MIT World Peace University

Cloud Infrastructure and Security
Third Year B. Tech, Semester 6

Installing and Running Docker on Windows

Assignment 5

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Contents

1 Aim

To install and Run Docker on Windows or Ubuntu

2 Objectives

1. To learn how to install Docker on Windows
2. To understand the importance of Docker

3 Theory

3.1 What is Docker?

Docker is a platform for developing, shipping, and running applications in containers. Docker enables you to separate your applications from your infrastructure so you can deliver software quickly. With Docker, you can manage your infrastructure in the same ways you manage your applications. By taking advantage of Docker's methodologies for shipping, testing, and deploying code quickly, you can significantly reduce the delay between writing code and running it in production.

3.2 Why Docker?

1. **Rapid Deployment**: Docker containers can be built, deployed, and scaled quickly.
2. **Version Control**: Docker images are version-controlled and can be pushed to a remote repository.
3. **Isolation**: Docker containers are isolated from each other and from the host system.
4. **Portability**: Docker containers can run on any system that supports Docker.
5. **Resource Efficiency**: Docker containers share the host system's kernel and require fewer resources than virtual machines.
6. **Security**: Docker containers are secure by default and can be further secured using Docker security features.
7. **Scalability**: Docker containers can be scaled horizontally and vertically to meet demand.
8. **Microservices**: Docker containers are ideal for building microservices-based applications.
9. **DevOps**: Docker containers are a key enabler of DevOps practices.
10. **Continuous Integration/Continuous Deployment (CI/CD)**: Docker containers are used in CI/CD pipelines to automate the build, test, and deployment process.
11. **Cloud-Native Applications**: Docker containers are the foundation of cloud-native applications.
12. **Open Source**: Docker is open source and has a large community of contributors.

4 Setting up Docker on Windows

Download and run the docker installer from the official website: https://www.docker.com/products/docker-desktop

