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C170 Data Management - Applications

Performance Assessment

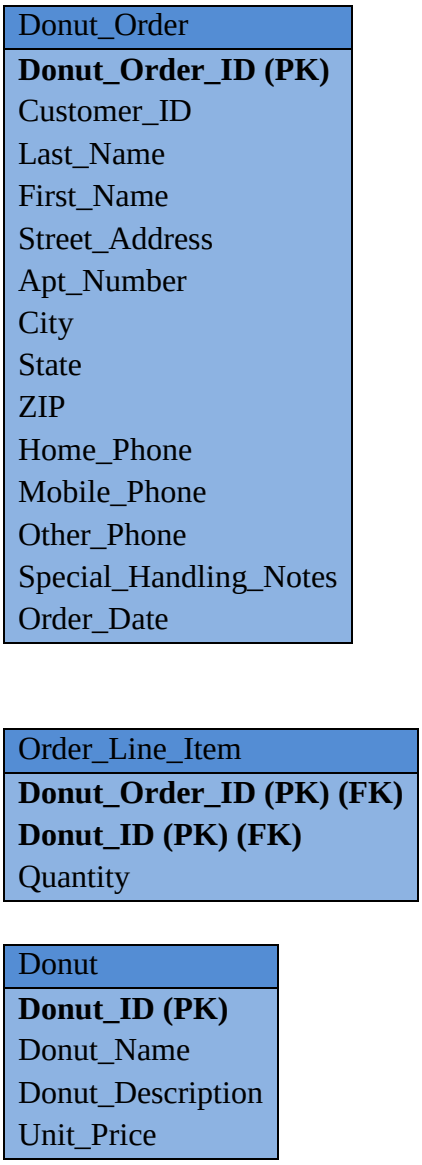
Rubric Section A1a

Donut_Order
Customer_ID
Last_Name
First_Name
Street_Address
Apt_Number
City
State
ZIP
Home_Phone
Mobile_Phone
Other_Phone
Donut_ID (PK)
Donut_Name
Donut_Description
Unit_Price
Donut_Order_ID (PK)
Special_Handling_Notes
Order_Date
Quantity

Rubric Section A1ai

To convert the unnormalized data from the order form to a 1NR table, I first determined that the basic entity that needs to be contained for this part is a donut order. I took every attribute from the donut order form that needs to be contained in a database and included it as an attribute in the table. Since only one table could be used for this part, it was necessary to use two attributes for the primary key. I chose Donut_Order_ID and Donut_ID as those are the two which, taken together, will be unique for each order. Each purchase will have a unique order ID associated with it, and each purchase can only be for one type of donut, regardless of quantity. The customer information would not work as a primary key in this instance because a customer can place multiple orders. However, inputting the order and donut ID together will always result in the same customer information. It was also necessary to allow only one donut type to be associated with each order because to allow multiple types of donuts per order would result in repeating groups which isn't suitable for a relational database. The same problem would exist if multiple values were entered for the Donut_ID field.

Rubric Section A1b



Rubric Section A1bi

To convert the table from 1NR to 2NR, it was necessary to divide the composite primary key found in the Donut_Order table and create a new entity, Donut, and an associative entity, Order_Line_Item. Donut_Order can keep Donut_Order_ID as its primary key while all Donut-related information was moved to a new table with Donut_ID serving as the primary key. Each donut could have a similar name, description, or price, but a Donut_ID number can only be used once for each type of donut. The only problem left to be solved is how to keep track of which donuts, and in what quantity, belong to each order. Many orders can contain many donuts while many donuts can belong to many orders. This many-to-many relationship can't be represented as such in a relational database. To solve this, I created the associative entity Order_Line_Item which uses the Donut_Order_ID and Donut_ID as both the primary key and foreign keys. These two values can then produce the quantity of donut for each order.

Rubric Section A1c

Customer
Customer_ID (PK)
Last_Name
First_Name
Street_Address
Apt_Number
City
State
ZIP
Home_Phone
Mobile_Phone
Other_Phone

Donut_Order
Donut_Order_ID (PK)
Customer_ID (FK)
Special_Handling_Notes
Order_Date

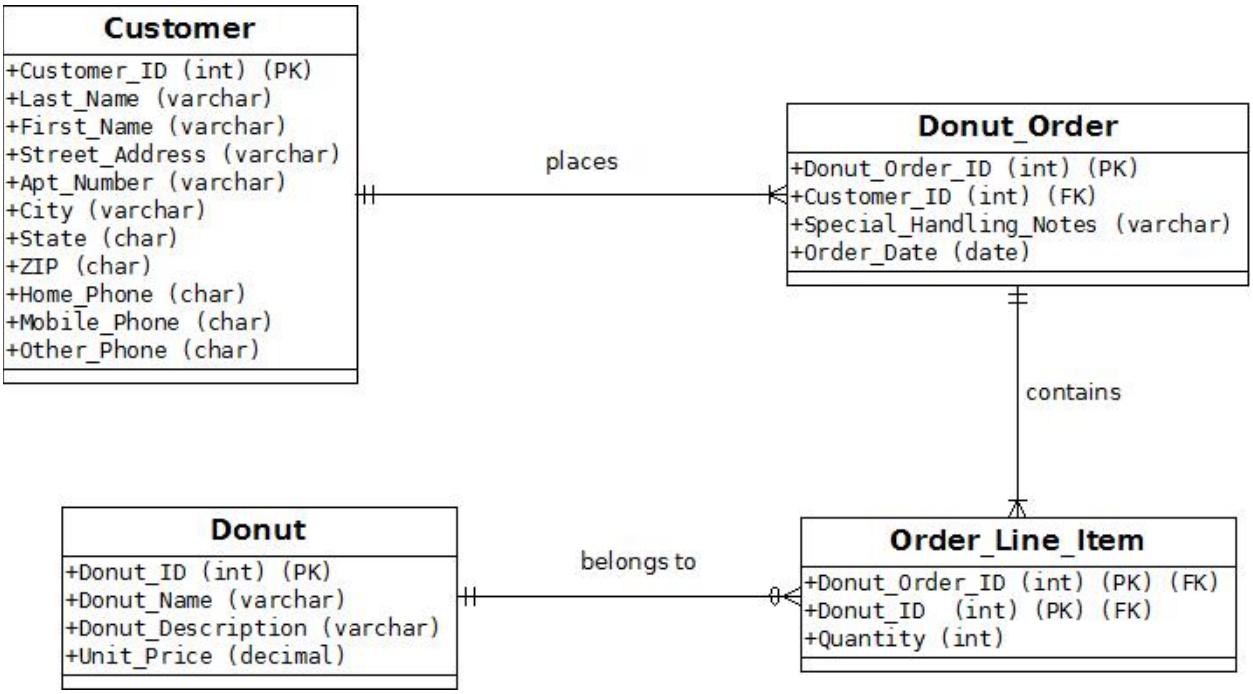
Order_Line_Item
Donut_Order_ID (PK) (FK)
Donut_ID (PK) (FK)
Quantity

Donut
Donut_ID (PK)
Donut_Name
Donut_Description
Unit_Price

Rubric Section A1ci

To convert the tables from 2NR to 3NR, the only problem left to solve is that of the transitive dependency found in the Donut_Order table. While the Donut_Order_ID determines the Order_Date and Special_Handling_Notes, the Customer_ID determines the remaining customer information in the table although it is not itself a primary key. To resolve this, I moved the customer information to a new table, Customer, with Customer_ID serving properly as the primary key. The order-related information remained in the Donut_Order table as well as the Customer_ID attribute which now serves as a foreign key there to represent the one-to-many relationship between Customer and Donut_Order.

