Django And Flutter — A Step by Step Tutorial for a Boilerplate Application

Introduction

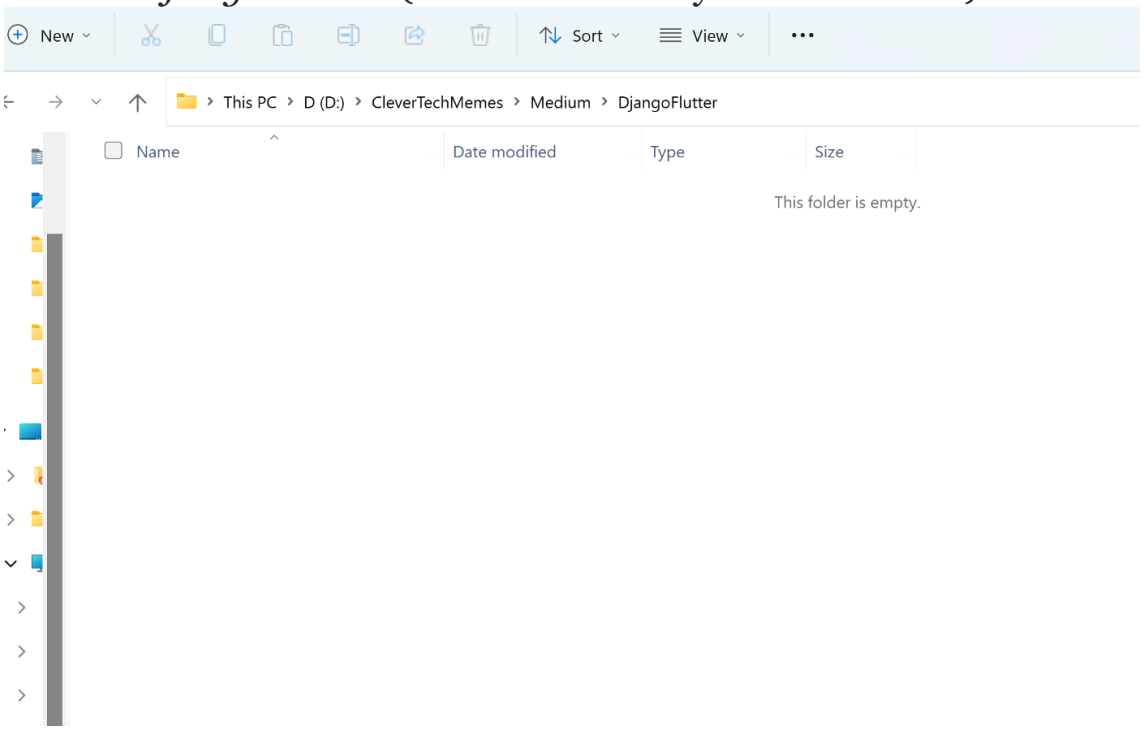
Django and *Flutter* are two fundamental backend and frontend tools for entrepreneurs and programmers to develop their applications. *Django* is well-known for its flexible and fast development capabilities based on *Python* programming language and *Flutter* is a platform-independent frontend technology based on the *Dart* language. In this tutorial, it is going to be shown step by step how to create a *Django* and *Flutter* application and what changes are needed to be applied to both that they can communicate with each other.

You can find the code for the Django and Flutter boilerplate at Clever Tech Memes GitHub repository. You can follow me on Clever Tech Memes, Twitter and YouTube for the latest educational content.

Preparing the Environment and the Requirements

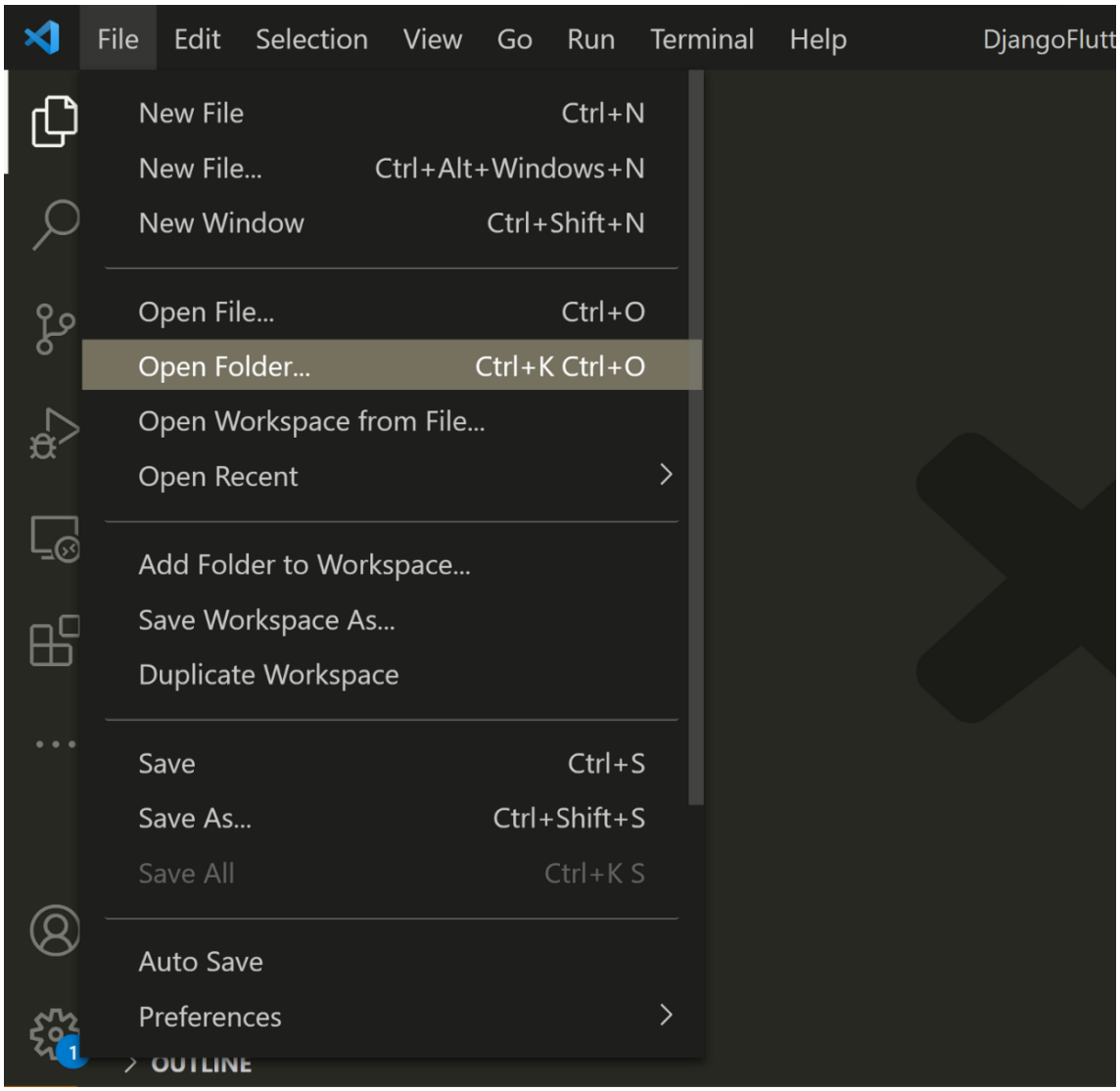
For this tutorial, it is required that you install Flutter based on your operating system. Also, you need to install VSCODE IDE for your machine. After, the installation completes, you need to open *VSCODE*, and create a folder to keep

your *Django* and *Flutter* code like the following empty folder named *DjangoFlutter* (You can choose your own name):

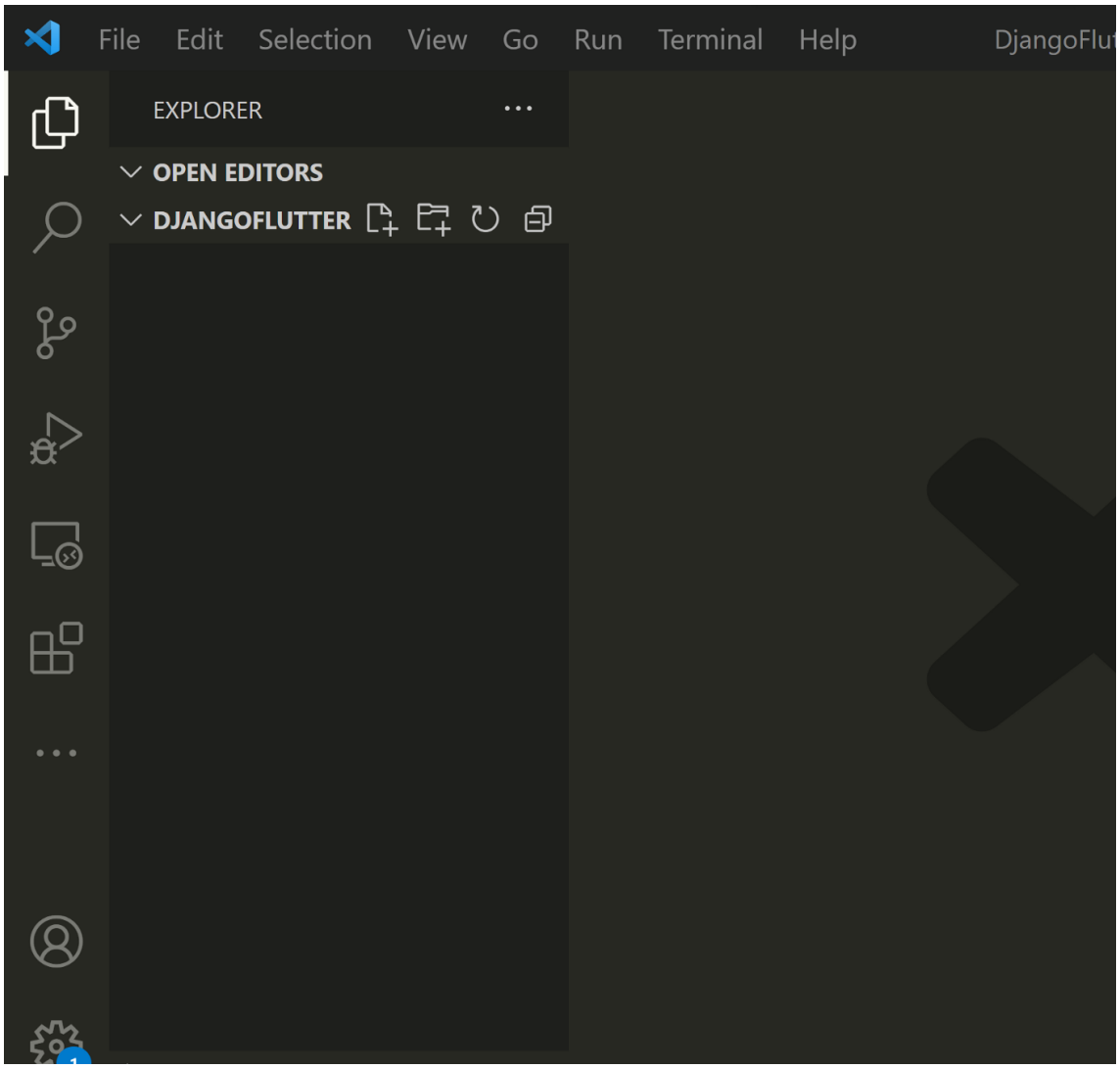


Empty folder to keep your Django and Flutter code

After, you open the *VSCODE*, you can open the *DjangoFlutter* folder by clicking on File and Open Folder as follows:

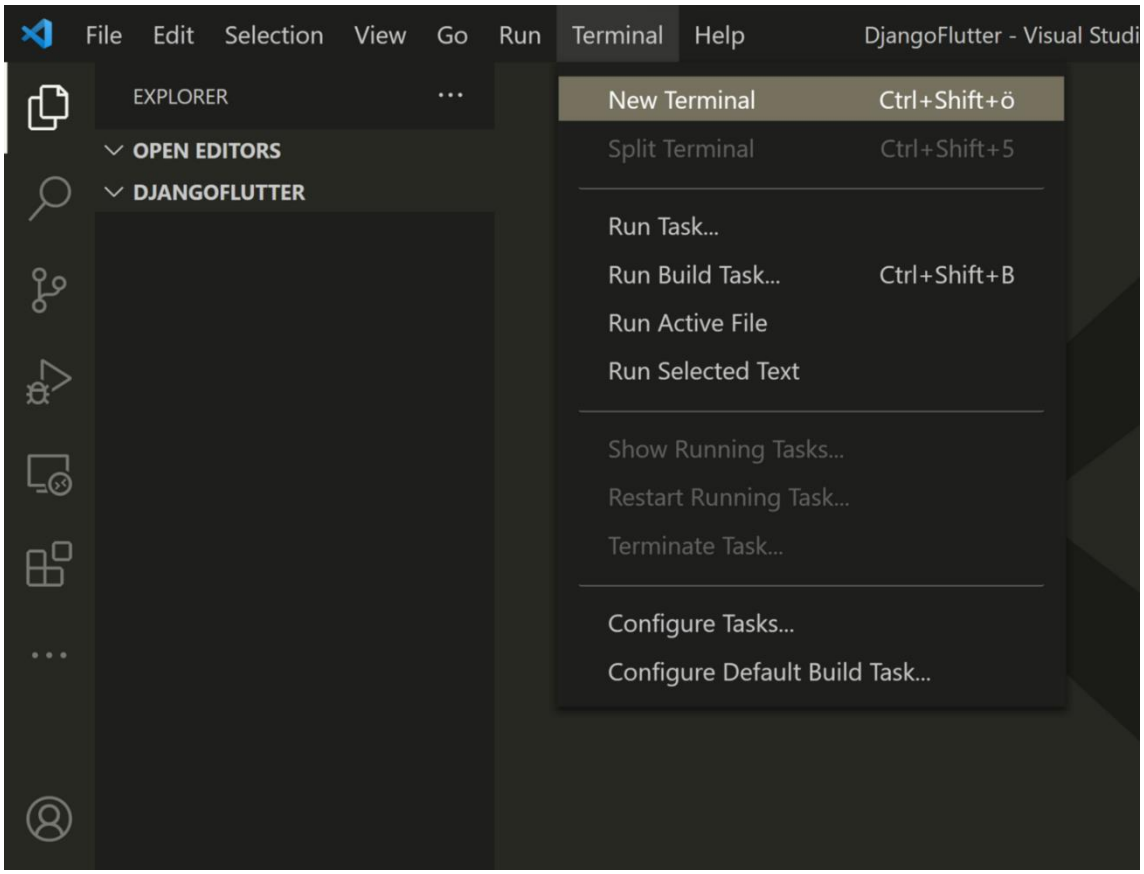


Now, you can see the DjangoFlutter folder on your VSCODE explorer as follows:



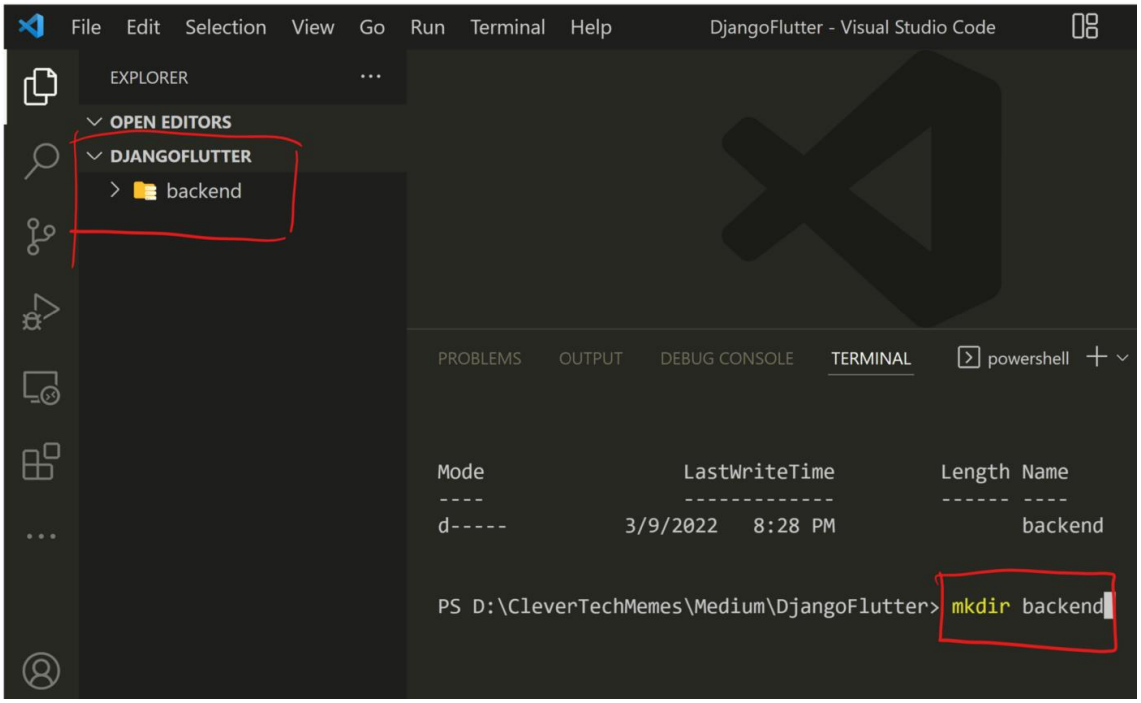
Seeing the Djangoflutter folder

Open a new terminal as shown below:



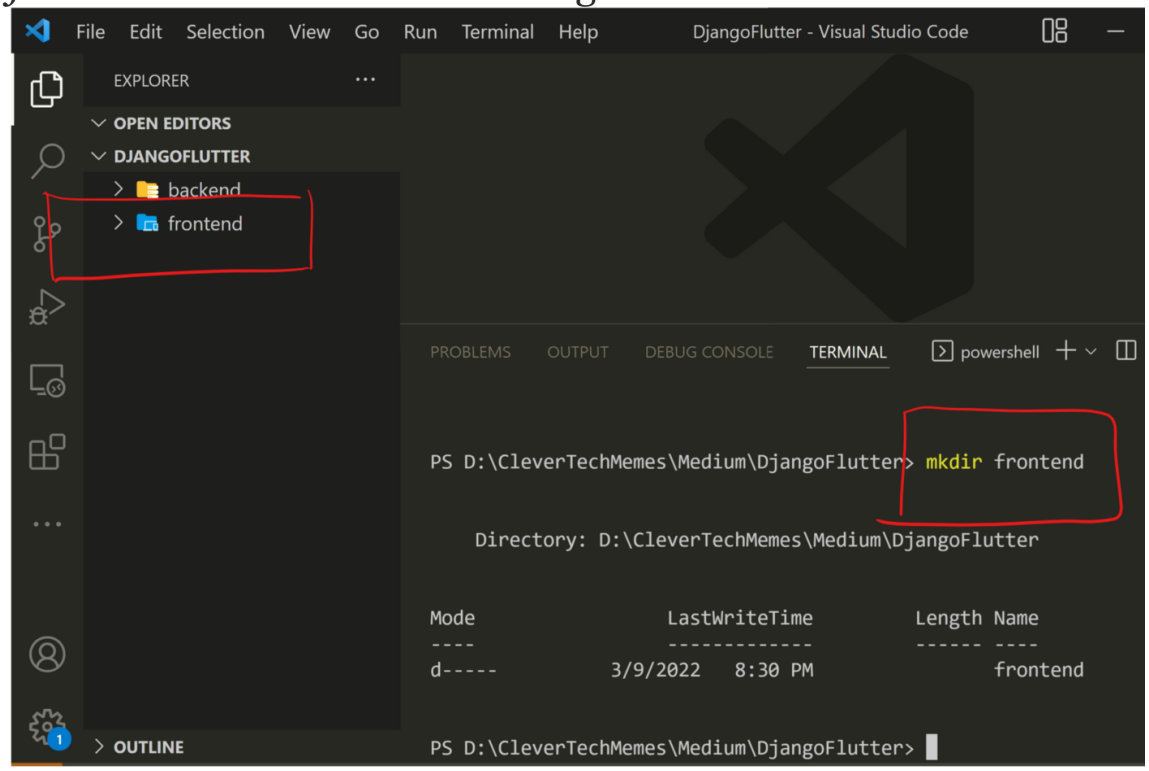
Opening a terminal in VSCODE

Now, you can create a folder named *backend* using the *mkdir command:*



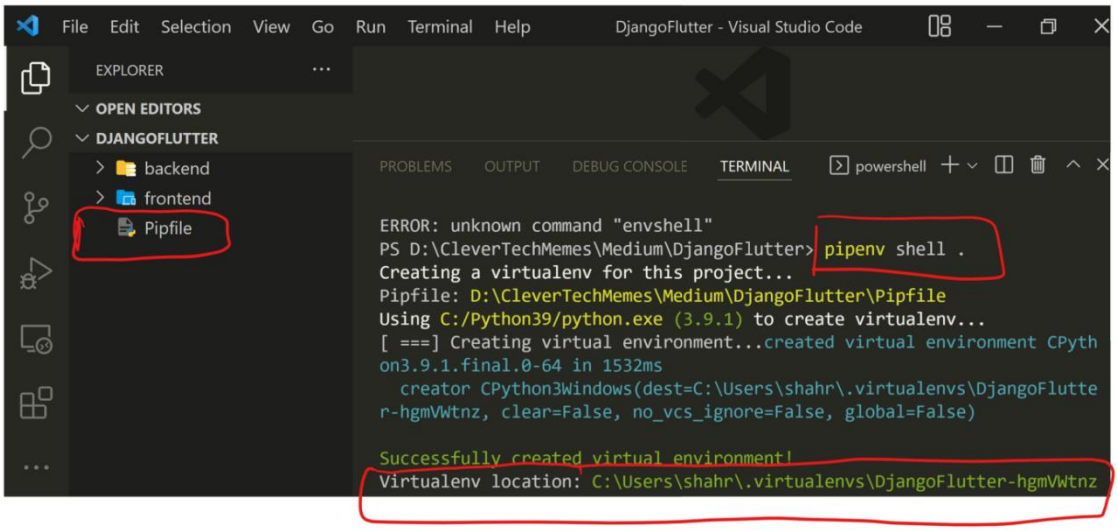
Creating a backend folder

Then, a folder named *frontend* is created using *mkdir frontend* command like following:



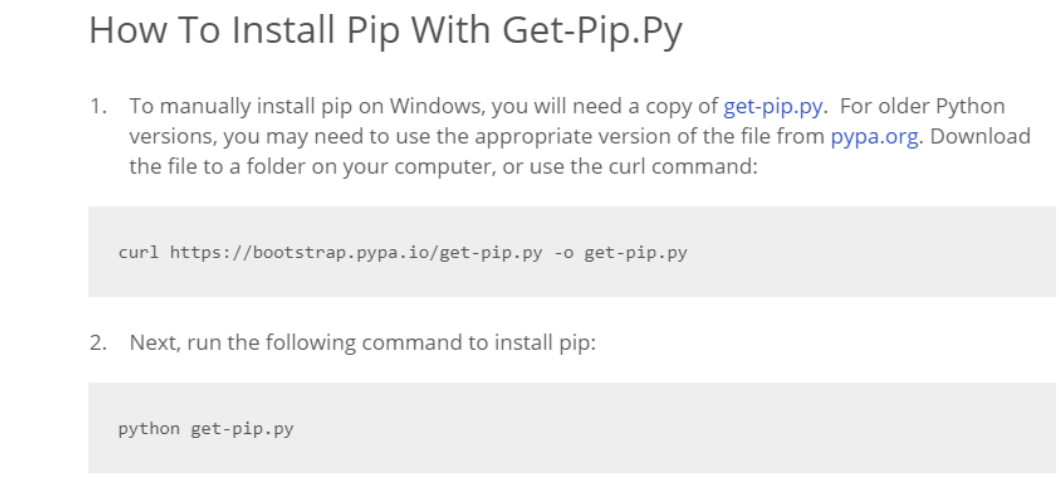
Creating a frontend folder

It is recommended to work within a virtual environment, so let us create a virtual environment for installation of the libraries, so we use ***"pipenv shell ."*** as follows:



Creating a virtual environment

In case, you do not have installed *Python* , *pip or pipenv*, you need to install them. You can have a look at this article *"Installing pip"* for the installation of *pip*. Especially, you can refer to the following section for installing *pip:*



How To Install Pip With Get-Pip.Py

1. To manually install pip on Windows, you will need a copy of get-pip.py. For older Python versions, you may need to use the appropriate version of the file from pypa.org. Download the file to a folder on your computer, or use the curl command:

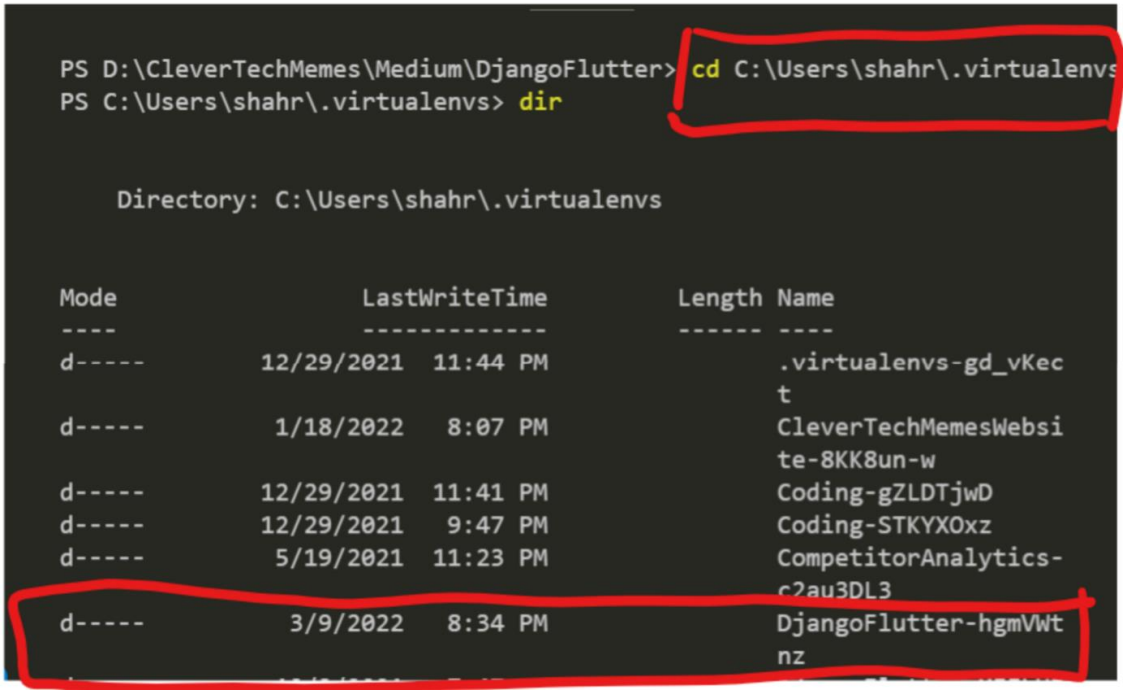
```
curl https://bootstrap.pypa.io/get-pip.py -o get-pip.py
```

2. Next, run the following command to install pip:

```
python get-pip.py
```

Installing Pip

Now, one can go to the path containing all the virtual environments and see the created virtual environment:

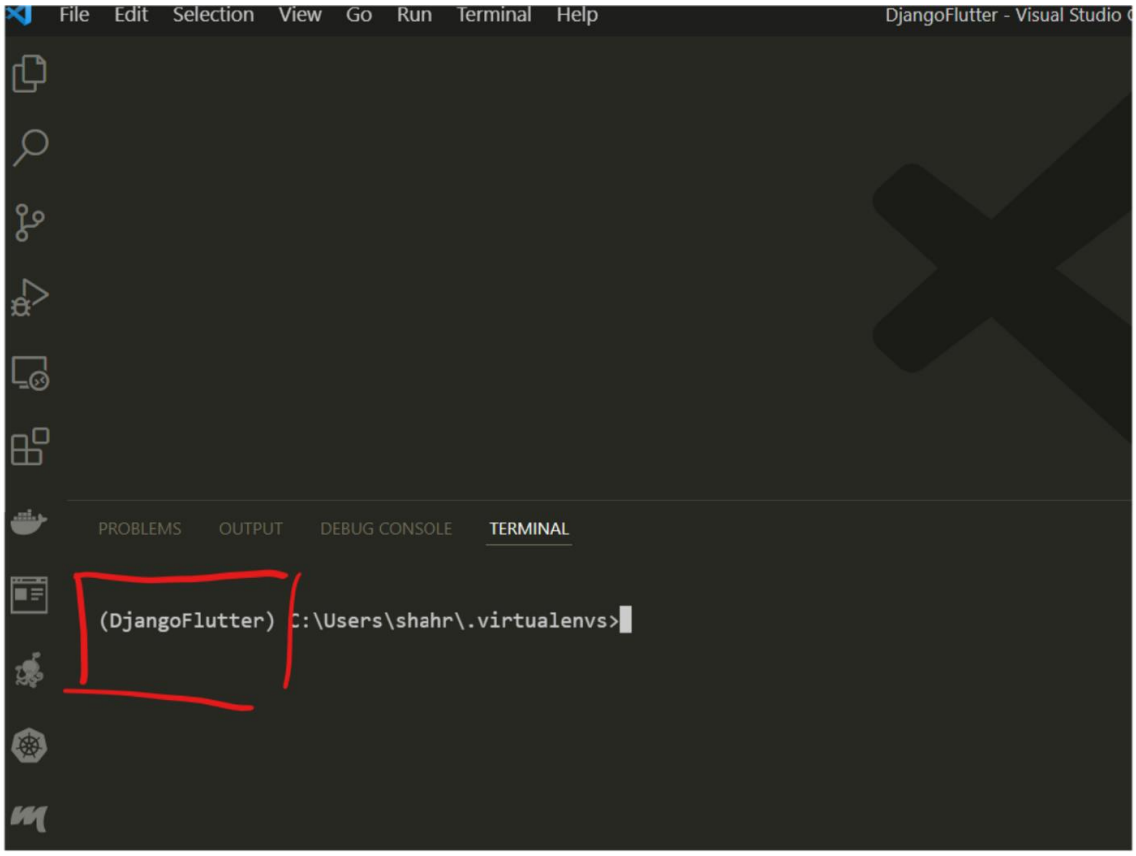


```
PS D:\CleverTechMemes\Medium\DjangoFlutter> cd C:\Users\shahr\.virtualenvs
PS C:\Users\shahr\.virtualenvs> dir


    Directory: C:\Users\shahr\.virtualenvs


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
d-----        12/29/2021  11:44 PM                .virtualenvs-gd_vKect
d-----         1/18/2022   8:07 PM                CleverTechMemesWebsite-8KK8un-w
d-----        12/29/2021  11:41 PM                Coding-gZLDTjwD
d-----        12/29/2021   9:47 PM                Coding-STKYXOxz
d-----         5/19/2021  11:23 PM                CompetitorAnalytics-c2au3DL3
d-----          3/9/2022   8:34 PM                DjangoFlutter-hgmVWtnz
```

Seeing the Created Virtual Environment

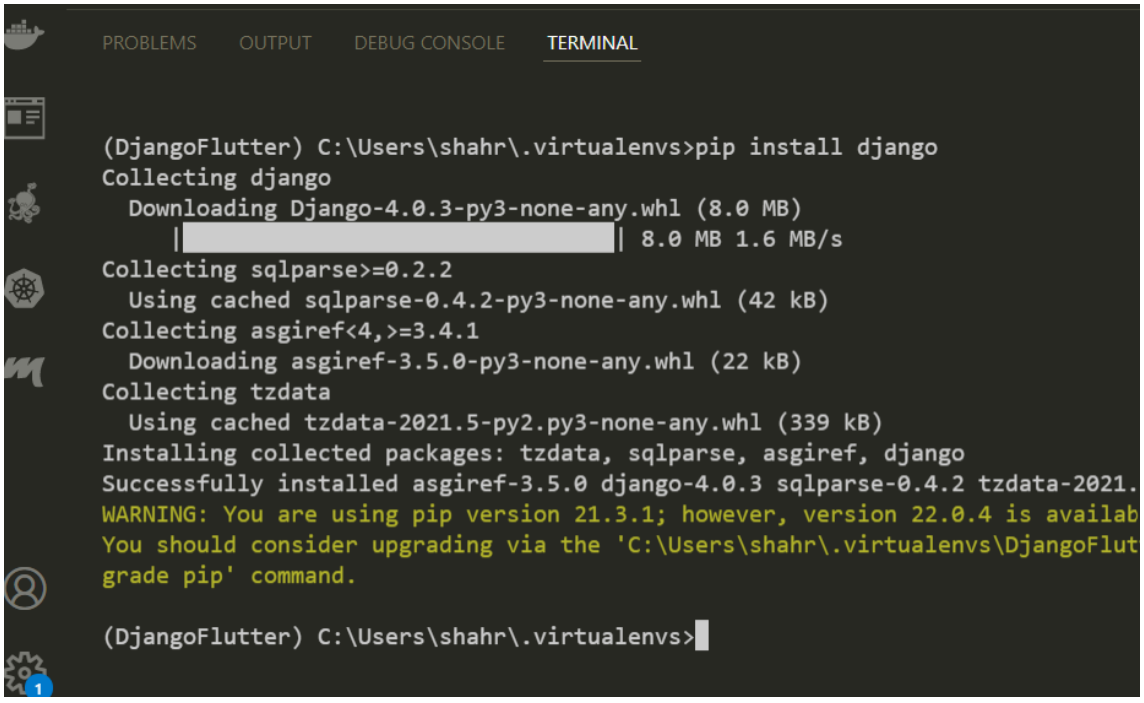
You can see all your virtual environments, you can now activate your virtual environment by using **“.\”** like the following picture. Please pay attention that there is a ***Scripts folder*** inside as well as an ***activate*** file so you need to run the following command (On other operating systems like MAC it may be slightly different); however, you may still face the following error as you may be on ***powershell*** and you need to switch to ***command prompt (cmd)***:

Now, it should be possible to see that the virtual environment is activated:



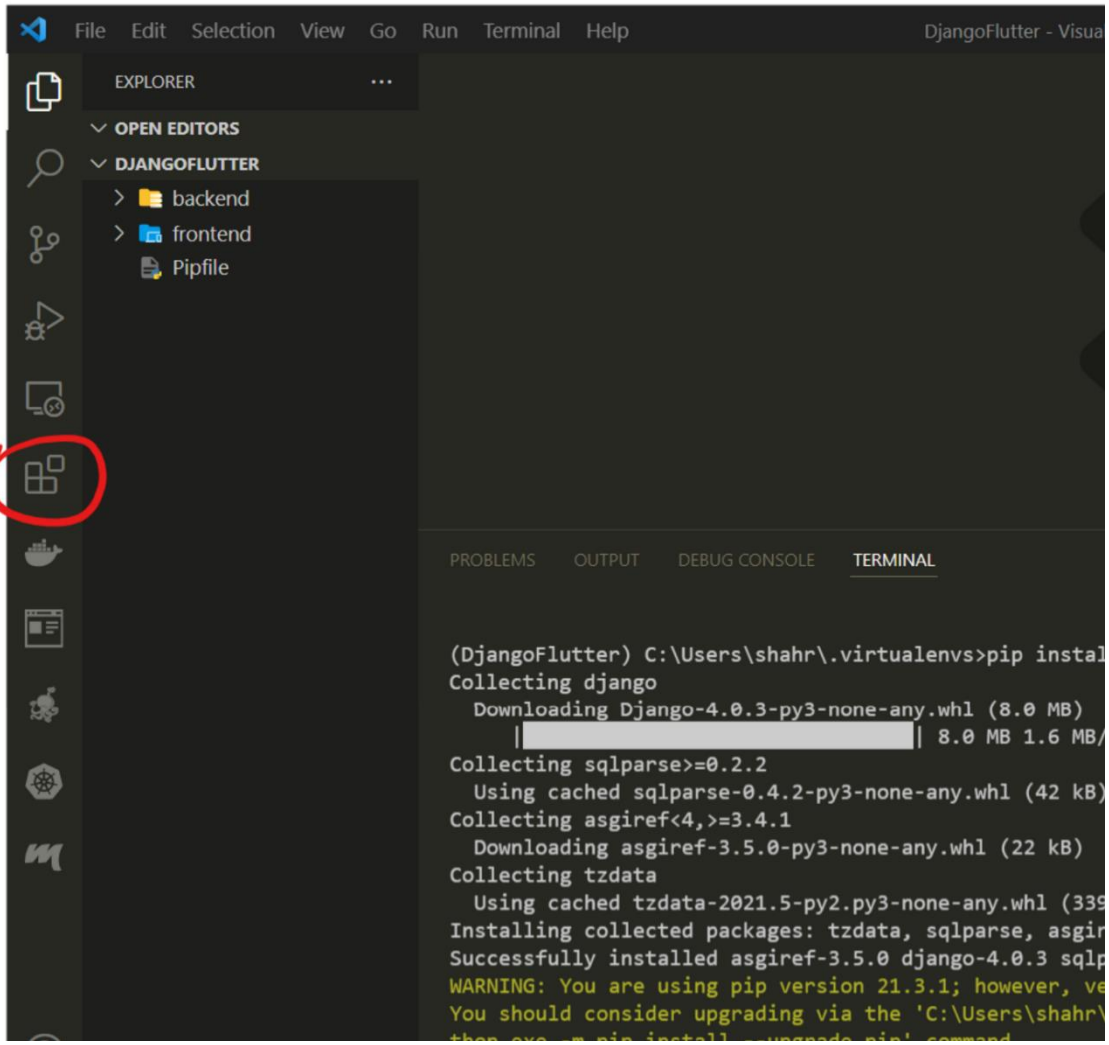
Activating the virtual environment

We can install ***django*** by using ***"pip install django"*** as follows:



pip install django

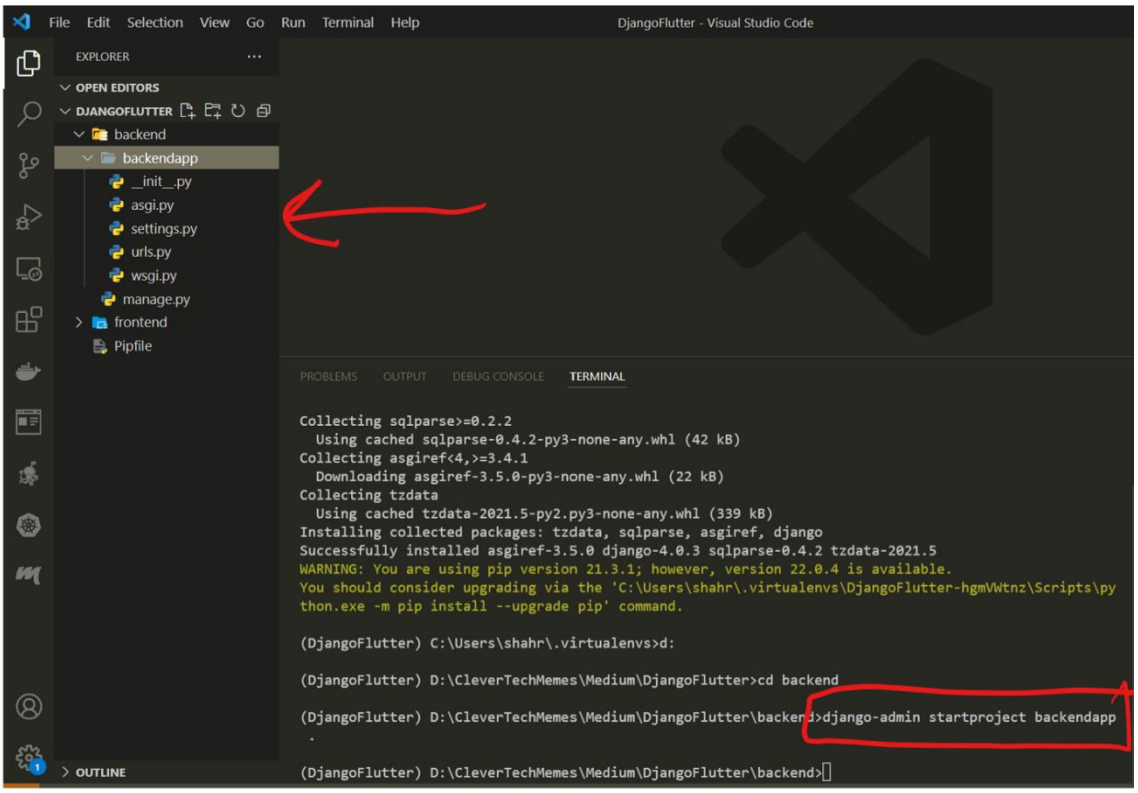
Click on the extensions and install the useful extensions including **“Awesome Flutter Snippets”, “Dart”, “Flutter”, “Prettier”, “Python”, “Django”**



Extensions

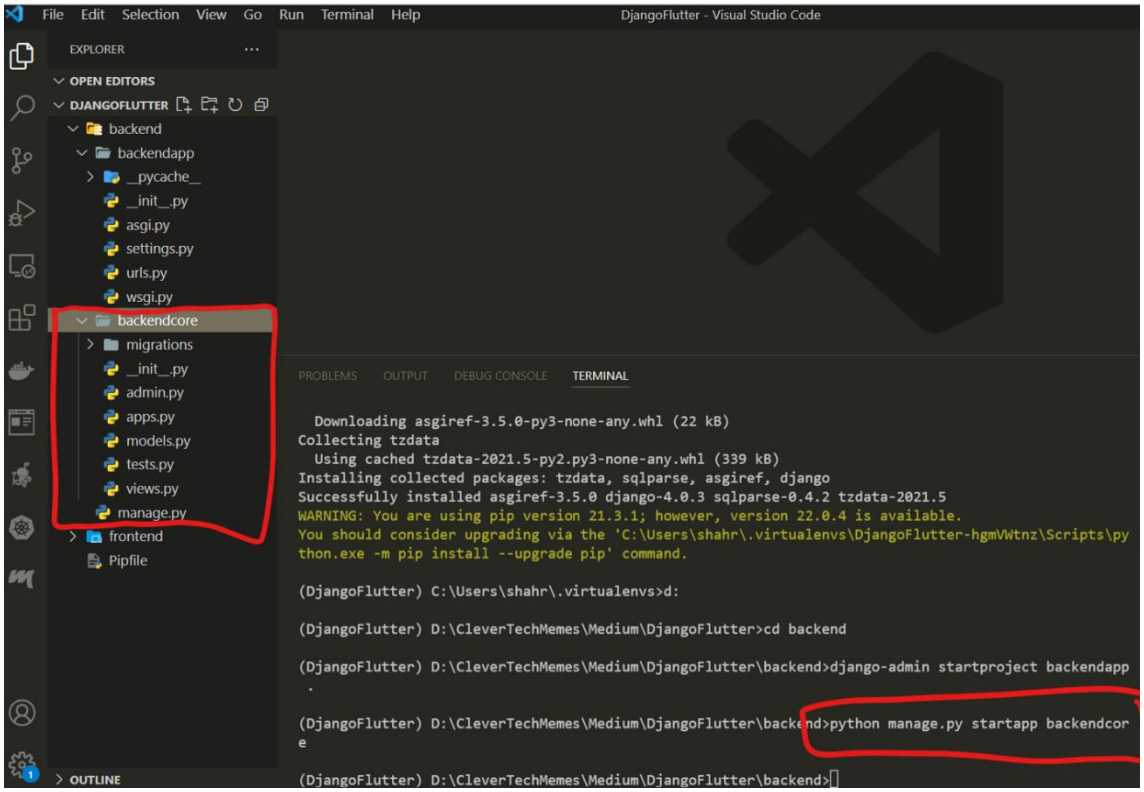
Creating And Running the Django Backend

Let us switch to the backend folder, and create a *django* project named ***backendapp*** using ***“django-admin startproject backendapp .”:***



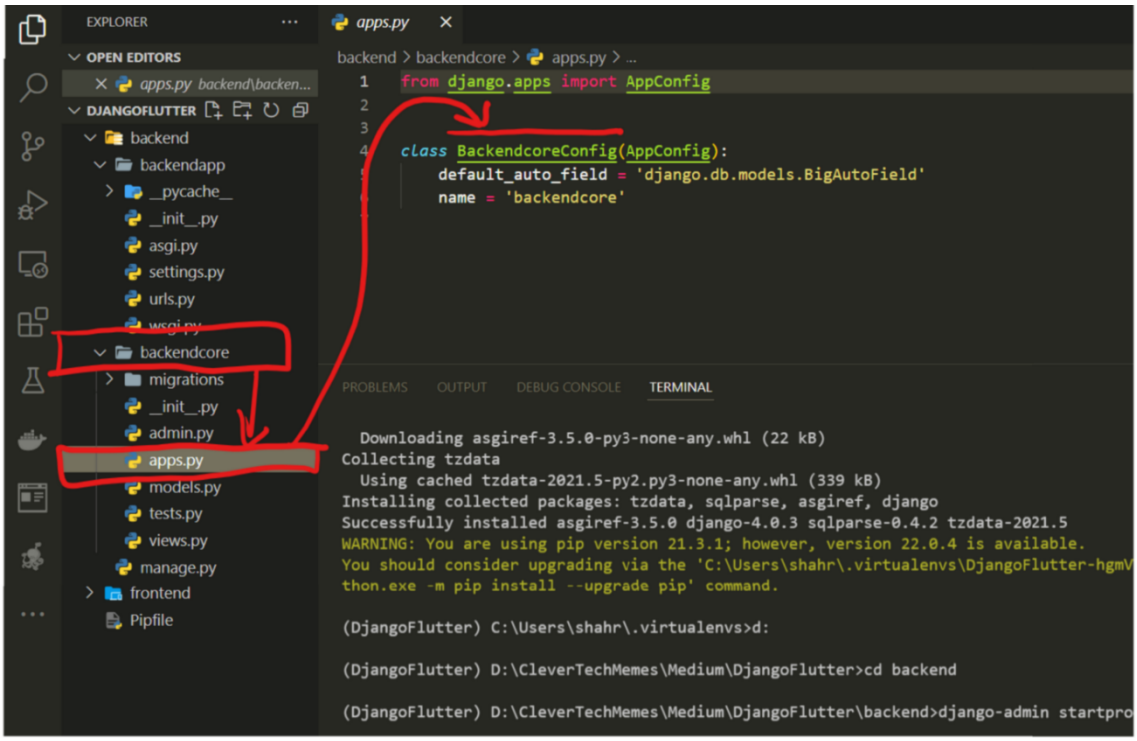
django-admin startproject backendapp .

The beauty of *Django* is the possibility to create various apps for different purposes e.g., user management. Let us create an app named ***backendcore*** by using ***“python manage.py startapp backendcore”***

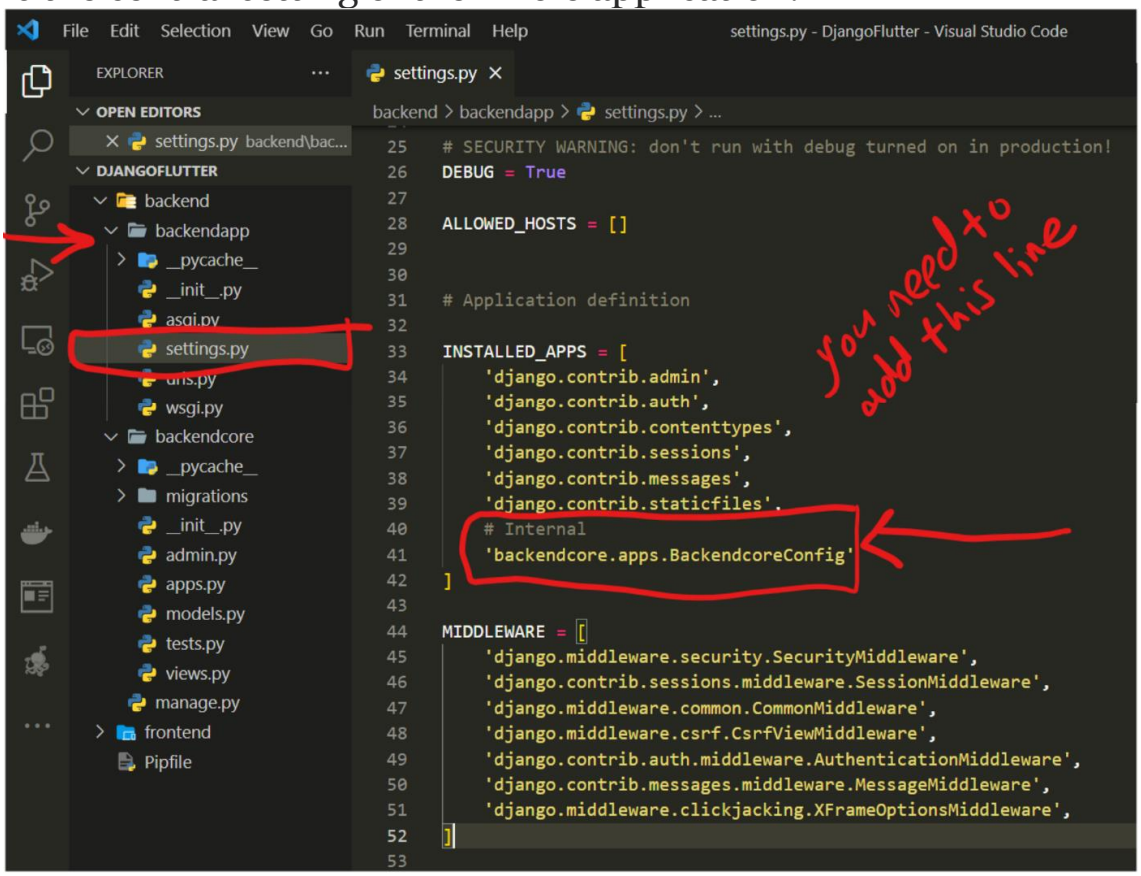


Creating an app

Now, we need to add the created app to the list of installed apps in Django. So, we can do it by referring to the ***apps.py*** file inside the ***backendcore***, and using the ***backendcoreconfig*** function



