Pharmacy Database

Connor Fox, Meaad Hassan, Tartil Chowdhury

Overview

- Application
- Requirements
- Schema
- ER Diagram
- SQL Queries

Application

- More than 66% of all adults in the United States use prescription drugs (georgetown.edu)
    - Health and Comfortable Living
- Legalities surrounding prescription drugs require strict regulation
    - Amounts, recipients, dosages, etc.
- Meaad & Tartil shared experience
    - Knowledge on pertinent figures

Requirements

- Track where the prescription is coming from (manufacturer)
- Track where Rx is going (customers)
- Track if the Rx has been filled

- How is a person paying for their Rx (copay/insurance)
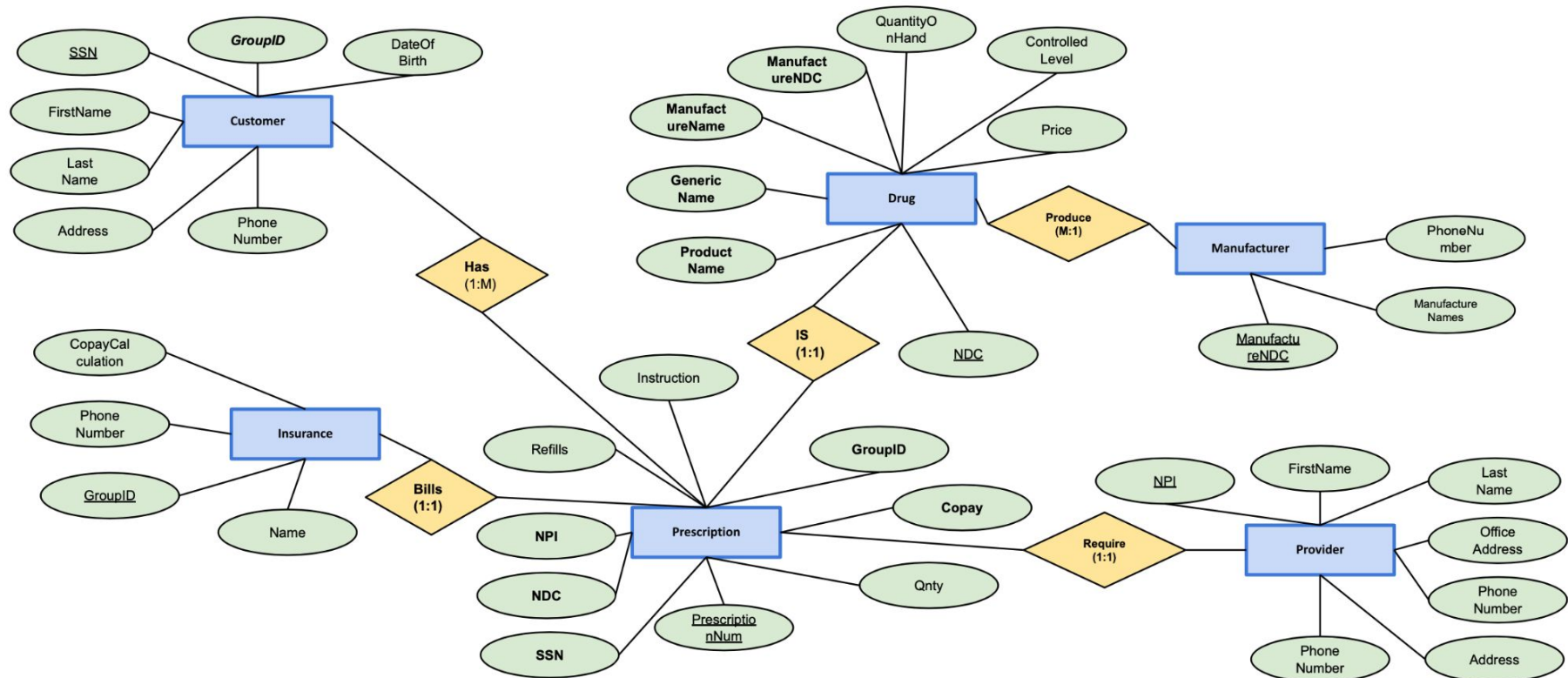- How should they use their Rx (instructions)

