Α.

1.

a.

1NF

DONUTORDERS				
51/				
PK	Donut Order ID			
PK	Donut ID			
	Customer ID			
	Order Date			
	First Name			
	Last Name			
	Street Address Apartment			
	City			
	State			
	Zip Code			
	Home Phone			
	Mobile Phone			
	Other Phone			
	Qty of Donuts			
	Donut Name			
	Donut Description			
	Unit Price			
	Special Handling Notes			

i. First, I took all data present in "Sales form" and created an un-normalized list. From there I figure out that some attributes are related, they are: Donut ID, Donut Name,

Donut Description, Unit Price, and they all depends on Donut ID. And all other attributes depend on Donut Order ID. So, I make both Donut ID and Donut Order ID as a composite key to identify all attributes in this "DONUTORDERS" table. The table is in 1st Normal Form and the values in each column is atomic and there is not repeating groups. All attributes are now depending on composite key Donut Order ID and Donut ID.

b.

2nf

DONUTORDERS				
PK	Donut Order ID			
	Customer ID			
	Order Date			
	First Name			
	Last Name			
	Street Address			
	Apartment			
	City			
	State			
	Zip Code			
	Home Phone			
	Mobile Phone			
	Other Phone			
	Qty of Donuts			
	Special Handling Notes			

ORDERITEMS			
PK	Donut Order ID	FK	
PK	Donut ID	FK	
	Qty of Donuts		

DONUTINFO		
PK	Donut ID	
	Donut Name Donut Description Unit Price	

I.

Conversion to 2NF occurs when we eliminate partial dependencies. By looking at "DONUTORDERS" table that I created in last part I realize that not all attributes depend entirely on combination of Donut Order ID and Donut ID composite key and this violates the 2nd normal form. To solve this issue, I created 3 table by breaking the first normal form table by identifying the primary keys and their dependent attributes. The attributes that are dependent in a partial dependency are removed from the original table and placed in the new table with the dependency's determinant. Because Qty of Donuts is dependent on both Donut Order ID and Donut ID in the "ORDERITEMS" table, I leave that in the "ORDERITEMS" table. In addition, by using composite primary key Donut Order ID and Donut ID, primary key/foreign key relationships have been created. By creating three tables all partial dependencies have been removed and no attribute is dependent on only a portion of the primary key.

C.

CUSTOMERINFO			
PK	Customer ID	INTEGER	
	First Name	VARCHAR	
	Last Name	VARCHAR	
	Street Address	VARCHAR	
	Apartment	VARCHAR	
	City	VARCHAR	
	State VARCHAR Zip Code VARCHAR Home Phone VARCHAR		
	Mobile Phone	VARCHAR	
	Other Phone	VARCHAR	

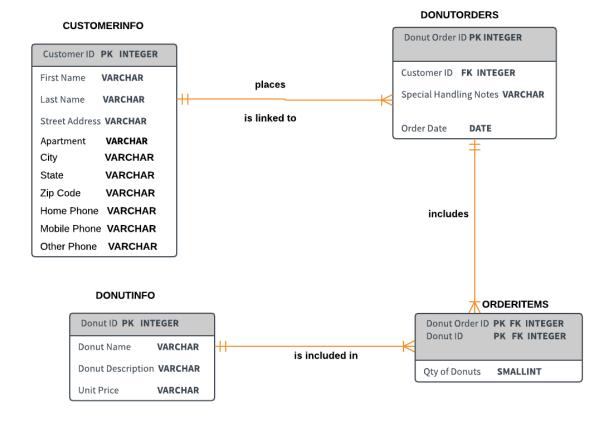
DONUTINFO			
PK	Donut ID INTEGER		
	Donut Name VARCHAR Donut Description VARCHAR Unit Price VARCHAR		

ORDERITEMS			
PK	Donut Order ID	FK INTEGER	
PK	Donut ID	FK INTEGER	
	Qty of Donuts	SMALLINT	

DONUTORDERS		
PK	Donut Order ID	INTEGER
FK	Customer ID Special Handling Notes Order Date	INTEGER VARCHAR DATE

C. I took the table from 2NF and remove all transitive dependencies. Tables I created in 2nd NF still have some transitive dependency. For Instance, "DONUTORDERS" table contain attribute Customer ID which can be used to determine other attributes such as first name as well as other fields. So, I break down "DONUTORDERS" table and created 4th table "CUSTOMER INFO" to remove all transitive dependency.

