

VHT2 TASK 1: NORMALIZATION AND DATABASE DESIGN Part A



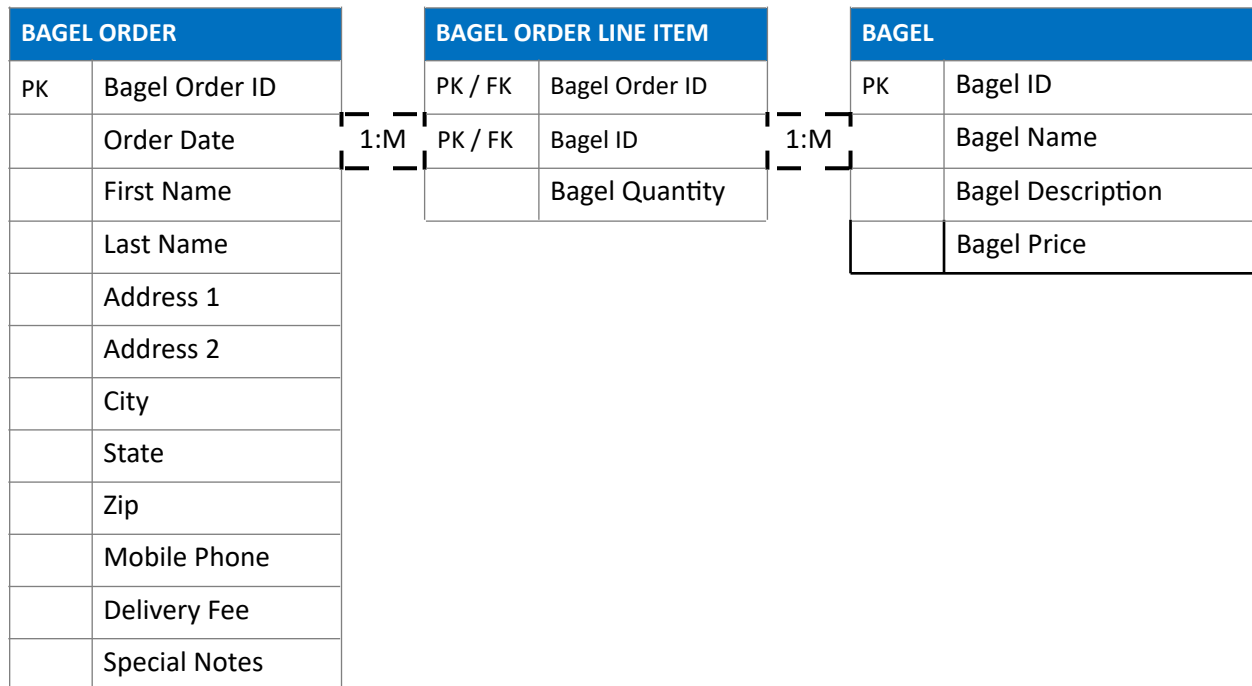
Nora's Bagel Bin Database Blueprints

First Normal Form (1NF)

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

Nora's Bagel Bin Database Blueprints *(continued)*

Second Normal Form (2NF)



To normalize from 1NF to 2NF, we have to eliminate partial dependency on the composite primary key in the Bagel Order relation table.

Bagel Name, Bagel Description, Bagel price depend only on the Bagel ID instead of combination of Bagel Order ID and Bagel Order.

Order Date, First Name, Last Name, Address 1, Address 2, City, State, Zip, Mobile Phone, Delivery, and Special Notes depend only on the Bagel Order ID instead of combination of Bagel Order ID and Bagel Order.

Finally, the only attribute left in 1NF Bagel Order relation that is still partial dependency on the composite primary key is Bagel Quantity which be assign to the joint table, Bagel Order Line Item.

