

# PROJECT DOCUMENTATION

## 1. Title

COFAC-19

*Meaning:* Chris and Obed Fight Against Covid-19

## 1. Authors/Team members

Chris Gomez

Obed Osei-Akoto.

### 1.2. Abstract

The novel coronavirus known as Covid-19 has had a considerable impact on our society and changed how we engage our lives. It has managed to overwhelm the governments to the point that many countries had to shut down. Furthermore, there have been many epicenters of the virus since its advent in December of 2019. However, not all countries have been affected the same way as they differ in how many confirmed cases, deaths and recoveries are recorded. The reasons for this are unclear, and new data is being gathered every day that help answer questions and, at times, surface new ones. In our paper we examined the current top three countries with the most cases: Italy, Spain and The United States of America. Alongside these countries we initially display the recorded results of Japan and China, the latter of which is the supposed origin of the virus. Japan was chosen arbitrarily as the fifth country only to give the user an initial summary of five countries. We display the confirmed cases, deaths and recoveries of the mentioned countries and give the user the opportunity to change the country of Japan with a country of their choice and display how that country is affected compared to the remaining countries of Italy, Spain, the United States of America and China. As it stands at the moment of the writing of this paper the United

States of America is the country most affected by covid-19 in terms of having the most confirmed cases and deaths.

## 1.3 Introduction

The second quarter of the year 2020 brought about an event that most will remember for the rest of their lives: a pandemic that shut down most of the world. At the end of December of the year 2019 there was news being circulated that a novel virus was starting to spread in the city of Wuhan in China [1]. At first, it seemed like another virus that may spread within the region of its origin and then disappear. However, the influence of this virus quickly spread to other regions in China, then to other countries and eventually the whole world. It went from an epidemic to a pandemic quickly. The virus in question was a conovavrius, which was named Covid-19 (covid being the virus and 19 being the year which it was introduced). The countries hardest hit were South Korea, Italy and Spain [2]. South Korea quickly became the focus of the virus by the end of February and early March, but due to the country's intense methods of testing and swift overall reaction to the virus, the country quickly went from the focus to the “manual” of how to defeat the virus [3]. After South Korea then came Italy. Italy did not have the same outcome as South Korea as it not only had numerous cases every day, but also numerous deaths. Italy became the new focus, as well as, being considered the new epicenter of the virus. The world watched on and cases and deaths grew every day in Italy, hoping that they would not be the next to be hit. The United States of America eventually started seeing cases dramatically rise and the fear started to sink in that it might be the next target. The United States of America and South Korea had their first case around the same time, but, like in Italy, the United States did not fare the same as South Korea. As testing began it became apparent that the virus was spreading quickly through the states that by March 20, 2020 the United States already surpassed South Korea (note: at the time of writing this paper South Korea still has less cases then the date mentioned) [4]. The dramatic increase could only indicate that the virus had been in the states for some time and it was being spread quite efficiently. Spain, like Italy, was witnessing a rise in cases and deaths; the situation with Spain made sense due to being in close proximity to Italy [2]. The United States, eventually, started shutting down all essential businesses, however, this hap-

pened state by state and it could be argued that if states waited any longer to shut down then the country would have been worse off. Till this date, April, 23, 2020, the country is on lockdown, however, some states will be easing on the lockdown order in the coming days.

Currently, the United States of America is the country with the most cases and deaths [4]. In terms of cases, Spain and Italy trail next to the United States, respectively. Countries and hospitals deal with the life and health of their patients with coronavirus every day. Good medical care doesn't just rely on well-trained doctors and nurses and on high quality facilities and equipment. Without accurate, comprehensive and up to date and accessible data, medical personnel may not offer the best treatment or may in fact misdiagnose the condition, which can have serious consequences. For this reason, our team has decided to look at the confirmed cases, deaths and recoveries in the following countries: The United States of America, Spain, Italy, China and Japan. We used the most up to date info for each country [5]. The first three countries were picked due to them currently being the countries with the most cases; China was used because it is currently predicted that the origin of the virus came from there; Japan was an arbitrary country that was selected to give a comparison to the other countries. We will display the statistics through various graphs and give the user the power to choose another country that will replace Japan and then demonstrate how the new country compares to the other four countries. This project provides the systematic procedure by which the records of this virus are created, captured, maintained, and disposed of. Our Application also ensures their preservation, accurate and efficient updating and timely availability. Application in question here refers to how we are gathering data and our unique way of presenting that data.