- **Entity Profiles**

Schema Overview:

- Customers
- Drugs
  - Manufacturers
- Insurance Companies
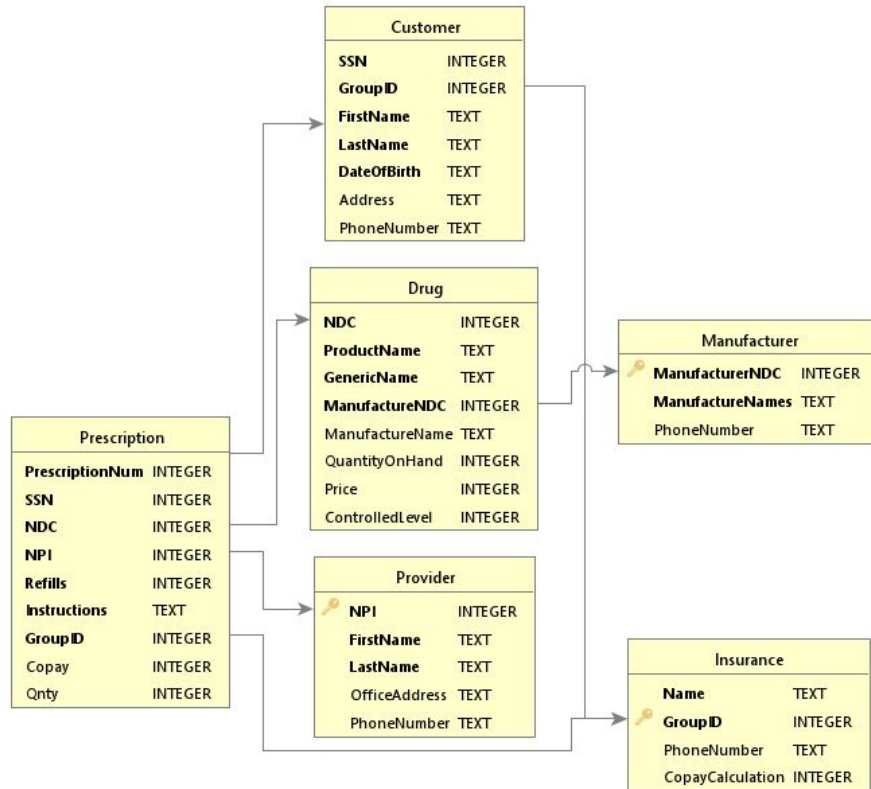- Prescriptions
- Providers

Database Schema:

Customer	**SSN (PK)**	*GroupID (FK)*	FirstName	LastName	DateOfBirth	Address	PhoneNumber			
	INT	INT	Text	Text	TEXT	Text	TEXT			

Drug	**NDC (PK)**	ProductName	GenericName	*ManufacturerNDC (FK)*		ManufacturerName	QuantityOnHand	Price	ControlledLevel	
	INT	TEXT	TEXT	INT		TEXT	INT	INT	INT	

Insurance	Name	**GroupID (PK)**	PhoneNumber	CopayCalculation						
	TEXT	INT	TEXT	INT						

Manufacturer	**ManufacturerNDC (PK)**		ManufactureNames	PhoneNumber						
	INT		TEXT	INT						

Prescription	**PrescriptionNum (PK)**		SSN (FK)	*NDC (FK)*	*NPI (FK)*	Refills	Instructions	*GroupID (FK)*	*Copay (FK)*	Qnty
	INT		INT	INT	INT	INT	TEXT	INT	INT	INT

