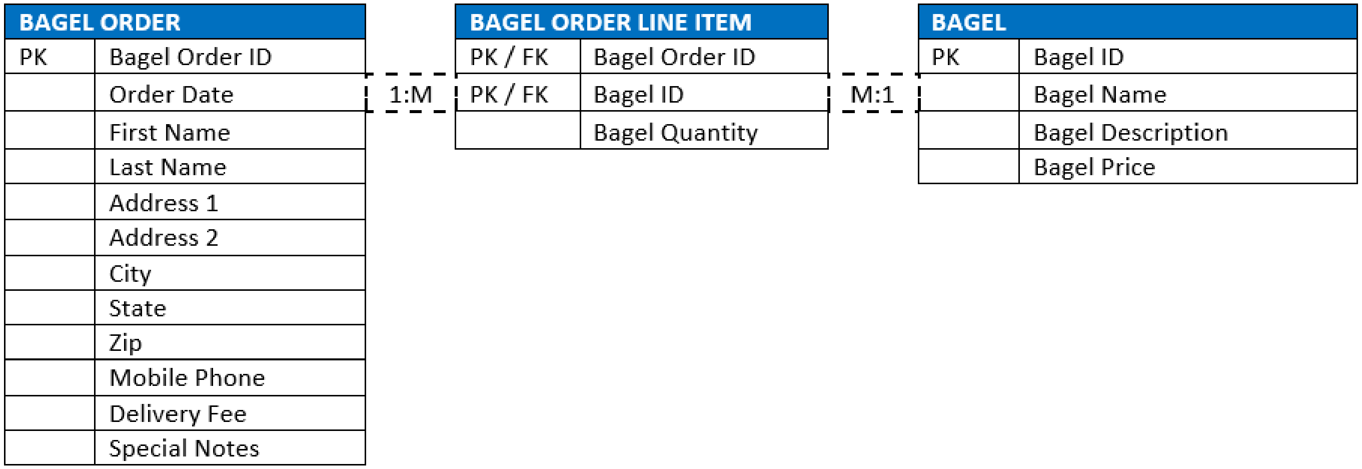
Kerrie Abrams

Student ID: 010894830

Part A

A.1.a-b

Second Normal Form (2NF)



BAGEL ORDER	
PK	Bagel Order ID
	Order Date
	First Name
	Last Name
	Address 1
	Address 2
	City
	State
	Zip
	Mobile Phone
	Delivery Fee
	Special Notes

1:M

BAGEL ORDER LINE ITEM	
PK / FK	Bagel Order ID
PK / FK	Bagel ID
	Bagel Quantity

M:1

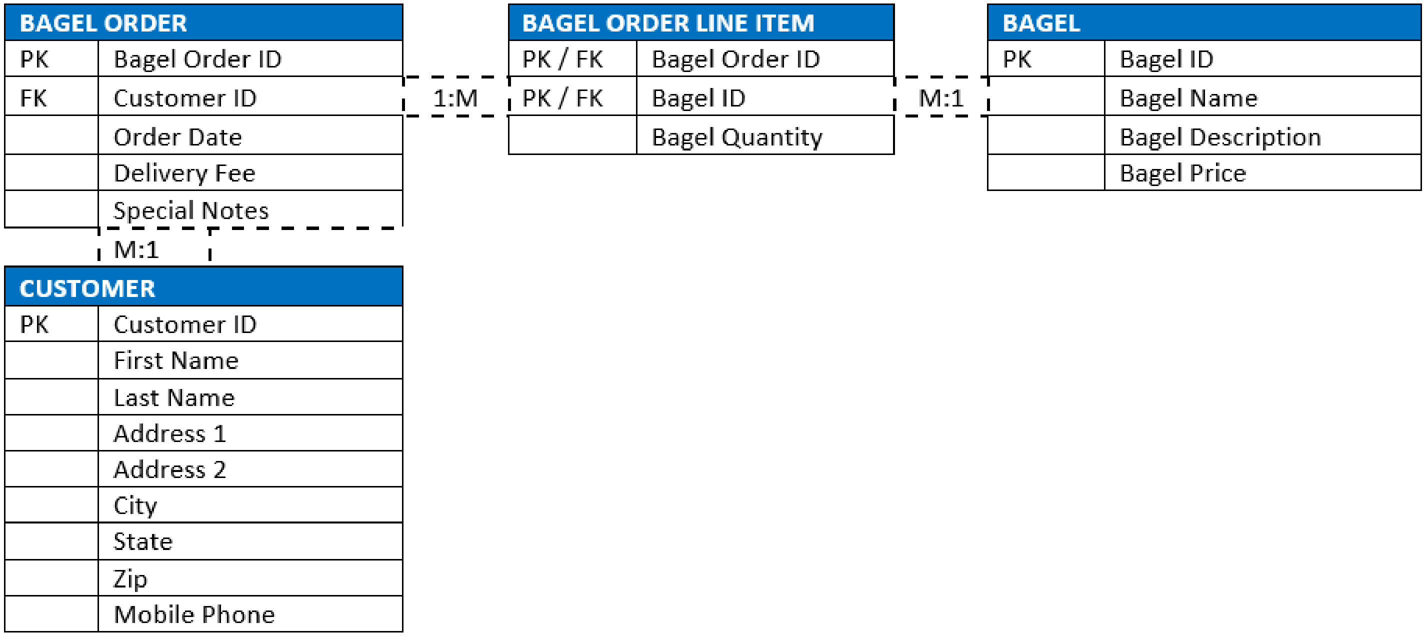
BAGEL	
PK	Bagel ID
	Bagel Name
	Bagel Description
	Bagel Price

