CS3219 OTOT Task A1

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GitHub Repo Link: A1

In general, the steps on how to dockerize and run a container is as follows:

1. Create a Dockerfile, each containing a number of stanzas
2. Build the container image by typing the command:

```
docker build -t <image-name> <dockerfile path>
```

3. Run the container by typing the command:

```
docker run -d --name <container-name> -p <machine-port:container-port>
<image-name>
```

All flags may be omitted. Flags info:

- `-d` to run the container in the background
- `--name` the container-name, if unassigned a random one would be used
- `-p` the port to expose

Task A1.1

How to run the Node.js container:

1. Create a Dockerfile within the app directory, by running the following command:

```
touch Dockerfile
```

2. Fill in the Dockerfile with the following content:

```
# Base image used (unspecified tag will use the latest one available in
Dockerhub)
FROM node:16

# Create app directory
WORKDIR /usr/src/app
```

```
# Install app dependencies
# A wildcard is used to ensure both package.json AND package-lock.json are
copied
# where available (npm@5+)
COPY package*.json ./

RUN npm install
# If you are building your code for production
# RUN npm ci --only=production

# Bundle app source
COPY . .

EXPOSE 8080
CMD [ "node", "index.js" ]
```

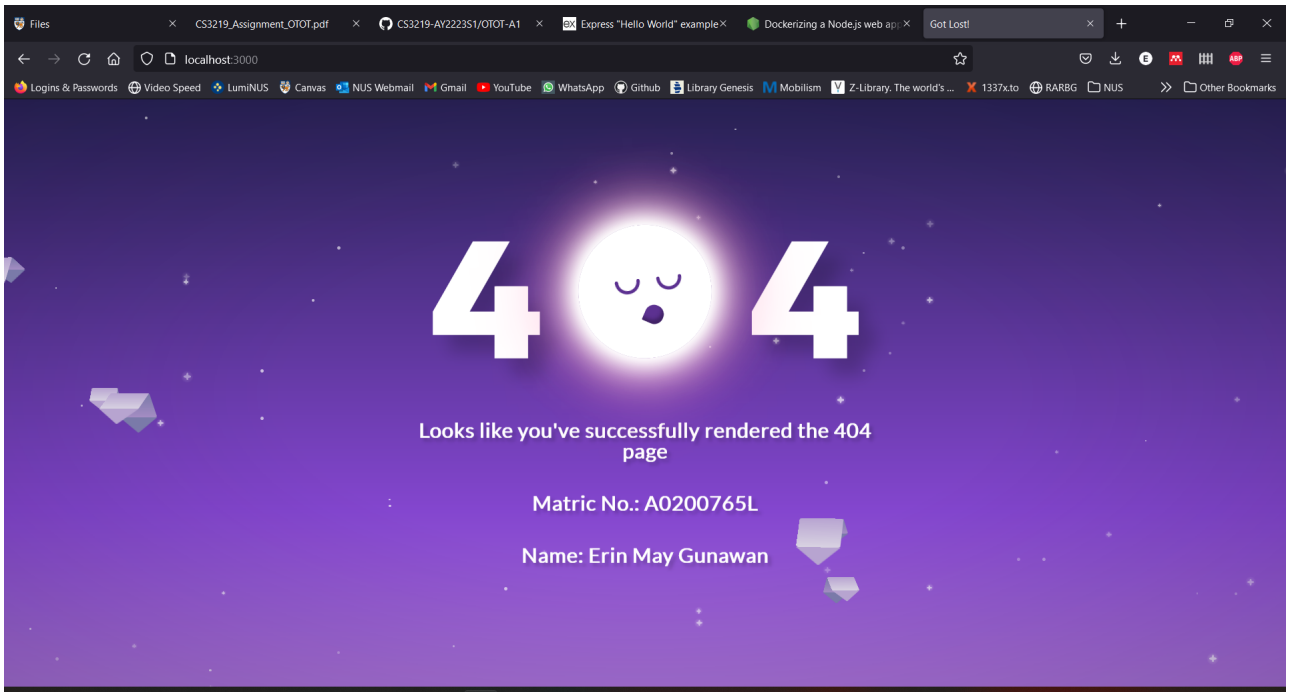
3. Run the following commands to build the image and get the container up and running:

```
# Build the image
docker build -t erinmayg/node-web-app .

# Run the container
docker run -d --name node-web-app -p 3000:8080 erinmayg/node-web-app
```

4. You can check whether the container is up and running by typing the command:

```
# Lists all docker containers (exited and running)
docker ps -a

# Check logs
docker logs node-web-app
```

5. Once the container is ready (running), you can view the static webpage in your browser by opening http://localhost:3000.



