Module 1

1. Installing docker: https://docs.docker.com/get-docker/

2. Make a directory

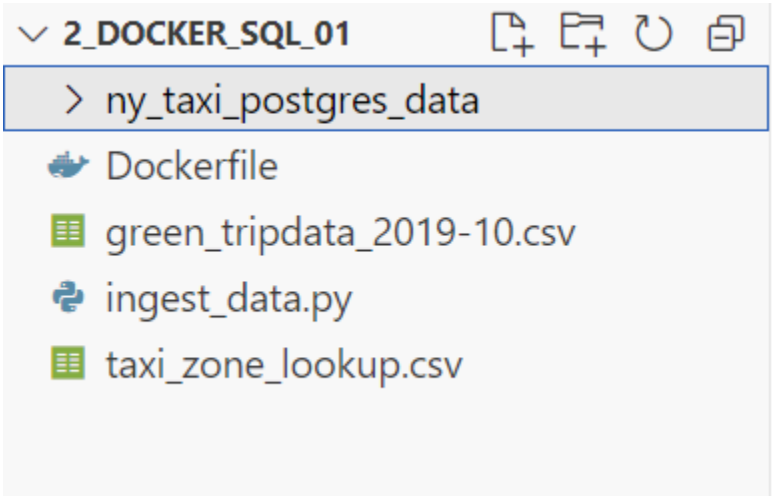
```
zhaoy@ZYX MINGW64 /e/DataEnigneer
$ mkdir 2_docker_sql_01

zhaoy@ZYX MINGW64 /e/DataEnigneer
$ cd 2_docker_sql_01

zhaoy@ZYX MINGW64 /e/DataEnigneer/2_docker_sql_01
$ code .
```

3. Create a docker file and ingest_data.py (check my Github)

4. Create a folder named ny_taxi_postgres_data



5. Paste those code in the terminal and run this code

```
docker run -it \
 -e POSTGRES_USER="postgres" \
 -e POSTGRES_PASSWORD="postgres" \
 -e POSTGRES_DB="ny_taxi" \
 -v e:/DataEnigneer/2_docker_sql_01/ny_taxi_postgres_data/ny_taxi_postgres_data:/var/lib/postgresql/data \
 -p 5432:5432 \
 --network=pg-network \
 --name pg-database-01 \
 Postgres:13
```

This command starts a **PostgreSQL database** server in a Docker container. It uses the **PostgreSQL 17 Alpine image** and sets up database parameters, port forwarding, and volume mapping for persistent storage.

`docker run --rm`
Starts a new Docker container, remove the container when it stops, cleaning up resources

`-e (Environment Variables)`

- These options pass **environment variables** to the container to configure the PostgreSQL database:
    - `POSTGRES_DB=ny_taxi`: Sets the default database name to `ny_taxi`.
    - `POSTGRES_USER=postgres`: Sets the username for the database to `postgres`.
    - `POSTGRES_PASSWORD=postgres`: Sets the password for the `postgres` user to `postgres`.

`-p 5432:5432`

- Maps port **5432** on your host machine to port **5432** in the container.
    - PostgreSQL's default port is **5432**.
    - This allows you to connect to the database using tools like `psql`, DBeaver, or a Python script from your host machine.

`-v E:/DataEnigneer/2_docker_sql_01/ny_taxi_postgres_data:/var/lib/postgresql/data`

- **Volume Mapping**: Maps a directory on your local file system (`E:/DataEnigneer/2_docker_sql_01/ny_taxi_postgres_data`) to the container's **data directory** (`/var/lib/postgresql/data`).
    - **Purpose**: Ensures that your database data is stored persistently on your local machine, even if the container is removed.

`postgres:17-alpine`

- Specifies the **Docker image** to use:
    - `postgres`: PostgreSQL database server image.
    - `17-alpine`: Version **17** of PostgreSQL built on the lightweight **Alpine Linux**.

6. After this code, you will see there are many files under the ny_taxi_postgres_data folder.

What Happens When You Run It?