Rubric Section B1, B2, B2a, B2b, B3



Rubric Section B4a, B4b, B4c

There are four entities in the diagram as that is the number of entities needed to make this database in 3NR form with all the required information included. The entities are Customer, Donut, Donut_Order, and Order_Line_Item. The Customer entity represents the customers who solicit the donut shop. It contains their name, address, and phone information. The next entity, Donut, represents each type of donut available for purchase at the donut shop with its name, description, and price. The Donut_Order entity represents the orders that are placed by a customer for donuts. Each order has a unique ID number, a date it was placed, and optional notes for the order. It contains a foreign key of Customer_ID to relate each order to an individual customer. Finally, the Order_Line_Item is an associative entity to keep track of which donuts and how many belong to each order. It was necessary to include due to the inability of relational databases to represent many-to-many relationships as such.

Customer and Donut_Order has a one-to-many relationship because a customer must place an order for this entity to exist. A customer can place just one or many orders while each order can be placed by one and only one customer.

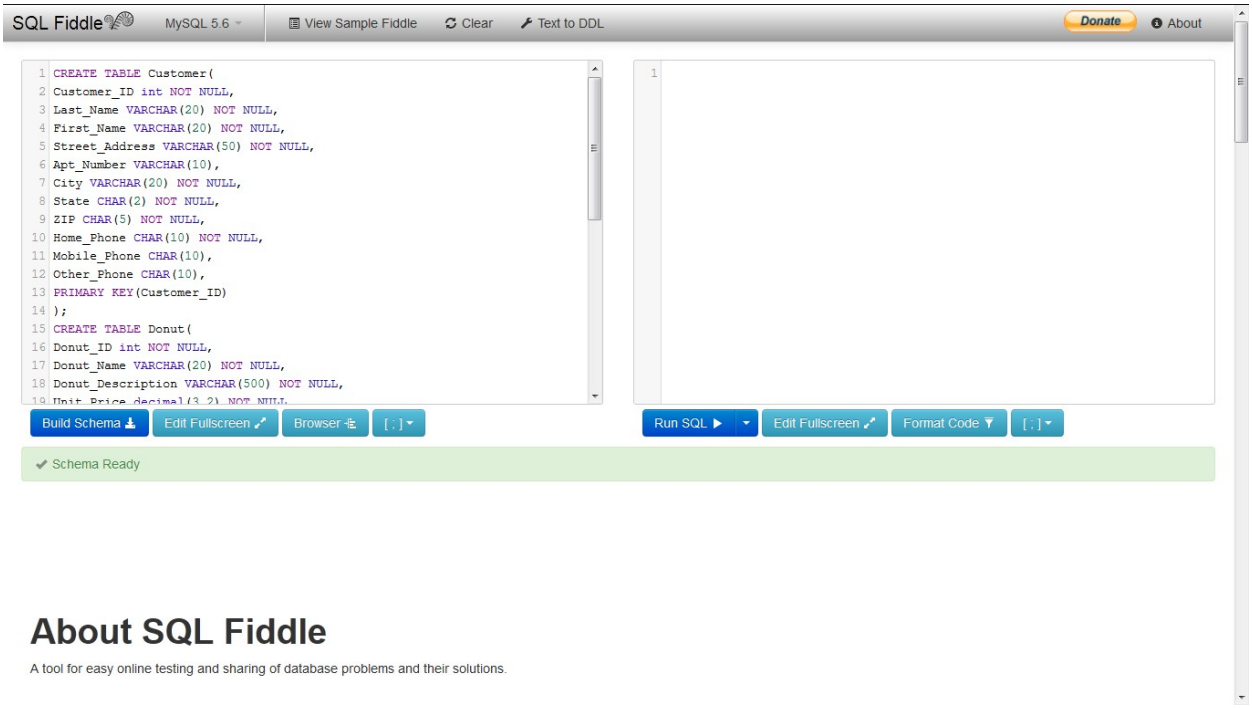
The Donut entity can belong to either zero or many Order_Line_Item instances. A new donut may not have been ordered yet but would still need to exist in the database. Each line item can contain one and only one Donut_ID to associate it with a particular donut.

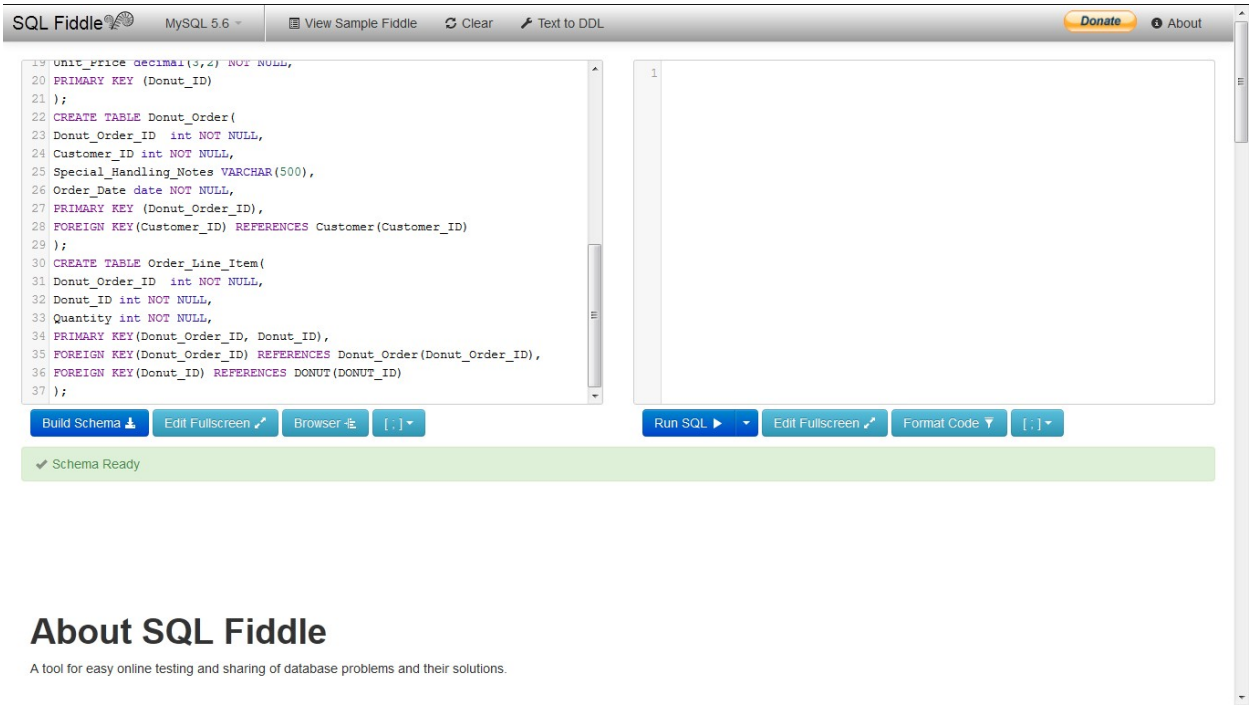
A Donut_Order can create one or many Order_Line_Item instances, but it must create at least one instance in order to exist as an order. Similar to the last example, each line item can be created by one and only one order.

