Q3 [15 points] Line Charts

Goal	Explore temporal patterns in the *BoardGameGeek* data using line charts in D3 to compare how the number of ratings grew. Integrate additional data about board game rankings onto these line charts and explore the effect of axis scale choice.
Technology	D3 Version 5 (included in the lib folder) Chrome v131.0.0 (or higher): The browser used for grading your code Python HTTP server (for local testing)
Allowed Libraries	D3 library is provided to you in the **lib** folder. You must **NOT** use any D3 libraries (d3*.js) other than the ones provided. On Gradescope, these libraries are provided for you in the autograder environment.
Deliverables	[Gradescope] **Q3.(html / js / css)**: The HTML, JavaScript, CSS to render the line charts. Do not include the D3 libraries or boardgame_ratings.csv dataset.

Use the dataset in the file *boardgame_ratings.csv* (in the Q3 folder) to create line charts. Refer to the tutorial for line chart here:

Note: You will create four charts in this question, which should be placed one after the other **on a single HTML page**, like the example image below (Figure 3). Note that your design need NOT be identical to the example; however, the submission must follow the DOM structure specified at the end of this question.

IMPORTANT: use the Margin Convention guide for specifying chart dimensions and layout. The autograder will assume this convention has been followed for grading purposes. The SVG viewBox attribute is not recommended to define the position and dimension of your SVG.

1. **[5 points] Creating line chart.** Create a line chart (Figure 3.1) that visualizes the number of board game ratings from November 2016 to August 2020 (inclusively), for the eight board games: ['Catan', 'Dominion', 'Codenames', 'Terraforming Mars', 'Gloomhaven', 'Magic: The Gathering', 'Dixit', 'Monopoly']. Use d3.schemeCategory10() to differentiate these board games. Add each board game's name next to its corresponding line. For the x-axis, show a tick label for every three months. Use D3 axis.tickFormat() and d3.timeFormat() to format the ticks to display abbreviated months and years. For example, Jan 17, Apr 17, Jul 17. (See Figure 3.1 and its x-axis ticks).

   - Chart title: Number of Ratings 2016-2020
   - Horizontal axis label: Month. Use D3.scaleTime().
   - Vertical axis label: Num of Ratings. Use a linear scale (for this part).

   VERY IMPORTANT — Beware of "Silent Date Conversion": Opening the csv file in an application like Excel may silently modify date strings without warning you, e.g., converting hyphen-separated date strings (e.g., 2016-11-01) into slash-separated date strings (e.g., 11/01/16). Impacted students would see a "correct" line chart visualization on their local computers, but when they upload their code to Gradescope, test cases will fail (e.g., tick labels are not found, lines are not drawn) because the x-scale cannot be computed (as the dates are parsed as NaN). **To view the content of a csv file, we recommend you only use text editors (e.g., sublime text, notepad) that do not silently modify csv files.**

2. **[5 points] Adding board game rankings.** Create a line chart (Figure 3.2) for this part (append to the same HTML page) whose design is a variant of what you have created in part 1. Start with your chart from part 1. Modify the code to visualize how the rankings of ['Catan', 'Codenames', 'Terraforming Mars', 'Gloomhaven'] change over time by adding a **circle marker** with the ranking text on their corresponding lines. Show the **circle marker** for every three months and exactly align with the x-axis ticks in part 1. (See Figure 3.2). Add a legend to explain what this **circle marker** represents next to your chart (See the Figure 3.2 bottom right).

- Chart title: Number of Ratings 2016-2020 with Rankings

3. **[5 points] Axis scales in D3.** Create two line charts (Figure 3.3-1 and 3.3-2) for this part (append to the same HTML page) to try out two axis scales in D3. Start with your chart from part 2. Then modify the vertical axis scale for each chart: the first chart uses the square root scale for its vertical axis (only), and the second chart uses the log scale for its vertical axis (only). Keep the **circle markers** and the **circle marker** legend you implemented in part 2. At the bottom right of the last chart, add your **GT username** (e.g., gburdell3, see Figure 3.3-2 for example).

Note: the horizontal axes should be kept in linear scale, and only the vertical axes are affected.
Hint: You may need to carefully set the scale domain to handle the 0s in data.

- First chart (Figure 3.3-1)
  - Chart title: Number of Ratings 2016-2020 (Square root Scale)
  - This chart uses the **square root** scale for its vertical axis (only)
  - Other features should be the same as part 2.

