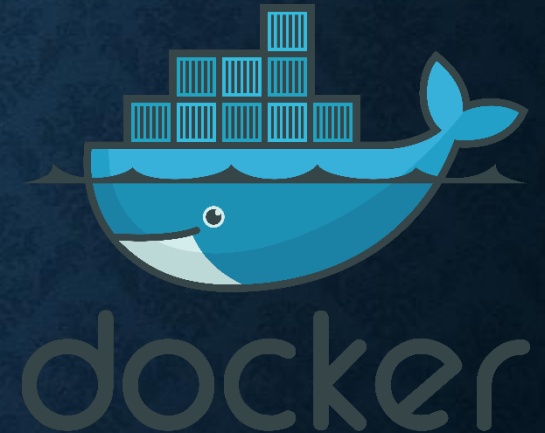


# **MID TERM PROJECT - BASIC TODO APP**

## **FASTAPI, KAFKA, KONG, STREAMLIT WITH DOCKER**



**Submitted by: TAJ AHMED (PDG DS&AI BV)**

```

● PS D:\todo_app> python -m venv venv
● PS D:\todo_app> venv\Scripts\activate
○ (venv) PS D:\todo_app> pip install fastapi uvicorn streamlit confluent-kafka requests
Collecting fastapi
  Using cached fastapi-0.111.0-py3-none-any.whl.metadata (25 kB)
Collecting uvicorn
  Using cached uvicorn-0.30.0-py3-none-any.whl.metadata (6.3 kB)
Collecting streamlit
  Using cached streamlit-1.35.0-py2.py3-none-any.whl.metadata (8.5 kB)
Collecting confluent-kafka
  Downloading confluent_kafka-2.4.0-cp312-cp312-win_amd64.whl.metadata (2.4 kB)
Collecting requests
  Using cached requests-2.32.3-py3-none-any.whl.metadata (4.6 kB)
Collecting starlette<0.38.0,>=0.37.2 (from fastapi)
  Using cached starlette-0.37.2-py3-none-any.whl.metadata (5.9 kB)
Collecting pydantic!=1.8,!<1.8.1,!<2.0.0,!<2.0.1,!<2.1.0,<3.0.0,>=1.7.4 (from fastapi)
  Using cached pydantic-2.7.2-py3-none-any.whl.metadata (108 kB)
Collecting typing-extensions>=4.8.0 (from fastapi)
  Downloading typing_extensions-4.12.1-py3-none-any.whl.metadata (3.0 kB)
Collecting fastapi-cli>=0.0.2 (from fastapi)
  Using cached fastapi_cli-0.0.4-py3-none-any.whl.metadata (7.0 kB)
Collecting httpx>=0.23.0 (from fastapi)
  Using cached httpx-0.27.0-py3-none-any.whl.metadata (7.2 kB)
Collecting jinja2>=2.11.2 (from fastapi)
  Using cached jinja2-3.1.4-py3-none-any.whl.metadata (2.6 kB)
Collecting python-multipart>=0.0.7 (from fastapi)
  Using cached python_multipart-0.0.9-py3-none-any.whl.metadata (2.5 kB)
Collecting ujson!=4.0.2,!<4.1.0,!<4.2.0,!<4.3.0,!<5.0.0,!<5.1.0,>=4.0.1 (from fastapi)
  Using cached ujson-5.10.0-cp312-cp312-win_amd64.whl.metadata (9.5 kB)
Collecting orjson>=3.2.1 (from fastapi)
  Using cached orjson-3.10.3-cp312-cp312-win_amd64.whl.metadata (50 kB)
Collecting email-validator>=2.0.0 (from fastapi)

