**DBMS Project :** ( Rent Your Car) (With Oracle)

**Description of Project and list of Assumptions :**

The project is to design a database for a company called RYC.com. The business objective of RYC.com is to list vehicles of clients who can rent them to customers for a certain period of time.

The project is designed by considering the suggestions and limitations proposed by company.

At present we have considered vehicle as CAR but this project can be extended to include bicycles, helicopters and airplanes.

**Assumptions :**

1. General Manager is for an office and GM\_id is defined in Office table only.
2. Manger ID of every employee is maintained in Employee table only.
3. Managers of employees will report to General Manager of office.
4. Rejected booking requests are also maintained in Booking\_Request table , and is tracked through a field ‘ Client\_response’
5. Transactions,Accidents are tracked through Booking \_ID which is in booking\_request table.
6. IF Employee is a client then we have a table level constraint that checks the inspecting empid & Client emp id . IF both are same then system throws error and does not allow user to insert the record.
7. Database stores only the latest divorce status of employee though employee has multiple divorces.
8. Though If employee changes his/her name multiple times in the past ,database stores only the last name prior to the present name.
9. Customers provide rating to the vehicle and client separately.

**3 .ERM to a Relational Database:**

**Office :**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Office id** | Name | Address | Ph number | Fax Number | Email | Open Hours | Businessdays | No of Emps | Directions | GM Id | GM name |

**Emp:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **EMp Id** | Office id | F Name | L Name | M Name | Address | SSN | Salary | Tax dedu | DOB | Marital St | Spouse | Office | Hiring Dt | Divorce status | Previous name | Manager ID |

**Checks :**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Emp id** | **Clnt Id** | Credit score | Scored date | Remarks |

**Client :**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Clnt Id** | Office id | SSN | F Name | L Name | M Name | DOB | Home Ph | Cell Ph | Street Add | Email | CC No | Card Exp | Credit score | F Name | L Name | M Name | DOB | Home Ph | Cell Ph | Street Add | Email | CC No | Card Exp | Credit score |  |  |  |

**Lists :**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Clnt Id** | **Car id** | **Registered Date** | Office id | Registered upto | unlist\_date |

**Vehicle :**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Car id** | Clnt Id | Car info | Curr mileage | Class | Features | Make | Color | Year | Pic | Daily price | Miles included | Addition cost/mile | Weekly discount | Monthly discount | Car description | Registered upto |

**Customer :**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Cust id** | Office Id | F Name | L Name | Birth Date | Cell phone | Address | Email | DL state | DL Num | Credit card No | Card exp |  |

**Booking Request :**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Booking Id** | Req Dt | Car Id | Cust Id | Clnt Id | Clnt Response | vehicle location | Clnt reply Dt & Time | Vehicle req upto |

**Rating :**

|  |  |  |  |
| --- | --- | --- | --- |
| **Booking Id** | Rating to Client by Customer | Rating to Customer by Client | Rating of vehicle by Customer |

**Transaction :**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Tran Id** | Booking Id | Tran Dt | Amount | Miles run |

**Accident :**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Booing Id** | Accident Dt | Acc Time | Place | Ext of Damage | Cost of Damage | Police Report(Y/N) | Summary of Report | Remarks |  |  | Place | Ext of Damage | Cost of Damage | Police Report(Y/N) | Summary of Report | Remarks |

**Manager**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Manager Id** | Mgr Name | Rep EMP Ids | Rep emp Name | Office Id |  |  |  |  |  |

**Table wise Functional Dependencies :**

**Office : (**PK- Office id)

Office id, Name, Address, Ph number, Fax Number, Email, Open Hours, Businessdays, No of Emps, Directions, GM Id, GM name

FDs:

Office id🡪Name, Address, Ph number, Fax Number, Email, Open Hours, Businessdays, No of Emps, Directions, GM Id, GM name

GM Id🡪Office id, Name, Address, Ph number, Fax Number, Email, Open Hours, Businessdays, No of Emps, Directions, GM name

Ph number 🡪GM Id,Office id, Name, Address, Fax Number, Email, Open Hours, Businessdays, No of Emps, Directions, GM name

Email 🡪GM Id,Office id, Name, Address, Ph number, Fax Number,Open Hours, Businessdays, No of Emps, Directions, GM name

**Client** (PK-Clnt Id, FK-Office id)

Clnt Id, office id, SSN,F Name, L Name, M Name, DOB, Home Ph, Cell Ph , Address, Email, CC No, Card Exp, Credit score

FDs:

Clnt Id🡪SSN,F Name, L Name, M Name, DOB, Home Ph, Cell Ph , Address, Email, CC No, Card Exp, Credit score

SSN🡪Clnt Id, F Name, L Name, M Name, DOB, Home Ph, Cell Ph , Address, Email, CC No, Card Exp, Credit score

Home Ph, 🡪 Clnt Id, office id SSN,F Name, L Name, M Name, DOB, Cell Ph , Address, Email, CC No, Card Exp, Credit score

Cell Ph 🡪Clnt Id, office id SSN,F Name, L Name, M Name, DOB, Home Ph, , Address, Email, CC No, Card Exp, Credit score

Email🡪Clnt Id, office id SSN,F Name, L Name, M Name, DOB, Home Ph, Cell Ph , Address, CC No, Card Exp, Credit score

TO make this into NF we need to split address field into : Flat No,Street No,City,State,zipcode

**Vehicle :** (PK- Car id,FK-Clnt\_Id)

Car id, Clnt Id, Car info, Curr mileage, Class, Features, Make, Color, Year, Pic, Daily price, Miles included, Addition cost/mile, Weekly discount, Monthly discount, Car description.

FDs:

Car id🡪Clnt Id, Car info, Curr mileage, Class, Features, Make, Color, Year, Pic, Daily price, Miles included, Addition cost/mile, Weekly discount, Monthly discount, Car description.

**Emp** (PK-EMP ID, FK-Office id)

EMP Id, Office id, F Name, L Name, M Name, Gender, Address, SSN, Salary, Tax dedu, DOB, Marital St, Spouse, Office, Hiring Dt, Divorce status, Previous name, Manager ID, Manager name, No of years at this office, No of years at company, Last degree & Date, List of certificates, List of Degrees, No of Dependents, Home Ph No, Cell Ph No.

FDs:

EMP Id 🡪 Office id, F Name, L Name, M Name, Gender, Address, SSN, Salary, Tax dedu, DOB, Marital St, Spouse, Office, Hiring Dt, Divorce status, Previous name, Manager ID, Manager name, No of years at this office, No of years at company, Last degree & Date, List of certificates, List of Degrees, No of Dependents, Home Ph No, Cell Ph No.

SSN🡪EMP Id, Office id, F Name, L Name, M Name, Gender,Address, Salary, Tax dedu, DOB, Marital St, Spouse, Office, Hiring Dt, Divorce status, Previous name, Manager ID, Manager name, No of years at this office, No of years at company, Last degree & Date, List of certificates, List of Degrees, No of Dependents, Home Ph No, Cell Ph No.

Home Ph No🡪EMP Id, Office id, F Name, L Name, M Name, Gender, Address, SSN, Salary, Tax dedu, DOB, Marital St, Spouse, Office, Hiring Dt, Divorce status, Previous name, Manager ID, Manager name, No of years at this office, No of years at company, Last degree & Date, List of certificates, List of Degrees, No of Dependents, Cell Ph No.

Cell Ph No🡪EMP Id, Office id, F Name, L Name, M Name, Gender,Address, SSN, Salary, Tax dedu, DOB, Marital St, Spouse, Office, Hiring Dt, Divorce status, Previous name, Manager ID, Manager name, No of years at this office, No of years at company, Last degree & Date, List of certificates, List of Degrees, No of Dependents, Home Ph No.

EMP Id🡪Office id

Office id🡪Office

EMP Id🡪 Manager ID

Manager ID🡪Manager name,

MVDs:

EMP Id 🡪List of certificates

EMP Id 🡪 List of Degrees

**Checks**(PK- Emp id &Clnt Id)

Emp id, Clnt Id ,Is\_employee,Clnt\_emp\_id, credit score, Scored date, Remarks

FDs:

Emp id, Clnt Id🡪 Is\_employee,Clnt\_emp\_id, credit score, Scored date, Remarks

**Lists :** (PK- Clnt Id, Car id)

Clnt Id, Car id, Registered Date, Office id, Registered upto, unlist\_date

FDs:

Clnt Id, Car id 🡪 Registered Date ,Office id, Registered upto, unlist\_date

Car Id🡪Clnt Id

Clnt Id🡪Office id ( 3NF)

**Customer:** (PK- Cust id, Fk- Office Id)

Cust id, Office Id, F Name, L Name, Birth Date, Cell phone, Address, Email, DL state, DL Num, Credit card No,Card exp

FDs:

Cell phone🡪Cust id🡪Office Id, F Name, L Name, Birth Date, Address, Email, DL state, DL Num, Credit card No,Card exp

Email🡪Cust id🡪Office Id, F Name, L Name, Birth Date, Cell phone, Address, DL state, DL Num, Credit card No,Card exp

DL Num🡪Cust id🡪Office Id, F Name, L Name, Birth Date, Cell phone, Address, Email, DL state, Credit card No,Card exp

Credit card No🡪Cust id🡪Office Id, F Name, L Name, Birth Date, Cell phone, Address, Email, DL state, DL Num, Card exp

Cust id🡪 DL Num

DL Num🡪 DL state(3 NF)

**Booking Request** : (PK- Booking Id, FK- Car Id, Cust Id, Clnt Id)

Booking Id, Req Dt, Car Id, Cust Id, Clnt Id, Clnt Response, vehicle location,Clnt reply Dt & Time, Vehicle req upto

FDs:

Booking Id🡪Req Dt, Car Id, Cust Id, Clnt Id, Clnt Response, vehicle location, Clnt reply Dt & Time, Vehicle req upto

Booking Id 🡪Car Id

Car Id🡪Clnt Id Id (3 NF)

**Rating :**(PK & FK- Booking Id)

Booking Id, Rating to Client by Customer, Rating to Customer by Client, Rating of vehicle by Customer

FDs:

Booking Id 🡪 Rating to Client by Customer, Rating to Customer by Client, Rating of vehicle by Customer

**Transaction :** (PK- Tran Id)

Tran Id, Booking Id, Tran Dt, Amount, Miles run

FDs:

Tran Id🡪 Booking Id, Tran Dt, Amount, Miles run

Booking Id🡪 Tran Id ,Tran Dt, Amount, Miles run

**Accident :** (PK- Booing Id)

Booing Id, Accident Dt, Acc Time, Place, Ext of Damage, Cost of Damage, Police Report(Y/N), Summary of Report, Remarks

FDs:

Booing Id🡪 Accident Dt, Acc Time, Place, Ext of Damage,Cost of Damage, Police Report(Y/N), Summary of Report, Remarks

**Manager**(PK-Manager Id)

Manager Id, Mgr Name, Rep EMP Ids, Rep emp Name, Office Id

FDs:

Manager Id🡪Mgr Name, Rep EMP Ids, Rep emp Name, Office Id

Manager Id🡪Rep EMP Ids

Rep EMP Ids🡪Rep emp Name ( 3NF)

MVD :

Manager Id🡪Rep EMP Ids

**5. Normalization**

**1. Office : (**PK- Office id)

To make this into 1NF Address field is to be split in to fields : Flat No,Street Name,City,State,zipcode

FDs:

Office Id 🡪 GM Id

GM Id🡪 GM name.

