

# CPSC 349: Front-End Web Engineering - Fall 2020

## COVID-19 Project, due: 349-01 – 8 Dec, 349-02 – 11 Dec at start of class

Given the current state of events, many websites have been created to summarize the statistics, trends, and predictions of the COVID-19 virus, showing data at the country, state, and county levels, using a **combination of maps, tables, graphs (linear and logarithmic scatter plots, bar charts and tree graphs)** comparing the spread from region to region.

Your team's task is to use client-side JavaScript, forms, ReactJS, React frameworks, and Firebase to build a COVID-19 website. You may use any additional third-party Web Service APIs, libraries, or modules, provided you comply with the terms of their licenses.

Students will work in teams of 3-4 members, with one member serving as the Team Leader. The choice of Covid-19 website to create is up to the individual team; it will not be assigned. It will, however, require approval from the instructor.

To help you decide on a design, the most popular COVID-19 sites are shown in this document.

All of these sites pull their data from a relatively small number of International, national, and state sites. The top data sources are: **BNO, 1point3acres, worldometers.info, the Covid tracking project, CDC. ECDC. WHO.** Detailed links for these sites are shown at the end of this document.

All of these sites heavily use tables and graphs. The top 6 React CHART FRAMEWORKS all have a wide variety of examples on their sites, with code.

**nivo rocks:** <https://nivo.rocks/#/> (wide variety of data visualization components, built on React)

**React-Vis:** <https://uber.github.io/react-vis/> (Uber's large, composable charting library)

**Victory:** <https://formidable.com/open-source/victory/> (range of modular charting components)

**Recharts:** <https://recharts.org/en-US> (super simple, well-built, React composable charting library)

**ChartJS:** <https://www.chartjs.org/> (simple, flexible, JS charting library for developers)  
repackaged as React-chartjs-2: <https://github.com/jerairrest/react-chartjs-2>

**canvasJS:** <https://canvasjs.com/react-charts/>

The screenshot shows the BNO News : USA homepage. At the top, there is a red header with the BNO logo. Below the header, a summary table provides the total number of cases, deaths, recovered, and unresolved cases. A detailed table below lists the number of cases, new cases, deaths, new deaths, death rate, serious & critical cases, recovered, and links for each US state.

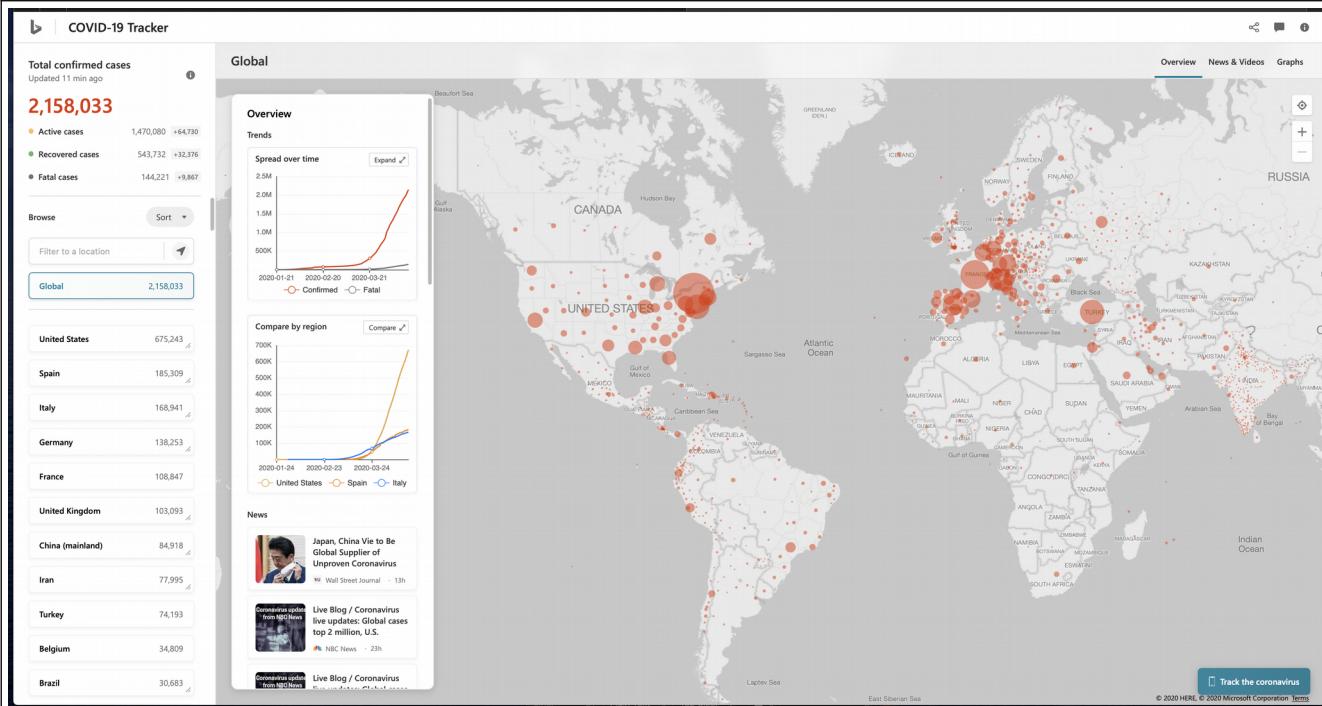
CASES	DEATHS	RECOVERED	UNRESOLVED
702,166	36,934	42,138	623,094

