

CSE 412 - Phase 02

Team members: Monil Patel, Samson Mathais, Worifung Achu

ER-to-Relational Model Transformation

DDL SCRIPTS

Defining the Database

```
1 CREATE DATABASE CSE412;
```

Make table

```
20 CREATE TABLE make (
21     "MAKE_ID" SERIAL PRIMARY KEY,
22     "BRAND" VARCHAR(150) NOT NULL UNIQUE,
23     "MAKE ORIGIN" VARCHAR(100)
24 );
25
```

Model table

```
CREATE TABLE model (
    "MODEL_ID" SERIAL PRIMARY KEY,
    "MAKE_ID" INTEGER NOT NULL REFERENCES make("MAKE_ID") ON DELETE RESTRICT,
    "MODELNAME" VARCHAR(150) NOT NULL,
    "MODELTYPE " VARCHAR(100), -- note trailing space in header
    "FUELTYPE" VARCHAR(50),
    UNIQUE ("MAKE_ID", "MODELNAME")
);
```

Dealership table

```
36 -- DEALERSHIP table matching: ['DEALERSHIPS_ID', 'DEALERSHIP_NAME', 'LOCATION']
37 CREATE TABLE dealership (
38     "DEALERSHIPS_ID" varchar(25) PRIMARY KEY,
39     "DEALERSHIP_NAME" VARCHAR(200) NOT NULL,
40     "LOCATION" VARCHAR(250) NOT NULL
41 );
42
```

Customer table

```
43 -- CUSTOMER table (unchanged column names from previous design; CSV not provided for customers)
44 CREATE TABLE customer (
45     CUST_ID          SERIAL PRIMARY KEY,
46     FULL_NAME        VARCHAR(200) NOT NULL,
47     PHONE_NUMBER     VARCHAR(50) NOT NULL UNIQUE,
48     ADDR             VARCHAR(400),
49     USERNAME         VARCHAR(100) NOT NULL UNIQUE,
50     PASS_HASH        TEXT NOT NULL,
51     CREATED_AT       TIMESTAMP WITH TIME ZONE DEFAULT now()
52 );
```

Car table

```
53 -- CAR table matching car_info columns:
54 -- ['CAR NAME', 'MODEL', 'IMAGE', 'PRICE RANGE', 'PRICE($)', 'STOCK TYPE', 'MILEAGE', 'RATING', 'REVIEW',
55 --  'DEALER NAME', 'CAR_ID', 'VIN', 'COLOR', 'PRICE', 'AVAILABLE STATUS', 'DEALERSHIPS_ID', 'MODEL_ID', 'MAKE_ID']
56 CREATE TABLE car (
57     "CAR_ID"          SERIAL PRIMARY KEY,
58     "CAR NAME"        VARCHAR(255),
59     "IMAGE"           TEXT,
60     "PRICE RANGE"     VARCHAR(100),
61     "PRICE($)"        NUMERIC(12,2),
62     "STOCK TYPE"      VARCHAR(100),
63     "MILEAGE"         VARCHAR(100),
64     "RATING"          NUMERIC(3,2),
65     "REVIEW"         TEXT,
66     "DEALER NAME"     VARCHAR(255),
67     "VIN"             VARCHAR(100) NOT NULL UNIQUE,
68     "COLOR"           VARCHAR(50),
69     "PRICE"           NUMERIC(12,2) NOT NULL CHECK ("PRICE" >= 0),
70     "IS_AVAIL"        BOOLEAN NOT NULL DEFAULT TRUE,
71     "DEALERSHIPS_ID"  VARCHAR(25) REFERENCES dealership("DEALERSHIPS_ID") ON DELETE RESTRICT,
72     "MODEL_ID"        INTEGER REFERENCES model("MODEL_ID") ON DELETE RESTRICT,
73     "MAKE_ID"         INTEGER REFERENCES make("MAKE_ID") ON DELETE RESTRICT,
74     "CREATED_AT"      TIMESTAMP WITH TIME ZONE DEFAULT now()
75 );
```

