Accelerating Information Technology Innovation

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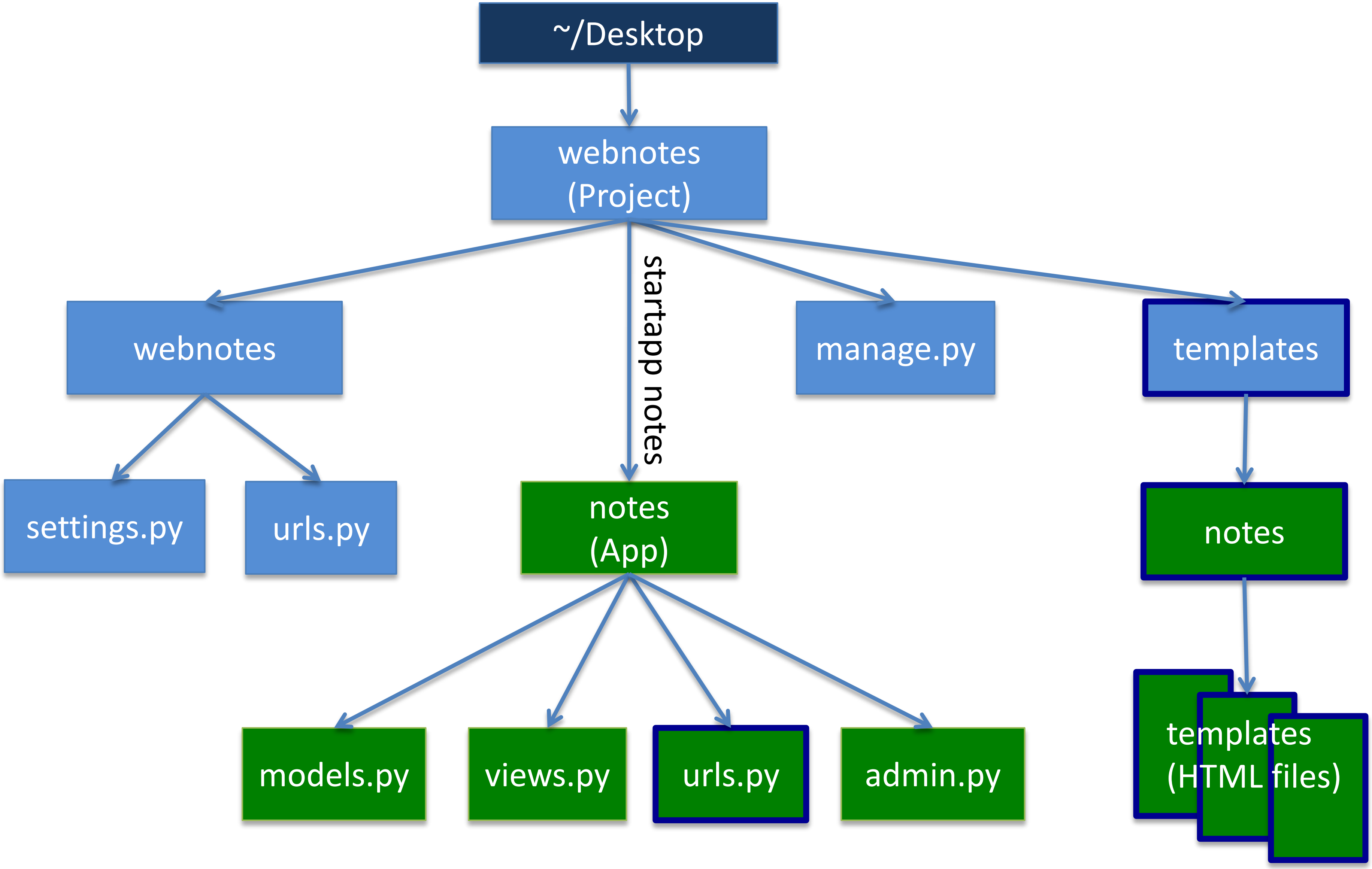
Ghana Summer 2013
Lecture DJ02 – Django Models

