

DEVOPS PROJECT

Docker Containerization

create a Dockerfile to containerize the application and ensure it runs correctly within a Docker container

I have a project in my git hub repository , I need to run the application in my local environment (optional).

Requirement:

- Python : 3.6 – 3.7
- Postgresql
- Django

Step to run the project

Clone the git hub repository

git clone <https://github.com/jameskomo/bus-reservation-system.git>

change the directory to project directory

cd bus-reservation-system

Create a virtual environment

python -m venv venv

here, the python creates a virtual environment.so,we needed to activate the environment

venv\Scripts\activate

```
C:\Users\HP>cd bus-reservation-system
C:\Users\HP\bus-reservation-system>python -m venv venv
C:\Users\HP\bus-reservation-system>venv\Scripts\activate
(venv) C:\Users\HP\bus-reservation-system>
```

Then,

Required to run the command

pip install -r requirements.txt

this command show that the project required dependencies are install in virtual environment to run without any errors.

Next step to check:

```
(venv) C:\Users\HP\bus-reservation-system>python manage.py migrate
Operations to perform:
  Apply all migrations: admin, auth, contenttypes, myapp, sessions, users
Running migrations:
  No migrations to apply.
```

The final step is to run the project .

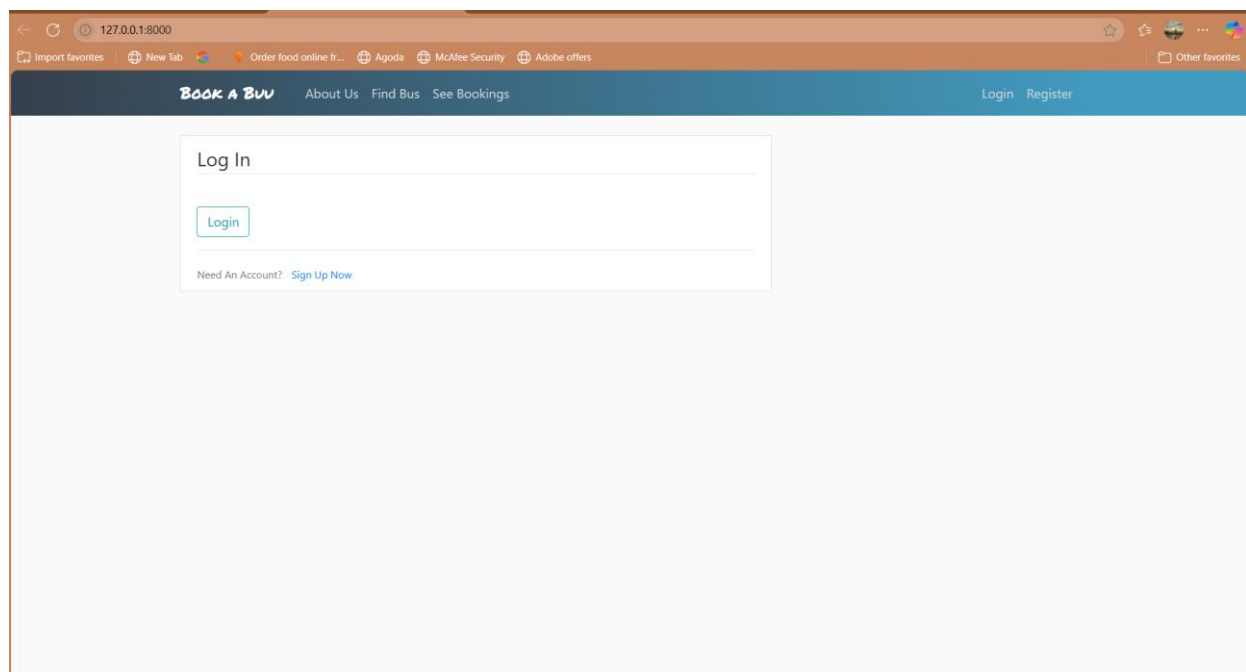
Using this commad :

```
python manage.py runserver
```

```
(venv) C:\Users\HP\bus-reservation-system>python manage.py runserver
Performing system checks...

System check identified no issues (0 silenced).
June 12, 2025 - 09:38:28
Django version 2.0.7, using settings 'myproject.settings'
Starting development server at http://127.0.0.1:8000/
Quit the server with CTRL-BREAK.
```

The project runs successfully . we can check them in server at <http://127.0.0.1:8000/>



create a Dockerfile to containerize the application and ensure it runs correctly within a Docker container.

