



# Django - Level One

Getting Started with Django!



- We've finally reached the moment we've been waiting for - Django!
- Before we dive into the technical details of Django, let's learn a little more about it and its interesting background!



- Django is a free and open source web framework.
- It is used by many sites, including Pinterest, PBS, Instagram, BitBucket, Washington Times, Mozilla, and more!



- Django was created in 2003 when the web developers at the Lawrence Journal-World newspaper started using Python for their development.
- The fact that it originated at a newspaper is important!



- Because the original developers were surrounded by writers, good written documentation is a key part of Django!
- This means you have excellent references to check on the official Django docs!



- Django has its own excellent basic tutorial where you are walked through creating a basic polling web app.
- The reason it is a poll also extends back to its newspaper roots!



- When encountering Django tutorials you will often read that you should create a virtual environment or an “venv”
- Let’s talk about what this is and how to use it!



# Django

- A virtual environment allows you to have a virtual installation of Python and packages on your computer.
- So why would you ever want or need this?





- Packages change and get updated often!
- There are changes that break backwards compatibility.
- So what do you do if you want to test out new features but not break your web app?



- You create a virtual environment that contains the newer version of the package.
- Luckily, Anaconda makes this really easy for us!
- A virtual environment handler is included!



- To use a virtual environment with conda we use these commands:
  - `conda create --name myEnv django`
- Here we created an environment called “myEnv” with the latest version of Django.



- You can then activate the environment:
  - `activate myEnv`
- Now, anything installed with pip or conda when this environment is activated, will only be installed for this environment.



- You can then deactivate the environment
  - `deactivate myEnv`
- Its encouraged to use virtual environments for your projects to keep them self-contained and not run into issues when packages update!



# Django

Creating our first django project!



- You can install Django with
  - `conda install django`
- Or for normal python distributions:
  - `pip install django`

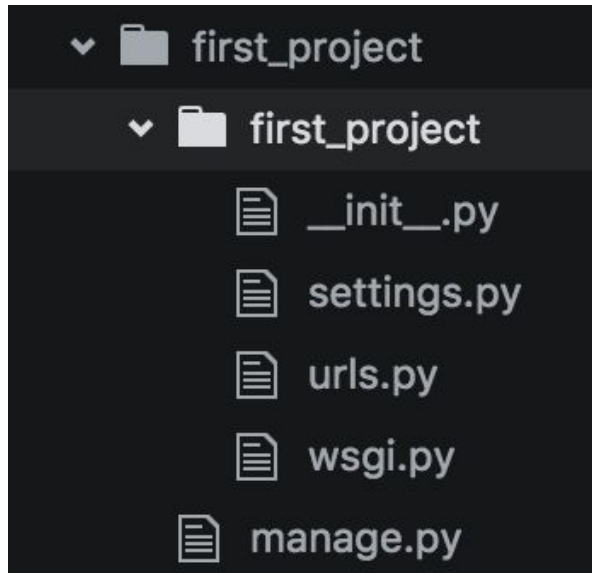


- When you install Django, it actually also installed a command line tool called:
  - `django-admin`
- Let's create our first project. Type:
  - `django-admin startproject first_project`