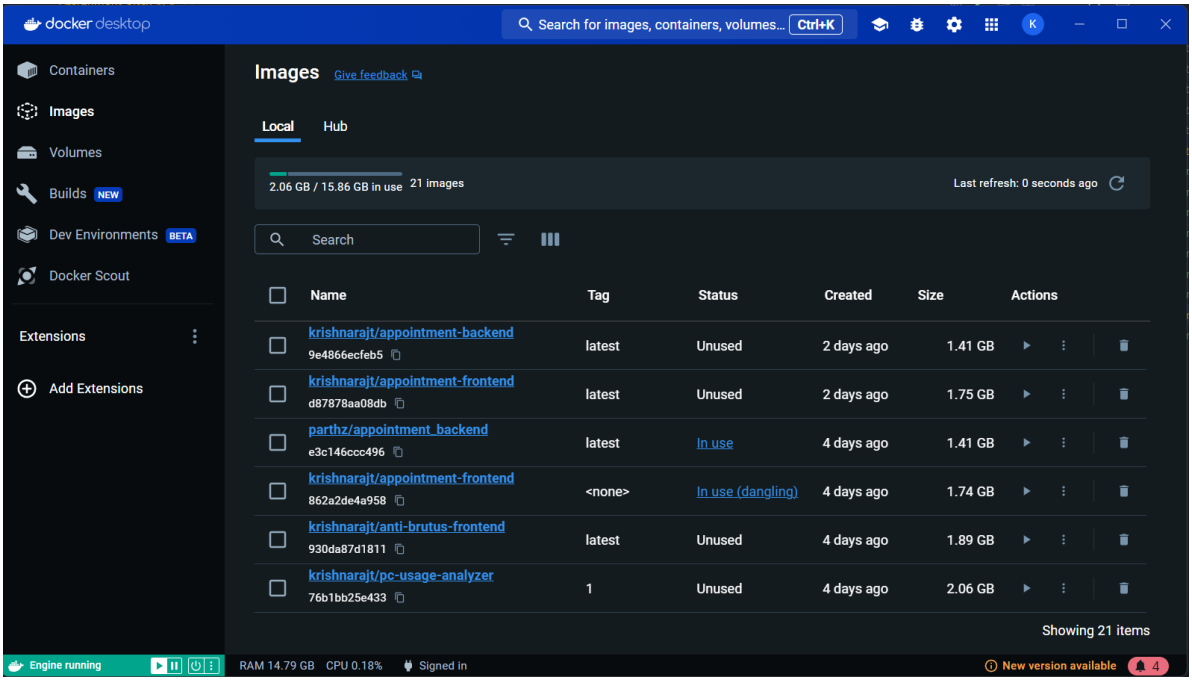


Figure 1: The Home page with images in the Docker GUI

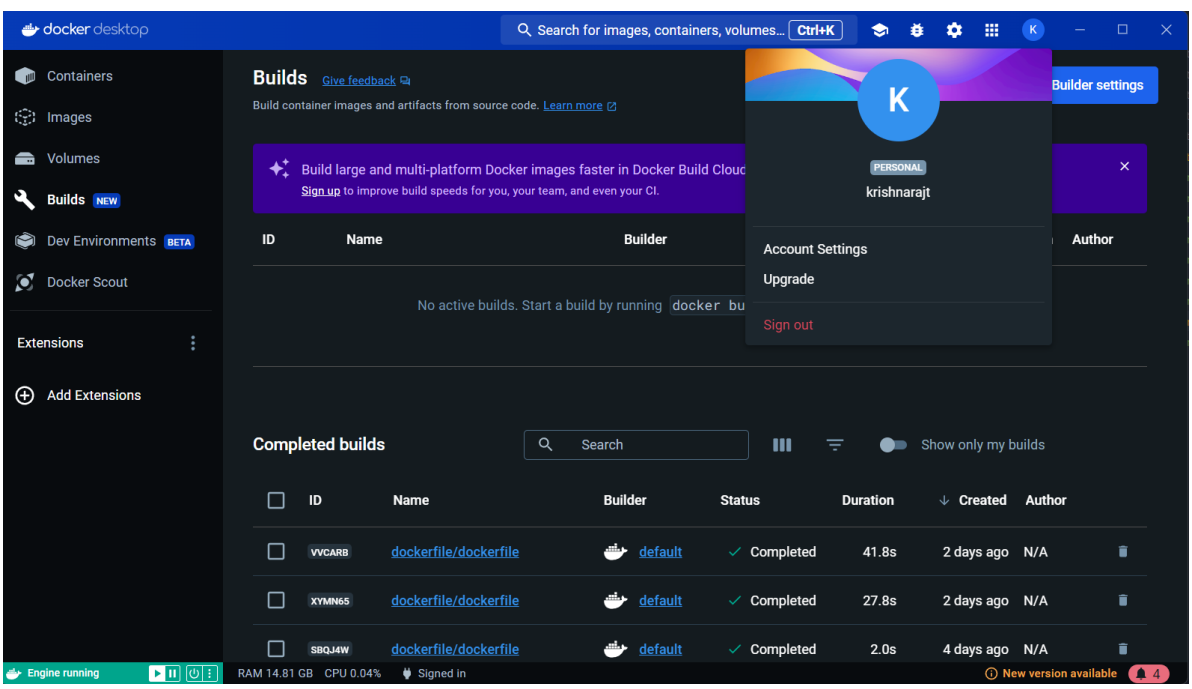


Figure 2: You can then log in to your docker account in the GUI.

