# Urban Growth and Housing Prices for Various Places Over Time

## Basic Info

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Link to project repository

## Background and Motivation

We chose this topic for a number of reasons:

1. Real estate investing:
    i. We are curious to see which places have grown in population/housing price the most/least over time and to then be able to piece together reasons for why this is and what to expect moving forward.
2. Home purchases and budgeting:
    i. The decision to either buy a home or rent is always a topic worthy of discussion. Seeing what housing prices are for various places over time can then be used to compare rental rates to be able to decide which path is best for each person.
3. Population growth and job opportunities:
    i. With urban growth comes opportunities for companies to relocate to fit the demand in each region or vice-a-versa. This allows for decision making of where to move that has a job that best fits your skill set. We also would like to see GDP by state to see if there are any key factors for movements.

## Project Objectives

**What would we like to learn and accomplish?**

1. How Urban Growth has affected housing prices over time in different locations.

2. To understand which regions have experienced the fastest growth and which regions have seen the greatest increase in housing costs.
3. To better understand how market rates change based on population size.

# Data

We plan on gathering the following data:

1. Urban growth data:
    i. This will come from population and urban density from the US census bureau, and other open-source data platforms. We also plan on gathering information related to the GDP of each state to better understand population shifts and the effects from them.
        1. https://www.census.gov/
        2. https://www.bea.gov/data/gdp/gdp-state
2. Housing price data:
    i. This will come from historical selling prices and current market rates through places such as Zillow, realtor.com, and other government related tax assessment records.
        1. https://www.zillow.com/
        2. https://www.realtor.com/
        3. https://www.bls.gov/eag/home.html

# Data Processing

We expect there to be data cleanup in order to correctly match up data that is gathered from different sources.

We plan to derive urban growth quantities and housing prices for the timeline for the regions we choose to highlight.

**How will data processing be implemented?**

Data will be scraped/read in using a python colab notebook. Inside the notebook is where all cleaning and formatting of the data will be done.

We will also be gathering data from the websites mentioned above as the majority of them have .csv files available for download that can easily be formatted to match each other.

# Visualization Design

Develop three alternative prototype designs for your visualization

1. Have a main page with the US states and then sub plots off to the side that can be manipulated based on filters.
2. Have a main page with the US states that can be selected and then have plots off to the side reflect data from the highlighted states.
3. Have a heat map of the US states that reflects growth rate, population, etc that can be toggled.

And one final design that incorporates the best of your three designs

- A geographical map where different regions are color coded based on housing prices/population density. With multiple plots on the side.

**Describe your designs and justify your choices of visual encodings.**

Bubble chart for each region that represents the population size and its x/y orientation represents housing prices vs growth rate of population.

A heatmap of each region where darker colors represent higher prices/growth/density with an option to toggle between layers. Include a legend.

An urban growth map that toggles before/after views of housing prices/population density

Line graph (one for population growth and another for housing price trends

# Must-Have Features

A map-based visual that shows each location’s population and housing costs.

Line or bar graph that highlights each region’s population and housing costs over time.

# Optional Features

A map-based visual that shows a prediction of what each region will look like in 5 years, 10 years.

A comparative analysis that allows the user to compare two regions side by side.

