

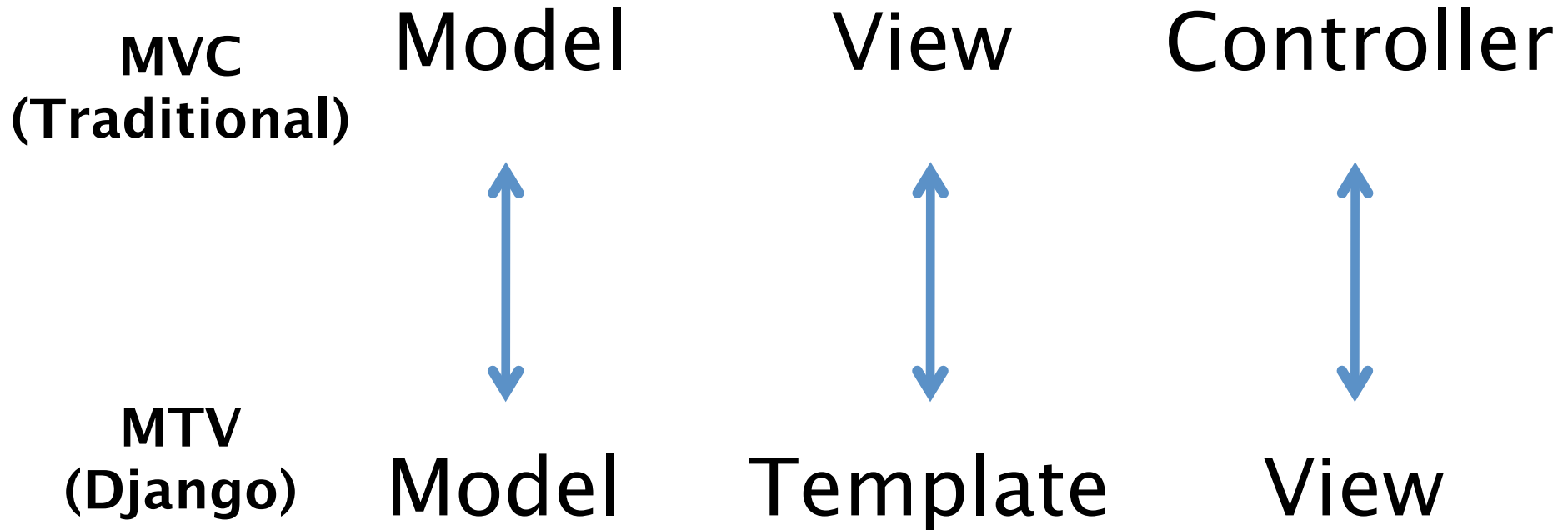


Accelerating Information Technology

<http://aiti.mit.edu>

Ghana Summer 2012
Lecture DJ05 – Django Templates

Django Architecture



weather.html

```
<html>
  <head>
    <title> Weather </title>
  </head>
  <body>
    <p>Today's weather in {{ city }} is {{ description }}.</p>
    <div id="temperature">
      {% for day in thisWeek %}
        <li> On {{ day.date }}, the temperature will be {{ day.temperature }}.
      </li>
      {% endfor %}
    </div>
    <div id="ads">
      {% block ads %}
        Click on these ads!
      {% endblock %}
    </div>
  </body>
</html>
```

Context

```
city = 'Accra'  
description = 'sunny'  
thisWeek = [dict(date='Thursday',  
                 temperature=20),  
            dict(date='Friday',  
                 temperature=25),  
            dict(date='Saturday',  
                 temperature=22)]
```

Displayed by browser

Today's weather in Accra is sunny.

- On Thursday, the temperature will be 20.
- On Friday, the temperature will be 25.
- On Saturday, the temperature will be 22.

Click on these ads!

Templates

- A text-based template for HTML, CSS, XML, JavaScript, etc.
- Mixture between hard-coded text and abstractions
- Abstractions
 - Variables
 - Tags
- Re-useable and extensible

Hard-coded Text in weather.html

```
<html>
  <head>
    <title> Weather </title>
  </head>
  <body>
    <p>Today's weather in {{ city }} is {{ description }}.</p>
    <div id="temperature">
      {% for day in thisWeek %}
        <li> On {{ day.date }}, the temperature will be
        {{ day.temperature }}. </li>
      {% endfor %}
    </div>
    <div id="ads">
      {% block ads %}
        Click on these ads!
      {% endblock %}
    </div>
  </body>
</html>
```