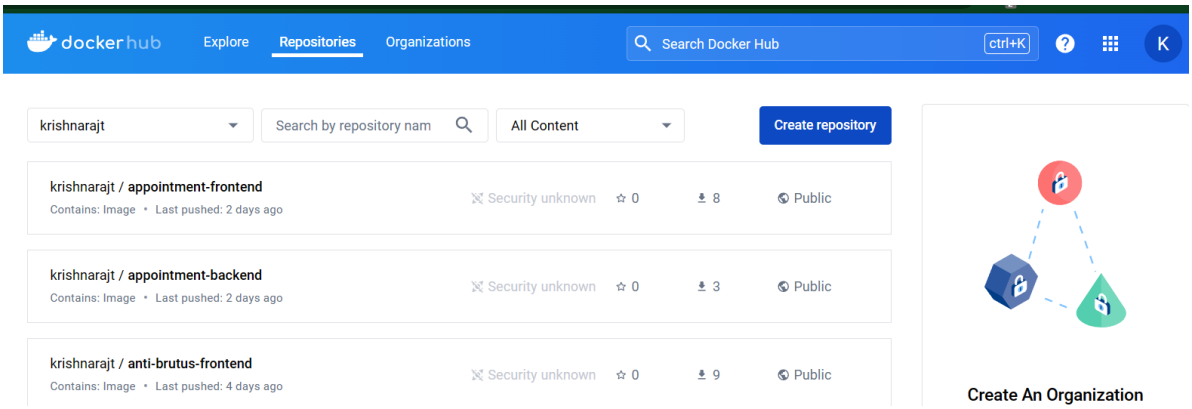


Figure 3: Docker Hub in the GUI

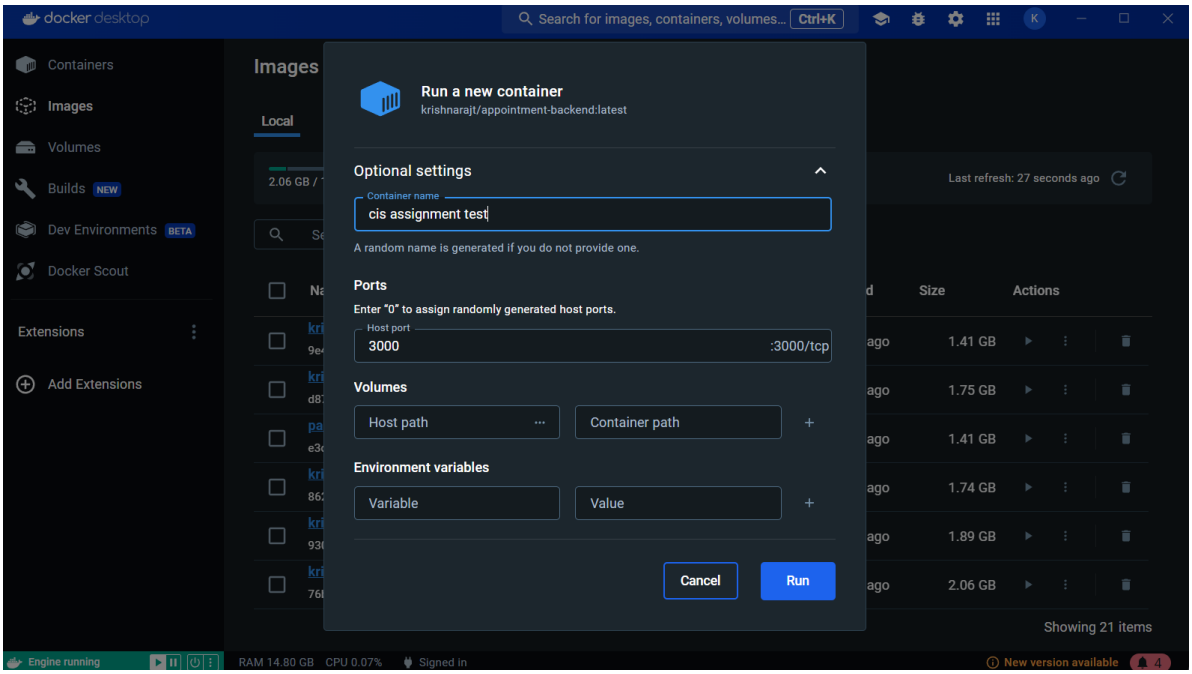


Figure 4: Setting up a new Container in the GUI.