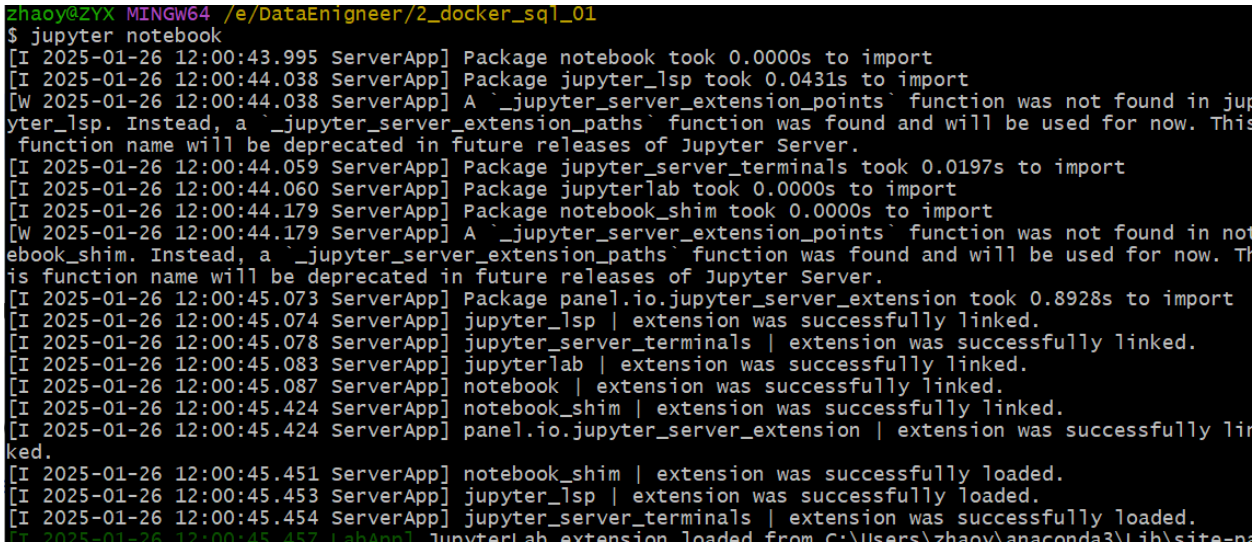
1. A Docker container starts using the PostgreSQL 17 Alpine image.
2. It initializes a database named `ny_taxi`, with the username and password both set to `postgres`.
3. The database listens for connections on port 5432 (accessible from your host machine).
4. Data is stored in the local directory (`E:/DataEnigneer/...`) to persist across container restarts.

Why Use This Setup?

1. **Port Mapping**: Allows database access from your host system or other applications.
2. **Environment Variables**: Configures the database automatically on startup.
3. **Persistent Storage**: Ensures database data is not lost when the container is removed.
4. **Alpine Image**: Optimized for size, making it lightweight and faster to start.

