

Project title:	Datvis
Topic:	Week 14 Topic 7: Extending the apps, part 3
What progress have you made this topic?	
<p>I've extended the data visualizer template. I've added two extensions:</p> <p>COVID-19 MAP This map shows how the COVID-19 outbreak develops over time in different countries. The page displays a world map with countries colored according to the epidemiological statistics. So far, as a proof of concept, I've added a world map as an SVG image that displays the real data from a CSV file with COVID-19 world statistics I've found on Wikipedia.</p> <p>PIE CHART 3D Extends the existing "Tech Diversity: Race" visualization with 3D graphics:</p> <ul style="list-style-type: none"> ★ I've added percentage values for legend items next to labels. ★ I've created a new PieChart3D constructor function to display a pie chart as a three-dimensional figure using the 3D capability provided by P5.js. 	
What problems have you faced and were you able to solve them?	
<p>COVID-19 MAP It is pretty challenging to render a CSV map image to HTML canvas provided by p5.js by default. There are CSV libraries for p5.js, but I've decided not to use ready-made solutions and develop them from scratch. I ended up with a working solution, however, it has noticeable performance issues.</p> <p>PIE CHART 3D Since I had no previous experience with 3D, I had to learn this topic from the very beginning. P5.js API does not provide suitable graphic primitives, I have had to build a custom 3D shape from scratch. After a few days of googling, I've found a solution on how to build a 3D cylinder with triangles.</p>	
What are you planning to do over the next few weeks?	
<p>COVID-19 MAP</p> <ul style="list-style-type: none"> <input type="checkbox"/> Add a dataset selector for the map with the following datasets: Daily cases, Total cases, Daily deaths, Total deaths <input type="checkbox"/> Fix SVG rendering performance issues <input type="checkbox"/> Highlight country when it hovered with a mouse <input type="checkbox"/> Change a page layout to place the date slider under the map <p>PIE CHART 3D</p> <ul style="list-style-type: none"> ★ Highlight a 3D pie chart slice when a related legend label has hovered over 	
Are you on target to successfully complete your project If you aren't on target, how will you address the issue?	
I am on track, full of confidence that I will finish on time.	

Project title:	Datvis
Topic:	Week 16 Topic 8: Callbacks
What progress have you made this topic?	
COVID-19 MAP <ul style="list-style-type: none"> ★ After doing some serious research I found a more efficient yet simpler way to render SVG in a P5.js environment. I used createDiv to fill inline SVG loaded from an SVG file. I've used a loadStrings callback to use loaded strings asynchronously. ★ I've changed the primary data source to a file from the World Health Organization (WHO). I have reviewed several alternative data sources and have concluded that this one from WHO is the most complete, accurate, and convenient to use in my extension. ★ I've added a selector to switch between different datasets: "Daily cases", "Total cases", "Daily deaths", "Total deaths". ★ Bunch of minor bugs and improvements. 	
What problems have you faced and were you able to solve them?	
COVID-19 MAP <p>It turned out that version 0.6.0 of P5.js library provided by the original template had some bugs related to WebGL and missed some useful functions (for example, https://p5js.org/reference/#/p5/normal). Also, the API reference on the p5js.org does not reflect the older versions. So I've decided to update P5.js to the current version 1.4.0.</p> <p>I've faced a huge number of technical difficulties in working with SVG: image placing and scaling, selecting and editing using DOM, etc. There are not many ready-made solutions and documentation on this topic on the Internet. So much had to be done through trial and error.</p> <p>All this took a lot of effort but was very exciting.</p>	
What are you planning to do over the next few weeks?	
COVID-19 MAP <ul style="list-style-type: none"> <input type="checkbox"/> A "Per 1M capita" checkbox. A modifier that sets the mode of displaying data per 1M capita rather than absolute numbers. <input type="checkbox"/> Make the map interactive: show a country's value in a tip when a mouse points to the country. PIE CHART 3D <ul style="list-style-type: none"> <input type="checkbox"/> I've extracted all code to build a 3D pie slice to a separate constructor function "PieSlice3D". <input type="checkbox"/> An ability to rotate the pie chart 3D object with the mouse. 	
Are you on target to successfully complete your project? If you aren't on target, how will you address the issue?	
I am on track, feel pretty confident.	

