Ain Shams University
Faculty of Engineering
Computers and Systems Engineering Department

CSE421: Database Systems

Trading Company

- An SQL Database Report

INTRODUCED BY

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Contents

Introduction:

Design

Trading companies are businesses working with different kinds of products which are sold for consumer, business, or government purposes. Trading companies buy a specialized range of products, maintain a stock or a shop, and deliver products to customers.

Importers or wholesalers maintain a stock and deliver products to shops or large end customers. They work in a large geographical area, while their customers, the shops, work in smaller areas and often in just a small neighborhood.

Design Requirements

I designed a database for a Trading Company System describes:

- the movement of the products into the stock from suppliers and from the stock to the customers
- Each movement considered as a bill with all required information
- either bill in from supplier (invoice) or bill out to customer (burchase)
- The system also manages the products and their categories
- manages information of employees' roles and permissions
- manages customers and suppliers' information and orders from suppliers to customers.
- some employees have permisiion to add, edit, delete data.
- the system also have stock where price and remaining quantity of each product are stored.

Entities and their attributes

- **company** (branch_id, name, street, postalcode, city).
- **employee** (person_id, FName, Minit, LName, phone, street, postalcode, city, gender, email, day, month, year, com_id, salary).
- **supplier** (person_id, FName, Minit, LName, phone, street, postalcode, city, gender, email, day, month, year, title).
- **customer** (person_id, FName, Minit, LName, phone, street, postalcode, city, gender, email, day, month, year, potential).
- **bill_in** (bill_id, bill_date, emp_id, bill_sup_id).
- **Bill_body_in** (bill_body_in_id, bill_in_id, prod_id, quantity, price, discount).
- **bill_out** (bill_id, bill_date, emp_id, bill_cus_id).
- **Bill_body_out** (bill_body_out_id, bill_out_id, prod_id, quantity, price, discount).
- **login** (id, emp_id, username, password).
- **role** (role_id, role_name, role_describtion).
- **permissions** (per_role_id, per_name).
- **emp_has** (emp_id, role_id, per_role_id).
- **product** (prod_id, prod_name, code, emp_id, ctg_id, subctg_id).
- **category** (ctg_id, ctg_name).
- **sub_category** (subctg_id, subctg_name).
- **supplies** (person_id, prod_id).
- **stock** (stock_id, prod_id, quantity, price).

Constraints

- Each person may be classified into employee or customer or supplier.
- Each branch must have many employees
- Each employee must belong to only one branch.
- Each employee may have one login
- Each login must belong to one employee
- Each employee must have one or more role
- Each role must go to one or more employee
- Each employee must have one or more permission
- Each permission must go to one or more employee
- Each supplier must supply one or more product.
- Each product must be supplied from one or more suppliers.
- Each employee may generate one or more bill.
- Each bill must be generated only by one employee.
- Each supplier may have many bill_in .
- Each customer may have many bill_out .
- Each bill out must be generated only by one customer.
- Each bill in must be generated only by one supplier.
- Each bill in must contain one or more bill_body_in
- Each bill out must contain one or more bill_body_out
- Each bill_body_in must belong to only one bill in .
- Each bill_body_out must belong to only one bill out .
- Each bill_body_in may update only one stock.
- Each bill_body_out may update only one stock.
- Each product must have one category
- Each product must have one sub category
- Each category may have many products

- Each sub category may have many products

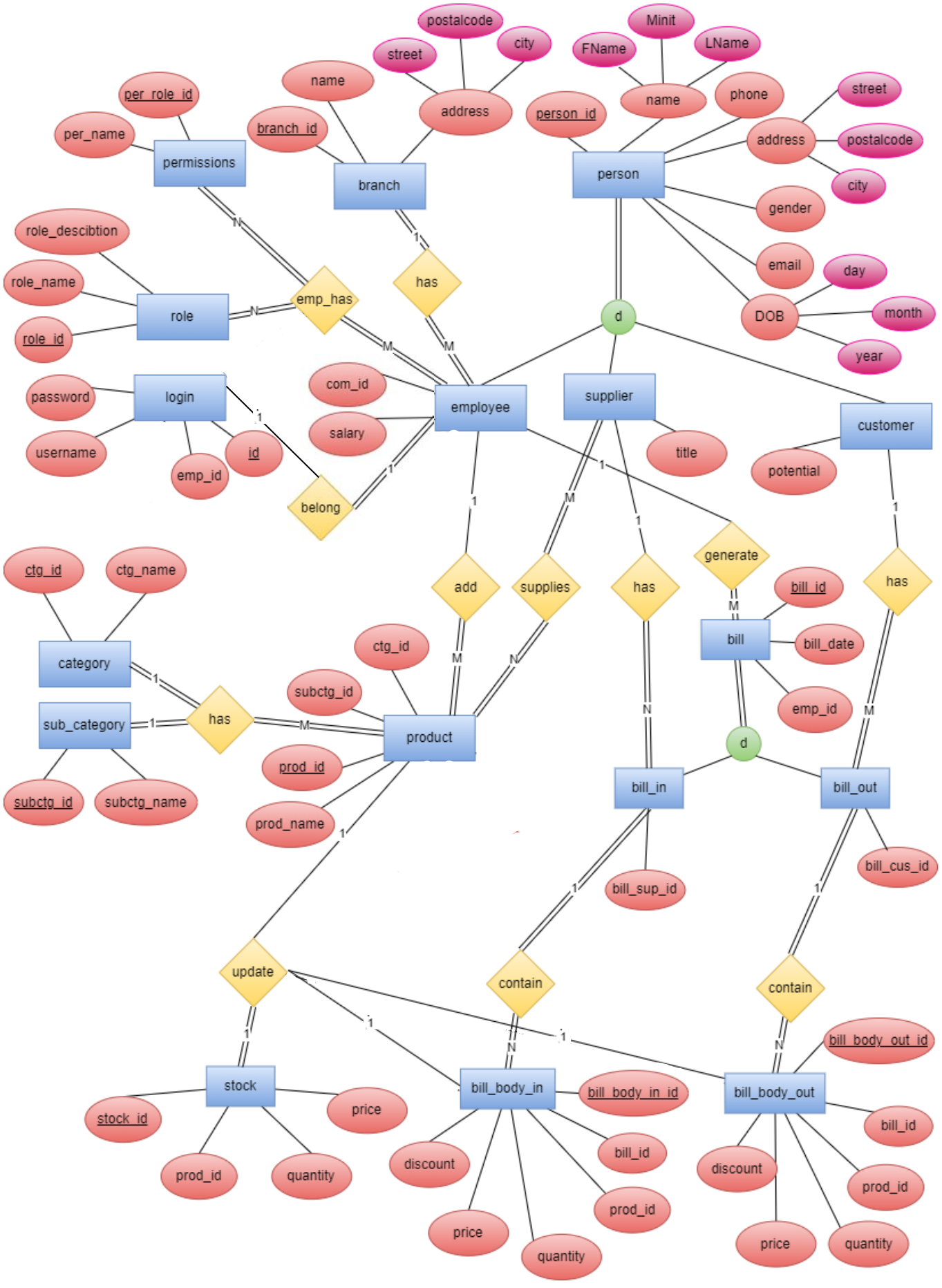
Assumptions

- Customers can't login nor suppliers only the employee can.
- The system doesn't support late payments, all paid cash and at the same date of the bill.
- All price in L.E

