

Topic: Image Compression 25: Setup, Model & Logic

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Overview

The Python Imaging Library adds image processing capabilities to your Python interpreter.

This library provides extensive file format support, an efficient internal representation, and fairly powerful image processing capabilities.

The core image library is designed for fast access to data stored in a few basic pixel formats. It should provide a solid foundation for a general image processing tool.

1. Go to [Pillow documentation](#) and install the Django package in the Django server terminal and in Celery terminal

```
$ pip install pillow
```

2. In the Django server, we create a new app IMAGE_COMPRESSION

```
$ python manage.py startapp image_compression
```

3. Register the new app in SETTINGS.PY INSTALLED_APPS

```

# Application definition

INSTALLED_APPS = [
    'django.contrib.admin',
    'django.contrib.auth',
    'django.contrib.contenttypes',
    'django.contrib.sessions',
    'django.contrib.messages',
    'django.contrib.staticfiles',
    'dataentry',
    'uploads',
    'crispy_forms',
    'crispy_bootstrap5',
    'emails',
    'ckeditor',
    'anymail',
    'image_compression',
]

```

4. Create the model in MODELS.PY

```

1 from django.db import models
2 from django.contrib.auth.models import User
3
4
5 class CompressImage(models.Model):
6     # dropdown selection as [(10,10), (20,20), (30,30), ... (100,100)]
7     QUALITY_CHOICES = [(i, i) for i in range(10, 101, 10)]
8
9     user = models.ForeignKey(User, on_delete=models.CASCADE)
10    original_img = models.ImageField(upload_to='original_images/')
11    quality = models.IntegerField(choices=QUALITY_CHOICES, default=80)
12    compressed_img = models.ImageField(upload_to='compressed_images/')
13    compressed_at = models.DateTimeField(auto_now_add=True)
14
15    def __str__(self):
16        return self.user.username
17

```

To make the QUALITY field a drop-down option, we use the SELECT TAG. Where we see the VALUE AND THE LABEL (which is displayed as a user option in the dropdown)

```

<!DOCTYPE html>
<html>
<body>

<h1>The select element</h1>

<p>The select element is used to create a drop-down list.</p>

<form action="/action_page.php">
  <label for="cars">Choose a car:</label>
  <select name="cars" id="cars">
    <option value="volvo">Volvo</option>
    <option value="saab">Saab</option>
    <option value="opel">Opel</option>
    <option value="audi">Audi</option>
  </select>
  <br><br>
  <input type="submit" value="Submit">
</form>

<p>Click the "Submit" button and the form-data will be sent to a page on the
server called "action_page.php".</p>

</body>
</html>

```

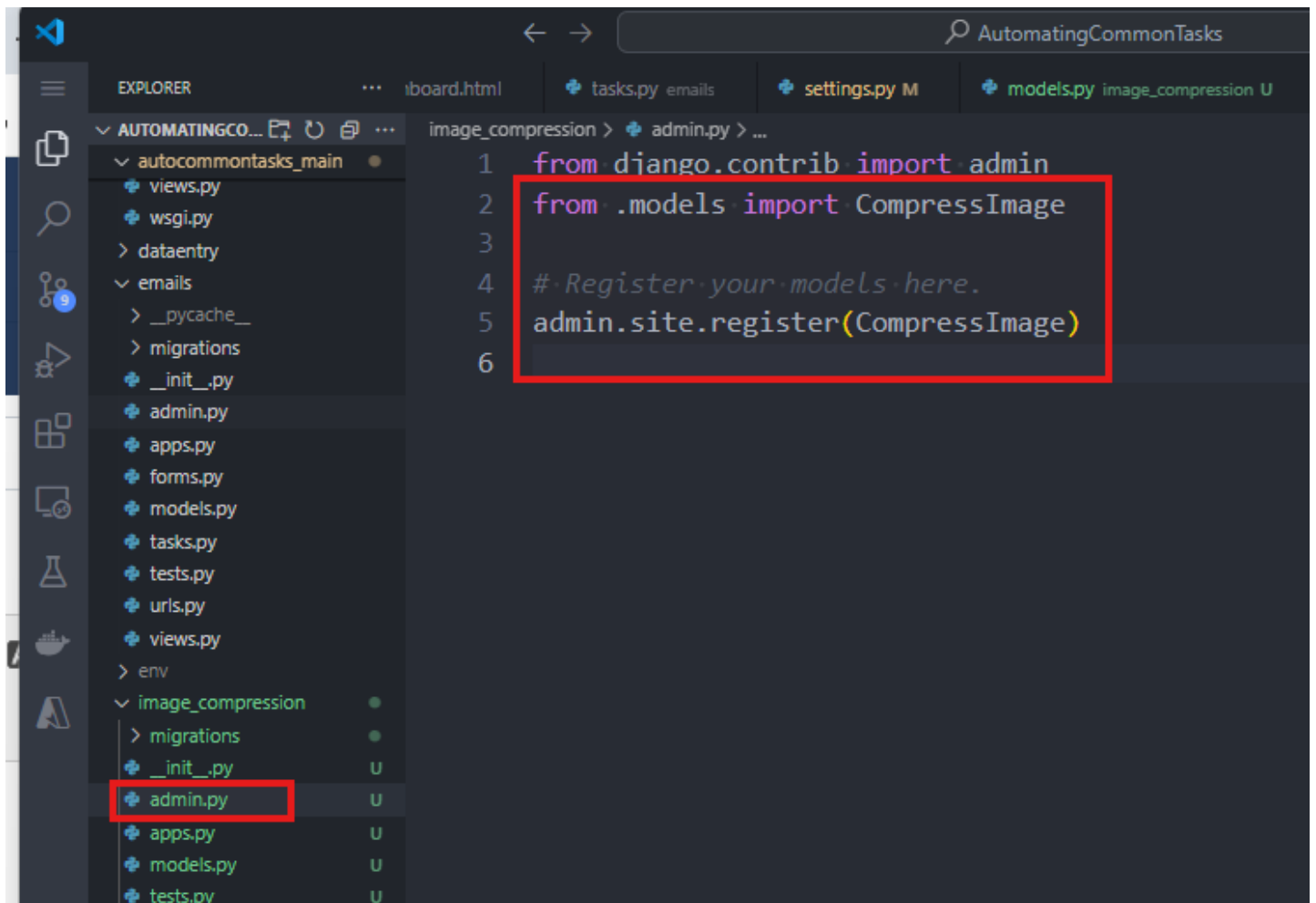
The select element

The select element is used to create a drop-down list.

