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

Course Project

Course Title:	Introduction to Database
Course Code:	IS 229
Semester/Year:	Spring 2021
Course Instructor:	T. Sara Aljomman

Project Title:	**Supermarket**

Student Name	Student ID	Section No.	Signature
Nwara Mohammed Aljoufi	440019357	371	Nwara

Part # 1: Conceptual Part:

A. ***Introduction:***
B. ***EER Model:***

Introduction:

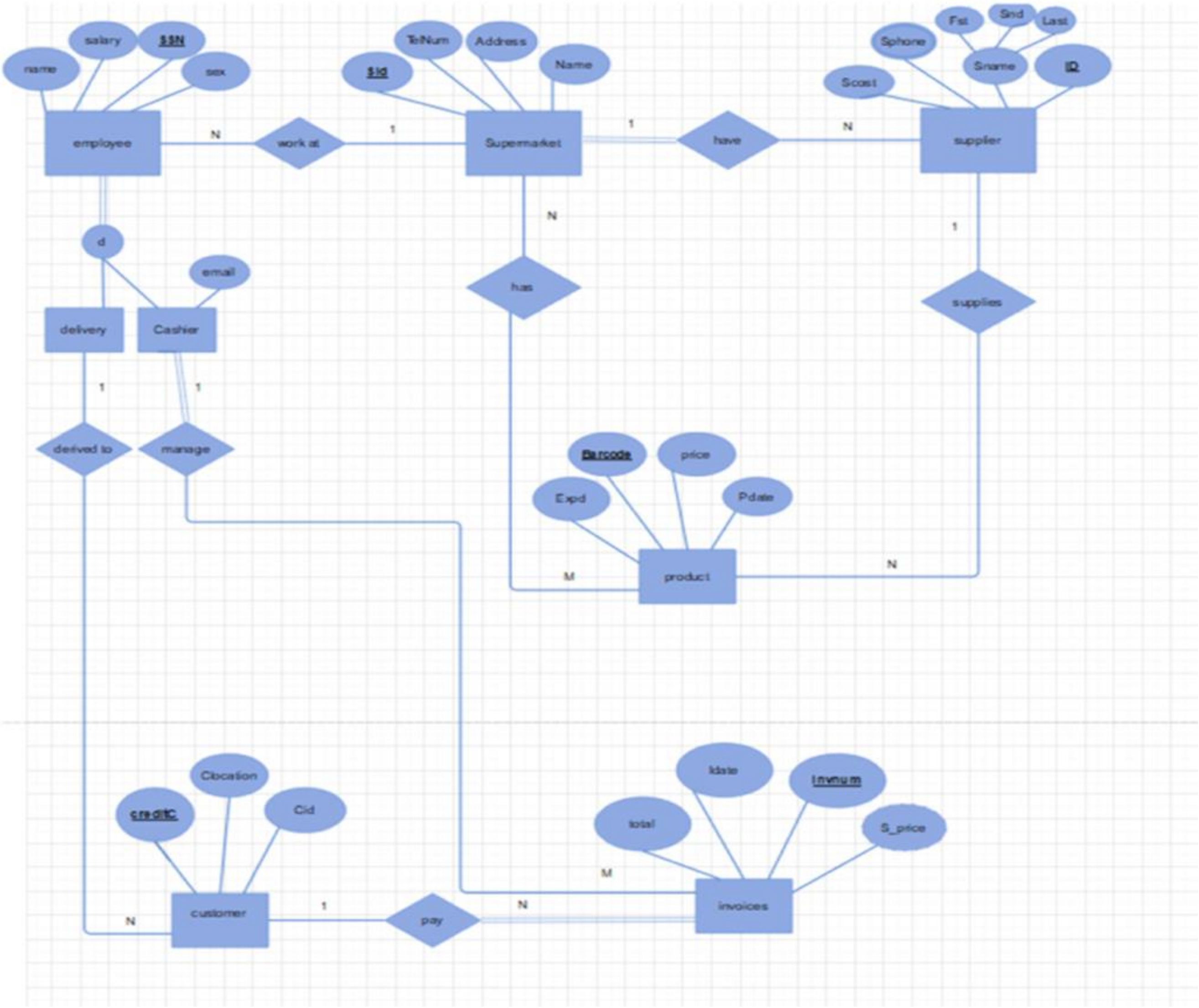
Here the project which we will design is the database management system of the Supermarket with employee(cashier, delivery) and supplier entity which also has product and customer with finally the invoices that will have. The system is designed on the Oracle. An Oracle database is a list ofdata viewed as a unit. The aim of a database is to store and retrieve similar information. Oracle Database is the first company grid computing database to handle knowledge and applications in a scalable and cost-effective manner. The first step while designing the whole project is the designing the ERDs. The second step is to make the normalization of the given ERRs. Then after we will get the normalized system and there is creation of the database function is performed. And the DML queries will be performed. And then we have to make the Views of the whole database

.

The Scenario:

- supermarket system described by Name, and has uniquely identified Sid(supermarket ID), TelNum , Address. employee and supplier they corporate in that system.
- Cashier and delivery are the only persons that can be separate under employee. An employee has salary, sex, name and uniquely identified by SSN.
- Scost ,its may have multi Sphone ,Sname(Fst-Snd-Last) and uniquely identified ID are referred to supplier information, cashier characteristic property is that he or she has email account.
- A product has a Pdate ,Expd(expiration date) ,price,and has uniquely identified Barcode.
- Each Product supplies on exactly one supplier ,but supplier can supplies many products on.
- The supermarket has at least one product while product can has one or more supermarket.
- A supermarket capacity realize several employees to work at .While employee can work at just one supermarket. On the other hand supermarket must have one or more supplier. Whereas supplier have at most one supermarket.
- costumer has uniquely identified by creditC (credit card) ,Clocation and Cid.
- invoices characteristic property is Idate , total , uniquely identified by Invnum ,and has derived S_price(sale price) from generalPrice * saleAmount.
- delivery can derived to several customers ,but customer derived to exactly one delivery.
- Customer pay at least one Invoice. Where Invoices may pay from only one customer. On the other hand Cashier must manage more than one invoice , and invoice can manage exactly one cashier.

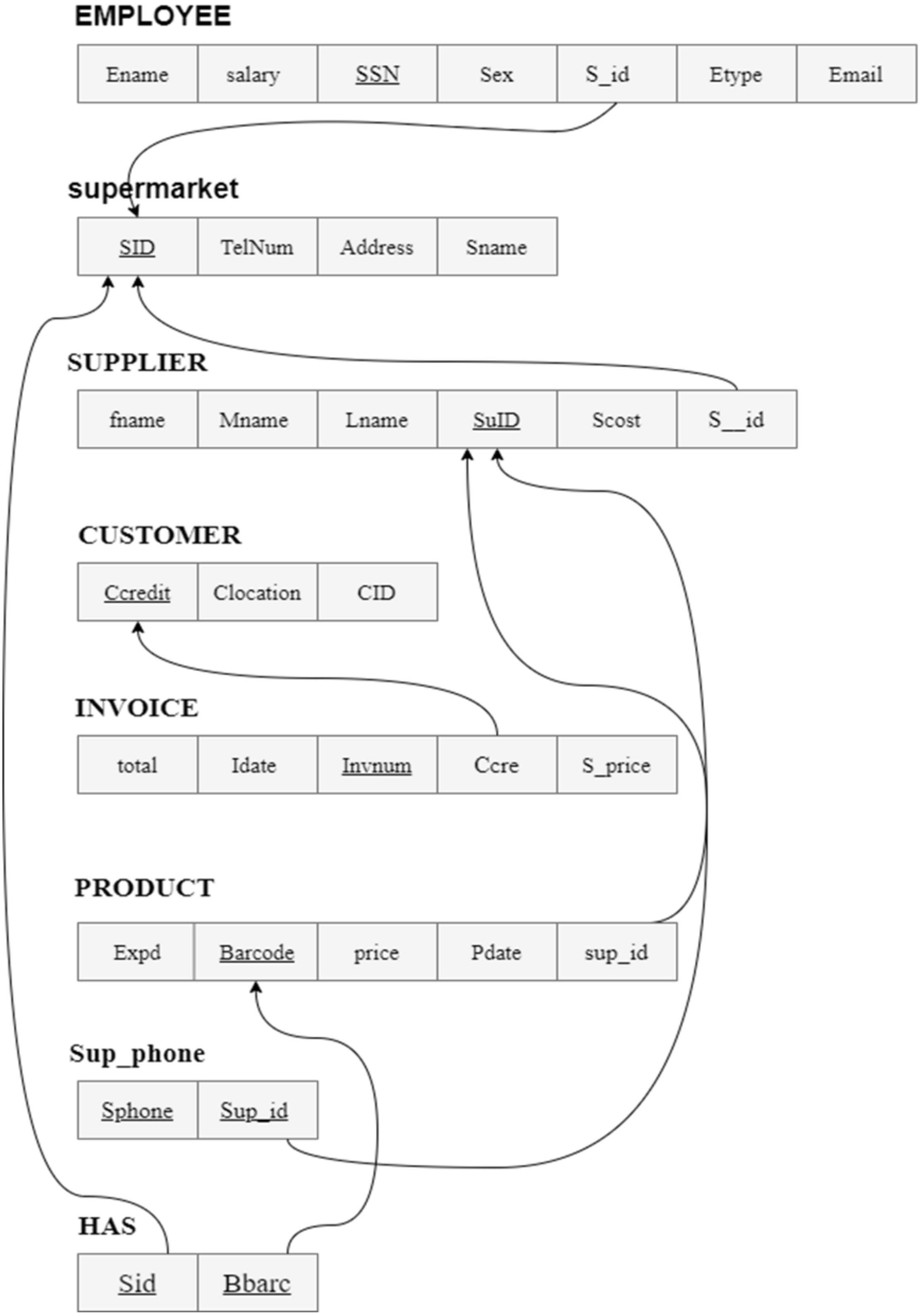
ERR:


name
salary
SSN
sex
employee
N
work at
1
TelNum
Address
Sid
Name
Supermarket
1
have
N
Fst
Snd
Last
Sphone
Sname
ID
Scost
supplier
N
has
1
supplies
d
email
delivery
Cashier
1
1
derived to
manage
Barcode
price
Expd
Pdate
M
product
N
Idate
Invnum
total
S_price
M
Clocation
creditC
Cid
customer
N
1
pay
N
invoices

Part # 2: **Logical part:**

1. ***Mapping:***
2. ***Normalization:***

Mapping:



EMPLOYEE

Ename	salary	SSN	Sex	S_id	Etype	Email

supermarket

SID	TelNum	Address	Sname

SUPPLIER

fname	Mname	Lname	SuID	Scost	S__id

CUSTOMER

Ccredit	Clocation	CID

INVOICE

total	Idate	Invnum	Ccre	S_price

PRODUCT

Expd	Barcode	price	Pdate	sup_id

Sup_phone

Sphone	Sup_id

HAS

Sid	Bbarc

Normalization:

- Loosely speaking, First Standard Type specifies that each relation attribute should disallows composite, multivalued attributes and nested relation. Now, by extension, this table comes in 1NF except in supplier. In the **1NF** we have to check the tables that they have these issues and resolve them into smaller tables.

- Second Normal Form(**2NF**) is the subsequent advance in normalizing a data set. 2NF expands on the primary typical structure (1NF).In 2NF we have to remove partial dependency:

- Third typical structure (**3NF**) when no non-prime attribute is transitively dependent on the primary we must check there is no Transitive Dependency.

- To reach (**BCNF)** first we must check there is no prime attribute is dependent on non-prime attribute so the primary key is the super key always.

