Final Report

1. INTRODUCTION

1.1 Project Overview

This project titled "Visualizing Housing Market Trends: An Analysis of Sale Prices and Features using Tableau" focuses on understanding how different housing attributes like renovations, number of bedrooms/bathrooms, and house age impact sale prices. Using Tableau, the project presents a dynamic, user-friendly dashboard to assist stakeholders in making data-driven decisions in the real estate market.

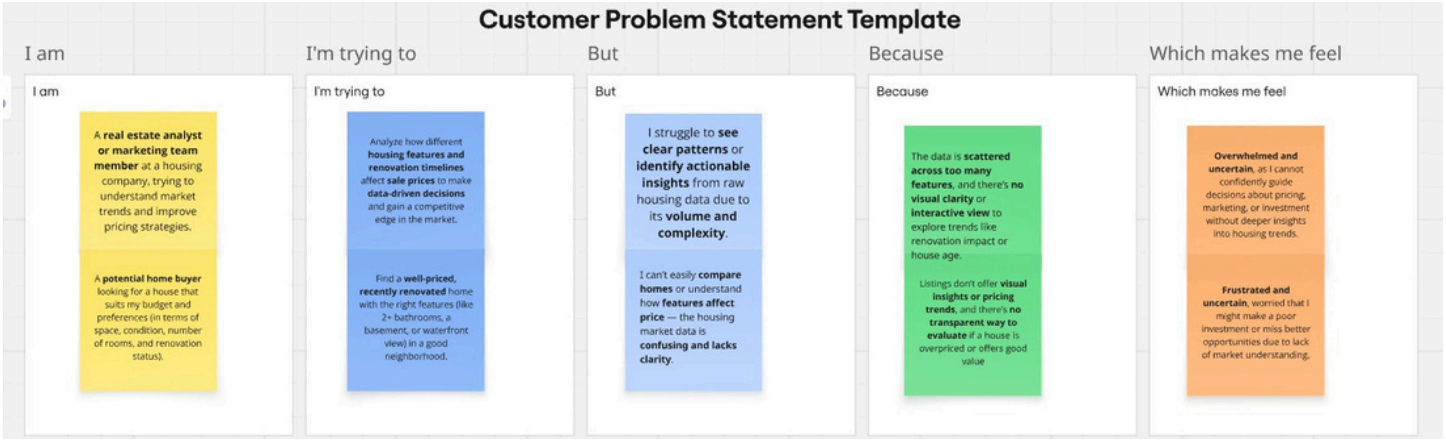
1.2 Purpose

The purpose is to simplify housing data analysis through interactive visualizations, aiding buyers, sellers, and analysts to identify trends, justify pricing, and improve marketing strategies using insights from historical housing data.