В



The entities were selected from the data normalization process and will be used to hold different types of data. The relationships were determined based on data types. Each entity will be used to hold different types of data. For Instance, "CUSTOMERINFO" table will be used to hold only customer data. "DONUTORDERS" table will be used to hold only order details. "ORDERITEMS" table will give us more information about order. Lastly, "DONUTINFO" table will be used to hold only donut information.

B4B

Relationships are determined by how entities are associated with one another. Relationships are identified by the business process.

- Customer (customerInfo) places DonutOrder
- Each DonutOrder is linked to Customer (CustomerInfo)

A customer to a seller can be the one who purchases service from him. For every DonutOrder a customer places he is given a Donut Order ID. Donut Order ID is a unique number and it must be different for every order. Thus, if a customer place more than one separate DonutOrders he will have more than one Donut Order ID. On the other hand, each DonutOrders must-be linked to a single customer, so we can separate different Customer Orders and keep a record of each order.

- DonutOrders includes OrderItems
- OrderItems is included in DonutOrders

OrderItems are the items in a DonutOrder. When a customer places DonutOrders it can include one (plain) or more (gazed, cinnamon) Items (OrderItems). All those items need to be recorded and the customer is given a single Donut Order ID for each order.

OrderItems includes Donut (DonutInfo)

• Donut (DonutInfo) is included in OrderItems

Since a customer can buy one or more items (donuts) at once and get a single DonutOrderID then there will be a one-to-many relationship between DonutInfo and OrderItems. For each item in the DonutInfo table purchased by a customer, its own record (Qty) needs to appear in the Order Items table. On the other side, to prevent a shortage of donuts and to force customers to try different types of donuts each customer is only allowed to order one donut of each type.

C. Relationships

- Each "CUSTOMERINFO" may have 1 or many "DONUTORDERS", but each "DONUTORDERS" must exactly belong to one "CUSTOMERINFO".
- Each "DONUTORDERS" may have 1 or many "ORDERITEMS", but each "ORDERITEMS" must belong to exactly one "DONUTORDERS".
- Each "DONUTINFO" may have 1 or many "ORDERITEMS", but each "ORDERITEMS" must belong to exactly one "DONUTINFO".

C.

