



Django

Getting Python in the web

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Course Prerequisites

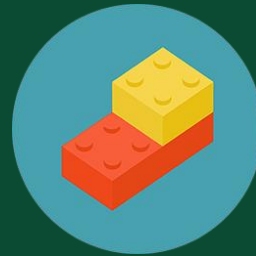
<HTML
CSS}



Course Objectives



Learn How to use Python in web development.



Learn How Django works and how to build awesome website using it.

Intro

Intro

Django is a high-level Python Web framework that encourages rapid development .
It takes care of much of the hassle of Web development, so you can focus on writing your
app without needing to reinvent the wheel.

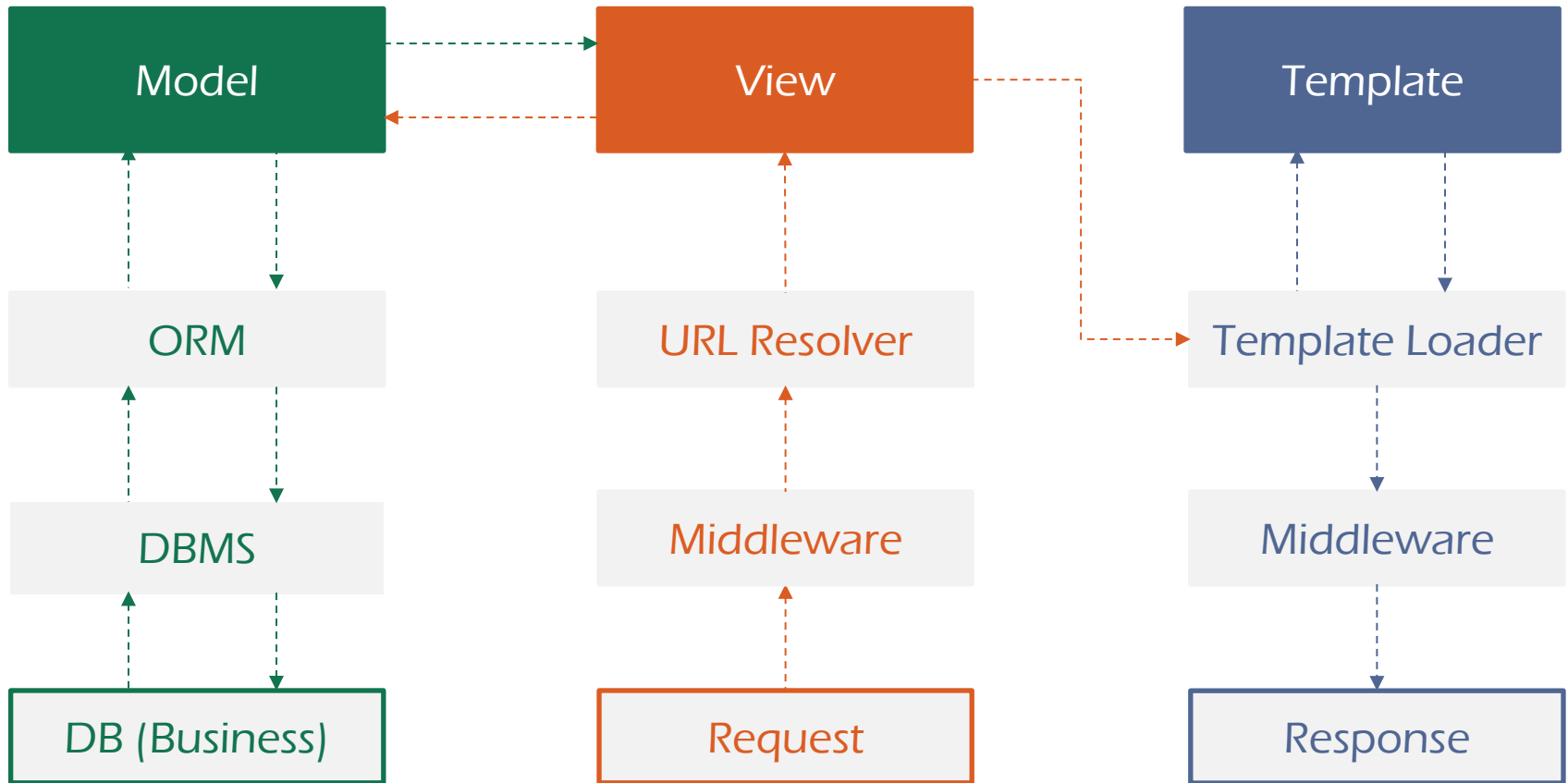
websites that uses



Moz://a



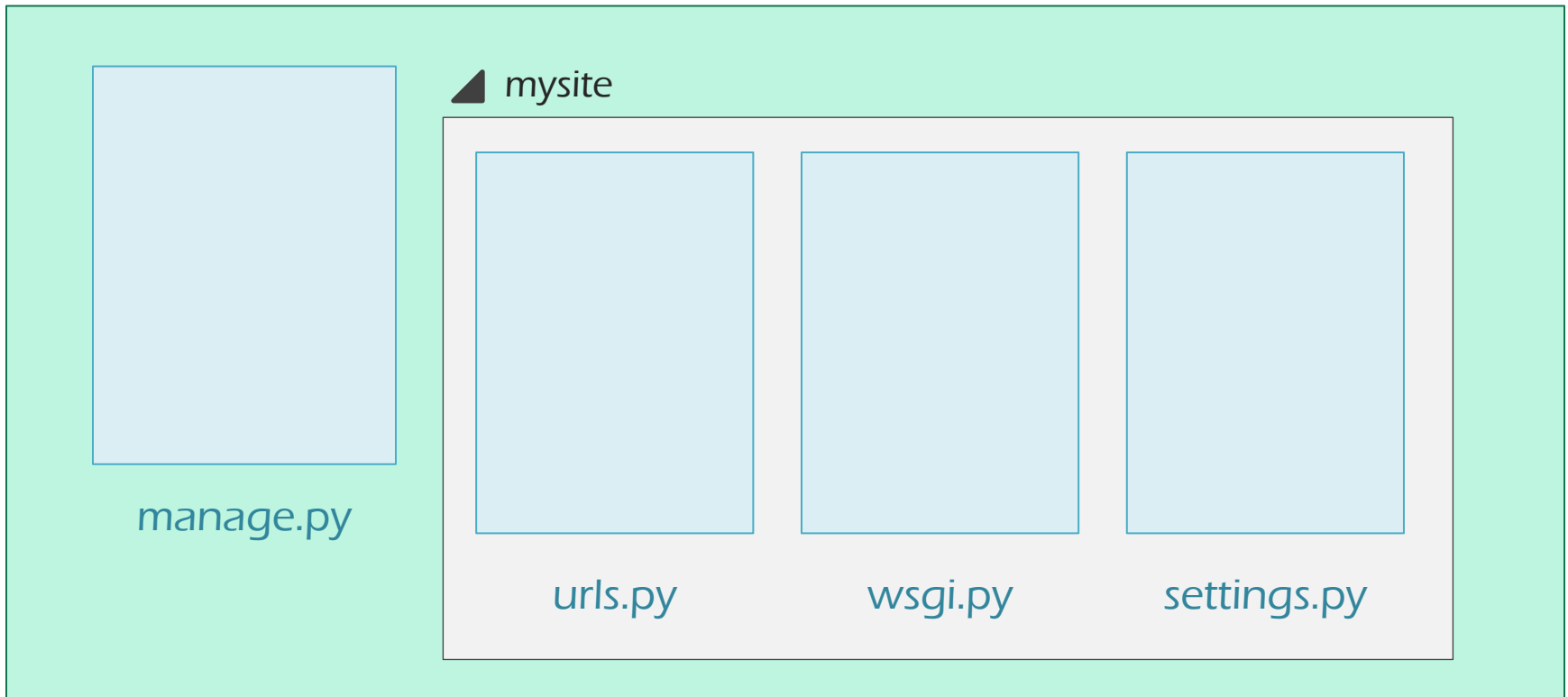
Architecture



First Project

```
$ django-admin startproject mysite
```