This is a transitive dependency , so it is not in 3NF.TO make this into 3NF we need to make separate relation for GM Id , GM name.And these are available in EMP table.

So,

Final Table is : **Office id, Name, Flat No,Street Name,City,State,zipcode, Ph number, Fax Number, Email, Open Hours, Businessdays, No of Emps, Directions, GM Id.**

**2. Client** (PK-Clnt Id, FK-Office id)

Clnt Id, office id, SSN,F Name, L Name, M Name, DOB, Home Ph, Cell Ph , Address, Email, CC No, Card Exp, Credit score

FDs:

Clnt Id🡪SSN,F Name, L Name, M Name, DOB, Home Ph, Cell Ph , Address, Email, CC No, Card Exp, Credit score

SSN🡪Clnt Id, F Name, L Name, M Name, DOB, Home Ph, Cell Ph , Address, Email, CC No, Card Exp, Credit score

Home Ph, 🡪 Clnt Id, office id SSN,F Name, L Name, M Name, DOB, Cell Ph , Address, Email, CC No, Card Exp, Credit score

Cell Ph 🡪Clnt Id, office id SSN,F Name, L Name, M Name, DOB, Home Ph, , Address, Email, CC No, Card Exp, Credit score

Email🡪Clnt Id, office id SSN,F Name, L Name, M Name, DOB, Home Ph, Cell Ph , Address, CC No, Card Exp, Credit score

TO make this into 1NF we need to split address field into : Flat No,Street Name,City,State,zipcode.

So, Final table is :

**Clnt Id, office id, SSN,F Name, L Name, M Name, DOB, Flat No, Street Name, City, State, zipcode, Home Ph, Cell Ph , Email, CC No, Card Exp, Credit score**

**3. Vehicle :** (PK- Car id,FK-Clnt\_Id)

Final Table is : **Car id, Clnt Id, Car info, Curr mileage, Class, Features, Make, Color, Year, Pic, Daily price, Miles included, Addition cost/mile, Weekly discount, Monthly discount, Car description.**

**4. Emp** (PK-EMP ID, FK-Office id)

EMP Id, Office id, F Name, L Name, M Name, Gender,Address, SSN, Salary, Tax dedu, DOB, Marital St, Spouse, Office, Hiring Dt, Divorce status, Previous name, Manager ID, Manager name, No of years at this office, No of years at company, Last degree & Date, List of certificates, List of Degrees, No of Dependents, Home Ph No, Cell Ph No.

FDs:

EMP Id 🡪 Office id, F Name, L Name, M Name, Gender,Address, SSN, Salary, Tax dedu, DOB, Marital St, Spouse, Office, Hiring Dt, Divorce status, Previous name, Manager ID, Manager name, No of years at this office, No of years at company, Last degree & Date, List of certificates, List of Degrees, No of Dependents, Home Ph No, Cell Ph No.

SSN🡪EMP Id, Office id, F Name, L Name, M Name, Gender,Address, Salary, Tax dedu, DOB, Marital St, Spouse, Office, Hiring Dt, Divorce status, Previous name, Manager ID, Manager name, No of years at this office, No of years at company, Last degree & Date, List of certificates, List of Degrees, No of Dependents, Home Ph No, Cell Ph No.

Home Ph No🡪EMP Id, Office id, F Name, L Name, M Name, Gender, Address, SSN, Salary, Tax dedu, DOB, Marital St, Spouse, Office, Hiring Dt, Divorce status, Previous name, Manager ID, Manager name, No of years at this office, No of years at company, Last degree & Date, List of certificates, List of Degrees, No of Dependents, Cell Ph No.

Cell Ph No🡪EMP Id, Office id, F Name, L Name, M Name, Gender, Address, SSN, Salary, Tax dedu, DOB, Marital St, Spouse, Office, Hiring Dt, Divorce status, Previous name, Manager ID, Manager name, No of years at this office, No of years at company, Last degree & Date, List of certificates, List of Degrees, No of Dependents, Home Ph No.

To make this relation into 1NF ‘Address’ field will be split into Flat No,StreetName, City,State,zipcode

EMP Id🡪Office id

Office id🡪Office .

This is a transitive dependency , so it is not in 3NF.TO make this into 3NF we need to make separate relation for office id & office which are already available in Office relation.

EMP Id🡪 Manager ID

Manager ID🡪Manager name.

This is a transitive dependency , so it is not in 3NF.TO make this into 3NF we need to make separate relation for Manager Id & Manger Name which are already available in emp relation relation.( as manager itself is an employee).

MVDs:

EMP Id 🡪 List of certificates (EMP\_ID is the primary key, so we need to make separate relation for for emp id & certificates)

The final Relation will be :

**EMP Id, Office id, F Name, M Name, L Name,** **Gender, Flat No, Street Name, City, State, zipcode ,SSN, Salary, Tax dedu, DOB, Marital St, Spouse, Hiring Dt, Divorce status, Previous name, Manager ID, No of years at this office, No of years at company, Last degree,No of Dependents, Home Ph No, Cell Ph No.**

**5.Checks**(PK- Emp id &Clnt Id)

Emp id, Clnt Id , Is\_employee,Clnt\_emp\_id, credit score, Scored date, Remarks

FDs:

Emp id, Clnt Id🡪 Is\_employee,Clnt\_emp\_id,credit score, Scored date, Remarks

**6. Lists :** (PK- Clnt Id, Car id)

Clnt Id, Car id, Registered Date, Office id, Registered upto, unlist\_date

FDs:

Clnt Id, Car id 🡪 Registered Date ,Office id, Registered upto, unlist\_date

Car Id🡪Clnt Id ; Clnt Id🡪Office id ( This is a transitive dependency ,so it is not in 3NF)

SO Clnt Id & Office id should be separated from this table.These are already available in Client table.

So the final table is :  **Clnt Id, Car id, Registered Date, Registered upto, unlist\_date**

**7. Customer:** (PK- Cust id, Fk- Office Id, DL Num)

Cust id, Office Id, F Name, L Name, Birth Date, Cell phone, Address, Email, DL state, DL Num, Credit card No,Card exp

To make this relation into 1NF ‘Address’ field will be split into Flat No,StreetName, City,State,zipcode

FDs

Cust id🡪 DL Num

DL Num🡪 DL state.

This is a transitive dependency , so it is not in 3NF.TO make this into 3NF we need to make separate relation for DL Num & DL state.

‘DL Num‘ will be made foreign key to this table.

So the final table is :  **Cust id, Office Id, F Name, L Name, Birth Date, Cell phone, Flat No, Street Name, City, State, zipcode, Email, DL Num, Credit card No, Card exp**

**8. DL:** ( PK-DL Num)

Final Relation is : **DL Num,DL state, DL issued date,DL Valid upto,Remarks**

**9.Booking Request** : (PK- Booking Id, FK- Car Id, Cust Id)

Booking Id, Req Dt, Car Id, Cust Id, Clnt Id, Clnt Response, vehicle location, Clnt reply Dt & Time, Vehicle req upto

FDs:

Booking Id🡪Req Dt, Car Id, Cust Id, Clnt Id, Clnt Response,vehicle location, Clnt reply Dt & Time, Vehicle req upto

Booking Id 🡪Car Id ; Car Id🡪Clnt Id

This is a transitive dependency , so it is not in 3NF.TO make this into 3NF we need to make separate relation for Car Id , Clnt Id.

But these are already available in Vehicle table.

So, the final table will be :

**Booking Id, Req Dt, Car Id, Cust Id,Clnt Response, vehicle location, Clnt reply Dt & Time, Vehicle req upto**

**10. Rating :**(PK & FK- Booking Id)

Final relation is : **Booking Id, Rating to Client by Customer, Rating to Customer by Client, Rating of vehicle by Customer**

**11.Transaction :** (PK- Tran Id , FK-Booking Id)

Tran Id, Booking Id, Tran Dt, Amount, Miles run

FDs:

Tran Id🡪 Booking Id, Tran Dt, Amount, Miles run

Booking Id🡪 Tran Id ,Tran Dt, Amount, Miles run

Final Table is :  **Tran Id, Booking Id, Tran Dt, Amount, Miles run**

**12.Accident :** (PK & FK- Booing Id)

Booing Id, Accident Dt, Acc Time, Place, Ext of Damage, Cost of Damage, Police Report(Y/N), Summary of Report, Remarks

FDs:

Booing Id🡪 Accident Dt, Acc Time, Place, Ext of Damage,Cost of Damage, Police Report(Y/N), Summary of Report, Remarks

Final Table is : **Booing Id, Accident Dt, Acc Time, Place, Ext of Damage,Cost of Damage, Police Report(Y/N), Summary of Report, Remarks**

**13. Manager**(PK -Manager Id,Rep EMP Id, FK-Manager Id, Rep EMP Id)

Manager Id, Mgr Name, Rep EMP Id, Rep emp Name, Office Id

FDs:

Manager Id🡪Mgr Name, Rep EMP Id, Rep emp Name, Office Id

Manager Id🡪Rep EMP Ids;

Rep EMP Id🡪Rep emp Name.

This is a transitive dependency , so it is not in 3NF.TO make this into 3NF we need to make separate relation for EMP Ids, Emp name . And these already available in EMP table.

Manager Id🡪Mgr Name ,Manger is an employee, so Mgr name is not required to maintain in this table.

Manager Id🡪Rep EMP Id ;

Rep EMP Id 🡪OFFICE ID

This is a transitive dependency , so it is not in 3NF.TO make this into 3NF we need to make separate relation for EMP Ids, Office id . And these already available in EMP table.

MVD :

Manager Id🡪Rep EMP Id ( only one MVD is available).

