1. Dataset source and preprocessing steps

Dataset name: Issued building permits
From: City of Vancouver website
URL: https://opendata.vancouver.ca/explore/dataset/issued-building-permits/information/
The data from 2017 to 2025 but on the website display between 2020 to 2024

Step 1: Download data from the website
Step 2: Data Cleaning

- Count missing/null values per column.
- Fill optional fields of missing value.
- Clean/convert values.
- Check for duplicate Permit Numbers.
    - there are not duplicate.
- Formatted data for visualization in D3.js.

Step 3: Using data to build charts

2. How to use your report

- You can explore different building permit trends by year.
- Use the Year Filter located at the top right corner to dynamically update all charts.
- Hover, click, and interact with charts to reveal more detailed information.

3. What each page represents

- Use menu on the left-hand side
    - **Home Page:** The detail of dataset
    - **Dashboard:** Overall, of Building Permits Project this contain summarize of Total Permits, Total Project Value, and Average Project Value compared to the previous year.
    - **Project Value by Neighborhood (Bar Chart):** Displays the Top 10 neighborhoods by total project value.
    - **Monthly Permits Issued (Line Chart**): Shows the number of permits issued each month.
    - **Building Permit Locations (Map):** Displays the number of permits issued across Vancouver neighborhoods.
    - **Distribution of Permits (Pie Chart):** Illustrates the distribution of permit types (e.g., New Building, Addition/Alteration).
    - **Elapsed Days VS Project Value (Scatter Plot):** Shows the relationship between elapsed days and project value.

4. What to look for on each page

a. **Home Page:** Read the detail of dataset and you can click the link to see original dataset.
b. **Dashboard:** See summarize of each year.
c. **Project Value by Neighborhood (Bar Chart):** Identify which neighborhoods have the highest total project values.
d. **Monthly Permits Issued (Line Chart**): Observe seasonal trends in building permit issuance across the year.
e. **Building Permit Locations (Map):** See which areas are most active in issuing permits.
f. **Distribution of Permits (Pie Chart):** Understand the types of construction activities most common in the dataset.
g. **Elapsed Days VS Project Value (Scatter Plot):** Analyze if there's a pattern between how long projects take and their monetary value.

5. What interactive options are available to the user

- **Year Filtering:** Change the year to see updated data across all visualizations.
- **Hover Over:** Tooltips will display detailed information**.**
- **Click on a Neighborhood (in the bar chart):** Filters the dashboard to focus only on that neighborhood.
- **Zoom and Pan (on the map):** Navigate around Vancouver for a closer look.
- **Hover over a bar in the bar chart:** the bar will enlarge.

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

1. **Dataset Selection – 0%**

   Dataset name: Issued building permits
   From: City of Vancouver website
   URL: https://opendata.vancouver.ca/explore/dataset/issued-building-permits/information/
   The data from 2017 to 2025 but on the website display between 2020 to 2024
   There are 45,384 rows.

2. **Problem Definition – 5%**
   Clearly state 1-2 analytical questions that you wish to investigate in depth.

   - Which neighborhood had the highest total building project value?
   - Which month had the highest number of permits issued?
   - Which neighborhood had the highest number of building permits issued?
   - Which type of work had the highest number of building permits issued?
   - Is there a relationship between the number of days a project takes (Elapsed Days) and the total project value (Value)?

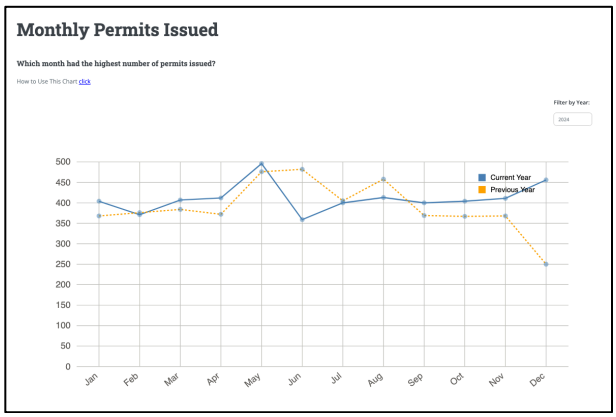
3. **Data Cleaning, Data Modeling, Field Creating, Categorizing and Filtering – 20%**
   Option2: JavaScript & D3.js, Extra credit 5%

   - **I use JavaScript & D3.js for cleaning data**
     - Load saw csv data
     - Filter data by issue year 2020 – 2024 (I don't use 2025 because the data has only until April)
     - Count missing/null values per column.
     - Fill optional fields of missing value.
     - Clean/convert values.
     - Check for duplicate Permit Numbers (there are not duplicate).
     - Formatted data for visualization in D3.js.