2. IDEATION PHASE

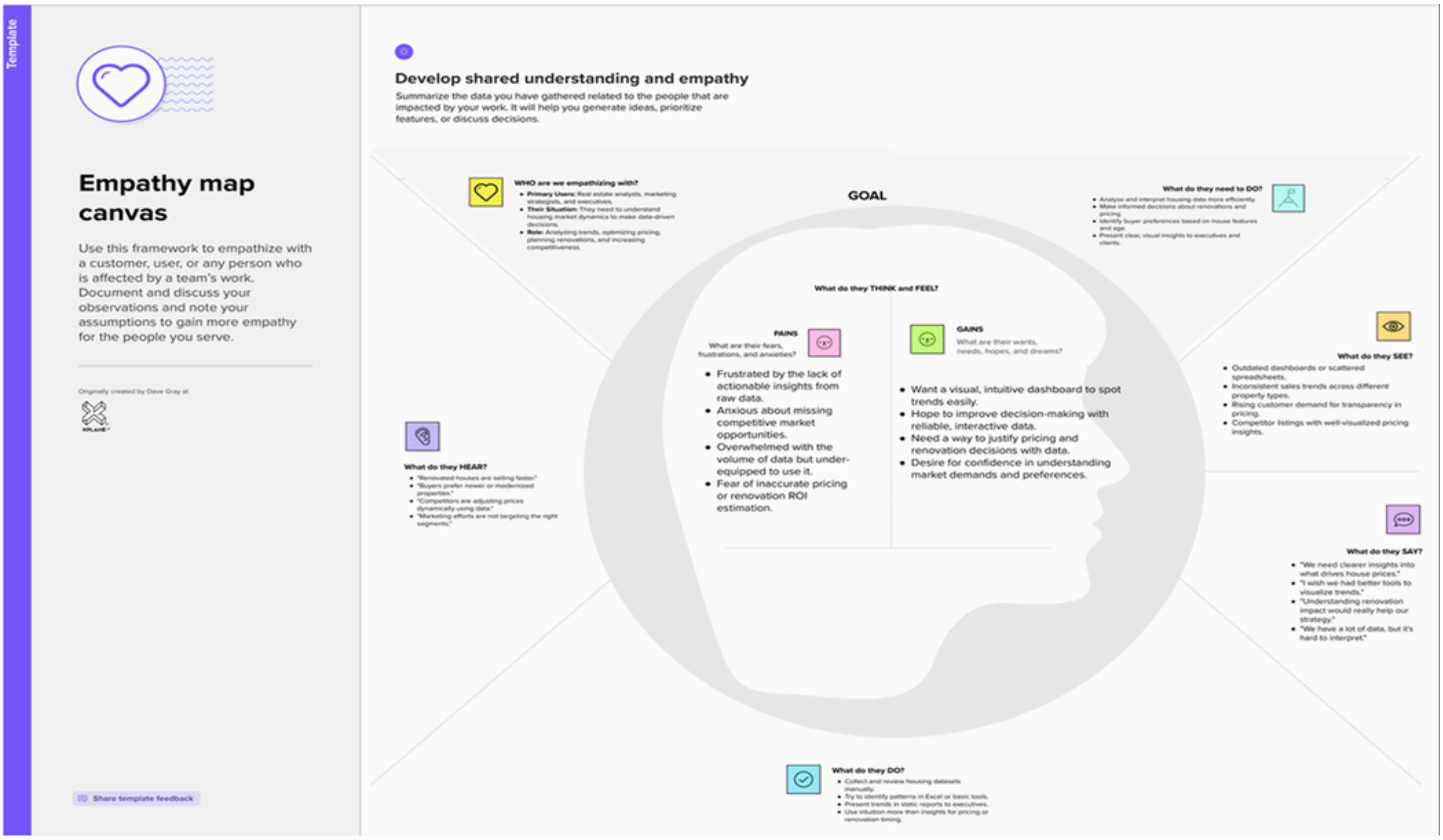
2.1 Problem Statement

Real estate analysts and potential homebuyers struggle to interpret raw housing data due to its complexity and lack of visual clarity. The absence of interactive views makes it difficult to evaluate the effect of features like renovation timelines or house age on sale prices. This leads to uncertainty in pricing, marketing, and investment decisions.



2.2 Empathy Map Canvas

Goals & Motivations: Discover housing trends, justify renovation ROI, segment homes, build reports.Positive Moments: Inspired by visuals, spot patterns, present insights, reuse dashboards.Negative Moments: Dashboard complexity, chart lag, confusion in KPIs.Interactions: Login to Tableau, apply filters, export visuals, refer in meetings.Opportunities: Simplify visuals, improve legends, ensure fast responses.