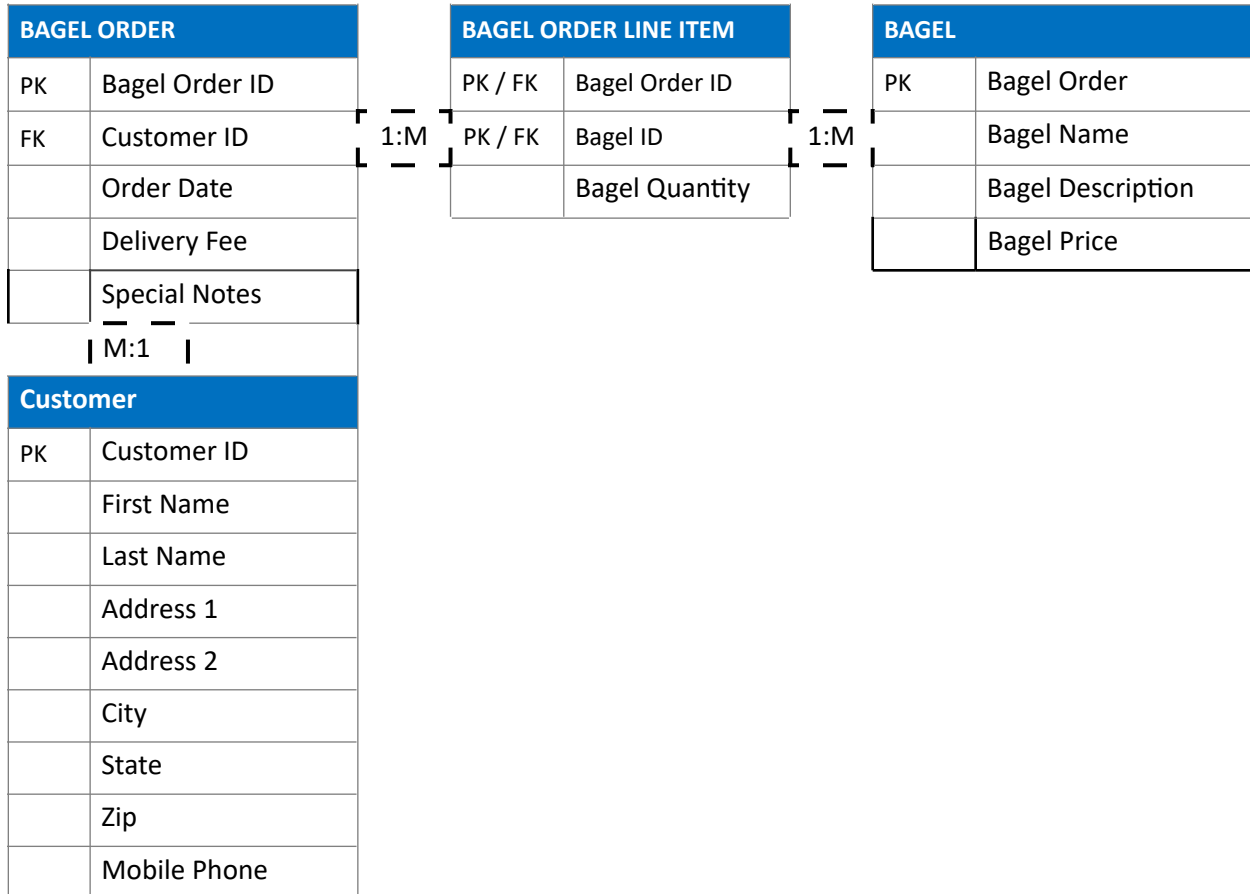
Bagel Order can contain many different bagels, and bagels can be sold to different bagel orders.

Bagel Order can have many Bagel Order Line Items, and each Bagel Order Line item can have have one Bagel Order.

Bagel Order Line Item can have many different bagels, and many bagels can be assigned to one Bagel order Line Item.

Nora's Bagel Bin Database Blueprints *(continued)*

Third Normal Form (3NF)



To normalize from 2NF to 3NF, we simply eliminate the transitive dependency attributes to a new table where they depend on the primary key.