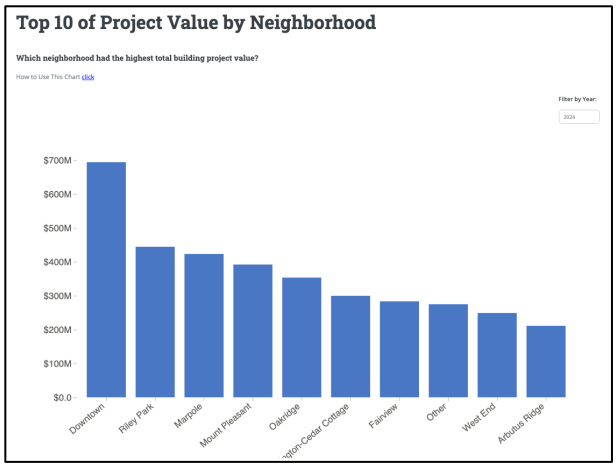
Part 2: Core Visualization – 30%

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

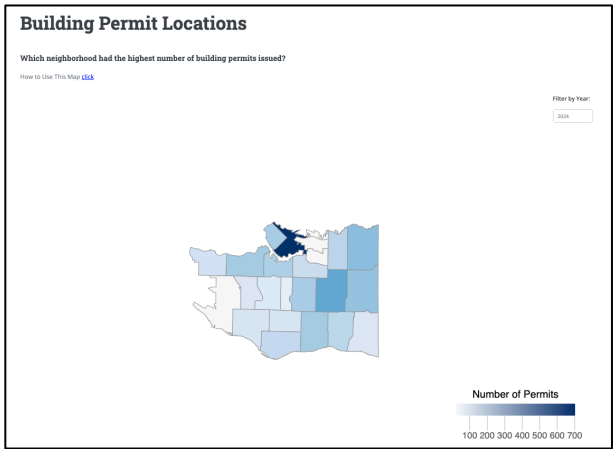
- **Time-Series Chart (e.g., line/area chart showing trends over time).**

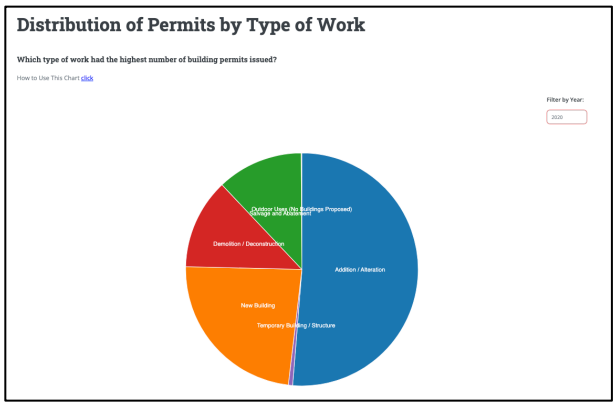


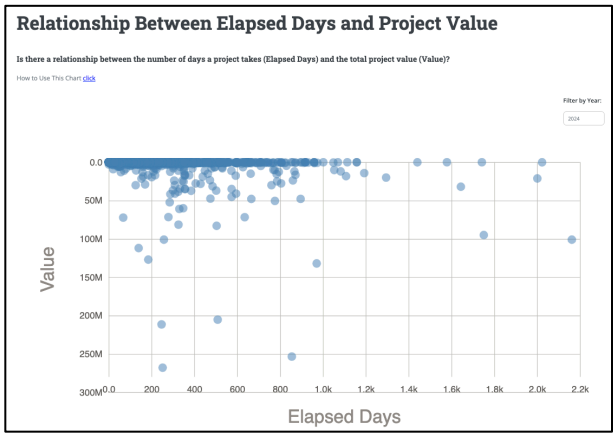
- **Comparative Visualization (e.g., bar chart, scatter plot, or heatmap comparing categories).**



