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San Francisco Housing Analysis

I. Introduction

For the past couple of years, San Francisco has always been in the top ten of most expensive cities to live in the United States. This is due to the growth of high-paid tech employees that are residing in the city on top of the weather advantages that the city offers. In our project, we are looking to investigate the housing market in San Francisco.

This dataset gathers information of houses available for sale in the city of San Francisco. There are a total of 9 columns in this dataset:

price	sqft	beds	bath	laundry	pets	housing_type	parking	hood_district
6800	1600	2	2	(a) in-unit	(d) no pets	(c) multi	(b) protected	7
3500	550	1	1	(a) in-unit	(a) both	(c) multi	(b) protected	7
5100	1300	2	1	(a) in-unit	(a) both	(c) multi	(d) no parking	7
9000	3500	3	2.5	(a) in-unit	(d) no pets	(c) multi	(b) protected	7
3100	561	1	1	(c) no laundry	(a) both	(c) multi	(d) no parking	7
3800	800	2	1	(b) on-site	(c) cats	(c) multi	(b) protected	9
3100	750	1	1	(a) in-unit	(d) no pets	(c) multi	(b) protected	8
3000	650	1	1	(b) on-site	(a) both	(c) multi	(d) no parking	7
3000	650	1	1	(b) on-site	(a) both	(c) multi	(b) protected	7
3200	650	1	1	(a) in-unit	(c) cats	(c) multi	(b) protected	9
3100	650	1	1	(b) on-site	(a) both	(c) multi	(b) protected	7
15000	3500	4	3.5	(a) in-unit	(d) no pets	(a) single	(b) protected	1

From the data provided, we can assume that this data was collected through some sort of survey website where it offered options such as a, b, c, or d. During the data cleaning process, we removed the multiple choice selections and only kept the description. We also formatted the data by making all text as proper for a more professional look.

Price	Sqft	Bedrooms	Bathrooms	Laundry	Pet Policy	Housing Type	Parking	District
6800	1600	2	2	In-Unit	No Pets	Multi	Protected	7
3500	550	1	1	In-Unit	Both	Multi	Protected	7
5100	1300	2	1	In-Unit	Both	Multi	No Parking	7
9000	3500	3	2.5	In-Unit	No Pets	Multi	Protected	7
3100	561	1	1	No Laundry	Both	Multi	No Parking	7
3800	800	2	1	On-Site	Cats	Multi	Protected	9
3100	750	1	1	In-Unit	No Pets	Multi	Protected	8
3000	650	1	1	On-Site	Both	Multi	No Parking	7
3000	650	1	1	On-Site	Both	Multi	Protected	7
3200	650	1	1	In-Unit	Cats	Multi	Protected	9
3100	650	1	1	On-Site	Both	Multi	Protected	7
15000	3500	4	3.5	In-Unit	No Pets	Single	Protected	1

We then uploaded the dataset on BigQuery and assigned schema to each field.

Field name	Type	Mode	Key	Collation	Default Value	Policy Tags ❓	Description
Price	INTEGER	NULLABLE					Housing price in San Francisco
Size_sqft_	INTEGER	NULLABLE					Size of house in square footage
Bedrooms	INTEGER	NULLABLE					Number of bedrooms the unit has
Bathrooms	FLOAT	NULLABLE					Number of bathrooms the unit has
Laundry	STRING	NULLABLE					Wheter laundry is in-unit, on-site, or no laundry
Pets	STRING	NULLABLE					Pet policy for the house
Housing_Type	STRING	NULLABLE					Type of house: multi-house, single or double
Parking	STRING	NULLABLE					Type of parking available: valet, protected, off-street, or no parking
Neighborhood_District	INTEGER	NULLABLE					District that the house is located in

Note that the 'Field Name' for the columns might be different from the ones on our Grafana's dashboard. The difference is to ensure that our dashboard will be presented more professionally with accurate column names.

