Q1 [25 points] Designing a good table. Visualizing data with Tableau.

Goal	Design a table, a grouped bar chart, and a stacked bar chart with filters in Tableau.
Technology	Tableau Desktop
Deliverables	**Gradescope:** After selecting HW2 - Q1, click **Submit Images**. You will be taken to a list of questions for your assignment. Click **Select Images** and submit the following four PNG images under the corresponding questions: • **table.png**: Image/screenshot of the table in Q1.1 • **grouped_barchart.png**: Image of the chart in Q1.2 • **stacked_barchart_1.png**: Image of the chart in Q1.3 after filtering data for Max.Players = 2 • **stacked_barchart_2.png**: Image of the chart in Q1.3 after filtering data for Max.Players = 4 **Q1 will be manually graded after the grace period.**

Setting Up Tableau

Install and activate Tableau Desktop by following "HW2 Instructions" on Canvas. The product activation key is for your use in this course only. **Do not share the key with anyone.** If you already have Tableau Desktop installed on your machine, you may use this key to reactivate it.

If you do not have access to a Mac or Windows machine, use the 14-day trial version of *Tableau Online*:

1. Visit https://www.tableau.com/trial/tableau-online
2. Enter your information (name, email, GT details, etc.)
3. You will then receive an email to access your Tableau Online site
4. Go to your site and create a workbook

If neither of the above methods work, use Tableau for Students**.** Follow the link and select "Get Tableau For Free". You should be able to receive an activation key which offers you a one-year use of Tableau Desktop at no cost by providing a valid Georgia Tech email.

Connecting to Data

1. It is optional to use Tableau for Q1.1. Otherwise, complete all parts using **a single Tableau workbook**.
2. Q1 will require connecting Tableau to two different data sources. You can connect to multiple data sources within one workbook by following the directions here.
3. For Q1.1 and Q1.2:
   a. Open Tableau and connect to a data source. Choose `To a File – Text file`. Select the **popular_board_game.csv** file from the skeleton.
   b. Click on the graph area at the bottom section next to "Data Source" to create worksheets.
4. For Q1.3:
   a. You will need a *data.world* account to access the data for Q1.3. Add a new data source by clicking on `Data – New Data Source`.
   b. When connecting to a data source, choose `To a Server – Web Data Connector`.
   c. Enter this URL to connect to the data.world data set on board games. You may be prompted to log in to *data-world* and authorize Tableau. If you haven't used data.world before, you will be required to create an account by clicking "Join Now". Do not edit the provided SQL query.

      NOTE: If you cannot connect to *data-world*, you can use the provided csv files for Q1 in the skeleton. The provided csv files are identical to those hosted online and can be loaded directly into Tableau.

   d. Click the graph area at the bottom section to create another worksheet, and Tableau will automatically create a data extract.

Table and Chart Design

1. **[5 points] Good table design.** Visualize the data contained in *popular_board_game.csv* as a data table (known as a text table in Tableau). In this part (Q1.1), you can use any tool (e.g., Excel, HTML, Pandas, Tableau) to create the table.

We are interested in grouping popular games into "support solo" (min player = 1) and "not support solo" (min player > 1). Your table should clearly communicate information about these two groups simultaneously. For each group (Solo Supported, Solo Not Supported), show:

   a. Total number of games in each category (fighting, economic, ...)
   b. In each category, the game with the highest number of ratings. If more than one game has the same (highest) number of ratings, pick the game you prefer. **NOTE:** Level of Detail expressions may be useful if you use Tableau.
   c. Average rating of games in each category (use simple average), rounded to 2 decimal places.
   d. Average playtime of games in each category, rounded to 2 decimal places.
   e. In the bottom left corner below your table, include your GT username (In Tableau, this can be done by including a caption when exporting an image of a worksheet or by adding a text box to a dashboard. If you use Tableau, refer to the tutorial here).
   f. Save the table as **table.png**. (If you use Tableau, go to Worksheet/Dashboard → Export → Image). **NOTE:** Do not take screenshots in Tableau since your image must have high resolution. You can take a screenshot If you use HTML, Pandas, etc.

Your learning goal here is to practice good table design, which is not strongly dependent on the tool that you use. Thus, we do not require that you use Tableau in this part. You may decide the most meaningful column names, the number of columns, and the column order. You are not limited to only the techniques described in the lecture. For OMS students, the lecture video on this topic is *Week 4 - Fixing Common Visualization Issues - Fixing Bar Charts, Line Charts*. For campus students, review lecture slides 42 and 43.

