1 Project Report

1.1 What i did for final project

```
15 years ago,I build a IOT system for traceing the location of vehicles.
work and data flow like this:
IOT devices of the vehicle get the location by GPS module and send the data to TCP
server by GPRS/2/3/4G
Back-end part store and analyse the data and front-end show the datas to users .

Now i just get the data of two tables from Mysql and prepare data for front-end
coders by Django REST framword.
```

1.2 table comments

```
class Vehicles(models.Model):
    id = models.CharField(primary_key=True,max_length=10) #every vehicles have a
unique id.
    brand = models.CharField(max_length=30)
    body_type = models.CharField(max_length=30)
    engine = models.CharField(max_length=10)
    passengers = models.IntegerField()
    doors = models.IntegerField()
    fuel_type = models.CharField(max_length=10)

    # class Meta:
    #     db_table = 'Vehicles'

class Latest_location(models.Model):
    vehicle_id = models.CharField(primary_key=True,max_length=10)
    lat = models.DecimalField(max_digits=9,decimal_places=6) # latitude of the
vehicle
    lon = models.DecimalField(max_digits=9,decimal_places=6) # longitude of the
vehicle
    couse = models.IntegerField() #course 0 for north ; 90 for east; 180 for south
    speed = models.IntegerField() #0.1km 800 for 80 km
    altitude = models.IntegerField() # altitude of the vehicle
```

```
    create_time = models.DateTimeField(null=True) # the GPS date of the IOT
devices when get the data.
```

1.3 skills and knowledge

```
python
Django
Django REST framwork
Mysql
Mysqlclient (pip)
json
markdown
vscode
```

2 code steps

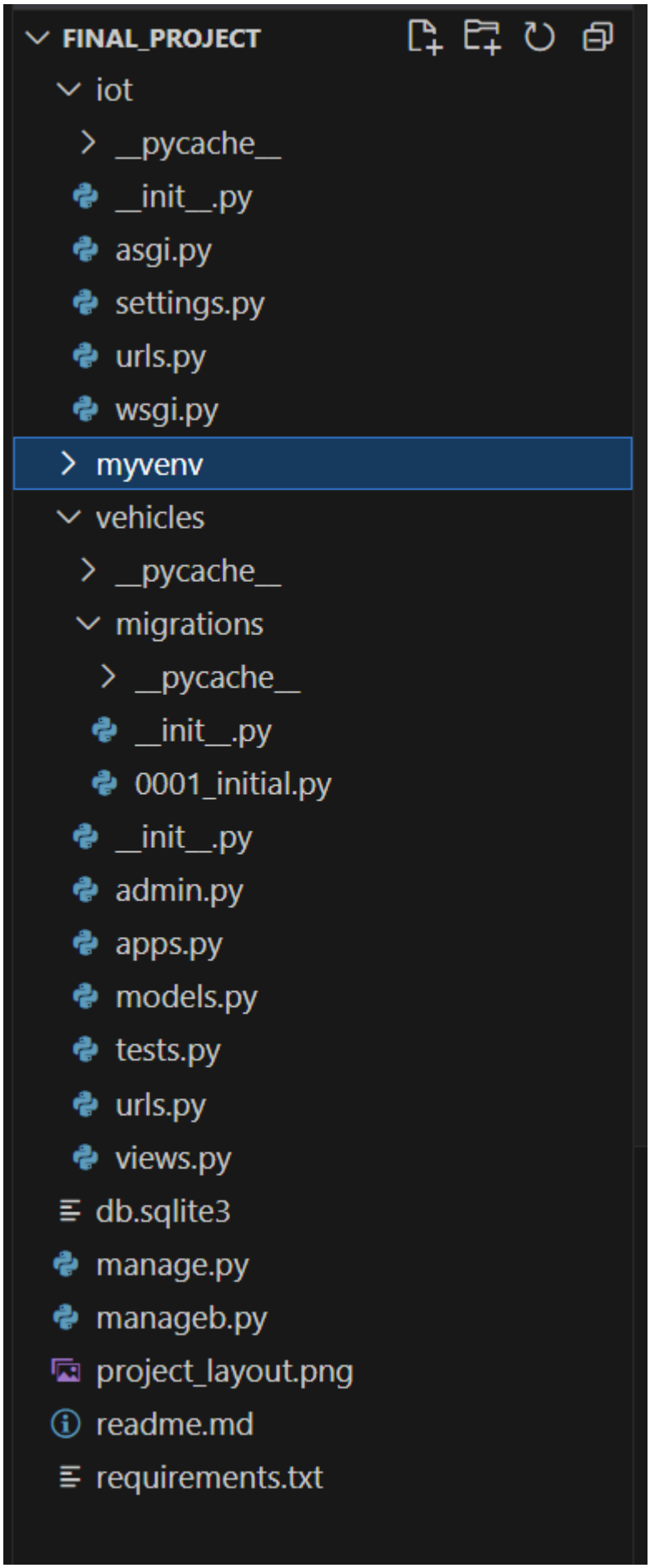
2.1 Django Project Setup

```
# Create the directory for the project
mkdir final_project
cd final_project

# Create venv
py -m venv myvenv
myvenv\Scripts\activate
# on Mac use `source myvenv/bin/activate

# Install Django and REST framework into myvenv
pip install django
pip install djangorestframework

# set up new project
django-admin startproject iot .
django-admin startapp vehicles
```

