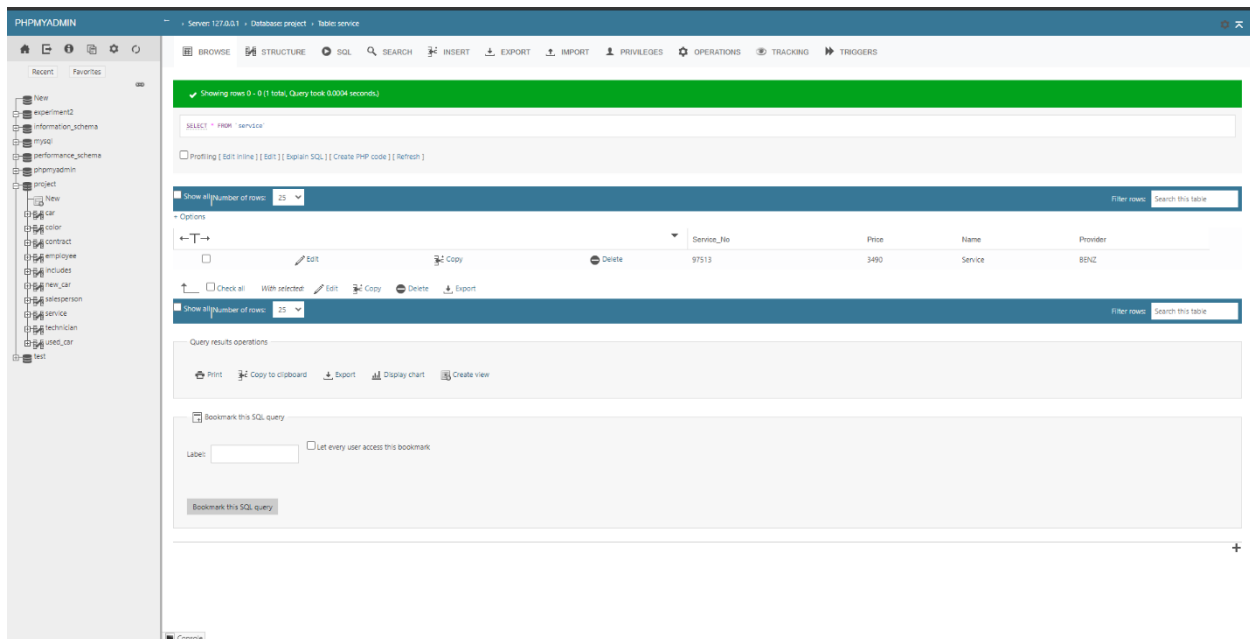


```
INSERT INTO `salesperson` (`Emp_ID`, `Sales`) VALUES ('2000', '90');
```

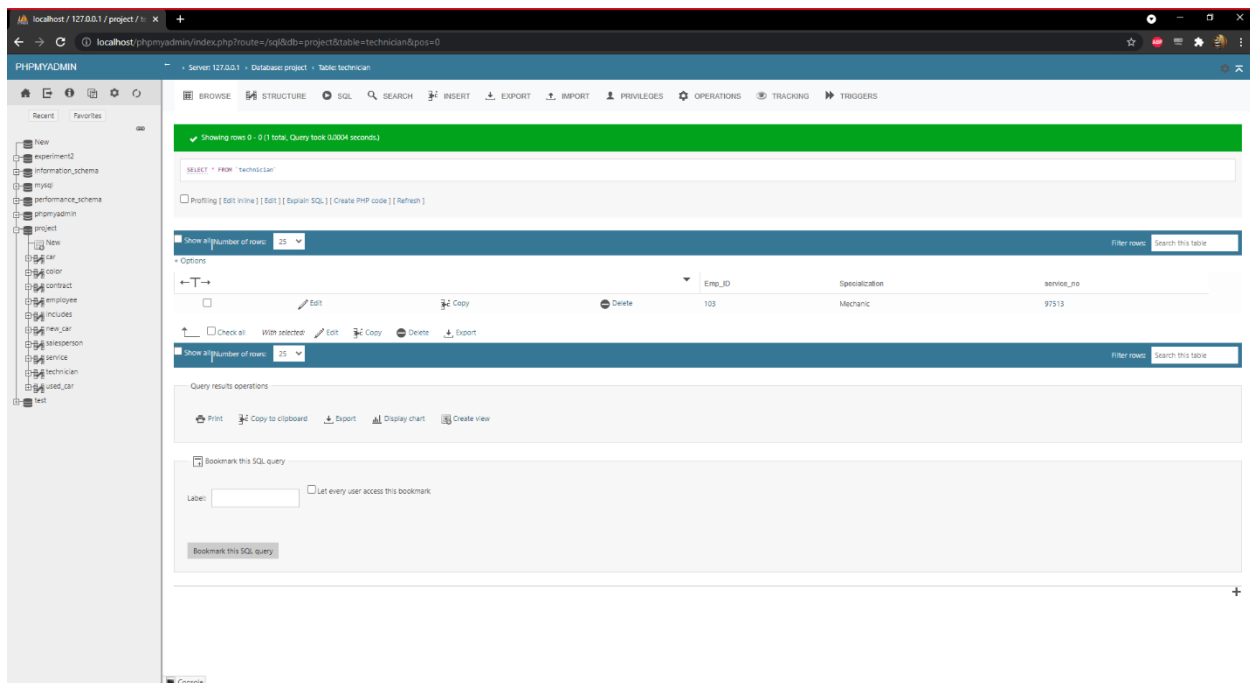
```
INSERT INTO `salesperson` (`Emp_ID`, `Sales`) VALUES ('505', '11');
```

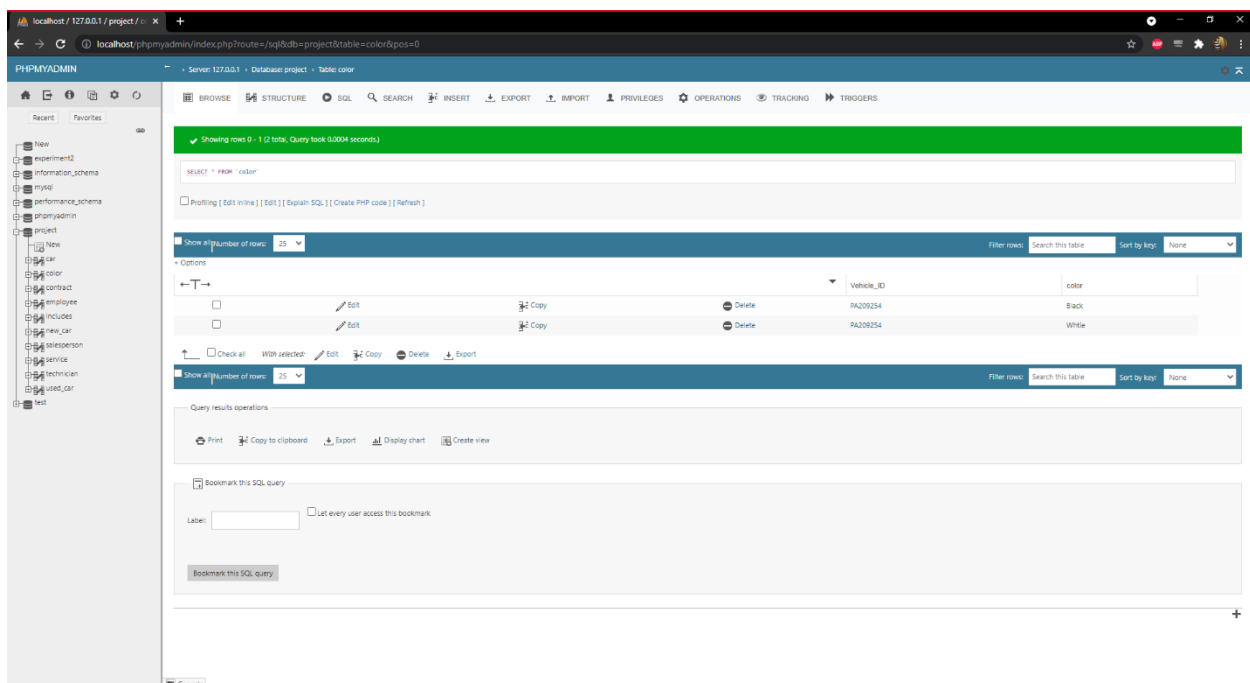
```
INSERT INTO `service` (`Service_No`, `Price`, `Name`, `Provider`) VALUES
('97513', '3490', 'Service', 'BENZ');
```



