UNIVERSAL FURNITURE OUTLET

DATABASE MANAGEMENT SYSTEMS

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PART 1:

1. Identify the entities in the UFO application. List each entity with a short definition. Note you need to underline the attribute used as the primary key.

Ans: The entities with their attributes, business rules to describe relationship among entities and the supertype-subtype relationships are as follows:

- **Customer** (Customer_account_number, Customer_Name, Billing_Address,Contact)
- **Orders** (Order_Number, Delivery_Address, Customer_account_number)
- **Furniture** (Item_Code, Description, Unit_Price, Quantity_in_Stock)
- **Truck** (Vehicle_Number,Lic_Plate_Number, Lic_Exp_Date, Inspection_Exp_Date, SSN)
- **Employee** (SSN, Emp_Name, Emp_Address, Phone, Salary, Emp_Type)
- **Driver** (SSN, Driver_License, DL_Exp_Date)
- **Sales_Reps** (SSN,Commission,Order_number)
- **Shipment** (Shipment_ID,Vehicle_number,Order_number)

2. Write business rules to describe the relationship among these entities:

- Each **Customer** can place one or more **Orders**.
- Each **Order** is placed by one **Customer**.
- Each **Order** can have one or more **Order_Items**.
- Each **Order_item** is for one **Order**.
- Each **Order** can be included in one or more **Shipments**.
- Each **Shipment** is for one **Order**.
- Each **Shipment** is assigned to one **Truck**.
- Each **Truck** can carry one or more **Shipments**.
- Each **Truck** is assigned to one **Driver**.
- Each **Driver** is be assigned to one **Truck**.
- Each **Furniture** can be included in zero or many **Order_Items**.
- Each **Sales_reps** can take one or many **Orders**.
- Each **Order** is taken by one **Sales_reps**

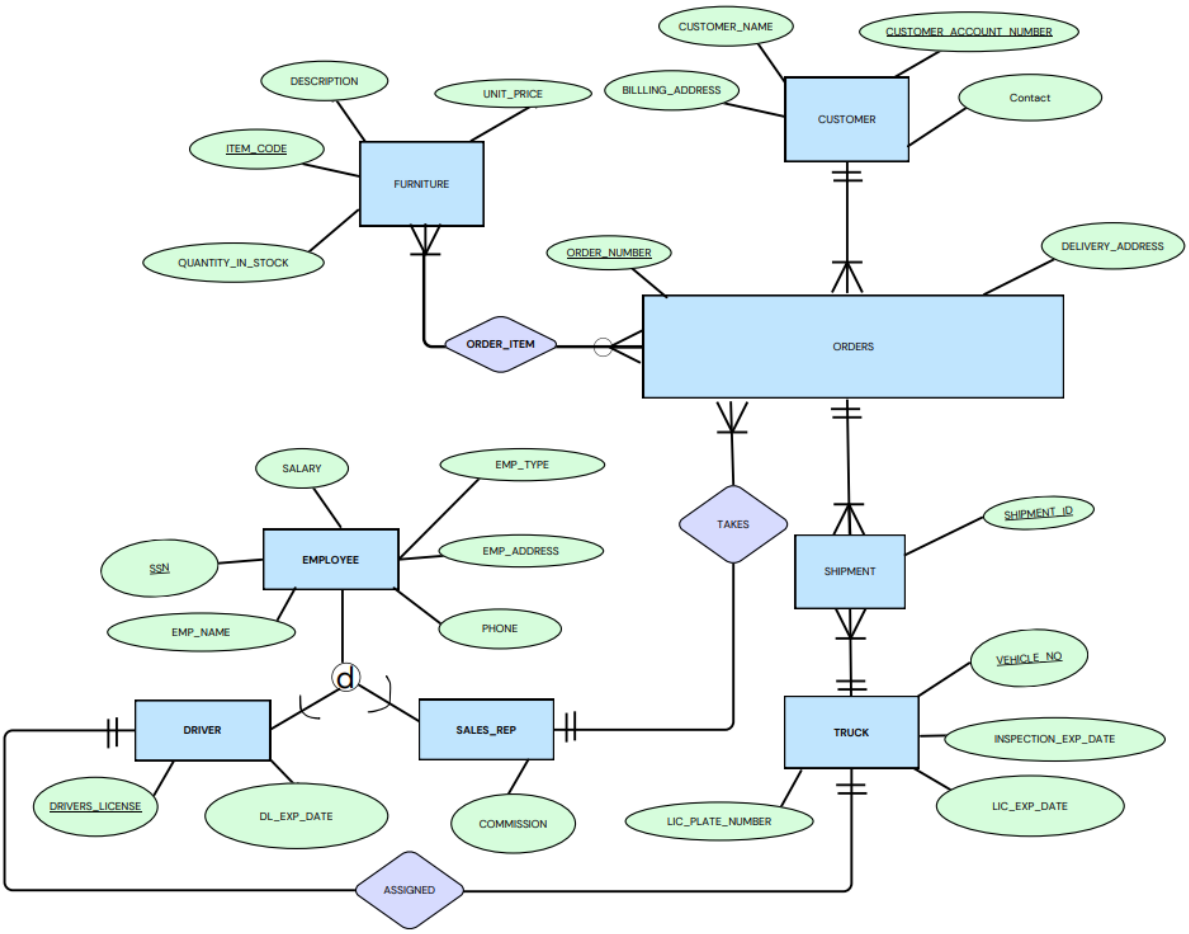
3. Describe supertype-subtype relationships as:

- Driver is a type of Employee.
- Sales_reps is a type of Employee.