```

```
PS D:\todo_app> pip install fastapi uvicorn streamlit confluent-kafka requests sqlalchemy psycpg2-binary alembic
>>
Requirement already satisfied: fastapi in d:\todo_app\venv\lib\site-packages (0.111.0)
Requirement already satisfied: uvicorn in d:\todo_app\venv\lib\site-packages (0.30.0)
Requirement already satisfied: streamlit in d:\todo_app\venv\lib\site-packages (1.35.0)
Requirement already satisfied: confluent-kafka in d:\todo_app\venv\lib\site-packages (2.4.0)
Requirement already satisfied: requests in d:\todo_app\venv\lib\site-packages (2.32.3)
Collecting sqlalchemy
  Using cached SQLAlchemy-2.0.30-cp312-cp312-win_amd64.whl.metadata (9.8 kB)
Collecting psycpg2-binary
  Using cached psycpg2_binary-2.9.9-cp312-cp312-win_amd64.whl.metadata (4.6 kB)
Collecting alembic
  Downloading alembic-1.13.1-py3-none-any.whl.metadata (7.4 kB)
Requirement already satisfied: starlette<0.38.0,>=0.37.2 in d:\todo_app\venv\lib\site-packages (from fastapi) (0.37.2)
Requirement already satisfied: typing-extensions>=4.8.0 in d:\todo_app\venv\lib\site-packages (from fastapi) (4.12.1)
Requirement already satisfied: fastapi-cli>=0.0.2 in d:\todo_app\venv\lib\site-packages (from fastapi) (0.0.4)
Requirement already satisfied: httpx>=0.23.0 in d:\todo_app\venv\lib\site-packages (from fastapi) (0.27.0)
Requirement already satisfied: jinja2>=2.11.2 in d:\todo_app\venv\lib\site-packages (from fastapi) (3.1.4)
Requirement already satisfied: python-multipart>=0.0.7 in d:\todo_app\venv\lib\site-packages (from fastapi) (0.0.9)
Requirement already satisfied: ujson!=4.0.2,!4.1.0,!4.2.0,!4.3.0,!5.0.0,!5.1.0,>=4.0.1 in d:\todo_app\venv\lib\site-packages (from fastapi) (5.10.0)
Requirement already satisfied: orjson>=3.2.1 in d:\todo_app\venv\lib\site-packages (from fastapi) (3.10.3)
Requirement already satisfied: email_validator>=2.0.0 in d:\todo_app\venv\lib\site-packages (from fastapi) (2.1.1)
Requirement already satisfied: click>=7.0 in d:\todo_app\venv\lib\site-packages (from uvicorn) (8.1.7)
Requirement already satisfied: h11>=0.8 in d:\todo_app\venv\lib\site-packages (from uvicorn) (0.14.0)
Requirement already satisfied: altair<6,>=4.0 in d:\todo_app\venv\lib\site-packages (from streamlit) (5.3.0)
Requirement already satisfied: blinker<2,>=1.0.0 in d:\todo_app\venv\lib\site-packages (from streamlit) (1.8.2)
Requirement already satisfied: cachetools<6,>=4.0 in d:\todo_app\venv\lib\site-packages (from streamlit) (5.3.3)
Requirement already satisfied: numpy<2,>=1.19.3 in d:\todo_app\venv\lib\site-packages (from streamlit) (1.26.4)
Requirement already satisfied: packaging<25,>=16.8 in d:\todo_app\venv\lib\site-packages (from streamlit) (24.0)
Requirement already satisfied: pandas<3,>=1.3.0 in d:\todo_app\venv\lib\site-packages (from streamlit) (2.2.2)
Requirement already satisfied: pillow<11,>=7.1.0 in d:\todo_app\venv\lib\site-packages (from streamlit) (10.3.0)
Requirement already satisfied: protobuf<5,>=3.20 in d:\todo_app\venv\lib\site-packages (from streamlit) (4.25.3)
Requirement already satisfied: pyarrow>=7.0 in d:\todo_app\venv\lib\site-packages (from streamlit) (16.1.0)
Requirement already satisfied: rich<14,>=10.14.0 in d:\todo_app\venv\lib\site-packages (from streamlit) (13.7.1)
Requirement already satisfied: tenacity<9,>=8.1.0 in d:\todo_app\venv\lib\site-packages (from streamlit) (8.3.0)
Requirement already satisfied: toml<2,>=0.10.1 in d:\todo_app\venv\lib\site-packages (from streamlit) (0.10.2)
```