- Second chart (Figure 3.3-2)
  - Chart title: Number of Ratings 2016-2020 (Log Scale)
  - This chart uses the **log scale** for its vertical axis (only). Set the y-scale domain minimum to 1.
  - Other features should be the same as part 2.

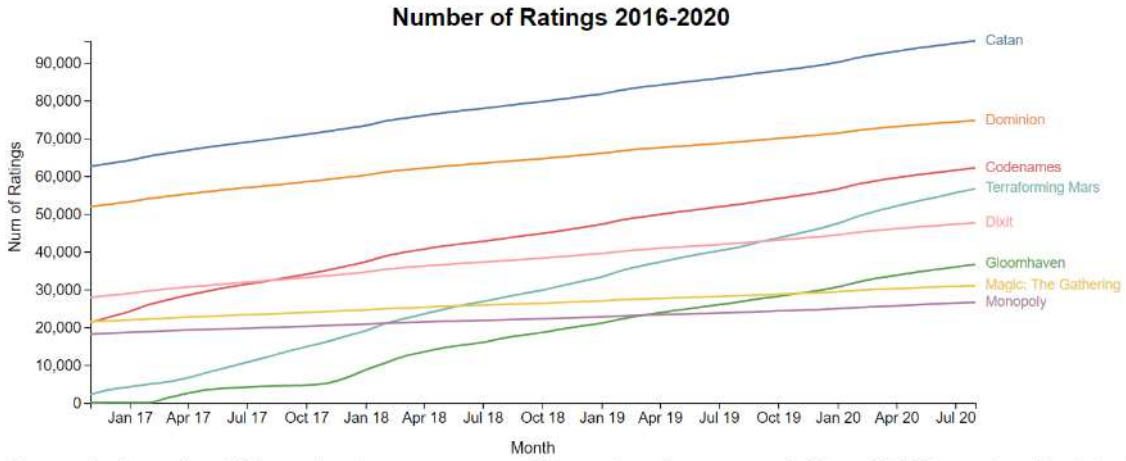


Figure 3.1: Example line chart. Your chart may appear different and can earn full credit if it meets all stated requirements.

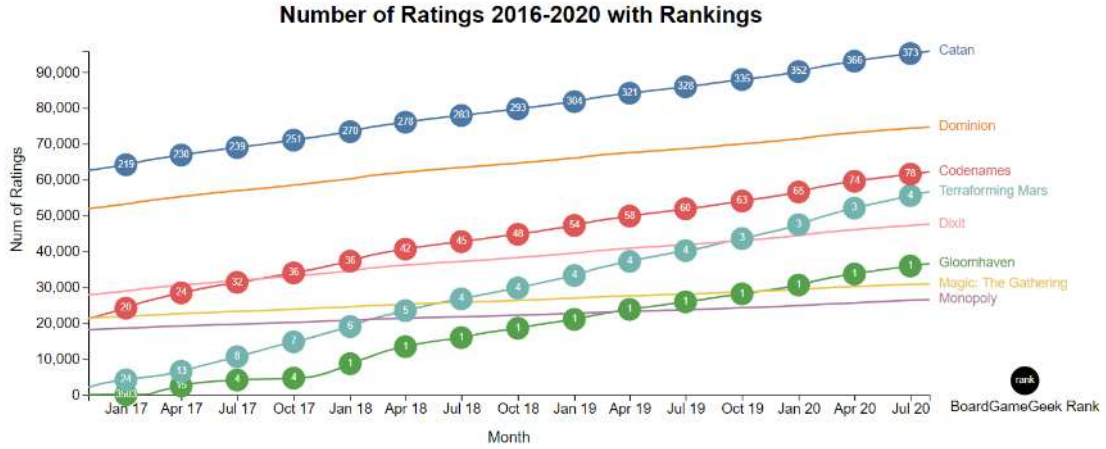


Figure 3.2: Example of a line chart with rankings. Your chart may appear different and can earn full credit if it meets all

stated requirements.

