EX. No.: 8 Creating and Executing Your First Container using Docker

Aim:

To create and execute your first container using Docker.

Procedure:

Make sure Docker is installed on your Ubuntu system. You can follow these steps to install Docker if you haven't already:

1. **Install Docker on Ubuntu**
2. **Start Docker**: Start and enable Docker to run at boot.
3. **Verify Docker Installation**: Check if Docker is installed properly.

Step-by-Step Process to Create a Dockerized Calculator Program

Step 1: Create the Python Calculator Program

1. Open a terminal on Ubuntu.
2. Create a directory for your project.
3. Inside the `calculator-docker` directory, create a Python file for the calculator. Use any text editor (like `nano`, `vim`, or `gedit`) to create a file named `calculator.py`.
4. Write a simple calculator program in `calculator.py`.
5. Save and exit the file (`CTRL + X`, then `Y`, and `Enter` if you're using nano).

Step 2: Create the Dockerfile

Now, you'll need to create a Dockerfile to define the Docker image for your Python calculator.

1. In the same directory (`calculator-docker`), create a file named `Dockerfile` (without any file extension).

```
nano Dockerfile
```

2. In the `Dockerfile`, write the following instructions:

```
# Use an official Python runtime as a base image
FROM python:3.9-slim

# Set the working directory inside the container
WORKDIR /app

# Copy the calculator program into the container
COPY calculator.py /app/

# Define the command to run the calculator program
CMD ["python", "calculator.py"]
```

Here's what each part does:

- `FROM python:3.9-slim`: Uses the official Python 3.9 image from Docker Hub.
- `WORKDIR /app`: Sets the working directory inside the container to `/app`.
- `COPY calculator.py /app/`: Copies your `calculator.py` program into the container's `/app` directory.
- `CMD ["python", "calculator.py"]`: When the container starts, it runs `calculator.py`.

3. Save and close the `Dockerfile` (using `CTRL + X`, then `Y`, and `Enter` for nano).

Step 3: Build the Docker Image

Now that you have the `Dockerfile` and `calculator.py`, you can build the Docker image.

1. In the terminal, make sure you're in the directory that contains the `Dockerfile` and `calculator.py` files.
2. Run the following command to build the Docker image:

```
docker build -t calculator .
```

This command tells Docker to:

- Use the current directory (`.`) to build the image.
- Tag (`-t`) the image with the name `calculator`.

It may take a few moments, and you'll see the build process in the terminal.

Step 4: Run the Docker Container

After the image is built, you can run it in a Docker container:

```
docker run -it calculator
```

- `-it`: This flag allows you to interact with the program running inside the container.
- `calculator`: This is the name of the image we just built.

The calculator program should now be running inside the container. You can use it to perform calculations, and it will keep running until you exit the program by typing "5" (Exit).

Step 5: Clean Up (Optional)

Once you're done, you can stop and remove the Docker container (if you have stopped it), and even remove the image:

1. To stop the container, simply type `exit` inside the program or press `CTRL + C` in the terminal.
2. To remove the Docker image, use the following command:

```
docker rmi calculator
```

Result:

Thus creating and executing the first container using docker has been done and executed successfully.