SO the final relation will be :

**Manager Id, Rep EMP Id.**

**SQL DEVELOPMENT:**

**Creating Office table:**

CREATE TABLE OFFICE (OFFICE\_ID VARCHAR2(6)PRIMARY KEY,

NAME VARCHAR2(25),FLAT\_NO NUMBER(3),STREET\_NAME VARCHAR2(15),

ZIPCODE NUMBER(6),PH\_NUMBER NUMBER(10),FAX\_NUMBER NUMBER(10),EMAIL VARCHAR2(30),OPEN\_HOURS VARCHAR2(25),BUSINESS\_DAYS VARCHAR2(50),NO\_OF\_EMPS NUMBER(4),DIRECTIONS VARCHAR2(250),GM\_ID NUMBER(6));

**Creating Client table:**

CREATE TABLE CLIENT(CLNT\_ID VARCHAR2(6) PRIMARY KEY,OFFICE\_ID VARCHAR2(6) REFERENCES OFFICE(OFFICE\_ID),SSN VARCHAR2(9),F\_NAME VARCHAR2(10),M\_NAME VARCHAR2(10),L\_NAME VARCHAR2(10),DOB DATE,FLAT\_NO NUMBER(3),STREET\_NAME VARCHAR2(15),CITY VARCHAR2(10),STATE VARCHAR2(15),ZIPCODE NUMBER(6),HOME\_PH NUMBER(9),CELL\_PH NUMBER(10),EMAIL VARCHAR2(25),

CC\_NO NUMBER(16),CARD\_EXP\_DATE DATE);

**Creating Vehicle table:**

CREATE TABLE VEHICLE(CAR\_ID VARCHAR2(6) PRIMARY KEY,CLNT\_ID VARCHAR2(6) REFERENCES CLIENT(CLNT\_ID),CAR\_INFO VARCHAR2(50),CURR\_MILEAGE NUMBER(6),CLASS VARCHAR2(2),FFEATURES VARCHAR2(75),MAKE VARCHAR2(15),COLOR VARCHAR2(10),YEAR NUMBER(4),PIC VARCHAR2(10),DAILY\_PRICE NUMBER(5,2),MILES\_INCLUDED NUMBER(3),ADDITIONAL\_COST\_PER\_MILE NUMBER(2),WEEKLY\_DISCOUNT NUMBER(4,2),MONTHLY\_DISCOUNT NUMBER(5,2),CAR\_DESCRIPTION VARCHAR2(50));

**Creating emp table:**

CREATE TABLE EMP(EMP\_ID NUMBER(6) PRIMARY KEY,OFFICE\_ID VARCHAR2(6) REFERENCES OFFICE(OFFICE\_ID),

F\_NAME VARCHAR2(10),M\_NAME VARCHAR2(10),L\_NAME VARCHAR2(10),GENDER CHAR, FLAT\_NO NUMBER(3),STREET\_NAME VARCHAR2(15),CITY VARCHAR2(10),STATE VARCHAR2(10),ZIPCODE NUMBER(6),SSN NUMBER(9)UNIQUE NOT NULL,SALARY NUMBER(5),TAX\_DEDUCTION NUMBER(5,2),DOB DATE,MARITAL\_STATUS CHAR(1) DEFAULT 'N' CHECK( MARITAL\_STATUS IN('Y','N')),SPOUSE\_NAME VARCHAR2(25),HIRING\_DATE DATE ,DIVORCE\_STATUS CHAR(1) DEFAULT 'N' CHECK(DIVORCE\_STATUS IN('Y','N')),PREVIOUS\_NAME VARCHAR2(25),NO\_OF\_YEARS\_AT\_OFFICE NUMBER(2),NO\_OF\_YEARS\_AT\_COMPANY NUMBER(2),LAST\_DEGREE VARCHAR2(30),NO\_OF\_DEPENDENTS NUMBER(2),HOME\_PH\_NO NUMBER(10),CELL\_PH\_NO NUMBER(10),MGR\_ID NUMBER(6);

**Creating CHECKS table:**

CREATE TABLE CHECKS(EMP\_ID NUMBER(6),CLNT\_ID VARCHAR2(6),PRIMARY KEY(EMP\_ID,CLNT\_ID),IS\_EMPLOYEE CHAR(1) DEFAULT 'N' CHECK(IS\_EMPLOYEE IN('Y','N')),CLNT\_EMP\_ID NUMBER(6),CONSTRAINT VALIDITY CHECK(CLNT\_EMP\_ID<>EMP\_ID),CREDIT\_SCORE NUMBER(3) CHECK(CREDIT\_SCORE BETWEEN 1 AND 100),SCORED\_DATE DATE,REMARKS VARCHAR2(100));

**Creating LISTS table:**

CREATE TABLE LISTS(CLNT\_ID VARCHAR2(6) REFERENCES CLIENT(CLNT\_ID),CAR\_ID VARCHAR2(6) REFERENCES VEHICLE(CAR\_ID), PRIMARY KEY (CLNT\_ID,CAR\_ID),REGISTERED\_DATE DATE,REGISTERED\_UPTO DATE,UNLIST\_DATE DATE);

**Creating DL table:**

CREATE TABLE DL(DL\_NUM VARCHAR2(20) PRIMARY KEY,DL\_STATE VARCHAR2(20),DL\_ISSUED\_DATE DATE,DL\_VALID\_UPTO DATE,REMARKS VARCHAR2(50));

**Creating CUSTOMER table:**

CREATE TABLE CUSTOMER(CUST\_ID NUMBER(4) PRIMARY KEY CHECK(CUST\_ID BETWEEN 1000 AND 9999),OFFICE\_ID VARCHAR2(6) REFERENCES OFFICE(OFFICE\_ID),F\_NAME VARCHAR2(10),M\_NAME VARCHAR2(10),L\_NAME VARCHAR2(10),BIRTH\_DATE DATE,CELL\_PHONE NUMBER(10),FLATNO NUMBER(3),STREET\_NAME VARCHAR2(15),CITY VARCHAR2(15),STATE VARCHAR2(15),ZIPCODE NUMBER(6),

EMAIL\_ID VARCHAR2(30),DL\_NUM VARCHAR2(20) REFERENCES DL(DL\_NUM),CREDIT\_CARD\_NO NUMBER(16),CARD\_EXP\_DATE DATE);

**Creating BOOKING\_REQUEST table:**

CREATE TABLE BOOKING\_REQUEST(BOOKING\_ID VARCHAR2(10) PRIMARY KEY,REQ\_DATE DATE,CAR\_ID VARCHAR2(6) REFERENCES VEHICLE(CAR\_ID),CUST\_ID NUMBER(4) REFERENCES CUSTOMER(CUST\_ID),

CLNT\_RESPONSE VARCHAR2(3) CHECK( CLNT\_RESPONSE IN('YES','NO')),VEHICLE\_LOCATION VARCHAR2(15),CLNT\_REPLY\_DATE\_TIME DATE,VEHICLE\_REQ\_UPTO DATE);

**Creating RATING table:**

CREATE TABLE RATING(BOOKING\_ID VARCHAR2(10) PRIMARY KEY REFERENCES BOOKING\_REQUEST(BOOKING\_ID),RATING\_TO\_CLIENT\_BY\_CUSTOMER NUMBER,RATING\_TO\_CUSTOMER\_BY\_CLIENT NUMBER,RATING\_OF\_VEHICLE\_BY\_CUSTOMER NUMBER);

**Creating TRANSACTION table:**

CREATE TABLE TRANSACTION(TRAN\_ID VARCHAR2(15) PRIMARY KEY,BOOKING\_ID VARCHAR2(10) REFERENCES BOOKING\_REQUEST(BOOKING\_ID),TRAN\_DATE DATE,AMOUNT NUMBER(6,2),MILES\_RUN NUMBER(5,2));

**Creating ACCIDENT table:**

CREATE TABLE ACCIDENT(BOOKING\_ID VARCHAR2(10) PRIMARY KEY REFERENCES BOOKING\_REQUEST(BOOKING\_ID),ACCIDENT\_DATE DATE,ACCIDENT\_TIME TIMESTAMP WITH LOCAL TIME ZONE,PLACE VARCHAR2(100),EXT\_OF\_DAMAGE VARCHAR2(100),COST\_OF\_DAMAGE NUMBER(6,2),POLICE\_REPORT CHAR CHECK(POLICE\_REPORT IN('Y','N')),SUMMARY\_REPORT VARCHAR2(250),REMARKS VARCHAR2(100));

**Creating MANAGER table:**

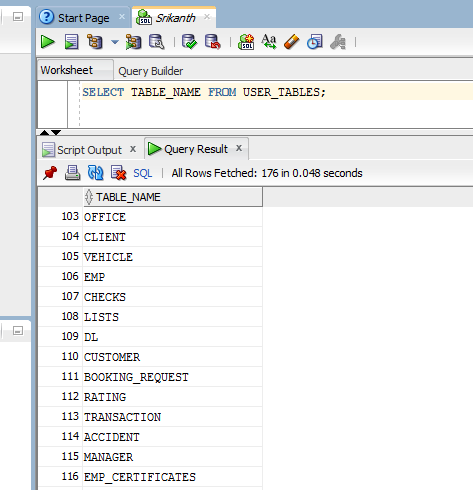
CREATE TABLE MANAGER(MANAGER\_ID NUMBER(6) REFERENCES EMP(EMP\_ID),REP\_EMP\_ID NUMBER(6) REFERENCES EMP(EMP\_ID),PRIMARY KEY(MANAGER\_ID,REP\_EMP\_ID));

**Creating EMP\_CERTIFICATES table:**

CREATE TABLE EMP\_CERTIFICATES(EMP\_ID NUMBER(6),CERTIFICATE VARCHAR2(35), PRIMARY KEY(EMP\_ID,CERTIFICATE));