mysite



```
$ cd mysite  
$ python manage.py runserver
```



settings.py

is a file that contain the configuration for all your project. It consists of some variables that have a value that affect on the project life style.

`BASE_DIR`

Define the base directory to use it in the project.

`DEBUG`

If True , It directs to that your application in the development mode.

We will introduce other settings later based on the related topics

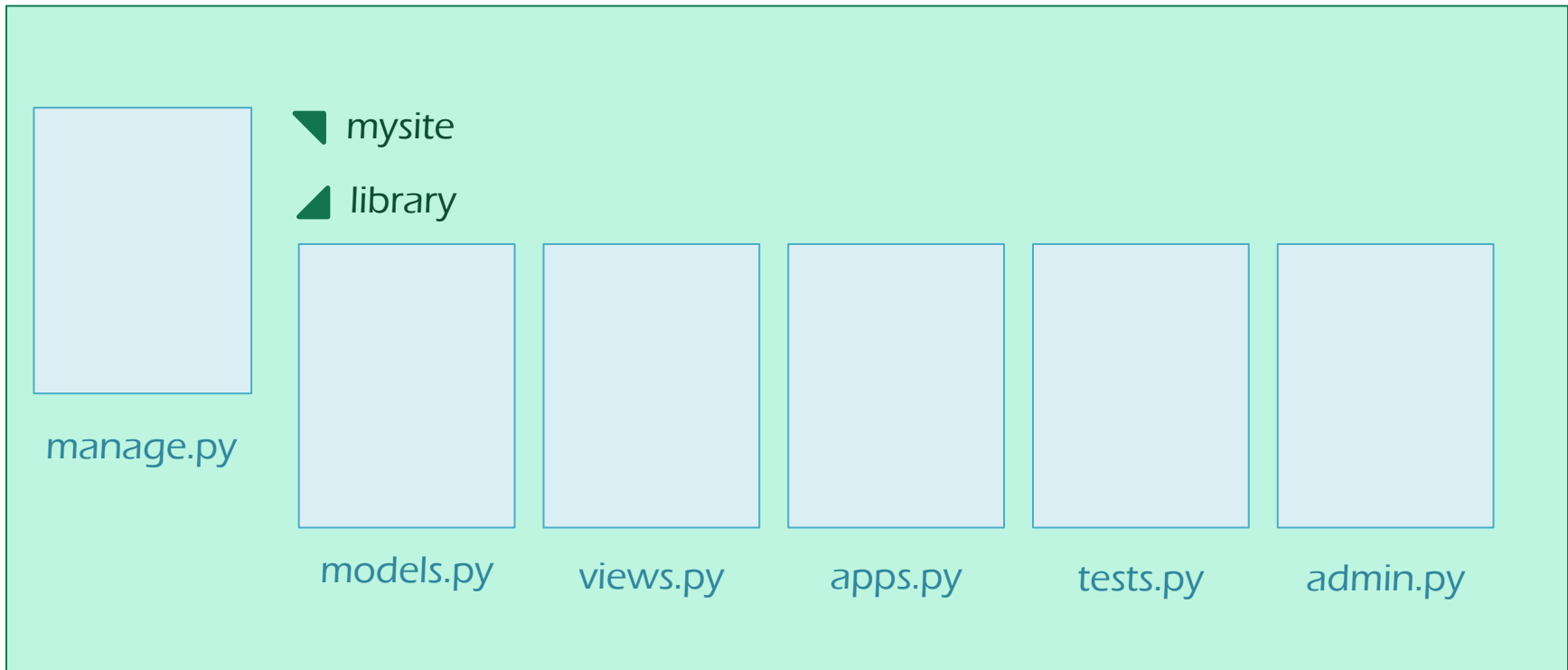


Apps

Website is a group of web apps

```
$ python manage.py startapp library
```

▲ mysite



----- library/views.py -----

```
from django.http import HttpResponse

def index(request):

    return HttpResponse("Hello World")
```