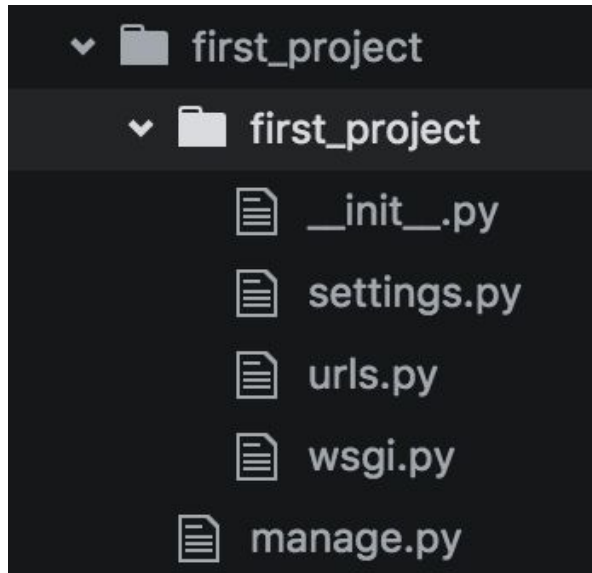


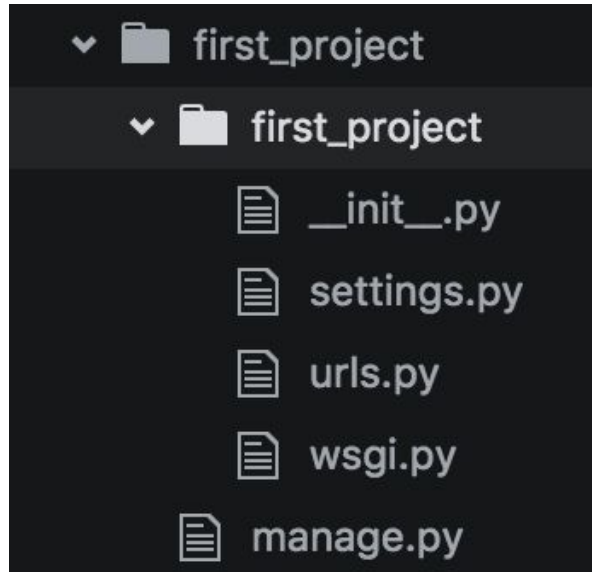
- You will then get something that looks like this:



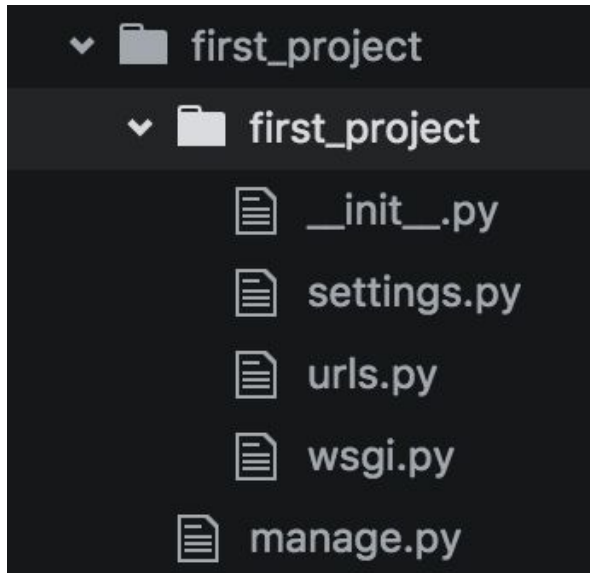


- Let's explain what is going on here!

