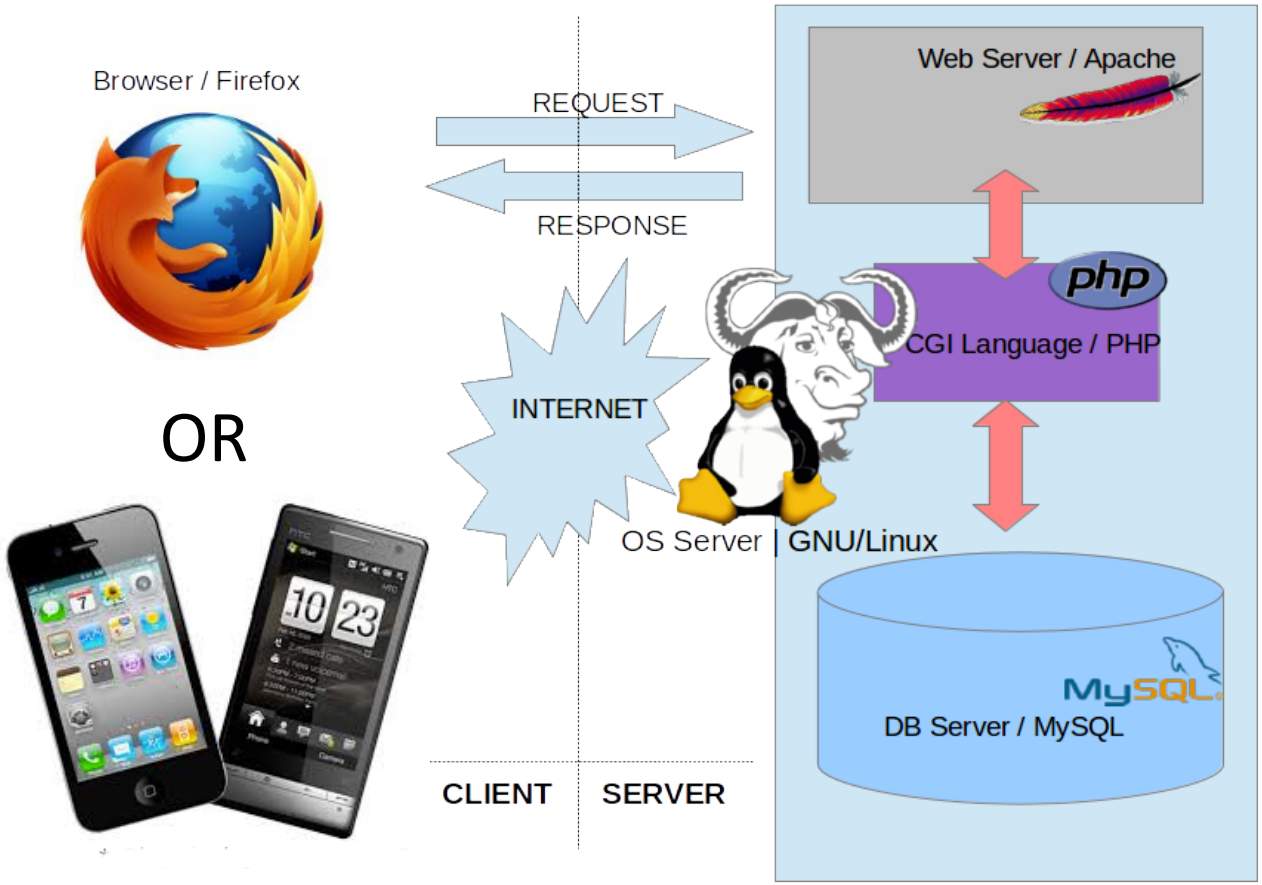
Tech Meet-up 1:
Intro to Django

Today's Meet-up

- The Big Picture
- Django – A Web Application Framework
- Your First Django App
- Models in Django
- Today's Assignment

The Big Picture

Once upon a time…



Nowadays…


Browser / Firefox
REQUEST
RESPONSE
INTERNET
OR
OR
CLIENT
SERVER
django
RAILS

Implementing the Backend

We need to implement the backend:

- A web application framework, like
  - MonoRail, CppCMS, Apache Click, Grails, Spring, Stripes, multiple, Catalyst, CakePHP, Drupal, Symfony, CherryPy, Django, web2py, Ruby on Rails, Compujure
- A host, like
  - Heroku, Google App Engine
- A RESTful API to communicate with frontend

Web Application Framework

- A framework (code libraries) to help you make web applications or websites
- Supports you with
  - Handling HTTP requests
  - Templates for common HTML layouts
  - URL mapping
  - Database communication
  - Session management
  - Site security

Django
Web Application Framework

Why Django?

Why Django?

- Fast and easy development of web applications
  - Modular and re-useable. Don't Repeat Yourself (DRY) principle
  - Built-in database management
- Active development and wide community support
- Supported by Google App Engine & Heroku

Pinterest

Atlassian Bitbucket

DISQUS

theguardian

Django vs. PHP

PHP SELECT Statement

```php
<?php
// This could be supplied by a user, for example
$firstname = 'fred';
$lastname  = 'fox';

// Formulate Query
// This is the best way to perform an SQL query
// For more examples, see mysql_real_escape_string()
$query = sprintf("SELECT firstname, lastname, address, age FROM friends
    WHERE firstname='%s' AND lastname='%s'",
    mysql_real_escape_string($firstname),
    mysql_real_escape_string($lastname));

// Perform Query
$result = mysql_query($query);

// Check result
// This shows the actual query sent to MySQL, and the error. Useful for debugging.
if (!$result) {
    $message  = 'Invalid query: ' . mysql_error() . "\n";
    $message .= 'Whole query: ' . $query;
    die($message);
}

// Use result
// Attempting to print $result won't allow access to information in the resource
// One of the mysql result functions must be used
// See also mysql_result(), mysql_fetch_array(), mysql_fetch_row(), etc.
while ($row = mysql_fetch_assoc($result)) {
    echo $row['firstname'];
    echo $row['lastname'];
    echo $row['address'];
    echo $row['age'];
}

// Free the resources associated with the result set
// This is done automatically at the end of the script
mysql_free_result($result);
?>
```

Django SELECT Statement

```
# Retrieve all Kaylas
kaylas = User.objects.filter(firstname = 'Kayla')

# Print out firstname, lastname, and kayaks rolled
for k in kaylas:
    print k.firstname, k.lastname, k.kayaks_rolled_count
```

Focus on building your product!