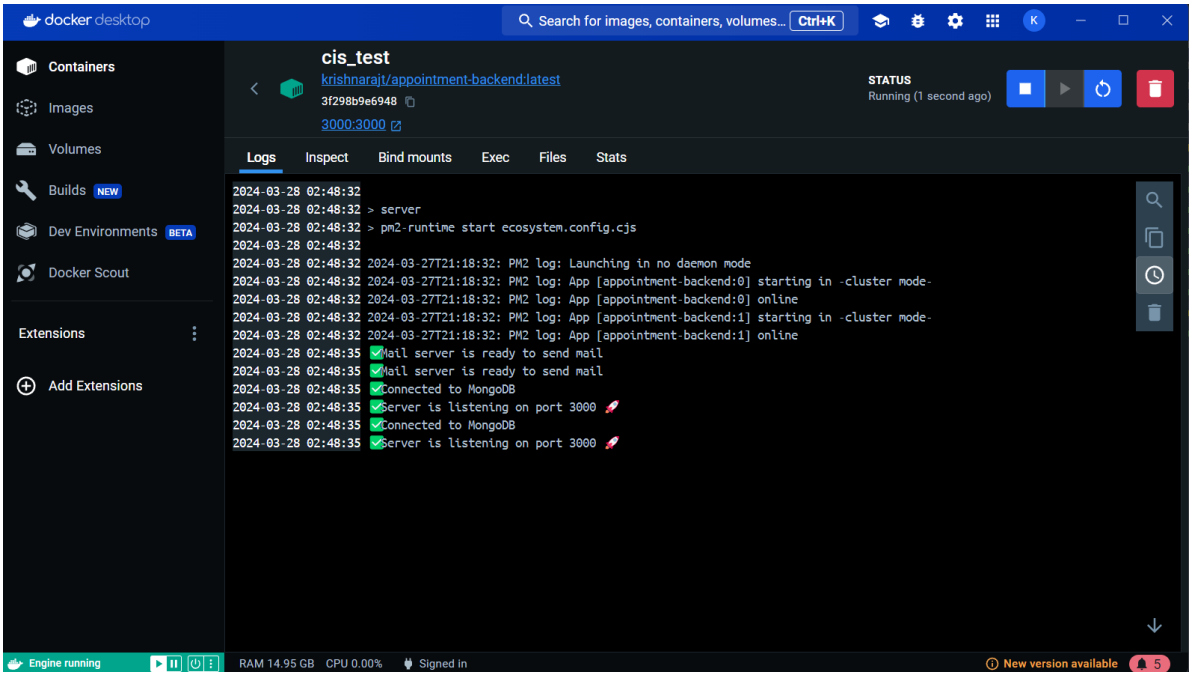


Figure 5: Running the Container

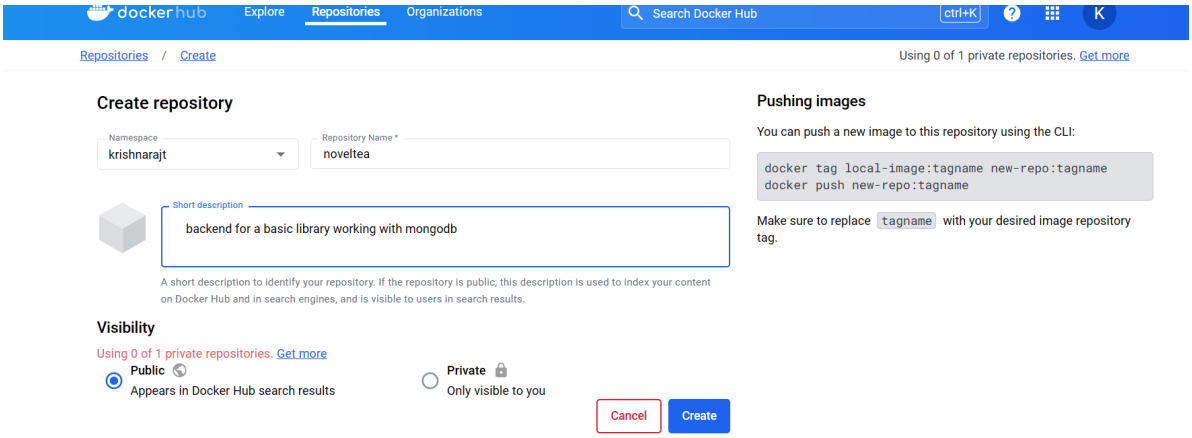
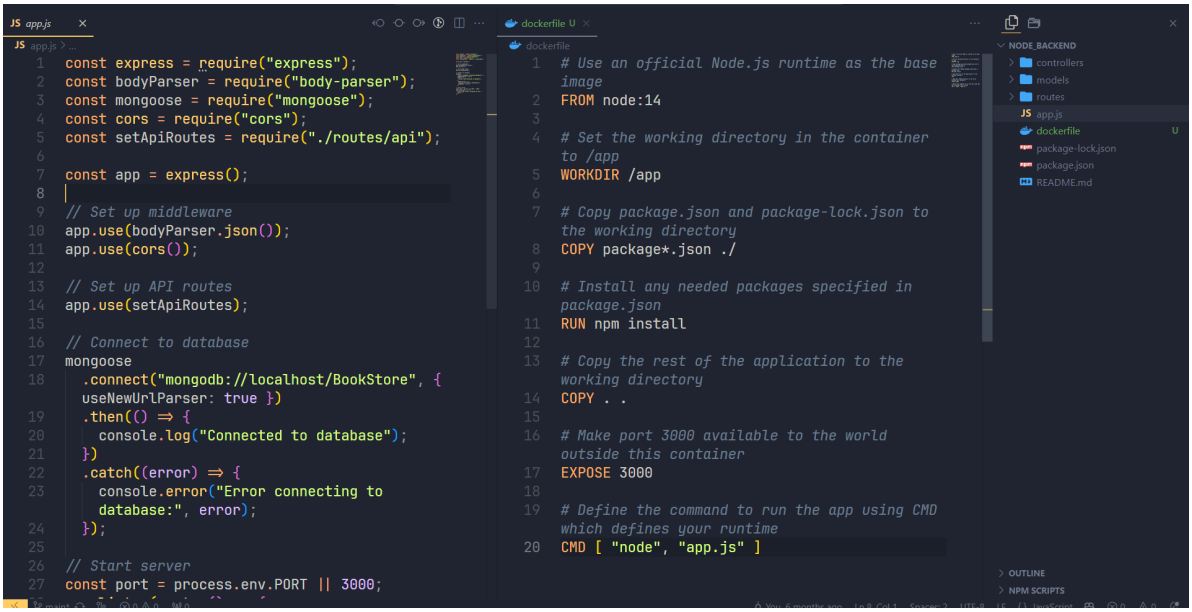


Figure 6: Making a New Repository in Docker Hub



```js
const express = require("express");
const bodyParser = require("body-parser");
const mongoose = require("mongoose");
const cors = require("cors");
const setApiRoutes = require("./routes/api");

const app = express();

// Set up middleware
app.use(bodyParser.json());
app.use(cors());

// Set up API routes
app.use(setApiRoutes);

// Connect to database
mongoose
  .connect("mongodb://localhost/BookStore", {
  useNewUrlParser: true })
  .then(() => {
    console.log("Connected to database");
  })
  .catch((error) => {
    console.error("Error connecting to
    database:", error);
  });

// Start server
const port = process.env.PORT || 3000;
```

```dockerfile
# Use an official Node.js runtime as the base image
FROM node:14

# Set the working directory in the container to /app
WORKDIR /app

# Copy package.json and package-lock.json to the working directory
COPY package*.json ./

# Install any needed packages specified in package.json
RUN npm install

# Copy the rest of the application to the working directory
COPY . .

# Make port 3000 available to the world outside this container
EXPOSE 3000

# Define the command to run the app using CMD which defines your runtime
CMD [ "node", "app.js" ]
```

Figure 7: You have to write a dockerfile for your code.

