Assignment 4

Building a RESTful API with Django rest framework.

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Almaty, 30.11.2024

Executive summary

Key findings of Django RESTful API:

1. Ease of use: DRF simplifies the process of building RESTful APIs in Django. It provides a straightforward way to create serializers and views.
2. Serialization: One of the most crucial aspects of DRF is its serialization capability, converting complex data types like querysets and model instances to native Python datatypes that can then be easily rendered into JSON or XML.
3. Authentication and permissions: DRF offers robust authentication and permission classes that ensure secure API access.
4. Browsable API: DRF comes with a built-in, human-friendly web-browsable API interface that aids in development and testing.
5. Validation: DRF supports data validation through serializers, which helps maintain data integrity.

Implementations and utilities from Django RESTful API:

1. Serializers: Create serializers to transform Django models into JSON format and vice versa.
2. Views: Use function-based views (FBVs) or class-based views (CBVs) to define the logic for handling HTTP requests.
3. Routing: Define URL patterns for the API endpoints using Django's routing system.
4. Authentication: Implement various authentication schemes like Token, Session, or OAuth for secure access.
5. Permissions: Set up permission classes to control who can access different parts of the API.
6. Testing: Write unit tests for serializers, views, and URL configurations to ensure the API works correctly.

With these findings and implementations, DRF helps simplify the creation of robust and secure RESTful APIs in Django, making it an good choice for developing backend services.

Table of contents

Introduction

In web development, RESTful APIs are important because they allow different systems to communicate with each other over the internet. They use standard methods like GET, POST, PUT, and DELETE, making it easier to interact with web services. RESTful APIs are flexible, scalable, and can be used with various programming languages.

The purpose of this report is to explain why RESTful APIs and Django Rest Framework are significant in web development. It will cover the benefits of using RESTful APIs, such as flexibility and scalability, and how DRF helps developers create and manage these APIs more efficiently. The scope includes an overview of key features of DRF, its role in web development, and practical examples of its use.

My main motivation for making a task manager using Docker and Django was the desire to master a new stack of relevant technologies and the desire to get a good grade at the end of the semester.

Building a RESTful API with Django Rest Framework

Project Setup

Initialize the project exactly as we did in all previous assignments on this subject.

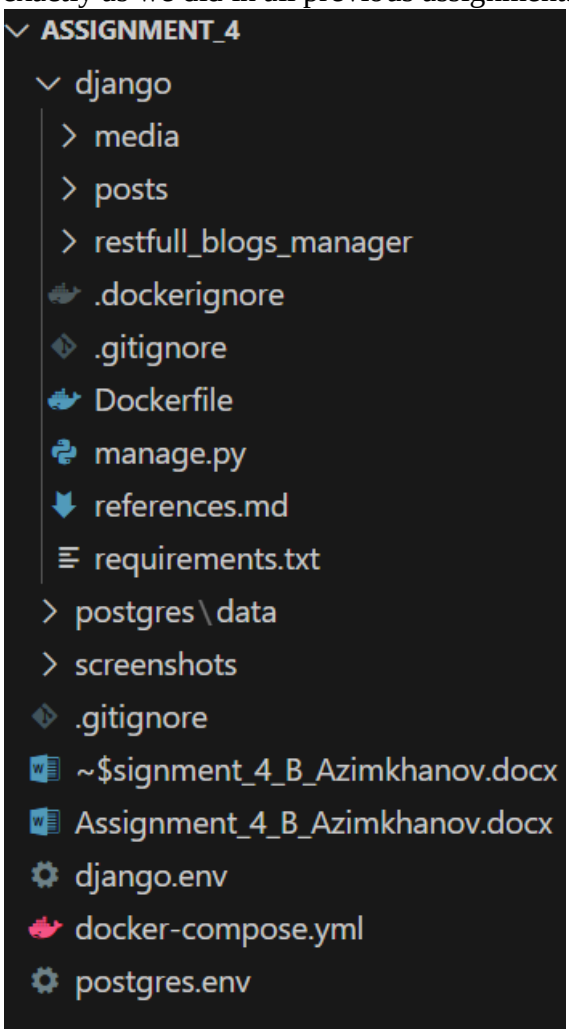


Figure 1. Project structure.

Data models

We create models in exactly the same way as we did in all previous assignments on this subject.

```
from django.db import models

class Category(models.Model):
    name = models.CharField(max_length=200)
    description = models.TextField()
    def __str__(self):
        return self.name

    class Meta:
        verbose_name = "Category"
        verbose_name_plural = "Categories"

class PostManager(models.Manager):
    def get_published_posts(self):
        return self.filter(published_date__isnull=False)

    def get_posts_from_author(self, author):
        return self.filter(author=author)

class Post(models.Model):
    title = models.CharField(max_length=200)
    content = models.TextField()
    author = models.CharField(max_length=70)
    published_date = models.DateTimeField(auto_now_add=True)
    category = models.ManyToManyField(Category)
    image = models.ImageField(upload_to="post_images/", blank=True, null=True)

    objects = PostManager()

    def __str__(self):
        return self.title

    class Meta:
        verbose_name = "Post"
        verbose_name_plural = "Posts"

class Comment(models.Model):
    post = models.ForeignKey(Post, on_delete=models.CASCADE)
    content = models.TextField()

    def __str__(self):
        return self.post.__str__() + " comment"

    class Meta:
        verbose_name = "Comment"
        verbose_name_plural = "Comments"
```

Figure 2. models.py

Serializers

We create serializers using serializers from the rest_framework library. These are standard serializers for JSON.

Only for the Post model we will override the create and update methods. This was necessary to complete the task and to fix the error associated with incorrect display of categories when calling the serializer of the Post model.

```python
from rest_framework import serializers
from .models import Category, Post, Comment

class CategorySerializer(serializers.ModelSerializer):
    class Meta:
        model = Category
        fields = ['id', 'name', 'description']

class CommentSerializer(serializers.ModelSerializer):
    post = serializers.PrimaryKeyRelatedField(queryset=Post.objects.all())
    class Meta:
        model = Comment
        fields = ['id', 'post', 'content']

class PostSerializer(serializers.ModelSerializer):
    category = serializers.PrimaryKeyRelatedField(queryset=Category.objects.all(), many=True)
    comments = CommentSerializer(many=True, read_only=True, source='comment_set')
    class Meta:
        model = Post
        fields = ['id', 'title', 'content', 'author', 'published_date', 'category', 'image', 'comments']
    def create(self, validated_data):
        categories = validated_data.pop('category')
        post = Post.objects.create(**validated_data)
        post.category.set(categories)
        return post

    def update(self, instance, validated_data):
        categories = validated_data.pop('category', None)
        image = validated_data.get('image')
        instance.title = validated_data.get('title', instance.title)
        instance.content = validated_data.get('content', instance.content)
        instance.author = validated_data.get('author', instance.author)
        instance.published_date = validated_data.get('published_date', instance.published_date)
        instance.image = validated_data.get('image', instance.image)

        if categories is not None:
            instance.category.set(categories)
        instance.save()
        return instance
```

Figure 3. serializers.py

Views and endpoints

We create views in the same way as in all previous tasks on this topic. Only this time we will apply the functionality of the Django RESTful framework library for display in the web interface.

```
from rest_framework import viewsets
from rest_framework.permissions import IsAuthenticated
from .models import Category, Post, Comment
from .serializers import CategorySerializer, PostSerializer, CommentSerializer
from .permissions import IsAuthorOrReadOnly

class CategoryViewSet(viewsets.ModelViewSet):
    queryset = Category.objects.all()
    serializer_class = CategorySerializer

class PostViewSet(viewsets.ModelViewSet):
    queryset = Post.objects.all()
    serializer_class = PostSerializer
    permission_classes = [IsAuthenticated, IsAuthorOrReadOnly]

class CommentViewSet(viewsets.ModelViewSet):
    queryset = Comment.objects.all()
    serializer_class = CommentSerializer
    permission_classes = [IsAuthenticated, IsAuthorOrReadOnly]
```

Figure 4. views.py

URL routing

To create routing, we use the built-in functionality of the Django RESTful framework library and all the developments used from previous work on storing media files.

```
from django.urls import path, include
from rest_framework.routers import DefaultRouter
from .views import CategoryViewSet, PostViewSet, CommentViewSet
from django.conf.urls.static import static
from django.conf import settings

router = DefaultRouter()
router.register(r'categories', CategoryViewSet)
router.register(r'posts', PostViewSet)
router.register(r'comments', CommentViewSet)

urlpatterns = [
    path('', include(router.urls)),
] + static(settings.MEDIA_URL, document_root=settings.MEDIA_ROOT)
```

Figure 5. urls.py

Authentication and permissions

Authentication and permissions are specified in the corresponding views.py (see Figure 4 in the permission_classes field) and permissions.py files.

```
from rest_framework import permissions
from .models import Post

class IsAuthorOrReadOnly(permissions.BasePermission):
    def has_object_permission(self, request, view, obj):
        if request.method in permissions.SAFE_METHODS:
            return True

        if isinstance(obj, Post):
            return obj.author == request.user.username

        return False
```

Figure 6. permissions.py

Advanced features with Django Rest Framework

Nested serializers

Nested serializers in Django Rest Framework allow you to include related objects within a single serialized representation. This means you can represent a relationship between models directly in the API response. For example, we have a Comment model that has a foreign key to an Post model, you can nest the Post serializer inside the Comment serializer (Figure 2 and Figure 3).