Choose a car:

Click the "Submit" button and the form-data will be sent to a page on the ser

5. Register the model for our ADMIN panel. Update ADMIN.PY:

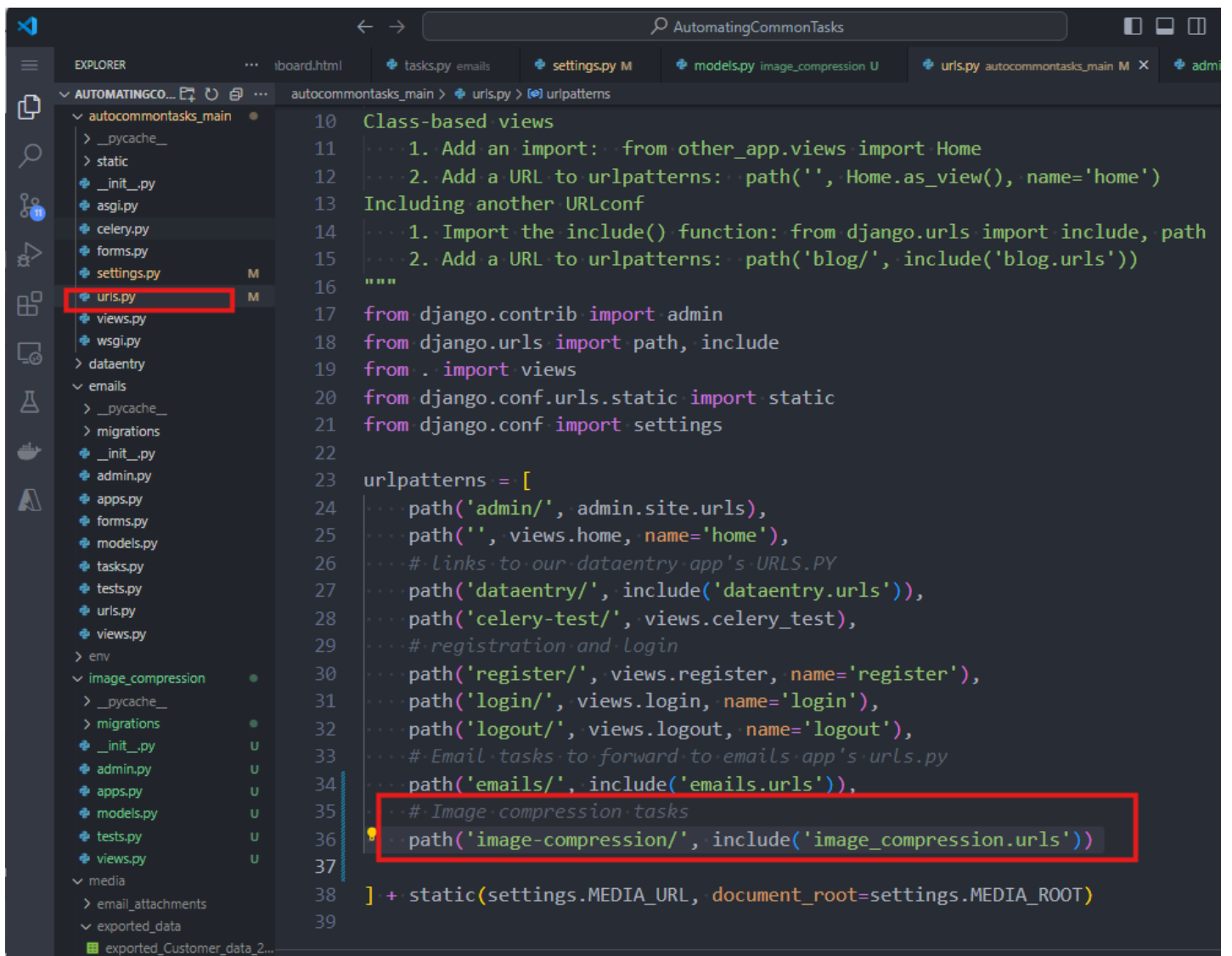


6. Make the necessary model migrations

```
$ python manage.py makemigrations
```

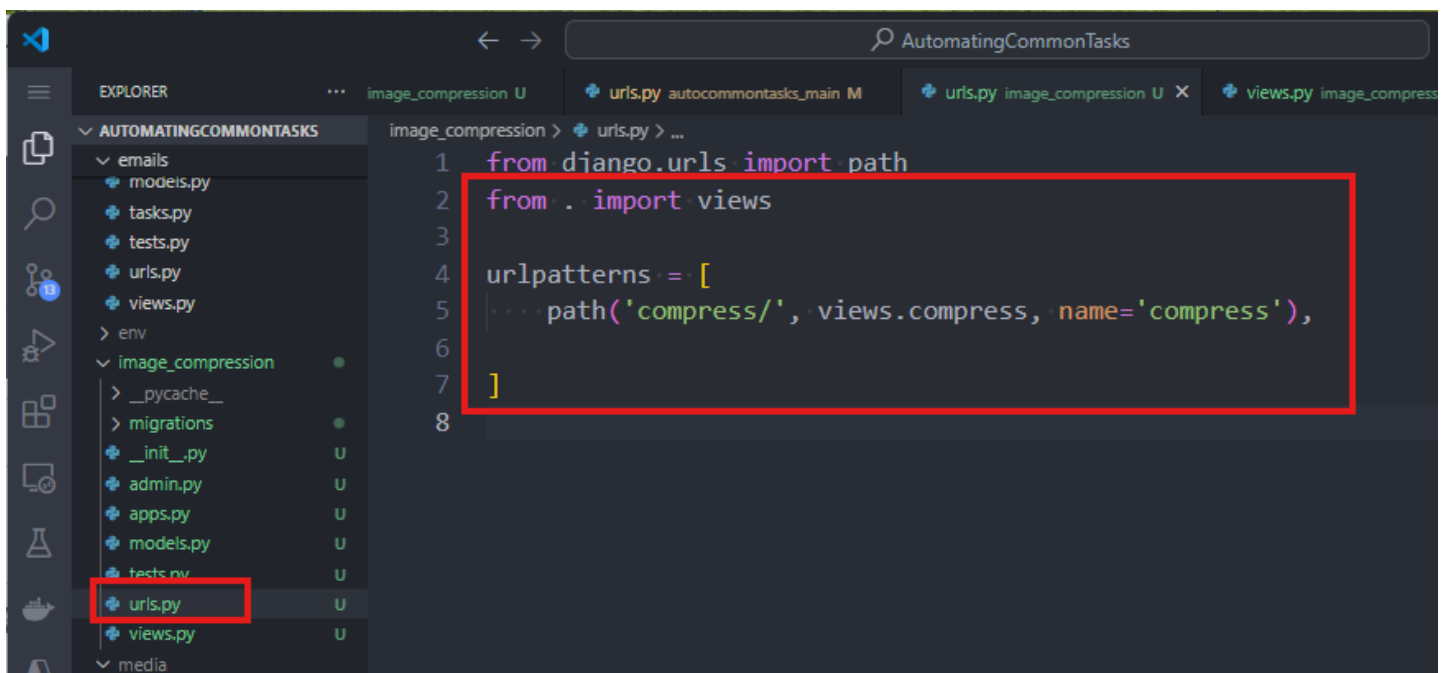
```
$ python manage.py migrate
```

7. Create the new URL pattern. Since we have a new app, we need to create a new pattern in our main project's URLS.PY.



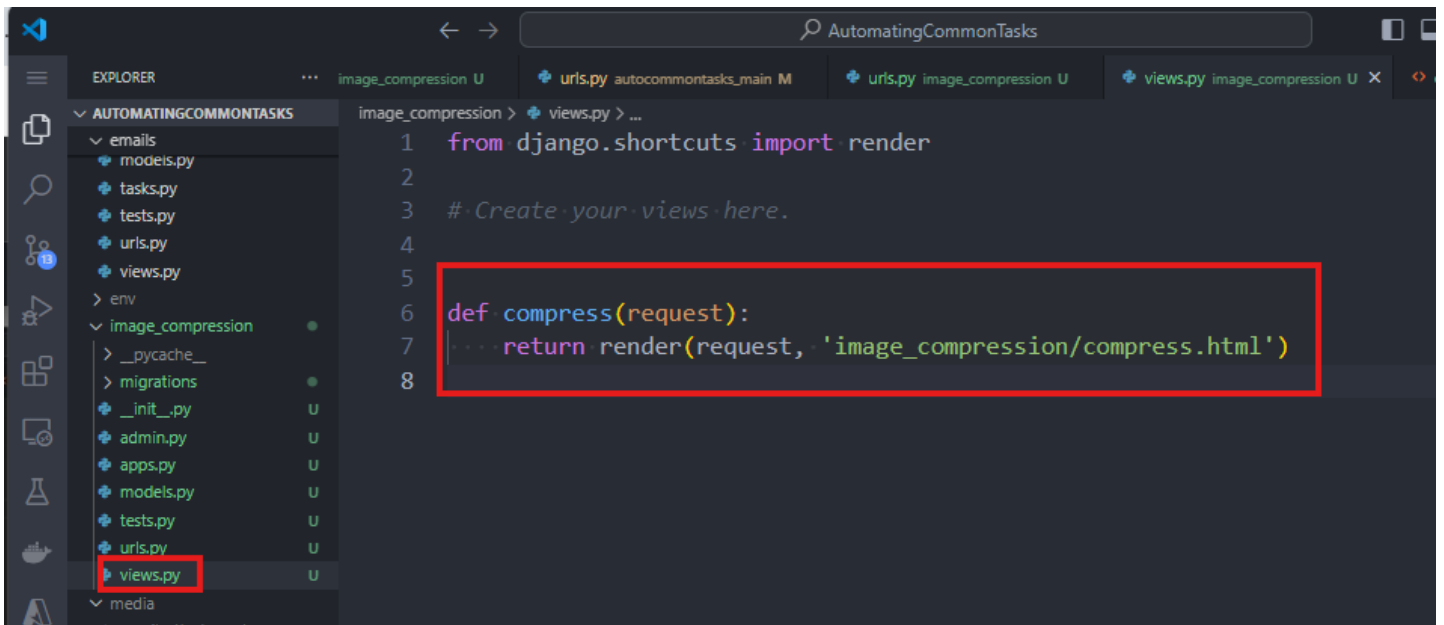
```
10 Class-based views
11 ...1. Add an import: from other_app.views import Home
12 ...2. Add a URL to urlpatterns: path('', Home.as_view(), name='home')
13 Including another URLconf
14 ...1. Import the include() function: from django.urls import include, path
15 ...2. Add a URL to urlpatterns: path('blog/', include('blog.urls'))
16 """
17 from django.contrib import admin
18 from django.urls import path, include
19 from . import views
20 from django.conf.urls.static import static
21 from django.conf import settings
22
23 urlpatterns = [
24     path('admin/', admin.site.urls),
25     path('', views.home, name='home'),
26     # links to our dataentry app's URLS.PY
27     path('dataentry/', include('dataentry.urls')),
28     path('celery-test/', views.celery_test),
29     # registration and login
30     path('register/', views.register, name='register'),
31     path('login/', views.login, name='login'),
32     path('logout/', views.logout, name='logout'),
33     # Email tasks to forward to emails app's urls.py
34     path('emails/', include('emails.urls')),
35     # Image compression tasks
36     path('image-compression/', include('image_compression.urls')),
37 ] + static(settings.MEDIA_URL, document_root=settings.MEDIA_ROOT)
38
39
```

Then, create a new URLS.PY file in our new app for image-compression-related URL paths.