Rubric Section C1

```
CREATE TABLE Customer(
Customer_ID int NOT NULL,
Last_Name VARCHAR(20) NOT NULL,
First_Name VARCHAR(20) NOT NULL,
Street_Address VARCHAR(50) NOT NULL,
Apt_Number VARCHAR(10),
City VARCHAR(20) NOT NULL,
State CHAR(2) NOT NULL,
ZIP CHAR(5) NOT NULL,
Home_Phone CHAR(10) NOT NULL,
Mobile_Phone CHAR(10),
Other_Phone CHAR(10),
PRIMARY KEY(Customer_ID)
);
CREATE TABLE Donut(
Donut_ID int NOT NULL,
Donut_Name VARCHAR(20) NOT NULL,
Donut_Description VARCHAR(500) NOT NULL,
Unit_Price decimal(3,2) NOT NULL,
PRIMARY KEY (Donut_ID)
);
CREATE TABLE Donut_Order(
Donut_Order_ID  int NOT NULL,
Customer_ID int NOT NULL,
Special_Handling_Notes VARCHAR(500),
Order_Date date NOT NULL,
PRIMARY KEY (Donut_Order_ID),
FOREIGN KEY(Customer_ID) REFERENCES Customer(Customer_ID)
);
CREATE TABLE Order_Line_Item(
Donut_Order_ID  int NOT NULL,
Donut_ID int NOT NULL,
Quantity int NOT NULL,
PRIMARY KEY(Donut_Order_ID, Donut_ID),
FOREIGN KEY(Donut_Order_ID) REFERENCES Donut_Order(Donut_Order_ID),
FOREIGN KEY(Donut_ID) REFERENCES DONUT(DONUT_ID)
);
```

Rubric Section C1a





Rubric Section D1

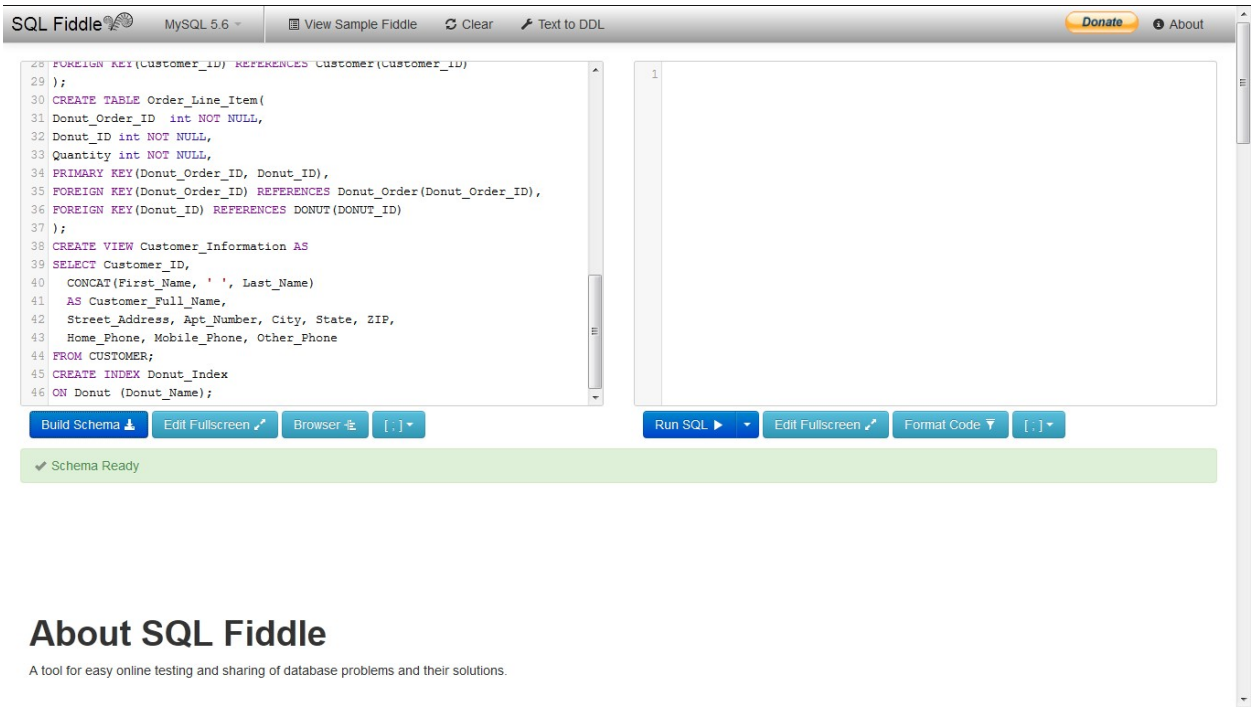
```
CREATE VIEW Customer_Information AS
SELECT Customer_ID,
  CONCAT(First_Name, ' ', Last_Name)
  AS Customer_Full_Name,
  Street_Address, Apt_Number, City, State, ZIP,
  Home_Phone, Mobile_Phone, Other_Phone
FROM CUSTOMER;
```