A.1.c

To normalize the BAGEL ORDER relation to second normal form, two new relations, BAGEL ORDER LINE ITEM and BAGEL, were created such that each non-key attribute of each relation relies entirely on their respective keys. Thus, the new BAGEL ORDER relation contains attributes that are functionally dependent on only *Bagel Order ID* such as the customer's information and details specific to an order with the exception to *Bagel Quantity*. BAGEL ORDER LINE ITEM, is an associative entity that describes the relationship between a BAGEL ORDER and a BAGEL with *Bagel Quantity* as the sole non-key attribute because it is dependent on both *Bagel Order ID* and *Bagel ID*. The BAGEL relation contains attributes that are dependent on *Bagel ID* such as information specific to a single bagel. Moreover, the relationship between BAGEL ORDER and BAGEL ORDER LINE ITEM is a one-to-many relationship because a bagel order may have many bagel order lines and many bagel order lines may be found within one bagel order. In addition, the relationship between BAGEL ORDER LINE ITEM and BAGEL is a many-to-one relationship because many order line items may relate to one type of bagel and one type of bagel can be ordered many times.

A.2.a-d

Third Normal Form (3NF)



BAGEL ORDER	
PK	Bagel Order ID
FK	Customer ID
	Order Date
	Delivery Fee
	Special Notes

BAGEL ORDER LINE ITEM	
PK / FK	Bagel Order ID
PK / FK	Bagel ID
	Bagel Quantity

BAGEL	
PK	Bagel ID
	Bagel Name
	Bagel Description
	Bagel Price

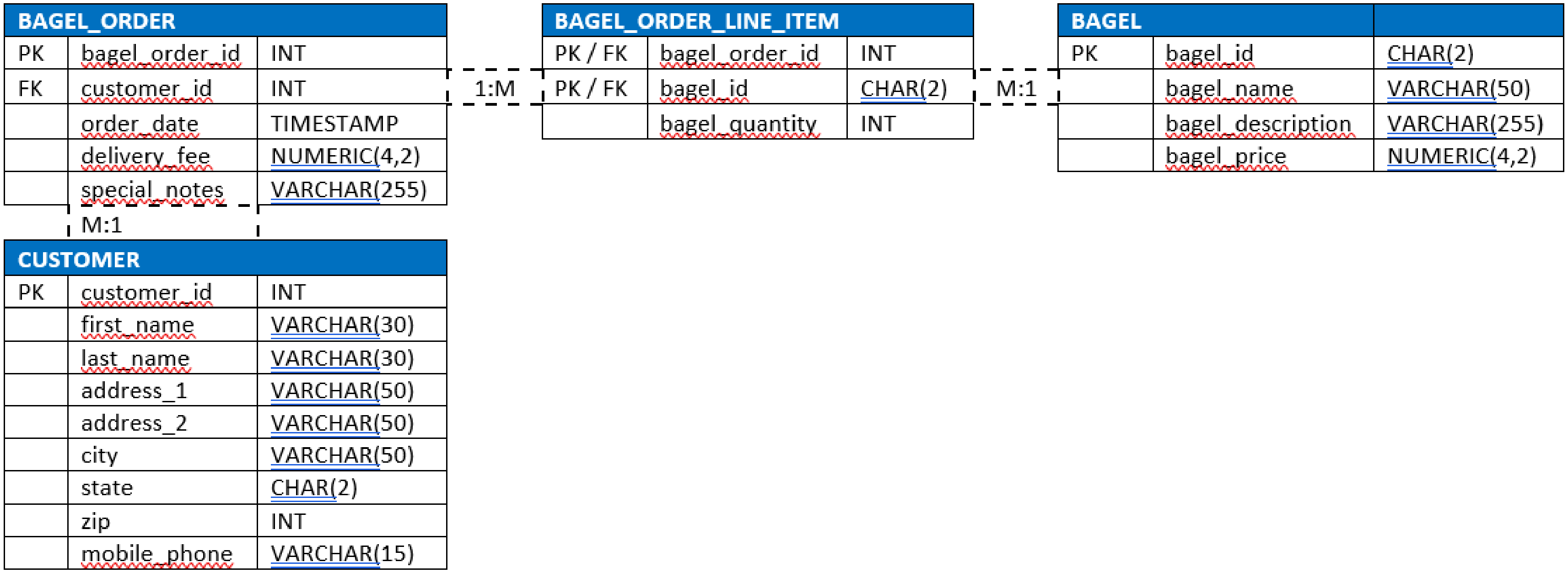
CUSTOMER	
PK	Customer ID
	First Name
	Last Name
	Address 1
	Address 2
	City
	State
	Zip
	Mobile Phone

A.2.e

To further normalize the relations to third normal form, a fourth relation, CUSTOMER, was created from the original BAGEL ORDER relation. Since a customer can make multiple purchases, there would be redundant customer data in BAGEL ORDER if left in second normal form. Thus, a new attribute, *Customer ID,* was created and placed within CUSTOMER as a primary key and BAGEL ORDER as a foreign key and any attributes related to customer information were placed within CUSTOMER. This was done to remove transitive dependencies. Furthermore, the relationship between BAGEL ORDER and CUSTOMER can be described as many-to-one because many bagel orders may belong to one customer and one customer may place many orders, but many customers may not place a single bagel order.