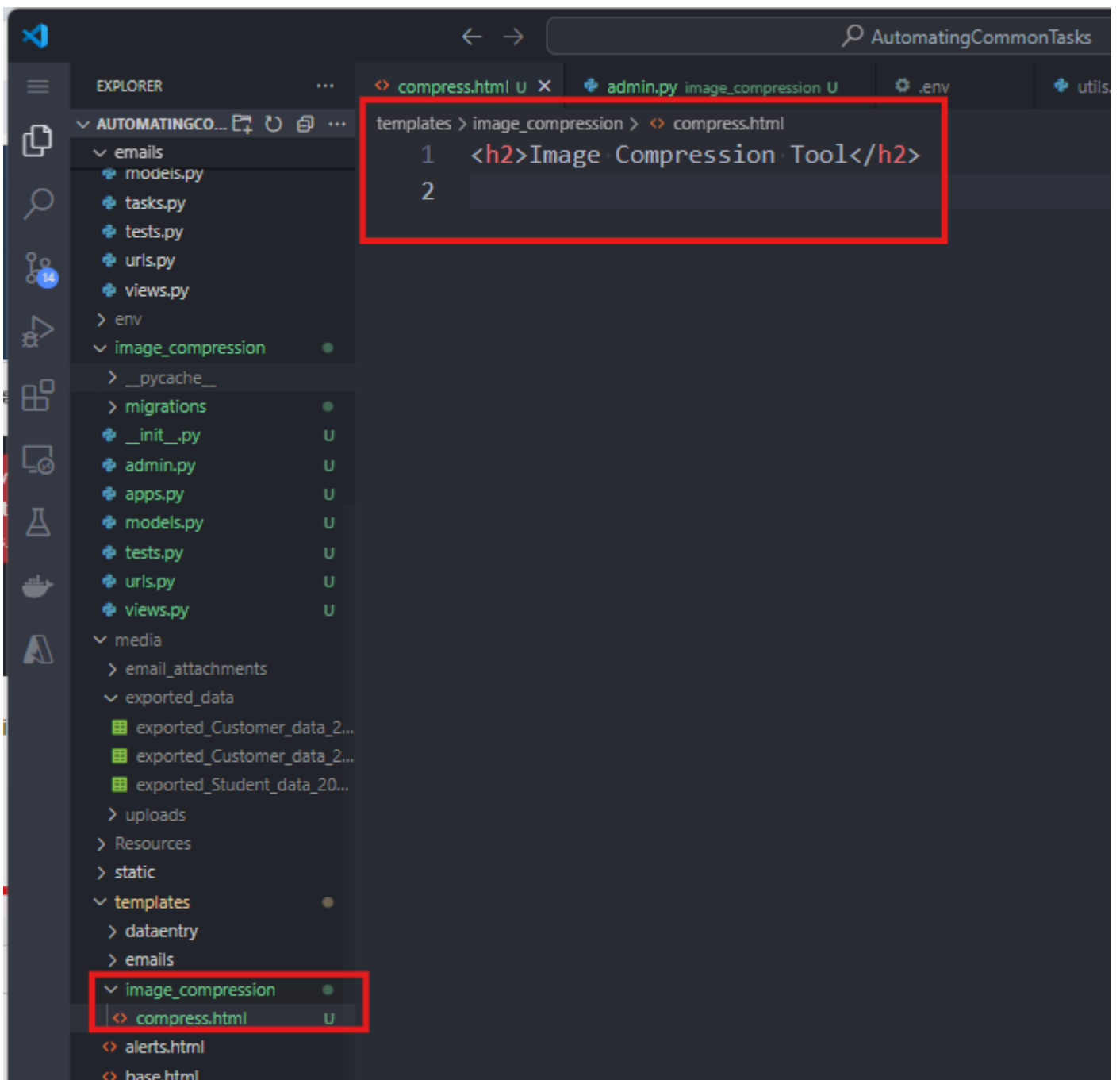


```
1 from django.urls import path
2 from . import views
3
4 urlpatterns = [
5     path('compress/', views.compress, name='compress'),
6 ]
7
8
```