San Francisco Housing Data ⓘ

Price	Size in Sqft	Bedrooms	Bathrooms	Laundry	Pets	Housing Type	Parking	District
1749	260	0	1	On-Site	No Pets	Multi	No Parking	8
1820	516	0	1	In-Unit	Both	Multi	No Parking	9
2099	525	0	1	On-Site	Both	Multi	No Parking	1
2000	525	0	1	On-Site	No Pets	Multi	Protected	6
1600	289	0	1	No Laundry	No Pets	Multi	No Parking	6
2066	549	0	1	In-Unit	Both	Multi	No Parking	8
1899	550	0	1	On-Site	No Pets	Multi	Protected	8
2299	550	0	1	On-Site	Both	Multi	No Parking	6

Given the dataset, we would like to do the analysis to answer the three potential questions that we believe San Francisco renters will have before moving to the city:

1. What is the reasonable budget range for new renters in San Francisco?
2. What are the available amenities that San Francisco houses and apartments offer?
3. Generally, how much space do I have if I want to rent a place in San Francisco?

II.   Data Analysis & Dashboard

For our research, we are studying the distribution of housing prices in San Francisco using various independent variables provided in the dataset.

Our dashboard provides an overview of the dataset, with a combination of different panels to provide insights such as: Histogram chart for Housing price distribution, Trend chart for Average housing price by Bedrooms, Pie chart for numbers of units with laundry types, etc.

Before diving into the analysis, please note that after receiving feedback, we have made several changes to our dashboard:

Original dashboard on 12/03/2023:
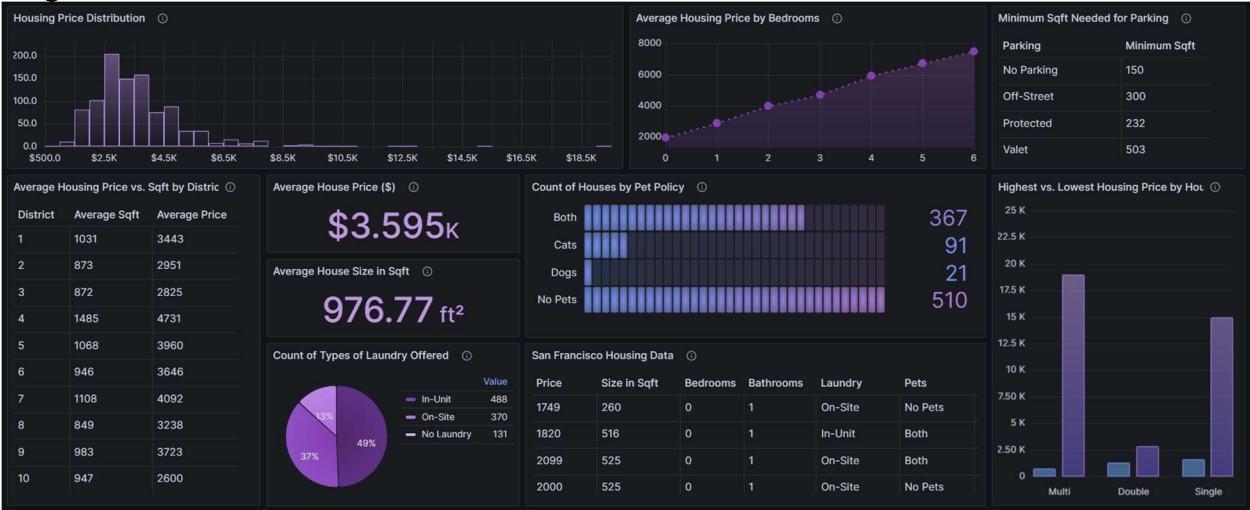
Updated dashboard on 12/04/2023:
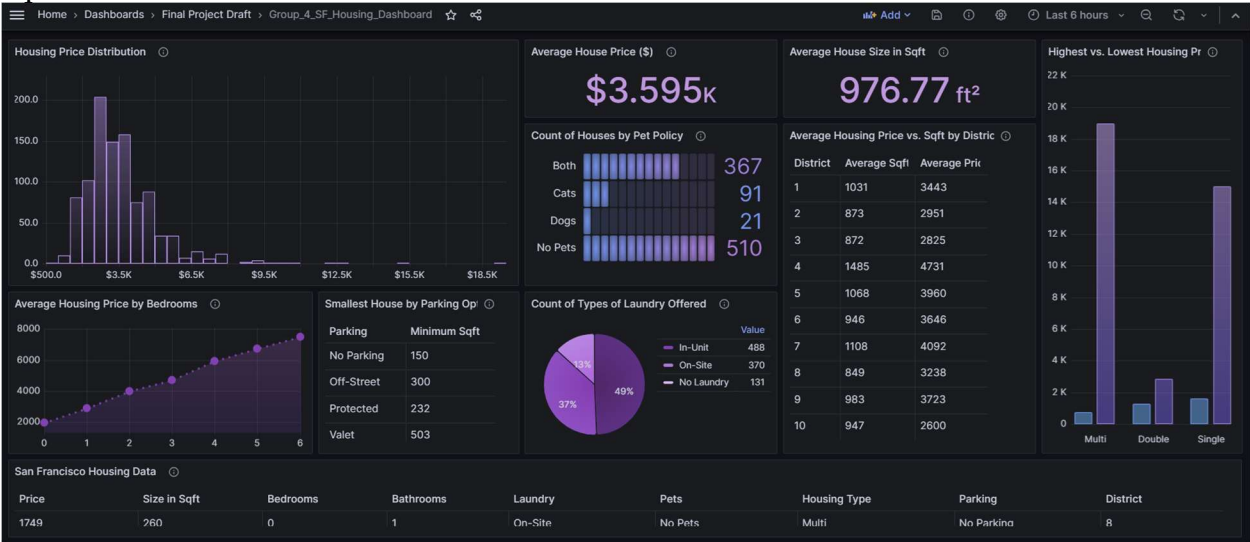
Here is the summary of our updates:

Feedback	Changes
Histogram's maximum might need to be cut off at 8,000 unless the upper values are mentioned in later analysis	We have decided not to set the maximum value at 8,000 for Histogram because the maximum on the bar chart is 19,000, we want to remain consistent with the values presented on our dashboard. Also, those upper values (outliers) will be explained during analysis.
Title for table "Minimum Sq ft Needed for Parking" needs to be updated	Updated table title to "Smallest House by Parking Options" according to suggestion
Layout: The full table data should show at the bottom of the page at full width and reconfigure the panels	Updated layout to show full data at the bottom and reorganized panels.

a) Histogram for Housing Price Distribution

For the very first panel, we would like to have an overview of the rent prices in San Francisco. We decided to use the histogram chart to show the housing price distribution:
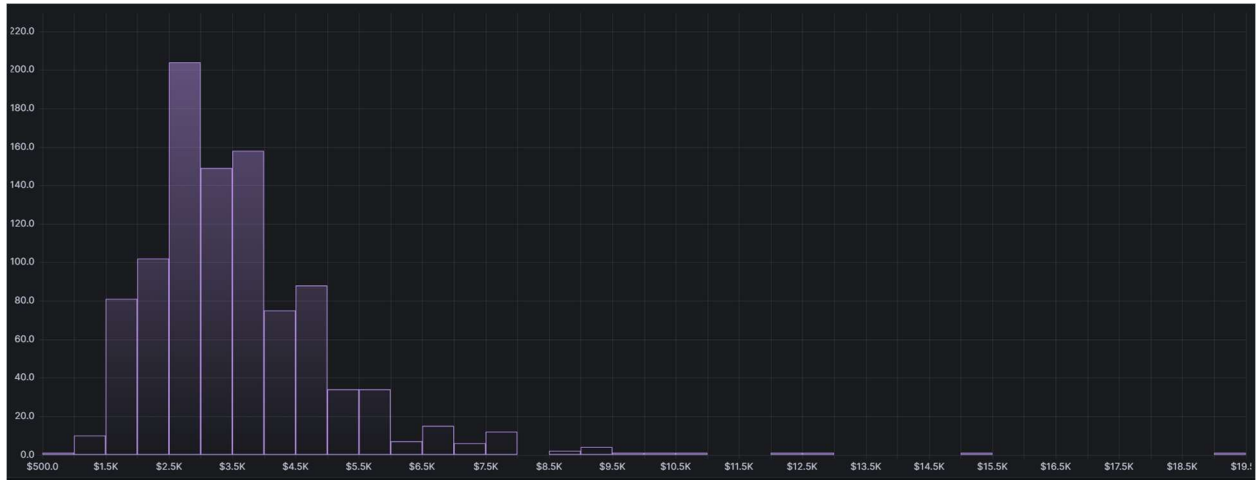
According to the chart, most rent prices fall between $1,500 to $8,000 with more than 93% of units falling within this range. The most popular price at $3,000 for more than 200 available units. Meanwhile, there are higher prices in the range of $8,500 to $19,500, however, those units are rare with approximately less than 7% of units in the dataset.

