DATABASE MANAGEMENT SYSTEMS

SWER351

DriveSmart Insurance Company Database Project

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SWER351 Project

Introduction:

DriveSmart is a car insurance company that provides insurance services on all types of vehicles. In this project, we implemented a database design for the company that would reflect their new business model, which is based on monitoring drivers and rewarding them those whose driving is safe, the database contains six tables ,

1. Customer : to store customer information like name ,email address and phone number so it helps the company to contact the customer when they need.

Customer table has Cus_ID as a primary key

2. Vehicle: contains information about vehicle and the tracking device information

Why do we need a Tracking Device in a vehicle?

The insurance company tracks their customers to see their trips , so they can know their total trips , and give them a score ,so they manage customer driving habits ,so they advise bad drivers to improve their driving habits and thank them also they give them a special reward .

Vehicle table has vehicle_ID as primary key

has Cus_ID as forign key

3. InsurancePolicy :this Table contains the insurance policy information like type of insurance , premium cost ,start date, and expiry date of current policy.

Insurance Policy table has ins_ID as primary key

Cus_ID , Veh_ID as forign key

4. DailyScore: every customer has three individual scores in every day : speed score ,breaking score , night driving score then they take the average of these 3 scores and give the customer daily Score . Customer sees his Score in Mobile application that is connected with the database .