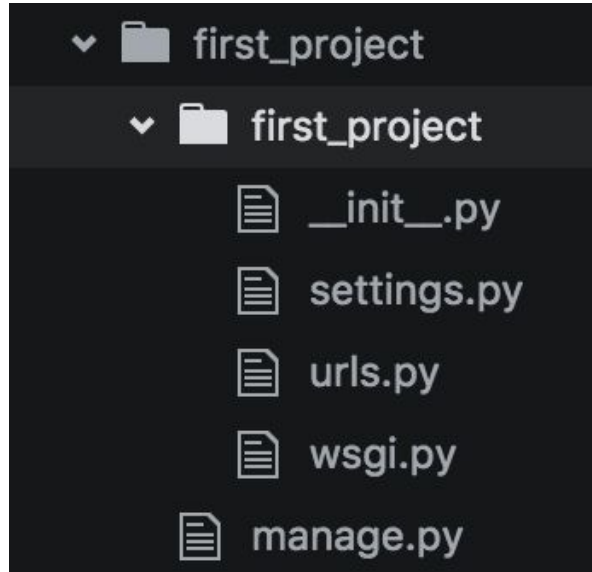




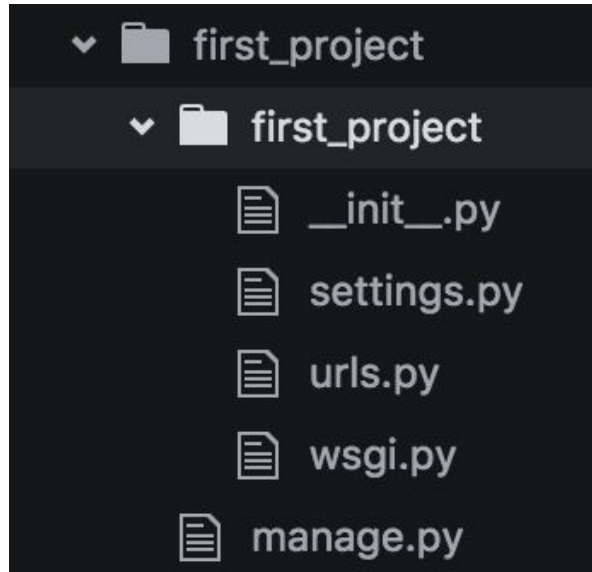
- `__init__.py`
  - This is a blank Python script that due to its special name let's Python know that this directory can be treated as a package



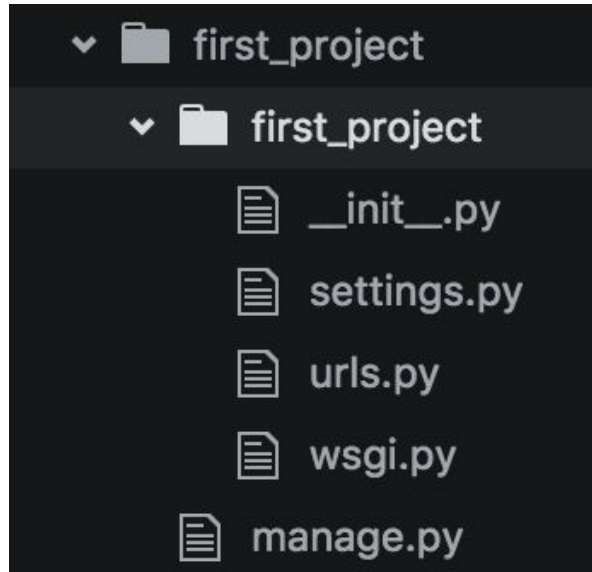
- settings.py
  - This is where you will store all your project settings



- `urls.py`
  - This is a Python script that will store all the URL patterns for your project. Basically the different pages of your web application.



- `wsgi.py`
  - This is a Python script that acts as the Web Server Gateway Interface. It will later on help us deploy our web app to production



- manage.py
  - This is a Python script that we will use a lot. It will be associated with many commands as we build our web app!



- Let's use `manage.py` now:
  - `python manage.py runserver`
- You will see a bunch of stuff but at the bottom you will see something like:

```
Django version 1.10.5, using settings  
'first_project.settings'  
Starting development server at  
http://127.0.0.1:8000/
```





# Django

- Copy and paste that url into your browser
  - <http://127.0.0.1:8000/>
- You should now see your very first web page being locally hosted on your computer.
- Congratulations!



- You should have also noticed a warning about migrations.
- This has to do with databases and how to connect them to Django
- What is a Migration?



- A migration allows you to move databases from one design to another, this is also reversible.
- So you can “migrate” your database
- We will touch back on this later, for now you can ignore this warning.



- That was the basics of getting started with Django!
- Up next we will continue by creating a very simple Hello World Django Application!



# Django

Creating our first django application!



- So far we have been able to use runserver to test our installation of Django.
- Now let's move on to creating our first Django Application.
- We'll learn about views and how to use them.



- Let's get some terminology straight:
  - A Django Project is a collection of applications and configurations that when combined together will make up the full web application (your complete website running with Django)



# Django

- Let's get some terminology straight:
  - A Django Application is created to perform a particular functionality for your entire web application. For example you could have a registration app, a polling app, comments app, etc.