----- mysite/urls.py -----

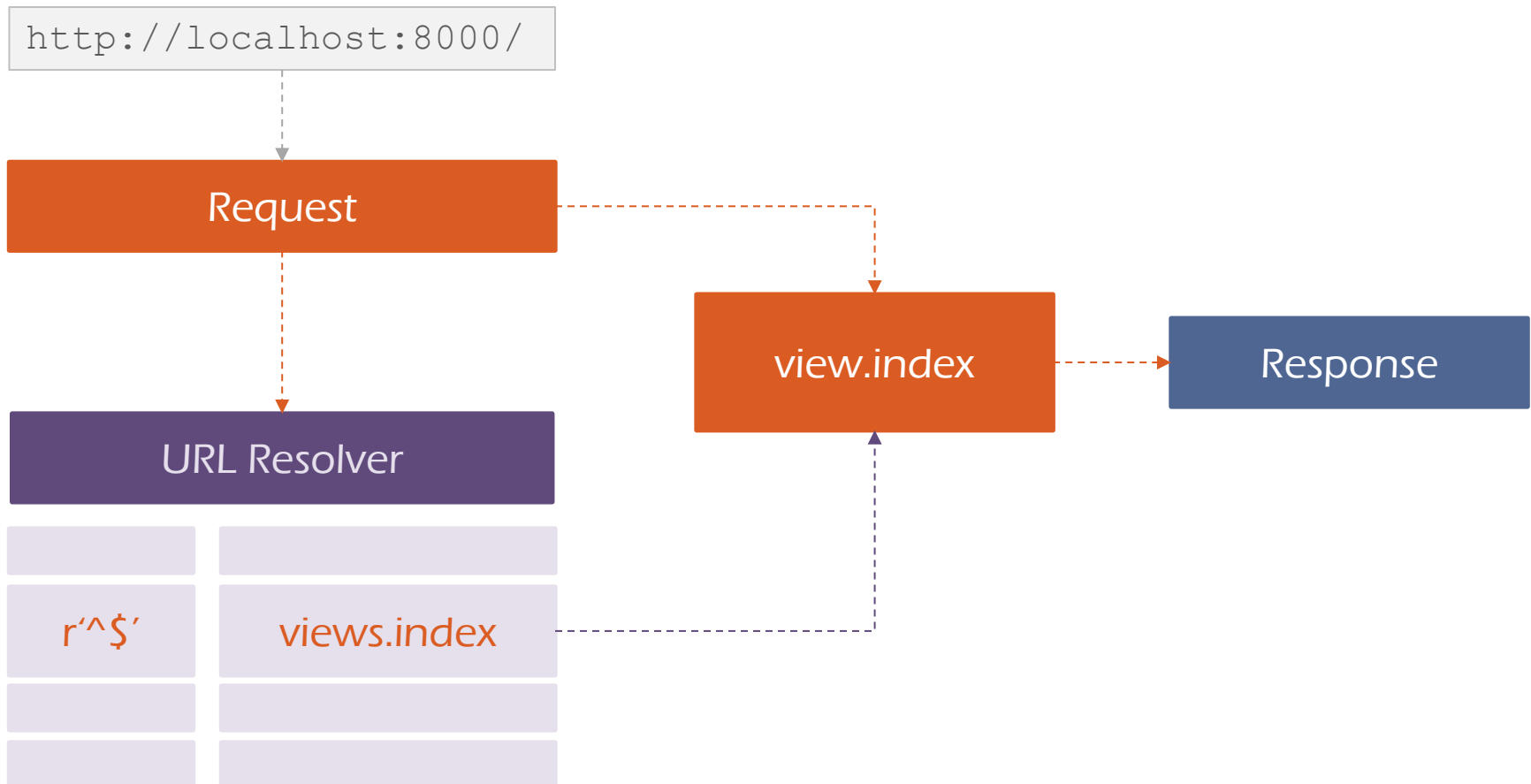
```
from django.conf.urls import url

from library import views

urlpatterns = [ url(r'^$', views.index) ]
```