Now, it is needed to add this line to the ***settings.py*** file which is the central setting of the whole application:

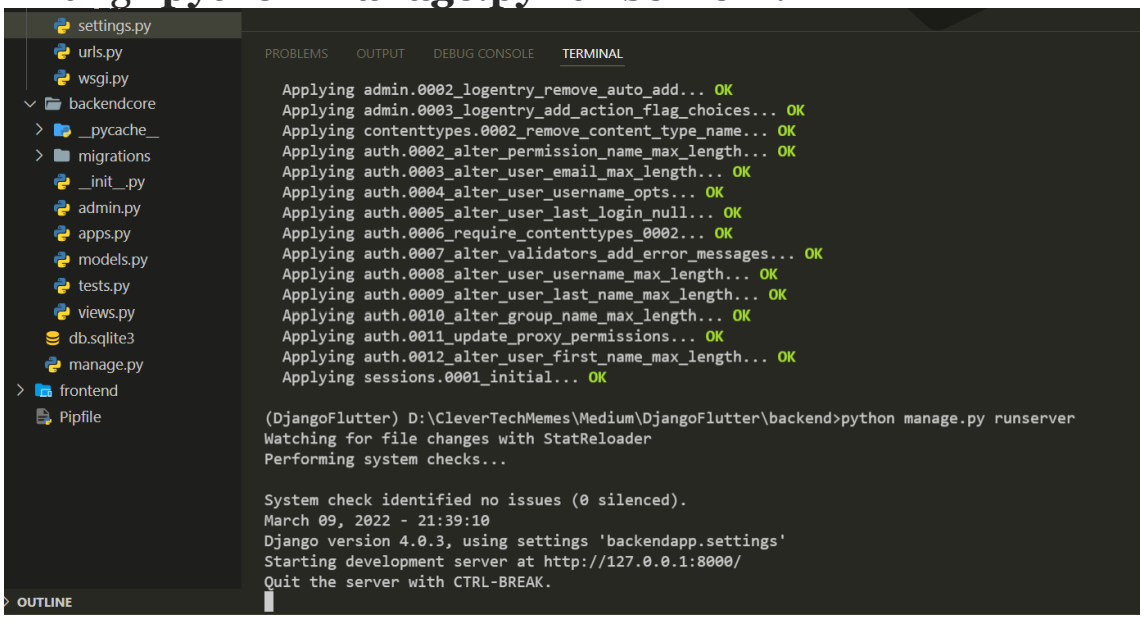


It is needed to migrate the changes by using **“python manage.py migrate”:**

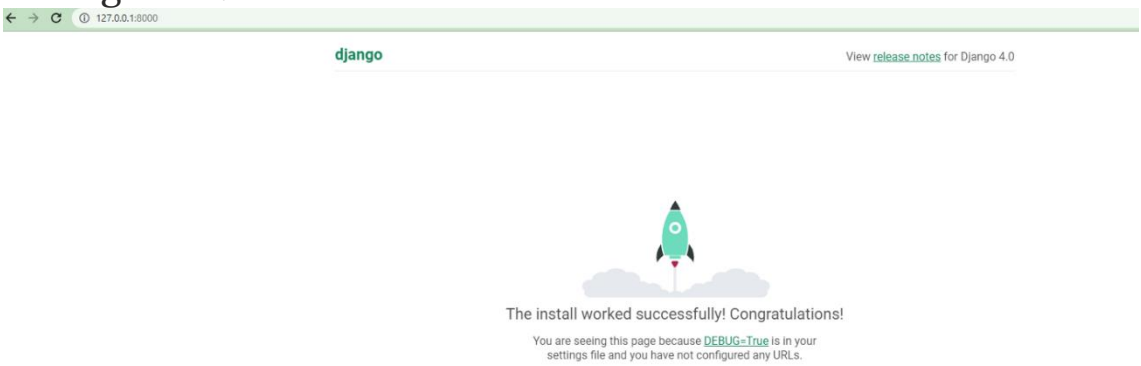
```
(DjangoFlutter) D:\CleverTechMemes\Medium\DjangoFlutter\backend>python manage.py migrate
Operations to perform:
  Apply all migrations: admin, auth, contenttypes, sessions
Running migrations:
  Applying contenttypes.0001_initial... OK
  Applying auth.0001_initial... OK
  Applying admin.0001_initial... OK
  Applying admin.0002_logentry_remove_auto_add... OK
  Applying admin.0003_logentry_add_action_flag_choices... OK
  Applying contenttypes.0002_remove_content_type_name... OK
  Applying auth.0002_alter_permission_name_max_length... OK
  Applying auth.0003_alter_user_email_max_length... OK
  Applying auth.0004_alter_user_username_opts... OK
  Applying auth.0005_alter_user_last_login_null... OK
  Applying auth.0006_require_contenttypes_0002... OK
  Applying auth.0007_alter_validators_add_error_messages... OK
  Applying auth.0008_alter_user_username_max_length... OK
  Applying auth.0009_alter_user_last_name_max_length... OK
  Applying auth.0010_alter_group_name_max_length... OK
  Applying auth.0011_update_proxy_permissions... OK
  Applying auth.0012_alter_user_first_name_max_length... OK
  Applying sessions.0001_initial... OK

(DjangoFlutter) D:\CleverTechMemes\Medium\DjangoFlutter\backend>
```

Migrating the changes

It is the time to see that we can run the Django server by writing **“python manage.py runserver”:**



If one goes to the browser and write 127.0.0.1:8000, s/he can see that the *Django* is up and running and you can access it through the browser:

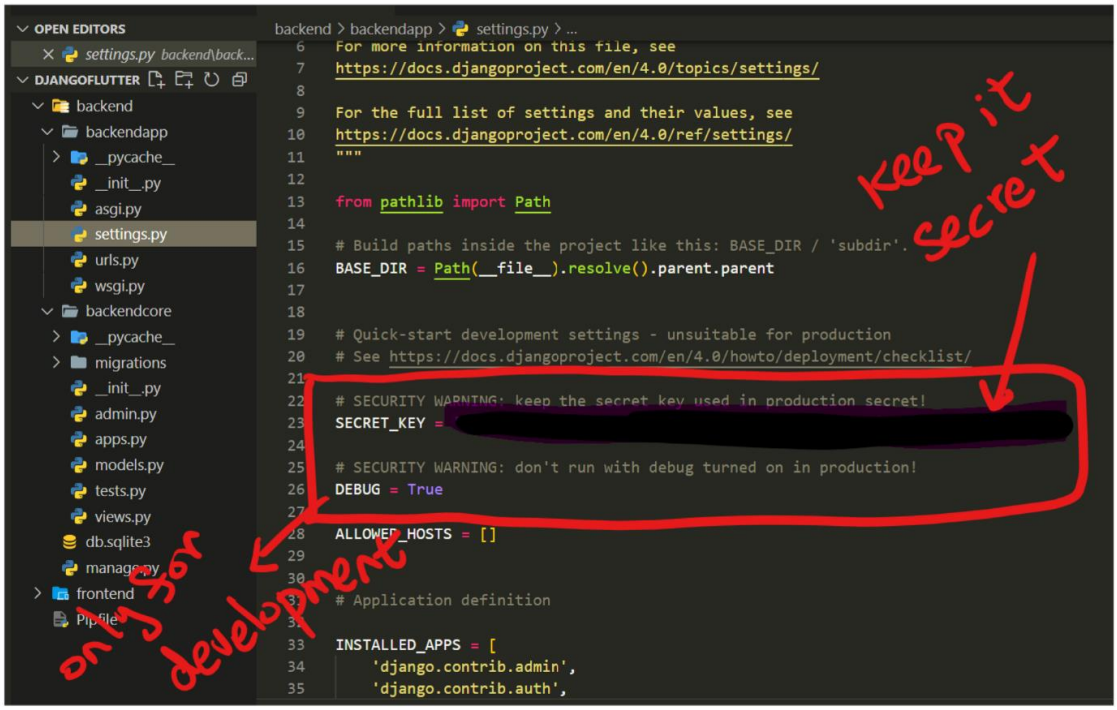


Django is up and running

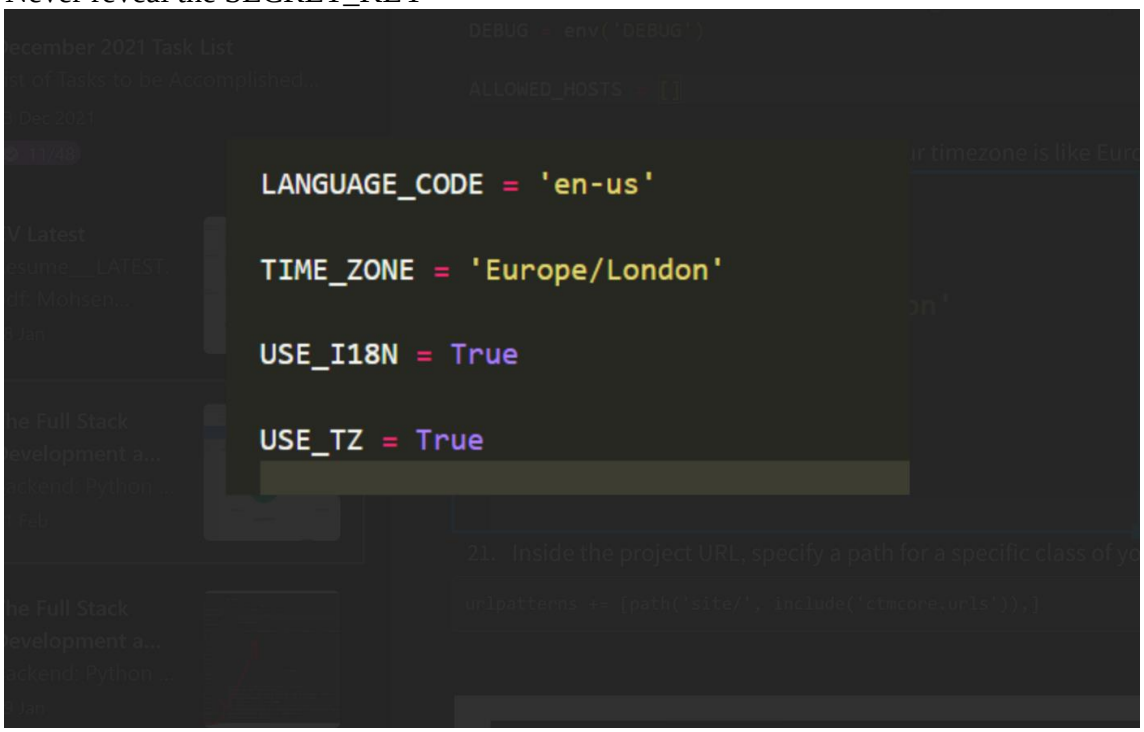
Improving the Django Setup

It is time to improve the Django setup, and it is important to keep in mind three main things:

1. **Timezone**: You need to adjust it to your timezone.
2. **Secret_key**: You should not reveal it to the public, otherwise, it can endanger the security of your application.
3. **DEBUG mode**: You need to change it when moving to production but for development being in *DEBUG mode* is fine.



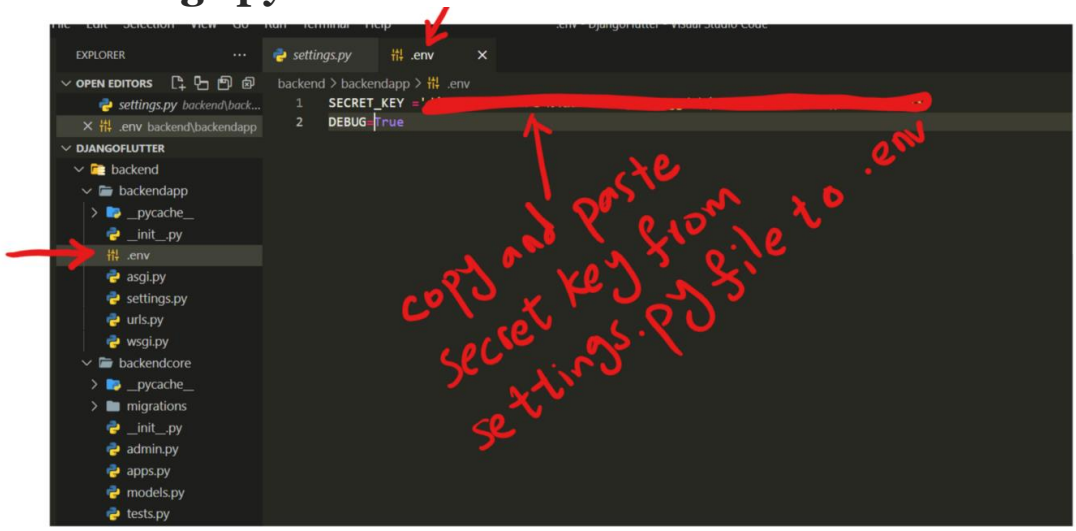
Never reveal the SECRET_KEY



Adapt time zone

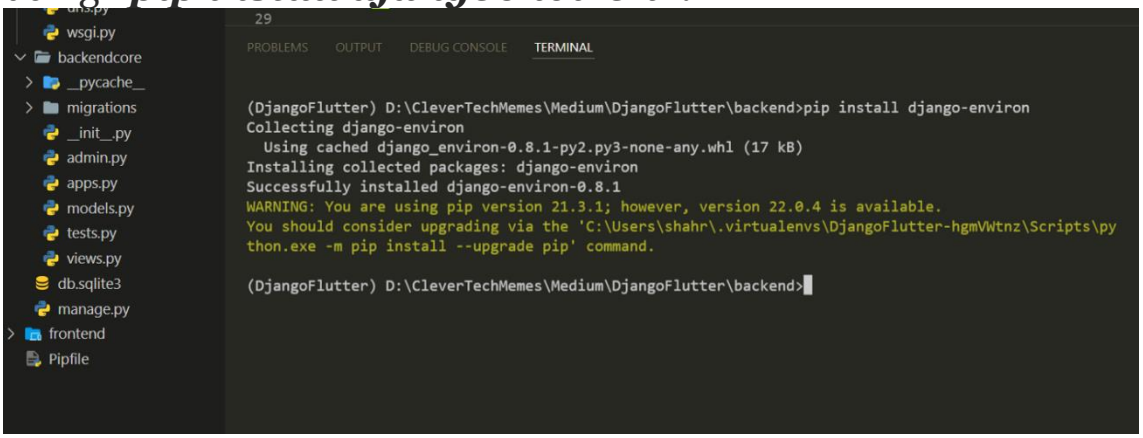
Let us explore how it is possible to consider the above matters. It is a best practice to consider **.env** file and keep the environmental variables like **secret_key** in that file and avoid pushing it to the public repositories. Therefore, let us

create **.env** file and copy and paste the **secret_key** from the **settings.py** to the **.env** file:



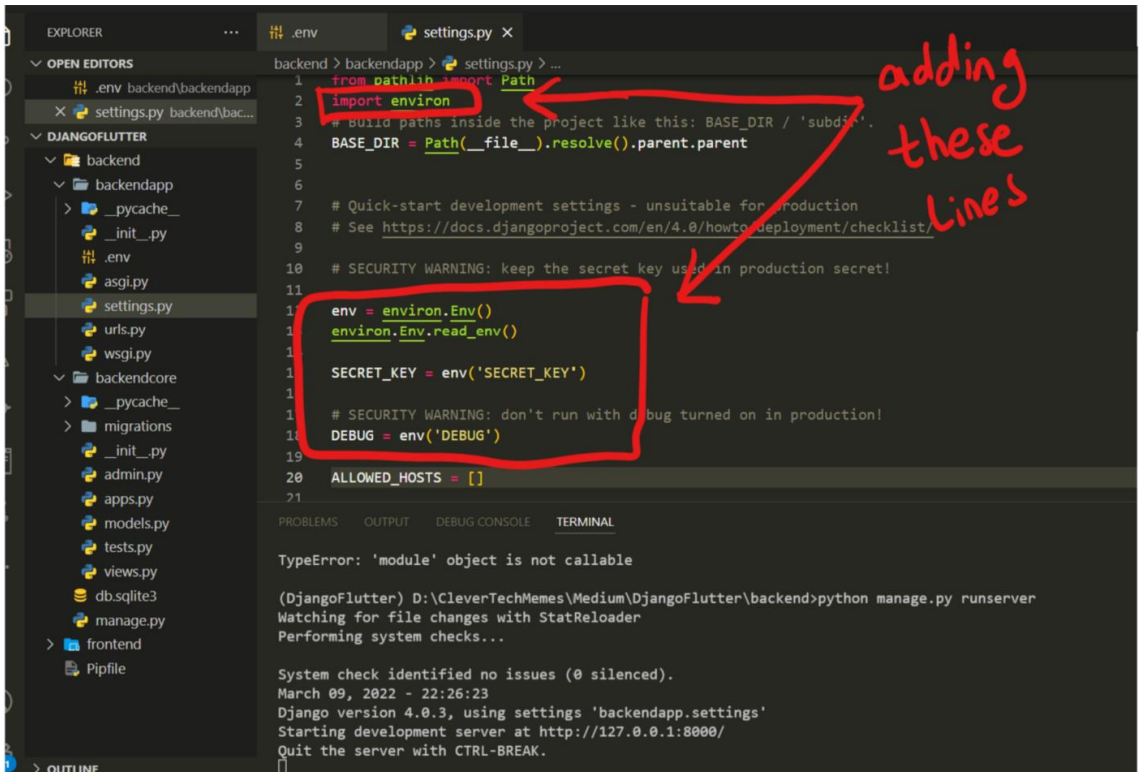
Creation of .env file

Now, we need to import these variables to the ***settings.py*** but for doing that, we need to install ***djangoenviron*** by using ***"pip install djangoenviron":***



pip install djangoenviron

It is needed to add these lines of codes specified in red to import the variables from the ***.env*** file and keep the environmental variables in a central and safe place:

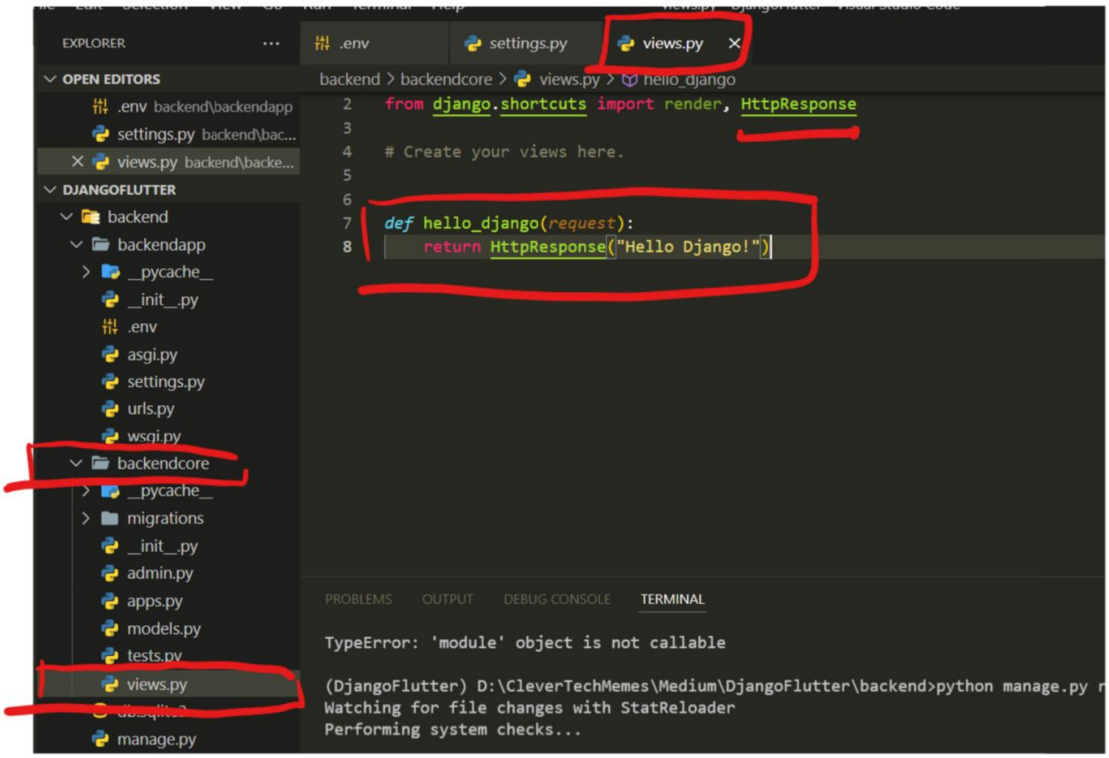


Importing environmental variables

You can see in above picture that we can still run the server properly.

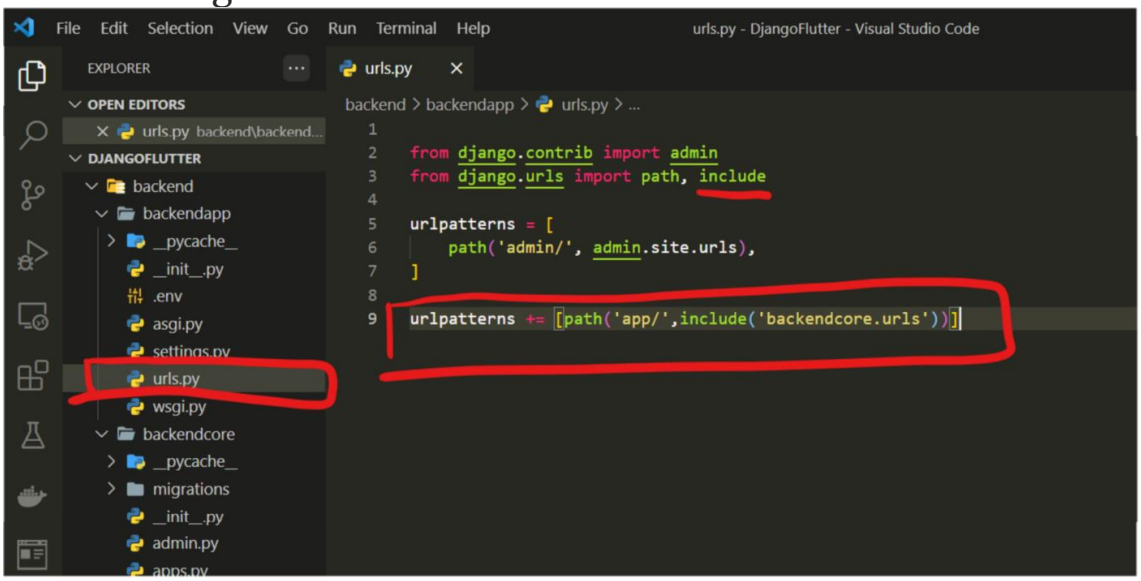
Writing a Simple View and Routing in Django

Let us now write a hello world view in *Django*: For doing that, it is needed to open ***views.py*** in the ***backendcore,*** and write the following function



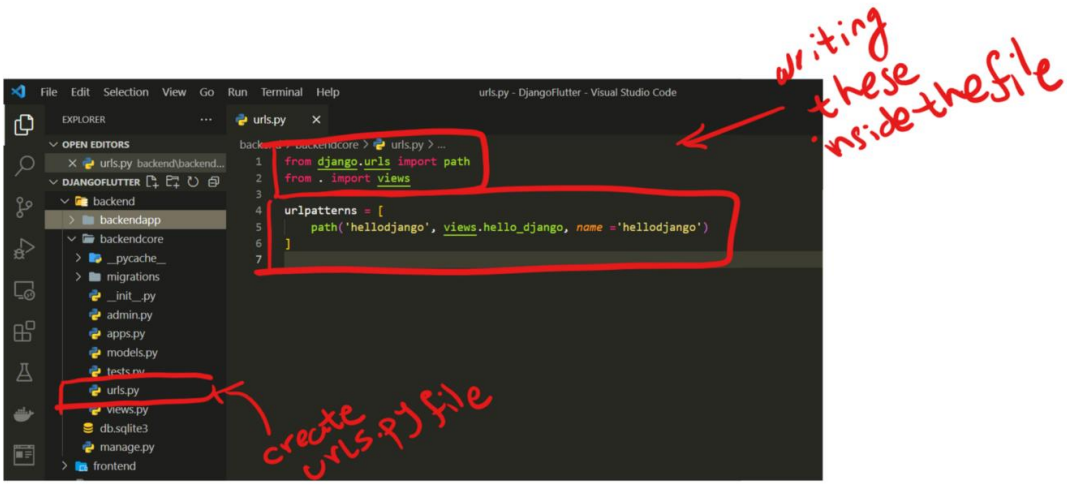
Writing a simple view

It is needed to route the incoming requests to the defined view, so we can edit the ***urls.py*** inside ***backendapp*** folder and add the following:



This means that paths with ***'app/'*** will be routed to the ***backendcore***; however, there does not yet exist

a ***urls.py*** file, so, let us create a ***urls.py*** inside the ***backendcore:***

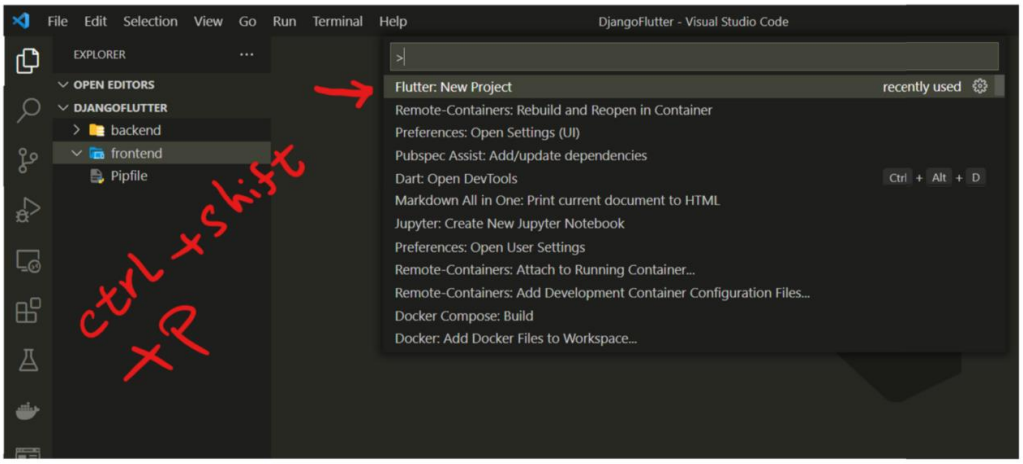


Creating the urls.py inside backendcore

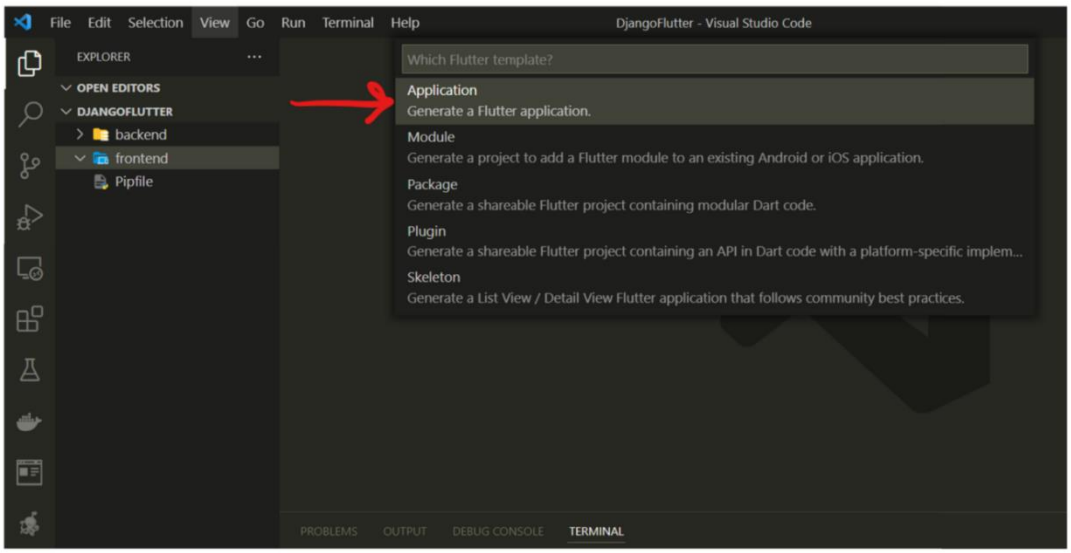
You should be able still to start the server, and now it is time to add the *Flutter* frontend

Creating Flutter Frontend

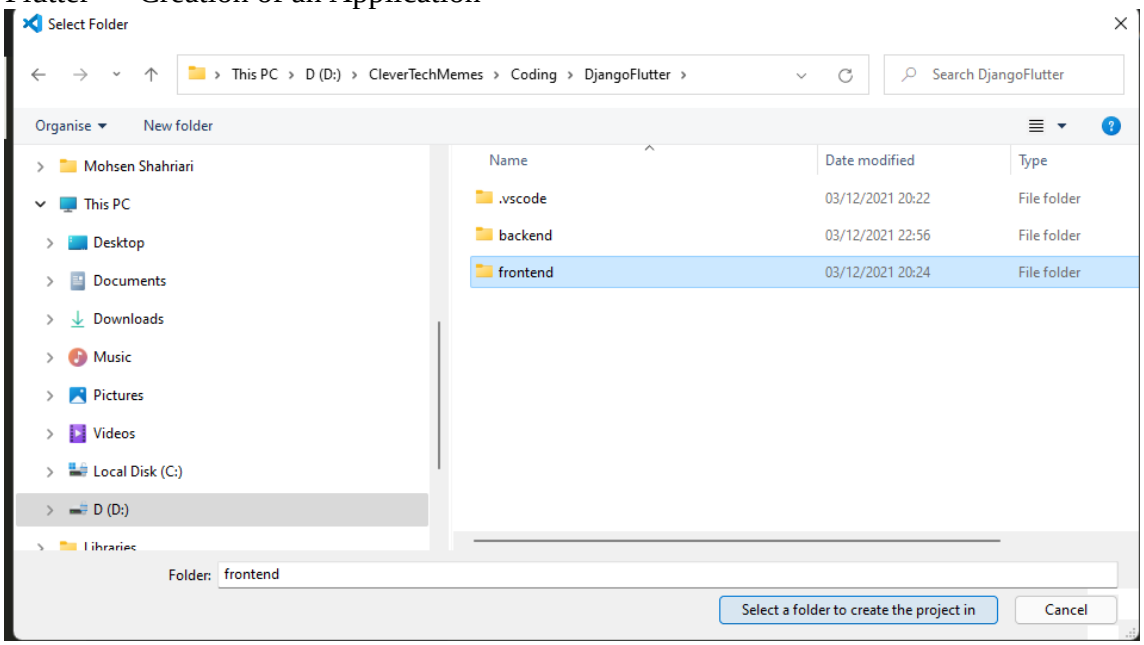
You need to first install Dart and Flutter — I assume it has been done. We can create a Flutter project in *VSCODE* using ***"CTRL + SHIFT + P"*** and selecting ***"Create Flutter Application"***, and then select the folder for creating the flutter application