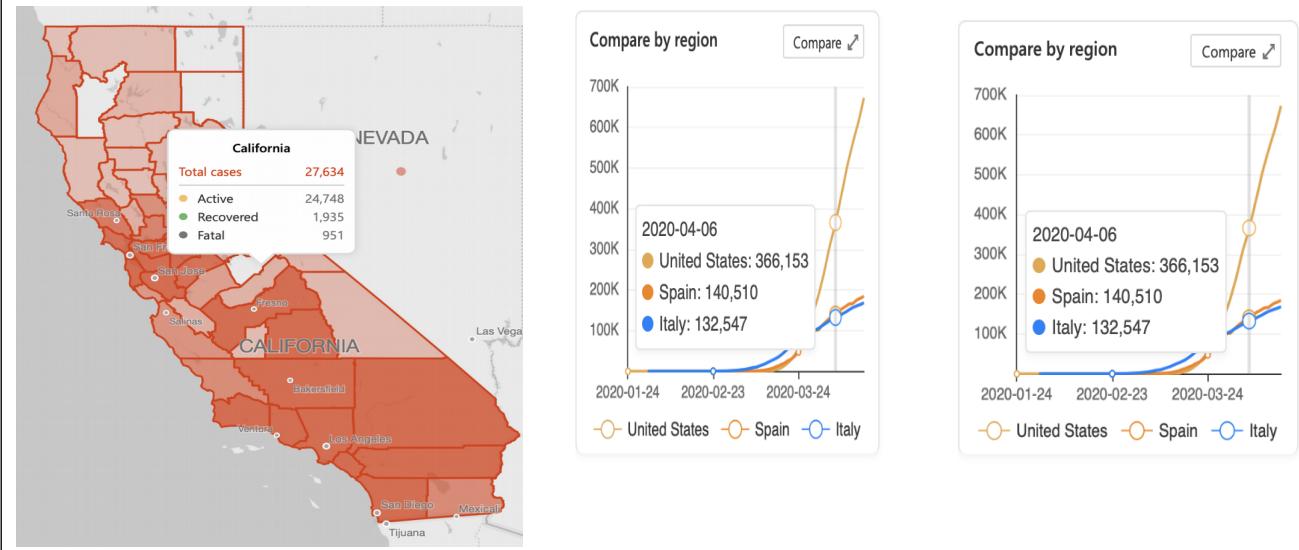
UNITED STATES	Cases	New cases	Deaths	New deaths	Death rate	Serious & Critical	Recovered	Links
New York	226,593	395	17,131	1,025	7.56%	4,504	13,366	<a href="#">Source</a>
New Jersey	78,467	3,150	3,840	322	4.89%	1,961	5,811	<a href="#">Source</a>
Massachusetts	34,402	2,221	1,404	159	4.08%	N/A	421	<a href="#">Source</a>
Michigan	30,023	760	2,227	134	7.42%	N/A	433	<a href="#">Source</a>
Pennsylvania	29,441	1,345	756	49	2.57%	N/A	404	<a href="#">Source</a>
California	29,175	1,085	1,041	68	3.57%	N/A	1,935	<a href="#">Source</a>
Illinois	27,575	1,842	1,134	62	4.11%	N/A	100	<a href="#">Source</a>
Florida	24,753	1,413	726	58	2.93%	N/A	1,116	<a href="#">Source</a>

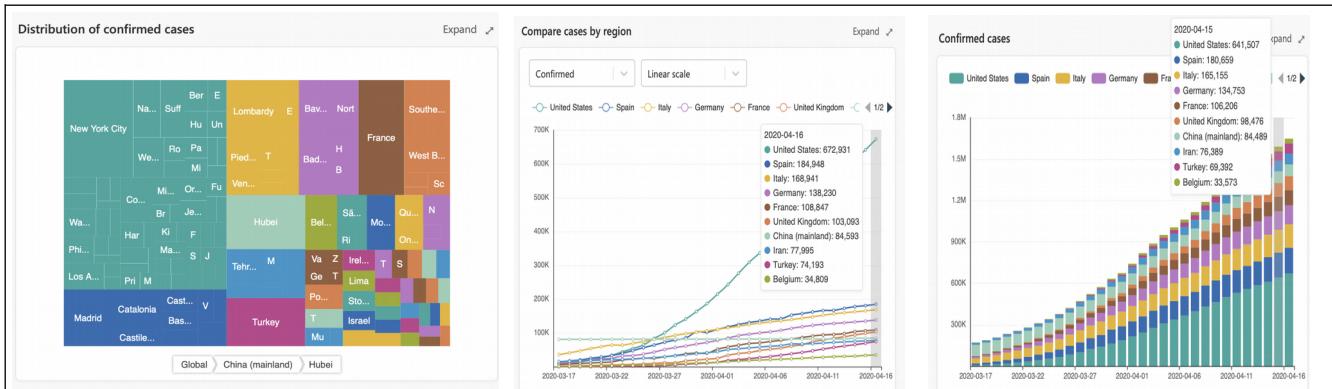
Data links on this site drill down

Bing COVID-19 tracker: Tracks local and global coronavirus cases. <https://www.bing.com/covid>  
Includes drill-down by country, state, and county (US examples)