A.3.a-b

Final Physical Database Model



BAGEL_ORDER		
PK	bagel_order_id	INT
FK	customer_id	INT
	order_date	TIMESTAMP
	delivery_fee	NUMERIC(4,2)
	special_notes	VARCHAR(255)

1:M

BAGEL_ORDER_LINE_ITEM		
PK / FK	bagel_order_id	INT
PK / FK	bagel_id	CHAR(2)
	bagel_quantity	INT

M:1

BAGEL		
PK	bagel_id	CHAR(2)
	bagel_name	VARCHAR(50)
	bagel_description	VARCHAR(255)
	bagel_price	NUMERIC(4,2)

M:1

CUSTOMER		
PK	customer_id	INT
	first_name	VARCHAR(30)
	last_name	VARCHAR(30)
	address_1	VARCHAR(50)
	address_2	VARCHAR(50)
	city	VARCHAR(50)
	state	CHAR(2)
	zip	INT
	mobile_phone	VARCHAR(15)

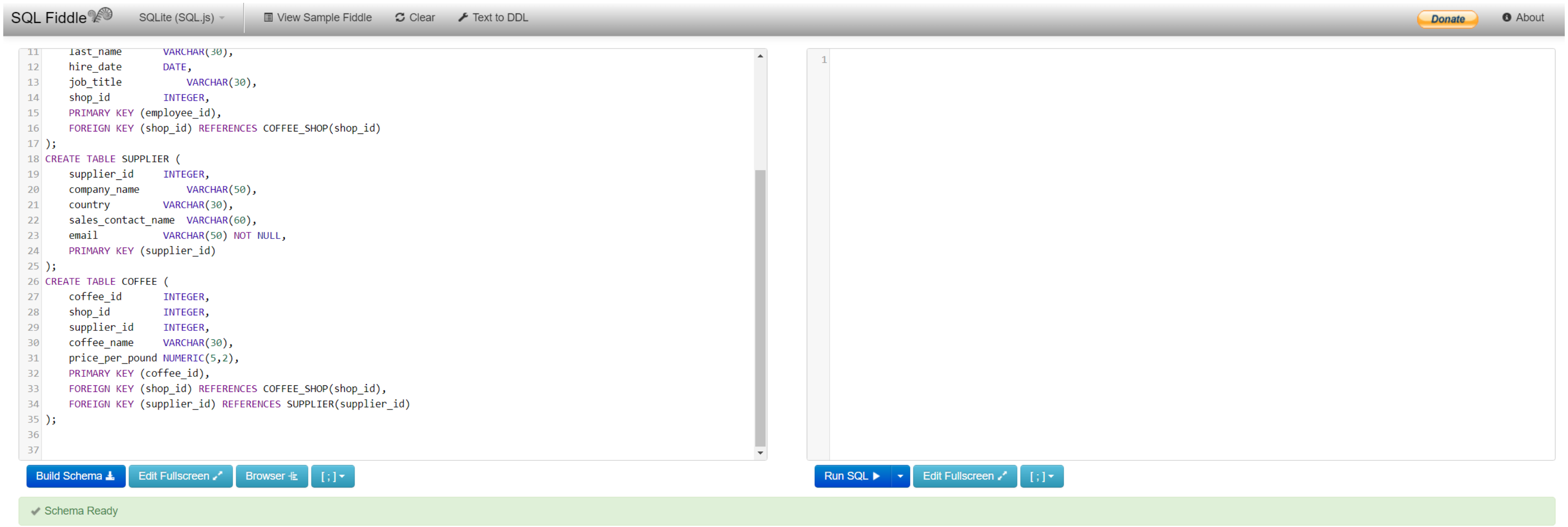
Part B

B.1.a

```
CREATE TABLE COFFEE_SHOP (
        shop_id                 INTEGER,
        shop_name               VARCHAR(50),
        city                    VARCHAR(50),
        state                   CHAR(2),
        PRIMARY KEY (shop_id)
);
CREATE TABLE EMPLOYEE (
        employee_id             INTEGER,
        first_name              VARCHAR(30),
        last_name               VARCHAR(30),
        hire_date               DATE,
        job_title               VARCHAR(30),
        shop_id                 INTEGER,
        PRIMARY KEY (employee_id),
        FOREIGN KEY (shop_id) REFERENCES COFFEE_SHOP(shop_id)
);
```

```
CREATE TABLE SUPPLIER (
        supplier_id             INTEGER,
        company_name            VARCHAR(50),
        country                 VARCHAR(30),
        sales_contact_name      VARCHAR(60),
        email                   VARCHAR(50)    NOT NULL,
        PRIMARY KEY (supplier_id)
);
CREATE TABLE COFFEE (
        coffee_id               INTEGER,
        shop_id                 INTEGER,
        supplier_id             INTEGER,
        coffee_name             VARCHAR(30),
        price_per_pound         NUMERIC(5,2),
        PRIMARY KEY (coffee_id),
        FOREIGN KEY (shop_id) REFERENCES COFFEE_SHOP(shop_id),
        FOREIGN KEY (supplier_id) REFERENCES SUPPLIER(supplier_id)
);
```

