

Universidad de Cundinamarca (UdeC)

Integrantes:

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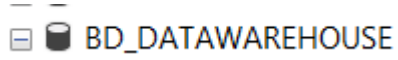
Julian Felipe Moreno Ramirez

BIG DATA (Profundización)

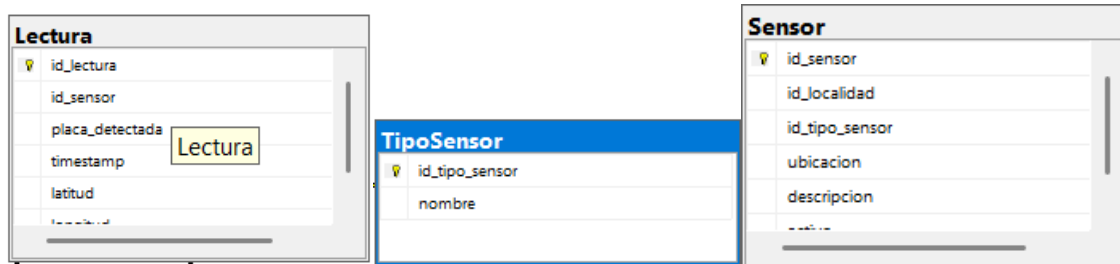
Simulación de Datos

2025

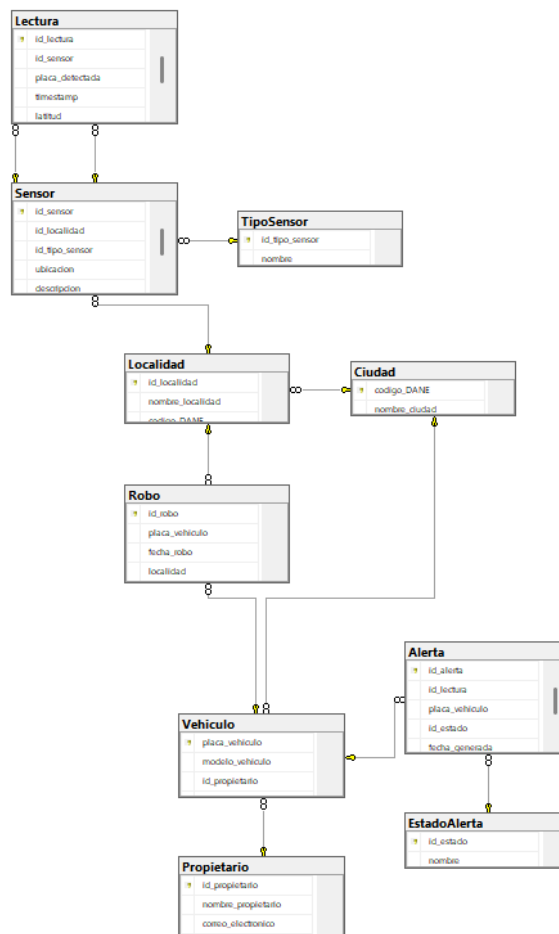
Incorporamos dentro del proyecto la simulación IoT



Después de la creación de cada una de las tablas creamos las relaciones con el MER



Sensor conectado con el MER



La tabla Lectura cuenta con los pre-registros para posteriormente continuar con la simulación:

Tabla Sensor, relacionada con las localidades, tipo de sensor y ubicación.

JulianMoreno.BD_D...Io MER - IoT - MM*						
JulianMoreno.BD_D...OUSE - dbo.Sensor						
	id_sensor	id_localidad	id_tipo_sen...	ubicacion	descripcion	activo
▶	4	2	1	Usaquen	Bogota	True
	5	3	1	Chapinero	Bogota	True
*	NULL	NULL	NULL	NULL	NULL	NULL