## **1.4 Related Work**

There are a numbers corona virus data source from the research that have been done through the internet, the existing data for covid-19 which have been develop by numerous of companies, universities and individuals offers several function but very overwhelming to users. In Our project(Application) user is given an option to add then compare how other countries are battling with the spread thus cases, recovery and deaths of covid-19.

Other than the adding to the default countries we already have, this Application also is capable in showing you total cases, recovery and deaths for the world.

## 1.5 Approach Code Requirement Description

We made a repo on a web-based platform (Github). It simplifies the process of working in group and made it easy to collaborate on the project merging changes in the master branch of the project. We also used a data source API ["https://covidapi.info/api/v1/";](https://covidapi.info/api/v1/)

Java File	Primary Methods
HttpClient.java	<p>static variable named apiUrl</p> <ul style="list-style-type: none"><li>• url used to make api calls</li></ul> <p>specificDataForCountry(country, date)</p> <ul style="list-style-type: none"><li>• Will make a call to API based on the country name and date.</li><li>• Confirmed cases, deaths and recoveries will be extracted and saved to an output folder and then to a Json file named output.json.</li></ul> <p>globalStats(date1, date2):</p> <ul style="list-style-type: none"><li>• Makes a call to API for global results based on a range of dates.</li><li>• Extracts confirmed cases, deaths and recoveries for the whole world.</li><li>• Note: Used only for one date and not a range of dates.</li></ul> <p>newHttpGet(url)</p> <ul style="list-style-type: none"><li>• This method is used in the above methods to obtain data in json format based on the passed in url.</li></ul>

CountryName.java	<p>constructor(filename)</p> <ul style="list-style-type: none"> <li>takes in the filename of the txt file that contains all the available countries to the API. This file is called ISO.txt.</li> <li>calls the createMap() method.</li> </ul> <p>createMap()</p> <ul style="list-style-type: none"> <li>Reads in the text file and, through the use of streams, extracts the name of the country and its three letter abbreviation. This returns a map where the country name is the key and the 3-letter abbreviation is the value.</li> </ul>
WorldStats.java	<p>constructor</p> <ul style="list-style-type: none"> <li>Takes in “,” in the constructor which means get world data on covid-19 from Worldometer.</li> </ul> <p>extractInformation()</p> <ul style="list-style-type: none"> <li>Makes a call to the API and extracts confirmed cases, deaths and recoveries for all countries. These values are then assigned to their respective instance variables to be used for the application.</li> </ul>
CountryCovidStats.java	<p>constructor(country, date)</p> <ul style="list-style-type: none"> <li>Class’s constructor takes in a country’s 3 letter abbreviation and a date.</li> </ul> <p>extractInformation()</p> <ul style="list-style-type: none"> <li>Based on the contractor, this method will make a call to the API and fill in the data for the instance variables. i.e. confirmed cases, deaths and recoveries.</li> </ul>
IndividualStat.java	<p>An enum class with one primary role</p> <ul style="list-style-type: none"> <li>Determine what</li> </ul>
Tools.java	<p>createMap()</p> <ul style="list-style-type: none"> <li>Used in JavaFx to get the Country Names and place them in a Map data structure.</li> </ul>
<p>GetPieChart.java</p> <p>Note: Three different pie chart classes were made for each section. We did this to divide responsibilities.</p>	<p>pieChart(List countries, Individual stat)</p> <ul style="list-style-type: none"> <li>creates a pie chart based on the country's parameter.</li> <li>displays the particular stat based on the Enum class passed as a parameter. Ex. displays confirmed cases</li> </ul> <p>addData(name, value)</p> <ul style="list-style-type: none"> <li>Update pie chart with the new countries data.</li> </ul>