Rubric Section D1a

Rubric Section E1

```
CREATE INDEX Donut_Index
ON Donut (Donut_Name);
```

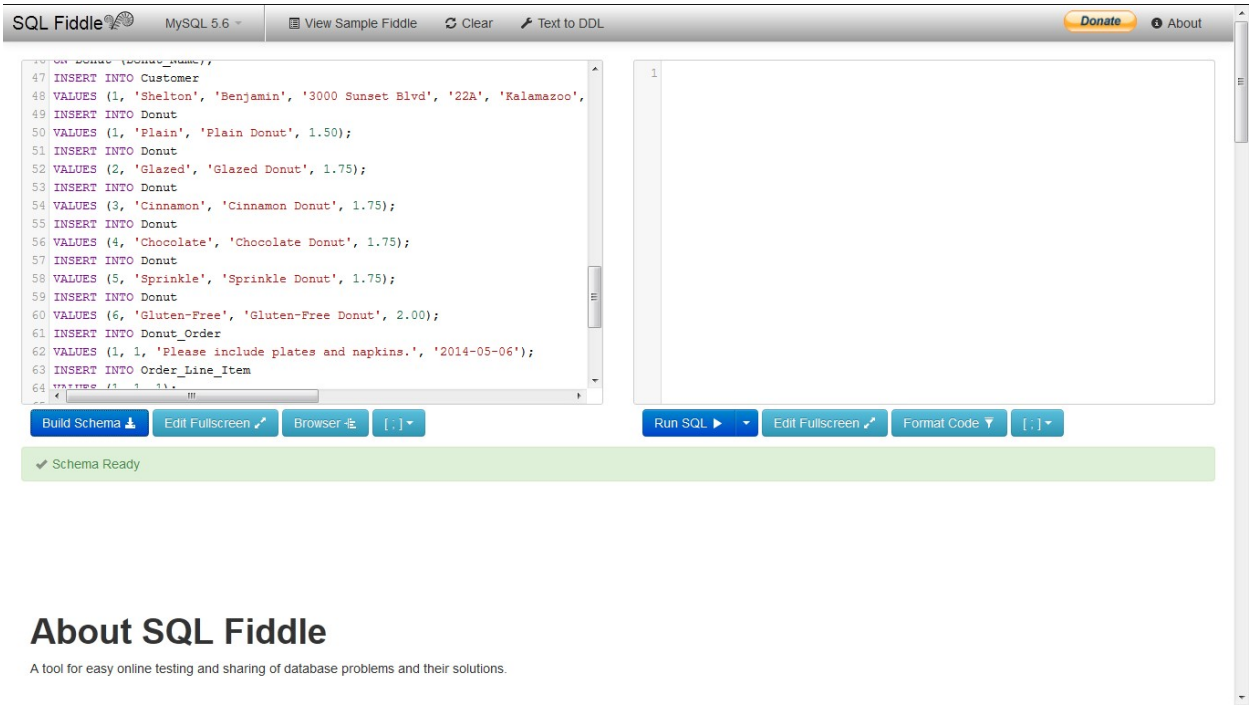
Rubric Section E1a

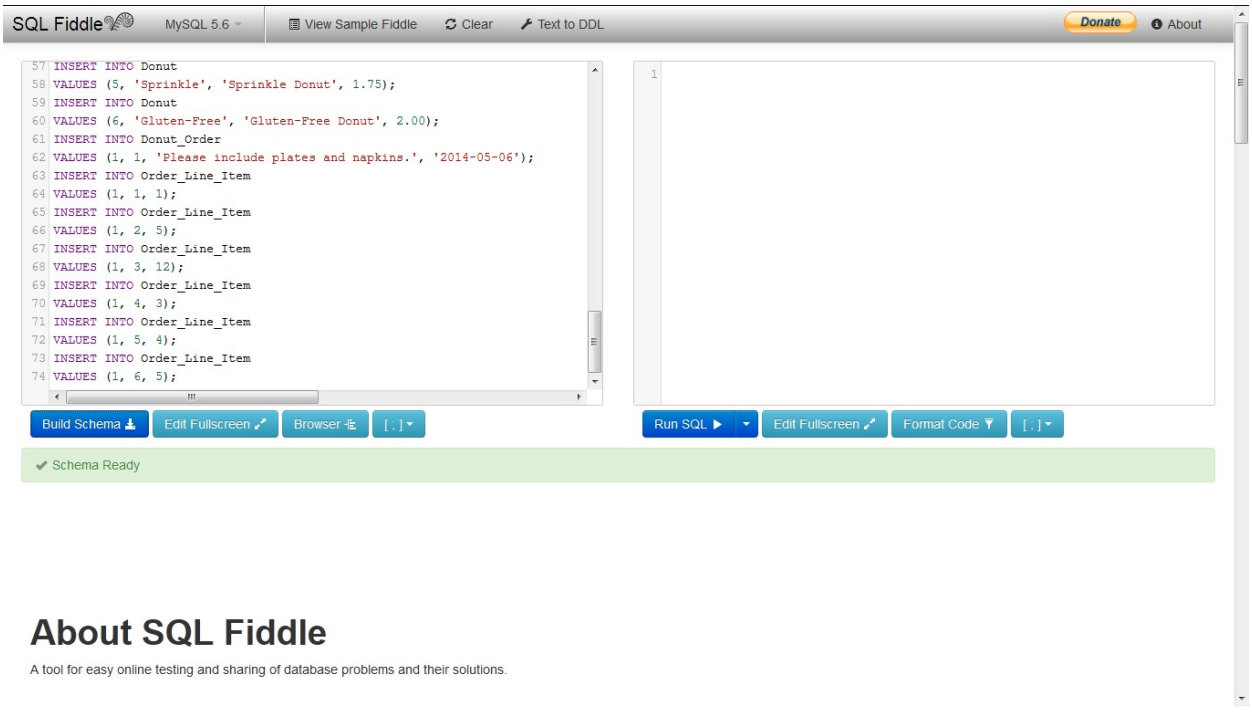


Rubric Section F1

```
INSERT INTO Customer
VALUES (1, 'Shelton', 'Benjamin', '3000 Sunset Blvd', '22A', 'Kalamazoo', 'CA', '37860',
'5551001000', '5552002000', '5553003000');
INSERT INTO Donut
VALUES (1, 'Plain', 'Plain Donut', 1.50);
INSERT INTO Donut
VALUES (2, 'Glazed', 'Glazed Donut', 1.75);
INSERT INTO Donut
VALUES (3, 'Cinnamon', 'Cinnamon Donut', 1.75);
INSERT INTO Donut
VALUES (4, 'Chocolate', 'Chocolate Donut', 1.75);
INSERT INTO Donut
VALUES (5, 'Sprinkle', 'Sprinkle Donut', 1.75);
INSERT INTO Donut
VALUES (6, 'Gluten-Free', 'Gluten-Free Donut', 2.00);
INSERT INTO Donut_Order
VALUES (1, 1, 'Please include plates and napkins.', '2014-05-06');
INSERT INTO Order_Line_Item
VALUES (1, 1, 1);
INSERT INTO Order_Line_Item
VALUES (1, 2, 5);
INSERT INTO Order_Line_Item
VALUES (1, 3, 12);
INSERT INTO Order_Line_Item
VALUES (1, 4, 3);
INSERT INTO Order_Line_Item
VALUES (1, 5, 4);
INSERT INTO Order_Line_Item
VALUES (1, 6, 5);
```