- **Geospatial Element (e.g., map of Canada/provinces).**







Part 3: Interactivity & Dashboard Design – 35%

1. **Navigation & Page Structure - 5%**

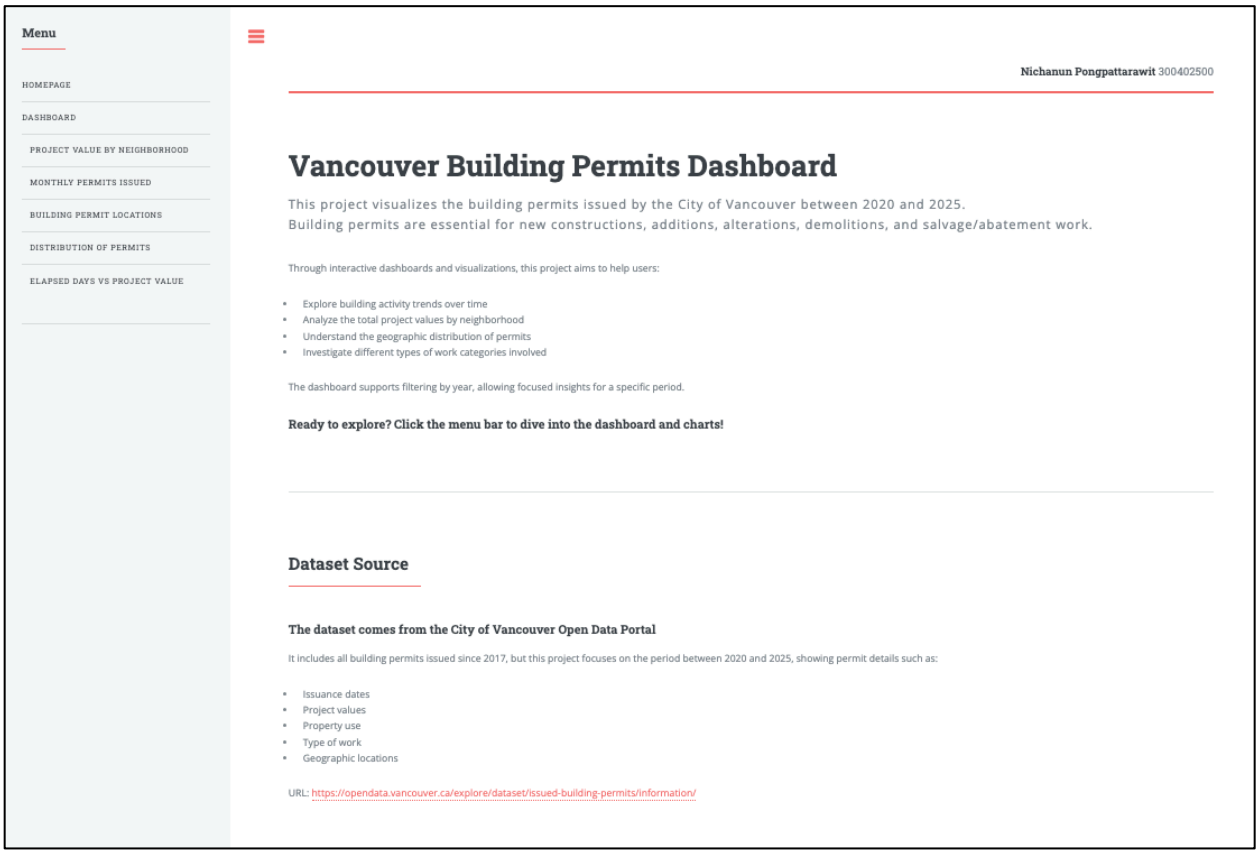
Your project must include:

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").

=

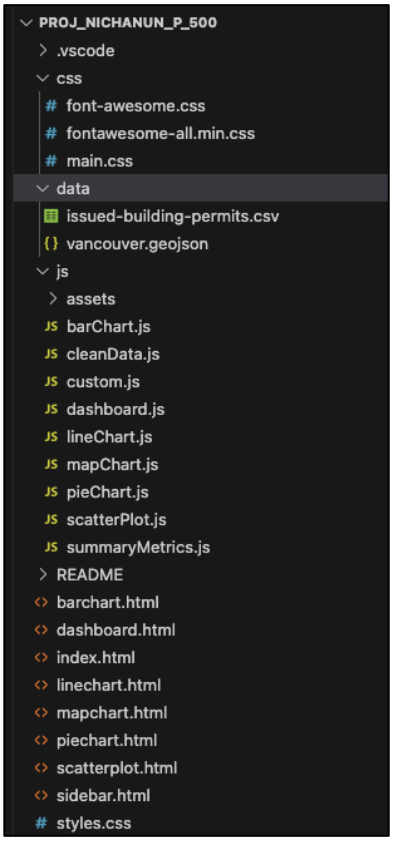
- The home page includes a title and a brief introduction explaining the purpose of the project, along with a description of the dataset source.
- Users can click a link to visit the original dataset website for further exploration.
- A sidebar navigation menu is provided, allowing users to jump easily to each visualization page, such as project value analysis, monthly permit trends, location distribution, and permit types



b. Visualization Page(s):

- **Option 2: Multi-page design** (separate HTML files for each visual, e.g., map.html, trends.html).

= I choose option 2 to separate HTML and JS files



- **Each visual page must have:**
  - A "Back to Home" button (and optionally, buttons to other visuals).

