Midterm

Installation

Installing Docker on Windows is simple as long as you follow the Docker desktop installer. Install WSL before it because it is recommended in the Docker documentation.

Challenge 1: Simple Web Server for Static Web Pages

Instructions

1. Create the `index.html` File
   - Create a directory for your project name it what you like. In this case I am using `simple-web-server`.
   - Inside this directory, create a file named `index.html` with the following content:

   ```
   <!DOCTYPE html>
   <html>
   <head>
   <title>Simple Web Server</title>
   </head>
   <body>
   <h1>Name: `${your name}`</h1>
   <h2>ID: `${your id}`</h2>
   </body>
   </html>
   ```

2. Create the `Dockerfile`
   - In the same directory, create a file named Dockerfile with the following content:

   ```
   FROM nginx:latest

   COPY index.html /usr/share/nginx/html/

   EXPOSE 80
   ```

3. Build the Docker Image
   - Open your terminal, navigate to the project directory, and build the Docker image:

   ```
   docker build -t simple-web-server .
   ```

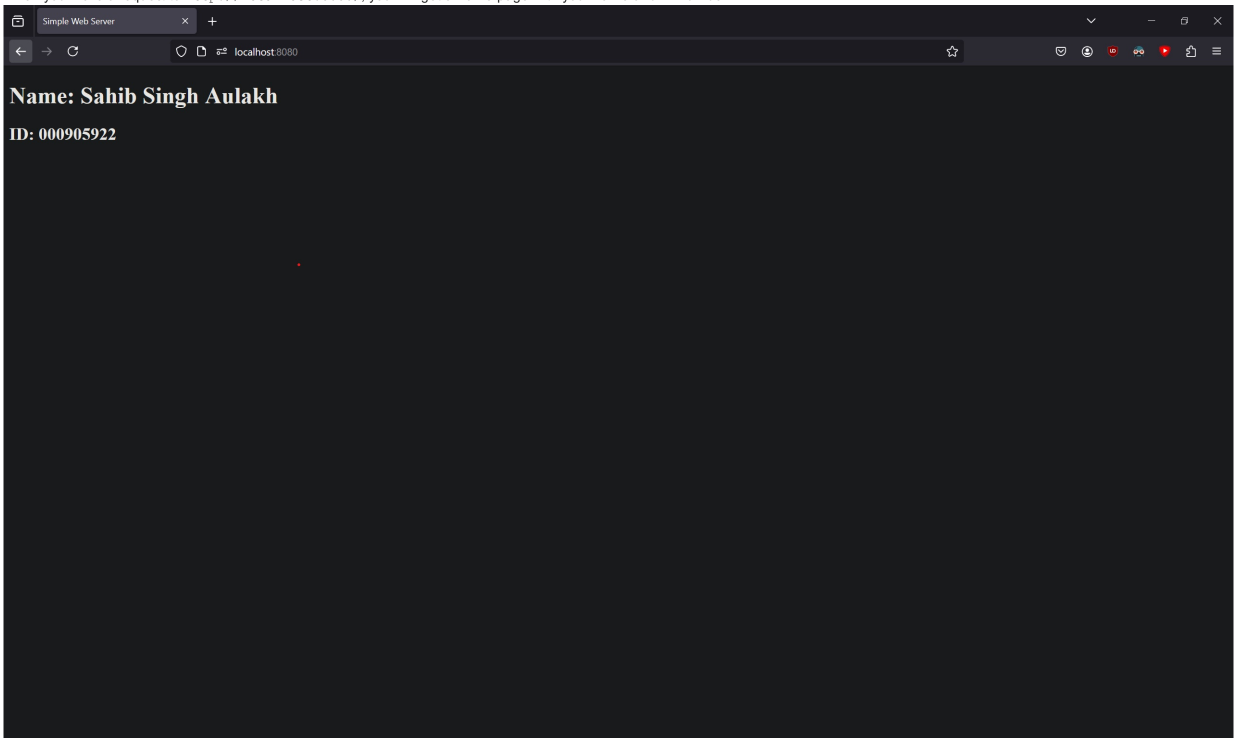
4. Run the Docker Container
   - Run the Docker container using the following command:

   ```
   docker run -d -p 8080:80 --name simple-web-server simple-web-server
   ```

5. Verify the Web Server
   - Open a web browser and navigate to `http://localhost:8080`. You should see the page with your name and student ID.

Expected Outcomes

1. When you make a request to `http://localhost:8080/`, you will get a home page with your name and ID number.



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Challenge 2: Creating a Dynamic Application

Instructions

1. Set Up the Application
   - Create a directory for your project name it what you like. In this case I am using `dynamic-app`.
   - Inside this directory, create a subdirectory named `app`.