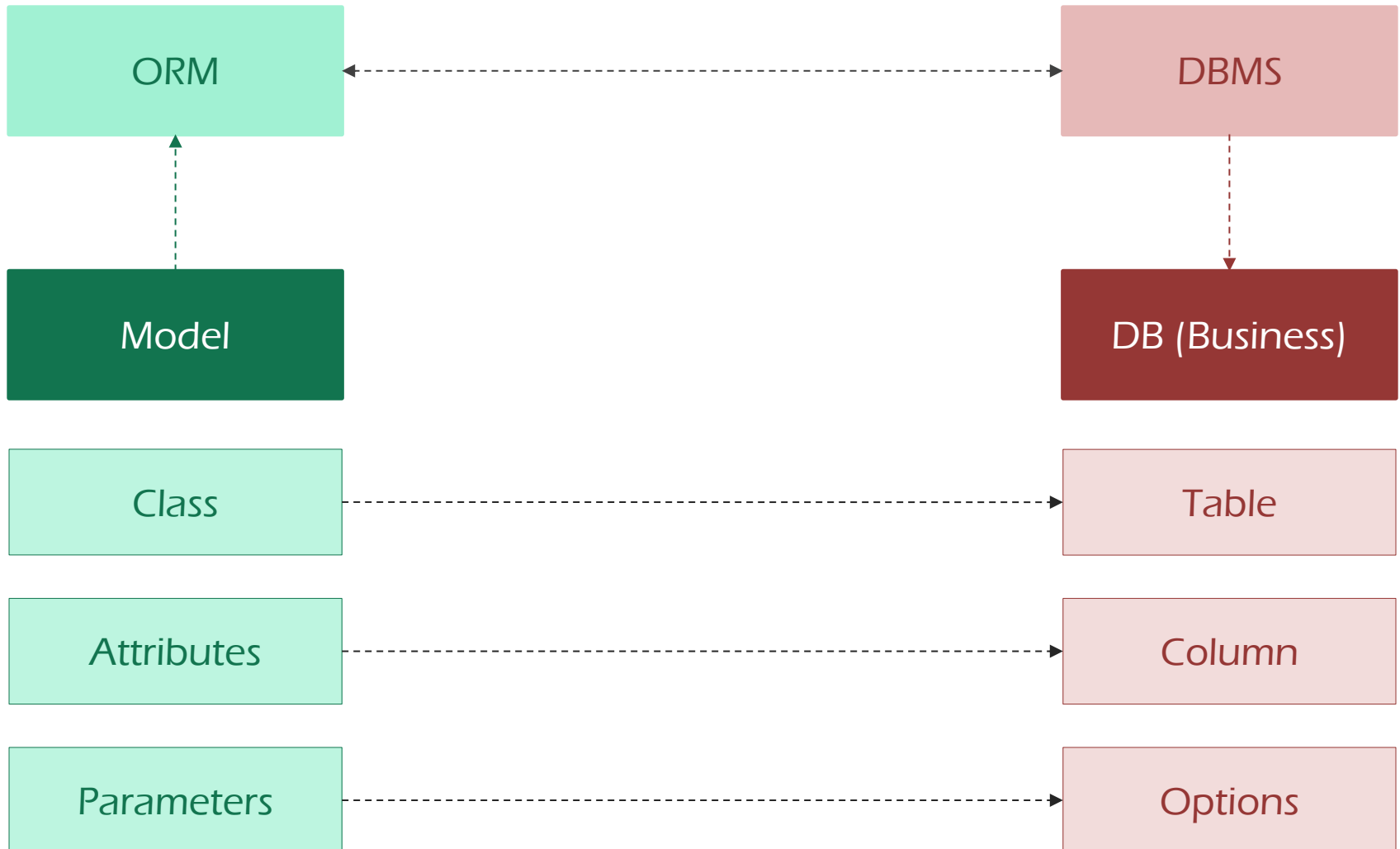


```
$ cd mysite
$ python manage.py runserver
```



Models

A model is the single, definitive source of information about your data.



Example

models.py

```
from django.db import models

class Book(models.Model):

    title = models.CharField(max_length=100)

    author = models.CharField(max_length=200)

    bid = models.AutoField(primary_key=True)
```



Migrate

`makemigrations``sqlmigrate``migrate`

mysite/settings.py

```
INSTALLED_APPS = [  
    ... # Add library app to the installed apps  
    'library.apps.LibraryConfig'  
]
```

library/models.py

```
from django.db import models  
  
class Author(models.Model):  
    first_name = models.CharField(max_length=200)  
    last_name = models.CharField(max_length=200)
```

```
$ cd helloworldapp  
$ python manage.py makemigrations  
$ python manage.py migrate
```



mysite/settings.py

```
DATABASES = {  
    'default': {  
        #Define the Database Engine  
  
        'ENGINE': 'django.db.backends.mysql',  
  
        'NAME': 'bookstore',  
  
        'USER': 'root',  
  
        'PASSWORD': '',  
  
        'HOST': 'localhost',  
    }  
}
```



Field Types & options

Field

options

null

If True , It is allowed fro the Field to be null.

choices

A Tuple of choices that Field value can be.

db_column

The name of the database column to use for this field

default

The default value for field if not given

primary_key

If True, Field will be the primary key of the table in DB.

unique

If True, Filed values must be unique.

```
first_name = models.Field(null=False, default="Ahmed", unique=True)
```



`CharField`

A string field, it map the VARCHAR type in SQL.

`EmailField`

A CharField that accepts valid Email addresses only.

`URLField`

A CharField that accepts valid urls only

`options`

`max_length`

`TextField`

A large text field



IntegerField

Values can be integer from -2147483648 to 2147483647.

AutoField

An IntegerField that automatically increments according to available IDs.

DecimalField

A fixed-precision decimal number, represented in Python by a **Decimal** instance

options

max_digits

Decimal_places

BooleanField

A Field that accept True/False values only.