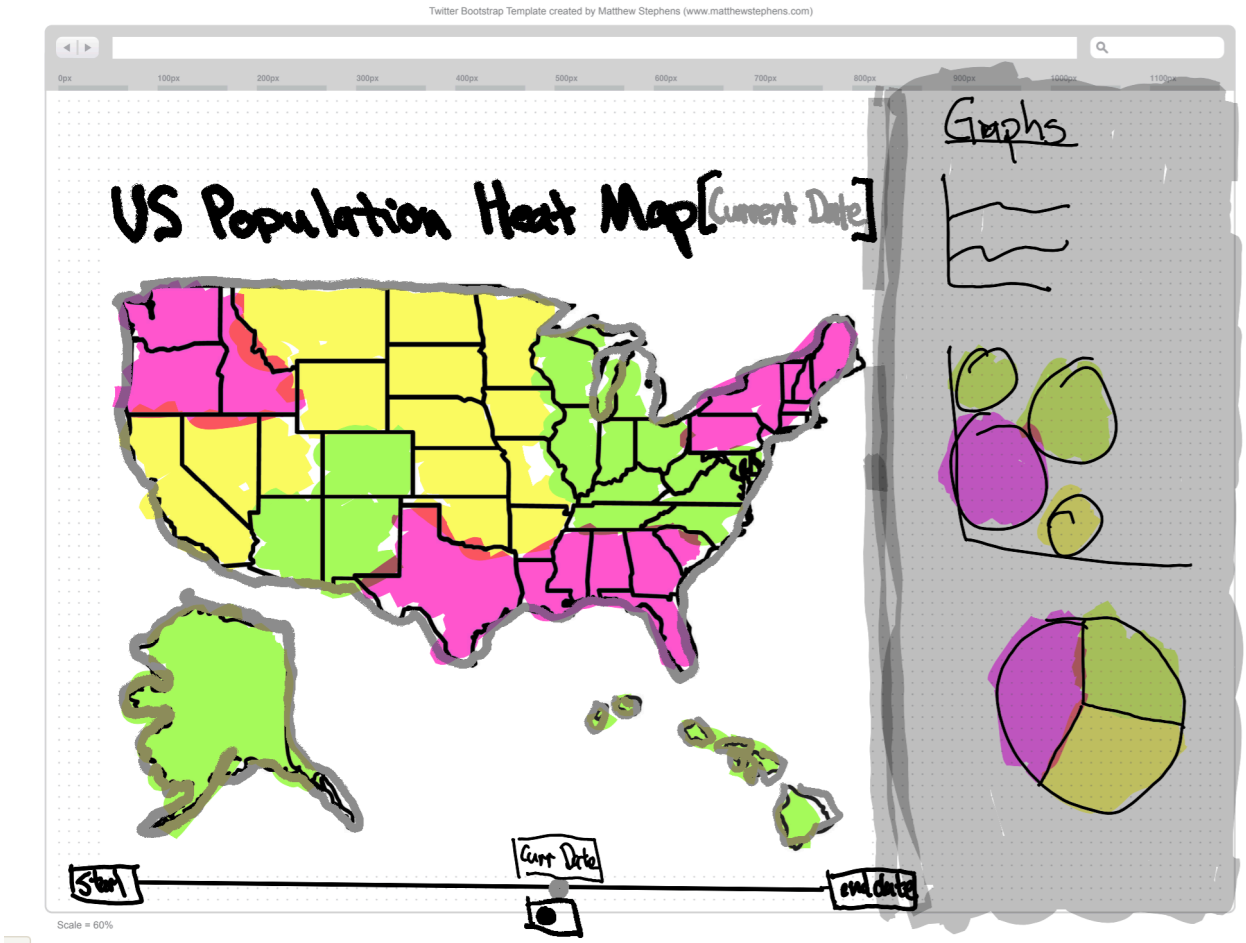
When small regions are selected the counties/cities within the state(s) will be colored individually.

