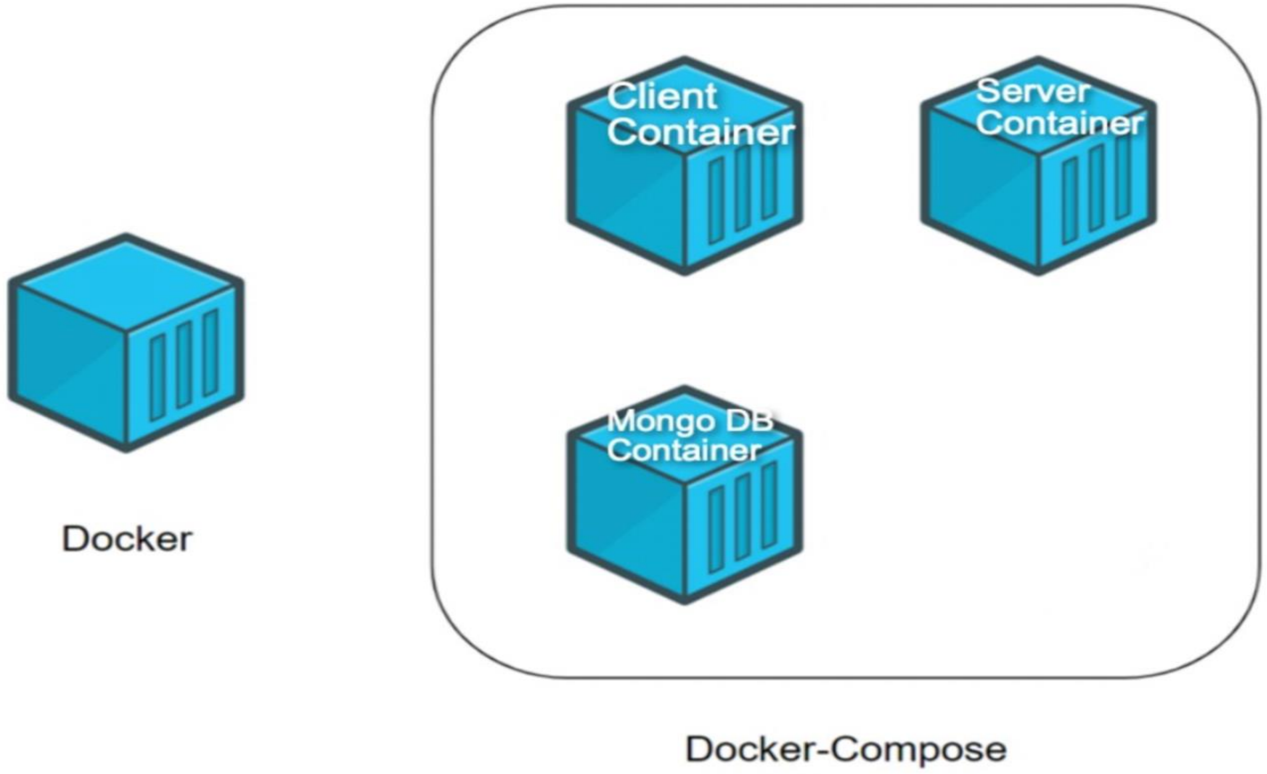
INTRODUCTION

In this project we built a Docker container based application using client server architecture that provides country oriented *COVID-19 Statistics* like number of confirmed cases, critical cases, deaths and recovered patients.

TECHNOLOGIES

Front-end: Written in JavaScript, CSS and HTML, using ***ReactJS*** which is a front-end JavaScript library and ***Bootstrap*** which is an open-source CSS framework.
Backend: Written in JavaScript, we used ***Express***, which is a backend web application framework for Node.js
Database: We used MongoDB as our DB

The application is deployed on Docker. We build three containers for Client, Server and Mongo DB. To run all these containers together we used Docker compose.