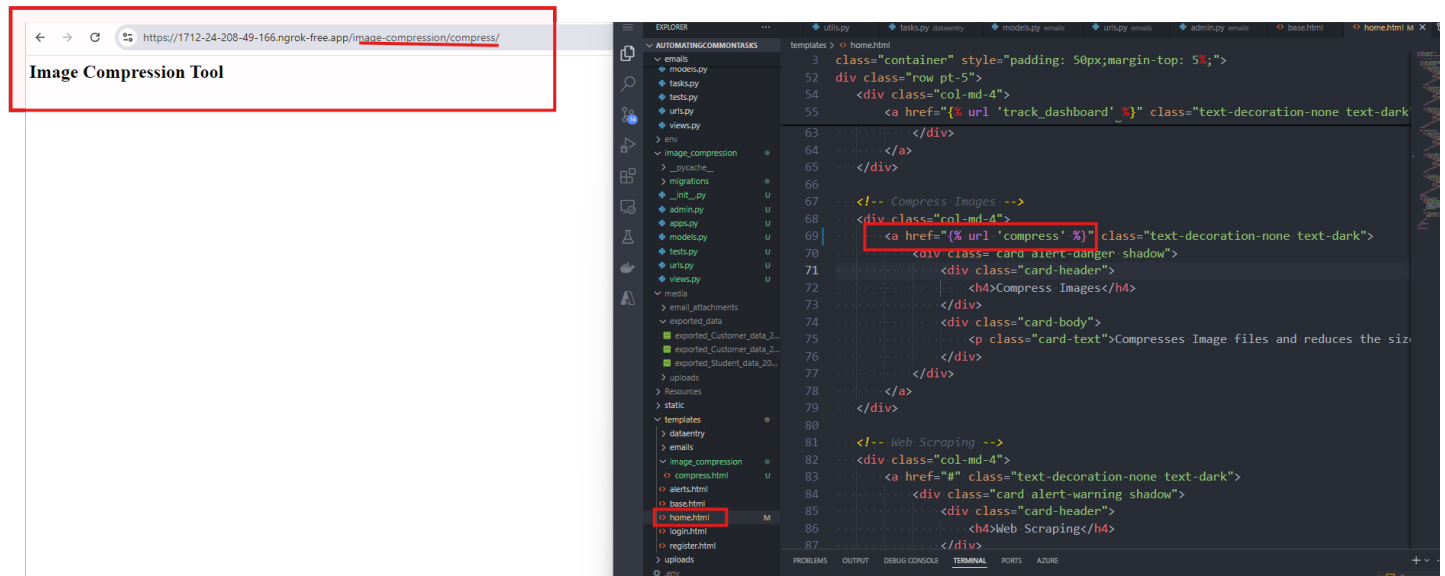
8. Create the function in the VIEWS.PY



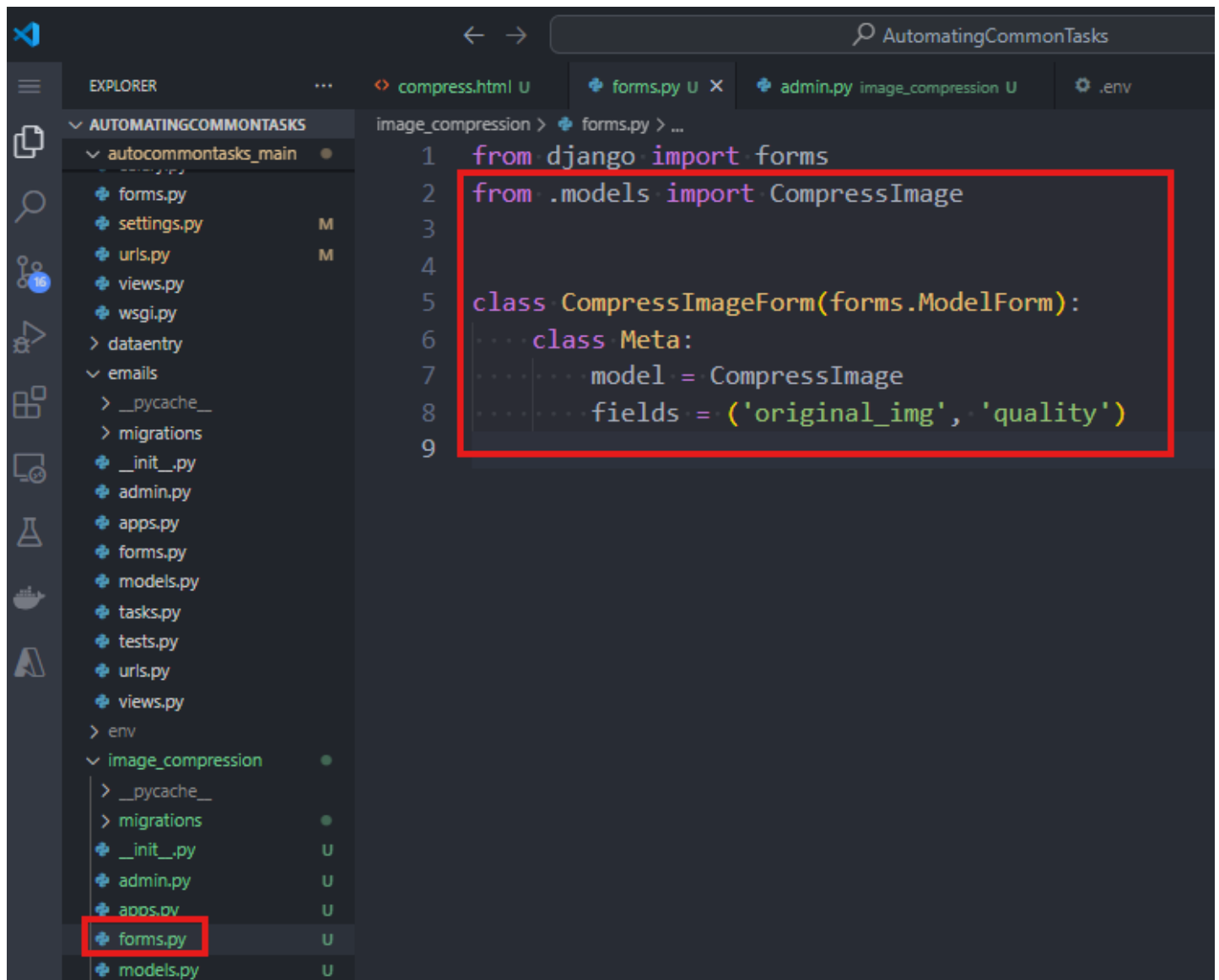
9. Create a new FOLDER called IMAGE_COMPRESSION, and in this folder, create a new file, COMPRESS.HTML



10. Update the HOME.HTML to call this new web page.



11. Create a FORMS.PY



12. Call our form using our VIEWS.PY:

```
1 from django.shortcuts import render
2 from .forms import CompressImageForm
3 # Create your views here.
4
5
6 def compress(request):
7     form = CompressImageForm()
8     context = {
9         'form': form,
10    }
11    return render(request, 'image_compression/compress.html', context)
12
```