DailyScore Table has Score_ID as primary key

Veh_ID as forign key

5. Trip : stores the trips done by customer , length of trips and time of trips

Trip table has Trip_ID as primary Key

Veh_ID as forign

6. Speed events :It stores the violation of Speed : location ,speed limit , and actual speed

   Speed events table has speed_event_ID as primary Key

   Veh_ID as forign Key

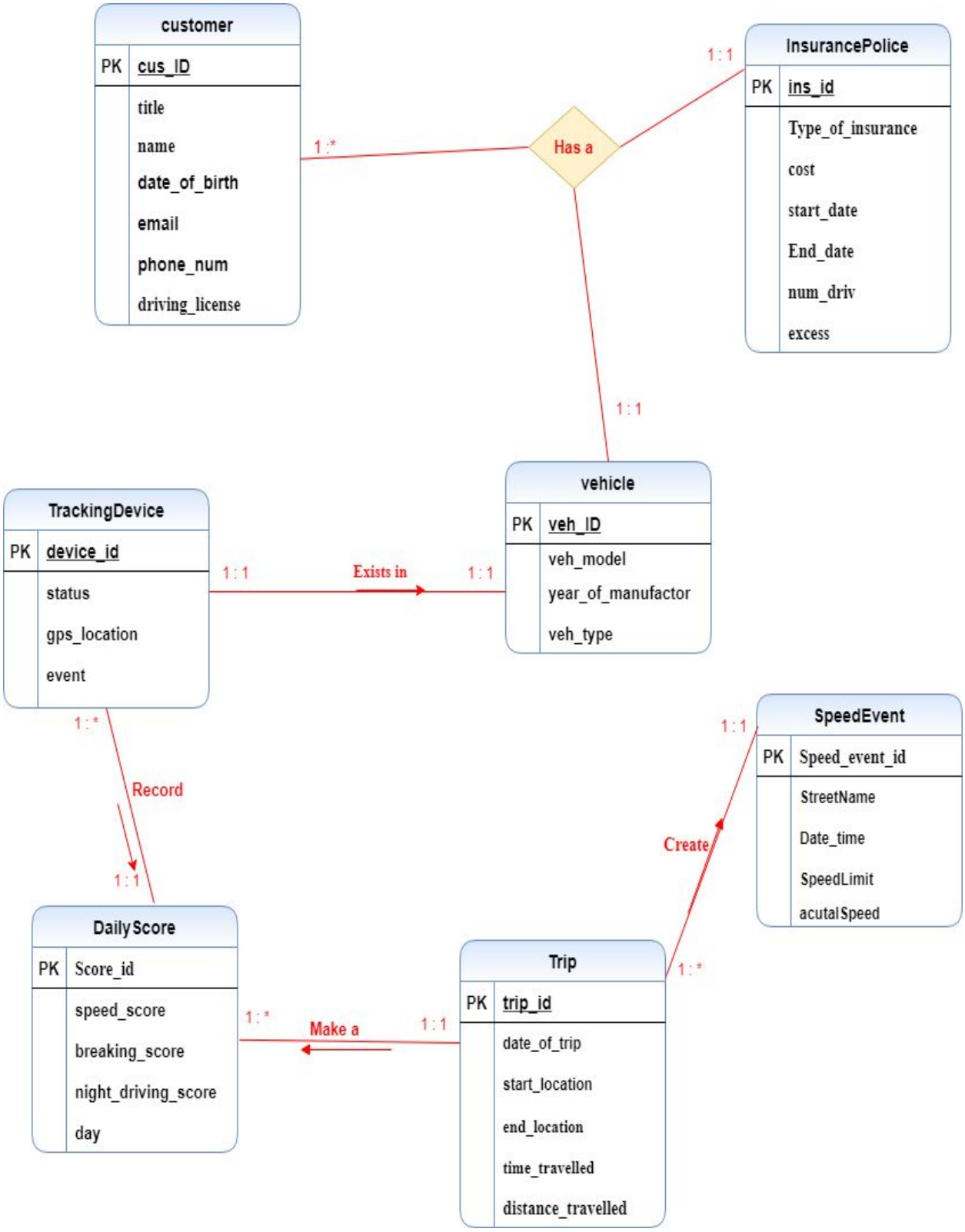
THE ENTITY RELATIONSHIP DIAGRAM

An entity relationship diagram (ERD) shows the relationships of entity sets stored in a database. An entity in this context is an object, a component of data. An entity set is a collection of similar entities. These entities can have attributes that define its properties.

By defining the entities, their attributes, and showing the relationships between them, an ER diagram illustrates the logical structure of databases.

ER diagrams are used to sketch out the design of a database.

INSURANCE COMPANY ER DIAGRAM :


customer
PK
cus_ID
title
name
date_of_birth
email
phone_num
driving_license
1 :*
Has a
1 : 1
InsurancePolice
PK
ins_id
Type_of_insurance
cost
start_date
End_date
num_driv
excess
1 : 1
vehicle
PK
veh_ID
veh_model
year_of_manufactor
veh_type
TrackingDevice
PK
device_id
status
gps_location
event
1 : 1
Exists in
1 : 1
1 : *
Record
1 : 1
SpeedEvent
PK
Speed_event_id
StreetName
Date_time
SpeedLimit
acutalSpeed
1 : 1
Create
DailyScore
PK
Score_id
speed_score
breaking_score
night_driving_score
day
1 : *
Make a
1 : 1
Trip
PK
trip_id
date_of_trip
start_location
end_location
time_travelled
distance_travelled
1 : *

Schema

1. Customer(

```
cus_ID      CHAR(10),
title           VARCHAR(255),
name        VARCHAR(255),
date_of_birth      date,
email               VARCHAR(255),
phone_num           CHAR(10),
driving_license       VARCHAR(255),
PRIMARY KEY (cus_ID)
);
```

2. Vehicle(

```
   cus_ID       CHAR(10),
   ins_ID              CHAR(10),
   veh_ID               CHAR(10),
   veh_model               VARCHAR(255),
   year_of_manufacture     VARCHAR(255),
   veh_type                VARCHAR(255),
   status            VARCHAR(255),
   gps_location      VARCHAR(255),
   event             VARCHAR(255),
   PRIMARY KEY (veh_ID),
   FOREIGN KEY (cus_ID ) REFERENCES customer,
    );
```

3. InsurancePolicies(

```
  cus_ID      CHAR(10),
   ins_ID             CHAR(10),
   veh_ID               CHAR(10),
   Type_of_insurance    VARCHAR(255),
   cost                 NUMERIC(8,2),
   start_date            date,
   End_date               date,
   num_driv              char(5),
   excess                VARCHAR(255)
   PRIMARY KEY (ins_ID),
```

```
   FOREIGN KEY (cus_ID ) REFERENCES customer,
   FOREIGN KEY (veh_ID ) REFERENCES Vehicle
);
```