SQL code

/*CREATING CUSTOMER INFO TABLE */

CREATE TABLE 'CUSTOMERINFO'(

`Customer ID` INT AUTO_INCREMENT NOT NULL,

`First Name` VARCHAR(300) NOT NULL,

`Last Name` VARCHAR(300) NOT NULL,

`Street Address` VARCHAR(300) NOT NULL,

`Apartment` VARCHAR(300),

```
'City' VARCHAR(300) NOT NULL,
 `State` VARCHAR(300)NOT NULL,
 'Zip Code' VARCHAR(300) NOT NULL,
 `Home Phone` VARCHAR(300),
 `Mobile Phone` VARCHAR(300),
 'Other Phone' VARCHAR(300),
 PRIMARY KEY('Customer ID')
);
/* DONUT ORDERS TABLE */
CREATE TABLE 'DONUTORDERS'(
 `Donut Order ID` INT AUTO_INCREMENT NOT NULL,
  `Customer ID` INT NOT NULL,
 'Special Handling Notes' VARCHAR(300),
 'Order Date' DATE NOT NULL,
 PRIMARY KEY('Donut Order ID'),
 FOREIGN KEY('Customer ID') REFERENCES 'CUSTOMERINFO'('Customer ID')
);
/*DONUT INFO TABLE */
 CREATE TABLE 'DONUTINFO'(
  `Donut ID` INT AUTO_INCREMENT NOT NULL,
  'Donut Name' VARCHAR(100) NOT NULL,
  'Donut Description' VARCHAR(100) NOT NULL,
  'Unit Price' VARCHAR(100)NOT NULL,
  PRIMARY KEY('Donut ID')
  );
  /*ORDER ITEMS TABLE */
CREATE TABLE 'ORDERITEMS'(
```

```
'Donut Order ID' INT ,

'Donut ID' INT ,

'Qty of Donuts' SMALLINT ,

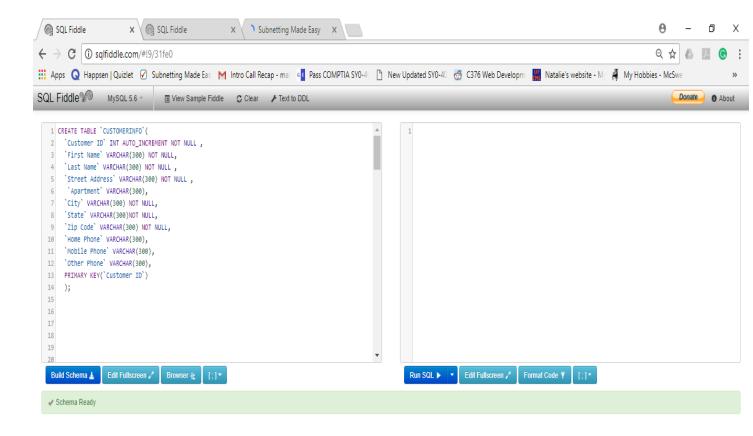
PRIMARY KEY('Donut Order ID', 'Donut ID'),

FOREIGN KEY('Donut ID')REFERENCES 'DONUTINFO'('Donut ID')

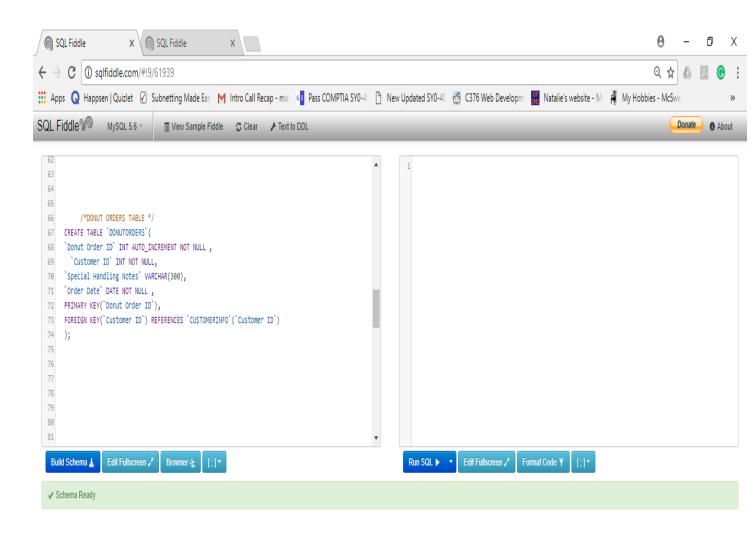
ON DELETE NO ACTION ON UPDATE NO ACTION,

FOREIGN KEY ('Donut Order ID')REFERENCES 'DONUTORDERS'('Donut Order ID')

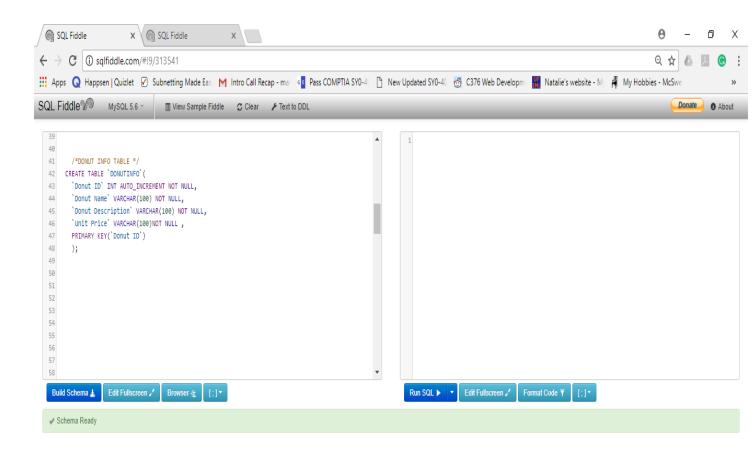
);
```