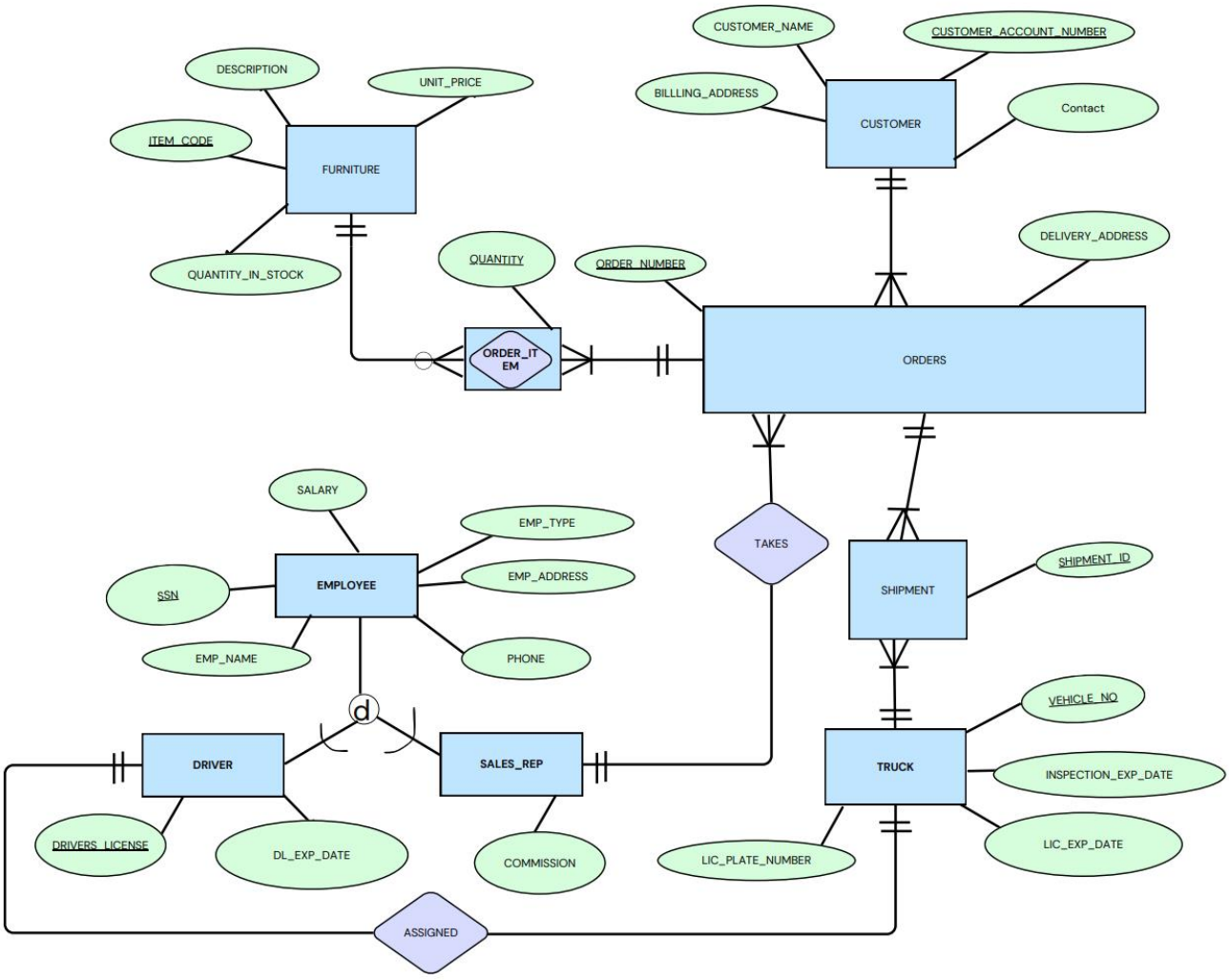
PART 2:

A. Create two E-R diagrams for the information system using Crow's foot notation. One diagram should show all entities and relationships including many-to-many relationships. The second diagram will include all the entities in the first diagram. In addition, it will have associative entities that replace many-to-many relationships.

Ans: The below is the ER Diagram including many-to-many relationships using Crow's foot notation.