Provider	**NPI (PK)**	FirstName	LastName	OfficeAddress	PhoneNumber					
	INT	TEXT	TEXT	TEXT	TEXT					

Entity Relationship Diagram

Relationship Diagram

First Name	Last name	DOB	**SSN**	**GroupID#**	ADDRESS	PHONE NUMBER
String	String	TEXT	INT	STRinG	STRING	TEXT
John	Appleseed	05/03/1991	111111111	201402502	3433 Evergreen Dearborn MI, 48128	3134332223
Frank	Wong	09/15/1968	222222222	201402502	3433 Rochester Troy MI, 48083	2483090099
Jennifer	Wallace	06/07/1978	336333336	201102401	3433 Dequindre Warren MI, 48092	5863233304
Ramesh	Narayan	03/14/2000	744474444	501454747	3433 Conant Hamtramack MI, 48212	3134902253
Manesh	Narayan	09/19/1987	447444447	501454747	3433 Conant Hamtramack MI, 48212	3134902253
		000	555555555	950890745	3433 Dequindre Warren MI, 48092	5863233301
		96	888888888	201402502	3433 Dequindre Warren MI, 48092	5863433302
		98	663666663	201102401	2333 Dequindre Warren MI, 48092	5863233304
		80	999999999	601405801	3433 Jefferson Roseville MI, 48066	5865431204
		95	987654321	950890745	3433 Jefferson Detroit MI, 48201	3134993201

INSURANCE NAME	**GroupID**	CopayCalc	Phone Number
String	INTEGER	Integer	TEXT
Priorty Health	950890745	0.2	8004465674
Blue Cross Blue Sheild	201402502	0	3132259000
Health alliance plan (HAP)	201102401	0.6	8004224641
Medicare(Meridian)	601405801	0	8884370606
Medicaid (United Health Care)	774455689	0.4	8009035253
United Health Care Commerical	501454747	0.8	8664141959

Generic name	PRODUCT name	NDC#	Manufacturer NDC	Drug COST	Manufacturer Name	QTY	C.S.A SCHEDULE
String	String	INT(NOT NULL)	INT(NOT NULL)	INT	String	INT	INT
Loratadine	Claratin	1152343321	11523	20	Schering Plough	600	NA
Fluoxetine	Prozac	4988403350	49884	100	Eli Lilly and Company	300	NA
Metformin	Glucophage	6838218401	68382	120	Bristol-Myers Squibb	200	NA
Omeprazole	Prilosec	1659033430	16590	80	AstraZenca	120	NA
Oxandrolone tablet	Oxandrin	5439611060	54396	500	BioTechnology General	60	3
Dextroamphetamine-saccharate	Adderal	5784410501	57844	350	Teva Pharmaceuticals	100	2
Diclofenac	Voltaren	5908831016	59088	20	GSK Consumer Health	5	NA
Alprazolam	Xanax	6191908960	61919	200	Pfizer	40	4
Famotidine	Pepcid	6671597488	66715	30	Johnson & Johnson	100	NA
Methocarbamol	Robaxin	6191235440	61912	80	Beximco Pharmaceutical	300	NA

Sample Database Tables

Prescription ID#	SSN	NDC#	NPI#	Group ID#	QTY	Refill	Instruction	CopayCalc
String	INT(NOT NULL)	INT(NOT NULL)	INT(NOT NULL)	INT	INT	INT	String	INT
184875589	111111111	1152343321	1978547194	950890745	30	2	Please Take twice daily	0.2
184875590	111111111	49884033501	1978547194	201102401	30	2	Please Take twice daily	0.6
184875591	111111111	6838218401	9182023433	201102401	30	2	Please Take twice daily	0.6
184875592	336333336	1152343321	1978547194	774455689	30	2	Please Take twice daily	0.4
184875593	336333336	5784410501	929292984	201402502	30	2	Please Take twice daily	0
184875594	999999999	6191908960	7981546721	201402502	30	2	Please Take twice daily	
184875595	987654321	6671597488	9182023433	601405801	30	2	Ple... da...	
184875596	987654321	1659033430	929292984	601405801	30	2	Ple... da...	
184875597	447444447	6838218401	9182023433	601405801	30	2	Ple... da...	
184875598	744474444	5908831016	7981546721	774455689	30	2	Ple... da...	
184875599	888888888	5439611060	9182023433	501454747	30	2	Ple... da...	
184875600	888888888	6191235440	9182023433	501454747	30	2	Ple... da...	