Project title:	Datvis
Topic:	Week 18 Topic 9: Testing for stability
What progress have you made this topic?	
<p>COVID-19 MAP</p> <ul style="list-style-type: none"> ★ Now the map is <i>interactive</i>! it shows a country's value in a tip when a mouse points to the country. ★ Highlight the country's border when it hovered with a mouse using CSS. ★ I've added a "Per 1M capita" checkbox. A modifier that sets the mode of displaying data per 1M capita rather than absolute numbers. <p>PIE CHART 3D</p> <ul style="list-style-type: none"> ★ Highlighting 3D pie chart slices when related legend labels are hovered over with a mouse. ★ I've implemented the control/rotation of the pie chart object about the center with mouse "drag" movements. ★ I've changed the default slice colours to more neutral tones. 	
What problems have you faced and were you able to solve them?	
<p>COVID-19 MAP</p> <p>The problem was the SVG map is an HTML element created with the <code>createDiv</code> method. By default, such HTML elements overlap any P5.js graphics like lines, dots, texts, etc. So to display any graphics over the map, It was necessary to swap z-indexes of the map and the canvas. I've changed the "pointer-events" property of the canvas to make the <code>:hover</code> CSS pseudo-class work for the map. It was a very non-trivial task.</p> <p>PIE CHART 3D</p> <p>It was incredibly difficult to understand all the nuances associated with the WebGL camera concept to "rotate" the pie chart with a mouse. So I've decided to use P5.js private API that implements this feature for the internals of <code>orbitControl()</code> method. I will redo this method after I go through the Graphics programming course.</p>	
What are you planning to do over the next few weeks?	
<p>Most of the planned functionality is ready, so I will concentrate on refactoring and testing:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Improve the project file structure. Create a lib directory and subdirectories for js files with different purposes to simplify navigation. <input type="checkbox"/> Refactoring, replace all hard-coded values into calculated or constant. <input type="checkbox"/> Document all code as much as possible with JSDoc <input type="checkbox"/> Extract all map-related code into a separate constructor function. <input type="checkbox"/> Test in different browsers 	
Are you on target to successfully complete your project? If you aren't on target, how will you address the issue?	
Most of the planned functionality is ready, I'm on track.	

Project title:	Datvis
Topic:	Week 20 Topic 10: Testing with users
What progress have you made this topic?	
<ul style="list-style-type: none"> ★ I've tested extensions in different browsers (Chrome, Safari, Firefox, MS Edge). Found and fixed some minor issues. ★ I've conducted user testing with my friends, record some observations. Based on testing results, no improvements were needed. ★ I've extracted all map-related code into a separate constructor function "WorldMap". This way the code became more tidy and organized. ★ I've documented most of the code with JSDoc. ★ I've changed the project file structure to make it more organized and easy to navigate. ★ I've created README.md with a brief description of the file structure and conventions. 	
What problems have you faced and were you able to solve them?	
<p>Refactoring is a pretty complicated process. What helped me a lot was that I used Git so I was able to keep track of all changes and revert it when it goes in the wrong direction. Other tools, like ESLint, helped to find some "code smells".</p> <p>It was quite difficult to get honest feedback from friends. Friends are more likely to praise than criticize. Ideally, such tests should be done with strangers, but it was quite difficult to carry out.</p>	
What are you planning to do over the next few weeks?	
I'm planning to write reports and submit the project.	
Are you on target to successfully complete your project? If you aren't on target, how will you address the issue?	
As a result of the user testing with friends, I got a lot of new ideas on how to improve the extensions. Next time, I would communicate with potential users in the beginning and the middle of a project to get early feedback, insight, and inspiration.	