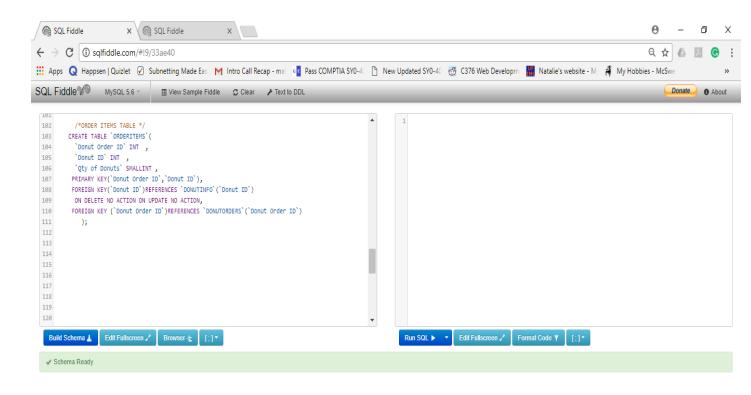










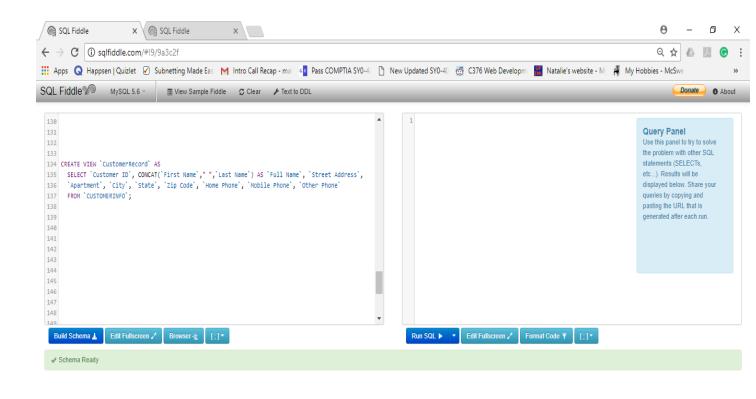




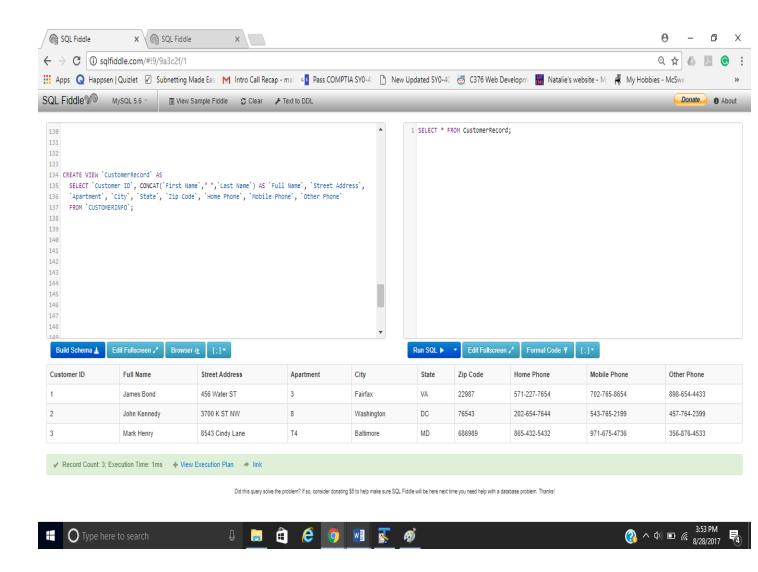
D

CREATE VIEW 'CustomerRecord' AS

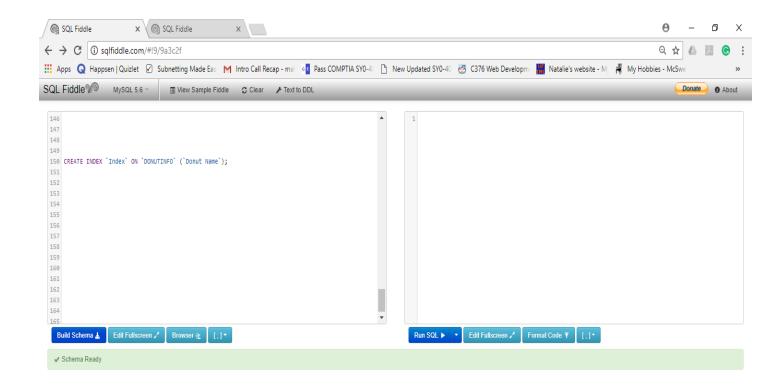
SELECT `Customer ID`, CONCAT(`First Name`," ",`Last Name`) AS `Full Name`, `Street Address`, `Apartment`, `City`, `State`, `Zip Code`, `Home Phone`, `Mobile Phone`, `Other Phone` FROM `CUSTOMERINFO`;