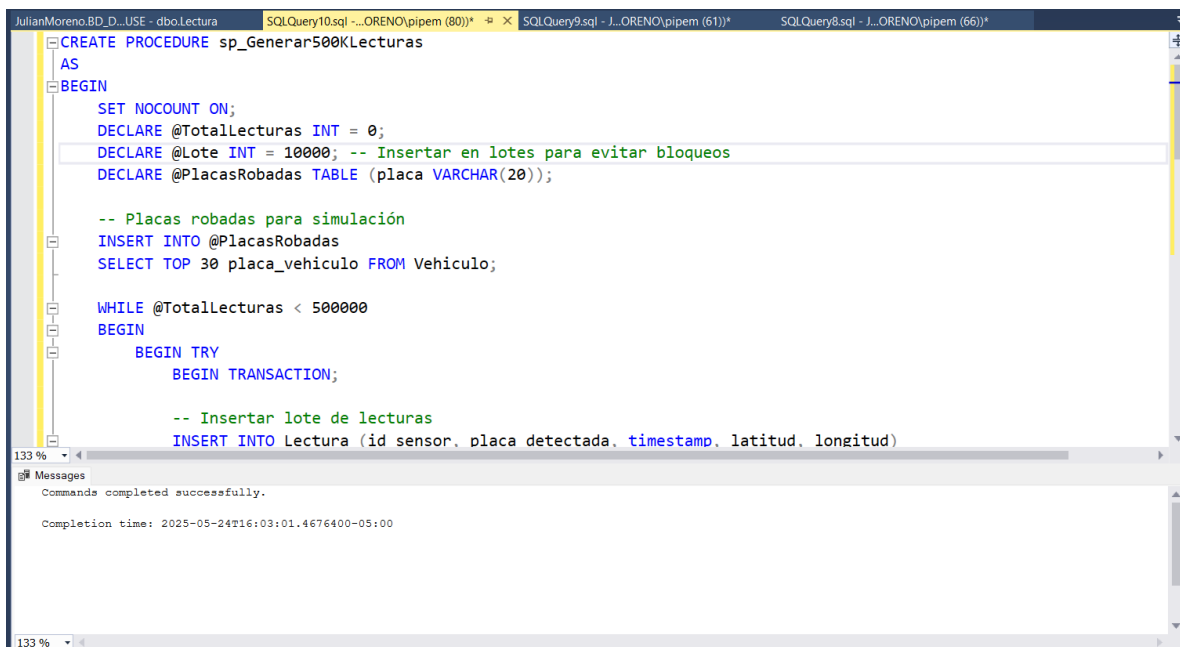
Tabla Lectura:

JulianMoreno.BD_D...USE - dbo.Lectura						
SQLQuery10.sql - ...ORENO\pipem (80))*						
SQLQuery9.sql - J...ORENO\pipem (61))*						
SQLQuery8.sql - J...ORENO\pipem (66))*						
	id_lectura	id_sensor	placa_dete...	timestamp	latitud	longitud
	13	4	EUD072	2025-05-17 ...	4,867000	-73,182000
	14	4	FOY522	2025-05-11 ...	5,457000	-73,101000
	15	4	AOS764	2025-05-17 ...	5,057000	-73,567000
	16	4	WLK184	2025-05-14 ...	4,985000	-74,022000
	17	4	VPQ815	2025-05-12 ...	5,137000	-74,052000
	18	4	JBV431	2025-05-08 ...	5,472000	-73,376000
	19	4	ZUS362	2025-04-26 ...	4,996000	-73,359000
	20	4	CMG923	2025-05-14 ...	5,349000	-74,012000
	21	4	HGD843	2025-05-21 ...	4,984000	-73,646000
	22	4	CHE828	2025-05-06 2025-05-21 15:53:12.753	5,000	000
	23	4	FFJ543	2025-05-14 ...	5,060000	-73,864000
	24	4	ZMQ439	2025-05-10 ...	5,524000	-73,148000
	25	4	XEO655	2025-04-26 ...	5,160000	-73,627000
	26	4	TKI160	2025-05-22 ...	4,875000	-73,562000
	27	4	SEP755	2025-05-16 ...	5,430000	-73,374000
	28	4	TWV984	2025-05-03 ...	4,956000	-73,726000
	29	4	XXD514	2025-05-18 ...	4,698000	-73,863000
	30	5	JNH083	2025-04-29 ...	4,654000	-73,199000
	31	5	DXB370	2025-05-13 ...	4,859000	-73,198000
	32	5	TDX619	2025-04-30 ...	5,408000	-73,550000
	33	5	ICC241	2025-05-21 ...	5,098000	-73,317000
	34	5	HYW583	2025-05-13 ...	5,199000	-73,357000
	35	5	EBI252	2025-05-22 ...	5,171000	-73,210000
	36	5	FUE721	2025-05-19 ...	5,091000	-73,628000
	37	5	TSU283	2025-05-19 ...	5,178000	-73,330000
	38	5	DZT554	2025-05-11 ...	5,040000	-73,547000
	39	5	JCQ898	2025-05-06 ...	5,079000	-73,965000
	40	5	JBE481	2025-04-26 ...	5,236000	-73,883000
	41	5	RWE480	2025-05-24 ...	4,684000	-73,976000
	42	5	...	...	...	...

