Theory: Launching web server

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§1. Make a Plan

After all the hard work of making an Internet service, you obviously want to see the result. What does it take to launch a Django web server? If you already have an application in your project, there are only a few steps left:

- Configure *settings.py* file;
- Launch the server on your local machine;
- Fix the errors (if any) with the help of the debug page.

It's hard to keep in mind the whole process of creating a service, so for mere convenience let's use a prepared project of my old friend Alan Smithee, a very prolific film director.

§2. Prepare a simple project

First, let's prepare a new project.

We'll create the project "*smithee*" itself, the application "*movies*", one template and one view handler. Run this code from your shell in any directory you want:

```
# Unix
django-admin startproject smithee
cd smithee
django-admin startapp movies
mkdir -p movies/templates/movies

# Windows
django-admin startproject smithee
cd smithee
django-admin startapp movies
mkdir movies\templates\movies
```

Add this code to the *movies/templates/movies/index.html* file:

```
<!DOCTYPE html>
<title>Movies</title>

<h1>Films by {{ director }}</h1>

<ul>
{% for movie in movies %}
  <li>{{ movie.year }} - {{ movie.title }}</li>
{% endfor %}
</ul>
```

Add this code to the *movies/views.py* module:

Current topic:

Stage 1 Launching web server

Topic depends on:

- ✗ Stage 1 HTTP URL
- ✓ Stage 1 Boolean logic 16
- ✓ Stage 1 List 13
- ✗ Stage 1 Django MVC

Topic is required for:

- Stage 2 Django template language
- Stage 1 Processing requests

Table of contents:

↑ Launching web server
§1. Make a Plan
§2. Prepare a simple project
§3. Configure settings.py
§4. Add Application to the Settings
§5. Custom Variables
§6. Starting the Local Server
§7. Django Debug Mode
Feedback & Comments

```
from django.conf import settings
from django.shortcuts import render
from django.views import View

movies = [
    {
        'title': 'Catchfire',
        'year': 1990,
    },

    {

        'title': 'Mighty Ducks the Movie: The First Face-Off',

        'year': 1997,

    },

    {

        'title': 'Le Zombi de Cap-Rouge',

        'year': 1997,

    },

]




class MovieView(View):

    def get(self, request, *args, **kwargs):

        return render(

            request, 'movies/index.html', context={

                'director': settings.DIRECTOR,

                'movies': movies,

            }

        )
```

In this example, we use the `settings.DIRECTOR` variable from the *settings.py* module. A bit further we shall see how to define it.

Since it is just a single page on the site, we add one path to the `urlpatterns` list in *smithee/urls.py*:

```
from django.urls import path
from movies.views import MovieView

urlpatterns = [
    path('', MovieView.as_view()),
]
```

Now that the preparation is done, we should configure the *settings.py* module to launch the server.

§3. Configure settings.py

Having the code, the only thing left is to tweak some configs in the *settings.py* module to make it work.

Remember that changing settings is a flexible way to control the work of your service. In addition to the existing variables, you can add your own so that they can be reachable throughout the project.

Settings.py is a usual Python module. The difference is that in this file you only define the variables and do not write any functions or classes. You can locate the module in the *<project_name>* directory: in our case, it is *smithee/settings.py*. Let's look more closely at what we need to work with a basic Django project.

```
BASE_DIR = os.path.dirname(os.path.dirname(os.path.abspath(__file__)))
```

`BASE_DIR` is the name of the folder where your project is located in the file system. You don't need to modify it because Django provides an OS independent way to find a base directory for your project. However, you should use it if you want to manipulate the included files. For example, if you want to define the name for a log file, it can be `LOG_FILE = os.path.join(BASE_DIR, 'smithee.logs')`

```
ALLOWED_HOSTS = ['localhost']
```

When you run your server on the local machine, you should add '*localhost*' to the `ALLOWED_HOSTS`. *Localhost* is an alias for the local address of your computer. But if your server is meant to be reachable via the Internet, you also need to add the name of your web host. If you were Google, the `ALLOWED_HOSTS` might look like this: `ALLOWED_HOSTS = ['www.google.com']`.

```
DATABASES = {}
```

By default, Django generates config with a *sqlite3* database for you. Since we don't use a database in our application, we can remove the default configuration and save `DATABASES` as an empty dictionary.

§4. Add Application to the Settings

To include your applications in the project, you should modify the INSTALLED_APPS variable in the *settings.py* module.

```
INSTALLED_APPS = [
    'django.contrib.admin',
    'django.contrib.auth',
    'django.contrib.contenttypes',
    'django.contrib.sessions',
    'django.contrib.messages',
    'django.contrib.staticfiles',
    'movies',
]
```

By default, Django prepares this list with applications you can use for your web service. Right now we don't get too deep with what *django.contrib.** modules are, but it's necessary to add your own application to the `INSTALLED_APPS`. In our case, it is the "*movies*" app.

