Assignment #1: Docker Containers

- commands used to build and run the stack:

```
C:\Users\spavulu3> cd C:\Users\spavulu3\Downloads

C:\Users\spavulu3\Downloads>mkdir ccda-a1

C:\Users\spavulu3\Downloads>cd ccda-a1

C:\Users\spavulu3\Downloads\ccda-a1>mkdir db

C:\Users\spavulu3\Downloads\ccda-a1>mkdir app

C:\Users\spavulu3\Downloads\ccda-a1>mkdir out

C:\Users\spavulu3\Downloads\ccda-a1>git init
Initialized empty Git repository in C:/Users/spavulu3/Downloads/ccda-a1/.git/

C:\Users\spavulu3\Downloads\ccda-a1>echo out/ >> .gitignore

C:\Users\spavulu3\Downloads\ccda-a1>echo __pycache__/ >> .gitignore

C:\Users\spavulu3\Downloads\ccda-a1>echo *.pyc >> .gitignore

C:\Users\spavulu3\Downloads\ccda-a1>tree /f
Folder PATH listing for volume Windows
Volume serial number is 8623-0BCC
C:.
│   .gitignore
│
├───app
├───db
└───out
```

```
PS C:\Users\spavulu3\Downloads\ccda-a1> docker compose up --build
>>
[+] Building 13.7s (21/21) FINISHED
 => [internal] load local bake definitions     0.0s
 => => reading from stdin 967B                 0.0s
 => [db internal] load build definition from   0.0s
 => => transferring dockerfile: 97B            0.0s
 => [app internal] load build definition from  0.0s
 => => transferring dockerfile: 179B           0.0s
 => [db internal] load metadata for docker.io  1.8s
 => [app internal] load metadata for docker.i  1.8s
 => [auth] library/python:pull token for regi  0.0s
 => [auth] library/postgres:pull token for re  0.0s
 => [app internal] load .dockerignore          0.0s
 => => transferring context: 2B                0.0s
 => [db internal] load .dockerignore           0.0s
 => => transferring context: 2B                0.0s
 => [db 1/2] FROM docker.io/library/postgres:  6.7s
 => => resolve docker.io/library/postgres:16@  0.0s
 => => sha256:51fc7db33937d227400 185B / 185B  0.1s
 => => sha256:5dab2b1c056e735 5.93kB / 5.93kB  0.2s
 => => sha256:7983d78dffe57b8802f 169B / 169B  0.1s
 => => sha256:51d5243186869b8d5f1 128B / 128B  0.2s
 => => sha256:9a2340cfeb8 113.19MB / 113.19MB  3.6s
 => => sha256:6f2681e5743dd57 3.14kB / 3.14kB  0.2s
 => => sha256:c9e310671a470 10.02kB / 10.02kB  0.2s
 => => sha256:bc6fd646359ee69ece0 116B / 116B  0.1s
```

- summary from stdout (the JSON printed by the app):

```
=== Summary ===

{

"total_trips": 6,

"avg_fare_by_city": [

{

"city": "Charlotte",

"avg_fare": 16.25
```

```
},
{
"city": "New York",
"avg_fare": 19.0
},
{
"city": "San Francisco",
"avg_fare": 20.25
}
],
"top_by_minutes": [
{
"id": 6,
"city": "San Francisco",
"minutes": 28,
"fare": 29.3
},
{
"id": 4,
"city": "New York",
"minutes": 26,
"fare": 27.1
},
```

```
{
"id": 2,
"city": "Charlotte",
"minutes": 21,
"fare": 20.0
},
{
"id": 1,
"city": "Charlotte",
"minutes": 12,
"fare": 12.5
},
{
"id": 5,
"city": "San Francisco",
"minutes": 11,
"fare": 11.2
},
{
"id": 3,
"city": "New York",
"minutes": 9,
"fare": 10.9
```

```
}

]

}
```

