

Milestone 2

Members:

- Ivan Tan (1901832)
- Clarence Toh (1901842)
- Gary Ng (1901863)





TABLE OF CONTENTS



01. Chosen Visualisation

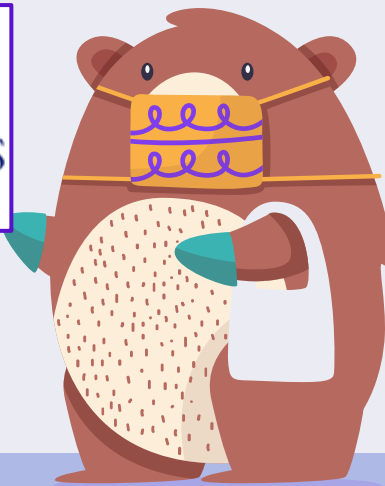
Source: Bloomberg

02. Solution

Visualisation Chosen



From: **John Hopkins University**

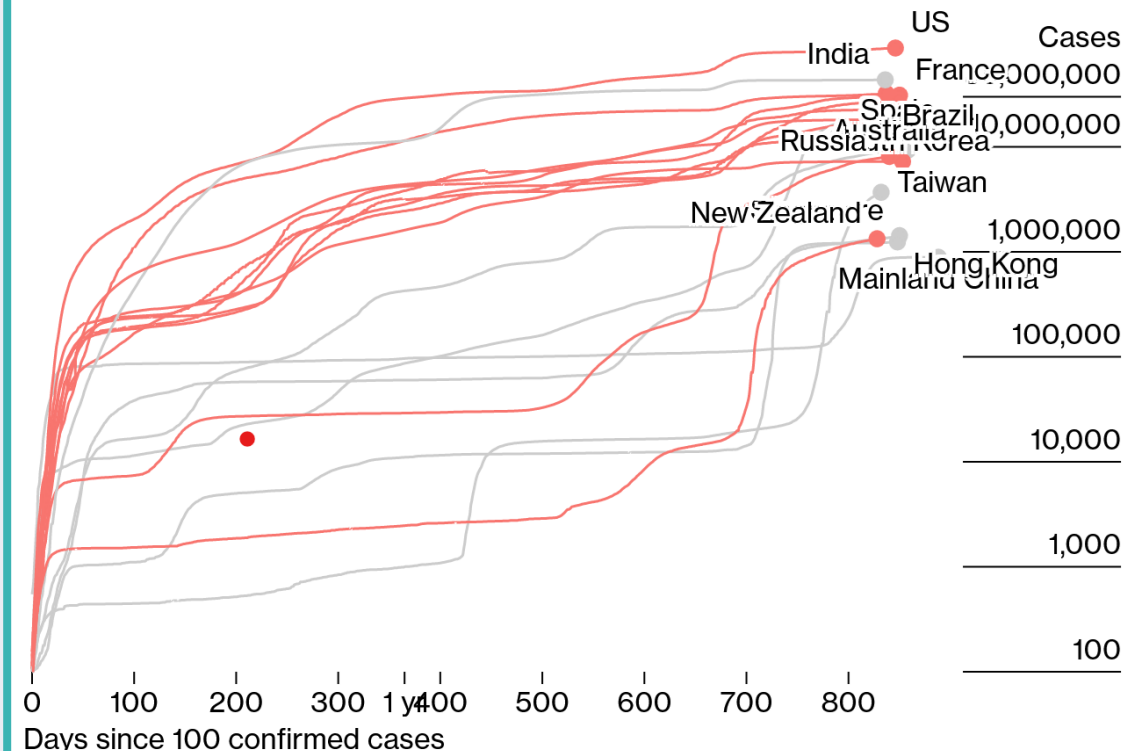


Getting to a Flatter Curve 📉

The first 894 days with more than 100 confirmed cases

Show deaths 📉

Asia Other



Graph Author (Source):

- Johns Hopkins University Center for Systems Science and Engineering.

About Graph:

- Multi-Line Graph of No. of COVID Cases from Day 0 to 800 After Reaching the 100th COVID Confirmed Case Mark (per Country).
- Days (X-Axis).
- No. of Cases (Y-Axis).
- Color of Lines:
 - **Grey** (for Asia Countries).
 - **Red** (for Non-Asia Countries).

URL: <https://www.bloomberg.com/graphics/2020-coronavirus-cases-world-map/#voronoi-container>



Critique

(John Hopkins University)



Data

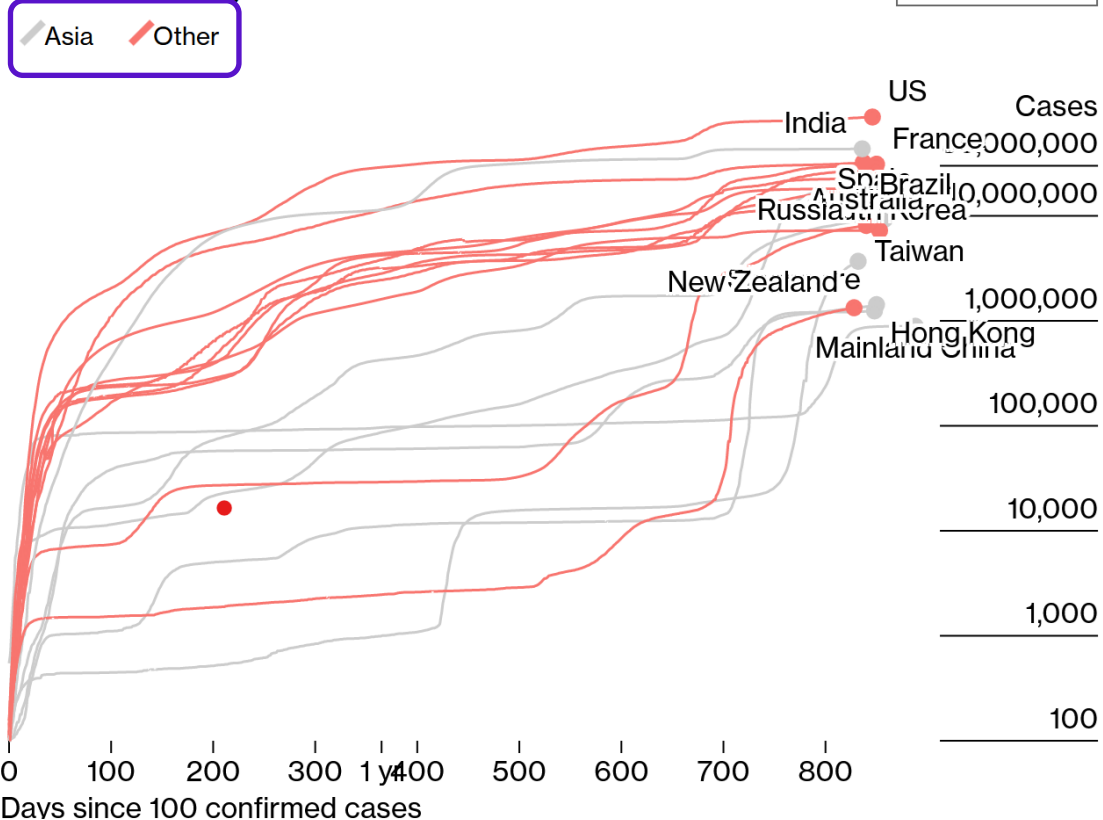


- The Author used **Red** (Color) for Non-Asian and **Grey** for 'Other' Non-Asian Countries within the Legend