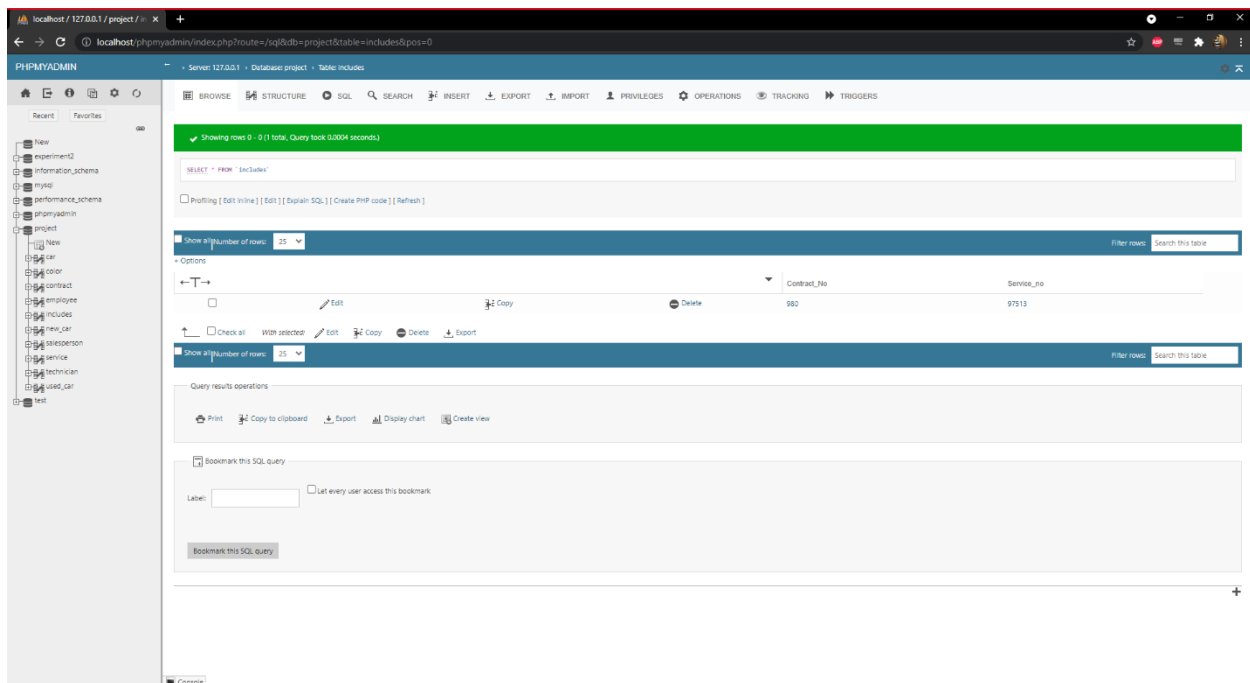
```
INSERT INTO `technician` (`Emp_ID`, `Specialization`, `service_no`) VALUES
('103', 'Mechanic', '97513');
```



```
INSERT INTO `color` (`Vehicle_ID`, `color`) VALUES ('PA209254', 'Black'),
('PA209254', 'Whitie');
```

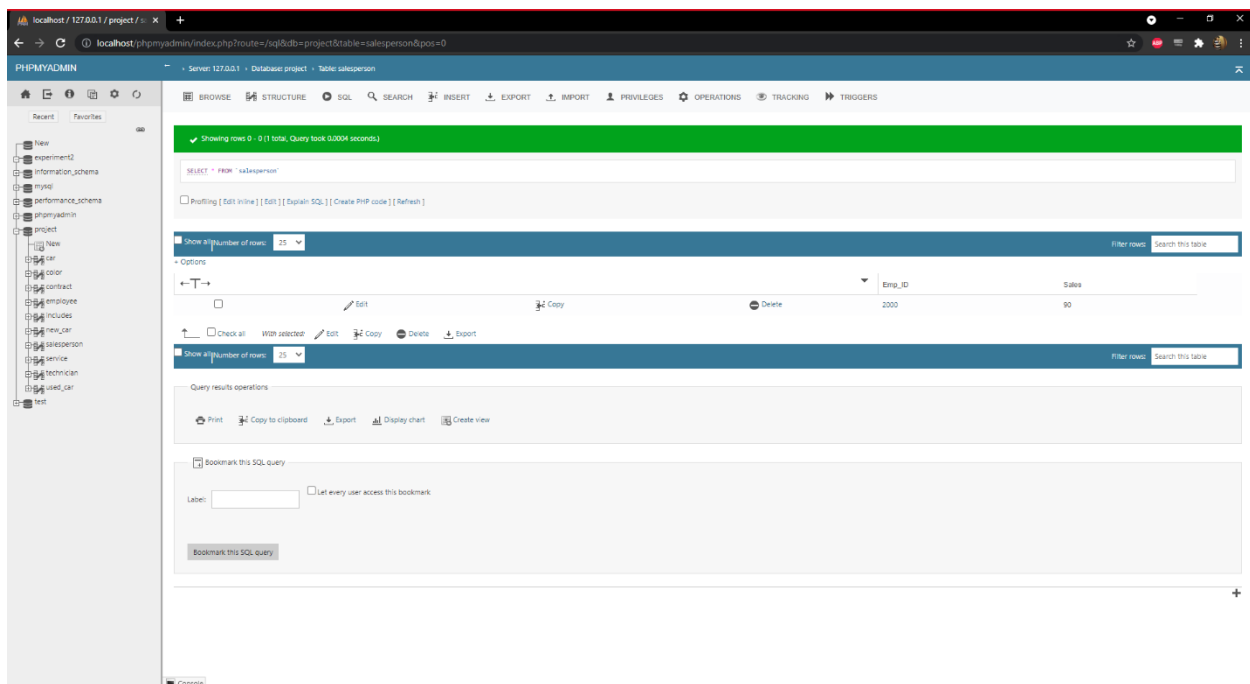


```
INSERT INTO `includes` (`Contract_No`, `Service_no`) VALUES ('980', '97513');
```



