

# Files

## settings.py

- ☒ **BASE\_DIR**
  - ☒ Directory where manage.py exists.
  - ☒ This allows to work relative to directory.
  - ☒ You can try to print BASE\_DIR and runserver.
- ☒ **SECRET\_KEY**
  - ☒ Should be unique to each project.
  - ☒ Modify few characters if using someone else project.
- ☒ **DEBUG**
  - ☒ Shows details for debugging
  - ☒ Should be changed to False when in production.
- ☒ **ALLOWED\_HOSTS**
  - ☒ Allowed domain names and ips.
  - ☒ Used as security measure in production.
- ☒ **INSTALLED\_APPS**
  - ☒ Components used in the whole project.
  - ☒ Remember to add all apps you create and also third-party apps you install in this list.
- ☒ **MIDDLEWARE**
  - ☒ Manages how requests are handled and securities are handled.
- ☒ **ROOT\_URLCONF**
  - ☒ Tells django how to manage routes.
- ☒ **TEMPLATES**
  - ☐ Create a templates directory with base.html inside it and respective folders for apps.
  - ☒ How are html templates rendered, where are they stored.
  - ☒ In DIRS list, add os.path.join(BASE\_DIR, "templates").
- ☒ **WSGI\_APPLICATION**
  - ☒ Tells django how to use servers.
  - ☒ Sometimes we may need to change it.
- ☒ **DATABASES**
  - ☒ Which database engine used and where is database stored.
  - ☒ By default uses sqlite3 database.
    - ☒ Change database name to create new database. Eg: change name to db2.sqlite3.
- ☒ **AUTH\_PASSWORD\_VALIDATORS**
  - ☒ Which password validators are applied.
- ☒ **STATIC\_URL**
  - ☒ Talk about later.

## models.py

In docs, arguments given in fields are required arguments. When adding new field, either do null=True or provide some default value(Eg. default="default value").

- ☒ **CharField**
  - ☒ Must have max\_length=120 argument.

- ☒ **TextField**
  - ☒ blank=False : Makes field as required while taking input.
  - ☒ null=True : Makes field nullable in database.
- ☒ **DecimalField**
  - ☒ decimal\_places=2 is required.
  - ☒ max\_digits=1000 is required.
- ☒ **BooleanField**
- ☐ **FileField**
  - ☐ upload\_to="images/"
- ☐ **ForeignKey**
  - ☐ First argument must be the other model.
  - ☐ on\_delete=models.CASCADE is required
  - ☐ on\_delete=models.SET\_NULL, null=True can also be set.
- ☐ **ManyToManyField**
  - ☐ through [can have an intermediate model eg TweetLike]
  - ☐ .add
  - ☐ .remove
  - ☐ .set [requires a queryset]
  - ☐ .all
  - ☐ May have to pass other model as a string if it is defined later.
- ☐ **OneToOneField**
  - ☐ Allows you to use . to access related model.
- ☐ To create foreign key to same model, user 'self' as the other model.

### Associating Users to Models

- ☐ Eg:

```
# from django.conf import settings

# User = settings.AUTH_USER_MODEL
# from django.contrib.auth import get_user_model
# User = get_user_model()
from django.contrib.auth.models import User

class TweetModel(models.Model):
    content = models.TextField(blank=True, null=True)
    user = models.ForeignKey(User, on_delete=models.CASCADE,
related_name="tweets")
```

- ☐ To access tweets from user\_obj, `user_obj.tweetmodel_set.all()` or `user_obj.tweets.all()` (if related\_name is provided).
- ☐ Similarly to access TweetLikes by a user, `user_obj.tweetlike_set.all()`

### Signals

- ☐ When creation, deletion of one model needs to affect another, we use signals to execute them.