**Q.8**

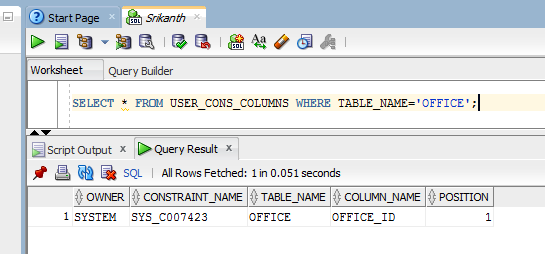
**List of Tables :**



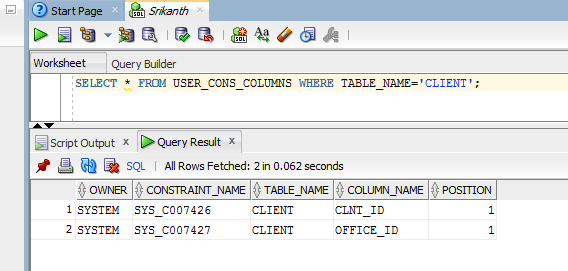
**Q.9**

**List of Table Constraints :**

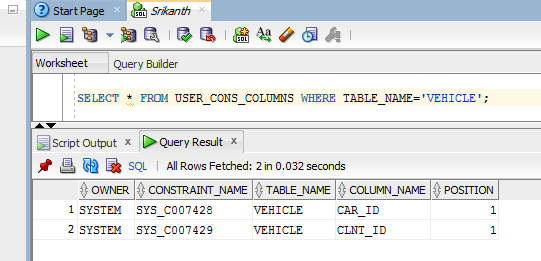
**Office:**



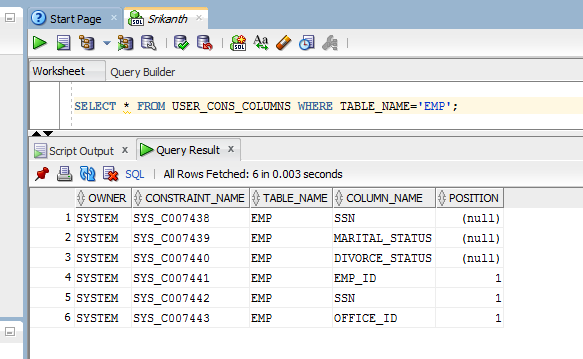
**CLIENT**



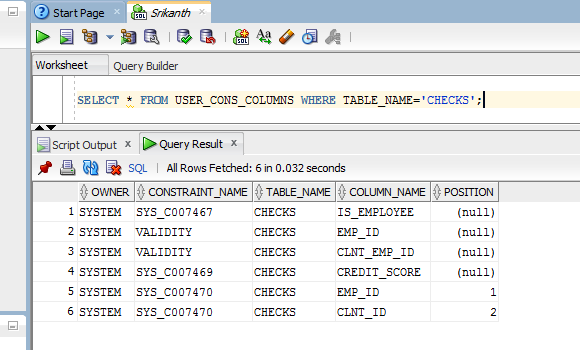
**VEHICLE**



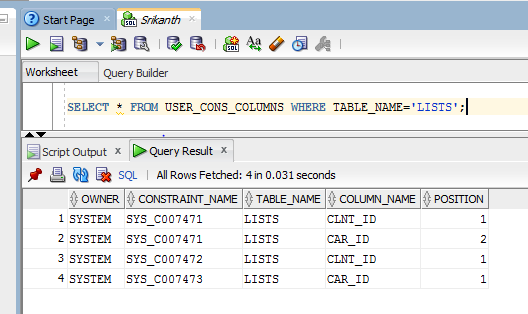
**EMP**



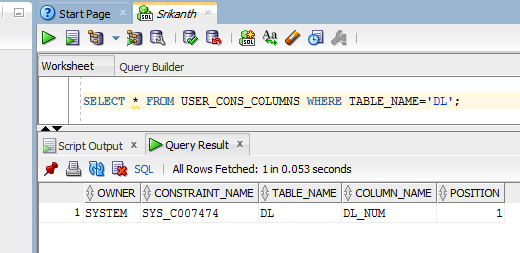
**CHECKS**



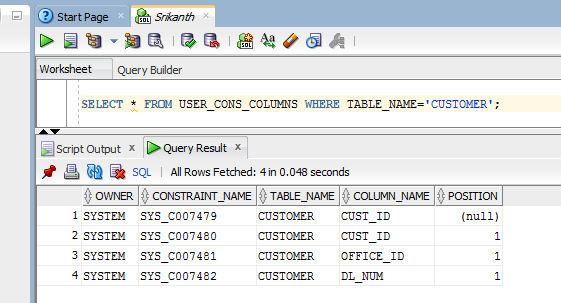
**LISTS**



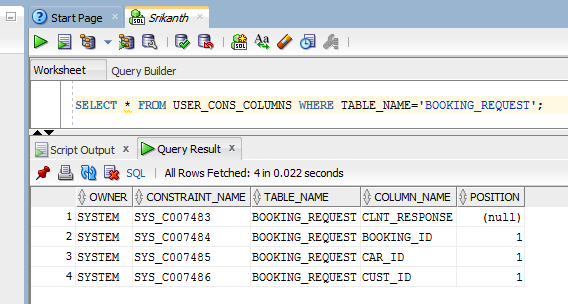
**DL**



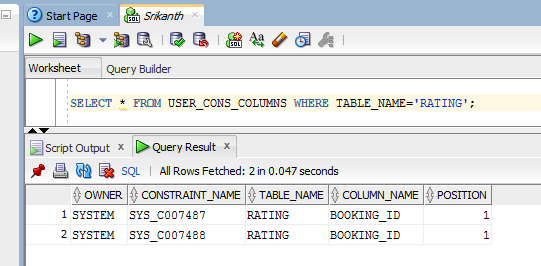
**CUSTOMER**



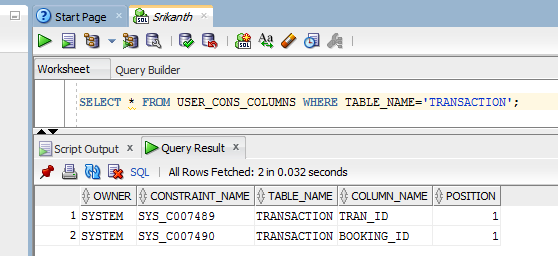
**BOOKING\_REQUEST**



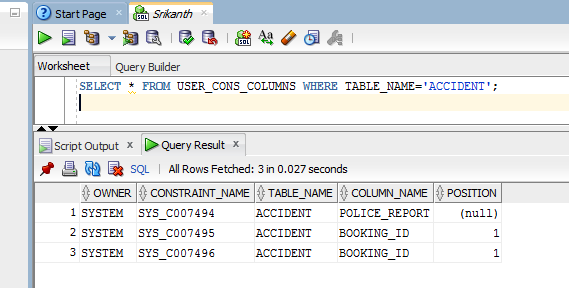
**RATING**



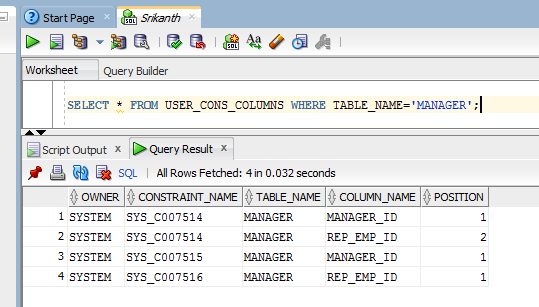
**TRANSACTION**



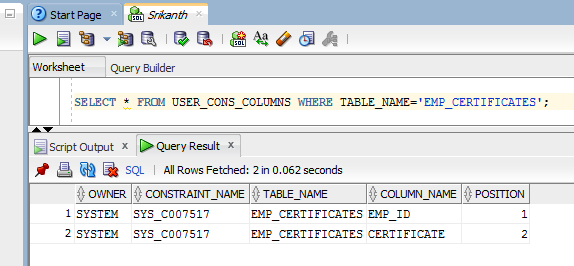
**ACCIDENT**



**MANAGER**

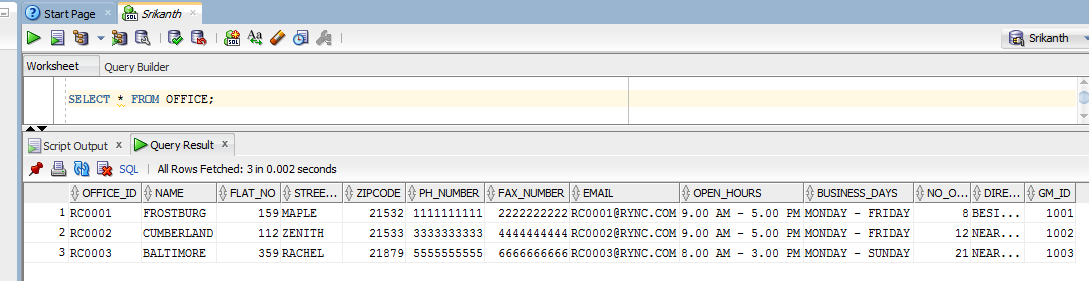


**EMP\_CERTIFICATES**

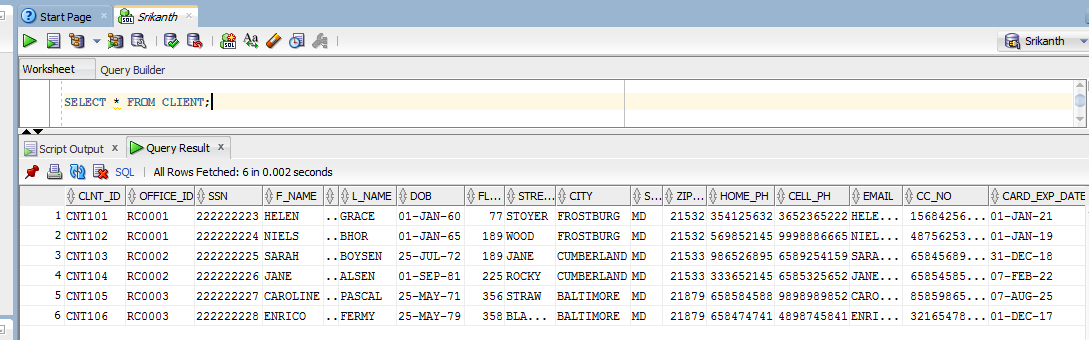


**10. List of Values on each table:**

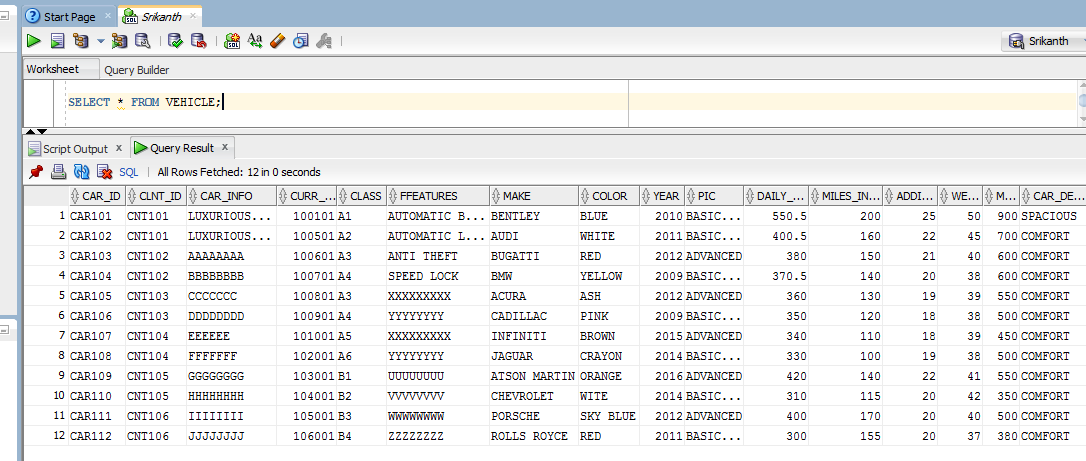
**Office:**



**CLIENT**

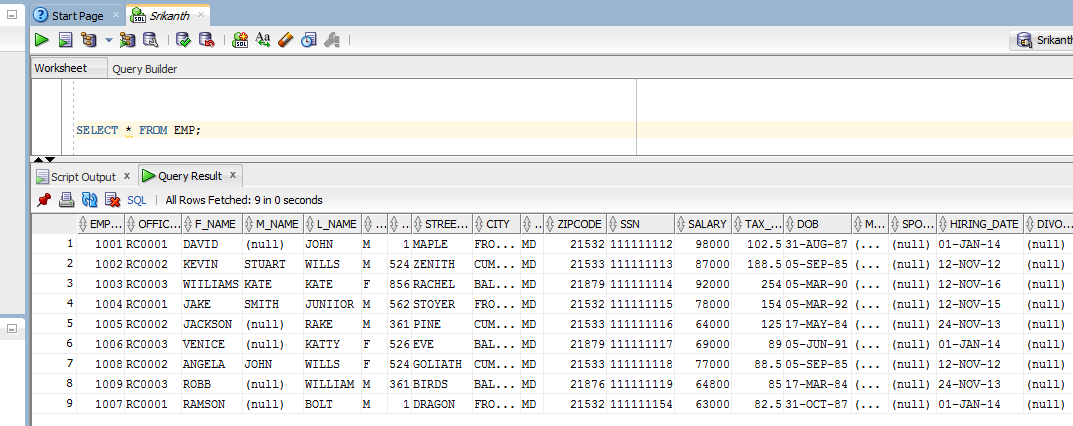


**VEHICLE**

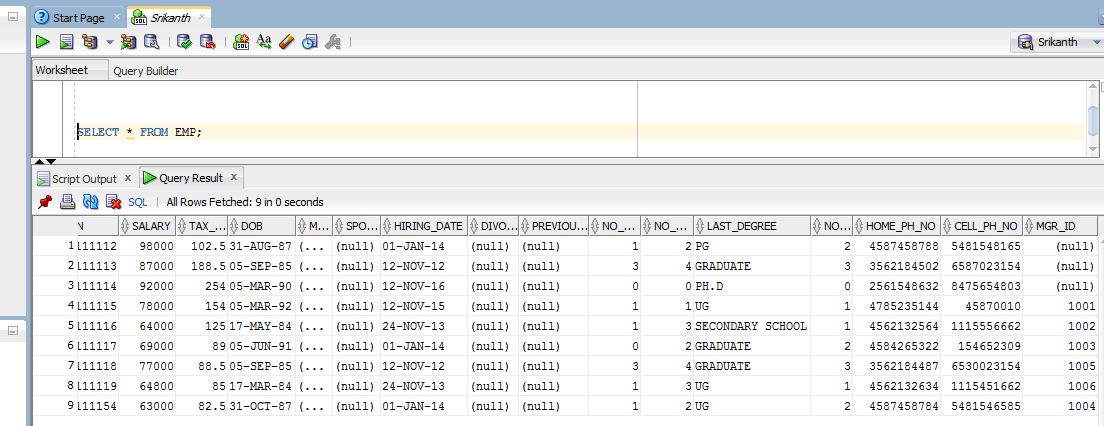


**EMP**

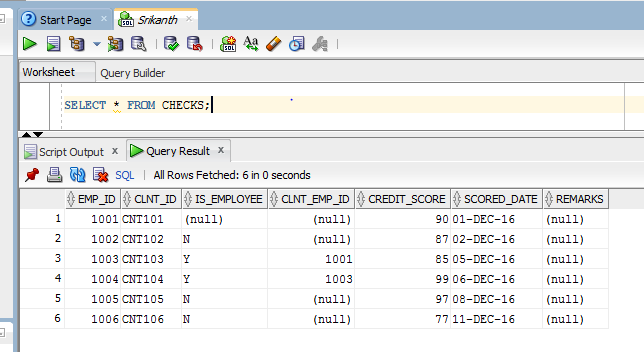
SCREENSHOT 1:



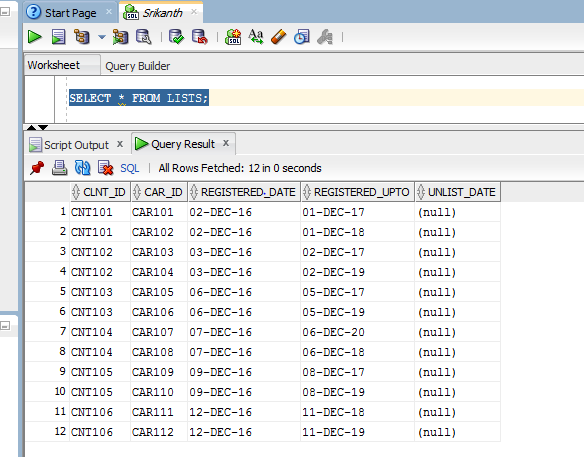
SCREENSHOT 2:



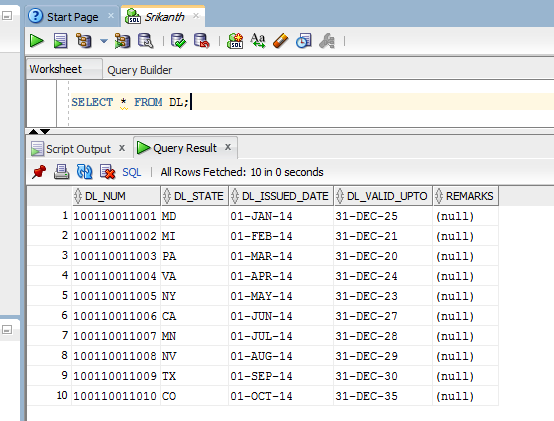
**CHECKS**



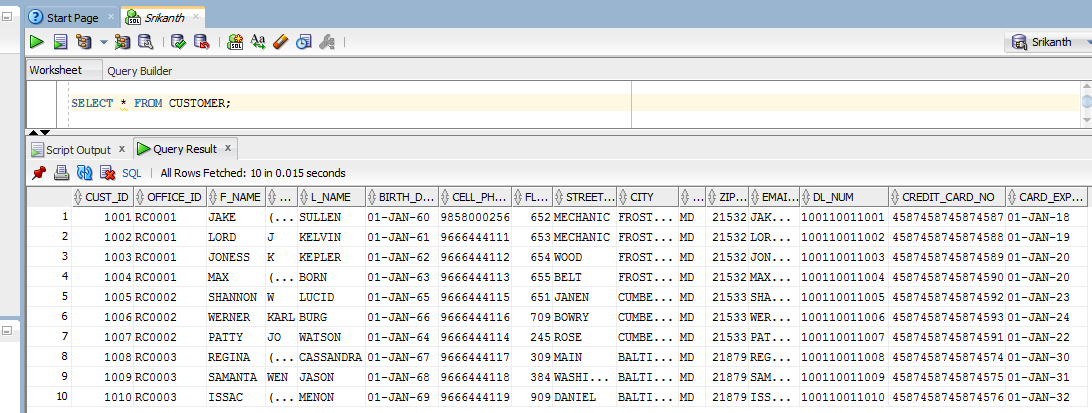
**LISTS**



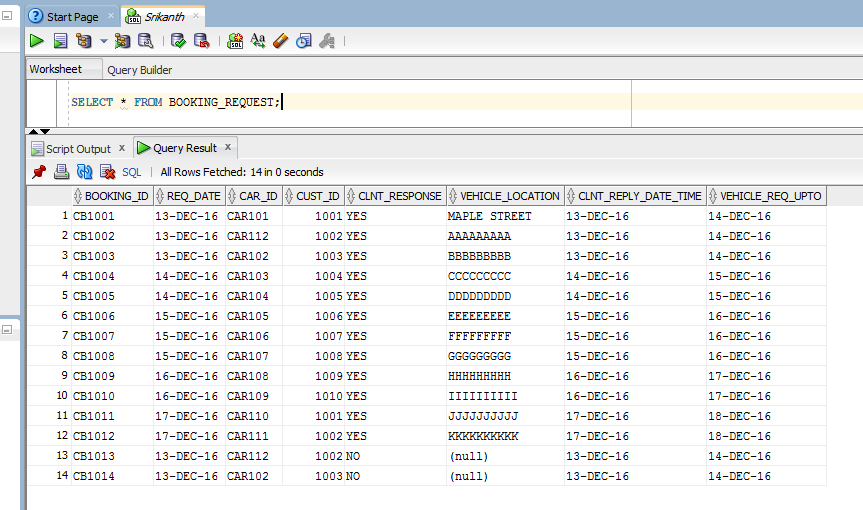
**DL**



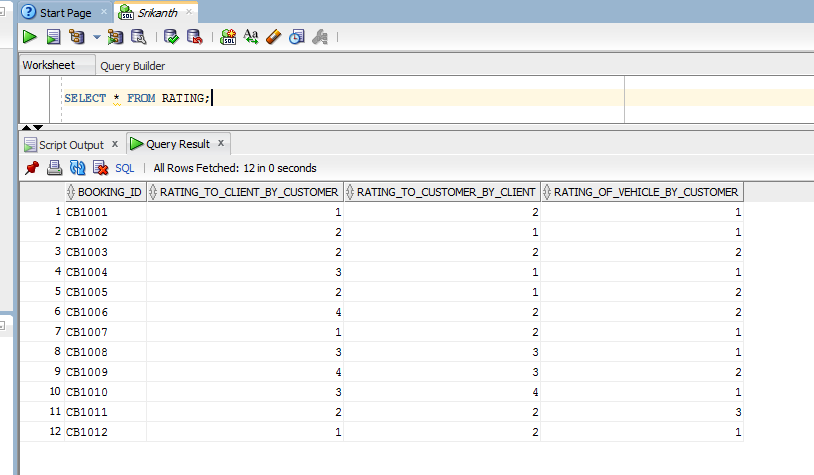
**CUSTOMER**



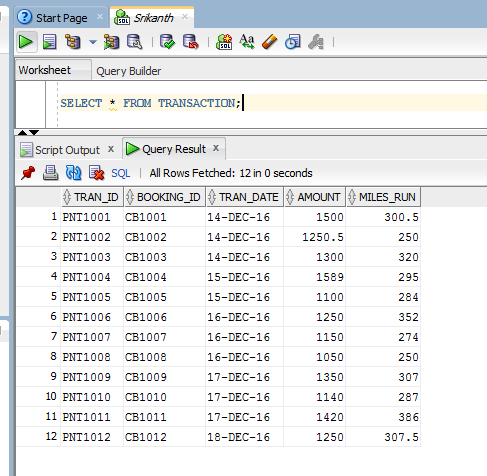
**BOOKING\_REQUEST**



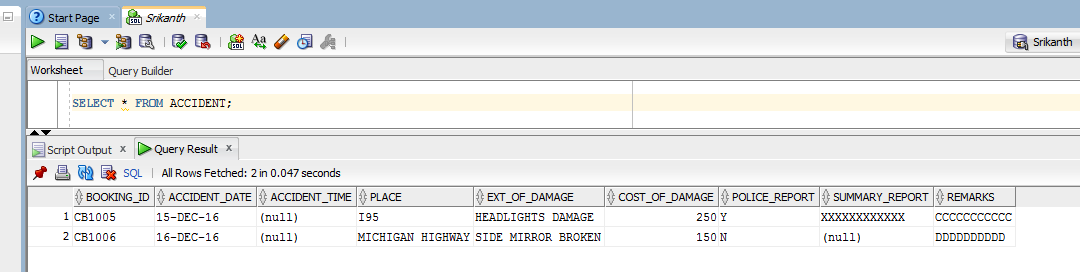
**RATING**



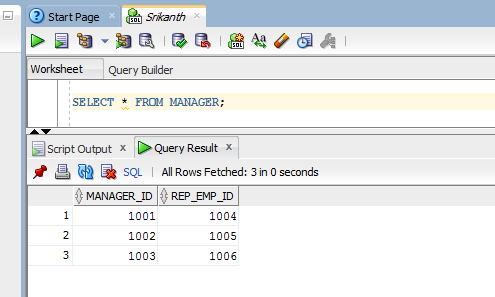
**TRANSACTION**



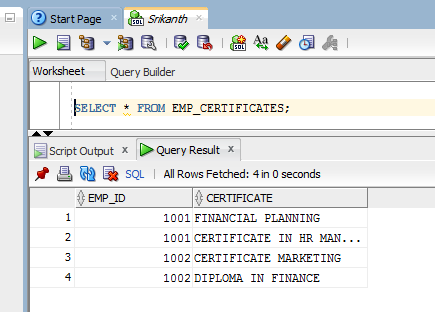
**ACCIDENT**



**MANAGER**



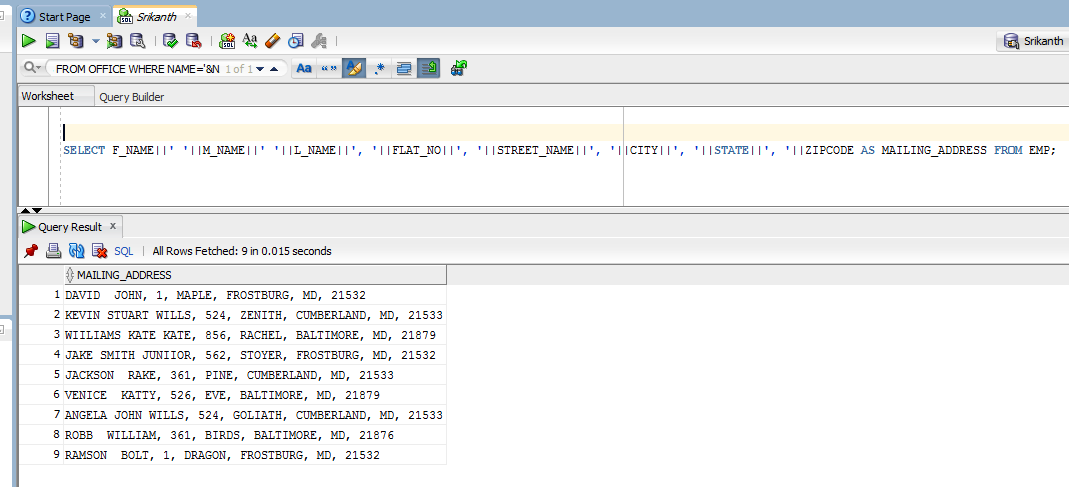
**EMP\_CERTIFICATES**



11 a. create mailing lables for employee ( name & address)

Query: SELECT F\_NAME||' '||M\_NAME||' '||L\_NAME||', '||FLAT\_NO||', '||STREET\_NAME||', '||CITY||', '||STATE||', '||ZIPCODE AS MAILING\_ADDRESS FROM EMP;

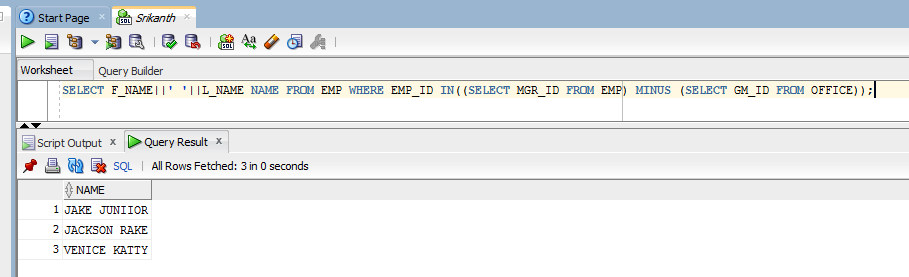
Output:



11 b. Display the name of employees that are office managers.

Query: SELECT F\_NAME||' '||L\_NAME NAME FROM EMP WHERE EMP\_ID IN((SELECT MGR\_ID FROM EMP) MINUS (SELECT GM\_ID FROM OFFICE));

Output:

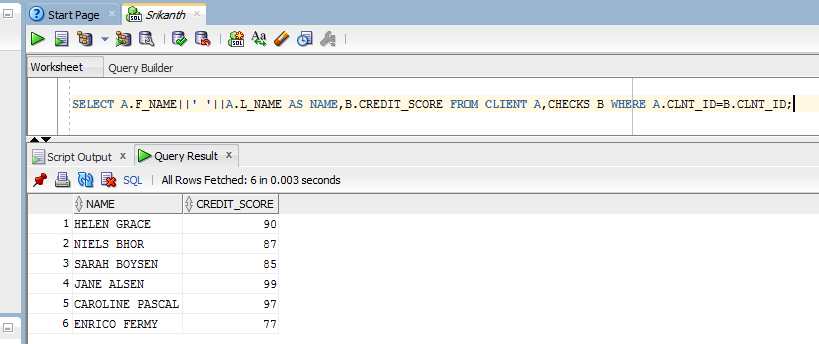


11 c. Display the first & last name of client with their credit score

Query:

SELECT A.F\_NAME||' '||A.L\_NAME AS NAME,B.CREDIT\_SCORE FROM CLIENT A,CHECKS B WHERE A.CLNT\_ID=B.CLNT\_ID;

Output:



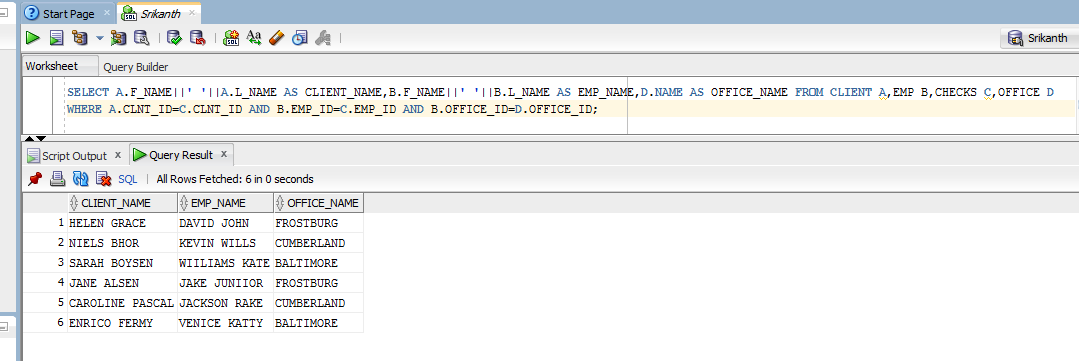