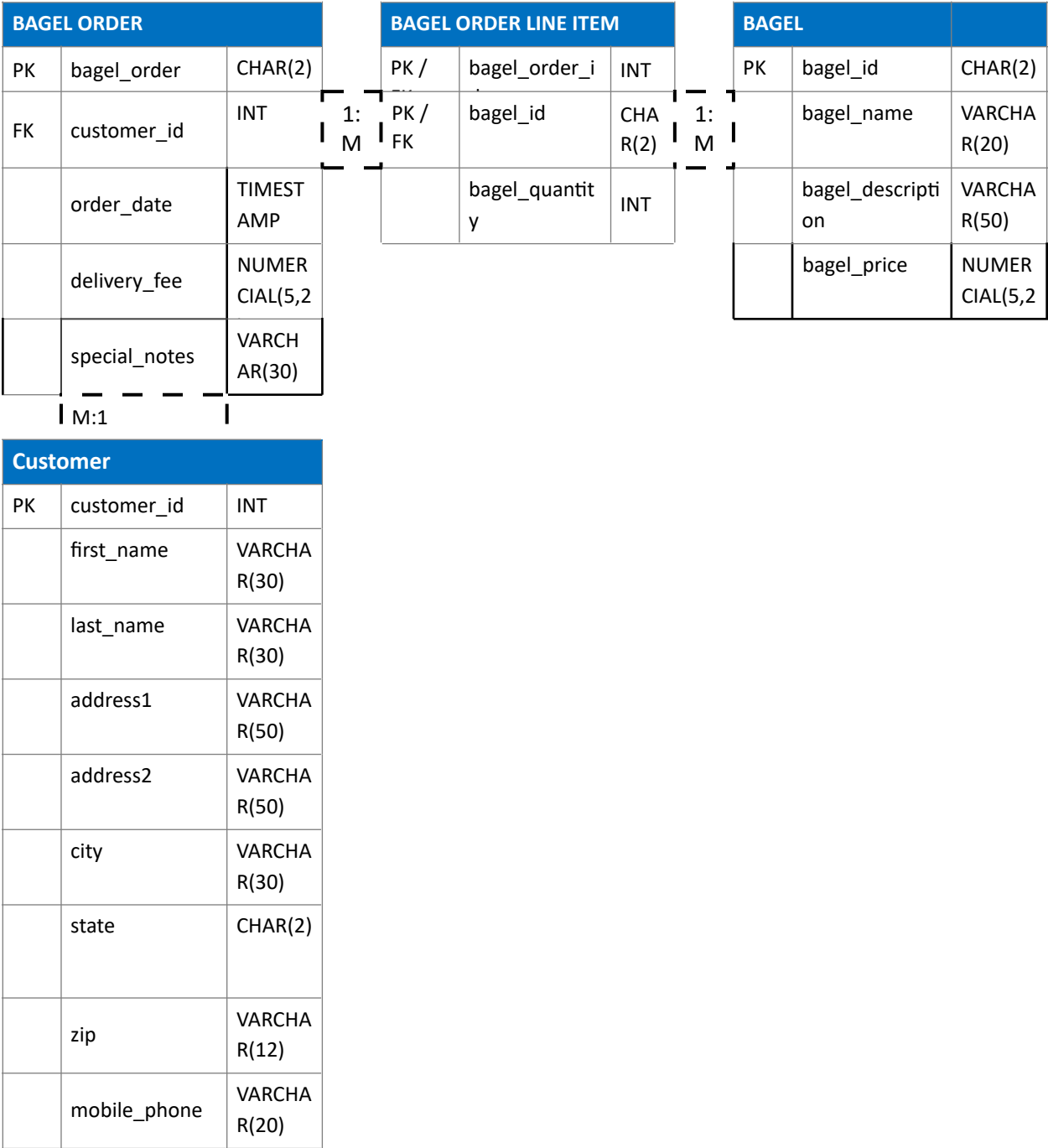
In 2NF we see that first name, last name, address 1, address 2, city, state, zip, and mobile phone are transitive dependency because they depend on another attribute that is not the primary key of the table

We move them into a new table called Customer.