4.
```
DailyScore(
    Score_id            int,
    veh_ID                 CHAR(10),
  speed_score   NUMERIC(8,2),
  breaking_score   NUMERIC(8,2),
  night_driving_score   NUMERIC(8,2),
  day                  date,
 PRIMARY KEY (score_ID),
 FOREIGN KEY (veh_ID ) REFERENCES Vehicle,
  );
```

5.
```
Trip (
  Trip_id     int,
  veh_ID   CHAR(10),
  date_of_trip  DATE,
  start_location   VARCHAR(255),
  end_location     VARCHAR(255),
  time_travelled   TIME,
  distance_travelled NUMERIC(8,2)
 PRIMARY KEY (trip_ID),
 FOREIGN KEY (veh_ID ) REFERENCES vehicle,
);
```

6.
```
SpeedEvents(
Speed_event_id       int,
 veh_ID       CHAR(10),
  StreetName       VARCHAR(255),
  Date_Time   datetime,
  SpeedLimit   NUMERIC(8,2),
  actualSpeed   NUMERIC(8,2),

  FOREIGN KEY (veh_ID ) REFERENCES vehicle,
  );
```

List of assumptions

- Each customer MAY **have** more than one insurance policy for more than one vehicle.
- In each vehicle, there **exists** a tracking device so that their driving is continuously monitored.
- Each vehicle has a tracking device which **records** the customer movement information.
- Each score was recorded for customer trips. Therefore, these trips **make** the daily score.
- The relationship between vehicle and tracking device is 1 to 1 so we put them in one table , because tracking device is in car so we make one table vehicle for vehicle and tracking device
- We connected insurance policy table ,vehicle , trip , speed events and daily score in one forign key (VehicleID) because vehicle make the trip , speed events ,and daily score ,also the insurance policy is for the vehicle

REPORTING ASSUMBTIONS:

- For calculating score we assumed date of score so when we want to calculate score in specific month we put a condition that date of score is in this specific month.
- In report 2.4 the report should return the trips by customer who his gps locator is off, but how we can know trips if the gps locator is off , so we assumed that we can't know the trips ,when gps locator is off.

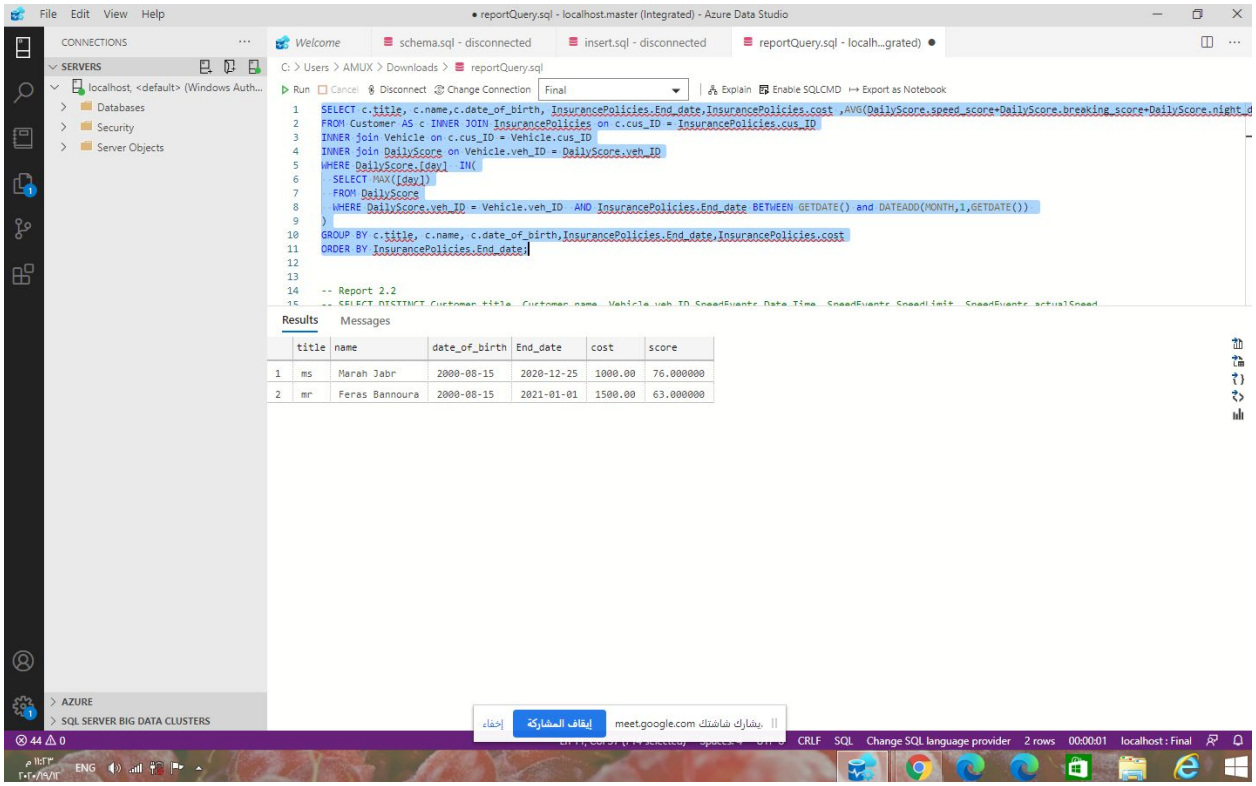
- in report 2.5 we gives all the scores for customer who achieve the report condition (Score >70) in last 2 months