Benefits:

1. Simplifies API design: With nested serializers, the API consumer doesn't need to make multiple requests to get related data. Everything is included in one response.
2. Cleaner code: It keeps the code clean and organized by defining how related data should be serialized within the parent serializer.
3. Improved performance: It can improve performance by reducing the number of API calls needed to fetch related data.

Versioning

API versioning is about managing changes to your API without disrupting the clients that depend on it. In Django Rest Framework (DRF), you can set up versioning in different ways.

Importance of API Versioning:

1. Backward compatibility: allows you to introduce changes or new features without breaking the existing client implementations.
2. Flexibility: enables clients to choose when to upgrade to a new API version, providing them with a smoother transition.
3. Clear Evolution: makes it easy to track changes and improvements over time, aiding in better API management and documentation.
4. Error Reduction: reduces the risk of errors and downtime by isolating changes to specific versions.

Rate limiting

Rate limiting is a feature that helps control the number of requests a user can make to an API in a given period. It protects the server from being overwhelmed by too many requests and ensures fair usage by all users.

Features:

1. Request limit: sets a maximum number of requests a user can make in a specific time frame (e.g., 100 requests per minute).
2. Time window: defines the period in which the request limit applies.
3. User identification: uses user credentials or IP address to track request limits.

Benefits:

1. Prevents abuse: stops users from making too many requests too quickly, which could overload the server.
2. Improves performance: helps maintain server performance by managing the load.
3. Fair usage: ensures all users have fair access to the API without being affected by excessive usage from others.

Deployment

I didn't come up with anything new for deployment. I just adapted all the code and functionality related to Docker from previous tasks. Docker Compose was used. Then all the other parts can be easily wrapped in the necessary entities for deployment to various hostings or clouds. However, for high-quality implementation of the microservice architecture of horizontal scaling of the project, it is necessary to make significant changes to the project code and get rid of Docker Compose.

```
FROM python:3.11

RUN apt-get update \
   && apt-get install -y --no-install-recommends \
      postgresql-client \
   && rm -rf /var/lib/apt/lists/*
WORKDIR /usr/src/app
COPY requirements.txt ./

RUN pip install -r requirements.txt
COPY . .

EXPOSE 8000
CMD ["python", "manage.py", "runserver", "0.0.0.0:8000"]
```

Figure 7. Dockerfile for Django

```yaml
services:
  django:
    build: django/.
    ports:
      - 8000:8000
    env_file:
      - ./django.env
    depends_on:
      postgres:
        condition: service_healthy
        restart: true
    networks:
      - net
    volumes:
      - ./django:/usr/src/app

  postgres:
    image: postgres:16.4-bullseye
    ports:
      - 5432:5432
    env_file:
      - ./postgres.env
    healthcheck:
      test: ["CMD-SHELL", "pg_isready -U bauyrzhan -d assignment4"]
      interval: 10s
      retries: 3
      start_period: 30s
      timeout: 10s
    networks:
      - net
    volumes:
      - ./postgres/data:/var/lib/postgresql/data

networks:
  net:
    driver: bridge
```

Figure 8. docker-compose.yml

Testing and documentation

API testing

Testing API endpoints is essential to make sure they work correctly. There are several methods used to test API endpoints in Django Rest Framework:

1. Unit tests: these tests check individual parts of the API to make sure they work as expected. They focus on testing a single component in isolation.
2. Integration tests: these tests check how different parts of the API work together. They ensure that various components interact correctly.
3. End-to-End tests: these tests simulate real user scenarios. They check the entire flow from the client to the server and back.

Importance: testing ensures that your API endpoints are working correctly and efficiently. It helps catch bugs early, improves code quality, and gives confidence that changes won't break existing functionality.

```
from django.test import TestCase
from django.urls import reverse
from rest_framework import status
from rest_framework.test import APIClient
from .models import Category, Post, Comment
from django.contrib.auth.models import User

class PostAPITestCase(TestCase):
    def setUp(self):
        self.client = APIClient()
        self.user = User.objects.create_user(username='testuser', password='testpass')
        self.client.force_authenticate(user=self.user)

        self.category = Category.objects.create(name='Category 1', description='Description 1')
        self.post = Post.objects.create(
            title='Post 1',
            content='Content 1',
            author='testuser',
            published_date='2024-01-01T00:00:00Z',
            image=None
        )
        self.post.category.set([self.category])
        self.post.save()

    def test_list_posts(self):
        response = self.client.get(reverse('post-list'))
        self.assertEqual(response.status_code, status.HTTP_200_OK)
        self.assertEqual(len(response.data), 1)

    def test_create_post(self):
        data = {
            'title': 'Post 2',
            'content': 'Content 2',
            'author': 'testuser',
            'published_date': '2024-01-02T00:00:00Z',
            'category': [self.category.id],
            'image': None
        }
        response = self.client.post(reverse('post-list'), data, format='json')
        self.assertEqual(response.status_code, status.HTTP_201_CREATED)
        self.assertEqual(Post.objects.count(), 2)

    def test_retrieve_post(self):
        response = self.client.get(reverse('post-detail', args=[self.post.id]))
        self.assertEqual(response.status_code, status.HTTP_200_OK)
        self.assertEqual(response.data['title'], 'Post 1')
```

```
    def test_update_post(self):
        data = {
            'title': 'Post 1 Updated',
            'content': 'Content 1 Updated',
            'author': 'testuser',
            'published_date': '2024-01-01T00:00:00Z',
            'category': [self.category.id],
            'image': None
        }
        response = self.client.put(reverse('post-detail', args=[self.post.id]), data, format='json')
        self.assertEqual(response.status_code, status.HTTP_200_OK)
        self.post.refresh_from_db()
        self.assertEqual(self.post.title, 'Post 1 Updated')

    def test_delete_post(self):
        response = self.client.delete(reverse('post-detail', args=[self.post.id]))
        self.assertEqual(response.status_code, status.HTTP_204_NO_CONTENT)
        self.assertEqual(Post.objects.count(), 0)

    def test_list_comments_for_post(self):
        comment = Comment.objects.create(post=self.post, content='Comment 1')
        response = self.client.get(reverse('comment-list'))
        self.assertEqual(response.status_code, status.HTTP_200_OK)
        self.assertEqual(len(response.data), 1)

    def test_create_comment_for_post(self):
        data = {
            'post': self.post.id,
            'content': 'Comment 2'
        }
        response = self.client.post(reverse('comment-list'), data, format='json')
        self.assertEqual(response.status_code, status.HTTP_201_CREATED)
        self.assertEqual(Comment.objects.count(), 1)
```

Figure 9. test.py

API documentation

To create the documentation I used the Swagger library.

