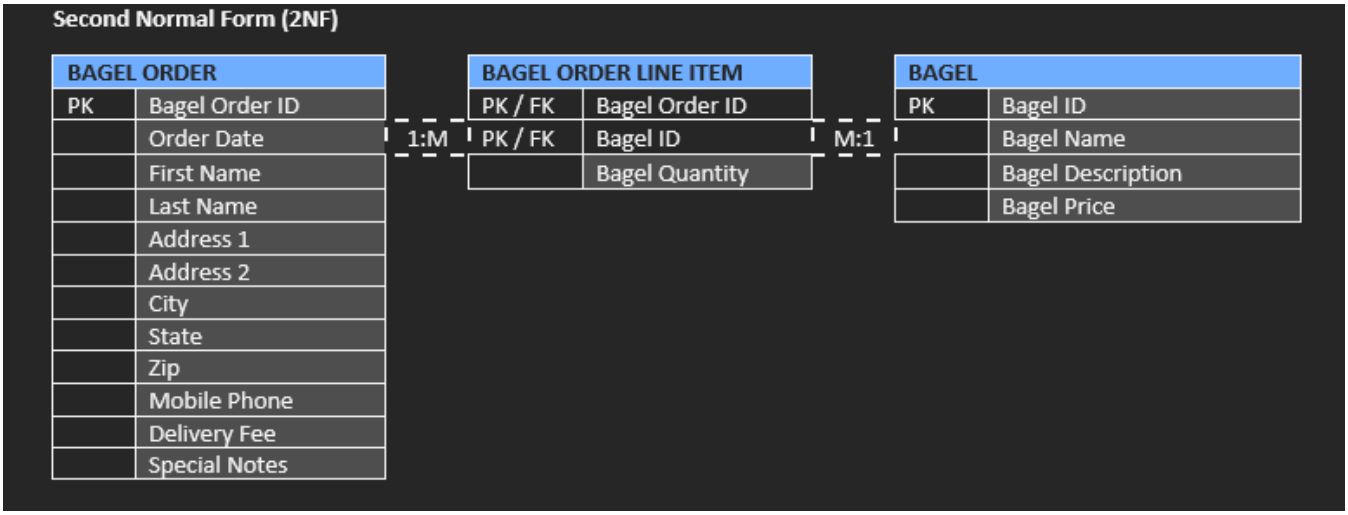
C170
Brandon Pinkston
2/26/2023

C170 PA: Normalization and Database Design

Part A:

QA-1. Section A & B:



QA-1. Section C:

The first step in converting the initial table into 2NF was figuring out if any of the columns from the initial table were dependent on the whole composite key from the initial table and then removing all other columns from the original table that aren't dependent on the whole composite key. The next step was creating two new tables that each contained one of the primary keys from the original composite key and the columns that are dependent on the individual key. Since tables with simple primary keys are naturally in 2NF and the column in "Bagel Order Line Item" is dependent on the whole composite key of its table, all tables are in the 2NF.

I chose the "1:M" cardinality between bagel order and bagel order line item because for each singular bagel order there could be multiple quantities of different bagels being ordered. This would result in bagel order line item containing several rows for that one order. I chose the "M:1" cardinality between bagel and bagel order line item because there can be many different bagel quantities being ordered in the bagel order line item but each of those bagels only references one bagel id.