B.1.b



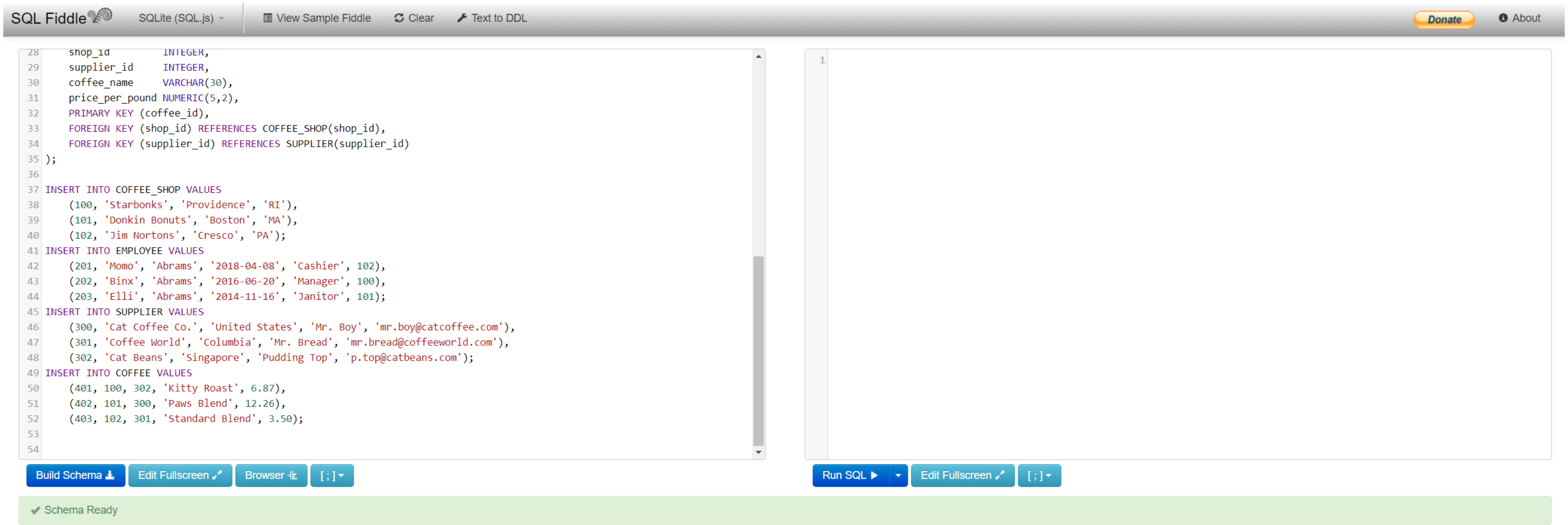
```sql
    last_name       VARCHAR(30),
    hire_date       DATE,
    job_title           VARCHAR(30),
    shop_id         INTEGER,
    PRIMARY KEY (employee_id),
    FOREIGN KEY (shop_id) REFERENCES COFFEE_SHOP(shop_id)
);
CREATE TABLE SUPPLIER (
    supplier_id     INTEGER,
    company_name        VARCHAR(50),
    country         VARCHAR(30),
    sales_contact_name  VARCHAR(60),
    email           VARCHAR(50) NOT NULL,
    PRIMARY KEY (supplier_id)
);
CREATE TABLE COFFEE (
    coffee_id       INTEGER,
    shop_id         INTEGER,
    supplier_id     INTEGER,
    coffee_name     VARCHAR(30),
    price_per_pound NUMERIC(5,2),
    PRIMARY KEY (coffee_id),
    FOREIGN KEY (shop_id) REFERENCES COFFEE_SHOP(shop_id),
    FOREIGN KEY (supplier_id) REFERENCES SUPPLIER(supplier_id)
);
```

✔ Schema Ready

B.2.a

```
INSERT INTO COFFEE_SHOP VALUES
        (100, 'Starbonks', 'Providence', 'RI'),
        (101, 'Donkin Bonuts', 'Boston', 'MA'),
        (102, 'Jim Nortons', 'Cresco', 'PA');
INSERT INTO EMPLOYEE VALUES
        (201, 'Momo', 'Abrams', '2018-04-08', 'Cashier', 102),
        (202, 'Binx', 'Abrams', '2016-06-20', 'Manager', 100),
        (203, 'Elli', 'Abrams', '2014-11-16', 'Janitor', 101);
INSERT INTO SUPPLIER VALUES
        (300, 'Cat Coffee Co.', 'United States', 'Mr. Boy', 'mr.boy@catcoffee.com'),
        (301, 'Coffee World', 'Columbia', 'Mr. Bread', 'mr.bread@coffeeworld.com'),
        (302, 'Cat Beans', 'Singapore', 'Pudding Top', 'p.top@catbeans.com');
INSERT INTO COFFEE VALUES
        (401, 100, 302, 'Kitty Roast', 6.87),
        (402, 101, 300, 'Paws Blend', 12.26),
        (403, 102, 301, 'Standard Blend', 3.50);
```

