

# **Project Report Format**

## **1. INTRODUCTION**

### **1.1 Project Overview:-**

This project aims to uncover insights from housing market data using Tableau. It focuses on analysing factors such as sale prices, renovation impact, and house features like bathrooms, bedrooms, and floors to assist real estate professionals in making data-driven decisions.

### **1.2 Purpose:-**

To visualize and interpret housing trends using Tableau dashboards and stories, making it easier to explore the relationship between sale prices and house features for better decisionmaking.

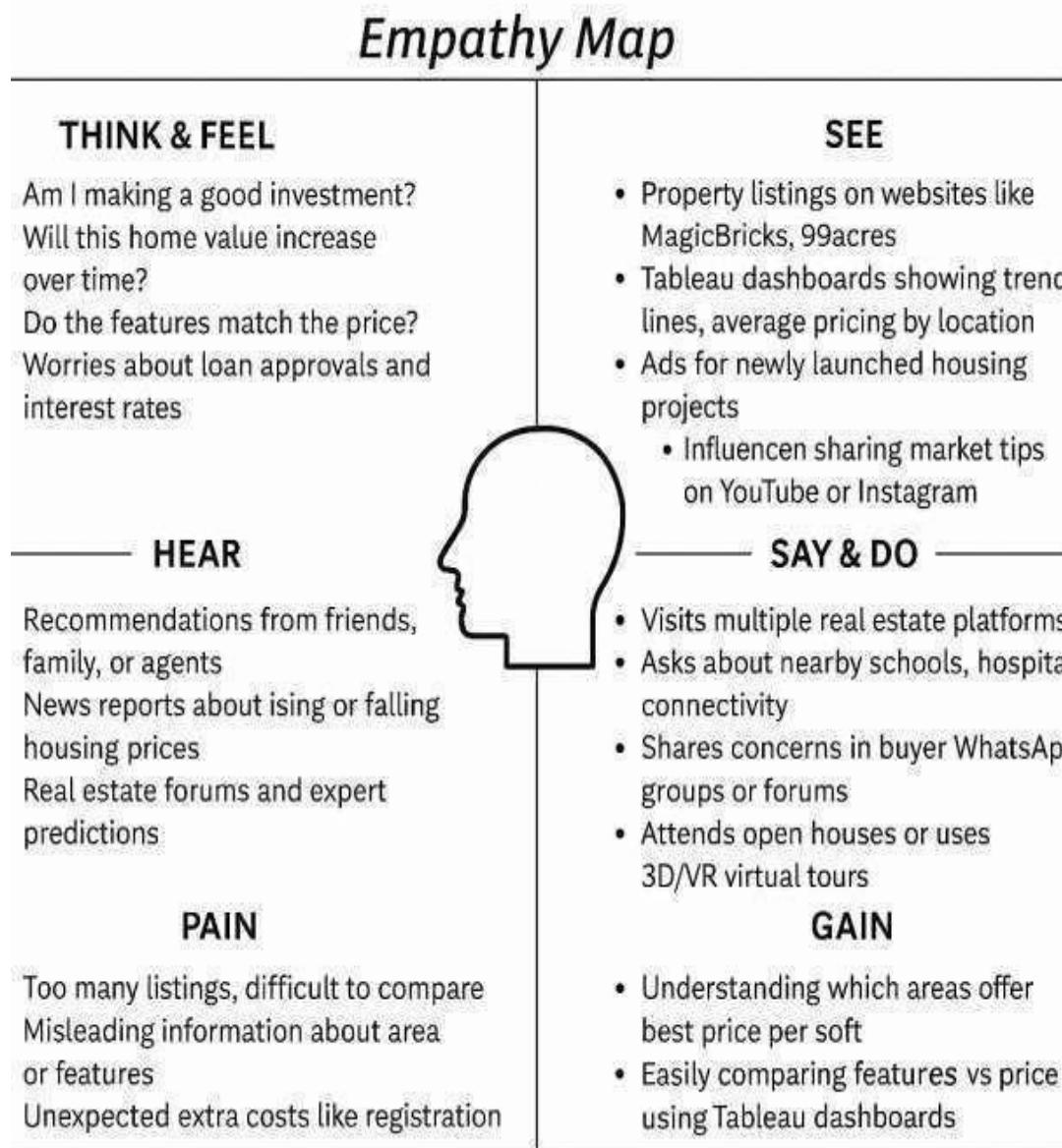
## **2. IDEATION PHASE:-**

### **2.1 Problem Statement**

Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1	A homebuyer or real estate investor	Understand which features affect property prices	The data is scattered and hard to interpret	Different sources present inconsistent or unclear information	Frustrated and unsure
PS-2	A market analyst or data-driven decisionmaker	Visualize pricing trends across time and location	Raw housing data is complex and overwhelming	I need an intuitive tool to quickly gain insights from large datasets	Overwhelmed but hopeful Tableau can help

I am	a first-time home buyer
I'm trying to	understand which areas offer affordable yet valuable homes
but	I can't compare home features like size, location, and price across regions easily
because	housing market data is scattered and not visually intuitive
which makes me feel	overwhelmed and uncertain in making a purchase decision

## 2.2 Empathy Map Canvas:-



## 2.3 Brainstorming :-

### Brainstorming – Project: Visualizing Housing Market Trends Using Tableau

**Step 1:** Team Gathering, Collaboration and Problem Selection

Team Members: S V Abhishek and Vangala Harika

Problem: Understanding the impact of house features and renovation on sale prices using visualizations in Tableau.

## **Step 2: Brainstorming, Idea Listing and Grouping:-**

Idea	Group
Show avg sale price, total homes, area	Data Overview
Compare sales price by renovation	Renovation Impact
Use pie chart for age + renovation	Renovation Impact
Group age by bedrooms/bathrooms/floors	Feature Analysis
Add filters for better interaction	Interactivity
Publish dashboard to Tableau Public	Deployment

## **Step 3: Idea Prioritization:-**

Idea	Feasibility	Impact	Priority

Renovation vs Price Chart	High	High	High
House features by age	High	High	High
Pie chart for renovation status	Medium	Medium	Medium
KPI indicators	High	Medium	High
Filters on dashboard	Medium	High	High
Tableau Public link	High	Medium	Medium

