Django

bazirano na tutorijalu i verziji 3.0

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Kreirano 2023-01-16 Mon 18:19, pritisni ESC za mapu, m za meni, Ctrl+Shift+F za pretragu

Sadržaj

Kreiranje i podešavanje projekta

Django

- Python okvir za razvoj veb aplikacija
- BSD licenca
- DRY princip
- *Full stack*
- *Database migration*
- Modularan - aplikacije
- Automatski admin interfejs
- Velika i aktivna zajednica
- *Caching, syndication, internationalization…*

Instalacija

```
$ pip install Django
```

Provera da li je instaliran:

```
$ python -m django --version
```

Preporuka: Koristiti virtualno okruženje

Kreiranje projekta

```
$ django-admin startproject mysite
```

Ovo će kreirati sledeće fajlove i foldere:

```
mysite/
    manage.py
    mysite/
        __init__.py
        settings.py
        urls.py
        wsgi.py
```

Podešavanje sajta

- Modul `mysite/settings.py`.
- Običan Python modul sa strukturama podataka za podešavanje svih aspekata sajta (baza, aplikacije, middleware…)
- Podrazumevano se koristi `sqlite3` baza što je sasvim dovoljno za razvoj.

```
...
# Database
# https://docs.djangoproject.com/en/3.0/ref/settings/#databases

DATABASES = {
    'default': {
        'ENGINE': 'django.db.backends.sqlite3',
        'NAME': 'mydatabase'),
    }
}
...
```

Pokretanje projekta

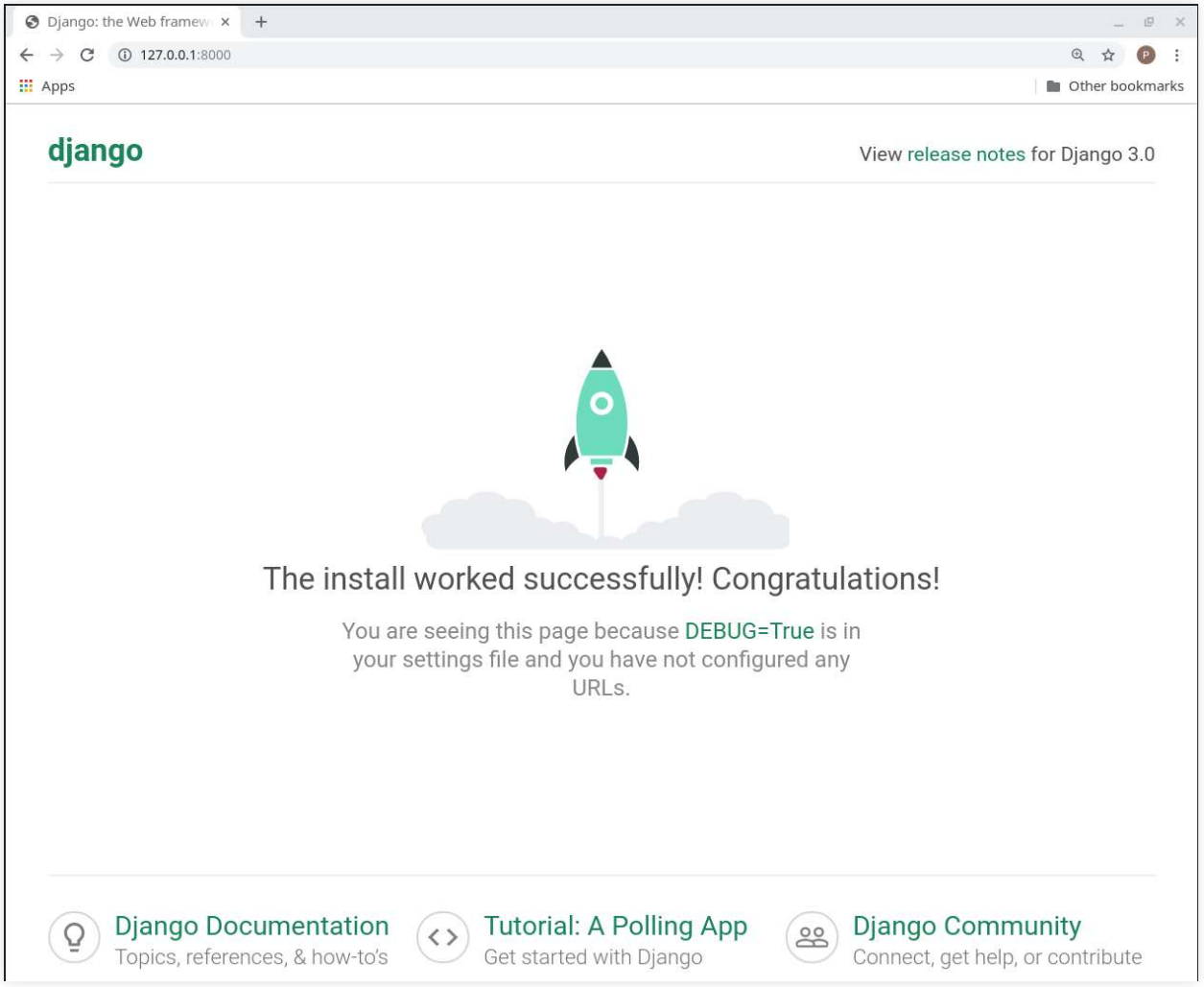
```
$ python manage.py runserver
Watching for file changes with StatReloader
Performing system checks...

System check identified no issues (0 silenced).

You have 17 unapplied migration(s). Your project may not work properly until you apply the migrations for app(s)
Run 'python manage.py migrate' to apply them.

December 04, 2019 - 19:20:25
Django version 3.0, using settings 'mysite.settings'
Starting development server at http://127.0.0.1:8000/
Quit the server with CONTROL-C.
```