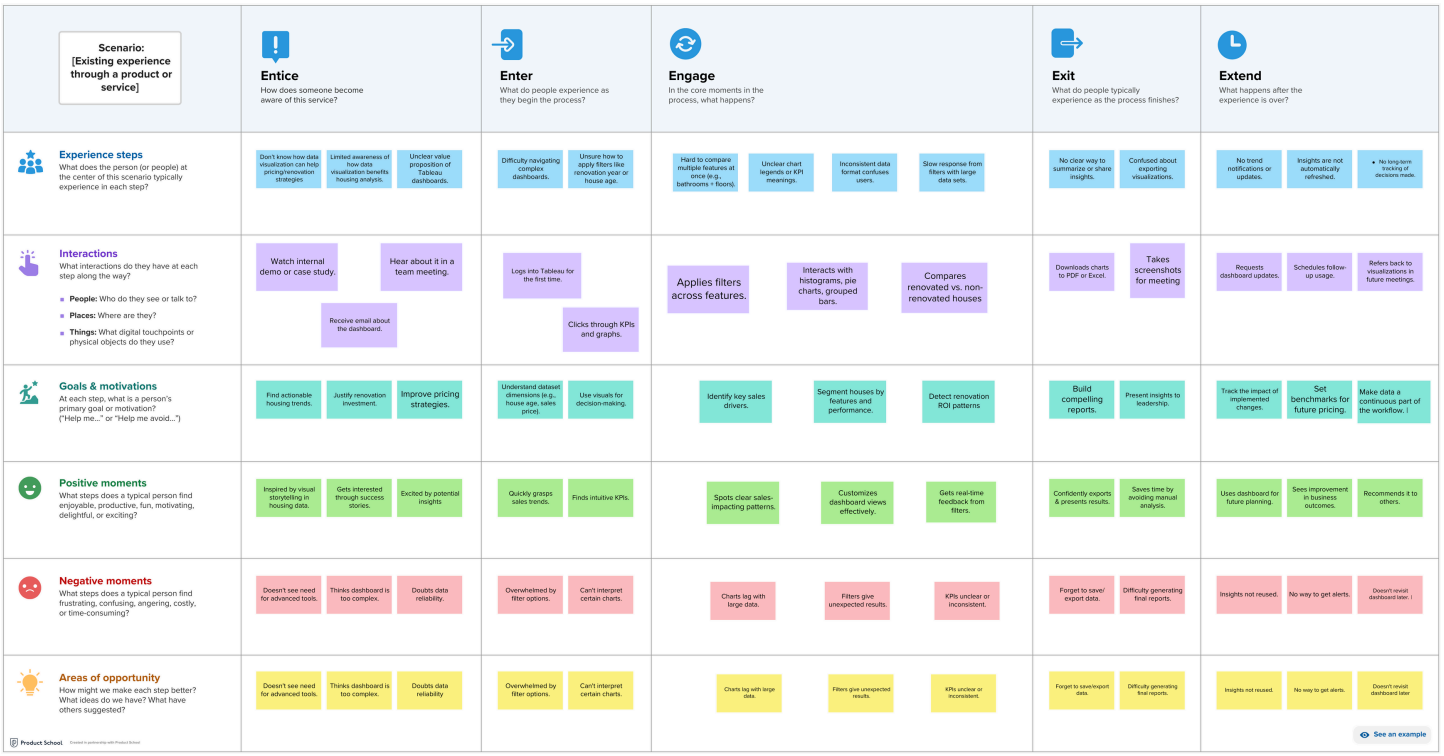
2.3 Brainstorming

Ideas generated revolved around using Tableau for an interactive dashboard, integrating filters for house features, and comparing renovations and age impacts. The problem was refined through team collaboration, with a solution focusing on accessibility, clarity, and actionable insights.

3. REQUIREMENT ANALYSIS

3.1 Customer Journey Map

Customers begin with limited awareness, face difficulty understanding visual tools, and desire actionable insights. By engaging with the dashboard, they explore trends, generate reports, and seek to reuse insights for planning. Long-term engagement can be improved with alerts and continuous updates.