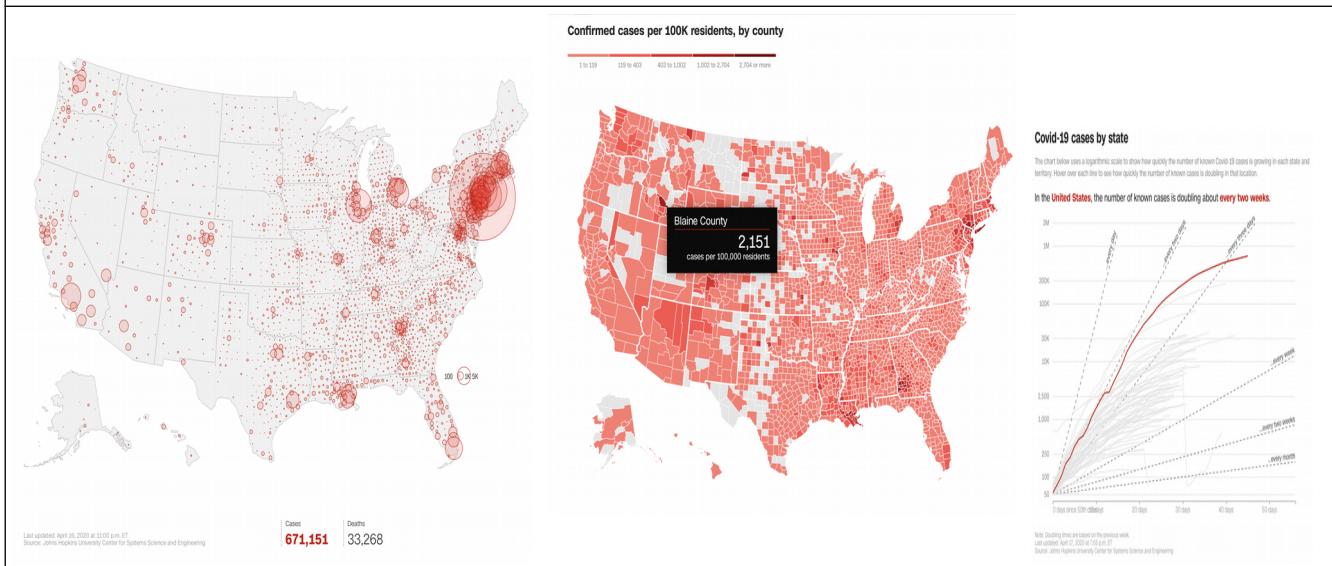


More examples from <https://www.bing.com/covid>





**Tracking Covid-19 cases in the US:** <https://www.cnn.com/interactive/2020/health/coronavirus-us-maps-and-cases/> State by state, and county by county. (First graph is a tree graph.)