Customer can have many bagel orders and bagel orders can have 1 customer.

Nora’s Bagel Bin Database Blueprints *(continued)*

Final Physical Database Model



VHT2 TASK 1: NORMALIZATION AND DATABASE DESIGN

Part B Create a database using the attached "Jaunty Coffee Co. ERD" by doing the following:

B1 Develop SQL code to create each table in the database design document:

CREATE TABLE IF NOT EXISTS coffee_shop

```
(
    shop_id INT,
    shop_name VARCHAR(50) NOT NULL,
    city VARCHAR(50) NOT NULL,
    state CHAR(2) NOT NULL,
    PRIMARY KEY(shop_id)
);
```

```
mysql> CREATE TABLE IF NOT EXISTS coffee_shop
-> (
->     shop_id INT,
->     shop_name VARCHAR(50) NOT NULL,
->     city VARCHAR(50) NOT NULL,
->     state CHAR(2) NOT NULL,
->     PRIMARY KEY(shop_id)
-> );
Query OK, 0 rows affected (0.00 sec)
```

CREATE TABLE IF NOT EXISTS supplier

```
(
    supplier_id INT,
    company_name VARCHAR(50) NOT NULL,
    country VARCHAR(30) NOT NULL,
    sales_contact_name VARCHAR(50) NOT NULL DEFAULT 'Joe Doe',
    email VARCHAR(50) NOT NULL,
    PRIMARY KEY(supplier_id)
);
```

```
mysql> CREATE TABLE IF NOT EXISTS supplier
-> (
->     supplier_id INT,
->     company_name VARCHAR(50) NOT NULL,
->     country VARCHAR(30) NOT NULL,
->     sales_contact_name VARCHAR(50) NOT NULL DEFAULT 'Joe Doe',
->     email VARCHAR(50) NOT NULL,
->     PRIMARY KEY(supplier_id)
-> );
Query OK, 0 rows affected (0.01 sec)
```

```

CREATE TABLE IF NOT EXISTS coffee
(
    coffee_id INT,
    shop_id INT NOT NULL,
    supplier_id INT NOT NULL,
    coffee_name VARCHAR(30) NOT NULL,
    price_per_pound DECIMAL(5,2) NOT NULL DEFAULT '0.00',
    PRIMARY KEY(coffee_id),
    FOREIGN KEY (shop_id) REFERENCES coffee_shop(shop_id)
        ON UPDATE CASCADE
        ON DELETE CASCADE,
    FOREIGN KEY (supplier_id) REFERENCES supplier(supplier_id)
        ON UPDATE CASCADE
        ON DELETE CASCADE
);

```

```

mysql> CREATE TABLE IF NOT EXISTS coffee
-> (
->     coffee_id INT,
->     shop_id INT NOT NULL,
->     supplier_id INT NOT NULL,
->     coffee_name VARCHAR(30) NOT NULL,
->     price_per_pound DECIMAL(5,2) NOT NULL DEFAULT '0.00',
->     PRIMARY KEY(coffee_id),
->     FOREIGN KEY (shop_id) REFERENCES coffee_shop(shop_id)
->     ON UPDATE CASCADE
->     ON DELETE CASCADE,
->     FOREIGN KEY (supplier_id) REFERENCES supplier(supplier_id)
->     ON UPDATE CASCADE
->     ON DELETE CASCADE
-> );
Query OK, 0 rows affected (0.00 sec)

```

```

CREATE TABLE IF NOT EXISTS employee
(

```

```

    employee_id INT,
    first_name VARCHAR(30) NOT NULL DEFAULT 'JOE',
    last_name VARCHAR(30) NOT NULL DEFAULT 'DOE',
    hire_date DATE NOT NULL DEFAULT '2000-01-01',
    job_title VARCHAR(30) NOT NULL,
    shop_id INT NOT NULL,
    PRIMARY KEY(employee_id),

