DATABASE PROJECT

COMP-1240 SQL-STRUCTURED QUERY LANGUAGE

CAR RENTAL DATABASE

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DATABASE DESCRIPTION

The car rental reservation system is used as a reference for the database used to fulfill the project requirement. The purpose of the database is to make reservations on rental vehicles. It also allows the user to track a vehicle, and to identify which ones are ready to turn over.

ENTITY RELATIONSHIP DIAGRAM

Figure 1 car rental Entity Relationship Diagram shows the tables and their entity relationship with the delete value. Each table shows the Primary Key and Foreign Key.

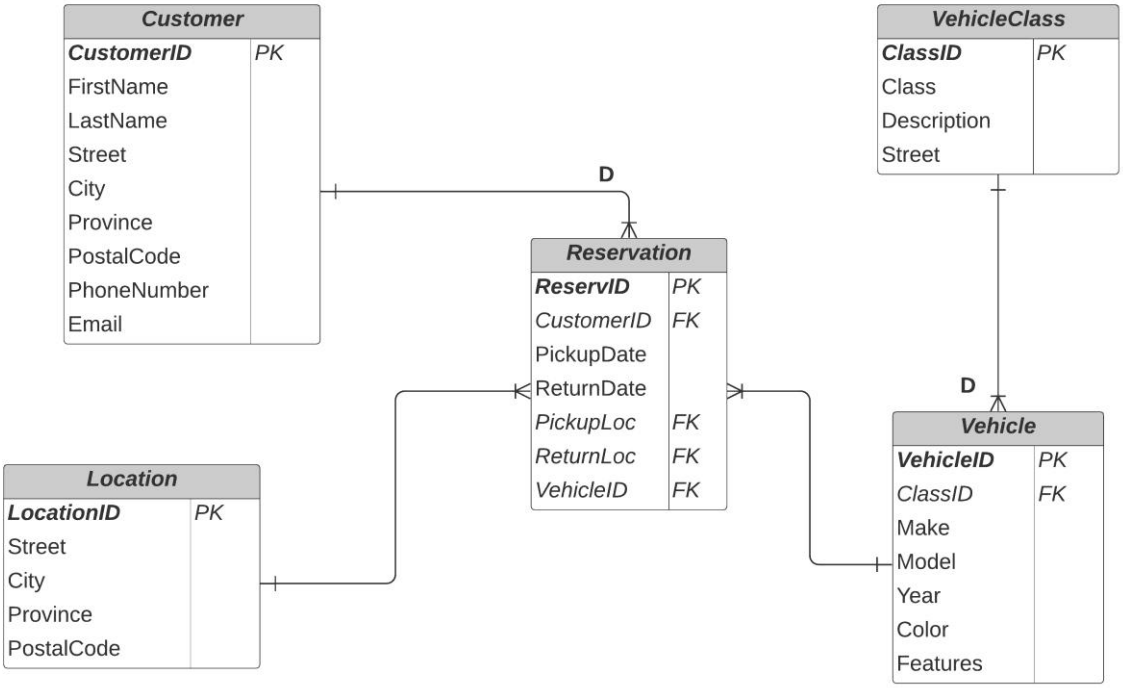


Figure 1

CARDINALITIES

Vehicle – VehicleClass: many to one

Location – Reservation: one to many

- A vehicle belongs to no more than one location. The vehicle's location is identified by its pickup location when reservation is made.

Vehicle – Reservation: one to many

- A vehicle can be rented many times or not at all. But a reservation number (ReservID) only has one vehicle at a specific date (pickup/return).

Reservation – Customer: many to one

- One customer can have many reservations on different dates with different vehicles.

Vehicle – Reservation – Customer: one to one

- One vehicle is rented only by one customer. If that same customer wants to rent another vehicle, a new reservation number (ReservID) will be issued.