BACKGROUND

GitHub Repository link: https://github.com/Shahi11/covid-19-tracker-docker

We have created an E2E application that shows country wise COVID-19, to build this application we implemented CRUD operations of persistent storage namely create, read, update and delete. The client initiates a request to server by calling the API's exposed by server. The server in turn processes these request based on call type and store/fetch/update the data we receive from the client in MongoDB. The following APIs were exposed on server side:

- ***GET*** *(get specific):* To retrieve the COVID data of a specific country from the server by passing the country name as a field parameter.
  Ex: GET http://localhost/lsds/covidTally/USA

- ***POST****:* To send COVID data of a specific country to the server and that data entry is then stored in Mongo DB. Request body contains the input data from client.
  Ex: POST http://localhost/lsds/covidTally/

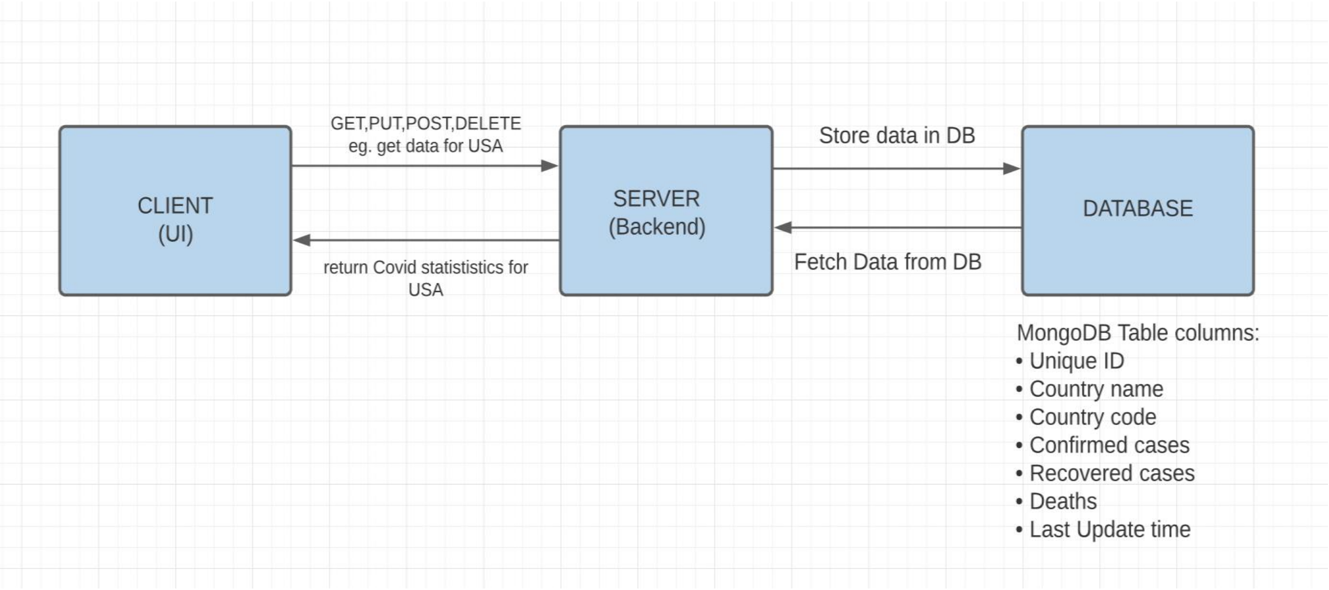
- ***GET*** *(get all):* To retrieve the COVID data of all the countries in DB from the server.
  Ex: GET http://localhost/lsds/covidTally

- ***DELETE:*** This API is used to delete the COVID data of a specific country from Mongo DB by passing the country name as a field parameter.
  Ex: DELETE http://localhost/lsds/covidTally/USA

- ***PUT:*** This API is used to update the COVID data of a country in Mongo DB by passing country name as a field parameter. Request body contains the updated input data from client.
  Ex: PUT http://localhost/lsds/covidTally/USA

The *ports* used are:
Frontend (*Client*): 3000
Backend (*Server*): 5000
DATABASE (*MongoDB*): 27017

ARCHITECTURE



We created a table named CovidTally containing the following columns in MongoDB:

- Unique ID
- Country
- Country Code
- Confirmed Cases
- Recovered Cases
- Deaths
- Last Update time