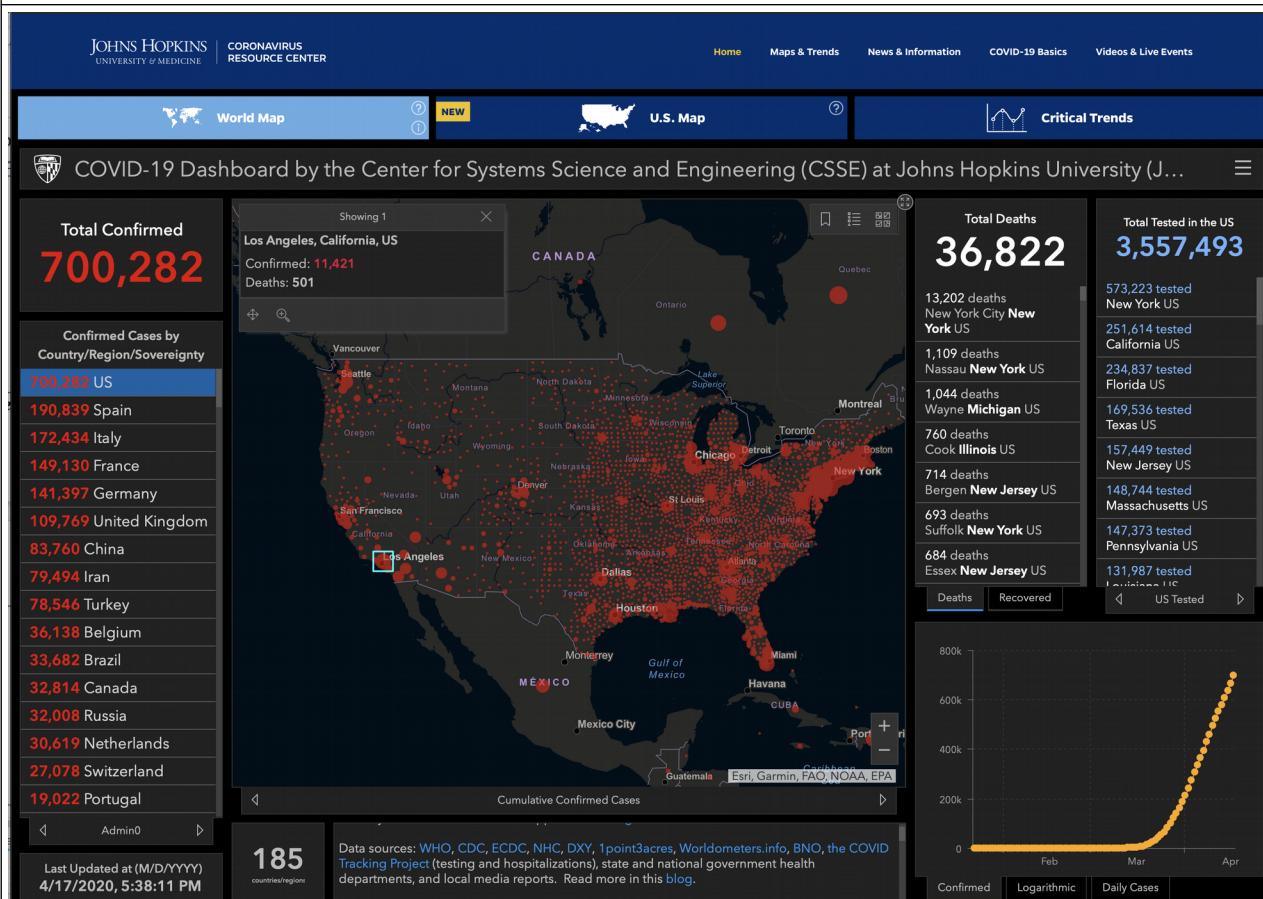


<https://coronavirus.thebaselab.com>



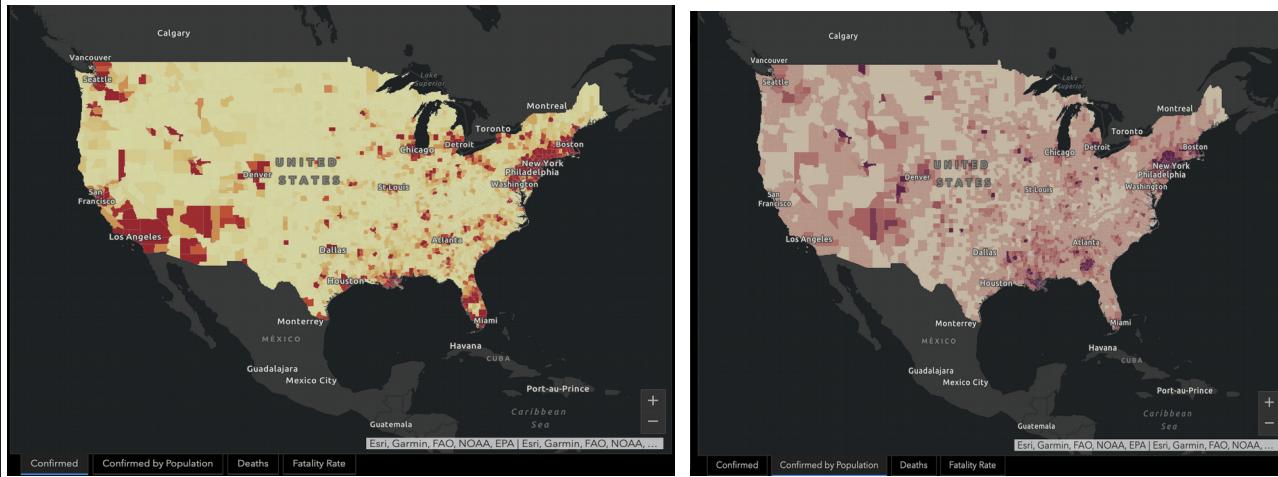


Note the startling speed of spread: <https://www.nbcnewyork.com/news/national-international/map-watch-the-coronavirus-cases-spread-across-the-world/2303276/>