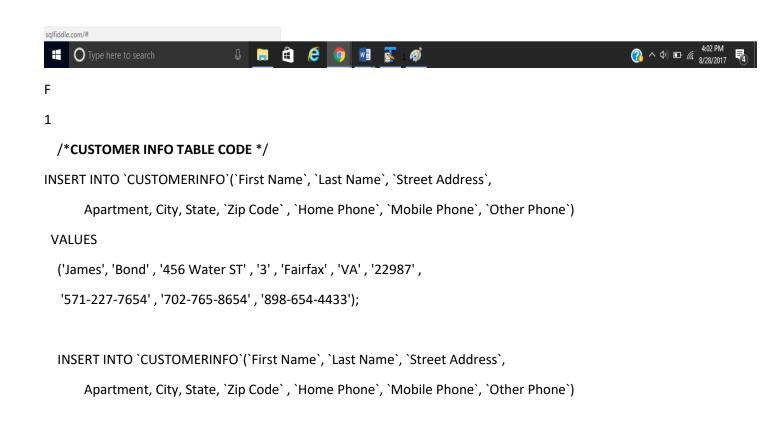






E1 CREATE INDEX 'Index' ON 'DONUTINFO' ('Donut Name');





```
VALUES
```

```
('John', 'Kennedy', '3700 K ST NW', '8', 'Washington', 'DC', '76543',

'202-654-7644', '543-765-2199', '457-764-2399');

INSERT INTO `CUSTOMERINFO`(`First Name`, `Last Name`, `Street Address`,

Apartment, City, State, `Zip Code`, `Home Phone`, `Mobile Phone`, `Other Phone`)

VALUES

('Mark', 'Henry', '8543 Cindy Lane', 'T4', 'Baltimore', 'MD', '686989',

'865-432-5432', '971-675-4736', '356-876-4533');
```

/*DONUT INFO TABLE CODES*/

```
INSERT INTO `DONUTINFO`(`Donut Name`, `Donut Description`, `Unit Price`) VALUES ('Plain', 'Plain Donut' ,'1.50');
INSERT INTO `DONUTINFO`(`Donut Name`, `Donut Description`, `Unit Price`) VALUES ('Glazed' ,'Glazed Donut','1.75');
INSERT INTO `DONUTINFO`(`Donut Name`, `Donut Description`, `Unit Price`) VALUES ('Cinnamon', 'Cinnamon Donut', '1.75');
INSERT INTO `DONUTINFO`(`Donut Name`, `Donut Description`, `Unit Price`) VALUES ('Chocolate', 'Chocolate Donut',' 1.75');
INSERT INTO `DONUTINFO`(`Donut Name`, `Donut Description`, `Unit Price`) VALUES ('Sprinkle', 'Sprinkle Donut', '1.75');
INSERT INTO `DONUTINFO`(`Donut Name`, `Donut Description`, `Unit Price`) VALUES ('Gluten-Free', 'Gluten-Free Donut', '2.00');
```