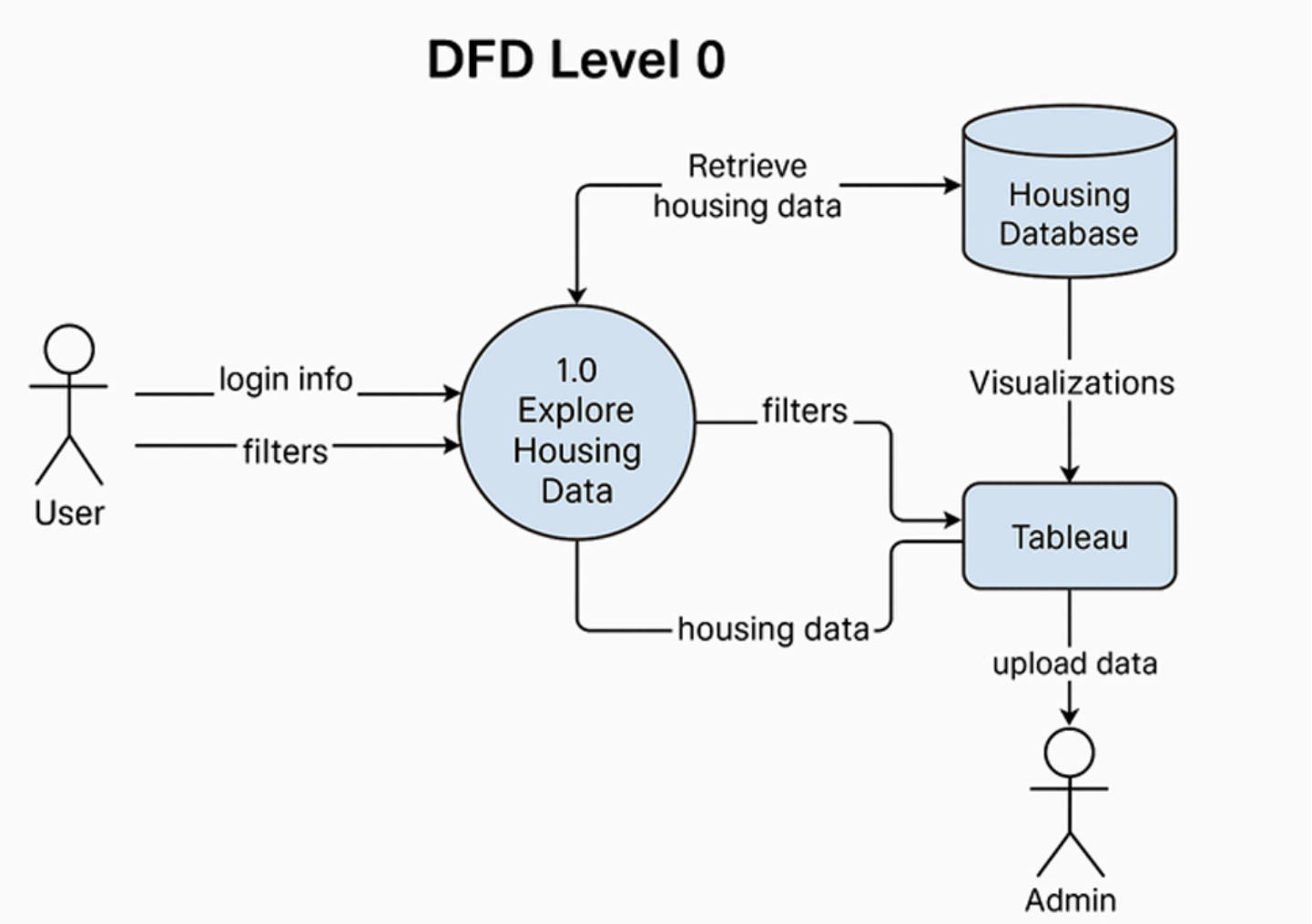


3.2 Solution Requirement

Functional Requirements:- Load housing data from Excel/CSV- Filter data by features (house age, renovations, etc.)- Generate diverse visualizations- Enable interactive dashboard elements Non-functional Requirements:- Usability: Easy-to-use Tableau interface- Security: Restricted access- Reliability: Works under different data loads- Performance: Loads in 2–3 seconds- Scalability & Availability

3.3 Data Flow Diagram

Data enters from Excel → Cleaned and filtered in Tableau Prep → Visualized in Tableau → Published on Tableau Public.



3.4 Technology Stack

Data Source: Microsoft Excel Cleaning & Aggregation: Excel / Tableau Prep Visualization Engine: Tableau Desktop / Public User Interaction: Filters, Parameters Geo-Mapping: Tableau Maps Documentation: Google Docs, Word Presentation: PowerPoint / Canva

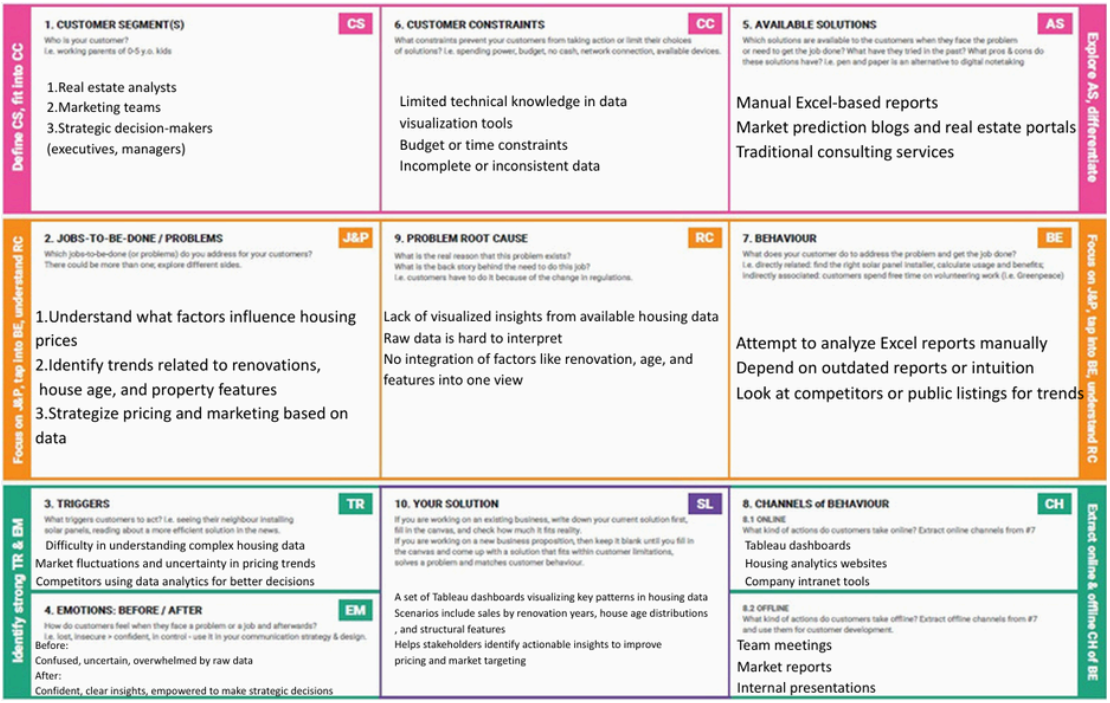
TECHNOLOGY STACK

Component	Description	Technology
Data Source	Source of transformed	Microsoft Excel (.xlsx)
Data Cleaning	Preprocess data (remove missing	Excel / Tableau Prep
Data Aggregation	Group and summarize data	Tableau (Calculated
Visualization Engine	Generate visual charts like	Tableau Desktop / Tableau Public
User Interaction Layer	Add filters, dropdowns,	Tableau Filters & Parameters
Geo-Mapping	Show houses on map based on	Tableau Map Visualization
Hosting & Sharing	Publish dashboards for	Tableau Public
Documentation	Record brainstorming,	Google Docs / Microsoft Word
Presentation Layer	Display final output to stakeholders and evaluators	Microsoft PowerPoint / Canva

