Django Forms Advanced

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Validating Forms in Django

Django Validators

- A **validator** is a **function** or **class** designed to **assess**
  - whether a given **value** **meets** specified **criteria**
- If the **value** **satisfies** all **criteria**, the validator does **not return** **anything**
- If any criteria are **not** **met**, it **raises** a **`ValidationError`**

validators.py

```
from django.core.exceptions import ValidationError

def validate_value(value):
    # If the value does not meet the criteria:
        raise ValidationError("Some Error Message")
```

Django Validators Reusability

- You can **efficiently reuse** validation logic across different types of fields in Django
- This reusability **extends** to
  - **Models:** apply the **same validation logic** to fields
  - **Forms: validation logic** can be **shared** among fields
  - **ModelForms: reuse** the **same validation** logic in the context of a Django ModelForm

Validating Forms

- **Form validation** occurs during the **data cleaning** process in Django
  - Raises `ValidationError` and provides relevant **information** about the **error**
  - The **cleaned** and **normalized** data is **returned** as a Python object
- Each **form field** is equipped with **custom validation** logic **tailored** to its specific requirements

Form Validators

- You can pass **additional validators** to a Form field

```
class NameForm(forms.Form):
    name = forms.CharField(
        validators=[validator_one, validator_two, ...]
    )
```

- You can use both:
  - **Custom** validators
  - **Built-in** Django validators

ModelForm Validation

- In a Django **ModelForm**, you can implement validation in two key aspects
  - Validating the **Model**
    - Ensure that the **data** adheres to the **validation rules** specified in the **corresponding** Django **model**
  - Validating the **Form**
    - Implement **custom validation** logic specific to the form
    - Considering any **additional criteria** or **constraints beyond** those defined in the model

Validating the Model

- Pass **additional validators** to the **Model field**

```
class Name(models.Model):
    first_name = models.CharField(
        max_length=20,
        validators=[
            validator_one,
            validator_two,
            ...
        ]
    )
```

Error Messages in Forms

- You can **customize** the **error messages** associated with an existing validator
  - by **overriding** the default **messages**
- Each validator has a list of **error message keys**
- Pass in a **dictionary** with **keys** and **error messages**

```
class NameForm(forms.Form):
    name = forms.CharField(
        error_messages={
            'required': 'Please, enter your name'
        })
```

Error Messages in Models

- You can **override** the **error messages** in the **model**

```
class UserName(models.Model):
    username = models.CharField(
        max_length=50,
        unique=True,
        error_messages={
            "unique": "The name is already taken."
        })
```

Error Messages in ModelForms

- You can **override** the **error messages** in the **ModelForm**

```
class NameModelForm(forms.ModelForm):
    class Meta:
        ...
        error_messages = {
            'name': {
                'max_length': "The name is too long."
            }
        }
```

Form Class Methods

__init__() Method

- `__init__(self, *args, **kwargs)`
- This method is the **constructor** for the form class
- Used to **initialize** the form and can be **overridden** to perform any **setups**

```
from django import forms

class NameForm(forms.ModelForm):
    def __init__(self, *args, **kwargs):
        super().__init__(*args, **kwargs)
        # Custom initialization code
        for field_name in self.fields:
            self.fields[field_name].widget.attrs['readonly'] = 'readonly'
            self.fields[field_name].required = False
```

clean() Method

- `clean(self)`
- This method is used for overall form **cleaning/validation** that involves **multiple** fields
- It's called **after** all **individual** field clean methods

```
def clean(self):
    cleaned_data = super(NameForm, self).clean()
    # Custom form validation logic
    if cleaned_data['first_name'] == cleand_data['last_name']:
        raise ValidationError('Incorrect names')
    return cleaned_data
```

clean_<fieldname>() Method

- `clean_<fieldname>(self)`
- This method is used to implement **custom cleaning/validation** for a **specific** field
- It's **automatically** called during **form validation**

```
def clean_email(self):
    email = self.cleaned_data.get('email')
    # Custom cleaning/validation field-specific logic
    if email and not email.endswith('@example.com'):
        raise ValidationError('Wrong domain')
    return email
```

Form Instance Methods

- `is_valid(self)`
  - This method is used to **check** if the form data **is valid**
  - It **triggers** the **validation** of **all fields** and returns **True** if the form is valid, otherwise **False**
- `save(self, commit=True)`
  - If your form is a **ModelForm** (associated with a **Django model**), this method is used to
    - **save** the form **data** to the **database**