2. Create the Application Code

   - Inside the `app` directory, create a file named `server.js` with the following content:

```
const express = require('express');

const app = express();
const port = 3000;

const books = [
{ id: 1, title: "1984", author: "George Orwell" },
{ id: 2, title: "To Kill a Mockingbird", author: "Harper Lee" }
];

app.get('/api/books', (req, res) => {
res.json(books);
});

app.get('/api/books/:id', (req, res) => {
const book = books.find(b => b.id == req.params.id);
if (book) {
    res.json(book);
} else {
    res.status(404).send('Book not found');
}
});

app.listen(port, () => {
console.log(`Server running at http://localhost:${port}/`);
});
```

3. Create `package.json`

   - In the `app` directory, create a `package.json` file with the following content:

```
{
"name": "dynamic-app",
"version": "1.0.0",
"main": "server.js",
"dependencies": {
    "express": "^4.17.1"
},
"scripts": {
    "start": "node server.js"
    }
}
```

4. Create a `Dockerfile` for the Application

   - In the `app` directory, create a `Dockerfile` with the following content:

```
FROM node:14

WORKDIR /usr/src/app

COPY package*.json ./
COPY server.js ./

RUN npm install

EXPOSE 3000

CMD ["npm", "start"]
```

5. Set Up `nginx`

   - In the `dynamic-app` directory, create an `nginx` directory.
     Inside the `nginx` directory, create a file named `default.conf` with the following content:

```
server {
    listen 80;

    location / {
        proxy_pass http://app:3000;
        proxy_set_header Host $host;
        proxy_set_header X-Real-IP $remote_addr;
        proxy_set_header X-Forwarded-For $proxy_add_x_forwarded_for;
        proxy_set_header X-Forwarded-Proto $scheme;
    }
}
```

6. Create a `Dockerfile` for `Nginx`

   - In the `nginx` directory, create a `dockerfile` with the following content:

```
FROM nginx:latest
COPY default.conf /etc/nginx/conf.d/default.conf
```

7. Create a Docker Compose File

   - In the `dynamic-app` directory, create a `docker-compose.yml` file with the following content:

```
version: '3.8'

services:
app:
    build: ./app
    ports:
    - "3000:3000"
nginx:
    build: ./nginx
    ports:
    - "8080:80"
    depends_on:
    - app
```

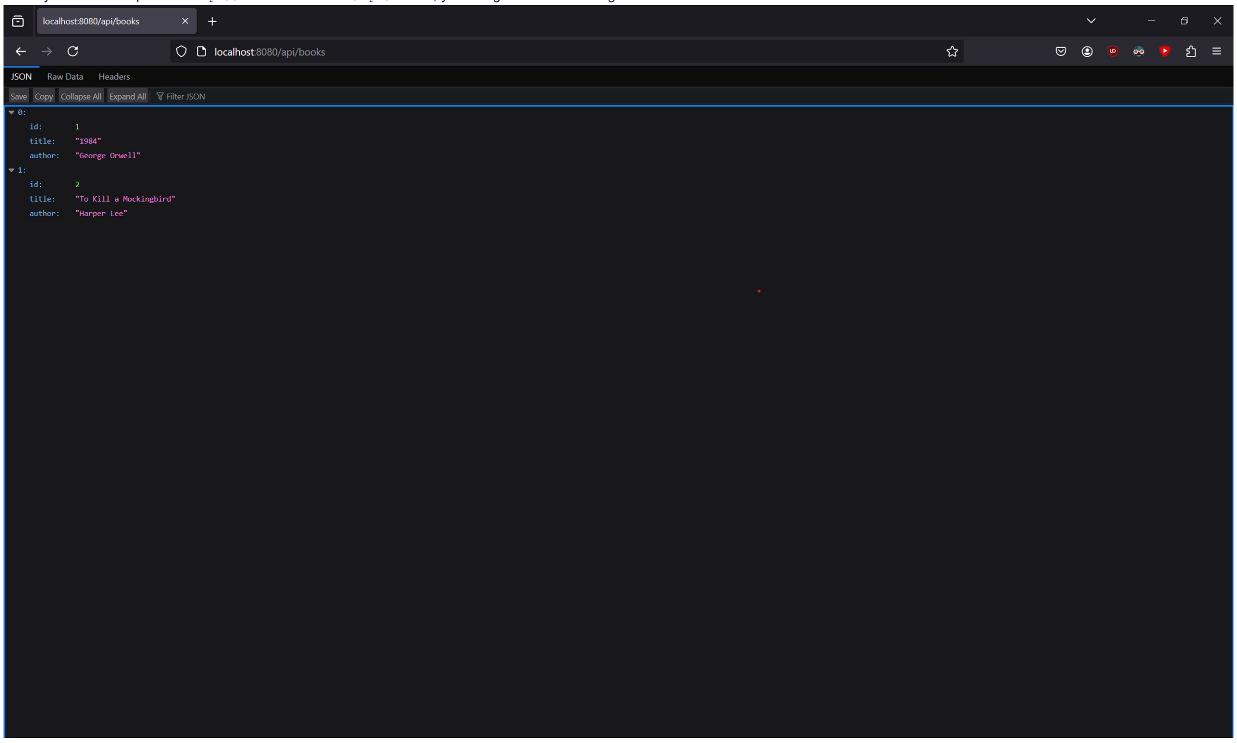
8. Build and Run the Application Using Docker Compose

