

# Django 8: Django REST Framework

IN608: Intermediate Application Development Concepts

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# Last Session's Content

- Security in Django
  - XSS protection
  - CSRF protection
  - SQL injection protection
  - Clickjacking protection
  - Secret key

# Today's Content

- Django REST framework
  - Permissions
  - Serialization
  - Viewsets
  - Routers

# Django REST Framework

# Django REST Framework

- Install Django REST framework

```
# Windows
...\> pipenv install djangorestframework

# Linux or macOS
$ pipenv install djangorestframework
```

# Django REST Framework

- View Pipfile & Pipfile.lock

```
[[source]]
name = "pypi"
url = "https://pypi.org/simple"
verify_ssl = true

[dev-packages]

[packages]
django = "*"
selenium = "*"
django-crispy-forms = "*"
djangorestframework = "*"

[requires]
python_version = "3.7"
```

# Django REST Framework

- `mvt/settings.py`
- Resource: <https://www.django-rest-framework.org/#installation>

```
INSTALLED_APPS = [  
    'polls.apps.PollsConfig',  
    'django.contrib.admin',  
    'django.contrib.auth',  
    'django.contrib.contenttypes',  
    'django.contrib.sessions',  
    'django.contrib.messages',  
    'django.contrib.staticfiles',  
    'crispy_forms',  
    'rest_framework',  
]
```

# Permissions

- `mvt/settings.py`
- Default permission policy may be set globally using the `DEFAULT_PERMISSION_CLASSES` setting
- `IsAdminUser` permission class will deny permission to any user unless `user.is_staff` is `True`
  - Suitable if you want your API to only be accessible to trusted admins
- `IsAuthenticated` permission class will deny permission to any unauthenticated user
- Resource: <https://www.django-rest-framework.org/api-guide/permissions>

```
REST_FRAMEWORK = {  
    'DEFAULT_PERMISSION_CLASSES': [  
        'rest_framework.permissions.IsAdminUser',  
    ]  
}
```



# Serialization

- In the `polls/` directory, create a file called `serializers.py`
- App structure:

```
polls/  
  __init__.py  
  admin.py  
  apps.py  
  forms.py  
  migrations/  
    __init__.py  
  models.py  
  serializers.py  
  static/  
    polls/  
      style.css  
  templates/  
    polls/  
      base.html  
      detail.html  
      index.html  
      results.html  
  tests.py  
  urls.py  
  views.py
```

# Serialization

- polls/serializers.py
- ModelSerializer
  - Automatically generates a set of fields based on the model
  - Automatically generates validators for the serializer
  - Includes default implementations of `.create()` & `.update()`
- Resource: <https://www.django-rest-framework.org/api-guide/serializers>

```
from rest_framework import serializers
from .models import User, Question, Choice

class UserSerializer(serializers.ModelSerializer):
    class Meta:
        model = User
        fields = ['id', 'username', 'email', 'first_name', 'last_name']

class QuestionSerializer(serializers.ModelSerializer):
    class Meta:
        model = Question
        fields = ['id', 'question_text', 'pub_date']

class ChoiceSerializer(serializers.ModelSerializer):
    class Meta:
        model = Choice
        fields = ['id', 'question', 'choice_text', 'votes']
```

# Viewsets

- polls/views.py
- `from rest_framework import viewsets`
- `from .serializers import UserSerializer, QuestionSerializer, ChoiceSerializer`
- `ModelViewSet` - provides all actions
- `ReadOnlyModelViewSet` - only provides read-only actions, i.e. `.list()` & `.retrieve()`
- Resource: <https://www.django-rest-framework.org/api-guide/viewsets>

```
class UserViewSet(viewsets.ReadOnlyModelViewSet):  
    queryset = User.objects.all()  
    serializer_class = UserSerializer
```

```
class QuestionViewSet(viewsets.ModelViewSet):  
    queryset = Question.objects.all()  
    serializer_class = QuestionSerializer
```

```
class ChoiceViewSet(viewsets.ModelViewSet):  
    queryset = Choice.objects.all()  
    serializer_class = ChoiceSerializer
```