4. PROJECT DESIGN

4.1 Problem-Solution Fit

Real estate professionals face difficulty analyzing complex datasets. The Tableau dashboard allows them to uncover patterns, make better pricing decisions, and track housing trends. Before: manual and unclear analysis. After: confident decision-making with clear insights.



4.2 Proposed Solution

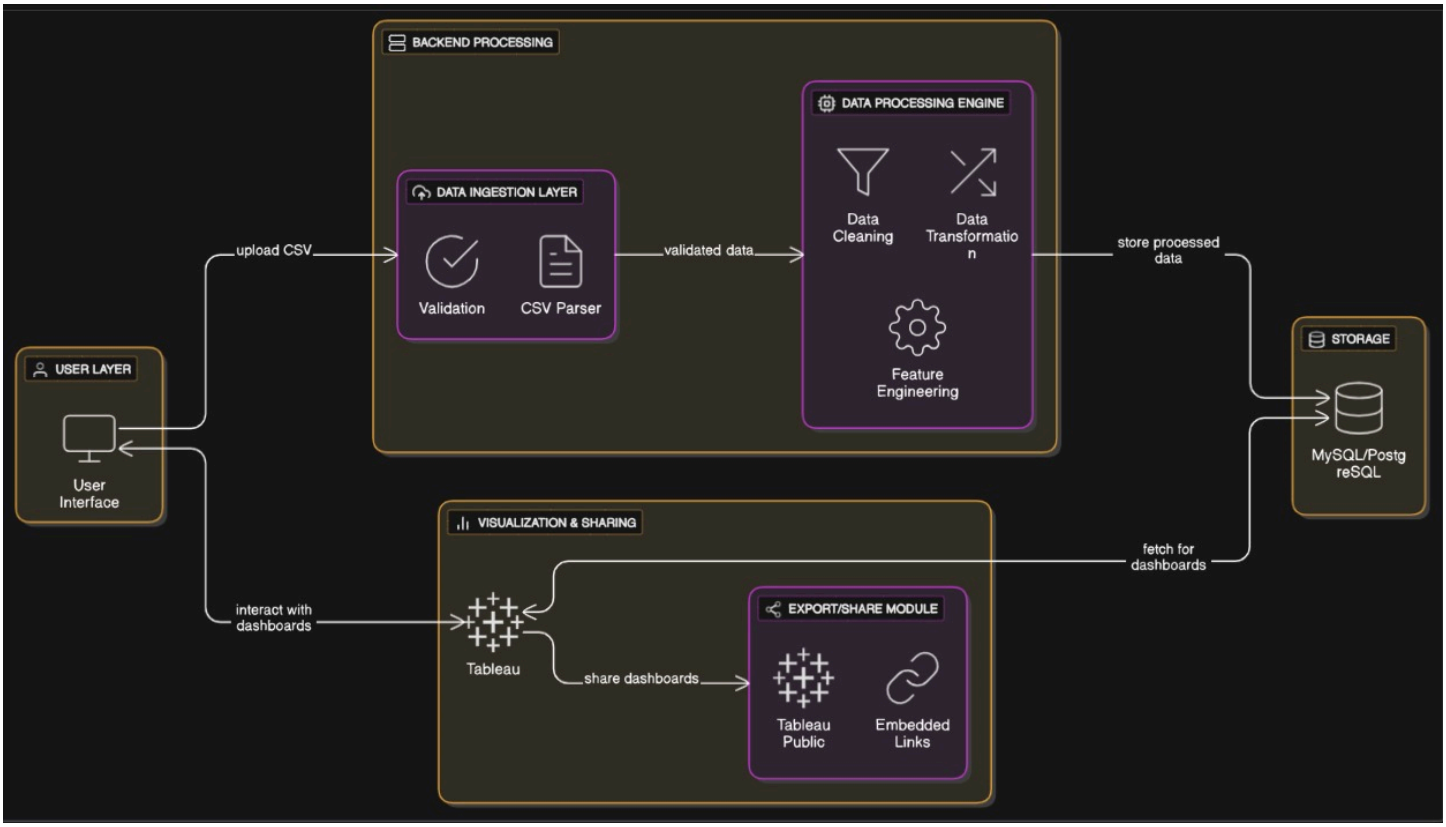
An interactive Tableau dashboard integrating sale price, renovation status, and structural features like bedrooms/bathrooms.