🔥 docker-compose.yml > {} services > {} kong > [ ] volumes

docker-compose.yml - The Compose specification establishes a standard for the definition of multi-container platform-agnostic applications (compose-spec.json)

```
1 version: '3'
2 services:
3   zookeeper:
4     image: confluentinc/cp-zookeeper:latest
5     environment:
6       ZOOKEEPER_CLIENT_PORT: 2181
7       ZOOKEEPER_TICK_TIME: 2000
8
9   kafka:
10    image: confluentinc/cp-kafka:latest
11    depends_on:
12      - zookeeper
13    ports:
14      - "9092:9092"
15    environment:
16      KAFKA_BROKER_ID: 1
17      KAFKA_ZOOKEEPER_CONNECT: zookeeper:2181
18      KAFKA_ADVERTISED_LISTENERS: PLAINTEXT://localhost:9092
19      KAFKA_OFFSETS_TOPIC_REPLICATION_FACTOR: 1
20
21   postgres:
22     image: postgres:latest
23     environment:
24       POSTGRES_USER: todo_user
25       POSTGRES_PASSWORD: todo_password
26       POSTGRES_DB: todo_db
27     ports:
28       - "5432:5432"
29
30   kong:
31     image: kong:latest
```



```
PS D:\todo_app> docker-compose up -d
time="2024-06-02T17:03:28+05:00" level=warning msg="D:\\todo_app\\docker-compose.yml: `version` is obsolete"
[+] Running 15/15
 ✓ postgres Pulled
   ✓ 09f376ebb190 Download complete
   ✓ ed155773e5e0 Download complete
   ✓ 061f31803c55 Download complete
   ✓ accd4903f49a Download complete
   ✓ 2016ff8e6e3a Download complete
   ✓ 088e651df7e9 Download complete
   ✓ 1655a257a5b5 Download complete
   ✓ ffebb35d2904 Download complete
   ✓ 293f0bec643a Download complete
   ✓ 119215dfb3e3 Download complete
   ✓ 4ddba458499d Download complete
   ✓ 90e48ae03559 Download complete
   ✓ 822c1a513e6a Download complete
   ✓ e02bbc8c8252 Download complete
[+] Running 4/4
 ✓ Container todo_app-zookeeper-1 Running
 ✓ Container todo_app-kafka-1 Running
 ✓ Container todo_app-postgres-1 Started
 ✓ Container todo_app-kong-1 Started
PS D:\todo_app> 
```

396.2  
136.9  
21.6  
72.4  
89.9  
56.6  
21.6  
39.3  
227.9  
21.6  
21.6  
39.3  
39.3  
39.3  
39.3  
74.1  
0.0  
0.0  
57.0  
57.0

Containers

Images

Volumes

Builds

Docker Scout

Extensions

Add Extensions

Engine running

RAM 3.81 GB CPU 0.50%

Signed in

v4.30.0

# Containers [Give feedback](#)

Container CPU usage  
2.58% / 400% (4 CPUs available)

Container memory usage  
809.9MB / 3.64GB

Show charts

Q

Search



Only show running containers

<input type="checkbox"/>	Name	Image	Status	Port(s)	CPU (%)	Last started	Actions
<input type="checkbox"/>	<div><div>▼</div><div> <a href="#">todo_app</a></div></div>		Running (4/4)		1.22%	2 minutes ago	<div><div></div><div></div><div></div></div>
<input type="checkbox"/>	<div><div></div><div><a href="#">kafka-1</a> c1de8c939fe9 </div></div>	<a href="#">confluentinc/cp-kafka:latest</a>	Running	<a href="#">9092:9092</a>	0.94%	3 hours ago	<div><div></div><div></div><div></div></div>
<input type="checkbox"/>	<div><div></div><div><a href="#">zookeeper-1</a> ebbe3bcb2401 </div></div>	<a href="#">confluentinc/cp-zookeeper:latest</a>	Running		0.28%	3 hours ago	<div><div></div><div></div><div></div></div>
<input type="checkbox"/>	<div><div></div><div><a href="#">kong-1</a> f4b2136a8165 </div></div>	<a href="#">kong:latest</a>	Running	<a href="#">8000:8000</a> <a href="#">Show all ports (2)</a>	0%	2 minutes ago	<div><div></div><div></div><div></div></div>
<input type="checkbox"/>	<div><div></div><div><a href="#">postgres-1</a> 6e3a311a8e55 </div></div>	<a href="#">postgres:latest</a>	Running	<a href="#">5432:5432</a>	0%	2 minutes ago	<div><div></div><div></div><div></div></div>