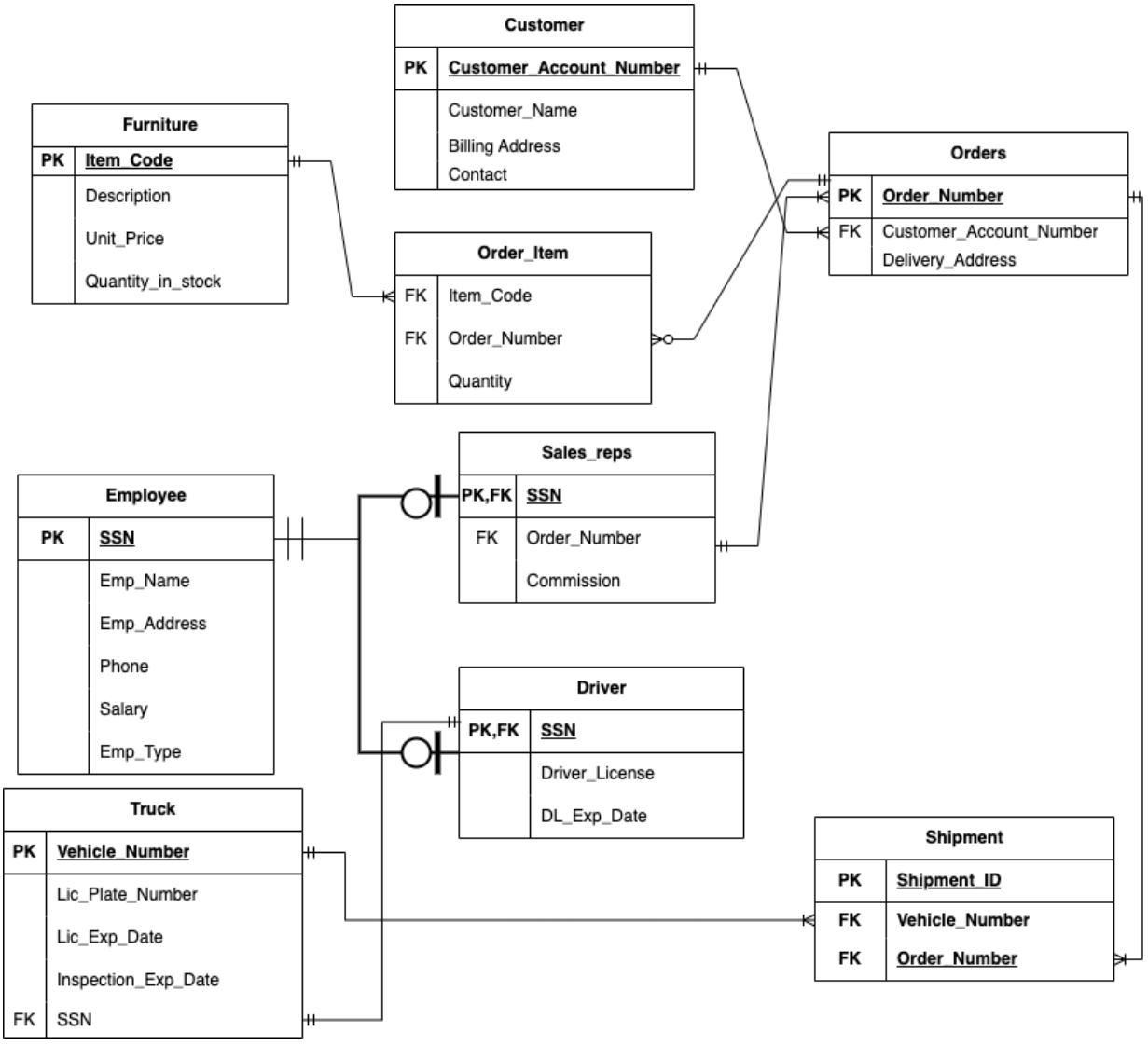


Ans: The ER diagram below is including the associative entities.


CUSTOMER_NAME
CUSTOMER_ACCOUNT_NUMBER
DESCRIPTION
UNIT_PRICE
BILLLING_ADDRESS
CUSTOMER
Contact
ITEM_CODE
FURNITURE
DELIVERY_ADDRESS
QUANTITY_IN_STOCK
QUANTITY
ORDER_NUMBER
ORDER_ITEM
ORDERS
SALARY
EMP_TYPE
TAKES
SHIPMENT_ID
SSN
EMPLOYEE
EMP_ADDRESS
SHIPMENT
EMP_NAME
PHONE
d
VEHICLE_NO
DRIVER
SALES_REP
TRUCK
INSPECTION_EXP_DATE
DRIVERS_LICENSE
DL_EXP_DATE
COMMISSION
LIC_PLATE_NUMBER
LIC_EXP_DATE
ASSIGNED

B. Create a relational schema for your database in third normal form. Describe your schema using the following format. Note that primary keys and foreign keys should be denoted (i.e., having **pk**, **fk** before the attribute names) and underlined. If an attribute is both a primary key and a foreign key, put both pk and fk before it.

Ans: The diagram below is the relationship schema presented in the third normal form. Both primary keys and foreign keys are mentioned.



C. Create a data dictionary for your database using the format described in Table 3.6 in Coronel & Morris (pp. 88, 13th Ed.). Make reasonable assumptions about data types and sizes for different attributes. **You must specify the schema name (the userid of the account in which the tables are created) in the data dictionary**.