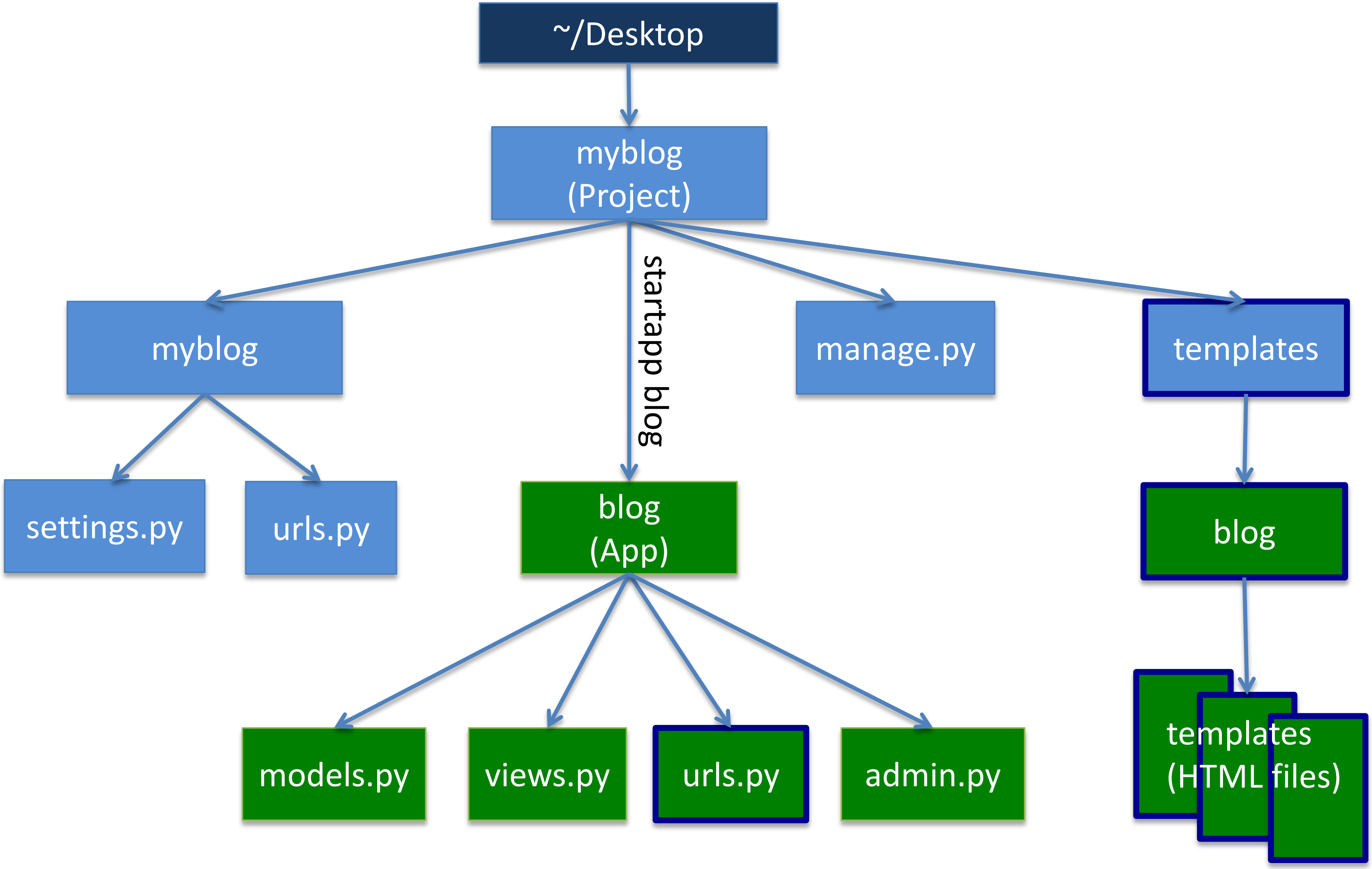
Agenda

- Django files
- Data Relations
- Django models

The Django File Structure



The Django File Structure



Representing data

Restaurant App

Restaurant
- Name
- Hours open
- Owner