DELETE

DELETE FROM `salesperson` WHERE `salesperson`.`Emp_ID` = 505;



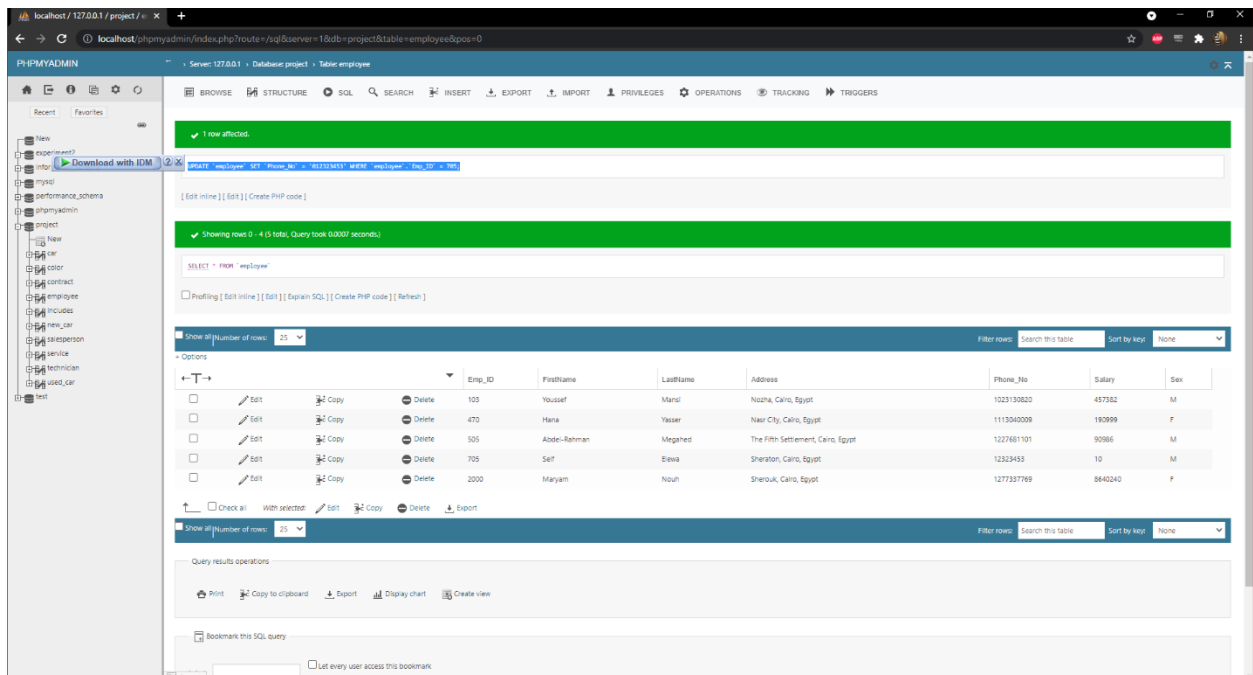
DELETE FROM `employee` WHERE `employee`.`Emp_ID` = 103 LIMIT 1;



The operation could not be completed as we defined the foreign keys that point towards this table's primary key to restrict the operation on DELETE. Hence, the error message.

UPDATE

UPDATE `employee` SET `Phone_No` = '012323453' WHERE `employee`.`Emp_ID` = 705;



UPDATE `employee` SET `Emp_ID` = '1010' WHERE `employee`.`Emp_ID` = 505;

localhost / 127.0.0.1 / project / ...

PHPMYADMIN - Server: 127.0.0.1 - Database: project - Table: employee

1 row affected.

SELECT * FROM employee

Showing rows 0 - 4 (5 total, Query took 0.006 seconds)

SELECT * FROM employee

Show all/Number of rows: 25

	Emp_ID	Firstname	Lastname	Address	Phone_No	Salary	Sex
<input type="checkbox"/>	103	Youssef	Mansi	Nozha, Cairo, Egypt	1023130820	457382	M
<input type="checkbox"/>	470	Hana	Yasser	Nasr City, Cairo, Egypt	1113040009	190999	F
<input type="checkbox"/>	705	Seif	Elena	Sheraton, Cairo, Egypt	12323433	10	M
<input type="checkbox"/>	1010	Abdel-Rahman	Megahed	The Fifth Settlement, Cairo, Egypt	1227681101	90986	M
<input type="checkbox"/>	2000	Maryam	Nouh	Sherouk, Cairo, Egypt	1277337769	8640240	F

Query results operations

Print Copy to clipboard Export Display chart Create view

Bookmark this SQL query

UPDATE `employee` SET `Emp_ID` = '9012' WHERE `employee`.`Emp_ID` = 2000;

localhost / 127.0.0.1 / project / ...

PHPMYADMIN - Server: 127.0.0.1 - Database: project - Table: employee

1 row affected.

UPDATE `employee` SET `Emp_ID` = '9012' WHERE `employee`.`Emp_ID` = 2000

Showing rows 0 - 4 (5 total, Query took 0.006 seconds)