We can assume that there are not many affordable housings in San Francisco based on the price distribution where most places would require you to make at least three times the rent price to be able to qualify for. For example, for a rent price of $3,000, you will have to make at least $9,000 monthly to be able to afford the place.

b) Average Housing Price by Bedrooms:
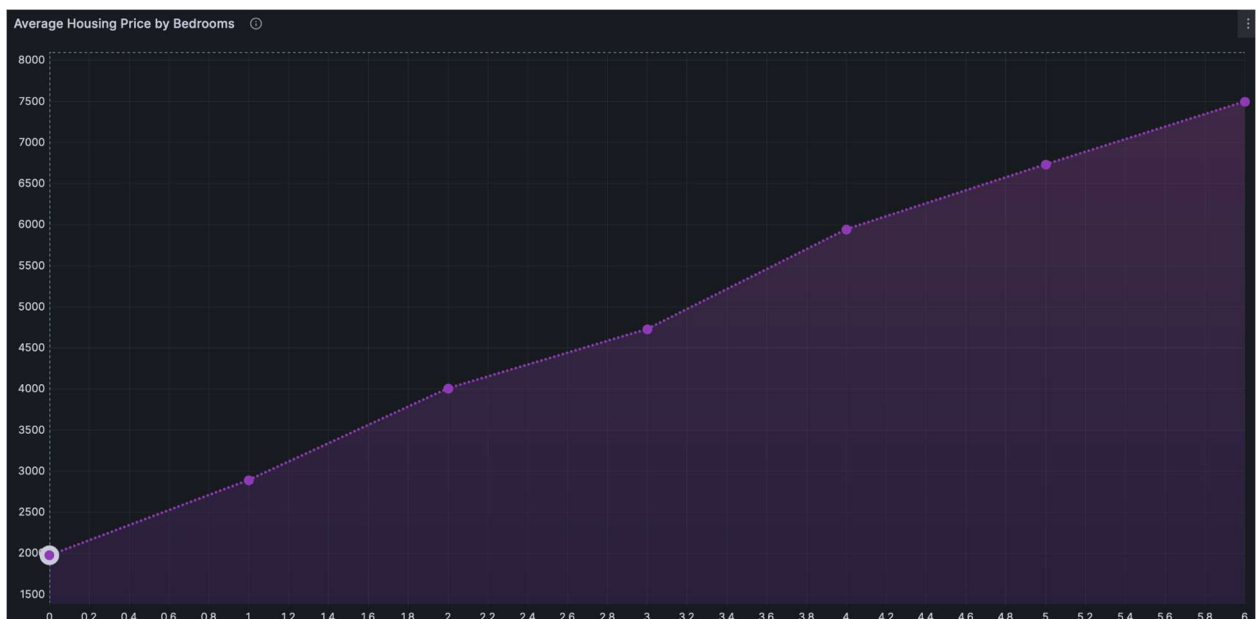
To better understand the housing price variations, we decided to look at the average price by number of bedrooms that the unit offers. There are several things that we want to emphasize:

- The trend chart reveals a positive correlation between the number of bedrooms and average housing prices.
- Larger homes with more bedrooms tend to command higher prices, indicating a potential premium for additional living space. For example, houses with one bedroom have an average price of under $3,000, meanwhile houses with two bedrooms averaging around $4,000.
- People can quickly figure out the typical price ranges based on bedroom preferences, helping them make well-informed decisions when renting or investing in real estate.
- It is essential to consider market trends and consult with real estate agents for accurate and up-to-date prices.