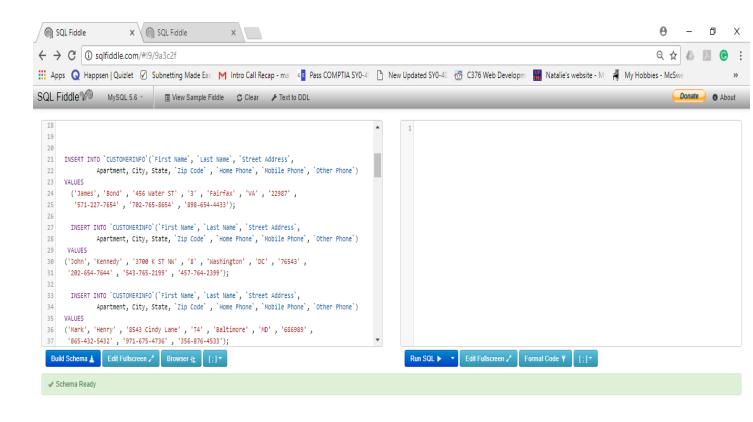
/*DONUT ORDERS TABLE CODES*/

INSERT INTO `DONUTORDERS` (`Customer ID`, `Special Handling Notes`, `Order Date`) VALUES (1,'Please include plates and napkins', NOW());
INSERT INTO `DONUTORDERS` (`Customer ID`, `Special Handling Notes`, `Order Date`) VALUES (2,'Please include plates and napkins', NOW());

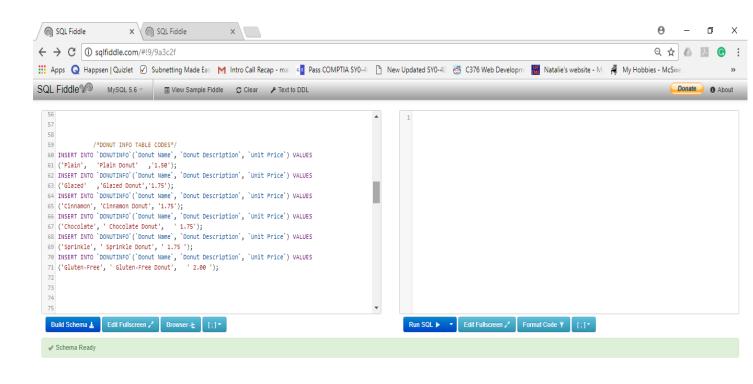
INSERT INTO `DONUTORDERS` (`Customer ID`, `Special Handling Notes`, `Order Date`) VALUES (1,'Please include plates and napkins', NOW());

/*ORDER ITEMS TABLE CODES*/

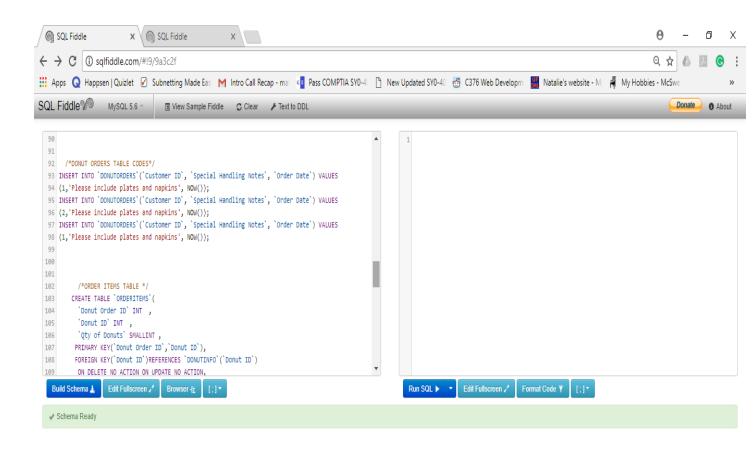
INSERT INTO 'ORDERITEMS' ('Donut Order ID', 'Donut ID', 'Qty of Donuts') VALUES(1,1,1);
INSERT INTO 'ORDERITEMS' ('Donut Order ID', 'Donut ID', 'Qty of Donuts') VALUES(1,2,5);
INSERT INTO 'ORDERITEMS' ('Donut Order ID', 'Donut ID', 'Qty of Donuts') VALUES(1,3,12);
INSERT INTO 'ORDERITEMS' ('Donut Order ID', 'Donut ID', 'Qty of Donuts') VALUES(1,4,3);
INSERT INTO 'ORDERITEMS' ('Donut Order ID', 'Donut ID', 'Qty of Donuts') VALUES(1,5,4);
INSERT INTO 'ORDERITEMS' ('Donut Order ID', 'Donut ID', 'Qty of Donuts') VALUES(1,6,5);