SELECT * FROM employee

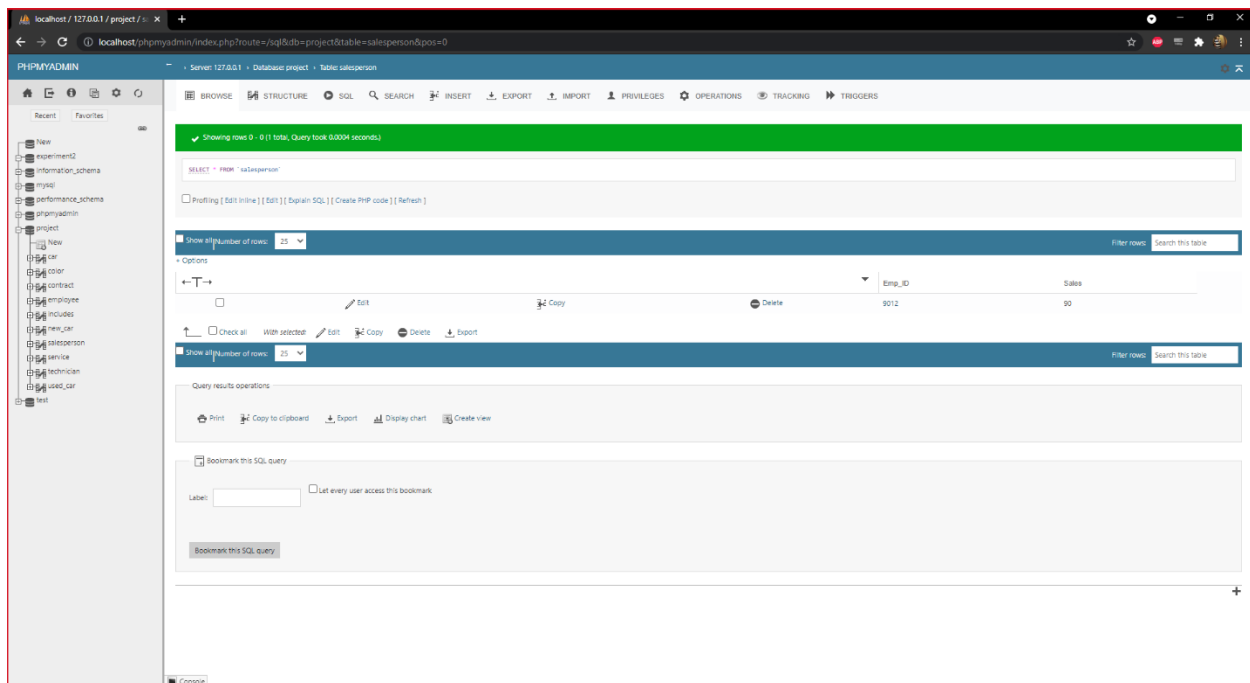
Show all/Number of rows: 25

	Emp_ID	Firstname	Lastname	Address	Phone_No	Salary	Sex
<input type="checkbox"/>	103	Youssef	Mansi	Nozha, Cairo, Egypt	1023130820	457382	M
<input type="checkbox"/>	470	Hana	Yasser	Nasr City, Cairo, Egypt	1113040009	190999	F
<input type="checkbox"/>	705	Seif	Elena	Sheraton, Cairo, Egypt	12323433	10	M
<input type="checkbox"/>	1010	Abdel-Rahman	Megahed	The Fifth Settlement, Cairo, Egypt	1227681101	90986	M
<input type="checkbox"/>	9012	Maryam	Nouh	Sherouk, Cairo, Egypt	1277337769	8640240	F

Query results operations

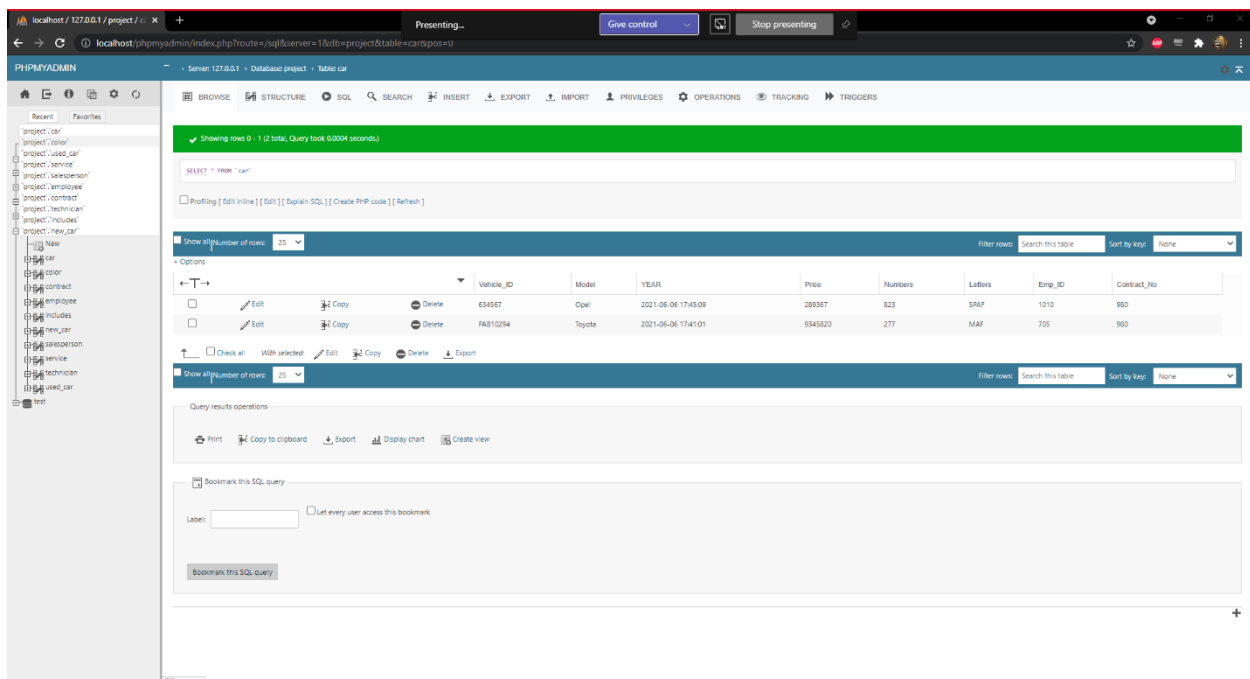
Print Copy to clipboard Export Display chart Create view

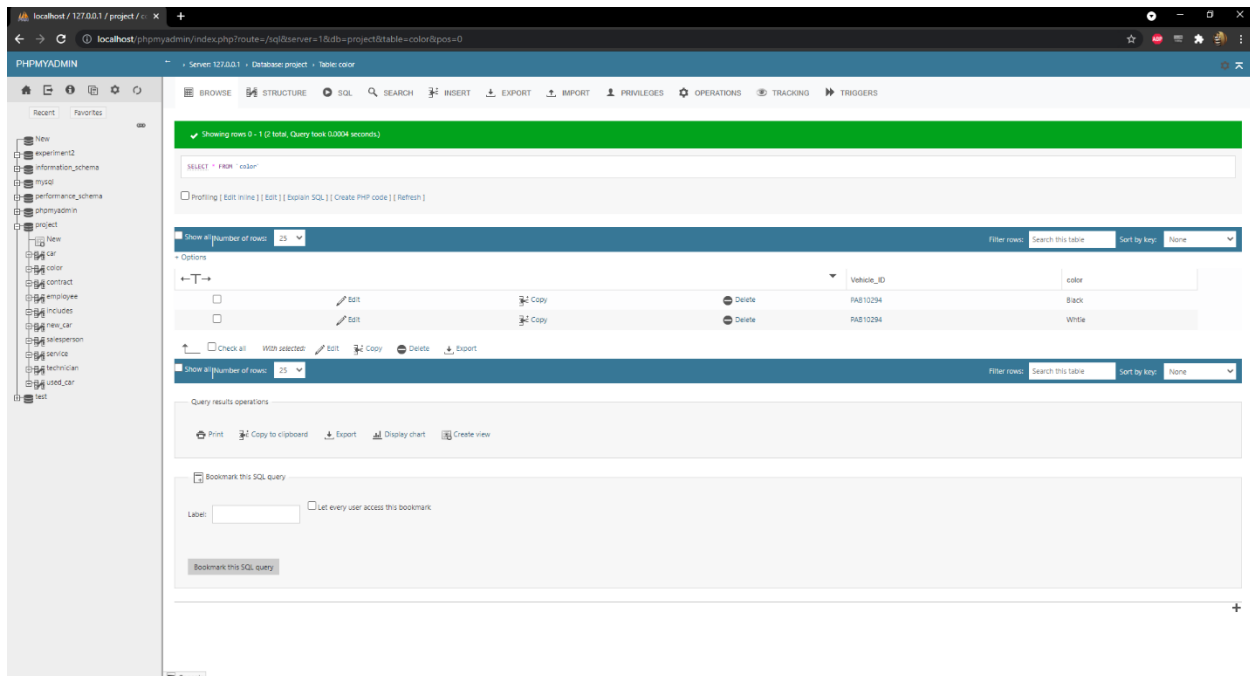
Bookmark this SQL query



The employee's id was updated successfully in all the tables that point to this primary key as foreign keys, since we specified that on UPDATE, the operation should cascade, hence, the id in salesperson table was also updated to match the id in employee table.

