Sales Order

<u>**OrderID**</u>
CustID
O_Date
FName
LName
Addr
Apt_Num
City
State
Zip
HPhone
CPhone
OPhone
<u>**DonutID**</u>
D_Name
D_Description
Quantity
Unit_Price
Notes

Task A

1NF

The attributes on the left have been structured to reflect the first normal form. It satisfies the requirements of the first normal form in that, there are no repeating groups and the primary key has been identified. The figure on the left identifies a composite primary key as OrderID and DonutID. The composite key satisfies the primary key requirement of first normal form. Each of the attributes below the composite key is defined to represent all entries in the sales order form uniquely, avoiding repeating groups.

2NF

The second normal form requirements stipulate that the tables must be in first normal form. Each of the tables meets the requirements of first normal form in that they each have either a single primary key or a composite primary key. Also, first normal form requires that each attribute will not allow multiple values. To complete the transition to second normal form, all remaining attributes in each table must rely completely on their designated primary key. The D_Order Table designates a primary key of OrderID. All attributes rely on OrderID to determine their value. The Order_Line Table defines a composite primary key of OrderID and DonutID. The quantity attribute is determined by both the OrderID and DonutID. Both OrderID and DonutID are also foreign keys pointing to D_Order and Donut for referential information. The Donut Table's primary key is DonutID each of the attributes rely on the primary key in this table. All three tables satisfy the requirements of the second normal form.

D_Order

OrderID
CustID
O_Date
FName
LName
Addr
Apt_Num
City
State
Zip
HPhone
CPhone
OPhone
Notes

Order_Line Table

OrderID
DonutID
Quantity

Donut

DonutID
D_Name
D_Description
Unit_Price

D_Order Table

OrderID
CustID
O_Date
Notes

3NF

The rules of third normal form state that all tables must be in second normal form and all transitive dependencies must be removed. To transition to third normal form customer attributes were separated from the D_Order Table and moved to the Customer Table. This removed the need for a composite key and now the new Customer Table has a single primary key that all attributes in the table are dependent upon. The CustID was added as a foreign key to resolve transitive dependencies. No other changes were necessary as all other tables met the requirements of being in second normal form and contained no transitive dependencies.

Order_Line Table

OrderID
DonutID
Quantity

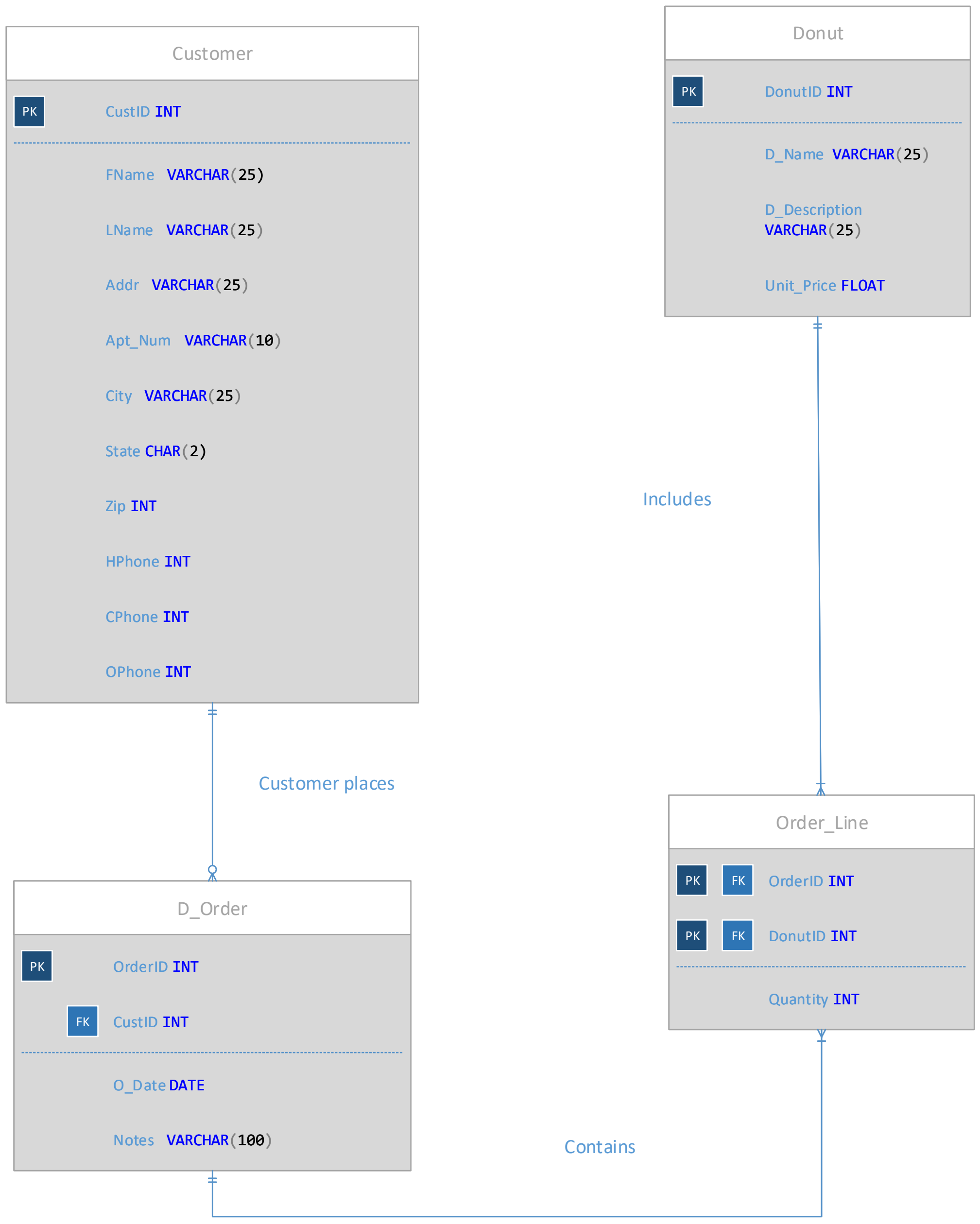
Donut Table

DonutID
D_Name
D_Description
Unit_Price

Customer Table

CustID
FName
LName
Addr
Apt_Num
City
State
Zip
HPhone
CPhone
OPhone

Task B



B.4.a – Each complete sales order will contain a unique customer, a unique order, possibly many order lines and a donut per order line. To efficiently manage this data, it must be broken down into its logical parts. The Customer entity represents all the attributes of a customer. The D_Order entity represents all attributes of the order. The Donut entity contains attributes to describe the donut ordered. The Order_Line entity contains the attributes of each item ordered.

B.4.b – The relationship between the entities is thus. A customer (Customer entity), places an order (D_order entity). Each order (D_Order entity) is entered on a separate line (Order_Line entity) of the sales order form. Each line (Order_Line entity) will include a donut (Donut entity).