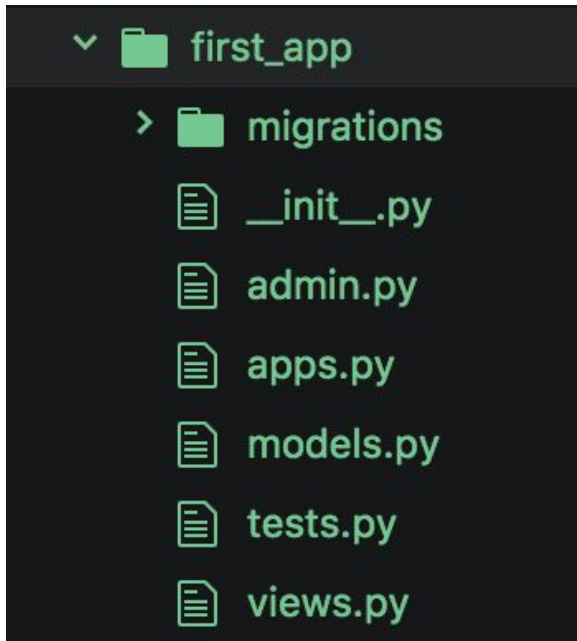


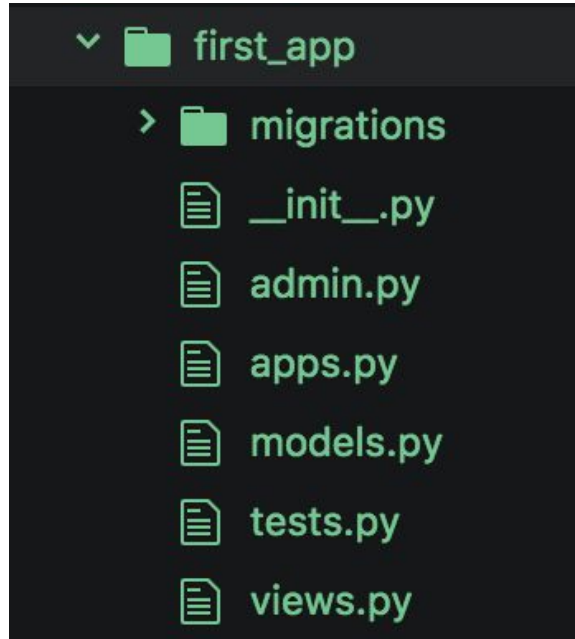


- These Django Apps can then be plugged into other Django Projects, so you can reuse them! (Or use other people's apps)
- Let's create a simple application with:
  - `python manage.py startapp first_app`

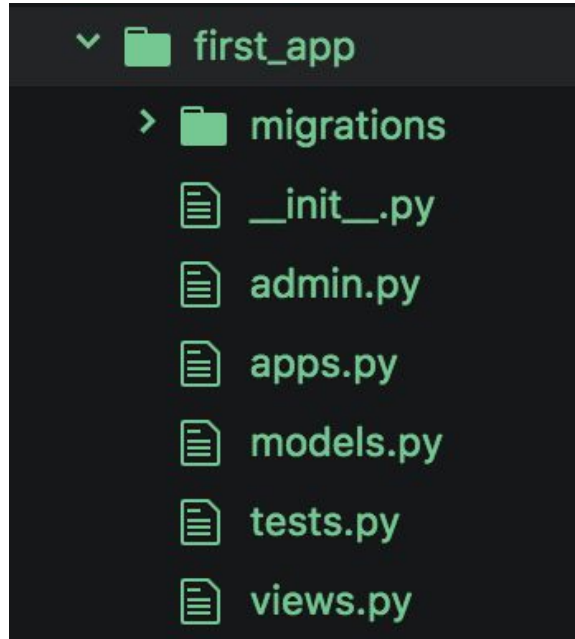


- Let's quickly discuss all of these files!