```

```

FOREIGN KEY (shop_id) REFERENCES coffee_shop(shop_id)
ON UPDATE CASCADE
ON DELETE CASCADE
);

```

```

mysql> CREATE TABLE IF NOT EXISTS employee
-> (
->     employee_id INT,
->     first_name VARCHAR(30) NOT NULL DEFAULT 'JOE',
->     last_name VARCHAR(30) NOT NULL DEFAULT 'DOE',
->     hire_date DATE NOT NULL DEFAULT '2000-01-01',
->     job_title VARCHAR(30) NOT NULL,
->     shop_id INT NOT NULL,
->     PRIMARY KEY(employee_id),
->     FOREIGN KEY (shop_id) REFERENCES coffee_shop(shop_id)
->     ON UPDATE CASCADE
->     ON DELETE CASCADE
-> );
Query OK, 0 rows affected (0.01 sec)

```

B2 Develop SQL code to populate each table in the database design document:

INSERT INTO coffee_shop

VALUES

```

('200', 'Supreme Coffee & Donuts', 'Brockton', 'MA'),
('201', 'Common Word Cafe', 'Roxbury', 'MA'),
('202', 'NajmaDinar', 'Dorchester', 'MA'),
('203', 'Open Kettle', 'Quincy', 'MA'),
('204', 'Son of Coffee Bean', 'Stoughton', 'MA'),
('205', 'No Doze Cafe', 'Haverhill', 'MA'),
('206', 'White's Bakery & Cafe', 'Methun', 'MA'),
('207', 'Heav'nly Donuts', 'Methun', 'MA'),
('208', 'Wicked Big Cafe', 'Haverhill', 'MA'),
('209', 'Cafe Mediterano', 'Essex Junction', 'VT'),
('210', 'Wayfarer Coffee Roasters', 'Laconia', 'NH'),
('211', 'Main Street Cafe', 'Avon', 'MA');

```

```

mysql> INSERT INTO coffee_shop
-> VALUES
-> ('200', 'Supreme Coffee & Donuts', 'Brockton', 'MA'),
-> ('201', 'Common Word Cafe', 'Roxbury', 'MA'),
-> ('202', 'NajmaDinar', 'Dorchester', 'MA'),
-> ('203', 'Open Kettle', 'Quincy', 'MA'),
-> ('204', 'Son of Coffee Bean', 'Stoughton', 'MA'),
-> ('205', 'No Doze Cafe', 'Haverhill', 'MA'),
-> ('206', 'White's Bakery & Cafe', 'Methun', 'MA'),
-> ('207', 'Heav'nly Donuts', 'Methun', 'MA'),
-> ('208', 'Wicked Big Cafe', 'Haverhill', 'MA'),
-> ('209', 'Cafe Mediterano', 'Essex Junction', 'VT'),
-> ('210', 'Wayfarer Coffee Roasters', 'Laconia', 'NH'),
-> ('211', 'Main Street Cafe', 'Avon', 'MA');
Query OK, 12 rows affected (0.00 sec)
Records: 12 Duplicates: 0 Warnings: 0