Početna strana



Kreiranje inicijalne šeme baze podataka

```
$ python manage.py migrate
Operations to perform:
  Apply all migrations: admin, auth, contenttypes, sessions
Running migrations:
  Applying contenttypes.0001_initial... OK
  Applying auth.0001_initial... OK
  Applying admin.0001_initial... OK
  Applying admin.0002_logentry_remove_auto_add... OK
  Applying admin.0003_logentry_add_action_flag_choices... OK
  Applying contenttypes.0002_remove_content_type_name... OK
  Applying auth.0002_alter_permission_name_max_length... OK
  Applying auth.0003_alter_user_email_max_length... OK
  Applying auth.0004_alter_user_username_opts... OK
  Applying auth.0005_alter_user_last_login_null... OK
  Applying auth.0006_require_contenttypes_0002... OK
  Applying auth.0007_alter_validators_add_error_messages... OK
  Applying auth.0008_alter_user_username_max_length... OK
  Applying auth.0009_alter_user_last_name_max_length... OK
  Applying auth.0010_alter_group_name_max_length... OK
  Applying auth.0011_update_proxy_permissions... OK
  Applying sessions.0001_initial... OK
```

Inicijalna šema potiče od podrazumevano uključenih aplikacija.

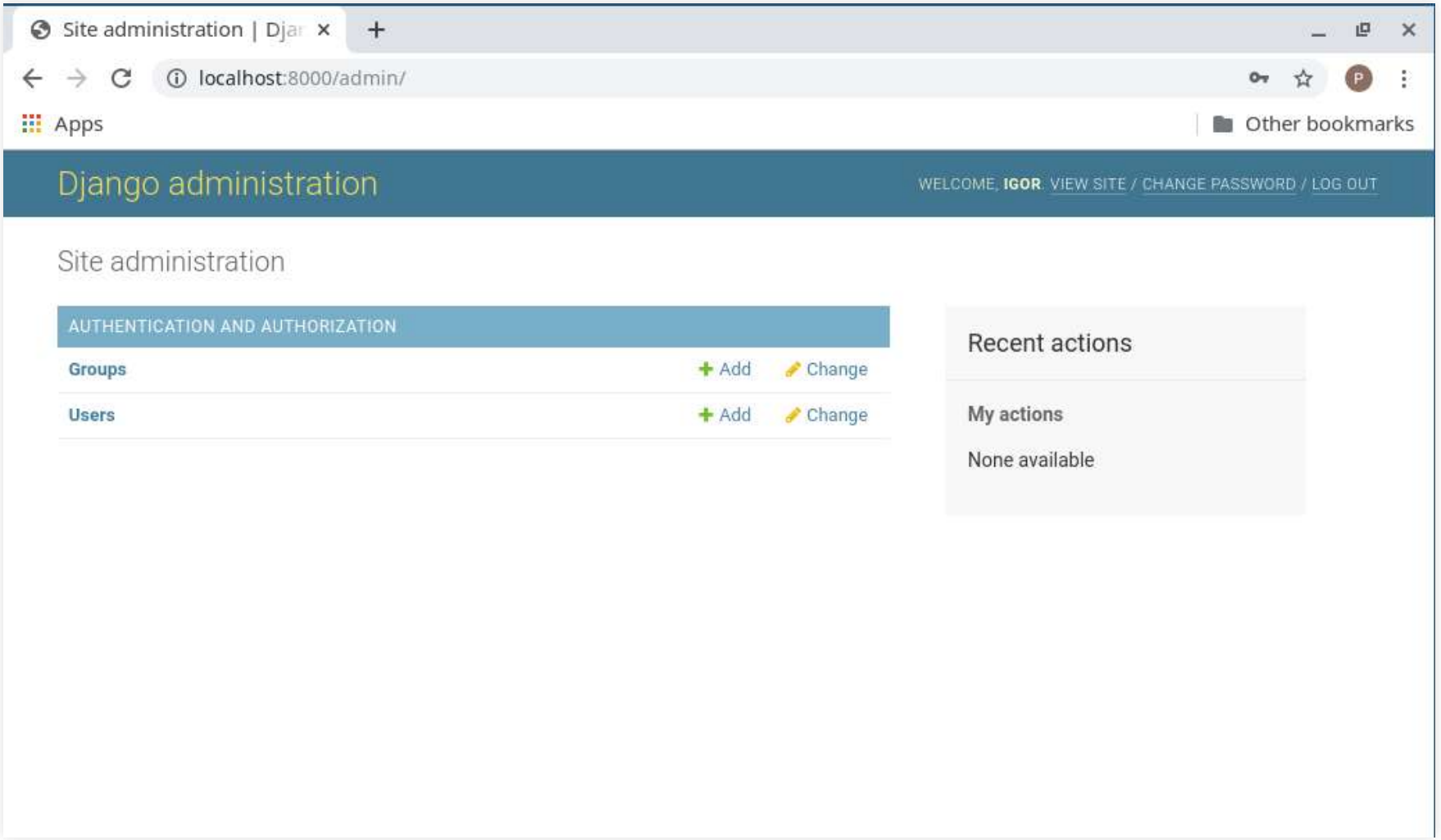
Admin interfejs

- Implementiran kao standardna Django aplikacija.
- Podrazumevano aktiviran.
- Potrebno je kreirati *admin* korisnika.

```
$ python manage.py createsuperuser
Username (leave blank to use 'igor'):
Email address: igord@uns.ac.rs
Password:
Password (again):
Superuser created successfully.
```

Pristup admin interfejsu

- Posle pokretanja aplikacije moguće je pristupiti admin interfejsu.
- Podrazumevano se pristupa na http://localhost:8000/admin/



Projekti i aplikacije

- Aplikacija je modul koji radi nešto korisno. Na primer, blog sistem, aplikacija za glasanje, forum i sl.
- Projekat predstavlja skup aplikacija i konfiguracije za određene web sajtove.