Person
- Name
- Age
- Gender

Food Item
- Name
- Ingredients list

- Name: Ashesi Cafeteria
- Hours: 7am-7pm
- Owner: Ashesi Univeristy

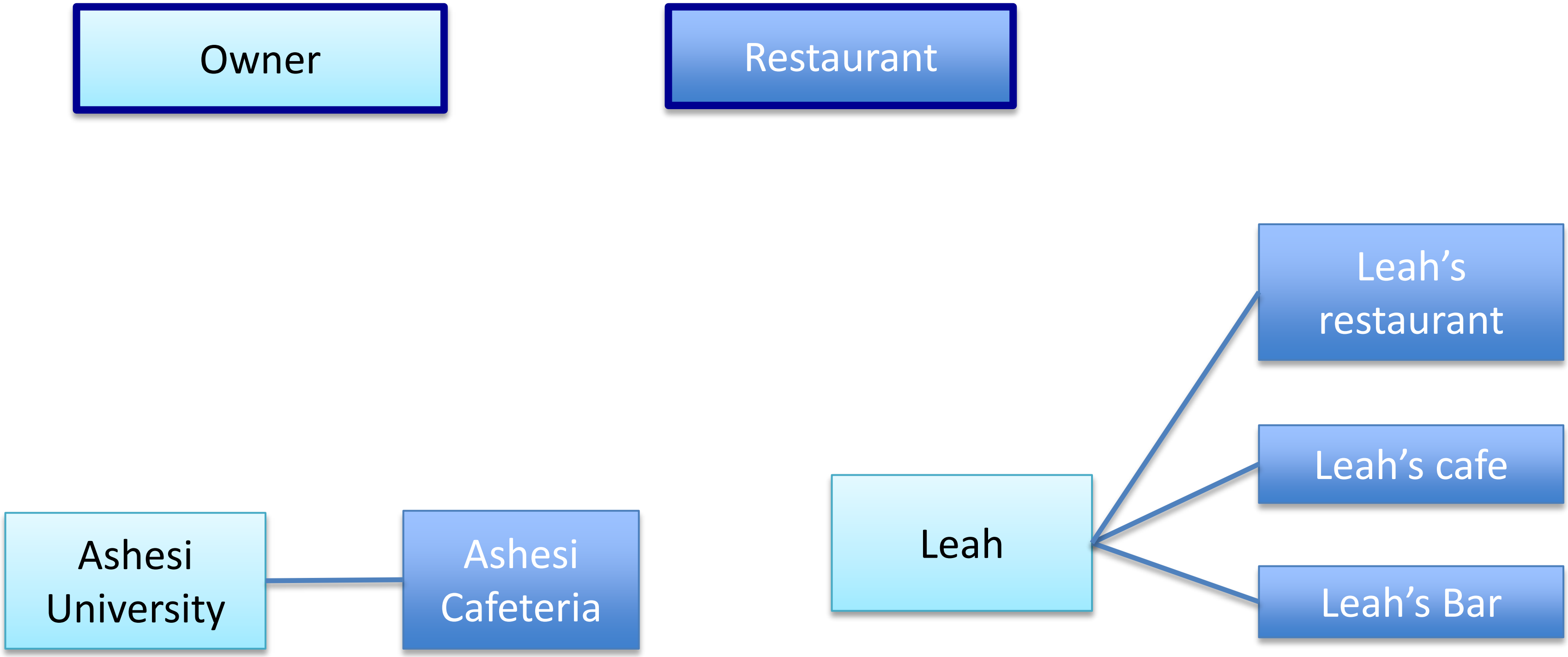
- Name: Leah’s Cafe
- Hours: 10am-9pm
- Owner: Leah