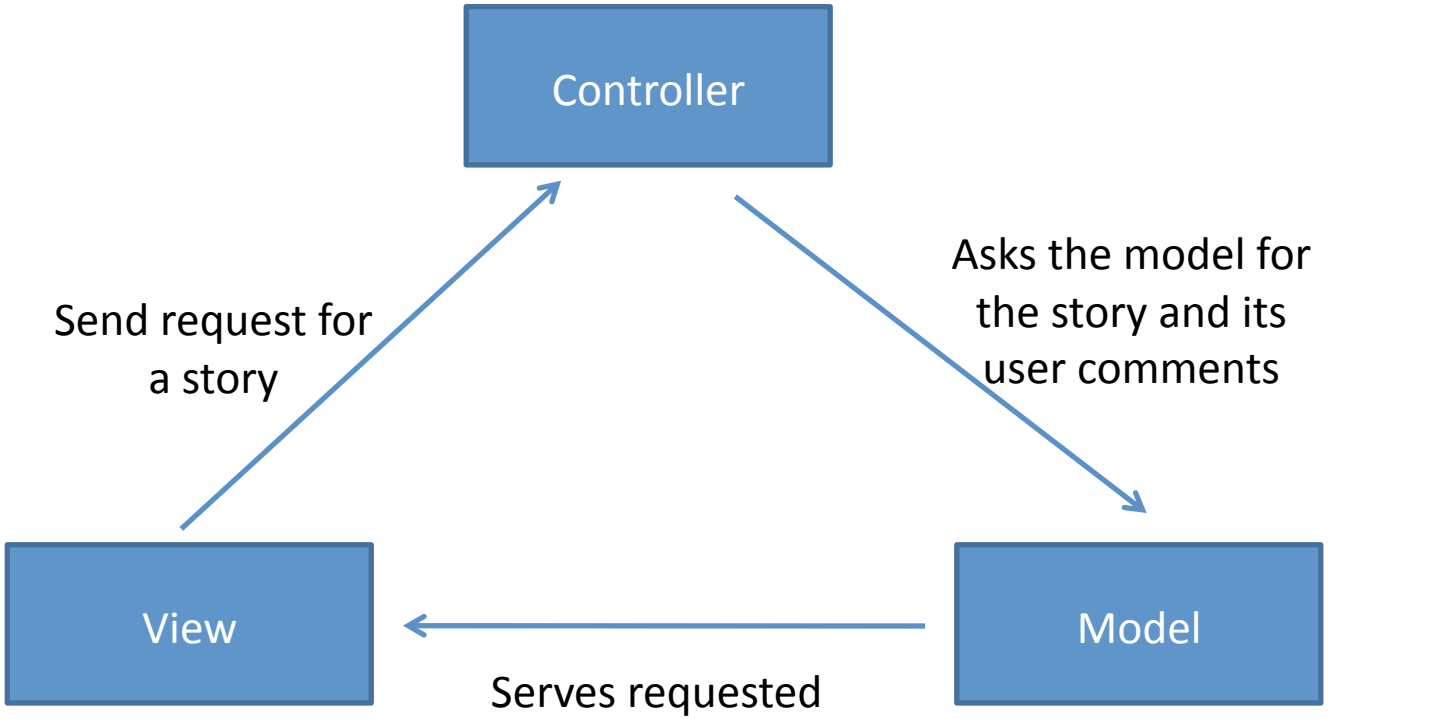
VS

Django Architecture

Model-View-Controller (MVC)

- A pattern for organizing code often seen in web app frameworks
- Main idea:
  1. Separate storage and manipulation of data (model) from presentation of data (view)
  2. Controller communicates between model and view
