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Topic: Total population and GDP per capita

<https://youtu.be/sFVwprLFWlo>

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Topic:-Total population and GDP Per Capita

Our scenario

we have used 3 different datasets to represent and visualize the life expectancy and GDP per capita. The csv file contains the countries, GDP and life expectancy.

I used promise all () to connect all the datasets and visualize using charts according to the data.

Design Planning

Data Preparation

Preparing the Data Is the First Step in Creating Graphs with D3.js The first step in creating graphs with D3.js is to prepare the data. CSV files, which stand for "Comma Separated Values," are a typical type of data format that are utilized for the storage of tabular data. It will be necessary for you to read and parse the CSV data by utilizing the built-in methods of D3.js such as `d3.csv()` or `d3.dsv()` in order to convert the data into a format that can be easily utilized for the creation of visualizations.

DOM Selection and Creation

The next step in the rendering process involves selecting and creating DOM elements for the document object model (DOM). The Document Object Model (DOM) is utilized by D3.js in order to modify HTML components. You can choose existing HTML elements or build new ones for the graph by making use of the `d3.select()` or `d3.selectAll()` functions that are available in D3.js. Connecting the Data to the DOM Elements After you have both the data and the DOM elements, the next step is to tie the data to the DOM elements. You can bind data to DOM elements based on a key or index using the methods that are provided by D3.js. Some examples of these methods include `data()` and `enter()`. During this step, a link is established between the data and the DOM elements. This connection ensures that any changes made to the data will be reflected in the graph.

Creating the Graph

Now that the data have been connected to the DOM elements, you are able to actually create the graph. D3.js offers a wide variety of methods for the creation of various kinds of visualizations. These methods include `d3.scale()`, which is used for the creation of scales that map data to visual attributes; `d3.axis()`, which is used for the creation of axes; and various `d3.shape` functions, which are used for the creation of various kinds of graphical elements, such as lines, bars, and circles. After you have generated the fundamental graph, you will then be able to add styles and make adjustments to it in order to make it more informative and visually beautiful. D3.js has significant support for styling and customization, including the ability to specify attributes, apply CSS classes, and use transitions to create animations that are fluid. You can also add interactivity to the graph by making use of the event handling functions that are provided by D3.js. Examples of this include hover effects and click interactions.

Data Updates and Transitions

One of the powerful characteristics of D3.js is its ability to manage data updates and transitions in a smooth manner. This capacity is one of its key selling points. The graph can be dynamically updated in response to changes in the data through the use of the data manipulation and transition capabilities

provided by D3.js. This enables you to construct dynamic and interactive visualizations that are capable of reacting in real time to changes that occur in the data that they are based on.

Testing and Refining

As a last step, it is essential to carefully test and improve the graph in order to guarantee that it is accurate, responsive, and performs effectively. Identifying and resolving any problems can be accomplished with the help of the built-in debugging and error handling functions of D3.js. In addition, the design of the graph can be improved further by soliciting comments and suggestions from users and then making any necessary adjustments in response to that feedback.