Form Instance Methods - Example

```
# forms.py
class MyModelForm(forms.ModelForm):
    class Meta:
        model = MyModel
        ...

# views.py
    ...
    my_form = MyModelForm(request.POST)
    if my_form.is_valid():
        instance = my_form.save()
        # This saves the form data to the database
```

ModelForm Functions

Formsets

Django modelform_factory()

- Instead of defining a class, you can use the **standalone function**
  - `modelform_factory(model,fields=None,…)`
- It **creates forms** from a **given model**
- This approach can be **more convenient** if you do **not need** to make many **customizations**

More at: *https://docs.djangoproject.com/en/5.2/ref/forms/models/#modelform-factory*

Using modelform_factory()

```
# models.py
from django.db import models

class Person(models.Model):
    name = models.CharField(max_length=100)
    email = models.EmailField()

# forms.py
from django.forms import modelform_factory
from .models import Person

PersonForm = modelform_factory(Person, fields=["name", "email"])
```

Django Formset

- **Formset** is a layer of **abstraction** to work with
  - **Multiple forms** on the **same page**
- It allows you to **manage** and **process** **multiple** forms **simultaneously**
- Django provides a `formset` **class** to handle this

Using Formsets

```
# models.py
from django.db import models

class Person(models.Model):
    name = models.CharField(max_length=100)
    email = models.EmailField()

# forms.py
from django import forms
from .models import Person

class PersonForm(forms.ModelForm):
    class Meta:
        model = Person
        fields = ['name', 'email']
```

Using Formsets

```
# forms.py
from django.forms import modelformset_factory
```

Creating a formset for the PersonForm

The formset will include forms for two persons

```
PersonFormSet = modelformset_factory(Person,
                                     form=PersonForm, extra=2)
```

Using Formsets

```
# views.py
from django.shortcuts import render, redirect
from .forms import PersonFormSet

def manage_people(request):
    if request.method == 'POST':
        formset = PersonFormSet(request.POST, queryset=Person.objects.all())
        if formset.is_valid():
            formset.save()
            # Do something upon successful form submission
            return redirect('success_page')
    else:
        formset = PersonFormSet(queryset=Person.objects.all())

    return render(request, 'manage_people.html', {'formset': formset})
```

Using Formsets

```
<!-- manage_people.html -->

<form method="post" action="">
  {% csrf_token %}
  {{ formset.management_form }}
  {% for form in formset %}
    {{ form.as_p }}
  {% endfor %}
  <input type="submit" value="Save">
</form>
```

Styling Forms

Django Simple Form Styling

- Can be applied on a form or formset
  - `as_p`, `as_div`, `as_ul`

```
<!-- manage_people.html -->

<form method="post" action="">
  {% csrf_token %}
  {{ formset.as_div}}
  <input type="submit" value="Save">
</form>
```

Bootstrap Forms

```html
<form>
  <div class="form-group">
    <label for="email">Email
        address
    </label>
    <input type="email"
        class="form-control"
        id="email"
        placeholder="Enter email"
    >
  </div>
  <button type="submit"
        class="btn btn-
        primary">Submit</button>
</form>
```

```python
from django import forms

class PersonForm(forms.ModelForm):
    def __init__(self, *args,
**kwargs):
        super().__init__(*args,
**kwargs)
        # Add a class attribute
self.fields['email'].widget.attrs[
'class'] = 'form-control'
        # Add a placeholder
self.fields['email'].widget.attrs[
'placeholder'] = 'Enter email'
        ...
```

Crispy Forms

- **Install Crispy Forms**

```
pip install django-crispy-forms
pip install crispy-bootstrap4
```

- Add **Crispy Forms** and Bootstrap4 to your **Installed Apps**

```
INSTALLED_APPS = (
        ...
        "crispy_forms",
        "crispy_bootstrap4",
        ...
    )
```

Crispy Forms

- Set a **default template pack** for your projects

```
# settings.py
...

CRISPY_ALLOWED_TEMPLATE_PACKS = "bootstrap4"

CRISPY_TEMPLATE_PACK = "bootstrap4"
```