- Name: Pancake
- Ingredients: Flour, water, sugar

- Name: Fried rice
- Ingredients: rice, chicken, oil

Representing data

One-to-many example



Owner

Restaurant

Ashesi University

Ashesi Cafeteria

Leah

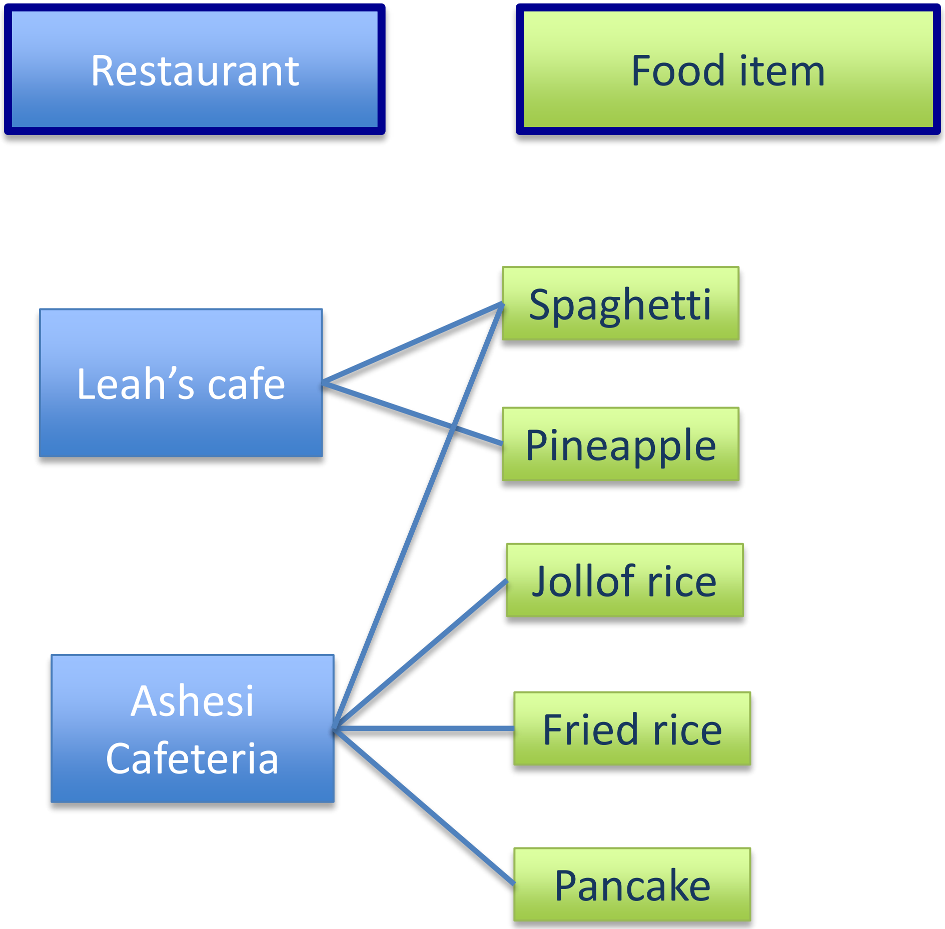
Leah’s restaurant

Leah’s cafe

Leah’s Bar

Representing data

Many-to-many example



Restaurant

Food item

Leah's cafe

Ashesi Cafeteria

Spaghetti

Pineapple

Jollof rice

Fried rice

Pancake

What is a model?

- A class describing data in your application
- Basically, a class with attributes for each data field that you care about
- The schema for your data

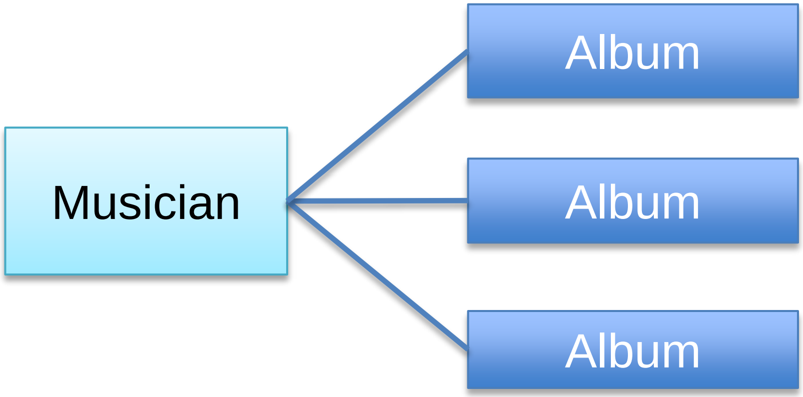
Django models

- Avoid direct work with the database
- No need to handle database connections, timeouts, etc. Let Django do it for you.
- Class that extends models.Model