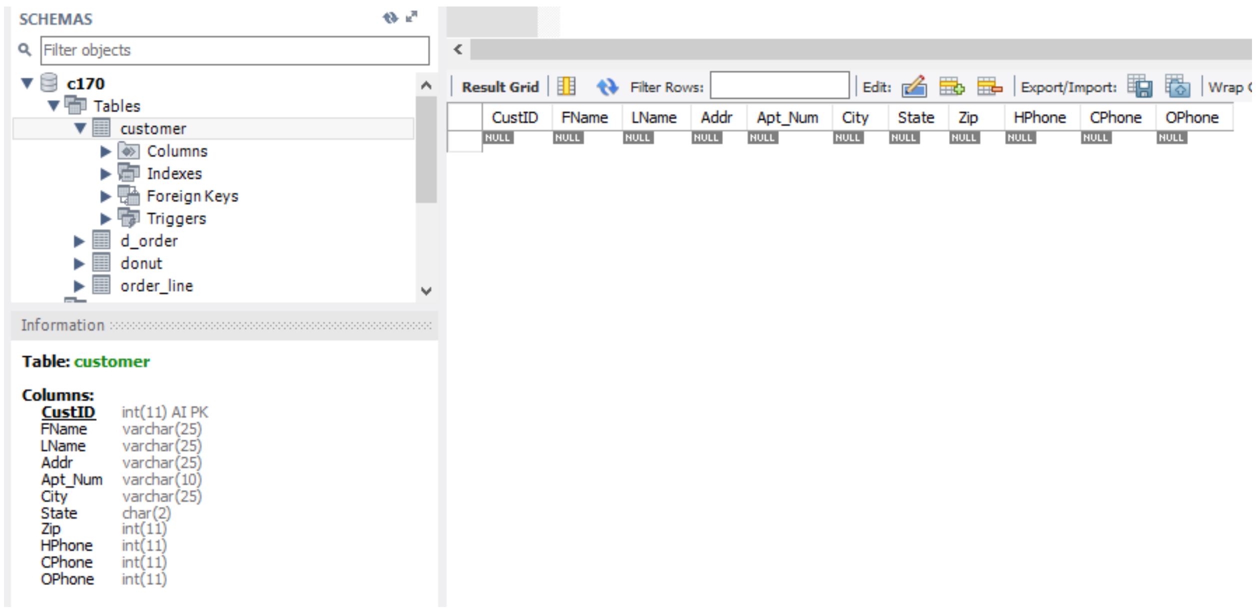
B.4.c - For each customer, there can be zero or more orders. This is represented in the diagram as two lines attached to the Customer Table that indicate one and only one customer. The end-point that is connected to the D_Order Table indicates that each customer may have zero to many orders. This is represented as a zero with three lines called a crowfoot pointing toward the D_Order Table. Each order may contain one or more lines per order. The diagram shows this relationship between D_Order Table as one and only one order (two lines), and the Order_Line Table as one or more (single line with crowfoot) lines associate with the order. For every donut in the order, each donut will be entered on one and only one order line per donut. This is reflected in the diagram as a line connecting the Donut Table with the Order Line Table. While there may be many lines in the order, each donut ordered will be listed on only one line. This is represented by the crowfoot connected to the Order_Line Table.

Task C

The tasks to follow were completed with MySQL Workbench.

Create Customer Table

```
CREATE TABLE Customer(
CustID INT PRIMARY KEY auto_increment,
FName VARCHAR(25) NOT NULL,
LName VARCHAR(25) NOT NULL,
Addr VARCHAR(25) NOT NULL,
Apt_Num VARCHAR(10),
City VARCHAR(25) NOT NULL,
State CHAR(2) NOT NULL,
Zip INT NOT NULL,
HPhone INT,
CPhone INT,
OPhone INT
);
```



CustID	FName	LName	Addr	Apt_Num	City	State	Zip	HPhone	CPhone	OPhone
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Information

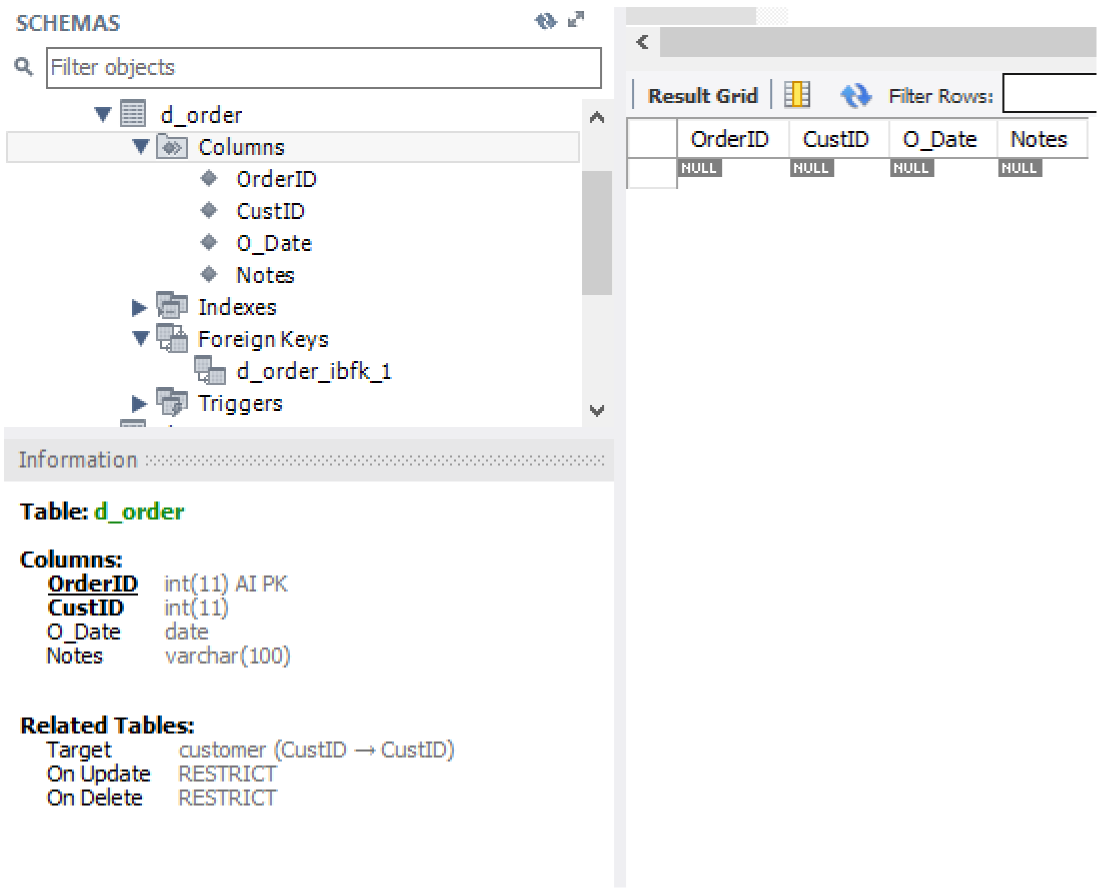
Table: customer

Columns:

CustID	int(11) AI PK
FName	varchar(25)
LName	varchar(25)
Addr	varchar(25)
Apt_Num	varchar(10)
City	varchar(25)
State	char(2)
Zip	int(11)
HPhone	int(11)
CPhone	int(11)
OPhone	int(11)

Create Donut Order Table

```
CREATE TABLE D_Order(
OrderID INT PRIMARY KEY,
CustID INT,
O_Date DATE NOT NULL,
Notes VARCHAR(100),
FOREIGN KEY(CustID) REFERENCES Customer(CustID)
);
```



OrderID	CustID	O_Date	Notes
NULL	NULL	NULL	NULL

Table: d_order

Columns:

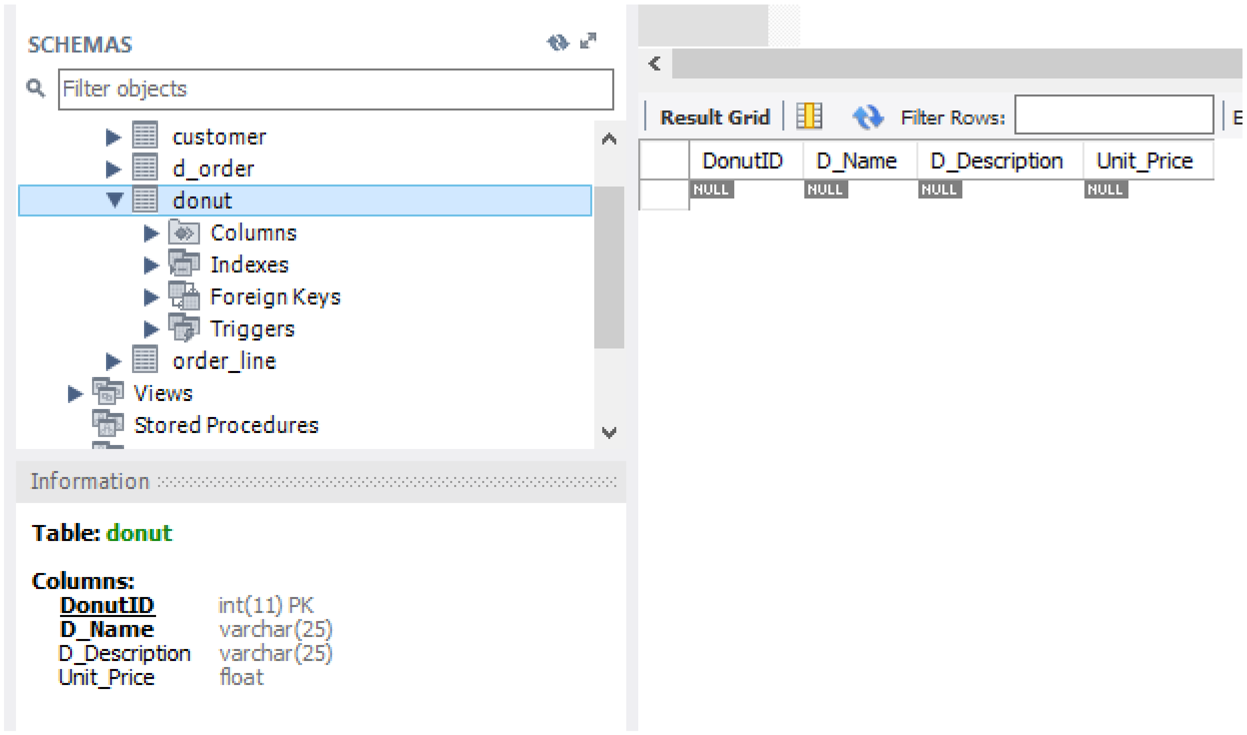
OrderID	int(11) AI PK
CustID	int(11)
O_Date	date
Notes	varchar(100)

Related Tables:

Target	customer (CustID → CustID)
On Update	RESTRICT
On Delete	RESTRICT

Create Donut Table

```
CREATE TABLE Donut(
DonutID INT PRIMARY KEY,
D_Name VARCHAR(25) NOT NULL,
D_Description VARCHAR(25),
Unit_Price FLOAT NOT NULL
);
```



SCHEMAS

Filter objects

- customer
- d_order
- donut
  - Columns
  - Indexes
  - Foreign Keys
  - Triggers
- order_line
- Views
- Stored Procedures

Information

Table: donut

Columns:

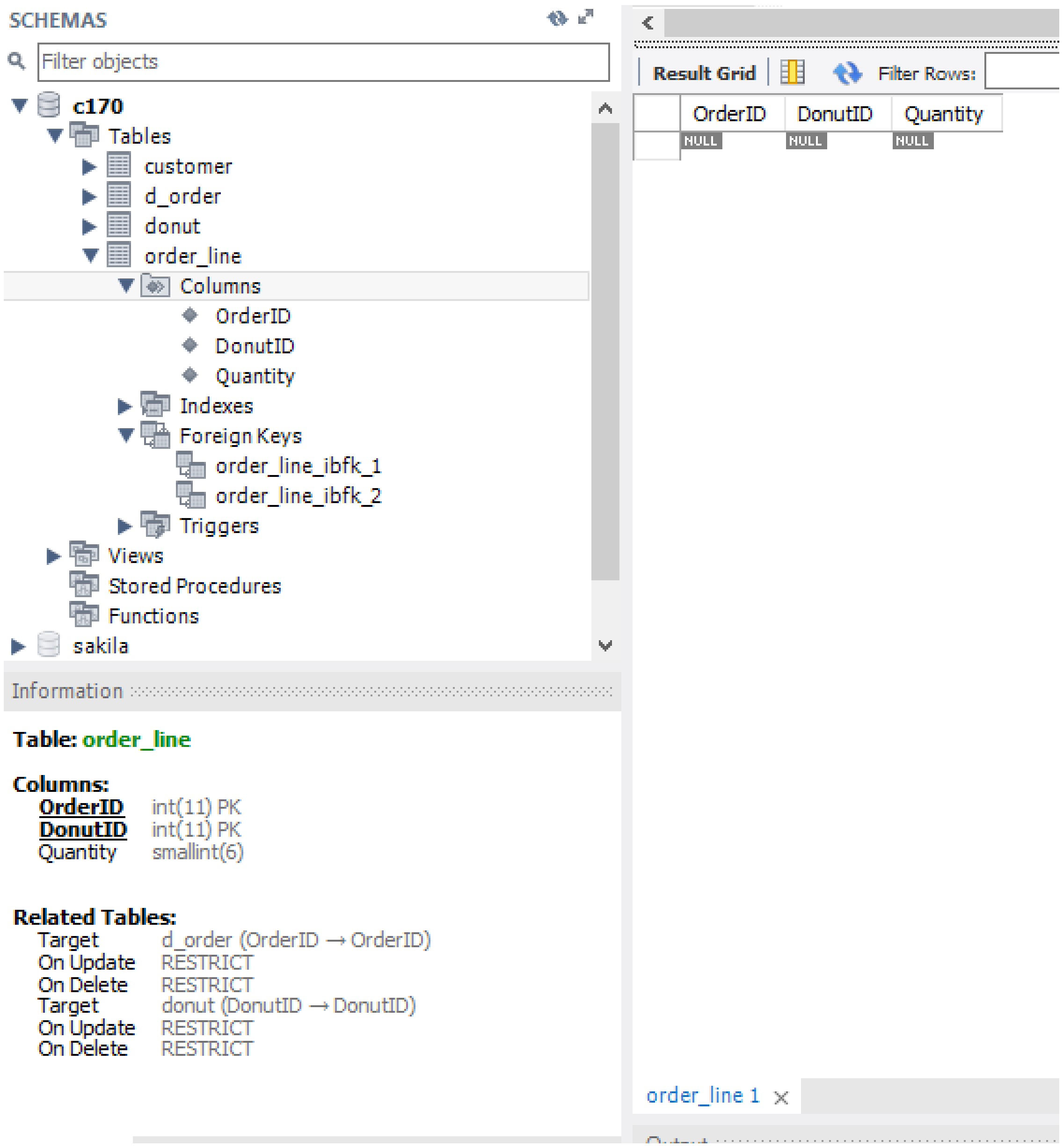
DonutID	int(11) PK
D_Name	varchar(25)
D_Description	varchar(25)
Unit_Price	float

Result Grid | Filter Rows:

DonutID	D_Name	D_Description	Unit_Price
NULL	NULL	NULL	NULL

Create Order Line Table

```
CREATE TABLE Order_Line (
OrderID INT,
DonutID INT,
Quantity SMALLINT NOT NULL,
FOREIGN KEY(OrderID) REFERENCES D_Order(OrderID),
FOREIGN KEY(DonutID) REFERENCES Donut(DonutID),
PRIMARY KEY (OrderID,DonutID)
);
```



OrderID	DonutID	Quantity
NULL	NULL	NULL

Table: order_line

Columns:

OrderID	int(11) PK
DonutID	int(11) PK
Quantity	smallint(6)

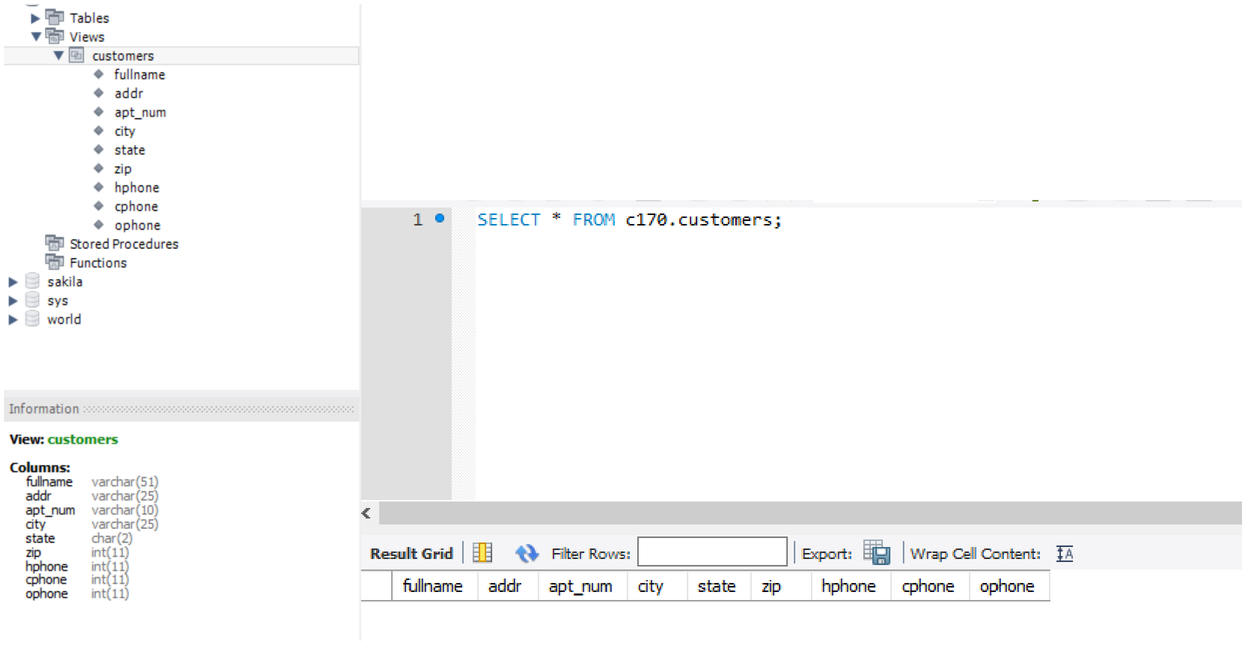
Related Tables:

Target	d_order (OrderID → OrderID)
On Update	RESTRICT
On Delete	RESTRICT
Target	donut (DonutID → DonutID)
On Update	RESTRICT
On Delete	RESTRICT

Task D

Create View Customers

Create view Customers as
select concat_ws(" ", fname, lname) as fullname, addr, apt_num, city, state, zip, hphone, cphone, ophone
from Customer;



```
SELECT * FROM c170.customers;
```

View: customers

Columns:

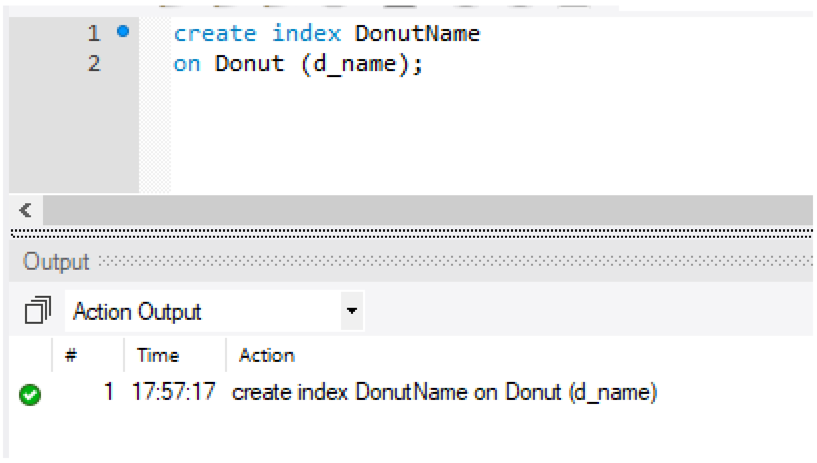
fullname	varchar(51)
addr	varchar(25)
apt_num	varchar(10)
city	varchar(25)
state	char(2)
zip	int(11)
hphone	int(11)
cphone	int(11)
ophone	int(11)

fullname	addr	apt_num	city	state	zip	hphone	cphone	ophone

Task E

Create Donut Table Index

create index DonutName
on Donut (d_name);

