



# National Textile University

## Department of Computer Science

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Subject:  
Operating System

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Submitted to:  
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Submitted by:  
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Reg number:  
23-NTU-CS-1141

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Lab Number:  
Docker Home Task

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Semester:  
5<sup>th</sup> -SE(A)

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# Whole Project Structure:

The screenshot shows the VS Code interface with the following details:

- EXPLORER:** Shows the project structure under "GUEST-BOOK [WSL: UBUNTU-24.04]".
  - backend: Dockerfile, package.json, server.js
  - frontend: Dockerfile, index.html
  - docker-compose.yml
- EDITOR:** The "package.json" file is open, showing the following content:

```
1  {
2    "name": "guest-book-backend",
3    "version": "1.0.0",
4    "type": "module",
5    "scripts": {
6      "start": "node server.js"
7    },
8    "dependencies": {
9      "express": "^4.18.2",
10     "mongoose": "^8.0.0",
11     "cors": "^2.8.5"
12   }
13 }
14 
```

- TERMINAL:** Shows the command history from a WSL session:

```
* asbah@asbah-Asif:~/guest-book$ touch docker-compose.yml
* asbah@asbah-Asif:~/guest-book$ mkdir backend
* asbah@asbah-Asif:~/guest-book$ mkdir frontend
* asbah@asbah-Asif:~/guest-book$ cd backend
* asbah@asbah-Asif:~/guest-book/backend$ touch package.json server.js dockerfile
* asbah@asbah-Asif:~/guest-book/backend$ cd ..
* asbah@asbah-Asif:~/guest-book$ cd frontend
* asbah@asbah-Asif:~/guest-book/frontend$ touch Dockerfile index.html
* asbah@asbah-Asif:~/guest-book/frontend$ ]
```

The screenshot shows the VS Code interface with the following details:

- EXPLORER:** Shows the project structure under "GUEST-BOOK [WSL: UBUNTU-24.04]".
  - backend: Dockerfile, package.json, server.js
  - frontend: Dockerfile, index.html
  - docker-compose.yml
- EDITOR:** The "docker-compose.yml" file is open, showing the following content:

```
3  services:
15   backend:
20     environment:
22       depends_on:
23         - mongodb
24     networks:
25       - frontend-backend-net
26       - backend-db-net
27
28 # Frontend
29 frontend:
30   build: ./frontend
31   container_name: guestbook-frontend
32   ports:
33     - "8080:80"
34   depends_on:
35     - backend
36   networks:
37     - frontend-backend-net
38
39 # Network Definitions
40 networks:
```

- **Image Building Commands:** Docker build -t backend

The screenshot shows a VS Code interface running in WSL Ubuntu-24.04. The Explorer sidebar displays a project structure for a 'GUEST-BOOK' application, including 'backend' and 'frontend' folders. The 'backend' folder contains a 'Dockerfile' and 'package.json' file. The 'frontend' folder contains a 'Dockerfile' and 'index.html' file. A 'docker-compose.yml' file is also present at the root. The Editor pane shows the content of the 'Dockerfile' for the 'backend' service. The Terminal pane shows the command 'docker build -t backend' being executed, with the output of the build process displayed. The bottom status bar indicates the terminal is in WSL Ubuntu-24.04.

## Docker build -t frontend

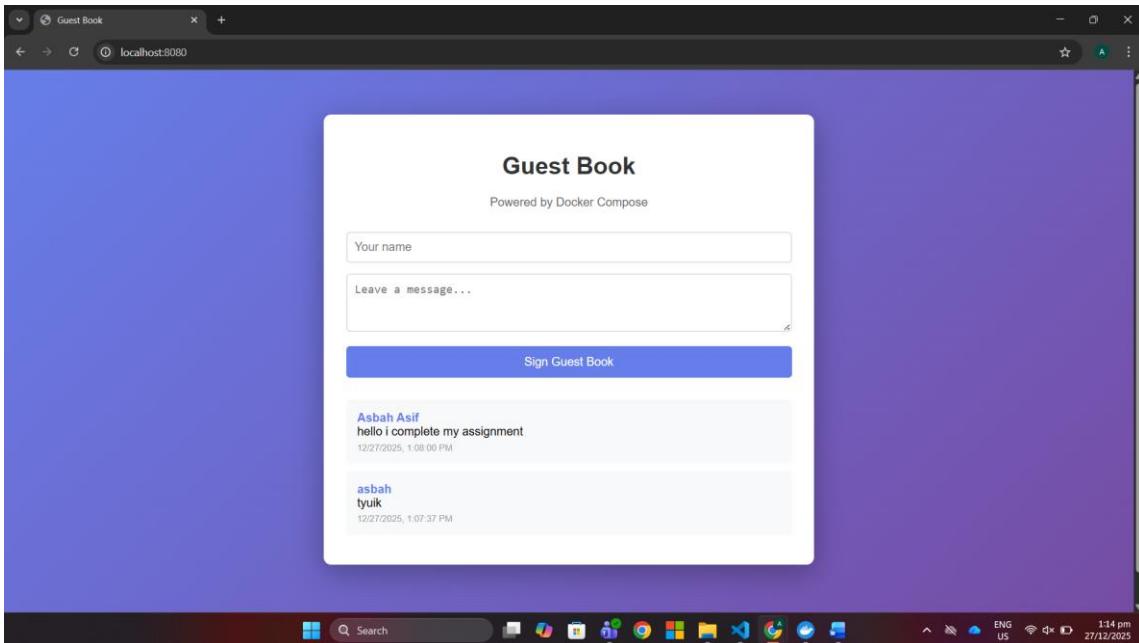
The screenshot shows a VS Code window with the following details:

- File Explorer:** Shows a project structure for "GUEST-BOOK [WSL: UBUNTU-24.04]". It includes a "backend" folder containing "Dockerfile", "package.json", and "server.js"; and a "frontend" folder containing "Dockerfile", "index.html", and "docker-compose.yml".
- Editor:** The "Dockerfile frontend" tab is active, displaying the following Dockerfile content:

```
FROM nginx:trixie
COPY index.html /usr/share/nginx/html/
EXPOSE 80
```
- Terminal:** The terminal shows the build process for the "frontend" image:

```
ashab@ashab-Asif:~/guest-book$ cd ./frontend/
ashab@ashab-Asif:~/guest-book/frontend$ docker build -t frontend .
[+] Building 4.0s (7/7) FINISHED
   => [internal] load build definition from Dockerfile
   => [internal] transfer dockerfile: 103B
   => [internal] load metadata for docker.io/library/nginx:trixie
   => [internal] load .dockerignore
   => [internal] transfer context: 2B
   => [internal] load build context
   => [internal] transfer context: 3.0kB
   => [1/2] FROM docker.io/library/nginx:trixie@sha256:f0b01117203ff38c2f9a9f01db1a7409459182a37c87cced5cb442d1d8fc66d19
   => resolve docker.io/library/nginx:trixie@sha256:f0b01117203ff38c2f9a9f01db1a7409459182a37c87cced5cb442d1d8fc66d19
   => [2/2] COPY index.html /usr/share/nginx/html/
--> exporting to image
--> exporting layers
--> exporting manifest sha256:f012ae30ccb3ac3e05f2e9ab98e098c1c7e8f92f7fcff995155fc4c13050
--> exporting config sha256:c2e1b575d1250b36d0ee8269035fe10e0d06f28bb6b827ddc78364db4d1
--> exporting attestation manifest sha256:302a359fbadeda8a5b3338b3048f2c186f0d0406fa17bad1d20e437f9aca27edf3d832b3d046e3b00b6e693
--> exporting manifest list sha256:d1aa672ef1533df5a4cd1e1d20e437f9aca27edf3d832b3d046e3b00b6e693
--> naming to docker.io/library/frontend:latest
--> unpacking to docker.io/library/frontend:latest
```
- Bottom Status Bar:** Shows "Ln 3, Col 10", "Spaces: 4", "UTF-8", "LF", "Docker", and "Finish Setup".
- Taskbar:** Shows icons for File, Edit, Selection, View, Go, Run, Terminal, Help, and various system status indicators.

## Web page at local host:



## Docker-compose.yml file:

version: "3.9"

services:

```
# MongoDB Database
mongodb:
  image: mongo:7-jammy
  container_name: guestbook-db
  volumes:
    - mongo_data:/data/db
  networks:
    - backend-db-net

# Backend API
backend:
  build: ./backend
  container_name: guestbook-backend
  ports:
    - "3000:3000"
  environment:
    - MONGO_URL=mongodb://mongodb:27017/guestbook
  depends_on:
    - mongodb
  networks:
    - frontend-backend-net
    - backend-db-net

# Frontend
frontend:
  build: ./frontend
  container_name: guestbook-frontend
  ports:
    - "8080:80"
  depends_on:
    - backend
```

networks:  
  - frontend-backend-net

## # Network Definitions

networks:  
  frontend-backend-net:  
    driver: bridge  
  backend-db-net:  
    driver: bridge

## # Volume Definition

volumes:  
  mongo\_data:

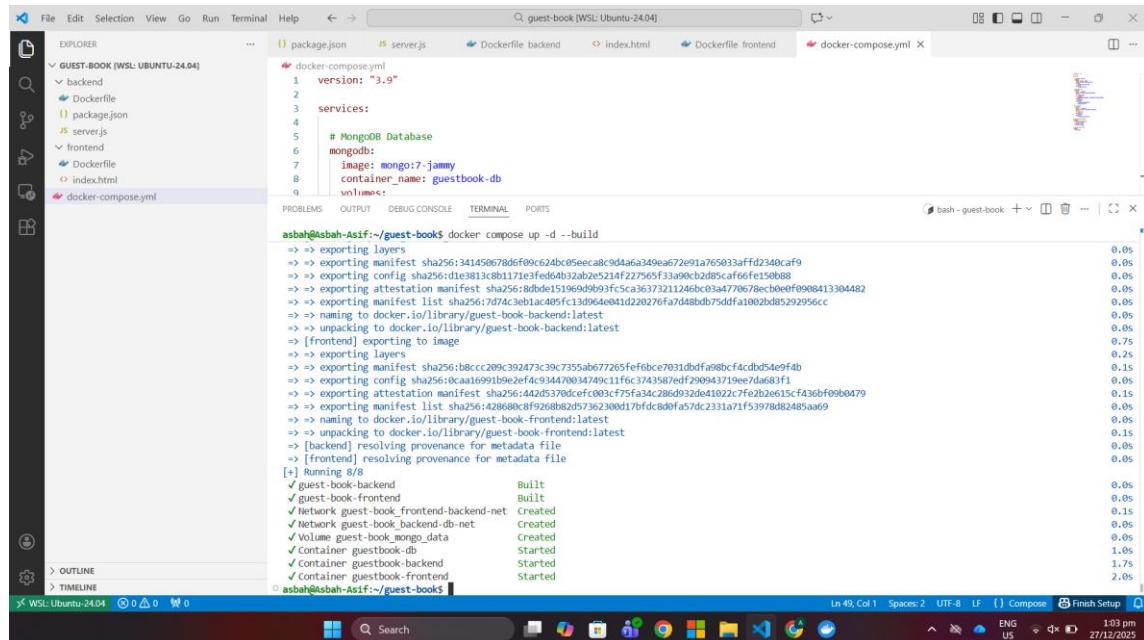
## Docker file (Backend):

```
FROM node:lts-alpine3.23
WORKDIR /app
COPY package*.json .
RUN npm install
COPY server.js .
EXPOSE 3000
CMD ["npm", "start"]
```

## Docker file (Frontend):

```
FROM nginx:trixie
COPY index.html /usr/share/nginx/html/
EXPOSE 80
```

## Remaining Screenshots:



```
asbah@Asbah-Asif:~/guest-book$ docker compose up -d --build
=> => transferring context: 63B
=> CACHED [backend 2/5] WORKDIR /app
=> CACHED [backend 3/5] COPY package*.json .
=> CACHED [backend 4/5] RUN npm install
=> CACHED [backend 5/5] COPY server.js .
=> [Frontend 2/2] COPY index.html /usr/share/nginx/html/
=> [backend] exporting to image
=> => exporting layers
=> => exporting manifest sha256:341450678d6f09c624bc05eeca8c9d4a6a349ea672e91a765033affd2340caf9
=> => exporting config sha256:d1e3813c8b1171e3fed64b32ab2e5214f227565f33a90cb2d85caf66fe150b88
=> => exporting attestation manifest sha256:8ddde151969d9b93fc5ca36373211246bc03a4770678ecb0e0f0908413304482
=> => exporting manifest list sha256:7d74c3eb1ac405fc13d964e041d220276fa7d48bdb75dfa1002bd85292956cc
=> => naming to docker.io/library/guest-book-backend:latest
=> => unpacking to docker.io/library/guest-book-backend:latest
=> [frontend] exporting to image
=> => exporting layers
=> => exporting manifest sha256:b8ccc209c392473c39c7355ab677265fef6bce7031dbdfa98bcf4cdbd54e9f4b
=> => exporting config sha256:0caa16991b9e2ef4c934470034749c11fc3743587edf290943719ee7da683f1
=> => exporting attestation manifest sha256:442d5370dcef003cf75fa34c286d932de41022c7fe2b2e615cf436bf09b0479
=> => exporting manifest list sha256:428680c8f9268b82d57362300d17bfdc8d0fa57dc2331a71f53978d82485aa69
=> => naming to docker.io/library/guest-book-frontend:latest
=> => unpacking to docker.io/library/guest-book-frontend:latest
=> [backend] resolving provenance for metadata file
=> [frontend] resolving provenance for metadata file
[+] Running 8/8
✓ guest-book-backend          Built
✓ guest-book-frontend         Built
✓ Network guest-book_frontend-backend-net Created
✓ Network guest-book_backend-db-net Created
✓ Volume guest-book_mongo_data Created
✓ Container guestbook-db      Started
✓ Container guestbook-backend Started
✓ Container guestbook-frontend Started
○ asbah@Asbah-Asif:~/guest-book$
```