Showing 5 items

PS D:\todo\_app> alembic init alembic

• >>

Creating directory 'D:\\todo\_app\\alembic' ... done

Creating directory 'D:\\todo\_app\\alembic\\versions' ... done

Generating D:\todo\_app\alembic.ini ... done

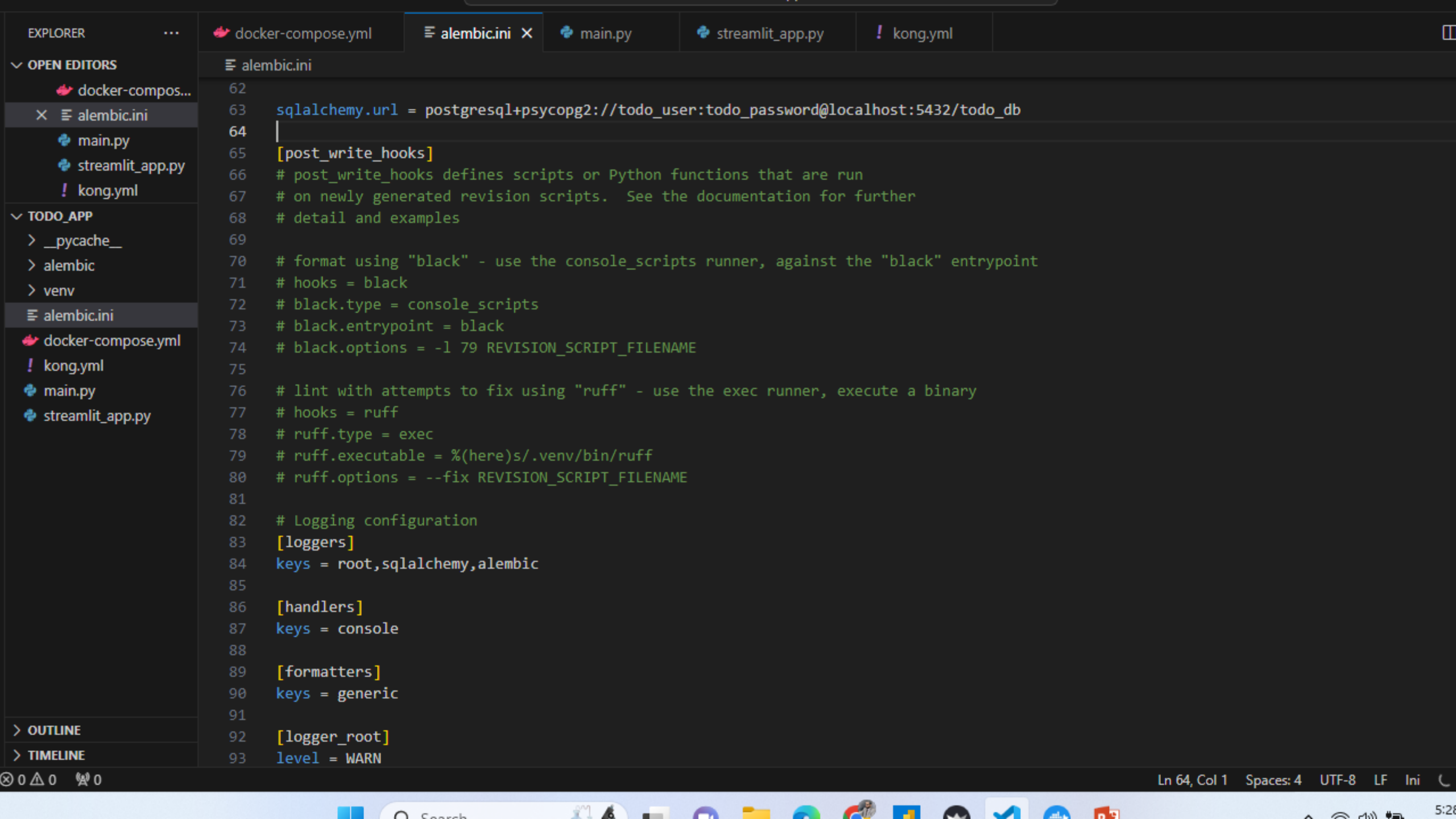
Generating D:\todo\_app\alembic\env.py ... done

Generating D:\todo\_app\alembic\README ... done

Generating D:\todo\_app\alembic\script.py.mako ... done

Please edit configuration/connection/logging settings in 'D:\\todo\_app\\alembic.ini' before proceeding.

○ PS D:\todo\_app> █





EXPLORER

OPEN EDITORS

docker-compos...  
alembic.ini  
env.py alembic  
models.py  
main.py  
streamlit\_app.py  
kong.yml

TODO\_...  
\_\_pycache\_\_  
alembic  
versions  
env.py  
README  
script.py.mako  
venv  
alembic.ini  
docker-compose.yml  
kong.yml  
main.py  
models.py  
streamlit\_app.py