- ☐ Eg

```
from django.db.models.signals import post_save #, pre_save, post_delete ...

...

def function_to_execute(sender, instance, created, *args, **kwargs):
    if created:
        # Executes only if the sender is created for first time.
        Profile.objects.get_or_create(user=instance)
    # Executes each time sender is saved
    # have creation statements here if you have already created users and
    save each of them from admin panel. After that you can remove the statement
    from here.

post_save.connect(function_to_execute, sender=User) # sender=SenderModel
```

## Commands

### manage.py

- ☒ **runserver**
  - ☒ Starts a development server.
  - ☒ You can allow the server to keep running and do all changes in another terminal, including migrations.
- ☒ **makemigrations** and **migrate**
  - ☒ Updates database.
  - ☒ Both commands are run together in sequence.
  - ☒ Run these upon any change in models.py.
  - ☒ To reset database,
    1. Delete all files in migrations folder (except \_\_init\_\_.py)
    2. Delete \_\_pycache\_\_ folder in migrations directory.
    3. Delete db.sqlite3 file.
- ☒ **createsuperuser**
  - ☒ Allows to create a superuser to login into admin page (urls/admin).
- ☒ **startapp appname**
  - ☒ Creates new app (component in project).
  - ☒ An app does one thing very good.
  - ☒ An app does one thing very good.
  - ☒ You need to add it in INSTALLED\_APPS list.
- ☐ **test**
  - ☐ To run tests in tests.py.
  - ☐ test [app\_name] can be used to test a specific app.
- ☒ **shell**
  - ☒ Allows you to import models and manipulate data to database using the model.
  - ☒ Eg. >>> from products.models import Product >>> Product.objects.all() >>> Product.objects.create(name="Watch", price=22)

## Functional Views

- ☒ Need to add views in urls.py.
- ☒ Takes a request object as argument.
- ☒ Conventionally, functions end with `_view`.
- ☒ Add `*args`, `**kwargs` also as arguments in function definitions.
- ☒ Returns `HttpResponse(html_string)`, `render(request, template_name, context_dictionary)`, `JsonResponse(data)` or `redirect(url)`
- ☒ Convention is to pass model objects as 'object' in context, and then access the attributes from it.
- ☐ You can use **require\_login** decorator.
- ☐ You can add `redirect("login?next=/profile/update")`
- ☒ To use forms, Eg:

```
from .forms import ProductForm
def product_detail_view(request):
    form = ProductForm(request.POST or None)
    if form.is_valid():
        obj = form.save(commit=False)
        # Play with objects
        obj.save()
    context['form'] = form
```

- ☒ `form.cleaned_data` can be used to clean data.
- ☒ `form.errors` can be used to view errors.

## request Object

Request object is also accessible in html templates.

- ☒ `.user`
  - ☒ Gives username of user logged in.
  - ☒ If no one is logged in, it gives `AnonymousUser`.
  - ☒ `.is_authenticated` (in template)
- ☒ `.method`
  - ☒ can have value 'GET', 'POST' or few other methods.
- ☒ `.GET` dictionary that contains data sent through get request.
- ☒ `.POST` dictionary contains data sent through post request.
- ☐ `.is_ajax()` : Tells if the request is ajax or not.

## ModelName.objects

- ☒ `.get(id=[number])`
  - ☐ This must return exactly one object.
- ☒ `.create(**dictionary)` or `.create(attribute1=value1, attribute2=value2 ...)`
- ☐ `.get_or_create()` : Does what it says.

- ☐ `.none()` : To create an empty queryset.
- ☐ `.filter(attr1=value1, attr2=value2)`
  - ☐ returns a list of objects.
  - ☐ **`.filter(foreign_model__foreign_attr="value")`**
  - ☐ `**filter(attr__in=[list, of, values])`
  - ☐ To filter with **or** condition:

```
from django.db.models import Q
qs.filter(Q(attr1="value1") | Q(attr2="value2"))
```

