University of Windsor

Django Templates

COMP 8347

Usama Mir

Usama.Mir@unwindsor.ca

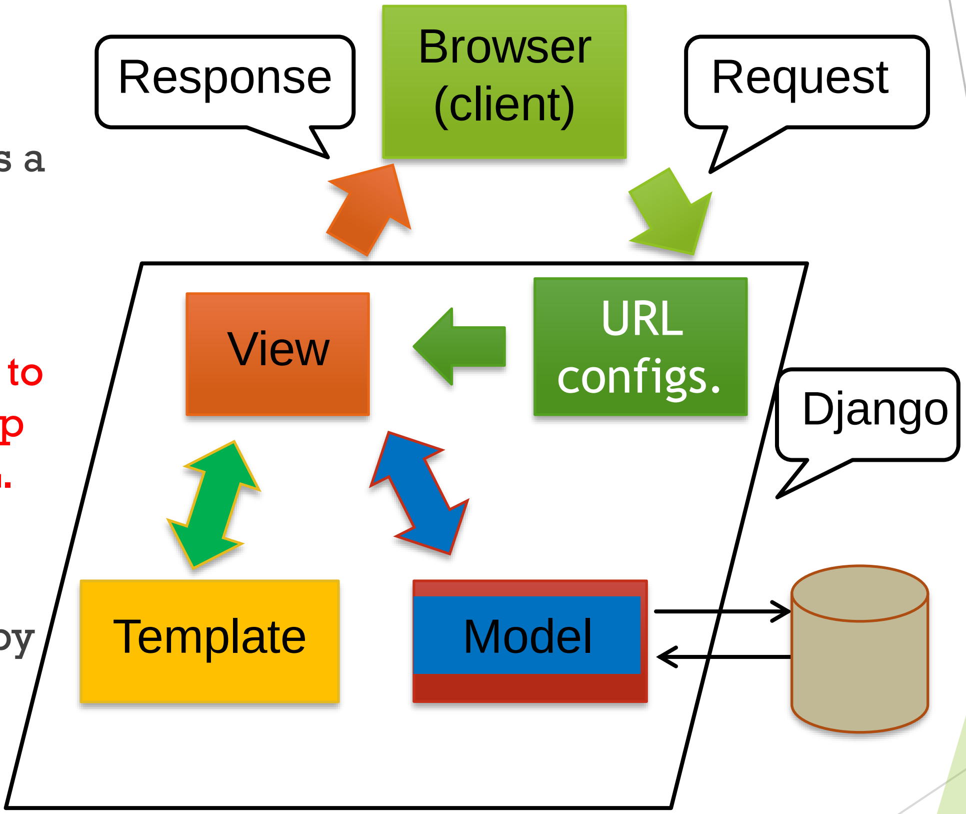
Django Templates

Topics

- Introduction to Templates
- Django Template Language
- Template Inheritance
- Including Static Files in Templates

Review MTV Architecture

- Represent data organization; defines a table in a database.
- Contain information to be sent to client; help generate final HTML.
- Actions performed by server to generate data.



Templates

- *Template*: a text document, or a normal Python string, that is marked-up using the Django template language.
  - Contains static content (e.g. HTML) and dynamic mark-up (specifying logic, looping, etc.)
  - Can contain block tags and/or variables
  - Choice of which template to use and data to display is made in view function itself (or through its arguments).

Shortcut Functions

- *django.shortcuts*: A package that collects helper functions and classes.
  - "span" multiple levels of MTV.
  - these functions/classes introduce *controlled coupling* for convenience.

- ***render()*:** A Django shortcut function
  - Combines a given template with a given context dict and returns an HttpResponse object with that rendered text.

Render()

- **render(*request*, *template_name*, *context=None*,** *content_type=None*, *status=None*, *using=None***)**
  - Required arguments
    - *request*: request obj used to generate the response.
    - *template_name*: The full name of a template to use or sequence of template names.
- *context*: a *dict-like* object used for passing information to a template.
  - Every rendering of a template typically requires a context.
    - Default (i.e., empty dict) – would not be very dynamic.
  - Contains a dictionary of 'key-value' pairs.
- *content_type*: The MIME type to use for the resulting document. Defaults to 'text/html'.
- *status*: The status code for the response. Defaults to 200.
- *using*: The NAME of a template engine to use for loading the template. Ex. BACKEND, DIR, APP_DIR etc
- www.webforefront.com/django/1.11/customizedjangotemplates.html