- Advantages
  - Develop and test model and view independently
  - Easier for others to understand (modularity)

Model-View-Controller (MVC) (news site example)



- Layout of stories on mobile phone or desktop browser

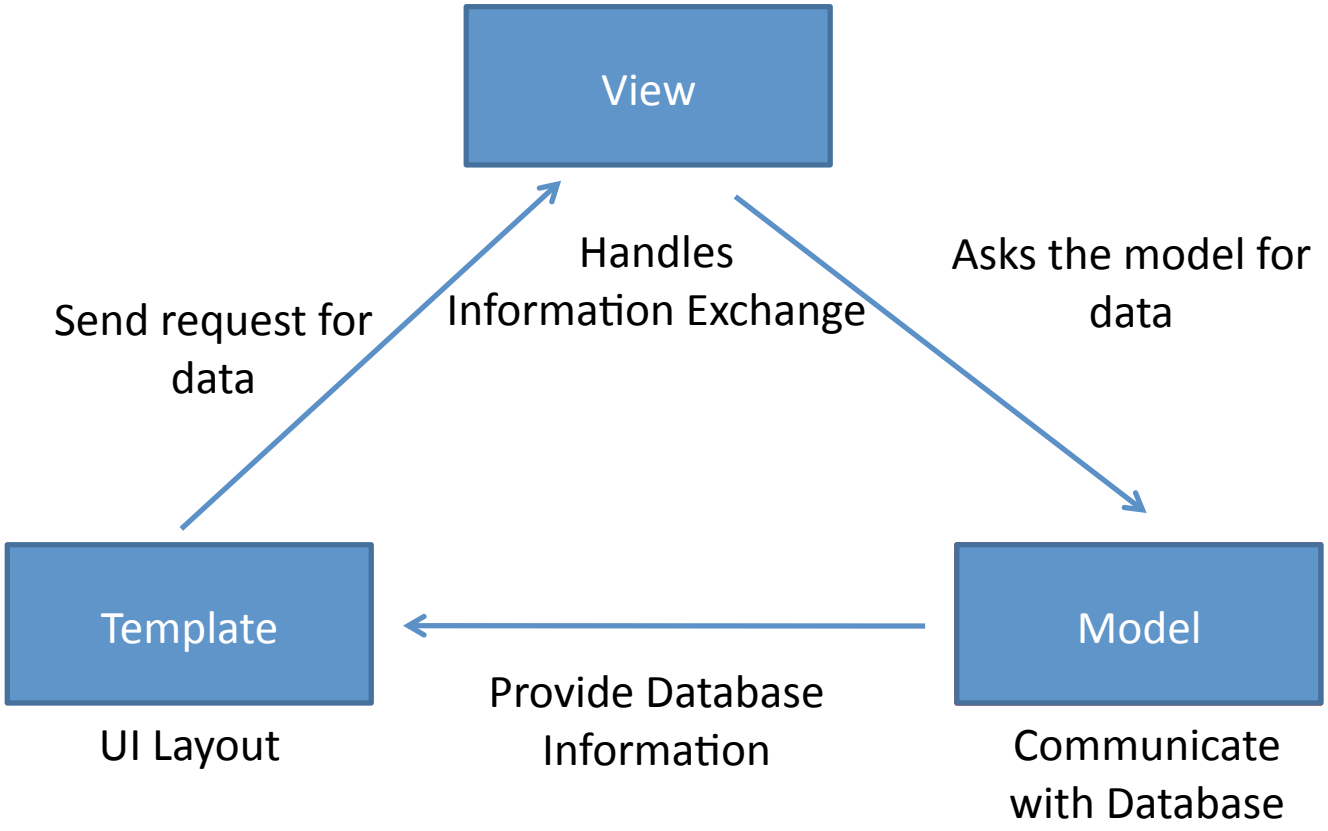
- News stories and images in a database
- User comments