Variables

- `{{ variable }}`
 - If variable doesn't exist, then output `TEMPLATE_STRING_IF_INVALID` (default: empty string `""`)
- `{{ variable.attribute }}`
 1. **Dictionary Lookup.** `variable["attribute"]`
 2. **Attribute Lookup.** `variable.attribute`
 3. **Method Call.** `variable.attribute()`
 4. **List-index Call.** `variable[attribute]`

Variables in weather.html

```
<html>
  <head>
    <title> Weather </title>
  </head>
  <body>
    <p>Today's weather in {{ city }} is {{ description }}.</p>
    <div id="temperature"
      {% for day in thisWeek %}
      <li> On {{ day.date }}, the temperature will be
      {{ day.temperature }}. </li>
      {% endfor %}

    </div>
    <div id="ads">
      {% block ads %}
      Click on these ads!
      {% endblock %}
    </div>
  </body>
</html>
```


Filters

- **Modify the output of variables**
- `{{ variable|filter }}`

```
foo := "Hello World"
```

```
bar := ['a', 'b', 'c']
```

```
{{ foo|lower }} --> hello world
```

```
{{ bar|length }} --> 3
```

```
{{ bar|slice:":2" }} --> ['a', 'b']
```

```
{{ baz|default:"error!" }} --> error!
```

Tags

- for loops
- if clauses
- comments
- blocks
- and many more built-in tags (look them up!)
- `{% tag %}` ... `{% endtag %}`

Tags in weather.html

```
<html>
  <head>
    <title> Weather </title>
  </head>
  <body>
    <p>Today's weather in {{ city }} is {{ description }}.</p>
    <div id="temperature"
      {% for day in thisWeek %}
        <li> On {{ day.date }}, the temperature will be
        {{ day.temperature }}. </li>
      {% endfor %}
    </div>
    <div id="ads">
      {% block ads %}
        Click on these ads!
      {% endblock %}
    </div>
  </body>
</html>
```

For loops

```
{% for x in y %}  
    ... logic ...  
{% endfor %}
```

```
fruit_basket := {'apples', 'oranges', 'pineapples'}
```

```
{% for fruit in fruit_basket %}  
    <li>{{ fruit }}</li>  
{% endfor}
```

```
    <li>apples</li>  
--> <li>orange</li>  
    <li>pineapples</li>
```

If clauses

```
{% if <condition> %}
```

```
    ... logic ...
```

```
{% else %}
```

```
    ... logic ...
```

```
{% endif %}
```

```
{% if rain > 1 }
```

```
    Buy an umbrella for {{ price1 }}
```

```
{% else %}
```

```
    Buy sunglasses for {{ price2 }}
```

```
{% endif %}
```

Comments

```
{% comment %}
```

```
    This comment won't be displayed!
```

```
{% endcomment}
```

- **Ignore everything inside tag**
 - For inline comments, use `{# blah blah blah #}`

Template Inheritance

- Define extensible parts of a template with block tags

```
{% block name %}
```

...

```
{% endblock %}
```

- Create child templates that can extend blocks
- Load parent template with

```
{% extends "parent_template" %}
```

weather.html

```
<html>
  <head>
    <title> Weather </title>
  </head>
  <body>
    <p>Today's weather in {{ city }} is {{ description }}.</p>
    <div id="temperature">
      {% for day in thisWeek %}
        <li> On {{ day.date }}, the temperature will be
        {{ day.temperature }}. </li>
      {% endfor %}

    </div>
    <div id="ads">
      {% block ads %}
      Click on these ads!
      {% endblock %}
    </div>
  </body>
</html>
```


ads.html

```
{% extends "weather.html" %}  
{% block ads %}  
{% if rain > 1 %}  
    Buy an umbrella!  
{% else %}  
    Buy sunglasses!  
{% endif %}  
{% endblock %}
```

Context

```
city = 'Accra'  
description = 'sunny'  
thisWeek = [dict(date='Thursday',temperature=20),  
             dict(date='Friday', temperature=25),  
             dict(date='Saturday', temperature=22)]  
rain = 3
```

Displayed by browser

Today's weather in Accra is sunny.

- On Thursday, the temperature will be 20.
- On Friday, the temperature will be 25.
- On Saturday, the temperature will be 22.

~~Click on these ads!~~ gone!

Buy an umbrella!