The schema name (user_id) used to execute the project is: **sxt4911**

TABLE NAME	ATTRIBUTE NAME	CONTENTS	TYPE	FORMAT	RANGE	REQUIRED	PK OR FK	FK REFERENCED TABLE
CUSTOMER	CUSTOMER_ACCOUNT_NUMBER	CUSTOMER ACCOUNT NUMBER	NUMBER	9999999999	1000000000-9999999999	Y	PK	
	BILLING_ADDRESS	BILLING ADDRESS	VARCHAR2					
	CUSTOMER_NAME	CUSTOMER NAME	VARCHAR2					
	CONTACT	CONTACT	NUMBER	9999999999	1000000000-9999999999			
FURNITURE	ITEM_CODE	ITEM CODE	NUMBER	9999	1000000000-9999999999	Y	PK	
	UNIT_PRICE	UNIT PRICE	NUMBER	9999999999				
	QUANTITY_IN_STOCK	QUANTITY IN STOCK	NUMBER					
	DESCRIPTION	DESCRIPTION	VARCHAR2					
TRUCK	VEHICLE_NUMBER	VEHICLE NUMBER	NUMBER	999999	100000-999999	Y	PK	
	LIC_PLATE_NUMBER	LICENSE PLATE NUMBER	NUMBER	9999999999	1000000000-9999999999			
	LIC_EXP_DATE	LICENSE EXPIRATION DATE	DATE	DD-MM-YYYY		Y		
	INSPECTION_EXP_DATE	INSPECTION EXPIRATION DATE	DATE	DD-MM-YYYY		Y		
	SSN	SOCIAL SECURITY NUMBER	NUMBER	9999999999	1000000000-9999999999		FK	DRIVER
EMPLOYEE	SSN	SOCIAL SECURITY NUMBER	NUMBER	9999999999	1000000000-9999999999	Y	PK	
	EMP_NAME	EMPLOYEE NAME	VARCHAR2			Y		
	EMP_ADDRESS	EMPLOYEE ADDRESS	VARCHAR2					
	SALARY	SALARY	NUMBER	999999.99		Y		
	PHONE	PHONE	NUMBER	999999999	100000000-999999999			
	EMPLOYEE_TYPE	EMPLOYEE TYPE	VARCHAR2					
DRIVER	SSN	SOCIAL SECURITY NUMBER	NUMBER	9999999999	1000000000-9999999999	Y	PK,FK	EMPLOYEE
	DRIVER_LICENSE	DRIVER LICENSE	NUMBER	9999999999	1000000000-9999999999	Y		
	DL_EXP_DATE	DRIVER LICENSE EXPIRATION DA	DATE	DD-MM-YYYY				
SALES_REPS	COMMISSION	COMMISSION	VARCHAR2					
	SSN	SOCIAL SECURITY NUMBER	NUMBER	9999999999	1000000000-9999999999	Y	PK,FK	EMPLOYEE
	ORDER_NUMBER	ORDER NUMBER	NUMBER	9999999999	1000000000-9999999999	Y	PK,FK	ORDERS
SHIPMENT	SHIPMENT_ID	SHIPMENT ID	NUMBER	9999999999	1000000000-9999999999	Y	PK	
	VEHICLE_NUMBER	VEHICLE NUMBER	NUMBER	999999	100000-999999		FK	TRUCK
	ORDER_NUMBER	ORDER NUMBER	NUMBER	9999999999	1000000000-9999999999	Y	FK	ORDERS
ORDERS	ORDER_NUMBER	ORDER NUMBER	NUMBER	9999999999	1000000000-9999999999	Y	PK	
	CUSTOMER_ACCOUNT_NUMBER	CUSTOMER ACCOUNT NUMBER	NUMBER	9999999999	1000000000-9999999999		FK	CUSTOMER
	DELIVERY_ADDRESS	DELIVERY ADDRESS	VARCHAR2					
ORDER_ITEM	ITEM_CODE	ITEM CODE	NUMBER	9999999999	1000000000-9999999999		FK	FURNITURE
	ORDER_NUMBER	ORDER NUMBER	NUMBER	9999999999	1000000000-9999999999		FK	ORDERS
	QUANTITY	QUANTITY	NUMBER	9999	1000-9999			

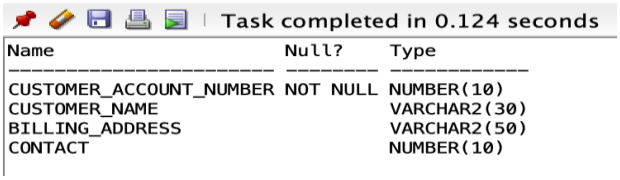
FK	FOREIGN KEY
PK	PRIMARY KEY
CHAR	FIXED CHARACTER LENGTH DATA(1-225 CHARACTERS)
VARCHAR	VARIABLE CHARACTER LENGTH DATA(1-2000 CHARACTERS)
NUMBER	NUMERIC DATA. NUMBER(9,2)

D. Create Tables in Oracle to implement the UFO database. This must be done in your UTA Oracle account so that I can verify your implementation. Enter about 5-8 rows in each table. **To document this part in your report, use the Describe command to list the schema of each table followed by the Select command to list its content. Grant Select to your instructor and the TA on all tables.**

Ans: The following attached outputs are for the "Describe" command to list the schema for each table and "Select" command to list the table content.