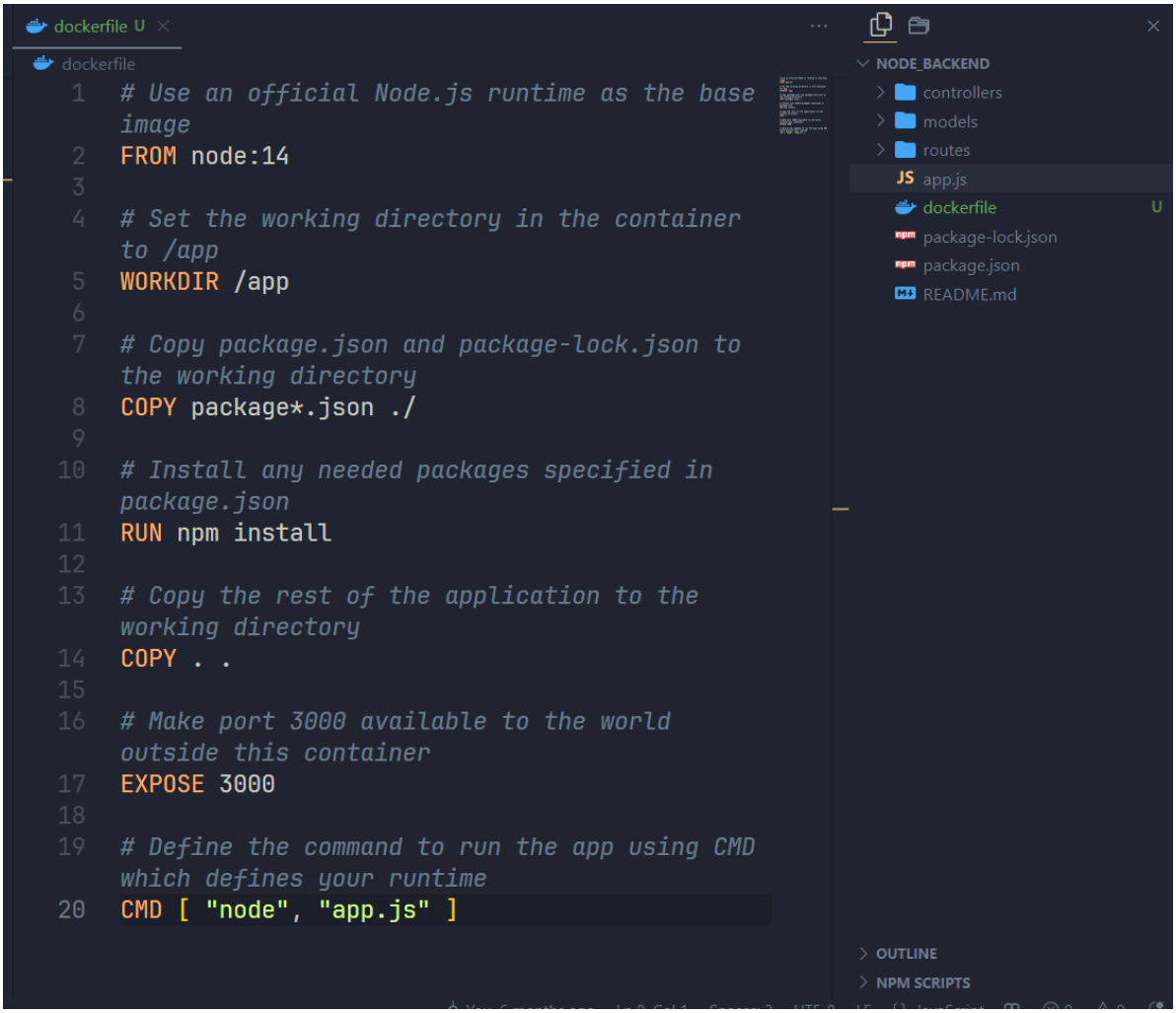


Figure 8: This is what the dockerfile looks like.