GetMulitBarChart.java	multiBar(countries, date) <ul style="list-style-type: none"> <li>Fills in the multi-bar graph with the values found in countries. Values are confirmed cases, deaths and recoveries per country in list.</li> </ul>
DeatiledStats.java	DetailedBox <ul style="list-style-type: none"> <li>Fills the confirmed cases, deaths and recoveries for the whole world.</li> </ul>
Main.java	Our main entry to the program Will call all the above classes and methods. menuLeft(countries, date) <ul style="list-style-type: none"> <li>Fills in the left zone with all the possible countries that the API can call. This is the on;y interactive part of the application. The application will be able to change one country in the graph to the country chosen. Values in the graph will change depending on the selection.</li> </ul>

*Table 1. Methods used in project*

## 1.5 Methodology/Results

For this project we used the Worldometer website [5] that has data related to coronavirus for all countries. We used their API to extract the information for a specific country and date, which then can be used to transform the information into a JSON format. Our main framework was JavaFx, which was used to create the front end of the application. On the backend the Worldometer API was used to extract data that created three main data structures: a map for the available countries, a list to hold our 5 countries and an object that holds the values for the whole world. For an overview of the methods used see Table 1.

In order to achieve the results intended in this paper we executed the following pipeline, 1) applied Worldometer API to extract data, 2) save the data into a json or text file, 3) read and parsed through the file for specific data, 4) added data to a data structure, and 5) displayed that data onto a JavaFx application. Depending on the exact information that will be displayed this pipeline will have minor variations, however, this is the general pattern. To display the data we used JavaFx for the front end of the application, which demonstrates 6 sections, 1) a snippet that

displays the confirmed cases, deaths and recovered for the whole world, 2) a section that displays the number of deaths per country, 3) a section that displays the number of recovered per country, 4) a section that displays the number of confirmed cases per country, 5) a section that displays the confirmed cases, deaths and recoveries per country in a multi-bar graph, and 6) a section that displays all the available countries that gives the user the option to select a new country that will then be displayed in the application. Our initial results, which demonstrated the statistics for the United States of America, Spain, Italy, China and Japan showed that the United States of America lead confirmed cases and deaths. Spain followed in confirmed cases, then Italy, then China and finally Japan. After the United States of America, Italy had the most deaths, then Spain, then China and finally Japan. With recoveries, Spain had the most, then China, then the United States of America, then Italy and finally Japan. Japan had the least amount in all categories as was expected. Japan was chosen as an arbitrary country with the idea that the user will then pick another country that will replace it. Values will be displayed for the new country and comparisons will be made again.

## **1.6 Conclusion**

Overall we learned three primary concepts: using an API and JSON to gather and extract data, connecting our data to a front end framework like JavaFx, and object oriented design principles. We designed in an object oriented manner by creating classes that are assigned one job. These classes can be instantiated various times within other classes to perform their task instead of repeating the same implementation many times. We also incorporated enums, which are made up of constants, with particular objects to achieve a goal. These enums applied a function that will return either confirmed cases, deaths or recoveries based on the name of the constant. This saved a lot of time and code that would otherwise feel redundant. Streams were very helpful here when it came to parsing through converted json files to attain specific data. Lastly, I (Chris) don't really work with GUI's (graphical user interfaces) as often I would like so to get a chance to learn how to connect data to JavaFx to display various information felt like a much needed connection that showed how the back end of software connects to the front end, and ultimately build and run an app. I think if we had more time we would play with the API a bit more to gain other

information from the Worldometer website, which, if successful, would allow us to present different data and answer better questions about covid-19. Another area I would like to spend more time on is learning more about what Javafx can do. I believe we only scratched the surface and, perhaps, there was a better way to display our data. Nonetheless, we are proud of the work we achieved and it was a great learning experience. The fact that we wanted to do more in hindsight is not a negative point, but instead, a very welcomed by product of the experience.

## 1.7 References

- [1] M. Baker, “A Scramble to Retrace the Steps of the First Wuhan Coronavirus Case in the U.S.”, The New York Times, Jan 22, 2020.
- [2] L. M. Lombrana, I. Rogers, “Virus Deaths Ease in Europe as Worst-Hit Countries Get Respite”, Bloomberg, Apr, 19, 2020.
- [3] M. Fisher and C. Sang-Hun, “How South Korea Flattened the Curve”, The New York Times, Mar 23, 2020.
- [4] “Coronavirus (COVID-19),” Google News. [Online]. Available: <https://news.google.com/covid19/map?hl=en-US&gl=US&ceid=US:en>. [Accessed: 24-Apr-2020].
- [5] “Coronavirus Cases:” Worldometer. [Online]. Available: <https://www.worldometers.info/coronavirus/>. [Accessed: 24-Apr-2020].