Supermarket

Sid	Name	Address	TelNum

Sid->Name

- It is in **1NF** while there is no multivalued attributes or nested relations ,and it is in **2NF** since there is only one primary key (full dependency) without partial. also in **3NF** because there is no transitive dependency finally it's in **BCNF** since primary key is the super key of that relation.

employee

name	salary	**SSN**	sex	Sid	type	email

SSN->salary

- It is in **1NF** while there is no multivalued attributes or nested relations.
It is in **2NF** since there is only one primary key (full dependency) without partial.
Also in **3NF** because there is no transitive dependency.
finally it's in **Boyce-codd Normal Form** since primary key is the super key of that relation.

supplier

Scost	Fst	Snd	Last	**ID**	Sid

ID->Scost

- This relation satisfies **1NF** with no multi or composite attributes or nested relation.
And satisfies **2NF** so its fully function dependent with only one PK.
Also there is no transitive dependency so it must be in **3NF**.
No prime attribute dependent on non-prime attribute so it is in BCNF.

product

Exp	Pdate	**Barcode**	price	SupID

Barcode->price

- It is in **1NF** while there is no multivalued attributes or nested relations ,and it is in **2NF** since there is only one primary key (full dependency) without partial. also in **3NF** because there is no transitive dependency finally it's in **BCNF** since primary key is the super key of that relation.

invoices

Total	**Invum**	Idate	S_price	creditC

Invum->total

- This relation satisfies **1NF** with no multi or composite attributes or nested relation.
And satisfies **2NF** so its fully function dependent with only one PK.
Also there is no transitive dependency so it must be in **3NF**.
No prime attribute dependent on non-prime attribute so it is in **BCNF**.

customer

credit	Clocation	Cid

creditC->Clocation

- It is in **1NF** while there is no multivalued attributes or nested relations.
It is in **2NF** since there is only one primary key (full dependency) without partial.
Also in **3NF** because there is no transitive dependency.
finally it's in **Boyce-codd Normal Form** since primary key is the super key of that relation.

Sup_phone

Sphone	S_id

- Satisfy **1NF** while there is no multivalued attributes or nested relations ,and it is in **2NF** since there is no partial dependency. also in **3NF** because there is no transitive dependency finally it's in **BCNF** since primary key is the super key of that relation.

Has

Sid	Bbarc

- Satisfy 1NF while there is no multivalued attributes or nested relations ,and it is in 2NF since there is no partial dependency. also in 3NF because there is no transitive dependency finally it's in BCNF since primary key is the super key of that relation.

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

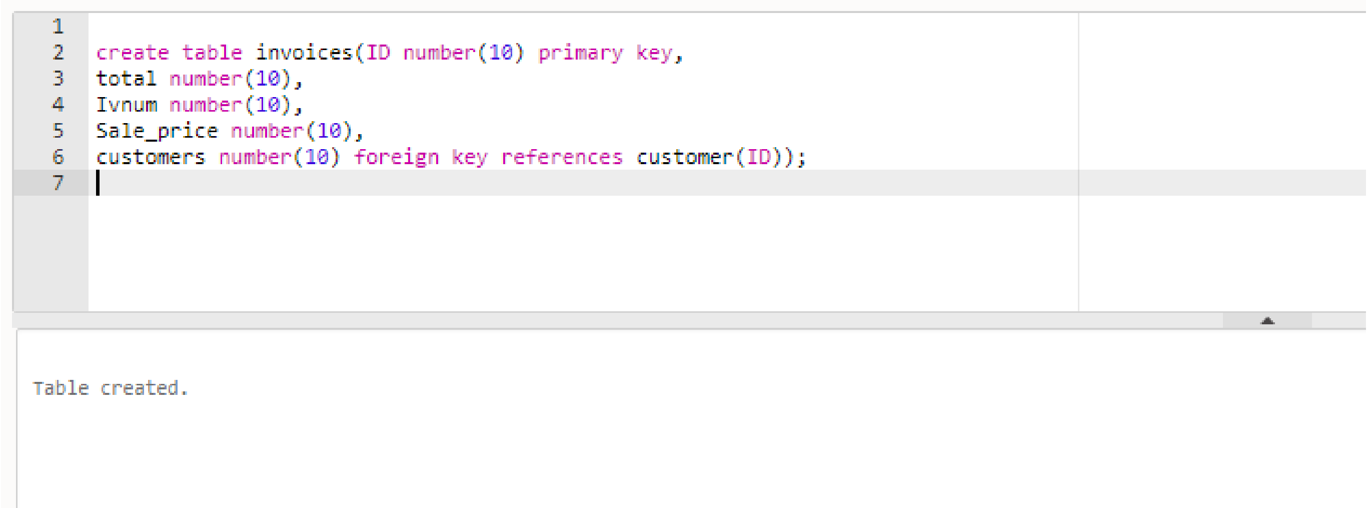
Use the Oracle (Oracle Database 11g Express Edition) as the DBMS for implementing your project.

- ***A. Schema Implementation:***
- ***B. Query implementations:***

Schema Implementation:

These queries are used to create the tables which we want to create. And the create is definition language which we used to create or define the schemas in the database.

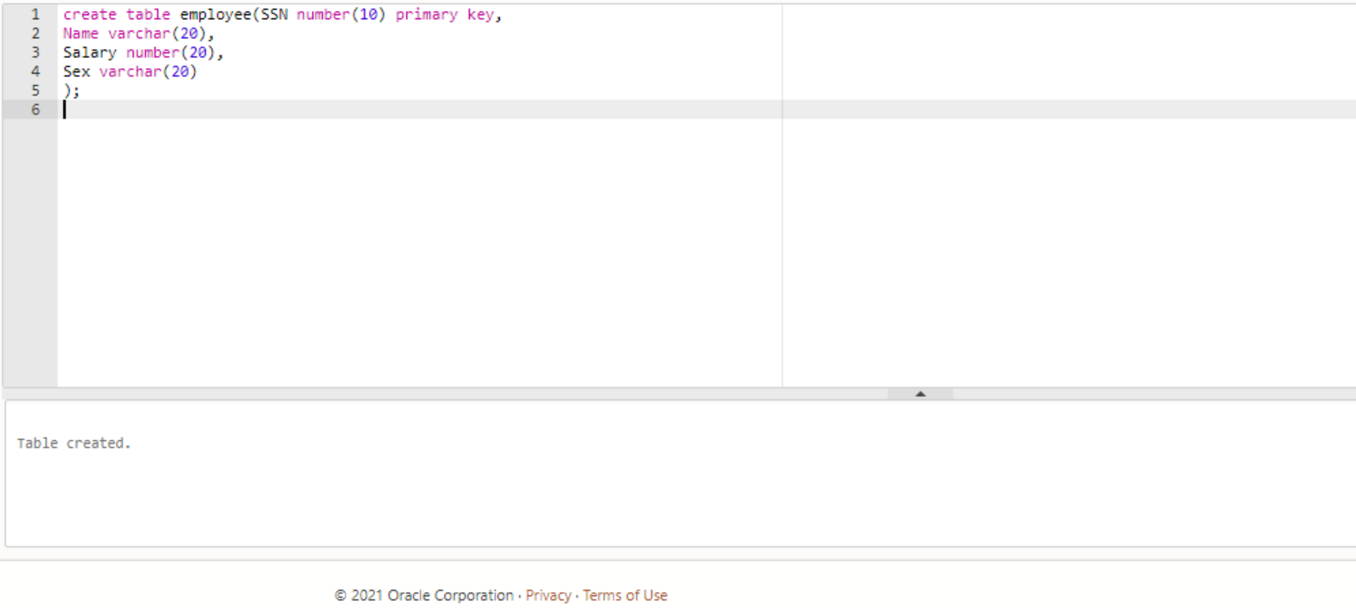
```
create table invoices(ID number(10) primary key,
total number(10),
Ivnum number(10),
Sale_price number(10),
customers number(10) foreign key references customer(ID));
```



```

create table invoices(ID number(10) primary key,
total number(10),
Ivnum number(10),
Sale_price number(10),
customers number(10) foreign key references customer(ID));

```

```
Table created.
```

```
create table employee(SSN number(10) primary key,
Name varchar(20),
Salary number(20),
Sex varchar(20)
);
```

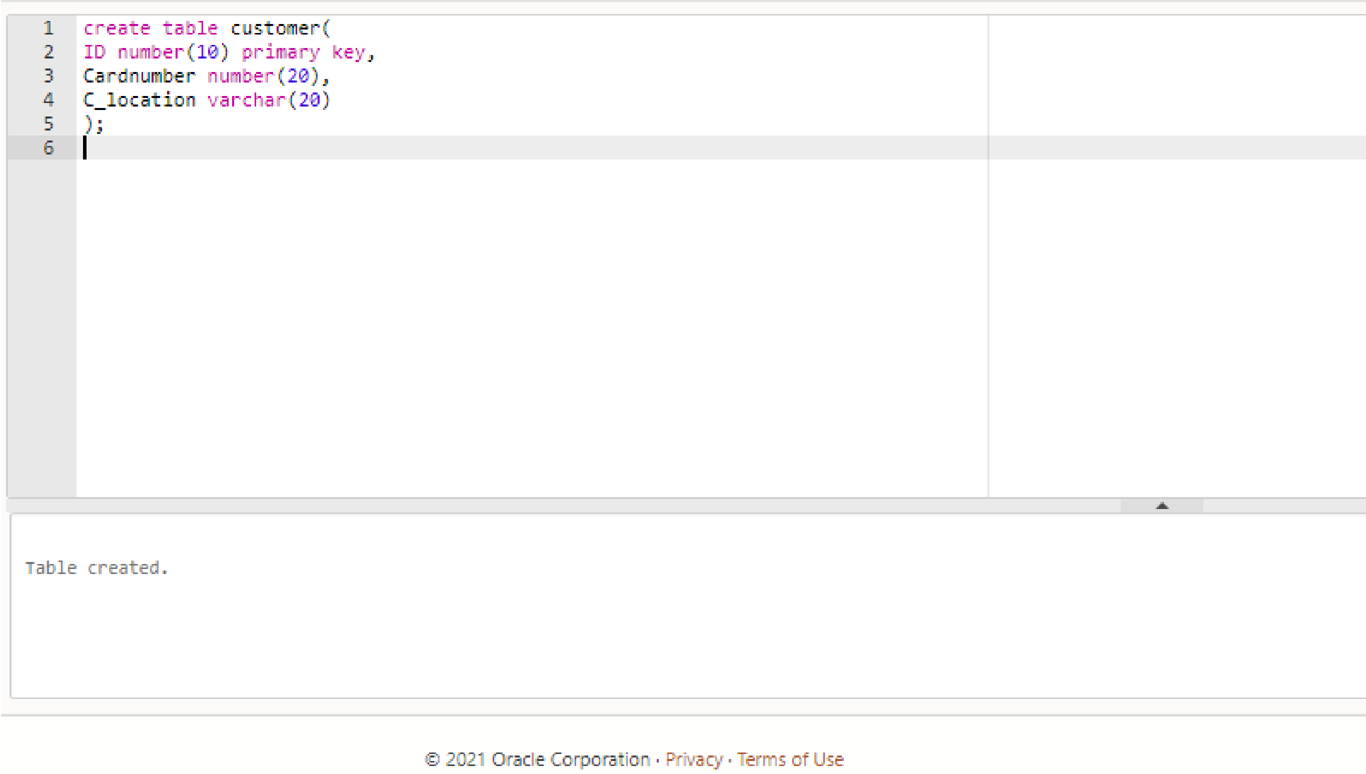


```
create table employee(SSN number(10) primary key,
Name varchar(20),
Salary number(20),
Sex varchar(20)
);
```

```
Table created.
```

© 2021 Oracle Corporation · Privacy · Terms of Use

create table customer(
ID number(10) primary key,
Cardnumber number(20),
C_location varchar(20)
);