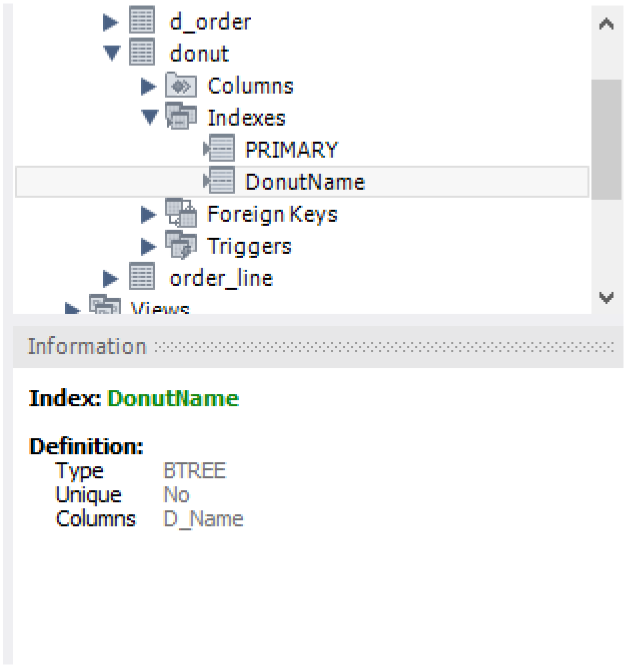


```
create index DonutName
on Donut (d_name);
```

Output

Action Output

	#	Time	Action
✓	1	17:57:17	create index DonutName on Donut (d_name)



```
▶ d_order
▼ donut
    ▶ Columns
    ▼ Indexes
        PRIMARY
        DonutName
    ▶ Foreign Keys
    ▶ Triggers
▶ order_line
▶ Views
```

Information

Index: DonutName

Definition:

Type	BTREE
Unique	No
Columns	D_Name

Task F

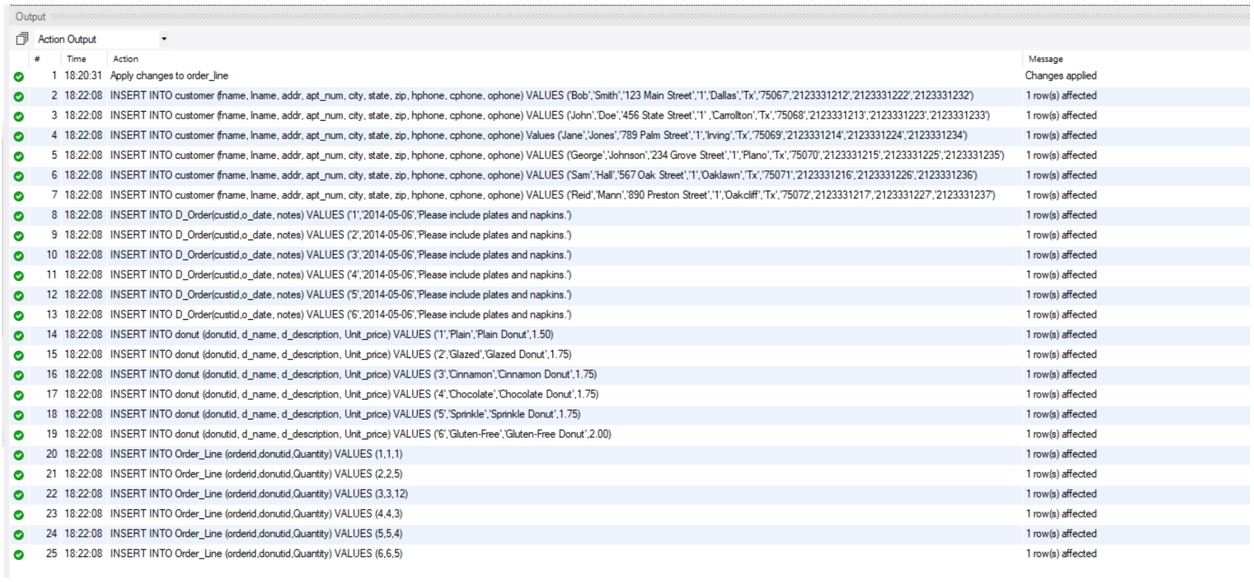
```
/* Customer Table */
INSERT INTO customer (fname, lname, addr, apt_num, city, state, zip, hphone, cphone, ophone)
VALUES ('Bob','Smith','123 Main
Street','1','Dallas','Tx','75067','2123331212','2123331222','2123331232');
INSERT INTO customer (fname, lname, addr, apt_num, city, state, zip, hphone, cphone, ophone)
VALUES ('John','Doe','456 State Street','1'
,'Carrollton','Tx','75068','2123331213','2123331223','2123331233');
INSERT INTO customer (fname, lname, addr, apt_num, city, state, zip, hphone, cphone, ophone)
Values ('Jane','Jones','789 Palm Street','1','Irving','Tx','75069','2123331214','2123331224','2123331234');
INSERT INTO customer (fname, lname, addr, apt_num, city, state, zip, hphone, cphone, ophone)
VALUES ('George','Johnson','234 Grove
Street','1','Plano','Tx','75070','2123331215','2123331225','2123331235');
INSERT INTO customer (fname, lname, addr, apt_num, city, state, zip, hphone, cphone, ophone)
VALUES ('Sam','Hall','567 Oak
Street','1','Oaklawn','Tx','75071','2123331216','2123331226','2123331236');
INSERT INTO customer (fname, lname, addr, apt_num, city, state, zip, hphone, cphone, ophone)
VALUES ('Reid','Mann','890 Preston
Street','1','Oakcliff','Tx','75072','2123331217','2123331227','2123331237');

/*D_Order Table*/
INSERT INTO D_Order(custid,o_date, notes)
VALUES ('1','2014-05-06','Please include plates and napkins.');
INSERT INTO D_Order(custid,o_date, notes)
VALUES ('2','2014-05-06','Please include plates and napkins.');
INSERT INTO D_Order(custid,o_date, notes)
VALUES ('3','2014-05-06','Please include plates and napkins.');
INSERT INTO D_Order(custid,o_date, notes)
VALUES ('4','2014-05-06','Please include plates and napkins.');
INSERT INTO D_Order(custid,o_date, notes)
VALUES ('5','2014-05-06','Please include plates and napkins.');
INSERT INTO D_Order(custid,o_date, notes)
VALUES ('6','2014-05-06','Please include plates and napkins.');

/*Donut Table*/
INSERT INTO donut (donutid, d_name, d_description, Unit_price)
VALUES ('1','Plain','Plain Donut',1.50);
INSERT INTO donut (donutid, d_name, d_description, Unit_price)
VALUES ('2','Glazed','Glazed Donut',1.75);
INSERT INTO donut (donutid, d_name, d_description, Unit_price)
VALUES ('3','Cinnamon','Cinnamon Donut',1.75);
INSERT INTO donut (donutid, d_name, d_description, Unit_price)
```

```
VALUES ('4','Chocolate','Chocolate Donut',1.75);
INSERT INTO donut (donutid, d_name, d_description, Unit_price)
VALUES ('5','Sprinkle','Sprinkle Donut',1.75);
INSERT INTO donut (donutid, d_name, d_description, Unit_price)
VALUES ('6','Gluten-Free','Gluten-Free Donut',2.00);

/*Order_Line Table*/
INSERT INTO Order_Line (orderid,donutid,Quantity)
VALUES (1,1,1);
INSERT INTO Order_Line (orderid,donutid,Quantity)
VALUES (1,2,5);
INSERT INTO Order_Line (orderid,donutid,Quantity)
VALUES (1,3,12);
INSERT INTO Order_Line (orderid,donutid,Quantity)
VALUES (1,4,3);
INSERT INTO Order_Line (orderid,donutid,Quantity)
VALUES (1,5,4);
INSERT INTO Order_Line (orderid,donutid,Quantity)
VALUES (1,6,5);
```