```

INSERT INTO supplier

VALUES

('300', 'Farmer Brothers', 'USA', 'Joesph Griffen', 'j.griffen@fmb.com'),
('301', 'Burdent Coffee', 'Spain', 'Sebastian De Leon', 'leon@burdentcoffee.com'),
('302', 'Kaldi Gourmet Coffee Roasters', 'Canada', 'George Saul',
"george.saul@kaldi.com"),
('303', 'Kahve Tedarikci', 'Turkey', 'Hamid Ould-Brahim',
"ouldbrahim.hamid@kahve.com"),
('304', 'Firebrand Roasters', 'USA', 'Michael Booth', 'booth@firebrand.com'),
('305', 'Patel's Wholesale Coffee Co.', 'United Kingdom', 'Kalpesh Patel',
"kpatel@pwc.co.uk"),
('306', 'Atlas Coffee Importers', 'USA', 'James Fahey', 'j.fahey@atlas.com'),
('307', 'Aztec Cafe', 'Mexico', 'Isabella Morlas', 'morlas@ac.co.mx'),
('308', 'BattleForged Rebels Coffee', 'Ireland', 'Sean Tracy', 'sean.tracy@bcr.com'),
('309', 'Bunaroma Royal Coffee Exporter', 'Ethiopia', 'Ibrahim Ottwa',
"ottwa@bunaroma.com"),
('310', 'Reykjavik Roasters', 'Iceland', 'Freydis Guomundsdottir', 'frey@rr.com'),
('311', 'Mayorga Organics', 'USA', 'Martin Mayorga', 'martin@mayorga.com');

```
mysql> INSERT INTO supplier
-> VALUES
-> ('300', 'Farmer Brothers', 'USA', 'Joesph Griffen', 'j.griffen@fmb.com'),
-> ('301', 'Burdent Coffee', 'Spain', 'Sebastian De Leon', 'leon@burdentcoffee.com'),
-> ('302', 'Kaldi Gourmet Coffee Roasters', 'Canada', 'George Saul', 'george.saul@kaldi.com'),
-> ('303', 'Kahve Tedarikci', 'Turkey', 'Hamid Ould-Brahim', 'ouldbrahim.hamid@kahve.com'),
-> ('304', 'Firebrand Roasters', 'USA', 'Michael Booth', 'booth@firebrand.com'),
-> ('305', 'Patel's Wholesale Coffee Co.', 'United Kingdom', 'Kalpesh Patel', 'kpatel@pwc.co.uk'),
-> ('306', 'Atlas Coffee Importers', 'USA', 'James Fahey', 'j.fahey@atlas.com'),
-> ('307', 'Aztec Cafe', 'Mexico', 'Isabella Morlas', 'morlas@ac.co.mx'),
-> ('308', 'BattleForged Rebels Coffee', 'Ireland', 'Sean Tracy', 'sean.tracy@bcr.com'),
-> ('309', 'Bunaroma Royal Coffee Exporter', 'Ethiopia', 'Ibrahim Ottwa', 'ottwa@bunaroma.com'),
-> ('310', 'Reykjavik Roasters', 'Iceland', 'Freydis Guomundsdottir', 'frey@rr.com'),
-> ('311', 'Mayorga Organics', 'USA', 'Martin Mayorga', 'martin@mayorga.com');
Query OK, 12 rows affected (0.00 sec)
Records: 12 Duplicates: 0 Warnings: 0
```

INSERT INTO coffee

VALUES

('400', '200', '301', 'EXTRA CREME', '12.46'),
('401', '209', '302', 'CELEBES SULAWESI KALOSS', '10.35'),
('402', '211', '300', 'Sierra Blend Medium Roast', '2.50'),
('403', '206', '306', 'Jamaica Blue Mountain', '4.50'),
('404', '201', '309', 'Specialty Sidamo Coffee', '6.95'),
('405', '203', '310', 'Dona Nenem', '15.30'),
('406', '205', '304', 'Firebrand Colombo Medium Roast', '3.50'),
('407', '204', '308', 'Celtic Storm', '9.50'),


```
( '408', '207', '307', 'Heavenly Hazelnut', '10.00'),
( '409', '208', '311', 'Muy Macho', '11.60'),
( '410', '210', '305', 'Monsoon Malabar AA Arabica', '8.35'),
( '411', '202', '303', 'Kahve Tedarikci Special', '20.00');
```

```
mysql> INSERT INTO coffee
-> VALUES
-> ( '400', '200', '301', 'EXTRA CREME', '12.46'),
-> ( '401', '209', '302', 'CELEBES SULAWESI KALOSSSI', '10.35'),
-> ( '402', '211', '300', 'Sierra Blend Medium Roast', '2.50'),
-> ( '403', '206', '306', 'Jamaica Blue Mountain', '4.50'),
-> ( '404', '201', '309', 'Specialty Sidamo Coffee', '6.95'),
-> ( '405', '203', '310', 'Dona Nenem', '15.30'),
-> ( '406', '205', '304', 'Firebrand Colombo Medium Roast', '3.50'),
-> ( '407', '204', '308', 'Celtic Storm', '9.50'),
-> ( '408', '207', '307', 'Heavenly Hazelnut', '10.00'),
-> ( '409', '208', '311', 'Muy Macho', '11.60'),
-> ( '410', '210', '305', 'Monsoon Malabar AA Arabica', '8.35'),
-> ( '411', '202', '303', 'Kahve Tedarikci Special', '20.00');
Query OK, 12 rows affected (0.00 sec)
Records: 12 Duplicates: 0 Warnings: 0
```