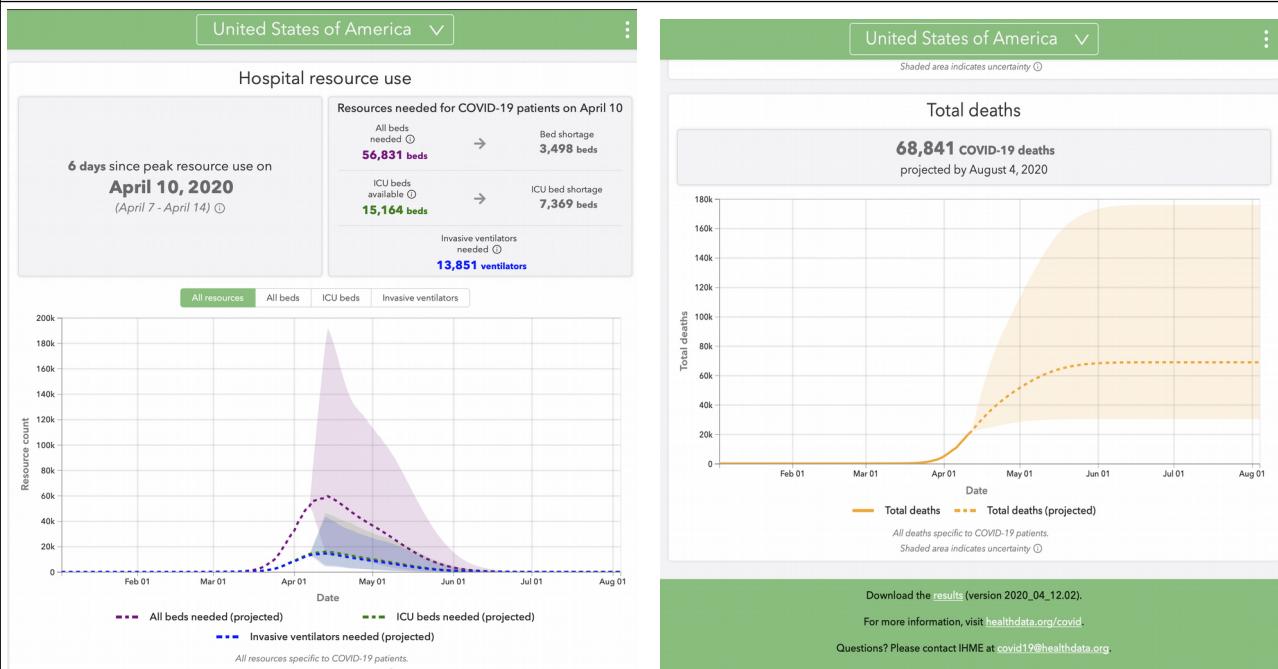
From johnhopkins (most websites get their data from here, which in turn gets its data from the Centers for Disease Control (CDC), and the World Health Organization (WHO)).

<https://coronavirus.jhu.edu/us-map>



Total confirmed cases by county

Adjusted by population



From the Institute for Health Metrics and Evaluation (Univ. of Washington site supported by Microsoft). <https://covid19.healthdata.org/united-states-of-america>

**NEW:**  
Testing numbers added, US state's recovered numbers are TEMPORARILY removed. CANADA AND AUSTRALIA ARE COMING BACK, they were TEMPORARILY removed.

**Quick Facts**

updated: a few seconds ago

**2,178,149**

Total Confirmed Cases

**145,329**

Total Deceased

**18,161,936**

Total Tested

**546,743**

Total Recovered

**Go To Region**

All Regions

World

USA

**World COVID-19 Stats ↗**

RECOVERED: 26%

FATALITY RATE: 7%

NAME	CONFIRMED	CHANGES TODAY	DECEASED	CHANGES TODAY	RECOVERED	TESTS
<b>TOTAL</b>	<b>2,178,149</b>	<b>↑ 91,817 (4.40%)</b>	<b>145,329</b>	<b>↑ 6,855 (4.95%)</b>	<b>546,743</b>	<b>18,161,936</b>
★ United States	675,640	↑ 27,637 (4.26%)	34,522	↑ 2,079 (6.40%)	1,868	3,394,173
★ Spain	184,948	↑ 4,289 (2.37%)	19,315	↑ 503 (2.67%)	19,259	930,230
★ Italy	168,941	↑ 3,786 (2.29%)	22,170	↑ 525 (2.42%)	15,729	1,178,403
★ France	165,027	↑ 17,164 (11.60%)	17,920	↑ 753 (4.38%)	7,928	333,807
★ Germany	137,698	↑ 2,945 (2.18%)	4,052	↑ 248 (6.51%)	15,824	1,728,357
★ United Kingdom	103,093	↑ 4,617 (4.68%)	13,729	↑ 861 (6.69%)	135	417,649
★ China	82,341		3,342		74,862	
★ Iran	77,995	↑ 1,606 (2.10%)	4,869	↑ 92 (1.92%)	14,656	310,340

**USA COVID-19 Stats ↗**

RECOVERED: 1%

FATALITY RATE: 6%

NAME	CONFIRMED	CHANGES TODAY	DECEASED	CHANGES TODAY	RECOVERED	TESTS
<b>TOTAL</b>	<b>675,640</b>	<b>↑ 27,637 (4.26%)</b>	<b>34,522</b>	<b>↑ 2,079 (6.40%)</b>	<b>1,868</b>	<b>3,394,173</b>
★ New York	226,198	↑ 7,636 (3.49%)	16,106	↑ 606 (3.90%)	N/A	550,579
★ New Jersey	75,317	↑ 4,287 (6.03%)	3,518	↑ 362 (11.47%)	N/A	154,010
★ Massachusetts	32,181	↑ 2,263 (7.56%)	1,245	↑ 137 (12.36%)	N/A	140,773
★ Michigan	29,263	↑ 1,204 (4.29%)	2,093	↑ 172 (8.95%)	N/A	97,093
★ Pennsylvania	27,735	↑ 982 (3.67%)	837	↑ 58 (7.44%)	N/A	141,470

From a high school student's site in the state of Washington.