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Show deaths 📉



Idiom

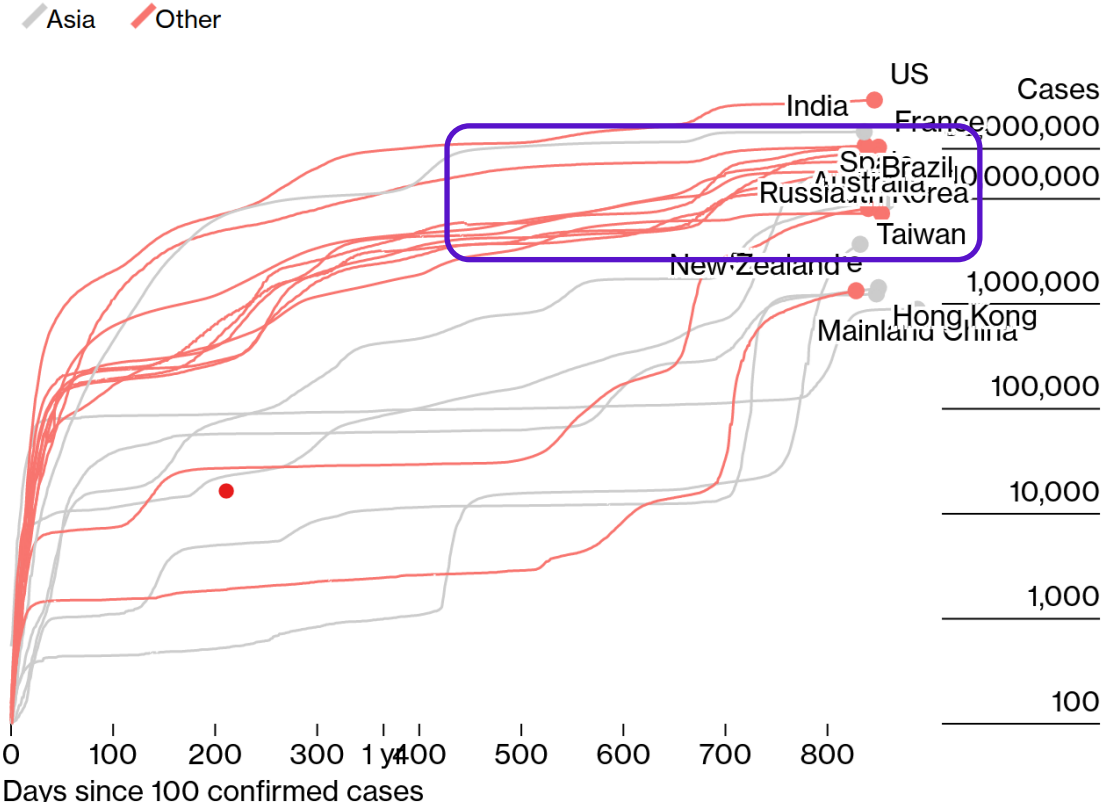


- The Authors Wanted to Visually Compare Each Country's COVID Cases Against the Other Ones (Asia and Non-Asia/Others), thus a Multi-Line Graph was Used.
 - However, Due to the Unproportionate 'Cases' Scale, Some Countries nearing the 10,000,000 and 100,000,000 Marks, on a Given No. Of Days, Results in Noticeable Overlaps of Lines/Country-Labels that Could Cause Confusion to the Viewer(s) as to which of Those Represents which Country.

Getting to a Flatter Curve 📉

The first 894 days with more than 100 confirmed cases

Show deaths 📉



Idiom



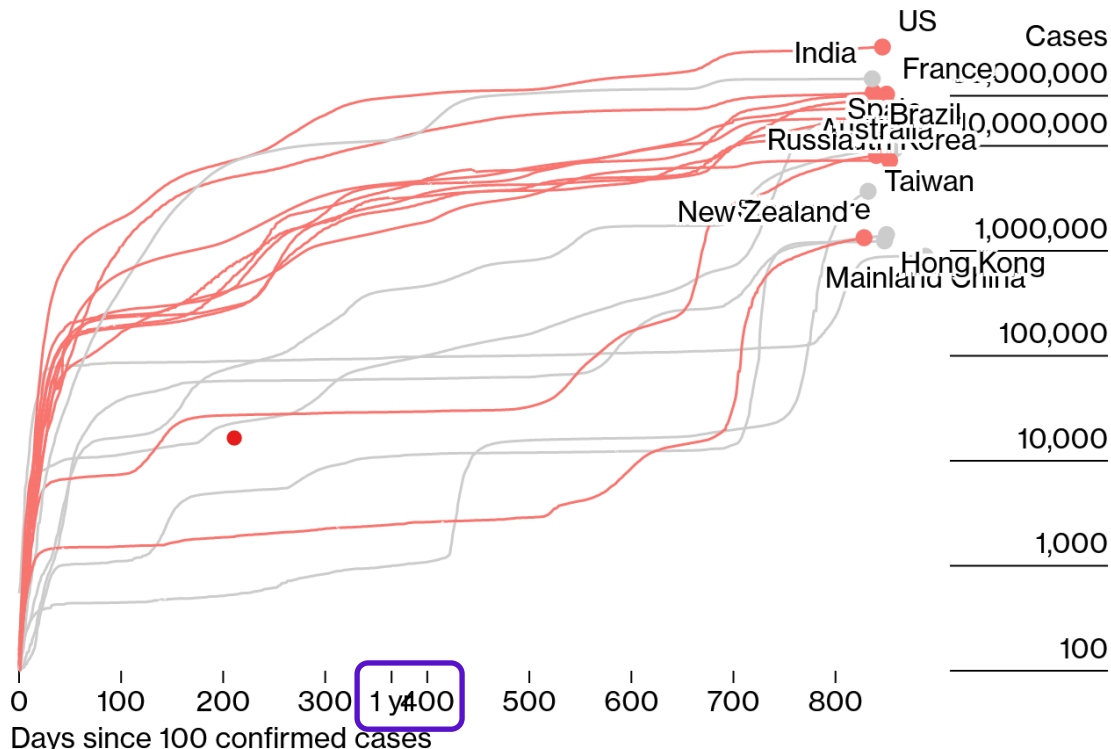
- The Authors Wanted to Visually Compare Each Country's COVID Cases Against the Other Ones (Asia and Non-Asia/Others), thus a **Multi-Line Graph was Used**.
 - Also, the X-Axis' '1 yr' Mark is Overlapping the '400' Day Mark, Making it More Inconvenient to Review the Respective (Country) Line's Day Mark on the X-Axis.

Getting to a Flatter Curve 🧐

The first 894 days with more than 100 confirmed cases

Show deaths 🧐

Asia Other



Task



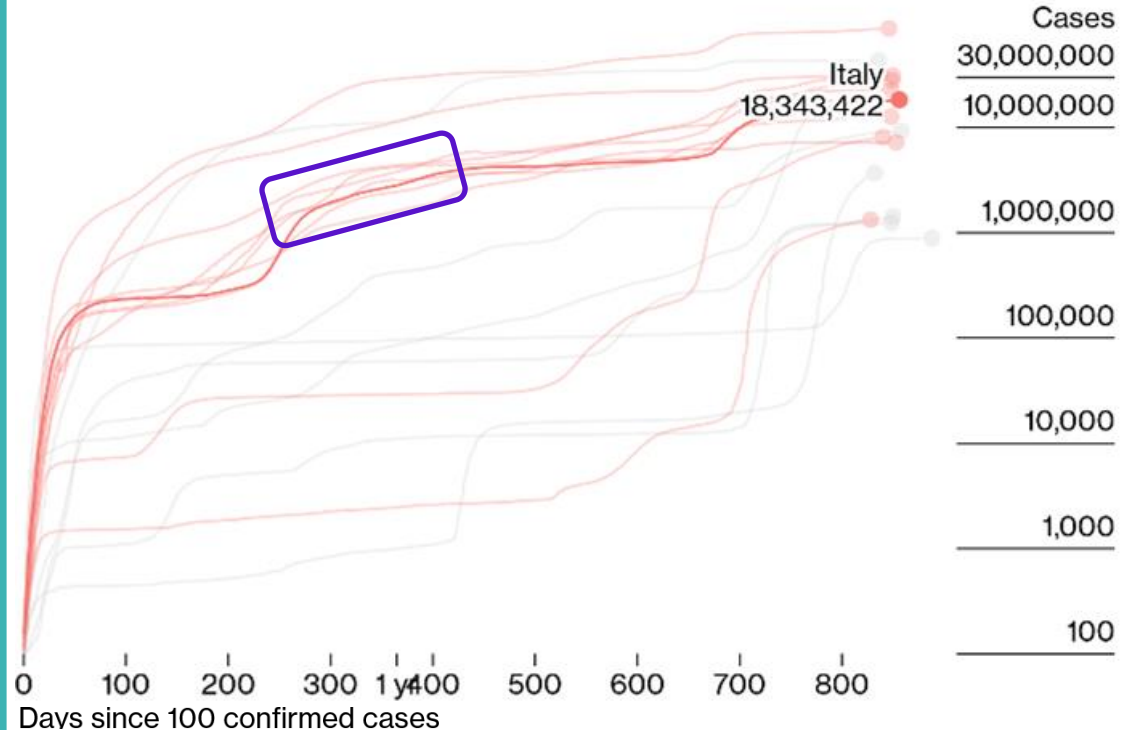
- The Authors Have also Implemented a Mouse **Hover-Over Feature** to Highlight the preferred Country in which the Viewer would Like to Focus On.
 - Despite this, due to the Extreme Closeness Between the Overlapping of (Country) Lines, Users With Mobility/Varying Impairments (e.g. Hand Tremors, Larger Fingers) and/or Utilizes this Feature in Differing Environments (e.g. On Public Transportation, On Their Device Using One-Hand) Would Be Affected to a Large Extent.