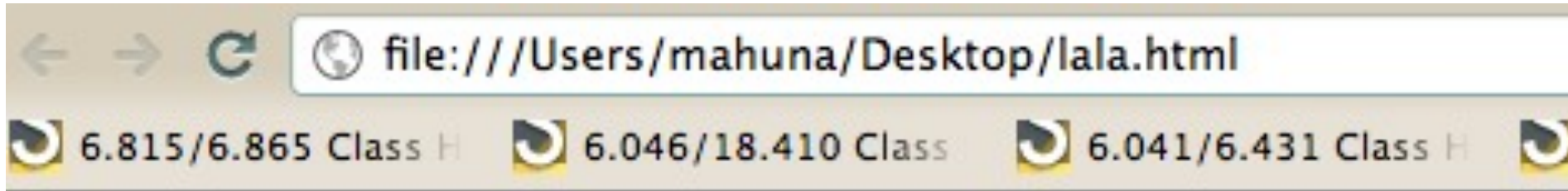
Template Inheritance

- In child template, redefine contents of the parent's block tag
 - similar to overriding methods in class inheritance
- If a block tag is not redefined, then use contents of block tag in parent
- `{{ block.super }}` explicitly refers to contents of block tag in parent

Views before

```
def get_titles(request, limit=100):
    book_list = Book.objects.all()[ :limit ]
    response = 'List of titles is:'
    for b in book_list:
        response+=str(b.title)
    return HttpResponse(response)
```

Views before

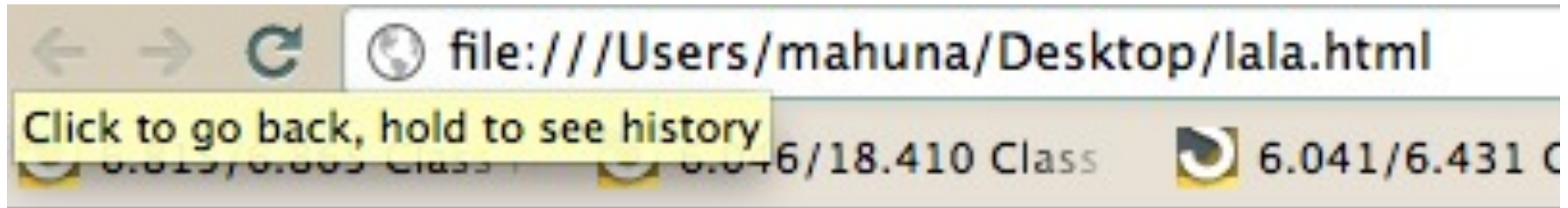


List of titles:Crime and PunishmentHarry Potter and the order of Phoenix

Views with more HTML

```
def get_titles(request, limit=100):
    book_list = Book.objects.all()[ :limit]
    response = HttpResponse()
    response.write(' <html><body>' )
    response.write(' <h1>List of titles</h1>' )
    response.write(' <ul>' )
    for b in book_list:
        response.write(' <li>Title:' +b.title)
        response.write(' </li>' )
    response.write(' </ul>' )
    response.write(' </body></html>' )
    return response
```

Views with more HTML



List of titles:

- Crime and Punishment
- Harry Potter and the Order of Phoenix

But it's messy and all together and I don't like it!

```
def get_titles(request, limit=100):
    book_list = Book.objects.all()[ :limit]
    response = HttpResponse()
    response.write('<html><body>')
    response.write('<h1>List of titles</
h1>')
    response.write('<ul>')
    for b in book_list:
        response.write('<li>Title:' + b.title)
        response.write('</li>')
    response.write('</ul>')
    response.write('</body></html>')
    return response
```


Instead: Template!

display_titles.html

```
<html>
<h1> List of titles </h1>
  <ul> {% for book in books %}
    <li> {{ book.title }} </li>
  {% endfor %}
</ul>
</html>
```

New View

```
def get_titles(request, limit=100):  
    book_list = Book.objects.all()[:limit]  
    my_temp=get_template('display_titles.html')  
    my_context = Context('books', book_list)  
    return my_temp.render(my_context)
```

Shortcut!

```
def get_titles(request, limit=100):  
    book_list = Book.objects.all()[:limit]  
    my_context = Context('books', book_list)  
    return render_to_response  
( 'display_titles.html', my_context)
```

Templates

Remember to specify where your templates are in `TEMPLATE_DIRS` in `settings.py`



Templates

- Mixture of hard-coded text and abstractions
- Abstractions often look like and function like Python code, but you can't run arbitrary Python code
 - Lookup list of built-in filters and tags in Django
 - Customize your own filters and tags
- Complex logic with arbitrary Python should be performed by `views.py` and only the processed variables should be passed to a template

ads.html

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

Context

```
city = 'Accra'  
description = 'sunny'  
thisWeek = [dict(date='Thursday',temperature=20),  
             dict(date='Friday', temperature=25),  
             dict(date='Saturday', temperature=22)]  
rain = 3
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