Sources: <https://bnonews.com/index.php/2020/01/tracking-coronavirus-u-s-data/><https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/cases-in-us.html>

## Examples from the Top 5 React Graphing Frameworks

 AreaBump svg   isomorphic	 Bar svg   isomorphic	 Bar HTTP API svg   isomorphic   HTTP API	 BarCanvas canvas
 Bubble hierarchy   svg   isomorphic	 Bubble HTTP API hierarchy   svg   isomorphic   HTTP API	 BubbleCanvas hierarchy   canvas	 BubbleHTML hierarchy   html   isomorphic
 Bullet svg   isomorphic	 Bump svg   isomorphic	 Calendar svg   isomorphic	 Calendar HTTP API svg   isomorphic   HTTP API
 CalendarCanvas canvas	 Chord relational   svg   isomorphic	 Chord HTTP API relational   svg   isomorphic   HTTP API	 ChordCanvas relational   canvas
 Choropleth map   svg   isomorphic	 ChoroplethCanvas map   canvas	 GeoMap map   svg   isomorphic	 GeoMapCanvas map   canvas
 HeatMap svg   isomorphic	 HeatMap HTTP API svg   isomorphic   HTTP API	 HeatMapCanvas canvas	 Line svg   isomorphic
 Line HTTP API svg   isomorphic   HTTP API	 LineCanvas canvas	 Network svg   isomorphic   experimental	 NetworkCanvas canvas   experimental
 ParallelCoordinates svg   isomorphic	 ParallelCoordinatesCanvas canvas	 Pie radial   svg   isomorphic	 Pie HTTP API radial   svg   isomorphic   HTTP API

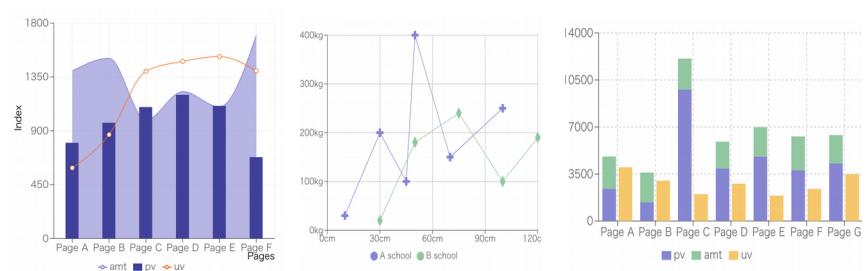
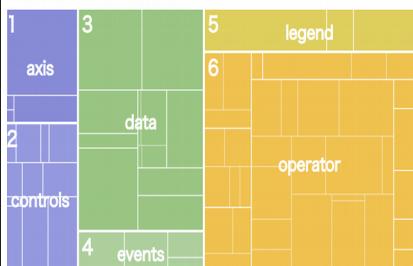
**nivo rocks:** <https://nivo.rocks/#/>



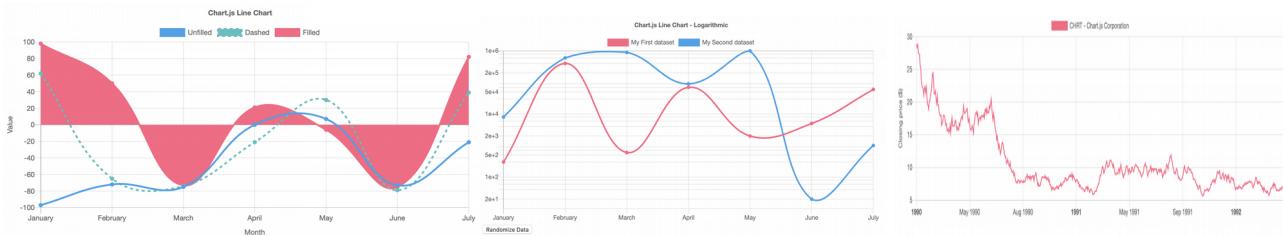
**React-Vis:** <https://uber.github.io/react-vis/>