Getting to a Flatter Curve 🗑

The first 894 days with more than 100 confirmed cases

Show deaths 🗑

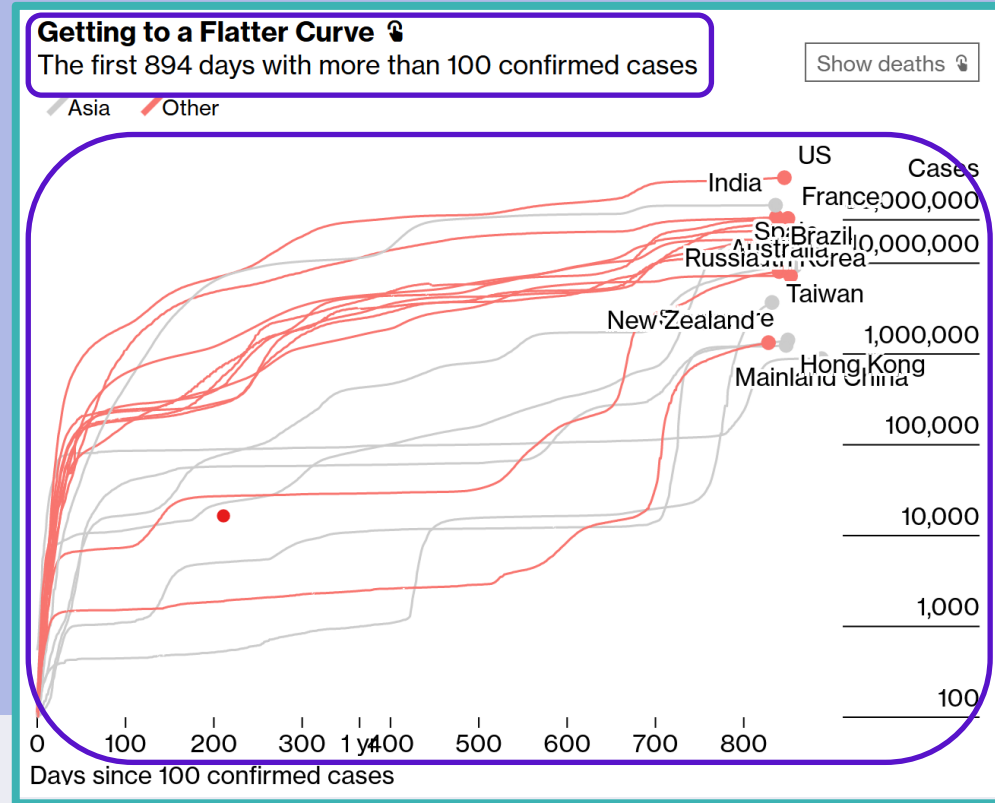
Asia Other



Task



- The Authors Added a Main Title for the Graph as '**Getting to a Flatter Curve**' with a Sub-Title of 'The first 894 days with more than 100 confirmed cases'.
 - However, the Main Title had a slightly bigger Font Size and a Bold Text Style, it was assumed that it would be related to the Sub-Title and the Graph, which is not true in this instance, making it confusing to the Viewer.
 - Also, the Main Title is Not Descriptive Enough in conveying what was Meant by 'Getting to a Flatter Curve' with respect to the Graph.



Solution (Original Dataset)

```
▼ jhu_csvs
01-01-2021.csv
01-01-2022.csv
01-02-2021.csv
01-02-2022.csv
01-03-2021.csv
01-03-2022.csv
01-04-2021.csv
01-04-2022.csv
01-05-2021.csv
01-05-2022.csv
01-06-2021.csv
01-06-2022.csv
01-07-2021.csv
01-07-2022.csv
```

```
> 01-01-2021.csv
FIPS,Admin2,Province_State,Country_Region,Last_Update,L
,,,Afghanistan,2021-01-02 05:22:33,33.93911,67.709953,5
,,,Albania,2021-01-02 05:22:33,41.1533,20.1683,58316,11
,,,Algeria,2021-01-02 05:22:33,28.0339,1.6596,99897,276
Andorra,2021-01-02 05:22:33,42.5063,1.5218,8117,84,7
```

Repo Dataset (Link):

https://github.com/CSSEGISandData/COVID-19/tree/1731460b0c53554f38c6422cc47c1a5b2b1f638c/csse_covid_19_data/csse_covid_19_daily_reports

Solution (Post-Processed Dataset)

```
{ country_data.json > ...
1 {
2   "01-22-2020": {
3     "Afghanistan": {
4       "Confirmed": 0.0,
5       "Deaths": 0.0,
6       "date": "01-22-2020"
7     },
8     "Albania": {
9       "Confirmed": 0.0,
10      "Deaths": 0.0,
11      "date": "01-22-2020"
12    },
13    "Algeria": {
14      "Confirmed": 0.0,
15      "Deaths": 0.0,
16      "date": "01-22-2020"
17    },
18    "Andorra": {
19      "Confirmed": 0.0,
20      "Deaths": 0.0,
21      "date": "01-22-2020"
22    },
```

```
{ country_regions.json > [ ] Europe
{
  "Europe": [
    "Andorra",
    "Albania",
    "Armenia",
    "Austria",
    "Bosnia and Herzegovina",
    "Belgium",
    "Bulgaria",
    "Belarus",
    "Switzerland",
    "Cyprus",
    "Czech Republic",
    "Germany",
    "Denmark",
    "Estonia",
    "Spain",
    "Finland",
    "Faroe Islands",
    "France",
    "France, Metropolitan",
```

CSV (Left):

- 1 Day = 1 CSV

JSON (Right):

- 2 Json Files Countries Regions (Mapping of Countries)

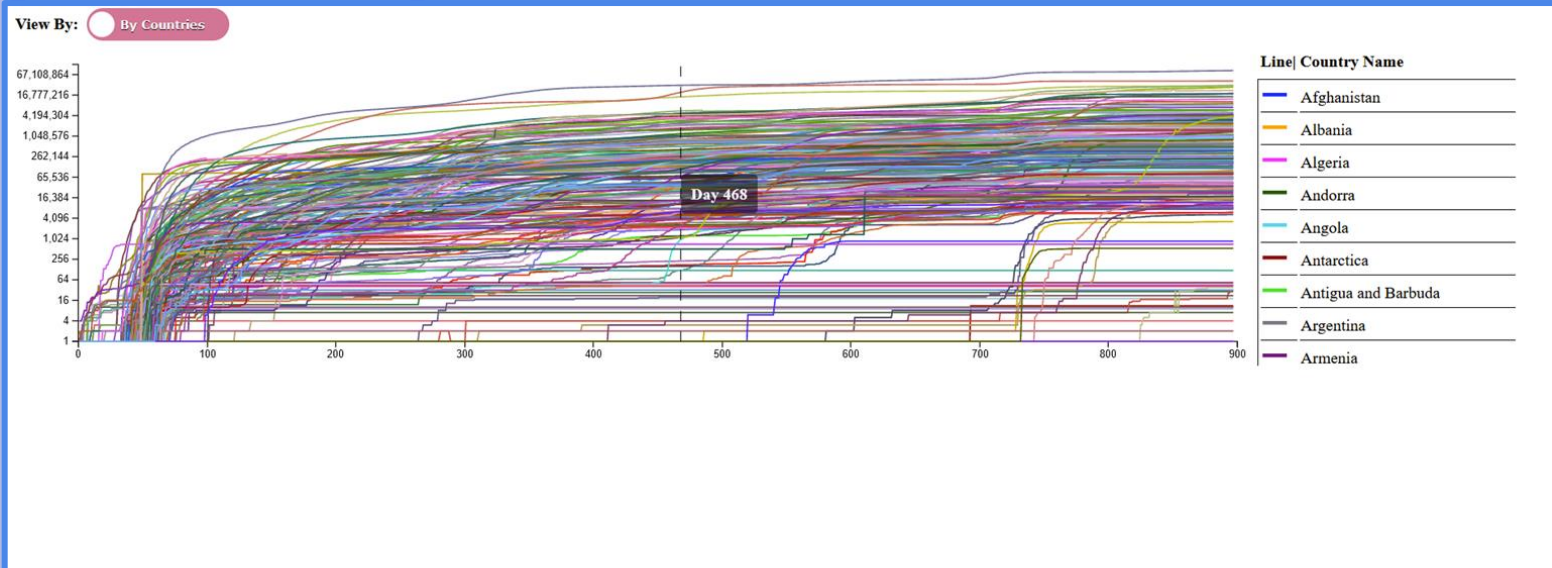
Solution (Sneek Peak)