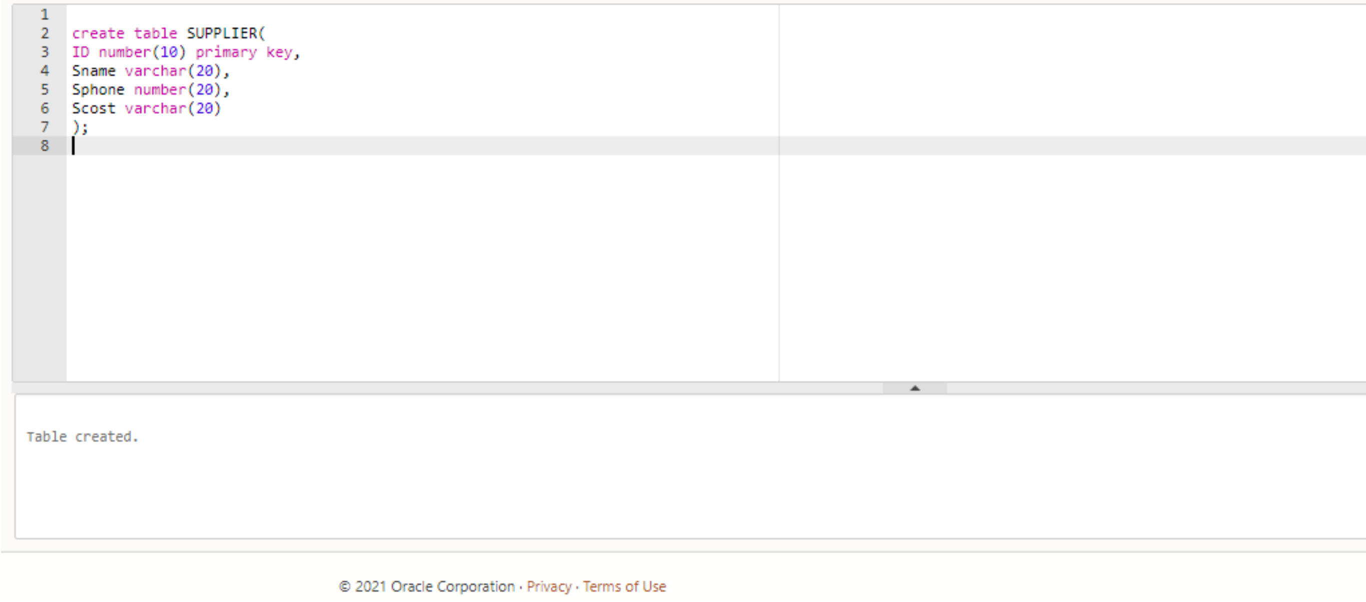


```
create table customer(
ID number(10) primary key,
Cardnumber number(20),
C_location varchar(20)
);
```

```
Table created.
```

© 2021 Oracle Corporation · Privacy · Terms of Use

create table SUPPLIER(
ID number(10) primary key,
Sname varchar(20),
Sphone number(20),
Scost varchar(20)
);

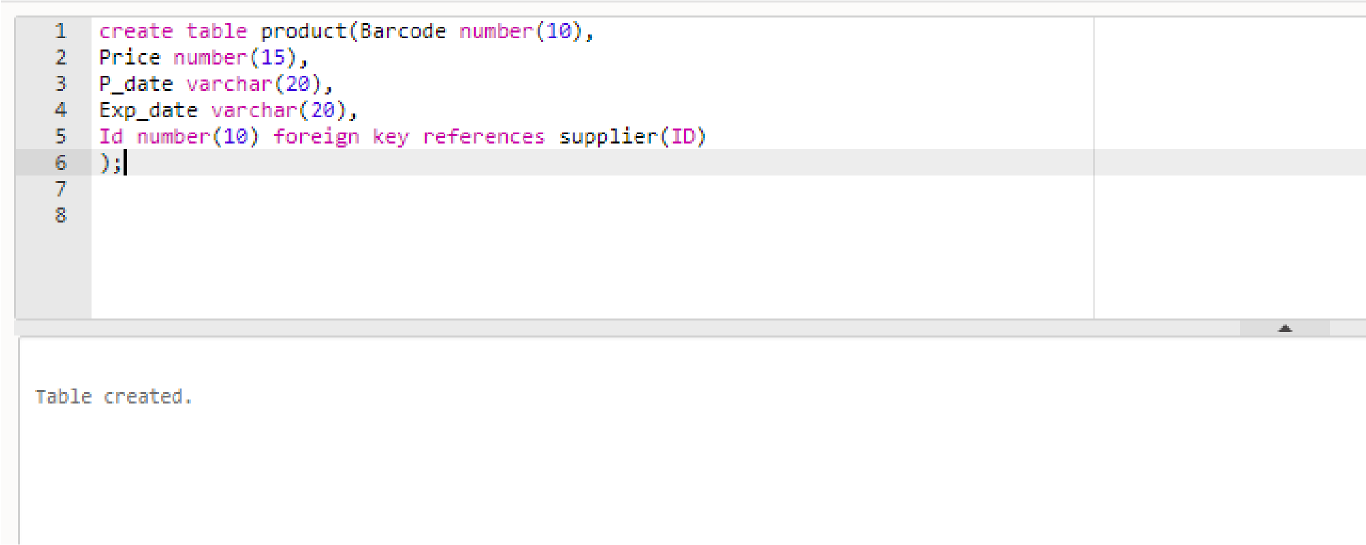


```
create table SUPPLIER(
ID number(10) primary key,
Sname varchar(20),
Sphone number(20),
Scost varchar(20)
);
```

```
Table created.
```

© 2021 Oracle Corporation · Privacy · Terms of Use

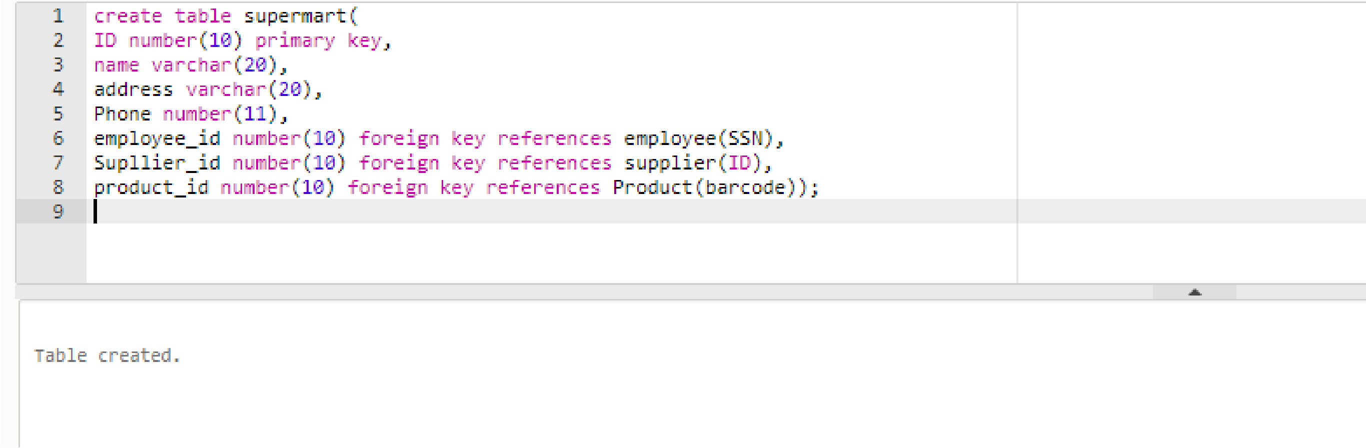
create table product(Barcode number(10),
Price number(15),
P_date varchar(20),
Exp_date varchar(20),
Id number(10) foreign key references supplier(ID)
);



```
create table product(Barcode number(10),
Price number(15),
P_date varchar(20),
Exp_date varchar(20),
Id number(10) foreign key references supplier(ID)
);
```

```
Table created.
```

Drop table supermart;
create table supermart(
ID number(10) primary key,
name varchar(20),
address varchar(20),
Phone number(11),
employee_id number(10) foreign key references employee(SSN),
Supllier_id number(10) foreign key references supplier(ID),
product_id number(10) foreign key references Product(barcode));



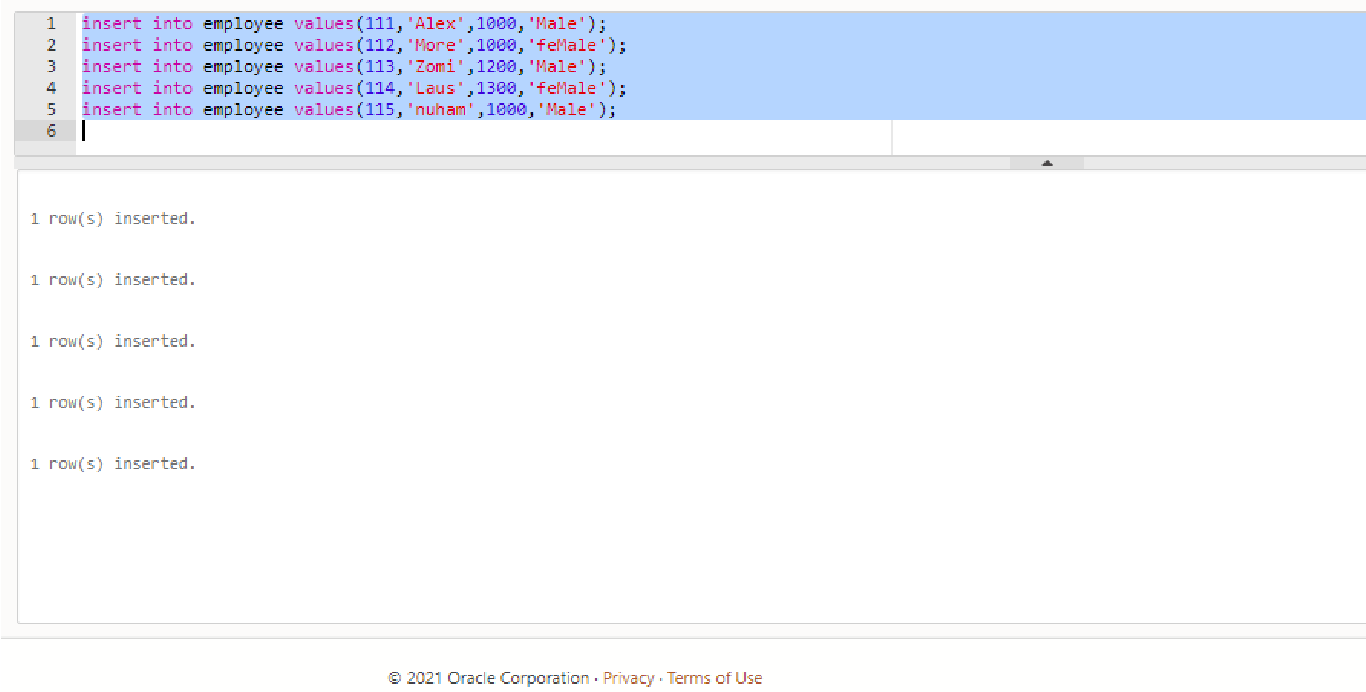
```
create table supermart(
ID number(10) primary key,
name varchar(20),
address varchar(20),
Phone number(11),
employee_id number(10) foreign key references employee(SSN),
Supllier_id number(10) foreign key references supplier(ID),
product_id number(10) foreign key references Product(barcode));
```

```
Table created.
```

Insert data:

The insert is used to enter the data into database we used here to insert the data into tables so our database contains the sample data.