CREATE STATEMENTS

```sql
CREATE DATABASE CarRental;

CREATE TABLE Customer (
   CustomerID    int IDENTITY (1,1) NOT NULL,
   FirstName     varchar(50) NOT NULL,
   LastName      varchar(50) NOT NULL,
   Street        varchar(100),
   City          varchar(50),
   Province      char(2),
   PostalCode    varchar(7),
   PhoneNumber   varchar(15),
   Email         varchar(50)
CONSTRAINT PKcustomer PRIMARY KEY (CustomerID),
CONSTRAINT uc_email UNIQUE (Email)
);

CREATE TABLE VehicleClass (
   ClassID       int IDENTITY (1,1) NOT NULL,
   Class         nvarchar(50),
   Description   nvarchar(250)
PRIMARY KEY (ClassID)
);
```

```sql
CREATE TABLE Vehicle (
    VehicleID     int IDENTITY (1,1) NOT NULL,
    ClassID       int NOT NULL,
    Make          varchar(50),
    Model         varchar(50),
    VehicleYear   smallint,
    Color         varchar(50),
    Features      nvarchar(250)
PRIMARY KEY (VehicleID),
CONSTRAINT fkClassID FOREIGN KEY (ClassID)
REFERENCES VehicleClass ON DELETE CASCADE
);

CREATE TABLE Location (
    LocationID    int IDENTITY(1,1) NOT NULL,
    Street        nvarchar(100),
    City          nvarchar(50),
    Province      nvarchar(50),
    PostalCode    varchar(7),
PRIMARY KEY (LocationID)
);

CREATE TABLE Reservation (
    ReservID      int IDENTITY(1,1) NOT NULL,
    CustomerID    int NOT NULL,
    PickupDate    date,
    ReturnDate    date,
    PickupLoc     int NOT NULL,
    ReturnLoc     int NOT NULL,
    VehicleID     int NOT NULL
PRIMARY KEY (ReservID),
CONSTRAINT fkRentalCustomer FOREIGN KEY (CustomerID)
REFERENCES Customer ON DELETE CASCADE,
CONSTRAINT fkRentalVehicle FOREIGN KEY (VehicleID)
REFERENCES Vehicle,
CONSTRAINT fkRentalPickupLoc FOREIGN KEY (PickupLoc)
REFERENCES Location (LocationID),
CONSTRAINT fkRentalReturnLoc FOREIGN KEY (ReturnLoc)
REFERENCES Location (LocationID)
);
```

INSERT STATEMENTS

CUSTOMER TABLE

```sql
INSERT INTO Customer (FirstName, LastName, Street, City, Province, PostalCode,
PhoneNumber, Email)
VALUES ('Cally', 'Reynolds', '134 Mcphillips St', 'Winnipeg', 'MB', 'R2C 2J6',
'(204) 555-4433', 'penatibus.et@lectusa.com'),
```

```
        ('Sydney', 'Bartlett', '844 Somewhere Ave', 'Abbottsford', 'BC', 'V1M 3L7',
'(604) 892-3256', 'nibh@ultricesposuere.edu'),
        ('Hunter', 'Newton','11 Duncan Street', 'Toronto', 'ON', 'M5V 3M2', '(909)
371-2187', 'quam.quis.diam@facilisisfacilisis.org'),
        ('Brooke', 'Perkins',  '8 South Mcmullen', 'Ajax', 'ON', 'L1T 1R5', '(831)
996-1240', 'sit@vitaealiquetnec.net'),
        ('Nolan', 'Slater', '12 Cultus Street', 'Richmond', 'BC', 'V3M 7Q3', '(340)
732-9367', 'sociis.natoque.penatibus@pedeCras.co.uk'),
        ('Germaine', 'Green', '708 South Boulevard', 'Vancouver', 'BC', 'V2W 7T7',
'(466) 455-4160', 'ultrices.Vivamus@orciin.edu'),
        ('Medge', 'Ratcliffe', '68 125th Street', 'Richmond', 'BC', 'V8B 2S7',
'(358) 751-8227', 'nulla.ante@posuerevulputate.org'),
        ('Nash', 'Vasquez', '3896 Home Lane', 'Alma', 'QC', 'G8B 1K7', '(989) 937-
6199', 'ut.nisi@elitAliquam.ca'),
        ('Michael', 'Rutledge', '1045 Kildare Avenue East', 'Winnipeg', 'MB', 'R2X
2J6', '(989) 937-6199', 'eget.lacus@sitametorci.org'),
        ('Guy', 'Ochoa', '2834 Brooklyn Street', 'Alcida', 'NB', 'E8J 2C4', '(720)
242-4596)', 'montes.nascetur@semperrutrum.net');
```