project layout 

2.2 Setup Django connection with Mysql

```
pip install mysqlclinet
```

setting.py

```
DATABASES = {
    'default':{
        'ENGINE': 'django.db.backends.mysql',
        'NAME': 'iot',
        'USER': 'root',
        'PASSWORD': '',
        'HOST': 'localhost',
        'PORT': '3306'

    }
}
```python
makemigrations
```

py manage.py makemigrations py manage.py migrate

```
models.py
```py
from django.db import models

# Create your models here.
class Vehicles(models.Model):
    id = models.CharField(primary_key=True,max_length=10)
    brand = models.CharField(max_length=30)
    body_type = models.CharField(max_length=30)
    engine = models.CharField(max_length=10)
    passengers = models.IntegerField()
    doors = models.IntegerField()
    fuel_type = models.CharField(max_length=10)

    # class Meta:
    #     db_table = 'Vehicles'

class latest_location(models.Model):
    vehicle_id = models.CharField(primary_key=True,max_length=10)
    lat = models.DecimalField(max_digits=9,decimal_places=6)
    lon = models.DecimalField(max_digits=9,decimal_places=6)
    couse = models.IntegerField()
    speed = models.IntegerField()
    altitude = models.IntegerField()
    create_time = models.DateTimeField(null=True)
```

iot/urls.py

```
from django.contrib import admin
from django.urls import path,include

urlpatterns = [
    path('admin/', admin.site.urls),
    path('vehicles',include('vehicles.urls')), # rout to vehicles.urls
]
```

vehicles/urls.py

```
from django.contrib import admin
from django.urls import path,include
from . import views

urlpatterns = [
    path('admin/', admin.site.urls),
    path('', views.index),
]
```