Tipo de Sensor:

JulianMoreno.BD_D...E - dbo.TipoSensor		
	id_tipo_sen...	nombre
▶	1	Camara
	2	GSP
*	NULL	NULL

## Creación del procedimiento de simulación:



The screenshot shows the SQL Server Enterprise Manager interface with a script window open. The script is a T-SQL procedure named `sp_Generar500KLecturas`. It includes comments in Spanish for inserting data in batches and selecting stolen license plates. The procedure uses a `WHILE` loop to generate 500,000 records. The Messages pane at the bottom indicates the commands completed successfully.

```
CREATE PROCEDURE sp_Generar500KLecturas
AS
BEGIN
    SET NOCOUNT ON;
    DECLARE @TotalLecturas INT = 0;
    DECLARE @Lote INT = 10000; -- Insertar en lotes para evitar bloqueos
    DECLARE @PlacasRobadas TABLE (placa VARCHAR(20));

    -- Placas robadas para simulación
    INSERT INTO @PlacasRobadas
    SELECT TOP 30 placa_vehiculo FROM Vehiculo;

    WHILE @TotalLecturas < 500000
    BEGIN
        BEGIN TRY
            BEGIN TRANSACTION;

            -- Insertar lote de lecturas
            INSERT INTO Lectura (id sensor, placa detectada, timestamp, latitud, longitud)
            SELECT TOP @Lote
            (SELECT TOP 30 placa_vehiculo FROM Vehiculo),
            (SELECT TOP 30 placa_vehiculo FROM Vehiculo),
            GETUTCTIME(),
            (SELECT TOP 30 latitud FROM Vehiculo),
            (SELECT TOP 30 longitud FROM Vehiculo);

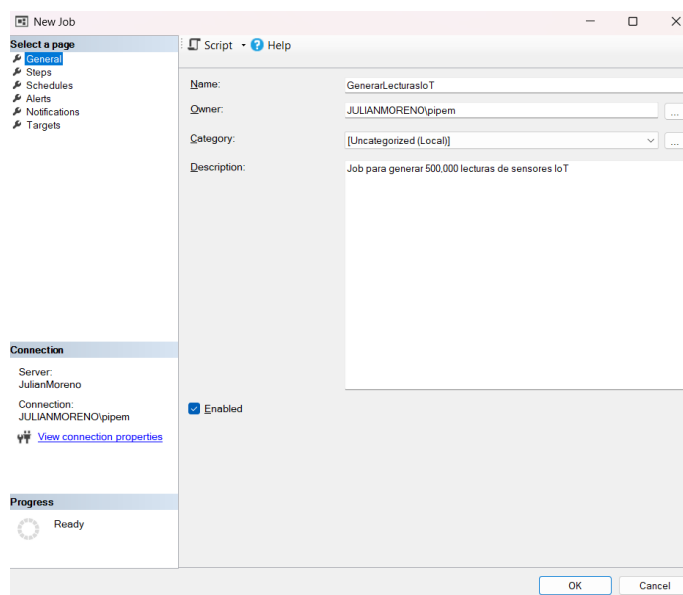
            COMMIT TRANSACTION;
            SET @TotalLecturas = @TotalLecturas + @Lote;
        END TRY
        BEGIN CATCH
            ROLLBACK TRANSACTION;
        END CATCH
    END
END
```

Messages

Commands completed successfully.

Completion time: 2025-05-24T16:03:01.4676400-05:00

## Creación de Job para ejecución de LecturasIoT



The screenshot shows the 'New Job' dialog box. The 'General' tab is selected. The job name is 'GenerarLecturasIoT', the owner is 'JULIANMORENO\pipem', and the category is '[Uncategorized] (Local)'. The description is 'Job para generar 500.000 lecturas de sensores IoT'. The 'Connection' section shows the server 'JulianMoreno' and connection 'JULIANMORENO\pipem'. The 'Progress' section shows a progress bar and the status 'Ready'. The 'Enabled' checkbox is checked.