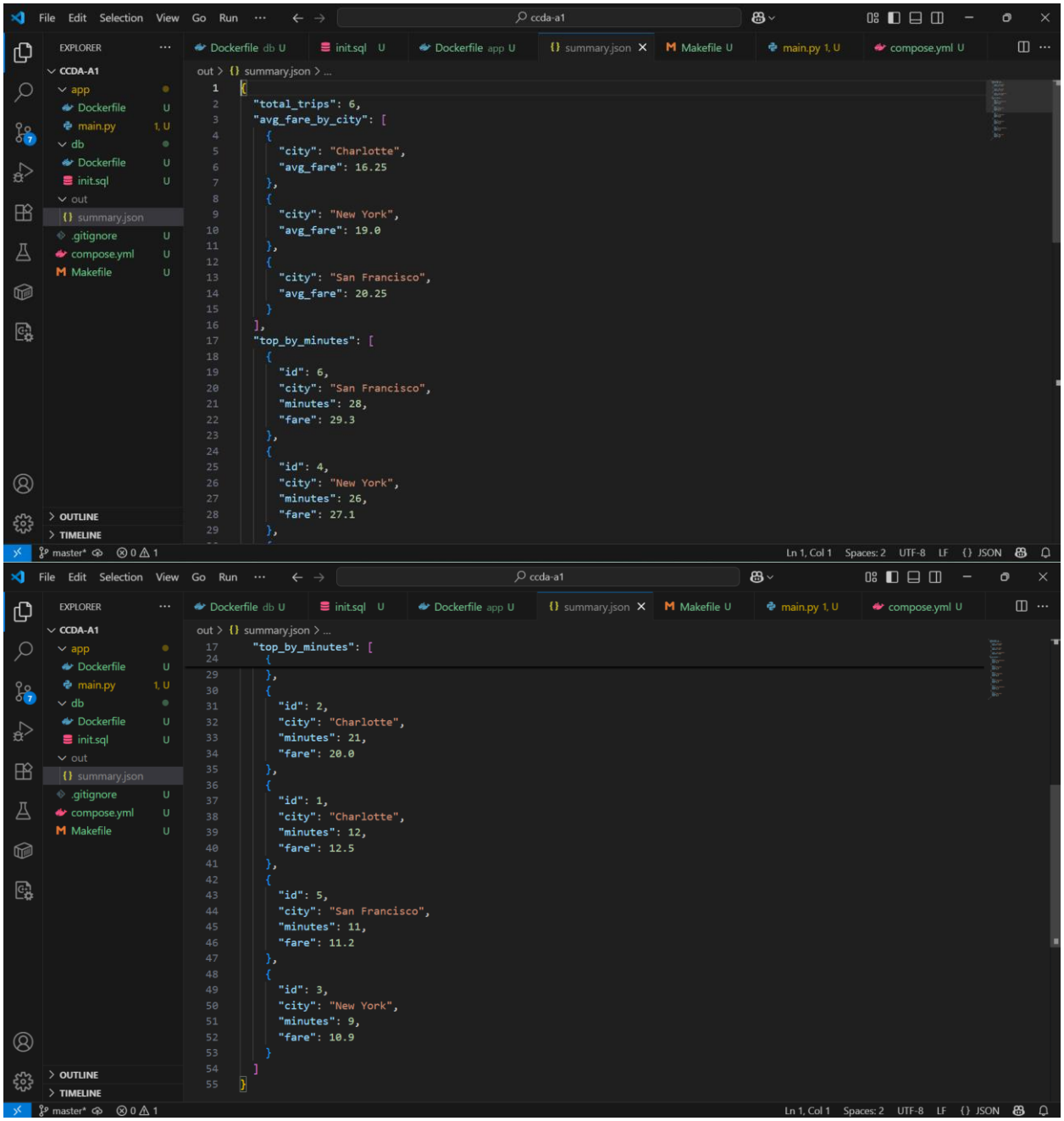
```
app-1  | === Summary ===
app-1  | {
app-1  |   "total_trips": 6,
app-1  |   "avg_fare_by_city": [
app-1  |     {
app-1  |       "city": "Charlotte",
app-1  |       "avg_fare": 16.25
app-1  |     },
app-1  |     {
app-1  |       "city": "New York",
app-1  |       "avg_fare": 19.0
app-1  |     },
app-1  |     {
app-1  |       "city": "San Francisco",
app-1  |       "avg_fare": 20.25
app-1  |     }
app-1  |   ],
app-1  |   "top_by_minutes": [
app-1  |     {
app-1  |       "id": 6,
app-1  |       "city": "San Francisco",
app-1  |       "minutes": 28,
app-1  |       "fare": 29.3
app-1  |     },
app-1  |     {
app-1  |       "id": 4,
app-1  |       "city": "New York",
app-1  |       "minutes": 26,
app-1  |       "fare": 27.1
```

```
app-1  |     },
app-1  |     {
app-1  |       "id": 2,
app-1  |       "city": "Charlotte",
app-1  |       "minutes": 21,
app-1  |       "fare": 20.0
app-1  |     },
app-1  |     {
app-1  |       "id": 1,
app-1  |       "city": "Charlotte",
app-1  |       "minutes": 12,
app-1  |       "fare": 12.5
app-1  |     },
app-1  |     {
app-1  |       "id": 5,
app-1  |       "city": "San Francisco",
app-1  |       "minutes": 11,
app-1  |       "fare": 11.2
app-1  |       "fare": 10.9
app-1  |     }
app-1  |   ]
app-1  | }
app-1 exited with code 0
```

- The contents of out/summary.json:


```
{
  "total_trips": 6,
  "avg_fare_by_city": [
    {
      "city": "Charlotte",
      "avg_fare": 16.25
    },
    {
      "city": "New York",
      "avg_fare": 19.0
    },
    {
      "city": "San Francisco",
      "avg_fare": 20.25
    }
  ],
```

```
  "top_by_minutes": [
    {
      "id": 6,
      "city": "San Francisco",
      "minutes": 28,
      "fare": 29.3
    },
    {
      "id": 4,
      "city": "New York",
      "minutes": 26,
      "fare": 27.1
    },
    {
      "id": 2,
      "city": "Charlotte",
      "minutes": 21,
      "fare": 20.0
    },
    {
      "id": 1,
      "city": "Charlotte",
      "minutes": 12,
      "fare": 12.5
    },
    {
      "id": 5,
      "city": "San Francisco",
      "minutes": 11,
      "fare": 11.2
    },
    {
      "id": 3,
      "city": "New York",
      "minutes": 9,
      "fare": 10.9
    }
  ]
}
```



- what I learned and what I would improve:

I learned how to design and run a multi-container application using Docker Compose, connecting a Postgres database with a Python application. Through this assignment, I practiced writing Dockerfiles, using environment variables, and handling service dependencies with health checks. I also gained experience with persisting output data using volumes. If I were to improve this project, I would add more robust error handling in the Python app and extend the database with larger, more realistic datasets for testing.