### 3 REQUIREMENT ANALYSIS:-

SNO	Perspective	Discover	Explore & Compare	Analyse Insights	Decide &Act	Reflect &Reuse
1	Goals & Motivations	Help me find reliable, visual housing market data.	Help me find reliable, visual housing market data.	Help me find patterns, trends, and high-growth areas.	Help me make a confident buying or investment decision	Help me revisit and track areas I'm interested in
2	Actions/Interactions	Searching online for dashboards or price trend tools	Filtering by location, price, home size, time	Analyzing price heatmaps, comparing multiple neighborhoods	Exporting or saving visuals; shortlisting areas or properties	Returning to the dashboard, setting alerts, or exporting data
3	Touch Points	Google search, housing blogs, YouTube explainer videos	Tableau dashboard interface; dropdown filters, charts	Time-series graphs, regional comparison dashboards, scatter plots	Export/download buttons, note-taking tools, top-5 list feature	Email alerts, saved dashboards, revisit bookmarks
4	Positive Moments	Finding a well-designed dashboard or overview video	Easy comparison of two cities or house types	Discovering an undervalued area with rising prices	Feeling empowered to shortlist or pitch to investors	Seeing saved trends or confirming their prior assumptions
5	Pain Points	Overwhelmed by scattered or outdated data sources	Dashboard too complex for first-time users; too many filters	Charts hard to interpret; lack of clear insight summaries	Analysis paralysis: afraid of choosing the wrong area	No reminders or saved state; forced to redo filters
6	Opportunity's	Create a clean landing page with one-click access to visuals	Add presets like "Affordable cities" or "Top ROI areas"	Include narrative summaries: "This area grew 10% in last 6 months"	Build a recommendation engine or "Decision Helper" widget	Allow account login to save preferences; enable area tracking & alerts

### 3.1 Customer Journey map

### 3.2 Solution Requirement:-

#### Functional Requirements:-

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Data Import	Load housing dataset from Excel or CSV
FR-2	Filtering & Interaction	Filter by city, price range, property size

FR-3	Visualization Generation	Display bar charts, line graphs, heatmaps
FR-4	Comparison Feature	Allow comparison of multiple cities/areas
FR-5	Export/Download	Enable export of visuals to PDF or image
FR-6	Saved View	Allow saving filter settings for later reuse

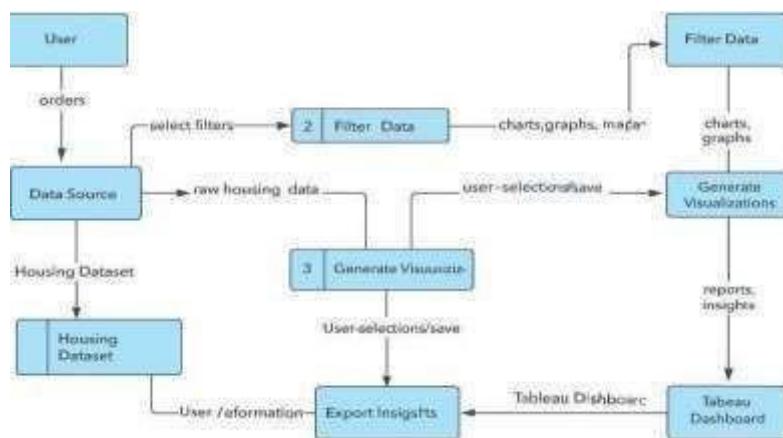
### **NON functional Requirements:**

Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	<b>Usability</b>	The dashboard should be intuitive and easy to use for non-technical users
NFR-2	<b>Security</b>	User data (if any) must be handled securely; access via Tableau Public
NFR-3	<b>Reliability</b>	The system should be available 99% of the time
NFR-4	<b>Performance</b>	Visualization should load within 3 seconds

NFR-5	<b>Availability</b>	Dashboard should be accessible 24/7 via the published tableau link
NFR-6	<b>Scalability</b>	Should handle increased data size

### 3.3 Data Flow Diagram:-



### User Stories:-

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Home Buyer	View Listings and Prices	USN-1	As a home buyer, I want to filter listings by city and price range	I can see relevant houses only for my budget	High	Sprint-1
Home Buyer	Visual Comparison	USN-2	As a home buyer, I want to compare house prices across cities	I can see a chart comparing at least 2 cities	High	Sprint-1
Real Estate Analyst	Analyze Trends	USN-3	As an analyst, I want to see price trends over time for a region	I can view a line graph of historical price trends	High	Sprint-2

<b>Real Estate Analyst</b>	Export Data	USN-4	As an analyst, I want to export visual insights into a PDF	I can download visuals as a PDF	Medium	Sprint-2
<b>Home Buyer / Analyst</b>	Access Saved View	USN-5	As a user, I want to save and return to my filtered dashboard later	I can return and see my previously saved filters	Low	Sprint-3

### 3.4 Technology Stack :-

#### Technical Architecture:-

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2

S.No	Component	Description	Technology
1	User Interface	Web-based dashboard view	Tableau Public
2.	Application Logic-1	Data filtering and user interaction	Tableau filters and parameters
3.	Application Logic-2	Data visualization logic	Tableau dashboards & calculated fields
4.	Application Logic-3	Not used (optional)	—
5.	Database	Housing dataset (CSV)	Excel / CSV

6.	Cloud Database	Hosted data files	Google Drive / Tableau Public
7.	File Storage	Source file storage	Local system / Google Drive
8.	External API-1	(Optional) Live pricing data API	RapidAPI (if used)
9.	External API-2	(Optional) Geolocation or Maps API	Google Maps API (if used)
10.	Machine Learning Model	Not used	—
11.	Infrastructure (Server / Cloud)	Tableau hosted online	Tableau Public

**Table-2: Application Characteristics:-**

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Uses Tableau Public (free) and data from Kaggle or open housing sources	Tableau Public, Excel
2.	Security Implementations	Tableau's built-in privacy and publishing settings	Tableau Privacy Settings
3.	Scalable Architecture	Can scale to visualize larger datasets or additional regions	Tableau filters, cloud storage
4.	Availability	Hosted 24/7 on Tableau Public	Tableau Public

5.	Performance	Optimized dashboard design, fast filters, small file size	Tableau filters, preaggregated data
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## 4 PROJECT DESIGN:-

### 4.1 Problem Solution Fit Problem – Solution Fit Template:-

## Problem – Solution Fit

### Target Customer

- First-time home buyers - Real estate analysts

### Problems

- Housing data is scattered across many websites
- Difficult to compare features like price, size, and location
- Raw data isn't visually intuitive
- Analysts can't easily spot trends across time or regions

### Existing Alternatives

- Using Excel sheets and raw CSV files
- Checking multiple property listing websites manually
- Watching YouTube videos for housing advice
- Relying on outdated or static graphs

### Your Solution

- A centralized, interactive Tableau dashboard
- Ability to filter housing data by city, price, size, and more
- Visualize trends using bar charts, heatmaps, and time-series graphs

- Compare multiple cities or neighborhoods side-by-side

## Key Benefits

- Simplifies decision-making for home buyers
- Saves time for analysts by visualizing trends instantly
- Reduces confusion by using clear, interactive visuals - Offers exportable reports for offline review