Service record table

```
78 -- SERVICE RECORD matching: ['SERVICE_ID', 'SERVICE_DESCRIPTION', 'TOTAL_COST', 'REPAIR_DATE', 'CAR_ID']
79 CREATE TABLE service_record (
80     "SERVICE_ID"     SERIAL PRIMARY KEY,
81     "SERVICE_DESCRIPTION" TEXT,
82     "TOTAL_COST"      NUMERIC(10,2) CHECK ("TOTAL_COST" >= 0),
83     "REPAIR_DATE"     DATE NOT NULL,
84     "CAR_ID"          INTEGER NOT NULL REFERENCES car("CAR_ID") ON DELETE CASCADE
85 );
```

Sale table

```
86
87 -- SALE table / Receipt: keep similar to previous design but referencing car "CAR_ID" and customer_id
88 CREATE TABLE sale (
89     SALE_ID          SERIAL PRIMARY KEY,
90     "CAR_ID"         INTEGER NOT NULL REFERENCES car("CAR_ID") ON DELETE RESTRICT,
91     CUST_ID          INTEGER NOT NULL REFERENCES customer(CUST_ID) ON DELETE CASCADE,
92     SALE_DATE        DATE NOT NULL,
93     SALE_PRICE        NUMERIC(12,2) NOT NULL CHECK (SALE_PRICE > 0),
94     CREATED_AT       TIMESTAMP WITH TIME ZONE DEFAULT now(),
95     UNIQUE ("CAR_ID", SALE_DATE)
96 );
97
```

Here are the scripts that we wrote as our DDL.

Car table

car

GeneralColumnsAdvancedConstraintsPartitionsParametersSecuritySQL

Inherited from table(s)

Select to inherit from...

Columns

	Name	Data type	Length/Precision	Scale	Not NULL?	Primary key?	Default
	CAR_ID	integer			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	nextval("car_CAF")
	CAR NAME	character varying	255		<input type="checkbox"/>	<input type="checkbox"/>	
	IMAGE	text			<input type="checkbox"/>	<input type="checkbox"/>	
	PRICE RANGE	character varying	100		<input type="checkbox"/>	<input type="checkbox"/>	
	PRICE(\$)	numeric	12	2	<input type="checkbox"/>	<input type="checkbox"/>	
	STOCK TYPE	character varying	100		<input type="checkbox"/>	<input type="checkbox"/>	
	MILEAGE	character varying	100		<input type="checkbox"/>	<input type="checkbox"/>	
	RATING	numeric	3	2	<input type="checkbox"/>	<input type="checkbox"/>	
	REVIEW	text			<input type="checkbox"/>	<input type="checkbox"/>	
	DEALER NAME	character varying	255		<input type="checkbox"/>	<input type="checkbox"/>	
	VIN	character varying	100		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	COLOR	character varying	50		<input type="checkbox"/>	<input type="checkbox"/>	
	PRICE	numeric	12	2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

IS_AVAIL	boolean				<input checked="" type="checkbox"/>	<input type="checkbox"/>	true
DEALERSHIPS_ID	character varying	25			<input type="checkbox"/>	<input type="checkbox"/>	
MODEL_ID	integer				<input type="checkbox"/>	<input type="checkbox"/>	
MAKE_ID	integer				<input type="checkbox"/>	<input type="checkbox"/>	
CREATED_AT	timestamp with time zone				<input type="checkbox"/>	<input type="checkbox"/>	now()

Customer

customer

General

Columns

Advanced

Constraints

Partitions

Parameters















Security

SQL

Inherited from table(s)

Select to inherit from...

Columns

	Name	Data type	Length/Precision	Scale	Not NULL?	Primary key?	Default
 	cust_id	integer			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	nextval('custo
 	full_name	character varying	200		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
 	phone_number	character varying	50		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
 	addr	character varying	400		<input type="checkbox"/>	<input type="checkbox"/>	
 	username	character varying	100		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
 	pass_hash	text			<input checked="" type="checkbox"/>	<input type="checkbox"/>	
 	created_at	timestamp with time zone			<input type="checkbox"/>	<input type="checkbox"/>	now()

Dealership

dealership

General

Columns

Advanced

Constraints

Partitions

Parameters
















Security

SQL

Inherited from table(s)

Select to inherit from...