Swagger allows us to describe the structure of your APIs so that machines can read them. The ability of APIs to describe their own structure is the root of all awesomeness in Swagger. Why is it so great? Well, by reading your API's structure, we can automatically build beautiful and interactive API documentation. We can also automatically generate client libraries for your API in many languages and explore other possibilities like automated testing. Swagger does this by asking your API to return a YAML or JSON that contains a detailed description of your entire API. This file is essentially a resource listing of your API which adheres to OpenAPI Specification. The specification asks you to include information like:

1. What are all the operations that your API supports?
2. What are your API's parameters and what does it return?
3. Does your API need some authorization?
4. And even fun things like terms, contact information and license to use the API.

```
"""
URL configuration for restfull_blogs_manager project.

The `urlpatterns` list routes URLs to views. For more information please see:
    https://docs.djangoproject.com/en/5.1/topics/http/urls/
Examples:
Function views
    1. Add an import:  from my_app import views
    2. Add a URL to urlpatterns:  path('', views.home, name='home')
Class-based views
    1. Add an import:  from other_app.views import Home
    2. Add a URL to urlpatterns:  path('', Home.as_view(), name='home')
Including another URLconf
    1. Import the include() function: from django.urls import include, path
    2. Add a URL to urlpatterns:  path('blog/', include('blog.urls'))
"""
from django.contrib import admin
from django.urls import include, path
from django.conf.urls.static import static
from django.conf import settings
from rest_framework.authtoken.views import obtain_auth_token
from restfull_blogs_manager.swagger import schema_view


urlpatterns = [
    path('swagger/', schema_view.with_ui('swagger', cache_timeout=0), name='schema-swagger-ui'),
    path('api-token-auth/', obtain_auth_token, name='api_token_auth'),
    path("", include("posts.urls")),
    path('admin/', admin.site.urls),
] + static(settings.MEDIA_URL, document_root=settings.MEDIA_ROOT)
```

Figure 10. urls.py of the root

Challenges and solutions

The most difficult part of the project is working with serializers and models. As I described earlier, there were problems with the correct presentation of comments when calling one or more posts via API.

Conclusion

During this project, I learned and practiced building a RESTful API using Django Rest Framework (DRF). I set up a new Django project and app, installed DRF, and added it to the settings. I defined data models for posts and comments, created serializers, and set up views and URL routing for different API endpoints. I also implemented authentication, permissions, and wrote tests to ensure the functionality of the API.

This experience gave me a solid understanding of using DRF to develop robust APIs. The tools and features provided by DRF, like serializers, viewsets, and authentication classes, significantly simplify the development process. They help automate routine tasks and reduce the complexity of creating advanced web applications, making Django and DRF popular choices among developers.

References

Links to Django tutorials from official documentation:

1. https://docs.djangoproject.com/en/5.1/intro/tutorial01/
2. https://docs.djangoproject.com/en/5.1/intro/tutorial02/
3. https://docs.djangoproject.com/en/5.1/intro/tutorial03/
4. https://docs.djangoproject.com/en/5.1/intro/tutorial04/
5. https://docs.djangoproject.com/en/5.1/intro/tutorial02/

Link to official Docker documentation:

- https://docs.docker.com/

Link to official Docker image registry where from I took base images for compose:

- https://hub.docker.com/

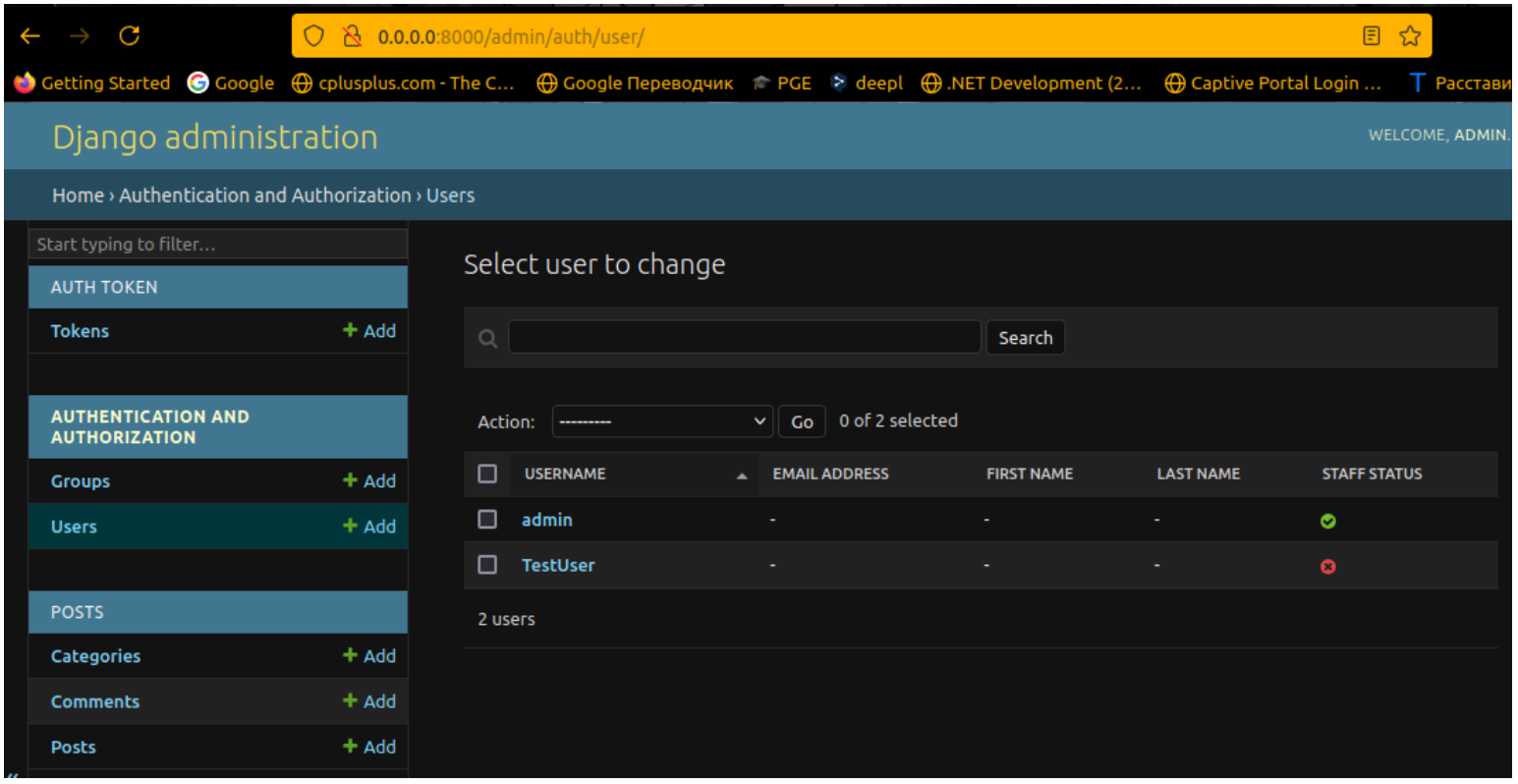
Links to some topics in StackOverflow and other resources:

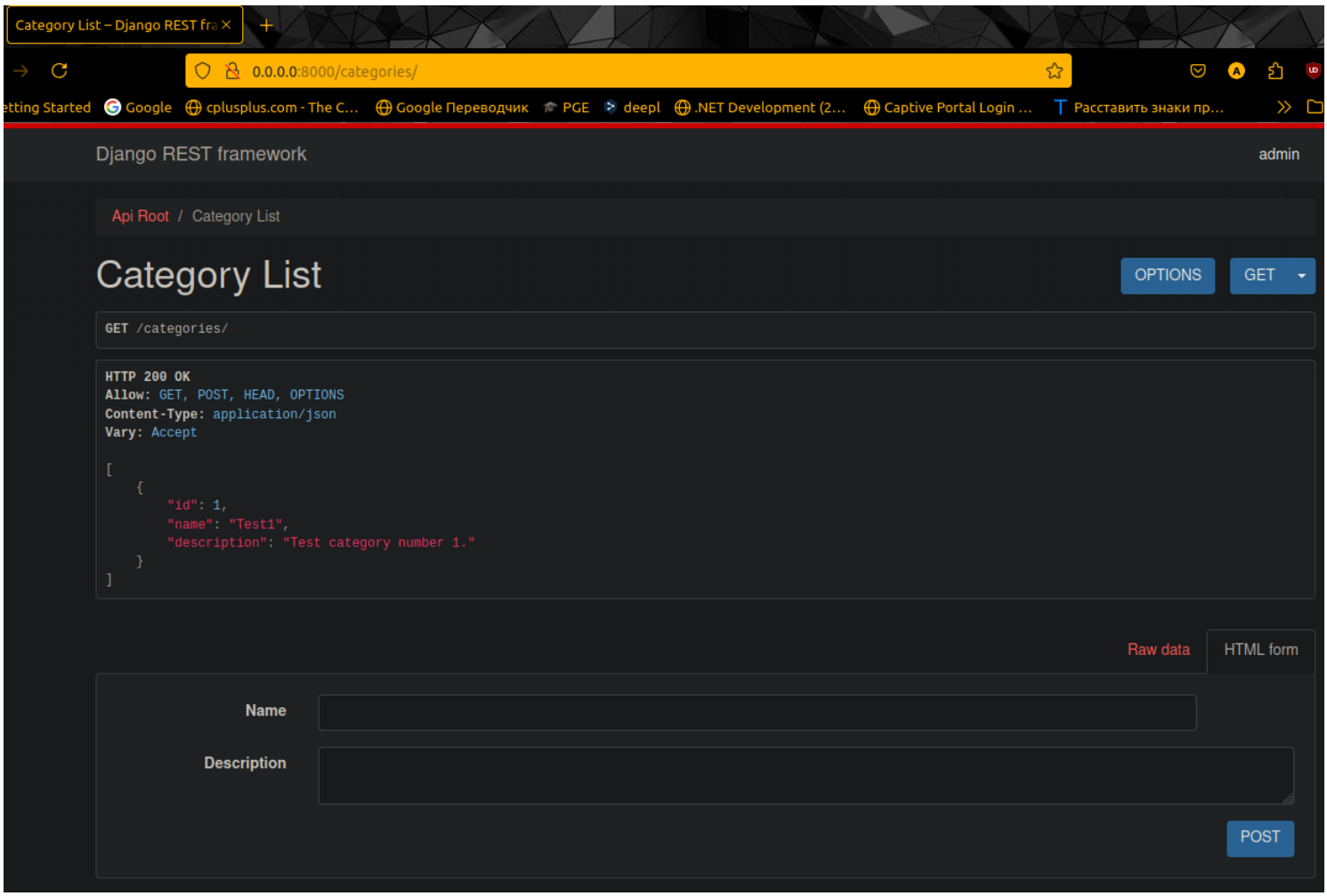
1. https://stackoverflow.com/questions/13164048/text-box-input-height
2. https://stackoverflow.com/questions/3681627/how-to-update-fields-in-a-model-without-creating-a-new-record-in-django
3. https://stackoverflow.com/questions/42614172/how-to-redirect-from-a-view-to-another-view-in-django
4. https://stackoverflow.com/questions/3805958/how-to-delete-a-record-in-django-models
5. https://stackoverflow.com/questions/14719883/django-can-not-get-a-time-function-timezone-datetime-to-work-properly-gett
6. https://stackoverflow.com/questions/3289601/null-object-in-python
7. https://stackoverflow.com/questions/11336548/how-to-get-post-request-values-in-django
8. https://stackoverflow.com/questions/11714721/how-to-set-the-space-between-lines-in-a-div-without-setting-line-height
9. https://stackoverflow.com/questions/3430432/django-update-table
10. https://stackoverflow.com/questions/15128705/how-to-insert-a-row-of-data-to-a-table-using-djangos-orm
11. https://stackoverflow.com/questions/67155473/how-can-i-get-values-from-a-view-in-django-every-time-i-access-the-home-page
12. https://stackoverflow.com/questions/3500859/django-request-get
13. https://stackoverflow.com/questions/50346326/programmingerror-relation-django-session-does-not-exist
14. https://stackoverflow.com/questions/18713086/virtualenv-wont-activate-on-windows
15. https://www.geeksforgeeks.org/swagger-integration-with-python-django/
16. https://stackoverflow.com/questions/51182823/django-rest-framework-nested-serializers
17. https://www.django-rest-framework.org/api-guide/permissions/
18. https://www.django-rest-framework.org/api-guide/versioning/
19. https://www.django-rest-framework.org/api-guide/viewsets/

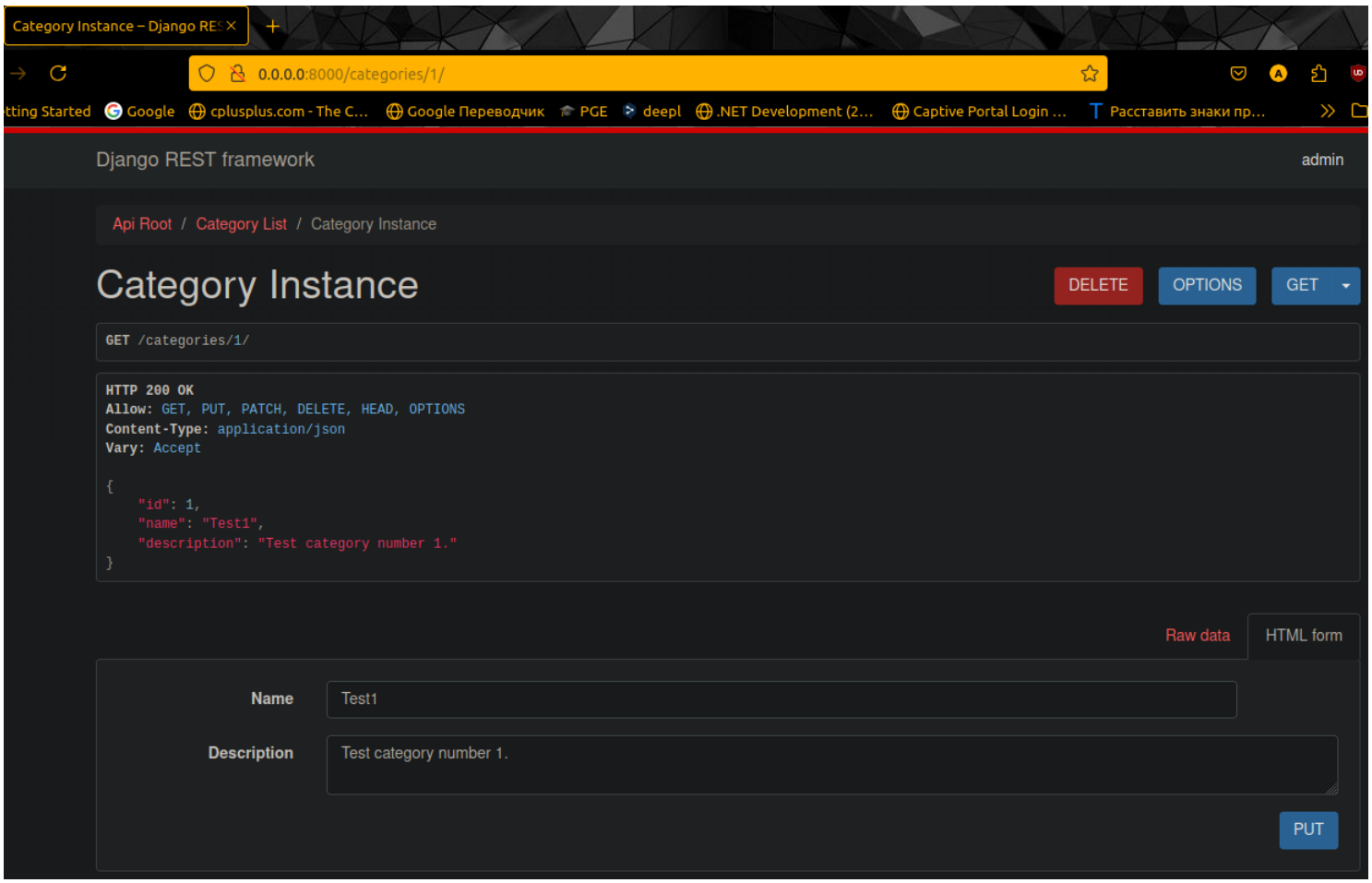
Link to my GitHub repository (screenshots, logs and SQL structure included):