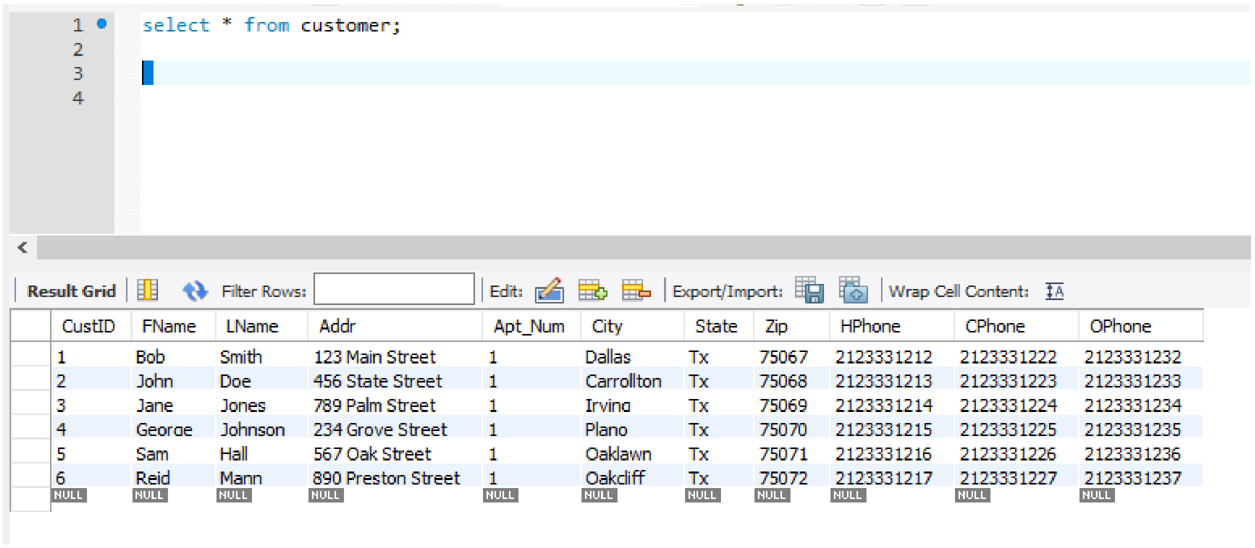
```
Output
Action Output
 #  Time      Action                                                                                                                                                                                   Message
 1  18:20:31  Apply changes to order_line                                                                                                                                                              Changes applied
 2  18:22:08  INSERT INTO customer (fname, lname, addr, apt_num, city, state, zip, hphone, cphone, ophone) VALUES ('Bob','Smith','123 Main Street','1','Dallas','Tx','75067','2123331212','2123331222','2123331232')          1 row(s) affected
 3  18:22:08  INSERT INTO customer (fname, lname, addr, apt_num, city, state, zip, hphone, cphone, ophone) VALUES ('John','Doe','456 State Street','1' ,'Carrollton','Tx','75068','2123331213','2123331223','2123331233')      1 row(s) affected
 4  18:22:08  INSERT INTO customer (fname, lname, addr, apt_num, city, state, zip, hphone, cphone, ophone) Values ('Jane','Jones','789 Palm Street','1','Irving','Tx','75069','2123331214','2123331224','2123331234')        1 row(s) affected
 5  18:22:08  INSERT INTO customer (fname, lname, addr, apt_num, city, state, zip, hphone, cphone, ophone) VALUES ('George','Johnson','234 Grove Street','1','Plano','Tx','75070','2123331215','2123331225','2123331235')    1 row(s) affected
 6  18:22:08  INSERT INTO customer (fname, lname, addr, apt_num, city, state, zip, hphone, cphone, ophone) VALUES ('Sam','Hall','567 Oak Street','1','Oaklawn','Tx','75071','2123331216','2123331226','2123331236')         1 row(s) affected
 7  18:22:08  INSERT INTO customer (fname, lname, addr, apt_num, city, state, zip, hphone, cphone, ophone) VALUES ('Reid','Mann','890 Preston Street','1','Oakcliff','Tx','75072','2123331217','2123331227','2123331237')    1 row(s) affected
 8  18:22:08  INSERT INTO D_Order(custid,o_date, notes) VALUES ('1','2014-05-06','Please include plates and napkins.')                                                                                  1 row(s) affected
 9  18:22:08  INSERT INTO D_Order(custid,o_date, notes) VALUES ('2','2014-05-06','Please include plates and napkins.')                                                                                  1 row(s) affected
10  18:22:08  INSERT INTO D_Order(custid,o_date, notes) VALUES ('3','2014-05-06','Please include plates and napkins.')                                                                                  1 row(s) affected
11  18:22:08  INSERT INTO D_Order(custid,o_date, notes) VALUES ('4','2014-05-06','Please include plates and napkins.')                                                                                  1 row(s) affected
12  18:22:08  INSERT INTO D_Order(custid,o_date, notes) VALUES ('5','2014-05-06','Please include plates and napkins.')                                                                                  1 row(s) affected
13  18:22:08  INSERT INTO D_Order(custid,o_date, notes) VALUES ('6','2014-05-06','Please include plates and napkins.')                                                                                  1 row(s) affected
14  18:22:08  INSERT INTO donut (donutid, d_name, d_description, Unit_price) VALUES ('1','Plain','Plain Donut',1.50)                                                                                    1 row(s) affected
15  18:22:08  INSERT INTO donut (donutid, d_name, d_description, Unit_price) VALUES ('2','Glazed','Glazed Donut',1.75)                                                                                  1 row(s) affected
16  18:22:08  INSERT INTO donut (donutid, d_name, d_description, Unit_price) VALUES ('3','Cinnamon','Cinnamon Donut',1.75)                                                                              1 row(s) affected
17  18:22:08  INSERT INTO donut (donutid, d_name, d_description, Unit_price) VALUES ('4','Chocolate','Chocolate Donut',1.75)                                                                            1 row(s) affected
18  18:22:08  INSERT INTO donut (donutid, d_name, d_description, Unit_price) VALUES ('5','Sprinkle','Sprinkle Donut',1.75)                                                                              1 row(s) affected
19  18:22:08  INSERT INTO donut (donutid, d_name, d_description, Unit_price) VALUES ('6','Gluten-Free','Gluten-Free Donut',2.00)                                                                        1 row(s) affected
20  18:22:08  INSERT INTO Order_Line (orderid,donutid,Quantity) VALUES (1,1,1)                                                                                                                         1 row(s) affected
21  18:22:08  INSERT INTO Order_Line (orderid,donutid,Quantity) VALUES (2,2,5)                                                                                                                         1 row(s) affected
22  18:22:08  INSERT INTO Order_Line (orderid,donutid,Quantity) VALUES (3,3,12)                                                                                                                        1 row(s) affected
23  18:22:08  INSERT INTO Order_Line (orderid,donutid,Quantity) VALUES (4,4,3)                                                                                                                         1 row(s) affected
24  18:22:08  INSERT INTO Order_Line (orderid,donutid,Quantity) VALUES (5,5,4)                                                                                                                         1 row(s) affected
25  18:22:08  INSERT INTO Order_Line (orderid,donutid,Quantity) VALUES (6,6,5)                                                                                                                         1 row(s) affected
```