# Routers

- polls/urls.py
- DefaultRouter() - returns a response containing hyperlinks to all the views
- register() - prefix & viewset
- Resource: <https://www.django-rest-framework.org/#installation>

```
from django.contrib.auth import views as auth_views
from django.urls import include, path
from rest_framework import routers
from . import views

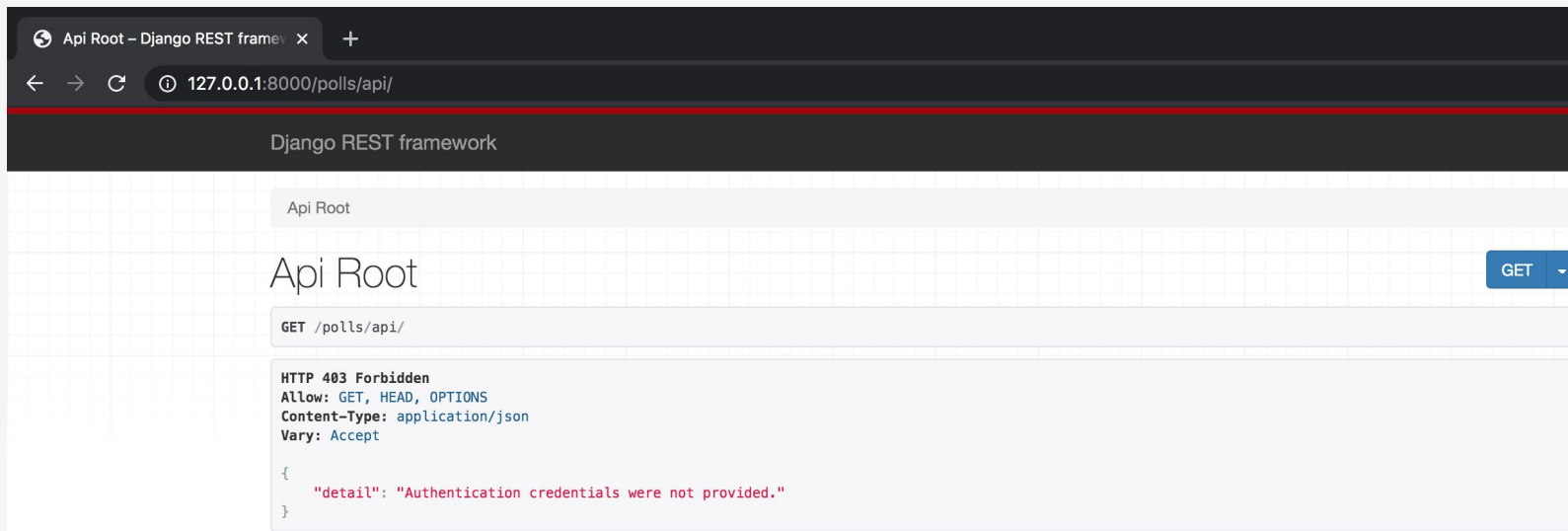
app_name = 'polls'

router = routers.DefaultRouter()
router.register(r'api/user', views.UserViewSet)
router.register(r'api/question', views.QuestionViewSet)
router.register(r'api/choice', views.ChoiceViewSet)

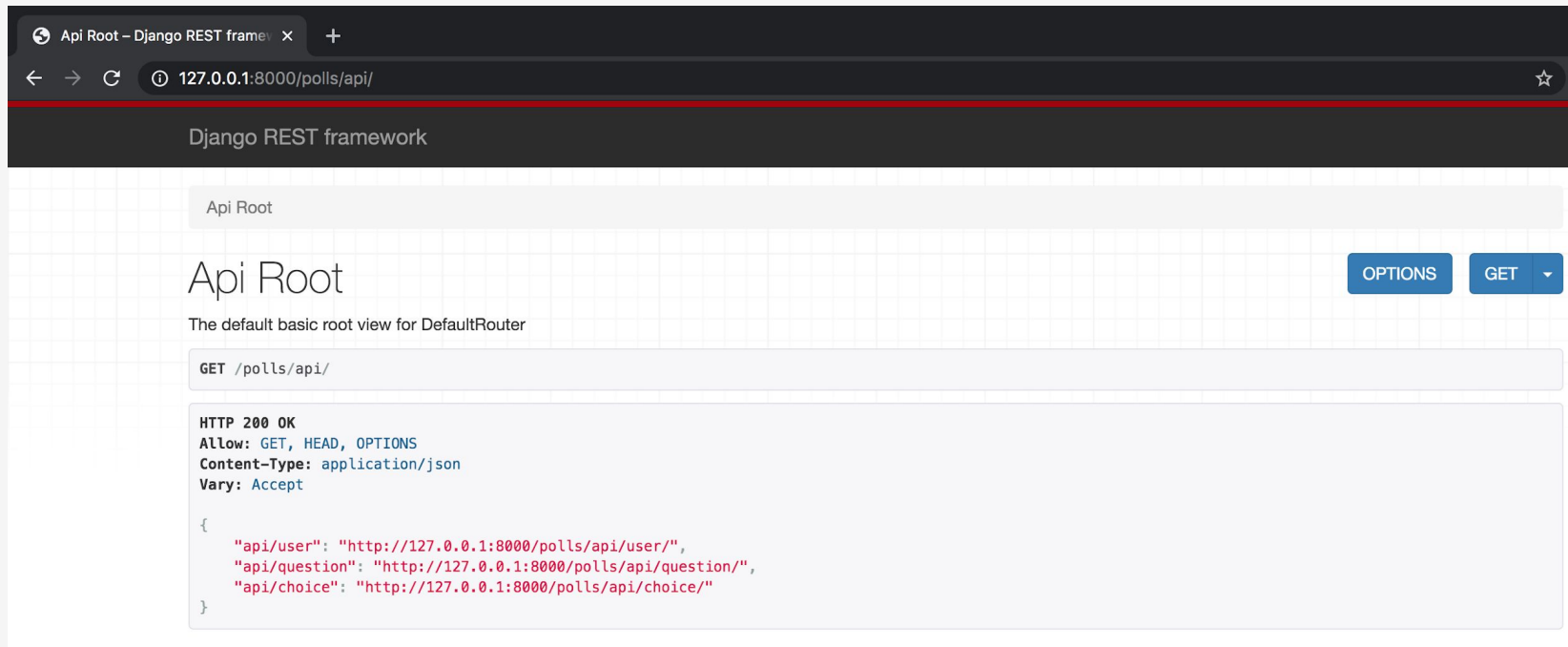
urlpatterns = [
    path('api/', include(router.urls), name='api'),
    path('accounts/signup/', views.SignupView.as_view(), name='signup'),
    path('accounts/login/', auth_views.LoginView.as_view(), name='login'),
    path('accounts/logout/', auth_views.LogoutView.as_view(), name='logout'),
    path('', views.IndexView.as_view(), name='index'), # /polls/
    path('<int:pk>/', views.DetailView.as_view(), name='detail'), # /polls/2/
    path('<int:pk>/results/', views.ResultsView.as_view(), name='results'), # /polls/2/results/
    path('<int:question_id>/vote/', views.vote, name='vote'), # /polls/2/vote/
]

urlpatterns += router.urls
```