UPDATE `car` SET `Vehicle_ID` = 'PAB10294' WHERE `car`.`Vehicle_ID` = 'PA209254';





The car's id was updated successfully in all the tables that point to this primary key as foreign keys, since we specified that on UPDATE, the operation should cascade, hence, the id in car table was also updated to match the id in color table.

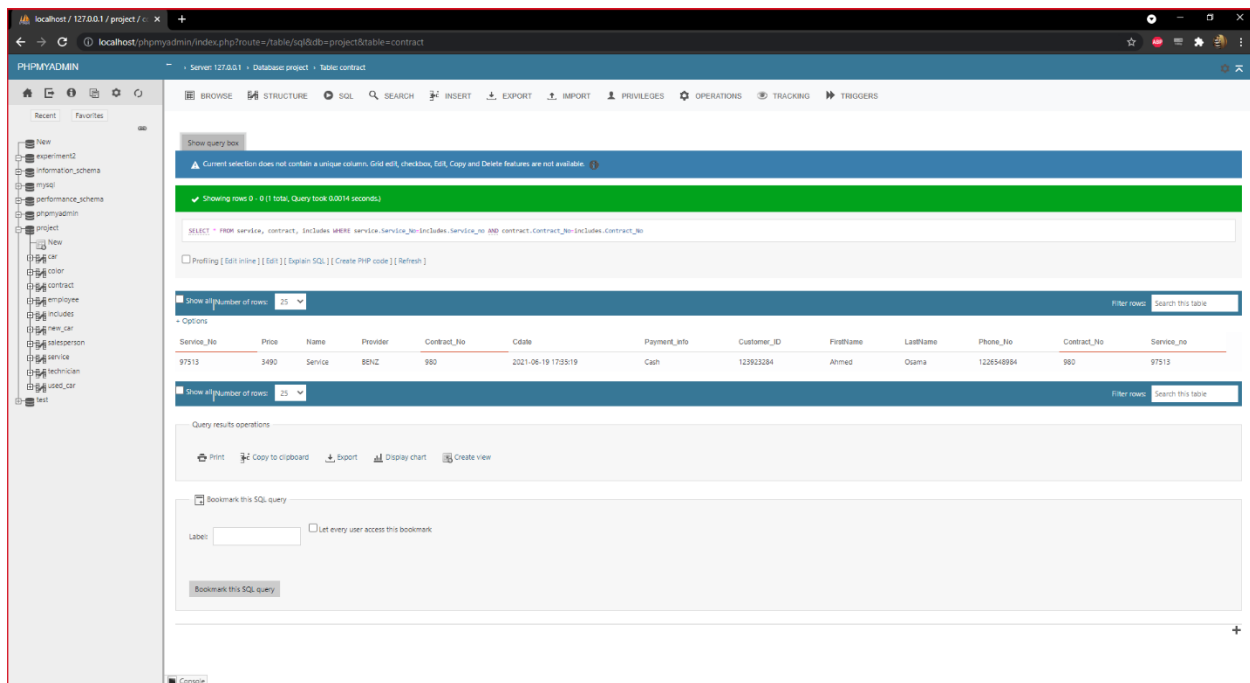
Queries

SELECT *

FROM service, contract, includes

WHERE service.Service_No=includes.Service_no

AND contract.Contract_No=includes.Contract_No



```
SELECT Customer_ID,FirstName, LastName, Count(*)
```

```
FROM contract,car,color
```

```
WHERE contract.Contract_No=car.Contract_No
```

```
AND color.Vehicle_ID=car.Vehicle_ID
```

```
GROUP BY Customer_ID
```


localhost / 127.0.0.1 / project / c +

localhost:phpmyadmin/index.php?route=/table/sql&db=project&table=contract

Server: 127.0.0.1 - Database: project - Table: contract

Recent Favorites

- New
- experiment2
- information_schema
- mysql
- performance_schema
- phpmyadmin
- project
 - new
 - car
 - color
 - contract
 - employee
 - includes
 - new_car
 - seaperson
 - service
 - technician
 - used_car
- test

Delimiter: ☐ Show this query here again ☐ Retain query box ☐ Rollback when finished ☒ Enable foreign key checks

Go

Hide query box

Current selection does not contain a unique column. Grid edit, checkbox, Edit, Copy and Delete features are not available.

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

☐ Profiling ☐ Edit inline ☐ Edit ☐ Explain SQL ☐ Create PHP code ☐ Refresh

Show all (Number of rows: 25) Filter rows Search this table

Options

Customer_ID	FirstName	LastName	Count(*)
123923284	Ahmed	Osama	2

Show all (Number of rows: 25) Filter rows Search this table

Query results operations

Print Copy to clipboard Export Display chart Create view

Bookmark this SQL query

Label: ☐ Let every user access this bookmark

Bookmark this SQL entry

Console

SELECT FirstName, LastName, max(salary)

FROM employee

localhost / 127.0.0.1 / project / c +

localhost:phpmyadmin/index.php?route=/table/sql&db=project&table=contract

Server: 127.0.0.1 - Database: project - Table: employee

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 - technician
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Bookmark this SQL query

Delimiter: ☐ Show this query here again ☐ Retain query box ☐ Rollback when finished ☒ Enable foreign key checks

Go

Hide query box

Showing rows 0 - 0 (1 total, Query took 0.0010 seconds)

☐ Profiling ☐ Edit inline ☐ Edit ☐ Explain SQL ☐ Create PHP code ☐ Refresh

Show all (Number of rows: 25) Filter rows Search this table

Options

FirstName	LastName	max(salary)
Youssef	Mami	6640240

Show all (Number of rows: 25) Filter rows Search this table

Query results operations

Print Copy to clipboard Export Display chart Create view

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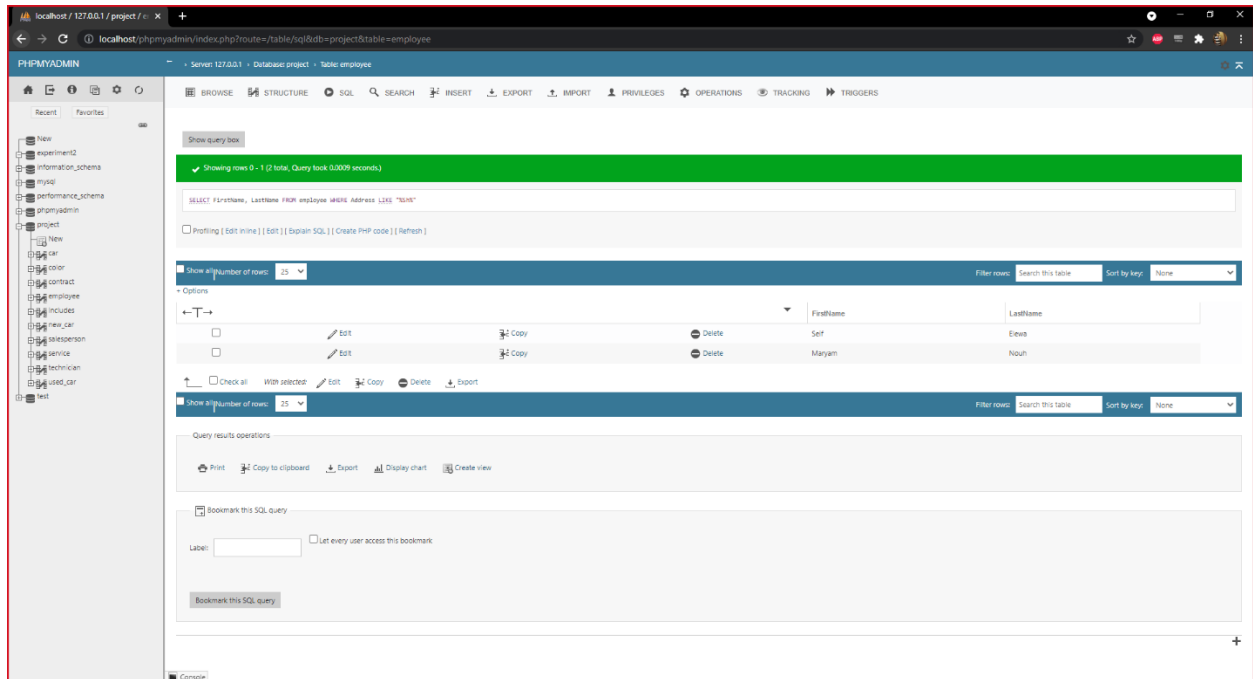
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Console

```
SELECT FirstName, LastName
```

```
FROM employee
```