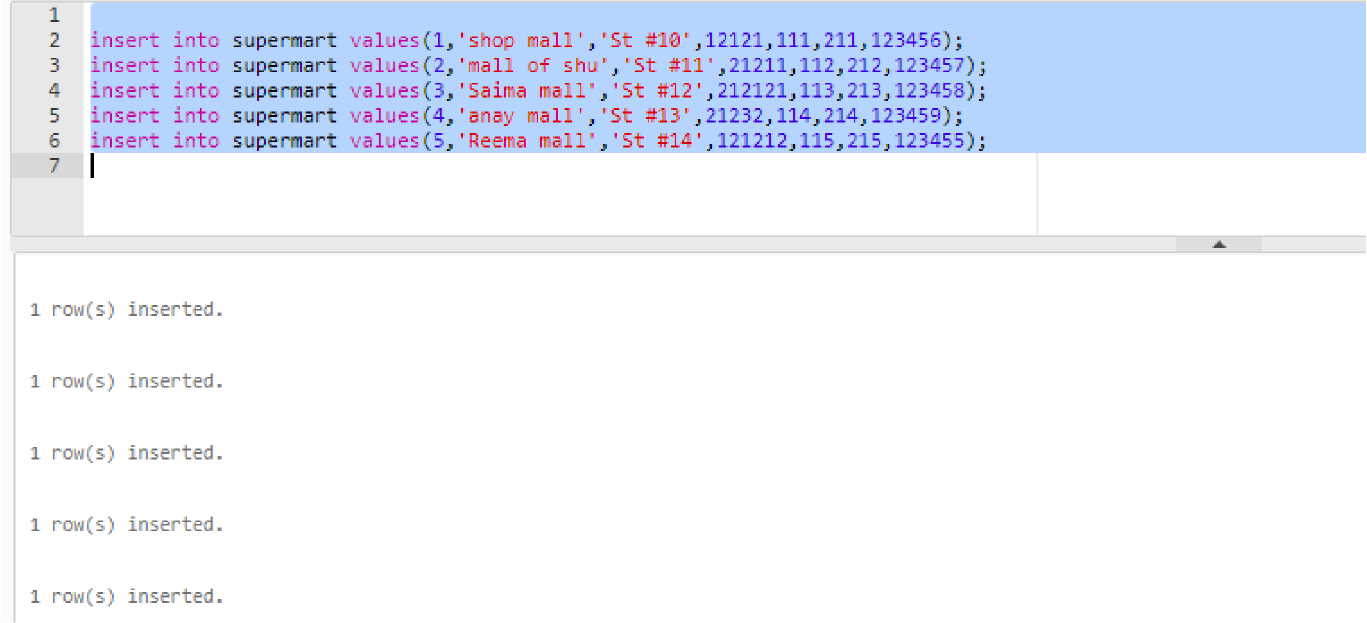
insert into employee values(111,'Alex',1000,'Male');
insert into employee values(112,'More',1000,'feMale');
insert into employee values(113,'Zomi',1200,'Male');
insert into employee values(114,'Laus',1300,'feMale');
insert into employee values(115,'nuham',1000,'Male');



```
insert into employee values(111,'Alex',1000,'Male');
insert into employee values(112,'More',1000,'feMale');
insert into employee values(113,'Zomi',1200,'Male');
insert into employee values(114,'Laus',1300,'feMale');
insert into employee values(115,'nuham',1000,'Male');
```

```
1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.
```

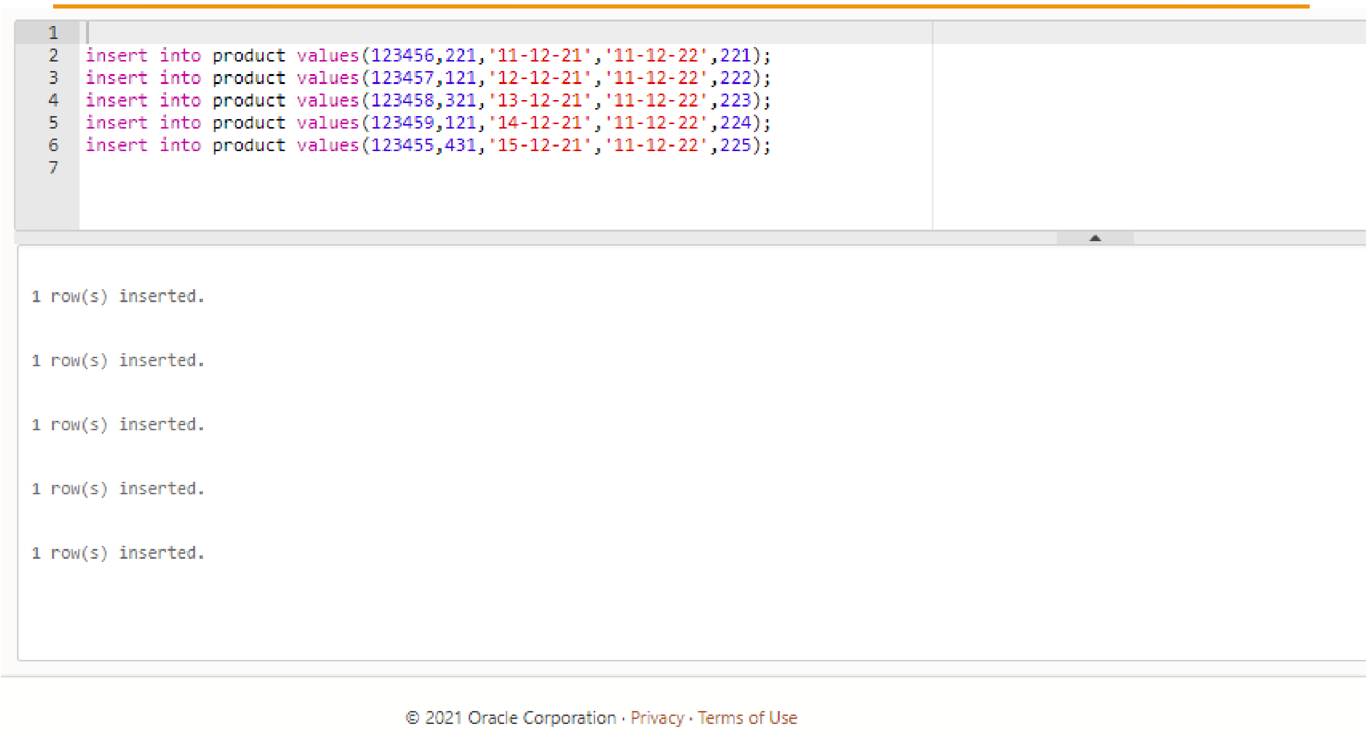
insert into supermart values(1,'shop mall','St #10',12121,111,211,123456);
insert into supermart values(2,'mall of shu','St #11',21211,112,212,123457);
insert into supermart values(3,'Saima mall','St #12',212121,113,213,123458);
insert into supermart values(4,'anay mall','St #13',21232,114,214,123459);
insert into supermart values(5,'Reema mall','St #14',121212,115,215,123455);



```
insert into supermart values(1,'shop mall','St #10',12121,111,211,123456);
insert into supermart values(2,'mall of shu','St #11',21211,112,212,123457);
insert into supermart values(3,'Saima mall','St #12',212121,113,213,123458);
insert into supermart values(4,'anay mall','St #13',21232,114,214,123459);
insert into supermart values(5,'Reema mall','St #14',121212,115,215,123455);
```

```
1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.
```

```
insert into product values(123456,221,'11-12-21','11-12-22',221);
insert into product values(123457,121,'12-12-21','11-12-22',222);
insert into product values(123458,321,'13-12-21','11-12-22',223);
insert into product values(123459,121,'14-12-21','11-12-22',224);
insert into product values(123455,431,'15-12-21','11-12-22',225);
```

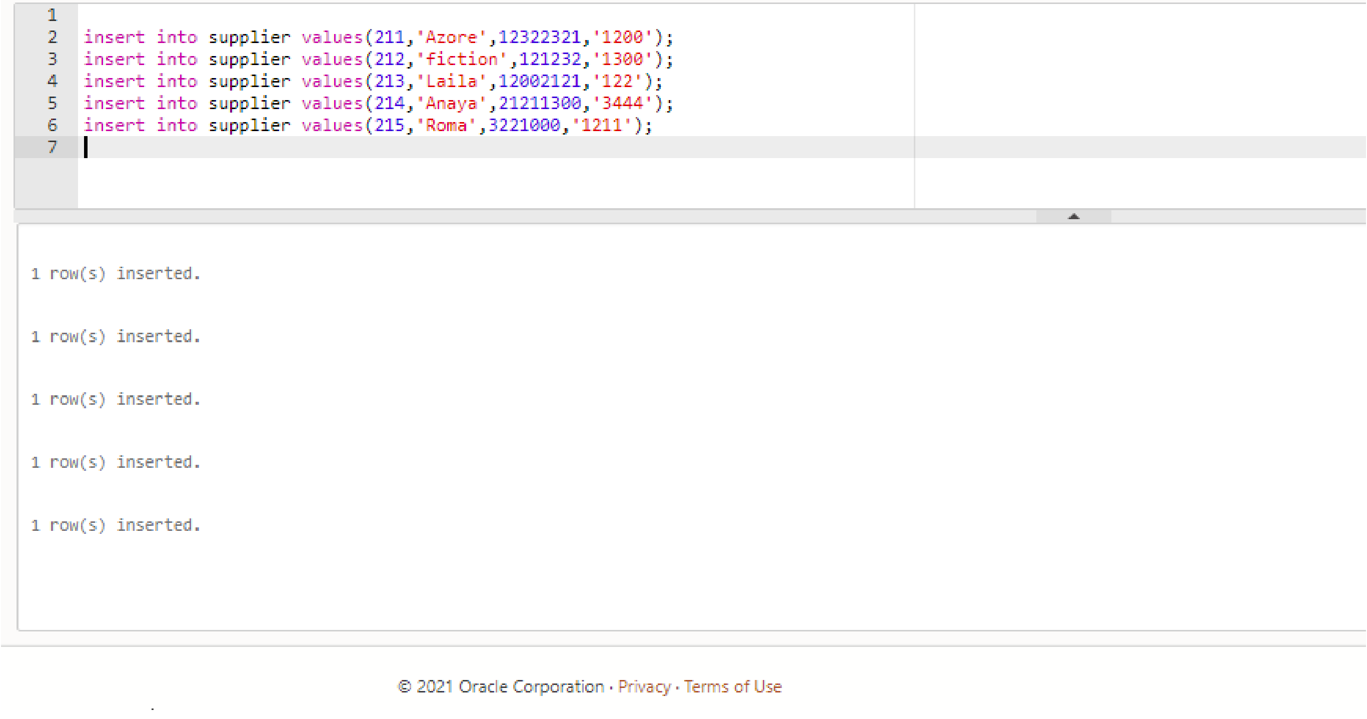


```
insert into product values(123456,221,'11-12-21','11-12-22',221);
insert into product values(123457,121,'12-12-21','11-12-22',222);
insert into product values(123458,321,'13-12-21','11-12-22',223);
insert into product values(123459,121,'14-12-21','11-12-22',224);
insert into product values(123455,431,'15-12-21','11-12-22',225);
```

```
1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.
```

© 2021 Oracle Corporation · Privacy · Terms of Use

```
insert into supplier values(211,'Azore',12322321,'1200');
insert into supplier values(212,'fiction',121232,'1300');
insert into supplier values(213,'Laila',12002121,'122');
insert into supplier values(214,'Anaya',21211300,'3444');
insert into supplier values(215,'Roma',3221000,'1211');
```