Model-Template-View

In Django: Model-Template-View
(similar to MVC pattern)

- Model
  - describes database information
- Template
  - decides how to present information
- View
  - manages what information to output based on request

Model-Template-View

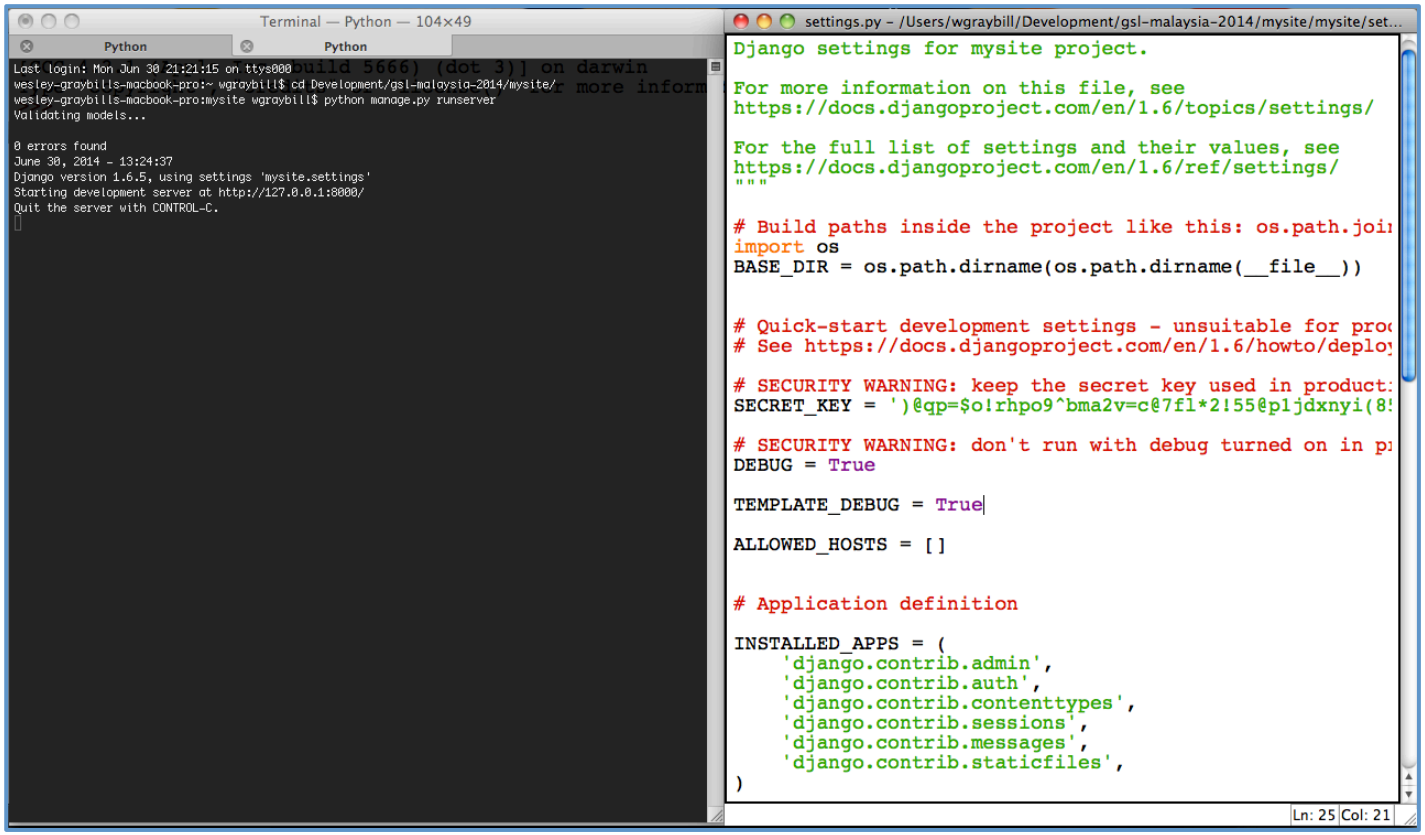


Your First Django App

Programming Interface

Terminal / Command Prompt

Python IDLE or Favorite editor



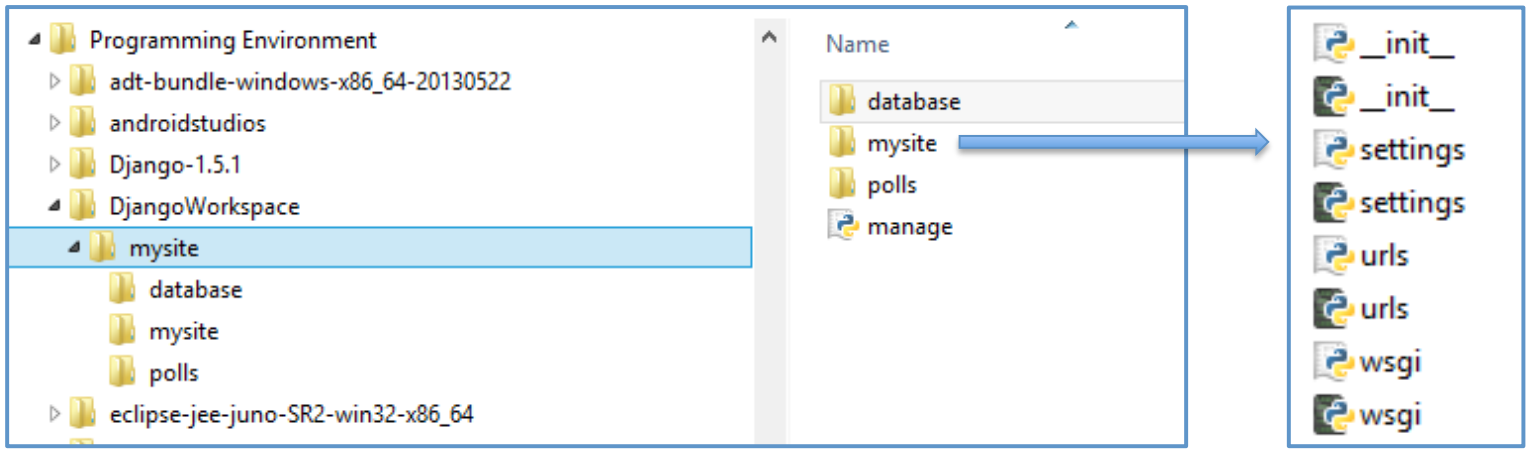
New Project

Project Structure:

Whole project in one folder (mysite)

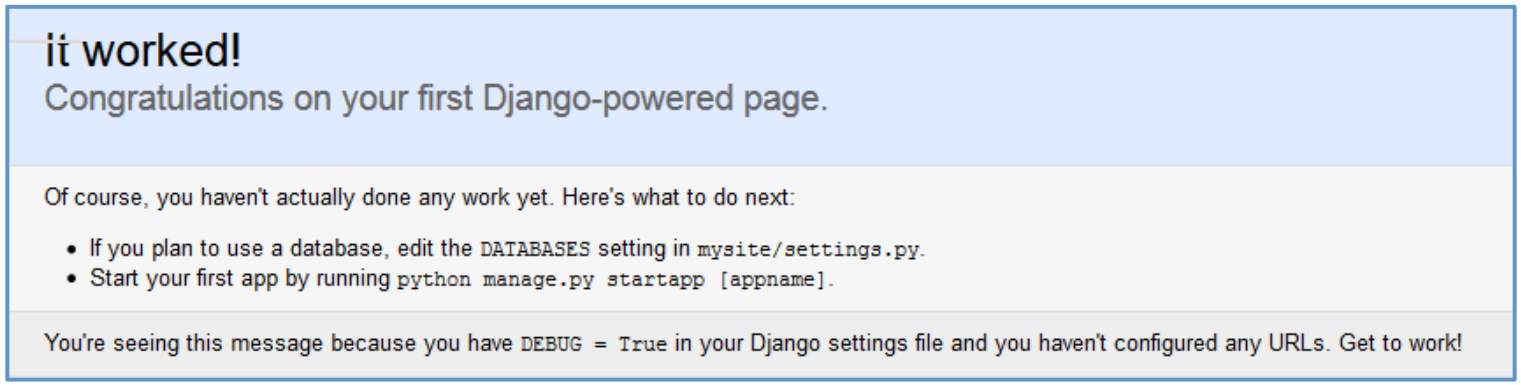
- MySite Python package
- Applications (polls)
- (Database)
- manage.py
  - Use for interaction with your project