Reports results & screenshot

2.1. Renewals report:

Scenario For Report 2.1

Feras Bannoura is a customer of DriveSmart Insurance Company. He owns a car as it was insured on 1/1/2020 for an annual amount of 1,500 shekels in exchange for comprehensive insurance for the car, which will expire at the end of this month. While Marah Jabr bought a new car and insured it for a period of six months in the company on 25/6/2020 at an amount of 1,000 shekels in exchange for the third-party insurance. Therefore, the insurance expires at the end of this month. In addition, Emran Alheeh renewed the insurance on his truck on 1/12/2020, with an annual amount of 7000 shekels in exchange for comprehensive insurance. Moreover, muhmod Ayash owns an old truck, which was insured for an annual amount of 7000 shekels on 23/8/2020 in exchange for comprehensive insurance. Mohammad also comprehensively insured his car, at an amount of 1,500 shekels on 15/8/2020.

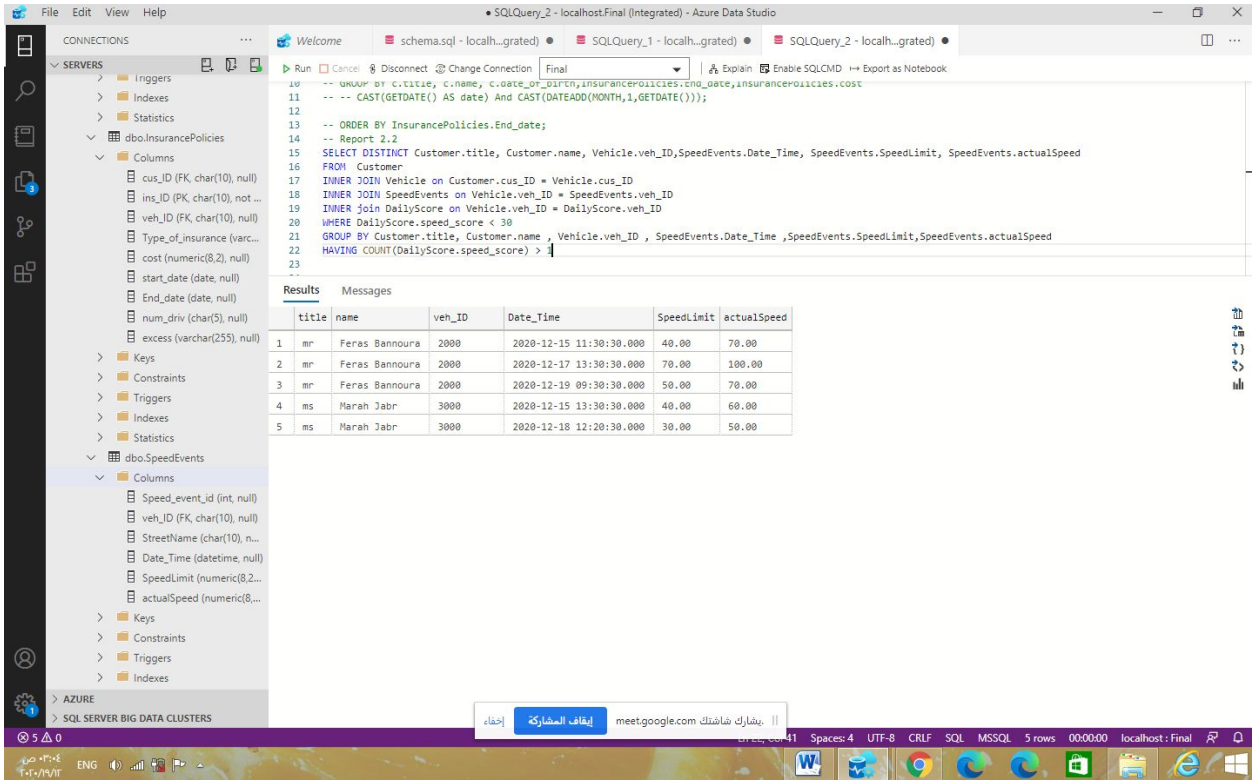


2.2. High risk drivers report:

Scenario For Report 2.2

Feras is a reckless driver, accustomed to driving quickly as he does not adhere to the speed limit on the roads. As he exceeded the speed limit 3 times during the last two weeks, on Al-Amal Street, where the speed limit was 40 km / h and his speed was 70 km/ h,\. The second time in Beit Sahour Street Where the specified speed was 70 km/h and its speed was 100 km/ h, and the third time on Al-Quds Street, where the specified speed was 50 km/ h and its speed was 70 km/h.

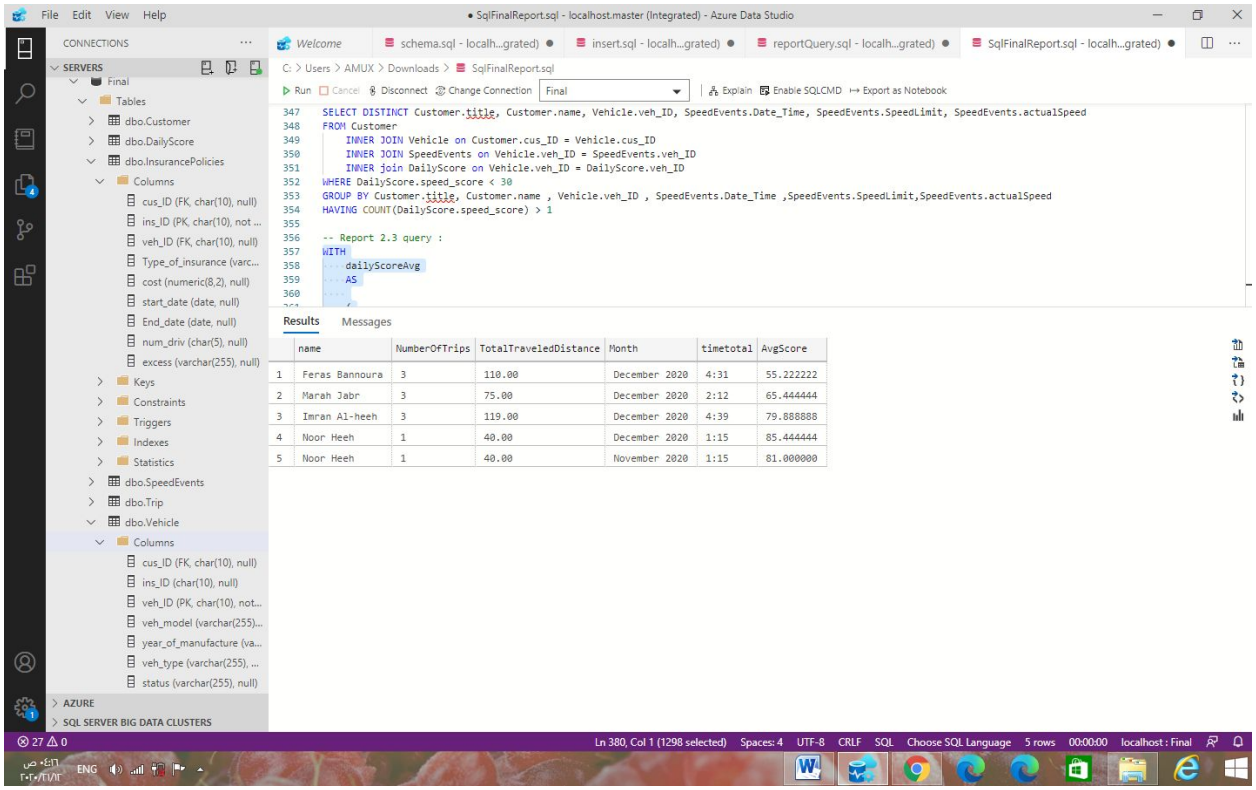
Marah is a good driver. But during the last two weeks she exceeded the speed limit twice and it was unintentionally, the first time in Al-Khader Street, where the speed limit was 40 km / h and the speed was 60 km/ h, and the second time in Al-Madbasa Street, where the specified speed was 30 km / h Its speed is 50 km / h.