Kreiranje aplikacije unutar projekta

```
$ python manage.py startapp polls
```

Kreira fajlove i foldere sledećeg oblika:

```
polls/
    __init__.py
    admin.py
    apps.py
    migrations/
        __init__.py
    models.py
    tests.py
    views.py
```

Django modeli

Django modeli

- Smešteni su u `[app_name]/models.py` fajlu
- Predstavljaju definitivan izvor definicije podataka u aplikaciji.
- *DRY* - sve ostalo vezano za podatke se dedukuje iz modela.

```
from django.db import models


class Question(models.Model):
    question_text = models.CharField(max_length=200)
    pub_date = models.DateTimeField('date published')


class Choice(models.Model):
    question = models.ForeignKey(Question, on_delete=models.CASCADE)
    choice_text = models.CharField(max_length=200)
    votes = models.IntegerField(default=0)
```

Aktivacija modela

- Potrebno je prvo aktivirati aplikaciju. Obavlja se dodavanjem klase `PollsConfig` iz fajla `polls/apps.py` u `settings.py` fajl za sajt, n-torka `INSTALLED_APPS`

```
INSTALLED_APPS = (
    'polls.apps.PollsConfig',
    'django.contrib.admin',
    'django.contrib.auth',
    'django.contrib.contenttypes',
    'django.contrib.sessions',
    'django.contrib.messages',
    'django.contrib.staticfiles',
)
```

Kreiranje migracije

```
$ python manage.py makemigrations polls
Migrations for 'polls':
  polls/migrations/0001_initial.py:
    - Create model Choice
    - Create model Question
```

Kreiran je fajl `polls/migrations/0001_initial.py`.

Pregled SQL-a za određenu migraciju

```
$ python manage.py sqlmigrate polls 0001
BEGIN;
--
-- Create model Choice
--
CREATE TABLE "polls_choice" (
    "id" serial NOT NULL PRIMARY KEY,
    "choice_text" varchar(200) NOT NULL,
    "votes" integer NOT NULL
);
--
-- Create model Question
--
CREATE TABLE "polls_question" (
    "id" serial NOT NULL PRIMARY KEY,
    "question_text" varchar(200) NOT NULL,
    "pub_date" timestamp with time zone NOT NULL
);

...

COMMIT;
```

Primena migracije nad bazom

```
$ python manage.py migrate
Operations to perform:
  Apply all migrations: admin, auth, contenttypes, polls, sessions
Running migrations:
  Applying polls.0001_initial... OK
```

Migracije - sumarno

Kod migracije šeme baze podataka uz očuvanje podataka raditi sledeće:

- Modifikovati `model.py`
- Kreirati migraciju:

```
$ python manage.py makemigrations
```