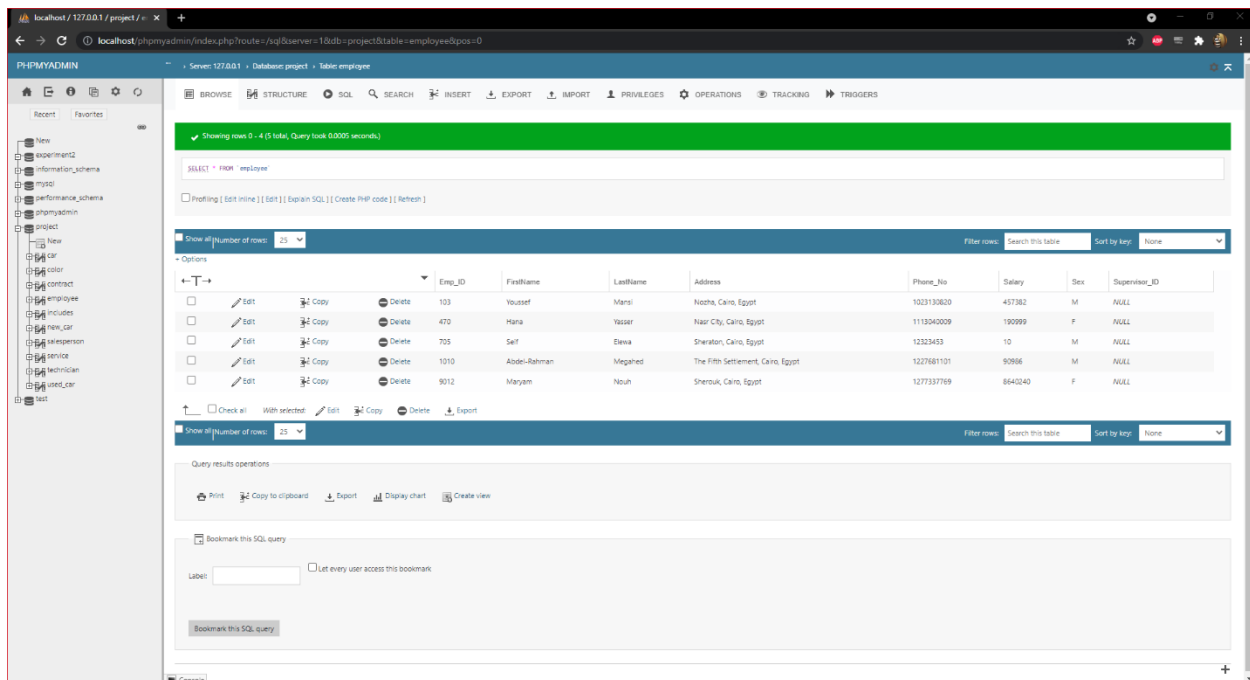
```
WHERE Address LIKE "Sh%"
```



Alter

```
ALTER TABLE employee ADD Supervisor_ID SMALLINT
```

```
ALTER TABLE `employee` ADD FOREIGN KEY (`Supervisor_ID`) REFERENCES `employee`  
(`Emp_ID`) ON DELETE SET NULL ON UPDATE CASCADE;
```



After creating the database, a new attribute was to be added to the employee table, which consists of a unity relationship “supervises”. This was done using ALTER TABLE, to add a new attribute called supervisor_id. This new attribute references the primary key of the table as foreign key, so that constraint was then added, while highlighting to set null on delete and cascade on update.

More inserts and updates functionalities:

```
INSERT INTO `employee` (`Emp_ID`, `FirstName`, `LastName`, `Address`,
`Phone_No`, `Salary`, `Sex`, `Supervisor_ID`) VALUES ('321', 'John', 'Doe',
'Misr el Gedidia, Cairo, Egypt', '01198462812', '5000', 'M', NULL), ('856',
'Hana', 'Ahmed', 'Maadi, Cairo, Egypt', '01009836121', '3500', 'F', NULL);
```

```
INSERT INTO `salesperson` (`Emp_ID`, `Sales`) VALUES ('856', '30');
```

```
INSERT INTO `service` (`Service_No`, `Price`, `Name`, `Provider`) VALUES
('760', '1500', 'Electronic', 'PRI'), ('540', '4000', 'Tires', 'HAM');
```

```
UPDATE `service` SET `Name` = 'Maintenance' WHERE `service`.`Service_No` = 97
513;
```

```
INSERT INTO `technician` (`Emp_ID`, `Specialization`, `service_no`) VALUES  
('321', 'Electric', '760'), ('705', 'Tire Change', '540');
```

```
INSERT INTO `contract` (`Contract_No`, `Cdate`, `Payment_info`,  
`Customer_ID`, `FirstName`, `LastName`, `Phone_No`) VALUES ('1230', '2013-06-  
14 22:24:52', 'Cash', '9832', 'Omar', 'Nouh', '0122000560'), ('3209', '2004-  
04-14 22:24:52', 'Credit', '6452', 'Jack', 'Christan', '01119820132');
```

```
INSERT INTO `car` (`Vehicle_ID`, `Model`, `YEAR`, `Price`, `Numbers`,  
`Letters`, `Emp_ID`, `Contract_No`) VALUES ('8219', 'BYD', '2021-06-07  
22:27:49.000000', '200000', '378', 'hgs', '856', '1230'), ('1346', 'Jeep',  
'2021-05-04 22:27:50', '500000', '843', 'dng', '1010', '3209');
```

```
INSERT INTO `color` (`Vehicle_ID`, `color`) VALUES ('634567', 'Red'),  
('1346', 'Blue');
```

```
INSERT INTO `color` (`Vehicle_ID`, `color`) VALUES ('634567', 'Grey'),  
('8219', 'Burgundy');
```

```
INSERT INTO `new_car` (`Vehicle_ID`, `Quantity`) VALUES ('8219', '1');
```

```
INSERT INTO `used_car` (`Vehicle_ID`, `Odometer`) VALUES ('1346', '10000');
```

```
INSERT INTO `includes` (`Contract_No`, `Service_no`) VALUES ('980', '760'),  
('1230', '540');
```

```
INSERT INTO `includes` (`Contract_No`, `Service_no`) VALUES ('1230', '760'),  
('3209', '97513');
```