7. Download your dataset or import your dataset.

Open a new terminal, open the jupyter notebook

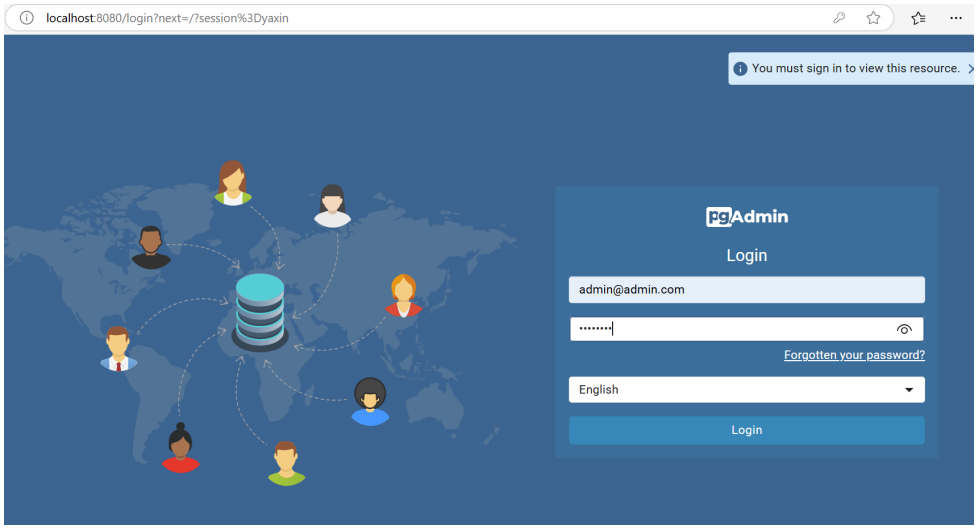


8. Open a new terminal and run those code.

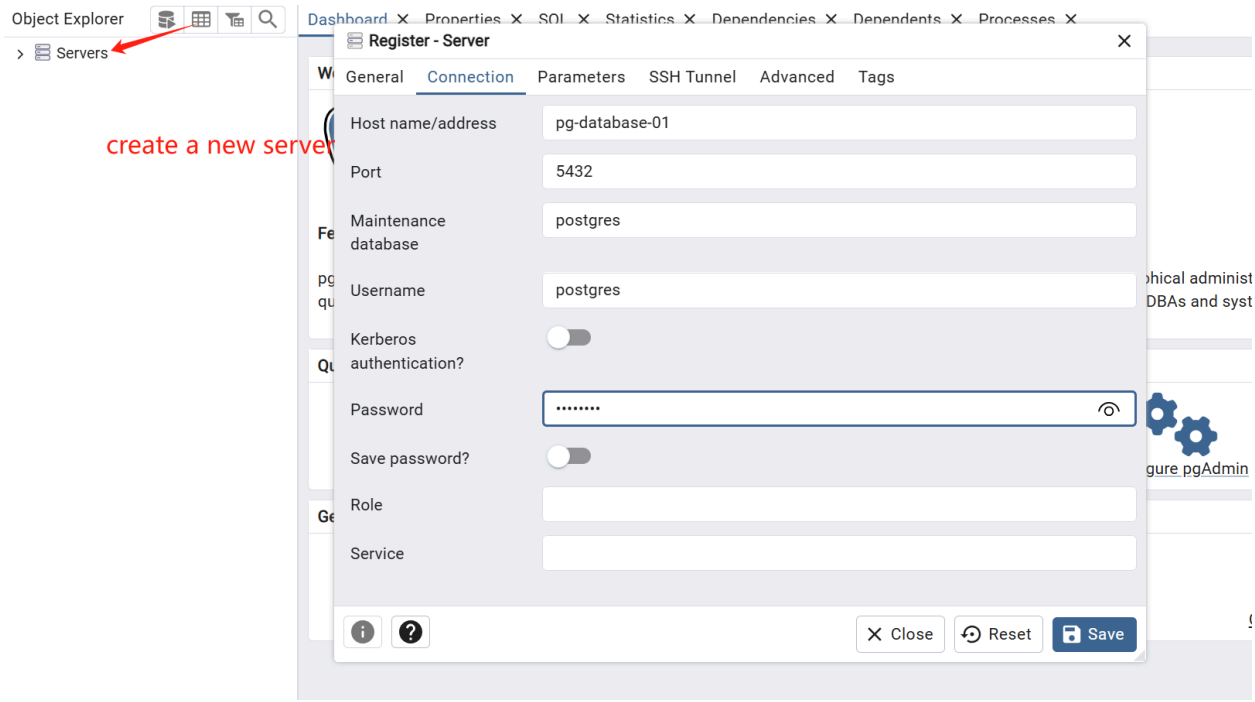
```
docker run -it \
 -e PGADMIN_DEFAULT_EMAIL="admin@admin.com" \
 -e PGADMIN_DEFAULT_PASSWORD="postgres" \
 -p 8080:80 \
 --network=pg-network \
 --name pgadmin-2 \
 dpage/pgadmin4
```