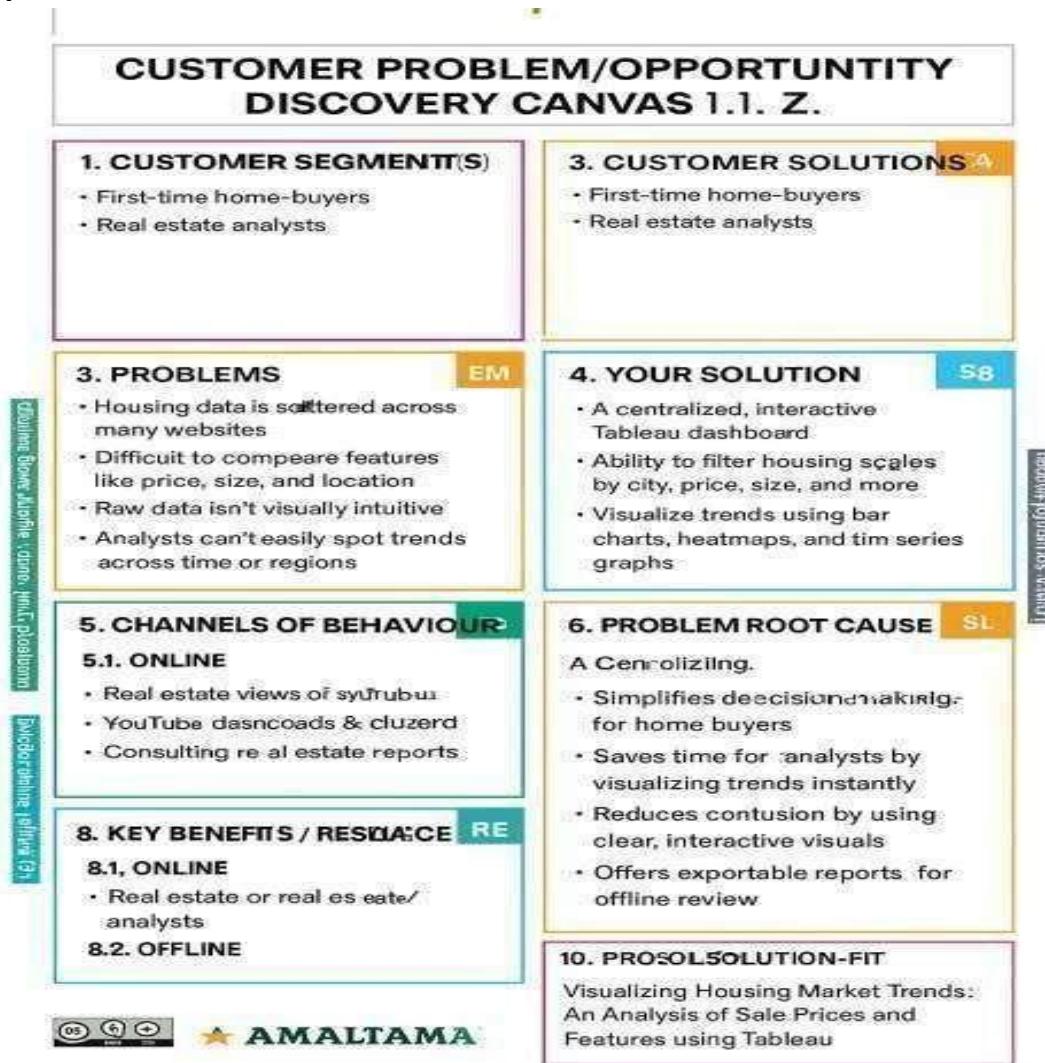
## Unique Value Proposition (UVP)

- raw data or static websites, this dashboard combines real estate insights, filters, and visual clarity in one place.
- It's user-friendly, built on Tableau, and customized to users' goals (whether buying or analyzing).

### Purpose:-

- Solve complex problems in a way that fits the state of your customers.
- Succeed faster and increase your solution adoption by tapping into existing mediums and channels of behavior.
- Sharpen your communication and marketing strategy with the right triggers and messaging.  Increase touch-points with your company by finding the right problem-behavior fit and building trust by solving frequent annoyances, or urgent or costly problems.
- Understand the existing situation in order to improve it for your target group.

## Template:-



## 4.2 Proposed Solution Proposed Solution Template:-

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Housing market data is often scattered, difficult to compare, and lacks intuitive visual representation. This makes it hard for home buyers and analysts to identify trends, understand key influencing factors, and make data-driven decisions.

2.	Idea / Solution description	<p>Our solution is a Tableau-based dashboard that visually represents housing market trends using a dataset containing housing sales, renovation status, house age, number of bedrooms, bathrooms, floors, and basement area.</p> <p>It enables users to:</p> <ul style="list-style-type: none"> <li>• Analyze total sales by years since renovation</li> <li>• View house age distributions</li> <li>• Compare features like bathrooms, bedrooms, and floors</li> <li>• Identify pricing trends using clear, interactive visuals</li> </ul> <p>This empowers real estate analysts, marketing teams, and decision-makers with actionable insights.</p>
3.	Novelty / Uniqueness	<p>Unlike traditional spreadsheets or static reports, this dashboard provides an interactive, filterable, and visual representation of housing data. It brings together renovation impact, age analysis, and feature-based comparison — all in one place — built with minimal tools (only Tableau and open datasets), making it accessible and scalable.</p>
4.	Social Impact / Customer Satisfaction	<p>This project improves the home-buying process by offering clarity and confidence in decisionmaking for first-time buyers. Analysts save time interpreting raw data. Stakeholders gain deeper insights to develop better marketing, pricing, and investment strategies — increasing satisfaction and trust.</p>

5.	Business Model (Revenue Model)	<p>This can be offered as a premium analytics solution to real estate firms or consultancy services.</p> <p>Additional revenue can be generated through:</p> <ul style="list-style-type: none"> <li>• Subscription access to dashboards</li> <li>• Custom insights for clients</li> <li>• Integration with company websites to attract leads</li> </ul>
6.	Scalability of the Solution	<p>The solution is highly scalable:</p> <ul style="list-style-type: none"> <li>• New datasets (e.g., from other regions or years) can be added easily</li> <li>• Additional filters and visualizations can be implemented without rewriting the logic</li> <li>• It can support multiple use cases like rental trends, commercial real estate, etc.</li> </ul>

#### 4.3 Solution Architecture:-

### Solution Architecture:-

Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions. Its goals are to:

- Find the best tech solution to solve existing business problems.
- Describe the structure, characteristics, behavior, and other aspects of the software to project stakeholders.
- Define features, development phases, and solution requirements.
- Provide specifications according to which the solution is defined, managed, and delivered.

## **Key Aspects:-**

### **Business Problem:-**

Stakeholders such as real estate analysts and executives struggle to interpret scattered housing market data. There's a need for a centralized tool to visualize and analyze house prices, renovation effects, and property characteristics.