11 d.Display the name of client,name of employee, and the office name employee works at.

Query:

SELECT A.F\_NAME||' '||A.L\_NAME AS CLIENT\_NAME,B.F\_NAME||' '||B.L\_NAME AS EMP\_NAME,D.NAME AS OFFICE\_NAME FROM CLIENT A,EMP B,CHECKS C,OFFICE D

WHERE A.CLNT\_ID=C.CLNT\_ID AND B.EMP\_ID=C.EMP\_ID AND B.OFFICE\_ID=D.OFFICE\_ID;

Output:

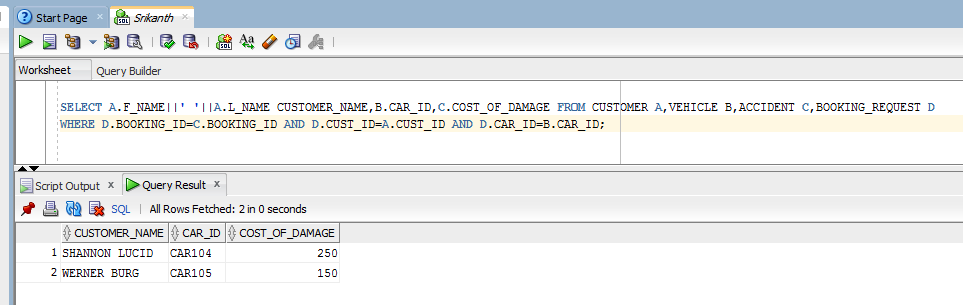


11 e.display name of customers who had accident,car id, and cost of damage

Query:

SELECT A.F\_NAME||' '||A.L\_NAME CUSTOMER\_NAME,B.CAR\_ID,C.COST\_OF\_DAMAGE FROM CUSTOMER A,VEHICLE B,ACCIDENT C,BOOKING\_REQUEST D WHERE D.BOOKING\_ID=C.BOOKING\_ID AND D.CUST\_ID=A.CUST\_ID AND D.CAR\_ID=B.CAR\_ID;

Output:

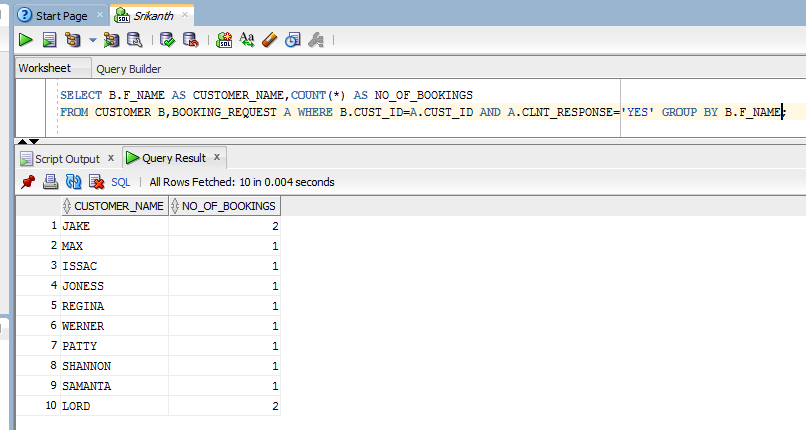


11 f. display total number of cars rented by each customer

Query:

SELECT B.F\_NAME AS CUSTOMER\_NAME,COUNT(\*) AS NO\_OF\_BOOKINGS FROM CUSTOMER B,BOOKING\_REQUEST A WHERE B.CUST\_ID=A.CUST\_ID AND A.CLNT\_RESPONSE='YES' GROUP BY B.F\_NAME;

Output:



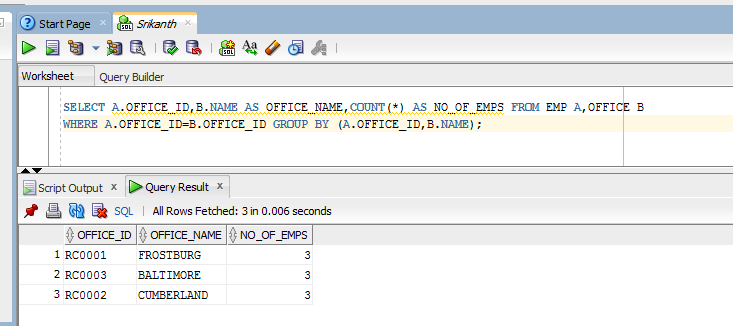
11 g.Display the number of employees for each office

Query:

SELECT A.OFFICE\_ID,B.NAME AS OFFICE\_NAME,COUNT(\*) AS NO\_OF\_EMPS FROM EMP A,OFFICE B

WHERE A.OFFICE\_ID=B.OFFICE\_ID GROUP BY (A.OFFICE\_ID,B.NAME);

