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Assignment 1: Static Visualization

Introduction:
The purpose of this report is to analyze the waste management data provided and draw insights from it. The data contains information on the weight of different waste streams produced by five different buildings in the years 2019, and 2020.

Data Preprocessing and Analysis:
After analyzing the data, it was found that the data is skewed, with more data points provided for Graham and Swig Buildings. The data was initially intended for year-on-year analysis, but upon further inspection, it was determined that the data was not evenly distributed across the years. More data points are present for the year 2018 compared to 2019 and 2020. The given data contains information on a total of five different buildings.
I grouped all the misplaced waste data into three separate categories—"Misplaced in Compost", "Misplaced in Recycling" and "Misplaced in Landfill". Based on my assumption that waste is misplaced due to oversight or lack of time, further details on the type of waste were not relevant to my analysis. If a particular category among Compost, Recycling, and Landfill was missing for a month, I calculated the median to populate it.
- Analysis 1: To compare the waste generation and placement for all the Buildings, I first calculated the monthly sum for each stream for Graham and Swig, and then I computed the median over the months. I used the median to avoid outliers in the sequence that might skew the average of the values. This will give us the average waste generated in these buildings over a month. Next, I calculated the sum of waste generated per stream per student, to further normalize the imbalance that would have been created since Swig and Graham have close to 400 students while other dorms have close to 200 students. Using this normalized and equally distributed data, I generated the "Monthly Waste Generation and Placement per Student per Dorm"
- Analysis 2: I created a month-wise Waste generation and Placement Bar Graph for the Buildings: Swig and Graham, as there is well-distributed data available over four months. I wanted to use this data to further drill down into the Waste Generation and Placement Patterns for both Buildings. The visual pattern could help identify specific targets for improvement in waste management infrastructure, such as providing more recycling bins or composting bins in buildings with higher rates of misplaced waste over time.

Findings
From the 2019 to 2020 data analysis, several patterns have emerged:

1. **Graham Building**: The highest per capita waste generation was noted here, with a significant portion misplaced to recycling. The misplacement here overshadows proper recycling efforts, with landfills and compost forming the bulk of the waste.
2. **Time Series Trends**: A consistent generation of waste in Graham was observed, which was higher than in Swig. However, an upward trend in misplacement in Swig suggests a converging trajectory between the two buildings.

Conclusion:
In conclusion, the analysis provides valuable insights into the waste management data. It can be used to identify the waste streams that need more attention and to plan waste management strategies accordingly. I utilized the stacked and grouped bar graph with a CalRecycle color scheme to compare attributes with multiple features such as month, stream, and waste placement. Moreover, minimal background contrast helps the visualization to be easy to compare and interpret. The findings of this analysis can be used to inform waste management policies and practices promoting sustainability and reducing environmental impact. Overall, this report highlights the importance of proper waste management and the need for continued efforts towards sustainable living.