- ☐ Every queryset (returned by filter/all functions) has `.count()` method.
- ☐ `querySet.orderBy('?')` : randomly orders the queryset.
- ☐ `querySet.values_list("list", "of", "values", "to", "return", flat=True)`
- ☐ `querySet.aggregate(django.db.models.Sum('field_name'))`
- ☐ `querySet.annotate` // Look in docs it's better than aggregate.
- ☐ `querySet.distinct()` # Useful when using Q.
- ☐ `.filter(attr__iexact="VaLUe")` [Ignores exact match]
- ☐ `model_object.save()` can be used to save the model\_objects.
- ☐ `model_object.delete()`
- ☐ `.all().delete()`, `.filter(user__username="manas").delete()`
- ☐ To render error if id is incorrect:

```
def tweet_detail_view(request, tweet_id, *args, **kwargs):
    try:
        obj = TweetModel.objects.get(id=tweet_id)
    except :
        raise Http404(f"TweetModel with id={tweet_id} not found.")
    return HttpResponse(f"<h1>Testing {tweet_id} {obj.content}</h1>")
```

- ☐ **Sending JSON response:**
  - ☐ Eg of one data:

```
def tweet_detail_view(response, tweet_id, *args, **kwargs):
    data = {
        'id': tweet_id
    }
    status = 200
    try:
        obj = TweetModel.objects.get(id=tweet_id)
        data['content'] = obj.content
    except:
        data['message'] = "Not found"
        status = 404
    return JsonResponse(data, status=status)
```

- ☐ Eg of list:

```
def tweet_list_view(response, tweet_id, *args, **kwargs):
    data = {
        'response': [{ 'id': x.id, 'content': x.content } for x in
        TweetModel.objects.all()]
    }
    return JsonResponse(data)
```

## urls.py

- ☒ Best practice is to create a urls.py for each app and include it in the main project urls.py.
- ☒ Copy paste main project urls.py to create apps urls.py.
- ☒ Adding urls is given in the starter page.
- ☐ To render a template directly,
  - ☐ TemplateView.as\_view(template\_name='[template.html]')
- ☐ Add an optional character: re\_path(s"profiles?/", some\_view) # last s is optional.
- ☐ To add dynamic urls,:


```
# In urls.py
path('tweets/<int:tweet_id>', tweet_detail_view)
# In views.py
def tweet_detail_view(request, tweet_id, *args, **kwargs):
    return HttpResponse(f"tweet_id={tweet_id}")
```

- ☐ Instead of path, re\_path can be used to add paths with regular expressions.

## templates

- ☒ Django first looks at the DIRS list for templates, then in installed apps templates directory (in sequence).
- ☒ Create a base.html with common headers and other things. Add {% block body %}{% endblock body %} In all other html pages, {% extends 'base.html' %} {% block body %} Then content here will be placed between body block in base.html {% endblock body %}
- ☒ To create components separately, create html documents separately and add {% include 'component.html' %}
  - ☐ You can pass variables: {% include 'component.html' with form=form btn\_label=btn\_label %}
- ☒ Context variables can be used inside template with {{ variable }} format.
- ☒ To render a list, use for loop:

```
{% for item in list_of_items %}
<li>item</li>
{% endfor %}
```

-  To check for conditions, use

```
{% if variable == "some_value" %}
  <h4> variable is 'some value'</h4>
{% elif variable == "some_other_value" %}
  <h4>variable is some other value</h4>
{% endif %}
```

Refer builtin template tags in docs to know about more tags.

-  comment

```
{% comment "Comment title" %}
<tag>Commented text</tag>
{% endcomment %}
```

-  cycle:

```
{% for item in items %}
<tr class="{% cycle 'row1' 'row2' %}"></tr>
```





-  To render forms, use

```
<form action="[url]" method='POST'>
{% csrf_token %}
{{ form.as_p }}
<input type="submit" >
```

forms.as\_ul is also a valid method. Default action sends request to current url. You can put action='.' to get same effect as default. To perform google search from your website,

```
<form action='http://www.google.com/search' method='GET'>
  <input type='text' name='q' placeholder='Google Search' />
  <input type='Submit' value='Search' />
</form>
```

## Filters

-  Filters are used in {{ }} this type of syntax.
-  Filters can be used one on top of other. {{ variable|capfirst|upper }}
-  See docs for builtin filters.
-  Custom filters can be created.