Our repository (covid-19-tracker-docker) contains:

- Server Files
- Client Files
- Docker File
- Docker compose.yml file to compose all the application services

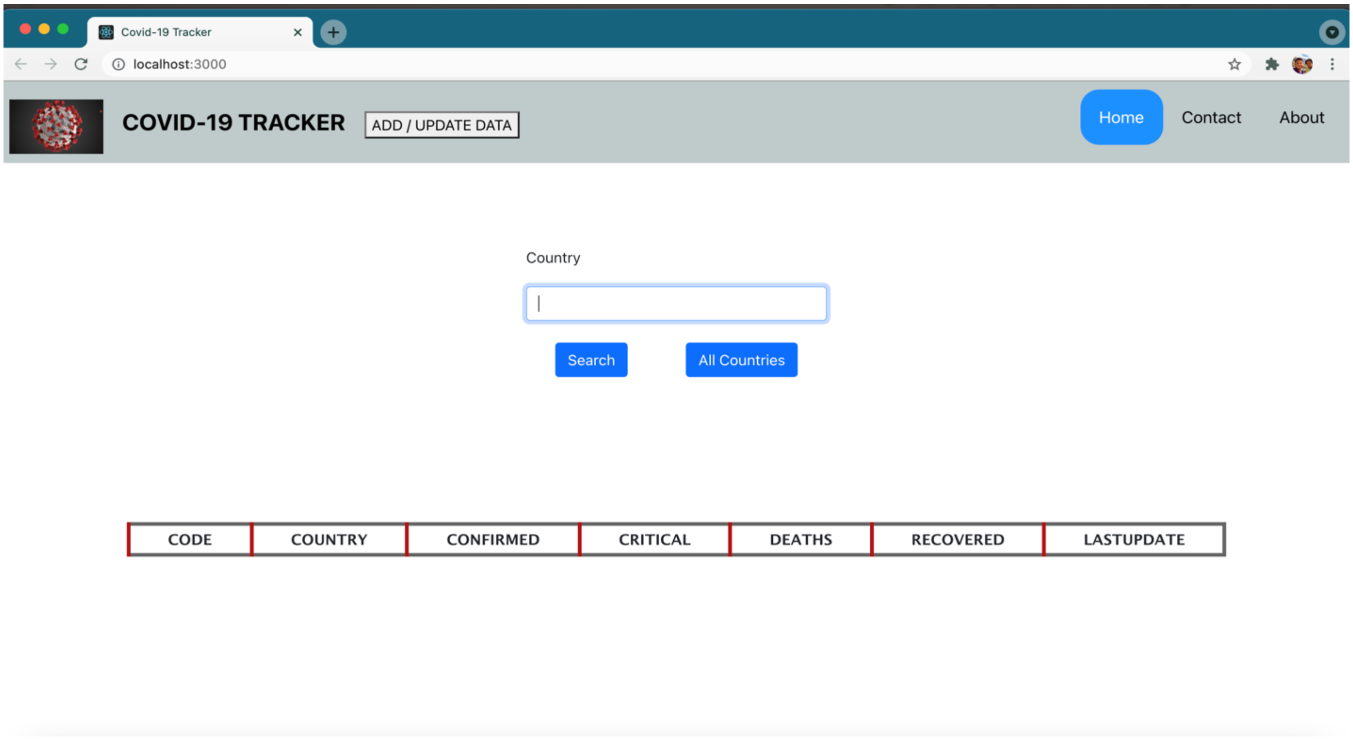
Compose is a tool for defining and running multi-container Docker applications. In our case we had a client container, a server container and a Database container to run them all together we used Compose. To compose we used dockercompose.yml file to configure our application services.

