

Create Multi-Stage Dockerfile.

File Structure

Your project folder should look like this:

```
lab-2/
|
├── index.js      # Your express server file
├── package.json  # Your dependencies and npm scripts
├── package-lock.json # Auto-generated (optional but recommended)
├── Dockerfile    # The Dockerfile you will use
└── dist/         # Generated by build script (created automatically)
```

Required Files

1. index.js

Example:

```
const express = require("express");
const app = express();

app.get("/", (req, res) => {
  res.send("Hello from Docker!");
});

app.use((req, res) => {
  res.status(404).send("PAGE NOT FOUND");
});

app.listen(3001, () => {
  console.log(`Server listening on http://localhost:3001`);
});
```

2. package.json

Example:

```
{
  "name": "lab2",
  "version": "1.0.0",
  "main": "index.js",
  "scripts": {
    "start": "node index.js",
    "build": "echo 'Building production files...' && mkdir -p dist && cp -r index.js package.json dist/"
  },
  "dependencies": {
    "express": "^4.19.2"
  }
}
```

3. Dockerfile

Make sure it contains this **AS build**:

```
# ----- Build Stage -----
FROM node:18 AS build
LABEL maintainer="prtk"
LABEL version="1.0"

WORKDIR /app

COPY package*.json ./
RUN npm install

COPY . .

RUN npm run build

# ----- Production Stage -----
FROM node:18-alpine

WORKDIR /app

COPY package*.json ./
RUN npm install --production

COPY --from=build /app/dist ./
```

EXPOSE 3001

CMD ["node", "index.js"]

Steps to Run the Program in Docker

Step 1: Go to the project folder

```
cd /home/prateek_kumar/devops/lab-3
```

Step 2: Build the Docker image

```
sudo docker build -t second_lab .
```

Explanation (simple English):

- Reads the Dockerfile
 - Installs dependencies
 - Builds the project
 - Creates a final Docker image named **second_lab**
-

Step 3: Run the container

```
sudo docker run -p 3001:3001 second_lab
```

Explanation:

- Runs the image in a container
 - Maps container's port **3001** to your machine's port **3001**
-

Step 4: Open Browser

Visit:

<http://localhost:3001>

You should see:

Hello from Docker!

Terminal Outputs :-

```
_1rv24mc078_prateek_kumar@arch ~/d/lab-2> npm init -y
Wrote to /home/prateek_kumar/devops/lab-2/package.json:

{
  "name": "lab-2",
  "version": "1.0.0",
  "description": "",
  "main": "index.js",
  "scripts": {
    "test": "echo \\\"Error: no test specified\\\" && exit 1"
  },
  "keywords": [],
  "author": "",
  "license": "ISC",
  "type": "commonjs"
}

_1rv24mc078_prateek_kumar@arch ~/d/lab-2> npm install express

added 68 packages, and audited 69 packages in 3s

16 packages are looking for funding
  run `npm fund` for details

found 0 vulnerabilities
_1rv24mc078_prateek_kumar@arch ~/d/lab-2> nano Dockerfile
_1rv24mc078_prateek_kumar@arch ~/d/lab-2> nano package.json
_1rv24mc078_prateek_kumar@arch ~/d/lab-2> nano index.js
_1rv24mc078_prateek_kumar@arch ~/d/lab-2> ls
Dockerfile  index.js  node_modules/  package.json  package-lock.json
_1rv24mc078_prateek_kumar@arch ~/d/lab-2> npm start

> lab-2@1.0.0 start
> node index.js

Server is running on http://localhost:3000
_1rv24mc078_prateek_kumar@arch ~/d/lab-2 [1]> █
```

```

Step 7/15 : COPY . .
----> 5d8933502c9f
Step 8/15 : RUN npm run build
----> Running in c18526f675b2

> lab2@1.0.0 build
> echo 'Building production files...' && mkdir -p dist && cp -r index.js package.json dist/

Building production files...
----> Removed intermediate container c18526f675b2
----> b12c7bcd8d3c
Step 9/15 : FROM node:18-alpine
----> ee77c6cd7c18
Step 10/15 : WORKDIR /app
----> Using cache
----> 16bac5e5bcb0
Step 11/15 : COPY package*.json ./
----> Using cache
----> bbd1d0b0a9dc
Step 12/15 : RUN npm install --production
----> Running in 0cf05d947361
npm warn config production Use '--omit=dev' instead.

added 68 packages, and audited 69 packages in 2s

16 packages are looking for funding
  run `npm fund` for details

found 0 vulnerabilities
npm notice
npm notice New major version of npm available! 10.8.2 -> 11.6.2
npm notice Changelog: https://github.com/npm/cli/releases/tag/v11.6.2
npm notice To update run: npm install -g npm@11.6.2
npm notice
----> Removed intermediate container 0cf05d947361
----> e8dca65273bb
Step 13/15 : COPY --from=build /app/dist ./
----> 835c9ceda8da
Step 14/15 : EXPOSE 3000
----> Running in a2089d3d9384
----> Removed intermediate container a2089d3d9384
----> bd395102e9b6
Step 15/15 : CMD ["node", "index.js"]
----> Running in d3eca0b36a25
----> Removed intermediate container d3eca0b36a25
----> 2fae44bb1370
Successfully built 2fae44bb1370
Successfully tagged second_lab:latest
1rv24mc078_prateek_kumar@arch ~/d/lab-2> sudo docker run -it -p 4000:3000 second_lab
Server is running on http://localhost:3000

```

Browser result :-

Hello from Express running inside Docker! final build