Course Project: Interactive Data Storytelling with D3.js

Overview: Create an interactive web-based data story using D3.js to visualize a dataset of your choice from Canadian government open data sources.

By completing this task, you will apply D3.js to transform raw data into dynamic, interactive visualizations.

Part 0: Pre-Preparation

1. Create a folder as **Proj_FirstName_LastNameInitial_xxx**(last three digits of your student ID).

2. Ensure that all files required for your project submission are placed within this folder. (Consider which files you need to include in this folder to make your d3.js report accessible to others. **Include only the necessary files. Otherwise, a deduction will be made.**)

3. If it's determined that you have shared your work with another student, you will receive a score of 0 for the assignment and will face additional consequences.

4. You need to submit at least **3 parts**:

    1) A **Readme PDF**, where

        a. The guidance to run and use your d3.js project is included.

            (1) dataset source and preprocessing steps
            (2) how to use your report
            (3) what each page represents
            (4) what to look for on each page
            (5) what interactive options are available to the user

        b. After the guidance, you copy the structure of the instructions and, under each task, provide your answers or explanation.

    2) A **series of html, css, js code files** containing your final data visualizations.
    3) A **10-minute video recording shared link**, serving as a data storytelling demo, where you use the d3.js project to walk through your data analysis process and communicate the story behind the data.

a. Assume the audience has limited knowledge of the dataset and is unaware of the key questions you've defined to answer through your report.
b. You don't need to use the full 10 minutes, as long as your demo video conveys enough comprehensive information and convincing points that align with your visualization.
c. The audience should be able to see you while listening to your speech. It's a good idea to record an online meeting with just yourself, **with the camera on**.

Part 1: Dataset Selection, Problem Definition & Data Preparation – 25%

1. **Dataset Selection – 0%**
    -   In this course project, you will choose a dataset from one of the Canadian governmental open data portals (e.g., Canada Open Data, Vancouver Open Data, New Westminster Open Data, etc.).
    -   **Content:** Your dataset should contain all the necessary information to complete the tasks outlined below.
    -   **Size**: Your dataset should contain more than 100 records but avoid using overly large datasets.
    -   **Include** the dataset source URL in your PDF report.

2. **Problem Definition – 5%**
    -   Clearly state **1-2 analytical questions** that you wish to investigate in depth.
    -   You will **NOT** be graded for the choice of questions as long as
        i) Your final data visualizations accurately, persuasively, and clearly address your defined question(s).
        ii) Ensure that your analysis is correctly done (be mindful of your calculations), and your insights are easy for your audience to understand.

3. **Data Cleaning, Data Modeling, Field Creating, Categorizing and Filtering – 20%**

    You are free to choose one of the following 3 tools for data preparation. Note that the requirements will **be different** depending on the tool you choose.

    -   **Option1: Tableau or Power BI**

- You need to submit two versions of your dataset:
  - Raw (Unprocessed) Data: Original file as downloaded.
  - Processed Data: Processed file ready for D3.js.
- Document your data exploration, data cleaning, data modeling, field creating, categorizing and filtering process in detail in the report.

- **Option2: JavaScript & D3.js, Extra credit 5%**
  - Automate your full data preparation process using JS and D3.js code will earn you 5% extra credit.
  - You need to submit the raw (unprocessed) dataset only.
  - A processed version of your dataset should be generated by running your code.
  - Document your data exploration, data cleaning, data modeling, field creating, categorizing and filtering in detail using in-line comments and multi-line comments.

Part 2: Core Visualization – 30%

Implement **at least 3 distinct chart types with transitions** for smooth update using D3.js:

- **Time-Series Chart** (e.g., line/area chart showing trends over time).
- **Comparative Visualization** (e.g., bar chart, scatter plot, or heatmap comparing categories).
- **Geospatial Element** (e.g., map of Canada/provinces).

Part 3: Interactivity & Dashboard Design – 35%

1. **Navigation & Page Structure - 5%**
   Your project must include:
   a. **Home Page** (index.html) with**:**
      - A **title** and **brief introduction** explaining your project's purpose.
      - **Dataset source**
      - **Navigation buttons** to jump to each visualization (e.g., "View Trends", "Explore Map").

   b. **Visualization Page(s):**
      - **Option 1: Single-page design** (all visuals in one HTML file, toggle visibility via tabs/buttons).

- **Option 2: Multi-page design** (separate HTML files for each visual, e.g., map.html, trends.html).
- **Each visual page must have:**
  - A "Back to Home" button (and optionally, buttons to other visuals).
  - A clear title and contextual description of the chart.

2. **Responsive Design: - 10%**
   - Ensure visualizations adapt to screen size

3. **UI Components - 20%**
   a. Add **dropdown menus** or **sliders** to filter data (e.g., select year/province).
   b. Include **tooltips** showing details on hover.
      - Detailed values
      - Context (e.g., "% change from previous year").

4. **Linked Interactions, Extra credit 10%**
   - Clicking/hovering on one chart should update others (e.g., selecting a province highlights it on the map and filters the time-series chart).

Phase 5: Your Data Story Telling– 10%

- A **10-minute video recording shared link**, serving as a data storytelling demo, where you use the d3.js visualization project to walk through your data analysis process and communicate the story behind the data.
  - Assume the audience has limited knowledge of the dataset and is unaware of the key questions you've defined to answer through your report.
  - You don't need to use the full 10 minutes, as long as your demo video conveys enough comprehensive information and convincing points that align with your visualization.
  - The audience should be able to see you while listening to your speech. It's a good idea to record an online meeting with just yourself, **with the camera on**.