More queries:

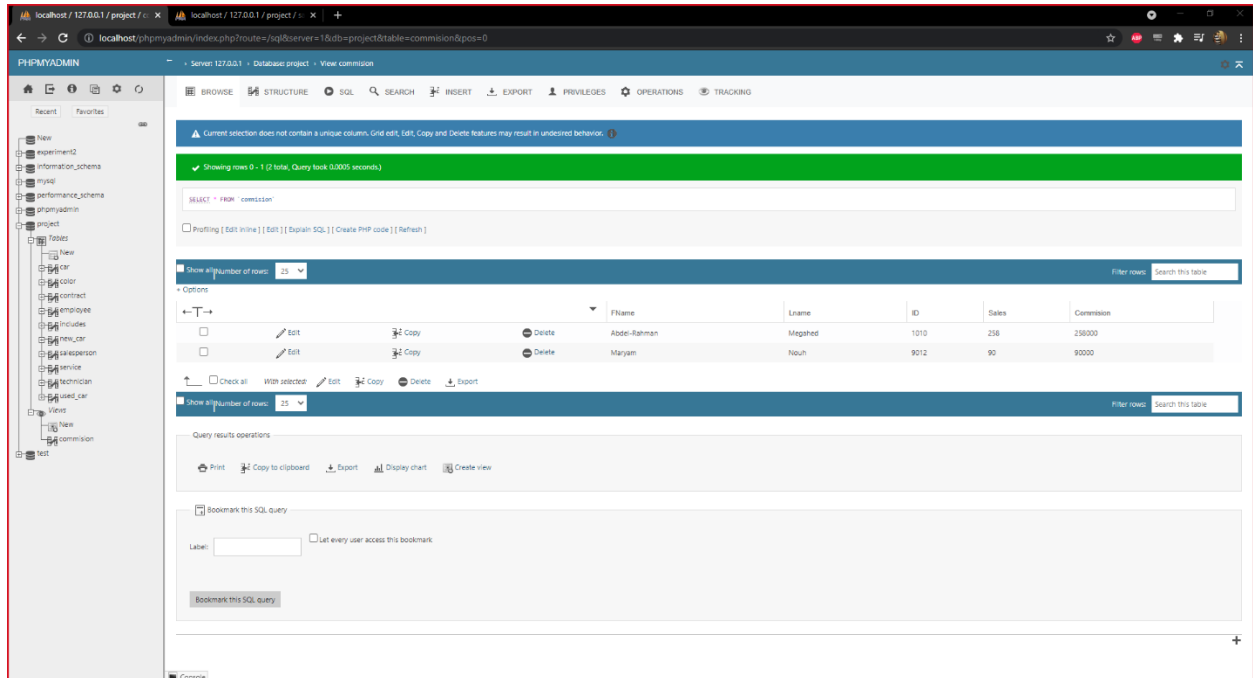
```
CREATE VIEW Commision(FName, Lname, ID, Sales, Commision) AS
```

```
SELECT FirstName, LastName, employee.Emp_ID, sales, sales*1000
```

```
FROM employee, salesperson
```

WHERE employee.Emp_ID=salesperson.Emp_ID

AND sales>50



SELECT customer_id, payment_info, vehicle_id, contract.contract_No, provider,
Name

FROM service,includes,car,contract

WHERE service.Service_No=includes.Service_no

AND contract.Contract_No=car.Contract_No

AND includes.Contract_No=contract.Contract_No

localhost/phpmyadmin/index.php?route=/table/sql&db=project&table=contract

PHPMYADMIN

Server: 127.0.0.1 Database: project Table: contract

BROWSE STRUCTURE SQL SEARCH INSERT EXPORT IMPORT PRIVILEGES OPERATIONS TRACKING TRIGGERS

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used_car
test

Hide query box

Current selection does not contain a unique column. Grid edit, checkbox, Edit, Copy and Delete features are not available.

Showing rows 0 - 6 (7 total, Query took 0.0091 seconds)

SELECT customer_id, payment_info, vehicle_id, contract.contract_no, provider, Name FROM service,includes,car,contract WHERE service.Service_No=includes.Service_no AND contract.Contract_No=car.Contract_No AND includes.Contract_No=contract.Contract_No

Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]

Show all [Number of rows: 25] Filter rows: Search this table

Options

customer_id	payment_info	vehicle_id	contract_no	provider	Name
123923284	Cash	634567	980	PRJ	Electronic
123923284	Cash	PAB10294	980	PRJ	Electronic
123923284	Cash	634567	980	BENZ	Maintenance
123923284	Cash	PAB10294	980	BENZ	Maintenance
9832	Cash	8219	1230	HAM	Tires
9832	Cash	8219	1230	PRJ	Electronic
6452	Credit	1346	3209	BENZ	Maintenance

Show all [Number of rows: 25] Filter rows: Search this table

Console y results operations

SELECT Customer_ID, FirstName, LastName,COUNT(*)

FROM contract, car

WHERE contract.Contract_No=car.Contract_No

GROUP BY Customer_ID

localhost / 127.0.0.1 / project / ... localhost / 127.0.0.1 / project / ...

localhost/phpmyadmin/index.php?route=/table/sql&db=project&table=salesperson

PHPMYADMIN

Server: 127.0.0.1 Database: project Table: salesperson

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service
technician
used_car
test

Show query box

Current selection does not contain a unique column. Grid edit, checkbox, Edit, Copy and Delete features are not available.

Showing rows 0 - 2 (3 total, Query took 0.0013 seconds)

SELECT Customer_ID, FirstName, LastName,COUNT(*) FROM contract, car WHERE contract.Contract_No=car.Contract_No GROUP BY Customer_ID

Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]

Show all [Number of rows: 25] Filter rows: Search this table

Options

Customer_ID	FirstName	LastName	COUNT(*)
6452	Jack	Christian	1
9832	Omar	Nouh	1
123923284	Ahmed	Osama	2