2.3. Customer trips report:

Scenario For Report 2.3

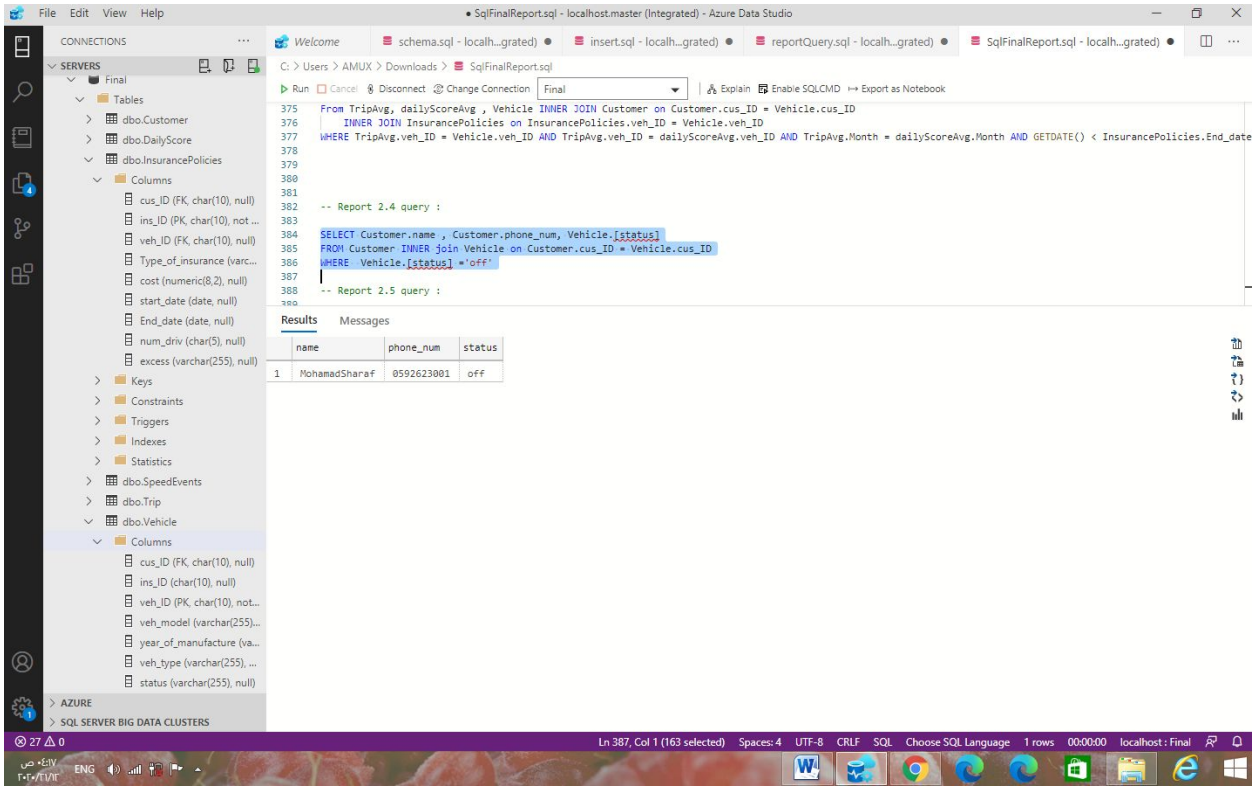
Customer trips are recorded. For example, on 22/5/2020, Feras recorded a trip from Beit Sahour to Nablus, which lasted for 2:23h. On 12/7/2020, Marah recorded a trip from Al-Khader to Hebron, which lasted for 1:12h. On the same day, Feras recorded a trip from Bethlehem to Ramallah and lasted for 1:33h. In addition, Emran recorded a trip on 12/8/2020 from Sourif to Bethlehem, which lasted for 1:14h. etc