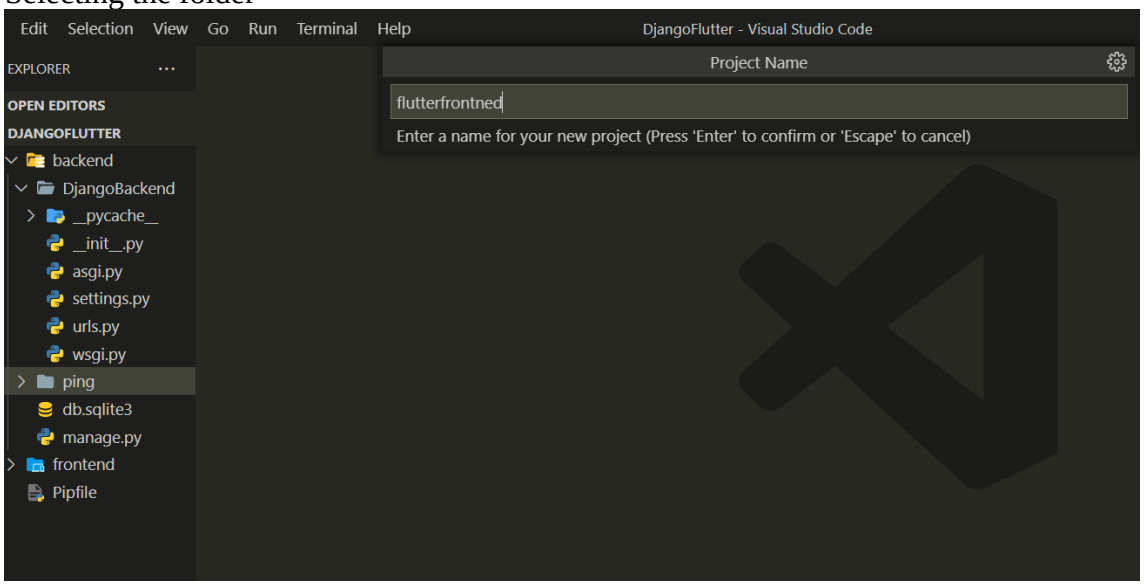
Flutter: New Project



Flutter — Creation of an Application

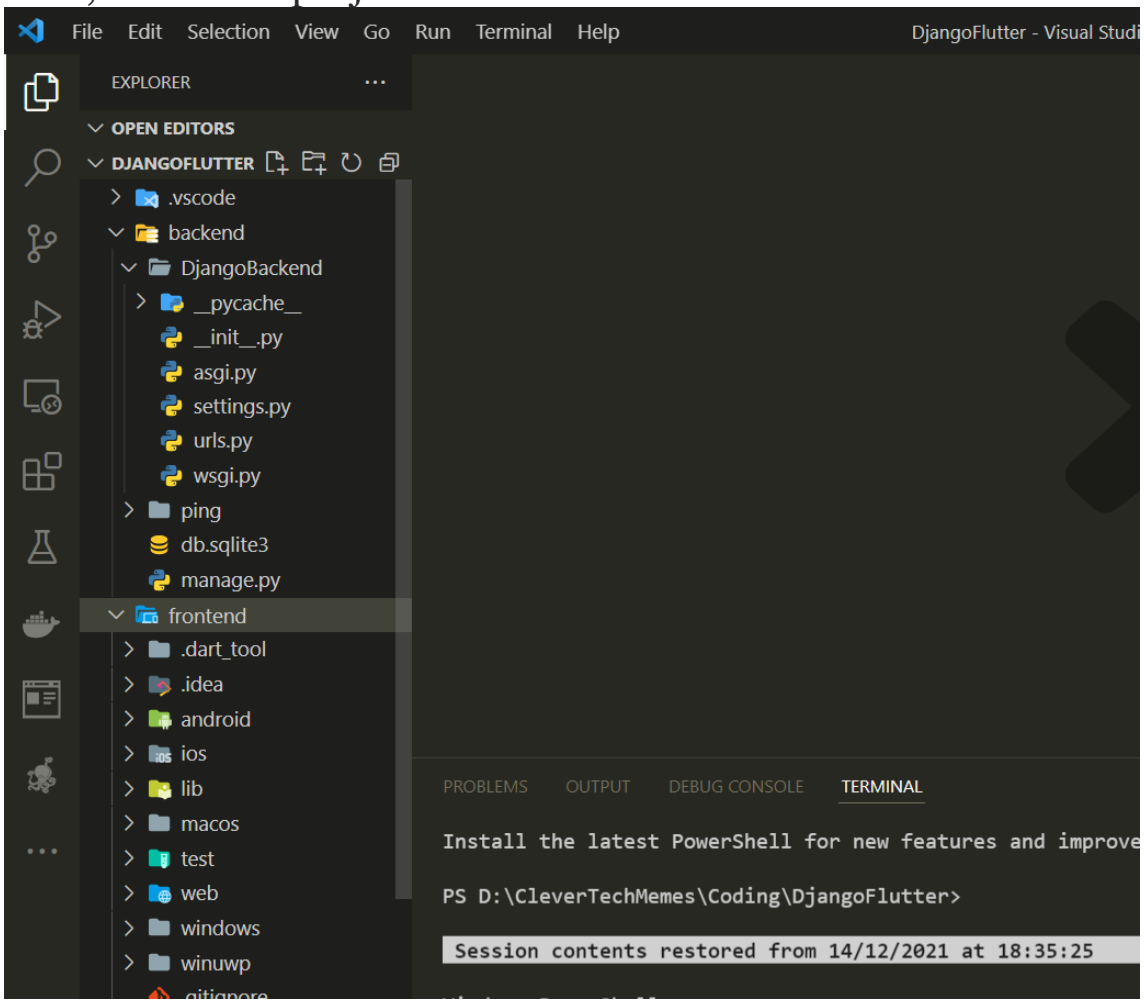


Selecting the folder

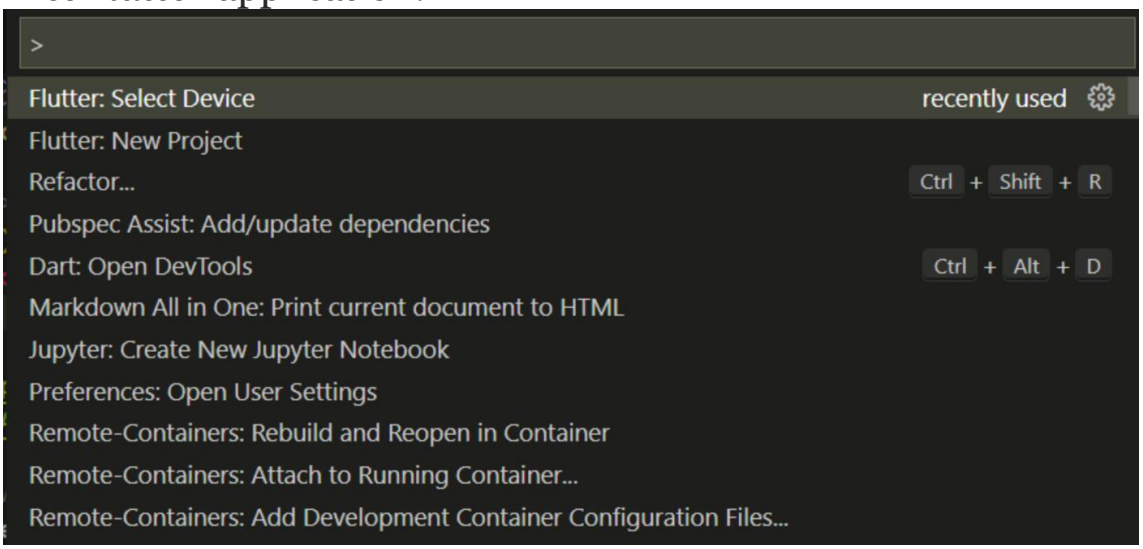


Name of the Flutter app

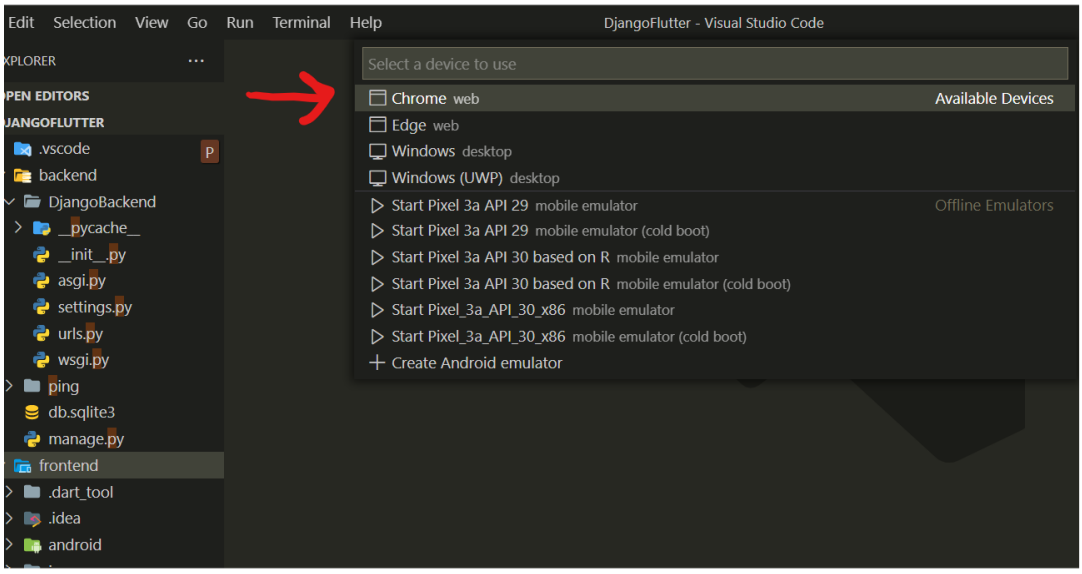
Now, the flutter project is created



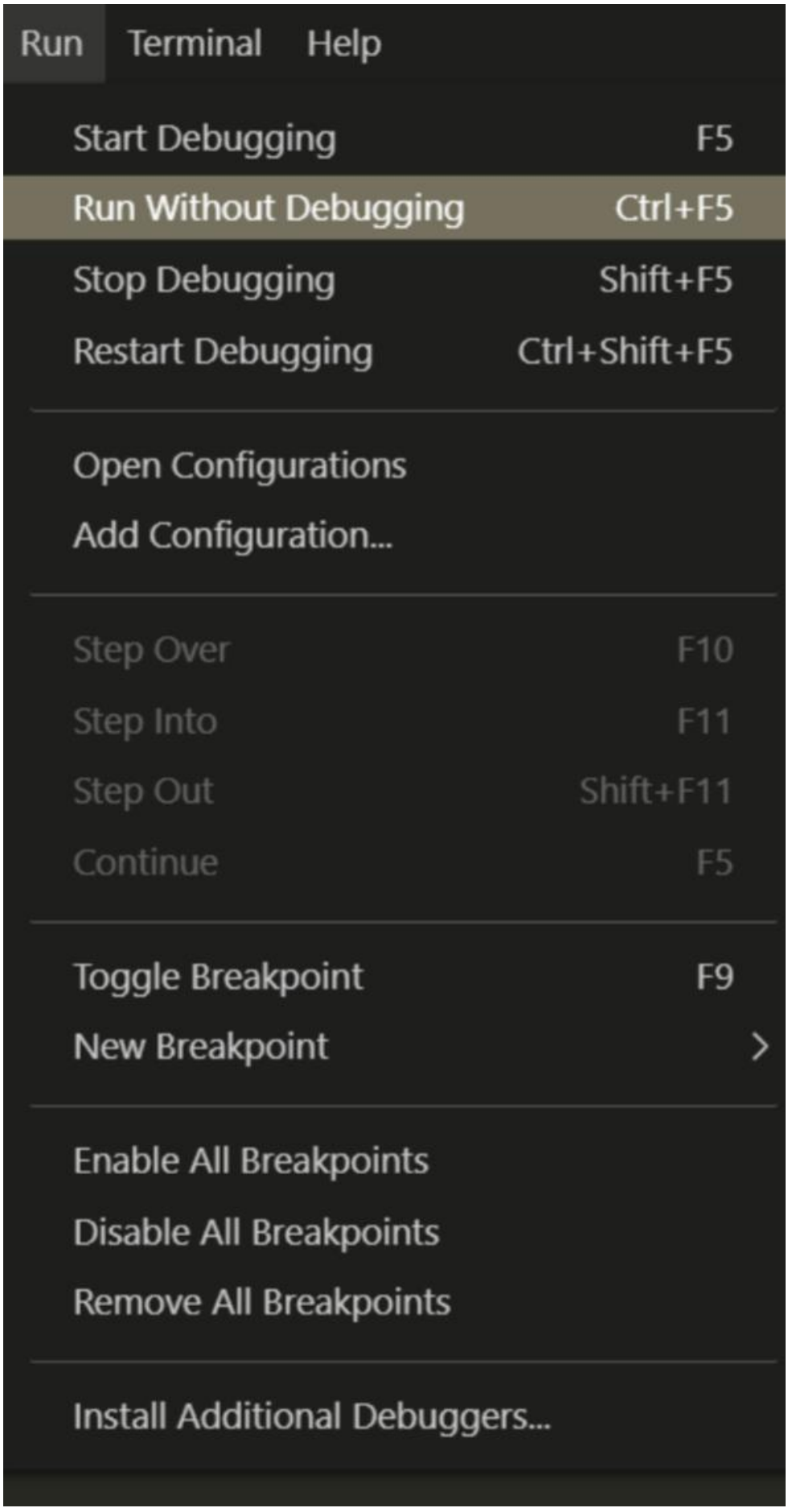
we can select the device, and start running our first *Flutter* application:



Select device

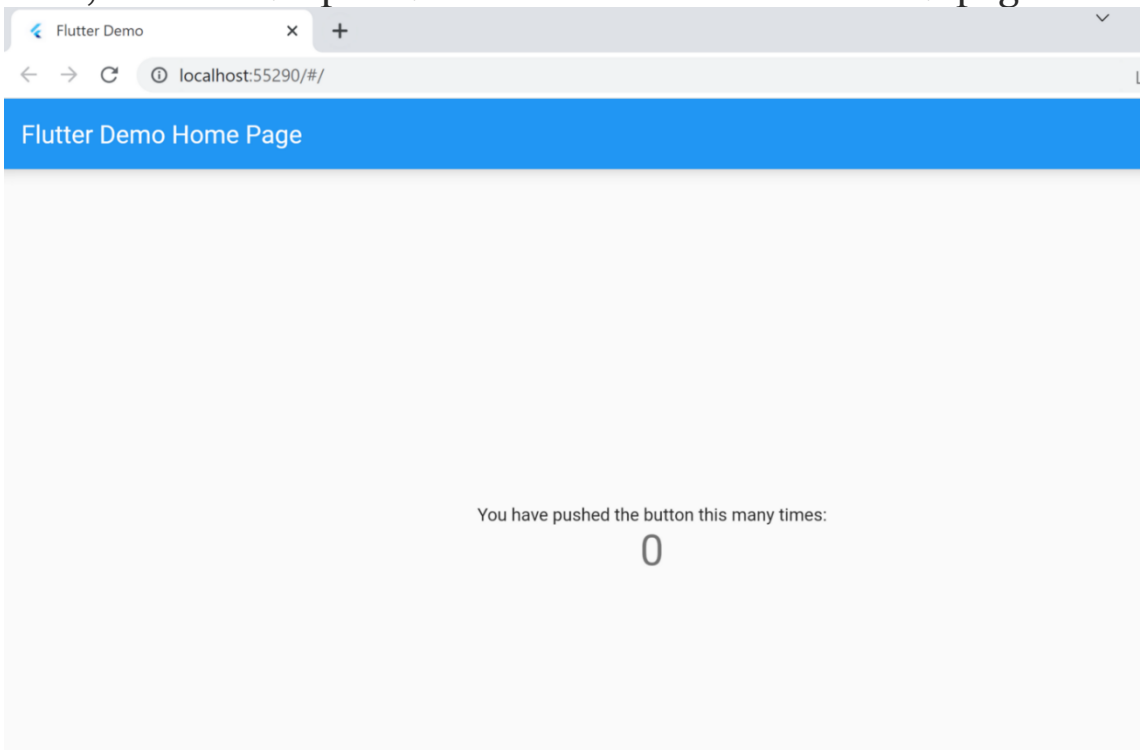


Selecting Chrome Web


Run
Terminal
Help
Start Debugging F5
Run Without Debugging Ctrl+F5
Stop Debugging Shift+F5
Restart Debugging Ctrl+Shift+F5
Open Configurations
Add Configuration...
Step Over F10
Step Into F11
Step Out Shift+F11
Continue F5
Toggle Breakpoint F9
New Breakpoint
Enable All Breakpoints
Disable All Breakpoints
Remove All Breakpoints
Install Additional Debuggers...