MANUFAC Name	ManufactureNDC	Phone #
String	INT(NOT NULL)	TEXT
Pfizer	61919	8335701757
Schering Plough	11523	9087404000
Eli Lilly and Company	49884	8005455979
Bristol-Myers Squibb	68382	8003322056
AstraZenca	16590	8002369933
BioTechnology General	54396	8004158484
Teva Pharmaceuticals	57844	8888382872
GSK Consumer Health	59088	8002451040
Johnson & Johnson	66715	8665652873
Beximco Pharmaceutical	61912	8884847900

Sample Database Tables

Provider Fname	Provider Lname	**NPI**	OfficeAddress	PhoneNumber
String	String	INTEGER(not Null)	String	TEXT
Merog	Yunus	1978547194	8723 Evergreen Dearborn MI, 48128	3134332223
Wahidi	Khalid	7981546721	8723 Dequindre Warren MI, 48092	5863233300
Lambart	Bitter	9182023433	8723 Rochester Troy MI, 48083	2483090099
Miranda	Bushing	1938382811	8723 Conant Hamtramack MI, 48212	3132453429
Longster	Shortleg	929292984	8723 Jefferson Detroit MI, 48201	3132981000

Sample Database Tables

```sql
1  SELECT PhoneNumber
2  FROM Customer
3  WHERE SSN = 222222222
4      AND LastName = "Wong"
5
```

PhoneNumber
1   2483090099

Execution finished without errors.
Result: 1 rows returned in 16ms
At line 1:
SELECT PhoneNumber
FROM Customer
WHERE SSN = 222222222
            AND LastName = "Wong"

Query 1: A customer forgot to pick up their prescription. . . you must call them to remind them. You know their SSN and last name.

```
1  SELECT FirstName,LastName,DateOfBirth
2  FROM Customer
3  WHERE GroupID = 501454747
4
```

	FirstName	LastName	DateOfBirth	
1	Ramesh	Narayan	3142000	
2	Manesh	Narayan	9191987	

Query 2: Find the first name, last name, and DOB of members under an insurance policy.

```
Execution finished without errors.
Result: 2 rows returned in 17ms
At line 1:
SELECT FirstName,LastName,DateOfBirth
FROM Customer
WHERE GroupID = 501454747
```

```
1  SELECT ManufactureName,ManufacturerNDC,PhoneNumber
2  FROM Drug, Manufacturer
3  WHERE ManufactureNDC=ManufacturerNDC
4      AND NDC = 5439611060 |
```

ManufactureName	ManufacturerNDC	PhoneNumber	
1 Bristol-Myers Squibb	68382	8884847900	

Query 3: Find manufacturer contact information based on their NDC.

```
Execution finished without errors.
Result: 1 rows returned in 18ms
At line 1:
SELECT ManufactureName,ManufacturerNDC,PhoneNumber
FROM Drug, Manufacturer
WHERE ManufactureNDC=ManufacturerNDC
            AND NDC = 5439611060
```

```
1    SELECT GenericName,ManufactureName
2    FROM Drug
3    WHERE ProductName = "Adderal"
```

	GenericName	ManufactureName	
1	Dextroamphetamine-saccharate	Teva Pharmaceuticals	

Query 4: Find the Generic Drug name for Adderall since insurance will not cover cost of brand name drug.

```
Execution finished without errors.
Result: 1 rows returned in 14ms
At line 1:
SELECT GenericName,ManufactureName
FROM Drug
WHERE ProductName = "Adderal"
```