The following commands were used to build the E2E application on Docker:

```
docker build -t client .          :  To build the Client Image on Docker.
docker build -t server .          :  To build the Server image on Docker.
docker-compose up                 :  To run all the containers together.
```

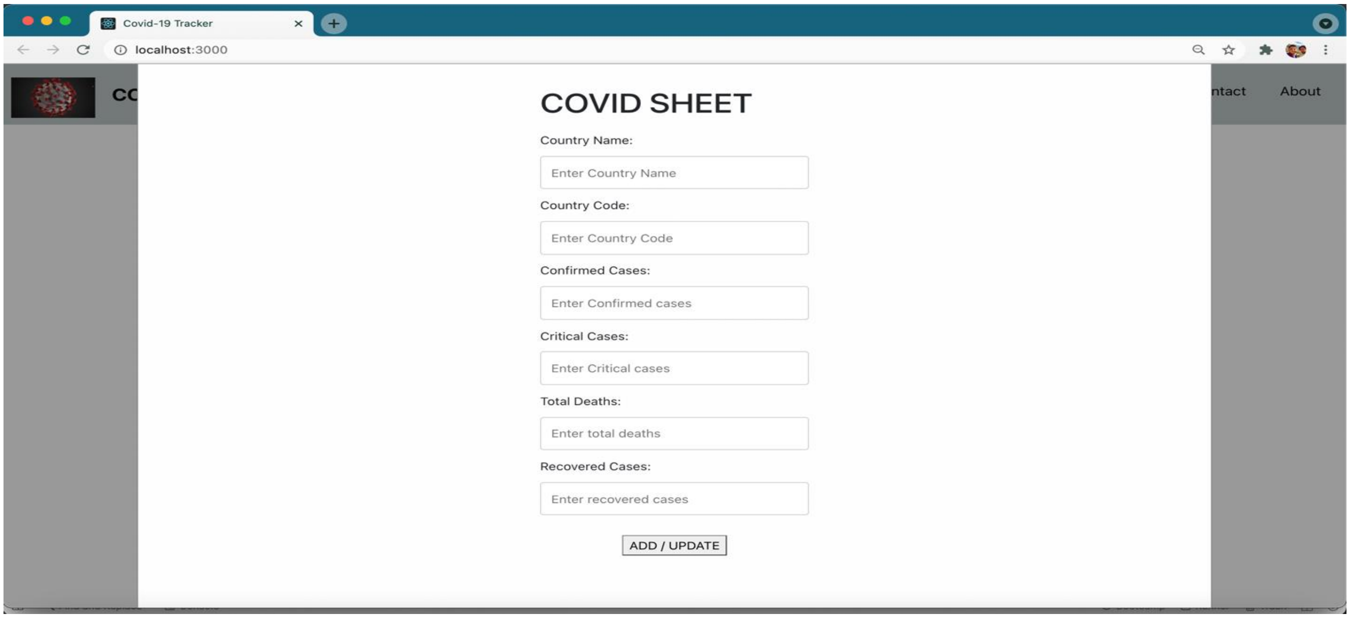
STEP BY STEP SCREENSHOTS

1) CLIENT UI Homepage: User can input country name and get COVID-19 statistics of that country. User can also click on "All Countries" to fetch stats of all the countries stored in Database.



CODE	COUNTRY	CONFIRMED	CRITICAL	DEATHS	RECOVERED	LASTUPDATE

2) CLIENT UI ADD/UPDATE data form: User can add new country COVID-19 statistics in the form and store the data in the Database.



COVID SHEET

Country Name:

Enter Country Name

Country Code:

Enter Country Code

Confirmed Cases:

Enter Confirmed cases

Critical Cases:

Enter Critical cases

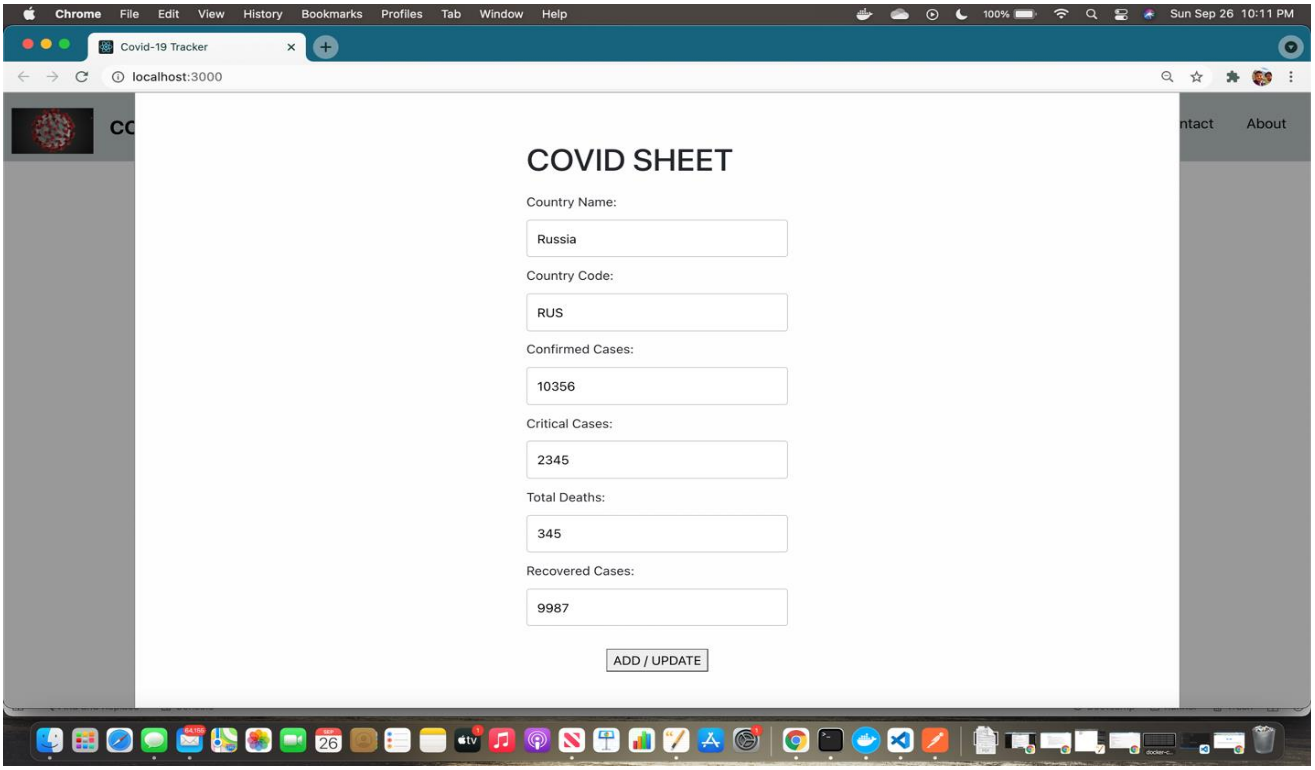
Total Deaths:

Enter total deaths

Recovered Cases:

Enter recovered cases

3) We Input the COVID-19 stats of country : Russia and click on ADD/UPDATE



COVID SHEET

Country Name:

Russia

Country Code:

RUS

Confirmed Cases:

10356

Critical Cases:

2345

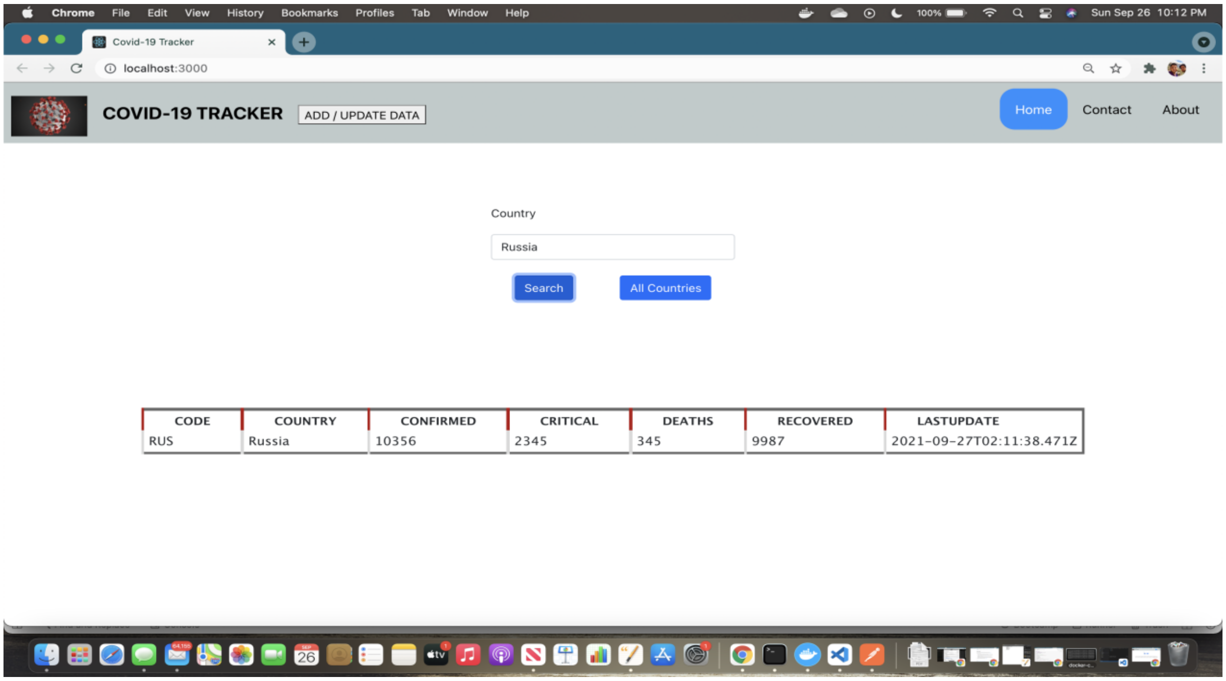
Total Deaths:

345

Recovered Cases:

9987

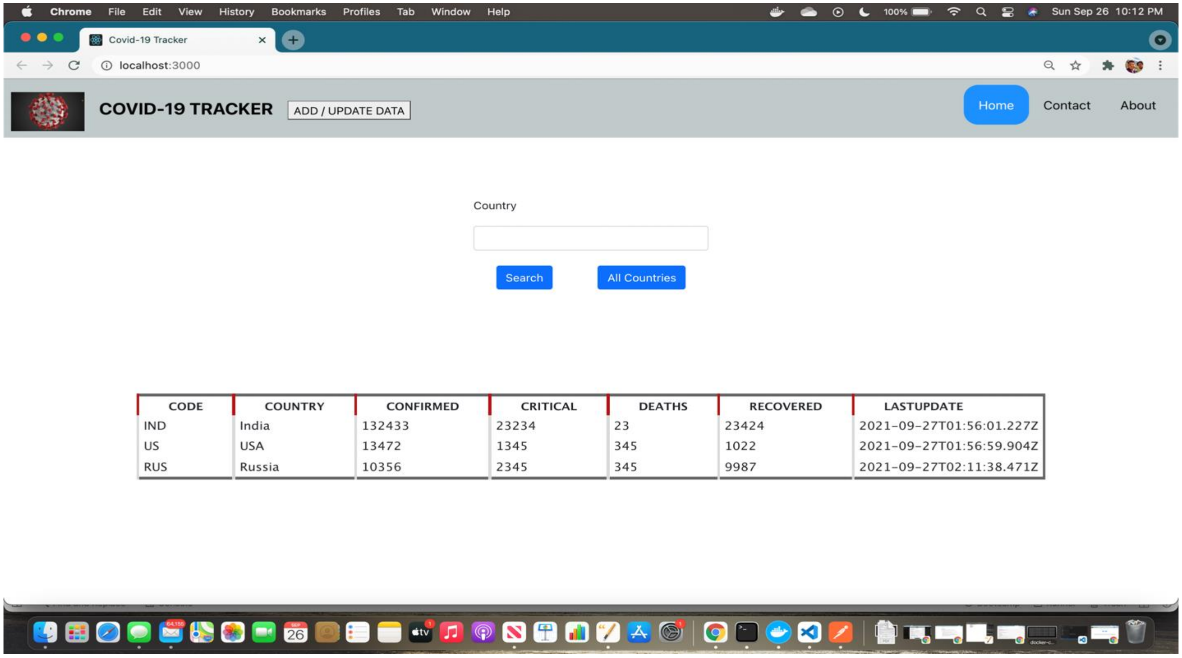
4) To verify if the data is stored successfully we search for country “Russia” from client and get response from server containing the same data we stored in last step.