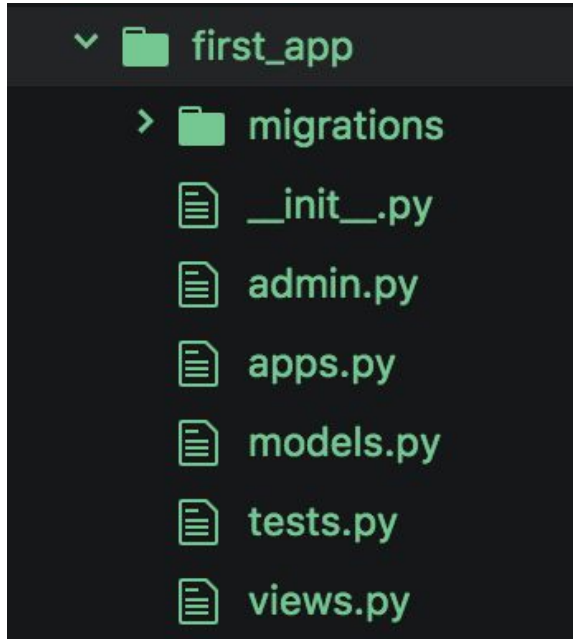




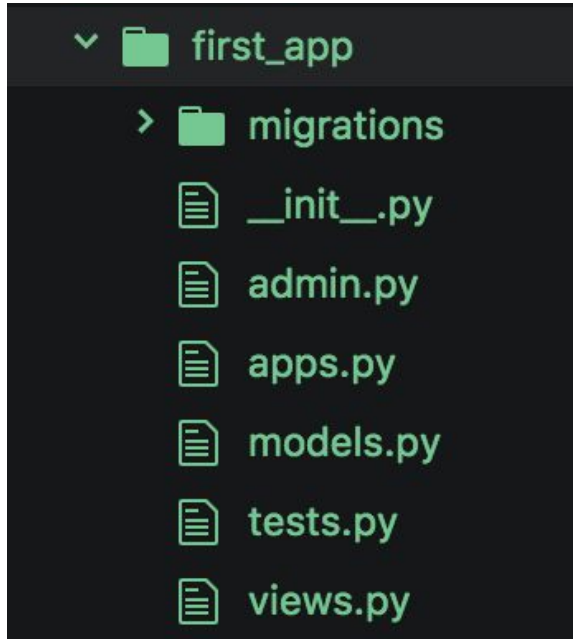
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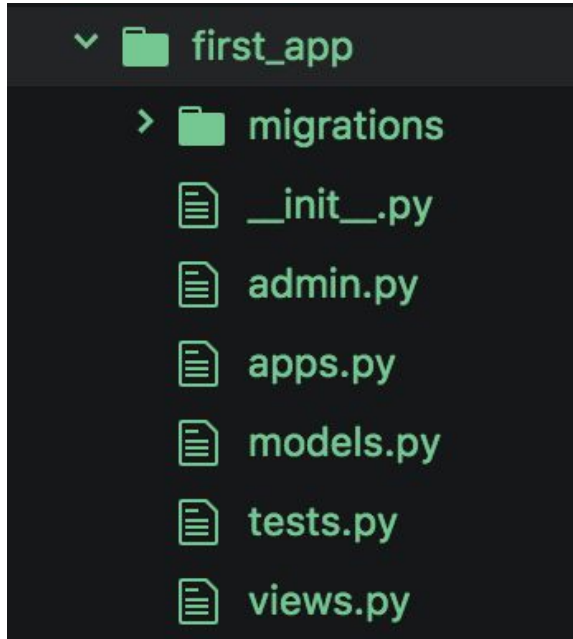
- admin.py
  - You can register your models here which Django will then use them with Django's admin interface.