Results | Messages

CustomerID	FirstName	LastName	Street	City	Province	PostalCode	PhoneNumber	Email

Results | Messages

	CustomerID	FirstName	LastName	Street	City	Province	PostalCode	PhoneNumber	Email
1	1	Cally	Reynolds	134 Mcphillips St	Winnipeg	MB	R2C 2J6	(204) 555-4433	penatibus.et@lectusa.com
2	2	Sydney	Bartlett	844 Somewhere Ave	Abbottsford	BC	V1M 3L7	(604) 892-3256	nibh@ultricesposuere.edu
3	3	Hunter	Newton	11 Duncan Street	Toronto	ON	M5V 3M2	(909) 371-2187	quam.quis.diam@facilisisfacilisis.org
4	4	Brooke	Perkins	8 South Mcmullen	Ajax	ON	L1T 1R5	(831) 996-1240	sit@vitaealiquetnec.net
5	5	Nolan	Slater	12 Cultus Street	Richmond	BC	V3M 7Q3	(340) 732-9367	sociis.natoque.penatibus@pedeCras.co.uk
6	6	Germaine	Green	708 South Boulevard	Vancouver	BC	V2W 7T7	(466) 455-4160	ultrices.Vivamus@orciin.edu
7	7	Medge	Ratcliffe	68 125th Street	Richmond	BC	V8B 2S7	(358) 751-8227	nulla.ante@posuerevulputate.org
8	8	Nash	Vasquez	3896 Home Lane	Alma	QC	G8B 1K7	(989) 937-6199	ut.nisi@elitAliquam.ca
9	9	Michael	Rutledge	1045 Kildare Avenue East	Winnipeg	MB	R2X 2J6	(989) 937-6199	eget.lacus@sitametorci.org
10	10	Guy	Ochoa	2834 Brooklyn Street	Alcida	NB	E8J 2C4	(720) 242-4596)	montes.nascetur@semperrutrum.net

VEHICLECLASS TABLE

```
INSERT INTO VehicleClass (Class, Description)
VALUES ('Car', '5-door sedan type'),
       ('SUV', 'Sport utility vehicle suitable for city and off-road conditions'),
       ('Van', 'Perfect for families, seats up to 8'),
       ('Truck', 'Pickup truck with open cargo area');
```

Results | Messages

ClassID	Class	Description

Results | Messages

	ClassID	Class	Description
1	1	Car	5-door sedan type
2	2	SUV	Sport utility vehicle suitable for city and off-road conditions
3	3	Van	Perfect for families, seats up to 8
4	4	Truck	Pickup truck with open cargo area

VEHICLE TABLE

```
INSERT INTO Vehicle (ClassID, Make, Model, VehicleYear, Color, Features)
VALUES (1, 'Chevrolet', 'Malibu', '2019', 'Blue', 'Power mirrors & lock doors,
tilt steering wheel, bluetooth'),
       (1, 'Hyundai', 'Accent', '2018', 'Blue', 'Cruise control, bluetooth, A/C'),
       (1, 'Kia', 'Forte', '2019', 'Red', 'Automatic, bluetooth, AM/FM stero'),
       (1, 'Ford', 'Fusion', '2016', 'Ruby Red', 'Automatic, bluetooth, AM/FM
stero'),
       (2, 'Chevrolet', 'Traverse', '2019', 'Black', '7-seat, Apple carplay and
Android auto, intelligent stop/start'),
       (2, 'Nissan', 'Qashqai', '2018', 'Pearl White', 'Tilt steering wheel, power
mirrors, bluetooth'),
       (2, 'Ford', 'Escape', '2017', 'Magnetic Metallic', 'Remote start,
bluetooth, memory seat'),
       (3, 'Honda', 'Odyssey', '2020', 'Steel Metallic', '3.5L, 24-valve, Direct
Injection, i-VTEC V6, power tailgate w/ programmable height'),
       (3, 'Dodge', 'Grand Caravan', '2020', 'Pearl White', 'Bluetooth and
navigation system'),
       (3, 'Dodge', 'Grand Caravan', '2015', 'Black', 'A/C, AM/FM stereo,
Automatic'),
       (4, 'Chevrolet', 'Colorado', '2019', 'Silver', 'Apple carplay and Android
auto, bluetooth'),
       (4, 'Chevrolet', 'Silverado', '2016', 'Silver', 'A/C, AM/FM stereo'),
       (4, 'Ford', 'F-150', '2019', 'Black', 'Apple carplay, Android auto,
bluetooth');
```