Technology Stack:

- Vanilla D3 (version 7)
 - Multi-Line Graph Plots, Manipulation, Filtering, Selections, etc

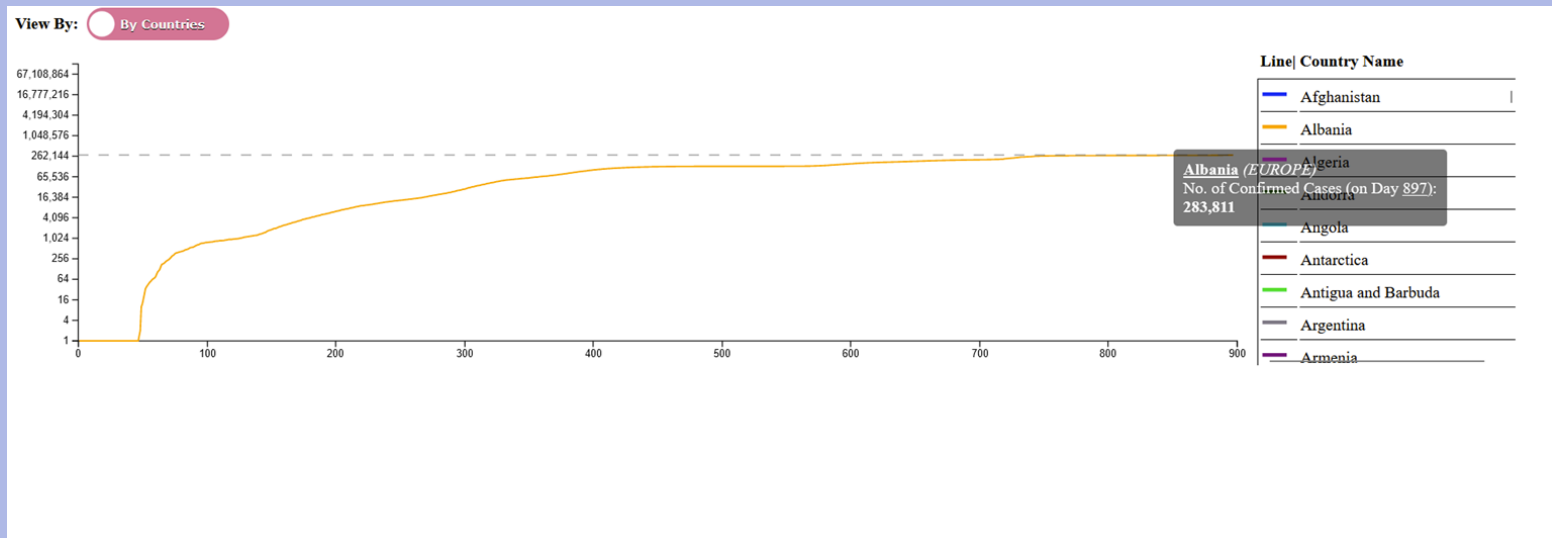
Solution (Functions)



Kept JHU's Forest Approach but:

- Showed all Countries with (**Coloured**) Lines, to show dissimilarity between countries in “View By: ☒ By Countries” Selection.
- With Log Scale
- Included Display of Day Number currently at on Hover Over of Line Chart

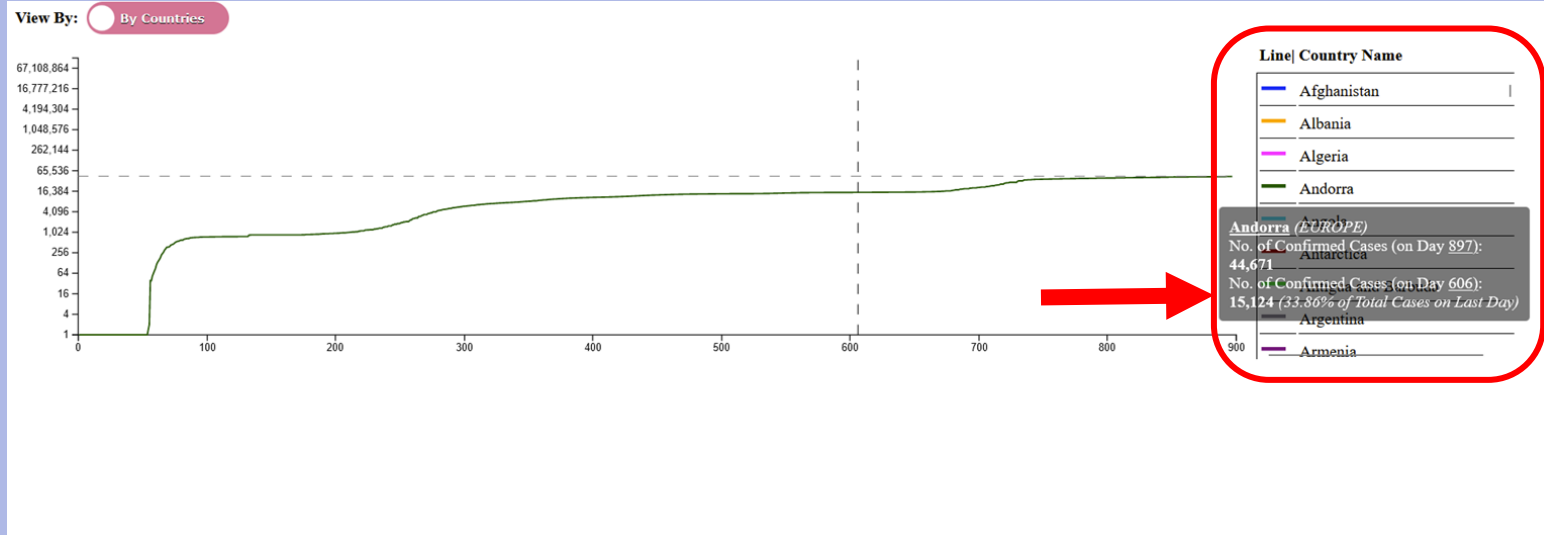
Solution



Kept JHU's Forest Approach but:

- Used a Tabular Legend (**Coloured Lines** Corresponding to Graph with **Country Names**)
- On Hovered-Over **Any** Country:
 - Included Display of Country's **Total Confirmed Cases** (at End Day 897)
 - **Region** it is in
 - **Selectively Isolate** the Country's Trending Cases (on Line Chart)
 - Showed the Maximum Cases (at End Day 897) via Dotted Line for Corresponding to Log Y Scale (Easier Viewing)