DateField

A date, represented in Python by a `datetime.date` instance

TimeField

A date, represented in Python by a `datetime.time` instance

DateTimeField

A date, represented in Python by a `datetime.datetime` instance

options

`auto_now`

`auto_now_add`



ForeignKey

Describe the many-to-one relationship

ManyToManyField

Describe the many-to-many relationship

OneToOneField

Describe the one-to-one relationship

options

RelatedModel

on_delete

to_field

models.py

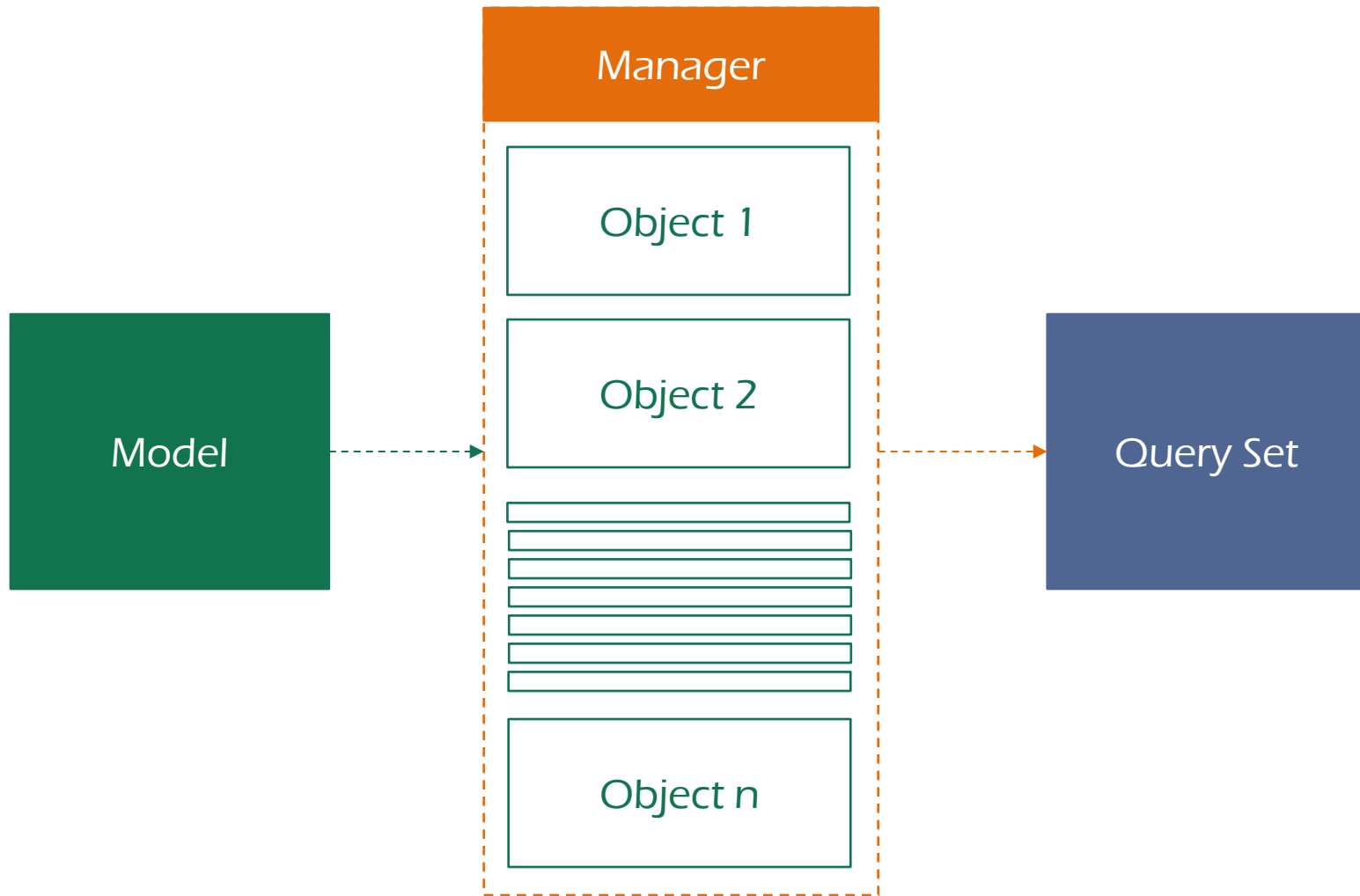
```
from django.db import models
```

```
class User(models.Model):
```

```
    group_id = models.ForeignKey('Group', on_delete=models.CASCADE)
```



Model Operations

`Post``.``objects``.``all()`

INSERT

```
u = User(first_name='Ahmed')  
u.last_name= 'Moawad'  
u.save()
```

#or use create method

```
User.objects.create(first_name='Ahmed', last_name='Moawad')
```



Retrieve Objects

SELECT ... WHERE

```
User.objects.create(first_name='Ahmed', last_name='Moawad')

User.objects.create(first_name='Mohamed', last_name='Saeed')

User.objects.create(first_name='Omar', last_name='Saeed', age=12)

User.objects.all()

<QuerySet [<User: User object>, <User: User object>],<User: User object>]>

# To filter the resulting QuerySet based on condition, use filter

User.objects.filter(last_name='Saeed')

<QuerySet [<User: User object>, <User: User object>] >

# To Retrieve single record, use get

User.objects.get(age = 12)

<User: User object>
```



DELETE

```
User.objects.create(first_name='Ahmed', last_name='Moawad')  
User.objects.create(first_name='Mohamed', last_name='Saeed')  
User.objects.create(first_name='Omar', last_name='Saeed', age=12)  
User.objects.filter(last_name='Saeed').delete()
```



UPDATE

```
User.objects.create(first_name='Ahmed', last_name='Moawad')  
User.objects.create(first_name='Mohamed', last_name='Saeed')  
User.objects.create(first_name='Omar', last_name='Saeed', age=12)  
User.objects.filter(last_name='Saeed').update(age = 19)
```



Field Lookups

LIKE

```
User.objects.create(first_name='Ahmed', last_name='Moawad')           #1
User.objects.create(first_name='Mohamed', last_name='Saeed')          #2
User.objects.create(first_name='Omar', last_name='saeed', age=12)      #3
User.objects.filter(first_name__in=['Ahmed', 'Omar'])                  [#1, #3]
User.objects.filter(last_name__iexact='saeed')                         [#2, #3]
User.objects.filter(age__gt=13)                                         [#1, #2]
```



```
from django.db.models import F

User.objects.create(first_name='Ahmed', last_name='Moawad')

User.objects.create(first_name='Mohamed', last_name='Saeed')

User.objects.create(first_name='Omar', last_name='Omar', age=12)

User.objects.filter(last_name= F('first_name'))
```



GROUP BY ... HAVING

```
from django.db.models import Avg

User.objects.create(first_name='Ahmed', last_name='Moawad') #1
User.objects.create(first_name='Mohamed', last_name='Saeed') #2
User.objects.create(first_name='Omar', last_name='saeed', age=12) #3
User.objects.count() #3

User.objects.all().aggregate(Avg('age'))

{'age__avg': 14}
```