B.2.b



```
    shop_id         INTEGER,
    supplier_id     INTEGER,
    coffee_name     VARCHAR(30),
    price_per_pound NUMERIC(5,2),
    PRIMARY KEY (coffee_id),
    FOREIGN KEY (shop_id) REFERENCES COFFEE_SHOP(shop_id),
    FOREIGN KEY (supplier_id) REFERENCES SUPPLIER(supplier_id)
);

INSERT INTO COFFEE_SHOP VALUES
    (100, 'Starbonks', 'Providence', 'RI'),
    (101, 'Donkin Bonuts', 'Boston', 'MA'),
    (102, 'Jim Nortons', 'Cresco', 'PA');
INSERT INTO EMPLOYEE VALUES
    (201, 'Momo', 'Abrams', '2018-04-08', 'Cashier', 102),
    (202, 'Binx', 'Abrams', '2016-06-20', 'Manager', 100),
    (203, 'Elli', 'Abrams', '2014-11-16', 'Janitor', 101);
INSERT INTO SUPPLIER VALUES
    (300, 'Cat Coffee Co.', 'United States', 'Mr. Boy', 'mr.boy@catcoffee.com'),
    (301, 'Coffee World', 'Columbia', 'Mr. Bread', 'mr.bread@coffeeworld.com'),
    (302, 'Cat Beans', 'Singapore', 'Pudding Top', 'p.top@catbeans.com');
INSERT INTO COFFEE VALUES
    (401, 100, 302, 'Kitty Roast', 6.87),
    (402, 101, 300, 'Paws Blend', 12.26),
    (403, 102, 301, 'Standard Blend', 3.50);
```

✔ Schema Ready

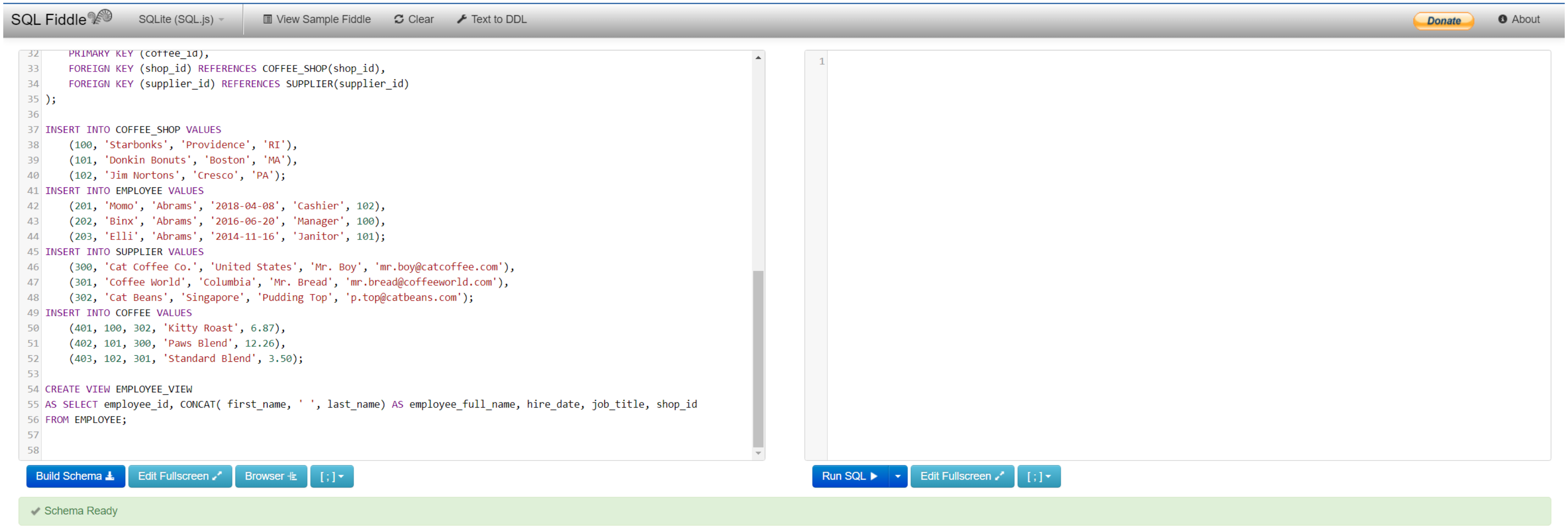
B.3.a

CREATE VIEW EMPLOYEE_VIEW

AS SELECT employee_id, CONCAT(first_name, ' ', last_name) AS employee_full_name, hire_date, job_title, shop_id

FROM EMPLOYEE;

B.3.b



```
    PRIMARY KEY (coffee_id),
    FOREIGN KEY (shop_id) REFERENCES COFFEE_SHOP(shop_id),
    FOREIGN KEY (supplier_id) REFERENCES SUPPLIER(supplier_id)
);

INSERT INTO COFFEE_SHOP VALUES
    (100, 'Starbonks', 'Providence', 'RI'),
    (101, 'Donkin Bonuts', 'Boston', 'MA'),
    (102, 'Jim Nortons', 'Cresco', 'PA');
INSERT INTO EMPLOYEE VALUES
    (201, 'Momo', 'Abrams', '2018-04-08', 'Cashier', 102),
    (202, 'Binx', 'Abrams', '2016-06-20', 'Manager', 100),
    (203, 'Elli', 'Abrams', '2014-11-16', 'Janitor', 101);
INSERT INTO SUPPLIER VALUES
    (300, 'Cat Coffee Co.', 'United States', 'Mr. Boy', 'mr.boy@catcoffee.com'),
    (301, 'Coffee World', 'Columbia', 'Mr. Bread', 'mr.bread@coffeeworld.com'),
    (302, 'Cat Beans', 'Singapore', 'Pudding Top', 'p.top@catbeans.com');
INSERT INTO COFFEE VALUES
    (401, 100, 302, 'Kitty Roast', 6.87),
    (402, 101, 300, 'Paws Blend', 12.26),
    (403, 102, 301, 'Standard Blend', 3.50);

CREATE VIEW EMPLOYEE_VIEW
AS SELECT employee_id, CONCAT( first_name, ' ', last_name) AS employee_full_name, hire_date, job_title, shop_id
FROM EMPLOYEE;
```