- **CUSTOMER TABLE:**

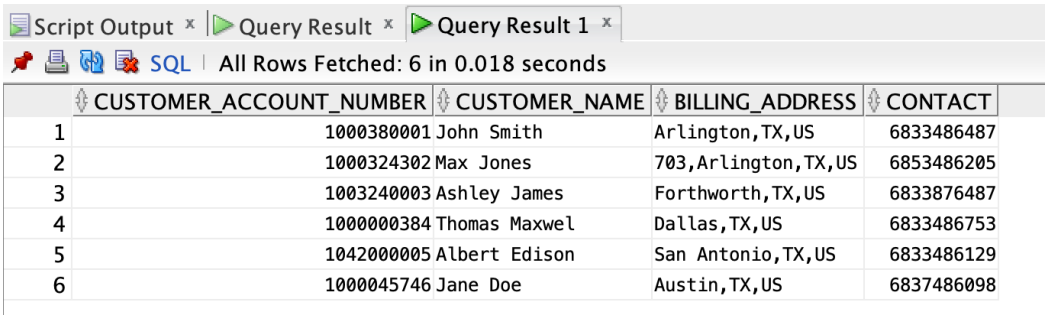
Describe Customer;



Task completed in 0.124 seconds

Name	Null?	Type
CUSTOMER_ACCOUNT_NUMBER	NOT NULL	NUMBER(10)
CUSTOMER_NAME		VARCHAR2(30)
BILLING_ADDRESS		VARCHAR2(50)
CONTACT		NUMBER(10)

SELECT * FROM Customer;



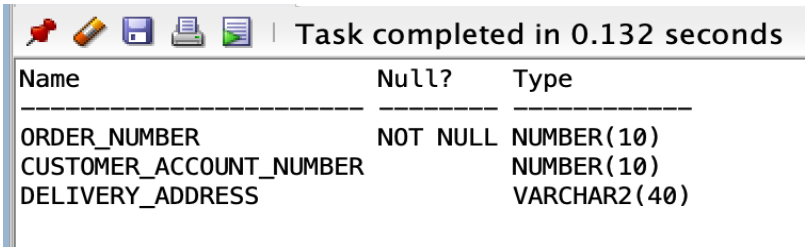
Script Output | Query Result | Query Result 1

SQL | All Rows Fetched: 6 in 0.018 seconds

	CUSTOMER_ACCOUNT_NUMBER	CUSTOMER_NAME	BILLING_ADDRESS	CONTACT
1	1000380001	John Smith	Arlington,TX,US	6833486487
2	1000324302	Max Jones	703,Arlington,TX,US	6853486205
3	1003240003	Ashley James	Forthworth,TX,US	6833876487
4	1000000384	Thomas Maxwel	Dallas,TX,US	6833486753
5	1042000005	Albert Edison	San Antonio,TX,US	6833486129
6	1000045746	Jane Doe	Austin,TX,US	6837486098

- **ORDERS TABLE**

Describe Orders;



Task completed in 0.132 seconds

Name	Null?	Type
ORDER_NUMBER	NOT NULL	NUMBER(10)
CUSTOMER_ACCOUNT_NUMBER		NUMBER(10)
DELIVERY_ADDRESS		VARCHAR2(40)

SELECT * FROM Orders;

Script Output | Query Result

SQL | All Rows Fetched: 6 in 0.025 seconds

	ORDER_NUMBER	CUSTOMER_ACCOUNT_NUMBER	DELIVERY_ADDRESS
1	451	1000380001	(null)
2	452	1000324302	(null)
3	453	1003240003	(null)
4	454	1000000384	(null)
5	455	1042000005	(null)
6	456	1000045746	(null)

- **FURNITURE TABLE**

Describe Furniture;

Script Output | Query Result

Task completed in 0.777 seconds

```
Name              Null?    Type
----------------- -------- ------------
ITEM_CODE         NOT NULL NUMBER(4)
DESCRIPTION                VARCHAR2(30)
UNIT_PRICE                 NUMBER(30)
QUANTITY_IN_STOCK          NUMBER(30)
```

SELECT * FROM Furniture;

Script Output | Query Result

SQL | All Rows Fetched: 6 in 0.021 seconds

	ITEM_CODE	DESCRIPTION	UNIT_PRICE	QUANTITY_IN_STOCK
1	1000	Chair	50	130
2	1001	Desk	100	150
3	1002	Sofa	1000	200
4	1003	Recliner	400	100
5	1004	Bed_Frame	600	30
6	1005	Book_shelf	250	75

- **TRUCK TABLE**

Describe Truck;

```
Name                Null?    Type
------------------- -------- ----------
VEHICLE_NUMBER      NOT NULL NUMBER(6)
LIC_PLATE_NUMBER             NUMBER(10)
LIC_EXP_DATE        NOT NULL DATE
INSPECTION_EXP_DATE NOT NULL DATE
SSN                          NUMBER(10)
```

SELECT * FROM Truck;

SQL | All Rows Fetched: 3 in 0.02 seconds

	VEHICLE_NUMBER	LIC_PLATE_NUMBER	LIC_EXP_DATE	INSPECTION_EXP_DATE	SSN
1	104631	1233244490	26-JUL-23	03-DEC-23	1234567890
2	123481	2343252901	23-MAY-24	30-DEC-24	3456789012
3	132451	1654646464	29-SEP-25	04-AUG-26	5678901234