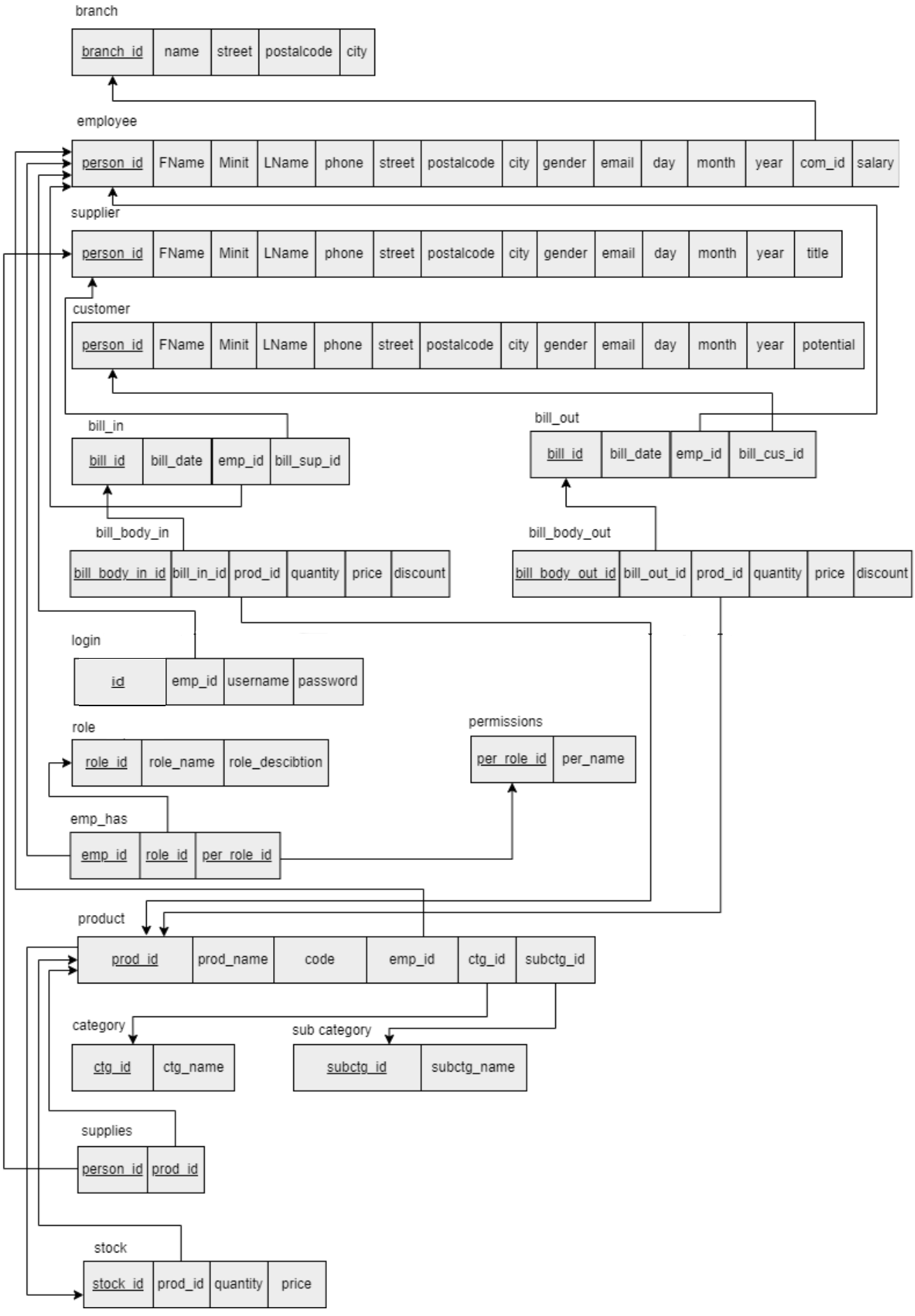
Database Diagrams

- Detailed EER Diagram
- Referential Diagram

Detailed EER Diagram



Referential Diagram

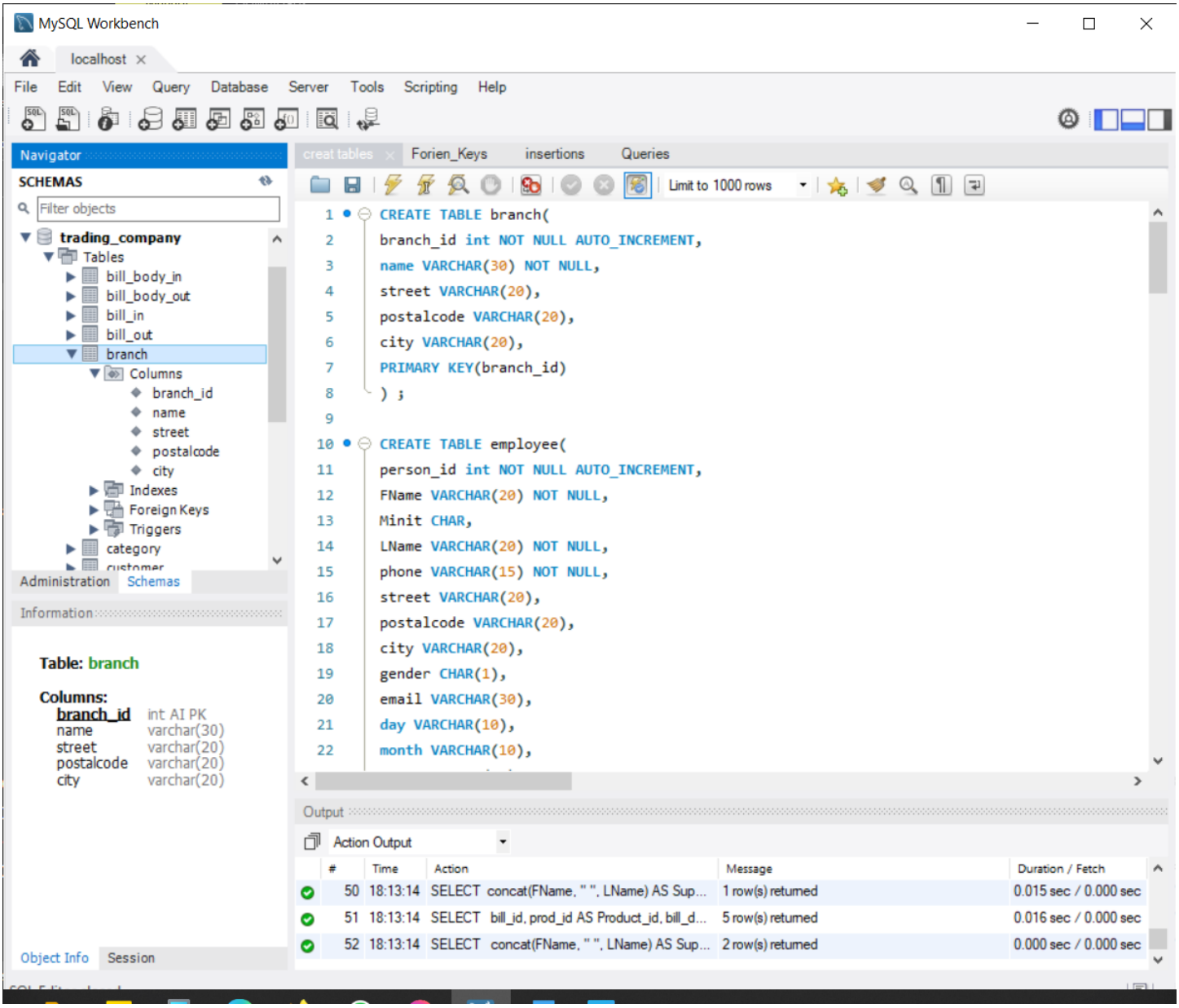


Database
SQL DDL

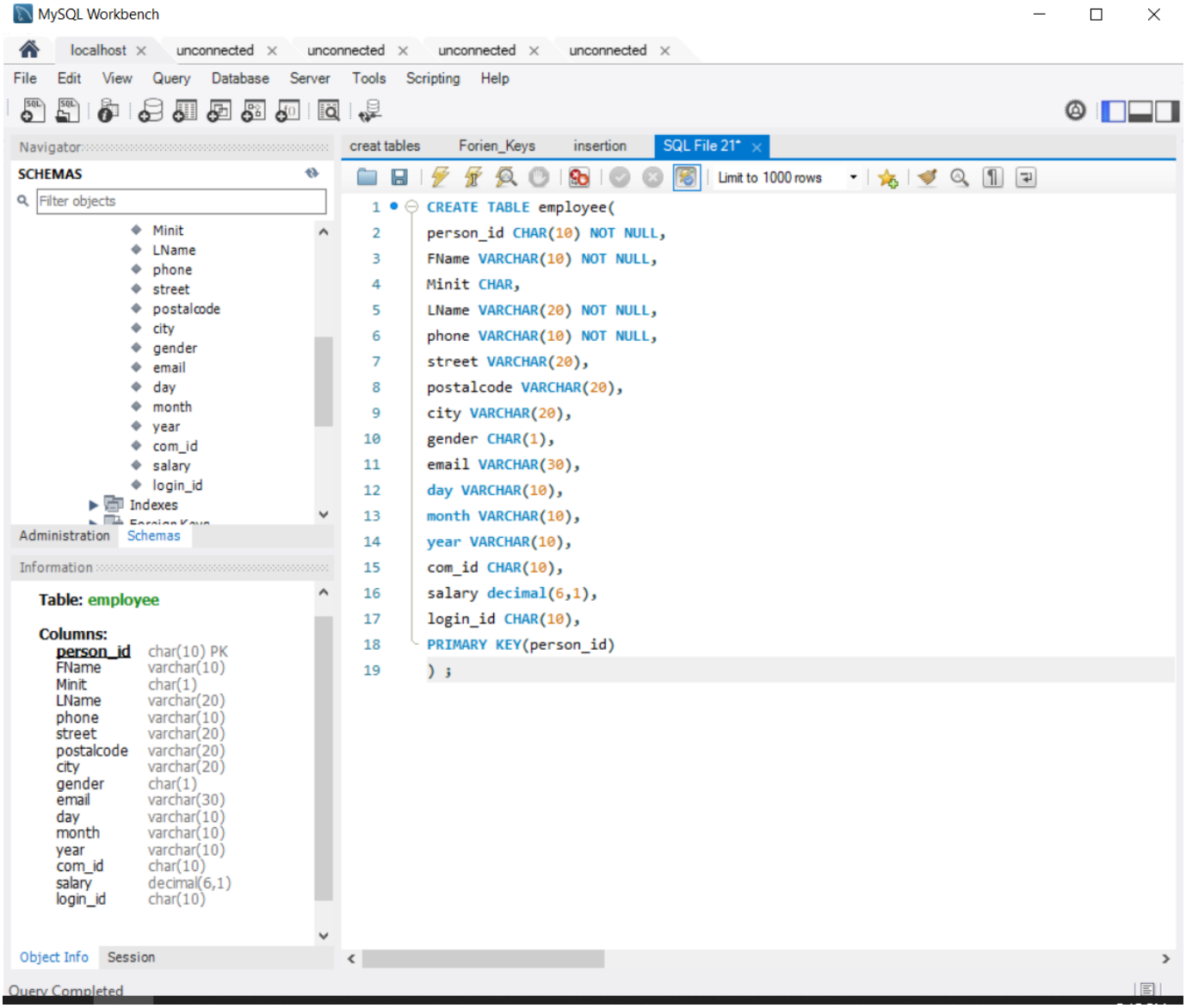
- Declaring Relations
- Foreign Keys Constraints