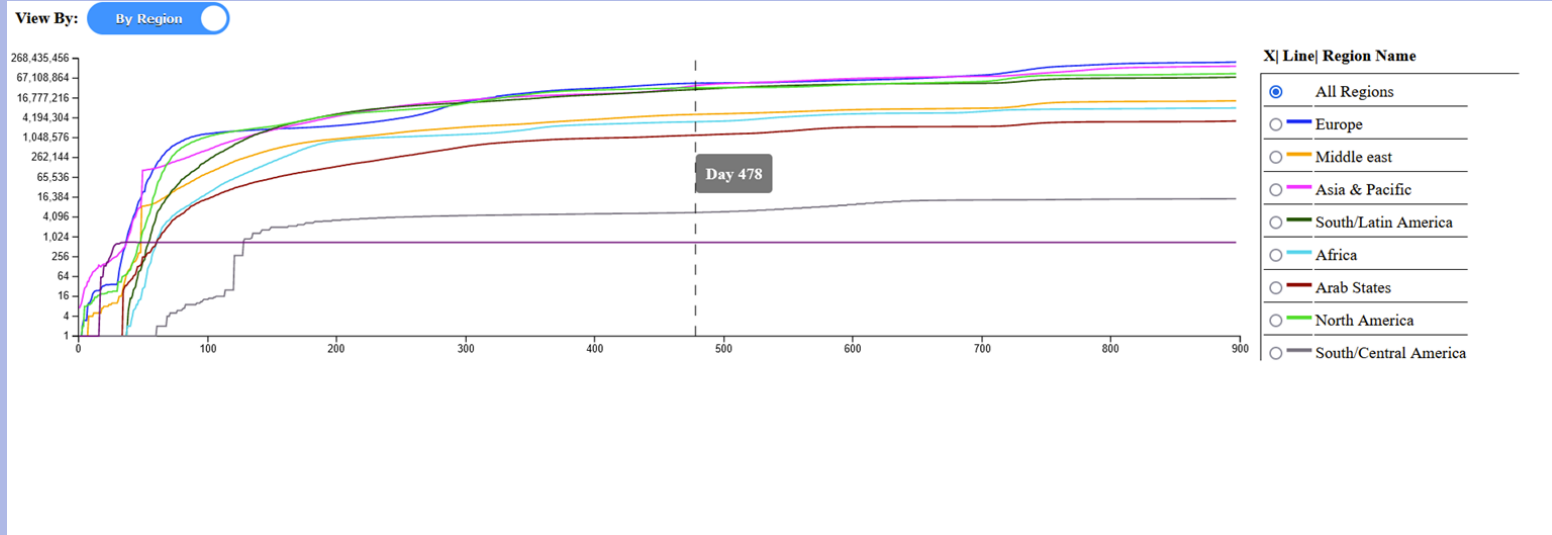
Solution



Kept JHU's Forest Approach but:

- On Selection on the Line Graph (**Plot** a Dotted-Line Day Marker)
 - On Hover-Over Any Country within the Legend, reveal Total Cases and % on End Day **PLUS** Cases to Selected Day

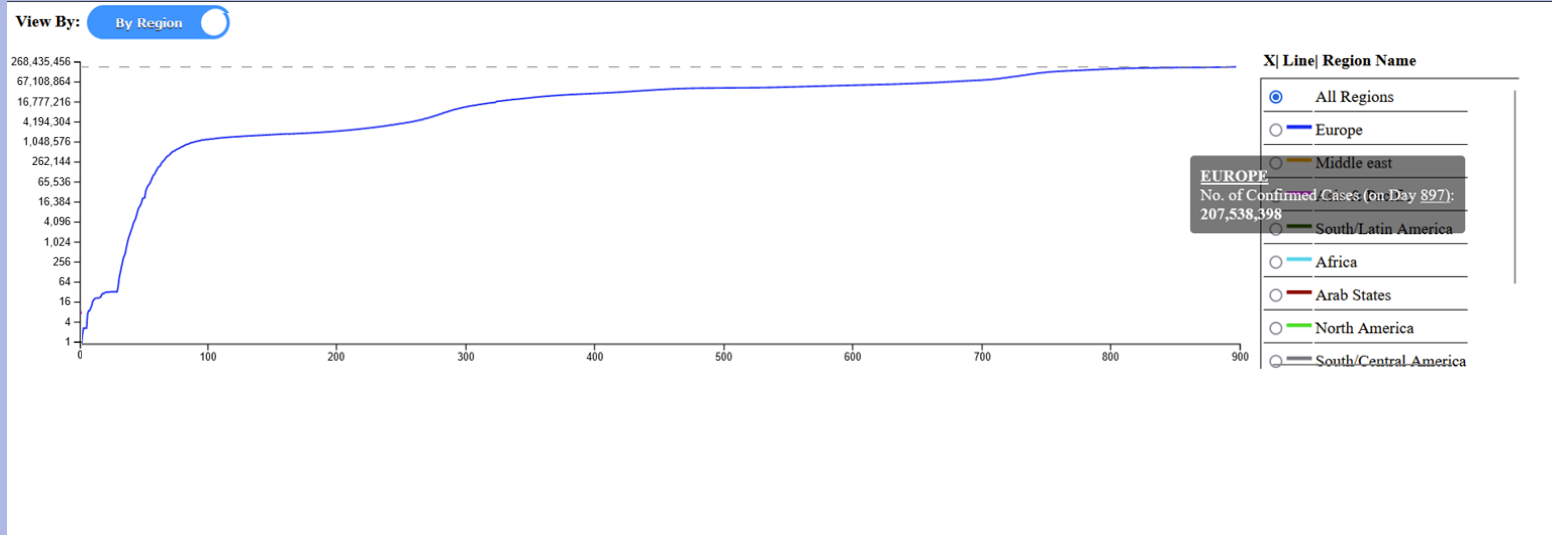
Solution



In Addition:

- On Switching to “View By: By Region” Selection:
 - Included Display of Day Number currently at on Hover Over of Line Chart

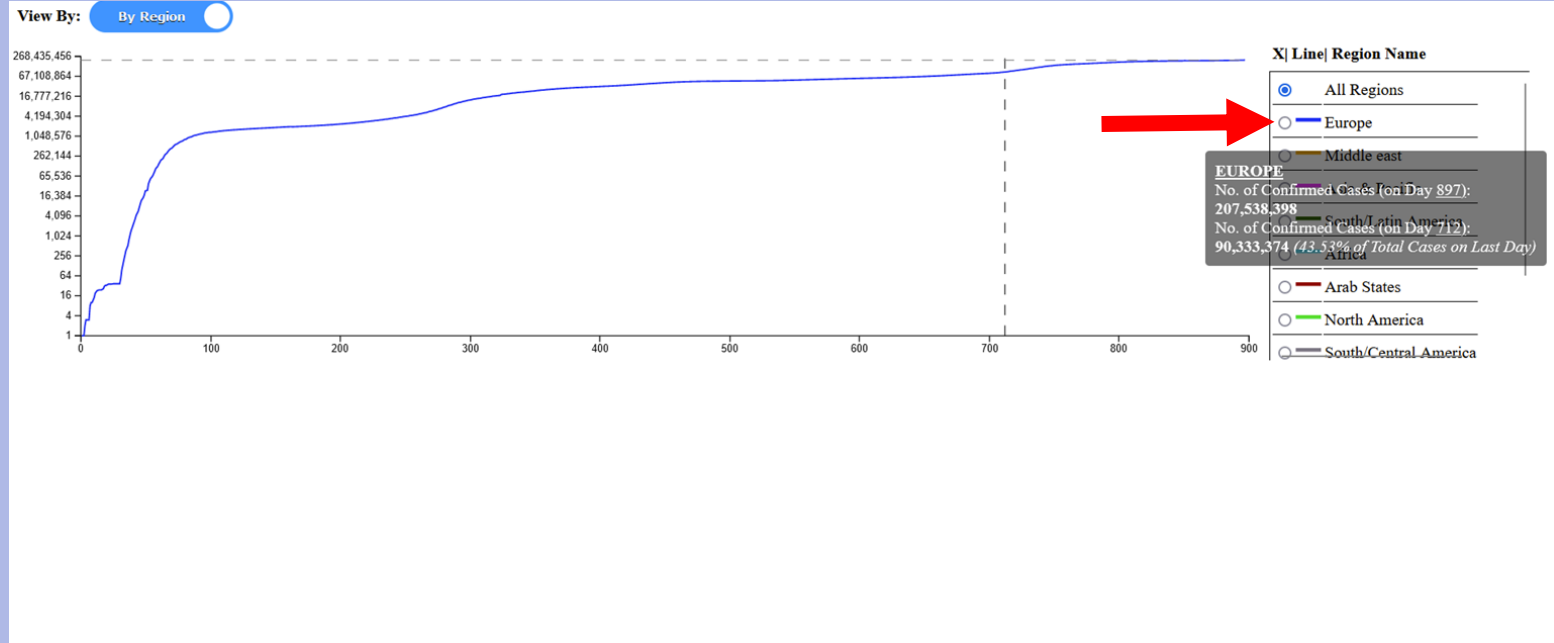
Solution



In Addition:

- On Hovered-Over **Any** Region:
 - Included Display of Region's **Total Confirmed Cases** (at End Day 897)
 - **Selectively Isolate** the Region's Trending Cases (on Line Chart)
 - Showed the Maximum Cases (at End Day 897) via Dotted Line for Corresponding to Log Y Scale (Easier Viewing)

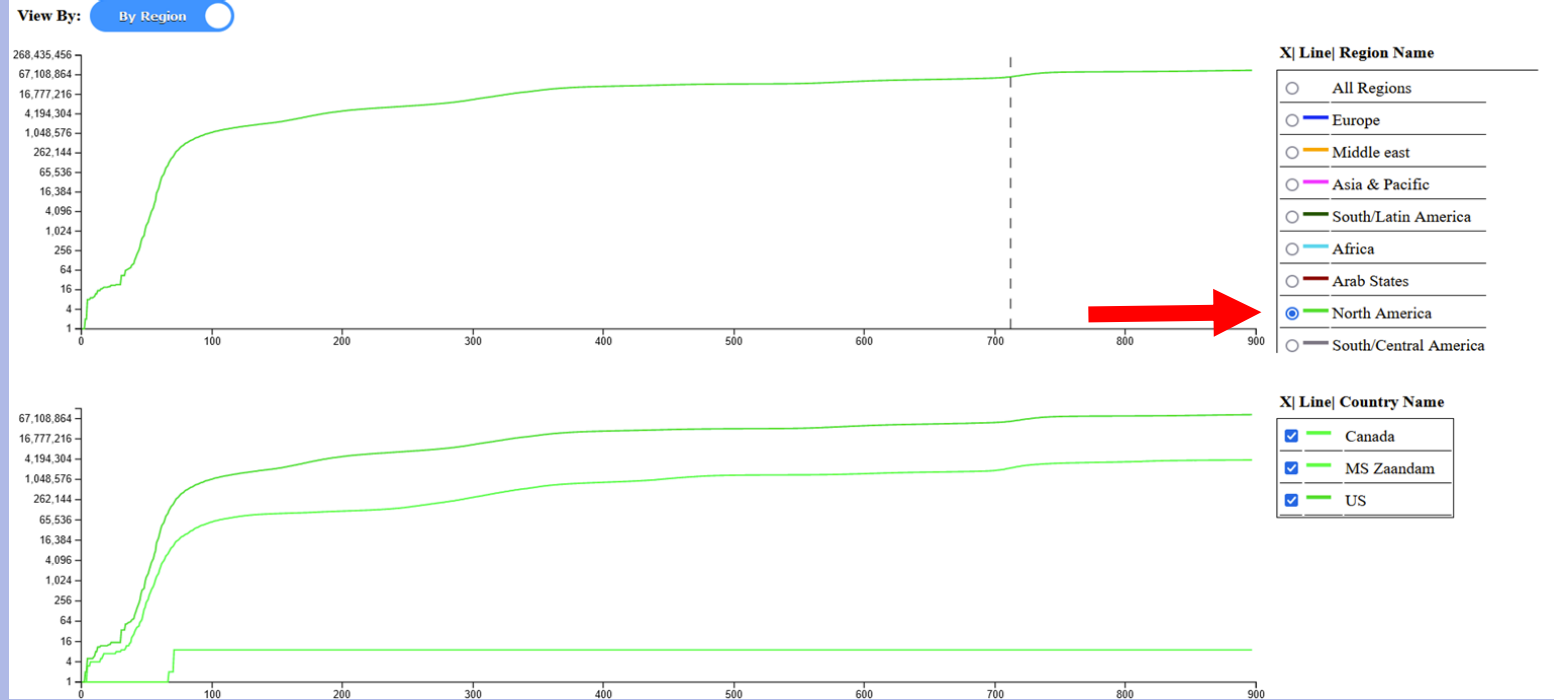
Solution



In Addition:

- Selection on Any Day within the Lower Line Graph (**Plot** a Dotted-Line Day Marker)
 - On Hover-Over Any Country within the Legend, reveal Total Cases and % on End Day **PLUS** Cases to Selected Day

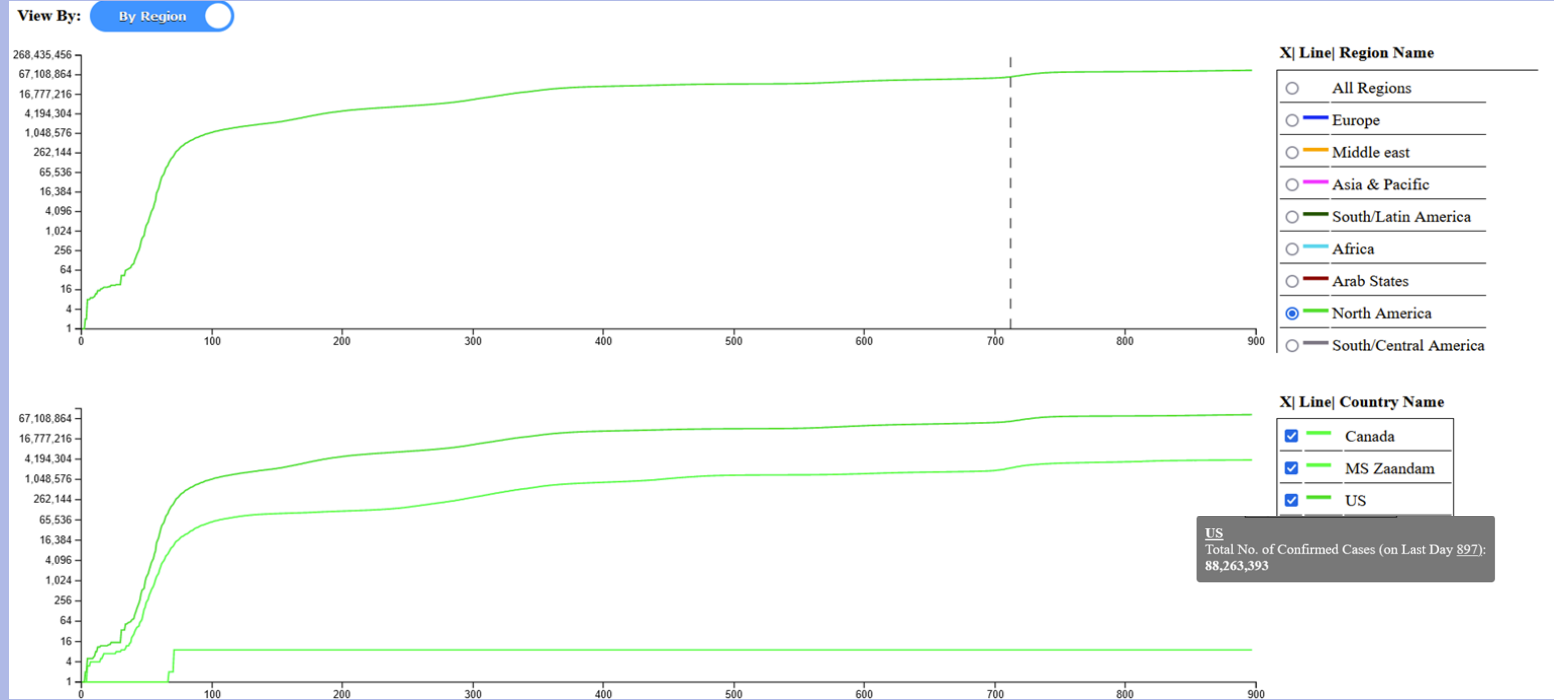
Solution



In Addition:

- Selection of **Any** Region:
 - Lower Chart appears, containing all Countries (with varying Brightness based on Case Nos.) in Selected Region

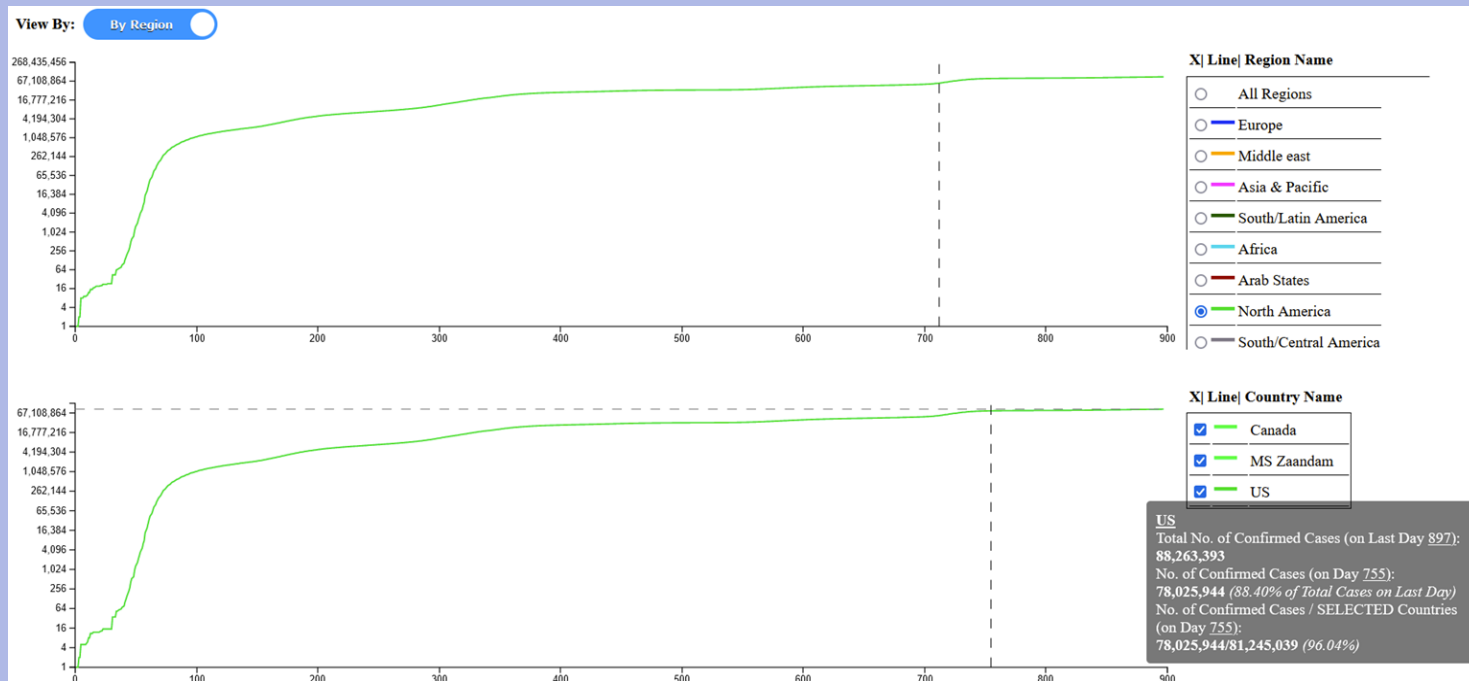
Solution



In Addition:

- Selection of **Any** Region:
 - Lower Chart appears, containing all Countries (with varying Brightness based on Case Nos.) in Selected Region

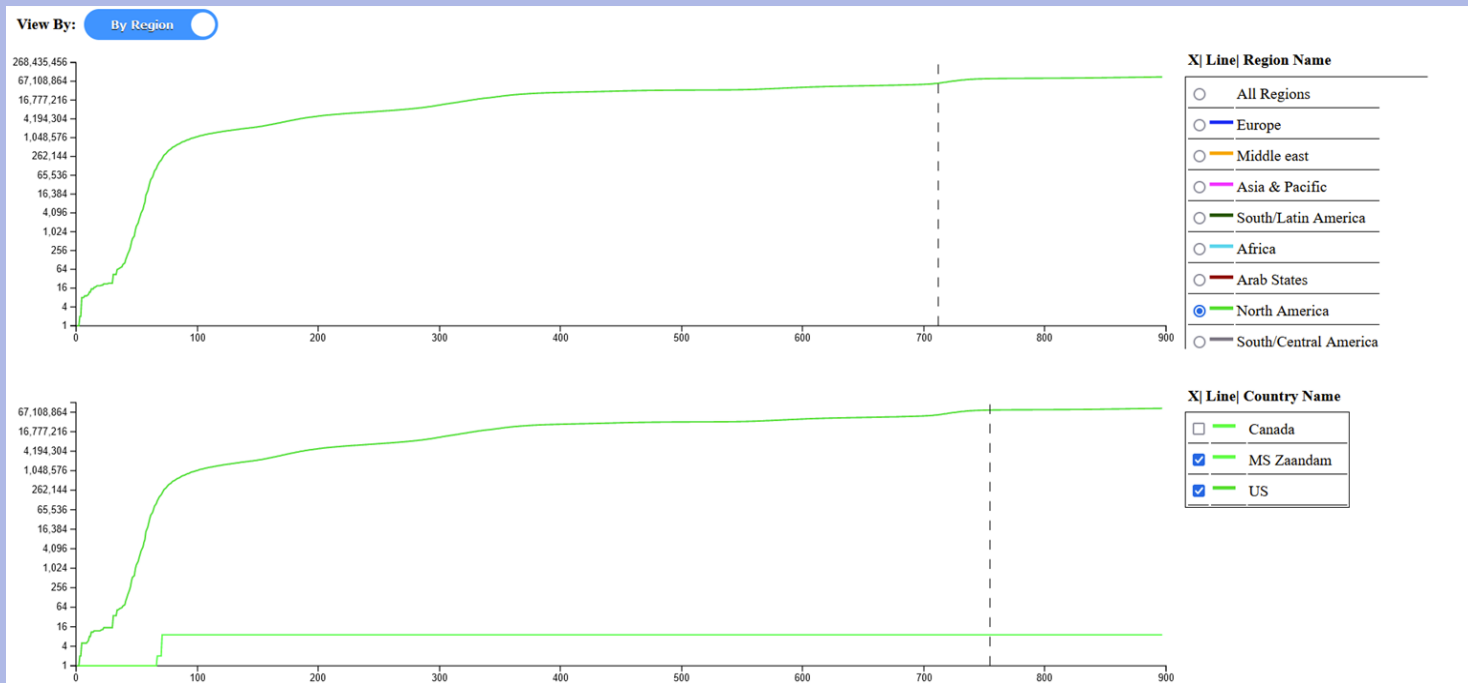
Solution



In Addition:

- On Selection of **Any** Day within the Lower Line Graph:
- On Selection on Any Day within the Lower Line Graph (**Plot** a Dotted-Line Day Marker)
 - On Hover-Over Any Country within the Lower Legend, reveal Total Cases and % on End Day **PLUS** Cases to Selected Day