New Job

Select a page: General, Steps, Schedules, Alerts, Notifications, Targets

Name: GenerarLecturasIoT

Owner: JULIANMORENO\pipem

Category: [Uncategorized] (Local)

Description: Job para generar 500.000 lecturas de sensores IoT

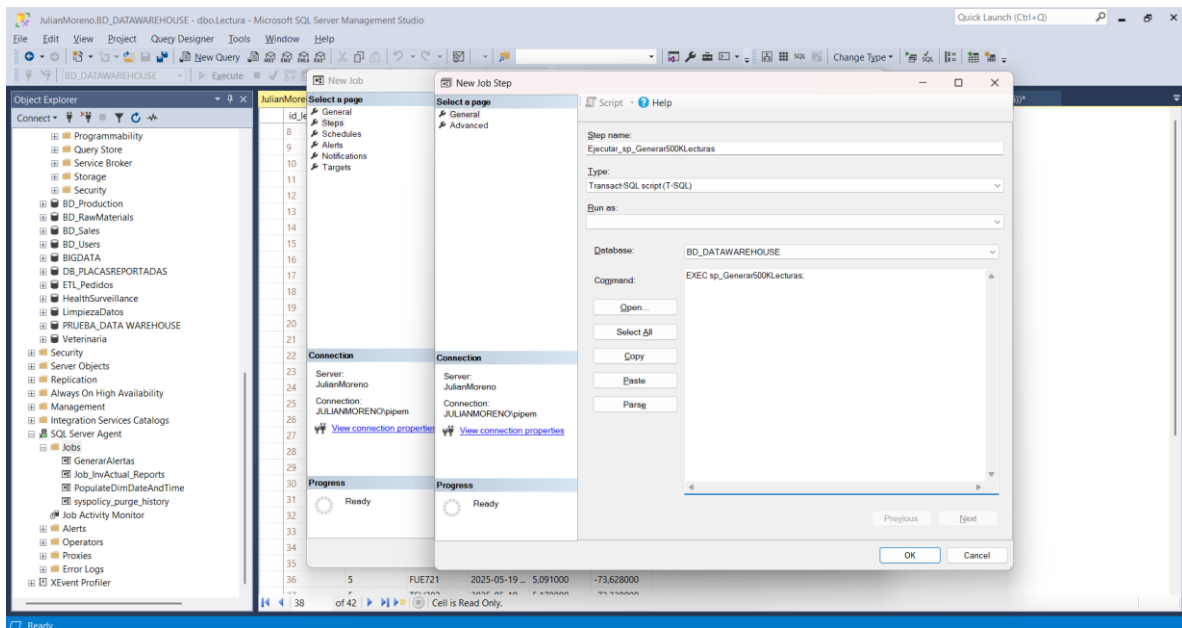
Connection: Server: JulianMoreno, Connection: JULIANMORENO\pipem, View connection properties

