**F21DV - Data Visualization and Analytics**

Coursework Lab 2

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Overview:

The purpose of this course work is getting an understanding of how interactive visualization works in web pages, get a more understanding of how animations and transition effects work, how one can dynamically update/change data and its visualization and to generate an interactive graphs/graphics using the d3 library.

Part 1. CSS Effects/Animations

Exercise 1: ­­­­­

Using the keyframes animation concept from the example above, write a simple D3 program that draws a ‘line-graph’ For each of the points on the graph, draw a small ‘svg’ circle. Set an animated keyframe style on each graph point, so when the mouse cursor moves over the point, it pulses.

Snippet:

Text

Description automatically generated

Output:

Graphical user interface, text

Description automatically generated

Exercise 2:

Create a webpage using D3 (adds items dynamically), then set the styles for the items so they use CSS to display extra information when the mouse cursor moves over them.

Snippet:

Text

Description automatically generated

Output:

Graphical user interface, text, application, email

Description automatically generated

Part 2. Events

Exercise 3:

Modify the above example so in addition to the color changing, other styles change (e.g., size and border styles).

Snippet:

Text

Description automatically generated

Output:

Graphical user interface, text

Description automatically generated

Exercise 4:

Based on the example above, instead of a ‘div’ element, use an ‘svg’ container and add a ‘circle’ svg.  When the mouse moves over the svg circle, change the radius (e.g., larger when the mouse moves over and back to the default size when the mouse moves out).

Snippet:

Text

Description automatically generated

Output:

Text

Description automatically generated

Exercise 5:

The "d3.pointer” method lets you get the mouse position.  When the mouse moves over the ‘svg’ container, add a ‘text’ svg element at the location of the mouse position.  As the mouse cursor moves around the svg container, have the text move to the cursor position (i.e., text follows the mouse cursor).

Snippet:

Text

Description automatically generated

Output:

Text

Description automatically generated

Part 3. D3 Transitions

Exercise 6:

Chain an extra transition onto the example above so that after the ‘div’ element animates to ‘red’ it then continues to transition to ‘green’ over 2 seconds.

Snippet:

Text

Description automatically generated

Output:

Text

Description automatically generated

Exercise 7:

In addition to transitioning the color, also change the ‘size’ of the div element so it transitions smaller then transitions larger (i.e., width and height style values).

Snippet:

Text

Description automatically generated

Output:

Graphical user interface, text

Description automatically generated

Exercise 8:

Combining the ‘transition’ method with the mouse over ‘event’.  So that the ‘div’ transitions color only when the mouse moves over and back to the original color when moves away from the element.

Snippet:

Text

Description automatically generated

Output:

Graphical user interface

Description automatically generated

Exercise 9:

Add two additional ‘div’ elements and perform the same ‘transitions’ but with different ‘easing’ methods (see the elements transition at the same time but with different easing motions).

Snippet:

Text

Description automatically generated

Output:

A picture containing text

Description automatically generated

Exercise 10:

Add the easing effect to the svg circle example, so when a mouse moves over a ‘circle’ svg element, it grows by a small amount, when the mouse moves away (out of focus) the svg circle returns to the original size (use the ease ‘bounce’).

Snippet:

Text

Description automatically generated

Output:

Graphical user interface, text, application

Description automatically generated

Exercise 11:

Add a ‘text’ svg element, when the mouse moves over the text, the size of the text changes color and increases in size (when the mouse moves out/away the text goes back to the original color/size).

Snippet:

Text

Description automatically generated

Output:

Graphical user interface, text, application, email

Description automatically generated

Exercise 12:

Add a third bar to the example above which starts to animate after 4 seconds.

Snippet:

Text

Description automatically generated

Output:  
Graphical user interface, text, application, Word

Description automatically generated

Exercise 13:

Chain an additional ‘transition’ effect to the above example, so that after completing the transition, the bars ‘transition’ back to their original height (grow then shrink).

Snippet:

Text

Description automatically generated

Output:

Text

Description automatically generated

Exercise 14:

Modify the transition effect so that the color also changes for the example above (e.g., blue to red).

Snippet:

Text

Description automatically generated

Output:

Graphical user interface, text

Description automatically generated

Part 4. Animated Chart

Exercise 15:

Take the above example, and add in the following mouse events below:

        e.g.,         .on("mouseover", onMouseOver) //Add listener for the mouseover event

                        .on("mouseout", onMouseOut)   //Add listener for the mouseout event

Snippet:

Text

Description automatically generated

Output:

Graphical user interface, application

Description automatically generated

Exercise 16:

Modify the example above so the popup text that is displayed when the mouse cursor moves over each bar is positioned ‘above’ the bar instead of the top left.

Snippet:

Text

Description automatically generated

Output:

Graphical user interface, application

Description automatically generated

Exercise 17:

Modify the bar chart example so each bar has a color that represents the value (e.g., red maximum and blue the minimum range)

Snippet:

Text

Description automatically generated

Output:

Text

Description automatically generated

Part 5. Changing Data and Transitioning

Exercise 18:

Modify the example so that it has a 3rd data set (e.g., add extra button and an extra test data set to the top of the file)

Snippet:

Text

Description automatically generated

Output:

Graphical user interface, text, application, email

Description automatically generated

Exercise 19:

Modify the example so that each data set is displayed in a different color (rectangle bars are drawn in a different color)

Snippet:

Text

Description automatically generated

Output:

Graphical user interface, text, application, email

Description automatically generated

Exercise 21:

Add an axis to the top and to the right of the bar chart (also displays an axis along the top and along the right of the chart)

Snippet:

Text

Description automatically generated

Output:

Graphical user interface, text

Description automatically generated

Part 6. Pie Chart

Exercise 24:

What is the output for the example above (and why)?

Snippet:

Text

Description automatically generated

Output:

Graphical user interface, text, application, Word

Description automatically generated

Exercise 25:

What is the interpolated color value for the above code (and why)?

Snippet:

Text

Description automatically generated

Output:

Graphical user interface, text, application, email

Description automatically generated

Exercise 26:

How would you interpolate a ‘date’ using D3? (Show an example in code)

Snippet:

Text

Description automatically generated

Output:

Graphical user interface, text, application

Description automatically generated

Part 8. D3 Force Layout

Exercise 28:

For the example above, modify the code so that each sphere is displayed as a different color.

Snippet:

Text

Description automatically generated

Output:

Graphical user interface, text, application

Description automatically generated

Exercise 31:

Modify the example, so the spheres change color when the mouse moves over them

Snippet:

Text

Description automatically generated

Output:

Graphical user interface, text, application

Description automatically generated