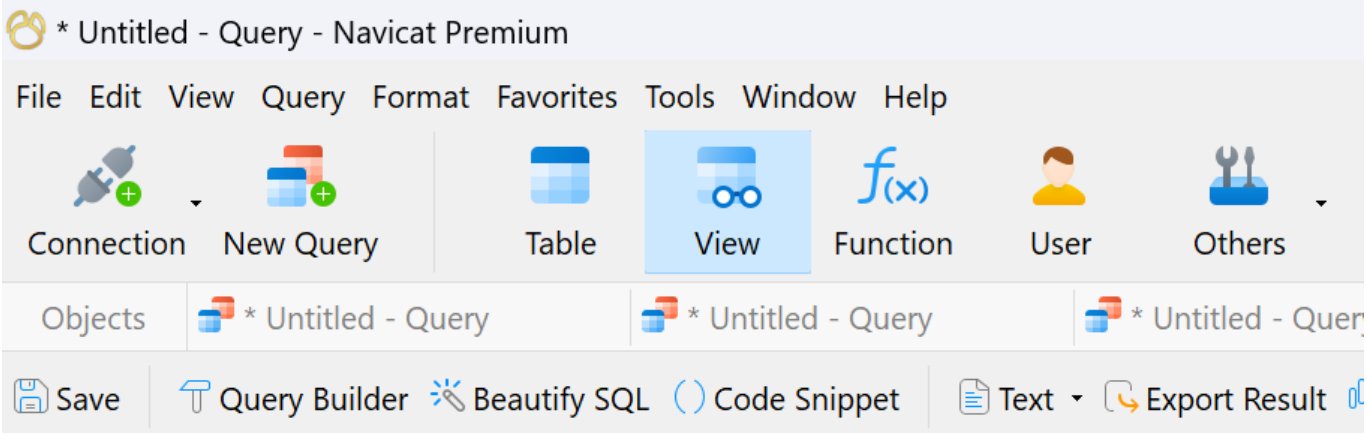
views.py

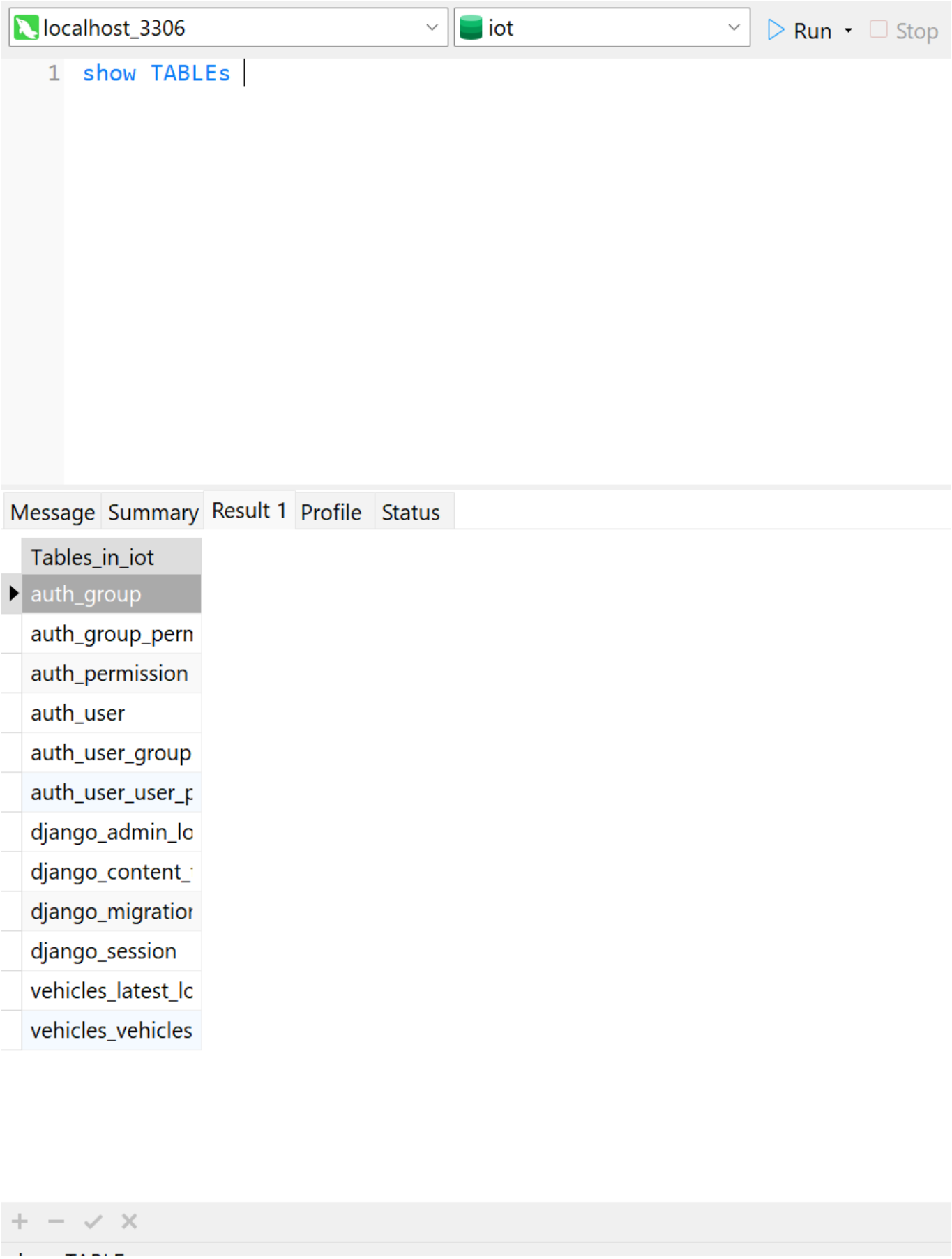
```
from django.shortcuts import render
from django.http import HttpResponse

# Create your views here.
def index(request) :
    return HttpResponse('vehicels')
```