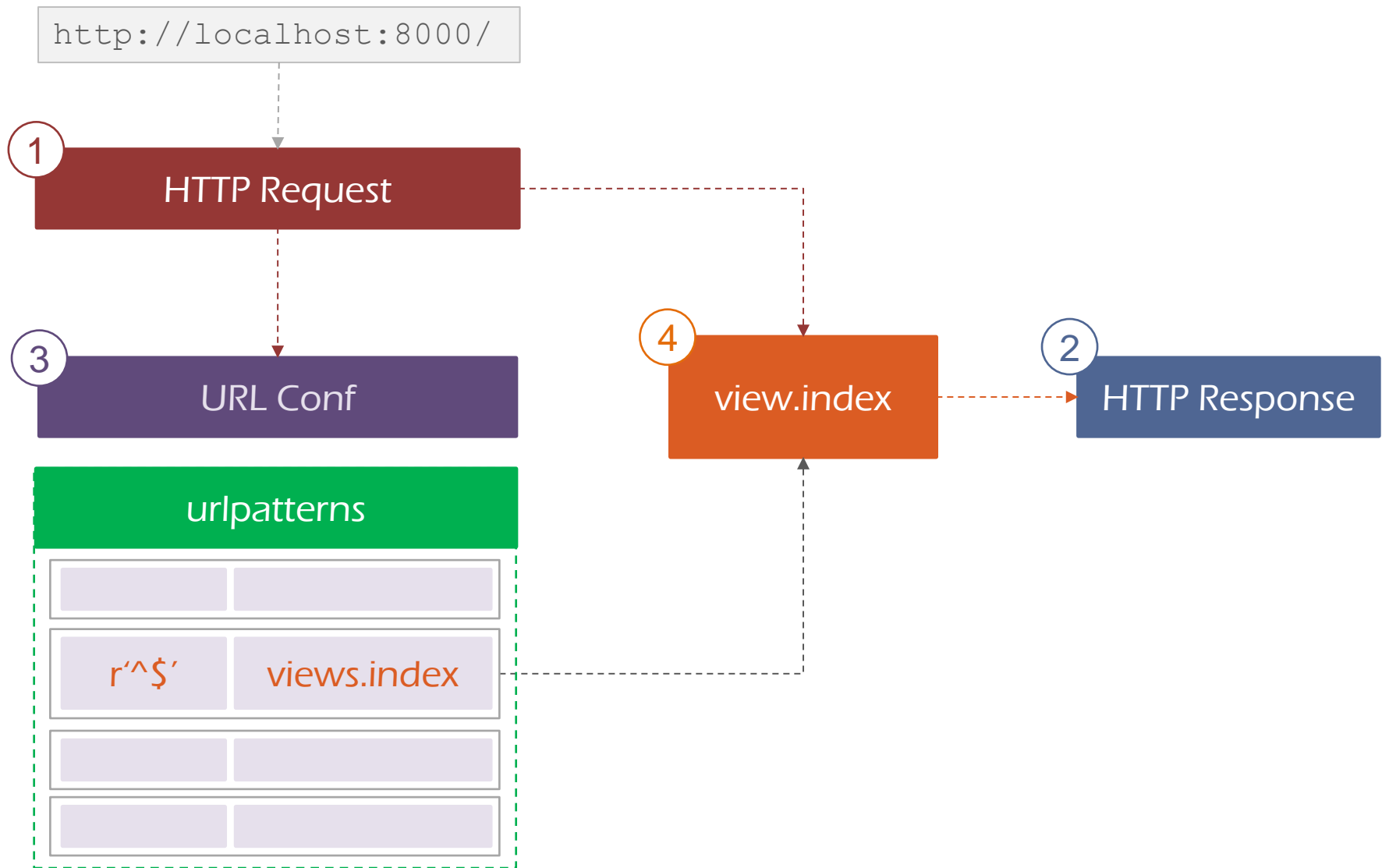
```
User.objects.raw('SELECT * FROM users_user')
```



Views

The Controller of Django

Intro



Create a View

views.py

```
from django.http import HttpResponse

def index(request):

    return HttpResponse("Hello World")

def getUser(request, user_id):

    # Write some code to fetch user by it's id

    ...
```



Http Request

HttpRequest



body

An attribute that contain the request body

method

An attribute that contain the request method

path

An attribute that contain the request path

GET

An attribute that contain the GET request parameters

POST

An attribute that contain the POST request parameters

COOKIES

An attribute that contain the cookies

FILES

An attribute that contain the request File objects

META

An attribute that contain the request headers.



`get_host`

Return the Host name of the request

`is_ajax`

Return True if the request was made by XMLHttpRequest

`is_secure`

Return True if the request was made by https

`get_signed_cookie(key, salt='')`

Get the value of the signed(with salt) cookie



Http Response

views.py

```
from django.http import HttpResponse

def index(request):

    res = HttpResponse("Hello World")

    res.write('<p> Hello Open Source </p>')

    return res
```

Hello World

Hello Open Source



```
views.py  
  
from django.http import HttpResponse  
  
def index(request):  
  
    res = HttpResponse("Hello World")  
  
    res.write('<p> Hello Open Source </p>')  
  
    res[ 'content-type' ] = 'text/plain'  
  
    return res
```

Hello World <p>Hello Open Source </p>



views.py

```
from django.http import HttpResponse

def index(request):

    res = HttpResponse("Hello World")

    res.write('<p> Hello Open Source </p>')

    res['content-type'] = 'text/plain'

    res.set_cookie('name', 'Ahmed')

    return res
```



views.py

```
from django.http import JsonResponse

def index(request):

    return JsonResponse({'name': 'Ahmed'})
```



HttpResponseRedirect

views.py

```
from django.http import HttpResponseRedirect, HttpResponse

def index(request): #view for /

    return HttpResponseRedirect("/posts")

def get_posts(request): #view for /posts

    return HttpResponse ("Here are your posts")
```

Here are your posts



Urls

The way server understands client

Intro

mysite/settings.py

...

```
ROOT_URLCONF = 'mysite.urls'
```

mysite/urls.py

```
from django.conf.urls import url
```

```
from . import views
```

```
urlpatterns = [ url(r'^$', views.index),  
                url(r'^/posts', views.posts) ]
```

library/urls.py

```
from django.conf.urls import url
```

```
from . import views
```

```
urlpatterns = [ url(r'^$', views.index) ]
```

urlpatterns

`r'^$',`

`views.index`

`r'^/posts'`

`views.posts`



```
url(regex, view, kwargs=None, name=None)
```

regex

The regex pattern that identify the url.

view

The view function that handle that url pattern

kwargs

Some Extra options to be used in the view and the template

name

The URL pattern name.