Results | Messages

VehicleID	ClassID	Make	Model	VehicleYear	Color	Features

Results | Messages

	VehicleID	ClassID	Make	Model	VehicleYear	Color	Features
1	1	1	Chevrolet	Malibu	2019	Blue	Power mirrors & lock doors, tilt steering wheel, bluetooth
2	2	1	Hyundai	Accent	2018	Blue	Cruise control, bluetooth, A/C
3	3	1	Kia	Forte	2019	Red	Automatic, bluetooth, AM/FM stero
4	4	1	Ford	Fusion	2016	Ruby Red	Automatic, bluetooth, AM/FM stero
5	5	2	Chevrolet	Traverse	2019	Black	7-seat, Apple carplay and Android auto, intelligent stop/start
6	6	2	Nissan	Qashqai	2018	Pearl White	Tilt steering wheel, power mirrors, bluetooth
7	7	2	Ford	Escape	2017	Magnetic Metallic	Remote start, bluetooth, memory seat
8	8	3	Honda	Odyssey	2020	Steel Metallic	3.5L, 24-valve, Direct Injection, i-VTEC V6, power tailgate w/ programmable height
9	9	3	Dodge	Grand Caravan	2020	Pearl White	Bluetooth and navigation system
10	10	3	Dodge	Grand Caravan	2015	Black	A/C, AM/FM stereo, Automatic
11	11	4	Chevrolet	Colorado	2019	Silver	Apple carplay and Android auto, bluetooth
12	12	4	Chevrolet	Silverado	2016	Silver	A/C, AM/FM stereo
13	13	4	Ford	F-150	2019	Black	Apple carplay, Android auto, bluetooth

LOCATION TABLE

```sql
INSERT INTO Location (Street, City, Province, PostalCode)
VALUES ('2000 Wellington Avenue', 'Winnipeg', 'MB', 'R3H 1C2'),
       ('30440 Liberator Avenue', 'Abbotsford', 'BC', 'V2T 6H5'),
       ('163 Carlingview Drive', 'Etobicoke', 'ON', 'M9W 5E7');
```

Results | Messages

LocationID	Street	City	Province	PostalCode

Results | Messages

	LocationID	Street	City	Province	PostalCode
1	1	2000 Wellington Avenue	Winnipeg	MB	R3H 1C2
2	2	30440 Liberator Avenue	Abbotsford	BC	V2T 6H5
3	3	163 Carlingview Drive	Etobicoke	ON	M9W 5E7

RESERVATION TABLE

```
INSERT INTO Reservation (CustomerID, PickupDate, ReturnDate, PickupLoc, ReturnLoc,
VehicleID)
VALUES (2, 'August 26, 2020', 'August 29, 2020', 1, 2, 2),
       (3, 'August 23, 2020', 'August 24, 2020', 2, 2, 1),
       (1, 'August 22, 2020', 'August 29, 2020', 1, 3, 3),
       (9, 'September 9, 2020', 'September 11, 2020', 3, 1, 6),
       (8, 'August 30, 2020', 'September 3, 2020', 2, 3, 8);
```

