Program - 2 : Develop a Multi-Stage Dockerfile for Container Orchestration

Project Structure :

                program2/

                        → Dockerfile

                        → package.json

                        → package-lock.json

                        → src/ index.js

                        → node_modules

Step 1: Create the Dockerfile

Step 2: Make a folder -> src and create a file -> index.js

Step 3: Create a file -> package.json

```
1rv24mc031_darshan_hegde@darshu-Inspiron-15-3520:~/Desktop/LabPrograms$ mkdir Program2
1rv24mc031_darshan_hegde@darshu-Inspiron-15-3520:~/Desktop/LabPrograms$ cd Program2
1rv24mc031_darshan_hegde@darshu-Inspiron-15-3520:~/Desktop/LabPrograms/Program2$ mkdir build
1rv24mc031_darshan_hegde@darshu-Inspiron-15-3520:~/Desktop/LabPrograms/Program2$ mkdir dist
1rv24mc031_darshan_hegde@darshu-Inspiron-15-3520:~/Desktop/LabPrograms/Program2$ mkdir src
1rv24mc031_darshan_hegde@darshu-Inspiron-15-3520:~/Desktop/LabPrograms/Program2$ cd src
1rv24mc031_darshan_hegde@darshu-Inspiron-15-3520:~/Desktop/LabPrograms/Program2/src$ touch index.js
1rv24mc031_darshan_hegde@darshu-Inspiron-15-3520:~/Desktop/LabPrograms/Program2/src$ open index.js
1rv24mc031_darshan_hegde@darshu-Inspiron-15-3520:~/Desktop/LabPrograms/Program2/src$ cd ..
1rv24mc031_darshan_hegde@darshu-Inspiron-15-3520:~/Desktop/LabPrograms/Program2$ cat index.js
cat: index.js: No such file or directory
1rv24mc031_darshan_hegde@darshu-Inspiron-15-3520:~/Desktop/LabPrograms/Program2$ cat src/index.js
const express=require('express')
const app=express();
const PORT=3000;

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

app.listen(PORT,()=>{
console.log(`Server is running on port ${PORT}`);
});
1rv24mc031_darshan_hegde@darshu-Inspiron-15-3520:~/Desktop/LabPrograms/Program2$ npm init -y
Wrote to /home/1rv24mc031_darshan_hegde/Desktop/LabPrograms/Program2/package.json:

{
  "name": "program2",
  "version": "1.0.0",
  "main": "index.js",
  "scripts": {
    "test": "echo \"Error: no test specified\" && exit 1"
  },
  "keywords": [],
  "author": "",
  "license": "ISC",
  "description": ""
}


1rv24mc031_darshan_hegde@darshu-Inspiron-15-3520:~/Desktop/LabPrograms/Program2$ open package.json
```

```
1rv24mc031_darshan_hegde@darshu-Inspiron-15-3520:~/Desktop/LabPrograms/Program2$ touch Dockerfile
1rv24mc031_darshan_hegde@darshu-Inspiron-15-3520:~/Desktop/LabPrograms/Program2$ open Dockerfile
1rv24mc031_darshan_hegde@darshu-Inspiron-15-3520:~/Desktop/LabPrograms/Program2$ cat Dockerfile
### Start Multi-stage Dockerrfile 1 &2
### (Build &Production Stage)

#Stage1:Build Stage
FROM node:20-alpine AS builder

# Set working directory
WORKDIR /app

#Copy package files and install dependencies
COPY package.json package-lock.json ./
RUN npm install

#Copy application src code
COPY . .

# Build the application
RUN npm run build

#Stage 2:Production Stage
FROM node:20-alpine

#Set working directory
WORKDIR /app

# Copy only necessary files from build stage
COPY --from=builder /app/package.json ./
COPY --from=builder /app/package-lock.json ./
COPY --from=builder /app/dist ./dist
COPY --from=builder /app/node_modules ./node_modules

#Expose the port
EXPOSE 3000

# Start app
CMD ["node", "dist/index.js"]
```

Step 4: Install Node modules with the following command npm install

```
1rv24mc031_darshan_hegde@darshu-Inspiron-15-3520:~/Desktop/LabPrograms/Program2$ nano package.json
1rv24mc031_darshan_hegde@darshu-Inspiron-15-3520:~/Desktop/LabPrograms/Program2$ npm i express

added 68 packages, and audited 69 packages in 3s

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

found 0 vulnerabilities
1rv24mc031_darshan_hegde@darshu-Inspiron-15-3520:~/Desktop/LabPrograms/Program2$ npm i

up to date, audited 69 packages in 613ms

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

found 0 vulnerabilities
1rv24mc031_darshan_hegde@darshu-Inspiron-15-3520:~/Desktop/LabPrograms/Program2$ cat package.json
{
  "name": "program2",
  "version": "1.0.0",
  "main": "index.js",
  "scripts": {
    "build": "mkdir -p dist && cp -r src/* dist/",
    "start": "node dist/index.js",
    "test": "echo \"Error: no test specified\" && exit 1"
  },
  "keywords": [],
  "author": "Darshan",
  "license": "ISC",
  "description": "",
  "dependencies": {
    "express": "^5.1.0"
  }
}
1rv24mc031_darshan_hegde@darshu-Inspiron-15-3520:~/Desktop/LabPrograms/Program2$ ls
build  dist  node_modules  package.json  package-lock.json  src
1rv24mc031_darshan_hegde@darshu-Inspiron-15-3520:~/Desktop/LabPrograms/Program2$ touch Dockerfile
```

Step 5: Execute the Docker Build Command docker build -t program2

Step 6: Run the Docker Run command specifying the port number

docker run -it -p 3000:3000 program2

Step 7: Test the container by verifying the localhost details on web server