Country: Russia

CODE	COUNTRY	CONFIRMED	CRITICAL	DEATHS	RECOVERED	LASTUPDATE
RUS	Russia	10356	2345	345	9987	2021-09-27T02:11:38.471Z

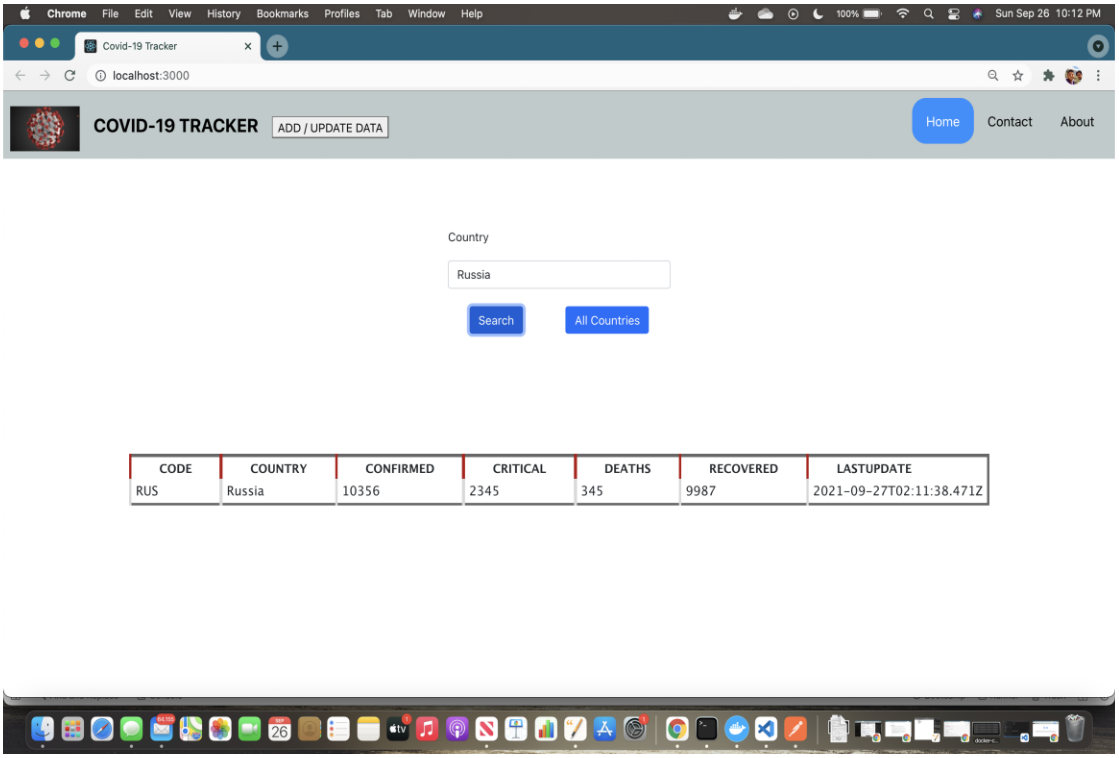
5) Also, now when we fetch data of all the countries we can see “Russia” is present in the response from server.



Country:

CODE	COUNTRY	CONFIRMED	CRITICAL	DEATHS	RECOVERED	LASTUPDATE
IND	India	132433	23234	23	23424	2021-09-27T01:56:01.227Z
US	USA	13472	1345	345	1022	2021-09-27T01:56:59.904Z
RUS	Russia	10356	2345	345	9987	2021-09-27T02:11:38.471Z

6) Upon restarting the DOCKER and fetching data of Russia, we can see the data is still persisted in the DB.



CODE	COUNTRY	CONFIRMED	CRITICAL	DEATHS	RECOVERED	LASTUPDATE
RUS	Russia	10356	2345	345	9987	2021-09-27T02:11:38.471Z