Results | Messages

ReservID	CustomerID	PickupDate	ReturnDate	PickupLoc	ReturnLoc	VehicleID

Results | Messages

	ReservID	CustomerID	PickupDate	ReturnDate	PickupLoc	ReturnLoc	VehicleID
1	1	2	2020-08-26	2020-08-29	1	2	2
2	2	3	2020-08-23	2020-08-24	2	2	1
3	3	1	2020-08-22	2020-08-29	1	3	3
4	4	9	2020-09-09	2020-09-11	3	1	6
5	5	8	2020-08-30	2020-09-03	2	3	8

INDEXES

An index for customer name with last name in ascending order:

```
CREATE NONCLUSTERED INDEX ix_CustomerName
ON Customer (LastName, FirstName ASC);

SELECT CONCAT (FirsName, ' ', LastName) AS Customer
FROM Customer;
```

Results | Messages

	Customer
1	Brooke Anderson
2	Germaine Green
3	Rae Hawkins
4	Hunter Newton
5	Guy Ochoa
6	Medge Ratcliffe
7	Cally Reynolds
8	Michael Rutledge
9	Nolan Slater
10	Nash Vasquez

Index for vehicle year in ascending order:

```
CREATE NONCLUSTERED INDEX ix_VehicleYear
ON Vehicle (VehicleYear ASC);

SELECT VehicleYear, VehicleID
FROM Vehicle;
```

Results | Messages

	VehicleYear	VehicleID
1	2015	10
2	2016	4
3	2016	12
4	2017	7
5	2018	2
6	2018	6
7	2019	1
8	2019	3
9	2019	5
10	2019	11
11	2019	13
12	2020	8
13	2020	9

Change last name of 'Brooke Perkins' to 'Anderson':

```
UPDATE Customer
SET LastName = 'Anderson'
WHERE FirstName = 'Brooke' AND
       LastName = 'Perkins';
```

Results | Messages

	CustomerID	FirstName	LastName	Street	City	Province	PostalCode	PhoneNumber	Email
1	4	Brooke	Perkins	8 South Mcmullen	Ajax	ON	L1T 1R5	(831) 996-1240	sit@vitaealiquetnec.net

Results | Messages

	CustomerID	FirstName	LastName	Street	City	Province	PostalCode	PhoneNumber	Email
1	4	Brooke	Anderson	8 South Mcmullen	Ajax	ON	L1T 1R5	(831) 996-1240	sit@vitaealiquetnec.net

Update phone number of CustomerID '10' to '(428) 755-9348':

```
UPDATE Customer
SET PhoneNumber = '(428) 755-9348'
WHERE CustomerID = 10;
```

Results | Messages

	CustomerID	FirstName	LastName	Street	City	Province	PostalCode	PhoneNumber	Email
1	10	Guy	Ochoa	2834 Brooklyn Street	Alcida	NB	E8J 2C4	(720) 242-4596)	montes.nascetur@sempernutrum.net

Results | Messages

	CustomerID	FirstName	LastName	Street	City	Province	PostalCode	PhoneNumber	Email
1	10	Guy	Ochoa	2834 Brooklyn Street	Alcida	NB	E8J 2C4	(428) 755-9348	montes.nascetur@sempernutrum.net

Delete CustomerID '2':

```
DELETE FROM Customer
WHERE CustomerID = 2;
```

Results | Messages

	CustomerID	FirstName	LastName	Street	City	Province	PostalCode	PhoneNumber	Email
1	1	Cally	Reynolds	134 Mcphillips St	Winnipeg	MB	R2C 2J6	(204) 555-4433	penatibus.et@lectusa.com
2	2	Sydney	Bartlett	844 Somewhere Ave	Abbottsford	BC	V1M 3L7	(604) 892-3256	nibh@ultricesposuere.edu
3	3	Hunter	Newton	11 Duncan Street	Toronto	ON	M5V 3M2	(909) 371-2187	quam.quis.diam@facilisisfacilisis.org
4	4	Brooke	Anderson	8 South Mcmullen	Ajax	ON	L1T 1R5	(831) 996-1240	sit@vitaealiquetnec.net
5	5	Nolan	Slater	12 Cultus Street	Richmond	BC	V3M 7Q3	(340) 732-9367	sociis.natoque.penatibus@pedeCras.co.uk
6	6	Germaine	Green	708 South Boulevard	Vancouver	BC	V2W 7T7	(466) 455-4160	ultrices.Vivamus@orciin.edu
7	7	Medge	Ratcliffe	68 125th Street	Richmond	BC	V8B 2S7	(358) 751-8227	nulla.ante@posuerevulputate.org
8	8	Nash	Vasquez	3896 Home Lane	Alma	QC	G8B 1K7	(989) 937-6199	ut.nisi@elitAliquam.ca
9	9	Michael	Rutledge	1045 Kildare Avenue East	Winnipeg	MB	R2X 2J6	(989) 937-6199	eget.lacus@sitametorci.org
10	10	Guy	Ochoa	2834 Brooklyn Street	Alcida	NB	E8J 2C4	(428) 755-9348	montes.nascetur@sempernutrum.net