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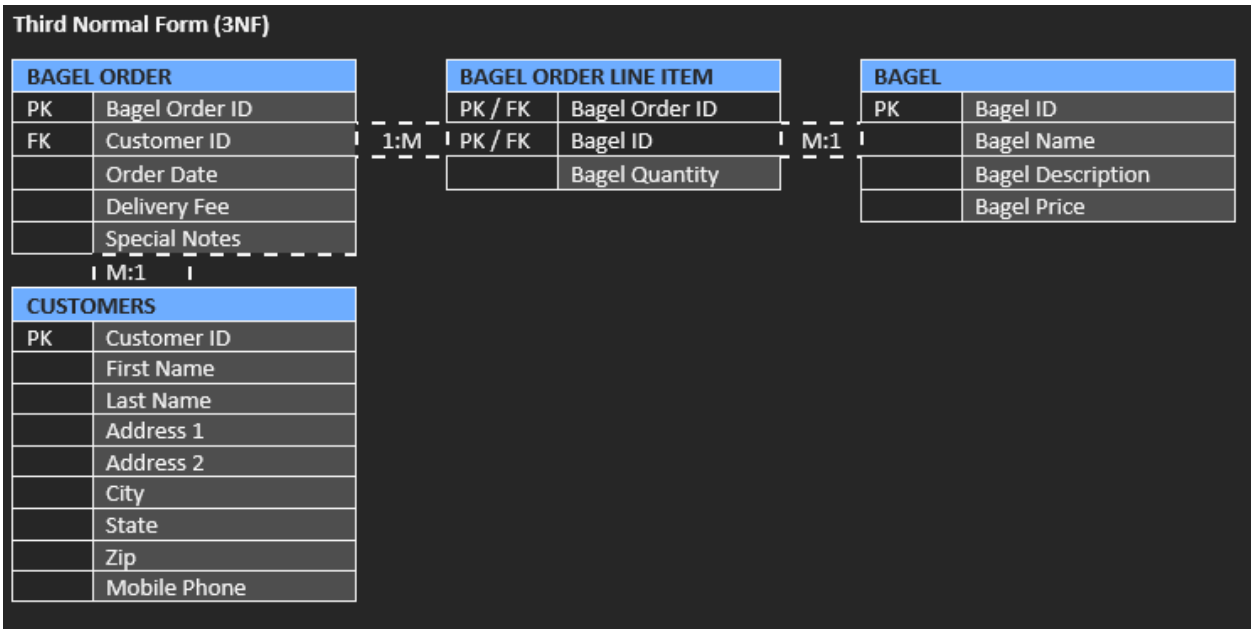
QA-2. Section A-D:



QA-2. Section E:

To turn the 2NF table and further normalize it to the 3NF form all non-key columns must only be dependent on the primary key and nothing but the primary key. So in order to do this I created a new table called customers that stores only the information that is directly relevant to that primary key and only that primary key. The same happens to the bagel order table because all values that did not solely depend on the order id were moved to the customers table. A foreign key is then placed on the bagel order table so that the information inside of customers can be referenced based on customer id in both tables.

The cardinalities for the two tables in the 2NF will stay the same, but the new 3NF form table cardinality introduced between bagel order and customers will be “M:1” because there can be several instances of one customer making different orders but each instance of that customer in bagel order will always reference a singular customer in the customer table.

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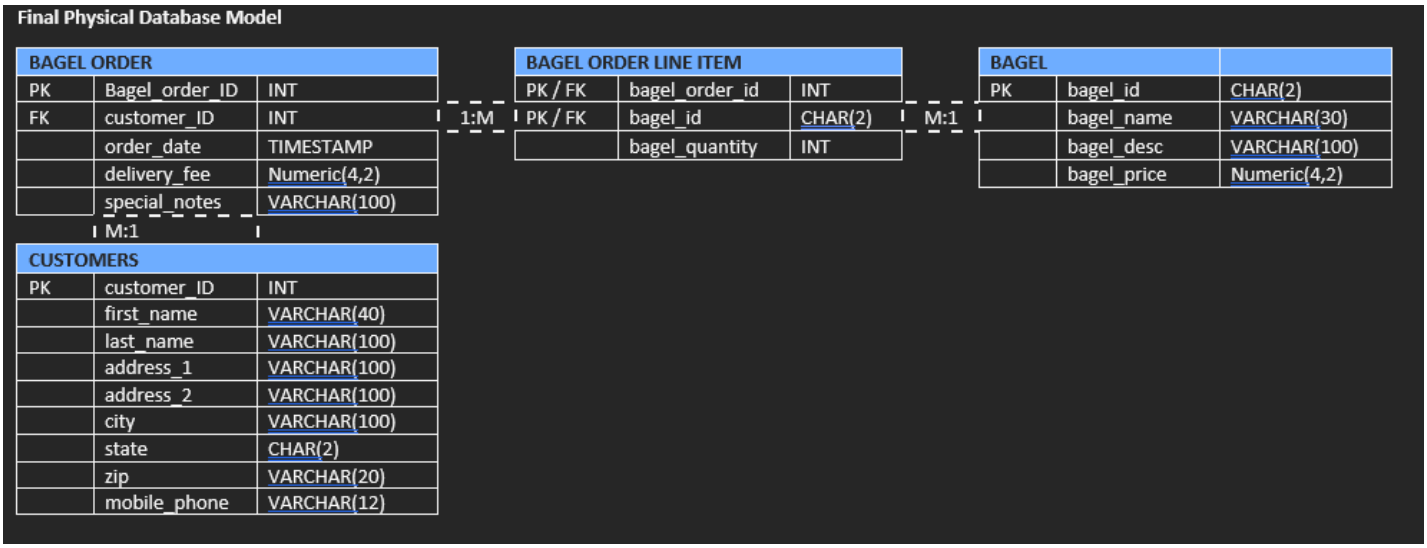
QA-3. Section A & B:



Part B:

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QB-1. Section A:

```
1
2  CREATE TABLE COFFEE_SHOP (
3  shop_id INT primary key,
4  shop_name VARCHAR(50),
5  city VARCHAR(50),
6  state CHAR(2)
7  );
8
9  CREATE TABLE SUPPLIER (
10 supplier_id INT primary key,
11 company_name VARCHAR(50),
12 country VARCHAR(30),
13 sales_contact_name VARCHAR(60),
14 email VARCHAR(50) NOT NULL
15 );
16
17 CREATE TABLE EMPLOYEE (
18 employee_id INT primary key,
19 first_name VARCHAR(30),
20 last_name VARCHAR(30),
21 hire_date DATE,
22 job_title VARCHAR(30),
23 shop_id INT,
24 foreign key (shop_id) references coffee_shop(shop_id)
25 );
26
27 CREATE TABLE COFFEE (
28 coffee_id INT primary key,
29 shop_id INT,
30 foreign key(shop_id) references coffee_shop(shop_id),
31 supplier_id INT,
32 foreign key(supplier_id) references supplier(supplier_id),
33 coffee_name VARCHAR(30),
34 price_per_pound NUMERIC(5,2)
35 );
```

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QB-1. Section B:

✓	1	00:27:43	CREATE TABLE COFFEE_SHOP (shop_id INT primary key, shop_name VARCHAR(50...	0 row(s) affected	0.000 sec
✓	2	00:28:08	CREATE TABLE SUPPLIER (supplier_id INT primary key, company_name VARCHAR(...	0 row(s) affected	0.015 sec
✓	3	00:28:13	CREATE TABLE EMPLOYEE (employee_id INT primary key, first_name VARCHAR(30)...	0 row(s) affected	0.031 sec
✓	4	00:28:17	CREATE TABLE COFFEE (coffee_id INT primary key, shop_id INT, foreign key(shop_i...	0 row(s) affected	0.031 sec

QB-2 Section A:

Coffee Shop table code + table view

```
INSERT INTO COFFEE_SHOP(shop_id, shop_name, city, state) VALUES(1, 'Brandons Coffee', 'Charlotte', 'NC'),(2,
'Scotts Coffee', 'Fort Mill', 'NC'),(3, 'Raymonds Coffee', 'Queens', 'NY');
```

shop_id	shop_name	city	state
1	Brandons Coffee	Charlotte	NC
2	Scotts Coffee	Fort Mill	NC
3	Raymonds Coffee	Queens	NY
NULL	NULL	NULL	NULL

Supplier table code + table view

```
INSERT INTO SUPPLIER(supplier_id, company_name, country, sales_contact_name, email) VALUES(1, 'Coffee Co',
'United States', 'Mike Miller', 'mmiller@gmail.com'),(2, 'Coffee Makers EU', 'Germany', 'Denis Panjuta',
'dpanjuta@gmail.com'),(3, 'Coffee Dad', 'United States', 'Brandon Pinkston', 'bpinkston@gmail.com');
```

supplier_id	company_name	country	sales_contact_name	email
1	Coffee Co	United States	Mike Miller	mmiller@gmail.com
2	Coffee Makers EU	Germany	Denis Panjuta	dpanjuta@gmail.com
3	Coffee Dad	United States	Brandon Pinkston	bpinkston@gmail.com
NULL	NULL	NULL	NULL	NULL

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Employee table code + table view

```
INSERT INTO EMPLOYEE(employee_id, first_name, last_name, hire_date, job_title, shop_id) VALUES(1, 'Dave', 'Masters', curdate(), 'Barista', 1),(2, 'William', 'Masters', curdate(), 'Barista', 1),(3, 'Shane', 'Masters', curdate(), 'Manager', 1);
```