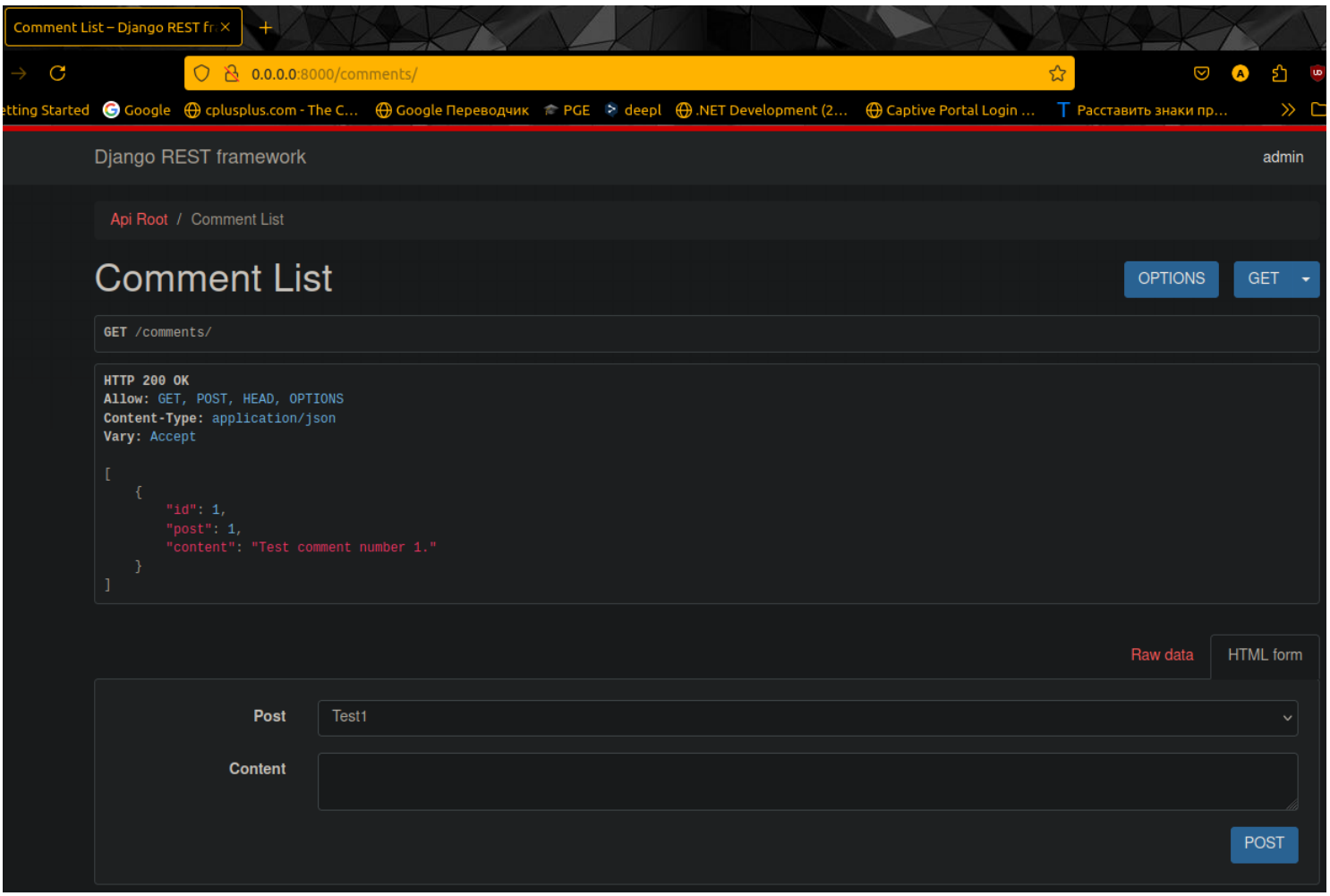
- https://github.com/BauyrzhanAzimkhanov/Web-application-development-MSc

Appendices


0.0.0.0:8000/admin/auth/user/
Getting Started
Google
cplusplus.com - The C...
Google Переводчик
PGE
deepl
.NET Development (2...
Captive Portal Login ...
Django administration
WELCOME, ADMIN.
Home › Authentication and Authorization › Users
Start typing to filter...
AUTH TOKEN
Tokens + Add
AUTHENTICATION AND AUTHORIZATION
Groups + Add
Users + Add
POSTS
Categories + Add
Comments + Add
Posts + Add
Select user to change
Search
Action: --------- Go 0 of 2 selected
USERNAME
EMAIL ADDRESS
FIRST NAME
LAST NAME
STAFF STATUS
admin - - -
TestUser - - -
2 users


Category List – Django REST fra
0.0.0.0:8000/categories/
Google
cplusplus.com - The C...
Google Переводчик
PGE
deepl
.NET Development (2...
Captive Portal Login ...
Расставить знаки пр...
Django REST framework
admin
Api Root / Category List
Category List
OPTIONS
GET
GET /categories/
HTTP 200 OK
Allow: GET, POST, HEAD, OPTIONS
Content-Type: application/json
Vary: Accept
[
{
"id": 1,
"name": "Test1",
"description": "Test category number 1."
}
]
Raw data
HTML form
Name
Description
POST


Category Instance – Django RE
0.0.0.0:8000/categories/1/
tting Started
Google
cplusplus.com - The C...
Google Переводчик
PGE
deepl
.NET Development (2...
Captive Portal Login ...
Расставить знаки пр...
Django REST framework
admin
Api Root / Category List / Category Instance
Category Instance
DELETE
OPTIONS
GET
GET /categories/1/
HTTP 200 OK
Allow: GET, PUT, PATCH, DELETE, HEAD, OPTIONS
Content-Type: application/json
Vary: Accept
{
"id": 1,
"name": "Test1",
"description": "Test category number 1."
}
Raw data
HTML form
Name
Test1
Description
Test category number 1.
PUT


Comment List – Django REST fr
0.0.0.0:8000/comments/
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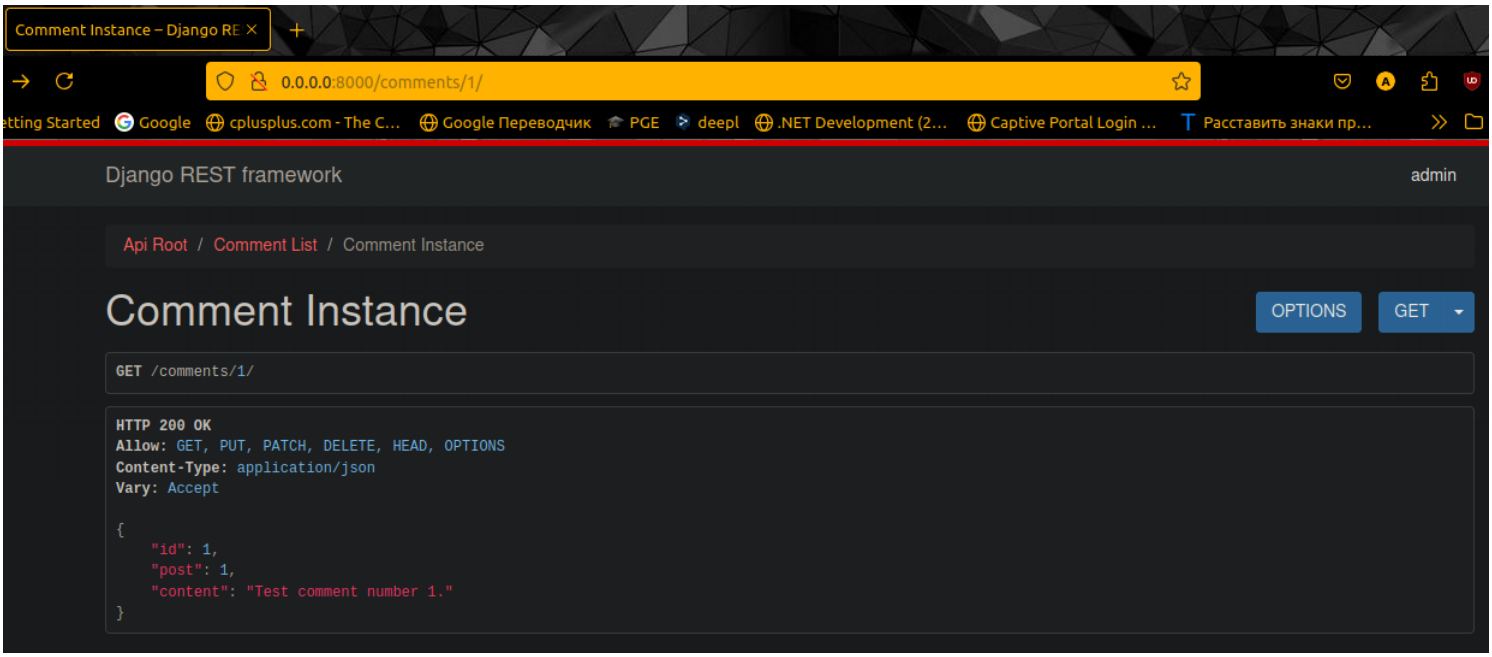
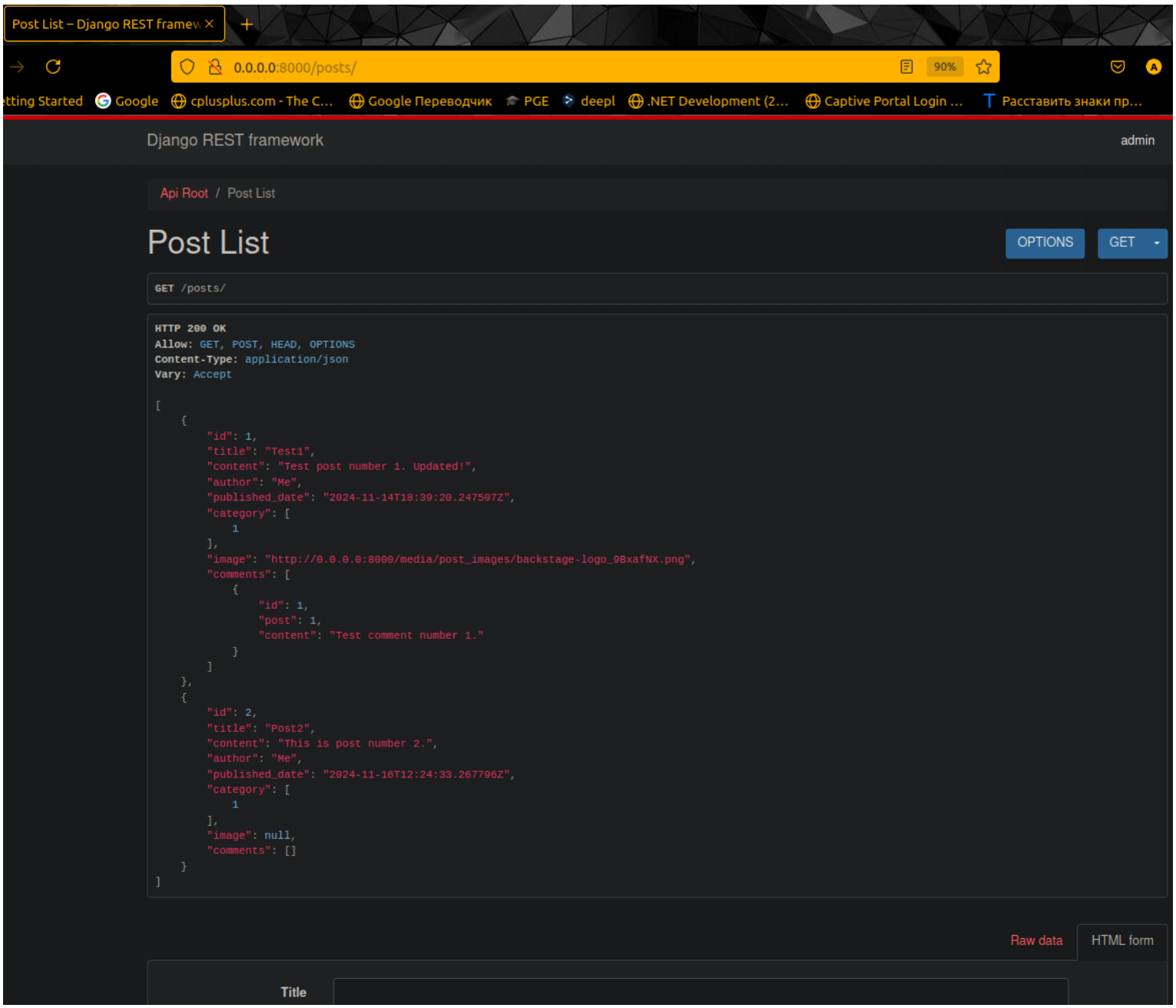
cplusplus.com - The C...
Google Переводчик
PGE
deepl
.NET Development (2...
Captive Portal Login ...
Расставить знаки пр...
Django REST framework
admin
Api Root / Comment List
Comment List
OPTIONS
GET
GET /comments/
HTTP 200 OK
Allow: GET, POST, HEAD, OPTIONS
Content-Type: application/json
Vary: Accept
[
{
"id": 1,
"post": 1,
"content": "Test comment number 1."
}
]
Raw data
HTML form
Post
Test1
Content
POST