OUTLINE  
TIMELINE

docker-compose.yml

alembic.ini

env.py

models.py

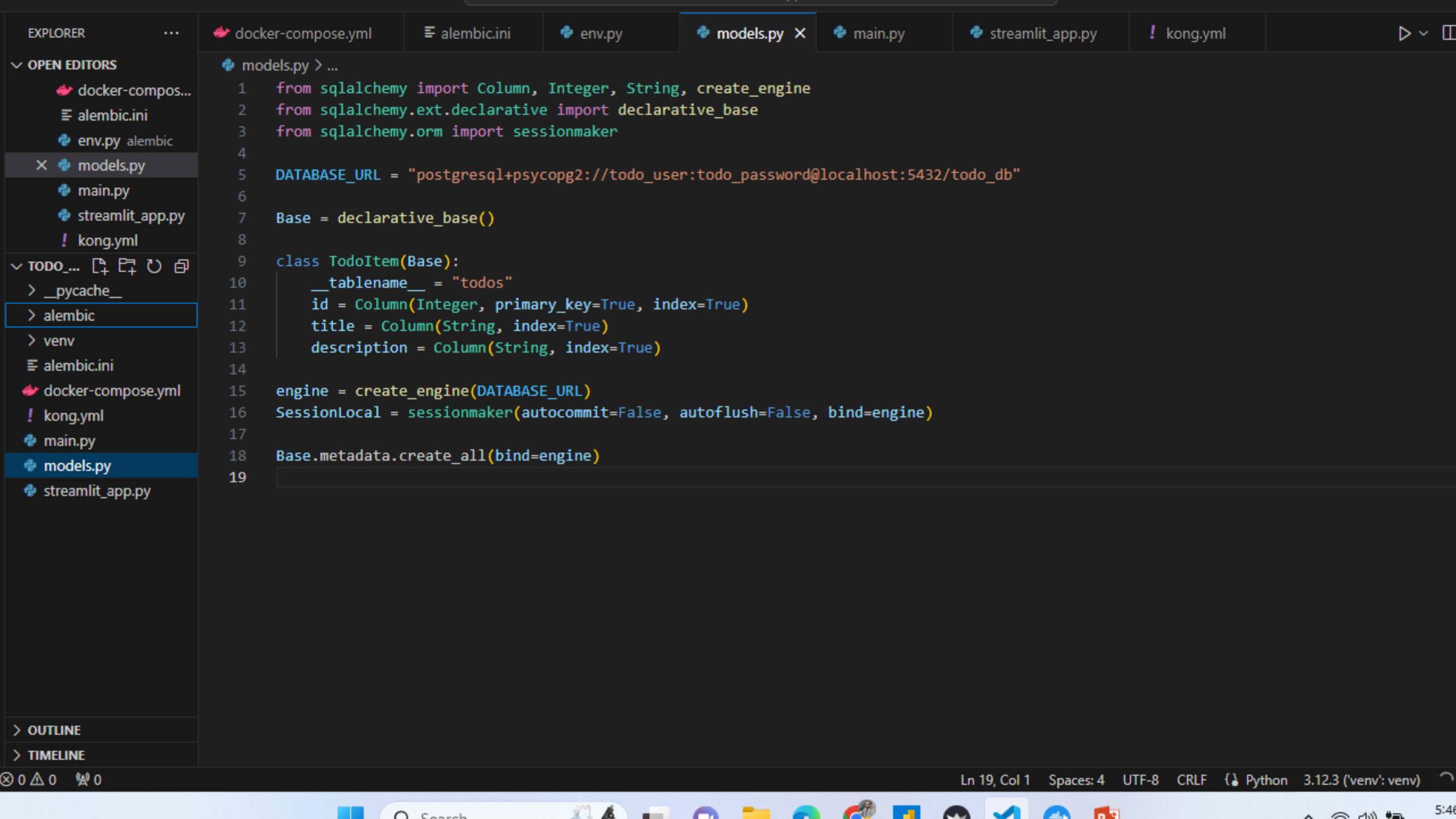
main.py

streamlit\_app.py

kong.yml

alembic > env.py > ...  
1 from logging.config import fileConfig  
2 from sqlalchemy import engine\_from\_config  
3 from sqlalchemy import pool  
4 from alembic import context  
5  
6 # Import your models here  
7 from models import Base  
8  
9 # this is the Alembic Config object, which provides  
10 # access to the values within the .ini file in use.  
11 config = context.config  
12  
13 # Interpret the config file for Python logging.  
14 # This line sets up loggers basically.  
15 fileConfig(config.config\_file\_name)  
16  
17 # add your model's MetaData object here  
18 # for 'autogenerate' support  
19 target\_metadata = Base.metadata  
20  
21 # other values from the config, defined by the needs of env.py,  
22 # can be acquired:  
23 # my\_important\_option = config.get\_main\_option("my\_important\_option")  
24 # ... etc.  
25  
26  
27 def run\_migrations\_offline():  
28 """Run migrations in 'offline' mode.  
29  
30 This configures the context with just a URL  
31 and not an Engine, though an Engine is acceptable  
32 here as well. By skipping the Engine creation