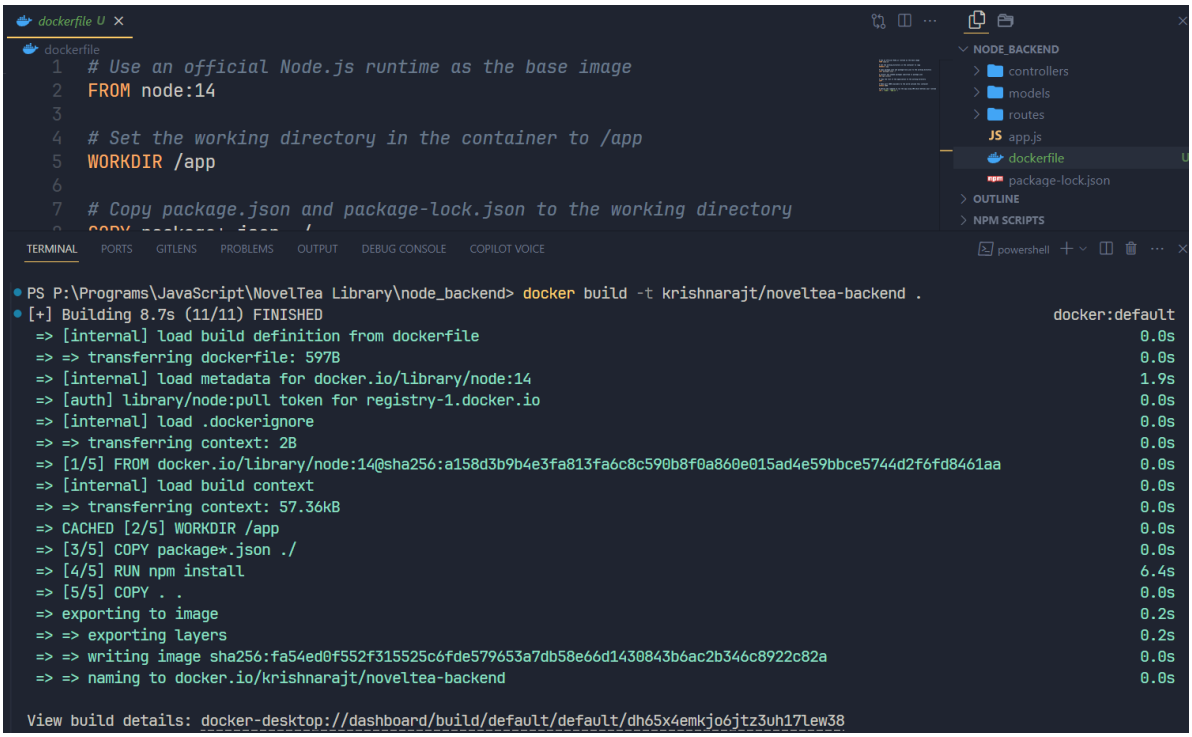


Figure 9: Building the image on the terminal.

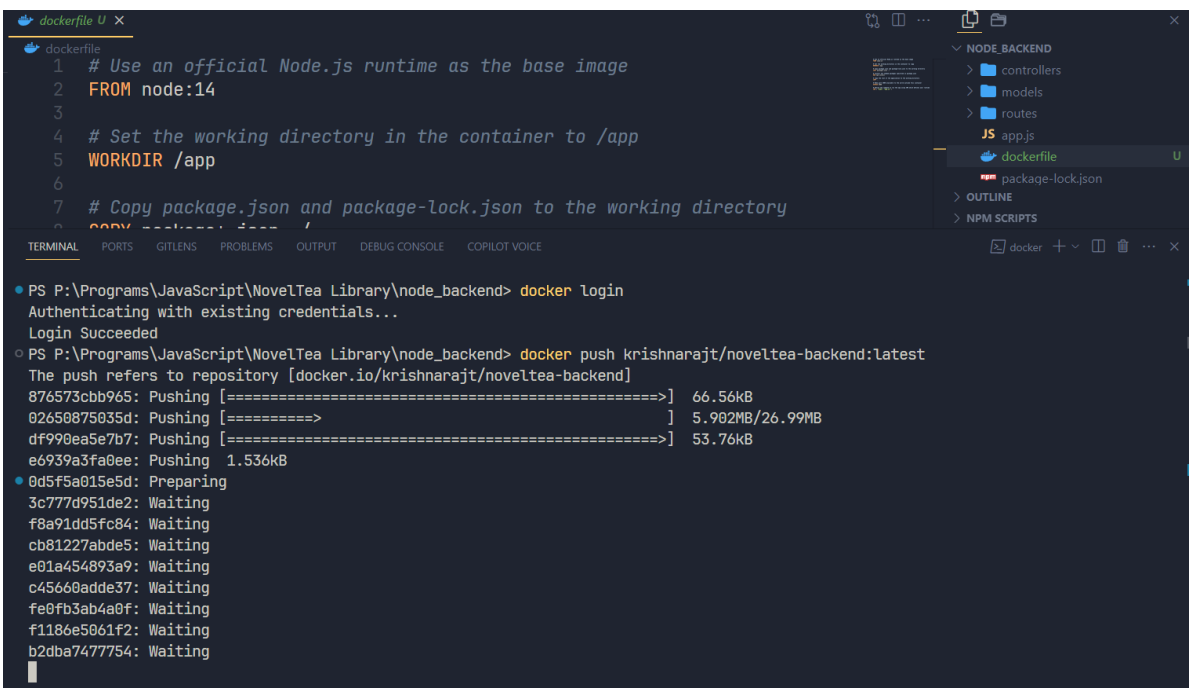


Figure 10: Pushing the new image on the hub.