Columns

	Name	Data type	Length/Precision	Scale	Not NULL?	Primary key?	Default
 	DEALERSHIPS_ID	character varying 	25				<input type="text"/>
 	DEALERSHIP_NAME	character varying 	200				<input type="text"/>
 	LOCATION	character varying 	250				<input type="text"/>

?

?

Close

Reset

Save







Make



make

General
Columns
Advanced
Constraints
Partitions
Parameters
Security
SQL

Inherited from table(s)
Select to inherit from...

Columns

	Name	Data type	Length/Precision	Scale	Not NULL?	Primary key?	Default
 	MAKE_ID	integer			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	nextval('mc
 	BRAND	character varying	150		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
 	MAKE ORIGIN	character varying	100		<input type="checkbox"/>	<input type="checkbox"/>	



Close
Reset
Save











Model



model

General
Columns
Advanced
Constraints
Partitions
Parameters
Security
SQL

Inherited from table(s)
Select to inherit from...

Columns

	Name	Data type	Length/Precision	Scale	Not NULL?	Primary key?	Default
 	MODEL_ID	integer			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	nextval('mc
 	MAKE_ID	integer			<input checked="" type="checkbox"/>	<input type="checkbox"/>	
 	MODELNAME	character varying	150		<input checked="" type="checkbox"/>	<input type="checkbox"/>	
 	MODELTYPE	character varying	100		<input type="checkbox"/>	<input type="checkbox"/>	
 	FUELTYPE	character varying	50		<input type="checkbox"/>	<input type="checkbox"/>	



Close
Reset
Save

Sale

sale

×













General Columns Advanced Constraints Partitions Parameters Security SQL

Inherited from table(s)

Select to inherit from...

Columns

+

	Name	Data type	Length/Precision	Scale	Not NULL?	Primary key?	Default
 	sale_id	integer v			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	nextval('sa
 	CAR_ID	integer v			<input checked="" type="checkbox"/>	<input type="checkbox"/>	
 	cust_id	integer v			<input checked="" type="checkbox"/>	<input type="checkbox"/>	
 	sale_date	date v			<input checked="" type="checkbox"/>	<input type="checkbox"/>	
 	sale_price	numeric v	12	2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
 	created_at	timestamp with time z v			<input type="checkbox"/>	<input type="checkbox"/>	now()

i

?

×

Close

↺

Reset

💾

Save

Service_record

service_record

×











General Columns Advanced Constraints Partitions Parameters Security SQL

Inherited from table(s)

Select to inherit from...

Columns

+

	Name	Data type	Length/Precision	Scale	Not NULL?	Primary key?	Default
 	SERVICE_ID	integer v			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	nextval('service.
 	SERVICE_DESCRIPTION	text v			<input type="checkbox"/>	<input type="checkbox"/>	
 	TOTAL_COST	numeric v	10	2	<input type="checkbox"/>	<input type="checkbox"/>	
 	REPAIR_DATE	date v			<input checked="" type="checkbox"/>	<input type="checkbox"/>	
 	CAR_ID	integer v			<input checked="" type="checkbox"/>	<input type="checkbox"/>	

i

?

×

Close

↺

Reset

💾

Save

Here are our tables. As you can see, we are getting the right primary keys in each table and the right attributes for each table with their respective domains to show that our DDL scripts executed properly.

Data Population

SELECT * For each table:

Query Query History					
1 select * from service_record;					
Data Output Messages Notifications					
<div><div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div><div></div></div><div>SQL</div></div>					
	SERVICE_ID [PK] integer	SERVICE_DESCRIPTION text	TOTAL_COST numeric (10,2)	REPAIR_DATE date	CAR_ID integer
1	1906398	Diagnosed and repaired Oil Drain Plug.	76.90	2023-10-12	629151
2	522849	Diagnosed and repaired Rim.	30.64	2022-11-13	659597
3	1872714	Diagnosed and repaired Timing Belt.	806.68	2021-02-03	772886
4	928325	Diagnosed and repaired no parts used.	40.88	2022-04-24	82768
5	759831	Diagnosed and repaired Engine Mount.	775.47	2023-11-18	666944
6	1882379	Diagnosed and repaired Gearbox Seal.	893.24	2020-02-09	97098
7	512524	Diagnosed and repaired no parts used.	111.47	2020-02-27	103760
8	333238	Diagnosed and repaired Clutch Kit.	920.10	2021-09-18	319689
9	833756	Diagnosed and repaired Spark Plugs.	569.47	2021-12-13	848125
10	1073540	Diagnosed and repaired Calipers.	325.33	2020-01-01	563048
11	733703	Diagnosed and repaired Oil Pump.	492.37	2024-01-23	531859
12	2019634	Diagnosed and repaired Oil Filter.	88.52	2023-05-03	191330
13	1787159	Diagnosed and repaired Oil Drain Plug.	59.68	2020-04-12	455964
14	495240	Diagnosed and repaired no parts used.	105.23	2021-05-02	704419
15	618362	Diagnosed and repaired Clutch Kit.	1462.54	2023-02-13	859980
16	342040	Diagnosed and repaired Brake Pads.	371.87	2023-06-01	938515
17	822173	Diagnosed and repaired TPMS Sensor.	111.55	2024-11-12	796194
18	1356554	Diagnosed and repaired TPMS Sensor.	180.02	2024-04-08	287494
19	1383283	Diagnosed and repaired Synthetic Oil.	90.92	2024-04-27	435310
20	703724	Diagnosed and repaired Clutch Kit.	1136.62	2022-04-09	834769
21	1037996	Diagnosed and repaired Synthetic Oil.	66.84	2024-05-31	85504
22	1918740	Diagnosed and repaired Battery Holder.	180.88	2023-02-06	669810

Query

Query History

1

select * from car;

Query

Query History

1

select * from dealership;

Data Output

Messages

Notifications

Query

Query History

1

select * from model;

Data Output

Messages

Notifications

≡+

📄

▼

📋

▼

🗑️

📦

⬇️

📈

SQL

Showing

	MODEL_ID [PK] integer	MAKE_ID integer	MODELNAME character varying (150)	MODELTYPE character varying (100)	FUELTYPE character varying (50)
1	38160	733739	Traverse LT	crossover	Gasoline
2	832859	733739	Traverse LS	crossover	Gasoline
3	427116	733739	Traverse 2LT	crossover	Gasoline
4	60772	733739	Traverse LT Leather	crossover	Gasoline
5	521965	733739	Traverse LTZ	crossover	Gasoline
6	715524	733739	Traverse Premier	crossover	Gasoline
7	168365	733739	Traverse LT Cloth	crossover	Gasoline
8	524968	733739	Traverse 1LT	crossover	Gasoline
9	761588	733739	Traverse High Country	crossover	Gasoline
10	56563	733739	Traverse RS	crossover	Gasoline
11	410232	733739	Traverse AWD Z71	crossover	Gasoline
12	659883	733739	Traverse Z71	crossover	Gasoline
13	55507	733739	Traverse FWD LT	crossover	Gasoline
14	381121	733739	Traverse LT 1LT	crossover	Gasoline
15	995159	733739	Traverse FWD LS	crossover	Gasoline
16	794424	733739	Traverse AWD LT	crossover	Gasoline

Query

Query History

1

select * from sale;

Data Output

Messages

Notifications

≡+

📄

▼

📋

▼

🗑️

📦

⬇️

📈

SQL

	sale_id [PK] integer	CAR_ID integer	cust_id integer	sale_date date	sale_price numeric (12,2)	created_at timestamp with time zone
--	-------------------------	-------------------	--------------------	-------------------	------------------------------	--

Query

Query History

Scratch Pad X

1

select * from customer;

Data Output

Messages

Notifications

≡+

📄

▼

📋

▼

🗑️

📦

⬇️

📈

SQL

Showing rows: 1 to 1

Page No: 1 of 1

⏪

⏩

	cust_id [PK] integer	full_name character varying (200)	phone_number character varying (50)	addr character varying (400)	username character varying (100)	pass_hash text	created_at timestamp with time zone
1	3	achu clinton	634-342-2353	2209 nowhere st	mistryuser	\$2y\$15\$jpU028aaFEe/zcqpwdUJBuJc.k2ekYpK8.5mVTXL26laraCXzofYq	2025-11-09 21

Query

Query History

1

2

select * from make;

Data Output

Messages


Notifications

This sql statement selects all the data from the make table.