Comment Instance – Django RE
0.0.0.0:8000/comments/1/
Google
cplusplus.com - The C...
Google Переводчик
PGE
deepl
.NET Development (2...
Captive Portal Login ...
Расставить знаки пр...
Django REST framework
admin
Api Root / Comment List / Comment Instance
Comment Instance
OPTIONS
GET
GET /comments/1/
HTTP 200 OK
Allow: GET, PUT, PATCH, DELETE, HEAD, OPTIONS
Content-Type: application/json
Vary: Accept
{
"id": 1,
"post": 1,
"content": "Test comment number 1."
}


Post List – Django REST framew
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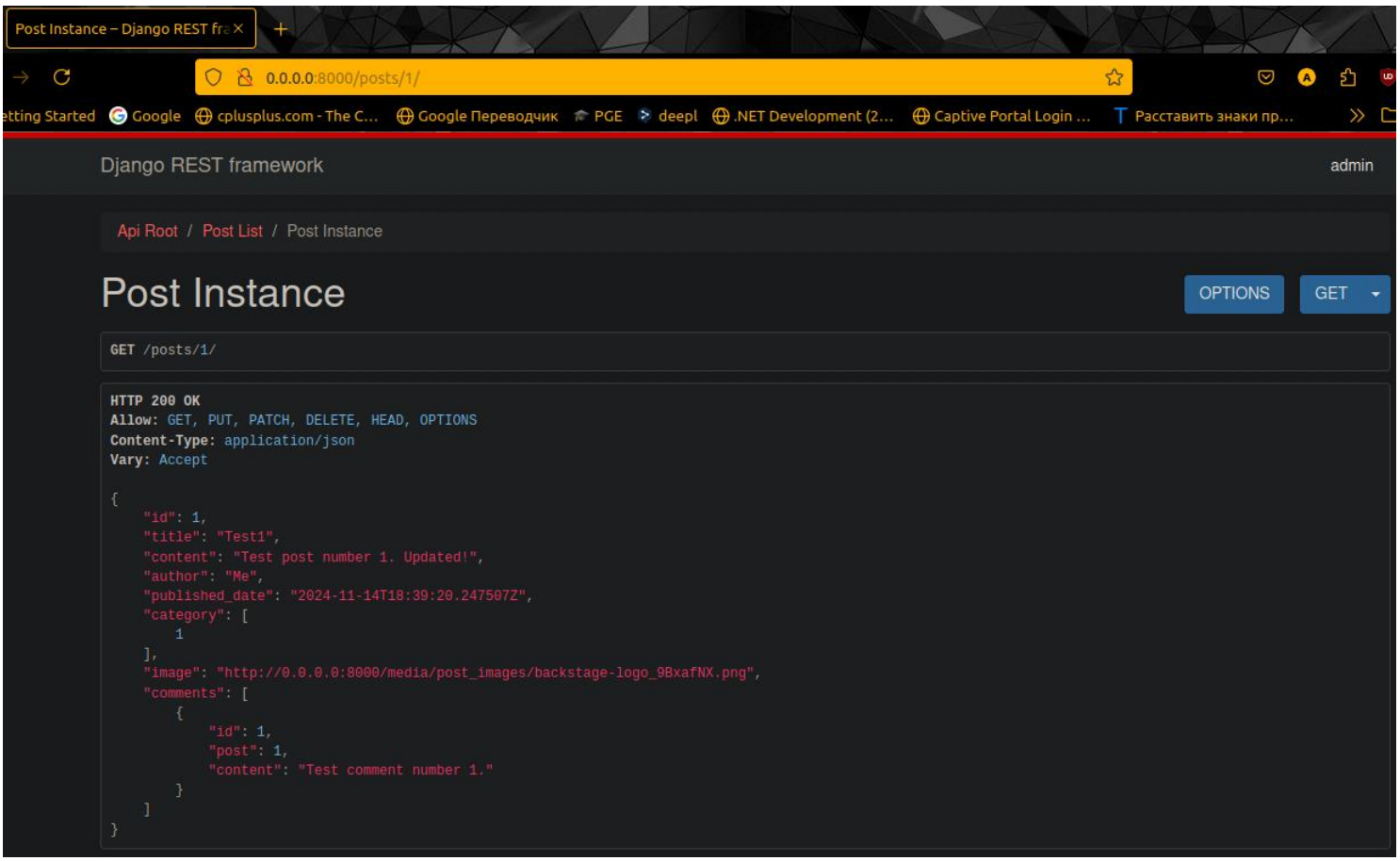
Расставить знаки пр...
Django REST framework
admin
Api Root / Post List
Post List
OPTIONS
GET
GET /posts/
HTTP 200 OK
Allow: GET, POST, HEAD, OPTIONS
Content-Type: application/json
Vary: Accept
[
{
"id": 1,
"title": "Test1",
"content": "Test post number 1. Updated!",
"author": "Me",
"published_date": "2024-11-14T18:39:20.247507Z",
"category": [
1
],
"image": "http://0.0.0.0:8000/media/post_images/backstage-logo_9BxafNX.png",
"comments": [
{
"id": 1,
"post": 1,
"content": "Test comment number 1."
}
]
},
{
"id": 2,
"title": "Post2",
"content": "This is post number 2.",
"author": "Me",
"published_date": "2024-11-16T12:24:33.267796Z",
"category": [
1
],
"image": null,
"comments": []
}
]
Raw data
HTML form
Title