Task G

G.1

Customer Table

select * from customer;



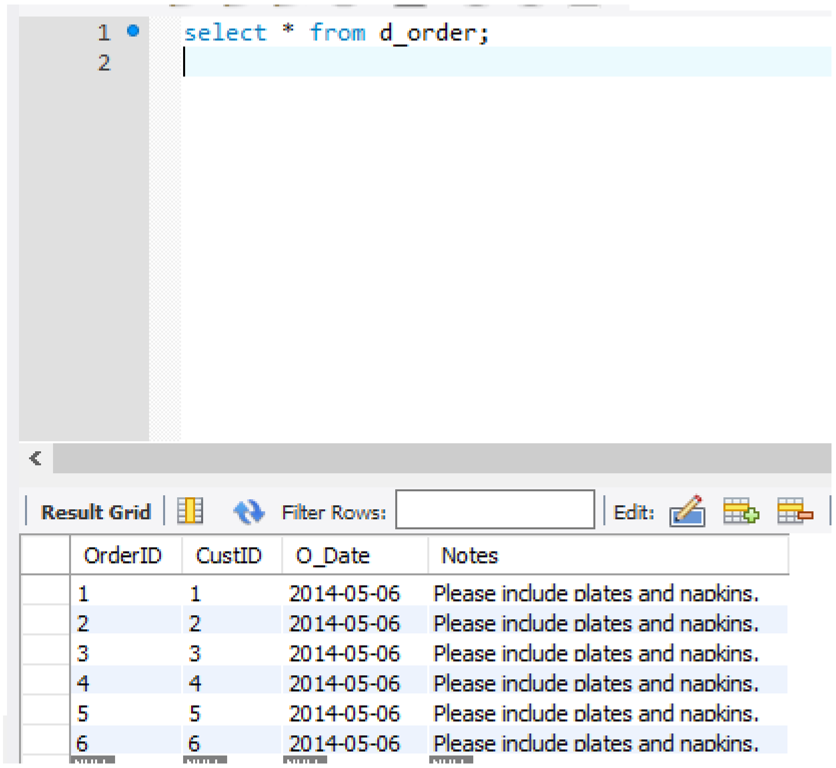
```
select * from customer;
```

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

CustID	FName	LName	Addr	Apt_Num	City	State	Zip	HPhone	CPhone	OPhone
1	Bob	Smith	123 Main Street	1	Dallas	Tx	75067	2123331212	2123331222	2123331232
2	John	Doe	456 State Street	1	Carrollton	Tx	75068	2123331213	2123331223	2123331233
3	Jane	Jones	789 Palm Street	1	Irving	Tx	75069	2123331214	2123331224	2123331234
4	George	Johnson	234 Grove Street	1	Plano	Tx	75070	2123331215	2123331225	2123331235
5	Sam	Hall	567 Oak Street	1	Oaklawn	Tx	75071	2123331216	2123331226	2123331236
6	Reid	Mann	890 Preston Street	1	Oakcliff	Tx	75072	2123331217	2123331227	2123331237
NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Donut Order Table

select * from d_order;



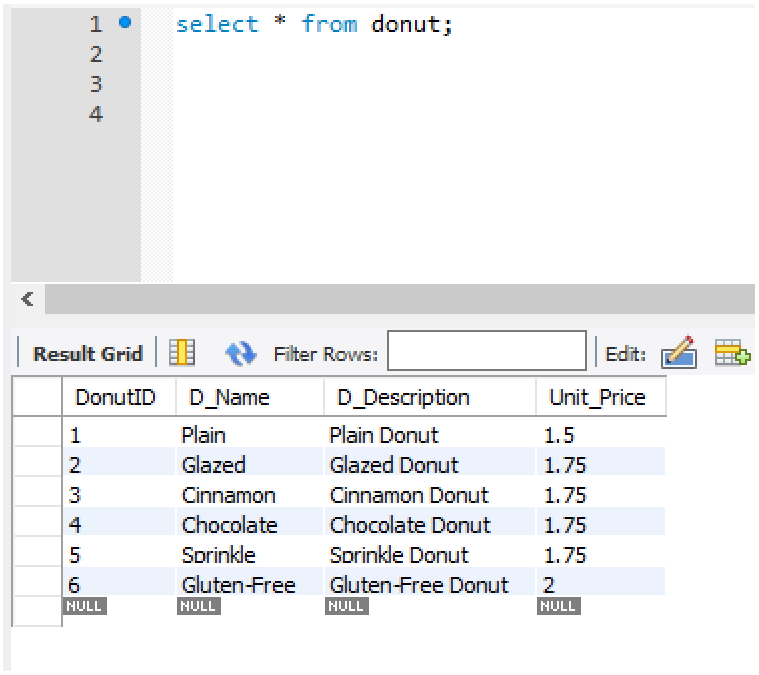
```
select * from d_order;
```

Result Grid | Filter Rows: | Edit:

OrderID	CustID	O_Date	Notes
1	1	2014-05-06	Please include plates and napkins.
2	2	2014-05-06	Please include plates and napkins.
3	3	2014-05-06	Please include plates and napkins.
4	4	2014-05-06	Please include plates and napkins.
5	5	2014-05-06	Please include plates and napkins.
6	6	2014-05-06	Please include plates and napkins.