An Example

```
from myapp.models import Book
from django.http import HttpResponse
def my_view(request):
    # View code here...
    books = Book.objects.all()
    response=HttpResponse()
    for item in books:
        para= '<p>' + item.title+ '</p>'
        response.write(para)
    return response
```

```
from django.shortcuts import render
from myapp.models import Book
def my_view(request):
    # View code here...
    books = Book.objects.all()
    return render(request,
        'myapp/index.html', { 'booklist':
        books })
```

Template Language Syntax

- The Django template system is meant to express presentation, not program logic.
  - The language does not try to be (X)HTML compliant.
  - Contains variables and tags.
  - ***Variables***: get replaced with values when the template is evaluated.
    - look like this: **{{ variable }}**.
  - ***Tags***: control the logic of the template.
    - Look like this: **{% tag %} ... tag contents ... {% endtag %}**

Variables

- When the template engine encounters a variable {{variable}}
  - it evaluates that variable and replaces it with the result.
- *Variable names*: any combination of alphanumeric characters and underscore ("_").
  - Cannot start with underscore
  - cannot have spaces or punctuation characters
  - The dot (".") has a special meaning

The Dot-lookup Syntax

- When the template system encounters a dot (.) e.g. {{my_var.x}}:
  - Tries the following lookups, in this order:
    - Dictionary lookup
    - Attribute or method lookup
    - Numeric index lookup
  - Example: **<h1>{{ employee.age}}</h1>**
    - Will be replaced with the age attribute of employee object

Filters

- *Filters*: Allow you to modify context variables for display.
    - Similar to unix pipes (|), e.g. {{ name|lower }}
    - Can be “chained” {{ text|escape|linebreaks }}
        - The output of one filter is applied to the next.
    - Some filters take arguments.
        - {{ story|truncatewords:50 }}: displays 1st 50 words of story variable.
    - arguments that contain spaces must be quoted
        - {{ list|join:", " }}: joins a list with comma and space

Tags

- Tags {% tag %} can have different functionality.
  - e.g. control flow, loops, logic
  - may require beginning and ending tags
  - some useful tags:
    - for
    - if, elif, else
    - block and extends

for Tag

- Used to loop over each item in an array
- Example:

```
<body>
{% for book in booklist %}
    <li>{{ book.title }}</li>
{% endfor %}
</body>
```

if, elif, else Tags

- Evaluates a variable
  - if the variable is “true”, then the contents of the block are displayed

```
{% if my_list|length > 5 %}
    <p> Number of selected items: {{ my_list|length }} </p>
{% elif my_list %}
     <p> Only a few items were selected </p>
{% else %}
     <p> {{my_list|default: ‘Nothing selected.’}} </p>
{% endif %}
```

url Tag

- *url Tag*: Returns an absolute path reference (a URL without the domain name) matching a given view function.
  - may have optional parameters v1 v2 etc
  - All arguments required by the URLconf should be present.
    - {% **url** 'path.to.some_view' v1 v2 %}
    - {% **url** 'path.to.some_view' arg1=v1 arg2=v2 %}

Removing Hardcoded URLs

urlpatterns = [

path(r'<int:emp_id>/', views.detail, name='detail'),

]

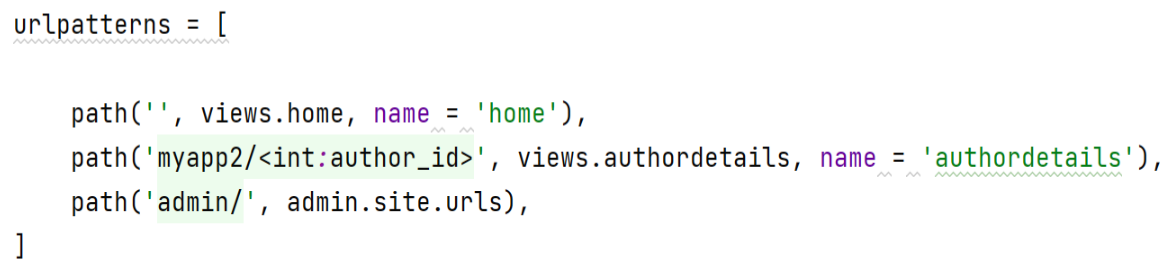
Matching url: **myapp/5/**

A hardcoded link in template file:

- <a href="/myapp/**{{** author.id **}}**/">**{{** author.name **}}**</a>
  - hard to change URLs on projects with many templates
  - Solution: use the {% url %} template tag, if name argument is defined in the corresponding ***urls.py***
- <a href="**{% url** 'myapp:detail' author.id **%}**">**{{**author.name **}}**</a>
  - looks up URL definition from the ***myapp.urls*** module
  - **path('<int:author_id>/', views.detail, name='detail')**
- If you want to change the URL
  - Matching url: **myapp/5/ → myapp/emp_info/5/**
  - **path('emp_info/<int:emp_id>/', views.detail, name='detail')**
  - Don't need to change anything in template file

Namespacing URL Names

- Adding namespaces allows Django to distinguish between views with same names in different APPs.
  - add namespace in app level *urls.py* (after import instructions)
    - app_name = ‘myapp2’
  - URL definition from the myapp2.urls module
    - path(’<int:author_id>/', views.detail, name='detail')
  - In template file, refer to it as
  - <a href="**{% url** ‘myapp2:detail’ author.id **%}**">**{{**author.name**}}**</a>
  - Assuming author.id=2, url tag will output string: /myapp/2 /
  - Final HTML string: <a href=“/myapp/2 / ">**{{**author.name**}}**</a>



```
urlpatterns = [

    path('', views.home, name = 'home'),
    path('myapp2/<int:author_id>', views.authordetails, name = 'authordetails'),
    path('admin/', admin.site.urls),
]
```

Template Inheritance

- *Template inheritance*: allows you to build a base “skeleton” template that contains all the common elements of your site.
  - defines **blocks** that child templates can override
  - *block Tag*: Used in base template to define blocks that can be overridden by child templates.
    - tells template engine that a child template may override those portions of the template
    - <title>**{% block** title **%}**Hello World**{% endblock %}**</title>
  - ***extends Tag*:** Used in child template
    - tells the template engine that this template “extends” another template.

Base&Child Templates

```
<!DOCTYPE html>
<html lang="en">
<head>
   <link rel="stylesheet" href="style.css" />
   <title>{% block title %}My amazing blog{%
         endblock %}</title>
</head>
<body>
      {% block sidebar %}
      <ul>
         <li><a href="/">Home</a></li>
         <li><a href="/blog/">Blog</a></li>
      </ul>
      {% endblock %}
      {% block content %}{% endblock %}
</body>
   </html>
```

```
{% 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 %}
```

load Tag

- *load Tag*: Loads a custom template tag set
  - {% **load** somelibrary package.otherlibrary %}
  - Ex.

  -
    ```
    <!DOCTYPE html>
    {% load static %}
    <html>
    <head>

      <link rel="stylesheet" type="text/css" href="{% static 'myapp/style.css' %}"/>
    ```
  - More examples on:

https://docs.djangoproject.com/en/4.1/howto/custom-template-tags/

Static Files

- *Static files*: additional files e.g., images, JavaScript, or CSS needed to render the complete web page.
  - static files are placed in a folder under your app
  - e.g. myapp/static/myapp/style.css
  - Add {% load static %} at top of template file

```
{% load static %}

    <link rel="stylesheet" type="text/css" href="{% static 'myapp/style.css' %}"/>
```

rel = Specifies the relationship between the current document and the linked document

Shortcut function: get_object_or_404

- *get_object_or_404(**klass,*args,**kwargs)**:* Calls get() on a given model manager.
  - raises Http404 instead of model’s DoesNotExist exception.
  - Required arguments:
    - *Klass*: A Model class, a Manager, or a QuerySet instance from which to get the object.
    - ***kwargs*: Lookup parameters, which should be in the format accepted by get() and filter().

An Example

```
from django.http import Http404
def my_view(request):
    try:
        my_object = MyModel.objects.get(pk=1)
    except MyModel.DoesNotExist:
        raise Http404
```

Alternatively,

```
from django.shortcuts import get_object_or_404
def my_view(request):
    my_object = get_object_or_404(MyModel, pk=1)
```

Other Shortcut Functions

- Visit the following URL:

https://docs.djangoproject.com/en/4.1/topics/http/shortcuts/

References

- https://docs.djangoproject.com/en/4.1/topics/templates/
- https://docs.djangoproject.com/en/4.1/topics/http/shortcuts/
- https://docs.djangoproject.com/en/4.1/howto/static-files/
- Python Web Development with Django, by J. Forcier et al.
- Slides from Dr. Arunita and Dr. Saja