- Primeniti migraciju:

```
$ python manage.py migrate
```

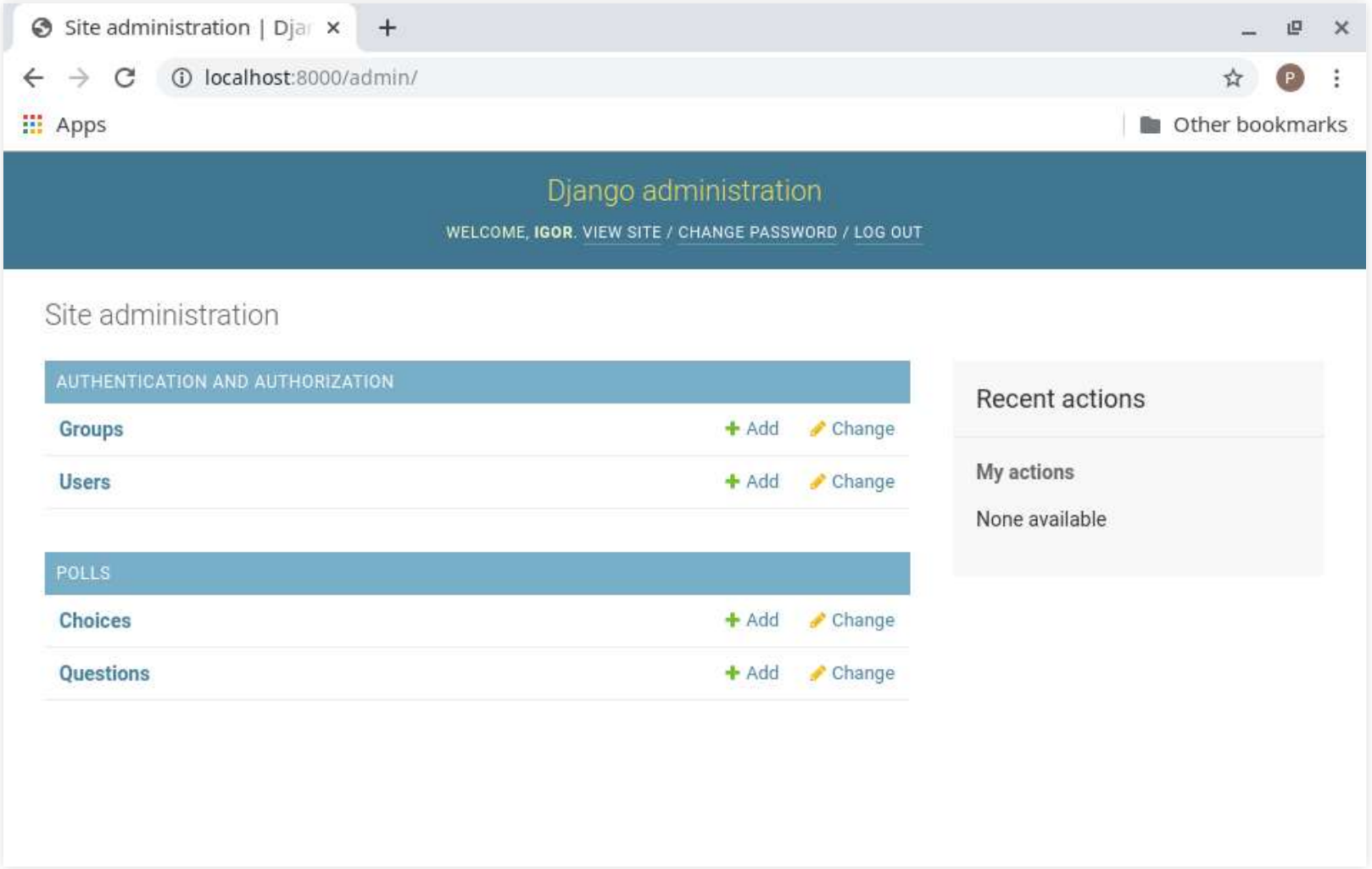
Registracija modela u admin interfejsu

- U fajlu `polls/admin.py`:

```
from django.contrib import admin

from .models import Question, Choice

admin.site.register(Question)
admin.site.register(Choice)
```


Site administration | Dja
localhost:8000/admin/
Apps
Other bookmarks
Django administration
WELCOME, IGOR. VIEW SITE / CHANGE PASSWORD / LOG OUT
Site administration
AUTHENTICATION AND AUTHORIZATION
Groups
Add
Change
Users
Add
Change
POLLS
Choices
Add
Change
Questions
Add
Change
Recent actions
My actions
None available

Model API

```
$ python manage.py shell
```

```
>>> from polls.models import Question, Choice
>>> Question.objects.all()
[]
>>> from django.utils import timezone
>>> q = Question(question_text="What's new?", pub_date=timezone.now())
>>> q.save()
>>> q.id
1
>>> q.question_text
"What's new?"
>>> q.pub_date
datetime.datetime(2012, 2, 26, 13, 0, 0, 775217, tzinfo=<UTC>)
>>> q.question_text = "What's up?"
>>> q.save()
>>> Question.objects.all()
[<Question: Question object>]
```

String reprezentacija instanci modela

```
from django.db import models

class Question(models.Model):
    # ...
    def __str__(self):
        return self.question_text

class Choice(models.Model):
    # ...
    def __str__(self):
        return self.choice_text
```

Korisničke metode nad modelom

```
import datetime

from django.db import models
from django.utils import timezone


class Question(models.Model):
    # ...
    def was_published_recently(self):
        return self.pub_date >= timezone.now() - datetime.timedelta(days=1)
```

Model API (2)

```
>>> from polls.models import Question, Choice
>>> Question.objects.all()
[<Question: What's up?>]

>>> Question.objects.filter(id=1)
[<Question: What's up?>]
>>> Question.objects.filter(question_text__startswith='What')
[<Question: What's up?>]

>>> from django.utils import timezone
>>> current_year = timezone.now().year
>>> Question.objects.get(pub_date__year=current_year)
<Question: What's up?>
```

Model API (3)

```
>>> Question.objects.get(id=2)
Traceback (most recent call last):
    ...
DoesNotExist: Question matching query does not exist.

>>> Question.objects.get(pk=1)
<Question: What's up?>

>>> q = Question.objects.get(pk=1)
>>> q.was_published_recently()
True

>>> q = Question.objects.get(pk=1)

>>> q.choice_set.all()
[]
```

Model API (4)

```
>>> q.choice_set.create(choice_text='Not much', votes=0)
<Choice: Not much>
>>> q.choice_set.create(choice_text='The sky', votes=0)
<Choice: The sky>
>>> c = q.choice_set.create(choice_text='Just hacking again', votes=0)

>>> c.question
<Question: What's up?>

>>> q.choice_set.all()
[<Choice: Not much>, <Choice: The sky>, <Choice: Just hacking again>]
>>> q.choice_set.count()
3

>>> Choice.objects.filter(question__pub_date__year=current_year)
[<Choice: Not much>, <Choice: The sky>, <Choice: Just hacking again>]

>>> c = q.choice_set.filter(choice_text__startswith='Just hacking')
>>> c.delete()
```

Podešavanje admin aplikacije

Podešavanje admin aplikacije

- Videti uputstvo ovde.

Pogledi - *Views*

Pogledi - *Views*

- Predstavljaju “vrstu” web stranice: blog home, arhiva po godini…
- U `polls` aplikaciji imaćemo 4 pogleda:
  - `Question` index stranicu
  - `Question` stranicu sa detaljima
  - `Question` stranicu sa rezultatima
  - Akciju za glasanje
- Pogledi generišu sadržaj koji se dostavlja klijentu na zahtev (URL request).
- Sadržaj mogu biti web stranice ali mogu biti npr. i JSON ili XML stringovi.
- Realizuju se kao python funkcije ili metode klase.

Prvi pogled

Fajl `polls/views.py`:

```
from django.http import HttpResponse


def index(request):
    return HttpResponse("Hello, world. You're at the polls index.")
```

Iz pogleda se vraća `HttpResponse` instanca ili izuzetak.

Rutiranje zahteva

- Svaki URL zahtev se mapira na odgovarajuću `view` funkciju posredstvom tzv. `URLconf`-a.
- Kreirati fajl `polls/urls.py` sa sadržajem:

```
from django.urls import path

from . import views

urlpatterns = [
    path('', views.index, name='index'),
]
```

- Zatim u glavnom `URLconf` fajlu za sajt `mysite/urls.py` uključiti `URLconf` aplikacije `polls`.