Results | Messages

	CustomerID	FirstName	LastName	Street	City	Province	PostalCode	PhoneNumber	Email
1	1	Cally	Reynolds	134 Mcphillips St	Winnipeg	MB	R2C 2J6	(204) 555-4433	penatibus.et@lectusa.com
2	3	Hunter	Newton	11 Duncan Street	Toronto	ON	M5V 3M2	(909) 371-2187	quam.quis.diam@facilisisfacilisis.org
3	4	Brooke	Anderson	8 South Mcmullen	Ajax	ON	L1T 1R5	(831) 996-1240	sit@vitaealiquetnec.net
4	5	Nolan	Slater	12 Cultus Street	Richmond	BC	V3M 7Q3	(340) 732-9367	sociis.natoque.penatibus@pedeCras.co.uk
5	6	Germaine	Green	708 South Boulevard	Vancouver	BC	V2W 7T7	(466) 455-4160	ultrices.Vivamus@orciin.edu
6	7	Medge	Ratcliffe	68 125th Street	Richmond	BC	V8B 2S7	(358) 751-8227	nulla.ante@posuerevulputate.org
7	8	Nash	Vasquez	3896 Home Lane	Alma	QC	G8B 1K7	(989) 937-6199	ut.nisi@elitAliquam.ca
8	9	Michael	Rutledge	1045 Kildare Avenue East	Winnipeg	MB	R2X 2J6	(989) 937-6199	eget.lacus@sitametorci.org
9	10	Guy	Ochoa	2834 Brooklyn Street	Alcida	NB	E8J 2C4	(428) 755-9348	montes.nascetur@sempernutrum.net

VIEW

This view table lists vehicles older than two (2) years old. This will help the company identify which vehicles the needs to turn over.

```
CREATE VIEW v_OldVehicle AS
SELECT VehicleYear, Make, Model, Color, Features, VehicleID
FROM Vehicle
WHERE VehicleYear < YEAR(CURRENT_TIMESTAMP) - 2;
```

Results | Messages

	VehicleYear	Make	Model	Color	Features	VehicleID
1	2016	Ford	Fusion	Ruby Red	Automatic, bluetooth, AM/FM stero	4
2	2017	Ford	Escape	Magnetic Metallic	Remote start, bluetooth, memory seat	7
3	2015	Dodge	Grand Caravan	Black	A/C, AM/FM stereo, Automatic	10
4	2016	Chevrolet	Silverado	Silver	A/C, AM/FM stereo	12

The code below creates a stored procedure that shows the vehicle reserved to a customer by searching VehicleID. If the vehicle is not rented, it will return an empty result.

```
CREATE PROC sp_ReserVehicle
    @VehicleID int
AS
    SET NOCOUNT ON;

    SELECT CONCAT(FirstName,' ', LastName) AS Customer, ReservID
    FROM Customer AS c
    JOIN Reservation AS r ON c.CustomerID = r.VehicleID
    WHERE VehicleID = @VehicleID;

GO

EXEC sp_ReserVehicle 8
```