Progress: Ready

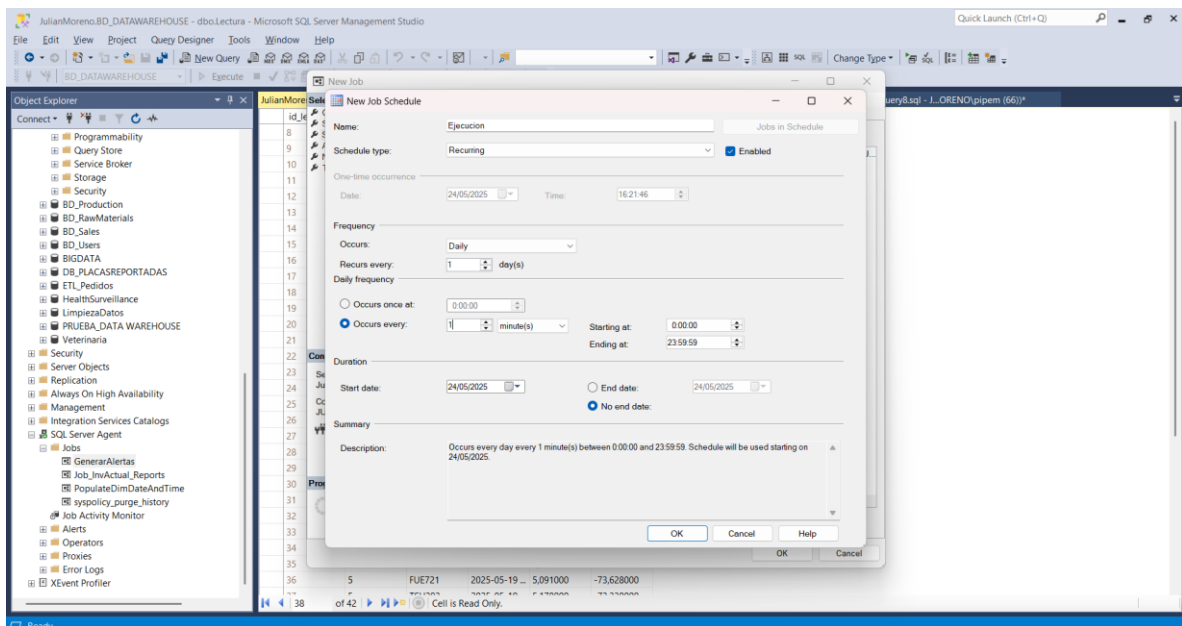
Enabled

OK Cancel

## Configuración de los Steps



## Configuración del Schedule:



## Ejecución del Job

SQL Server Enterprise Edition - 14.0.2542.1

Jobs

- Generate Job
- Job\_1
- Populate Job
- sysproc Job
- Generate Job
- Job Action
- Alerts
- Operator
- Proxies
- Error Log
- XEvent Profile

Ready

New Job...  
Start Job at Step...  
Stop Job  
Script Job as  
View History  
Enable  
Disable  
Start PowerShell  
Reports  
Rename  
Delete  
Refresh  
Properties

Start Jobs - JULIANMORENO

1 Remaining

2 Total  
1 Success

Details:

Action	Status	Message
Start Job 'GenerarLecturasIoT'	Success	
Execute job 'GenerarLecturasIoT'		

Close

JulianMoreno.BD\_D...E - dbo.TipoSensor

id_tipo_sen...	nombre
1	Camara
2	GSP
* NULL	NULL

JulianMoreno.BD\_D...IoT - MM\*

JulianMoreno.BD\_D...OUSE - dbo.Sensor

JulianMoreno.BD\_D...USE - dbo.Lectura

Start Jobs - JULIANMORENO

1 Remaining

2 Total  
1 Success

Details:


Action	Status	Message
Start Job 'GenerarLecturasIoT'	Success	
Execute job 'GenerarLecturasIoT'	In progress...	

Close

of 2

	id_tipo_sen...	nombre
►	1	Camara
	2	GSP
*	NULL	NULL



Start Jobs - JULIANMORENO



Success

2 Total  
2 Success

Details:

Action	Status	Messa
 Start Job 'GenerarLecturasIoT'	Success	
 Execute job 'GenerarLecturasIoT'	Success	

Close



Cantidad Total de Lecturas:

JulianMoreno.BD\_D...USE - dbo.Lectura      SQLQuery10.sql -...ORENO\pipem (80))\*      SQLQuery9.

```
-- Verifica que no haya NULL en placas  
SELECT COUNT(*) AS TotalLecturas FROM Lectura;  
-- Conteo total
```

133 %

Results    Messages

	TotalLecturas
1	500042

The screenshot shows a SQL Server Enterprise Manager interface. At the top, there are two tabs: 'SQLQuery10.sql - ...ORENO\pipem (80))\*' and 'SQLQuery9.sql - J...ORENO\pipem (61))\*'. The active window displays a SQL query in Spanish with green and blue syntax highlighting. The query is:   
-- Verifica que no haya NULL en placas  
SELECT COUNT(\*) AS TotalLecturas FROM Lectura;  
-- Conteo total  
Below the query window, there is a zoom level of '133 %' and two tabs: 'Results' and 'Messages'. The 'Results' tab is active, showing a single row of data in a table with two columns: 'TotalLecturas' and a value '9500042'.

```
-- Verifica que no haya NULL en placas
SELECT COUNT(*) AS TotalLecturas FROM Lectura;
-- Conteo total
```