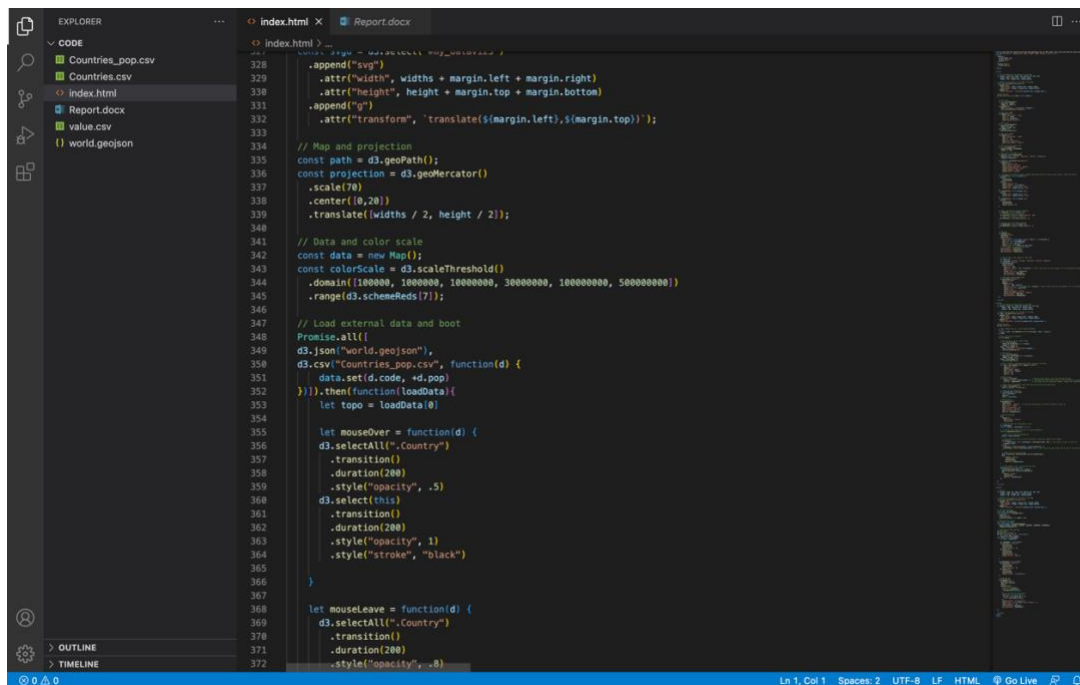
Screenshots and explanation

```

74     .attr("x", width)
75     .attr("y", height+50)
76     .text("Gdp per Capita");
77
78     // Add Y axis
79     var y = d3.scaleLinear()
80     .domain([35, 90])
81     .range([ height, 0]);
82     svg.append("g")
83     .call(d3.axisLeft(y));
84
85     // Add Y axis label:
86     svg.append("text")
87     .attr("text-anchor", "end")
88     .attr("x", 0)
89     .attr("y", -20)
90     .text("Life expectancy")
91     .attr("text-anchor", "start");
92
93     // Add a scale for bubble size
94     var z = d3.scaleSqrt()
95     .domain([200000, 1310000000])
96     .range([ 2, 30]);
97
98     // Add a scale for bubble color
99     var myColor = d3.scaleOrdinal()
100     .domain(["Asia", "Europe", "Americas", "Africa", "Oceania"])
101     .range(d3.schemeSet2);
102
103     var tooltip = d3.select("#my_dataviz")
104     .append("div")
105     .style("opacity", 0)
106     .attr("class", "tooltip")
107     .style("background-color", "black")
108     .style("border-radius", "5px")
109     .style("padding", "10px")
110     .style("color", "white");
111
112     // -2- Create 3 functions to show / update (when mouse move but stay on same circle) / hide the tooltip
113     var showTooltip = function(event,d) {
114         tooltip
115         .transition()
116         .duration(200)
117         tooltip
118         .style("opacity", 1);

```

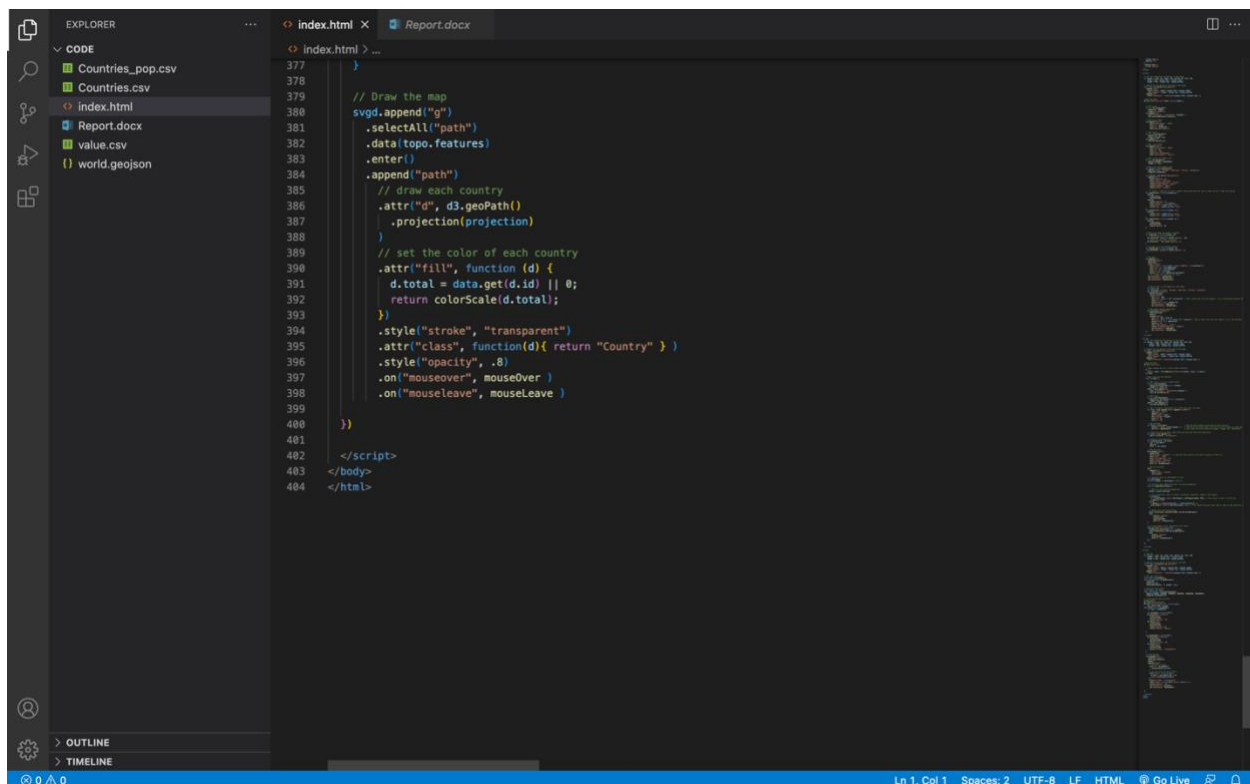
Here we have added a scale for bubble size and color used in first chart.