Declaring Relations

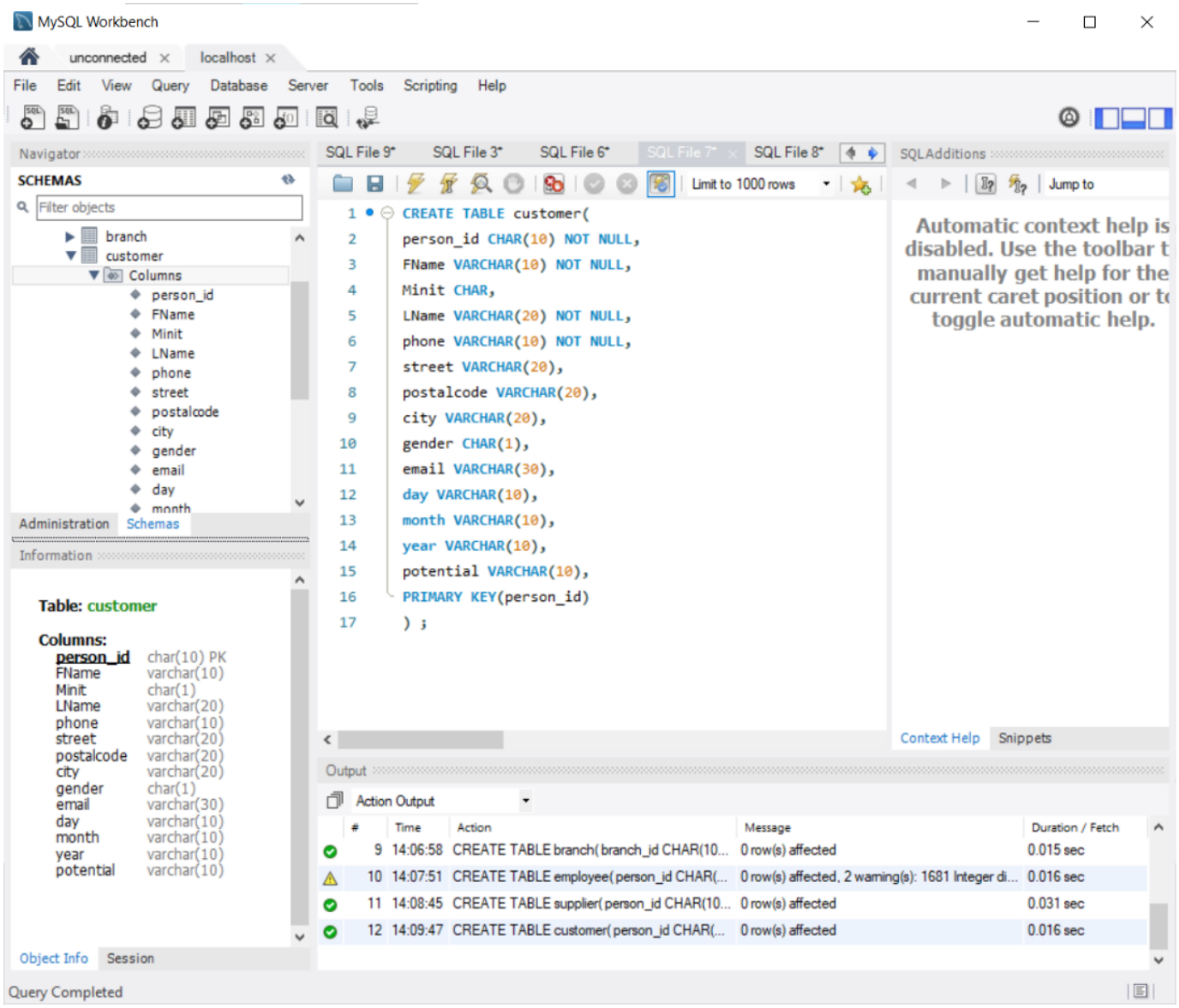
Create branch table



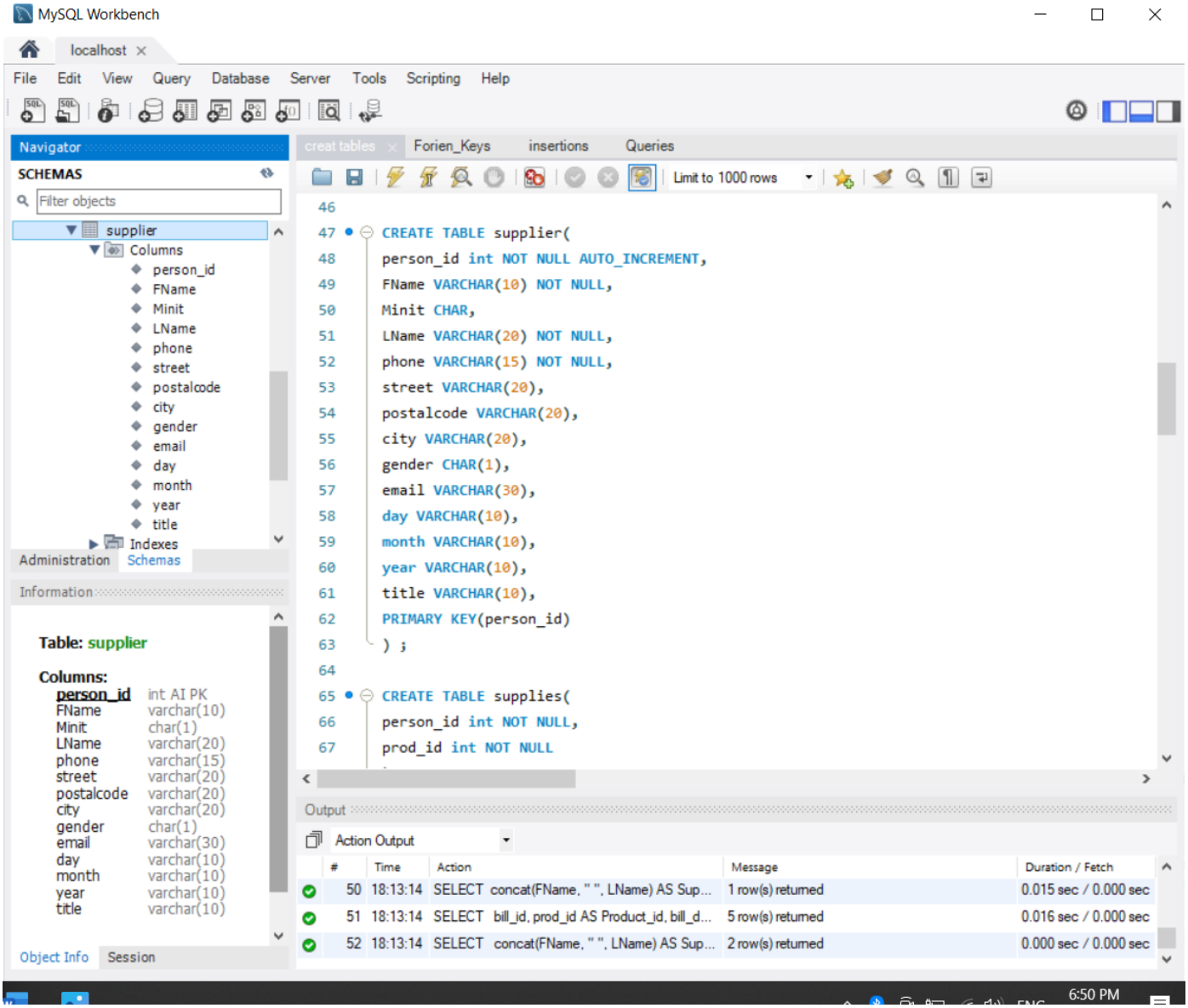
Create employee table



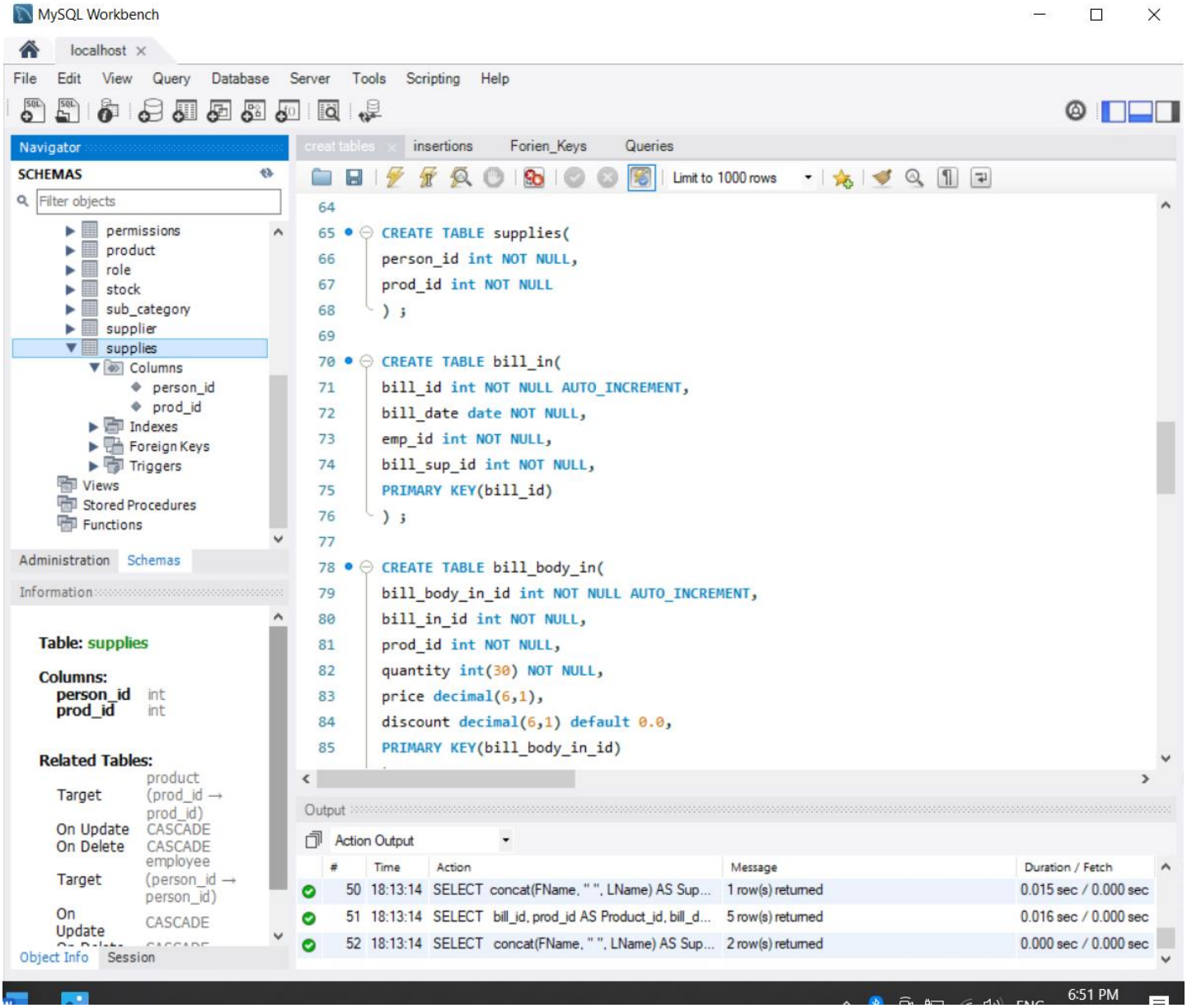
Create customer table



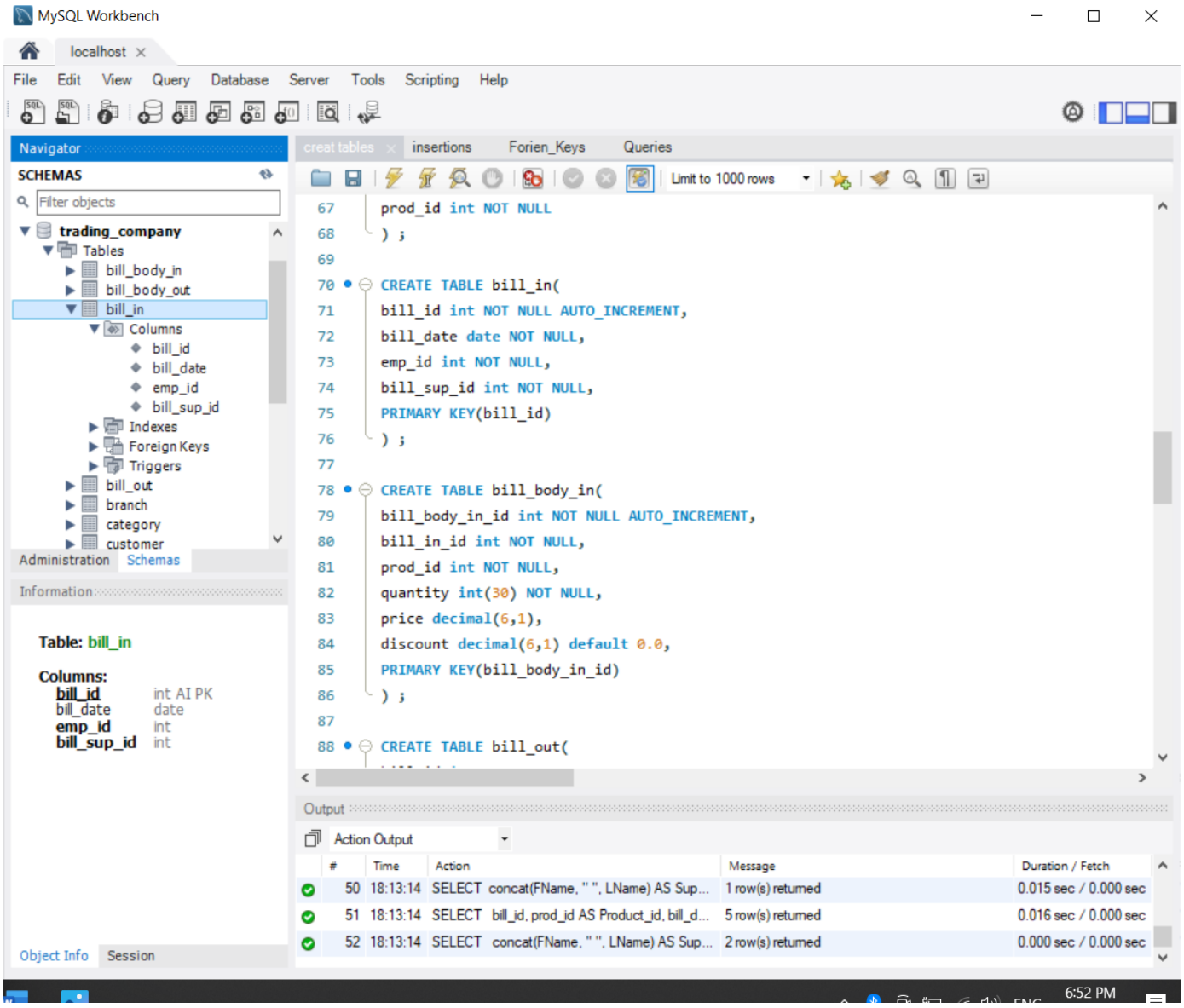
Create supplier table



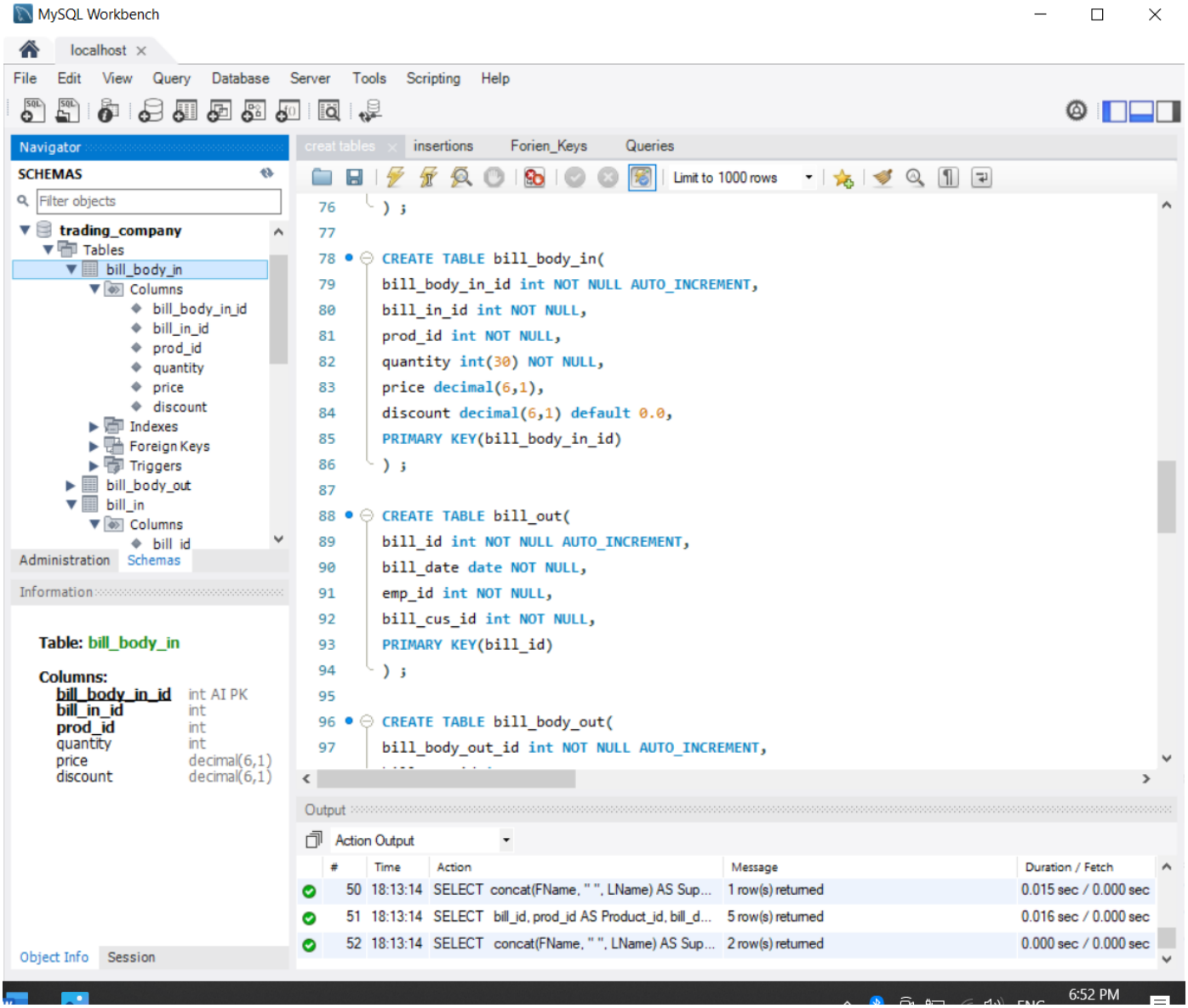
Create supplies table



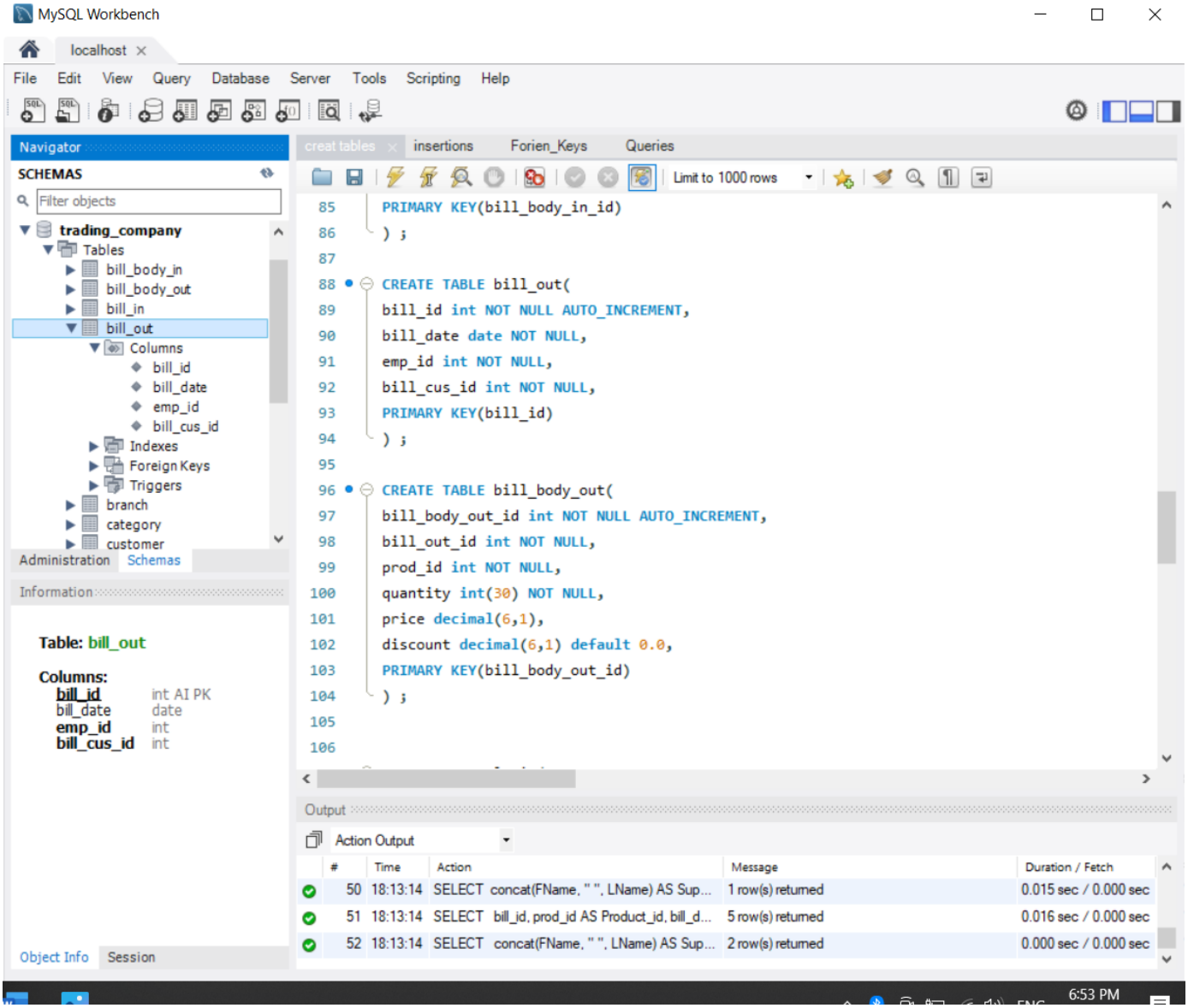
Create bill_in table



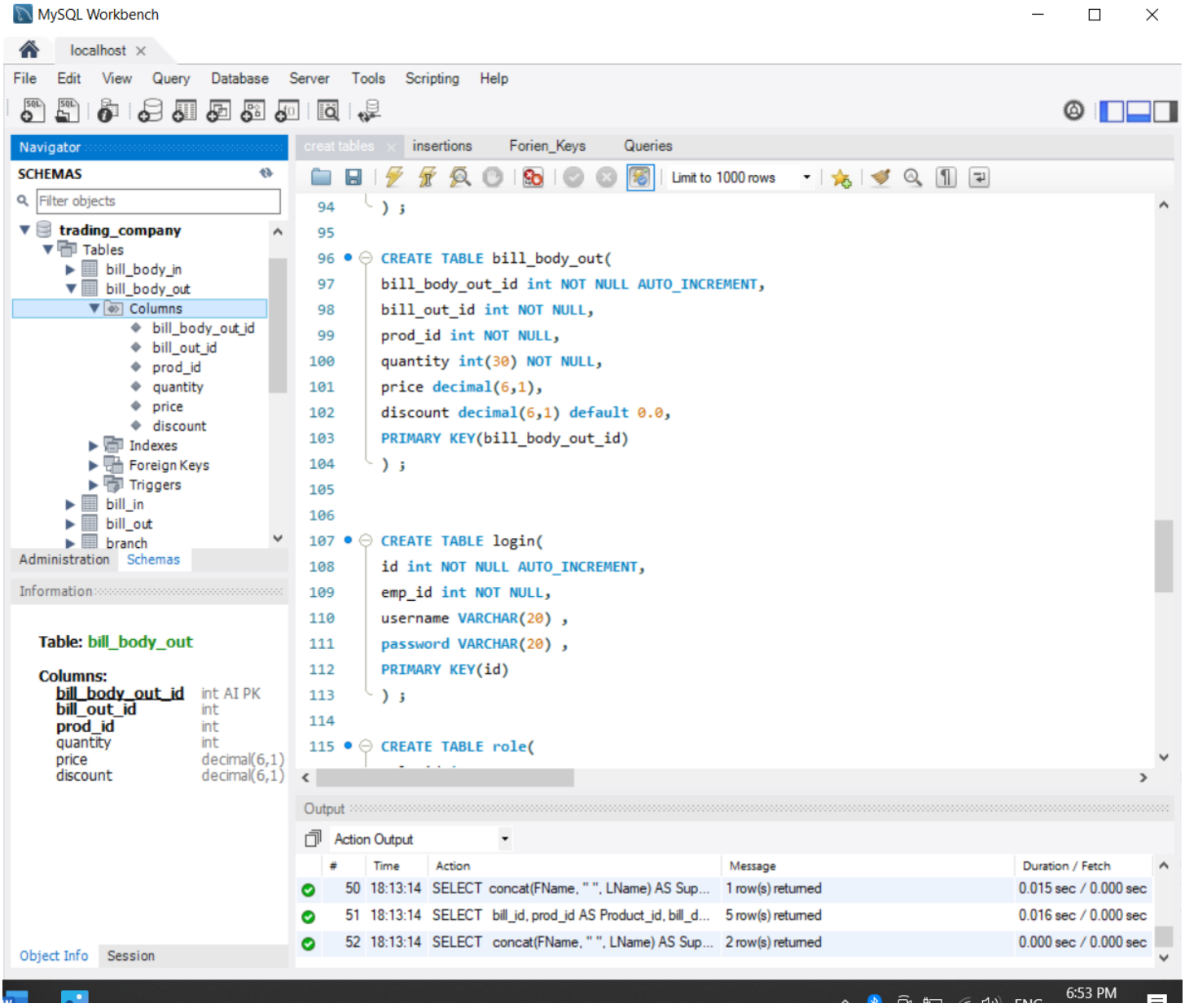
Create bill_body_in table



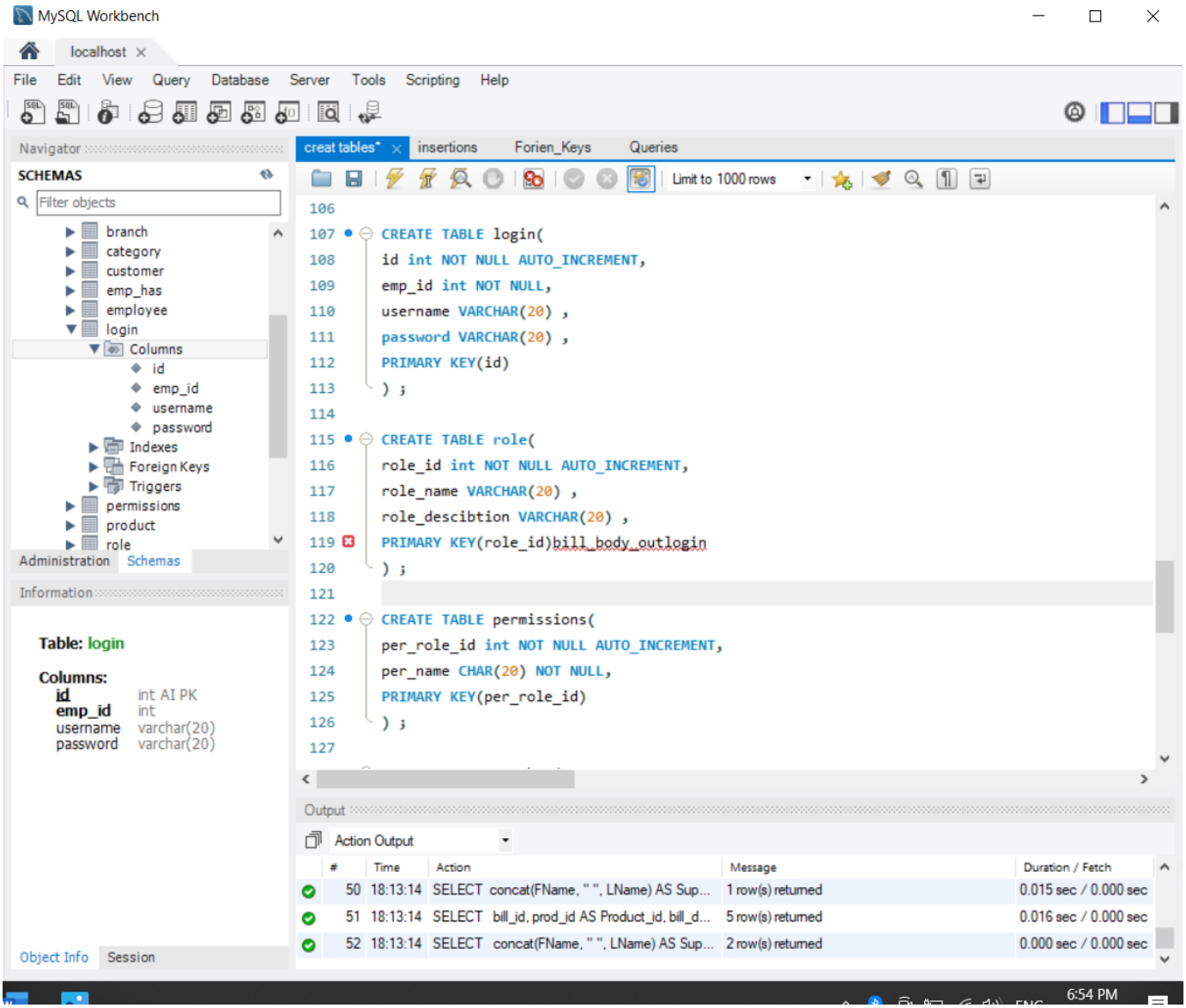
Create bill_out table



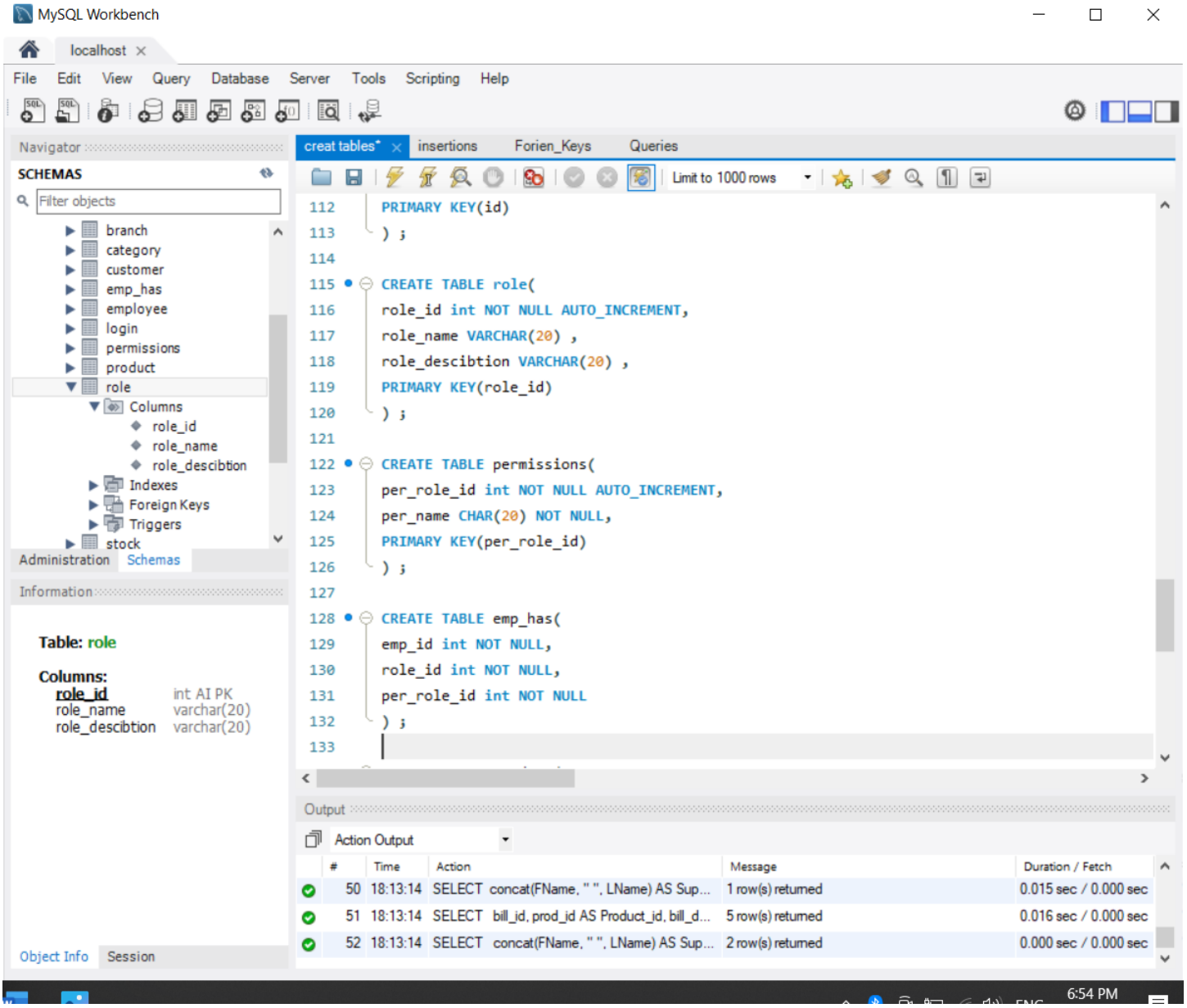
Create bill_body_out table



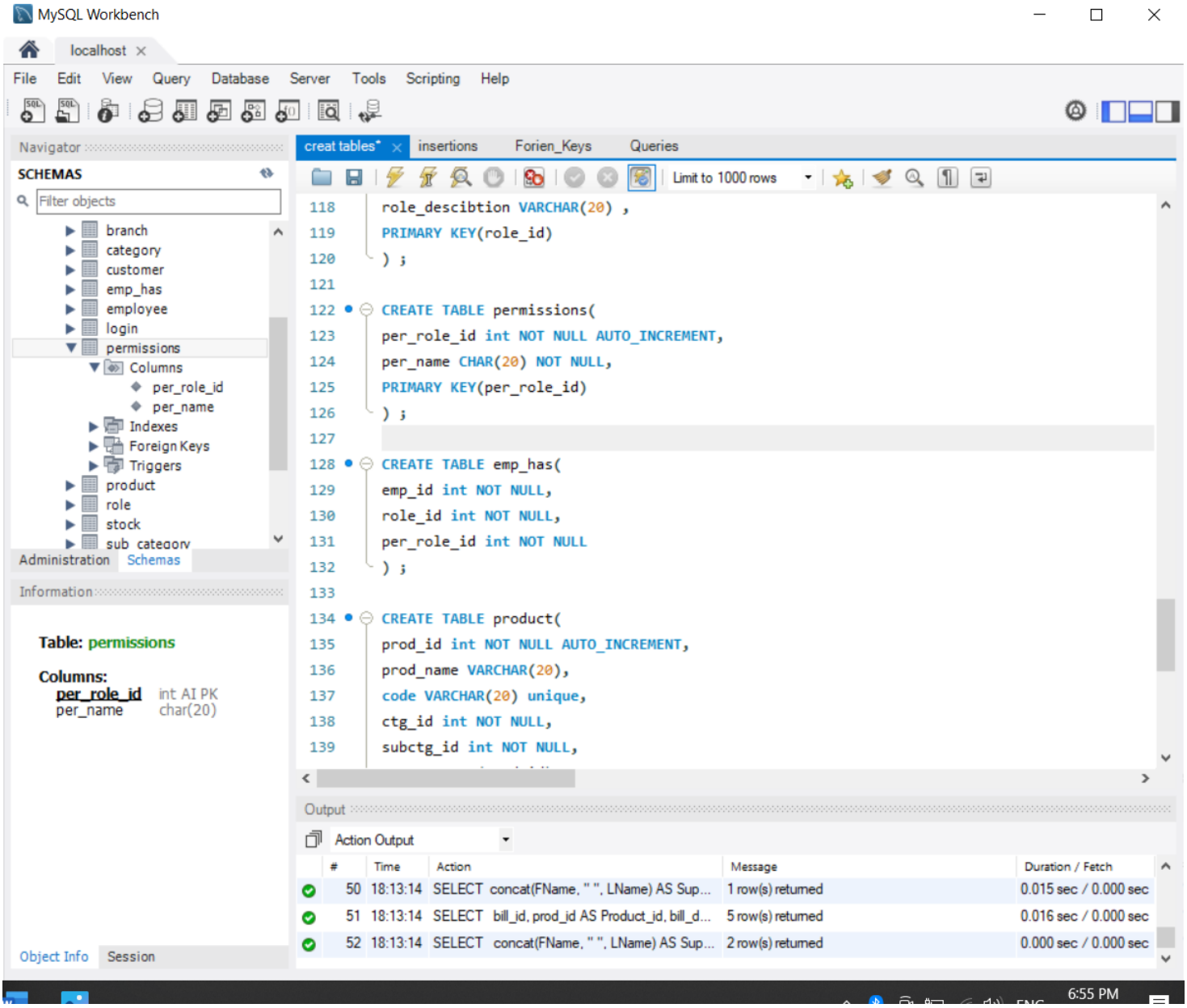
Create login table



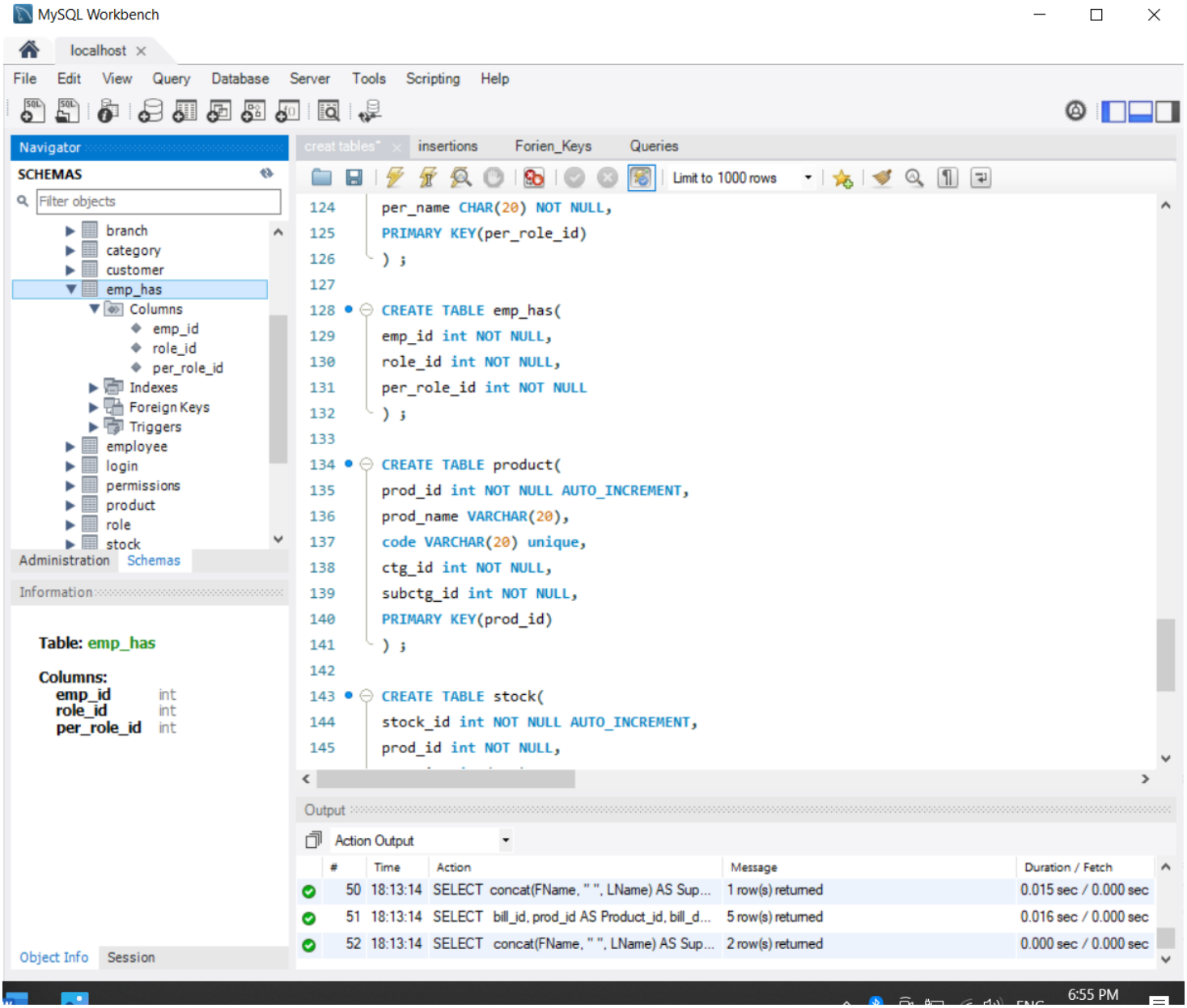
Create role table



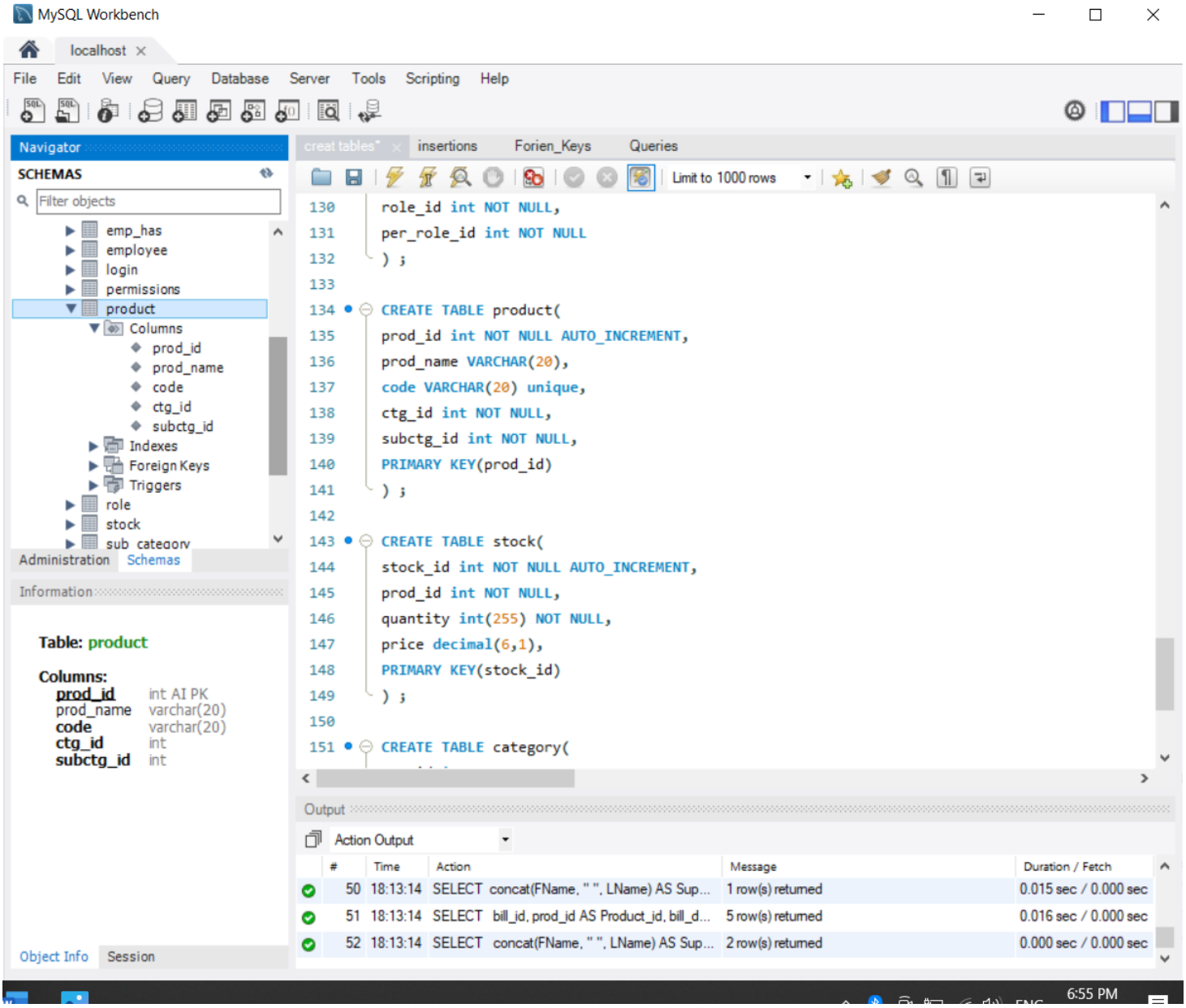
Create permissions table



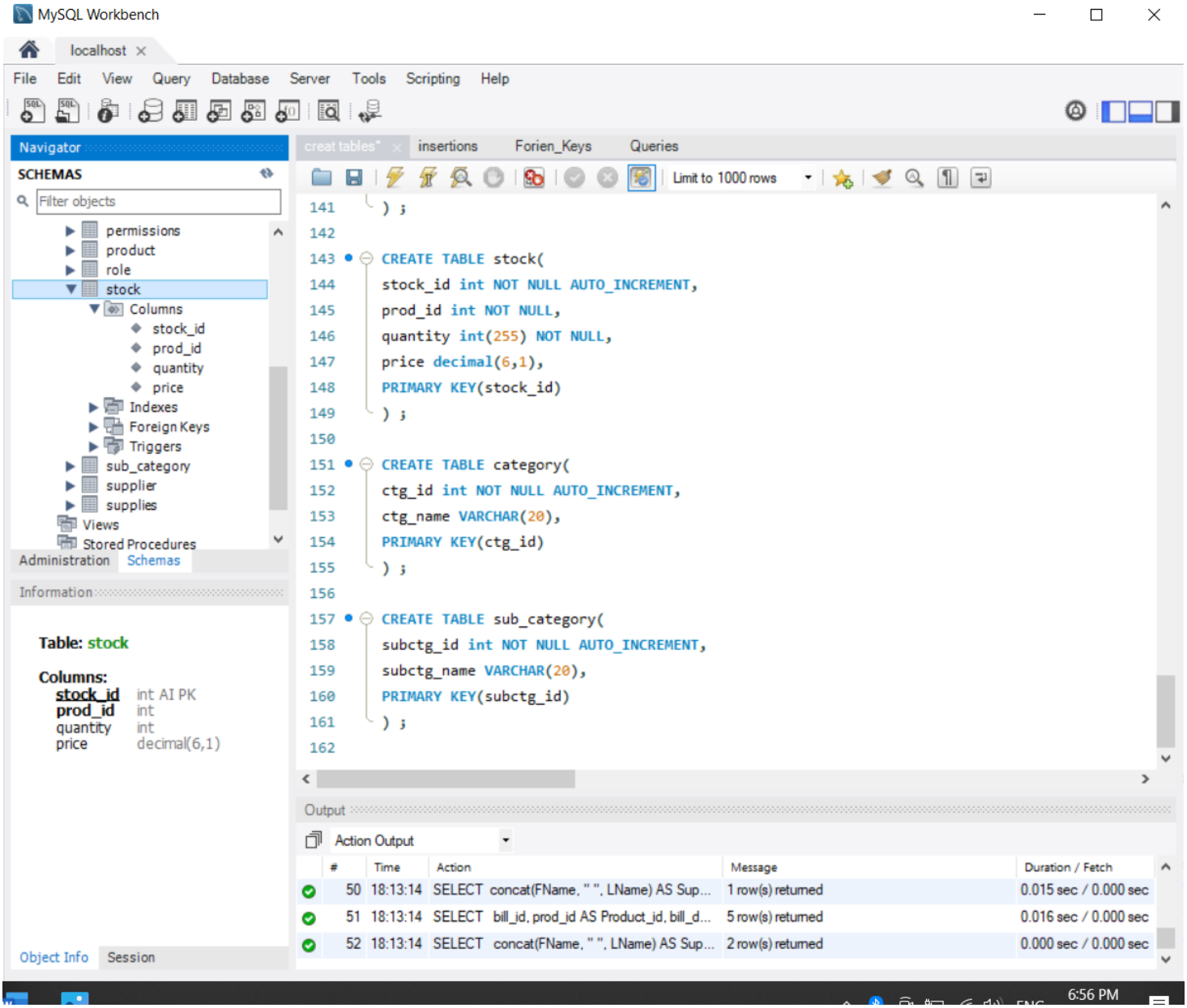
Create emp_has table



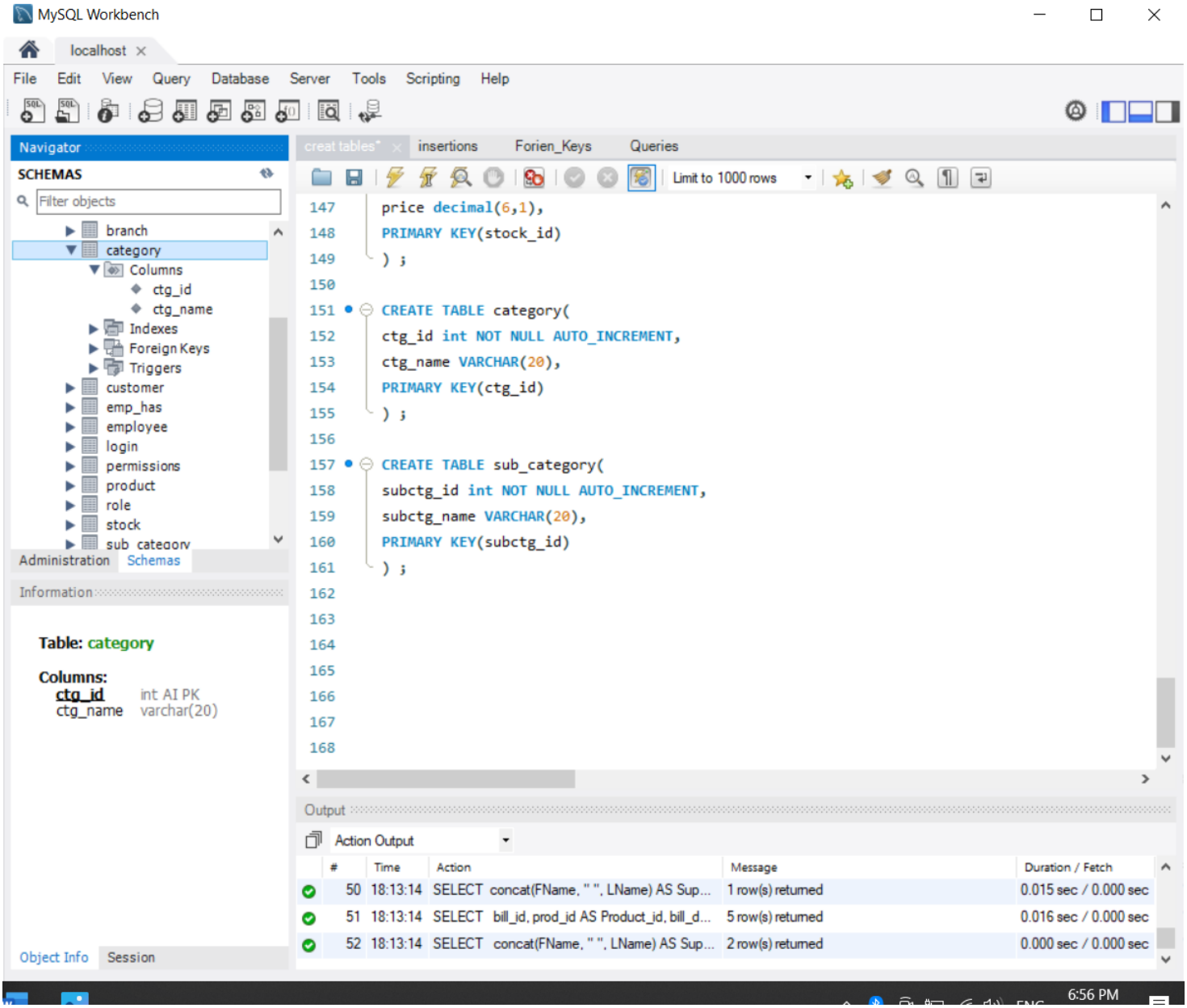
Create product table



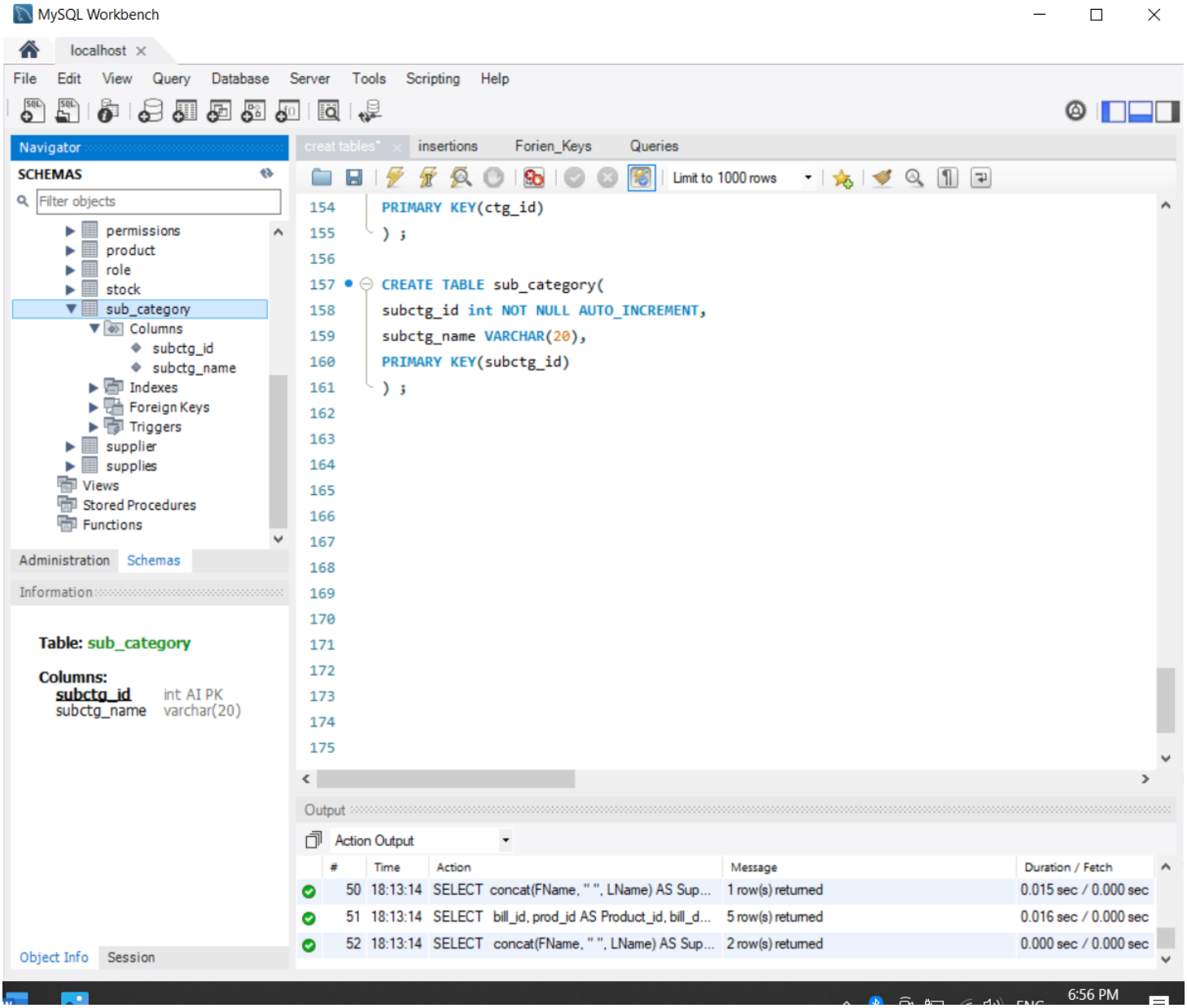
Create stock table



Create category table



Create sub_category table



Foreign Keys Constraints

```
ALTER TABLE employee
ADD CONSTRAINT emp_bran  FOREIGN KEY (com_id) REFERENCES branch(branch_id)
  ON DELETE CASCADE  ON UPDATE CASCADE;
```

```
ALTER TABLE bill_in
ADD CONSTRAINT in_bill_emp  FOREIGN KEY (emp_id) REFERENCES employee(person_id)
  ON DELETE CASCADE  ON UPDATE CASCADE,
ADD CONSTRAINT in_bill_sup   FOREIGN KEY (bill_sup_id) REFERENCES supplier(person_id)
  ON DELETE CASCADE  ON UPDATE CASCADE;
```

```
ALTER TABLE bill_body_in
ADD CONSTRAINT in_bodytohead  FOREIGN KEY (bill_in_id) REFERENCES bill_in(bill_id)
  ON DELETE CASCADE  ON UPDATE CASCADE,
ADD CONSTRAINT in_prod_bill   FOREIGN KEY (prod_id) REFERENCES product(prod_id)
  ON DELETE CASCADE  ON UPDATE CASCADE;
```

```
ALTER TABLE bill_out
ADD CONSTRAINT out_bill_emp  FOREIGN KEY (emp_id) REFERENCES employee(person_id)
  ON DELETE CASCADE  ON UPDATE CASCADE,
ADD CONSTRAINT out_bill_cus   FOREIGN KEY (bill_cus_id) REFERENCES customer(person_id)
  ON DELETE CASCADE  ON UPDATE CASCADE;
```

```