Crispy Forms

- You can use an **instance-level helper** to **customize** various aspects of the form's rendering

```
from crispy_forms.helper import FormHelper

class ExampleForm(forms.Form):
    ...
    def __init__(self, *args, **kwargs):
        super().__init__(*args, **kwargs)
        self.helper = FormHelper()
        self.helper.form_id = 'id-exampleForm'
        self.helper.form_class = 'blueForms'
        ...
```

Crispy Forms

```
<!-- Django template -->

{% load crispy_forms_tags %}

<form action="{% url 'url_name' %}"
        class="my-class" method="post">
    {% crispy form %}
</form>
```

The {% crispy %} tag includes the CSRF token by default

More at: https://django-crispy-forms.readthedocs.io/en/latest/crispy_tag_forms.html

Working with Media Files

Live Demo

What are Media Files?

- Media files encompass a variety of **digital content**
  - **pictures**, **music**, **audio**, **videos**, and **documents**
- These files are typically **encoded** during the saving process allowing computer programs or applications
  - to **read** and **work** with them
- For example, **document formats** can be easily read and edited in word-processing programs

Most Common Media Files

- **Image** file formats: JPEG, GIF, TIFF, BMP
- **Audio** file formats: AAC, MP3, WAV, WMA, DOLBY DIGITAL, DTS
  - Other available **audio** file formats: AIFF, ASF, FLAC, ADPCM, DSD, LPCM, OGG
- **Video** file formats: MPEG-1, MPEG-2, MPEG-4, AVI, MOV, AVCHD, H.264, H.265
  - Other available **video** formats: DivX and DivX HD, Xvid HD, MKV, RMVB, WMV9, TS/TP/M2T, WMV

Pillow - Python Imaging Library

- The **P**ython **I**maging **L**ibrary, often abbreviated as **PIL** (and known as **Pillow** in newer versions), is a free and open-source library
- It **enhances** Python's **capabilities** by providing **support** for opening, manipulating, and saving a wide range of **image file formats**
- **Compatible** with Windows, Mac OS X, and Linux
- Among the **supported formats** are PPM, PNG, JPEG, GIF, TIFF, and BMP

Installing Pillow

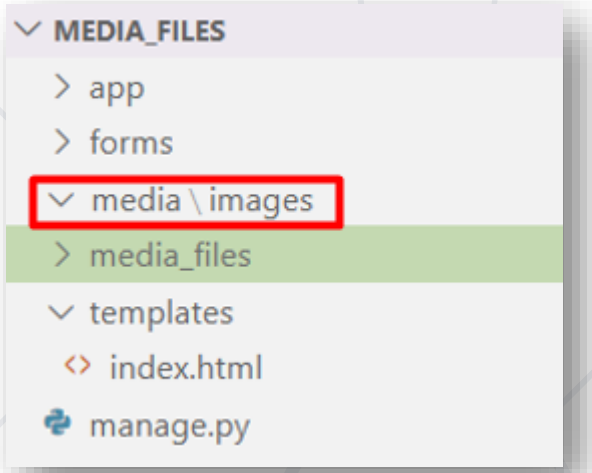
- To install **Pillow**, we can use the Python package manager (pip)

```
pip install pillow
```

- Warnings
  - Pillow and PIL **cannot** **co-exist** in the same environment
  - Before installing Pillow, please **uninstall** **PIL**

Configuring Media Folder

- Create a **media folder** and configure it in the **settings.py** file




```python
USE_L10N = True

USE_TZ = True


# Static files (CSS, JavaScript, Images)
# https://docs.djangoproject.com/en/3.0/howto/static-files/

STATIC_URL = '/static/'

MEDIA_ROOT = os.path.join(BASE_DIR, 'media/')
MEDIA_URL = '/media/'
```

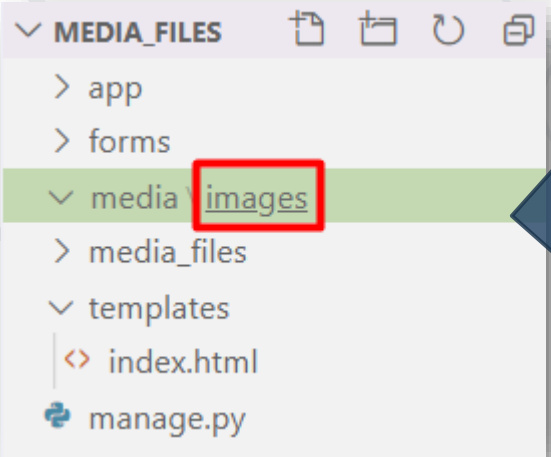
Create an Image Field in a Model

app > models.py > Image

```python
from django.db import models

# Create your models here.
class Image(models.Model):
    image = models.ImageField(upload_to="images")
```