This panel not only confirms what we expect that larger homes tend to have higher prices, but it also provides an overall view of San Francisco's higher cost of living with average rent of $2,000 for a studio apartment (no bedroom).

c) Smallest House by Parking Options:

Parking	Minimum Sqft
No Parking	150
Off-Street	300
Protected	232
Valet	503

Next, we study the spaces available for renting based on the parking preferences:

No Parking: With a minimum square footage of 150 sq ft, this option is suitable for compact dwellings or city settings where residents often rely on public transportation or alternative commuting methods.

Off-Street Parking: Requiring a minimum of 300 sq ft, this scenario signals the provision of at least one dedicated parking space, making it ideal for suburban or less densely populated areas.

Protected Parking (Covered/Enclosed): With a minimum square footage of 232 sq ft, this option provides shelter for vehicles, catering to regions with challenging weather conditions or homeowners seeking to safeguard their vehicles from the elements.

Valet Parking: Featuring a variable square footage requirement (depending on the scale of valet services), this scenario is often associated with high-density urban locales or upscale residences, where residents opt for valet services, minimizing the need for on-site parking spaces.

d) Average House Size and House Price

In the previous panel, we looked at the minimum area needed to have a parking space in the city of San Francisco but those are the smallest spaces that you could find based on parking preferences.

This panel tells us the typical average size of houses in the San Francisco housing market, which is 976.77 sq ft.

$$976.77 \text{ ft}^2$$

Together with the average size, we also looked at the average rent based on the houses available, which is approximately $3,600.

$$\$3.595\text{K}$$

These statistics visualization further confirm our expectations of San Francisco housing market, it does not offer much space given the high rent that it requires.

e) Average Housing Price vs. Size by District

District	Average Sqft	Average Price
1	1031	3443
2	873	2951
3	872	2825
4	1485	4731
5	1068	3960
6	946	3646
7	1108	4092
8	849	3238
9	983	3723
10	947	2600

This table contrasts the average prices and average sizes of houses across different districts.

The highest average sq ft and highest average price of houses is in district 4. If renters are looking for a bigger space with multiple bedrooms, they can consider living here.

Meanwhile, if renters are looking for a smaller space, the lowest average sq ft in district 8 is a good choice.

For better pricing with decent space, district 10 offers an average price of $2,600 with 947 sq ft.

Overall, average house prices are still very expensive given the small space available.

f) Number of Houses by Pet Policy:

Count of Houses by Pet Policy

Both	367
Cats	91
Dogs	21
No Pets	510
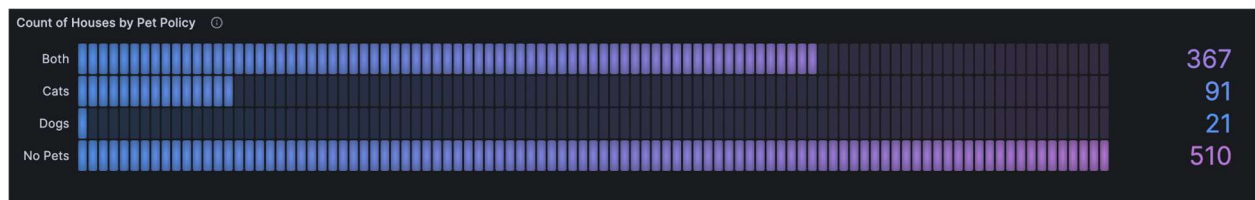
Next, we are going to discuss the amenities that San Francisco housing offers.

First is the bar gauge that provides the number of houses available on the market based on their pet policies. Out of the total number of houses (989), the following distribution of pet policies can be observed:

Both Cats and Dogs: 367 houses or 37.11% of the total.

Cats Only: 91 houses or 9.20% of the total.

**Dogs Only:** 21 houses or 2.12% of the total.

No Pets: 510 houses or 51.57% of the total.

Based on the analysis, we can suggest several points:

- Many houses in San Francisco do not allow pets, accounting for over 50% of the total housing stock. This could suggest that pet ownership is not as prevalent in San Francisco compared to other cities.
- There is a small but notable number of houses that allow only Cats or only Dogs. This could indicate a demand for homes with a specific pet policy among the population.