Url *args & **kwargs

*args

http://localhost:8000/post/2/comment/5

```
url(r'^post/([0-9]+)/comment/([0-9]+)$', view.index)
```

```
# view.py
```

```
def index(request, *args):
```

```
    print('Post ID', args[0])          #2
```

```
    print('Comment ID', args[1])       #5
```

http://localhost:8000/post/4

*kwargs

```
url(r'^post/(?P<post_id>[0-9]+)$', view.index)
```

```
#view.index
```

```
def index(request, post_id):
```

```
    print('Post ID', post_id)          #4
```



Include

```
include (module, namespace=None)
```

or

```
include (pattern_list)
```

module

The module that you import the urlspatterns from.

namespace

The new custom namespace for your imported urlpatterns

Pattern_list

A hard coded urlpatterns list



Include example

mysite/urls.py

```
from django.conf.urls import url, include
from . import views

urlpatterns = [
    url(r'^$', views.index),
    url(r'^/posts', views.posts),
    url(r'^/library', include('library.urls'))
]
```

library/urls.py

```
from django.conf.urls import url
from . import views

urlpatterns = [ url(r'^$', views.index) ]
```

urlpatterns

`r'^$',`

`views.index`

`r'^/posts'`

`views.posts`

`r'^/library'`

`library.urls`



Shortcuts

It used for saving coding time

```
render(request, templateName, context=None, content_type=None)
```

views.py

```
from django.shortcuts import render
```

```
# view.py
```

```
def index(request):
```

```
    # Your View Body and Actions
```

```
    return render(request, 'persons/index.html', { 'name': 'Ahmed' })
```



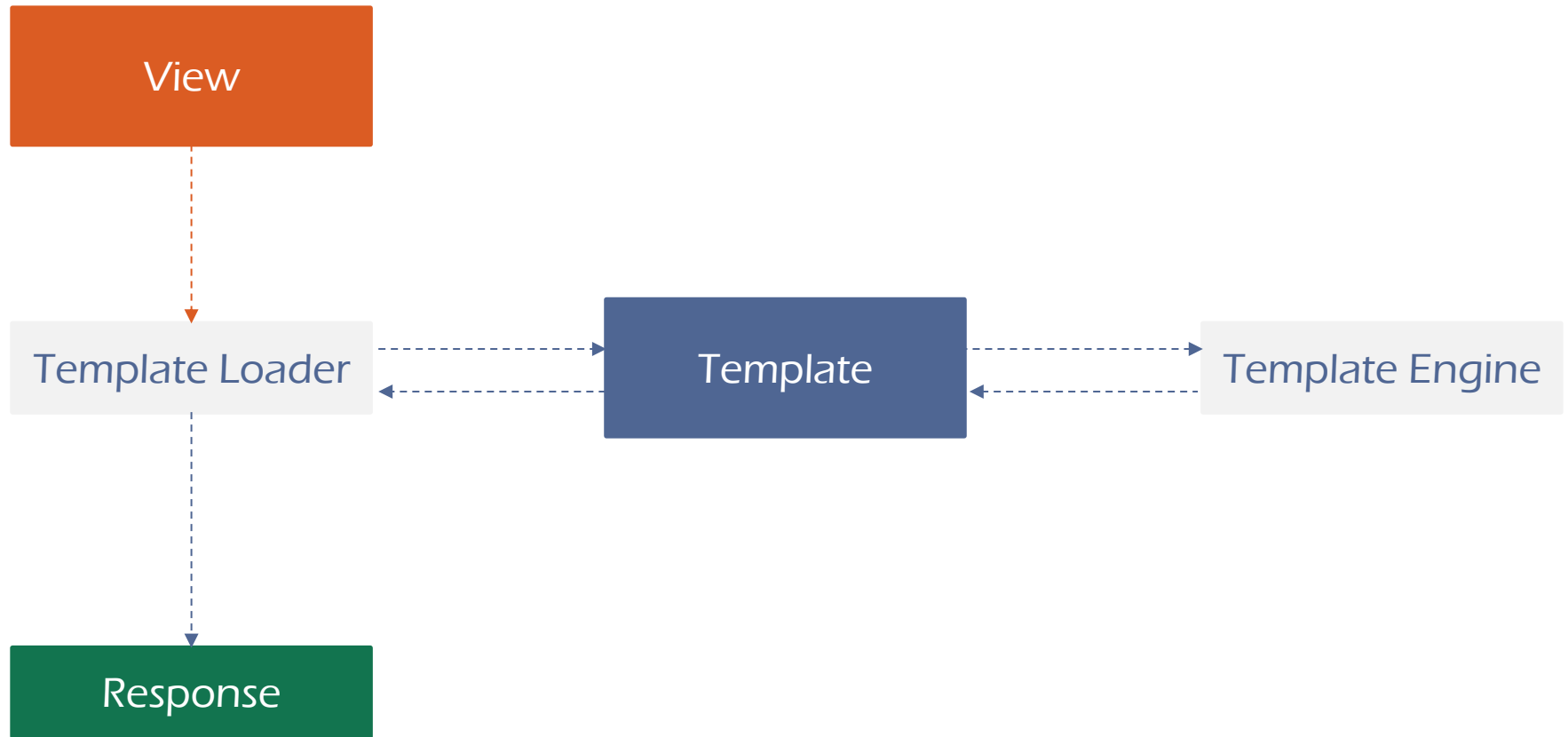
```
redirect(to, *args, **kwargs)
```

```
----- views.py -----  
from django.shortcuts import redirect  
  
# view.py  
def index(request):  
    # Your View Body and Actions  
    return redirect('/persons', { 'name': 'Ahmed' })
```