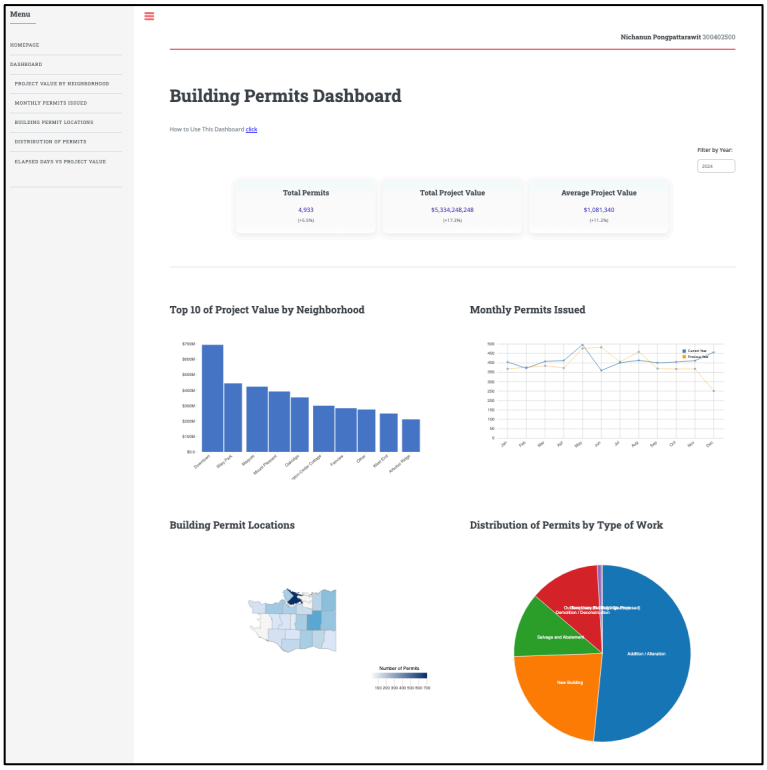
= I use a sidebar navigation menu is provided, allowing users to jump easily to each visualization page.

- **A clear title and contextual description of the chart**.

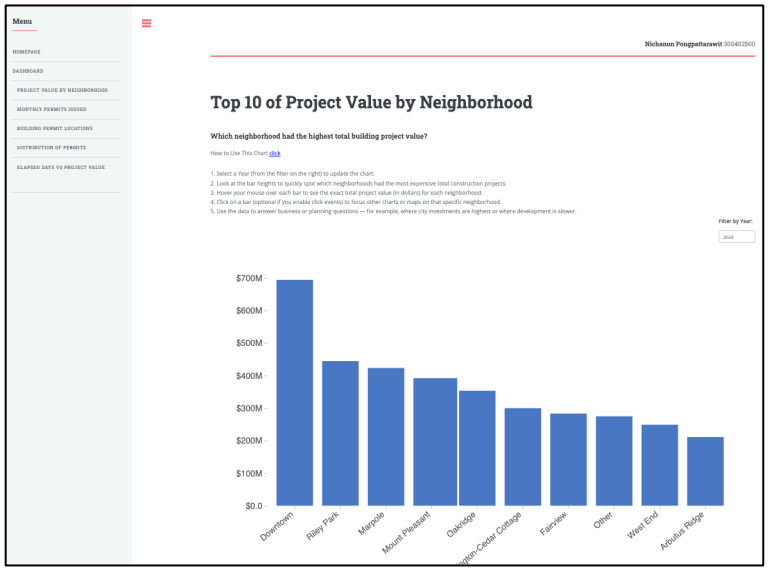
= each of page I add **“How to Use This Dashboard”**, user can click to see and click again to close it.