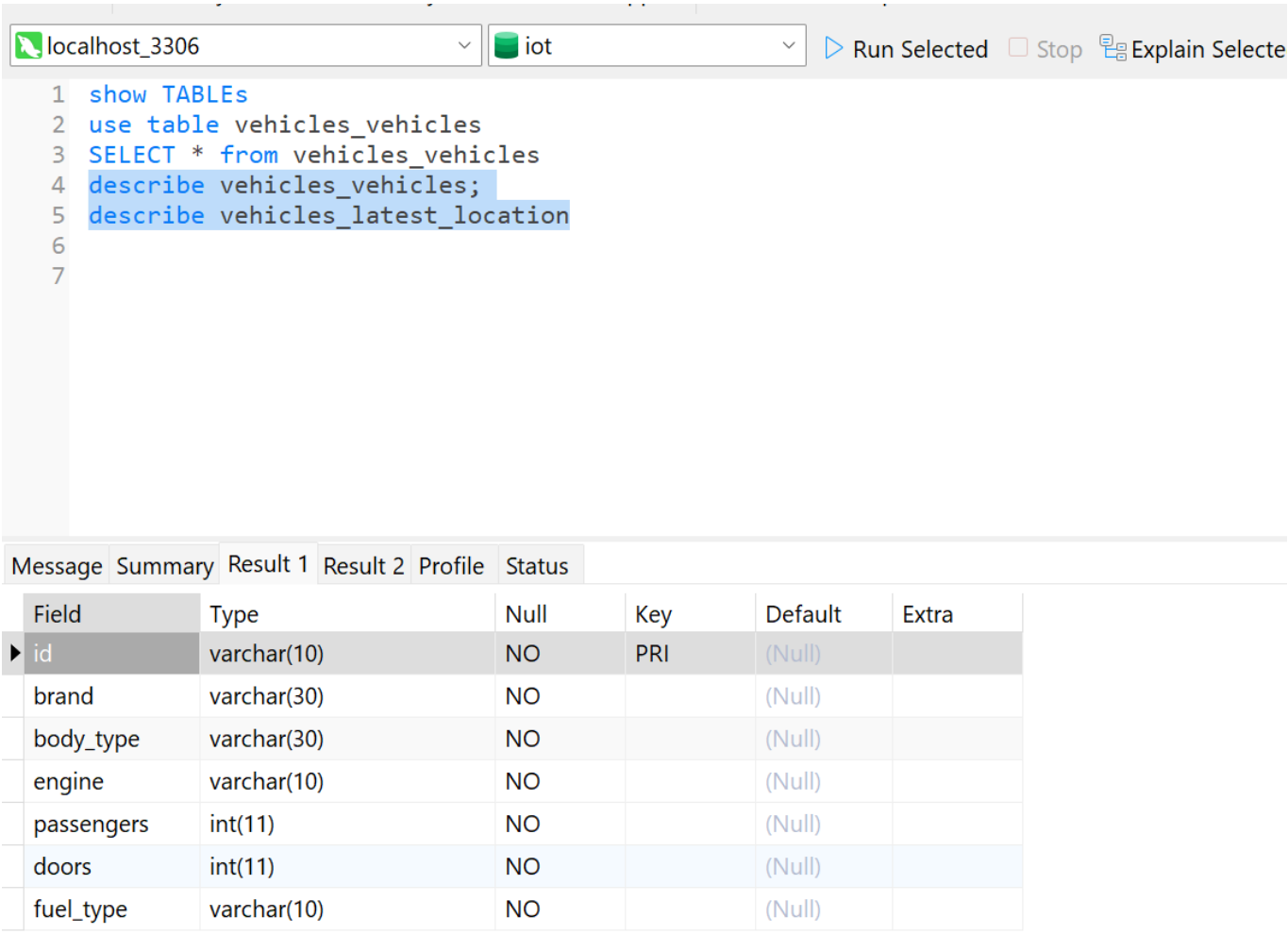
makemigrations

```
py manage.py makemigrations
py manage.py migrate
```