- In the `dynamic-app` directory, run the following command:

```
docker-compose up --build
```

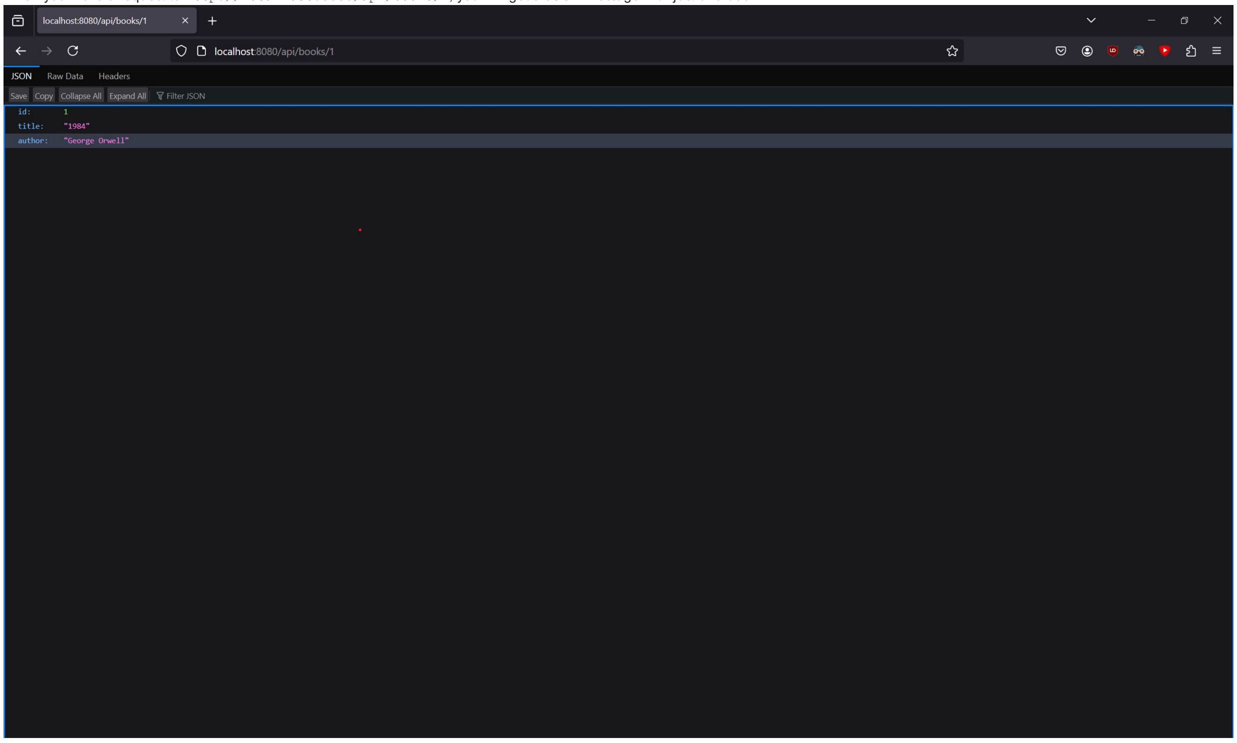
Expected Outcomes

- When you make a request to `http://localhost:8080/api/books`, you will get a JSON message with all books.



```
▼ 0:
    id:       1
    title:    "1984"
    author:   "George Orwell"
▼ 1:
    id:       2
    title:    "To Kill a Mockingbird"
    author:   "Harper Lee"
```

- When you make a request to `http://localhost:8080/api/books/1`, you will get a JSON message with just one book.



```
id:       1
title:    "1984"
author:   "George Orwell"
```

References

- [Docker Tutorial For Beginners (https://www.youtube.com/watch?v=gAkwW2tuIqE)](https://www.youtube.com/watch?v=gAkwW2tuIqE)
- [Docker Documentation (https://docs.docker.com/)](https://docs.docker.com/)