Task A1.2

How to run the nginx container:

1. Create a `nginx.conf` configuration file within the `nginx-sample` directory.

```
touch nginx.conf
```

2. Fill in the configuration file with the following:

```
server {
    listen       80;
    listen  [::]:80;
    server_name  localhost;

    root   /usr/share/nginx/html;

    location / {
        index  index.html index.htm;

        # a bunch of boilerplate proxy configuration
        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;

        proxy_pass https://localhost:80/index.html;
    }
}
```

Note: template taken from the configuration file in `/etc/nginx/conf.d/default.conf` from the `nginx` image in Dockerhub.

3. Create a Dockerfile within the `nginx` directory.

```
touch Dockerfile
```

4. Fill in the Dockerfile with the following:

```
FROM nginx
COPY index.html /usr/share/nginx/html/
COPY nginx.conf /etc/nginx/conf.d/
```

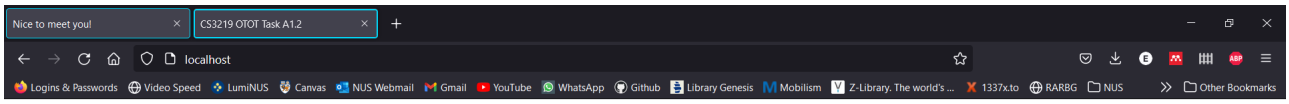
5. Build and run the image

```
# Build the image
docker build -t erinmayg/nginx-sample .

# Run the image
docker run -d --name nginx-sample -p 80:80 erinmayg/nginx-sample
```

6. You can check whether the container is up and running by typing the command:

```
# Lists all docker containers (exited and running)
docker ps -a

# Check logs
docker logs nginx-sample
```

7. Once the container is ready (running), you can view the static webpage in your browser by opening http://localhost:80.



Nginx reverse proxy server listening on port 80 for incoming HTTP requets.

Done by: Erin May Gunawan

Task A1-3

How to run nginx reverse proxy:

1. Create a `nginx.conf` configuration file within the `nginx` directory.

```
touch nginx.conf
```

2. Fill in the configuration file with the following:

```
server {
        # this server listens on port 80
        listen 80 default_server;
        listen [::]:80 default_server;

        server_name nodeserver;

        # the location / means that when we visit the root url
(localhost:80/), we use this configuration
        location / {
                # a bunch of boilerplate proxy configuration
                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;

                # the real magic is here where we forward requests to the
address that the Node.js server is running on
                proxy_pass http://nodeserver:8080;
        }
}
```

Note:

- `nodeserver` is the service name that will be defined in the `docker-compose.yaml` file later on. It can be replaced with other names as long as the `docker-compose.yaml` file follows suit.
- `8080` is the port number exposed in `app/Dockerfile`

3. Create a Dockerfile within the `nginx` directory.

```
touch Dockerfile
```

4. Fill in the following inside the Dockerfile:

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

5. Create the `docker-compose.yaml` file in the root folder for this project.

```
touch docker-compose.yaml
```

6. Fill in the following inside the `docker-compose.yaml` file:

```
version: '3.8'
services:
  nodeserver:
    container_name: node-web-app
    build:
    context: ./app
    ports:
      - '3000:8080'
  nginx:
    container_name: nginx-rev-proxy
    restart: always
    build:
    context: ./nginx
    ports:
      - '80:80'
```

Note:

- the service `nodeserver` is the same as the servername defined in `nginx/nginx.conf`

7. Build and run the containers by running in the root project directory:

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

8. You can check `http://localhost:80` in your web browser. It should now show the same page as in Task A1.1, which is evident that the reverse proxy is at work.