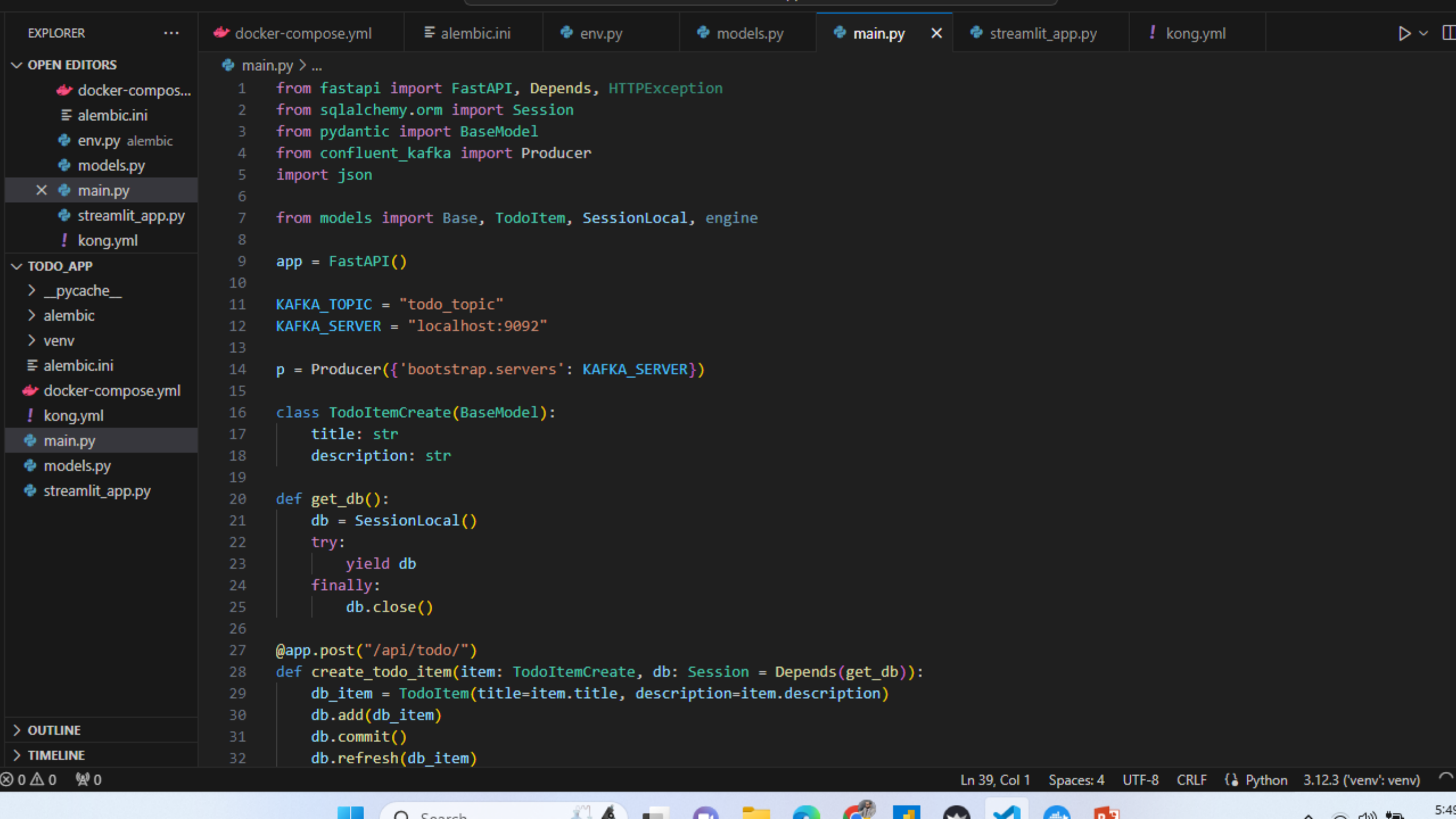
Ln 8, Col 1 Spaces: 4 UTF-8 LF Python 3.12.3 ('venv': venv)



```
● PS D:\todo_app> alembic revision --autogenerate -m "create todos table"
INFO [alembic.runtime.migration] Context impl PostgresqlImpl.
INFO [alembic.runtime.migration] Will assume transactional DDL.
INFO [alembic.ddl.postgresql] Detected sequence named 'todos_id_seq' as owned by integer column 'todos(id)', assuming SERIAL and omitting
Generating D:\todo_app\alembic\versions\2f417f4725c4_create_todos_table.py ... done
● PS D:\todo_app> alembic upgrade head
INFO [alembic.runtime.migration] Context impl PostgresqlImpl.
INFO [alembic.runtime.migration] Will assume transactional DDL.
INFO [alembic.runtime.migration] Running upgrade -> 2f417f4725c4, create todos table
○ PS D:\todo_app> █
```

powershell

Python



EXPLORER

...