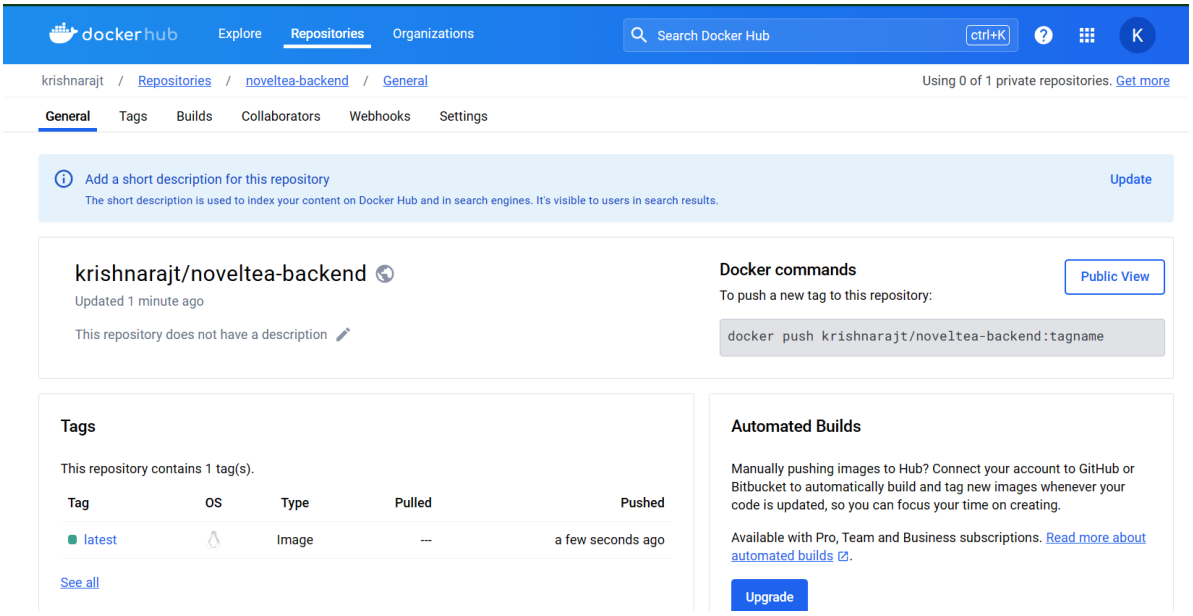


Figure 11: The updated repo with the new image.

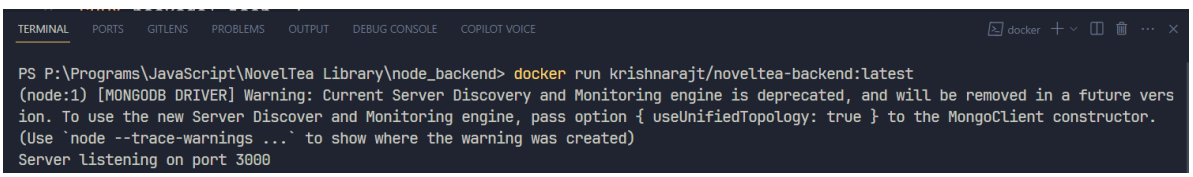


Figure 12: Running the newly created container on the terminal.

5 Platform

Operating System: Windows 11
IDEs or Text Editors Used: Visual Studio Code
Compilers or Interpreters: Python 3.10.1

6 FAQs

7 Conclusion

In this assignment, we have learnt how to install Docker on Windows and run it. We have also understood the importance of Docker in the field of Cloud Computing and DevOps.

References