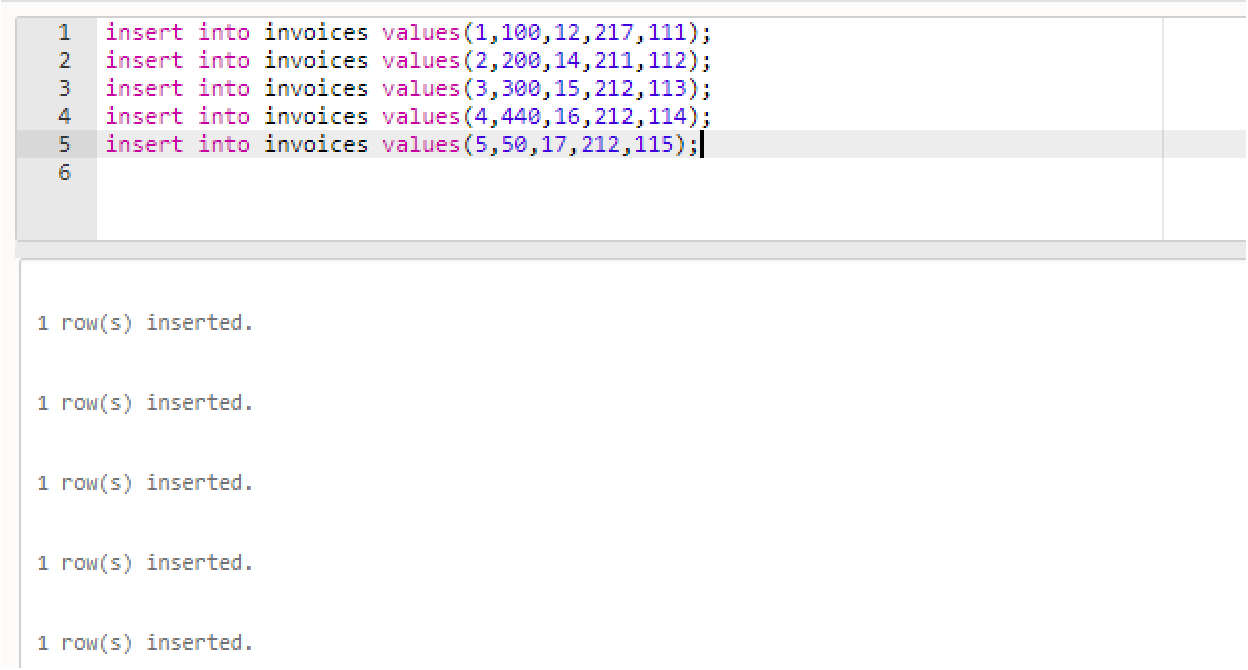


```
insert into supplier values(211,'Azore',12322321,'1200');
insert into supplier values(212,'fiction',121232,'1300');
insert into supplier values(213,'Laila',12002121,'122');
insert into supplier values(214,'Anaya',21211300,'3444');
insert into supplier values(215,'Roma',3221000,'1211');
```

```
1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.
```

© 2021 Oracle Corporation · Privacy · Terms of Use

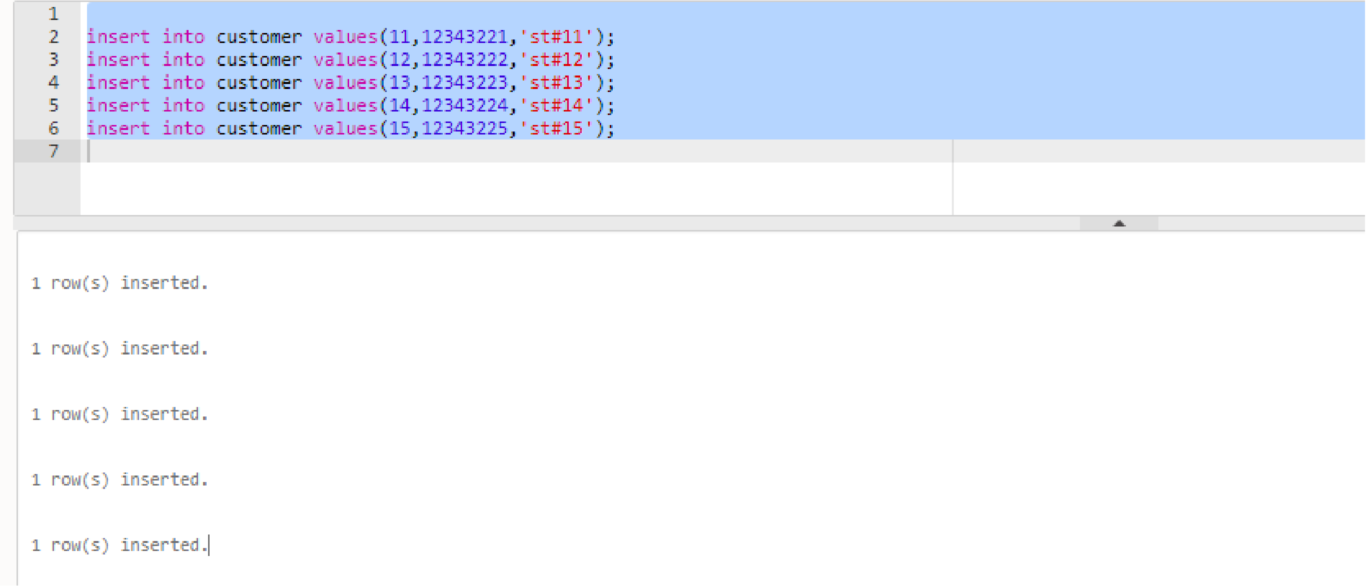
insert into invoices values(1,100,12,217,111);
insert into invoices values(2,200,14,211,112);
insert into invoices values(3,300,15,212,113);
insert into invoices values(4,440,16,212,114);
insert into invoices values(5,50,17,212,115);



```
insert into invoices values(1,100,12,217,111);
insert into invoices values(2,200,14,211,112);
insert into invoices values(3,300,15,212,113);
insert into invoices values(4,440,16,212,114);
insert into invoices values(5,50,17,212,115);
```

```
1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.
```

insert into customer values(11,12343221,'st#11');
insert into customer values(12,12343222,'st#12');
insert into customer values(13,12343223,'st#13');
insert into customer values(14,12343224,'st#14');
insert into customer values(15,12343225,'st#15');



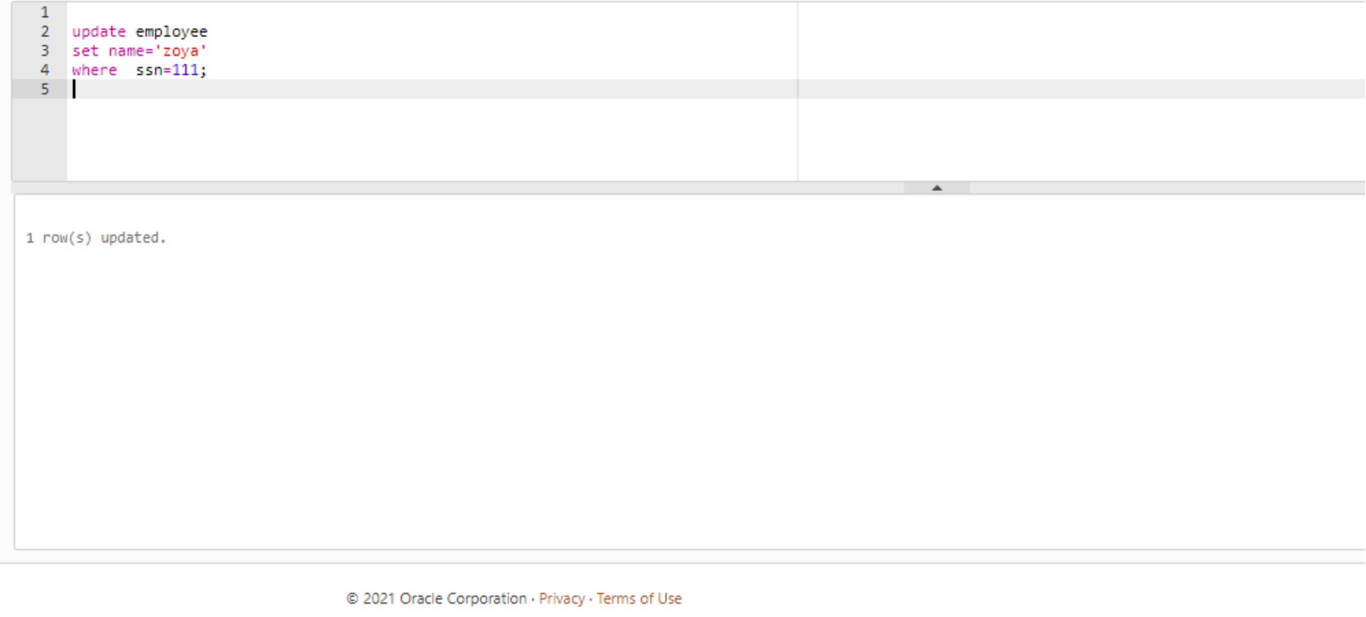
```

insert into customer values(11,12343221,'st#11');
insert into customer values(12,12343222,'st#12');
insert into customer values(13,12343223,'st#13');
insert into customer values(14,12343224,'st#14');
insert into customer values(15,12343225,'st#15');

```

```
1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.

1 row(s) inserted.
```

Query implementations:

The queries are DDL which are used to make changes or used to show the output of the tables on the screen of the device. Here we will use the select, update and delete or join keywords to perform the actions.

update employee
set name='zoya'
where ssn=111;

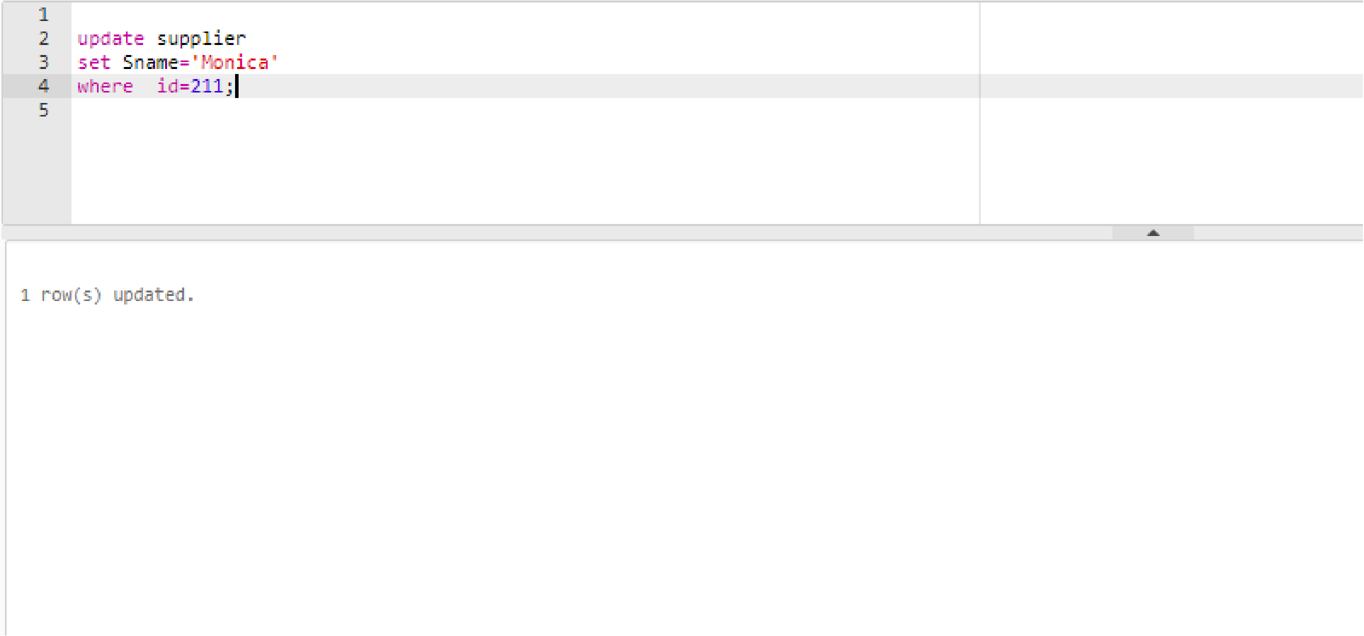


```

update employee
set name='zoya'
where  ssn=111;