Name of the folder where the images will be stored



Create a Model Form

forms > image_form.py > ImageForm > Meta

```python
from django.forms import ModelForm
from app.models import Image

class ImageForm(ModelForm):
    class Meta:
        model = Image
        fields = '__all__'
```

Add new cat image

Image: Choose File No file chosen

Submit

```html
<form enctype="multipart/form-data", method="POST">
    {% csrf_token %}
    {{ form.as_p }}
    <input type="submit">
</form>
```

Handling the POST Request

```
11      elif req.method == "POST"
12          form = ImageForm(req.POST, req.FILES)
13          if form.is_valid():
14              image = form.save()
15              image.save()
16              return render(req, 'index.html', {'images': images})
```

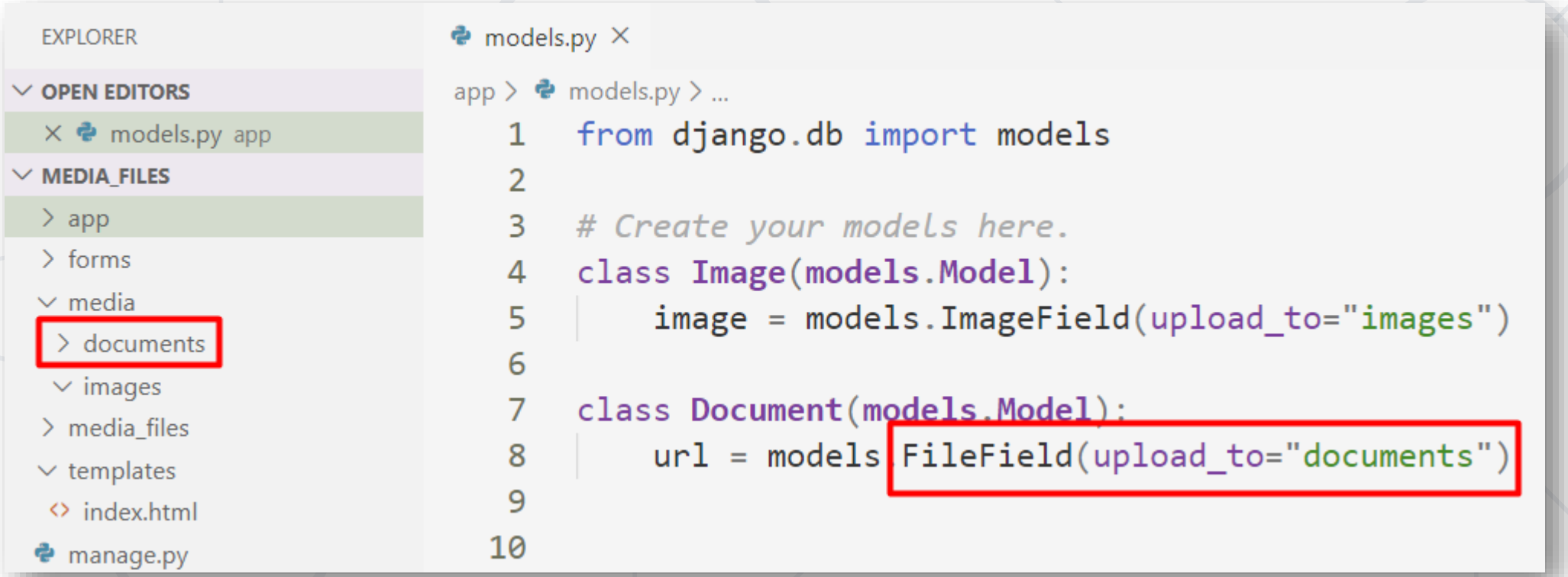
```
3   from django.conf import settings
4   from django.conf.urls.static import static
5
6
7   urlpatterns = [
8       path('', index, name="index")
9   ] + static(settings.MEDIA_URL, document_root=settings.MEDIA_ROOT)
```