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

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

Rutiranje zahteva (2)

Ako sada odete na adresu http://localhost:8000/polls/ dobićete string:

```
Hello, world. You’re at the polls index.
```

Dodatni `polls` pogledi

Fajl `polls/views.py`:

```
def detail(request, question_id):
    return HttpResponse("You're looking at question %s." % question_id)

def results(request, question_id):
    response = "You're looking at the results of question %s."
    return HttpResponse(response % question_id)

def vote(request, question_id):
    return HttpResponse("You're voting on question %s." % question_id)
```

Dodatne rute

Fajl `polls/urls.py`:

```
from django.urls import path

from . import views

urlpatterns = [
    # ex: /polls/
    path('', views.index, name='index'),
    # ex: /polls/5/
    path('<int:question_id>/', views.detail, name='detail'),
    # ex: /polls/5/results/
    path('<int:question_id>/results/', views.results, name='results'),
    # ex: /polls/5/vote/
    path('<int:question_id>/vote/', views.vote, name='vote'),
]
```

Primer mapiranja:

```
/polls/34   =>   detail(request=<HttpRequest object>, question_id=34)
```

Pogled koji nešto zaista i radi

Fajl `polls/views.py`:

```
from django.http import HttpResponse

from polls.models import Question


def index(request):
    latest_question_list = Question.objects.order_by('-pub_date')[:5]
    output = ', '.join([p.question_text for p in latest_question_list])
    return HttpResponse(output)

# Leave the rest of the views (detail, results, vote) unchanged
```

- Problem je što je izled vraćene strane hardkodiran u `view` funkciji.
- Prepustićemo renderovanje stranice Django obrađivaču šablona.

Šabloni

- Kreiramo folder `templates` unutar `polls` aplikacije.
- Konfiguracija za šablone je definisana u listi `TEMPLATES` u `settings.py` modulu:

```
TEMPLATES = [
    {
        'BACKEND': 'django.template.backends.django.DjangoTemplates',
        'APP_DIRS': True,
    },
]
```

- Ugrađene vrednosti za `BACKEND` podešavanje su:
  - `django.template.backends.django.DjangoTemplates`
  - `django.template.backends.jinja2.Jinja2`
- U `templates` folderu kreiramo `polls` direktorijum i u njemu fajl `index.html`.
- Putanja je dakle `polls/templates/polls/index.html`
- Iz aplikacije šablon se (zahvaljujući loaderu) referencira sa `polls/index.html`

Prvi šablon

Fajl `polls/templates/polls/index.html`:

```
{% if latest_question_list %}
    <ul>
    {% for question in latest_question_list %}
        <li><a href="/polls/{{ question.id }}/">
        {{ question.question_text }}</a></li>
    {% endfor %}
    </ul>
{% else %}
    <p>No polls are available.</p>
{% endif %}
```

Ažuriranje pogleda da koristi šablon

Fajl `polls/views.py`:

```
from django.http import HttpResponse
from django.template import loader

from .models import Question


def index(request):
    latest_question_list = Question.objects.order_by('-pub_date')[:5]
    template = loader.get_template('polls/index.html')
    context = {
        'latest_question_list': latest_question_list,
    }
    return HttpResponse(template.render(context, request))
```

Prečica `render`

- Učitavanje i rederovanje šablona i vraćanje `HttpResponse` instance je čest slučaj.
- Zbog toga postoji funkcija koja obavlja sav taj posao - `render()`

Fajl `polls/views.py`:

```
from django.shortcuts import render

from .models import Question


def index(request):
    latest_question_list = Question.objects.order_by('-pub_date')[:5]
    context = {'latest_question_list': latest_question_list}
    return render(request, 'polls/index.html', context)
```

Greška 404

Recimo da želimo da renderujemo detalje `Question` objekta.

Fajl `polls/views.py`:

```
from django.http import Http404
from django.shortcuts import render

from .models import Question
# ...
def detail(request, question_id):
    try:
        question = Question.objects.get(pk=question_id)
    except Question.DoesNotExist:
        raise Http404("Question does not exist")
    return render(request, 'polls/detail.html', {'question': question})
```

Za sada šablon `polls/templates/polls/detail.html` može biti prosto:

```
{{ question }}
```

Prečica `get_object_or_404`

- Čest obrazac je pronalaženje objekta po id-u i podizanje greške 404 ukoliko ne postoji.
- Za to može da se upotrebi prečica `get_object_or_404()`.

Fajl `polls/views.py`:

```
from django.shortcuts import get_object_or_404, render

from polls.models import Question
# ...
def detail(request, question_id):
    question = get_object_or_404(Question, pk=question_id)
    return render(request, 'polls/detail.html', {'question': question})
```

- Takođe postoji i `get_list_or_404()` koja koristi `filter` i podiže grešku 404 ukoliko je lista prazna.

Prepravka `details` šablona

Fajl `polls/templates/polls/detail.html`:

```
<h1>{{ question.question_text }}</h1>
<ul>
{% for choice in question.choice_set.all %}
    <li>{{ choice.choice_text }}</li>
{% endfor %}
</ul>
```

URL-ovi u šablonima

- Link u `index.html` šablonu je bio delimično hardkodiran:

```
<li>
  <a href="/polls/{{ question.id }}/">{{ question.question_text}}</a>
</li>
```

- To nije dobro kod većih aplikacija jer otežava promenu URL šeme.
- Zbog toga je bolje koristiti `{% url %}` tag.

```
<li><a href="{% url 'detail' question.id %}">
  {{ question.question_text }}</a></li>
```

U `polls.url` modulu:

```
...
# the 'name' value as called by the {% url %} template tag
path('<int:question_id>/', views.detail, name='detail'),
...
```

Namespaces u URL rutama

- U prethodnom primeru `url` tag referencira rutu iz `urls.py` fajla po imenu.
- Problem je ako imamo rute koje se isto zovu u više aplikacija.
- To se rešava domenom imena (*namespace*) koji se definiše sa `app_name` u `urls.py` modulu.