Insert Commands;

Query		Query History	
1	INSERT INTO service_record ("CAR_ID", "SERVICE_DESCRIPTION", "TOTAL_COST", "REPAIR_DATE")		
2	SELECT "CAR_ID", 'Oil change and tire rotation', 125.00, '2024-11-08'		
3	FROM car		
4	LIMIT 1;		
5			

This query inserts a new service record for routine vehicle maintenance by automatically selecting the first available car from the inventory and recording an oil change and tire rotation service costing \$125.00.



```
1 INSERT INTO sale ("CAR_ID", CUST_ID, SALE_DATE, SALE_PRICE)
2 SELECT c."CAR_ID", cu.CUST_ID, CURRENT_DATE, c."PRICE" * 0.95
3 FROM car c, customer cu
4 WHERE c."IS_AVAIL" = TRUE
5 LIMIT 1;
```

Data Output **Messages** Notifications

INSERT 0 0

Query returned successfully in 113 msec.

This query records a new vehicle sale by automatically matching an available car with a customer and applying a 5% discount to the sale price, then marks the transaction with today's date.

SQL Queries Covering Application Use Cases

This will enable users to filter by make when looking for a car.

1st SELECT query

Query

Query History

1

2

```
SELECT "BRAND", "MAKE ORIGIN" FROM MAKE WHERE "MAKE ORIGIN" = 'USA';
```

Data Output

Messages

Notifications

≡

+

📄

▼

📋

▼

🗑

🗄

⬇

📈

SQL

	BRAND character varying (150) 🔒	MAKE ORIGIN character varying (100) 🔒
1	Chevrolet	USA
2	Ford	USA
3	Lincoln	USA
4	Rambler	USA
5	Bremen	USA
6	Delorean	USA

Select the brand and the make origin from the make table

2nd SELECT query

Query

Query History

1

select "CAR NAME", "IMAGE", "PRICE(\$)" from car where "PRICE RANGE" = 'High' ;

2

Scratch Pad

x

Data Output

Messages

Notifications

SQL

Showing rows: 1 to 1000

Page No: 1 of 59

	CAR NAME character varying (255)	IMAGE text	PRICE(\$) numeric (12,2)
1	Chevrolet Traverse LT	https://www.cars.com/i/large/in/v2/fe8df1b1-434f-40b9-b35a-71dc3dae2b67/20b2af31-0c83-4d2f-ab14-ecaf3dbae2e1/NjJzQgtGyulkRglfzqzkf6BQDb0.jpg	41170.00
2	Chevrolet Traverse LT	https://www.cars.com/i/large/in/v2/110522e7-fa4b-509d-9a8d-4c4ce9a45d10/577781d3-be53-4988-bd45-dd1c4bdc3d4a/eCw69N-FNFEoJXkMKeh0F9e0E...	42540.00
3	Chevrolet Traverse LS	https://www.cars.com/i/large/in/v2/e1302f10-28b9-5444-ae89-dae0ab2f300d/a1daf799-b161-47e5-8357-fc39673264f/rQXaxq0qQLN-PQJTnw9iTYWQUn4...	37810.00
4	Chevrolet Traverse LT	https://www.cars.com/i/large/in/v2/6f69365b-5f1b-5b62-917f-67d8c7dfe522/fb430440-c2b7-416d-bc0f-c51ec8e6906a/NzSPwzQesCJRve5vAUVGgEGovj0j...	38329.00
5	Chevrolet Traverse Premier	https://www.cars.com/i/large/in/v2/9087312b-2e09-5802-8e2d-3549bc32f2fe/f162c31c-fc14-43dc-b41a-a5534328053c/KdVILUSwEEEEAvDsE0fqkxxkR_MU...	40000.00
6	Chevrolet Traverse LT	https://www.cars.com/i/large/in/v2/56f70e06-f78b-5db8-8599-c469c6c235fa/070fb6b2-b7ad-414a-ae4d-cc7583137c18/Wx-osU8JMeKWINpTNEa-DWTb7...	40539.00
7	Chevrolet Traverse High Country	https://www.cars.com/i/large/in/v2/026ebb15-64d0-5d08-a570-0ce10a043e2d/bc6b5dd8-6fe4-4c0c-bd4a-e3a185365c68/18xyWhPCwT6R8FusXT-Jjlvirb4.j...	35515.00
8	Chevrolet Traverse LT	https://www.cars.com/i/large/in/v2/color_matched_stock_photos/19f56a67-5bd6-408b-bcbf-ecad27b00858/8ed08be8-e8aa-4563-a849-05cf150055d3.jpg	42165.00