Rubric Section F1a

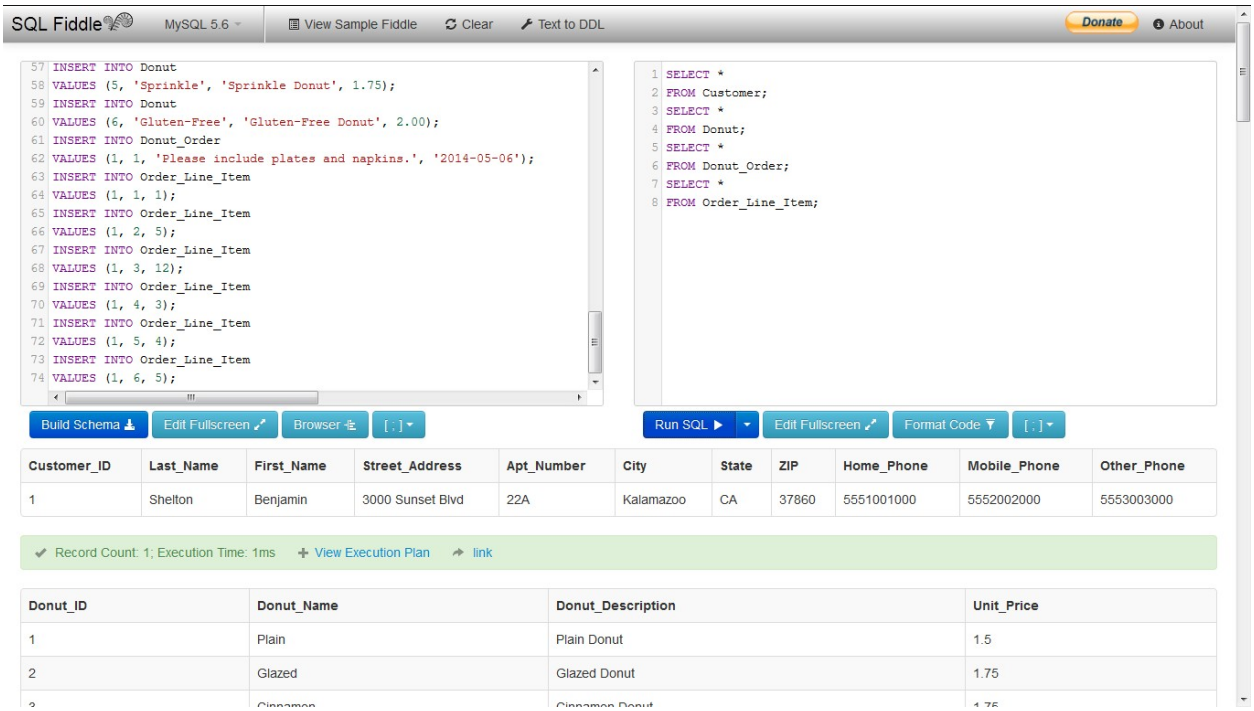


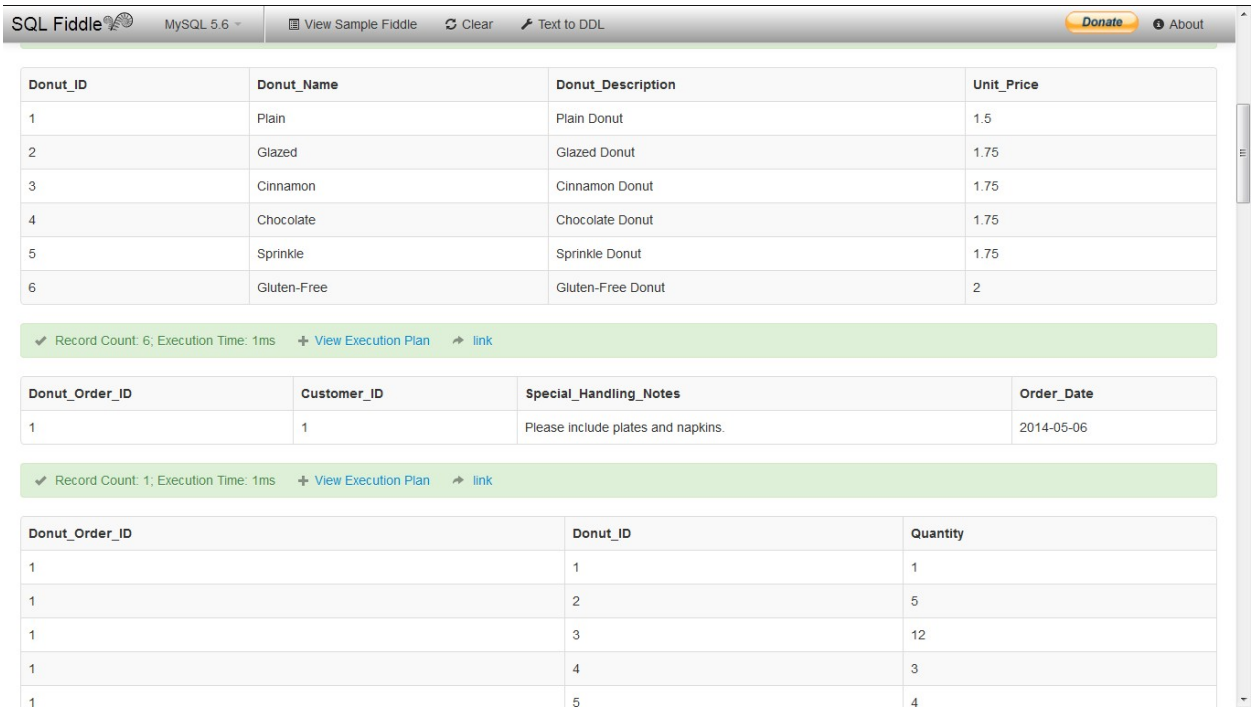


Rubric Section G1

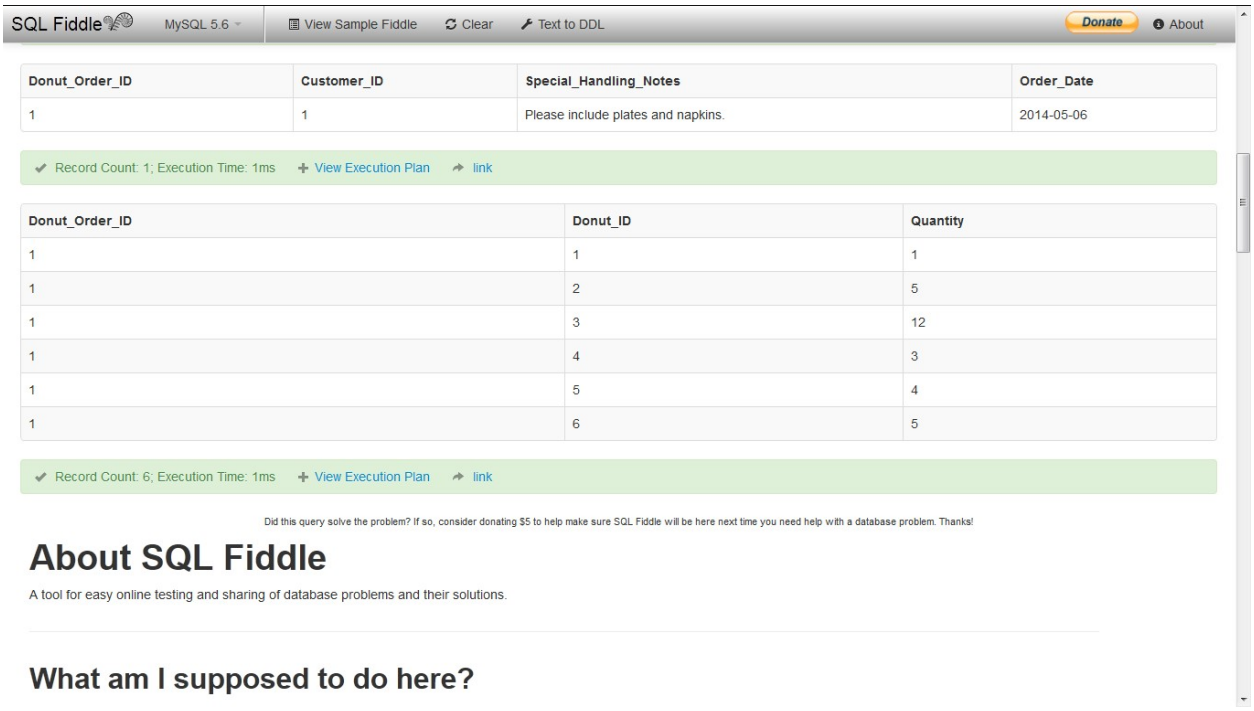
```
SELECT *
FROM Customer;
SELECT *
FROM Donut;
SELECT *
FROM Donut_Order;
SELECT *
FROM Order_Line_Item;
```

Rubric Section G1a





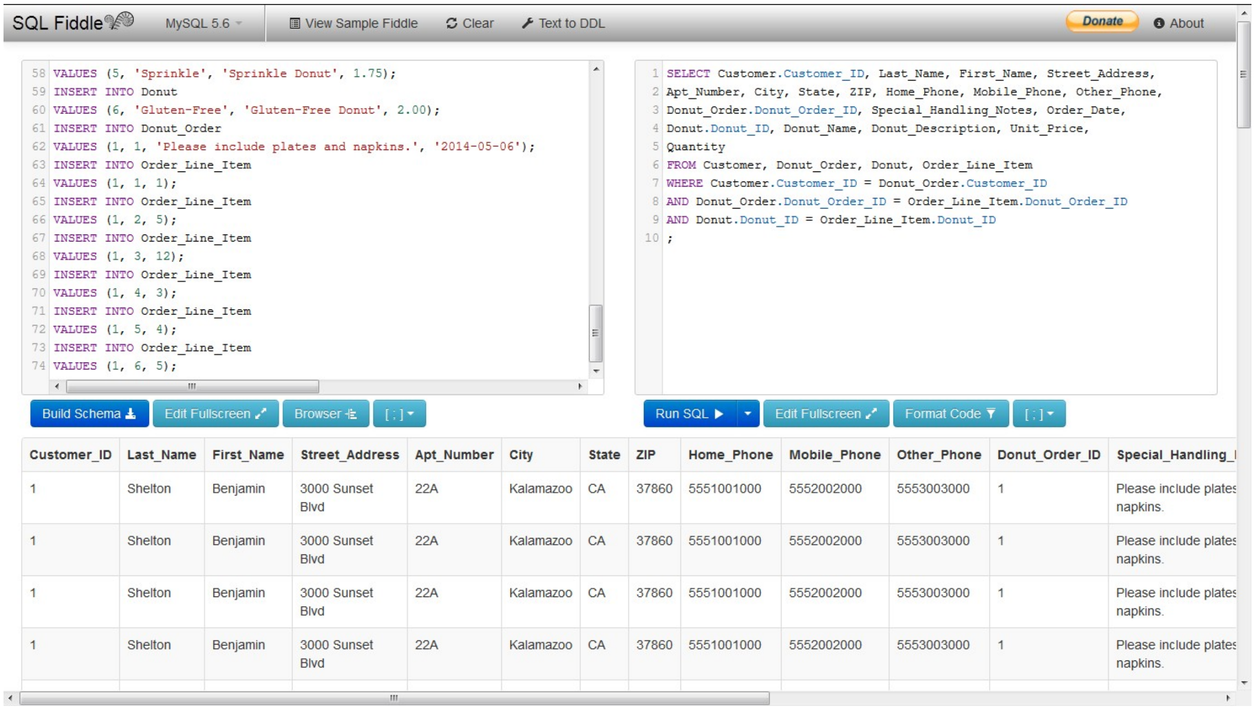
Rubric Section G1a



Rubric Section G2

```
SELECT Customer.Customer_ID, Last_Name, First_Name, Street_Address,
Apt_Number, City, State, ZIP, Home_Phone, Mobile_Phone, Other_Phone,
Donut_Order.Donut_Order_ID, Special_Handling_Notes, Order_Date,
Donut.Donut_ID, Donut_Name, Donut_Description, Unit_Price,
Quantity
FROM Customer, Donut_Order, Donut, Order_Line_Item
WHERE Customer.Customer_ID = Donut_Order.Customer_ID
AND Donut_Order.Donut_Order_ID = Order_Line_Item.Donut_Order_ID
AND Donut.Donut_ID = Order_Line_Item.Donut_ID
;
```