ALTER TABLE bill_body_out
ADD CONSTRAINT out_bodytohead  FOREIGN KEY (bill_out_id) REFERENCES bill_out(bill_id)
  ON DELETE CASCADE  ON UPDATE CASCADE,
ADD CONSTRAINT out_prod_bill   FOREIGN KEY (prod_id) REFERENCES product(prod_id)
  ON DELETE CASCADE  ON UPDATE CASCADE;
```

- ```
  ALTER TABLE login
  ADD CONSTRAINT log_emp   FOREIGN KEY (emp_id) REFERENCES employee(person_id)
    ON DELETE CASCADE  ON UPDATE CASCADE;
  ```

- ```
  ALTER TABLE emp_has
  ADD CONSTRAINT has_emp  FOREIGN KEY (emp_id) REFERENCES employee(person_id)
    ON DELETE CASCADE  ON UPDATE CASCADE,
  ADD CONSTRAINT has_role   FOREIGN KEY (role_id) REFERENCES role(role_id)
    ON DELETE CASCADE  ON UPDATE CASCADE,
  ADD CONSTRAINT has_per   FOREIGN KEY (per_role_id) REFERENCES permissions(per_role_id)
    ON DELETE CASCADE  ON UPDATE CASCADE;
  ```

- ```
  ALTER TABLE product
  ADD CONSTRAINT prod_ctg   FOREIGN KEY (ctg_id) REFERENCES category(ctg_id)
    ON DELETE CASCADE  ON UPDATE CASCADE,
  ADD CONSTRAINT prod_subCtg   FOREIGN KEY (subctg_id) REFERENCES sub_category(subctg_id)
    ON DELETE CASCADE  ON UPDATE CASCADE;
  ```

- ```
  ALTER TABLE supplies
  ADD CONSTRAINT supp  FOREIGN KEY (person_id) REFERENCES employee(person_id)
    ON DELETE CASCADE  ON UPDATE CASCADE,
  ADD CONSTRAINT sup_prod   FOREIGN KEY (prod_id) REFERENCES product(prod_id)
    ON DELETE CASCADE  ON UPDATE CASCADE;
  ```

- ```
  ALTER TABLE stock
  ADD CONSTRAINT stock_id   FOREIGN KEY (prod_id) REFERENCES product(prod_id)
    ON DELETE CASCADE  ON UPDATE CASCADE;
  ```
  ```

Data insertion

```
INSERT INTO branch (name,street ,postalcode ,city)
VALUES ('Alex Branch', '638','El-Marg', 'October'),
('Giza Branch', '152','El-Saf', 'Giza'),
('Cairo Branch', '731', 'Ain Shams', 'Cairo');
```

```
INSERT INTO employee (FName, Minit,LName ,phone ,street ,postalcode ,city ,gender ,email ,day ,month ,year, com_id, salary )
VALUES  ('Niveen','K','Adel', '01258965458','40','Sarayat','Cairo','F','neven40@gmail.com','20','3','1992','1','4000'),
('Islam','T','Magdi', '01525469523','36','Khalifa','Zagazig','M','islaam@gmail.com','11','5','1979','3','3500'),