How to Use This Dashboard click

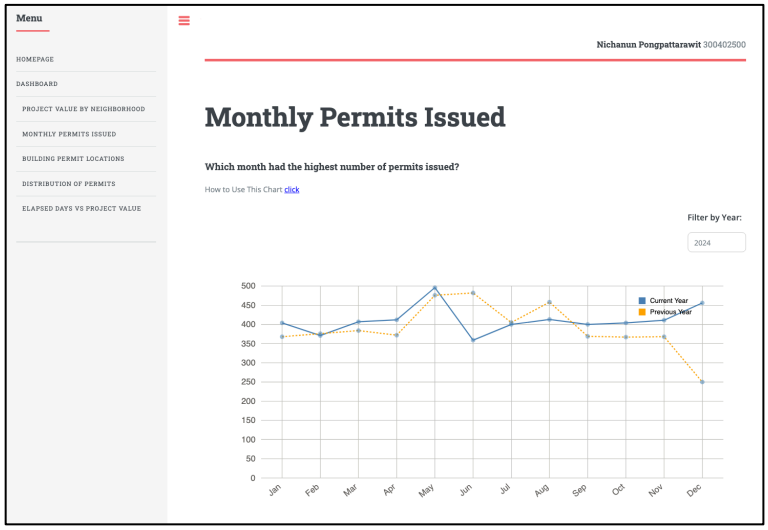
1.) Dashboard page



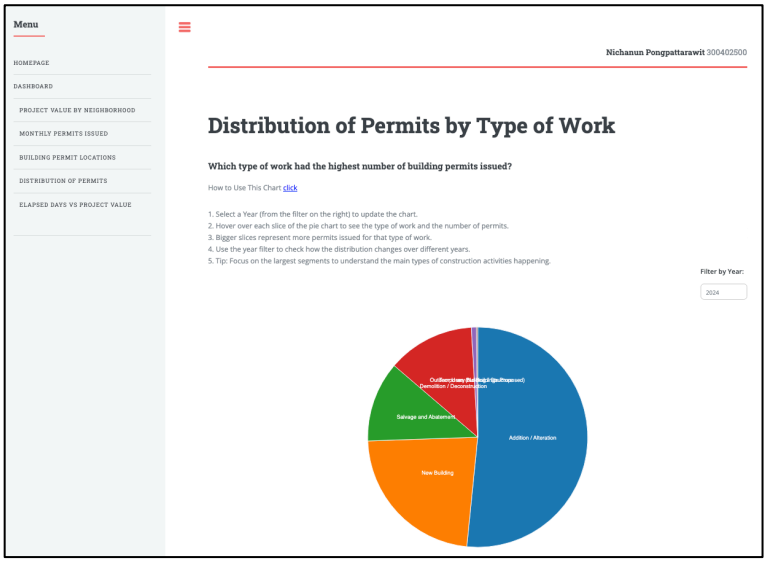
2.) Project Value by Neighborhood



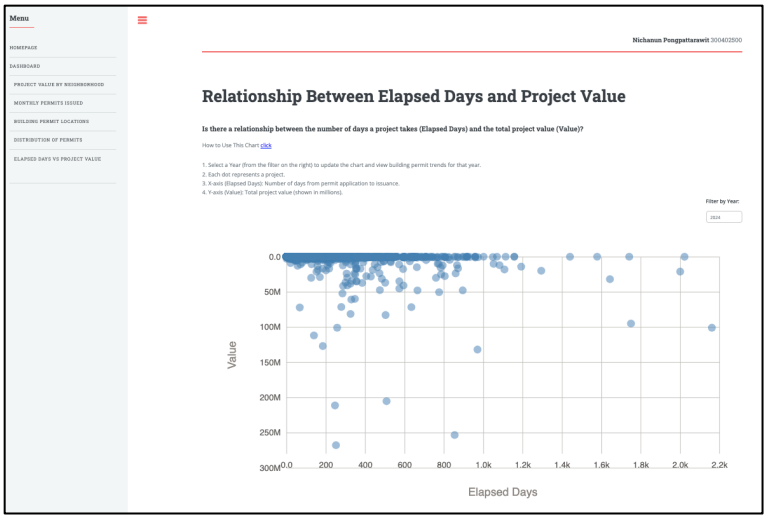
3.) Monthly Permits Issued



4.) Building Permit Locations



5.) Elapsed Days VS Project Value

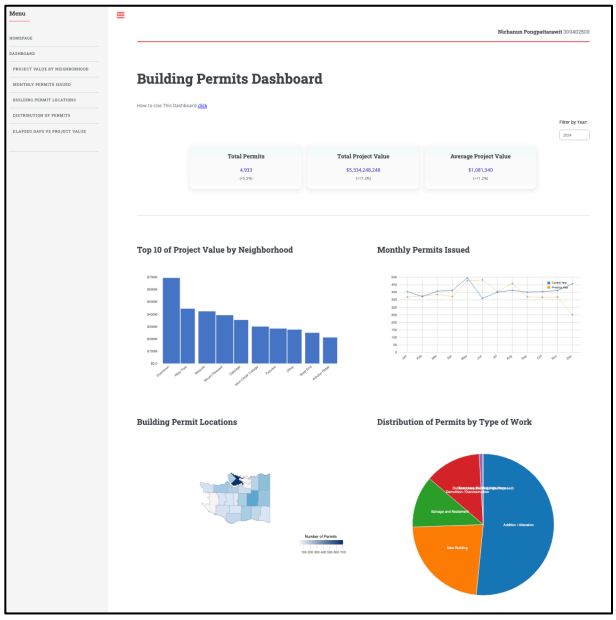


2. Responsive Design: - 10%

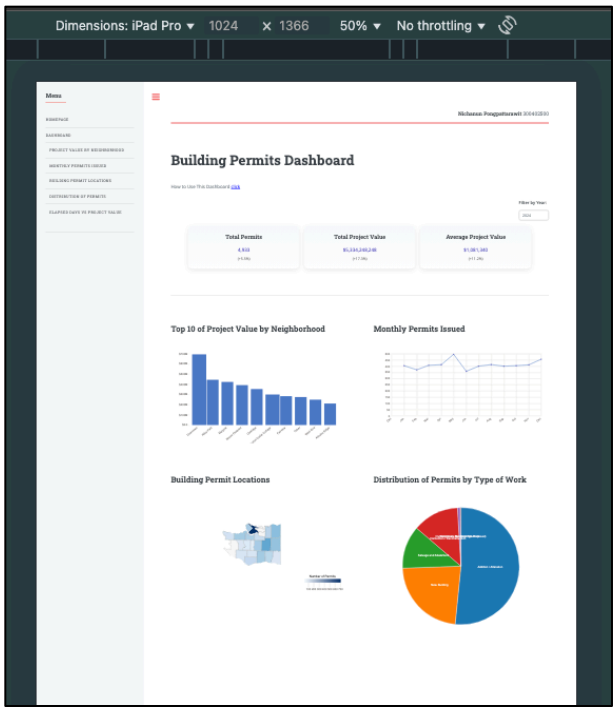
- Ensure visualizations adapt to screen size