Selecting the car name, images, and price from the car table where the price range is high. This enables users to filter by predefined price ranges

1 INSERT query

Query	Query History
1	<code>insert into Customer(cust_id, full_name, phone_number, addr, username, pass_hash, created_at) values (</code>
2	<code>1, --cust_id</code>
3	<code>'achu clinton', --full_name</code>
4	<code>'634-342-2353', --phone_number</code>
5	<code>'2209 nowhere st', --addr</code>
6	<code>'mistryuser', --username</code>
7	<code>'\$2y\$15\$lpU028aaFEe/zcqpwduJBuJc.k2ekYpK8.5mVTXL26laraCXzofYq', --password_hash</code>
8	<code>now() --created_at</code>
9	<code>)</code>
Data Output	Messages Notifications
INSERT 0 1	
Query returned successfully in 54 msec.	

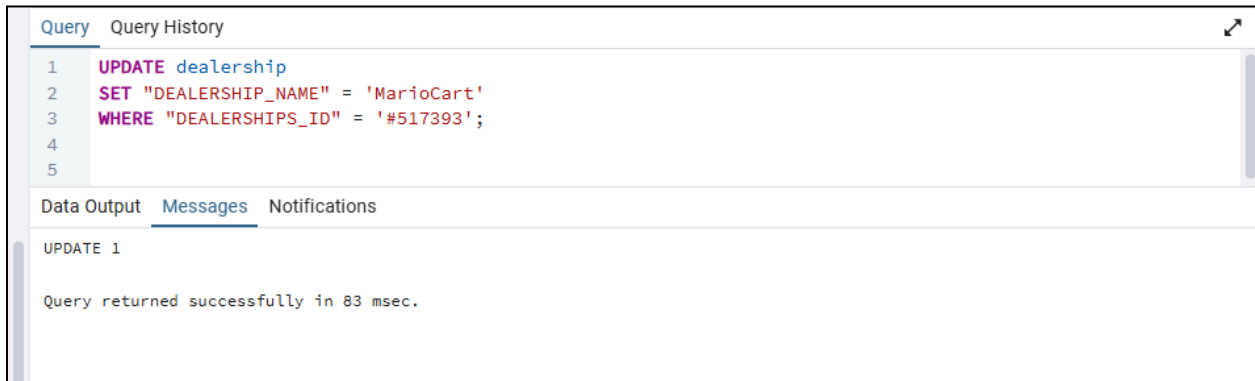
This query will be used in the creation of new users. When a user creates an account, their information will be stored in the database using this query.

1 DELETE query

Query	Query History
1	
2	<code>delete from customer where cust_id = 1</code>
Data Output	Messages Notifications
DELETE 1	
Query returned successfully in 67 msec.	

Users will be given the ability to delete their accounts. This will be accomplished via a delete command with a where clause specifying the user

1 UPDATE query



The screenshot shows a database query interface with two tabs: 'Query' and 'Query History'. The 'Query' tab is active, displaying a SQL UPDATE query. The query is as follows:

```
1 UPDATE dealership
2 SET "DEALERSHIP_NAME" = 'MarioCart'
3 WHERE "DEALERSHIPS_ID" = '#517393';
4
5
```

Below the query, there are three tabs: 'Data Output', 'Messages', and 'Notifications'. The 'Messages' tab is active, showing the following message:

```
UPDATE 1

Query returned successfully in 83 msec.
```

Users will be given the ability to delete their accounts. This will be accomplished via a delete command with a where clause specifying the user

Video Link

Here is the link to our video demo:

https://youtu.be/8VF31gPNJ_4