Fajl `polls/urls.py`:

```
from django.urls import path

from . import views

app_name = 'polls'
urlpatterns = [
    path('', views.index, name='index'),
    path('<int:question_id>/', views.detail, name='detail'),
    path('<int:question_id>/results/', views.results, name='results'),
    path('<int:question_id>/vote/', views.vote, name='vote'),
]
```

Fajl `polls/templates/polls/index.html`:

```
<li>
   <a href="{% url 'polls:detail' question.id %}"> {{ question.question_text }}</a>
</li>
```

Forme

Pisanje jednostavne forme

Šablon `polls/templates/polls/detail.html`:

```
<h1>{{ question.question_text }}</h1>

{% if error_message %}<p><strong>{{ error_message }}</strong></p>{% endif %}

<form action="{% url 'polls:vote' question.id %}" method="post">
{% csrf_token %}
{% for choice in question.choice_set.all %}
    <input type="radio" name="choice" id="choice{{ forloop.counter }}" value="{{ choice.id }}">
    <label for="choice{{ forloop.counter }}">{{ choice.choice_text }}</label><br>
{% endfor %}
<input type="submit" value="Vote">
</form>
```

Pogled

Fajl `polls/urls.py`:

```
path('<int:question_id>/vote/', views.vote, name='vote'),
```

Fajl `polls/views.py`:

```
from django.http import HttpResponse, HttpResponseRedirect
from django.shortcuts import get_object_or_404, render
from django.urls import reverse

from .models import Choice, Question
# ...
def vote(request, question_id):
    question = get_object_or_404(Question, pk=question_id)
    try:
        selected_choice = question.choice_set.get(pk=request.POST['choice'])
    except (KeyError, Choice.DoesNotExist):
        # Redisplay the question voting form.
        return render(request, 'polls/detail.html', {
            'question': question,
            'error_message': "You didn't select a choice.",
        })
    else:
        selected_choice.votes += 1
        selected_choice.save()
        # Always return an HttpResponseRedirect after successfully dealing
        # with POST data. This prevents data from being posted twice if a
        # user hits the Back button.
        return HttpResponseRedirect(reverse('polls:results', args=(question.id,)))
```

Rezultati glasanja

Po uspešnom glasanju (POST forme) vrši se redirekcija na `polls:results` pogled.

Fajl `polls/views.py`:

```
from django.shortcuts import get_object_or_404, render


def results(request, question_id):
    question = get_object_or_404(Question, pk=question_id)
    return render(request, 'polls/results.html', {'question': question})
```

Šablon `polls/templates/polls/results.html`:

```
<h1>{{ question.question_text }}</h1>

<ul>
{% for choice in question.choice_set.all %}
    <li>{{ choice.choice_text }} -- {{ choice.votes }} vote{{ choice.votes|pluralize }}</li>
{% endfor %}
</ul>

<a href="{% url 'polls:detail' question.id %}">Vote again?</a>
</ul>
```

Pogledi bazirani na klasama *Class-Based Views*

Upotreba klase za definisanje pogleda

```
from django.http import HttpResponse

def my_view(request):
    if request.method == 'GET':
        # <view logic>
        return HttpResponse('result')
```

Postaje:

```
from django.http import HttpResponse
from django.views import View

class MyView(View):
    def get(self, request):
        # <view logic>
        return HttpResponse('result')
```

Fajl `urls.py`:

```
from django.urls import path
from myapp.views import MyView

urlpatterns = [
    path('about/', MyView.as_view()),
```

Nasleđivanje

```
from django.http import HttpResponse
from django.views import View

class GreetingView(View):
    greeting = "Good Day"

    def get(self, request):
        return HttpResponse(self.greeting)
```

```
class MorningGreetingView(GreetingView):
    greeting = "Morning to ya"
```

Fajl `urls.py`:

```
urlpatterns = [
    path('about/', GreetingView.as_view(greeting="G'day")),
]
```

Podrška za forme

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

from .forms import MyForm

def myview(request):
    if request.method == "POST":
        form = MyForm(request.POST)
        if form.is_valid():
            # <process form cleaned data>
            return HttpResponseRedirect('/success/')
    else:
        form = MyForm(initial={'key': 'value'})

    return render(request, 'form_template.html', {'form': form})
```

Postaje:

```
from django.http import HttpResponseRedirect
from django.shortcuts import render
from django.views import View

from .forms import MyForm

class MyFormView(View):
    form_class = MyForm
    initial = {'key': 'value'}
    template_name = 'form_template.html'

    def get(self, request, *args, **kwargs):
        form = self.form_class(initial=self.initial)
        return render(request, self.template_name, {'form': form})

    def post(self, request, *args, **kwargs):
        form = self.form_class(request.POST)
        if form.is_valid():
            # <process form cleaned data>
            return HttpResponseRedirect('/success/')

        return render(request, self.template_name, {'form': form})
```

Dekoracija pogleda

Fajl `urls.py`:

```
from django.contrib.auth.decorators import login_required, permission_required
from django.views.generic import TemplateView

from .views import VoteView

urlpatterns = [
    path('about/', login_required(TemplateView.as_view(template_name="secret.html"))),
    path('vote/', permission_required('polls.can_vote')(VoteView.as_view())),
]
```

Ili na nivou metoda klase:

```
from django.contrib.auth.decorators import login_required
from django.utils.decorators import method_decorator
from django.views.generic import TemplateView

class ProtectedView(TemplateView):
    template_name = 'secret.html'