```

```
1 row(s) updated.
```

© 2021 Oracle Corporation · Privacy · Terms of Use

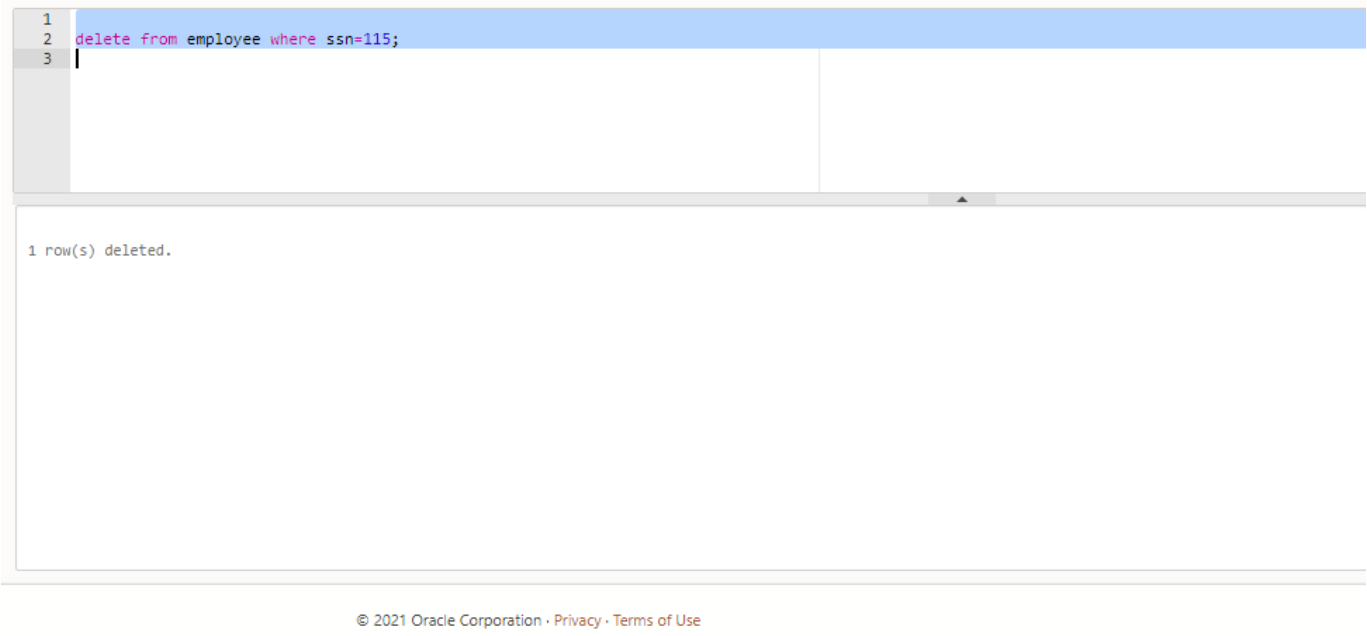
update supplier
set Sname='Monica'
where id=211;



```
update supplier
set Sname='Monica'
where  id=211;
```

```
1 row(s) updated.
```

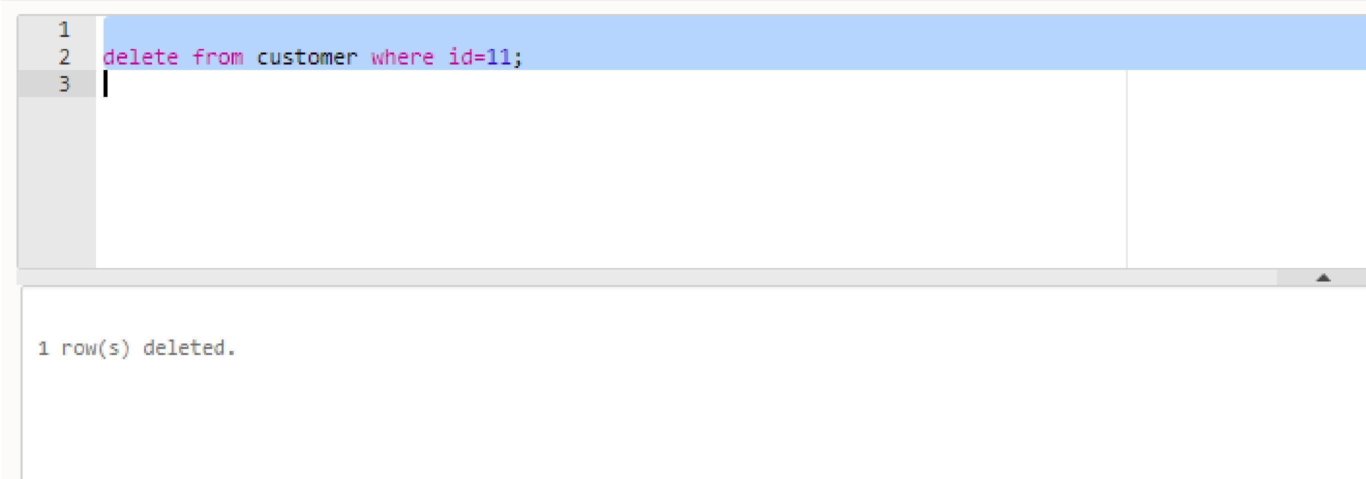
delete from employee where ssn=115;



```
delete from employee where ssn=115;
```

```
1 row(s) deleted.
```

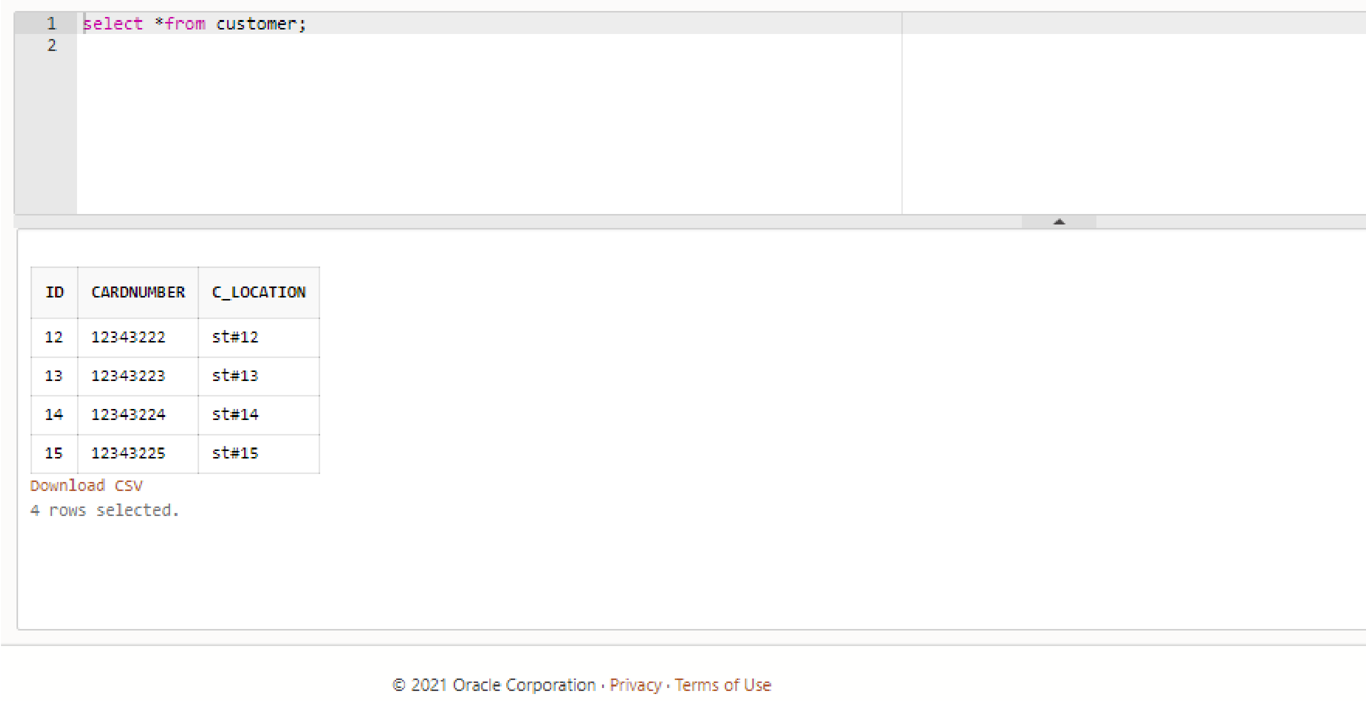
delete from customer where id=11;



```
delete from customer where id=11;
```

```
1 row(s) deleted.
```

select *from customer;



```
select *from customer;
```

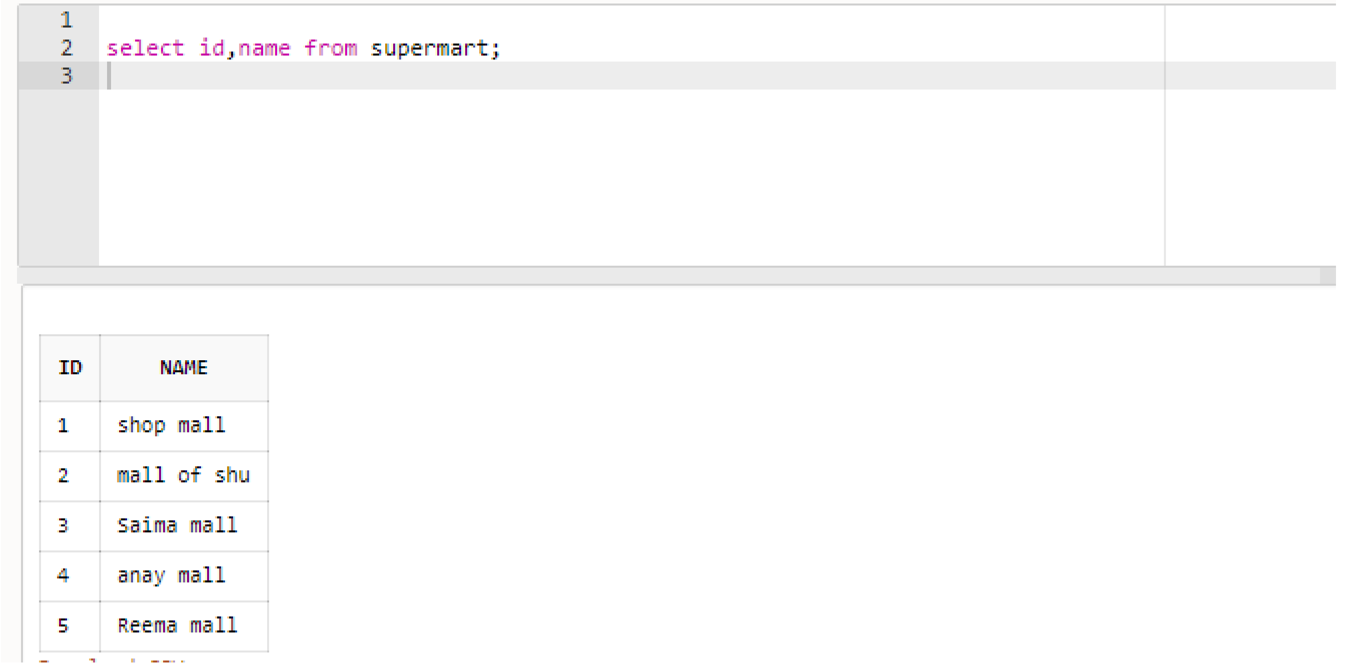
ID	CARDNUMBER	C_LOCATION
12	12343222	st#12
13	12343223	st#13
14	12343224	st#14
15	12343225	st#15

Download CSV

4 rows selected.