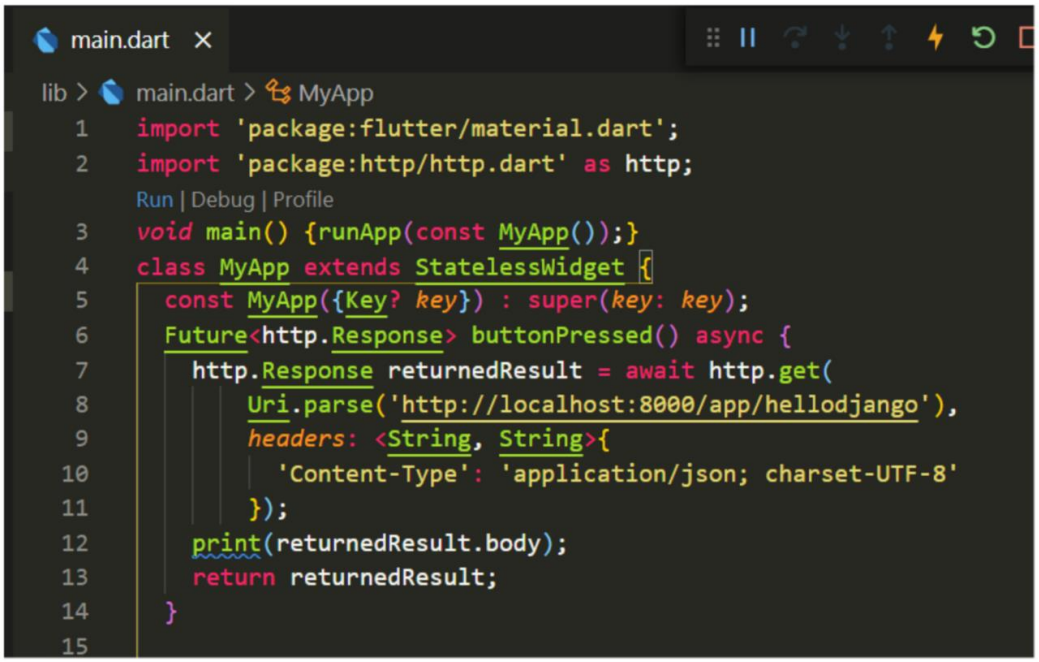
Run without debuggin

Now, it should be possible to see the flutter demo web page:

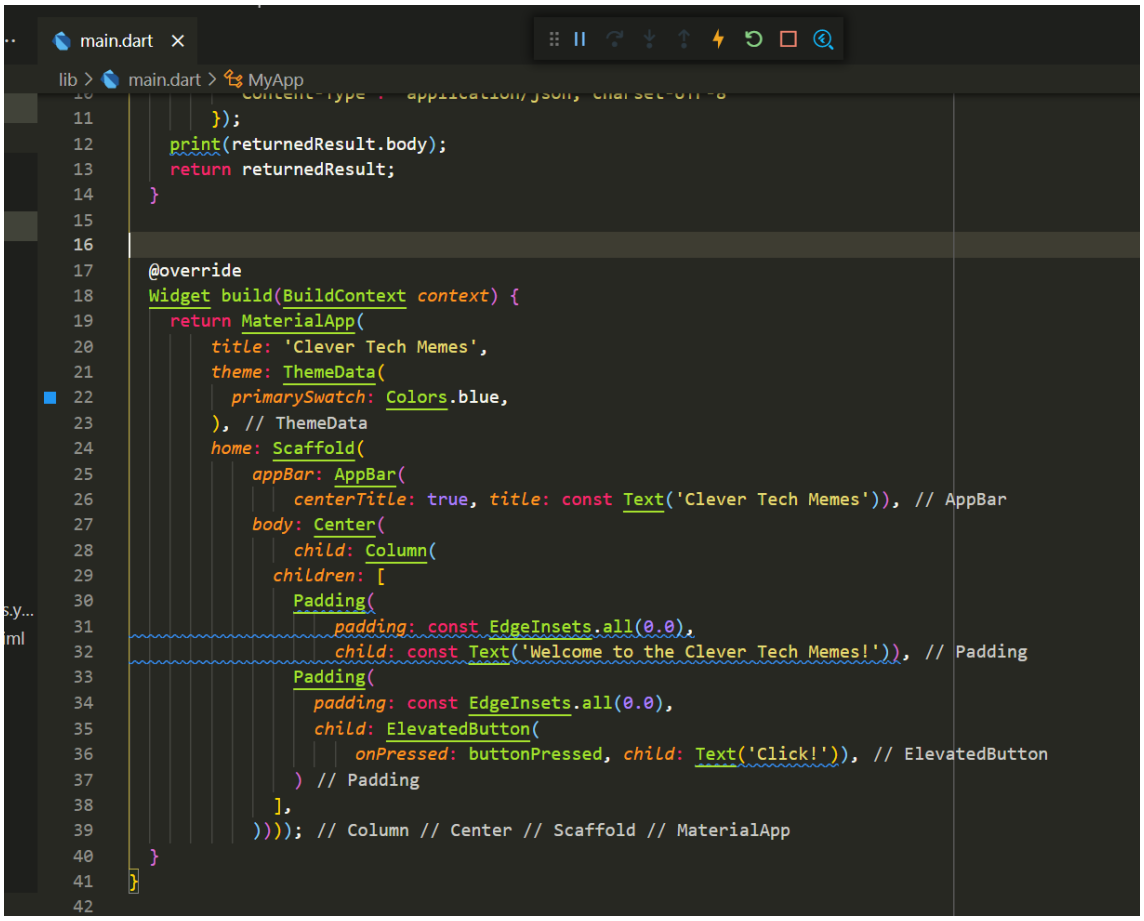


Flutter demo page

Now, let us delete the content of the ***main.dart*** file inside the ***lib*** folder, and write the following content:



Content of main.dart

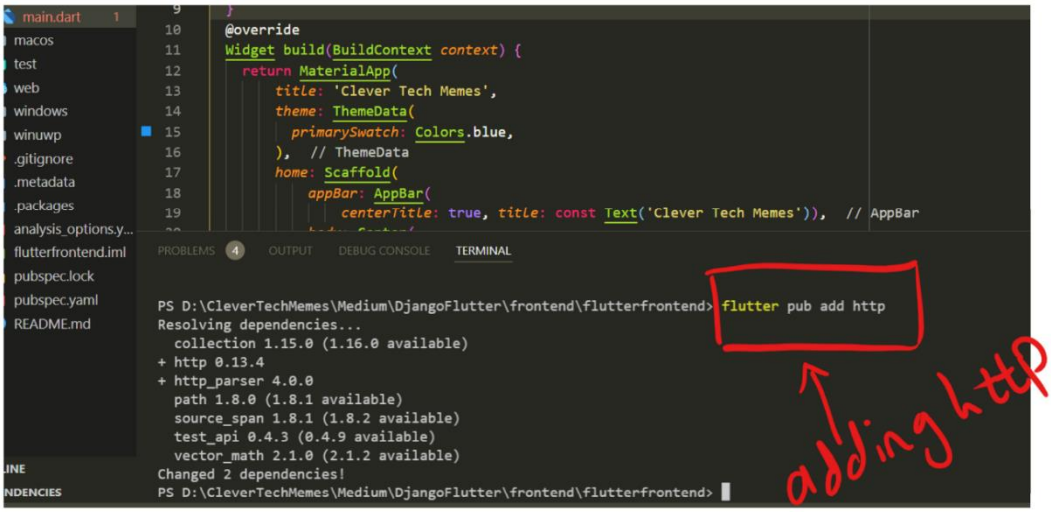


Content of main.dart

In this tutorial, the goal is to prepare boilerplate program and the way to make Django and Flutter work so I assume, the reader is familiar with the Flutter syntax. However, the above code adds bar, a welcome message and a button.
Also, ***buttonPressed*** function sends a *GET* request to the *Django* backend as soon as the button is pressed. So, here there is not much coding on Flutter side but only the necessary things are brought for the communication and demonstration purposes.

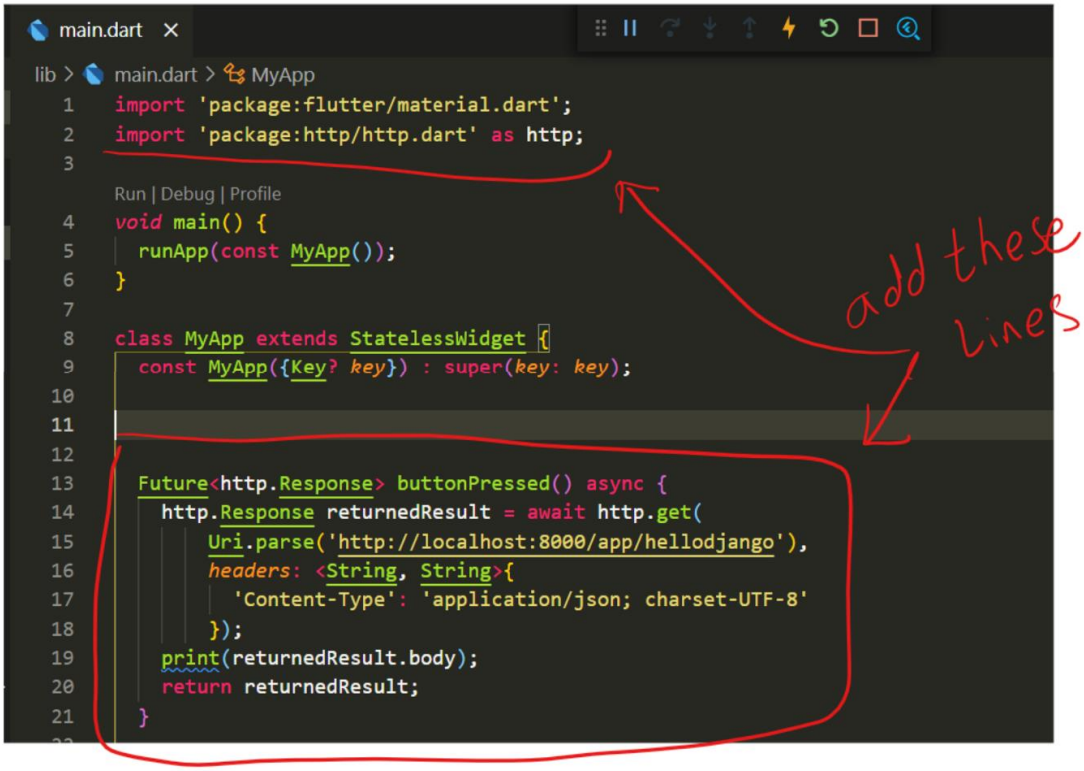
Communication Between Backend and Frontend

For the communication between the Django backend and Flutter Frontend, it is needed to add *http* dependency to *Flutter*, so we can write:



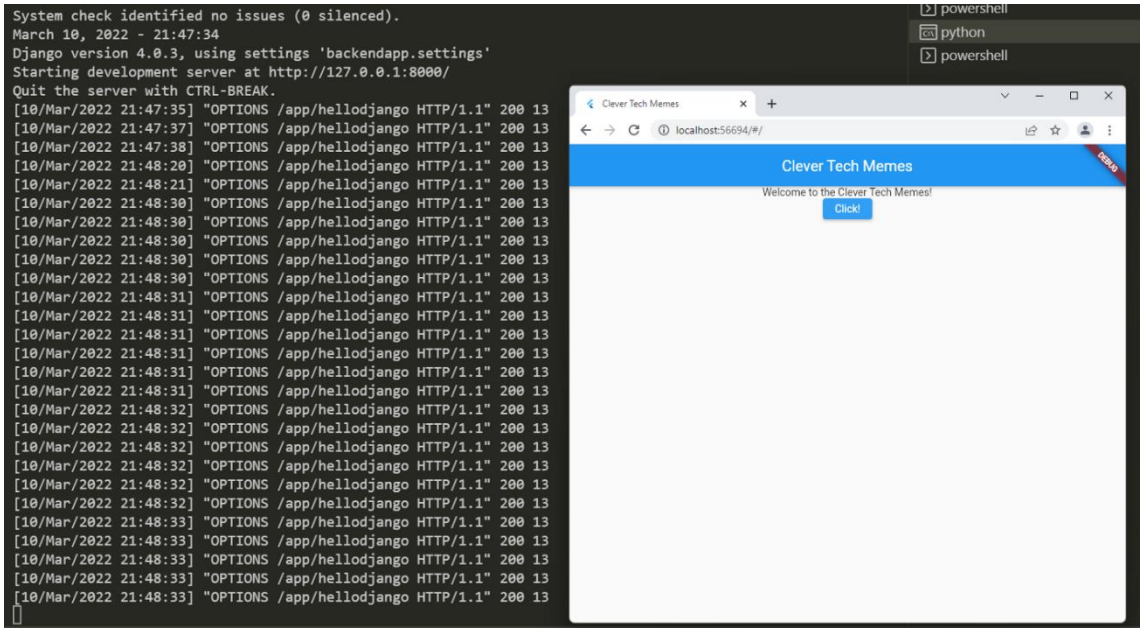
flutter pub add http

It is now possible to import the *http* library by writing import ***'package:http/http.dart' as http*** and send a request using ***http.get()*** in ***Flutter*** as follows***:***

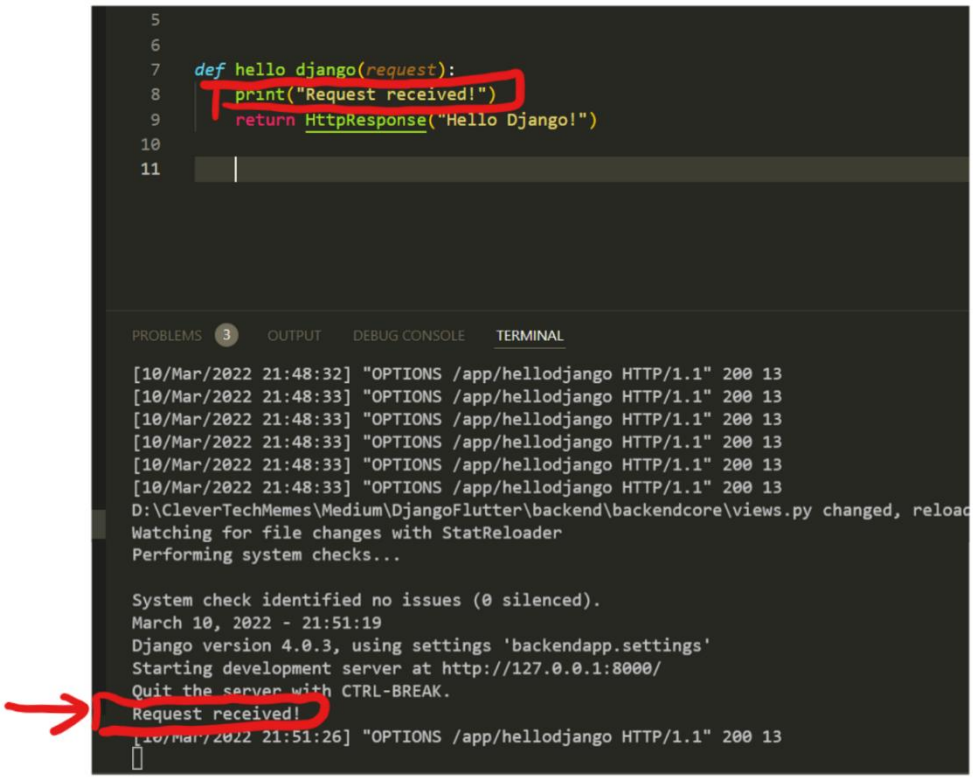


Sending a request when button is clicked

As soon as we run Django server by writing ***"python manage.py runserver"***, and we click the button in the browser, we can see that we receive requests in *Django i.e.,* 200 is generated which means that the request is successfully received.

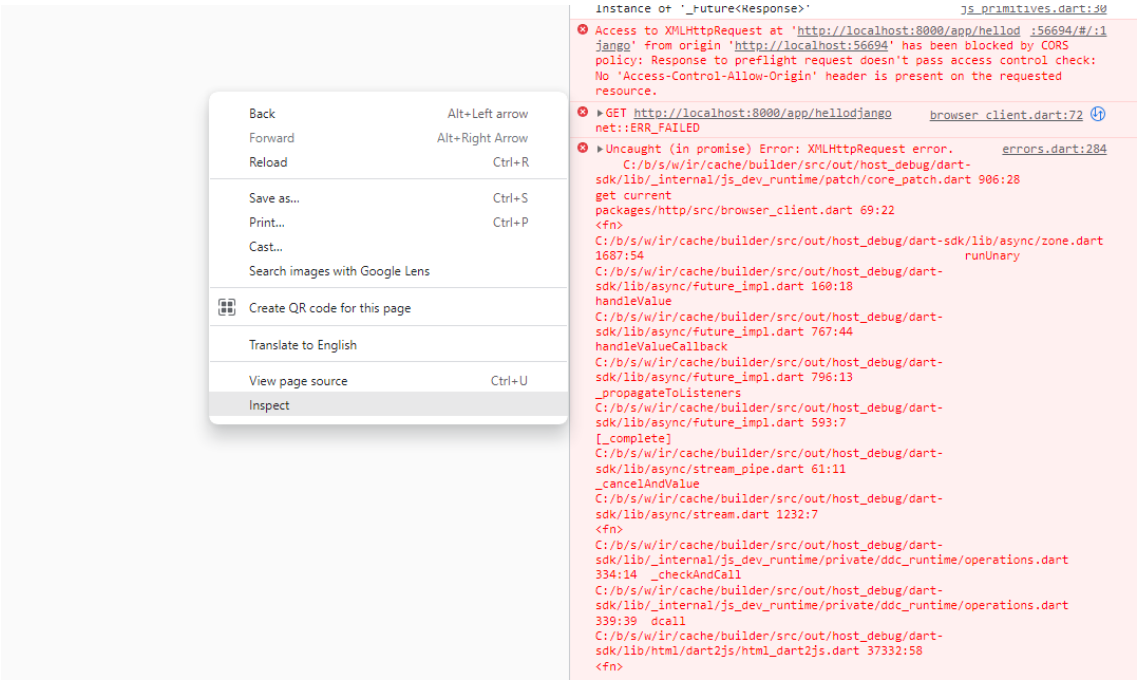


We can still make sure by writing in the *Django* view a printing statement like “request received” and figure out if the request can be printed, and it is working as follows:



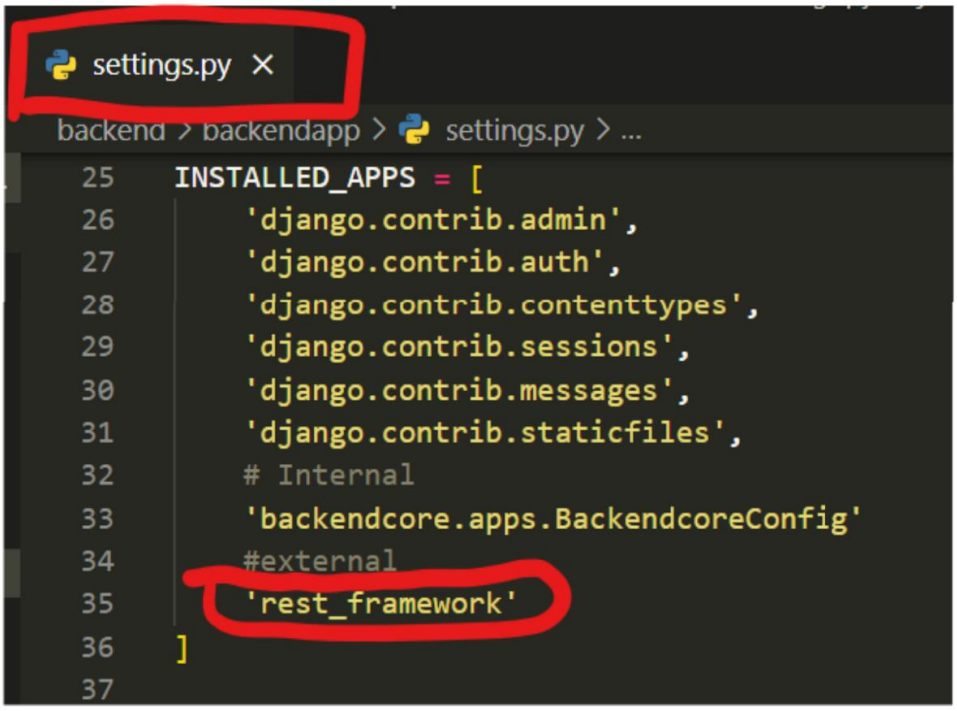
Adding a print

However, if we right click on the frontend page and inspect element, we can see that we receive the *CORS Origin Error* as the *Django* does not know *Flutter* as a reliable frontend to communicate.