docker-compose.yml

alembic.ini

env.py

models.py

main.py

X

streamlit\_app.py

! kong.yml

▶

□

▼ OPEN EDITORS

docker-compos...

alembic.ini

env.py alembic

models.py

X main.py

streamlit\_app.py

! kong.yml

▼ TODO\_APP

&gt; \_\_pycache\_\_

&gt; alembic

&gt; venv

alembic.ini

docker-compose.yml

! kong.yml

main.py

models.py

streamlit\_app.py

&gt; OUTLINE

&gt; TIMELINE

main.py &gt; ...

```
1  from fastapi import FastAPI, Depends, HTTPException
2  from sqlalchemy.orm import Session
3  from pydantic import BaseModel
4  from confluent_kafka import Producer
5  import json
6
7  from models import Base, TodoItem, SessionLocal, engine
8
9  app = FastAPI()
10
11  KAFKA_TOPIC = "todo_topic"
12  KAFKA_SERVER = "localhost:9092"
13
14  p = Producer({'bootstrap.servers': KAFKA_SERVER})
15
16  class TodoItemCreate(BaseModel):
17      title: str
18      description: str
19
20  def get_db():
21      db = SessionLocal()
22      try:
23          yield db
24      finally:
25          db.close()
26
27  @app.post("/api/todo/")
28  def create_todo_item(item: TodoItemCreate, db: Session = Depends(get_db)):
29      db_item = TodoItem(title=item.title, description=item.description)
30      db.add(db_item)
31      db.commit()
32      db.refresh(db_item)
```