## 1.8 Team Contributions

Meeting Days	Accomplishments
04/09/2020	<ul style="list-style-type: none"><li>• Discussed the three datasets available to us.</li><li>• Discussed how to divide team roles</li><li>• Will meet on Monday to choose dataset and finalize team roles</li></ul>



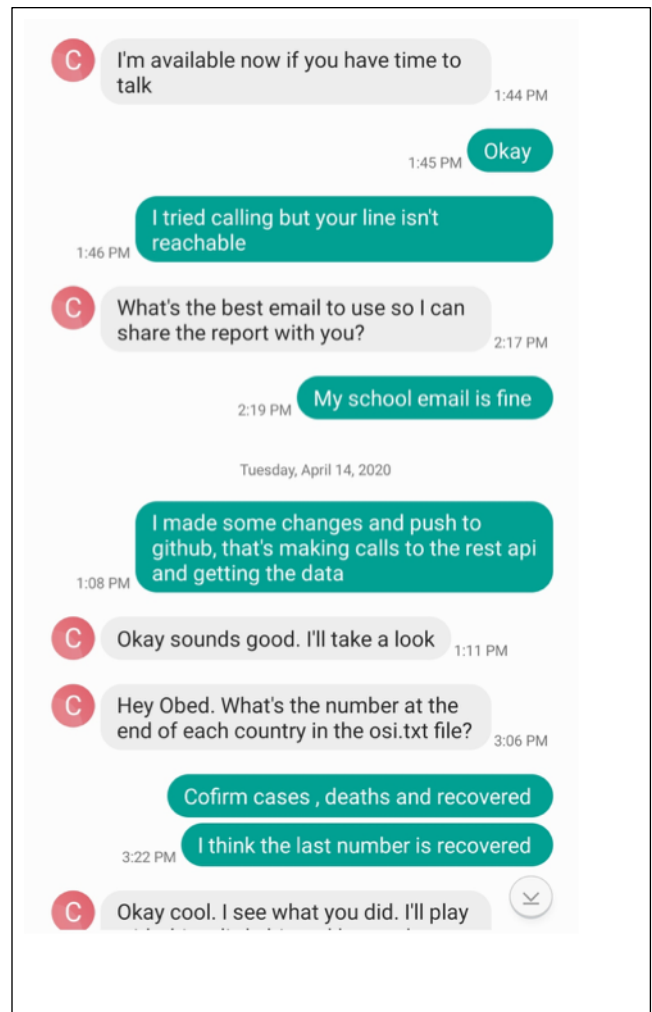
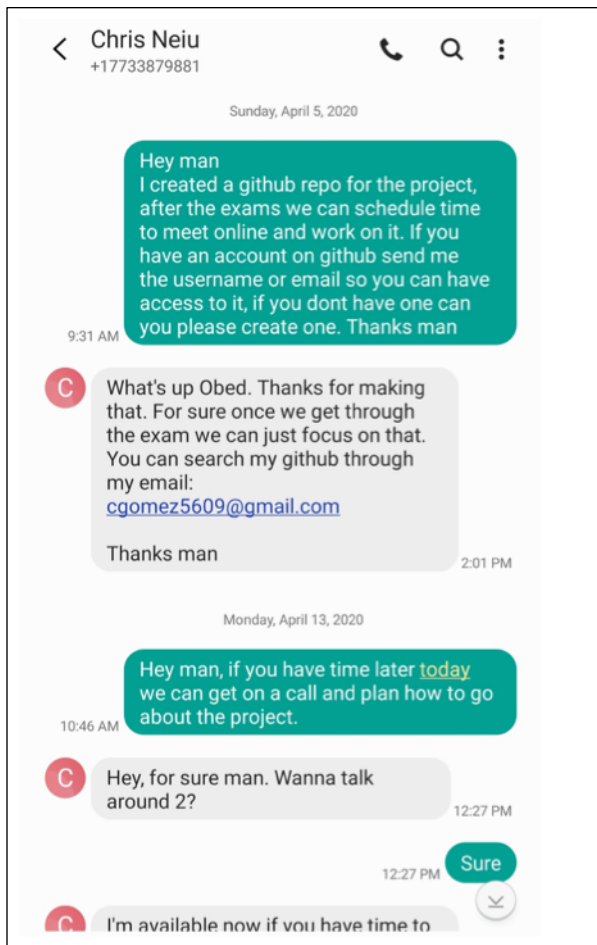
04/13/2020	<ul style="list-style-type: none"> <li>We chose the Worldometer dataset for our project.</li> <li>We are focusing on the issue of coronavirus.</li> <li>Obed will be extracting data using the API</li> <li>Chris will design project in an OOD pattern</li> </ul>
04/16/2020	<ul style="list-style-type: none"> <li>Assign new roles to each member</li> <li>Obed is in charge of User Interface using JavaFx</li> <li>Chris will extract information from the Json file to use in the application.</li> </ul>
04/19/2020	<ul style="list-style-type: none"> <li>Changed our questions, thus changed our design</li> <li>Based on Obed JavaFX application we made adjustments to how we will display our data.</li> </ul>
04/24/2020	<ul style="list-style-type: none"> <li>JavaFx graphs display the appropriate information.</li> <li>The application updates when a new country is selected</li> <li>Once updated with the new country then the necessary fields are updated as well.</li> </ul>