### **Technology Solution:-**

The solution uses Tableau to create an interactive dashboard built from a structured housing dataset (e.g., Kaggle's train.csv). Users can analyze renovation impacts, age distribution, and other features through visual filters and charts.

### **Features:-**

- Visualization of sales by renovation age
- Distribution analysis by bathrooms, bedrooms, floors
- Age comparison between renovated and non-renovated houses
- Exportable insights

### **Solution Delivery:**

- Tableau Public Dashboard
- Published with open-source CSV dataset
- Shared via URL + Screenshots

## Example - Solution Architecture Diagram: -

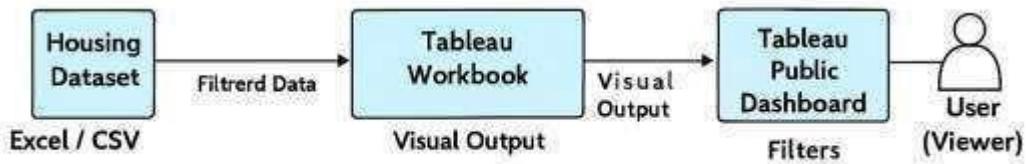


Figure 1: Solution Architecture for Housing Market Visualization using Tableau

## 5 PROJECT PLANNING & SCHEDULING

### 5.1 Project Planning Product Backlog, Sprint, Schedule & Estimation(4 marks)

Use the below template to create product backlog & Sprint Schedule

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Data Connection & Cleaning	USN-1	As a user, I want to import and clean the housing dataset in Tableau	3	High	S V Abhishek, Vangala Harika

Sprint-1	Filter Setup	USN-2	As a user, I want to filter data by city, price, bedrooms, etc. in the dashboard	2	High	S V Abhishek, Vangala Harika
Sprint-2	Visualize Trends	USN-3	As an analyst, I want to visualize total sales by years since renovation	3	High	S V Abhishek
Sprint-2	Comparative Views	USN-4	As a user, I want to compare house ages based on bathrooms, bedrooms, and floors	3	Medium	Vangala Harika
Sprint-3	Dashboard Layout	USN-5	As a user, I want to interact with a clear, clean dashboard layout	2	High	S V Abhishek
Sprint-3	Export Features	USN-6	As a user, I want to export visuals or summary reports from the dashboard	2	Medium	Vangala Harika
Sprint-4	Testing & Optimization	USN-7	As a team, we want to test dashboard loading and refine visual filters	2	High	S V Abhishek, Vangala Harika
Sprint-4	Tableau Public Deployment	USN-8	As a user, I want the dashboard to be published to Tableau Public with a share link	1	High	S V Abhishek

#### Project Tracker, Velocity & Burndown Chart: (4 Marks)

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)

Sprint-1	5	2 Days	20 June 2025	21 June 2025	5	21 June 2025
Sprint-2	5	2 Days	22 June 2025	23 June 2025	5	23 June 2025
Sprint-3	5	2 Days	24 June 2025	25 June 2025	5	25 June 2025
Sprint-4	5	1 Day	26 June 2025	26 June 2025	5	26 June 2025
Sprint-5	5	1 Day	27 June 2025	27 June 2025	5	27 June 2025

## Velocity:-

Average

$$\text{Velocity} = 5+5+5+5+5/2+2+2$$

$$+1+1=25/8=3.12 \text{ story points/day}$$

(rounded)

Final Average Team Velocity

= 3.1 Points per Day

## Burndown Chart:-

A burn down chart is a graphical representation of work left to do versus time. It is often used in agile [software development](#) methodologies such as [Scrum](#). However, burn down charts can be applied to any project containing measurable progress over time.



## 6 FUNCTIONAL AND PERFORMANCE TESTING

### 6.1 Performance Testing :-

#### Model Performance Testing:-

Project team shall fill the following information in model performance testing template.

S.No.	Parameter	Screenshot / Values
1.	Data Rendered	<ul style="list-style-type: none"> <li>- Total Rows: 21,609</li> <li>- Columns: 36</li> <li>- File used: Transformed_Housing_Data2.xlsx - Rendered from Tableau Data Source tab (attach screenshot)</li> </ul>
2.	Data Preprocessing	<ul style="list-style-type: none"> <li>- Converted CSV to Excel format</li> <li>- Renamed field names for readability (e.g., Sale Price, Years Since Renovation)</li> <li>- Created calculated field Renovation Status</li> </ul>

3.	Utilization of Filters	<p>Filters applied to:</p> <ul style="list-style-type: none"> <li>• Years Since Renovation</li> <li>• No. of Bedrooms, Bathrooms, Floors</li> <li>- Filters are shown on dashboard and individual sheets</li> </ul>
4.	Calculation fields Used	<ul style="list-style-type: none"> <li>- Years Since Renovation (if not provided)</li> <li>- Age of House (in Years) (calculated from Year Built and current year)</li> <li>- Renovation Status (custom calc for Yes/No)</li> </ul>
5.	Dashboard design	<p>No of Visualizations / Graphs – 4</p> <ol style="list-style-type: none"> <li>1. Scenario 1: Overall Data Overview</li> <li>2. Scenario 2: Bar chart by renovation years</li> <li>3. Scenario 3: Pie chart for age/renovation</li> <li>- Scenario 4: Grouped bar chart for house features</li> </ol>
6	Story Design	<p><b>No of Visualizations / Graphs – 4</b></p> <p>- - Story includes 3 scenario charts</p>

## Screenshot of Data Source:

Tableau Public - Book1

File Data Window Help

Tableau Desktop Public Edition

Buy Tableau

Connections Add

Sheets

Transformed\_Housing\_Data2 Microsoft Excel

Transformed\_Housing\_D...

Use Data Interpreter  
Data Interpreter might be able to clean your Microsoft Excel workbook.

Transformed\_Housing\_Data2

New Union

New Table Extension

Transformed\_Housing\_Data2 31 fields 21609 rows

Name: Transformed\_Housing\_Data2

Fields:

Type	Field Name	Phys...	Rem...
#	Sale Price	Transf...	Sale...
#	No of Bedrooms	Transf...	No of ...