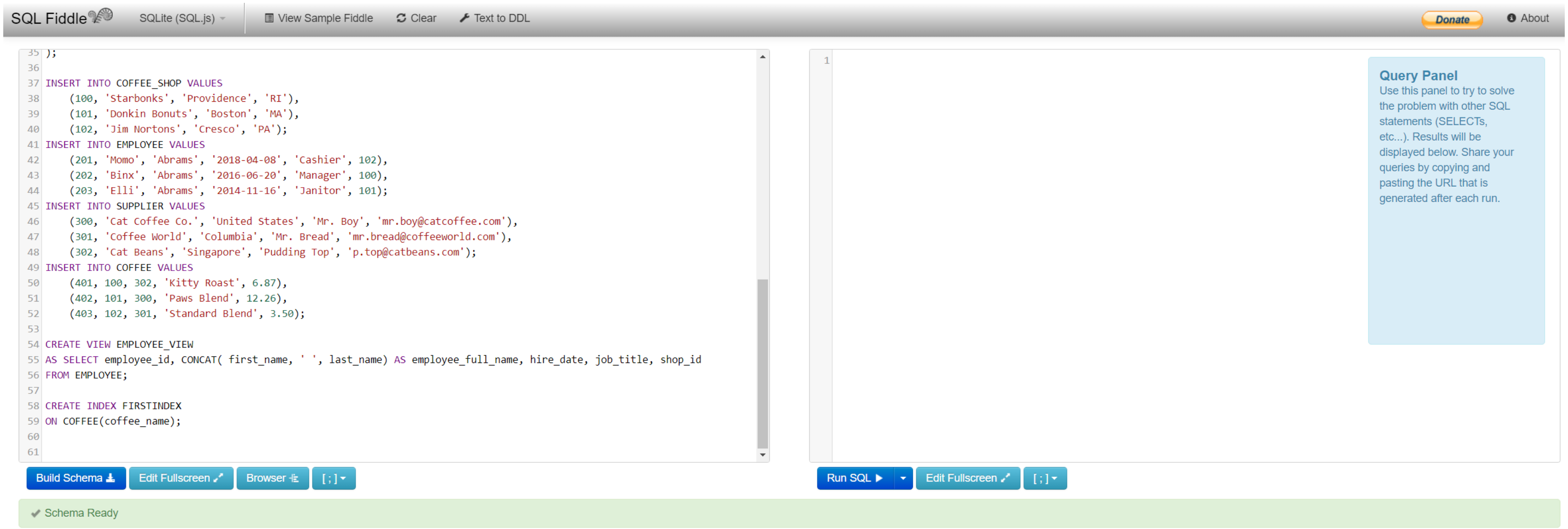
✔ Schema Ready

B.4.a

CREATE INDEX FIRSTINDEX

ON COFFEE(coffee_name);

B.4.b



```
);

INSERT INTO COFFEE_SHOP VALUES
    (100, 'Starbonks', 'Providence', 'RI'),
    (101, 'Donkin Bonuts', 'Boston', 'MA'),
    (102, 'Jim Nortons', 'Cresco', 'PA');
INSERT INTO EMPLOYEE VALUES
    (201, 'Momo', 'Abrams', '2018-04-08', 'Cashier', 102),
    (202, 'Binx', 'Abrams', '2016-06-20', 'Manager', 100),
    (203, 'Elli', 'Abrams', '2014-11-16', 'Janitor', 101);
INSERT INTO SUPPLIER VALUES
    (300, 'Cat Coffee Co.', 'United States', 'Mr. Boy', 'mr.boy@catcoffee.com'),
    (301, 'Coffee World', 'Columbia', 'Mr. Bread', 'mr.bread@coffeeworld.com'),
    (302, 'Cat Beans', 'Singapore', 'Pudding Top', 'p.top@catbeans.com');
INSERT INTO COFFEE VALUES
    (401, 100, 302, 'Kitty Roast', 6.87),
    (402, 101, 300, 'Paws Blend', 12.26),
    (403, 102, 301, 'Standard Blend', 3.50);

CREATE VIEW EMPLOYEE_VIEW
AS SELECT employee_id, CONCAT( first_name, ' ', last_name) AS employee_full_name, hire_date, job_title, shop_id
FROM EMPLOYEE;

CREATE INDEX FIRSTINDEX
ON COFFEE(coffee_name);
```

Query Panel
Use this panel to try to solve the problem with other SQL statements (SELECTs, etc...). Results will be displayed below. Share your queries by copying and pasting the URL that is generated after each run.