INSERT INTO employee

VALUES

```
( '100', 'Jose', 'Pellicier', '1998-03-21', 'Manager', '200'),
( '101', 'Nicolas', 'Do', '2017-12-13', 'Porter', '201'),
( '102', 'Rachida', 'Burkina', '1990-02-01', 'Manager', '202'),
( '103', 'Cindy', 'Noname', '2020-09-28', 'Barista', '203'),
( '104', 'Darach', 'O'Cathain', '2005-10-20', 'Buyer', '204'),
( '105', 'Sara', 'Smith', '2021-08-19', 'Team Member', '205'),
( '106', 'Ruth', 'Saul', '2000-02-28', 'Sr Baker', '206'),
( '107', 'Janet', 'Peters', '2005-04-08', 'Porter', '207'),
( '108', 'Carlos', 'Nee', '1995-05-19', 'Maintenance', '208'),
( '109', 'Kevin', 'Hellmuth', '2016-06-23', 'Shift Supervisor', '209'),
( '110', 'Ken', 'Prescott', '2009-09-15', 'Solution Architect Technology', '210'),
( '111', 'Mary', 'Barber', '2017-09-28', 'Sales', '211');
```

```
mysql> INSERT INTO employee
-> VALUES
-> ( '100', 'Jose', 'Pellicier', '1998-03-21', 'Manager', '200'),
-> ( '101', 'Nicolas', 'Do', '2017-12-13', 'Porter', '201'),
-> ( '102', 'Rachida', 'Burkina', '1990-02-01', 'Manager', '202'),
-> ( '103', 'Cindy', 'Noname', '2020-09-28', 'Barista', '203'),
-> ( '104', 'Darach', 'O'Cathain', '2005-10-20', 'Buyer', '204'),
-> ( '105', 'Sara', 'Smith', '2021-08-19', 'Team Member', '205'),
-> ( '106', 'Ruth', 'Saul', '2000-02-28', 'Sr Baker', '206'),
-> ( '107', 'Janet', 'Peters', '2005-04-08', 'Porter', '207'),
-> ( '108', 'Carlos', 'Nee', '1995-05-19', 'Maintenance', '208'),
-> ( '109', 'Kevin', 'Hellmuth', '2016-06-23', 'Shift Supervisor', '209'),
-> ( '110', 'Ken', 'Prescott', '2009-09-15', 'Solution Architect Technology', '210'),
-> ( '111', 'Mary', 'Barber', '2017-09-28', 'Sales', '211');
Query OK, 12 rows affected (0.00 sec)
Records: 12 Duplicates: 0 Warnings: 0
```

B3 Develop SQL code to create a view for employee table:

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;

```
mysql> 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;
Query OK, 0 rows affected (0.00 sec)
```

B4 Develop SQL code to create an index on the coffee_name field:

CREATE INDEX idx_coffename

ON coffee(coffee_name);

```
mysql> CREATE INDEX idx_coffename
-> ON coffee(coffee_name);
Query OK, 0 rows affected (0.00 sec)
Records: 0 Duplicates: 0 Warnings: 0
```