    @method_decorator(login_required)
    def dispatch(self, *args, **kwargs):
        return super().dispatch(*args, **kwargs)
```

- Za više informacija videti Introduction to class-based views

Podrška za HTTP metode

```
from django.urls import path
from books.views import BookListView

urlpatterns = [
    path('books/', BookListView.as_view()),
]
```

```
from django.http import HttpResponse
from django.views.generic import ListView
from books.models import Book

class BookListView(ListView):
    model = Book

    def head(self, *args, **kwargs):
        last_book = self.get_queryset().latest('publication_date')
        response = HttpResponse()
        # RFC 1123 date format
        response['Last-Modified'] = \
            last_book.publication_date.strftime('%a, %d %b %Y %H:%M:%S GMT')
        return response
```

Generički pogledi

Generički pogledi

- Prethodno prikazani pogledi su često korišćeni u web aplikacijama
  - Učitavanje podataka iz baze na osnovu parametra prosleđenog preko URL-a.
  - Renderovanje šablona i vraćanje rezultata.
- Generički pogledi upravo predstavljaju ovaj obrazac koda.
- Dva generička pogleda: `ListView` i `DetailsView`.

Korišćeni primer

```
class Publisher(models.Model):
    name = models.CharField(max_length=30)
    address = models.CharField(max_length=50)
    city = models.CharField(max_length=60)
    state_province = models.CharField(max_length=30)
    country = models.CharField(max_length=50)
    website = models.URLField()

    class Meta:
        ordering = ["-name"]

    def __str__(self):
        return self.name

class Author(models.Model):
    salutation = models.CharField(max_length=10)
    name = models.CharField(max_length=200)
    email = models.EmailField()
    headshot = models.ImageField(upload_to='author_headshots')

    def __str__(self):
        return self.name

class Book(models.Model):
    title = models.CharField(max_length=100)
    authors = models.ManyToManyField('Author')
    publisher = models.ForeignKey(Publisher, on_delete=models.CASCADE)
    publication_date = models.DateField()
```

Pogled

```
# views.py
from django.views.generic import ListView
from books.models import Publisher

class PublisherList(ListView):
    model = Publisher
```

```
# urls.py
from django.urls import path
from books.views import PublisherList

urlpatterns = [
    path('publishers/', PublisherList.as_view()),
]
```

- ako nismo zadali `template_name` atribut klase pogleda Django će konstruisati podrazumevano, u ovom slučaju `books/publisher_list.html`.

Fajl `books/.html`:

```
{% extends "base.html" %}

{% block content %}
    <h2>Publishers</h2>
    <ul>
        {% for publisher in object_list %}
            <li>{{ publisher.name }}</li>
        {% endfor %}
    </ul>
{% endblock %}
```

- Kontekst je u šablonu dostupan pod imenom `object_list`. Bolje je učiniti ga specifičnim za konkretan model.

Definisanje boljeg imena za kontekst šablona

```
# views.py
from django.views.generic import ListView
from books.models import Publisher

class PublisherList(ListView):
    model = Publisher
    context_object_name = 'my_favorite_publishers'
```

Dodavanje novih informacija u kontekst

Na primer, ako želimo da detaljni pregled izdavača sadrži i spisak knjiga:

```
from django.views.generic import DetailView
from books.models import Book, Publisher

class PublisherDetail(DetailView):

    model = Publisher

    def get_context_data(self, **kwargs):
        # Call the base implementation first to get a context
        context = super().get_context_data(**kwargs)
        # Add in a QuerySet of all the books
        context['book_list'] = Book.objects.all()
        return context
```

Pregled samo podskupa objekata

Možemo da koristimo `queryset` atribut klase pogleda da definišemo proizvoljan upit.

```
from django.views.generic import DetailView
from books.models import Publisher

class PublisherDetail(DetailView):

    context_object_name = 'publisher'
    queryset = Publisher.objects.all()
```

```
from django.views.generic import ListView
from books.models import Book

class BookList(ListView):
    queryset = Book.objects.order_by('-publication_date')
    context_object_name = 'book_list'
```

```
from django.views.generic import ListView
from books.models import Book

class AcmeBookList(ListView):

    context_object_name = 'book_list'
    queryset = Book.objects.filter(publisher__name='ACME Publishing')
    template_name = 'books/acme_list.html'
```

Dinamičko filtriranje

```
# views.py
from django.shortcuts import get_object_or_404
from django.views.generic import ListView
from books.models import Book, Publisher

class PublisherBookList(ListView):

    template_name = 'books/books_by_publisher.html'

    def get_queryset(self):
        self.publisher = get_object_or_404(Publisher, name=self.kwargs['publisher'])
        return Book.objects.filter(publisher=self.publisher)
```

Izmena objekata

```
from django.utils import timezone
from django.views.generic import DetailView
from books.models import Author

class AuthorDetailView(DetailView):

    queryset = Author.objects.all()

    def get_object(self):
        obj = super().get_object()
        # Record the last accessed date
        obj.last_accessed = timezone.now()
        obj.save()
        return obj
```

Šabloni detaljnije

Šabloni

- Tekstualni fajlovi koji imaju fiksne i varijablne delove.
- Koriste se za generisanje proizvoljnog tekstualnog sadržaja: HTML, JSON, XML, CSS, JavaScrip, Java, Python, Email, izveštaji...

Primer

```
{% extends "base_generic.html" %}

{% block title %}{{ section.title }}{% endblock %}

{% block content %}
<h1>{{ section.title }}</h1>

{% for story in story_list %}
<h2>
  <a href="{{ story.get_absolute_url }}">
    {{ story.headline|upper }}
  </a>
</h2>
<p>{{ story.tease|truncatewords:"100" }}</p>
{% endfor %}
{% endblock %}
```

Varijable konteksta

- Navode se u obliku `{{ varijabla }}`.
- Može se koristiti `dot` notacija za pristup atributima varijable pri čemu je semantika sledeća:
  - Prvo se pokušava po ključu rečnika
  - Zatim pristup atributu ili metodi
  - Na kraju se pokušava pristup po numeričkom indeksu (deo iza tačke mora biti numerički)

    Primer:

```
{{ my_dict.key }}
{{ my_object.attribute }}
{{ my_list.0 }}
```

Filteri

Na prikaz varijable se može uticati filterima.