2. **[10 points] Grouped bar chart.** Visualize *popular_board_game.csv* as a grouped bar chart in Tableau. Your chart should display game category (e.g., fighting, economic,...) along the horizontal axis and game count along the vertical axis. Show game playtime (e.g., <=30, (30, 60]) for each category. **NOTE:** Do not differentiate between “support solo” and “non-support solo” for this question.

   a. Design a vertically grouped bar chart. For each category, show the game count for each playtime.
   b. Include clearly labeled axes, a clear chart title, and a legend.
   c. In the bottom left corner of your image, include your GT username. **NOTE:** In Tableau, this can be done by including a caption when exporting an image of a worksheet or by adding a text box to a dashboard. Refer to the tutorial here.
   d. **Save the chart as grouped_barchart.png (**go to Worksheet/Dashboard → Export → Image.
      a. **NOTE:** Do not take screenshots in Tableau since your image must have high resolution.

The main goal here is for you to get familiarized with Tableau. Thus, we kept this open-ended, so you can practice making design decisions. **We will accept most designs.** We show one possible design in Figure 1.2, based on the tutorial from Tableau.

3. **[10 points] Stacked bar chart.** Visualize the *data.world* dataset (or *games_detailed_info_filtered.csv* if using the local files in the skeleton) as a stacked bar chart. Showcase the count of games in different categories and the relationship between game categories, their mechanics, and max player size.

   a. Create a **Worksheet** with a stacked bar chart that shows game counts for each playing mechanic (sub-bars) for each game category. **NOTE:** This data contains duplicate rows, as each row represents a distinct game. Do not remove duplicate rows from the data.
   b. Display game counts along the vertical axis and category along the horizontal axis.
   c. Include clear axes labels, a clear chart title, and a legend.
   d. Create a **Dashboard** using the worksheet you created.

e. Add a filter for the number of 'Max.Players' allowed in each game. Update the chart using this filter to generate the following chart images (Refer to the tutorial here on how to add a filter in a dashboard. Make sure to add 'Max.Players' in the filter shelf in the Worksheet first, like this):
   i. Select "2 Players" only in the filter. Save the resulting chart as '**stacked_barchart_1.png**'
   ii. Select "4 Players" only in the filter. Save the resulting chart as '**stacked_barchart_2.png**'
   iii. Both images must include your GT username in the bottom left. This can be added using a text box. Refer to the tutorial here.https://youtu.be/fRwQenvBJ6I
   iv. In each image, the filter must be visible. If you are using Tableau Online, you may need to add your worksheet containing the chart to a dashboard and then download an image of the dashboard that contains both the filter and the chart.

Note: To save a dashboard image, go to Dashboard - Export Image. Do not submit screenshots. An example of a possible design is shown in Figure 1.3.

Optional Reading: The effectiveness of stacked bar charts is often debated—sometimes, they can be confusing, difficult to understand, and may make data series comparisons challenging.