Create a Dockerfile :

```
# Use official Python image
FROM python:3.7-slim

# Set environment variables
ENV PYTHONDONTWRITEBYTECODE 1
ENV PYTHONUNBUFFERED 1

# Set work directory
WORKDIR /code

# Install system dependencies
RUN apt-get update && apt-get install -y \
    libpq-dev gcc python3-dev \
    && pip install --upgrade pip

# Copy project files
COPY requirements.txt /code/
RUN pip install -r requirements.txt

# Copy the rest of the code
COPY . /code/

# Create static files directory
RUN mkdir -p /code/static

# Collect static files
# RUN python manage.py collectstatic --noinput

# Run migrations (optional for dev)
CMD ["gunicorn", "myproject.wsgi:application", "--bind", "0.0.0.0:8000"]
```

Above code for build docker images and run the docker image

With this file, I have onemore file that is docker-compose.yml

version: '3.9'

services:

web:

build: .

command: gunicorn myproject.wsgi:application --bind 0.0.0.0:8000

volumes:

- ./code

ports:

- "8000:8000"

env_file:

- .env

depends_on:

- db

db:

image: postgres:12

environment:

POSTGRES_DB: \${DB_NAME}

POSTGRES_USER: \${DB_USER}

POSTGRES_PASSWORD: \${DB_PASSWORD}

volumes:

- postgres_data:/var/lib/postgresql/data

volumes:

postgres_data:

There is another file that is .dockerignore

__pycache__

*.pyc

*.pyo

*.pyd

*.sqlite3

*.env

.git

Then run the command for build the image

docker-compose build

```
(venv) C:\Users\HP\bus-reservation-system>docker-compose build
time="2025-06-12T10:13:48+05:30" level=warning msg="C:\\Users\\HP\\bus-reservation-system\\docker-compose.yml: the attribute 'version' is obsolete, it will be ignored, please remove it to avoid potential confusion"
Compose can now delegate builds to bake for better performance.
To do so, set COMPOSE_BAKE=true.
[+] Building 58.2s (14/14) FINISHED                                docker:desktop-linux
=> [web internal] load build definition from Dockerfile            0.1s
=> => transferring dockerfile: 749B                                0.0s
=> [web internal] load metadata for docker.io/library/python:3.7-slim 7.5s
=> [web auth] library/python:pull token for registry-1.docker.io   0.0s
=> [web internal] load .dockerignore                               0.0s
=> => transferring context: 2B                                       0.0s
=> [web 1/7] FROM docker.io/library/python:3.7-slim@sha256:b53f496ca43e5af6994f8e316cf03af31050bf7944e0e4a308ad8 0.1s
=> => resolve docker.io/library/python:3.7-slim@sha256:b53f496ca43e5af6994f8e316cf03af31050bf7944e0e4a308ad86c00 0.1s
=> [web internal] load build context                               6.0s
=> => transferring context: 2.89MB                                    5.2s
=> CACHED [web 2/7] WORKDIR /code                                  0.0s
=> CACHED [web 3/7] RUN apt-get update && apt-get install -y      libpq-dev gcc python3-dev      && pip install -- 0.0s
=> CACHED [web 4/7] COPY requirements.txt /code/                  0.0s
=> CACHED [web 5/7] RUN pip install -r requirements.txt            0.0s
=> [web 6/7] COPY . /code/                                         16.5s
=> [web 7/7] RUN mkdir -p /code/static                             1.8s
=> [web] exporting to image                                        27.5s
=> => exporting layers                                              15.4s
=> => exporting manifest sha256:3e52fd6db697ac7f1be4d3c160bc5a305aba83b18192f7fcd8b798c21ea977881 0.0s
=> => exporting config sha256:9a3c782eb84ed3695e04e8b1cb3906e12dfc3a34ee38d954cf52d039f87129db 0.0s
=> => exporting attestation manifest sha256:cbd7b074334c6fcf922dd0e127437272390daba49fa07587d1ff9b5257923a1e 0.0s
=> => exporting manifest list sha256:c72f3750b80a6ffa5a4d356c25eb3e3e04199a98c812827c11d85ecd83409a8c 0.0s
=> => naming to docker.io/library/bus-reservation-system-web:latest 0.0s
=> => unpacking to docker.io/library/bus-reservation-system-web:latest 11.9s
=> [web] resolving provenance for metadata file                    0.0s
[+] Building 1/1
✔web Built 0.0s
(venv) C:\Users\HP\bus-reservation-system>
```