- **EMPLOYEE TABLE**

Describe Employee;

```
Name          Null?    Type
------------- -------- ------------
SSN           NOT NULL NUMBER(10)
EMP_NAME      NOT NULL VARCHAR2(20)
EMP_ADDRESS            VARCHAR2(30)
SALARY        NOT NULL NUMBER(8,2)
PHONE                  NUMBER(9)
EMPLOYEE_TYPE          VARCHAR2(20)
```

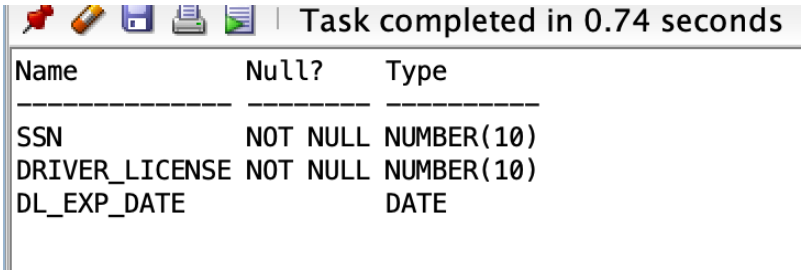
SELECT * FROM Employee;

SQL | All Rows Fetched: 6 in 0.023 seconds

	SSN	EMP_NAME	EMP_ADDRESS	SALARY	PHONE	EMPLOYEE_TYPE
1	1234567890	John Doe	1234 Main St, Anytown	50000	987654321	Driver
2	2345678901	Jane Smith	4321 Elm St, Newtown	55000	876543210	Sales_reps
3	3456789012	Alice Johnson	789 Pine Ave, Oldtown	60000	765432109	Driver
4	4567890123	Bob Brown	101 Oak Rd, Westcity	45000	654321098	Sales_reps
5	5678901234	Charlie Green	202 Maple Blvd, Eastville	65000	543210987	Driver
6	6789012345	Diana White	303 Birch Ln, Southtown	70000	432109876	Sales_reps

- **DRIVER TABLE**

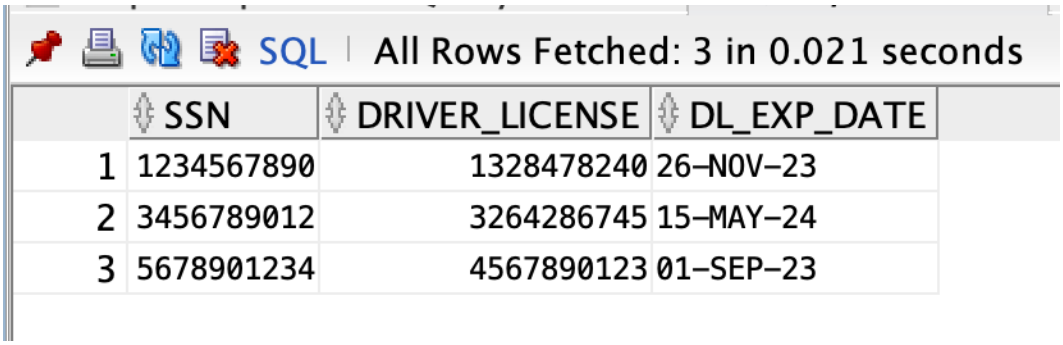
Describe Driver;



Task completed in 0.74 seconds

```
Name           Null?    Type
-------------- -------- ----------
SSN            NOT NULL NUMBER(10)
DRIVER_LICENSE NOT NULL NUMBER(10)
DL_EXP_DATE             DATE
```

SELECT * FROM Driver;



SQL | All Rows Fetched: 3 in 0.021 seconds

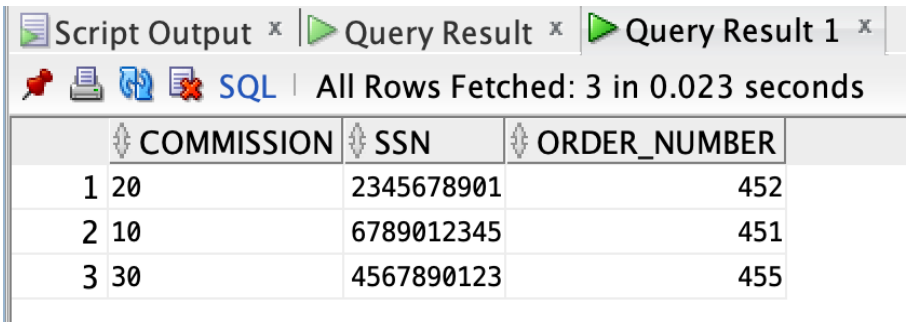
	SSN	DRIVER_LICENSE	DL_EXP_DATE
1	1234567890	1328478240	26-NOV-23
2	3456789012	3264286745	15-MAY-24
3	5678901234	4567890123	01-SEP-23

- **SALES_REPS TABLE**

Describe Sales_reps;

```
Name         Null?    Type
------------ -------- -----------
COMMISSION            VARCHAR2(3)
SSN          NOT NULL NUMBER(10)
ORDER_NUMBER NOT NULL NUMBER(10)
```

SELECT * FROM Sales_reps;