Post Instance – Django REST fra
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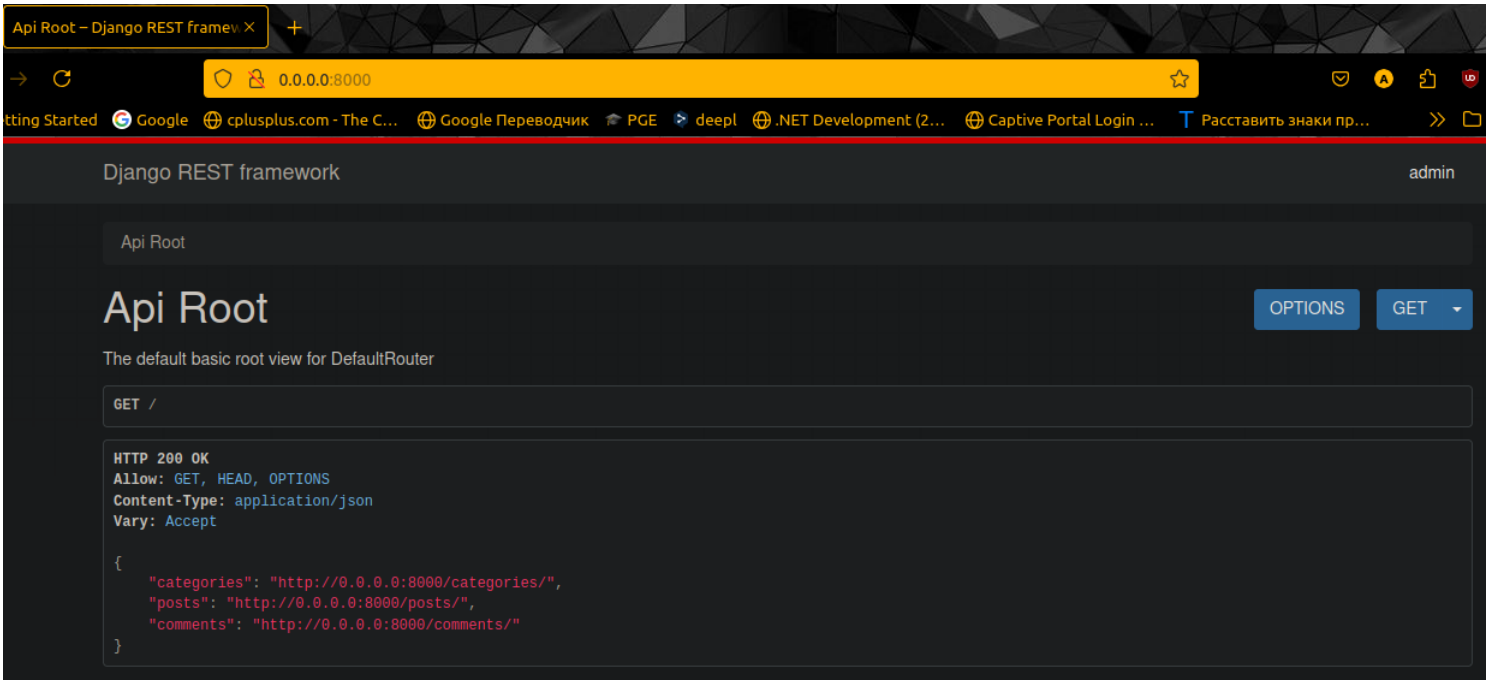
Расставить знаки пр...
Django REST framework
admin
Api Root / Post List / Post Instance
Post Instance
OPTIONS
GET
GET /posts/1/
HTTP 200 OK
Allow: GET, PUT, PATCH, DELETE, HEAD, OPTIONS
Content-Type: application/json
Vary: Accept
{
"id": 1,
"title": "Test1",
"content": "Test post number 1. Updated!",
"author": "Me",
"published_date": "2024-11-14T18:39:20.247507Z",
"category": [
1
],
"image": "http://0.0.0.0:8000/media/post_images/backstage-logo_9BxafNX.png",
"comments": [
{
"id": 1,
"post": 1,
"content": "Test comment number 1."
}
]
}


Api Root – Django REST framev
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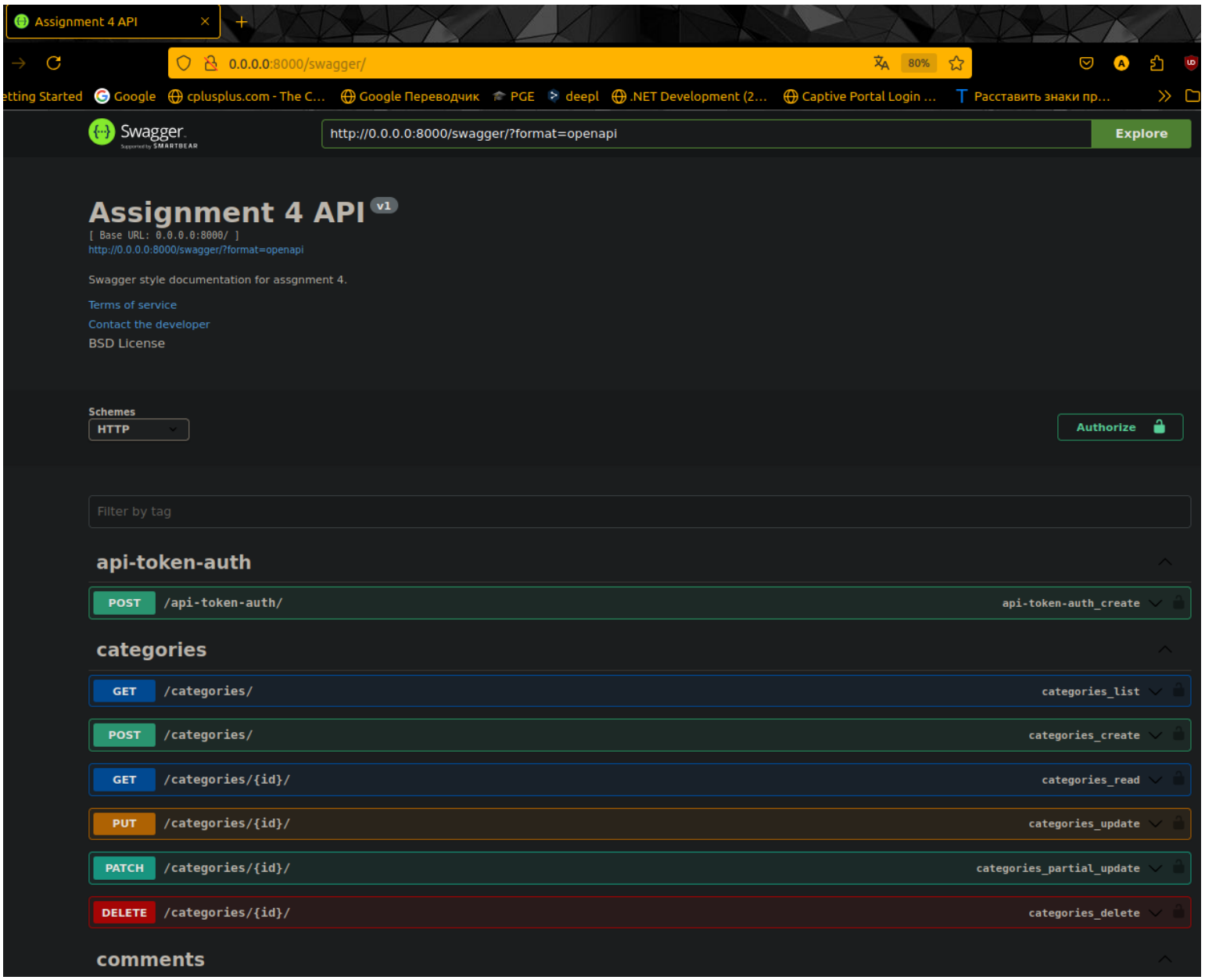
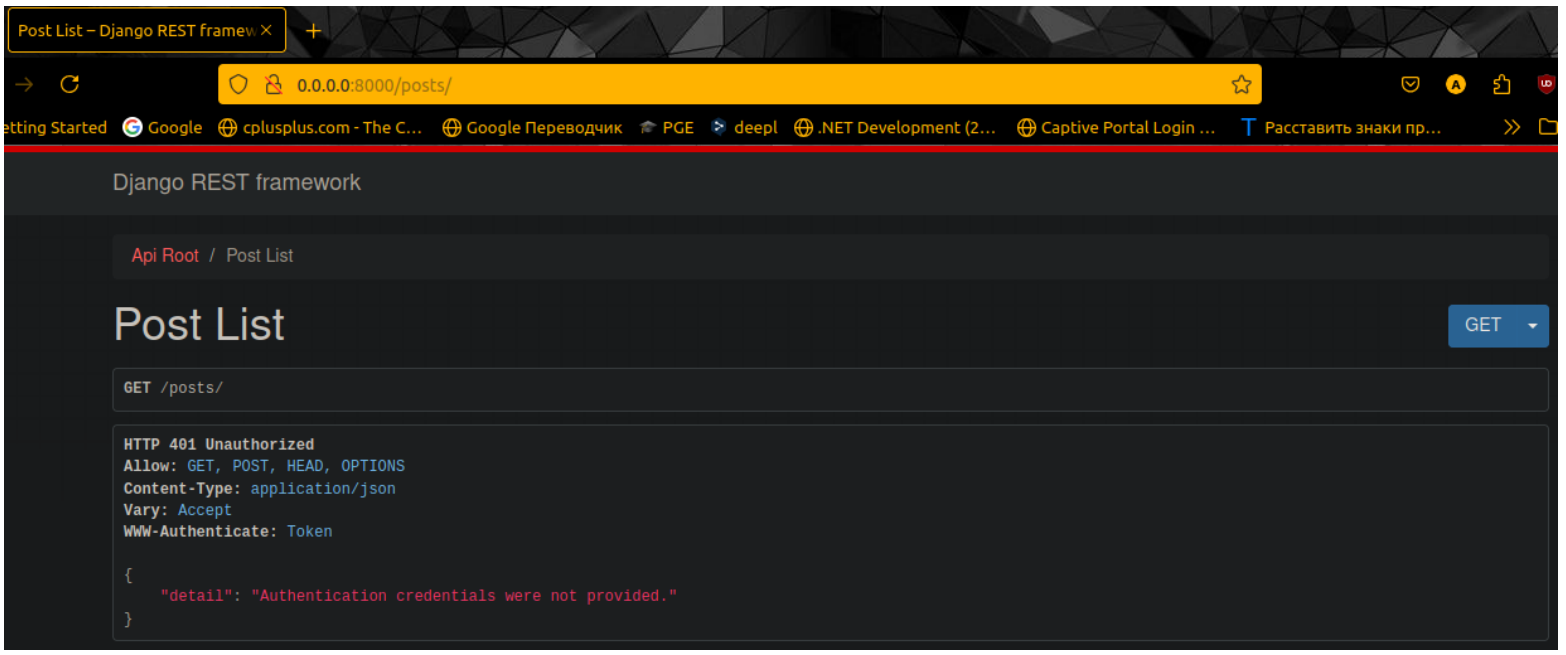
Расставить знаки пр...
Django REST framework
admin
Api Root
Api Root
OPTIONS
GET
The default basic root view for DefaultRouter
GET /
HTTP 200 OK
Allow: GET, HEAD, OPTIONS
Content-Type: application/json
Vary: Accept
{
"categories": "http://0.0.0.0:8000/categories/",
"posts": "http://0.0.0.0:8000/posts/",
"comments": "http://0.0.0.0:8000/comments/"
}




```
bauyrzhan@bauyrzhan-laptop:~/Desktop/web-dev/Web-application-development-MSc$ docker exec -it 730f4db664b6 bash
root@730f4db664b6:/usr/src/app# python manage.py test
Found 7 test(s).
Creating test database for alias 'default'...
System check identified no issues (0 silenced).
.......
----------------------------------------------------------------------
Ran 7 tests in 1.736s

OK
Destroying test database for alias 'default'...
root@730f4db664b6:/usr/src/app#
```