- ☒ Common ones are:
  - ☒ safe : To render text as html (this can be done in view using *mark\_safe*).
  - ☒ title : Capitalizes first letter of each word.
  - ☒ striptags : Removes all html tags.
  - ☒ slugify : Replaces spaces with '- '.
  - ☒ add:[number] : Adds a number.

## forms.py

- ☒ Create this file in the app.
- ☒ Inbuilt forms Eg.

```
from django import forms
from .models import Product
class ProductForm(forms.ModelForm):
    class Meta:
        model = Product
        fields = [
            'title',
            'description',
            'price'
        ]
```

- ☒ Raw django forms. Eg:

```
from django import forms
class RawProductForm(forms.Form):
    title = forms.CharField()
    description = forms.CharField()
    price = forms.DecimalField()
```

- ☒ Raw django forms
  - ☒ By default, all fields are required, to change required=False.
  - ☒ Search for django form fields for more info.
    - ☒ Core field arguments in docs tell about defaults.
  - ☒ Arguments in a FormField
    - ☒ required=False
    - ☒ label='New Label'
    - ☒ initial=199.99 (in DecimalField)
    - ☒ widget=forms.Textarea(attrs={"class":"class1 class2", "id":"some-id", "rows":20, "cols":120})
    - ☒ widget=forms.TextInput(attrs={"placeholder":"A placeholder"})

All widgets can be found in docs.

- ☒ Modifying PreBuilt Forms
  - ☒ Add the formFields like in raw django form to overwrite them.



- ☒ To validate data, create functions with name `clean_[field_name]`:

```
def clean_title(self, *args, **kwargs):
    title = self.cleaned_data.get('title')
    if 'CFE' not in title:
        raise forms.ValidationError("Title must contain CFE")
    if 'NEWS' not in title:
        raise forms.ValidationError("Title must contain 'NEWS'")
    return title
```

## admin.py

- ☐ Register models to be viewed from admin page.
  - ☐ `admin.site.register(ModelName)`
- ☐ Search by fields and show fields.
  - ☐ Eg:

```
class TweetAdmin(models.ModelAdmin):
    list_display = ['__str__', 'user']
    search_fields = ['content', 'user__username', 'user__email']
    class Meta:
        model = Tweet
admin.site.register(Tweet, TweetAdmin)
```

## Creating user

- ☐ `get_user_model().objects.create_user(username='something', password='somethingElse')`

## tests.py

- ☐ It is a good practice to have all declarations above and have all assert statements at the end of `test_ function`.

```
UserModel = get_user_model()
from rest_framework.test import APIClient

class TweetTestCase(TestCase):
    def setUp(self):
        self.user = UserModel.objects.create_user(username='cfe',
        password='somepassword')

    def get_client(self):
        client = APIClient()
        client.login(username='username', password='password')
        return client
```

```
def test_user_created(self):
    self.assertEqual(self.user.username, "cfe")
```

- ☐ assertEquals
- ☐ assertNotEqual

## Creating custom ModelManagers

```
# tweets -> models.py
class TweetQuerySet(models.QuerySet):
    def feed(self, argument):
        return self.filter(any complex query with argument)

class TweetManager(models.Manager):
    def get_queryset(self, *args, **kwargs):
        return TweetQuerySet(self.model, using=self._db)

    def feed(self, argument):
        return self.get_queryset().feed(argument) # this is to avoid .all()
        method call in between.

class TweetModel(models.Model):
    ...
    objects = TweetManager()

# to access,
TweetModel.objects.all().feed(user)
# or if feed method is also defined in TweetManager
TweetModel.objects.feed(user)
```

## Using Images in database (in development server)

### models.py

- ☐ add field models.ImageField(upload\_to='images/')

### settings.py

- ☐ MEDIA\_URL = '/media/'
- ☐ MEDIA\_ROOT = BASE\_DIR / 'media' # directory where media files will be stored.

### urls.py

- ☐ from django.conf import settings
- ☐ from django.conf.urls.static import static
- ☐ urlpatterns += static(settings.MEDIA\_URL, document\_root=settings.MEDIA\_ROOT)