Configure the URLs for media

Displaying the Image

```
1 <div class="card m-3" style="width: 18rem;">
2     <img class="card-img-top" src="{{ image.url }}" alt="Card image cap">
3 </div>
```

Create a Documents Folder



Create Model Form

document_form.py

forms > document_form.py > ...

```python
from django.forms import ModelForm
from app.models import Document

class DocumentForm(ModelForm):
    class Meta:
        model = Document
        fields = '__all__'
```

Add new document

Url: Choose File No file chosen

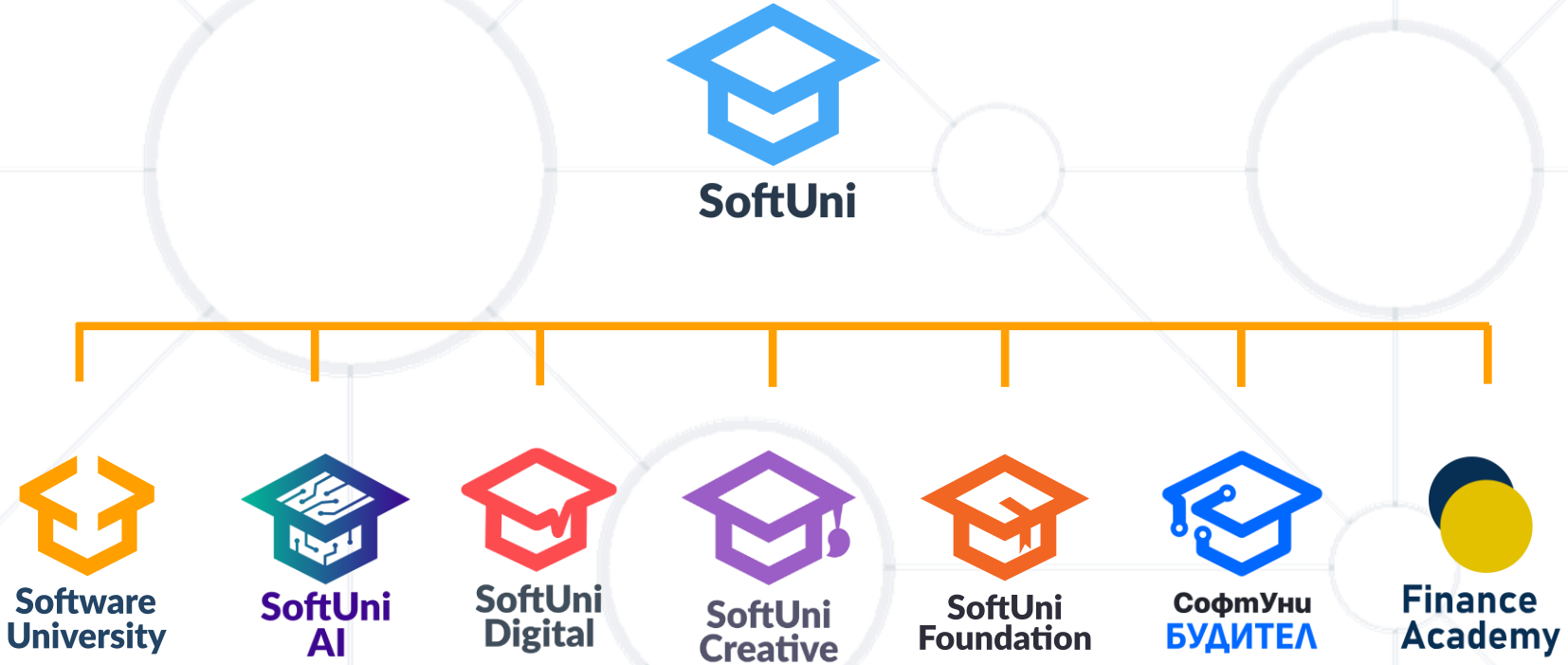
Submit

```html
<form enctype="multipart/form-data", method="POST">
    {% csrf_token %}
    {{ form.as_p }}
    <input type="submit">
</form>
```

Summary

- Validating Django Forms
  - Error Messages
- Form Class Methods
- ModelForm Functions
- Styling Forms
  - Bootstrap Forms, Crispy Forms
- Media Files
  - Pillow

Questions?



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