Output:

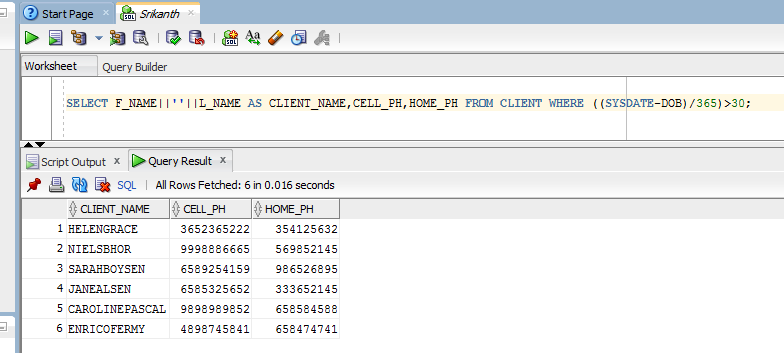


11 h.Dispaly name ,phone no of clients over 30 years old

Query:

SELECT F\_NAME||''||L\_NAME AS CLIENT\_NAME,CELL\_PH,HOME\_PH FROM CLIENT WHERE ((SYSDATE-DOB)/365)>30;

Output:



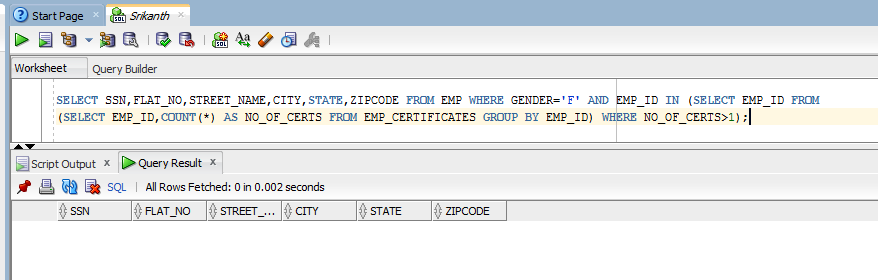
11 i.Dispaly SSN, address of female employees with more than one certificate

Query:

SELECT SSN,FLAT\_NO,STREET\_NAME,CITY,STATE,ZIPCODE FROM EMP WHERE GENDER='F' AND EMP\_ID IN (SELECT EMP\_ID FROM

(SELECT EMP\_ID,COUNT(\*) AS NO\_OF\_CERTS FROM EMP\_CERTIFICATES GROUP BY EMP\_ID) WHERE NO\_OF\_CERTS>1);

Output:

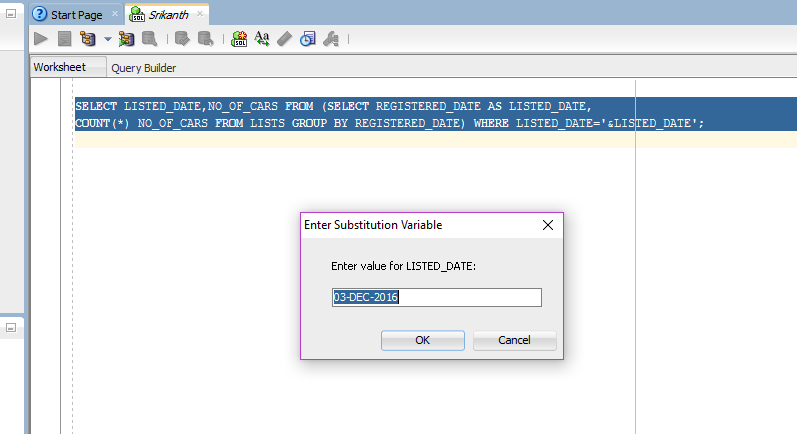


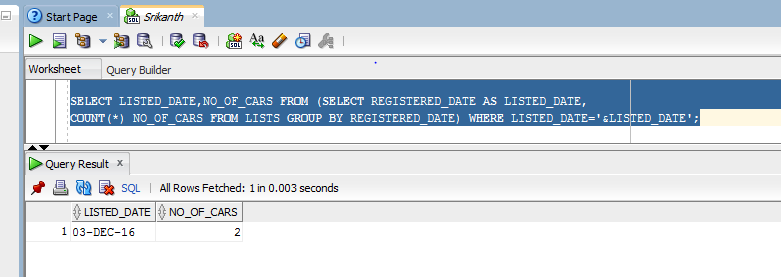
11 j.Dispaly the total number of cars listed on any day. User will inPut the date and time

Query:

SELECT LISTED\_DATE,NO\_OF\_CARS FROM (SELECT REGISTERED\_DATE AS LISTED\_DATE, COUNT(\*) NO\_OF\_CARS FROM LISTS GROUP BY REGISTERED\_DATE) WHERE LISTED\_DATE='&LISTED\_DATE';

Output:



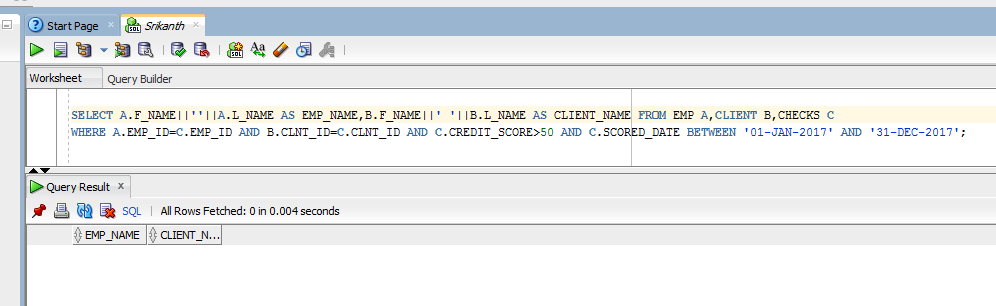


11 k.List the employee’ s name and clients name with score higher than 50 in 2017.

Query:

SELECT A.F\_NAME||''||A.L\_NAME AS EMP\_NAME,B.F\_NAME||' '||B.L\_NAME AS CLIENT\_NAME FROM EMP A,CLIENT B,CHECKS C WHERE A.EMP\_ID=C.EMP\_ID AND B.CLNT\_ID=C.CLNT\_ID AND C.CREDIT\_SCORE>50 AND C.SCORED\_DATE BETWEEN '01-JAN-2017' AND '31-DEC-2017';

Output:

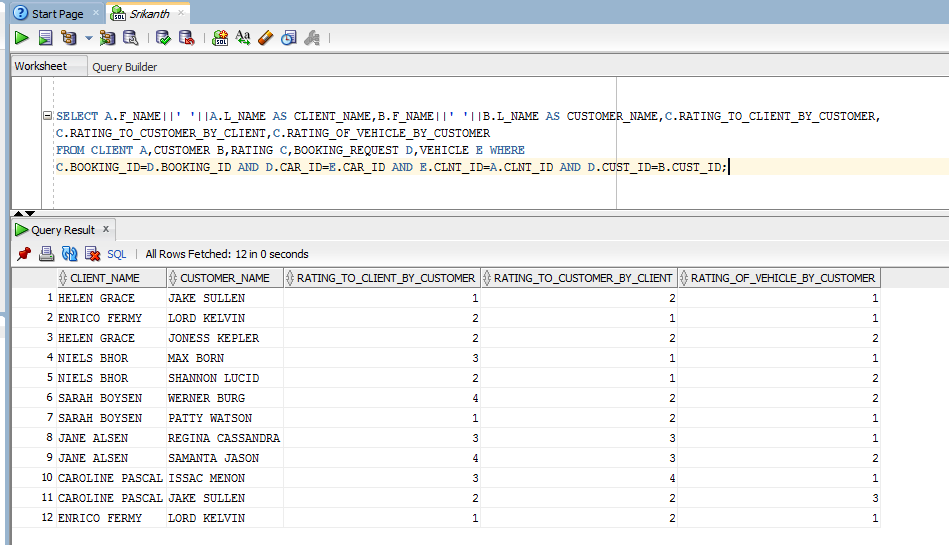


11 l. List of feedback ( client name, customer name, the rating number and who did rating)

Query:

SELECT A.F\_NAME||' '||A.L\_NAME AS CLIENT\_NAME,B.F\_NAME||' '||B.L\_NAME AS CUSTOMER\_NAME,C.RATING\_TO\_CLIENT\_BY\_CUSTOMER,C.RATING\_TO\_CUSTOMER\_BY\_CLIENT,C.RATING\_OF\_VEHICLE\_BY\_CUSTOMER FROM CLIENT A,CUSTOMER B,RATING C,BOOKING\_REQUEST D,VEHICLE E WHERE C.BOOKING\_ID=D.BOOKING\_ID AND D.CAR\_ID=E.CAR\_ID AND E.CLNT\_ID=A.CLNT\_ID AND D.CUST\_ID=B.CUST\_ID;

Output:



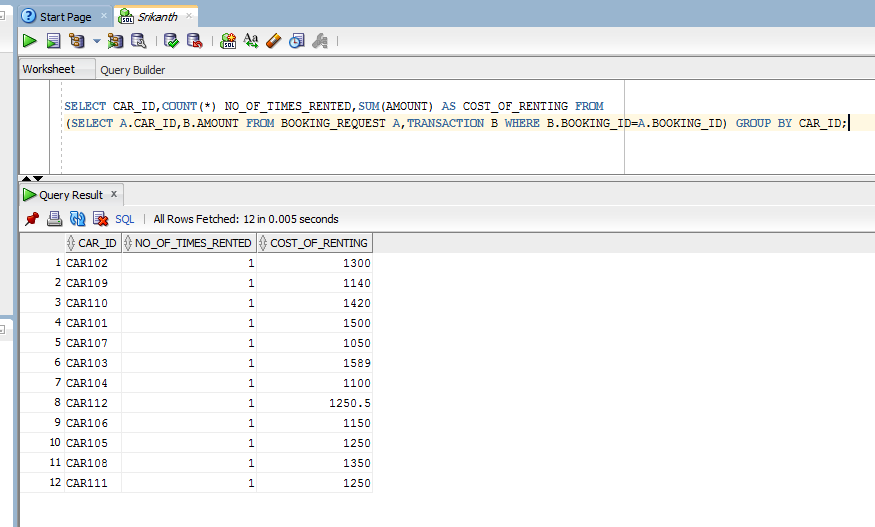
11 m.