Member Name	Roles	Contributions
Obed	API	Used API to retrieve JSON data in various formats.
Chris	Object Oriented Design	Design code in an Object Oriented Design
Obed	Java Fx	Overall design and code for JavaFX application.
Chris	Extract JSON data	Created, parsed and extracted all the necessary data from Json file.

Questions:

1. How many confirmed cases for each country? top 5
2. How many deaths for each country? top 5
3. How many recovered for each country? top 5
4. If a new country is picked, how does it compare to the other countries.

**Multiple screenshots of group interaction**



< Chris Neiu  
+17733879881

C Hey Obed. What's the number at the end of each country in the osi.txt file? 3:06 PM

Cofirm cases , deaths and recovered

I think the last number is recovered 3:22 PM

C Okay cool. I see what you did. I'll play with this a little bit and let you know Thursday what I find. 3:27 PM

Sure 3:27 PM

C Hey Obed. Is there anyway to read in the Json into some text file? Right now it prints to the console. And then how would we parse through it? 4:36 PM

Yeah save it to a text file 4:38 PM

The api output for country name was in ISO so I scraped online for the corresponding full name, and saved it in a file "ISO.txt" 4:41 PM

C Got it. Thank you 5:17 PM

7:08 PM Do you want to talk

C For sure. Call me when you're ready 7:09 PM

Saturday, April 18, 2020

C Small problem. I'm trying to do top 5 confirmed cases and top 5 deaths but it takes pretty long to run it because it's making a call to the api for every country. And some countries don't have everything up to date. So instead how about we just show the fatality rate for a specific country. Meaning

< Chris Neiu  
+17733879881

C I pushed some new files onto our repository. Take a look then we can have a quick meeting to see what's next. It's only a snippet. Now we just have to figure out what questions we want to answer about our project. 1:48 PM

Ok will take a look 1:52 PM

What time do you want to talk, same time as class time? 3:00 PM

C Do we have class tonight? 3:34 PM

I dont really know 3:34 PM

I'm asking someone. 3:35 PM

C I'm meeting with dr Trana in a bit so I can ask her then I'll let you know. From what I remember I thought she was going to go over concurrency in case you wanted to do the extra credit homework 3:37 PM

Great 3:37 PM

C So there is class. She said that if you are planning on doing the homework then you should attend but if not then

you'll get an idea of how it will look. If you want me to make any changes I can. I'm looking at your fx app right now 5:55 PM

C I LOVE your design. Nice job 6:12 PM

C When you have time let's have a quick meeting 6:33 PM

When?

I'm free you can call me now 6:35 PM

C Just pushed the files to github. Run the main method and you'll see how you can add the info to the graphs