13. In the COMPRESS.HTML, update as:

The left screenshot shows a web browser at <https://1712-24-208-49-166.ngrok-free.a...> displaying the 'Compress Images Tool'. It has a 'Choose File' button, a 'Quality' dropdown set to 80, and a 'Compress' button. The right screenshot shows the `compress.html` template in VS Code. Red boxes highlight the form action, the form, and the submit button.

```
1 {% extends 'base.html' %}
2
3 {% block content %}
4 {% load crispy_forms_tags %}
5
6 <div class="container mt-5 p-3 shadow rounded" style="max-width: 700px;">
7     <h2 class="text-center">Compress Images Tool </h2>
8     <form action="{% url 'compress' %}" method="POST" enctype="multipart/form-data">
9         {{ csrf_token }}
10
11         <div class="form-group">
12             {{ form | crispy }}
13         </div>
14
15         <div class="form-group">
16             <input type="submit" value="Compress" class="btn btn-primary">
17         </div>
18     </form>
19     {% include 'alerts.html' %}
20 </div>
21
22
23 {% endblock %}
```

14. We can change the label of the field on the form, so update FORMS.PY and add the line:

```
1 from django import forms
2 from .models import CompressImage
3
4
5 class CompressImageForm(forms.ModelForm):
6     class Meta:
7         model = CompressImage
8         fields = ('original_img', 'quality')
9
10    original_img = forms.ImageField(label='Upload an Image')
11
```

FROM:

Original img*

Choose File No file chosen

Quality*

80

TO:

Upload an Image*

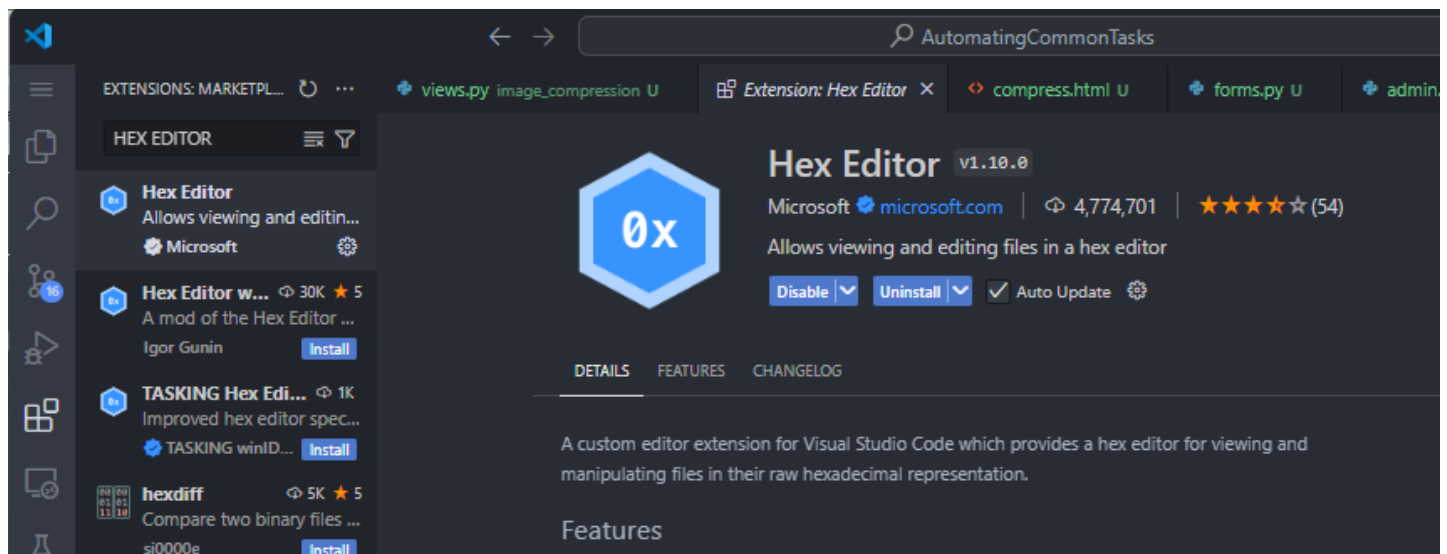
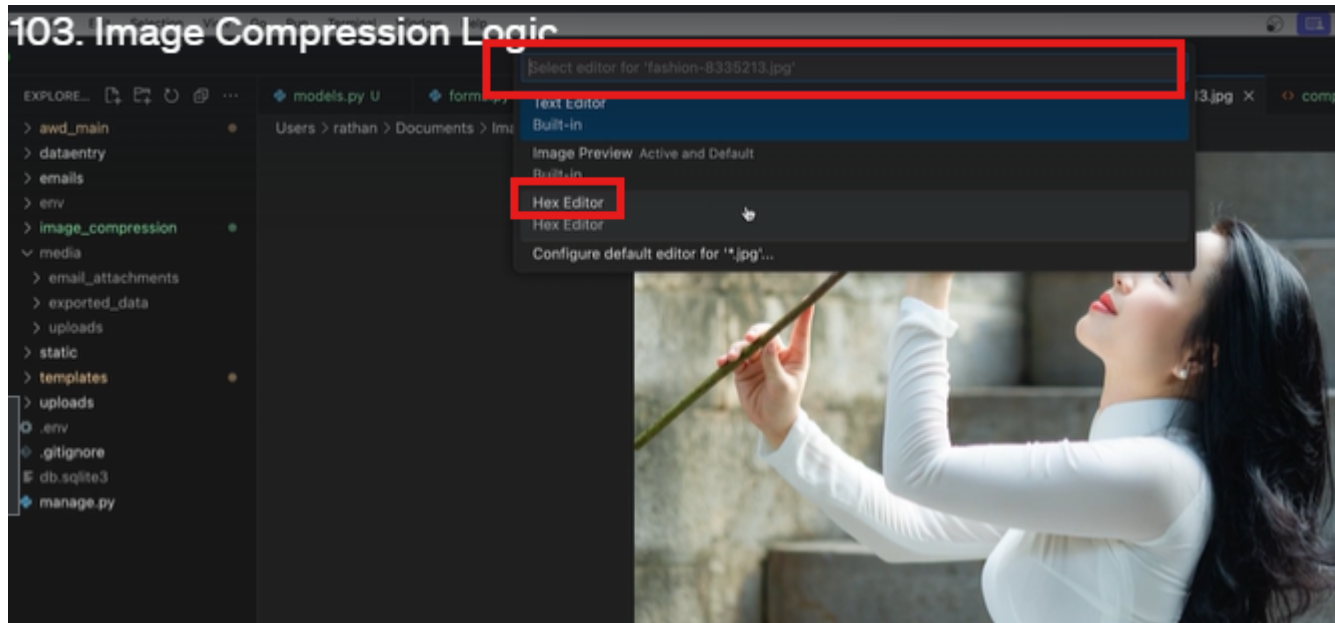
Choose File No file chosen

Quality*

80

15. When we use `io.BytesIO`, we get bytes value of the image. To see what is the visual representation of these bytes, you can add the EXTENSION 'HEX EDITOR'.