9. Open http://localhost:8080/ in your borwer

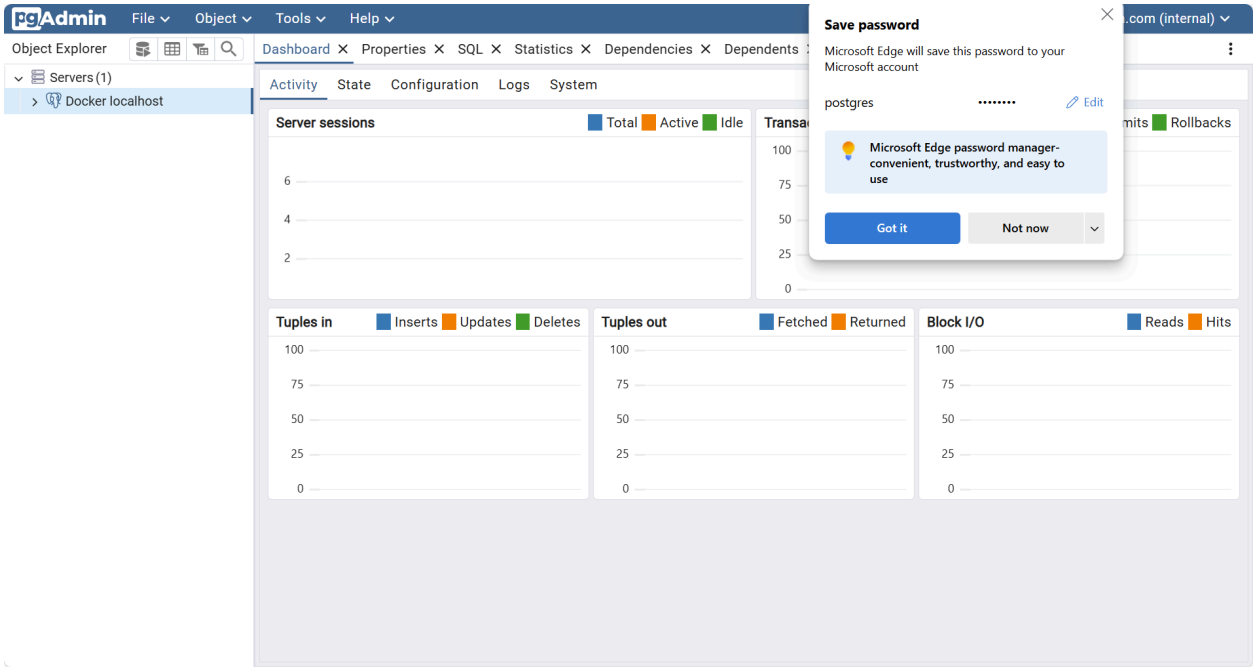
Login use your name and password