- MySite Python Package
  - __init__.py
  - settings.py
  - urls.py
  - wsgi.py



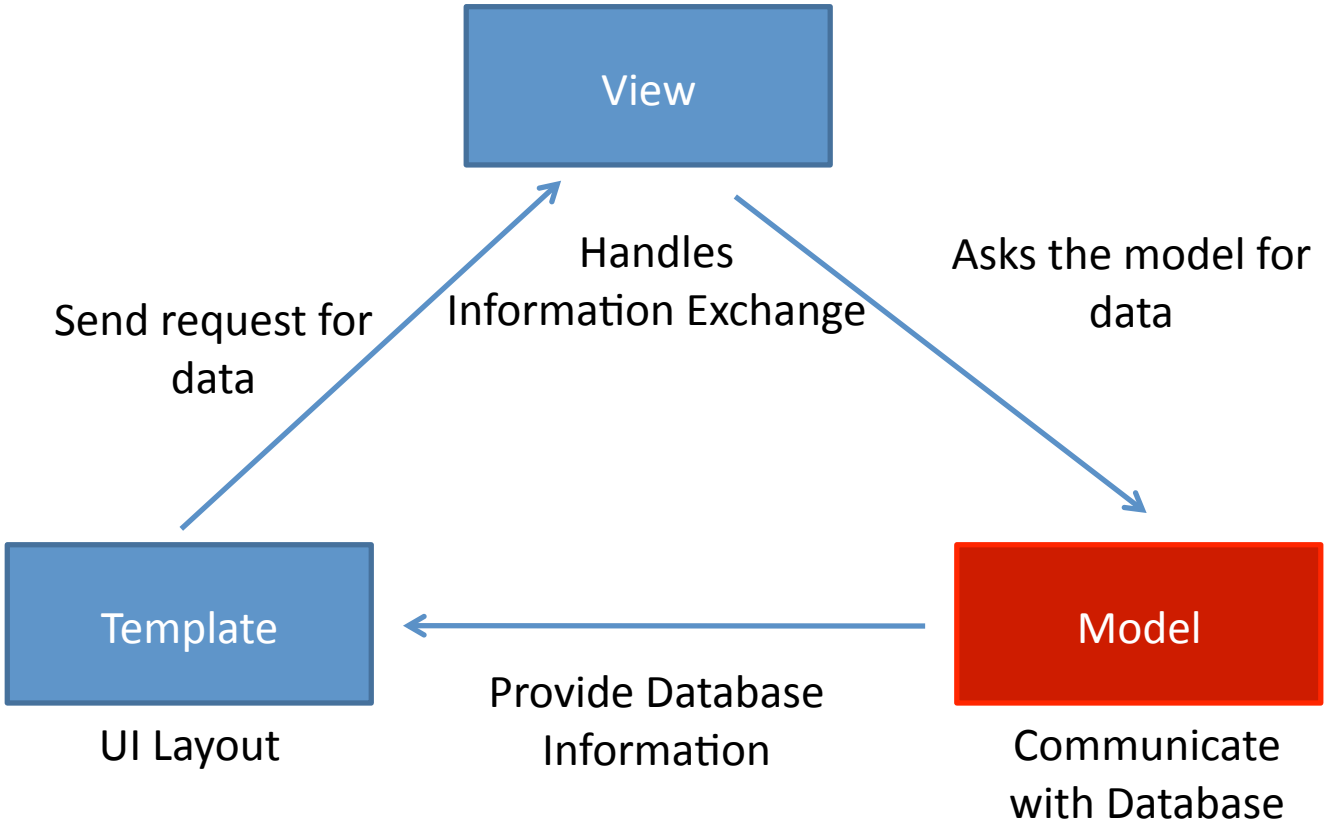
First Django Setup

After a couple commands in terminal...



Models

Models


View
Handles
Information Exchange
Send request for
data
Asks the model for
data
Template
Model
Provide Database
Information
UI Layout
Communicate
with Database

What is a Model

- Python class describing data in your application
  - Subclass of models.Model
- Assigns attributes to each data field
- Avoid direct work with the database
  - No need to handle database connections, timeouts, etc. – Let Django do it for you!
  - Provides Schema for database

Django Model Syntax

Import statements

SubClass of models.Model Class

Define fields

__unicode__ corresponds to python __str__

Can define more functions

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

# Create your models here.

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

    def __unicode__(self):
        return self.question

    def was_published_recently(self):
        return self.pub_date >= timezone.now() - datetime.timedelta(days=1)
```

Django Fields

We can define fields directly in our model class

– No need to define manually in database

Example: create two fields in our Poll class

```
class Poll(models.Model):
    question = models.CharField(max_length=200)
    pub_date = models.DateTimeField('date published')
```

Define Type of Field

- E.g. models.CharField

Define arguments of field

- E.g. max_length=200

Django will automatically create fields in database

Important Django Field Types

- BooleanField
  - Checkbox
- CharField(max_length)
  - Single-line textbox
- DateField
  - Javascript calendar
- DateTimeField
  - Javascript calendar, time picker
- DecimalField(max_digits, decimal_places)
  - Decimal numbers
- EmailField
  - Charfield that validates email address
- FileField
  - File upload, stores path in database
- FloatField
  - Floating point numbers
- IntegerField
  - Integer textbox
- PositiveIntegerField
  - Integer textbos for positive integers
- TextField
  - Multi-line textbox

Rules of Django Models

- When you update a model, ALWAYS RUN
  python manage.py syncdb
- All classes extend **models.Model**
- Models only live in **Apps**
- Django doesn't save objects until you call **save()** method

```
>>>a1 = Album(...)
# a1 is not saved to the database yet!
>>>a1.save()
# Now it is.
```

Today's Assignment

Today's Assignment

Get started with Django!

- If you haven't already, install Django 1.6
- Create your first Django app:

  Writing your first Django App – Part 1

Helpful Documentation:

- Models section of Django docs