	TotalLecturas
1	9500042

Como agregado también podemos programar un Job para la generación de Alertas de robo:

```
SQLQuery10.sql - J:\ORENO\pipem (80))* SQLQuery9.sql - J:\ORENO\pipem (61))* X JulianMoreno.BD_...ODELO RELACIONAL

CREATE PROCEDURE sp_ConsultarAlertasRobo
    @FechaInicio DATETIME = NULL,
    @FechaFin DATETIME = NULL,
    @IdLocalidad INT = NULL,
    @IdEstado INT = NULL
AS
BEGIN
    SET NOCOUNT ON;

    -- Establecer fechas por defecto (últimos 7 días)
    IF @FechaInicio IS NULL
        SET @FechaInicio = DATEADD(DAY, -7, GETDATE());

    IF @FechaFin IS NULL
```

133 %

Messages

Commands completed successfully.

Completion time: 2025-05-24T16:50:01.2353053-05:00

133 %

Query executed successfully. JULIANMORENO (16.0 RTM) JULIANMORENO\pipem (61) BD\_DATAWAREHOUSE 00:00:00 0 rows

Job Properties - GenerarAlertas

Select a page

- General
- Steps
- Schedules
- Alerts
- Notifications
- Targets

Connection

Server: JulianMoreno

Connection: JULIANMORENO\pipem

[View connection properties](#)

Progress

Ready

Move step:

Start step: 1.AlertasRobo

New... Insert... Edit Delete

OK Cancel

S...	Name	Type	On Succ...	On Failure
1	AlertasRobo	Transac...	Go to th...	Quit the...

133 %

Results

Total: 9500

1

Query executed successfully. JULIANMORENO (16.0 RTM) JULIANMORENO\pipem (61) BD\_DATAWAREHOUSE 00:00:00 1 rows

SQLQuery10.sql - ...ORENO\pipem (80))\*

SQLQuery9.sql - J...ORENO\pipem (61))\*

JulianMoreno.BD\_...ODELO RELACIONAL

-- Verifica que no haya NULL en placas

SELECT COUNT(\*) AS TotalLecturas FROM Lectura;

-- Conteo total

133 %

Results

Messages

	TotalLecturas
1	9500042

Query executed successfully

JULIANMORENO (16.0 RTM)

JULIANMORENO\pipem (61)

RF

Start Jobs - JULIANMORENO

1 Remaining

2 Total

1 Success

Details:

Action	Status	Message
Start Job 'GenerarAlertas'	Success	
Execute job 'GenerarAlertas'	In progress...	

Close

Start Jobs - JULIANMORENO

Success

2 Total

2 Success

Details:

Action	Status	Message
Start Job 'GenerarAlertas'	Success	
Execute job 'GenerarAlertas'	Success	

Close

Resultado:

SQLQuery10.sql - ORENO\pipem (80))

SQLQuery9.sql - JUL...m (61)) Executing...JulianMoreno.BD...ODELO RELACIONAL

EXEC sp\_ConultarAlertasRobo;