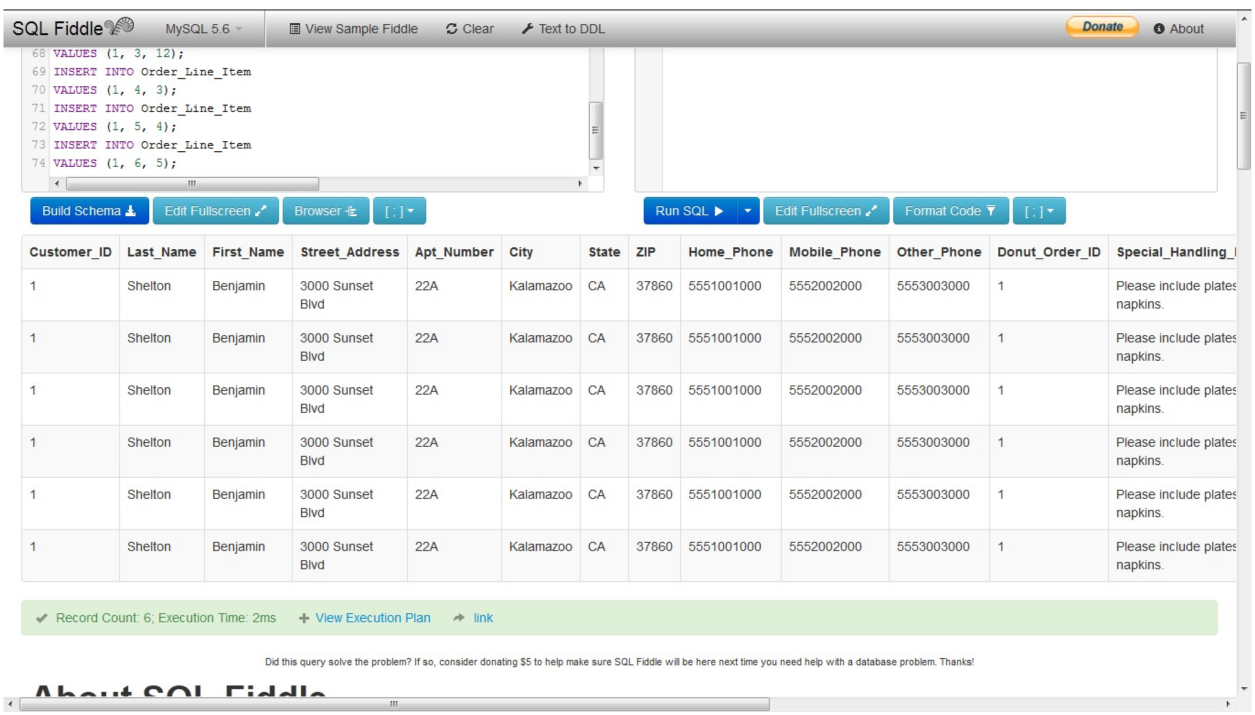
Rubric Section G2a




```sql
VALUES (5, 'Sprinkle', 'Sprinkle Donut', 1.75);
INSERT INTO Donut
VALUES (6, 'Gluten-Free', 'Gluten-Free Donut', 2.00);
INSERT INTO Donut_Order
VALUES (1, 1, 'Please include plates and napkins.', '2014-05-06');
INSERT INTO Order_Line_Item
VALUES (1, 1, 1);
INSERT INTO Order_Line_Item
VALUES (1, 2, 5);
INSERT INTO Order_Line_Item
VALUES (1, 3, 12);
INSERT INTO Order_Line_Item
VALUES (1, 4, 3);
INSERT INTO Order_Line_Item
VALUES (1, 5, 4);
INSERT INTO Order_Line_Item
VALUES (1, 6, 5);
```

```sql
SELECT Customer.Customer_ID, Last_Name, First_Name, Street_Address,
Apt_Number, City, State, ZIP, Home_Phone, Mobile_Phone, Other_Phone,
Donut_Order.Donut_Order_ID, Special_Handling_Notes, Order_Date,
Donut.Donut_ID, Donut_Name, Donut_Description, Unit_Price,
Quantity
FROM Customer, Donut_Order, Donut, Order_Line_Item
WHERE Customer.Customer_ID = Donut_Order.Customer_ID
AND Donut_Order.Donut_Order_ID = Order_Line_Item.Donut_Order_ID
AND Donut.Donut_ID = Order_Line_Item.Donut_ID
;
```

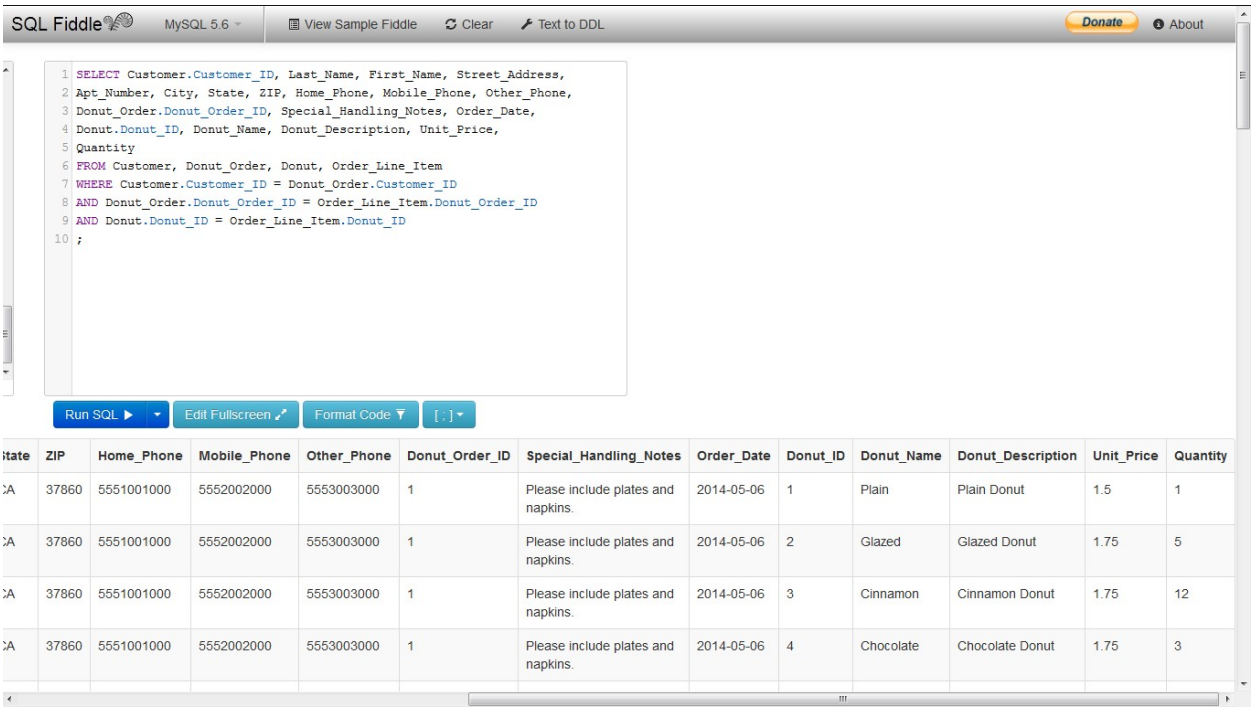
Customer_ID	Last_Name	First_Name	Street_Address	Apt_Number	City	State	ZIP	Home_Phone	Mobile_Phone	Other_Phone	Donut_Order_ID	Special_Handling_I
1	Shelton	Benjamin	3000 Sunset Blvd	22A	Kalamazoo	CA	37860	5551001000	5552002000	5553003000	1	Please include plates napkins.
1	Shelton	Benjamin	3000 Sunset Blvd	22A	Kalamazoo	CA	37860	5551001000	5552002000	5553003000	1	Please include plates napkins.
1	Shelton	Benjamin	3000 Sunset Blvd	22A	Kalamazoo	CA	37860	5551001000	5552002000	5553003000	1	Please include plates napkins.
1	Shelton	Benjamin	3000 Sunset Blvd	22A	Kalamazoo	CA	37860	5551001000	5552002000	5553003000	1	Please include plates napkins.