100 rows

TransformedHousing[Data] Sale Price TransformedHousing[Data] No of Bedrooms TransformedHousing[Data] No of Bathrooms TransformedHousing[Data] Flat Area (in Sqft) TransformedHousing[Data] Lot Area (in Sqft) Transform No of Fl

TransformedHousing[Data] Sale Price	TransformedHousing[Data] No of Bedrooms	TransformedHousing[Data] No of Bathrooms	TransformedHousing[Data] Flat Area (in Sqft)	TransformedHousing[Data] Lot Area (in Sqft)	Transform No of Fl
221.900	3	1.00000	1.180	5.650	
538.000	3	2.25000	2.570	7.242	
180.000	2	1.00000	770	10.000	
604.000	4	3.00000	1.960	5.000	
510.000	3	2.00000	1.680	8.080	
1.129.575	4	4.50000	5.420	101.930	

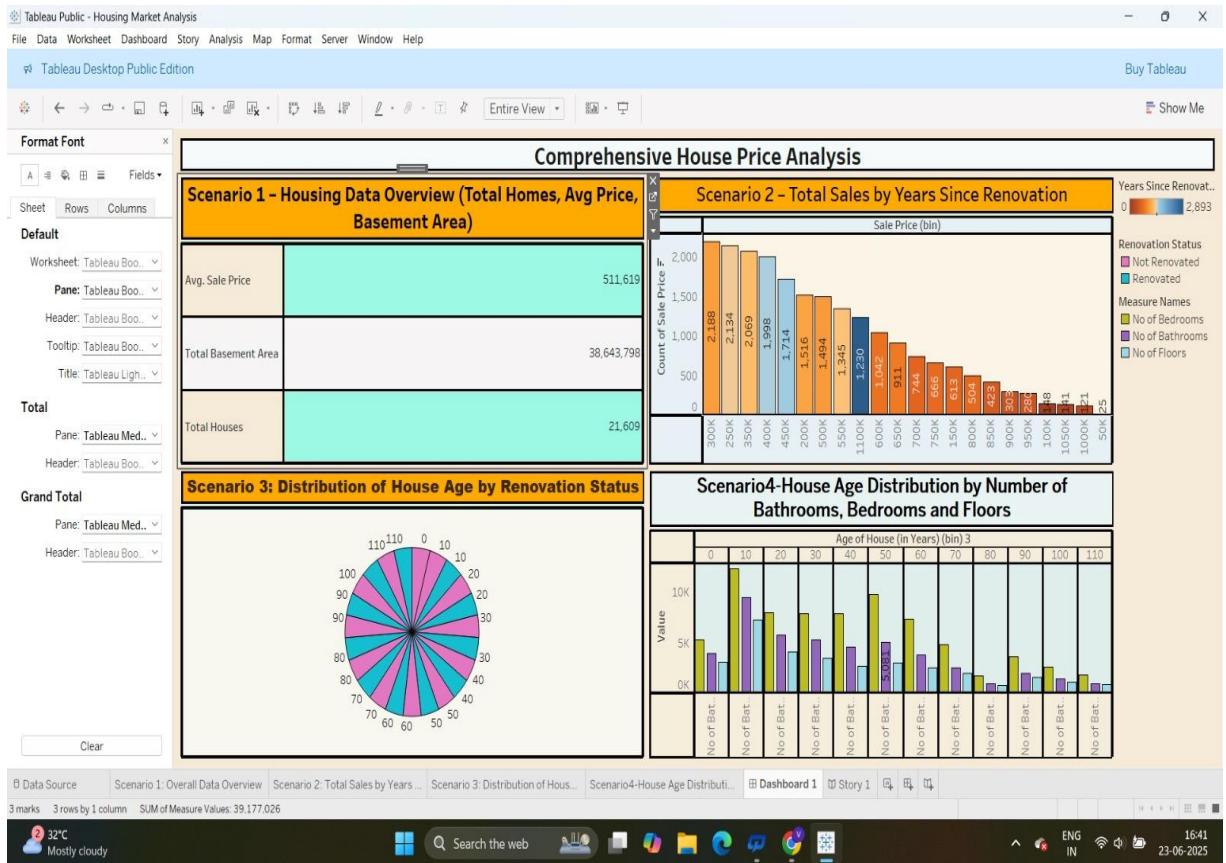
Sheet 1

32°C Mostly cloudy

Search the web

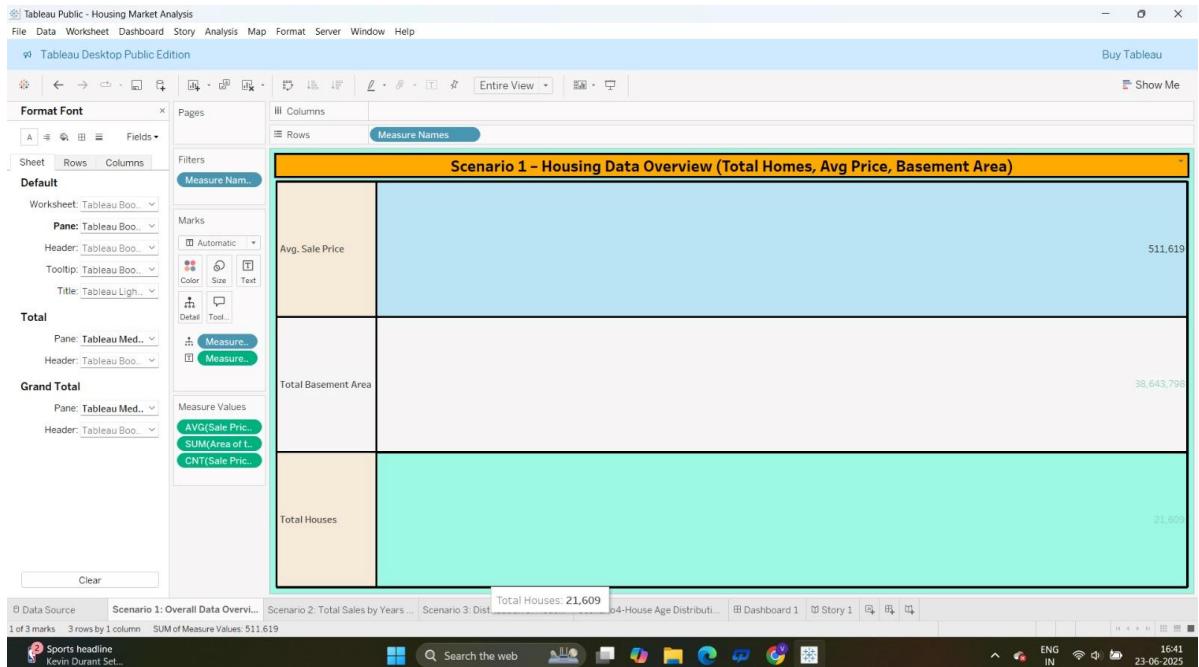
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## Screenshot of Dashboard with Filters:

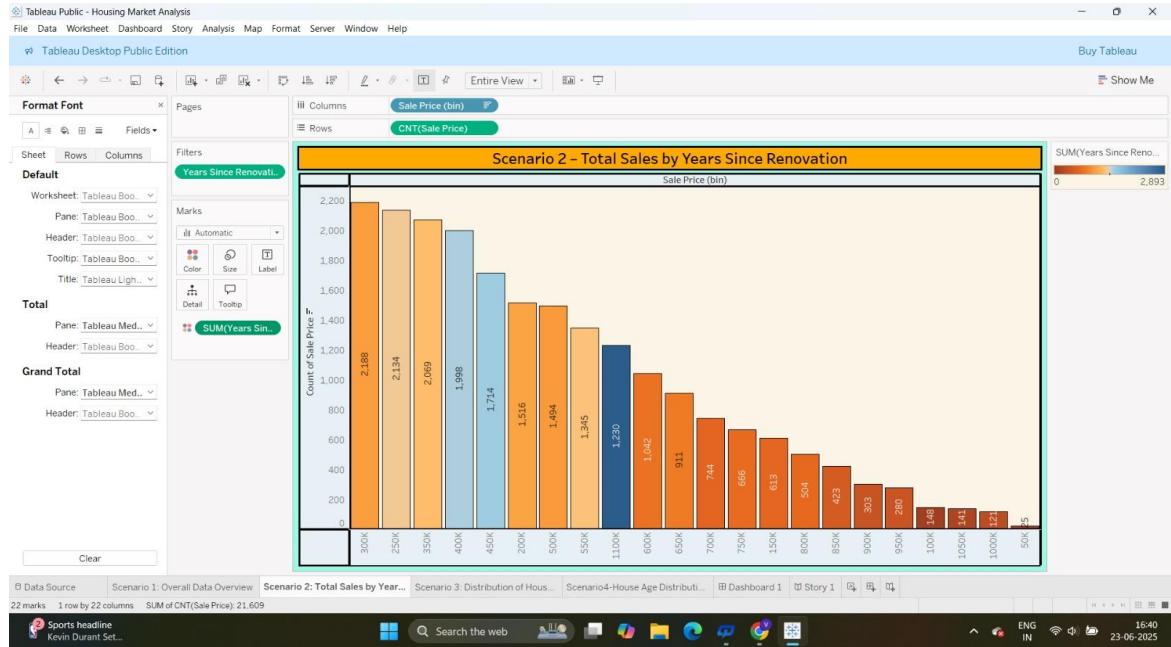


## 7 RESULTS

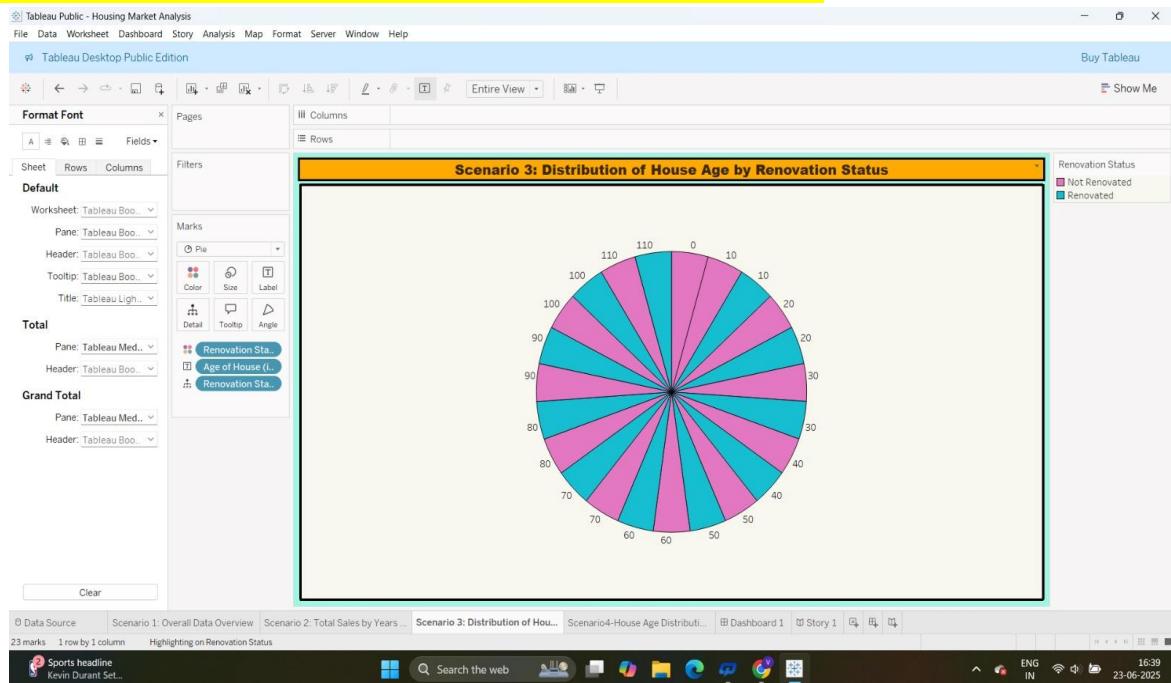
### 7.1 Output Screenshots :- Scenario 1: Overall Data Overview



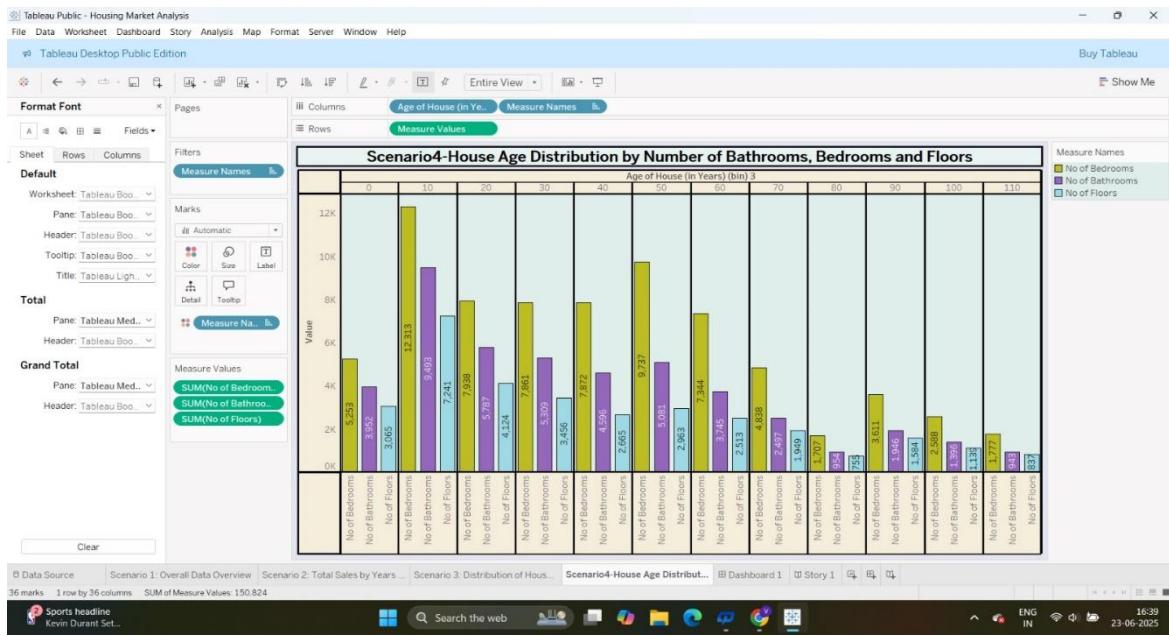
## Scenario 2: Total Sales by Years Since Renovation2



