# San Francisco Rental Prices Dashboard

In this notebook, you will compile the visualizations from the previous analysis into functions that can be used for a Panel dashboard.

```
In [ ]: # imports
        import panel as pn
        pn.extension('plotly')
        import plotly.express as px
        import pandas as pd
        import hvplot.pandas
        import matplotlib.pyplot as plt
        import os
        from pathlib import Path
        from dotenv import load_dotenv
```

```
In [ ]: # Read the Mapbox API key
        load_dotenv()
        map_box_api = os.getenv("mapbox")
        px.set_mapbox_access_token(map_box_api)
```

# Import Data

```
In [ ]: # Import the necessary CSVs to Pandas DataFrames
        # YOUR CODE HERE!
File_path = Path("Data/sfo_neighborhoods_census_data.csv")
Sfo_data = pd.read_csv(file_path, index_col='year')

File_path = PAth(Data/neighborhoods_coordinates.csv")
Df_neighboorhood_locations = pd.read_csv(file_path)
```

# Panel Visualizations

In this section, you will copy the code for each plot type from your analysis notebook and place it into separate functions that Panel can use to create panes for the dashboard.

These functions will convert the plot object to a Panel pane.

Be sure to include any DataFrame transformation/manipulation code required along with the plotting code.

Return a Panel pane object from each function that can be used to build the dashboard.

Note: Remove any `.show()` lines from the code. We want to return the plots instead of showing them. The Panel dashboard will then display the plots.

```
In [ ]: # Define Panel Visualization Functions
        def housing_units_per_year():
            """Housing Units Per Year."""

            # YOUR CODE HERE!


        def average_gross_rent():
            """Average Gross Rent in San Francisco Per Year."""

            # YOUR CODE HERE!
```

```python
def average_sales_price():
    """Average Sales Price Per Year."""

    # YOUR CODE HERE!


def average_price_by_neighborhood():
    """Average Prices by Neighborhood."""

    # YOUR CODE HERE!


def top_most_expensive_neighborhoods():
    """Top 10 Most Expensive Neighborhoods."""

    # YOUR CODE HERE!


def most_expensive_neighborhoods_rent_sales():
    """Comparison of Rent and Sales Prices of Most Expensive Neighborhoods."""
    # YOUR CODE HERE!


def parallel_coordinates():
    """Parallel Coordinates Plot."""

    # YOUR CODE HERE!


def parallel_categories():
    """Parallel Categories Plot."""

    # YOUR CODE HERE!


def neighborhood_map():
    """Neighborhood Map."""

    # YOUR CODE HERE!


def sunburst():
    """Sunburst Plot."""

    # YOUR CODE HERE!
```

## Panel Dashboard

In this section, you will combine all of the plots into a single dashboard view using Panel. Be creative with your dashboard design!

```python
In [ ]: # Create a Title for the Dashboard
        # YOUR CODE HERE!


        # Create a tab layout for the dashboard
        # YOUR CODE HERE!


        # Create the dashboard
        # YOUR CODE HERE!
```

## Serve the Panel Dashboard

```
In [ ]: # Serve the# dashboard
        # YOUR CODE HERE!
```

# Debugging

Note: Some of the Plotly express plots may not render in the notebook through the panel functions.

However, you can test each plot by uncommenting the following code

```
In [ ]: # housing_units_per_year()
```

```
In [ ]: # average_gross_rent()
```

```
In [ ]: # average_sales_price()
```

```
In [ ]: # average_price_by_neighborhood()
```

```
In [ ]: # top_most_expensive_neighborhoods()
```

```
In [ ]: # most_expensive_neighborhoods_rent_sales()
```

```
In [ ]: # neighborhood_map().show()
```

```
In [ ]: # parallel_categories()
```

```
In [ ]: # parallel_coordinates()
```

```
In [ ]: # sunburst()
```

```
In [ ]:
```