# Django REST Framework



# Django REST Framework



# Django REST Framework

The screenshot shows a web browser window with the address bar displaying '127.0.0.1:8000/polls/api/user/'. The page title is 'User List - Django REST frame'. The browser's address bar shows the URL '127.0.0.1:8000/polls/api/user/' and the page title is 'User List - Django REST frame'. The page content shows the 'User List' endpoint with a 'GET' method selected. The response is a JSON array of two user objects.

Api Root / User List

## User List

OPTIONS GET

GET /polls/api/user/

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

```
[
  {
    "id": 1,
    "username": "admin",
    "email": "admin@example.com",
    "first_name": "Admin",
    "last_name": "Admin"
  },
  {
    "id": 2,
    "username": "johndoe123",
    "email": "johndoe@example.com",
    "first_name": "John",
    "last_name": "Doe"
  }
]
```

# Django REST Framework

The screenshot shows a web browser window with the title "User Instance - Django REST framework". The address bar displays the URL "127.0.0.1:8000/polls/api/user/1/". The page header includes the text "Django REST framework" and a user profile "admin". The breadcrumb navigation shows "Api Root / User List / User Instance". The main heading is "User Instance", with "OPTIONS" and "GET" buttons to its right. Below the heading, the method "GET" and the path "/polls/api/user/1/" are shown. The response details are as follows:

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

```
{
  "id": 1,
  "username": "admin",
  "email": "admin@example.com",
  "first_name": "Admin",
  "last_name": "Admin"
}
```



# Django REST Framework



# Django REST Framework

Question List - Django REST framework

127.0.0.1:8000/polls/api/question/

admin

Api Root / Question List

## Question List

OPTIONS GET

GET /polls/api/question/

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

```
[
  {
    "id": 1,
    "question_text": "Did you enjoy class today?",
    "pub_date": "2020-07-17T09:36:55Z"
  },
  {
    "id": 2,
    "question_text": "What is your favourite course?",
    "pub_date": "2020-07-17T09:36:55Z"
  },
  {
    "id": 3,
    "question_text": "Who is your favourite teacher?",
    "pub_date": "2020-07-17T09:36:55Z"
  }
]
```

Raw data HTML form

Question text

Pub date

POST

# Programming Activity

- Checkout to master - `git checkout master`
- Create a new branch called 14-practical - `git checkout -b 14-practical`
- Open the file `14-practical.pdf` and work on the tasks described