© 2021 Oracle Corporation · Privacy · Terms of Use

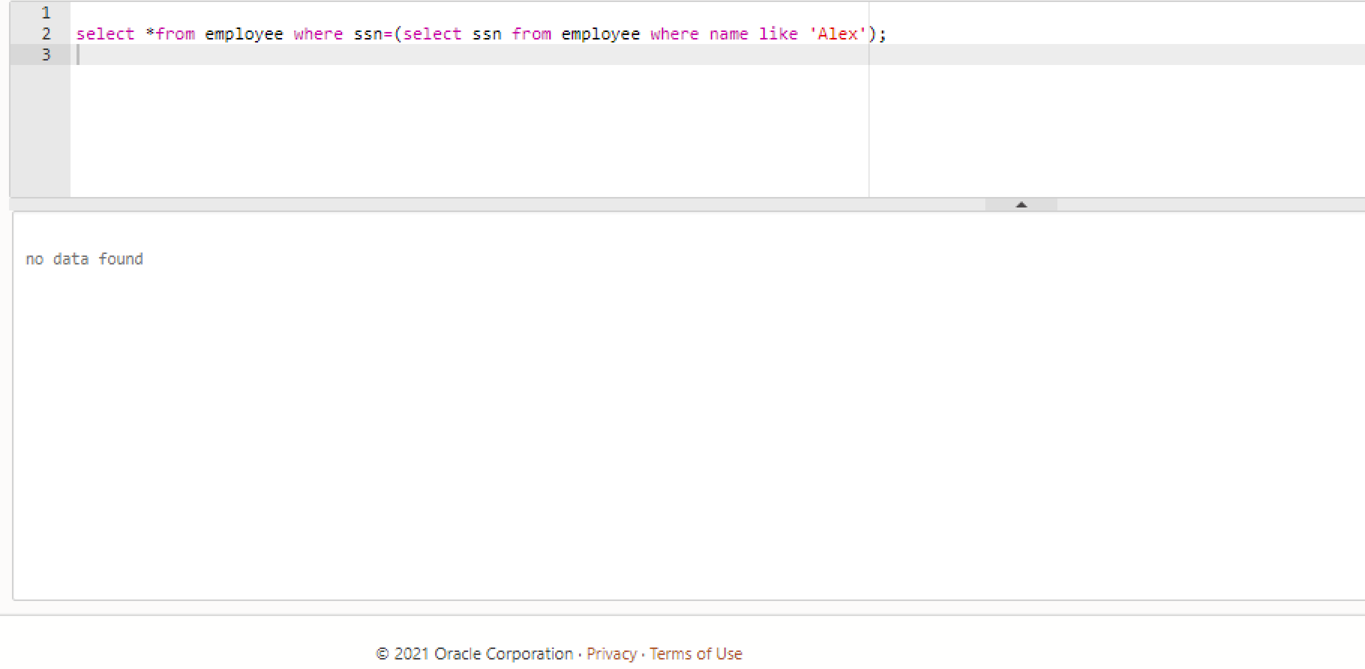
select id,name from supermart;



```
select id,name from supermart;
```

ID	NAME
1	shop mall
2	mall of shu
3	Saima mall
4	anay mall
5	Reema mall

select *from employee where ssn=(select ssn from employee where name like 'Alex');

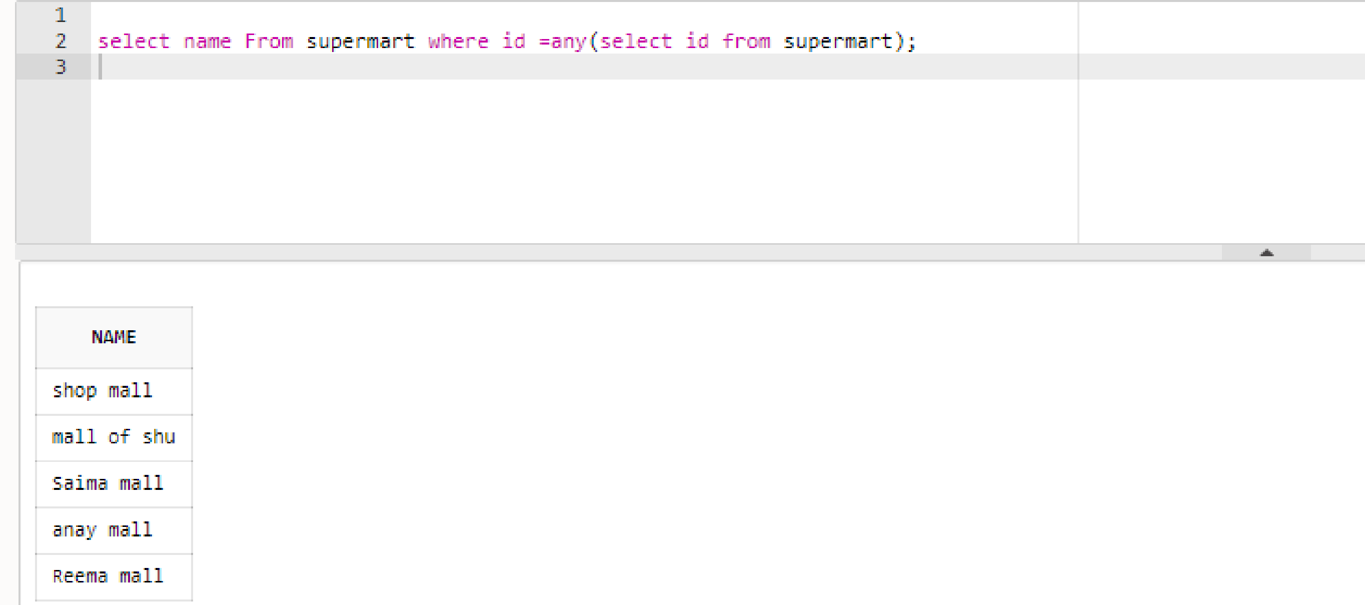


```
select *from employee where ssn=(select ssn from employee where name like 'Alex');
```

```
no data found
```

© 2021 Oracle Corporation · Privacy · Terms of Use

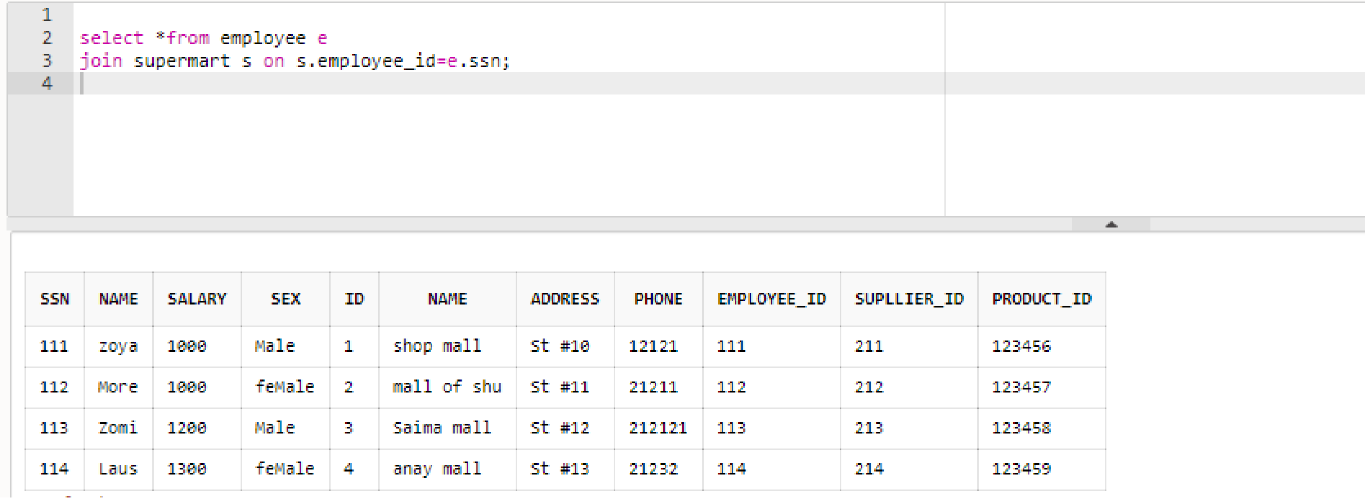
select name From supermart where id =any(select id from supermart);



```
select name From supermart where id =any(select id from supermart);
```

NAME
shop mall
mall of shu
Saima mall
anay mall
Reema mall

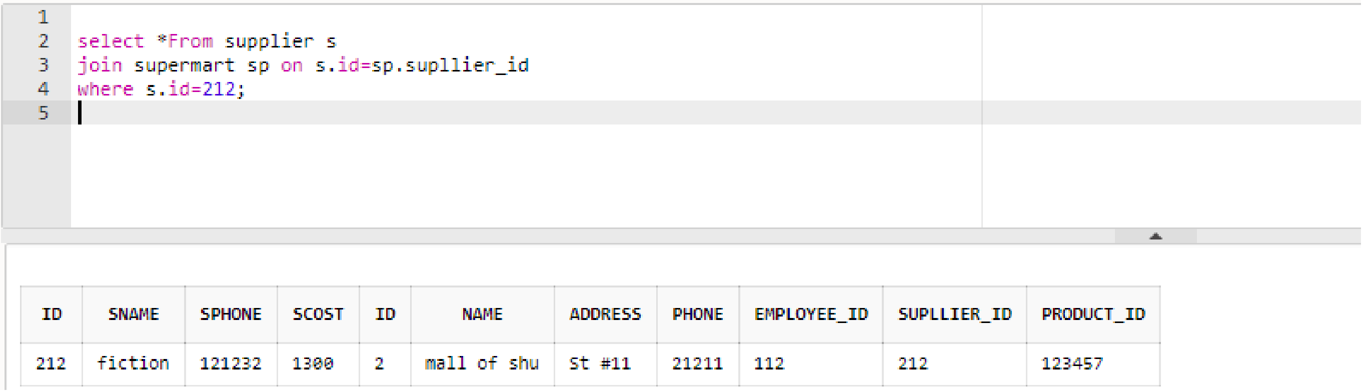
select *from employee e
join supermart s on s.employee_id=e.ssn;



```
select *from employee e
join supermart s on s.employee_id=e.ssn;
```

SSN	NAME	SALARY	SEX	ID	NAME	ADDRESS	PHONE	EMPLOYEE_ID	SUPLLIER_ID	PRODUCT_ID
111	zoya	1000	Male	1	shop mall	St #10	12121	111	211	123456
112	More	1000	feMale	2	mall of shu	St #11	21211	112	212	123457
113	Zomi	1200	Male	3	Saima mall	St #12	212121	113	213	123458
114	Laus	1300	feMale	4	anay mall	St #13	21232	114	214	123459