To check the images in docker hub or containers
docker images

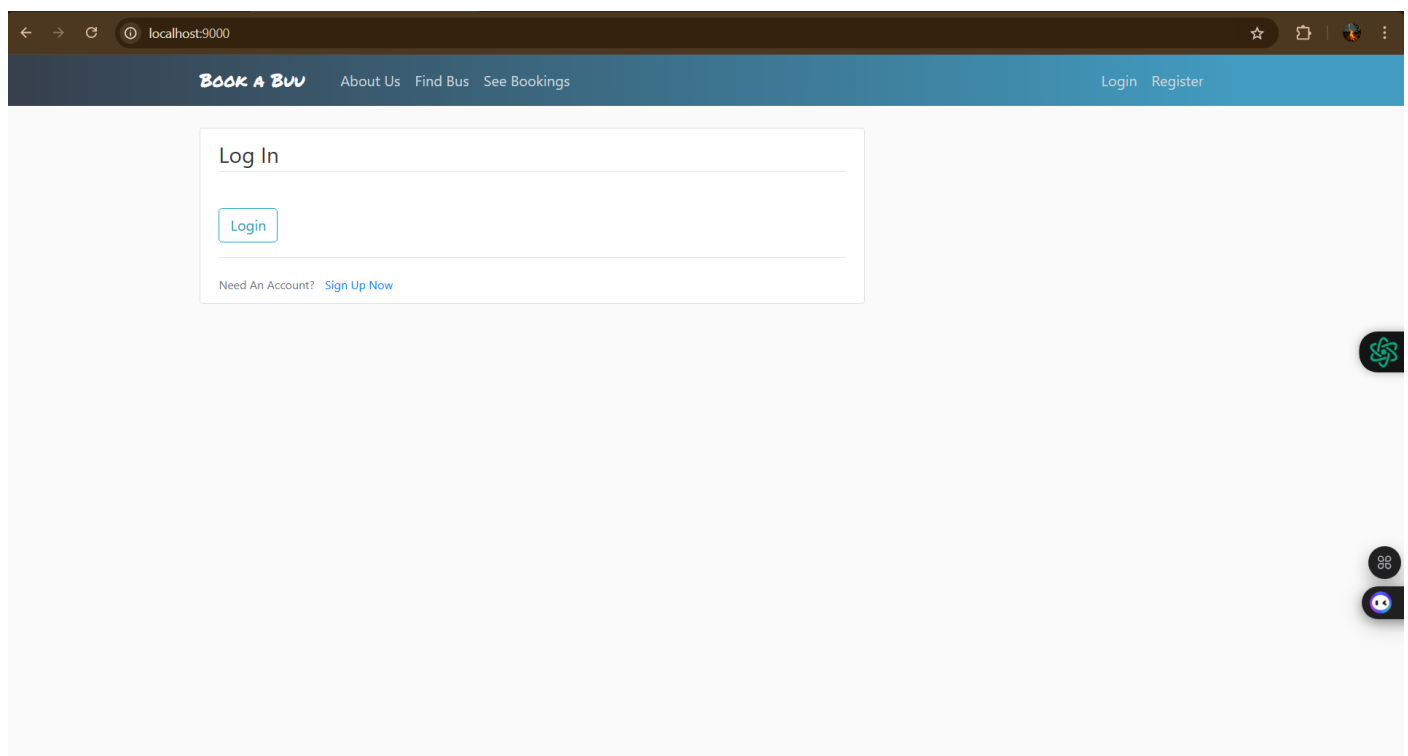
```
(venv) C:\Users\HP\bus-reservation-system>docker images
REPOSITORY              TAG          IMAGE ID        CREATED          SIZE
bus-reservation-system-web latest       c72f3750b80a   About a minute ago 1.13GB
postgres                13          9b6a9504a4b8   3 weeks ago     600MB
nginx                   latest      fb39280b7b9e   8 weeks ago     279MB
hello-world             latest      0b6a027b5cf3   4 months ago    20.4kB
```

Now, we required to run the container

docker run -d -p 8000:8000 --name bus-reservation-system bus-reservation-system-web

```
(venv) C:\Users\HP\bus-reservation-system>docker run -d -p 9000:8000 --name bus-reservation-system bus-reservation-system-web
722665139fc4721b64435c1654b8aa91569570688e9160cec04f2fdcabc8d4e2
```

Finally, the project run in the suitable port number : 9000



To check them in docker hub whether the container is running or not.

<input type="checkbox"/>	Name	Tag	Image ID	Created	Size	Actions
<input type="checkbox"/>	postgres	13	9b6a9504a4b8	21 days ago	599.79 MB	▶ ⋮ 🗑️
<input type="checkbox"/>	nginx	latest	fb39280b7b9e	2 months ago	279.31 MB	▶ ⋮ 🗑️
<input type="checkbox"/>	hello-world	latest	0b6a027b5cf3	5 months ago	20.4 KB	▶ ⋮ 🗑️
<input type="checkbox"/>	bus-reservation-system-web	latest	c72f3750b80a	17 minutes ag	1.13 GB	▶ ⋮ 🗑️

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