('Alaa','S','Mohammed', '01025436598','12','El-Tahrir','Giza','F','Alaa399@gmail.com','14','7','1991','1','4500'),
('Ibrahim','K','Mohsen', '01232532697','20','Fire El-Nasser','Cairo','M','Ibrahim38@gmail.com','3','1','1996','2','6000'),
('Ali','A','Fikry', '01025125463','14','Ain Shams','Cairo','M','AliFikry200@gmail.com','12','2','1986','3','7500');
```

```
INSERT INTO  login ( emp_id,username ,password)
VALUES ('1', 'Niveen123','gkj256h21'),
('2', 'Islam345','ert25vh'),
('3', 'Alaa125','dffr56hbb21'),
('4', 'Ibrahim654','wer12f52'),
('5', 'Ali1267','drt12g5');
```

```
INSERT INTO supplier (FName, Minit,LName ,phone ,street ,postalcode ,city ,gender ,email ,day ,month ,year, title )
VALUES  ('Soaad','K','Adel', '01258965458','40','Sarayat','Cairo','F','Soaad40@gmail.com','20','3','1992','chemicals'),
('Omar','T','Magdi', '01525469523','36','Khalifa','Zagazig','M','Omar@gmail.com','11','5','1979','fashion'),
('Mary','S','Mohammed', '01025436598','12','El-Tahrir','Giza','F','Mary399@gmail.com','14','7','1990','chemicals'),
('Fathy','K','Mohsen', '01232532697','20','Fire El-Nasser','Cairo','M','Fathy38@gmail.com','3','1','1996','furniture'),
('Ali','A','Fikry', '01025125463','14','Ain Shams','Cairo','M','AliFikry200@gmail.com','12','2','1986','fashion');
```

```
INSERT INTO customer (FName, Minit,LName ,phone ,street ,postalcode ,city ,gender ,email ,day ,month ,year, potential )
VALUES  ('Hanaa','K','Adel', '01258965458','40','Sarayat','Cairo','F','Hanaa40@gmail.com','20','3','1992','A'),
('Magdy','T','Magdi', '01525469523','36','Khalifa','Zagazig','M','Magdy@gmail.com','11','5','1979','B'),
('Mariam','S','Mohammed', '01025436598','12','El-Tahrir','Giza','F','Mariam399@gmail.com','14','7','1990','B'),
('Mina','K','Mohsen', '01232532697','20','Fire El-Nasser','Cairo','M','Mina38@gmail.com','3','1','1996','C'),
('nabil','A','Fikry', '01025125463','14','Ain Shams','Cairo','M','nabil200@gmail.com','12','2','1986','A');
```

```
INSERT INTO role (role_name, role_descibtion)
VALUES ('manager', 'contrl,lead'),