=

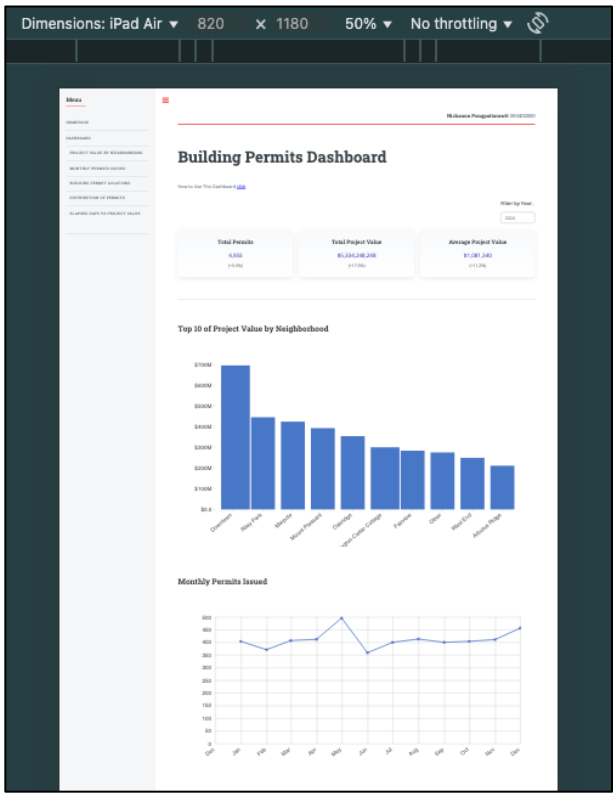
1.) Desktop



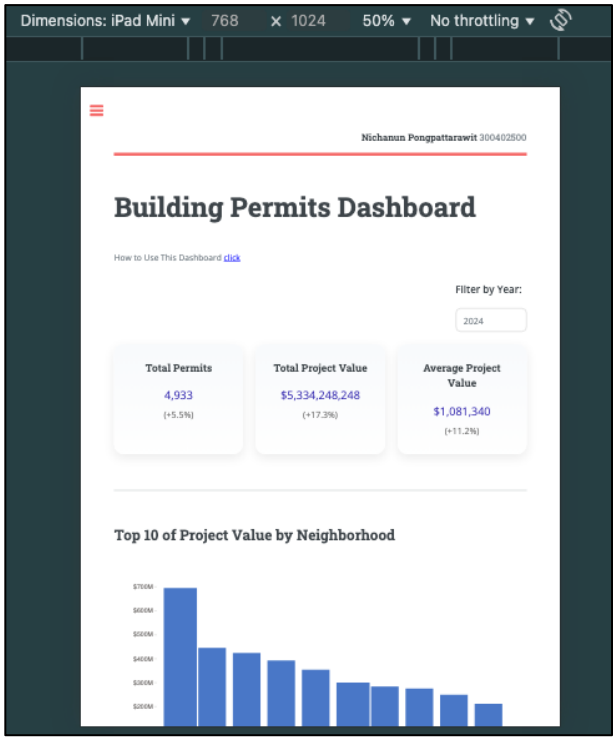
2.) iPAD Pro



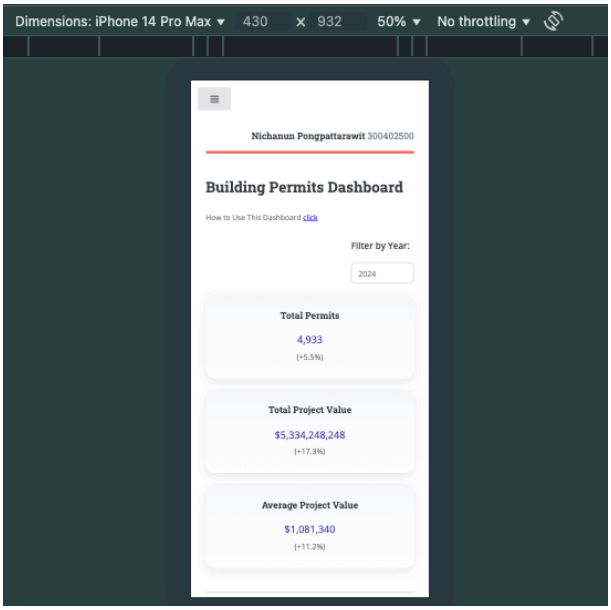
3.) iPad Air



4.) iPad Mini

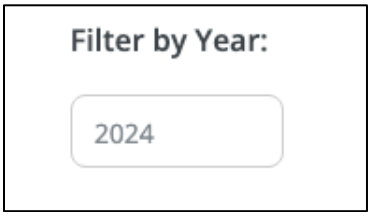


5.) iPhone 14 Pro Max



3. **UI Components - 20%**
    a. Add dropdown menus or sliders to filter data (e.g., select year/province).

= All of charts can filter by year.

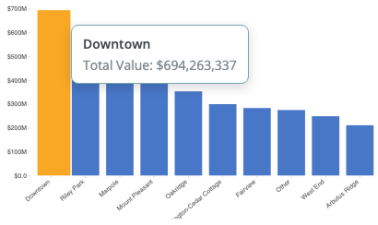


b. Include **tooltips** showing details on hover.

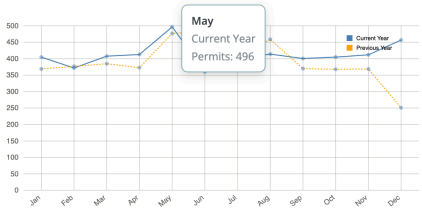
- Detailed values