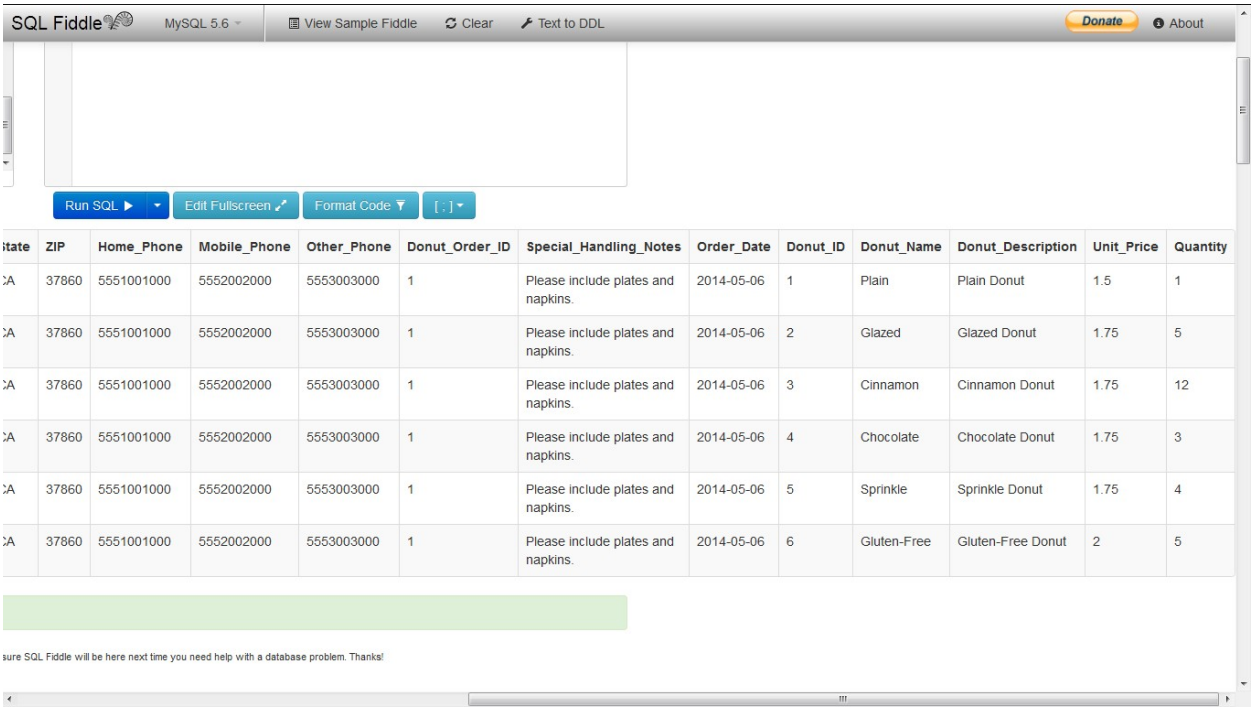

```sql
VALUES (1, 3, 12);
INSERT INTO Order_Line_Item
VALUES (1, 4, 3);
INSERT INTO Order_Line_Item
VALUES (1, 5, 4);
INSERT INTO Order_Line_Item
VALUES (1, 6, 5);
```

Customer_ID	Last_Name	First_Name	Street_Address	Apt_Number	City	State	ZIP	Home_Phone	Mobile_Phone	Other_Phone	Donut_Order_ID	Special_Handling_I
1	Shelton	Benjamin	3000 Sunset Blvd	22A	Kalamazoo	CA	37860	5551001000	5552002000	5553003000	1	Please include plates napkins.
1	Shelton	Benjamin	3000 Sunset Blvd	22A	Kalamazoo	CA	37860	5551001000	5552002000	5553003000	1	Please include plates napkins.
1	Shelton	Benjamin	3000 Sunset Blvd	22A	Kalamazoo	CA	37860	5551001000	5552002000	5553003000	1	Please include plates napkins.
1	Shelton	Benjamin	3000 Sunset Blvd	22A	Kalamazoo	CA	37860	5551001000	5552002000	5553003000	1	Please include plates napkins.
1	Shelton	Benjamin	3000 Sunset Blvd	22A	Kalamazoo	CA	37860	5551001000	5552002000	5553003000	1	Please include plates napkins.
1	Shelton	Benjamin	3000 Sunset Blvd	22A	Kalamazoo	CA	37860	5551001000	5552002000	5553003000	1	Please include plates napkins.

Rubric Section G2a



tate	ZIP	Home_Phone	Mobile_Phone	Other_Phone	Donut_Order_ID	Special_Handling_Notes	Order_Date	Donut_ID	Donut_Name	Donut_Description	Unit_Price	Quantity
A	37860	5551001000	5552002000	5553003000	1	Please include plates and napkins.	2014-05-06	1	Plain	Plain Donut	1.5	1
A	37860	5551001000	5552002000	5553003000	1	Please include plates and napkins.	2014-05-06	2	Glazed	Glazed Donut	1.75	5
A	37860	5551001000	5552002000	5553003000	1	Please include plates and napkins.	2014-05-06	3	Cinnamon	Cinnamon Donut	1.75	12
A	37860	5551001000	5552002000	5553003000	1	Please include plates and napkins.	2014-05-06	4	Chocolate	Chocolate Donut	1.75	3



tate	ZIP	Home_Phone	Mobile_Phone	Other_Phone	Donut_Order_ID	Special_Handling_Notes	Order_Date	Donut_ID	Donut_Name	Donut_Description	Unit_Price	Quantity
A	37860	5551001000	5552002000	5553003000	1	Please include plates and napkins.	2014-05-06	1	Plain	Plain Donut	1.5	1
A	37860	5551001000	5552002000	5553003000	1	Please include plates and napkins.	2014-05-06	2	Glazed	Glazed Donut	1.75	5
A	37860	5551001000	5552002000	5553003000	1	Please include plates and napkins.	2014-05-06	3	Cinnamon	Cinnamon Donut	1.75	12
A	37860	5551001000	5552002000	5553003000	1	Please include plates and napkins.	2014-05-06	4	Chocolate	Chocolate Donut	1.75	3
A	37860	5551001000	5552002000	5553003000	1	Please include plates and napkins.	2014-05-06	5	Sprinkle	Sprinkle Donut	1.75	4
A	37860	5551001000	5552002000	5553003000	1	Please include plates and napkins.	2014-05-06	6	Gluten-Free	Gluten-Free Donut	2	5

Rubric Section H

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