It offers real-time filtering and storytelling to explain trends and improve decision-making. Novelty: No-code dashboard with multiple integrated views.

Social Impact: Informed buyers and sellers, improved pricing transparency. Business Model: SaaS, consulting services, dashboard subscriptions. Scalability: Expandable to include more cities, features, KPIs.

4.3 Solution Architecture

Architecture includes components like:- Data ingestion from Excel- Preprocessing and transformation in Tableau- Visualization and interaction layers- Hosting and sharing via Tableau Public



5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

Sprint 1:- Data Collection (2 points)

Data Cleaning (3 points)

Feature Engineering (2 points)

Sprint 2:- Visualizations (5 points)

Dashboard Design (3 points)

Filters and Interactivity (3 points)

Story Narration (2 points)

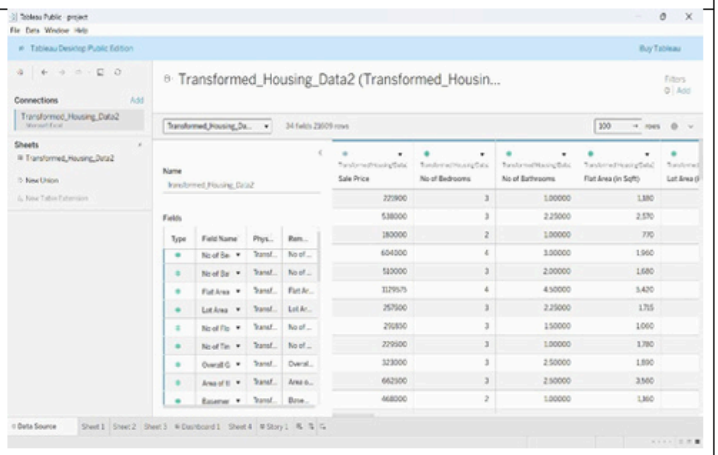
Publishing Dashboard (3 points)

Velocity: 12 points per sprint

6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance Testing

- Data cleaned, missing values removed, and categorical variables encoded- Filters applied on Sale Year, Location, Bedrooms, Sale Condition- Visuals included: Avg Price by Zip, Price per Sq Ft, Renovation Age- Total of 4 visualizations with 3 story captions

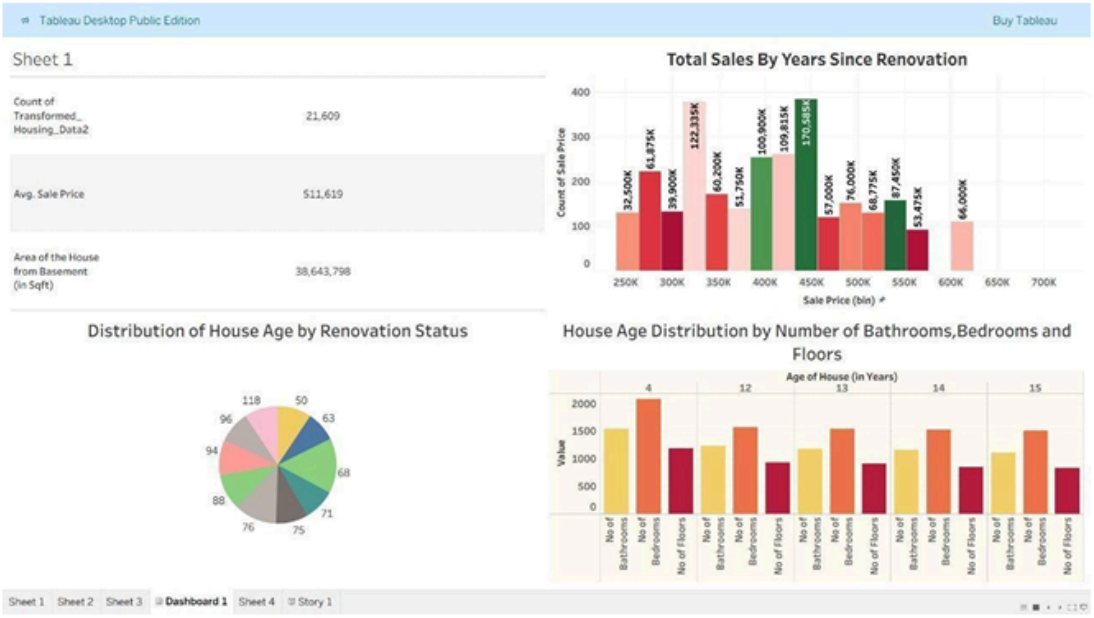
S.No.	Parameter	Screenshot / Values
1.	Data Rendered	
2.	Data Preprocessing	Data cleaned for null values, removed outliers, encoded categorical variables.
3.	Utilization of Filters	Filters applied on Sale Year, Location, Bedrooms, and Sale Condition.
4.	Calculation fields Used	- Average Price by Zip Code - Price per Sq Ft - Renovation Age
5.	Dashboard design	No. of Visualizations / Graphs: 4 Includes bar charts, pie charts, and histograms.
6	Story Design	No. of Visualizations / Graphs: 3 Structured narrative on housing price trends, regional differences, and feature correlations.