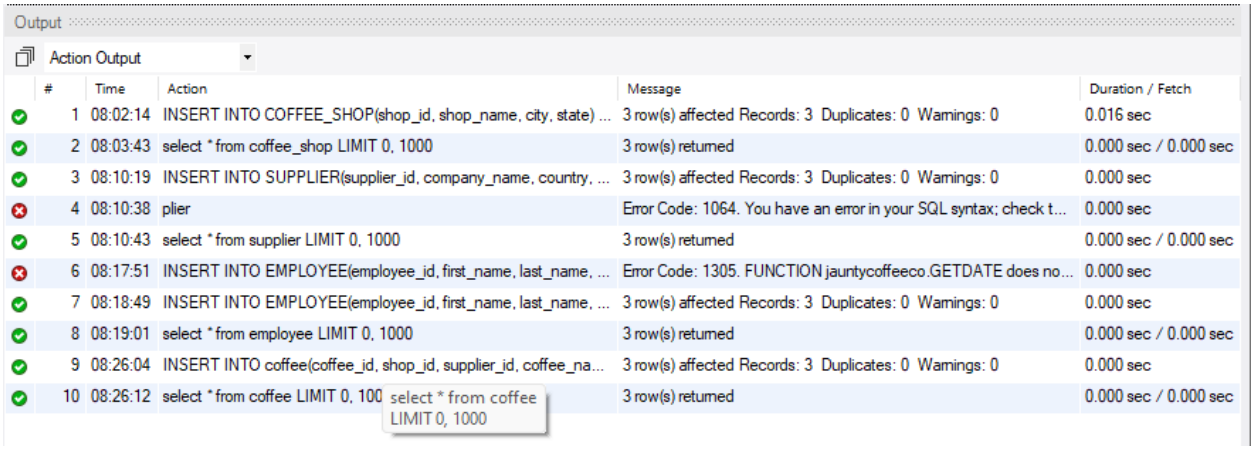
employee_id	first_name	last_name	hire_date	job_title	shop_id
1	Dave	Masters	2023-02-27	Barista	1
2	William	Masters	2023-02-27	Barista	1
3	Shane	Masters	2023-02-27	Manager	1
NULL	NULL	NULL	NULL	NULL	NULL

Coffee table code + table view

```
INSERT INTO coffee(coffee_id, shop_id, supplier_id, coffee_name, price_per_pound) VALUES(1, 1, 2, 'EU Sunrise', 8.99),(2, 1, 1, 'Coffee Co Special', 12.99),(3, 1, 3, 'Dad Surprise', 20.99);
```

coffee_id	shop_id	supplier_id	coffee_name	price_per_pound
1	1	2	EU Sunrise	8.99
2	1	1	Coffee Co Special	12.99
3	1	3	Dad Surprise	20.99
NULL	NULL	NULL	NULL	NULL

QB-2. Section B:



Output

Action Output

#	Time	Action	Message	Duration / Fetch
1	08:02:14	INSERT INTO COFFEE_SHOP(shop_id, shop_name, city, state) ...	3 row(s) affected Records: 3 Duplicates: 0 Warnings: 0	0.016 sec
2	08:03:43	select * from coffee_shop LIMIT 0, 1000	3 row(s) returned	0.000 sec / 0.000 sec
3	08:10:19	INSERT INTO SUPPLIER(supplier_id, company_name, country, ...	3 row(s) affected Records: 3 Duplicates: 0 Warnings: 0	0.000 sec
4	08:10:38	plier	Error Code: 1064. You have an error in your SQL syntax; check t...	0.000 sec
5	08:10:43	select * from supplier LIMIT 0, 1000	3 row(s) returned	0.000 sec / 0.000 sec
6	08:17:51	INSERT INTO EMPLOYEE(employee_id, first_name, last_name, ...	Error Code: 1305. FUNCTION jauntycoffeeco.GETDATE does no...	0.000 sec
7	08:18:49	INSERT INTO EMPLOYEE(employee_id, first_name, last_name, ...	3 row(s) affected Records: 3 Duplicates: 0 Warnings: 0	0.000 sec
8	08:19:01	select * from employee LIMIT 0, 1000	3 row(s) returned	0.000 sec / 0.000 sec
9	08:26:04	INSERT INTO coffee(coffee_id, shop_id, supplier_id, coffee_na...	3 row(s) affected Records: 3 Duplicates: 0 Warnings: 0	0.000 sec
10	08:26:12	select * from coffee LIMIT 0, 100	3 row(s) returned	0.000 sec / 0.000 sec

select * from coffee
LIMIT 0, 1000

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QB-3. Section A:

```
CREATE VIEW Employee_Full_Name2 AS
SELECT *, CONCAT(first_name, ' ', last_name) as employee_full_name
FROM employee
```