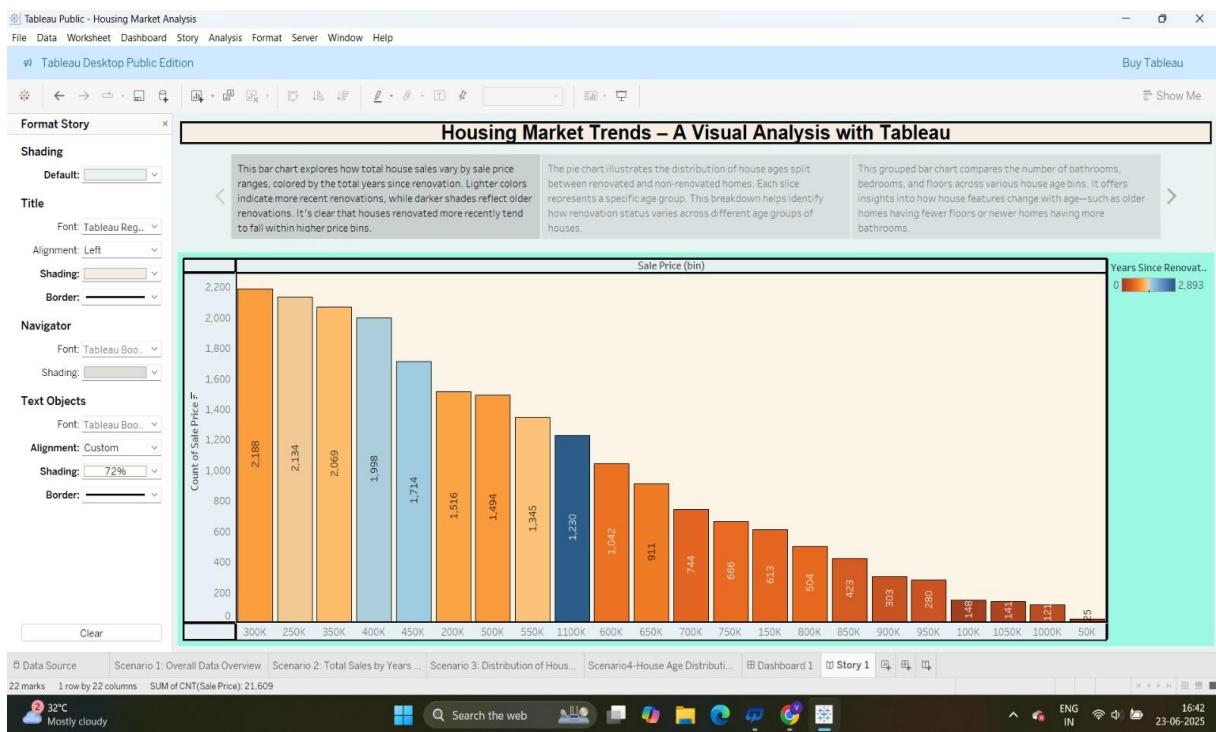
## Scenario 3: Distribution of House Age by Renovation Status



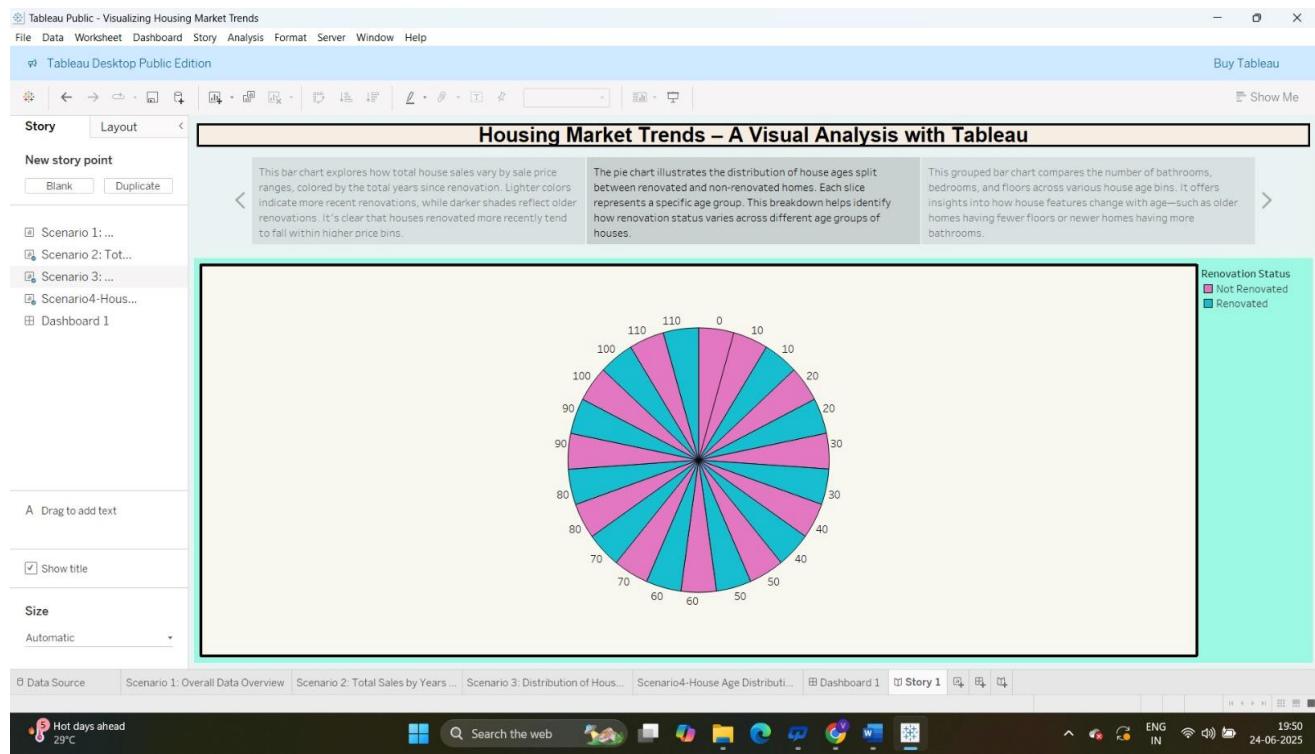
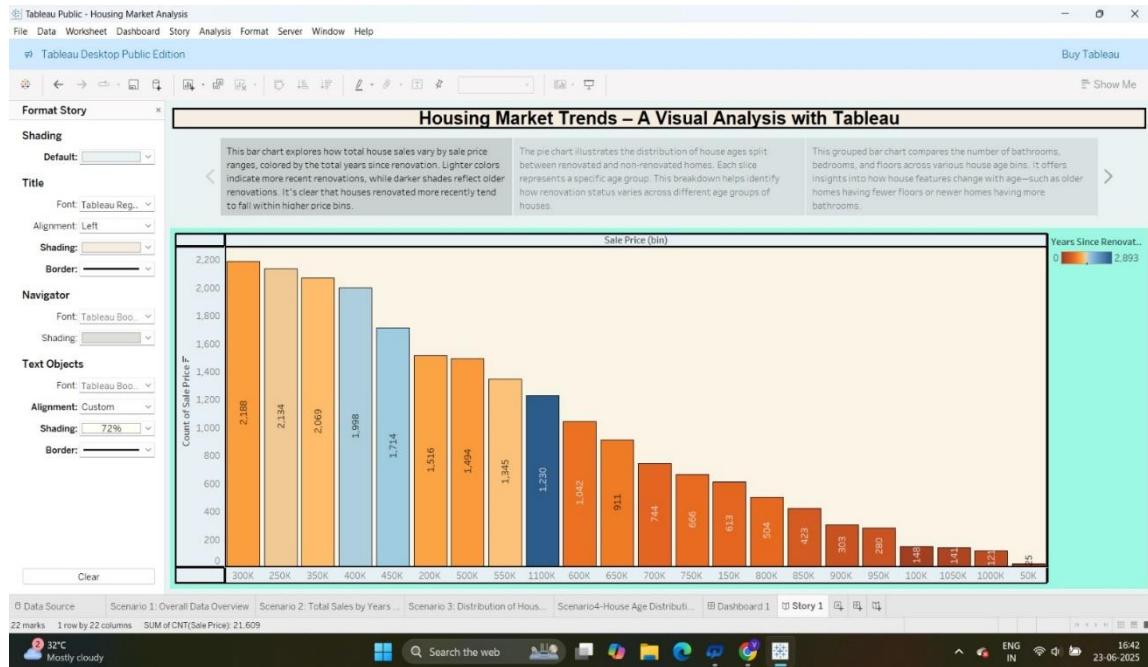
## Scenario4-House Age Distribution by Number of Bathrooms, Bedrooms and Floors