Templates

This is what client see



Example

```
<html>

  <head>

    <title>{% block title %}Default title{% endblock %}</title>

  </head>

  <body>

    <ul>

      {% for student in students %}

        {% block student %}

          <li> {{ student.name }} </li>

        {% endblock %}

      {% endfor %}

    </ul>

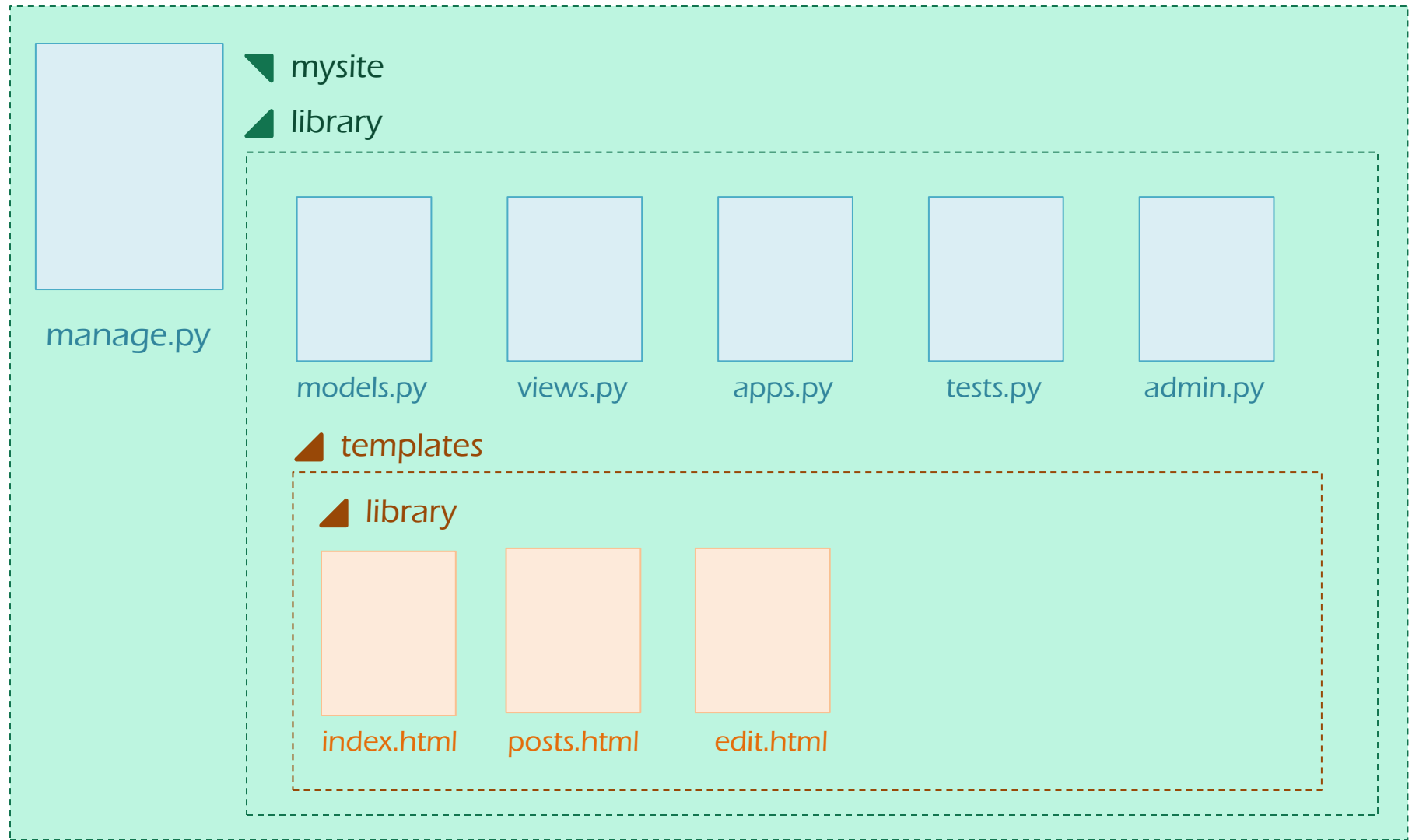
  </body>

</html>
```



Where To

mysite



mysite/settings.py

```
TEMPLATES = [  
  
    {  
  
        #Define the Template Engine for the following templates  
  
        'BACKEND': 'django.template.backends.django.DjangoTemplates',  
  
        #Define the directories that that the loader will search in  
  
        'DIRS': [],  
  
        #Define if the loader search in installed apps or not.  
  
        'APP_DIRS': True,  
  
    },  
  
]
```



Static Files Management

Configuration

settings.py

```
INSTALLED_APPS = [  
    # Other Apps,  
    "django.contrib.staticfiles"  
]  
  
STATIC_URL = '/static/'  
  
STATICFILES_DIRS = [  
    os.path.join(BASE_DIR, "static"),  
]
```

In your app create a directory called `static` and inside it put your app related static files

library/index.html

```
{% load static %}  
  

```



Admin

Fully Implemented Admin Panel

Django Framework provide developers with a fully functional admin panel. That can easily be integrated with your project business



```
$ cd mysite  
$ python manage.py createsuperuser
```



Register a model to Admin Panel

library/admin.py

```
from django.contrib import admin
```

```
from .models import Book
```

```
admin.site.register(Book)
```



Thank You