**Victory**



**Recharts:** <https://recharts.org/>



**ChartJS:** <https://www.chartjs.org/>



**canvasJS:** <https://canvasjs.com/react-charts/>

## DATA SOURCES used by the most popular Covid-19 sites.

**BNO:** <https://bnonews.com/index.php/2020/01/tracking-coronavirus-u-s-data/>

**1point3acres:** <https://coronavirus.1point3acres.com>

**worldometers.info:** <https://www.worldometers.info/coronavirus/>

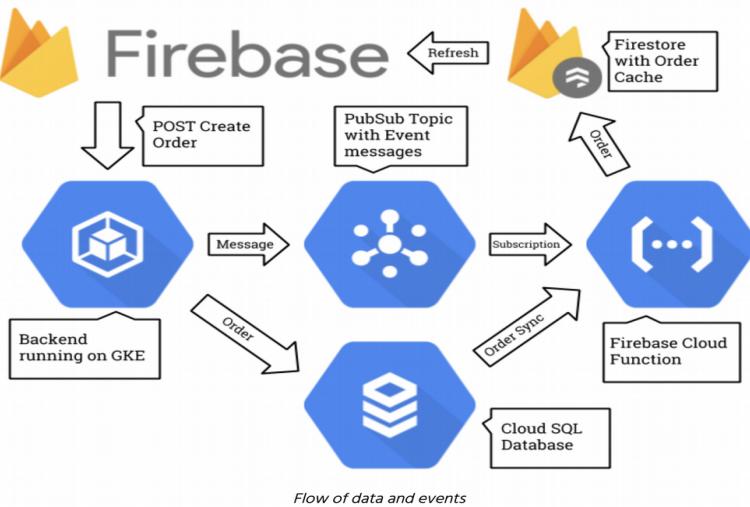
**the COVID tracking project:** <https://covidtracking.com/data>

**CDC:** [https://urldefense.proofpoint.com/v2/url?u=https-3A\\_\\_www.cdc.gov\\_coronavirus\\_2019-2Dncov\\_index.html&d=DwMFaQ&c=n6-cguzQvX\\_tUlZOS\\_4Og&r=ZNGvwmzlj8kMBY6JiOVCuA&m=l4tRzMk97krELxTIEBHo8DfBIHceLgA3njBSxpFaSkY&s=h6lhY9XL94FOKx6QJnNFE7oopNAn8i\\_x1i6gIDHWTd0&e=](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.cdc.gov_coronavirus_2019-2Dncov_index.html&d=DwMFaQ&c=n6-cguzQvX_tUlZOS_4Og&r=ZNGvwmzlj8kMBY6JiOVCuA&m=l4tRzMk97krELxTIEBHo8DfBIHceLgA3njBSxpFaSkY&s=h6lhY9XL94FOKx6QJnNFE7oopNAn8i_x1i6gIDHWTd0&e=)

**ECDC:** <https://www.ecdc.europa.eu/en/geographical-distribution-2019-ncov-cases>

**WHO:** [https://urldefense.proofpoint.com/v2/url?u=https-3A\\_\\_www.who.int\\_emergencies\\_diseases\\_novel-2Dcoronavirus-2D2019\\_situation-2Dreports&d=DwMFaQ&c=n6-cguzQvX\\_tUlZOS\\_4Og&r=ZNGvwmzlj8kMBY6JiOVCuA&m=l4tRzMk97krELxTIEBHo8DfBIHceLgA3njBSxpFaSkY&s=Kqo9h3kYNxWfxMkTXGNLn2mEPiaPYMNXYv6MBhwWxrQ&e=](https://urldefense.proofpoint.com/v2/url?u=https-3A__www.who.int_emergencies_diseases_novel-2Dcoronavirus-2D2019_situation-2Dreports&d=DwMFaQ&c=n6-cguzQvX_tUlZOS_4Og&r=ZNGvwmzlj8kMBY6JiOVCuA&m=l4tRzMk97krELxTIEBHo8DfBIHceLgA3njBSxpFaSkY&s=Kqo9h3kYNxWfxMkTXGNLn2mEPiaPYMNXYv6MBhwWxrQ&e=)

## Firebase articles you may want to read



### Auto refreshing your Firebase app using Pub/Sub and Cloud Functions

<https://www.unacast.com/post/auto-refreshing-your-firebase-app-using-pub-sub-and-cloud-functions>

<https://web.dev/covid19/> Ensure your website is available and usable for everyone during COVID-19. **How to ensure the functionality of your website is available, accessible, secure, usable, discoverable, and fast.**

### Functionality: Projects must...

Use ReactJS and one or more ReactJS frameworks

Use Firebase as the backend

Connect to at least one datasource for showing your statistics

Create a COVID-19 website that shows

- Cumulative confirmed, active, recovered, and died cases
- Current state of the spread of the virus in a table, ranked in descending order
  - **By country**, and/or
  - **By states or provinces within a country**, and/or
  - **By counties**, and/or
  - **By zip codes** (mail codes)
- Current state in a graph which updates as the user selects a geographic region
- Recent changes from the previous day, and/or a history of changes in a graph
- Prediction/rate of change (e.g., doubling every 2 days, or halving every 4 days)
- Predicted actual cases (not just confirmed – e.g., a possible number is between confirmed \* 10 to deaths \* 1000). For example, 40,000 confirmed / 900 deaths -> 400,000 to 900,000 actual
- Provide updates of your statistics throughout the day (at least once/day)

For debugging, allow your data to be downloaded and compared against the sources

## **Teams (max four members per team)**

You Teams typically divide up into different functionalities: API communication, UI design such as page layout using HTML, CSS, and ReactJS frameworks for Bootstrap, Graphing, ReactJS custom components, Firebase development, and so on. You may discuss your project and the technologies you are using with other teams, but each team must build its own application and submit its own work.