133 %

ResultsMessages

	id_alerta	placa_vehiculo	modelo_vehiculo	nombre_propietario	telefono	fecha_deteccion	ubicacion_sensor	nombre_localidad	estado_alerta	minutos_desde_deteccion
1	22917	KJK321	Volkswagen Golf	Teodora Mata-Cobos	2345521	2025-05-24 16:45:55.073	Chapinero	Chapinero	ABC123	6
2	26856	BBR444	Toyota Corolla	Hortensia Gallo J���dar	12338882	2025-05-24 16:43:48.720	Chapinero	Chapinero	ABC123	8
3	23327	KJK321	Volkswagen Golf	Teodora Mata-Cobos	2345521	2025-05-24 16:40:36.660	Usaquen	Usaquen	ABC123	11
4	25259	VX0926	Prado	Charlie Damelio	1231328123	2025-05-24 16:38:06.210	Chapinero	Chapinero	ABC123	13
5	25946	KJK321	Volkswagen Golf	Teodora Mata-Cobos	2345521	2025-05-24 16:34:13.183	Chapinero	Chapinero	ABC123	17
6	30316	EU542	Ford Fiesta	Dulce Alegria Borr���s	8877531	2025-05-24 16:33:30.950	Usaquen	Usaquen	ABC123	18
7	7703	AAA123	Nissan Versa	Olimpia del Barbera	12312738	2025-05-24 16:29:31.060	Chapinero	Chapinero	ABC123	22
8	7156	A0Z233	Mazda 3	Jose Ignacio Manso Bernal	1444821	2025-05-24 16:29:05.993	Chapinero	Chapinero	ABC123	22
9	19426	VX0926	Prado	Charlie Damelio	1231328123	2025-05-24 16:28:39.893	Usaquen	Usaquen	ABC123	23
10	7050	AAA123	Nissan Versa	Olimpia del Barbera	12312738	2025-05-24 16:28:04.807	Usaquen	Usaquen	ABC123	23
11	23215	SKQ123	Hyundai 10	Marianela Rodriguez	1234436	2025-05-24 16:27:45.153	Usaquen	Usaquen	ABC123	24
12	24885	BBR444	Toyota Corolla	Hortensia Gallo J���dar	12338882	2025-05-24 16:27:19.550	Usaquen	Usaquen	ABC123	24
13	6193	ABB456	Chevrolet Spark	Ruperta Villa Catal���	127773	2025-05-24 16:27:11.593	Chapinero	Chapinero	ABC123	24
14	25767	VX0926	Prado	Charlie Damelio	1231328123	2025-05-24 16:26:43.507	Chapinero	Chapinero	ABC123	25
15	9774	SKQ123	Hyundai 10	Marianela Rodriguez	1234436	2025-05-24 16:21:31.153	Chapinero	Chapinero	ABC123	30
16	12671	A0Z233	Mazda 3	Jose Ignacio Manso Bernal	1444821	2025-05-24 16:21:28.610	Usaquen	Usaquen	ABC123	30
17	1312	A0B123	Toyota Corolla	Jhon Alex Casta���	3000192381	2025-05-24 16:20:49.847	Usaquen	Usaquen	ABC123	31
18	29573	EU542	Ford Fiesta	Dulce Alegria Borr���s	8877531	2025-05-24 16:20:20.840	Usaquen	Usaquen	ABC123	31
19	15488	ACB123	Toyota Corolla	Jhon Alex Casta���	3000192381	2025-05-24 16:17:59.387	Usaquen	Usaquen	ABC123	34
20	4142	KJK321	Volkswagen Golf	Teodora Mata-Cobos	2345521	2025-05-24 16:17:38.020	Chapinero	Chapinero	ABC123	34
21	21835	EU542	Ford Fiesta	Dulce Alegria Borr���s	8877531	2025-05-24 16:17:13.760	Chapinero	Chapinero	ABC123	34
22	1599	AAA123	Nissan Versa	Olimpia del Barbera	12312738	2025-05-24 16:16:13.440	Usaquen	Usaquen	ABC123	35
23	8638	A0Z233	Mazda 3	Jose Ignacio Manso Bernal	1444821	2025-05-24 16:11:17.370	Usaquen	Usaquen	ABC123	40
24	2048	BBR444	Toyota Corolla	Hortensia Gallo J���dar	12338882	2025-05-24 16:09:52.063	Usaquen	Usaquen	ABC123	42
25	28155	SKQ123	Hyundai 10	Marianela Rodriguez	1234436	2025-05-24 16:09:41.557	Chapinero	Chapinero	ABC123	42
26	13267	XYZ987	Mazda CX-5	Carmes de Apicala	30091823	2025-05-24 16:09:38.537	Usaquen	Usaquen	ABC123	42
27	18025	BBR444	Toyota Corolla	Hortensia Gallo J���dar	12338882	2025-05-24 16:09:06.727	Chapinero	Chapinero	ABC123	42
28	13742	VX0926	Prado	Charlie Damelio	1231328123	2025-05-24 16:08:42.180	Chapinero	Chapinero	ABC123	43
29	488	EU542	Ford Fiesta	Dulce Alegria Borr���s	8877531	2025-05-24 16:08:16.387	Chapinero	Chapinero	ABC123	43

Link v  deo: <https://youtu.be/x2bSNRHluEo>