We concluded that this data analysis provides a comprehensive understanding of the pet policy preferences in the San Francisco housing market. The analysis also suggests that pet ownership might not be as prevalent as it could be, considering the relatively small numbers of pet-friendly houses.

g) Types of Laundry Offered:

	Value
In-Unit	488
On-Site	370
No Laundry	131
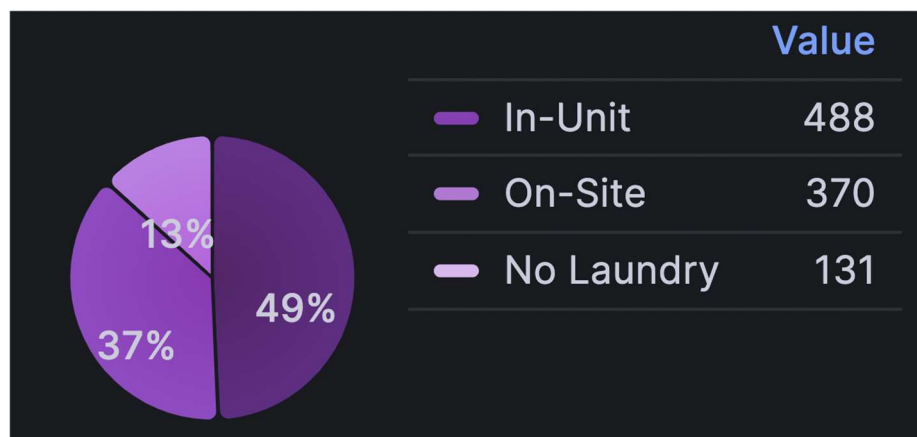
The next amenity that we are going to focus on is the laundry availability for renters. This pie chart explains the following statistics:

- Majority of San Francisco homes (49%) offer In-Unit Laundry facilities. This indicates that there are a lot of options available for those who want a fully integrated laundry system in their homes.
- 37% have on-site laundry facilities, meaning that renters do not have laundry machines in their homes, but typically can depend on the laundromat within the building.
- Lastly, 13% of San Francisco homes do have any type of laundry facilities. This means that there is a segment of the city's population who either must travel off-site to local laundromats or rely on friends and families for assistance.

For those considering moving to San Francisco, it is important to consider laundry needs when selecting a home. For example, if having an in-unit laundry is a top priority, potential renters may want to target neighborhoods where the demand for homes with this feature is high. On the other hand, if living without an in-unit laundry is not a concern, they may be able to find more affordable options in neighborhoods with fewer homes that offer this feature.

h) Highest vs. Lowest Housing Price by Housing Types:

In this panel, we are showing you a bar chart that breaks down the price range for different types of houses in San Francisco. It is especially useful for getting a sense of what you might expect to pay for different kinds of housing.
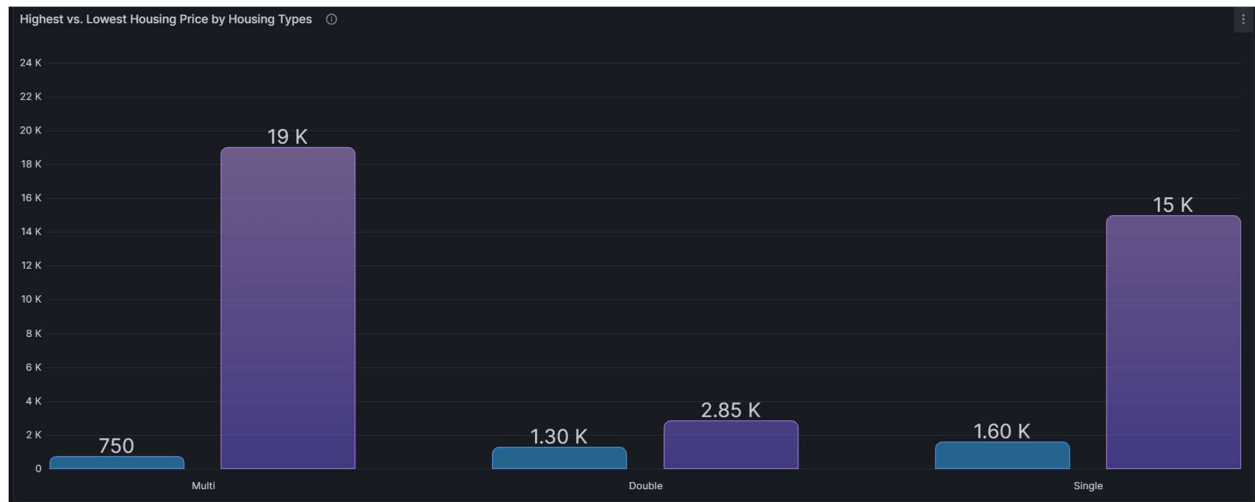
Multi-Family Housing: Houses come in a wide range of prices, from as low as $750 to a whopping $19,000. So, there's a lot of variety to choose from based on your budget.