('employee', 'make bills'),
('worker', 'transporting goods');
```

```
INSERT INTO permissions (per_name)
VALUES ('burchasing'),
('selling'),
('make reports'),
('add product'),
('add employee'),
('add supplier'),
('add customer'),
('update price');
```

```
INSERT INTO emp_has ( emp_id, role_id,per_role_id)
VALUES ('2', '1','4'),
('2', '1','5'),
('2', '1','6'),
('2', '1','7'),
('1', '2','8'),
('5', '2','1'),
('5', '2','2'),
('3', '2','2'),
('1', '2','2'),
('4', '2','2'),
('4', '2','3');
```

```
INSERT INTO category (ctg_name)
VALUES ('body care'),
('fashion');
```

```
INSERT INTO sub_category (subctg_name)
VALUES ('nails'),
('cosmetics'),
('makeup'),
('dress'),
('t-shirt'),
('jeans');
```

```
INSERT INTO product (prod_name,code , ctg_id,subctg_id)
VALUES ('nail remover', 'N001','1', '1'),
('blusher', 'g201','1', '3'),
('shower', 'r569','1', '2'),
('bodyLoshn', 'u589','1', '2'),
('maskara', 'g256', '1', '3'),
('highWaste', 'yt569','2', '6'),
('shortDress', 'f256','2', '4'),
('nightDress', 'q236', '2', '4');
```

```
INSERT INTO stock ( prod_id,quantity ,price)
VALUES ('1', '100','70'),
('2', '150','150'),
('3', '141','130'),
('4', '351','140'),
('5', '120','250'),
('6', '213','400'),
('7', '250','450'),
('8', '400','750');
```

```
INSERT INTO bill_in (bill_date , emp_id,bill_sup_id)
VALUES ('2021-09-05', '1','3'),
('2021-12-03', '1','4'),
('2021-06-03', '3','2'),
('2022-10-02', '4','5'),
('2022-2-13', '5','1');
```

```
INSERT INTO bill_body_in (bill_in_id,prod_id ,quantity ,price ,discount )
VALUES ('1', '3','26', '130','5'),
('1', '5','13', '120','5'),
('2', '4','5', '140','0'),
('3', '7','22', '450','10'),
('3', '8', '14', '750','0'),
('4', '2','2', '150','8'),
('5', '1','13', '70','0'),
('5', '6', '20', '400','6');
```

```
INSERT INTO bill_out (bill_date , emp_id,bill_cus_id)
VALUES ('2021-09-05', '1','3'),
('2021-12-03', '1','4'),
('2021-06-03', '3','2'),
('2022-10-02', '4','5'),
('2022-2-13', '5','1');
```

```
INSERT INTO bill_body_out (bill_out_id,prod_id ,quantity ,price ,discount )
VALUES ('1', '3','12', '130','5'),