## **Working with members of your team**

Each student on the team will receive the same grade. If you run into issues with your teammates, it is your responsibility to attempt to resolve them. Failing that (if you cannot contact them), bring the problem to my attention as soon as possible -- do not wait until the due date.

**Presentations** Since we cannot meet in person, each group will produce a 10-15 minute video of their work. Each of the other groups will meet virtually to watch the other groups, and to grade them using the below categories. It is recommended that each member of your group participate in your group presentation. It should first go through the functionality of the main parts of the website, followed by the data sources and frameworks used, and finally by details of implementation you want other groups to see.

**Grading** Your project will be judged according to the rubric on the next page, and by other teams, with up to 3 points each for each of the following categories, for a total of up to 30%.

## **Scoring will be submitted online, through a poll**

- 1) Quality of the presentation / teamwork
- 2) Quality of documentation describing your data sources and update speed
- 3) ReactJS charts and graphs functionality (how is data displayed – tree graph?)
- 4) ReactJS table functionality (display of statistics in tables, sortable ?)
- 5) Project regional data functionality (country, state, county, zip code)
- 6) Project data update (how often is the data updated)
- 7) Use of Firebase
- 8) Code quality
- 9) Innovation
- 10) Overall web design

## **Submission**

Upload the code and documentation for this project to a new public GitHub repository.

To complete your submission, **print the next two sheets, fill out the spaces on the first sheet, and submit both sheets** to the professor in class by presentation day. Failure to follow the instructions exactly will incur a 10% penalty on the grade for this assignment.

## CPSC-349 COVID-19 Project Submission, due: 349-01 – 8 Dec, 349-02 – 11 Dec at start of class

Team Name: ALN

Team Members: Hien Nguyen

Repository [https://github.com/HieNG94/CPSC349\\_COVID19\\_Web\\_Project](https://github.com/HieNG94/CPSC349_COVID19_Web_Project)

[.github.io](#)

Verify each of the following items and place a checkmark in the correct column. Each item incorrectly marked will incur a 5% penalty on the grade for this assignment

Completed	Not Completed	<b>COVID-19 website</b>
-- <input checked="" type="checkbox"/>	□ --	Created a COVID-19 website that shows the spread of the virus in regional, geographic information (*must* use a map)
-- <input checked="" type="checkbox"/>	□ --	Showed regional information by at least two of the following: <b>by country, and/or by state, and/or by county, and/or by zip code</b>
<input checked="" type="checkbox"/>		Has map showing current confirmed, active, recovered, and fatal cases by at least two of the following: <b>by country, by state, by county, and/or by zip code</b>
-- <input checked="" type="checkbox"/>	□ --	<b>Has tables showing current confirmed, active, recovered, and fatal cases by region, including changes from the previous data</b>
-- <input checked="" type="checkbox"/>	□ --	<b>Has tables showing cumulative stats by region</b>
-- <input checked="" type="checkbox"/>	□ --	Has graphs showing current confirmed, cumulative, and daily stats by region
-- <input checked="" type="checkbox"/>	□ --	Has graphs showing projected <b>actual</b> statistics per region (e.g., 10x confirmed cases, or 1000x confirmed deaths). For example, if it reports 52,000 confirmed cases and 930 deaths, actual statistics are between 520,000 and 930,000 cases.
-- <input checked="" type="checkbox"/>	□ --	Shows current state in a graph which updates as the user selects a region
-- <input checked="" type="checkbox"/>	□ --	Shows changes from the previous day in a graph
-- <input checked="" type="checkbox"/>	□ --	Shows graph of a history of changes by region in the past 14+ days
-- <input type="checkbox"/>	<input checked="" type="checkbox"/>	Graphs or tables showing prediction/rate of change of various regions (e.g., doubling every 2 days, or halving every 4 days)
-- <input type="checkbox"/>	<input checked="" type="checkbox"/>	Predicts actual cases (not just confirmed – e.g., 10x confirmed to 1000x fatalities, e.g., 40,000 confirmed / 900 deaths -> 400k to 900k actual)
-- <input checked="" type="checkbox"/>	□ --	Provide updates of your statistics throughout the day (at least once//hour)
-- <input checked="" type="checkbox"/>	□ --	Uses Firebase for storing data for performance
-- <input checked="" type="checkbox"/>	□ --	Shows (on website) links to sources of data, and authors of site
-- <input checked="" type="checkbox"/>	□ --	Project directory <b>pushed to new GitHub repository</b> listed above

**Comments on your submission**

**Fill out and print this page, and submit it on the day this project is due.**