= All of charts can hover to see the details.

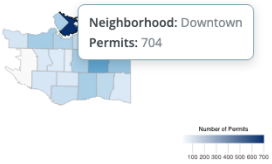
Top 10 of Project Value by Neighborhood



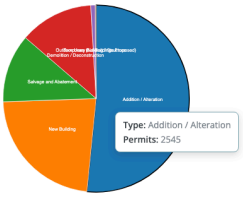
Monthly Permits Issued



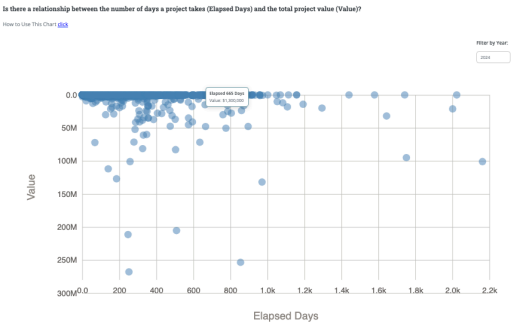
Building Permit Locations



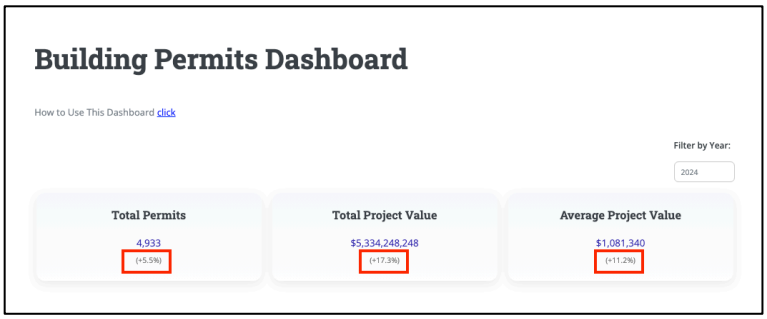
Distribution of Permits by Type of Work



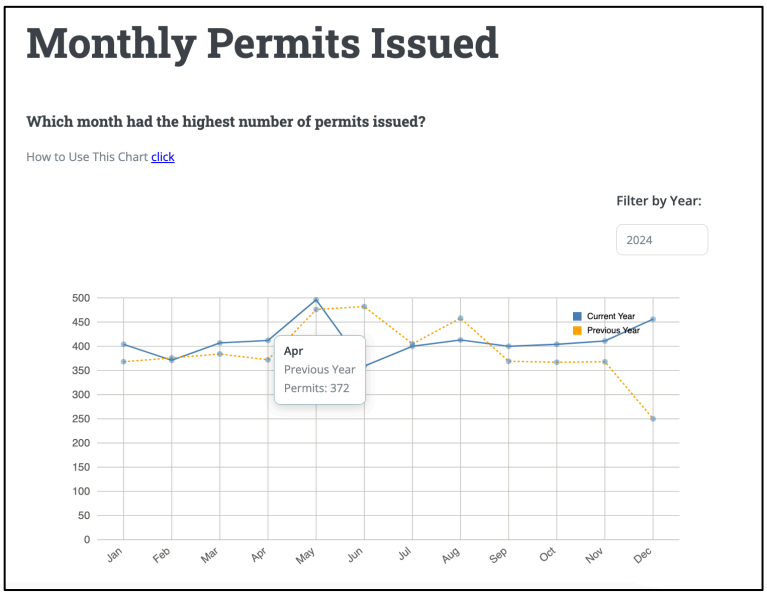
Relationship Between Elapsed Days and Project Value



- Context (e.g., "% change from previous year").
  = **The dashboard page** shows % change from previous year on summary metrics part.