7. RESULTS

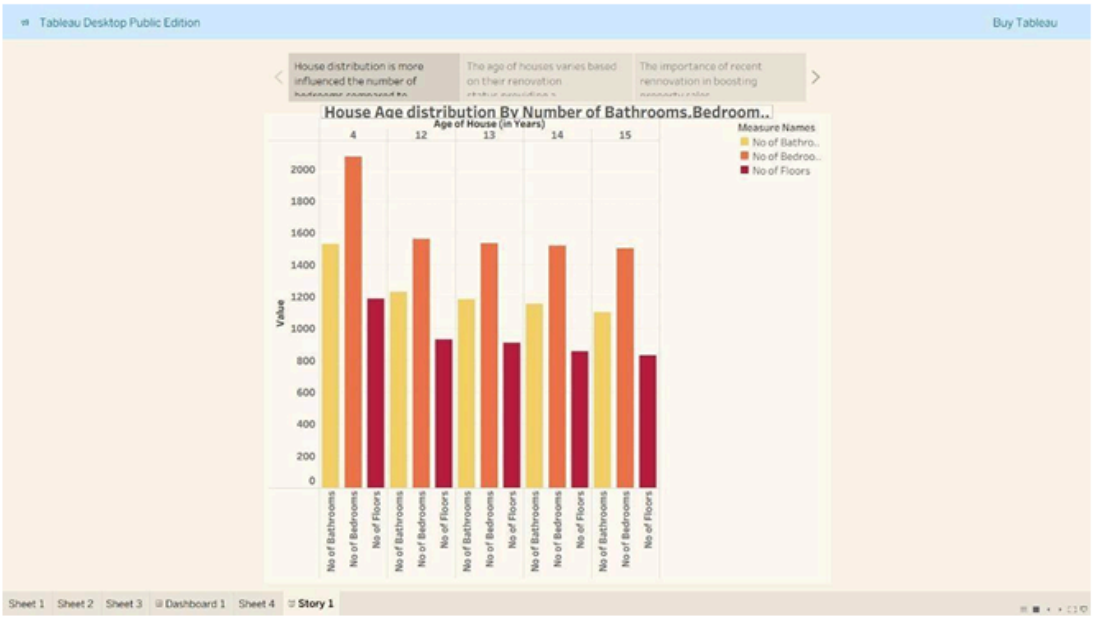
7.1 Output Screenshots

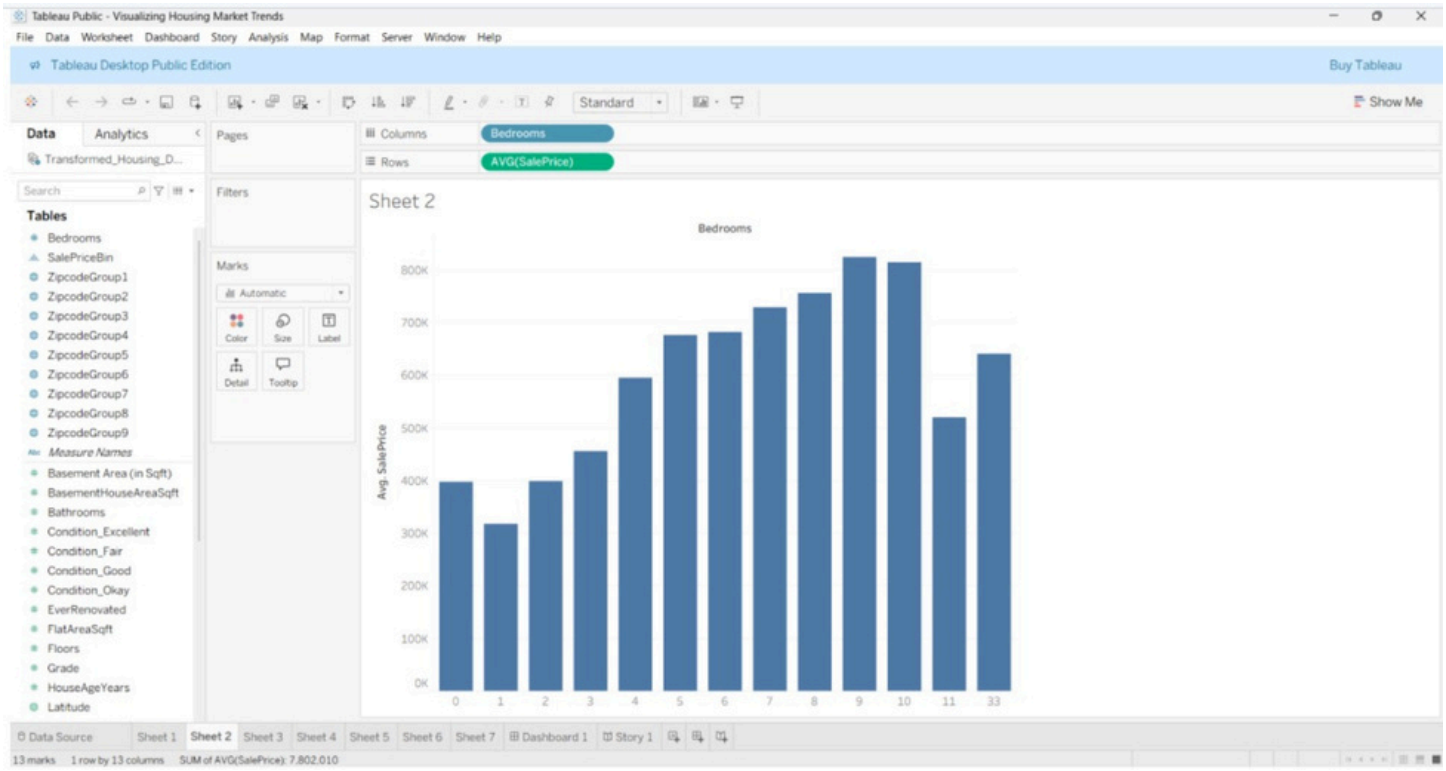
Screenshots to be attached showing dashboard features such as bar, pie, map, and histogram charts.

Dashboard:



Story:





8. ADVANTAGES & DISADVANTAGES

Advantages:-

1. Interactive and user-friendly- No coding required- Quick insights and visual trends- Suitable for non-tech users

2. Converts complex housing datasets into easy-to-understand dashboards using charts, maps, and filters.

3. Enables buyers, sellers, and investors to make informed decisions based on location, time, and property features.

Disadvantages:-

1. Depends on Tableau availability- Limited external customization- Filters may slow down on large datasets

2. Tableau is excellent for visual analysis, but not ideal for complex statistical modeling (e.g., regression analysis, predictive forecasting).

3. Tableau Public may experience lag when working with very large datasets unless optimized.

9. CONCLUSION

1.The project demonstrates how visual analytics empower real estate decision-making. Tableau transforms raw data into a comprehensible and interactive tool, helping stakeholders take strategic actions with confidence.

2.The project successfully transformed raw housing data into interactive dashboards that reveal key trends, such as seasonal pricing fluctuations, feature-driven price impacts, and regional disparities in home values. Through visual tools like time-series charts, scatter plots, and geographic heat maps, the solution supports intuitive exploration of the market and addresses the information gap faced by non-technical stakeholders.