```
{{ value|default:"nothing" }}
  Za value == None -- nothing
{{ value|length }}
  Za value == [1, 2, 3] -- 3
{{ value|filesizeformat }}
  Za value == 123456789 -- 117.7 MB
```

Filteri se mogu povezivati:

```
{{ text|escape|linebreaks }}
```

Mogu imati parametre:

```
{{ bio|truncatewords:30 }}
{{ list|join:", " }}
```

Tagovi

Složenije konstrukcije oblika:

```
{% tag %} ... sadržaj... {% endtag %}
```

Služe za implementaciju kontrole toke (petlji, uslova), učitavanje eksternih informacija i sl.

For

```
<ul>
{% for athlete in athlete_list %}
    <li>{{ athlete.name }}</li>
{% endfor %}
</ul>
```

`If`, `elif` i `else`

```
{% if athlete_list %}
    Number of athletes: {{ athlete_list|length }}
{% elif athlete_in_locker_room_list %}
    Athletes should be out of the locker room soon!
{% else %}
    No athletes.
{% endif %}
```

```
{% if athlete_list|length &gt; 1 %}
   Team: {% for athlete in athlete_list %} ... {% endfor %}
{% else %}
   Athlete: {{ athlete_list.0.name }}
{% endif %}
```

Nasleđivanje šablona

- Najkompleksniji i najmoćniji mehanizam Django obrađivača šablona.
- Omogućava definisanje šablona najvišeg nivoa i zatim redefiniciju i specijalizaciju za konkretne slučajeve.
- Ovim se većina konkretnih šablona minimizuje.

Nasleđivanje šablona (2)

```
<!DOCTYPE html>
<html lang="en">
<head>
    <link rel="stylesheet" href="style.css" />
    <title>{% block title %}My amazing site{% endblock %}</title>
</head>

<body>
    <div id="sidebar">
        {% block sidebar %}
        <ul>
            <li><a href="/">Home</a></li>
            <li><a href="/blog/">Blog</a></li>
        </ul>
        {% endblock %}
    </div>

    <div id="content">
        {% block content %}{% endblock %}
    </div>
</body>
</html>
```

Nasleđivanje šablona (3)

```
{% extends "base.html" %}

{% block title %}My amazing blog{% endblock %}

{% block content %}
{% for entry in blog_entries %}
    <h2>{{ entry.title }}</h2>
    <p>{{ entry.body }}</p>
{% endfor %}
{% endblock %}
```

Nasleđivanje šablona (4)

- Roditeljski `block` tagovi treba da imaju podrazumevani sadržaj.
- Ukoliko primetite da duplirate kod u šablonima to je znak da treba da kreirate blok i da ga smestite u roditeljski šablon i onda samo redefinišete gde je potrebno.
- Sadržaj roditeljskog bloka se može referencirati iz bloka putem `{{ block.super }}`.
- `endblock` opciono može definisati ime što je zgodno kod većih šablona.

```
{% block content %}
...
{% endblock content %}
```

Automatski HTML *escaping*

- Sprečavanje *Cross Site Scripting (XSS)*.
- Django automatski uključuje *HTML escaping* za sve stringove koje renderuje.
- To je moguće isključiti za pojedine delove šablona ili na nivou celog obrađivača.
- Sledeći karakteri se konvertuju:
  - `<` se konvertuje u `<`
  - `>` se konvertuje u `>`
  - `'` (jednostruki navodnici) se konvertuju u `&#39;`
  - `"` (dvostruki navodnici) se konvertuju u `&quot;`
  - `&` se konvertuje u `&`

Automatski HTML *escaping* - varijable

```
This will be escaped: {{ data }}
This will not be escaped: {{ data|safe }}
```

Za `data` vrednost `<b>` rezultuje sledećim kodom:

```
This will be escaped: &lt;b&gt;
This will not be escaped: <b>
```

Automatski HTML *escaping* - blokovi

```
{% autoescape off %}
    Hello {{ name }}
{% endautoescape %}
```

```
Auto-escaping is on by default. Hello {{ name }}

{% autoescape off %}
    This will not be auto-escaped: {{ data }}.

    Nor this: {{ other_data }}
    {% autoescape on %}
        Auto-escaping applies again: {{ name }}
    {% endautoescape %}
{% endautoescape %}
```

Pozivi metoda u šablonima

- Moguće je pozivati metode koje nemaju parametre.
- Sintaksa je ista kao za pristup atributima.

```
{% for comment in task.comment_set.all %}
    {{ comment }}
{% endfor %}
```

```
{{ task.comment_set.all.count }}
```

Moguće je pozivati i korisničke metode.

```
class Task(models.Model):
    def foo(self):
        return "bar"
```

```
{{ task.foo }}
```

Biblioteke tagova i filtera

- Tagovi i filteri se mogu definisati od strane korisnika ili autora aplikacija.
- Učitavaju se sa tagom `load`.

```
{% load humanize %}

{{ 45000|intcomma }}
```

- U ovom slučaju aplikacija `django.contrib.humanize` mora biti omogućena u konfiguraciji `INSTALLED_APPS`.
- Moguće je istovremeno učitati više biblioteka.

```
{% load humanize i18n %}
```

Reference

- Django dokumentacija