✓ Schema Ready

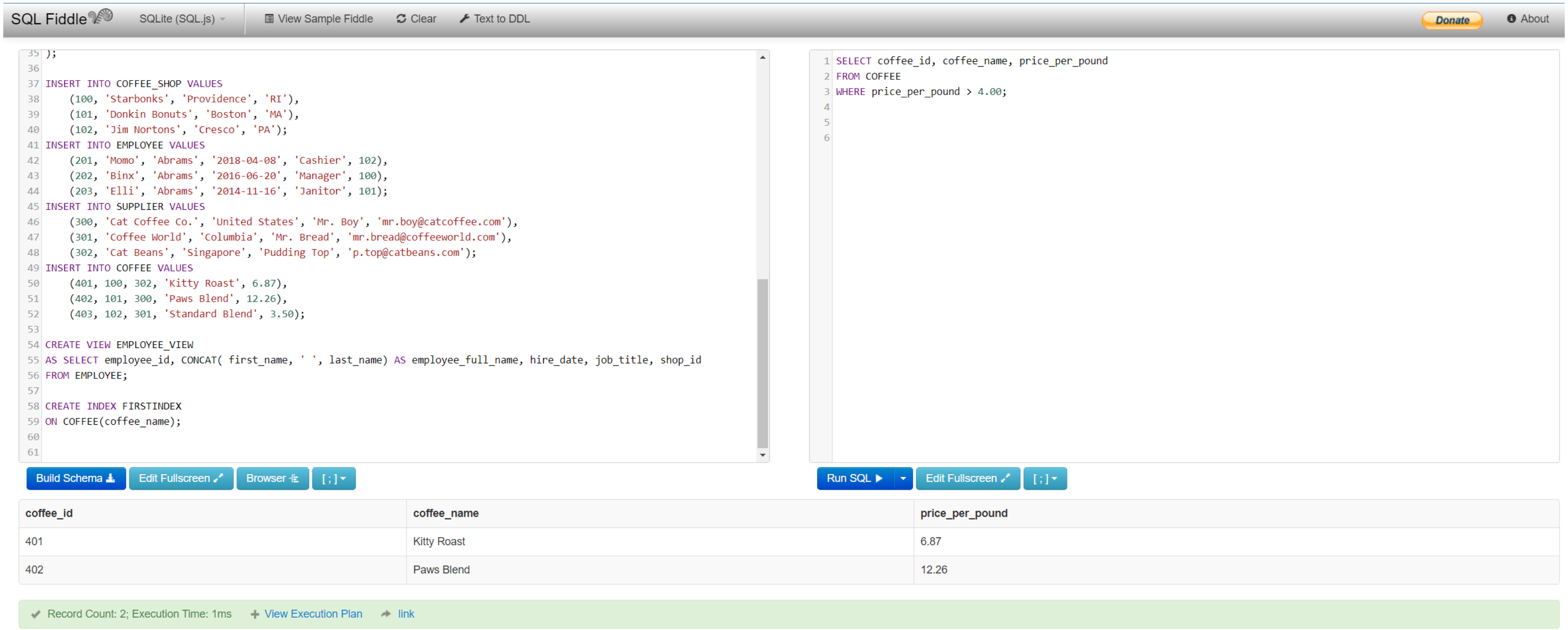
B.5.a

SELECT coffee_id, coffee_name, price_per_pound

FROM COFFEE

WHERE price_per_pound > 4.00;

B.5.b



```
);

INSERT INTO COFFEE_SHOP VALUES
    (100, 'Starbonks', 'Providence', 'RI'),
    (101, 'Donkin Bonuts', 'Boston', 'MA'),
    (102, 'Jim Nortons', 'Cresco', 'PA');
INSERT INTO EMPLOYEE VALUES
    (201, 'Momo', 'Abrams', '2018-04-08', 'Cashier', 102),
    (202, 'Binx', 'Abrams', '2016-06-20', 'Manager', 100),
    (203, 'Elli', 'Abrams', '2014-11-16', 'Janitor', 101);
INSERT INTO SUPPLIER VALUES
    (300, 'Cat Coffee Co.', 'United States', 'Mr. Boy', 'mr.boy@catcoffee.com'),
    (301, 'Coffee World', 'Columbia', 'Mr. Bread', 'mr.bread@coffeeworld.com'),
    (302, 'Cat Beans', 'Singapore', 'Pudding Top', 'p.top@catbeans.com');
INSERT INTO COFFEE VALUES
    (401, 100, 302, 'Kitty Roast', 6.87),
    (402, 101, 300, 'Paws Blend', 12.26),
    (403, 102, 301, 'Standard Blend', 3.50);

CREATE VIEW EMPLOYEE_VIEW
AS SELECT employee_id, CONCAT( first_name, ' ', last_name) AS employee_full_name, hire_date, job_title, shop_id
FROM EMPLOYEE;

CREATE INDEX FIRSTINDEX
ON COFFEE(coffee_name);
```

```
SELECT coffee_id, coffee_name, price_per_pound
FROM COFFEE
WHERE price_per_pound > 4.00;
```