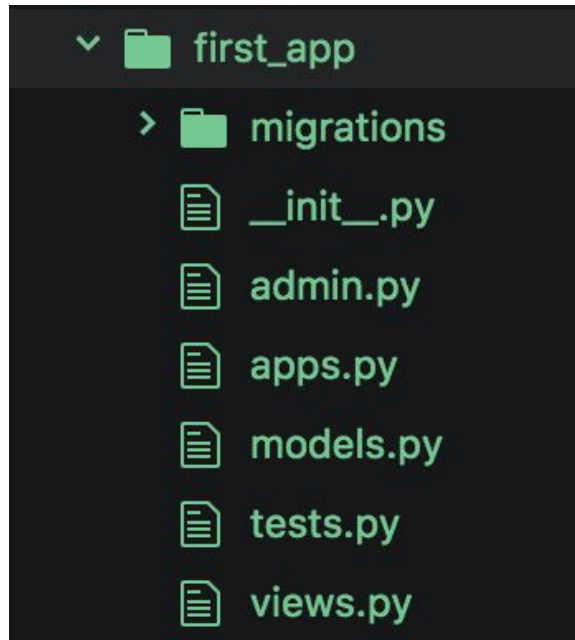
- apps.py
  - Here you can place application specific configurations



- `models.py`
  - Here you store the application's data models

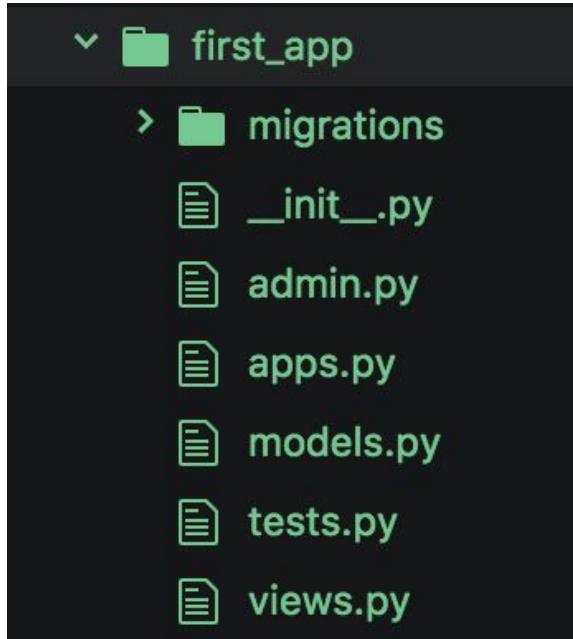


- tests.py
  - Here you can store test functions to test your code



- `views.py`
  - This is where you have functions that handle requests and return responses





- Migrations folder
  - This directory stores database specific information as it relates to the models



- Now let's learn the process of creating a view and mapping it to a URL!



# Django - Challenge!

Time to put your skills to the test!



- We've learned enough now that before we continue to learn about URL mappings, we should challenge you to make sure you can test your new skills!



- Complete the following tasks:
  - Create a New Django Project: “ProTwo”
  - Create a New Django App: “AppTwo”
  - Create an Index View that returns:
    - `<em>My Second App </em>`
  - Link this view to the `urls.py` file



# Django

- In the next lecture we will go through the steps of this challenge task!
- Best of luck, you already have all the knowledge needed to complete this!



# Django - Challenge Solutions

Let's go through the solutions together!



# Django - Mapping URLs

Let's quickly cover some more URL mappings!





- As we continue on through the course we are going to be dealing with mapping URLs quite a bit!
- There are several ways of doing this, let's briefly touch upon another way!



- We previously showed a very direct mapping from the `views.py` to the `urls.py`
- Now we want to show the ability of using the `include()` function from `django.conf.urls`



- The `include()` function allows us to look for a match with regular expressions and link back to our application's own `urls.py` file.
- We will have to manually add in this `urls.py` file



- So we would add the following to the project's `urls.py`
  - `from django.conf.urls import include`
  - `urlpatterns = [ ...  
 url(r'^first_app/', include('first_app.urls')),  
 ...]`



- This would allow us to look for any url that has the pattern:
  - [www.domainname.com/first\\_app/...](http://www.domainname.com/first_app/)
- If we match that pattern, the include() function basically tells Django to go look at the urls.py file inside of first\_app folder



- This might seem like a lot of work for a simple mapping, but later on we will want to try to keep our project's `urls.py` clean and modular
- So we set the reference to the app, instead of listing them all in the main `urls`



- Let's quickly walk through an example of all of this to show how it works!
- Quick note: We've covered everything in Part 1 of Django's Official Tutorial, so after this lecture you may want to go visit Part One and browse through it!