('1', '5','13', '35','5'),
('2', '4','5', '33','0'),
('3', '7','22', '122','10'),
('3', '8', '14', '16','0'),
('4', '2','2', '54','8'),
('5', '1','13', '33','0'),
('5', '6', '20', '22','6');
```

```
INSERT INTO supplies (person_id, prod_id)
VALUES ('1', '5'),
('2', '8'),
('5', '7'),
('3', '4'),
('4', '3'),
('5', '6'),
('3', '1'),
('1', '2'),
('2', '6');
```

Queries

Query 1: Cairo Employees who were born in the 90's

List of all employees

```
1 •  SELECT * FROM new_schema.employee;
```

Limit to 1000 rows

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content:

person_id	FName	Minit	LName	phone	street	postalcode	city	gender	email	day	month	year	com_id	salary
1	Niveen	K	Adel	01258965458	40	Sarayat	Cairo	F	neven40@gmail.com	20	3	1992	1	4000.0
2	Islam	T	Magdi	01525469523	36	Khalifa	Zagazig	M	islaam@gmail.com	11	5	1979	3	3500.0
3	Alaa	S	Mohammed	01025436598	12	El-Tahrir	Giza	F	Alaa399@gmail.com	14	7	1991	1	4500.0
4	Ibrahim	K	Mohsen	01232532697	20	Fire El-Nasser	Cairo	M	Ibrahim38@gmail.com	3	1	1996	2	6000.0
5	Ali	A	Fikry	01025125463	14	Ain Shams	Cairo	M	AliFikry200@gmail.com	12	2	1986	3	7500.0
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Statement:

```
-- Q1
/*Retrieve all employee who lives in cairo and were born in the 90's
*/
SELECT concat(FName, " ", LName) AS Employee_name, concat(day, "-",month, "-", year)
AS Birth_date, concat(street, ",", postalcode, ",",city) AS Address
FROM   employee
WHERE  city LIKE '%Cairo%'  AND  year LIKE '199%'  -- in the 90's
ORDER BY Employee_name;
```

Output :

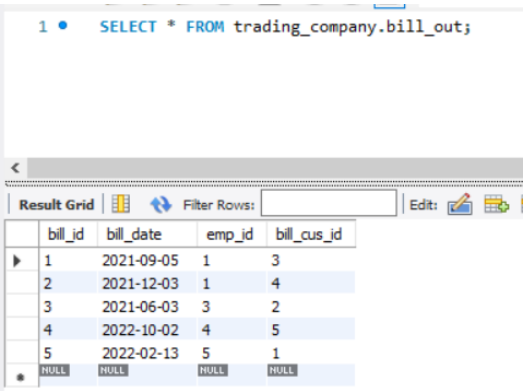
9

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Employee_name	Birth_date	Address
Ibrahim Mohsen	3-1-1996	20,Fire El-Nasser,Cairo
Niveen Adel	20-3-1992	40,Sarayat,Cairo

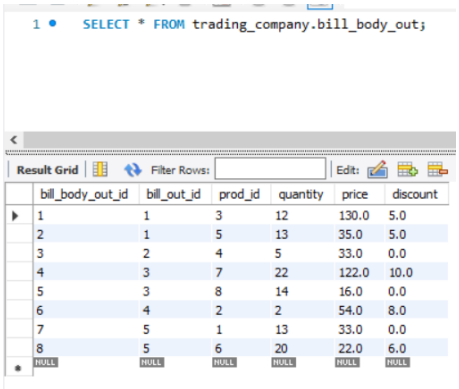
Query 2: product sales in 2022

List of all bills out and products



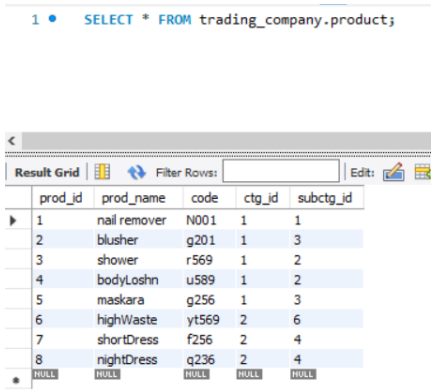
```
SELECT * FROM trading_company.bill_out;
```

bill_id	bill_date	emp_id	bill_cus_id
1	2021-09-05	1	3
2	2021-12-03	1	4
3	2021-06-03	3	2
4	2022-10-02	4	5
5	2022-02-13	5	1