B5 Develop SQL code to create an SFW (SELECT-FROM-WHERE) query for any of your tables or views:

SELECT coffee_name, price_per_pound

FROM coffee

WHERE price_per_pound >= '10.00'

ORDER BY coffee_name;

```
mysql> SELECT coffee_name, price_per_pound
-> FROM coffee
-> WHERE price_per_pound >= '10.00'
-> ORDER BY coffee_name;
+-----+-----+
| coffee_name | price_per_pound |
+-----+-----+
| CELEBES SULAWESI KALOSSI | 10.35 |
| Dona Nenem | 15.30 |
| EXTRA CREME | 12.46 |
| Heavenly Hazelnut | 10.00 |
| Kahve Tedarikci Special | 20.00 |
| Muy Macho | 11.60 |
+-----+-----+
6 rows in set (0.00 sec)
```

B6 Develop SQL code to create a join query on three different tables:

```
SELECT *
FROM coffee_shop
INNER JOIN coffee
USING (shop_id)
INNER JOIN supplier
USING (supplier_id);
```

This code select all the attributes in the coffee_shop table then join all attributes in the coffee table with the primary key and foreign key attribute shop_id. Then join all the attributes from the coffee table to attributes in the supplier table using the primary and foreign key, supplier_id.

supplier_id	shop_id	shop_name	city	state	coffee_id	coffee_name	price_per_pound	company_name	country	sales_contact_name	email
301	200	Supreme Coffee & Donuts	Brockton	MA	400	EXTRA CREME	12.46	Burdent Coffee	Spain	Sebastian De Leon	leon@burdentcoffee.com
309	201	Common Word Cafe	Roxbury	MA	404	Specialty Sidamo Coffee	6.95	Bunaroma Royal Coffee Exporter	Ethiopia	Ibrahim Ottwa	ottwa@bunaroma.com
303	202	NajmaDinar	Dorchester	MA	411	Kahve Tedarikci Special	20	Kahve Tedarikci	Turkey	Hamid Ould-Brahim	ouldbrahim.hamid@kahve.com
310	203	Open Kettle	Quincy	MA	405	Dona Nenem	15.3	Reykjavik Roasters	Iceland	Freydis Guomundsdottir	freydi@rr.com
308	204	Son of Coffee Bean	Stoughton	MA	407	Celtic Storm	9.5	BattleForged Rebels Coffee	Ireland	Sean Tracy	sean.tracy@bcr.com
304	205	No Doze Cafe	Haverhill	MA	406	Firebrand Colombo Medium Roast	3.5	Firebrand Roasters	USA	Michael Booth	booth@firebrand.com
306	206	White's Bakery & Cafe	Methun	MA	403	Jamaica Blue Mountain	4.5	Altas Coffee Importers	USA	James Fahey	j.fahey@atlas.com
307	207	Heav'nly Donuts	Methun	MA	408	Heavenly Hazelnut	10	Aztec Cafe	Mexico	Isabella Morias	morias@ac.co.mx
311	208	Wicked Big Cafe	Haverhill	MA	409	Muy Macho	11.6	Mayorga Organics	USA	Martin Mayorga	martin@mayorga.com
302	209	Cafe Mediterano	Essex Junction	VT	401	CELEBES SULAWESI KALOSS	10.35	Kaldi Gourmet Coffee Roasters	Canada	George Saul	george.saul@kaldi.com
305	210	Wayfarer Coffee Roasters	Laconia	NH	410	Monsoon Malabar AA Arabica	8.35	Patel's Wholesale Coffee Co.	United Kingdom	Kalpesh Patel	kpatel@pwc.co.uk
300	211	Main Street Cafe	Avon	MA	402	Sierra Blend Medium Roast	2.5	Farmer Brothers	USA	Joeph Griffen	j.griffen@fmb.com

✓ Record Count: 12; Execution Time: 16ms + View Execution Plan ➔ link