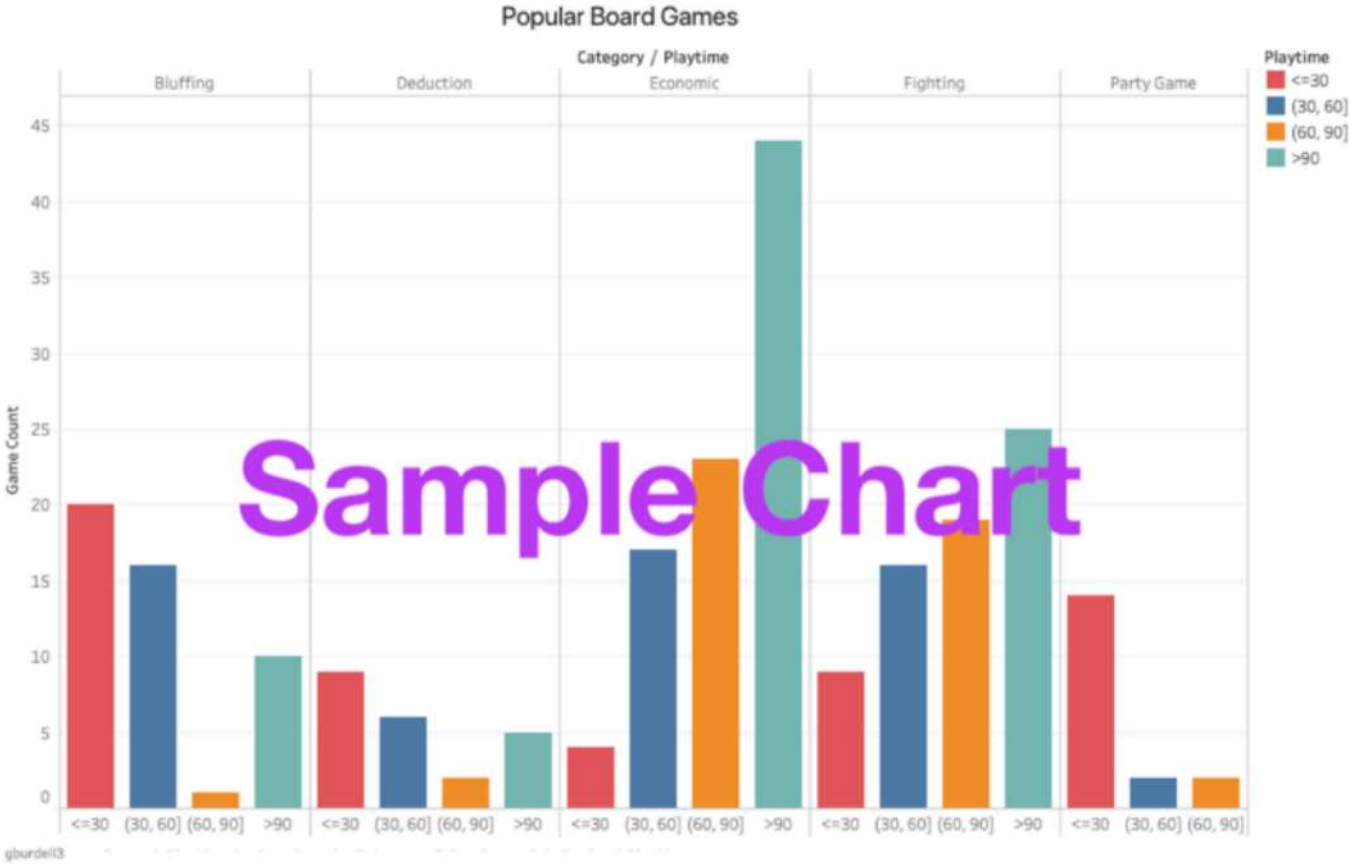

Figure 1.2: Example of a grouped bar chart. Your chart may appear different and can earn full credit if it meets all the stated requirements. Your submitted image should include your GT username in the bottom left.

Figure 1.3: Example of a stacked bar chart after selecting "4 Players" in Max.Players filter. Your chart may appear different and can earn full credit if it meets all the stated requirements. Your submitted image should include your GT username in the bottom left.

Important Points about Developing with D3 in Questions 2–5

1. We highly recommend that you use the latest Chrome browser to complete this question. We will grade your work using Chrome v131 (or higher)**.**
2. You will work with **version 5** of D3 in this homework. You must **NOT** use any D3 libraries (d3*.js) other than the ones provided in the **lib** folder.
3. For Q3–5, your D3 visualization **MUST** produce a DOM structure as specified at the end of each question. Not only does the structure help guide your D3 code design, but it also enables your code to be auto-graded (the auto-grader identifies and evaluates relevant elements in the rendered HTML). We highly recommend you review the specified DOM structure **before** starting to code.
4. **You need to setup a local HTTP server in the root (hw2-skeleton) folder to run your D3 visualizations**, as discussed in the D3 lecture (OMS students: the video "Week 5 - Data Visualization for the Web (D3) - Prerequisites: JavaScript and SVG". Campus students: see lecture PDF.). The easiest way is to use http.server for Python 3.x. (for more details, see link).
5. **All d3*.js files in the lib folder must be referenced using relative paths**, e.g., **"../lib/<filename>"** in your html files. For example, if the file "Q2/submission.html" uses d3, its header should contain:

   <script type="text/javascript" src="../lib/d3.v5.min.js"></script>

   It is incorrect to use an absolute path such as:

   <script type="text/javascript" src="C:/Users/polo/hw2-skeleton/lib/d3.v5.min.js"></script>
6. For questions that require reading from a dataset, use a **relative path** to read in the dataset file**.** For example, suppose a question reads data from `earthquake.csv`, the path should simply be "earthquake.csv" and **NOT** an absolute path such as "C:/Users/polo/hw2-skeleton/Q/earthquake.csv".
7. You can and are encouraged to decouple the style, functionality and markup in the code for each question. That is, you can use separate files for CSS, JavaScript and html.