

## CPSC 446/546

### Assignment 1

Due 9/11/2019, 11:59 pm

Upload to Canvas as a zip file named *yourfirstname\_yourlastname\_1.zip*.

This assignment includes some **very simple** programming exercises to get started. Programming in subsequent assignments will be more challenging. Do your own coding using code provided with the assignment and examples given in the Scott Murray textbook. Do not worry about getting pixel accurate results, just produce results that look like the examples (i.e. if the padding in or the RGB values are off by a bit you will still receive full credit.) You may use <https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference> to do tutorials and look up syntax.

This assignment also includes developing visualizations. Of course, learning how to develop visualizations is why you are taking the course. It is not expected that you will get ideal results, the expectation is that you will demonstrate thinking critically about the decisions you make in creating the visualizations.

Note that some questions are for (all students), and some are additional work for **CPSC 546** only.

1. Programming (75 pts total)

a. **(CPSC 446 and 546)** CSS 20 pts

Create a style sheet teststyle.css that will result in the pages shown below for the test files CSSDoc1.html and CSSDoc2.html. Note that you can find the names for CSS colors at [https://www.w3schools.com/cssref/css\\_colors.asp](https://www.w3schools.com/cssref/css_colors.asp), and fonts at [https://www.w3schools.com/cssref/css\\_websafe\\_fonts.asp](https://www.w3schools.com/cssref/css_websafe_fonts.asp). You will be graded on achieving the same appearance -- not on having a pixel by pixel identical result.



CSSDoc1.html

## Starting CPSC 446/546

### Easy start-up *programming*

- CSS
- SVG
- Javascript

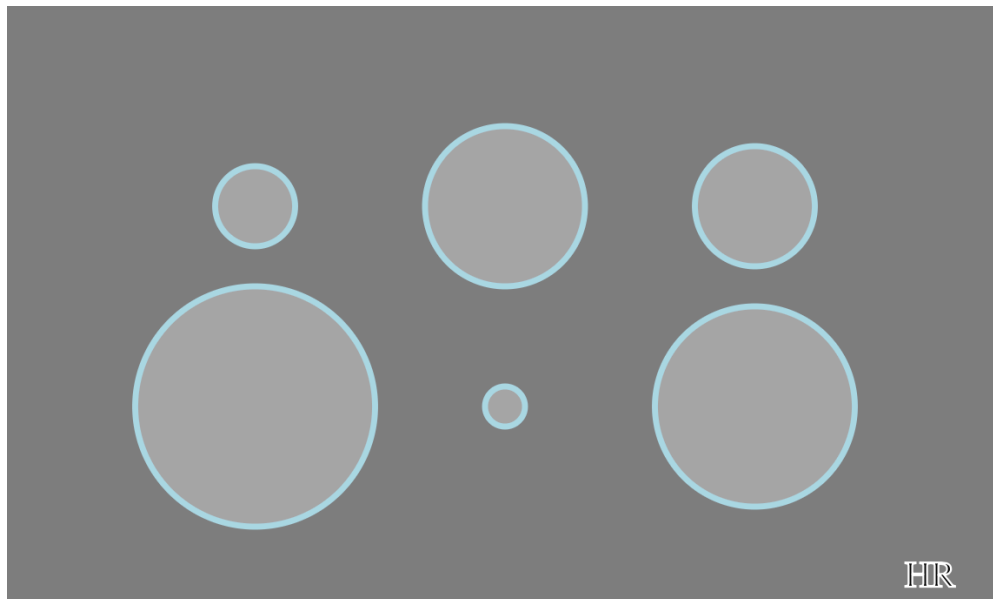
### Visualization exercise

- can be *hand-drawn*
- process is critical

CSSDoc2.html

b. **(CPSC 446 and 546)** SVG 20 pts

Create a file circles.html that draws filled and outlined circles with SVG with the circles scaled with radii 2,4,3,6,1,5. Use a grey rectangle as background. The distribution of the circles and their sizes should be as below, but the exact size of the rectangle and exact locations do not have to be the same. Include stroke outlined characters with **your** initials (my initials are HR) in the lower right hand corner of the diagram. You do not have to read in a file, all of the positions and radii can be hard-coded in the file.



c. JavaScript

i. (CPSC 446 and 546) 35 pts

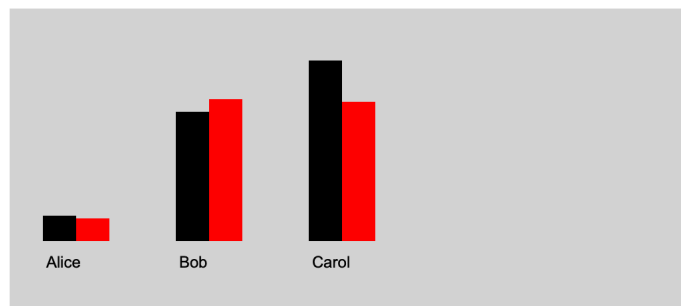
We will use JavaScript to create some SVG code to display a very small dataset. The goal is to use some of the basics of JavaScript.

