

SI 649 W 2018 Individual Assignment

In this assignment, you will design a visualization for a small data set and provide a rigorous rationale for your design choices. You should in theory be ready to explain the contribution of every pixel in the display. You are free to use any graphics or charting tool you please—including drafting it by hand. However, you may find it most instructive to create the chart from scratch using a graphics API of your choice.

Data Set: Antibiotics

After the World War II, antibiotics were considered as "wonder drugs", since they were easy remedy for what had been intractable ailments. To learn which drug worked most effectively for which bacterial infection, performance of the three most popular antibiotics on 16 bacteria were gathered.

Table 1—Burtin's Data

Bacteria	Antibiotic			Gram Staining
	Penicillin	Streptomycin	Neomycin	
<i>Aerobacter aerogenes</i>	870	1	1.6	negative
<i>Brucella abortus</i>	1	2	0.02	negative
<i>Brucella anthracis</i>	0.001	0.01	0.007	positive
<i>Diplococcus pneumoniae</i>	0.005	11	10	positive
<i>Escherichia coli</i>	100	0.4	0.1	negative
<i>Klebsiella pneumoniae</i>	850	1.2	1	negative
<i>Mycobacterium tuberculosis</i>	800	5	2	negative
<i>Proteus vulgaris</i>	3	0.1	0.1	negative
<i>Pseudomonas aeruginosa</i>	850	2	0.4	negative
<i>Salmonella (Eberthella) typhosa</i>	1	0.4	0.008	negative
<i>Salmonella schottmuelleri</i>	10	0.8	0.09	negative
<i>Staphylococcus albus</i>	0.007	0.1	0.001	positive
<i>Staphylococcus aureus</i>	0.03	0.03	0.001	positive
<i>Streptococcus fecalis</i>	1	1	0.1	positive
<i>Streptococcus hemolyticus</i>	0.001	14	10	positive
<i>Streptococcus viridans</i>	0.005	10	40	positive

The values in the table represent the minimum inhibitory concentration (MIC), a measure of the effectiveness of the antibiotic, which represents the concentration of antibiotic required to prevent growth in vitro. The reaction of the bacteria to Gram staining is described by the covariate “gram staining”. Bacteria that are stained dark blue or violet are Gram-positive. Otherwise, they are Gram-negative.

Dataset: [CSV](#)

Assignment

Your task is to design a visualization that you believe effectively communicates the data and provide a short write-up (no more than 4 paragraphs) describing your design. While you must use the data set given, note that you are free to transform the data as you see fit. You are also free to incorporate external data as you see fit. Your visualization should be interpretable without recourse to your short write-up. Do not forget to include title, axis labels or legends as needed!

As different visualizations can emphasize different aspects of a data set, you should document what aspects of the data you are attempting to most effectively communicate. In short, what story (or stories) are you trying to tell? Just as important, also note which aspects of the data might be obscured or down-played due to your visualization design.

In your write-up, you should provide a rigorous rationale for your design decisions. Document the visual encodings you used and why they are appropriate for the data. These decisions include the choice of visualization type, size, color, scale, and other visual elements, as well as the use of sorting or other data transformations. How do these decisions facilitate effective communication?

Format

This is an individual assignment. You may **not** work in groups. Your completed assignment is due on **Thurs 2/1, by midnight**. We will be discussing submissions in class, so be sure to avoid a late submission!

You must turn in two things:

1. Your visualization. This should be as a PNG, PDF, zipped website, or a link to a live website.
2. Your rationale. This should be as a text file or PDF describes (1) the communication goals of your visualization (1-2 paragraphs) and (2) your design rationale (1-2 paragraphs).

Grading (out of 30)

You will be graded on the following rubric:

Criterion	Ratings			Points
Clarity and Visual Hierarchy	5.0 pts	3.0 pts	0.0 pts	5.0 pts
	Excellent	Okay	Poor	
	There is a clear path through the visualization: it is clear where to look first, second, ... *Every* layer has appropriate salience without being busy.	The is a path through the visualization, but it may not always be clear, or some layers may have too little or too much salience.	There is no clear path through the visualization. The visual hierarchy is flat.	
Text and Annotation	5.0 pts	3.0 pts	0.0 pts	5.0 pts
	Excellent	Okay	Poor	
	Text is used to enhance understanding without being verbose. Text and visualization are intermixed fluidly.	Text is used, but is not intermixed fluidly with the visualization. Text may be over- or under-utilized in places.	Little or no use of text.	
Effectiveness and Expressiveness	5.0 pts	3.0 pts	0.0 pts	5.0 pts
	Excellent	Okay	Poor	
	Visual encodings used are appropriately effective for the tasks: the most important tasks are the most effective. Interactivity, if used, is smooth, used exactly as needed, and boosts understanding.	Visual encodings are good, but there may be some obviously better choices for some tasks. Interactivity boosts understanding, but may be over- or under-utilized, or have minor implementation issues.	Visual encodings are not well-chosen. Interactivity, if used, does not aid understanding.	
Visual Design	5.0 pts	3.0 pts	0.0 pts	5.0 pts
	Excellent	Okay	Poor	

	Visual design is aesthetically pleasing without being busy. Excellent use of layout, line, color, and typography.	Visual design is adequate. May be issues with particular choices in layout, color, typography, or line; design may be too busy or too bland.	Visual design is scattered or incoherent. Line, color, typography, and layout are used poorly.	
Rationale	5.0 pts	3.0 pts	0.0 pts	5.0 pts
	Excellent	Okay	Poor	
	Every aspect of the visualization is well-thought-out and justified. Visual encodings have clear perceptual justification.	Most of the visualization is well-justified. Some obvious justification may be missing, or there may be an incomplete perceptual justification.	There is no reasonable justification for any design decisions.	
Task and Communication Goal Descriptions	5.0 pts	3.0 pts	0.0 pts	5.0 pts
	Excellent	Okay	Poor	
	Tasks and/or communication goals are clearly described and well-suited to the visualization problem.	Some tasks and/or communication goals are unclear, or ill-suited to the visualization problem.	All tasks and/or communication goals are unclear or ill-suited to the visualization problem.	
Total Points: 30.0				

Feedback from us

You are going to do this assignment and receive feedback from us on it individually and as a class (in lecture on 2/5). Our grading is going to be **stringent**. As stated above, you should be able to justify everything about your design.

Second turn-in

After receiving feedback, you will have the option to do the assignment again and hand in a new version, which will completely replace your grade on the assignment. This will allow you to incorporate our feedback into your solution.

If you do not turn in the individual assignment on the first due date, you can still hand in a version on the second due date, but there will be a 20% penalty to your grade.