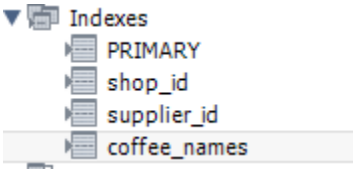
employee_id	first_name	last_name	hire_date	job_title	shop_id	employee_full_name
1	Dave	Masters	2023-02-27	Barista	1	Dave Masters
2	William	Masters	2023-02-27	Barista	1	William Masters
3	Shane	Masters	2023-02-27	Manager	1	Shane Masters

QB-3. Section B:

3	08:32:31	CREATE VIEW Employee_Full_Name2 AS SELECT *, CONCAT(...	0 row(s) affected		0.000 sec
4	08:32:46	select * from employee_full_name2 LIMIT 0, 1000	3 row(s) returned		0.000 sec / 0.000

QB-4. Section A:

```
1  CREATE INDEX coffee_names on coffee(coffee_name);
```



QB-4. Section B:

1	09:10:35	CREATE INDEX coffee_names on coffee(coffee_name)	0 row(s) affected Records: 0 Duplicates: 0 Warnings: 0		0.031 sec
2	09:11:49	select * from coffee where coffee_name like 'EU Sunrise' LIMIT 0, 1000	1 row(s) returned		0.000 sec / 0.000 sec

Index: coffee_names

Definition:

Type	BTREE
Unique	No
Visible	Yes
Columns	coffee_name

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QB-5. Section A:

```
Select employee_id, concat(first_name, ' ', last_name) as full_name
from employee
where job_title like 'Barista';
```

employee_id	full_name
1	Dave Masters
2	William Masters

QB-5. Section B:

Action Output

#	Time	Action	Message	Duration / Fetch
1	08:41:13	Select employee_id, concat(first_name, '', last_name) as full_name fro...	2 row(s) returned	0.000 sec / 0.000 sec
2	08:41:22	Select employee_id, concat(first_name, ' ', last_name) as full_name fro...	2 row(s) returned	0.000 sec / 0.000 sec

QB-6. Section A:

```
1  Select *
2  from coffee
3  full join supplier using(supplier_id)
4  join coffee_shop using(shop_id);
```

shop_id	supplier_id	coffee_id	coffee_name	price_per_pound	company_name	country	sales_contact_name	email	shop_name	city	state
1	2	1	EU Sunrise	8.99	Coffee Makers EU	Germany	Denis Panjuta	dpanjuta@gmail.com	Brandons Coffee	Charlotte	NC
1	1	2	Coffee Co Special	12.99	Coffee Co	United States	Mike Miller	mmiller@gmail.com	Brandons Coffee	Charlotte	NC
1	3	3	Dad Surprise	20.99	Coffee Dad	United States	Brandon Pinkston	bpinkston@gmail.com	Brandons Coffee	Charlotte	NC

QB-6. Section B:

1	08:41:13	Select employee_id, concat(first_name, '', last_name) as full_name from employee ...	2 row(s) returned	0.000 sec / 0.000 sec
2	08:41:22	Select employee_id, concat(first_name, ' ', last_name) as full_name from employee ...	2 row(s) returned	0.000 sec / 0.000 sec
3	08:46:28	Select * from coffee full join supplier using(supplier_id), full join coffee_shop using...	Error Code: 1066. Not unique table/alias: 'full'	0.000 sec
4	08:48:22	Select * from coffee full join supplier using(supplier_id), full join coffee_shop using...	Error Code: 1066. Not unique table/alias: 'full'	0.000 sec
5	08:48:40	Select * from coffee full join supplier using(supplier_id) join coffee_shop using(sho...	3 row(s) returned	0.000 sec / 0.000 sec
6	08:50:44	EXPLAIN Select * from coffee full join supplier using(supplier_id) join coffee_shop ...	OK	0.000 sec