Script Output | Query Result | Query Result 1

SQL | All Rows Fetched: 3 in 0.023 seconds

	COMMISSION	SSN	ORDER_NUMBER
1	20	2345678901	452
2	10	6789012345	451
3	30	4567890123	455

- **ORDER_ITEM TABLE**

Describe Order_Item;

```
Name          Null? Type
------------- ----- ----------
ITEM_CODE           NUMBER(10)
ORDER_NUMBER        NUMBER(10)
QUANTITY            NUMBER(4)
```

SELECT * FROM Order_Item;

Script Output | Query Result | Query Result 1

SQL | All Rows Fetched: 6 in 0.02 seconds

	ITEM_CODE	ORDER_NUMBER	QUANTITY
1	1001	451	5
2	1002	452	15
3	1003	453	12
4	1004	454	10
5	1005	455	60
6	1000	456	100

- **SHIPMENT TABLE**

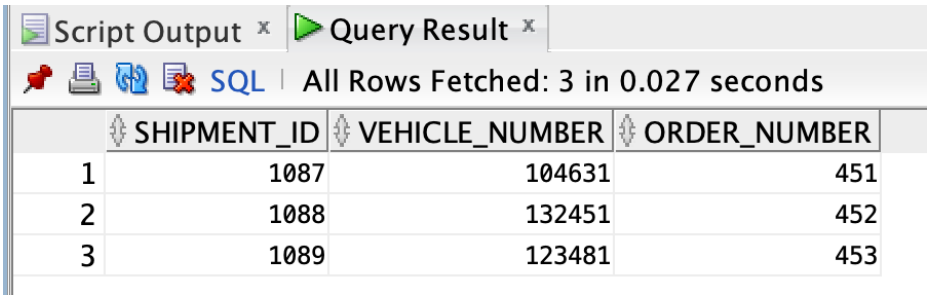
Describe Shipment;

Script Output | Query Result | Query Result 1

Task completed in 0.763 seconds

```
Name           Null?    Type
-------------- -------- ----------
SHIPMENT_ID    NOT NULL NUMBER(4)
VEHICLE_NUMBER          NUMBER(6)
ORDER_NUMBER   NOT NULL NUMBER(10)
```

SELECT * FROM Shipment;


Script Output | Query Result

SQL | All Rows Fetched: 3 in 0.027 seconds

	SHIPMENT_ID	VEHICLE_NUMBER	ORDER_NUMBER
1	1087	104631	451
2	1088	132451	452
3	1089	123481	453

GRANTING "SELECT" PERMISSION:

GRANT SELECT ON Customer TO dxr5351;
GRANT SELECT ON Driver TO dxr5351;
GRANT SELECT ON Employee TO dxr5351;
GRANT SELECT ON Furniture TO dxr5351;
GRANT SELECT ON Orders TO dxr5351;
GRANT SELECT ON Sales_reps TO dxr5351;
GRANT SELECT ON Shipment TO dxr5351;
GRANT SELECT ON Truck TO dxr5351;
GRANT SELECT ON Order_Item to dxr5351;

GRANT SELECT ON Customer TO guz;
GRANT SELECT ON Driver TO guz;
GRANT SELECT ON Employee TO guz;
GRANT SELECT ON Furniture TO guz;
GRANT SELECT ON Orders TO guz;
GRANT SELECT ON Sales_reps TO guz;
GRANT SELECT ON Shipment TO guz;
GRANT SELECT ON Truck TO guz;
GRANT SELECT ON Order_Item to guz;

E. Query Results:

1. SELECT Customer_name, Billing_address, Contact
   FROM Customer;

Output 1:

SQL | All Rows Fetched: 6 in 0.019 seconds

	CUSTOMER_NAME	BILLING_ADDRESS	CONTACT
1	John Smith	Arlington,TX,US	6833486487
2	Max Jones	703,Arlington,TX,US	6853486205
3	Ashley James	Forthworth,TX,US	6833876487
4	Thomas Maxwel	Dallas,TX,US	6833486753
5	Albert Edison	San Antonio,TX,US	6833486129
6	Jane Doe	Austin,TX,US	6837486098

2. SELECT o.Order_number, o.Delivery_Address, c.Customer_name, c.Billing_address, c.Contact, oi.Item_Code, f.Description, f.Unit_Price, oi.Quantity
   FROM Orders o
   JOIN Customer c ON o.Customer_account_number = c.Customer_account_number
   JOIN Order_Item oi ON o.Order_number = oi.Order_number
   JOIN Furniture f ON oi.Item_Code = f.Item_Code
   WHERE o.Order_number = 451;

Output 2:

Script Output | Query Result

SQL | All Rows Fetched: 1 in 0.02 seconds

	ORDER_NUMBER	DELIVERY_ADDRESS	CUSTOMER_NAME	BILLING_ADDRESS	CONTACT	ITEM_CODE	DESCRIPTION	UNIT_PRICE
1	451	(null)	John Smith	Arlington,TX,US	6833486487	1001	Desk	10(