```
SELECT * FROM trading_company.bill_body_out;
```

bill_body_out_id	bill_out_id	prod_id	quantity	price	discount
1	1	3	12	130.0	5.0
2	1	5	13	35.0	5.0
3	2	4	5	33.0	0.0
4	3	7	22	122.0	10.0
5	3	8	14	16.0	0.0
6	4	2	2	54.0	8.0
7	5	1	13	33.0	0.0
8	5	6	20	22.0	6.0



```
SELECT * FROM trading_company.product;
```

prod_id	prod_name	code	ctg_id	subctg_id
1	nail remover	N001	1	1
2	blusher	g201	1	3
3	shower	r569	1	2
4	bodyLoshn	u589	1	2
5	maskara	g256	1	3
6	highWaste	yt569	2	6
7	shortDress	f256	2	4
8	nightDress	q236	2	4

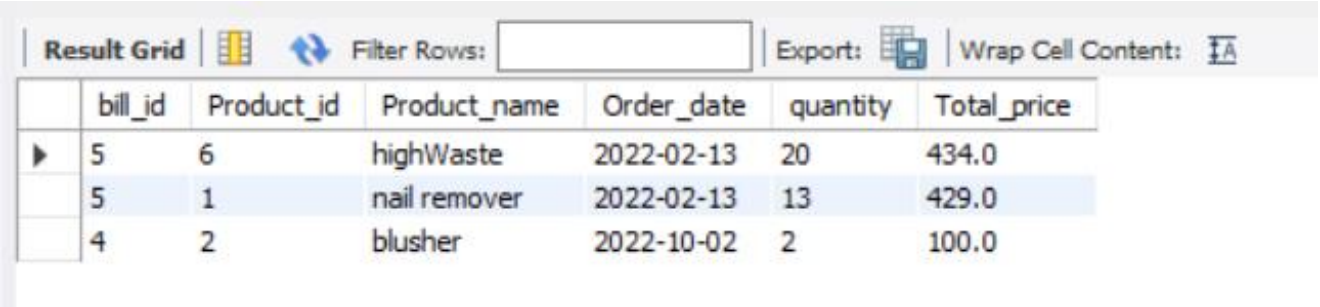
(join 3 tables with INNER JOIN method)

Retrieve bill number, product id, Product_name, order date, quantity, and the total price that occurred after the start of 2022

Statement :

```
-- Q2
/*Retrieve bill number, product id, Product_name, order date, quantity, and the total
price that occurred after the start of 2022
*/
SELECT   bill_id, product.prod_id AS Product_id, prod_name AS Product_name,bill_date AS Order_date, quantity,
         ((quantity * price)-discount) AS Total_price
FROM    bill_out  INNER JOIN bill_body_out
                ON bill_id = bill_out_id
                INNER JOIN product
                ON bill_body_out.prod_id = product.prod_id
WHERE    bill_date >= '2022-01-01'
ORDER BY Total_price DESC;
```

Output :

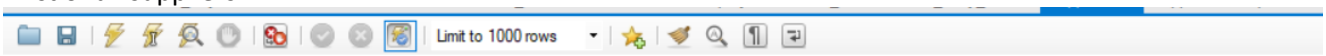


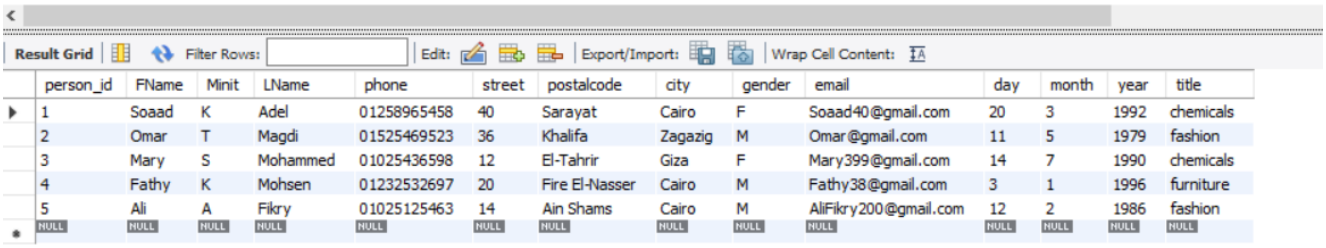
Result Grid | Filter Rows: | Export: | Wrap Cell Content:

bill_id	Product_id	Product_name	Order_date	quantity	Total_price
5	6	highWaste	2022-02-13	20	434.0
5	1	nail remover	2022-02-13	13	429.0
4	2	blusher	2022-10-02	2	100.0

Query 3: find suppliers supplies lives in Giza

list of all suppliers



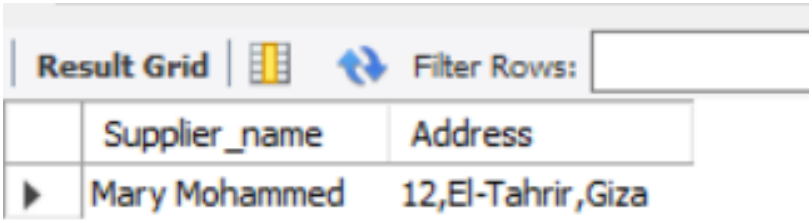


person_id	FName	Minit	LName	phone	street	postalcode	city	gender	email	day	month	year	title
1	Soaad	K	Adel	01258965458	40	Sarayat	Cairo	F	Soaad40@gmail.com	20	3	1992	chemicals
2	Omar	T	Magdi	01525469523	36	Khalifa	Zagazig	M	Omar@gmail.com	11	5	1979	fashion
3	Mary	S	Mohammed	01025436598	12	El-Tahrir	Giza	F	Mary399@gmail.com	14	7	1990	chemicals
4	Fathy	K	Mohsen	01232532697	20	Fire El-Nasser	Cairo	M	Fathy38@gmail.com	3	1	1996	furniture
5	Ali	A	Fikry	01025125463	14	Ain Shams	Cairo	M	AliFikry200@gmail.com	12	2	1986	fashion
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Statement :

```
-- Q3
/*Retrieve all suppliers lives in Giza
*/
SELECT  concat(FName, " ", LName) AS Supplier_name, concat(street, ",", postalcode, ",",city) AS Address
FROM     supplier
WHERE  city LIKE '%Giza%'
ORDER BY Supplier_name;
```

Output :



Supplier_name	Address
Mary Mohammed	12,El-Tahrir,Giza

Query 4: all invoices(bills in) exceeds 1000L.E in 2022

List of all bills in and products

```
SELECT * FROM trading_company.bill_in;
```

bill_id	bill_date	emp_id	bill_sup_id
1	2021-09-05	1	3
2	2021-12-03	1	4
3	2021-06-03	3	2
4	2022-10-02	4	5
5	2022-02-13	5	1

```
SELECT * FROM trading_company.bill_body_in;
```

bill_body_in_id	bill_in_id	prod_id	quantity	price	discount
1	1	3	26	130.0	5.0
2	1	5	13	120.0	5.0
3	2	4	5	140.0	0.0
4	3	7	22	450.0	10.0
5	3	8	14	750.0	0.0
6	4	2	2	150.0	8.0
7	5	1	13	70.0	0.0
8	5	6	20	400.0	6.0

```
SELECT * FROM trading_company.product;
```

prod_id	prod_name	code	ctg_id	subctg_id
1	nail remover	N001	1	1
2	blusher	g201	1	3
3	shower	r569	1	2
4	bodyLoshn	u589	1	2
5	maskara	g256	1	3
6	highWaste	yt569	2	6
7	shortDress	f256	2	4
8	nightDress	q236	2	4

(join 3 tables with INNER JOIN method)

Retrieve bill number, product id, Product_name, order date, quantity, and the total price of orders exceeds 1000L.E.

Statement :

```
-- Q4
/*Retrieve bill number, product id, order date, Product_name, quantity, and the total
price of orders exceeds 1000L.E.
*/
SELECT   bill_id, product.prod_id AS Product_id, prod_name AS Product_name,bill_date AS Order_date, quantity,
         ((quantity * price)-discount) AS Total_price
FROM    bill_out  INNER JOIN bill_body_in
                ON bill_id = bill_in_id
                INNER JOIN product
                ON bill_body_in.prod_id = product.prod_id
WHERE    ((quantity * price)-discount) >= '1000'
ORDER BY Total_price DESC;
```

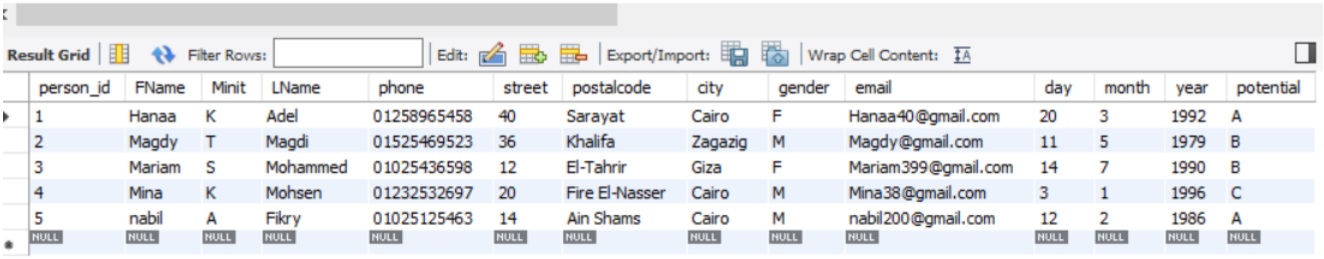
Output :

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

bill_id	Product_id	Product_name	Order_date	quantity	Total_price
3	8	nightDress	2021-06-03	14	10500.0
3	7	shortDress	2021-06-03	22	9890.0
5	6	highWaste	2022-02-13	20	7994.0
1	3	shower	2021-09-05	26	3375.0
1	5	maskara	2021-09-05	13	1555.0

Query 5: all customers class A

All customers



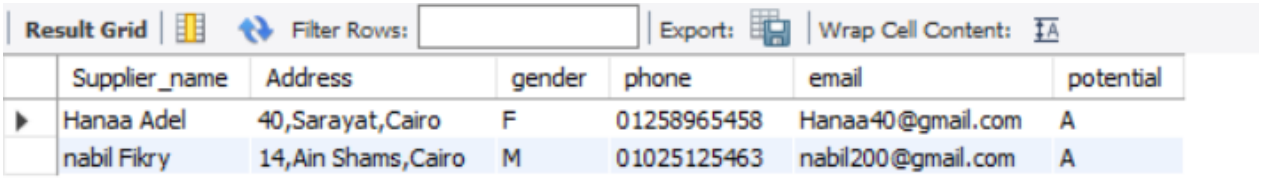
Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content:

person_id	FName	Minit	LName	phone	street	postalcode	city	gender	email	day	month	year	potential
1	Hanaa	K	Adel	01258965458	40	Sarayat	Cairo	F	Hanaa40@gmail.com	20	3	1992	A
2	Magdy	T	Magdi	01525469523	36	Khalifa	Zagazig	M	Magdy@gmail.com	11	5	1979	B
3	Mariam	S	Mohammed	01025436598	12	El-Tahrir	Giza	F	Mariam399@gmail.com	14	7	1990	B
4	Mina	K	Mohsen	01232532697	20	Fire El-Nasser	Cairo	M	Mina38@gmail.com	3	1	1996	C
5	nabil	A	Fikry	01025125463	14	Ain Shams	Cairo	M	nabil200@gmail.com	12	2	1986	A
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Statement

```
-- Q5
/*Retrieve all customers class A
*/
SELECT   concat(FName, " ", LName) AS Supplier_name,
concat(street, ",", postalcode, ",",city) AS Address,
gender,phone,email,potential
FROM   customer
WHERE  potential LIKE 'A'
ORDER BY Supplier_name;
```

Output :



Result Grid | Filter Rows: | Export: | Wrap Cell Content:

Supplier_name	Address	gender	phone	email	potential
Hanaa Adel	40,Sarayat,Cairo	F	01258965458	Hanaa40@gmail.com	A
nabil Fikry	14,Ain Shams,Cairo	M	01025125463	nabil200@gmail.com	A