Query 5: Find the amount of refills a customer has on a specific prescription.

```
1  SELECT FirstName, LastName,ProductName, Refills
2  FROM Customer,Prescription,Drug
3  WHERE PrescriptionNum = 184875590
4      AND Customer.SSN=Prescription.SSN
5      AND Prescription.NDC=Drug.NDC
```

FirstName	LastName	ProductName	Refills
1 John	Appleseed	Prozac	2

```
Execution finished without errors.
Result: 1 rows returned in 17ms
At line 1:
SELECT FirstName, LastName,ProductName, Refills
FROM Customer,Prescription,Drug
WHERE PrescriptionNum = 184875590
            AND Customer.SSN=Prescription.SSN
            AND Prescription.NDC=Drug.NDC
```

Query 6: Find the contact information of a doctor who provides for Delia.

```sql
SELECT Provider.FirstName, Provider.LastName, Provider.PhoneNumber
FROM Prescription,Provider,Customer
WHERE  Prescription.NPI=Provider.NPI
    AND Customer.FirstName="Delia"
    AND Prescription.SSN=Customer.SSN
```

	FirstName	LastName	PhoneNumber
1	Wahidi	Khalid	5863233300

Execution finished without errors.
Result: 1 rows returned in 15ms
At line 1:
SELECT Provider.FirstName, Provider.LastName, Provider.PhoneNumber
FROM Prescription,Provider,Customer
WHERE Prescription.NPI=Provider.NPI
            AND Customer.FirstName="Delia"
            AND Prescription.SSN=Customer.SSN

Before

184875589	111111111	1152343321	1978547194	2	Please Take twice daily	950890745	0.2	30
184875590	111111111	4988403350	1978547194	2	Please Take twice daily	201102401	0.6	30
184875591	111111111	6838218401	9182023433	2	Please Take twice daily	201102401	0.6	30
184875592	336333336	1152343321	1978547194	2	Please Take twice daily	774455689	0.4	30
184875593	336333336	5784410501	929292984	2	Please Take twice daily	201402502	0	30
184875594	999999999	6191908960	7981546721	2	Please Take twice daily	201402502	0	30
184875595	987654321	6671597488	9182023433	2	Please Take twice daily	601405801	0	30
184875596	987654321	1659033430	929292984	3	Please Take twice daily	601405801	0	30
184875597	447444447	6838218401	9182023433	2	Please Take twice daily	601405801	0	30
184875598	744474444	5908831016	7981546721	2	Please Take twice daily	774455689	0.4	30
184875599	888888888	5439611060	9182023433	2	Please Take twice daily	501454747	0.8	30
184875600	888888888	6191235440	9182023433	2	Please Take twice daily	501454747	0.8	30

SQL Query #7

UPDATE Prescription
SET Refills=5
Where SSN=111111111

Update the number of refills for person with SSN 111111111 to 5 for all prescriptions.

After

184875589	111111111	1152343321	1978547194	5	Please Take twice daily	950890745	0.2	30
184875590	111111111	4988403350	1978547194	5	Please Take twice daily	201102401	0.6	30
184875591	111111111	6838218401	9182023433	5	Please Take twice daily	201102401	0.6	30
184875592	336333336	1152343321	1978547194	2	Please Take twice daily	774455689	0.4	30
184875593	336333336	5784410501	929292984	2	Please Take twice daily	201402502	0	30
184875594	999999999	6191908960	7981546721	2	Please Take twice daily	201402502	0	30
184875595	987654321	6671597488	9182023433	2	Please Take twice daily	601405801	0	30
184875596	987654321	1659033430	929292984	3	Please Take twice daily	601405801	0	30
184875597	447444447	6838218401	9182023433	2	Please Take twice daily	601405801	0	30
184875598	744474444	5908831016	7981546721	2	Please Take twice daily	774455689	0.4	30
184875599	888888888	5439611060	9182023433	2	Please Take twice daily	501454747	0.8	30
184875600	888888888	6191235440	9182023433	2	Please Take twice daily	501454747	0.8	30