Now open an image file. On the tab of this image, right-click, select 'REOPEN EDITOR WITH', and select HEXEDITOR and you will see the HEX value of the file.



Resources > Datasets > Image+Compression > Image Compression > butterflies-1127666.jpg

00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	Decoded Text	
00000000	FF	D8	FF	E0	00	10	4A	46	49	46	00	01	01	00	00	01	J F I F
00000010	00	01	00	00	FF	DB	00	43	00	05	03	04	04	04	03	05	. . . . . C
00000020	04	04	04	05	05	05	06	07	0C	08	07	07	07	07	0F	0B	. . . . .
00000030	0B	09	0C	11	0F	12	12	11	0F	11	11	13	16	1C	17	13	. . . . .
00000040	14	1A	15	11	11	18	21	18	1A	1D	1D	1F	1F	1F	13	17 !
00000050	22	24	22	1E	24	1C	1E	1F	1E	FF	DB	00	43	01	05	05	" \$ " . \$ C
00000060	05	07	06	07	0E	08	08	0E	1E	14	11	14	1E	1E	1E	1E	. . . . .
00000070	1E	1E	1E	1E	1E	1E	1E	1E	1E	1E	1E	1E	1E	1E	1E	1E	. . . . .
00000080	1E	1E	1E	1E	1E	1E	1E	1E	1E	1E	1E	1E	1E	1E	1E	1E	. . . . .
00000090	1E	1E	1E	1E	1E	1E	1E	1E	1E	1E	1E	1E	1E	1E	FF	C0	. . . . .
000000A0	00	11	08	0D	80	14	40	03	01	22	00	02	11	01	03	11 @ "
000000B0	01	FF	C4	00	1F	00	00	01	05	01	01	01	01	01	01	00	. . . . .
000000C0	00	00	00	00	00	00	00	01	02	03	04	05	06	07	08	09	. . . . .
000000D0	0A	0B	FF	C4	00	B5	10	00	02	01	03	03	02	04	03	05	. . . . .
000000E0	05	04	04	00	00	01	7D	01	02	03	00	04	11	05	12	21 } !
000000F0	31	41	06	13	51	61	07	22	71	14	32	81	91	A1	08	23	1 A . . Q a . " q . 2 #
00000100	42	B1	C1	15	52	D1	F0	24	33	62	72	82	09	0A	16	17	B . . . R . . \$ 3 b r
00000110	18	19	1A	25	26	27	28	29	2A	34	35	36	37	38	39	3A	. . . % & ' () * 4 5 6 7 8 9 :
00000120	43	44	45	46	47	48	49	4A	53	54	55	56	57	58	59	5A	C D E F G H I J S T U V W X Y Z
00000130	63	64	65	66	67	68	69	6A	73	74	75	76	77	78	79	7A	c d e f g h i j s t u v w x y z
00000140	83	84	85	86	87	88	89	8A	92	93	94	95	96	97	98	99	. . . . .
00000150	9A	A2	A3	A4	A5	A6	A7	A8	A9	AA	B2	B3	B4	B5	B6	B7	. . . . .
00000160	B8	B9	BA	C2	C3	C4	C5	C6	C7	C8	C9	CA	D2	D3	D4	D5	. . . . .
00000170	D6	D7	D8	D9	DA	E1	E2	E3	E4	E5	E6	E7	E8	E9	EA	F1	. . . . .
00000180	F2	F3	F4	F5	F6	F7	F8	F9	FA	FF	C4	00	1F	01	00	03	. . . . .
00000190	01	01	01	01	01	01	01	01	01	00	00	00	00	00	00	01	. . . . .

WARNINGS:

16. We use BUFFER.SEEK(0) to make sure that after we save, we set our cursor position back to 0.

```
7 def compress(request):
17
18     """# perform the compression
19     """
20     img = Image.open(original_img)
21     buffer = io.BytesIO()
22     print('buffer cursor position or pointer at the beginning = >', buffer.tell())
23     img.save(buffer, format='JPEG', quality=quality)
24     """# print('buffer:=>', buffer.getvalue())
25     print('buffer cursor position or pointer after image compression = >', buffer.tell())
26     """# pointer goes back to 0 location after saving in the buffer
27     buffer.seek(0)
28     print('buffer cursor position or pointer after return to zero = >', buffer.tell())
29
30     """# save teh compressed image inside the model with filename format
31     """
32     compressed_image.compressed_img.save(
33         f'compressed_{original_img}', buffer
34     )
35     return redirect('compress')
36
37 else:
38     form = CompressImageForm()
39     context = {
40         'form': form,
41     }
42     return render(request, 'image_compression/compress.html', context)
```