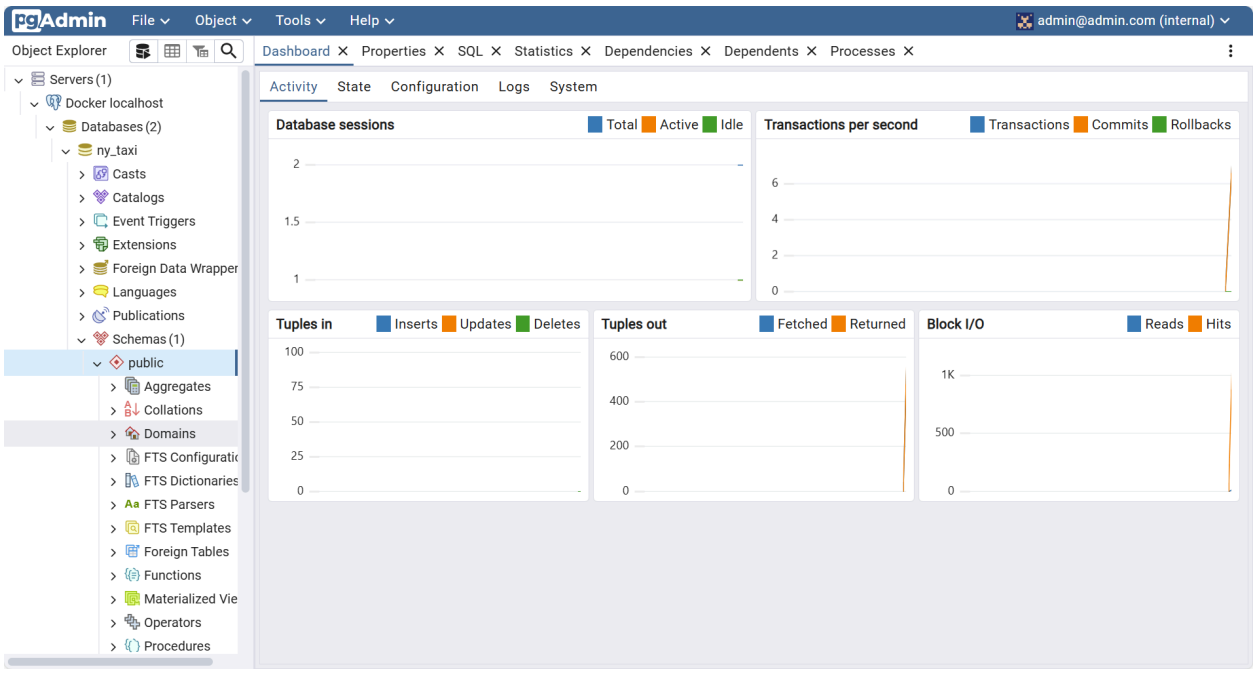


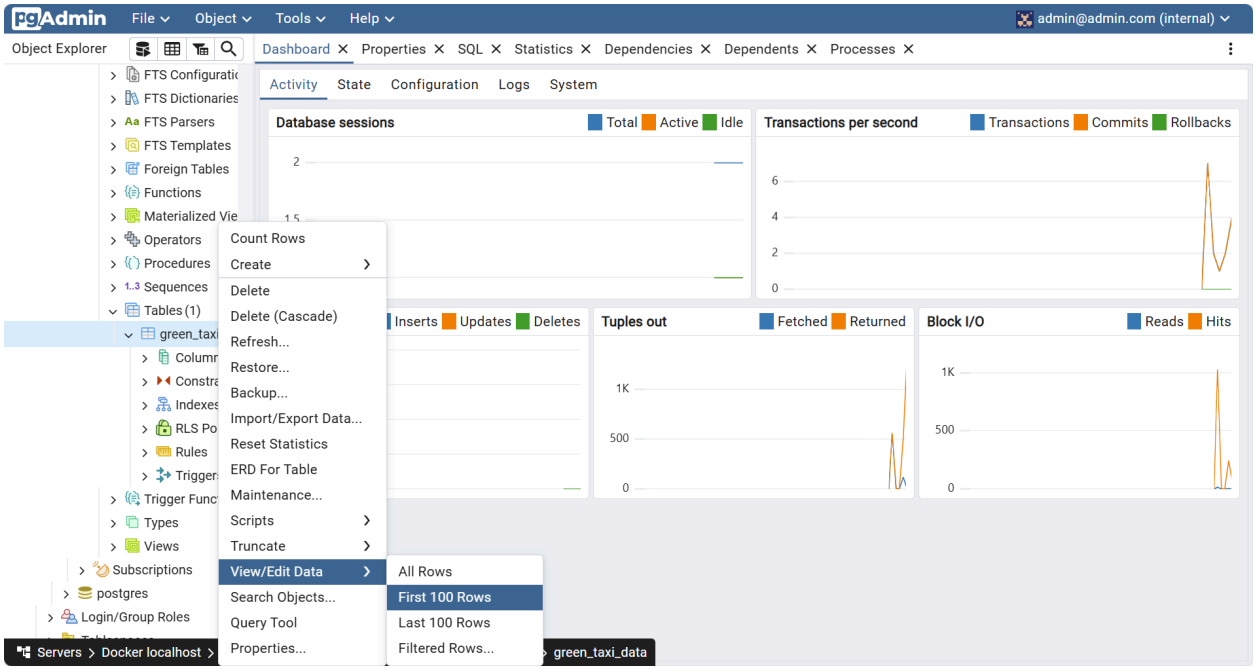
Create a new server



10. Explore our data







11. Write your code here