# Django - Templates

Let's learn how to use Templates!





- Templates are a key part to understanding how Django really works and interacts with your website.
- Later on we will learn about how to connect templates with models so you can display data created dynamically.



- For now, let's focus on the basics of templates and template tags.
- The template will contain the static parts of an html page (parts that are always the same)



- Then there are template tags, which have their own special syntax.
- This syntax allows you to inject dynamic content that your Django App's views will produce, effecting the final HTML



- To get started with templates you first need to create a templates directory and then a subdirectory for each specific app's templates.
- It goes inside of your top level directory:
  - `first_project/templates/first_app`



- The next step is to let Django know of the templates by editing the DIR key inside of the TEMPLATES dictionary in the settings.py file.
- However, there is an issue we have to deal with before we do this!



- We want our Django Project to be easily transferrable from one computer to another, but the DIR key will require a “hard-coded” path
- How do we resolve this?



- We can use Python's `os` module to dynamically generate the correct file path strings, regardless of computer!
- Import `os` and try out the following:
  - `print(__file__)`
  - `print(os.path.dirname(__file__))`



- We will use this os module to feed the path to the DIR key inside of the TEMPLATES dictionary.
- Once we've done that we can create an html file called index.html inside of the templates/first\_app directory





- Inside this HTML file we will insert template tags (a.k.a Django Template Variable).
- These template variables will allow us to inject content into the HTML directly from Django!



- This is now starting to reveal the power of why we would use a Web Framework
- Django will be able to inject content into the HTML
- Which means we can later on use Python code to inject content from a database!



- In order to achieve this, we will use the `render()` function and place it into our original `index()` function inside of our `views.py` file.
- Let's now code through everything we just discussed!



# Django Templates Challenge !

Test your knowledge of Templates!



- Templates is a big leap forward for us, so it is a good time to quickly practice using them!
- We will use your older ProTwo project (recreate it if you no longer have it)
- Complete the following tasks...



# Django Templates Challenge - Solutions

Test your knowledge of Templates!



- Create a templates directory and connect it to the settings.py file
- Create a new view called help and use url mapping to render it for any page with the extension /help
- Add template tags to return “Help Page”



- Best of luck and in the next lecture we will code through the solution!





# Django - Static Files

Learn how to insert static media files.



- So far we've used templates to insert simple text.
- But we don't always just want text, what about other types of media, for example, returning a User's Photo?
- Let's discuss static media files!



- To do this, we will create a new directory inside of the project called static (just like we did for templates)
- Then we will add this directory path to the project's settings.py file
- We will also add a STATIC\_URL variable



- Once we've done that we need a place to store our static image files
- We create a directory inside of static called images
- Place a favorite .jpg file inside this images directory (or just download one)



- To test that this all worked you can go to:
  - `127.0.0.1:8000/static/images/pict.jpg`
- That will confirm that the paths are set up and connected properly.
- But what we really want to do is set up a template tag for this!

- To do this inside an html file, we add in a few specific tags, at the top:
  - `{% load staticfiles %}`
- Then we want to insert the image with an HTML `<img src= >` style tag using:
  - `<img src={%static "images/pic.jpg" %} />`



- Notice how this template tag is a little different in that it uses
  - `{% %}`
- instead of
  - `{{ }}`



- We will discuss and show these differences more clearly in future lectures, but for now consider `{{ }}` as being used for simple text injection, and we can use `{% %}` for more complex injections and logic





- Now let's code through an example of serving up a static image!
- Afterwards we can dive into models and databases!