The scenario is that three people (Alice, Bob and Carol) each have some savings to invest, and the names of two things they want to buy. This information is in the array *people*. The current cost of the things they want is stored in *things*. They will invest their savings at a rate of return (given in an interactive prompt) and the cost of the things they want to buy will increase at the rate of inflation (given in another interactive prompt.) This visualization will show each person's savings and the total cost of what they want to buy now, and the same quantities in 5 years, assuming annual compounding. You are given starter code SavingsPurchase-starter.html.

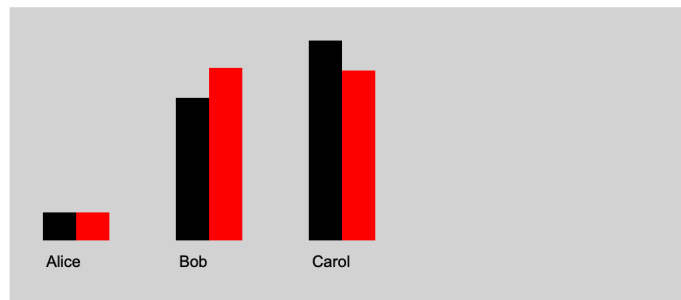
**Assignment 1**

**Savings and Desired Purchases in 5 Years**

2019 savings and costs



2024, assuming investment return 2 percent and inflation 4 percent

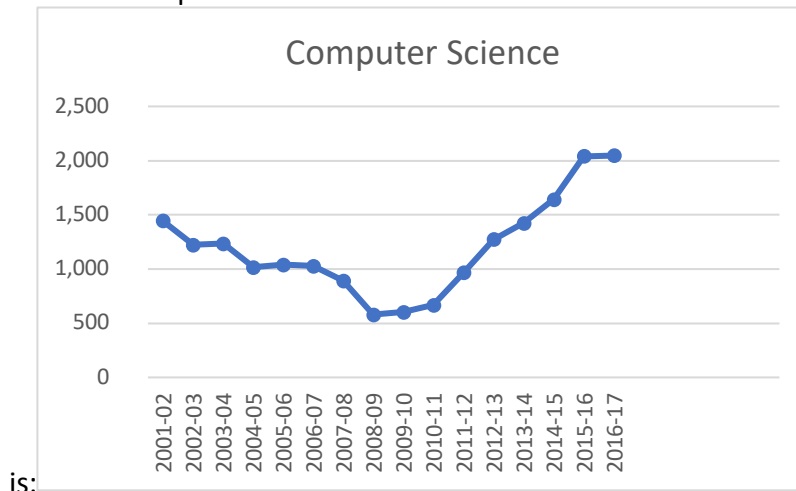


ii. (CPSC 546 students only )

Add lines and annotations to make clear the scales on the bar charts. Add annotations to show what items the people intend to buy.

## 2. Creating Visualizations – Thinking Through the Process (25 pts total)

a. **(CPSC 446 and 546)** The Yale Office of Institutional Research makes a lot of data available at <https://oir.yale.edu/historical-data-main-page> . They include some visualizations [https://oir.yale.edu/sites/default/files/w005\\_enroll\\_sum\\_fig\\_0.pdf](https://oir.yale.edu/sites/default/files/w005_enroll_sum_fig_0.pdf) which shows enrollment trends, and the impact of WWII. Dataset w034 shows yale college registrations by department. One plot that can be made from this that can address the question of “How did the financial crash of 2008 affect interest in CS?”



Form two other questions that can be examined with the data from w034 (e.g. looking at the composition of course registrations in a division, the change of the different divisions registrations over time, or something more imaginative...) Using any method you want (any application like Excel, Mat Lab etc. or by hand) pick out data from w034 and visualize it to address the question. For **each of the two** questions:

- I. Present a visualization and the data selected to make it.
- II. Explain how the numbers in the selected data were transformed into visual elements (e.g. positions, sizes, colors etc).
- III. Why is the style of visualization (i.e. pie chart, bar chart, scatter plot etc) best for answering this question?

### b.) **CPSC 546 students only**

Form another question that can be answered by combining data from one of the other data sets available from OIR with w034. Prepare a visualization, and answer the same three questions