Django fields

- All you do is define a field type
  - Ex: active = models.BooleanField()
- Django handles the rest:
  - Bit value in sql database
  - Represented as a checkbox on a webpage
  - Validation of values

Musician example



Django Model Syntax

```
class Musician(models.Model):
    first_name = models.CharField(max_length=50)
    last_name = models.CharField(max_length=50)
    instrument = models.CharField(max_length=100)
    def __unicode__():
        return last_name+”, “+first_name

class Album(models.Model):
    artist = models.ForeignKey(Musician)
    name = models.CharField(max_length=100)
    release_date = models.DateField()
    num_stars = models.IntegerField()
    def __unicode__():
        return name
```

Important Django field types

- BooleanField
  - Checkbox
- CharField(max_length)
  - Single-line textbox
- DateField
  - Javascript calendar
- DateTimeField
  - Javascript calendar, time picker

Important Django field types

- DecimalField(max_digits, decimal_places)
  - Decimal numbers
- EmailField
  - Charfield that validates email address
- FileField
  - File upload, stores path in database
- FloatField
  - Floating point numbers

Important Django field types

- IntegerField
  - Integer textbox
- PositiveIntegerField
  - Integer textbos for positive integers
- TextField
  - Multi-line textbox

Important Django Field types

- TimeField
  - Time picker
- URLField
  - Textbox for URLs
- Anything you create

Field options

```
CharField(max_length=200)
```

- null, blank

```
URLField(null=True, blank=True)
```

- default

```
IntegerField(default=1)
```

- unique

```
EmailField(unique=True)
```

Field options

- Choices:
  - List or tuple of 2-tuples to use as field choices
  - Django will represent it with a drop-down instead of a textbox

```
class Student(models.Model):
   YEAR_IN_SCHOOL_CHOICES = (
      (‘FR’, ‘Freshman’),
      (‘SO’, ‘Sophomore’),
      (‘JR’, ‘Junior’),
      (‘SR’, ‘Senior’),
      )
   year = models.CharField(max_length=2,
      choices=year_in_school_choices)
```

DateField and DateTimeField options

- Auto_now
  - Any time the object is saved, the field will be updated with the current time.
- Auto_now_add
  - The time will always be equal to the creation date of the object.

Model Methods

- __unicode__():
  - Equivilant of toString – used for auto-generated admin pages
- Get_absolute_url()
  - Used for deciding URLs that reference a specific object

Django Relationship Fields

- ForeignKey(foreign class)
  - Many-to-one
- ManyToManyField(foreign class)
- OneToOneField(foreign class)
  - Enforces uniqueness

Rules of Django Models

When you update a model, you have to delete the database and then run:

```
python manage.py syncdb
```

Keep code clean

Always create a __unicode__() method

Name your variables well

Don’t think too much about the database

Solving errors

What to do when you get an error?

NameError: the variable mynote is not defined (views.py, line 23)

Solving errors

```
$ cd urls.py
```

The file urls.py does not exist

Where to find error messages

- Top or bottom of long print-out
- Browser
- Terminal

Errors

- Write down the name of the error and the file and line #
- Try to solve error by yourself
- Once you solve it, write down what you did to fix it and what was wrong before
- This way you’ll know what to do next time!

Lab 2

- Refer to Django diagram to figure out where each file is
- Read the directions carefully
- Doesn’t tell you exactly what to type – you have to figure it out!

Lab Computers

- Ashesi students use big computers so non-students can log on to small computers