Ln 39, Col 1

Spaces: 4

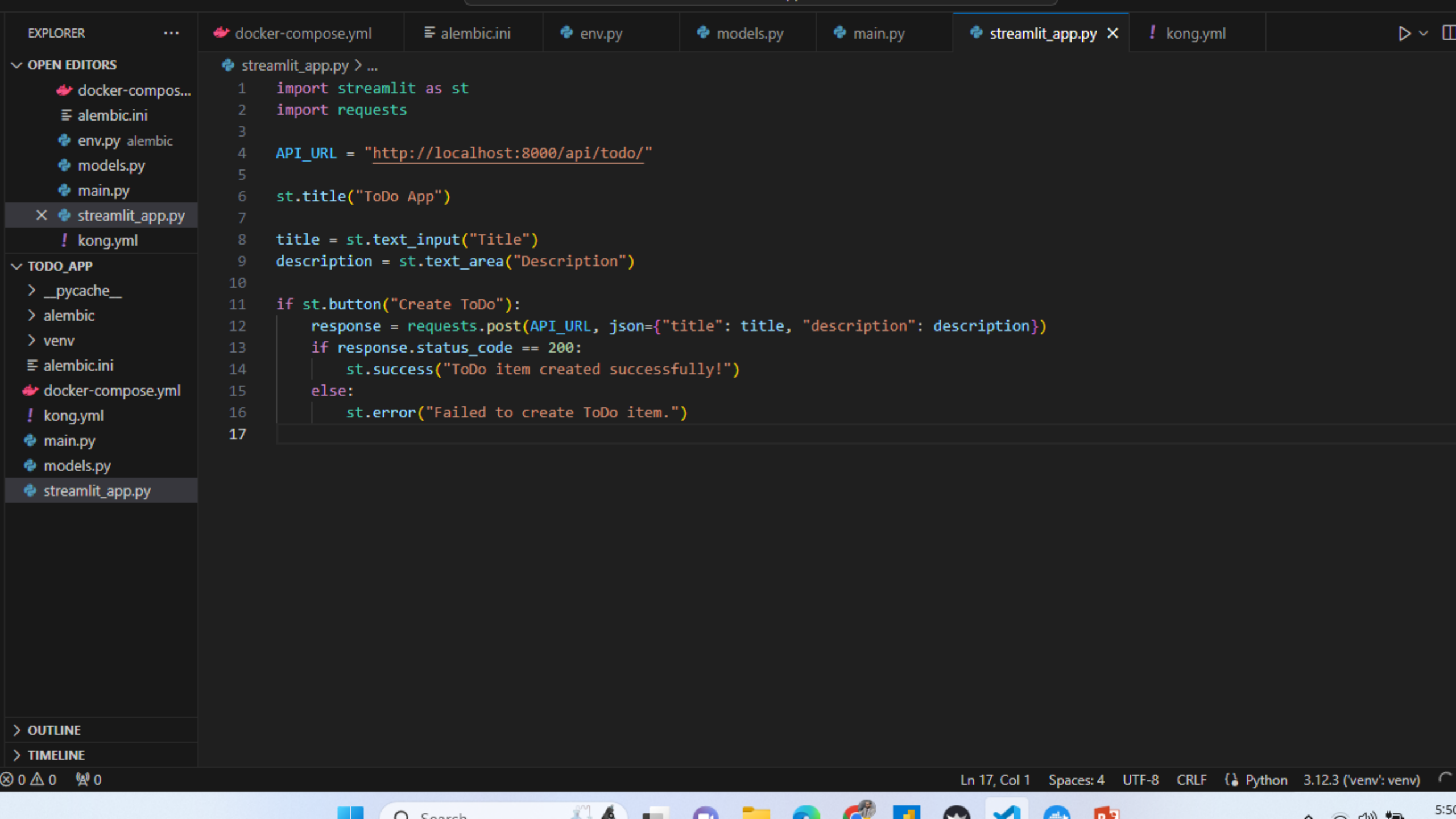
UTF-8

CRLF

{ Python

3.12.3 ('venv': venv)

5:49







PS D:\todo\_app> uvicorn main:app --reload

INFO: Will watch for changes in these directories: ['D:\\todo\_app']  
INFO: Uvicorn running on http://127.0.0.1:8000 (Press CTRL+C to quit)  
INFO: Started reloader process [13112] using WatchFiles  
INFO: Started server process [10540]  
INFO: Waiting for application startup.  
INFO: Application startup complete.



```
PS D:\todo_app> streamlit run streamlit_app.py  
>>
```

You can now view your Streamlit app in your browser.

Local URL: <http://localhost:8501>

Network URL: <http://192.168.0.106:8501>

uvicorn  
streamlit

 Python virtual environment was successfully activated, even though "(venv)" indicator may not be present in the terminal prompt. [Learn more.](#) 

Source: Python

Don't show again

```
PS D:\todo_app> docker-compose exec kong kong reload
```

```
>>
```

```
time="2024-06-02T17:54:51+05:00" level=warning msg="D:\\todo_app\\docker-compose.yml: `version` is obsolete"
```



```
Kong reloaded
```

```
PS D:\todo_app> █
```

```
uvicorn
```

```
streamlit
```

```
powershell
```

 Python virtual environment was successfully activated, even though "(venv)" indicator may not be present in the terminal prompt. [Learn more.](#) 

Source: Python

Don't show again

Deploy

# ToDo App

Title

Description

Create ToDo

# ToDo App

Title

Description

Create ToDo



Search





# ToDo App

Title

Description

Create ToDo

Containers

Images

Volumes

Builds

Docker Scout

Extensions

Add Extensions

## Containers [Give feedback](#)

Container CPU usage ⓘ

3.58% / 400% (4 CPUs available)

Container memory usage ⓘ

833.53MB / 3.64GB

[Show charts](#)

Only show running containers

<input type="checkbox"/>	Name	Image	Status	Port(s)	CPU (%)	Last started	Actions
<input type="checkbox"/>	<a href="#">todo_app</a>		Running (4/4)		3.58%	46 minutes ago	
<input type="checkbox"/>	<a href="#">kafka-1</a> c1de8c939fe9	<a href="#">confluentinc/cp-kafka:latest</a>	Running	<a href="#">9092:9092</a>	1.29%	3 hours ago	
<input type="checkbox"/>	<a href="#">zookeeper-1</a> ebbe3bcb2401	<a href="#">confluentinc/cp-zookeeper:latest</a>	Running		0.25%	3 hours ago	
<input type="checkbox"/>	<a href="#">kong-1</a> f4b2136a8165	<a href="#">kong:latest</a>	Running	<a href="#">8000:8000</a> <a href="#">Show all ports (2)</a>	2.04%	46 minutes ago	
<input type="checkbox"/>	<a href="#">postgres-1</a> 6e3a311a8e55	<a href="#">postgres:latest</a>	Running	<a href="#">5432:5432</a>	0%	46 minutes ago	

Showing 5 items

Engine running



RAM 3.62 GB CPU 0.50% Signed in

v4.30.0