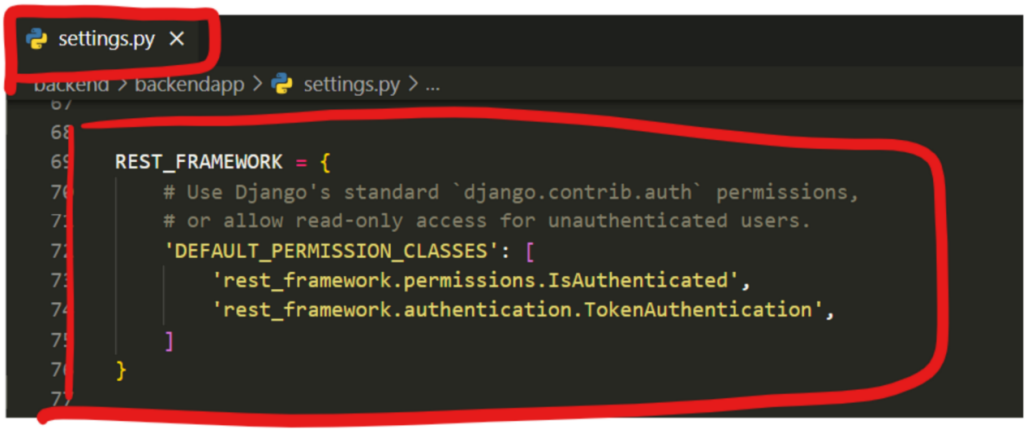
Resolving Django Cross Site Origin And Using REST

To resolve this issue, let us install D*jango Rest Framework* by writing the ***"pip install django-rest-framework"***, and add the rest framework to the installed apps:



Adding ‘rest_framework’ to the setting

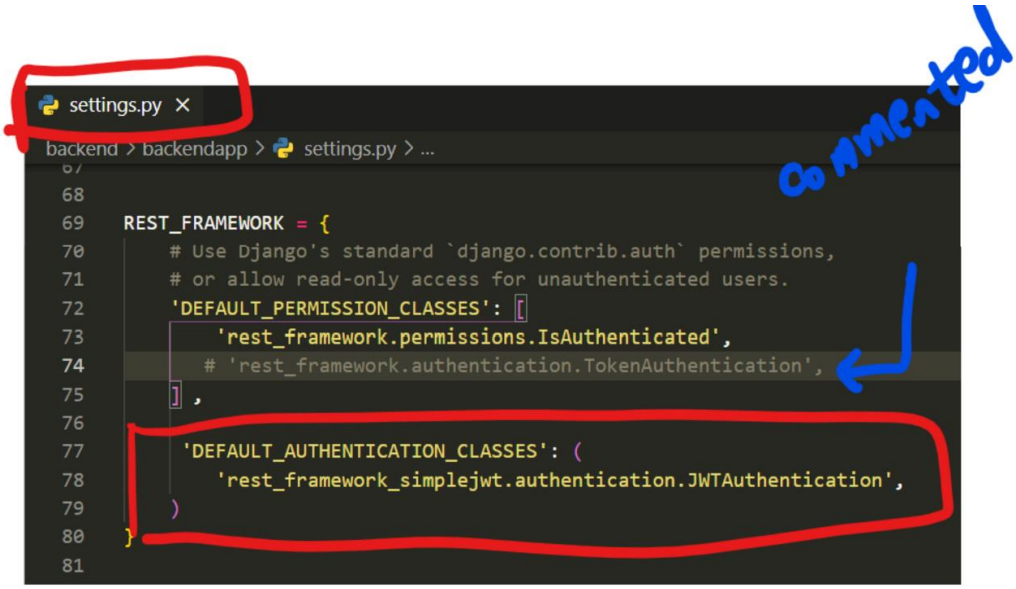
And add the following to the ***settings.py*** file as follows:



Let us install the ***simple-jwt*** and the ***django cors headers***. We require ***simple-jwt***, to activate the token authentication in Django and we require ***cors-origin*** because we need to communicate with an external frontend like Flutter, so let us install these libraries by writing:

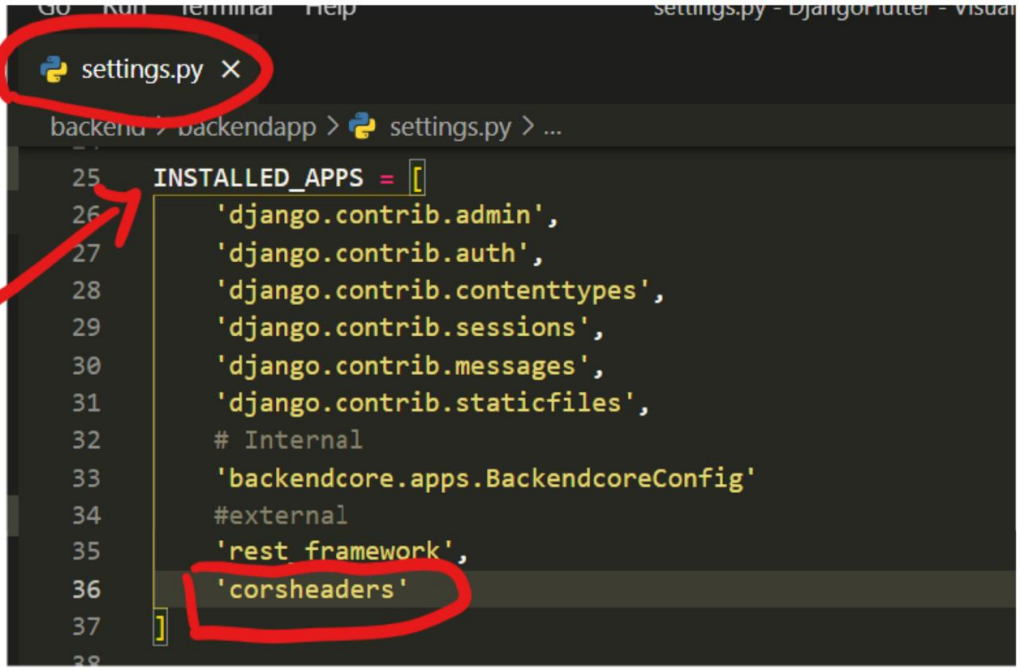
- ***pip install django-cors-headers***
- ***pip install djangorestframework-simplejwt***

In ***REST_Framework***, it is needed to add ***simplejwt as follows:***

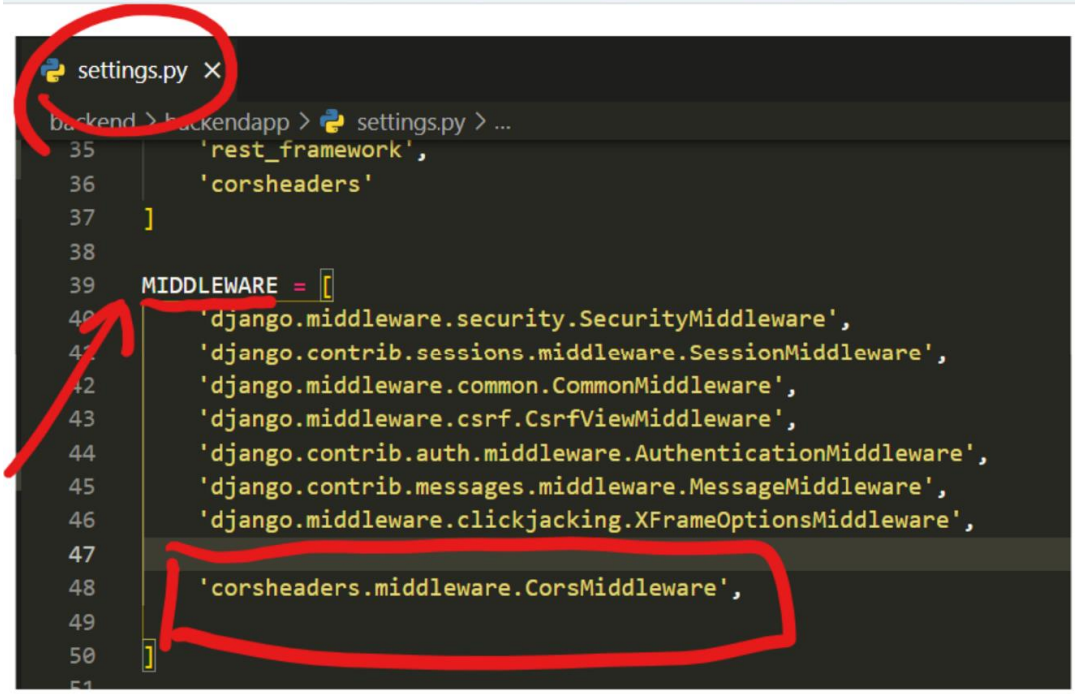


Also, we need to add the ***SIMPLE_JWT*** configuration as shown below:

We need to add ***corsheaders*** to the installed apps:

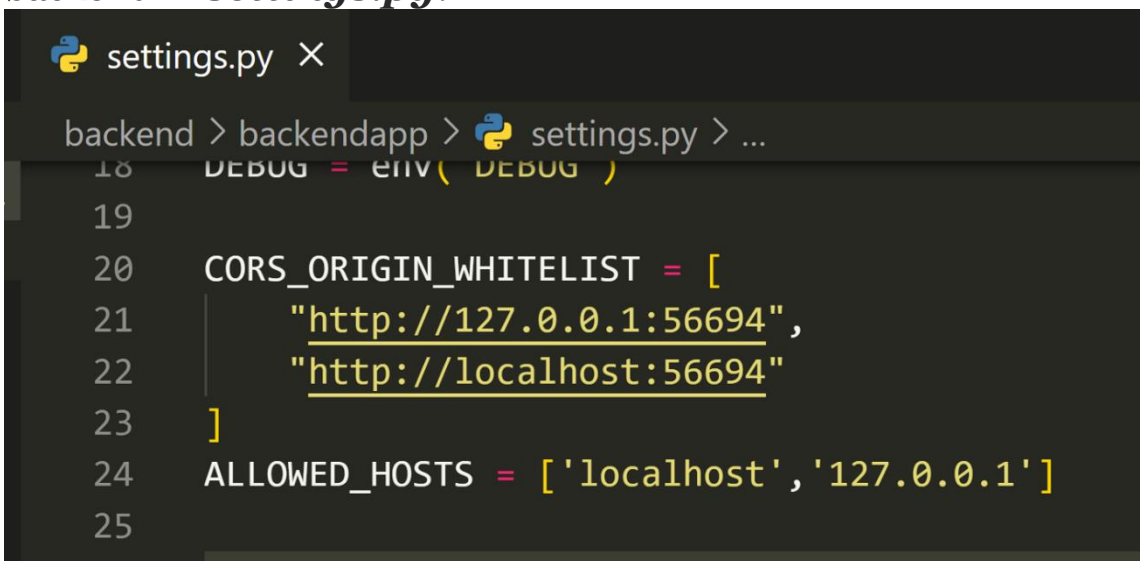


Still, we need to add the following to the ***MIDDLEWARE*** in ***settings.py*** as follows:

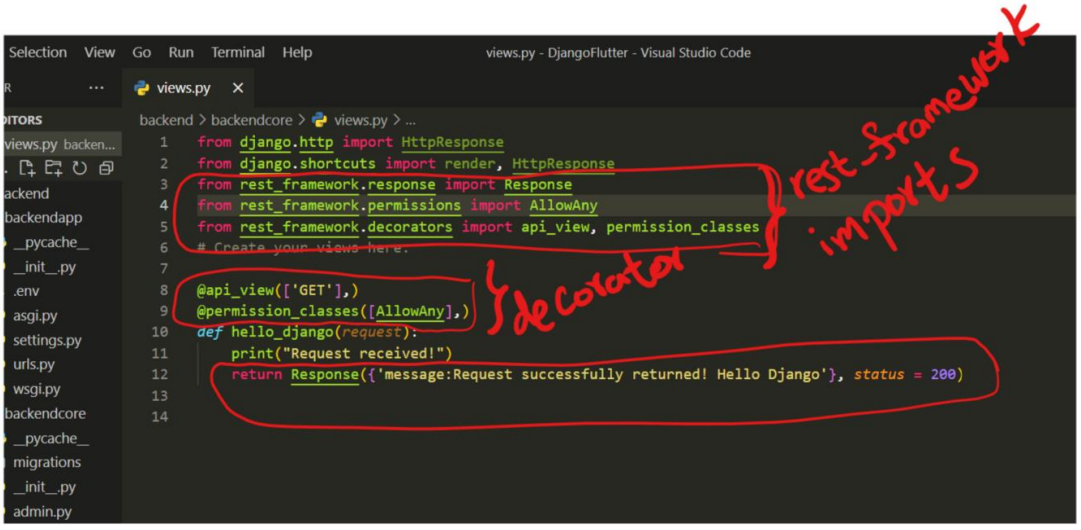


Flutter needs to be allowed to communicate with Django so we need to add localhost to the list of allowed hosts and

the ***CORS_ORIGIN_WHITELIST*** sending request to backend in ***settings.py***:

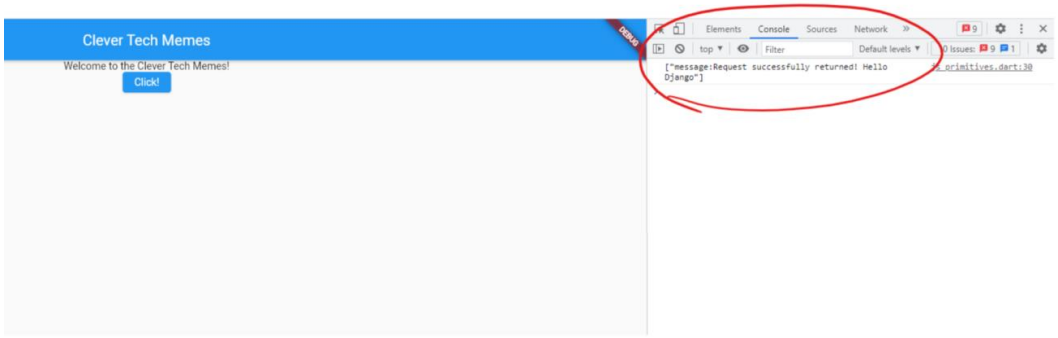


Let us use the ***Response*** from the ***rest_framework*** to slightly change the ***views.py*** file and send a proper message back to the client as follows:



Please note the we need to add decorators like ***@permission_classes and @api_view.*** You can imagine them as wrap functions in which allow the function to process the request as well as receiving a GET request.

Now, if we click the button in the browser, we can see the successful communication between the ***Django and Flutter***:



Summary:

Django and *Flutter* are two important backend and frontend technologies in which has helped developers and entrepreneurs to create useful applications. Django is popular due to fast-development cycle and its root in Python programming language and nowadays wide range of practitioners can use it. Flutter is getting momentum in the market by being platform independent and it means writing your code once and run it everywhere. In this tutorial, it is shown step-by-step how to create boilerplate *Django* and *Flutter* application that can communicate with each other.