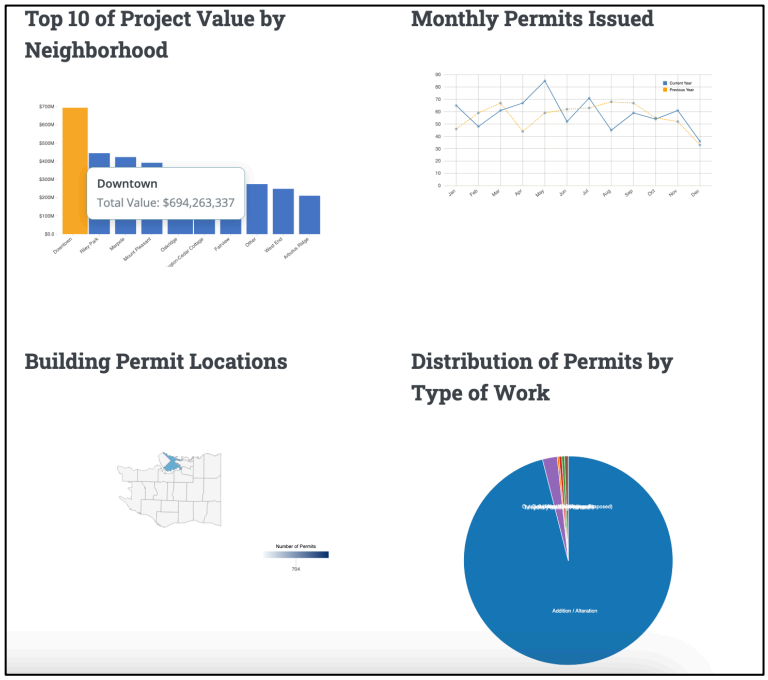
Line chart shows the permits current year and previous year

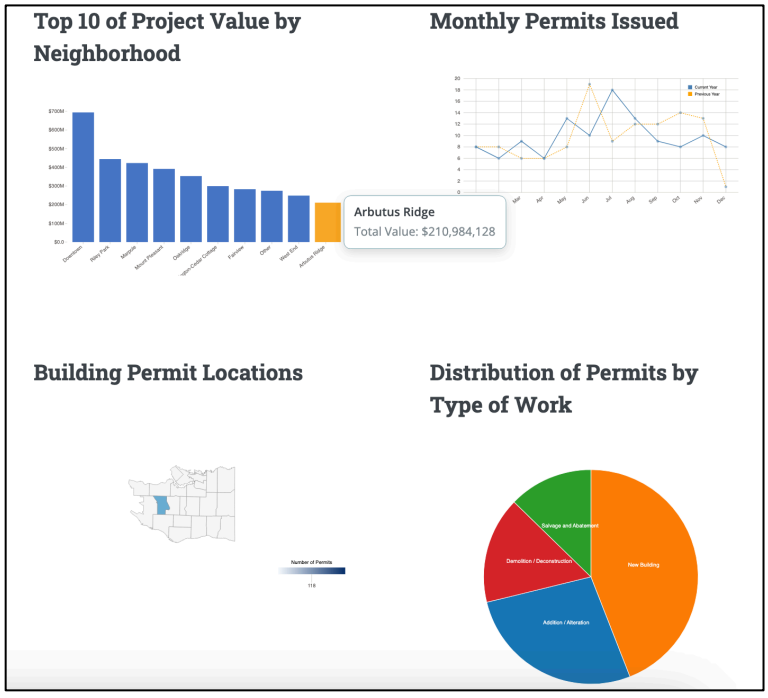


4. **Linked Interactions,** Extra credit 10%

- Clicking/hovering on one chart should update others (e.g., selecting a province highlights it on the map and filters the time-series chart).

= Click the bar chart to update the values in the other charts and click again to back to see all data.





Phase 5: Your Data Story Telling– 10%

= Video recording: https://collegedouglas-my.sharepoint.com/:v:/g/personal/pongpattarawitn_student_douglascollege_ca/ETSAJ5L8LIBKgf7l1znq37EBIKFsgT9g4_Y0JkOjuxDO1Q