2.4. Customers misusing tracking device report:

Scenario For Report 2.4

Some customers try to cheat the tracking device by switching it off to avoid being tracked. Like mohammed who has recently disabled the tracking device, so it became difficult to record all his movement information.


File Edit View Help
• SqlFinalReport.sql - localhost.master (Integrated) - Azure Data Studio
CONNECTIONS
SERVERS
Final
Tables
dbo.Customer
dbo.DailyScore
dbo.InsurancePolicies
Columns
cus_ID (FK, char(10), null)
ins_ID (PK, char(10), not ...
veh_ID (FK, char(10), null)
Type_of_insurance (varc...
cost (numeric(8,2), null)
start_date (date, null)
End_date (date, null)
num_driv (char(5), null)
excess (varchar(255), null)
Keys
Constraints
Triggers
Indexes
Statistics
dbo.SpeedEvents
dbo.Trip
dbo.Vehicle
Columns
cus_ID (FK, char(10), null)
ins_ID (char(10), null)
veh_ID (PK, char(10), not...
veh_model (varchar(255)...
year_of_manufacture (va...
veh_type (varchar(255), ...
status (varchar(255), null)
AZURE
SQL SERVER BIG DATA CLUSTERS
Welcome
schema.sql - localh...grated)
insert.sql - localh...grated)
reportQuery.sql - localh...grated)
SqlFinalReport.sql - localh...grated)
C: > Users > AMUX > Downloads > SqlFinalReport.sql
Run Cancel Disconnect Change Connection Final Explain Enable SQLCMD Export as Notebook
From TripAvg, dailyScoreAvg , Vehicle INNER JOIN Customer on Customer.cus_ID = Vehicle.cus_ID
INNER JOIN InsurancePolicies on InsurancePolicies.veh_ID = Vehicle.veh_ID
WHERE TripAvg.veh_ID = Vehicle.veh_ID AND TripAvg.veh_ID = dailyScoreAvg.veh_ID AND TripAvg.Month = dailyScoreAvg.Month AND GETDATE() < InsurancePolicies.End_date
-- Report 2.4 query :
SELECT Customer.name , Customer.phone_num, Vehicle.[status]
FROM Customer INNER join Vehicle on Customer.cus_ID = Vehicle.cus_ID
WHERE Vehicle.[status] ='off'
-- Report 2.5 query :
Results
Messages
name
phone_num
status
1
MohamadSharaf
0592623001
off
27 0
Ln 387, Col 1 (163 selected)
Spaces: 4
UTF-8
CRLF
SQL
Choose SQL Language
1 rows
00:00:00
localhost : Final
ENG

2.5. Customers Rewards report:

Scenario For Report 2.5

noor heeh is a very good driver , in the last two months her average score is above 70.

Here we tried to show customers whose daily main scores stayed above 70 for the last two months.