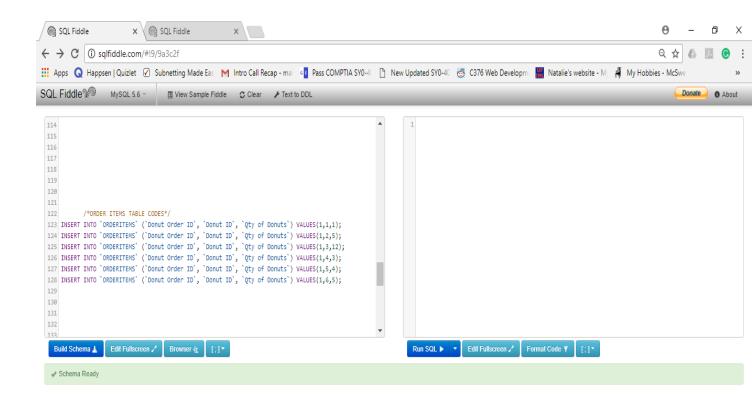


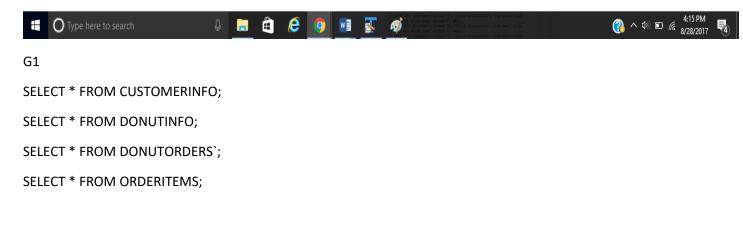




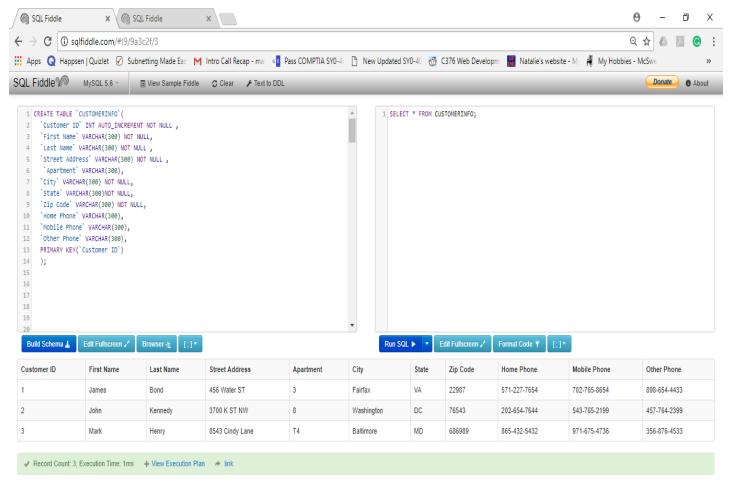






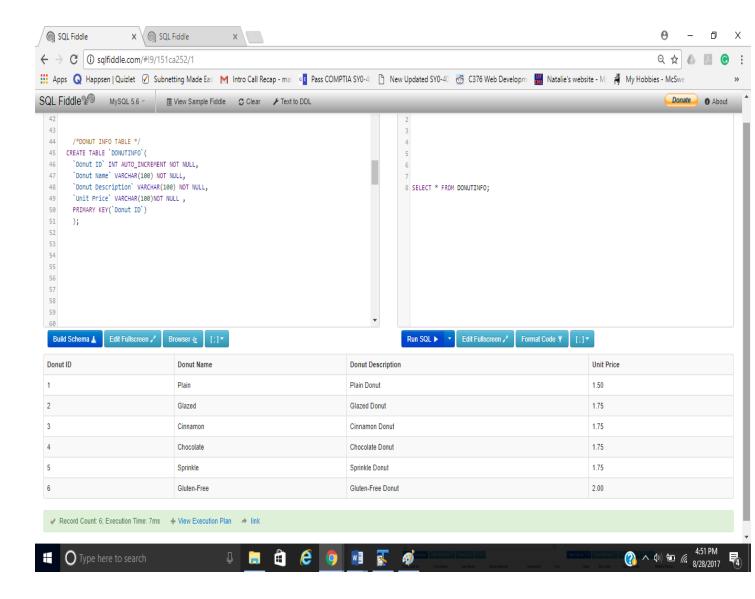


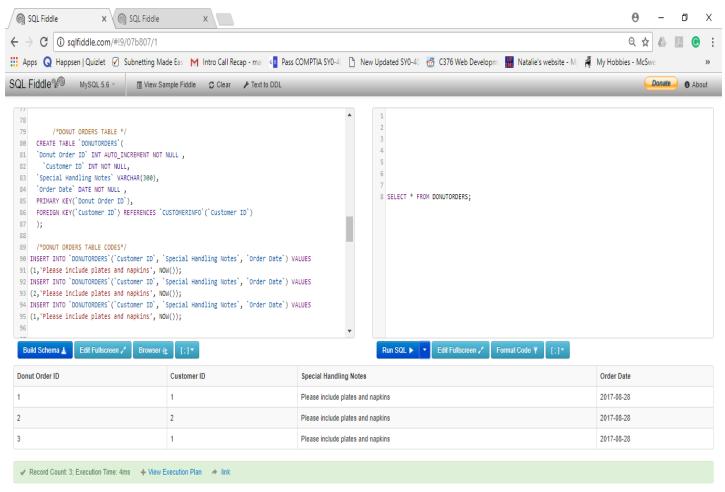
G2



Did this query solve the problem? If so, consider donating \$5 to help make sure SQL Fiddle will be here next time you need help with a database problem. Thanks!

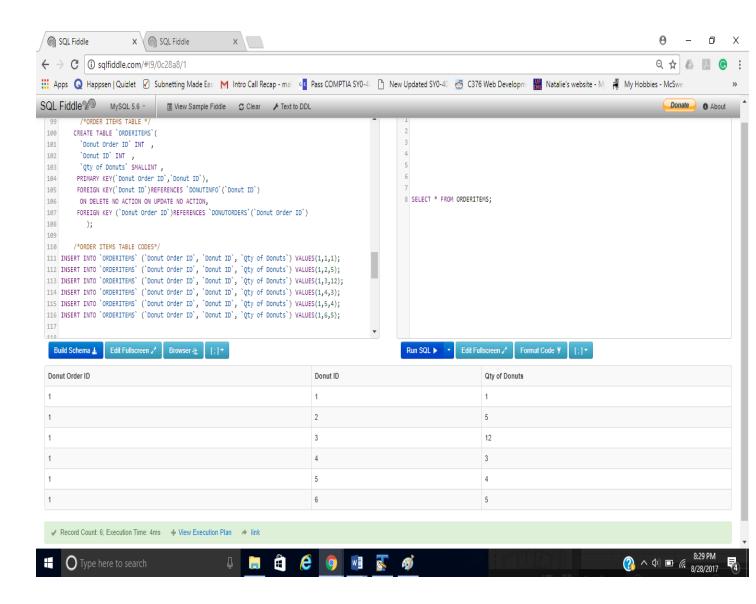






Did this query solve the problem? If so, consider donating \$5 to help make sure SQL Fiddle will be here next time you need help with a database problem. Thanks!





SELECT CUSTOMERINFO. `Customer ID`, CUSTOMERINFO. `First Name`, CUSTOMERINFO. `Last Name`,

CUSTOMERINFO. `Street Address`, CUSTOMERINFO. `Apartment`, CUSTOMERINFO. `City`, CUSTOMERINFO. State,

CUSTOMERINFO. 'Zip Code', CUSTOMERINFO. 'Home Phone', CUSTOMERINFO. 'Mobile Phone',

CUSTOMERINFO. Other Phone , DONUTORDERS. Special Handling Notes , DONUTORDERS. Order Date ,

DONUTORDERS. Donut Order ID', DONUTINFO. Donut ID', DONUTINFO. Donut Name',

DONUTINFO. Donut Description', ORDERITEMS. 'Qty of Donuts', DONUTINFO. 'Unit Price'

FROM CUSTOMERINFO JOIN DONUTORDERS

ON CUSTOMERINFO. 'Customer ID'=DONUTORDERS.'Customer ID'

JOIN ORDERITEMS

ON DONUTORDERS. Donut Order ID'=ORDERITEMS. Donut Order ID'

JOIN DONUTINFO

ON ORDERITEMS. Donut ID'=DONUTINFO. Donut ID';