Show all [Number of rows: 25] Filter rows: Search this table

Query results operations

Print Copy to clipboard Report Display chart Create view

Bookmark this SQL query

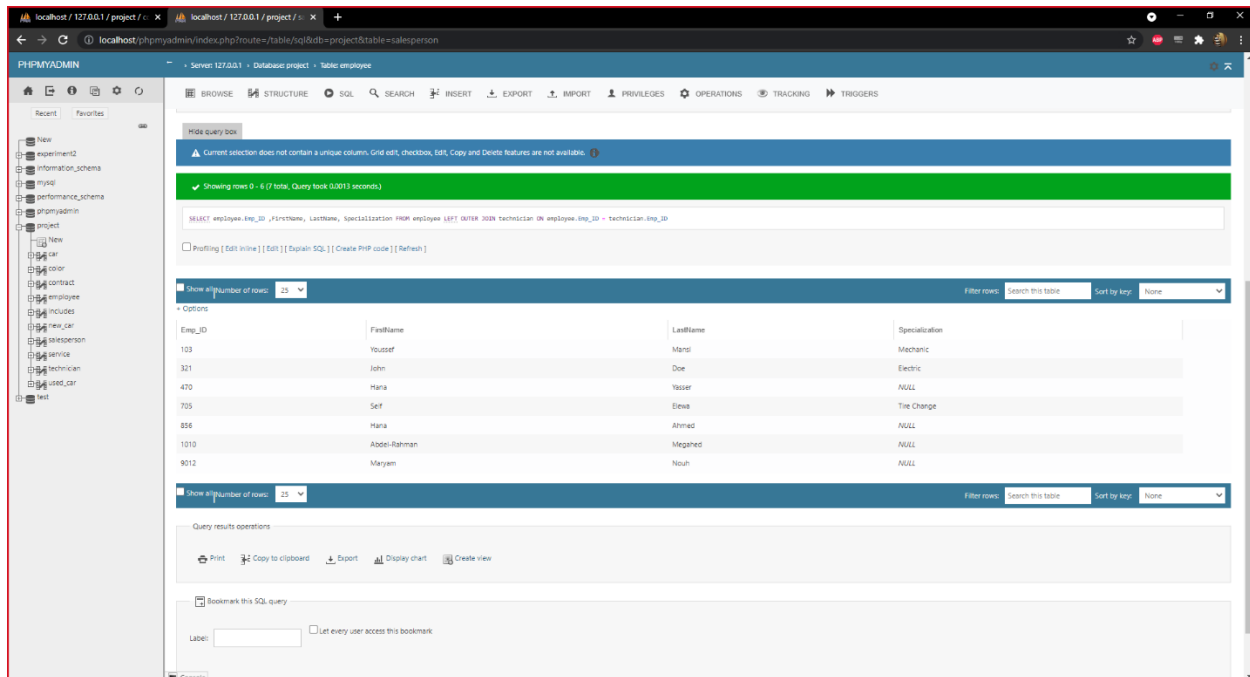
Label: Let every user access this bookmark

Bookmark this SQL query

Console

```
SELECT employee.Emp_ID ,FirstName, LastName, Specialization

FROM employee LEFT OUTER JOIN technician ON employee.Emp_ID =
technician.Emp_ID;
```



More update functionalities:

```
UPDATE `employee` SET `Supervisor_ID` = '9012' WHERE `employee`.`Emp_ID` = 103;
```

```
UPDATE `employee` SET `Supervisor_ID` = '9012' WHERE `employee`.`Emp_ID` = 1010;
```

```
UPDATE `employee` SET `Supervisor_ID` = '103' WHERE `employee`.`Emp_ID` = 321;
```

```
UPDATE `employee` SET `Supervisor_ID` = '1010' WHERE `employee`.`Emp_ID` = 470;
```

```
UPDATE `employee` SET `Supervisor_ID` = '103' WHERE `employee`.`Emp_ID` = 705;
```

```
UPDATE `employee` SET `Supervisor_ID` = '1010' WHERE `employee`.`Emp_ID` = 856;
```

More queries:

```
SELECT Emp_ID, FirstName, LastName, AVG(Salary)
```

```
FROM employee
```

```
WHERE Emp_ID IN (
```

```
SELECT Supervisor_ID
```

```
FROM employee)
```

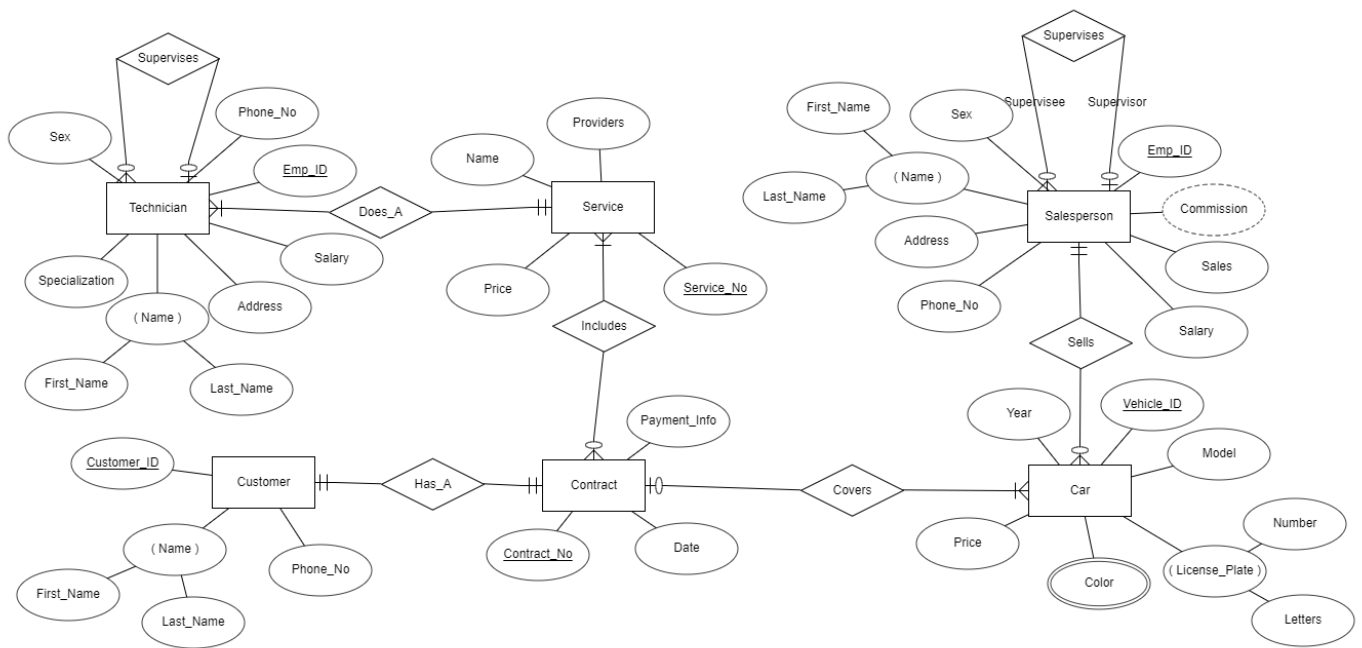
```
GROUP BY Emp_ID
```

The screenshot shows the PHPMyAdmin web interface. The left sidebar displays a database structure tree with the 'employee' table selected. The main panel shows the results of a SQL query. The query is: `SELECT Emp_ID, FirstName, LastName, AVG(Salary) FROM employee WHERE Emp_ID IN (SELECT Supervisor_ID FROM employee) GROUP BY Emp_ID`. The results table has 4 columns: Emp_ID, FirstName, LastName, and AVG(Salary). It contains 3 rows of data.

Emp_ID	FirstName	LastName	AVG(Salary)
103	Youssef	Mari	457382
1010	Abdel-Rahman	Megahed	90965.9921875
9012	Mariam	Noun	8540240

Below the table, there are options for query results operations: Print, Copy to clipboard, Export, Display chart, and Create view. There is also a section for bookmarking the query, with a label field and a checkbox for 'Let every user access this bookmark'.

ERD+ Diagram for generated SQL



Tool used to write SQL

PHP MyAdmin: phpMyAdmin is a free software tool written in PHP, intended to handle the administration of MySQL over the Web. phpMyAdmin supports a wide range of operations on MySQL and MariaDB. Frequently used operations (managing databases, tables, columns, relations, indexes, users, permissions, etc) can be performed via the user interface, while you still have the ability to directly execute any SQL statement.