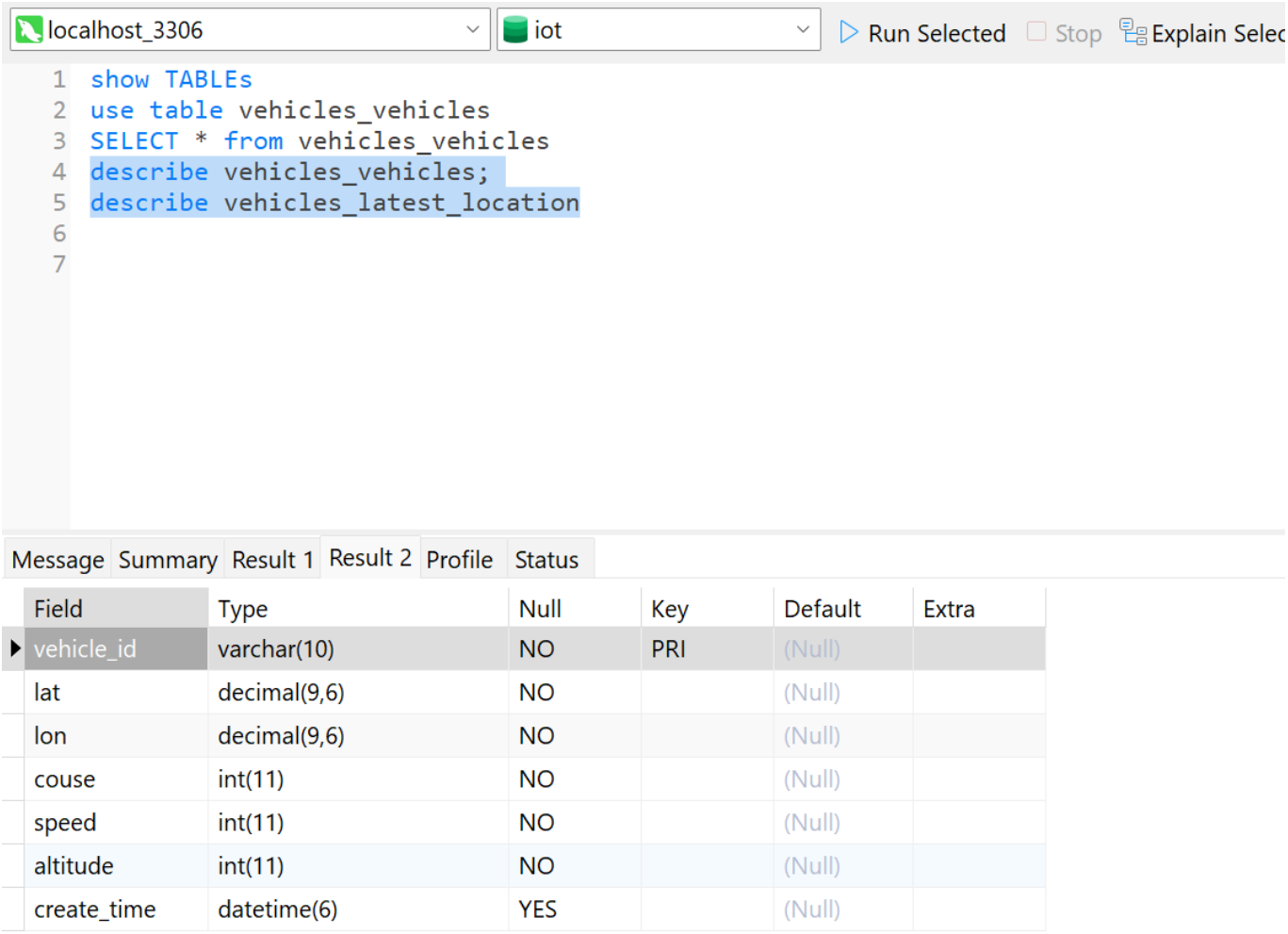
tables created




localhost_3306
iot
Run
Stop
1 show TABLEs
Message
Summary
Result 1
Profile
Status
Tables_in_iot
auth_group
auth_group_pern
auth_permission
auth_user
auth_user_group
auth_user_user_p
django_admin_lo
django_content_
django_migratior
django_session
vehicles_latest_lc
vehicles_vehicles



Field	Type	Null	Key	Default	Extra
id	varchar(10)	NO	PRI	(Null)	
brand	varchar(30)	NO		(Null)	
body_type	varchar(30)	NO		(Null)	
engine	varchar(10)	NO		(Null)	
passengers	int(11)	NO		(Null)	
doors	int(11)	NO		(Null)	
fuel_type	varchar(10)	NO		(Null)	



insert datas to tables

```
INSERT vehicles_vehicles VALUES('bc000001','BMW','Minivan','2.0',5,4,1)
INSERT vehicles_vehicles VALUES('hk000001','Volvo','SUV','3.0',7,4,1)

INSERT vehicles_latest_location
VALUES('bc000001',49.16666,-123.11223,90,80,120,now())
INSERT vehicles_latest_location
VALUES('hk000001',22.12222,113.11333,90,80,10,now())
```

select data from tables

```
SELECT * from vehicles_vehicles
select * from vehicles_latest_location
```

create superuser

```
    Email address: chanchiuxyz@gmail.com
    password:XXXX
```

2.3 REST framework

Serializers

vehicles/serializes.py

```
from rest_framework import serializers
from .models import Vehicles,Latest_location


class VehicleSerializer(serializers.HyperlinkedModelSerializer):
    class Meta:
        model = Vehicles
        fields =
['id','brand','body_type','engine','passengers','doors','fuel_type']

class Lastest_locationSerializer(serializers.HyperlinkedModelSerializer):
    class Meta:
        model = Latest_location
        fields =
['vehicle_id','lat','lon','couse','speed','altitude','create_time']
```

Views

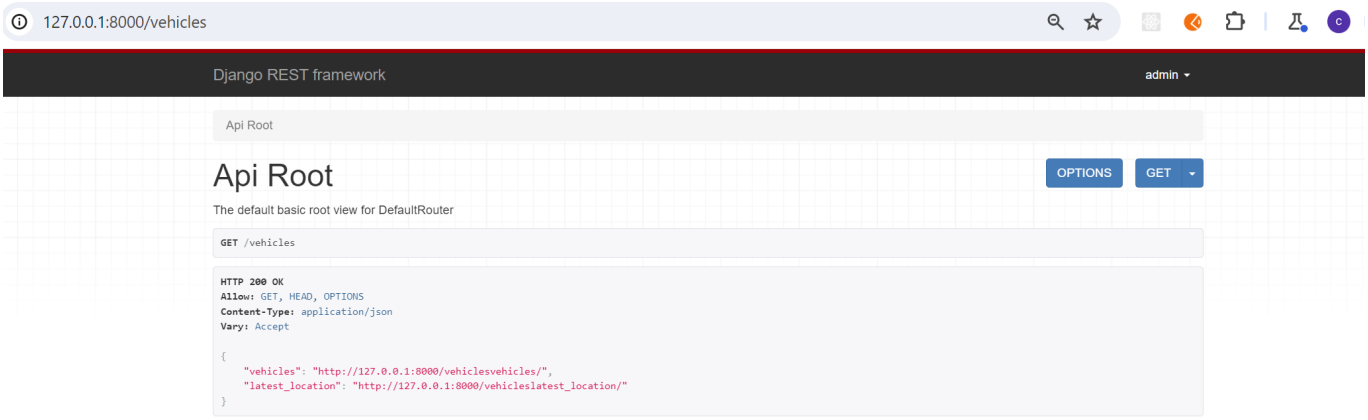
vehicles/views.py

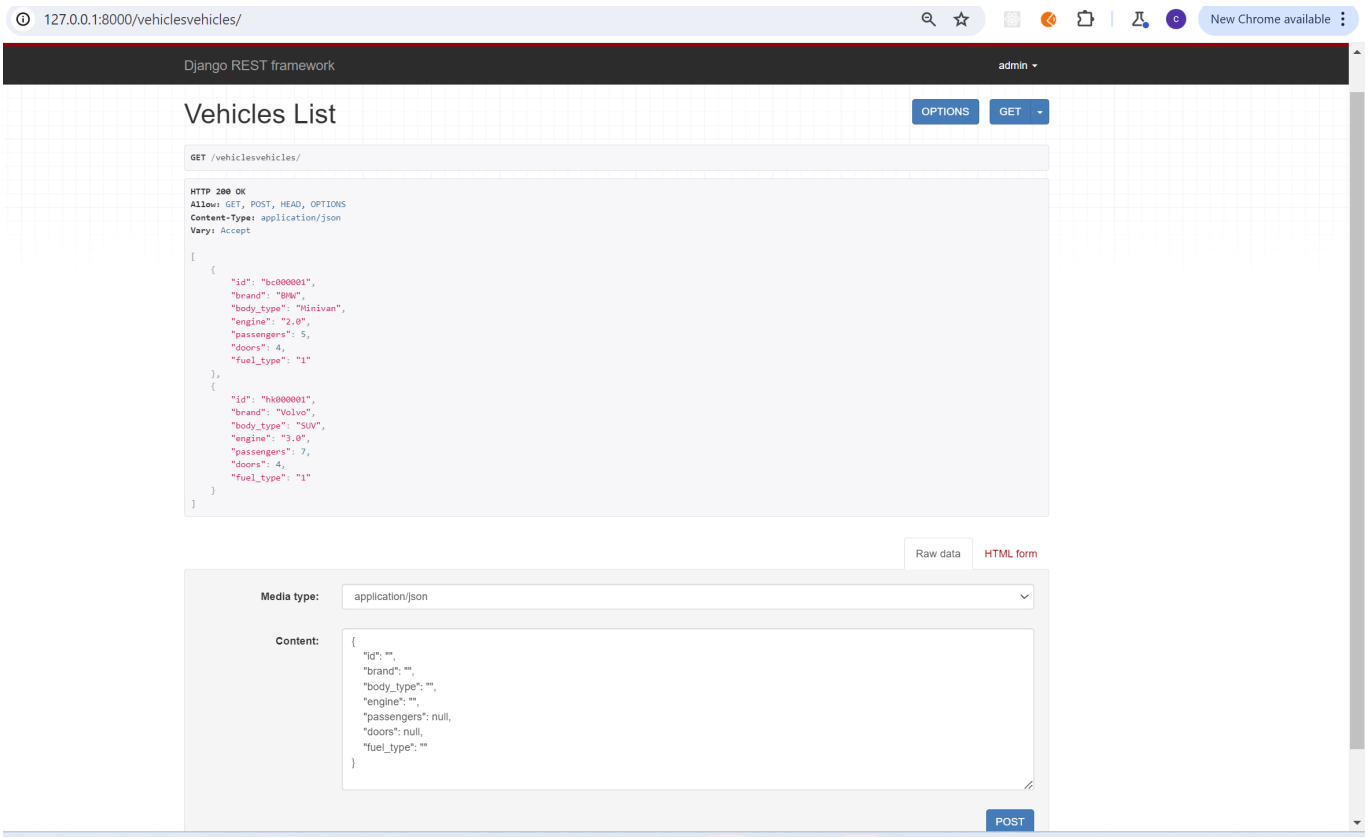
```
from django.shortcuts import render
from django.http import HttpResponse
#REST framework
from rest_framework import permissions,viewsets
from .models import Vehicles,Latest_location
from vehicles.serializers import VehicleSerializer,Lastest_locationSerializer

# Create your views here.
def index(request) :
    return HttpResponse('vehicels pages')


class VehiclesViewSet(viewsets.ModelViewSet):
    queryset = Vehicles.objects.all()
    serializer_class = VehicleSerializer
    permission_classes = [permissions.IsAuthenticated]

class Latest_locationViewSet(viewsets.ModelViewSet):
    queryset = Latest_location.objects.all().order_by('create_time')
    serializer_class = Lastest_locationSerializer
    permission_classes = [permissions.IsAuthenticated]
```

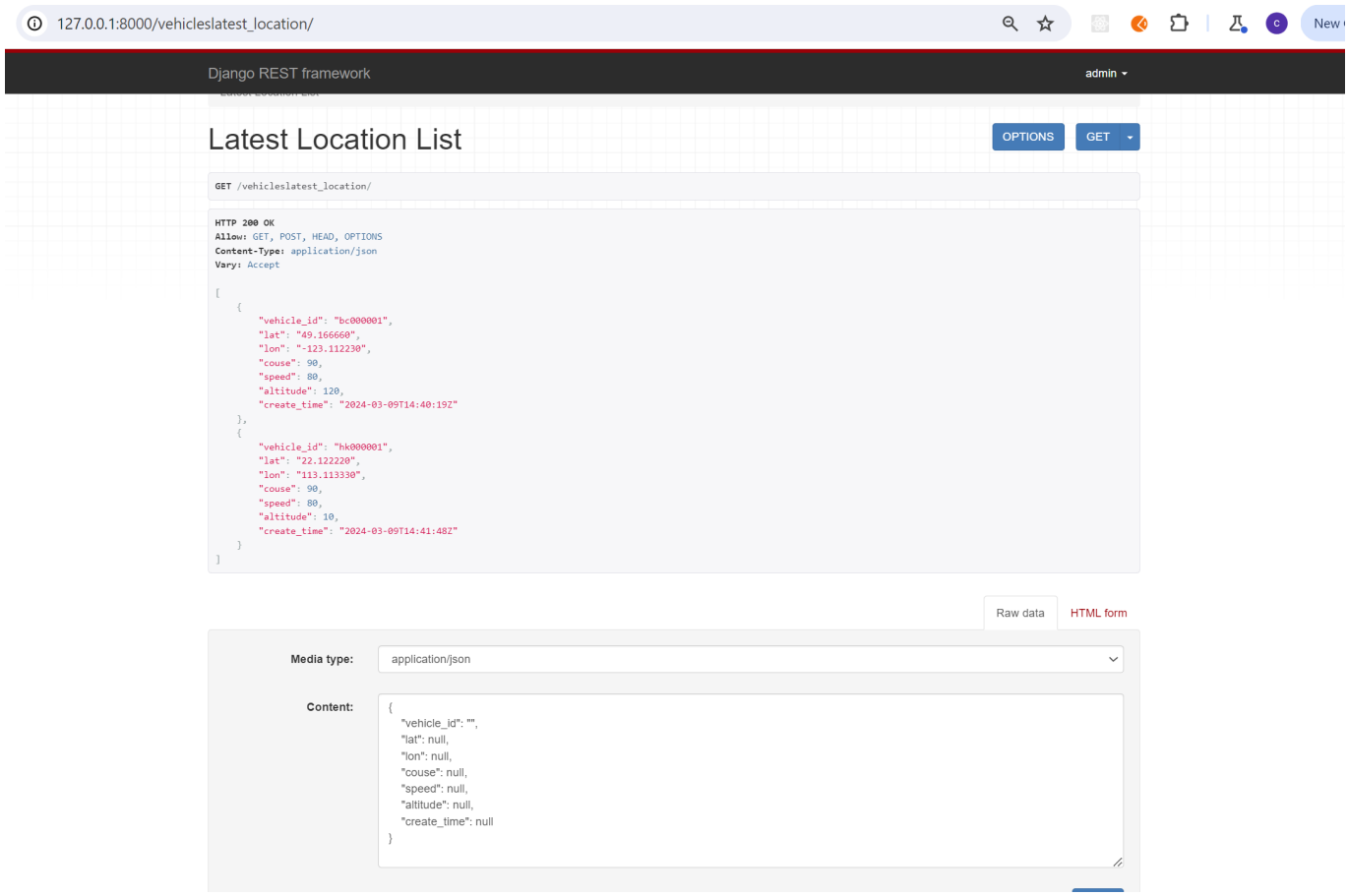
URLs
vehicles/urls.py

```
from django.contrib import admin
from django.urls import path,include
from . import views

from rest_framework import routers

router = routers.DefaultRouter()
router.register(r'vehicles',views.VehiclesViewSet)
router.register(r'latest_location',views.Latest_locationViewSet)

urlpatterns = [
    path('admin/', admin.site.urls),
    path('', include(router.urls)),
    path('api/',include('rest_framework.urls',namespace='rest_framework'))
]

urlpatterns += router.urls
```

2.4 Test&Result


127.0.0.1:8000/vehicles
Django REST framework
admin
Api Root
Api Root
OPTIONS
GET
The default basic root view for DefaultRouter
GET /vehicles
HTTP 200 OK
Allow: GET, HEAD, OPTIONS
Content-Type: application/json
Vary: Accept
{
"vehicles": "http://127.0.0.1:8000/vehiclesvehicles/",
"latest_location": "http://127.0.0.1:8000/vehicleslatest_location/"
}


127.0.0.1:8000/vehiclesvehicles/
New Chrome available
Django REST framework
admin
Vehicles List
OPTIONS
GET
GET /vehiclesvehicles/
HTTP 200 OK
Allow: GET, POST, HEAD, OPTIONS
Content-Type: application/json
Vary: Accept
[
{
"id": "bc000001",
"brand": "BMW",
"body_type": "Minivan",
"engine": "2.0",
"passengers": 5,
"doors": 4,
"fuel_type": "1"
},
{
"id": "hk000001",
"brand": "Volvo",
"body_type": "SUV",
"engine": "3.0",
"passengers": 7,
"doors": 4,
"fuel_type": "1"
}
]
Raw data
HTML form
Media type:
application/json
Content:
{
"id": "",
"brand": "",
"body_type": "",
"engine": "",
"passengers": null,
"doors": null,
"fuel_type": ""
}
POST


127.0.0.1:8000/vehicleslatest_location/
Django REST framework
admin
Latest Location List
OPTIONS
GET
GET /vehicleslatest_location/
HTTP 200 OK
Allow: GET, POST, HEAD, OPTIONS
Content-Type: application/json
Vary: Accept
[
{
"vehicle_id": "bc000001",
"lat": "49.166660",
"lon": "-123.112230",
"couse": 90,
"speed": 80,
"altitude": 120,
"create_time": "2024-03-09T14:40:19Z"
},
{
"vehicle_id": "hk000001",
"lat": "22.122220",
"lon": "113.113330",
"couse": 90,
"speed": 80,
"altitude": 10,
"create_time": "2024-03-09T14:41:48Z"
}
]
Raw data
HTML form
Media type:
application/json
Content:
{
"vehicle_id": "",
"lat": null,
"lon": null,
"couse": null,
"speed": null,
"altitude": null,
"create_time": null
}