This screenshot shows the initial setup of a D3.js map in VS Code. The Explorer panel on the left lists files: Countries_pop.csv, Countries.csv, index.html, Report.docx, value.csv, and world.geojson. The index.html file is open in the editor, displaying JavaScript code from line 328 to 372. The code includes:

- SVG element creation and styling (width, height, margin, transform).
- Map and projection setup using `d3.geoPath()` and `d3.geoMercator()`, centered at [0, 20] and translated to the center of the SVG.
- Data and color scale setup using `d3.scaleThreshold()` with a domain of [100000, 1000000, 10000000, 500000000] and a red color scheme.
- Promise.all() usage to load external data (world.geojson) and CSV files (Countries_pop.csv, Countries.csv) simultaneously.
- Mouseover and mouseleave event handlers for country selection, including transitions for opacity and stroke.

This is screenshot of a code where I have loaded the map and projection and I have used Promise.all() for loading multiple dataset.



This screenshot shows the drawing phase of the D3.js map in VS Code. The index.html file is open, displaying JavaScript code from line 377 to 484. The code includes:

- Appending a 'g' (group) element to the SVG.
- Selecting all 'path' elements and entering a data join with `topo.features`.
- Drawing each country using `d3.geoPath()` and the `projection` function.
- Setting the fill color of each country based on its total value using the `colorScale` function.
- Setting the stroke to 'transparent' and the class to 'Country'.
- Setting the opacity to 0.8.
- Adding mouseover and mouseleave event listeners to the country paths.

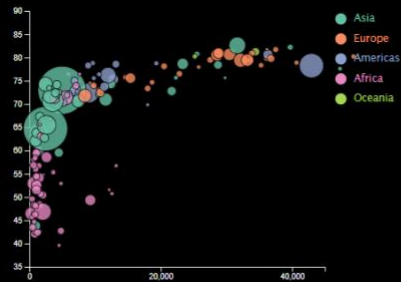
This is the part of screenshot where we draw the map

Our Scenario

This data contains the information about countries, continents, life expectancy, population, and GDP per capita. Here's a breakdown of the data:
Column 1: "country" - This column contains the names of different countries.
Column 2: "continent" - This column contains the continents to which the countries belong, such as Asia, Europe, Africa, Americas, and Oceania.
Column 3: "lifeExp" - This column contains the life expectancy in years for each country.
Column 4: "pop" - This column contains the population of each country.
Column 5: "gdpPerCap" - This column contains the GDP per capita for each country.

The data seems to be organized in rows, with each row representing a specific country and its corresponding information. The data appears to be a snapshot of various socio-economic indicators for different countries, potentially from a given year or time period. This type of data can be used for various analyses, such as comparing life expectancy and GDP per capita across different continents or countries, exploring trends over time, and identifying patterns or relationships between variables.

Graph 1: GDP per Capita

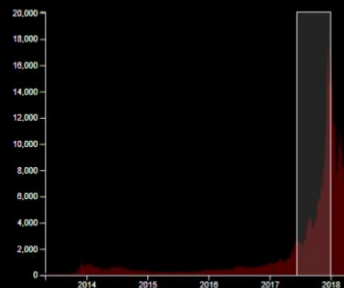


This graph is basically showing the bubble chart of the GDP per capita income. The density and the size of the bubble shows the size of the values. In USA there is highest GDP per capita. It has also multiple factors that could be impacted on the GDP per capita

It can be seen that the Asia has Highest GDP per capita as per Collective because the greater population.

Graph 2: Line Chart of Date per Total Population of World

Well, the population of the world is increasing



This line chart is showing the population of the world. It can be seen that in the 2017 to 2018, the population kept on rising and then due to Covid outbreak, it decreases. The interactivity is applied on this graph which offers the user to zoom into the graph as much he wants. The user can convert the years into the months and days.

Graph 3: Showing Weak Points

It is seen that the countries with the high population has low GDP income, only china has some exceptions in Asia.



This graph is showing the population. The dark area means more population and light area means less population. As in the First of the graph, it was showing that the population has link with the GDP per capita. But it is wrong the China and India has one of the densest populations in the world, but its GDP is good as compared to the low population countries.

Conclusion

Through this complete visualization we can understand that GDP and population are inter-connected with each other, as the population of country increases the GDP of that country decreases, but it's not true for some countries like India and China with good governance or plans.