coffee_id	coffee_name	price_per_pound
401	Kitty Roast	6.87
402	Paws Blend	12.26

✓ Record Count: 2; Execution Time: 1ms

B.6.a

SELECT *

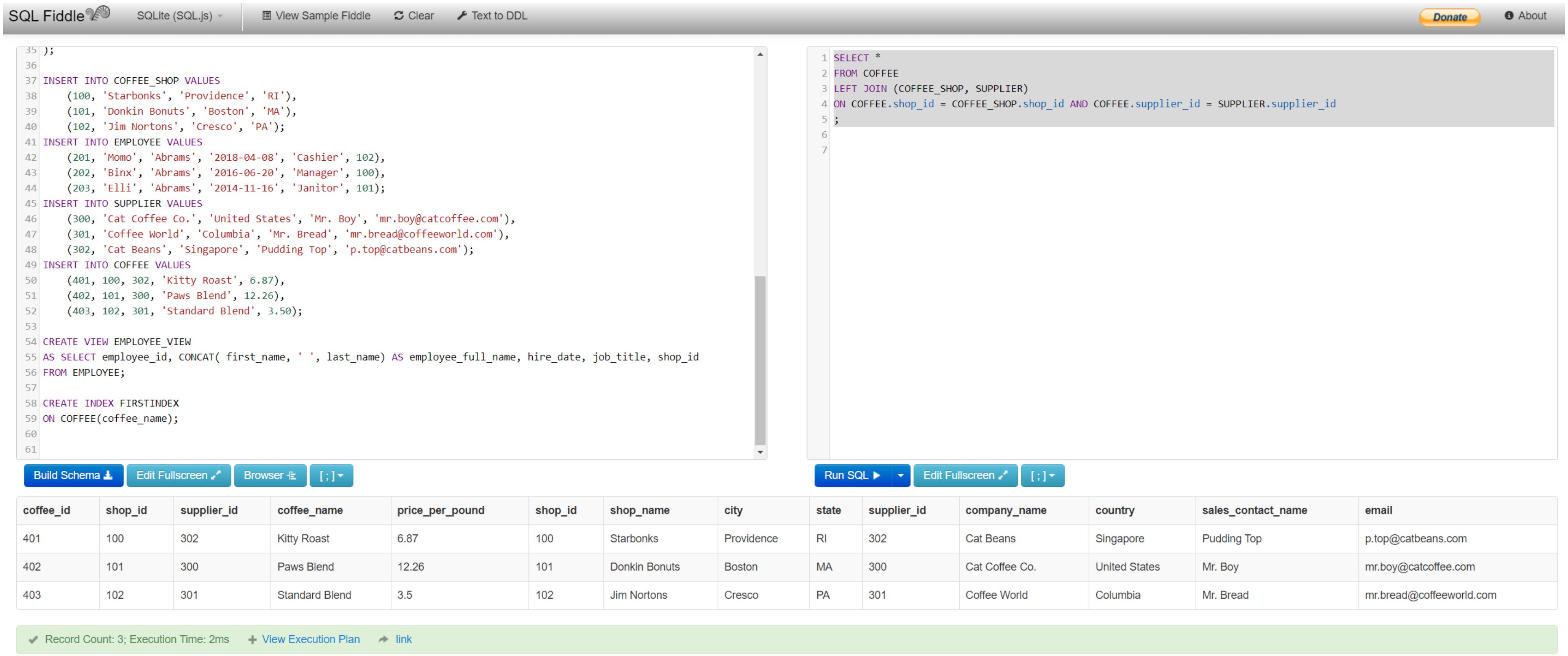
FROM COFFEE

LEFT JOIN (COFFEE_SHOP, SUPPLIER)

ON COFFEE.shop_id = COFFEE_SHOP.shop_id AND COFFEE.supplier_id = SUPPLIER.supplier_id

;

B.6.b



```
);

INSERT INTO COFFEE_SHOP VALUES
    (100, 'Starbonks', 'Providence', 'RI'),
    (101, 'Donkin Bonuts', 'Boston', 'MA'),
    (102, 'Jim Nortons', 'Cresco', 'PA');
INSERT INTO EMPLOYEE VALUES
    (201, 'Momo', 'Abrams', '2018-04-08', 'Cashier', 102),
    (202, 'Binx', 'Abrams', '2016-06-20', 'Manager', 100),
    (203, 'Elli', 'Abrams', '2014-11-16', 'Janitor', 101);
INSERT INTO SUPPLIER VALUES
    (300, 'Cat Coffee Co.', 'United States', 'Mr. Boy', 'mr.boy@catcoffee.com'),
    (301, 'Coffee World', 'Columbia', 'Mr. Bread', 'mr.bread@coffeeworld.com'),
    (302, 'Cat Beans', 'Singapore', 'Pudding Top', 'p.top@catbeans.com');
INSERT INTO COFFEE VALUES
    (401, 100, 302, 'Kitty Roast', 6.87),
    (402, 101, 300, 'Paws Blend', 12.26),
    (403, 102, 301, 'Standard Blend', 3.50);

CREATE VIEW EMPLOYEE_VIEW
AS SELECT employee_id, CONCAT( first_name, ' ', last_name) AS employee_full_name, hire_date, job_title, shop_id
FROM EMPLOYEE;

CREATE INDEX FIRSTINDEX
ON COFFEE(coffee_name);
```

```
SELECT *
FROM COFFEE
LEFT JOIN (COFFEE_SHOP, SUPPLIER)
ON COFFEE.shop_id = COFFEE_SHOP.shop_id AND COFFEE.supplier_id = SUPPLIER.supplier_id
;
```

coffee_id	shop_id	supplier_id	coffee_name	price_per_pound	shop_id	shop_name	city	state	supplier_id	company_name	country	sales_contact_name	email
401	100	302	Kitty Roast	6.87	100	Starbonks	Providence	RI	302	Cat Beans	Singapore	Pudding Top	p.top@catbeans.com
402	101	300	Paws Blend	12.26	101	Donkin Bonuts	Boston	MA	300	Cat Coffee Co.	United States	Mr. Boy	mr.boy@catcoffee.com
403	102	301	Standard Blend	3.5	102	Jim Nortons	Cresco	PA	301	Coffee World	Columbia	Mr. Bread	mr.bread@coffeeworld.com

✓ Record Count: 3; Execution Time: 2ms   + View Execution Plan   link