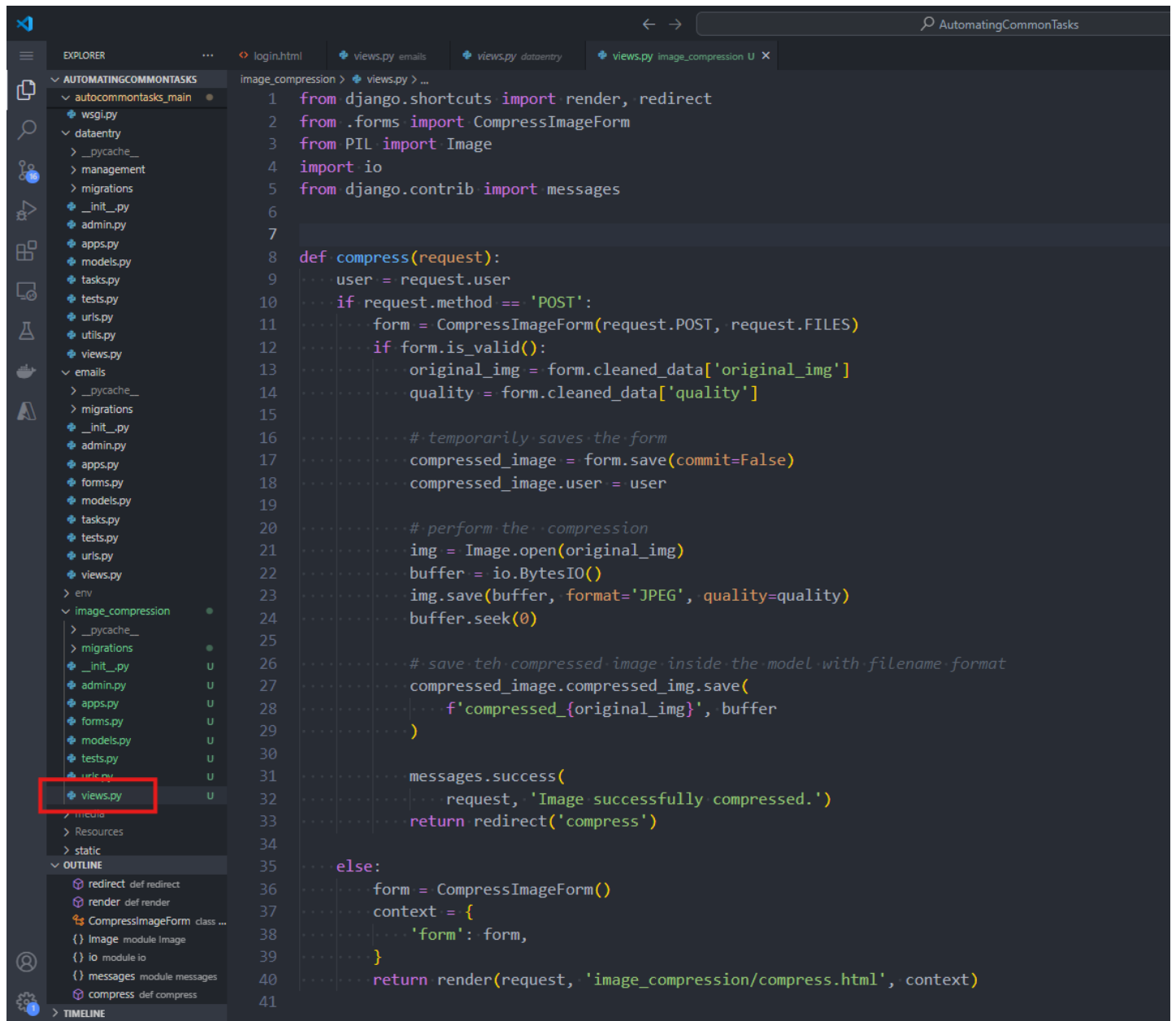
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS AZURE

?(ckeditor.W0001) django-ckeditor bundles CKEditor 4.22.1 which isn't supported anymore and which does have unfixed security issues, see for example <https://ckeditor.com/cke4/release>, CKEditor 5 respectively django-ckeditor-5 after checking whether the CKEditor 5 license terms work for you) or switch to the non-free CKEditor 4 LTS package. See notice has been added by the django-ckeditor developers and we are not affiliated with CKSource and were not involved in the licensing change, so please refrain from complaining to us.

System check identified 1 issue (0 silenced).
August 30, 2024 - 16:35:55
Django version 4.2.14, using settings 'autocommontasks_main.settings'
Starting development server at http://127.0.0.1:8000/
Quit the server with CTRL-BREAK.

```
buffer cursor position or pointer at the beginning = > 0
buffer cursor position or pointer after image compression = > 1226514
buffer cursor position or pointer after return to zero = > 0
Internal Server Error: /image-compression/compress/
Traceback (most recent call last):
File "C:\Users\Rosilie\OneDrive\Desktop\LEARNING DJANGO PROJECTS\AutomatingCommonTasks\env\lib\site-packages\django\db\backends\utils.py", line 89, in _execute
```

17. The VIEWS.PY shall be:



18. Checking our ADMIN panel

← → ↻ ⓘ http://127.0.0.1:8000/admin/image_compression/compressimage/5/change/

Django administration

Home > Image_Compression > Compress images > commontask_admin

Start typing to filter...

AUTHENTICATION AND AUTHORIZATION

Groups + Add

Users + Add

DATAENTRY

Customers + Add

Employees + Add

Students + Add

EMAILS

Email trackings + Add

Emails + Add

Lists + Add

Sents + Add

Subscribers + Add

IMAGE_COMPRESSION

Compress images + Add

UPLOADS

Uploads + Add

Change compress image

commontask_admin

User: commontask_admin ✎ + 👁

Original img: Currently: original_images/flat-500-4322521_cpdmALp.jpg

Change: No file chosen

Quality: 30 ▼

Compressed img: Currently: compressed_images/compressed_flat-500-4322521_gFLYuX3.jpg

Change: No file chosen

19. To set the image format to any format not just JPEG, we update our VIEWS.PY AS:

```
... # perform the compression
... img = Image.open(original_img)

... # set the image format based on the uploaded image's format
... output_format = img.format

... buffer = io.BytesIO()
... img.save(buffer, format=output_format, quality=quality)
... buffer.seek(0)

... # save the compressed image inside the model with filename format
```