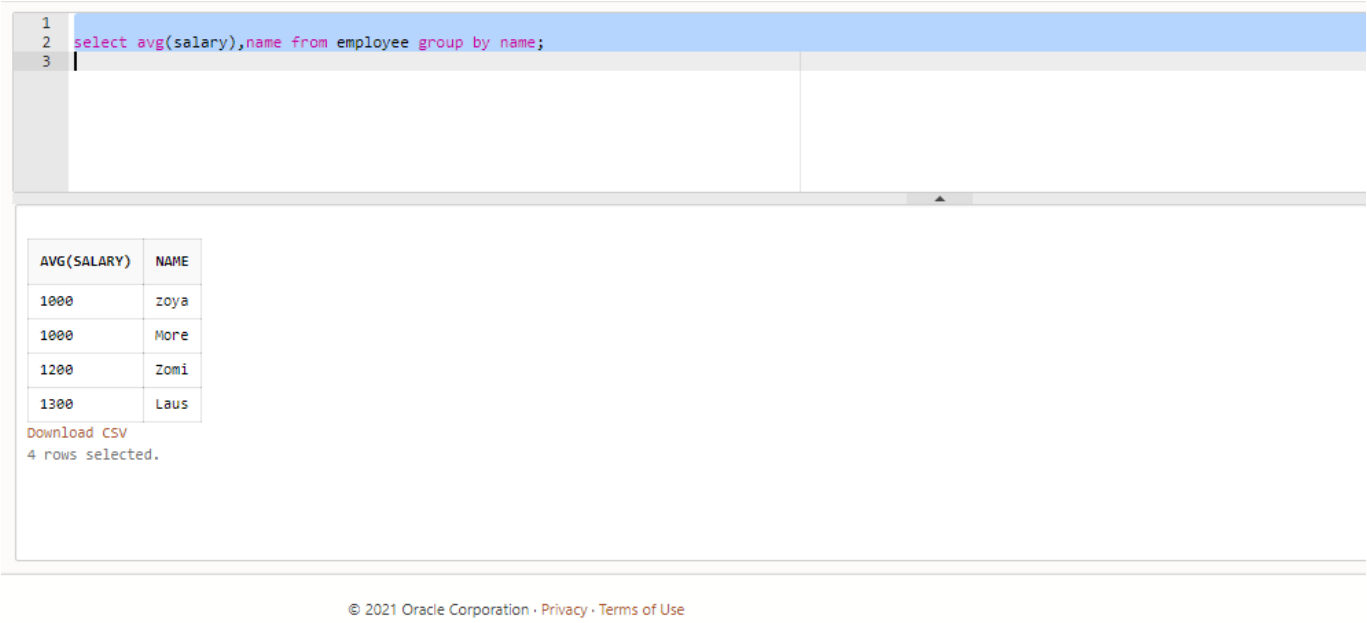
select *From supplier s
join supermart sp on s.id=sp.supllier_id
where s.id=212;



```
select *From supplier s
join supermart sp on s.id=sp.supllier_id
where s.id=212;
```

ID	SNAME	SPHONE	SCOST	ID	NAME	ADDRESS	PHONE	EMPLOYEE_ID	SUPLLIER_ID	PRODUCT_ID
212	fiction	121232	1300	2	mall of shu	St #11	21211	112	212	123457

select avg(salary),name from employee group by name;



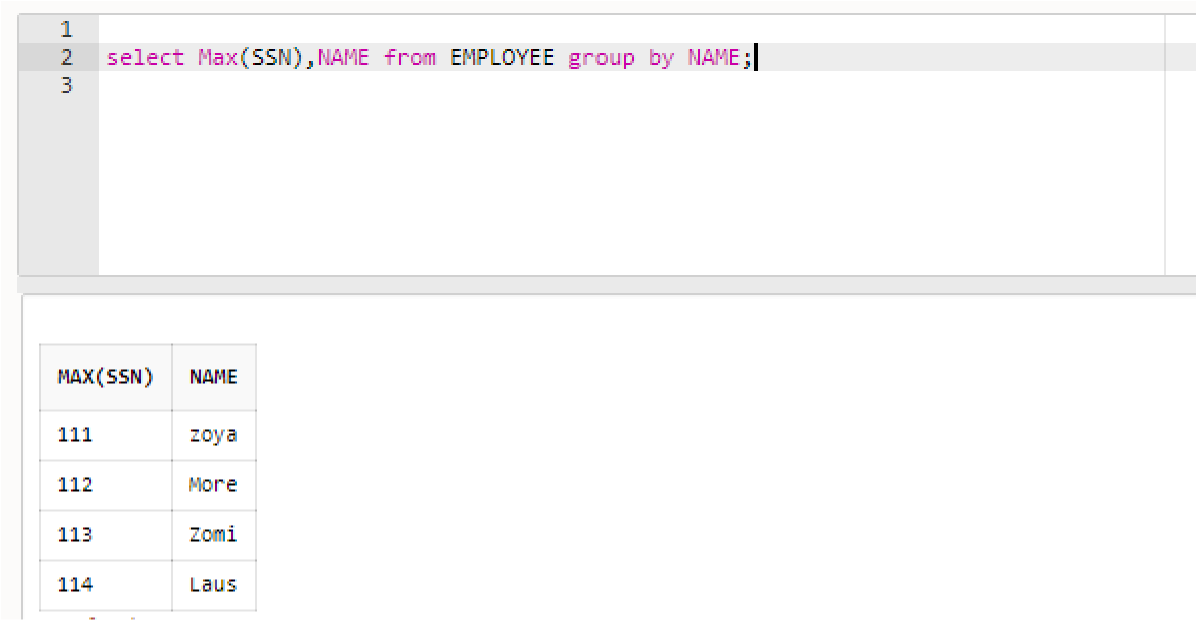
```
select avg(salary),name from employee group by name;
```

AVG(SALARY)	NAME
1000	zoya
1000	More
1200	Zomi
1300	Laus

Download CSV
4 rows selected.

© 2021 Oracle Corporation · Privacy · Terms of Use

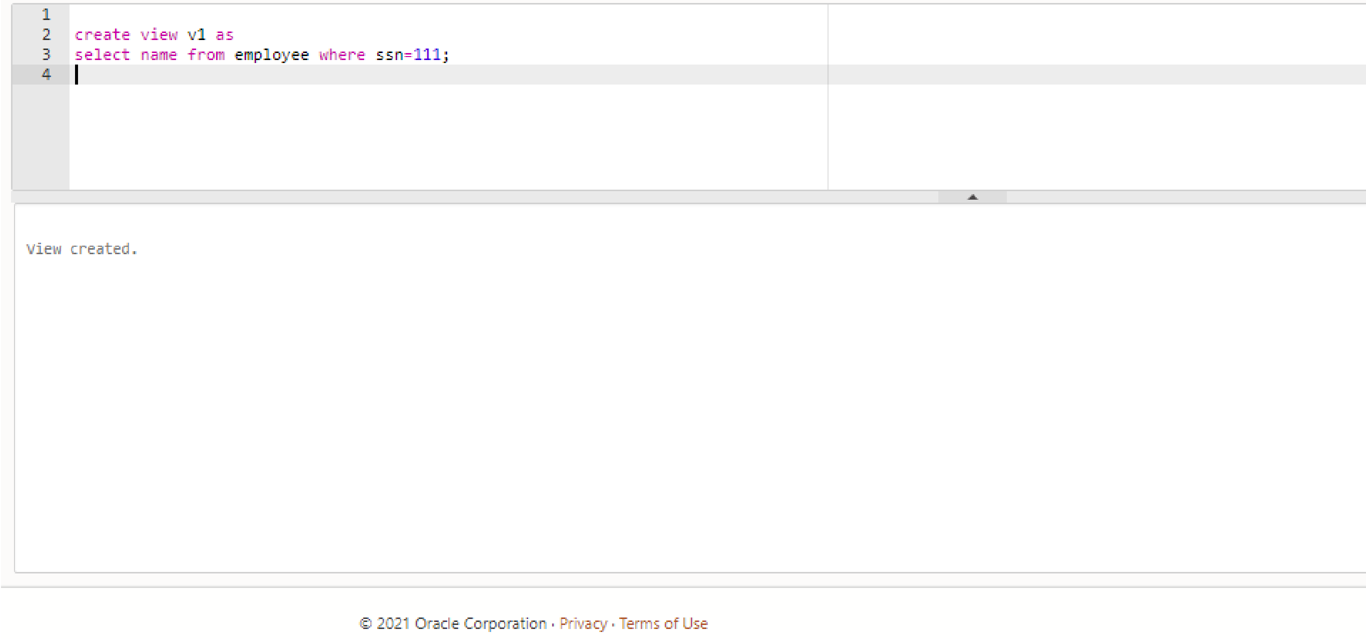
select Max(SSN),NAME from EMPLOYEE group by NAME;#



```
select Max(SSN),NAME from EMPLOYEE group by NAME;
```

MAX(SSN)	NAME
111	zoya
112	More
113	Zomi
114	Laus

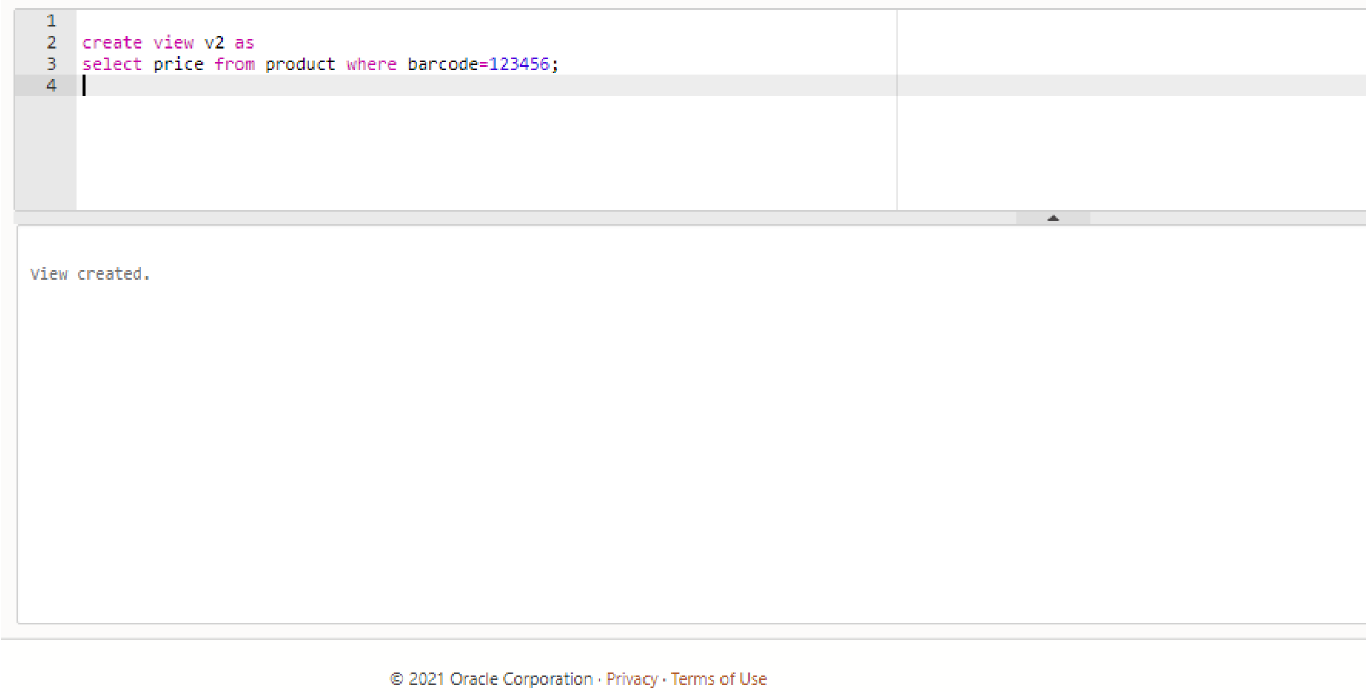
create view v1 as
select name from employee where ssn=111;



```
create view v1 as
select name from employee where ssn=111;
```

```
View created.
```

create view v2 as
select price from product where barcode=123456;



```
create view v2 as
select price from product where barcode=123456;
```

```
View created.
```