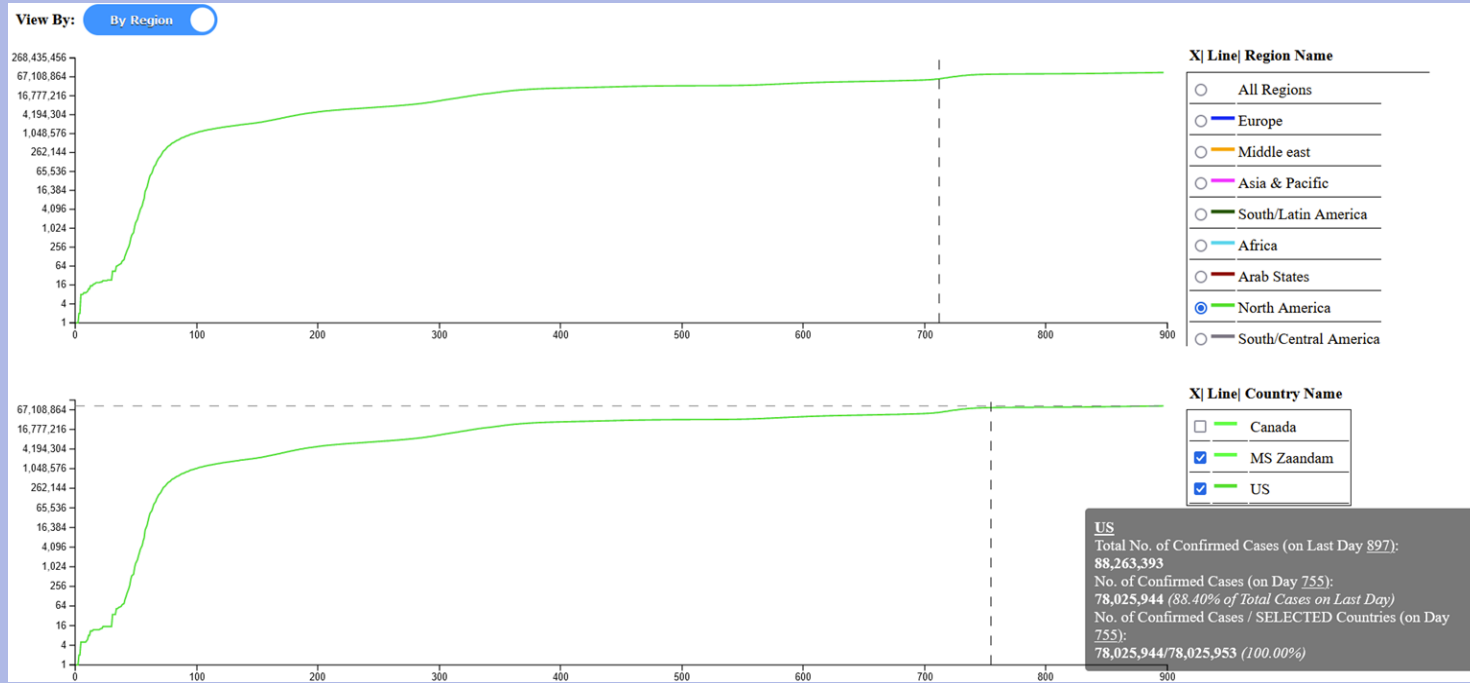
Solution



In Addition:

- On De-Selecting A Country in the Lower Line Chart, the Graph Updates

Solution

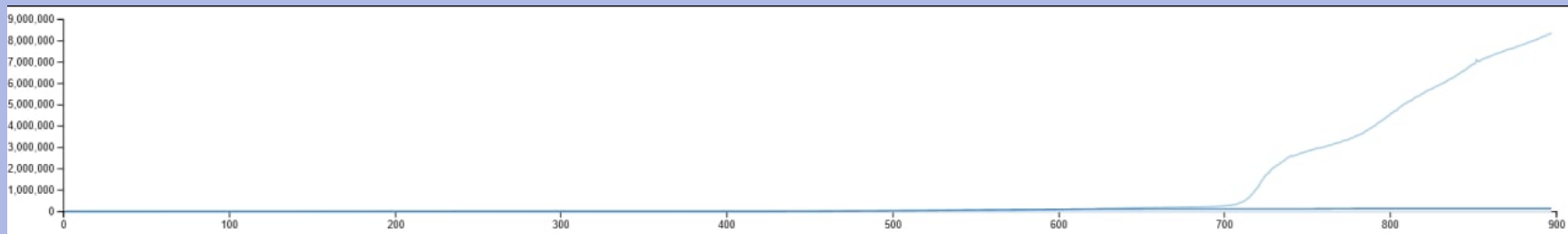


In Addition:

- On Hovering Over Any *Selected* Country, the Cases and % for the Selected Day is Shown.

What if...

(Proportional Y-Scale for Case No.)



Result:

- Countries get Squished together (Showing only 2 Lines in this example)

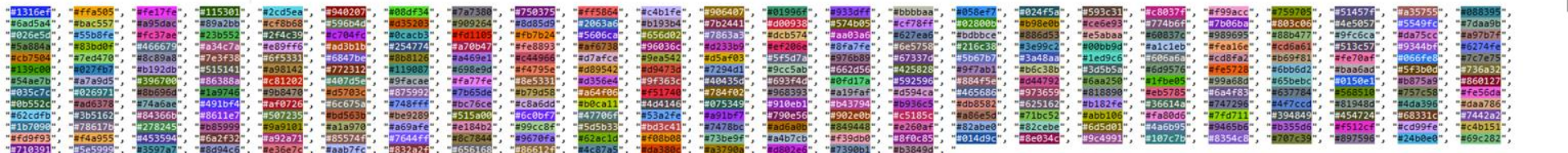
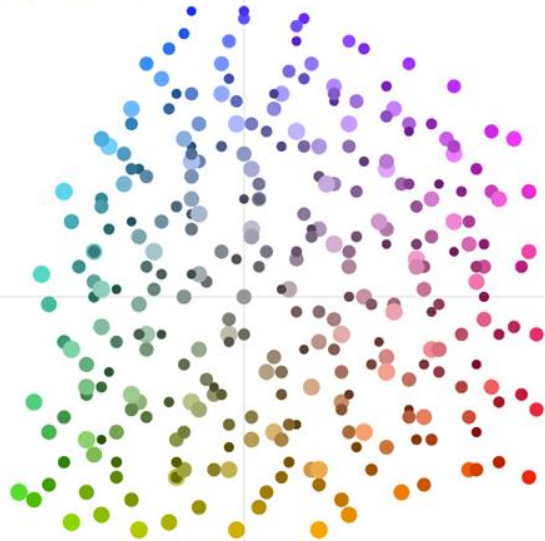


Solution (Color Scale)

- Chose a Color Generator Repository via Git Pages:
 - Found Colors with a Range of Not too Dark to Not too Light
 - Color Samples are obtained via the **CIECAM02-UCS Color Space** so that Perceptually Different Colours are Equally Spaced.
 - The Git-Hosted Sampler Always chooses the Next Colour to be as far as Possible from all the Previously Sampled Colours (I.e. No Color Overlaps).



Category Color Generator



(note: d3.jab("white") = {r: 100, a: 0, b: 0})

Allowed colors:

```
function constraint(i, a, b) {  
  return i > 30 && i < 80;  
}
```

Start ☒ hex codes

Status

x=787, y=181.6666717529297
J=undefined, a=38, b=22
R=211 G=246 B=218

Some example constraints

```
// All colours with integer J,a,b values  
function constraint(i, a, b) {  
  return true;  
}  
  
// Constant distance to a given colour:  
function constraint(i, a, b) {  
  var centre = d3.jab(120, 20, 20); // J, a, b  
  var dist = jab_dist(centre, d3.jab(i, a, b));  
  return (75 < dist && dist < 76);  
}  
  
// other functions...  
return 30*30 < a*a+b*b; // No greys  
return a < b < 50; // no red  
return i < 30; // dark  
return 50 < i; // light  
return jab_dist(d3.jab(i, a, b), d3.jab("blue")) < 50; // blue  
return jab_dist(d3.jab(i, a, b), d3.jab("red")) < 50; // red  
return jab_dist(d3.jab(i, a, b), d3.jab("yellow")) > 70; // no  
return rgb().r > 230; // strong red channel
```

CIECAM02-UCS Color Space Git Pages: <http://jnnnnn.github.io/category-colors-constrained.html>



Solution (Improvements Needed)

- Due to Much Data Manipulation and Data Processing
(I.e. Switching From “By Region” to “By Countries”, and Vice Versa),
Waiting/Loading Time per Switch Lasts for Approx. 5 seconds before Graph Loads.
 - Discovered (Nearing Submission) about **Web Workers** (I.e. Multi-Threading) via JavaScript that could allow such Heavy Data Processing to run in the background.
 - This, could also allow Loading Page (Animated GIF Image Format, Apart From Internet Bandwidth) to Function as per Normal, without CPU Overheads.
- Hover Over Tooltip Positioning (Cross past WIndow Height)



Thank
you



Stay Safe!