3.Despite limitations such as dependency on data quality and some analytical constraints, the project highlights the clear advantage of combining data storytelling with interactive visual analytics. It lays the groundwork for future enhancements such as real-time data integration, predictive modeling, or embedding within a broader property advisory platform.

10. FUTURE SCOPE

1. Add real-time data integration from housing platforms- Expand KPIs to include eco-ratings or walk scores- Extend coverage across more regions- Incorporate predictive models for pricing trends

2.Predictive Analytics & Forecasting • Enhance Tableau with external tools (like Python, R, or machine learning APIs) to forecast future housing prices based on historical trends, inflation, and economic indicators. • Helps users anticipate market movements and prepare investment strategies.

3. Advanced Feature Correlation • Add multivariate analysis to examine how combinations of features (e.g., square footage + location + age) influence prices. • Use heatmaps, bubble charts, and regression overlays for deeper insights.

4. Voice and AI Chat Integration • Integrate voice-enabled filters or AI chatbots to help users explore insights using natural language (e.g., “Show me areas with the highest price growth in 2024”).

11. APPENDIX

Dataset Link: https://www.kaggle.com/datasets/rituparnaghosh18/transformed-housing-data-2

Demo Video: Demo video.mp4

GitHub / Project Demo Link:
GitHub - Rishmitha08/Visualizing-Housing-Market-Trends-An-Analysis-of-Sale-Prices-and-Features-using-Tab...