If you forget to include your app, you may see an exception upon starting your server or accessing a page. For example, the server will not be able to find a template because you do not register an app where this template is placed.

With that, we finish our work with the default configuration; but if you're curious, you can tweak some more.

§5. Custom Variables

In *settings.py* you can include other values of your project. You may have constants that stay the same for several modules or even applications. For example, the name of the director for whom we're making a site may appear on different pages of our project, so we save his name in *settings.py* module:

```
DIRECTOR = 'Alan Smithee'
```

You may define this variable in any place in the *settings.py*. After that, you can access the *DIRECTOR's* name through the import `django.conf.settings.DIRECTOR`. You can pass it to your templates or use it for any other purpose you wish. It's convenient to save it in the settings: if you accidentally made a mistake and wrote `DIRECTOR = 'John Doe'`, you can easily fix it in just one place instead of a dozen.

§6. Starting the Local Server

We have an application and we configured the settings: looks like we're finally ready to start the server! To launch the server on your local machine, you should run the *runserver* command from your terminal in the project's root directory:

```
python manage.py runserver
```

If you see *"Error: That port is already in use."*, it means that the default port 8000 is in use by some other application. In this case, you can choose any other available port and pass it as the last argument to the command:

```
python manage.py runserver 9090
```

So `python manage.py runserver` is an equivalent to `python manage.py runserver 8000`.

Congratulations! Django starts the server and now you can access it through the browser. Type the address *http://localhost:8000* or *http://localhost<port_you_used>* and you will see a part of Alan Smithee filmography.

§7. Django Debug Mode

Let's face it though: bugs happen. If something went wrong, you want to know where in the application it is. You can start the debug mode adding `DEBUG = True` in your *settings.py* module. **Debug mode** is a state of an application when it shows tracebacks and other useful information in your browser when the server fails.

It's strongly recommended to set DEBUG = False when you launch the server for your users. You can accidentally disclose some secret information through the tracebacks. To prevent such situations, do not forget to turn off the debug mode for the production servers.

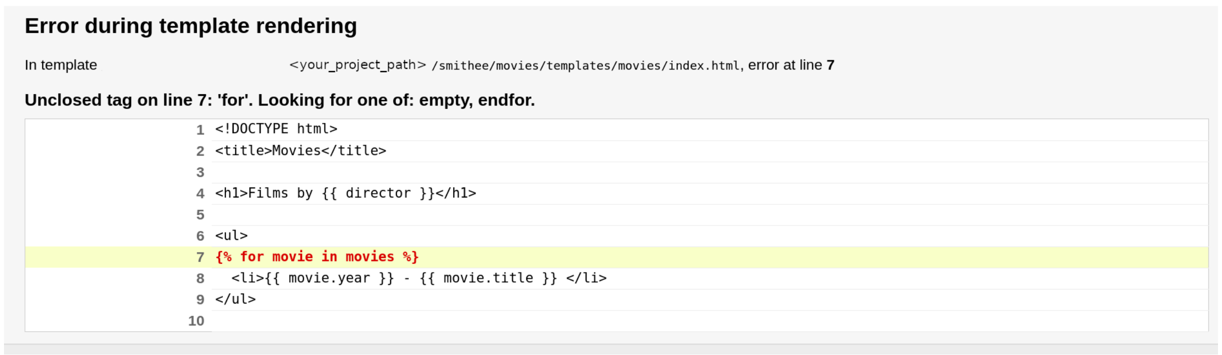
When the application was under construction, one of the developers forgot the `{% endfor %}` tag in the *movies/templates/movies/index.html*:

```
<!DOCTYPE html>
<title>Movies</title>

<h1>Films by {{ director }}</h1>

<ul>
{% for movie in movies %}
  <li>{{ movie.year }} - {{ movie.title }}</li>
</ul>
```

When we try to access the page with the films, we get this instead:



Error during template rendering

In template <your_project_path> /smithee/movies/templates/movies/index.html, error at line **7**

Unclosed tag on line 7: 'for'. Looking for one of: empty, endfor.

```
 1 <!DOCTYPE html>
 2 <title>Movies</title>
 3
 4 <h1>Films by {{ director }}</h1>
 5
 6 <ul>
 7 {% for movie in movies %}
 8   <li>{{ movie.year }} - {{ movie.title }} </li>
 9 </ul>
10
```

As you see, Django suggests in which file and line there is a mistake. It's not always that easy to spot the place of an error in your code for Django, but you can use other information from the debug page to find it by yourself.

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