Results | Messages

	Customer	ReservID
1	Nash Vasquez	5

```
EXEC sp_ReserVehicle 4
```

Results | Messages

Customer	ReservID

STORED PROCEDURE WITH ERROR HANDLING

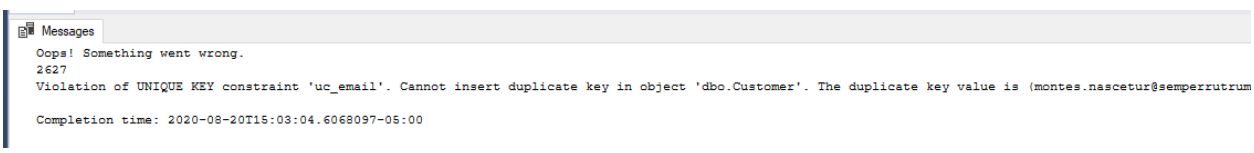
This stored procedure adds a customer and returns an error message when an input does not meet a requirement. In this case, there cannot be a duplicate email.

```
CREATE PROC sp_AddCustomer
    @CustomerID       int,
    @FirstName        varchar(50),
    @LastName         varchar(50),
    @Street           varchar(100),
    @City             varchar(50),
    @Province         char(2),
```

```sql
    @PostalCode       varchar(7),
    @PhoneNumber      varchar(15),
    @Email            varchar(50)
AS
BEGIN
SET NOCOUNT ON;

    BEGIN TRY
        BEGIN TRAN;

        INSERT INTO Customer (FirstName, LastName, Street, City, Province,
PostalCode, PhoneNumber, Email)
        VALUES (@FirstName, @LastName, @Street, @City, @Province, @PostalCode,
@PhoneNumber, @Email)

        COMMIT TRAN;
    END TRY

    BEGIN CATCH

        PRINT 'Oops! Something went wrong.'
        PRINT Error_Number();

        ROLLBACK TRAN;
    END CATCH;
END;
```

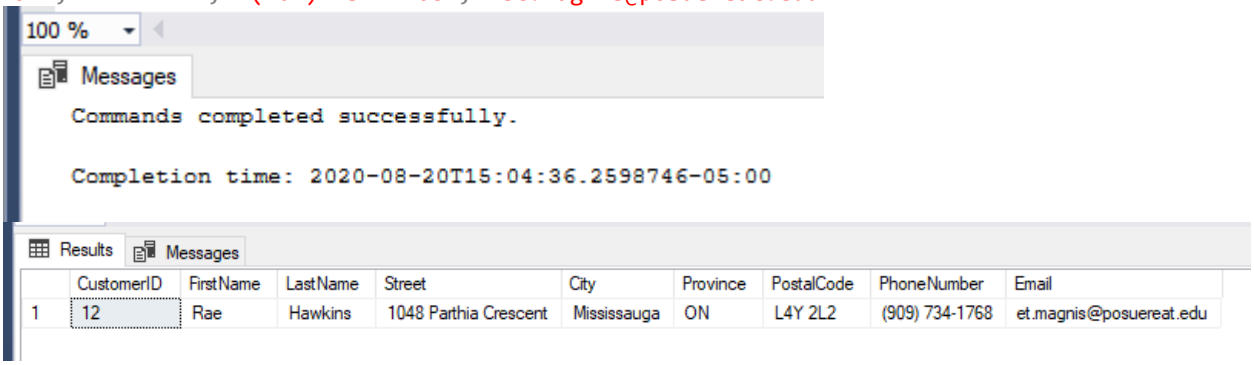
Unsuccessful input:

```sql
EXEC sp_AddCustomer 'Rae', 'Hawkins', '1048 Parthia Crescent', 'Mississauga',
'ON', 'L4Y 2L2', '(909) 734-1768', 'montes.nascetur@semperrutrum.net'
```



Successful input:

```sql
EXEC sp_AddCustomer 'Rae', 'Hawkins', '1048 Parthia Crescent', 'Mississauga',
'ON', 'L4Y 2L2', '(909) 734-1768', 'et.magnis@posuereat.edu'
```



	CustomerID	FirstName	LastName	Street	City	Province	PostalCode	PhoneNumber	Email
1	12	Rae	Hawkins	1048 Parthia Crescent	Mississauga	ON	L4Y 2L2	(909) 734-1768	et.magnis@posuereat.edu