Post List – Django REST framew
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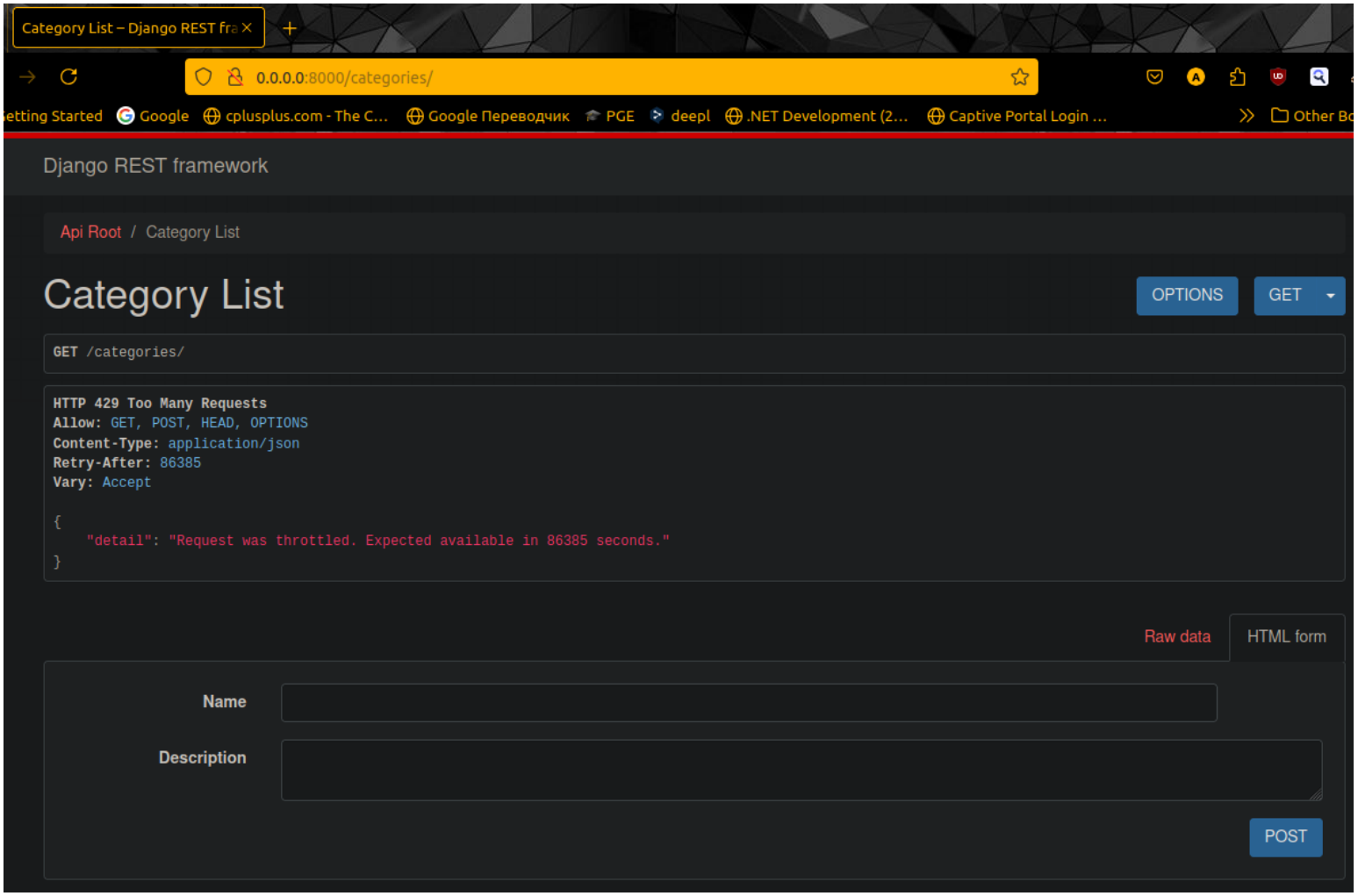
Расставить знаки пр...
Django REST framework
Api Root / Post List
Post List
GET
GET /posts/
HTTP 401 Unauthorized
Allow: GET, POST, HEAD, OPTIONS
Content-Type: application/json
Vary: Accept
WWW-Authenticate: Token
{
"detail": "Authentication credentials were not provided."
}


Category List – Django REST fra
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Captive Portal Login ...
Other Bo
Django REST framework
Api Root / Category List
Category List
OPTIONS
GET
GET /categories/
HTTP 429 Too Many Requests
Allow: GET, POST, HEAD, OPTIONS
Content-Type: application/json
Retry-After: 86385
Vary: Accept
{
"detail": "Request was throttled. Expected available in 86385 seconds."
}
Raw data
HTML form
Name
Description
POST