Donut Table

select * from donut;

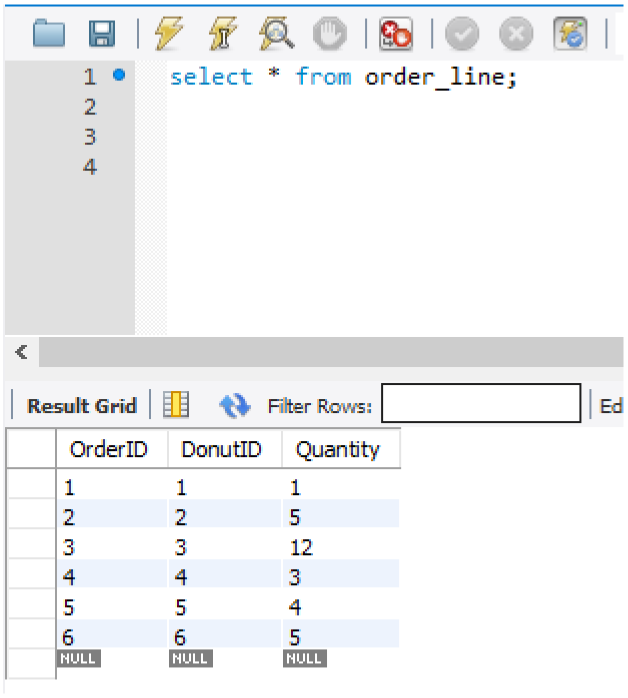


```
select * from donut;
```

DonutID	D_Name	D_Description	Unit_Price
1	Plain	Plain Donut	1.5
2	Glazed	Glazed Donut	1.75
3	Cinnamon	Cinnamon Donut	1.75
4	Chocolate	Chocolate Donut	1.75
5	Sprinkle	Sprinkle Donut	1.75
6	Gluten-Free	Gluten-Free Donut	2
NULL	NULL	NULL	NULL

Order Line Table

select * from order_line;

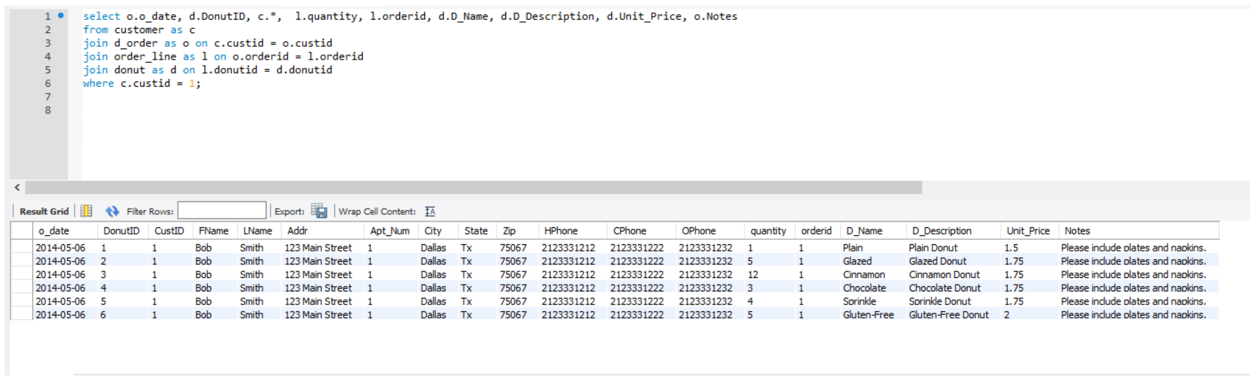


```
select * from order_line;
```

OrderID	DonutID	Quantity
1	1	1
2	2	5
3	3	12
4	4	3
5	5	4
6	6	5
NULL	NULL	NULL

G.2

select o.o_date, d.DonutID, c.*, l.quantity, l.orderid, d.D_Name, d.D_Description, d.Unit_Price, o.Notes
from customer as c
join d_order as o on c.custid = o.custid
join order_line as l on o.orderid = l.orderid
join donut as d on l.donutid = d.donutid
where c.custid = 1;



```
select o.o_date, d.DonutID, c.*,  l.quantity, l.orderid, d.D_Name, d.D_Description, d.Unit_Price, o.Notes
from customer as c
join d_order as o on c.custid = o.custid
join order_line as l on o.orderid = l.orderid
join donut as d on l.donutid = d.donutid
where c.custid = 1;
```

o_date	DonutID	CustID	FName	LName	Addr	Apt_Num	City	State	Zip	HPhone	CPhone	OPhone	quantity	orderid	D_Name	D_Description	Unit_Price	Notes
2014-05-06	1	1	Bob	Smith	123 Main Street	1	Dallas	Tx	75067	2123331212	2123331222	2123331232	1	1	Plain	Plain Donut	1.5	Please include plates and napkins.
2014-05-06	2	1	Bob	Smith	123 Main Street	1	Dallas	Tx	75067	2123331212	2123331222	2123331232	5	1	Glazed	Glazed Donut	1.75	Please include plates and napkins.
2014-05-06	3	1	Bob	Smith	123 Main Street	1	Dallas	Tx	75067	2123331212	2123331222	2123331232	12	1	Cinnamon	Cinnamon Donut	1.75	Please include plates and napkins.
2014-05-06	4	1	Bob	Smith	123 Main Street	1	Dallas	Tx	75067	2123331212	2123331222	2123331232	3	1	Chocolate	Chocolate Donut	1.75	Please include plates and napkins.
2014-05-06	5	1	Bob	Smith	123 Main Street	1	Dallas	Tx	75067	2123331212	2123331222	2123331232	4	1	Sprinkle	Sprinkle Donut	1.75	Please include plates and napkins.
2014-05-06	6	1	Bob	Smith	123 Main Street	1	Dallas	Tx	75067	2123331212	2123331222	2123331232	5	1	Gluten-Free	Gluten-Free Donut	2	Please include plates and napkins.