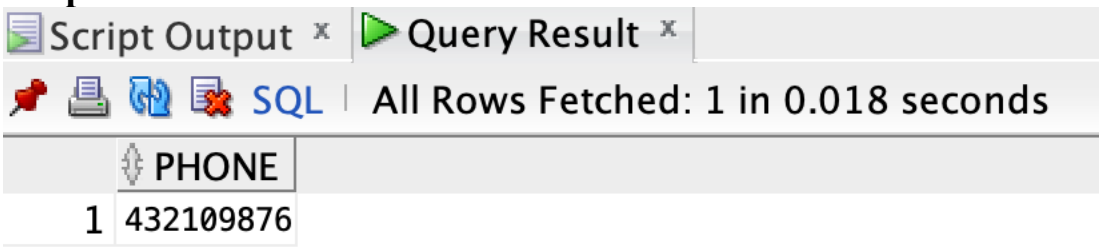
Script Output | Query Result

SQL | All Rows Fetched: 1 in 0.02 seconds

	IBER	DELIVERY_ADDRESS	CUSTOMER_NAME	BILLING_ADDRESS	CONTACT	ITEM_CODE	DESCRIPTION	UNIT_PRICE	QUANTITY
1	451	(null)	John Smith	Arlington,TX,US	6833486487	1001	Desk	100	5

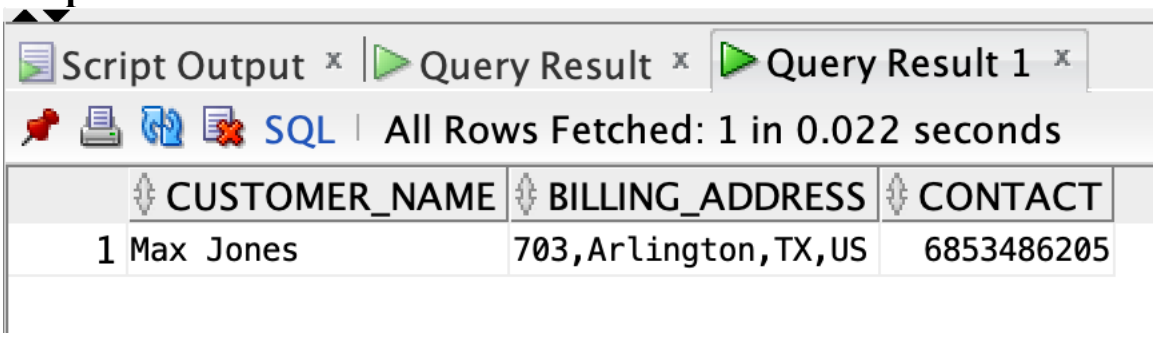
3. SELECT e.Phone
   FROM Employee e
   JOIN Sales_reps s ON e.SSN = s.SSN
   JOIN Orders o ON s.Order_number = o.Order_number
   WHERE o.Order_number = 451;

Output 3:



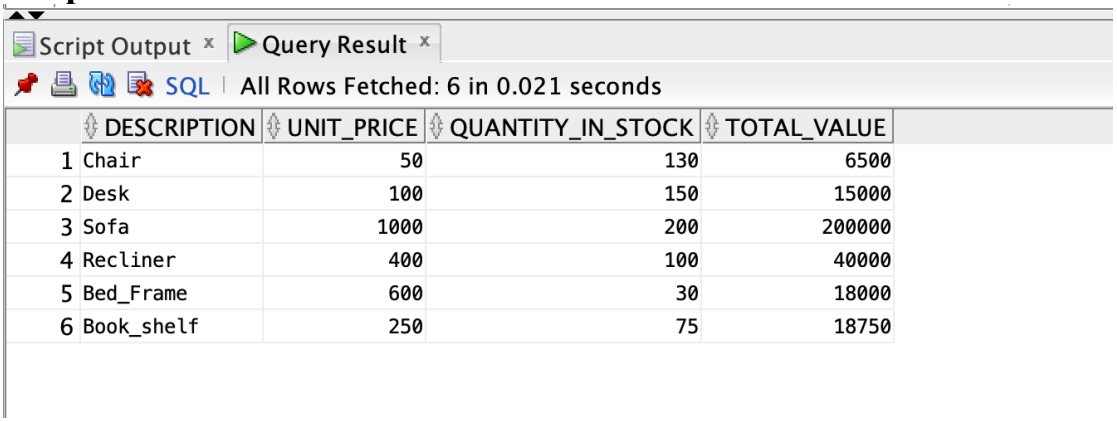
4. SELECT c.Customer_name, c.Billing_address, c.Contact
   FROM Customer c
   JOIN Orders o ON c.Customer_account_number = o.Customer_account_number
   JOIN Shipment s ON o.Order_number = s.Order_number
   JOIN Truck t ON s.Vehicle_number = t.Vehicle_number
   JOIN Driver d ON t.SSN = d.SSN
   WHERE d.SSN = 5678901234;

Output 4:



5. SELECT f.Description, f.Unit_Price, f.Quantity_in_Stock, (f.Quantity_in_Stock * f.Unit_Price) AS Total_Value
   FROM Furniture f
   WHERE f.Unit_Price > 25;

Output 5:



Script Output | Query Result

SQL | All Rows Fetched: 6 in 0.021 seconds

	DESCRIPTION	UNIT_PRICE	QUANTITY_IN_STOCK	TOTAL_VALUE
1	Chair	50	130	6500
2	Desk	100	150	15000
3	Sofa	1000	200	200000
4	Recliner	400	100	40000
5	Bed_Frame	600	30	18000
6	Book_shelf	250	75	18750