Double-Family Housing: If you're looking at double-family houses, the prices are a bit more consistent, ranging from $1,300 to $2,850. This suggests that there might be a more standard pricing trend for this type of housing.

Single-Family Housing: For single-family houses, the price range is the most diverse, going from $1,600 to $15,000. This makes sense since single-family houses can vary a lot in size, amenities, and location.

III.   Answering Stakeholders' Questions

At the beginning of our analysis, we suggested three questions that renters or stakeholders should ask before moving to San Francisco, here are our answers:

1. What is the reasonable budget range for new renters in San Francisco?

The price range or the budget that renters should prepare for before moving to San Francisco is about $2,000 to $6,000 for more comfortable living. It is not impossible to find cheaper rent for less than $1,000 in the city, but typically you would have to opt in for a shared-space rental.

According to the histogram for price distributions, the majority of houses on the market fall within that range. Renters should also refer to the trend chart regarding average prices according to the number of bedrooms.

2. What are the available amenities that San Francisco houses and apartments offer?

As a city with smaller living spaces, there are not many amenities available in San Francisco housing. The main ones would include laundry, parking, and pet policy.

Based on our pie chart, 49% of houses provide in-unit laundry, 37% have on-site laundry, and the remaining 13% do not have laundry facilities. Also, our bar gauge suggests that most landlords would not allow pets, and if they do, there are more places that allow cats than dogs.

3. Generally, how much space do I have if I want to rent a place in San Francisco?

Our statistics visualization shows that the average space in San Francisco is 977 sq ft. While this is not exactly a small space, given the average rent at approximately $3,600, renters would probably have to pay around $3.68 per square foot for their home. Evidently, the bigger the space, the higher the rent.

For more details, please refer to the two panels for "Minimum space needed for Parking" and "Average Housing Price vs. Sq ft by District." They can give a general idea of average house size in San Francisco based on parking and district locations.

IV.   Conclusion

For our conclusion, we have a couple of recommendations to people who are interested in living and purchasing a home in San Francisco:

Know Your Budget: Before you start your house search, figure out what you can afford. With the wide price range, we found in our analysis, having a clear budget will help you focus on places that match your financial comfort.

Think about Your Lifestyle: Different types of houses offer different living experiences. If you love city living with shared amenities, consider Double & Multi -Family Housing. If you prefer more space and privacy, single-family homes might be your thing. Understand what suits your lifestyle best.

Explore Neighborhoods: San Francisco's neighborhoods are like personalities – each unique. Take the time to explore different areas to find the one that feels right for you, considering amenities, vibe, and affordability.

Stay Flexible and Informed: The real estate scene can change, so keep an eye on trends. Being flexible and adapting to the market's twists and turns will make your house search smoother.

One thing that we believe would be extremely helpful to future renters or homeowners in San Francisco is the crime rate. If crime rate was provided based on different locations in the city, renters can make more informed decisions based on their safety needs as to which area they would like to live in.

In a nutshell, San Francisco has a lot to offer. By being mindful of your budget, considering your lifestyle, exploring neighborhoods, and staying informed, you will be on the right track to finding a home that feels just right for you.