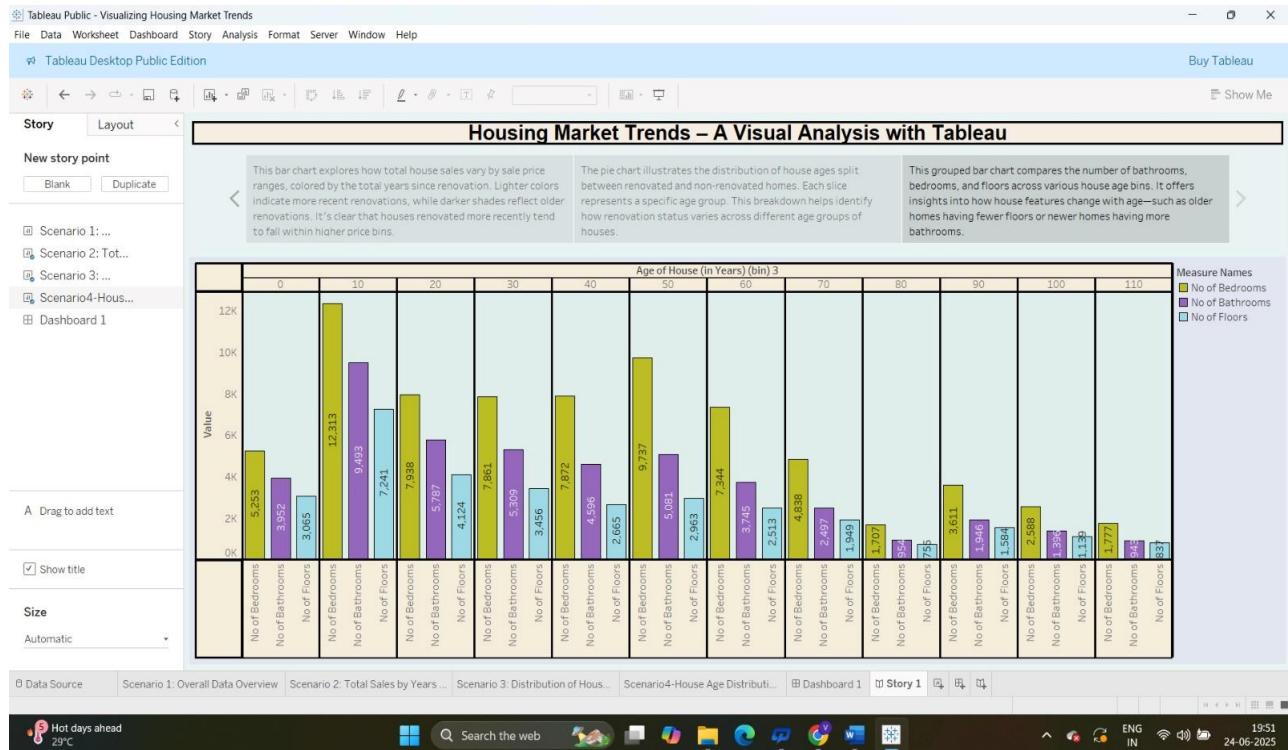


## Dashboard 1:-



## Story 1:-





## 8 ADVANTAGES & DISADVANTAGES:- Advantages:

- Visualizes complex housing data easily
  - Helps analysts and buyers make quicker decisions
  - Saves time through interactivity and filters
- Disadvantages:**
- Limited to available dataset features
  - Real-time data updates not automated in Tableau Public

## 9 CONCLUSION:-

This project successfully analyzed housing market trends using Tableau. Visualizations highlighted how renovation years, house age, and property features impact sale price and buyer decisions.

**10 FUTURE SCOPE:-**

- Add real-time data integration
- Use predictive models for price forecasting
- Expand to include location-based insights (geographic dashboards)

## 11. APPENDIX

- **Source Code:** N/A (Tableau is low-code)
- **Dataset Link:-**  
[https://public.tableau.com/views/VisualizingHousingMarketTrends/Dashboard1?:language=enUS&publish=yes&:sid=&:redirect=auth&:&display\\_count=n&:&origin=viz\\_share\\_link](https://public.tableau.com/views/VisualizingHousingMarketTrends/Dashboard1?:language=enUS&publish=yes&:sid=&:redirect=auth&:&display_count=n&:&origin=viz_share_link)
- **GitHub & Project Demo Link:-**

**Git hub Link:-**

<https://github.com/SvAbhishek2845/Visualizing-Housing-Market-Trends-An-Analysis-of-Sale-Prices-and-Features-using-Tableau>

**Project Video Demo Link:-**