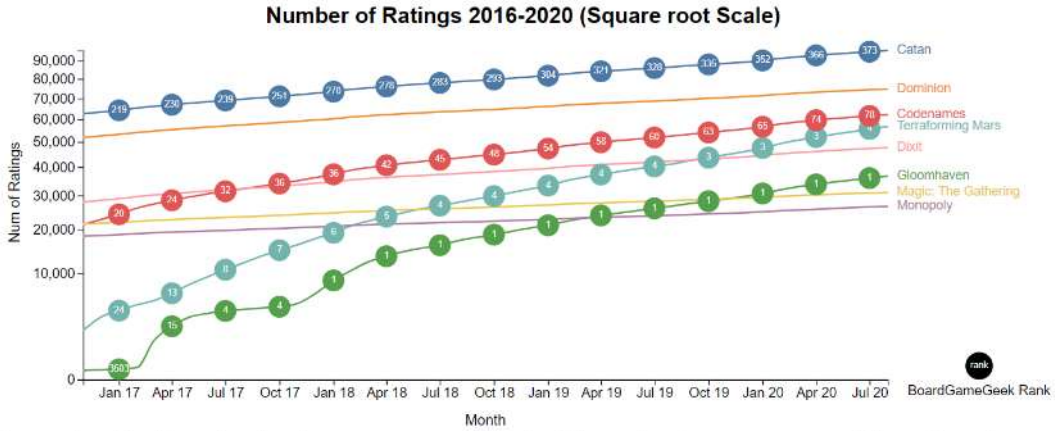
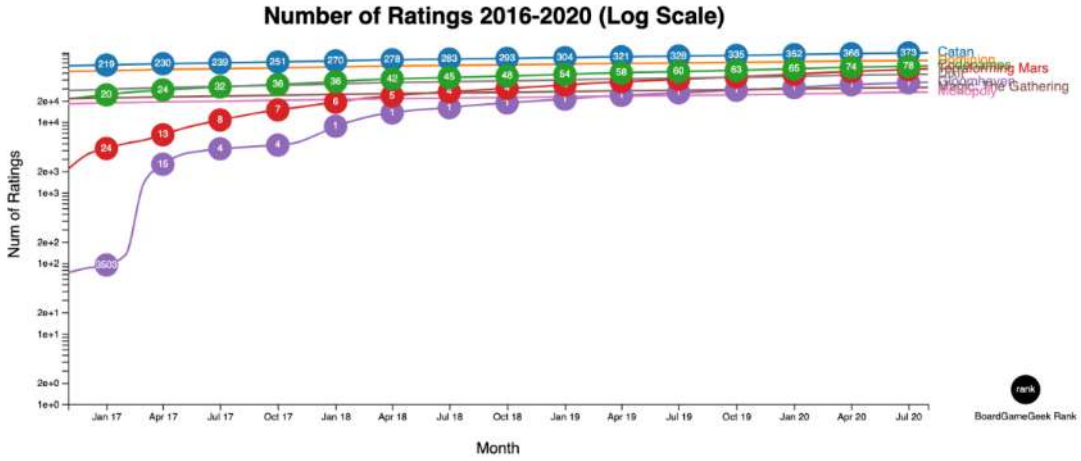


Figure 3.3-1: Example of a line chart using square root scale. Your chart may appear different and can earn full credit if it meets all stated requirements.



gburdell3

Figure 3.3-2: Example of a line chart using log scale. Your chart may appear different and can earn full credit if it meets all stated requirements.

Note: Your D3 visualization **MUST** produce the following DOM structure.

```
<svg id="svg-a"> plot (Q3.1)
|
+-- <text id="title-a"> chart title
|
+-- <g id="plot-a"> containing Q3.1 plot elements
    |
    +-- <g id="lines-a"> containing plot lines, line labels
    |
    +-- <g id="x-axis-a"> x-axis
    |   |
    |   +-- (x-axis elements)
    |   |
    |   +-- <text> x-axis label
    |
    +-- <g id="y-axis-a"> y-axis
        |
        +-- (y-axis elements)
        |
        +-- <text> y-axis label

<svg id="svg-b"> plot (Q3.2)
|
+-- <text id="title-b"> chart title
|
+-- <g id="plot-b"> containing Q3.2 plot elements
|   |
|   +-- <g id="lines-b"> containing plot lines, line labels
|   |
|   +-- <g id="x-axis-b"> for x-axis
|   |   |
|   |   +-- (x-axis elements)
|   |   |
|   |   +-- <text> x-axis label
|   |
|   +-- <g id="y-axis-b"> for y-axis
|   |   |
|   |   +-- (y-axis elements)
|   |   |
|   |   +-- <text> for y-axis label
|   |
|   +-- <g id="symbols-b"> containing plotted circle marker symbols, symbol labels
|
+-- <g id="legend-b"> containing legend symbol and legend text element(s)


<svg id="svg-c-1"> plot (Q3.3-1): same as format for Q3.2, with c-1 in ids
(e.g., id="svg-c-1", etc.)

<svg id="svg-c-2"> plot (Q3.3-2): same as format for Q3.2, with c-2 in ids
(e.g., id="svg-c-2", etc.)

<div id="signature"> containing GT username
```