SQL Query #8

DELETE FROM Customer
WHERE FirstName="Frank";

Before

Filter	Filter	Filter	Filter	Filter		Filter	Filter
222222222	201402502	Frank	Wong		9151968	3433 Rocheste...	2483090099
336333336	201102401	Jennifer	Wallace		6071978	3433 Dequindr...	5863233304
888888888	201102401	Cody	Wallace		1011998	2333 Dequindr...	5863233304
648479182	950890745	Barney	Wabble		6201975	3433 Rocheste...	2483090099
663666663	950890745	Levona	Smith		1302000	3433 Dequindr...	5863233301
987654321	601405801	Howard	Packets		12251980	3433 Jefferson...	5865431204
447444447	501454747	Ramesh	Narayan		3142000	3433 Conant ...	3134902253
555555555	501454747	Manesh	Narayan		9191987	3433 Conant ...	3134902253
999999999	950890745	Steve	Cook		241995	3433 Jefferson...	3134993201
111111111	950890745	John	Appleseed		5031991	3433 Evergree...	3134332223
744474444	201402502	Delia	Align		291996	3433 Dequindr...	5863433302

Delete all customers by the first name of Frank.

After

Filter	Filter	Filter	Filter	Filter		Filter	Filter
336333336	201102401	Jennifer	Wallace		6071978	3433 Dequindr...	5863233304
888888888	201102401	Cody	Wallace		1011998	2333 Dequindr...	5863233304
648479182	950890745	Barney	Wabble		6201975	3433 Rocheste...	2483090099
663666663	950890745	Levona	Smith		1302000	3433 Dequindr...	5863233301
987654321	601405801	Howard	Packets		12251980	3433 Jefferson...	5865431204
447444447	501454747	Ramesh	Narayan		3142000	3433 Conant ...	3134902253
555555555	501454747	Manesh	Narayan		9191987	3433 Conant ...	3134902253
999999999	950890745	Steve	Cook		241995	3433 Jefferson...	3134993201
111111111	950890745	John	Appleseed		5031991	3433 Evergree...	3134332223
744474444	201402502	Delia	Align		291996	3433 Dequindr...	5863433302

Before SQL Query #9

Inserting a new drug, along with its manufacturer details.

INSERT INTO Manufacturer
VALUES(61412,"GlaxoSmith",8001549521);
INSERT INTO Drug
VALUES(614123555,"Zantac","Ranitidine",61412,"GlaxoSmith",100,50,NULL);

	NDC	ProductName	GenericName	ManufactureNDC	ManufactureName	QuantityOnHand	Price	ontrolledLevel ▼
		Filter	Filter	Filter	Filter	Filter	Filter	Filter
	614123555	Zantac	Ranitidine	61412	GlaxoSmith	100	50	NULL
2	1152343321	Claratin	Loratadine	11523	Schering Plough	600	20	NULL
3	4988403350	Prozac	Fluoxetine	49884	Eli Lilly and Company	300	100	NULL
4	5439611060	Glucophage	Metformin	68382	Bristol-Myers Squibb	200	120	NULL
5	5784410501	Prilosec	Omeprazole	16590	AstraZenca	120	80	NULL
6	5908831016	Oxandrin	Oxandrolone tablet	54396	BioTechnology General	60	500	NULL
7	6191235440	Robaxin	Methocarbamol	61912	Beximco Pharmaceutical	300	80	NULL
8	6671597488	Xanax	Alprazolam	61919	Pfizer	40	200	NULL
9	6191935440	Voltaren	Diclofenac	59088	GSK Consumer Health	5	20	2
10	6191908960	Adderal	Dextroamphetamine-saccharate	57844	Teva Pharmaceuticals	100	350	3
11	6838218401	Pepcid	Famotidine	66715	Johnson & Johnson	100	30	4