The total number of time cars are rented, and the total cost of renting

Query:

SELECT CAR\_ID,COUNT(\*) NO\_OF\_TIMES\_RENTED,SUM(AMOUNT) AS COST\_OF\_RENTING FROM (SELECT A.CAR\_ID,B.AMOUNT FROM BOOKING\_REQUEST A,TRANSACTION B WHERE B.BOOKING\_ID=A.BOOKING\_ID) GROUP BY CAR\_ID;

Output:

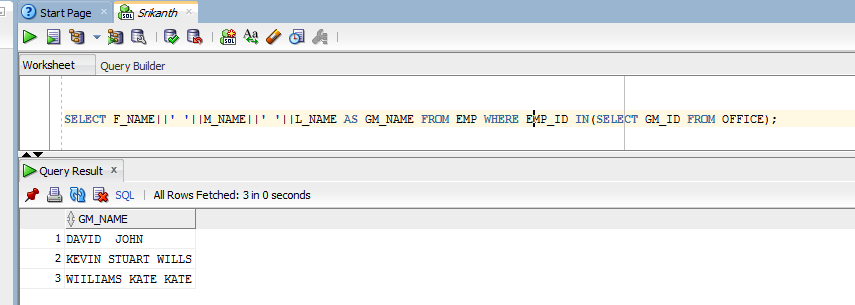


11 n.List employees’ name who is the manager of an office

Query:

SELECT F\_NAME||' '||M\_NAME||' '||L\_NAME AS GM\_NAME FROM EMP WHERE EMP\_ID IN(SELECT GM\_ID FROM OFFICE);

Output:

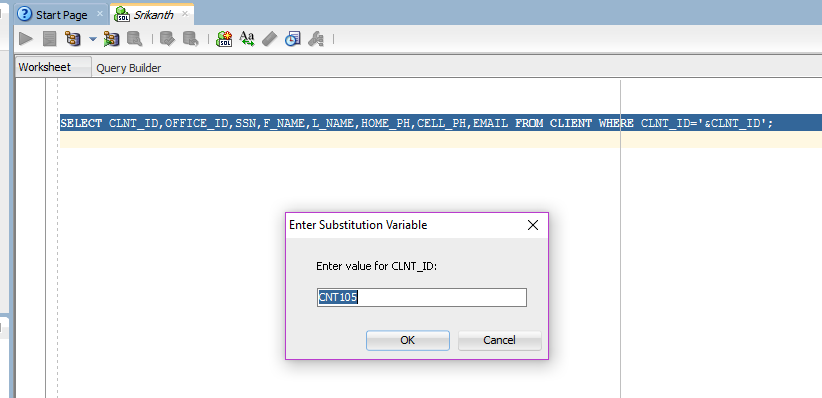


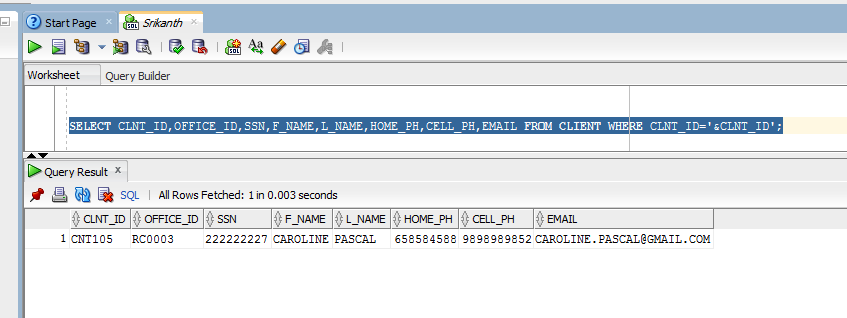
11 o.Search the database for a client .User input the data .Display client useful info.

Query:

SELECT CLNT\_ID,OFFICE\_ID,SSN,F\_NAME,L\_NAME,HOME\_PH,CELL\_PH,EMAIL FROM CLIENT WHERE CLNT\_ID='&CLNT\_ID';

Output:





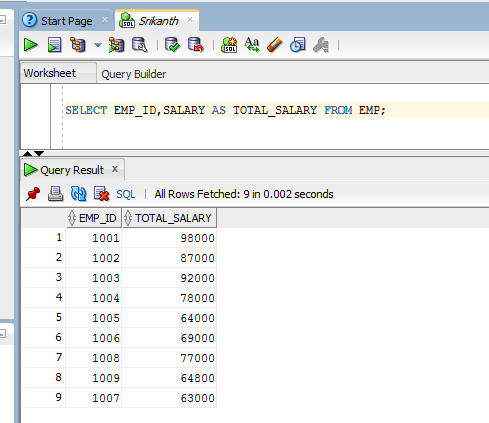
11 p

Total Salary of employee

Query:

SELECT EMP\_ID,SALARY AS TOTAL\_SALARY FROM EMP;

Output:

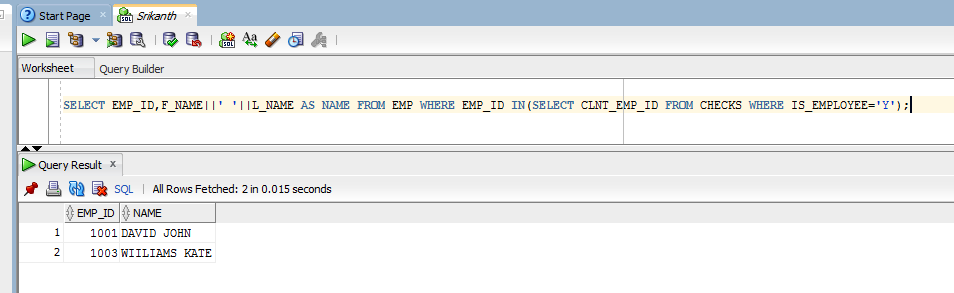


11 q.List employee names who also rented a car

Query:

SELECT EMP\_ID,F\_NAME||' '||L\_NAME AS NAME FROM EMP WHERE EMP\_ID IN(SELECT CLNT\_EMP\_ID FROM CHECKS WHERE IS\_EMPLOYEE='Y');

Output:



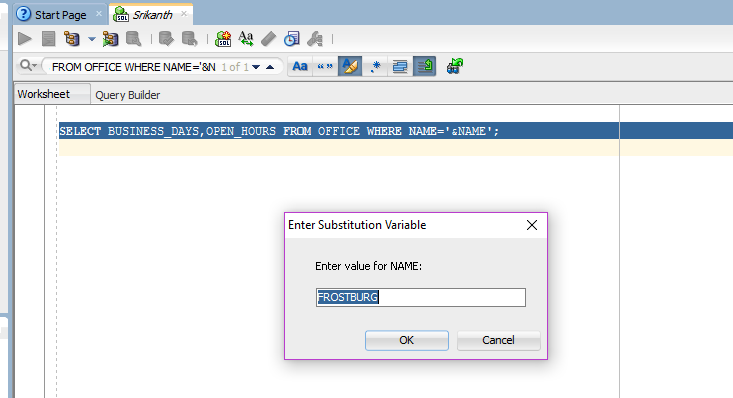
11 r.

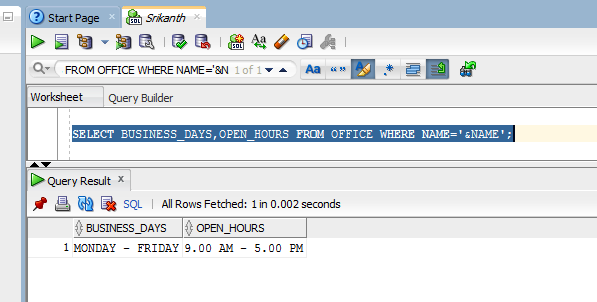
Input the office name, display the operating days and hours

Query:

SELECT BUSINESS\_DAYS,OPEN\_HOURS FROM OFFICE WHERE NAME='&NAME';

Output:





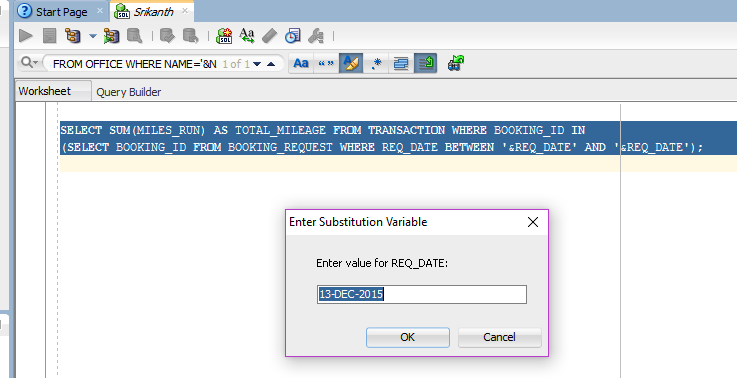
11 s.Dispaly the total mileage used in a given period.User input the start and end date

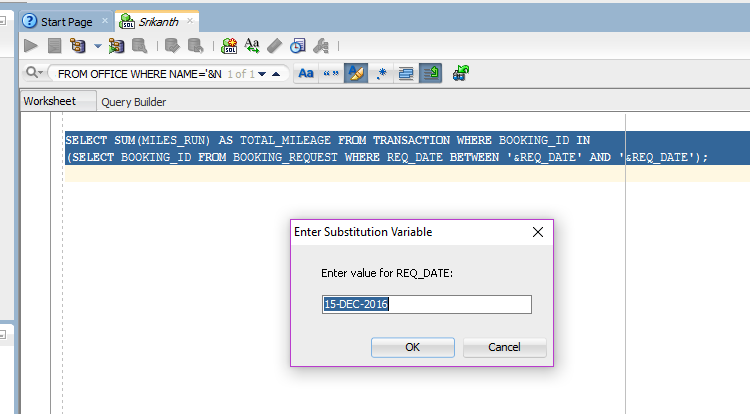
Query:

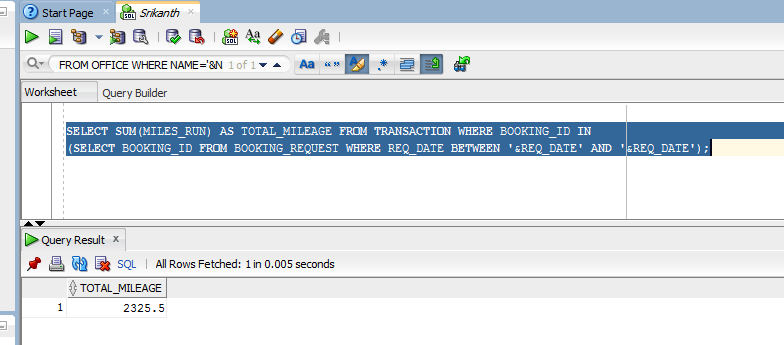
SELECT SUM(MILES\_RUN) AS TOTAL\_MILEAGE FROM TRANSACTION WHERE BOOKING\_ID IN

(SELECT BOOKING\_ID FROM BOOKING\_REQUEST WHERE REQ\_DATE BETWEEN '&REQ\_DATE' AND '&REQ\_DATE');

Output:







11 t. Write your own useful query to the customers.

Query:

SELECT A.CUST\_ID,A.F\_NAME||' '||A.L\_NAME AS CUSTOMER\_NAME,C.BOOKING\_ID,B.RATING\_TO\_CUSTOMER\_BY\_CLIENT FROM CUSTOMER A,RATING B,BOOKING\_REQUEST C WHERE B.BOOKING\_ID=C.BOOKING\_ID AND C.CUST\_ID=A.CUST\_ID AND B.RATING\_TO\_CUSTOMER\_BY\_CLIENT<=2;

Output:

