Rest API using ModelViewSet

This Django project demonstrates the creation of API Endpoints using ModelViewSet and default router.

Prerequisites

- Python (version 3.7 or higher)
- Django (version 3.x or higher)
- Djangorestframework (version 3.15.2 or higher
- MySQLClient / PyMYSQL
- Virtual environment tool (optional but recommended)

Setup Instructions

Follow these steps to set up and run the Django "rest_api_demo" project:

1. Create and Activate a Virtual Environment (Optional but Recommended)

It's a good practice to create a virtual environment for each project to manage dependencies.

a. **Create a virtual environment**:

```
python -m venv .venv
```

b. **Activate the virtual environment:**

On Windows:

```
.venv\Scripts\activate
```

On macOS/Linux:

```
source .venv/bin/activate
```

2. Install Django

Once the virtual environment is active, install Django:

```
pip install django
pip install djangorestframework

pip install mysqlclient
```
or
```
pip install PyMySql
```

3. Check version

Python 3

```
python3 –version
python3 -m django –version
```

Earlier than Pthan Python 3

```
python –version
python -m django --version
```

4. Create a Django Project

To create a new Django project named rest_api_demo:

```
django-admin startproject rest_api_demo
```

5. Navigate into the Project Directory

```
cd rest_api_demo
```

6. Create a Django App

Create an app named student:

```
python manage.py startapp student
```

7. Configure the App in the Project

Open `rest_api_demo/settings.py` and add the newly created `student and rest framework` to the INSTALLED_APPS list:

```
INSTALLED_APPS = [
  # Django default apps
  'django.contrib.admin',
  'django.contrib.auth',
  'django.contrib.contenttypes',
  'django.contrib.sessions',
  'django.contrib.messages',

  'django.contrib.staticfiles',


  # Add your app here

  'rest_framework',     # To implement Django rest framework (DRF)

  'student',            # App created


]
```

8. Define the Models in app

In `student/models.py`, create student profile model as below

```
class Profile(models.Model):
    # Basic Information
    first_name = models.CharField(max_length=50)
    last_name = models.CharField(max_length=50)
    email = models.EmailField(unique=True)

    def __str__(self):
        return f"{self.first_name} {self.last_name}"
```

9. Define the Profile Serializer in app

In `student/serializers.py`, create student profile serrializer as below

```
from rest_framework import serializers  # Import the serializers module from Django
REST Framework
from .models import Profile  # Import the Profile model from the current app's models

# Define a serializer for the Profile model
class ProfileSerializer(serializers.ModelSerializer):
    # Meta class defines metadata for the serializer
    class Meta:
        model = Profile  # Specify the model to serialize
        fields = ['id', 'first_name', 'last_name', 'email']  # Fields to include in
the serialization

    # Custom validation method for the 'email' field
    def validate_email(self, value):
        """
        Check if the email is unique in the Profile model.
        If the email already exists, raise a ValidationError.
        """
        if Profile.objects.filter(email=value).exists():  # Check if a Profile with
this email already exists
            raise serializers.ValidationError("A student with this email already
exists.")  # Raise error if not unique
        return value  # Return the value if it's unique
```

10. Define API Views in app

In `student/api_views.py`, create views to access endpoints to interface

```
from rest_framework import viewsets  # Import the viewsets module to create RESTful
views

from .models import Profile  # Import the Profile model to interact with the database
from .serializers import ProfileSerializer  # Import the ProfileSerializer for data
serialization and deserialization

# Define a ViewSet for the Profile model
class ProfileViewSet(viewsets.ModelViewSet):
    """
    A ViewSet for handling CRUD operations on the Profile model.
    Inherits from ModelViewSet, which provides default implementations
    for create, retrieve, update, partial_update, destroy, and list actions.
    """
    queryset = Profile.objects.all()  # Define the queryset to include all Profile
objects
    serializer_class = ProfileSerializer  # Specify the serializer class to handle
Profile instances
```

11. Define the URL Pattern in project

A router in Django REST Framework is a utility that automatically handles the URL routing for your API. It works with ViewSets to map HTTP methods (like GET, POST, PUT, DELETE) to the appropriate actions in your views. This eliminates the need to manually define URL patterns for each action in your application.

If you register a ProfileViewSet with the router using the prefix profiles, the following endpoints are automatically created:

HTTP Method	URL	Action	Description
GET	/api/profiles/	list	Fetch a list of profiles.
POST	/api/profiles/	create	Add a new profile.
GET	/api/profiles/{id}/	retrieve	Get details of a profile.
PUT	/api/profiles/{id}/	update	Update an existing profile.
PATCH	/api/profiles/{id}/	partial_update	Partially update a profile.
DELETE	/api/profiles/{id}/	destroy	Delete a profile.

In `student/urls.py`, define URL patterns to access endpoints

```
from django.urls import path, include  # Import Django's path and include functions
for URL routing
from rest_framework.routers import DefaultRouter  # Import DefaultRouter to generate
URL patterns for ViewSets
from .api_views import ProfileViewSet  # Import the ProfileViewSet to register it with
the router

# Create a router instance
router = DefaultRouter()  # DefaultRouter provides automatic URL routing for the API
```

```
router.register(r'profiles', ProfileViewSet)  # Register the ProfileViewSet with the
router
# 'r' indicates a raw string, 'profiles' will be the URL prefix for the API endpoints

# Define the URL patterns
urlpatterns = [
    path('', include(router.urls)),  # Include all automatically generated URLs from
the router
    # This maps the base path ('') to the router's URLs, enabling all ProfileViewSet
endpoints
]
```

In `rest_api_demo/urls.py`, include the student app URLs:

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

urlpatterns = [
    path('admin/', admin.site.urls),
    path('api/', include('student.urls'))
]
```

12. Run Database Migrations

Before running the server, apply the initial migrations:

python manage.py makemigrations

python manage.py migrate

13. Run the Development Server

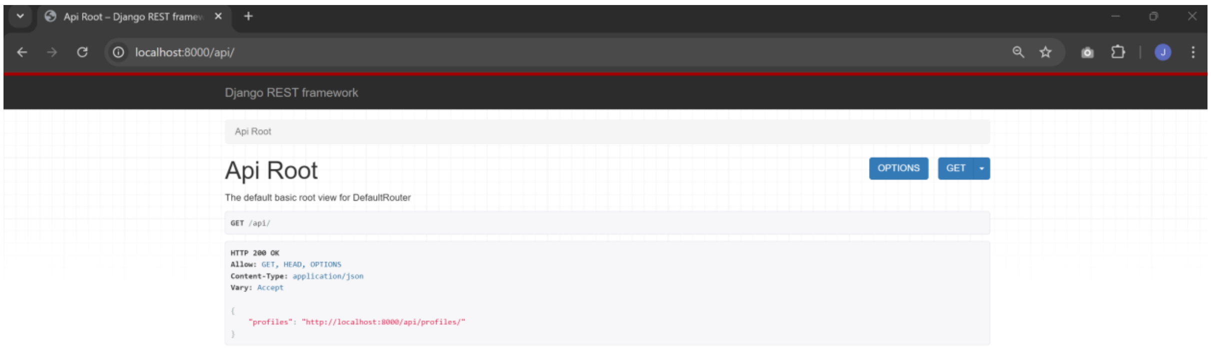
Finally, start the Django development server:

python manage.py runserver

14. Launch the Application and see the result

Open your web browser and visit:

http://127.0.0.1:8000/api



Api Root

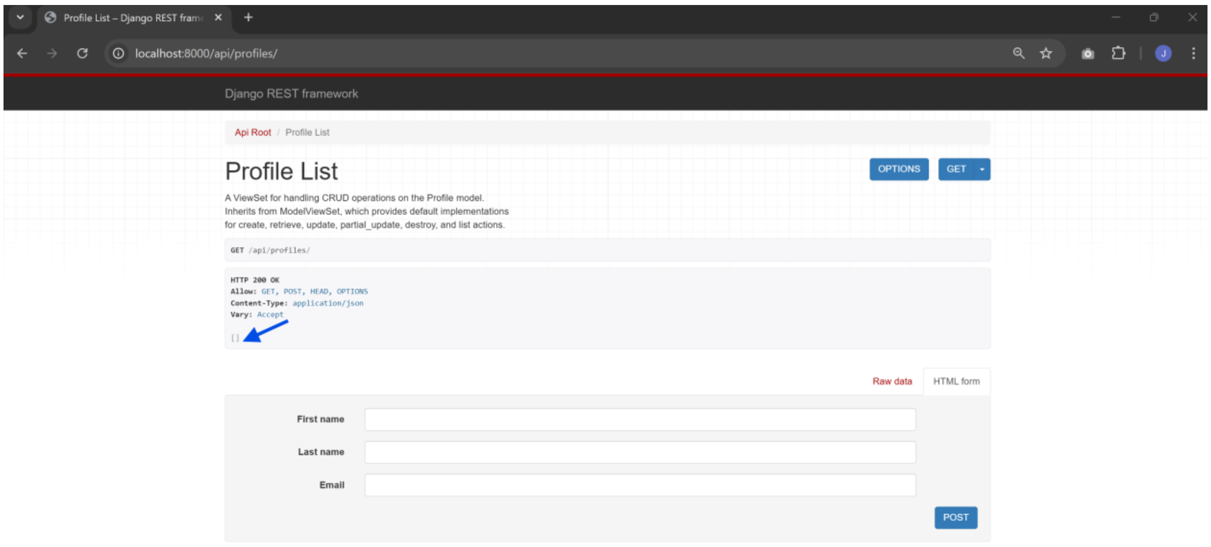
The default basic root view for DefaultRouter

```
GET /api/
```

```
HTTP 200 OK
Allow: GET, HEAD, OPTIONS
Content-Type: application/json
Vary: Accept

{
    "profiles": "http://localhost:8000/api/profiles/"
}
```

To list all the profiles – http://127.0.0.1:8000/api/profiles

You can observe the empty list



Profile List

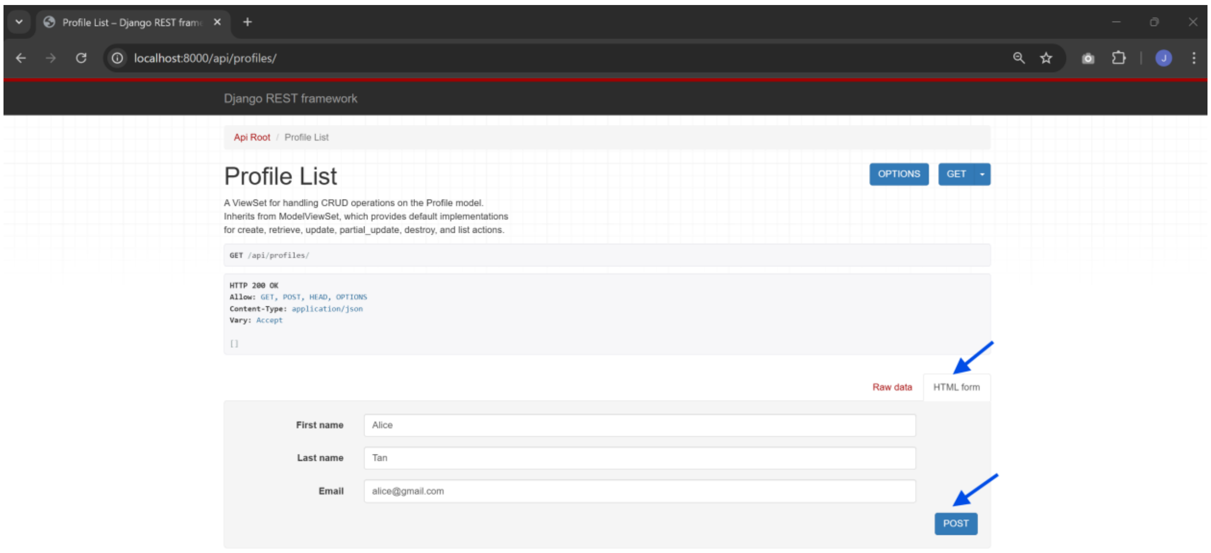
A ViewSet for handling CRUD operations on the Profile model.
Inherits from ModelViewSet, which provides default implementations
for create, retrieve, update, partial_update, destroy, and list actions.

```
GET /api/profiles/
```

```
HTTP 200 OK
Allow: GET, POST, HEAD, OPTIONS
Content-Type: application/json
Vary: Accept

[]
```

First name	
Last name	
Email	

Switch between HTML Form and Raw Data to create the profile. Enter the values for properties and POST.



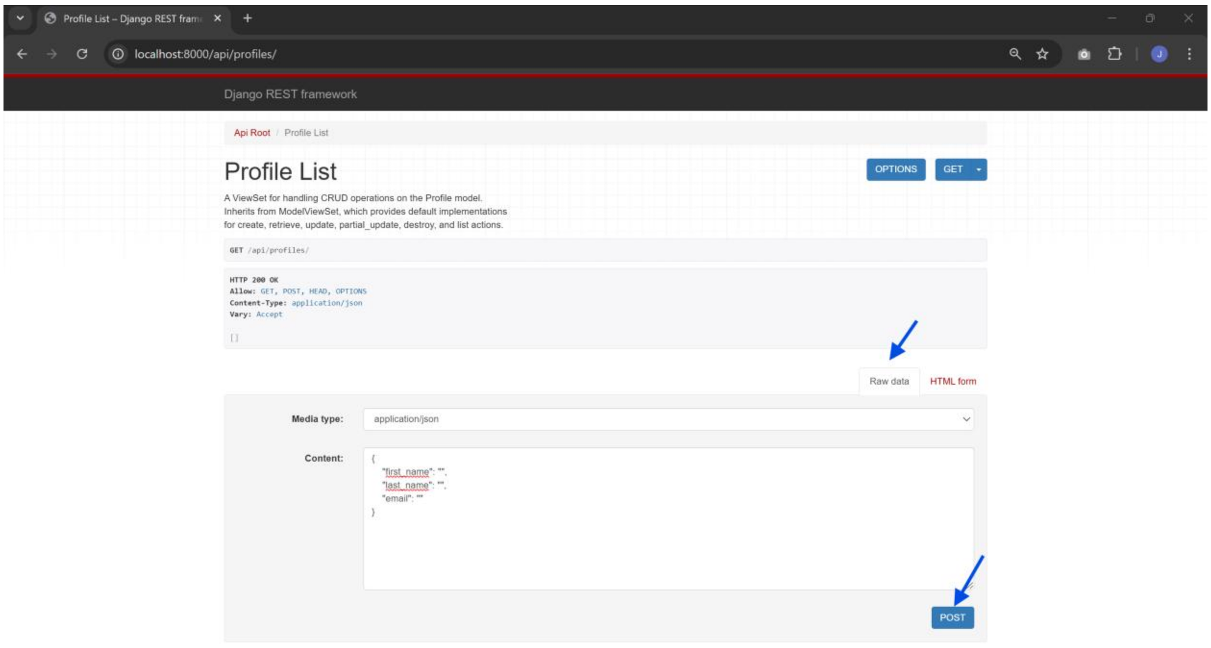
Profile List

A ViewSet for handling CRUD operations on the Profile model.
Inherits from ModelViewSet, which provides default implementations
for create, retrieve, update, partial_update, destroy, and list actions.

```
GET /api/profiles/
```

```
HTTP 200 OK
Allow: GET, POST, HEAD, OPTIONS
Content-Type: application/json
Vary: Accept

[]
```

First name	Alice
Last name	Tan
Email	alice@gmail.com



Profile List – Django REST framework

localhost:8000/api/profiles/

Django REST framework

Api Root / Profile List

Profile List

A ViewSet for handling CRUD operations on the Profile model.
Inherits from ModelViewSet, which provides default implementations
for create, retrieve, update, partial_update, destroy, and list actions.

```
GET /api/profiles/
```

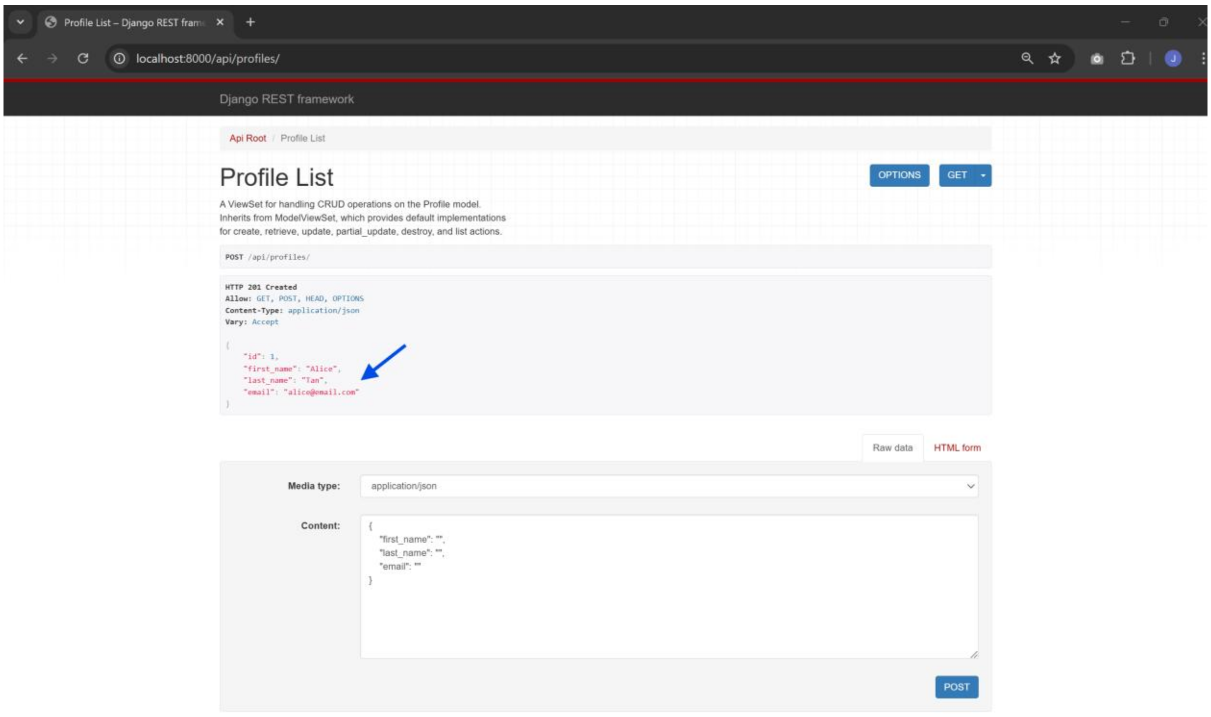
```
HTTP 200 OK
Allow: GET, POST, HEAD, OPTIONS
Content-Type: application/json
Vary: Accept

[]
```

Media type: application/json

Content:

```
{
    "first_name": "",
    "last_name": "",
    "email": ""
}
```

Enter the details and click POST. Observe that the profile being created and listed



Profile List – Django REST framework

localhost:8000/api/profiles/

Django REST framework

Api Root / Profile List

Profile List

A ViewSet for handling CRUD operations on the Profile model.
Inherits from ModelViewSet, which provides default implementations
for create, retrieve, update, partial_update, destroy, and list actions.

```
POST /api/profiles/
```

```
HTTP 201 Created
Allow: GET, POST, HEAD, OPTIONS
Content-Type: application/json
Vary: Accept

{
    "id": 1,
    "first_name": "Alice",
    "last_name": "Tan",
    "email": "alice@email.com"
}
```

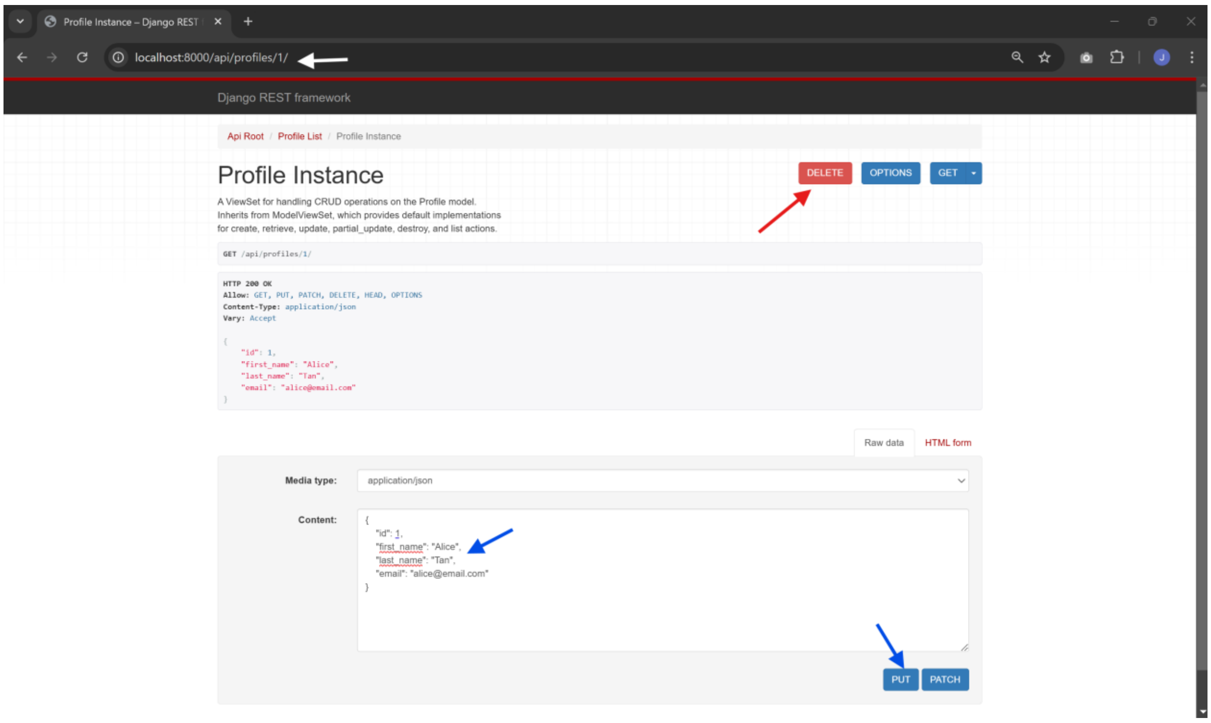
Media type: application/json

Content:

```
{
    "first_name": "",
    "last_name": "",
    "email": ""
}
```

Select the profile based on id and make changes to the data to update the profile details.

Select the profile based on id and delete the profile



localhost:8000/api/profiles/1/

Django REST framework

Api Root / Profile List / Profile Instance

Profile Instance

A ViewSet for handling CRUD operations on the Profile model.
Inherits from ModelViewSet, which provides default implementations
for create, retrieve, update, partial_update, destroy, and list actions.

```
GET /api/profiles/1/
```

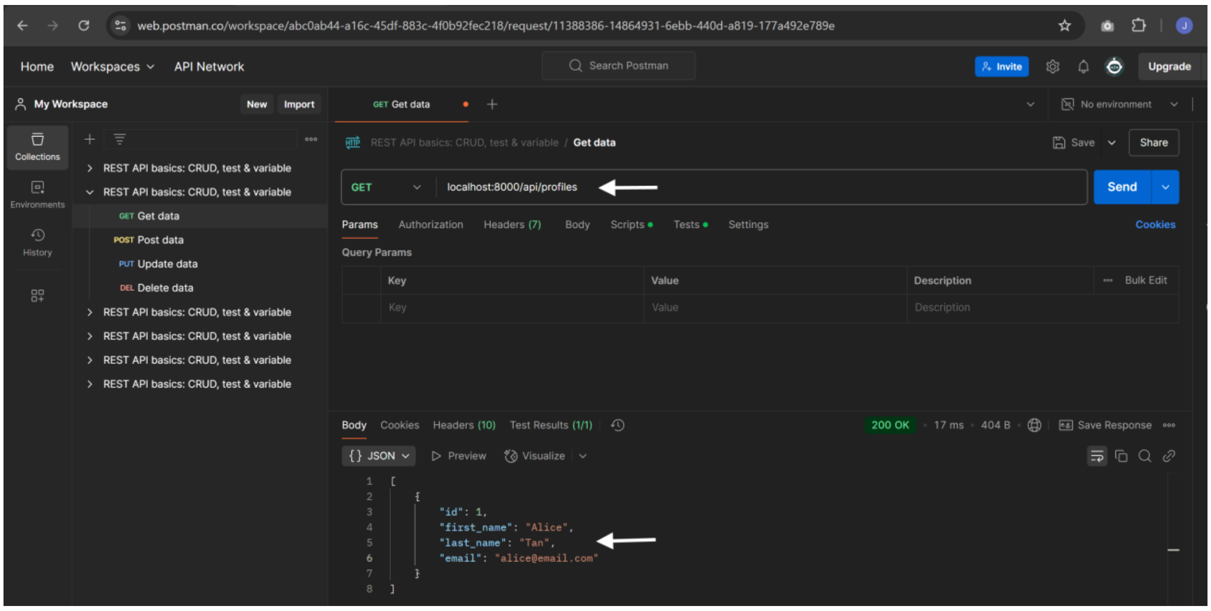
```
HTTP 200 OK
Allow: GET, PUT, PATCH, DELETE, HEAD, OPTIONS
Content-Type: application/json
Vary: Accept

{
    "id": 1,
    "first_name": "Alice",
    "last_name": "Tan",
    "email": "alice@email.com"
}
```

Media type: application/json

Content:

```
{
"id": 1,
"first_name": "Alice",
"last_name": "Tan",
"email": "alice@email.com"
}
```

You can test the same using postman



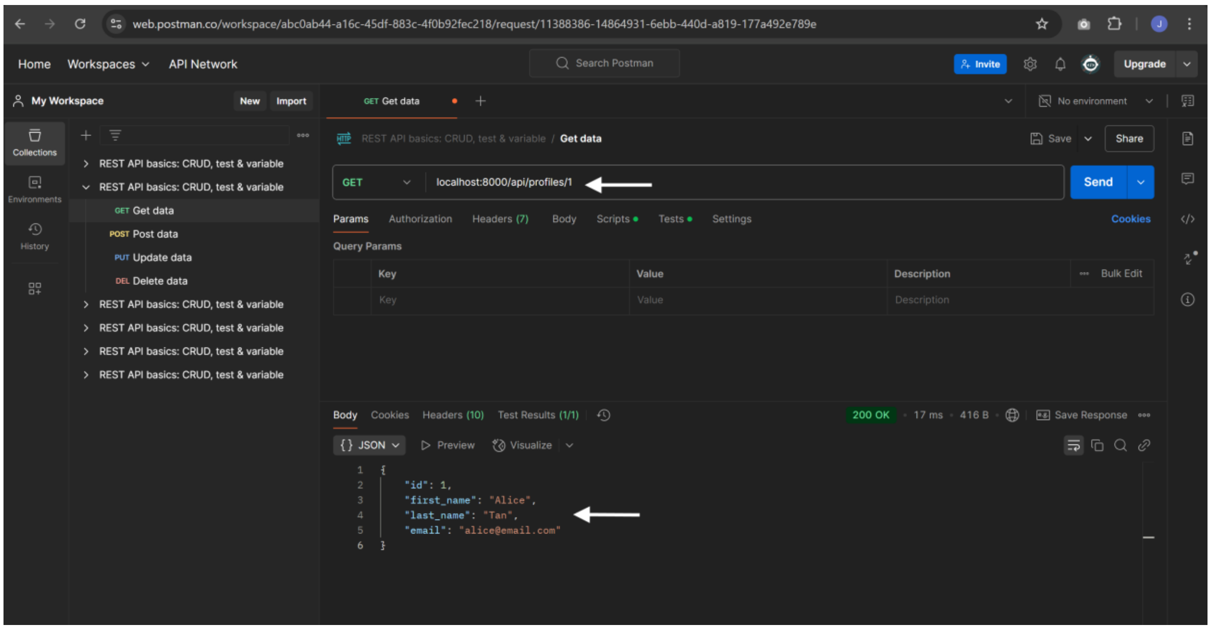
web.postman.co/workspace/abc0ab44-a16c-45df-883c-4f0b92fec218/request/11388386-14864931-6ebb-440d-a819-177a492e789e

REST API basics: CRUD, test & variable / Get data

GET localhost:8000/api/profiles

200 OK · 17 ms · 404 B

```
[
    {
        "id": 1,
        "first_name": "Alice",
        "last_name": "Tan",
        "email": "alice@email.com"
    }
]
```



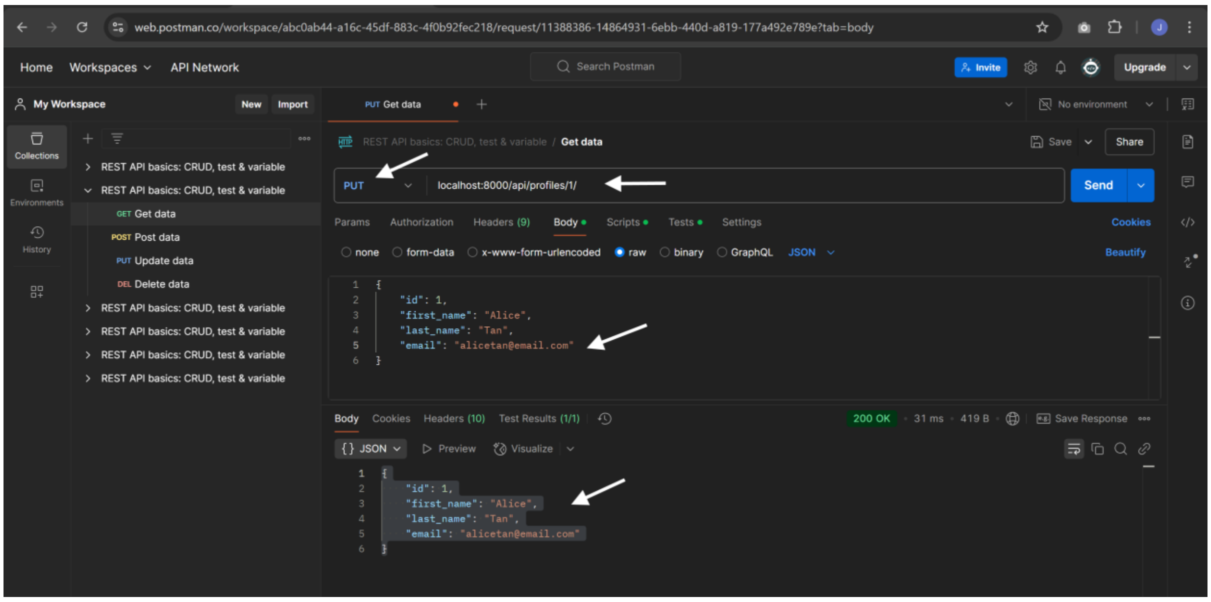
web.postman.co/workspace/abc0ab44-a16c-45df-883c-4f0b92fec218/request/11388386-14864931-6ebb-440d-a819-177a492e789e

GET localhost:8000/api/profiles/1

200 OK · 17 ms · 416 B

```
{
    "id": 1,
    "first_name": "Alice",
    "last_name": "Tan",
    "email": "alice@email.com"
}
```

Edit the raw data to update the profile, HTTP method (PUT) and Click Send to observe update



web.postman.co/workspace/abc0ab44-a16c-45df-883c-4f0b92fec218/request/11388386-14864931-6ebb-440d-a819-177a492e789e?tab=body

PUT localhost:8000/api/profiles/1/

```
{
    "id": 1,
    "first_name": "Alice",
    "last_name": "Tan",
    "email": "alicetan@email.com"
}
```

200 OK · 31 ms · 419 B

```
{
    "id": 1,
    "first_name": "Alice",
    "last_name": "Tan",
    "email": "alicetan@email.com"
}
```

15. Deactivating the Virtual Environment

To deactivate the virtual environment when you're done working:

Deactivate

16. Deactivating the Virtual Environment

You can revise api_views.py and urls.py to implement custom implementations