	ManufacturerNDC	ManufactureNames	PhoneNumber
	Filter	Filter	Filter
	11523	Schering Plough	8335701757
	16590	AstraZenca	9087404000
	49884	Eli Lilly and Company	8005455979
	54396	BioTechnology General	8003322056
	57844	Teva Pharmaceuticals	8002369933
	59088	GSK Consumer Health	8004158484
	61412	GlaxoSmith	8001549521
	61912	Beximco Pharmaceutical	888382872
	61919	Pfizer	8002451040
	66715	Johnson & Johnson	8665652873
	68382	Bristol-Myers Squibb	8884847900

Before

SQL Query #10

111111111	950890745	John	Appleseed	5031991	3433 Evergree...	3134332223
222222222	201402502	Frank	Wong	9151968	3433 Rocheste...	2483090099
336333336	201102401	Jennifer	Wallace	6071978	3433 Dequindr...	5863233304
447444447	501454747	Ramesh	Narayan	3142000	3433 Conant ...	3134902253
555555555	501454747	Manesh	Narayan	9191987	3433 Conant ...	3134902253
663666663	950890745	Levona	Smith	1302000	3433 Dequindr...	5863233301
744474444	201402502	Delia	Align	291996	3433 Dequindr...	5863433302
888888888	201102401	Cody	Wallace	1011998	2333 Dequindr...	5863233304
987654321	601405801	Howard	Packets	12251980	3433 Jefferson...	5865431204
999999999	950890745	Steve	Cook	241995	3433 Jefferson...	3134993201

INSERT INTO Customer
VALUES(648479182,950890745,"
Barney","Wabble",06201975,"3433
Rochester Troy MI,
48083",2483090099);

Inserting a new customer into database.

After

111111111	950890745	John	Appleseed	5031991	3433 Evergree...	3134332223
222222222	201402502	Frank	Wong	9151968	3433 Rocheste...	2483090099
336333336	201102401	Jennifer	Wallace	6071978	3433 Dequindr...	5863233304
447444447	501454747	Ramesh	Narayan	3142000	3433 Conant ...	3134902253
555555555	501454747	Manesh	Narayan	9191987	3433 Conant ...	3134902253
648479182	950890745	Barney	Wabble	6201975	3433 Rocheste...	2483090099
663666663	950890745	Levona	Smith	1302000	3433 Dequindr	5863233301
744474444	201402502	Delia	Align	291996	3433 Dequindr	5863433302
888888888	201102401	Cody	Wallace	1011998	2333 Dequindr...	5863233304
987654321	601405801	Howard	Packets	12251980	3433 Jefferson...	5865431204
999999999	950890745	Steve	Cook	241995	3433 Jefferson...	3134993201

Query 11: Find the prescriptions given by a certain medical provider ordered by customer's SSN.

```sql
1   SELECT Drug.GenericName,Prescription.NDC, Provider.FirstName, Provider.LastName
2   FROM Prescription, Drug, Provider
3   Where Prescription.NPI=1978547194
4   AND Prescription.NDC=Drug.NDC
5   AND Prescription.NPI=Provider.NPI
6   ORDER BY SSN
```

	GenericName	NDC	FirstName	LastName
1	Loratadine	1152343321	Merog	Yunus
2	Fluoxetine	4988403350	Merog	Yunus
3	Loratadine	1152343321	Merog	Yunus

```
Execution finished without errors.
Result: 3 rows returned in 18ms
At line 1:
SELECT Drug.GenericName,Prescription.NDC, Provider.FirstName, Provider.LastName
FROM Prescription, Drug, Provider
Where Prescription.NPI=1978547194
AND Prescription.NDC=Drug.NDC
AND Prescription.NPI=Provider.NPI
ORDER BY SSN
```

Questions?