# Project Schedule

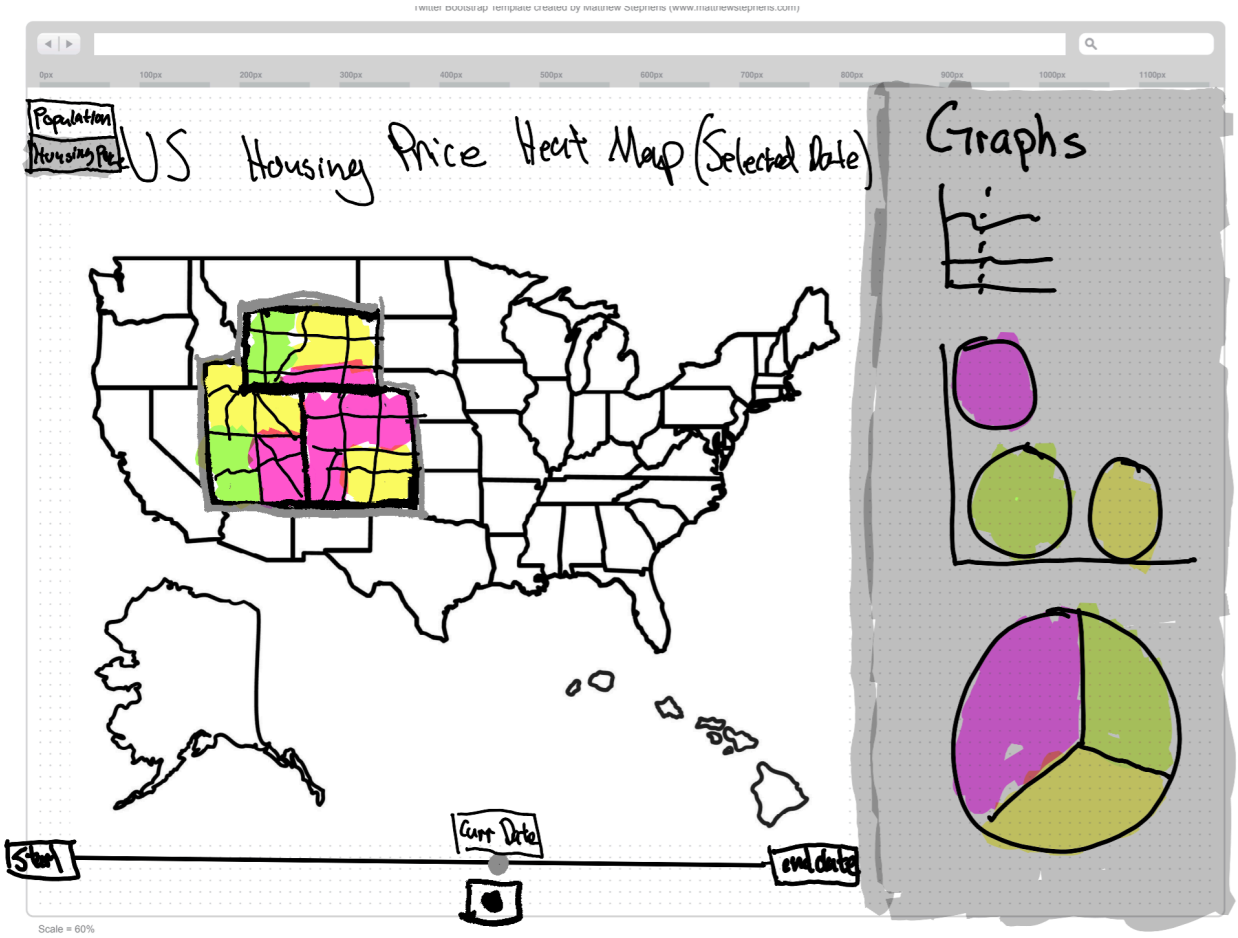
- Week 3 (Sep 2-6)
    - Rough draft of project proposal
    - Create group GitHub repository
- Week 4 (Sep 9-13) Project Proposal Due
    - Complete and turn in Project Proposal
    - Schedule a time to meet with staff member
- Week 5 (Sep 16-20) Project Review w/ Staff (as a group!)
    - Meet with TA for project review
- Week 6 (Sep 23-27) Project Review w/ Staff (as a group!)
    - Gather data needed to implement project
- Week 7 (Sep 30-Oct 4) Midterm Exam
- Week 8 (Oct 7-11) Fall Break
- Week 9 (Oct 14-18)
    - Finish compiling data for project milestone
- Week 10 (Oct 21-25) Project Milestone Due
    - Submit project milestone for review
    - Start coding website
- Week 11 (Oct 28-Nov 1)
    - Code website
- Week 12 (Nov 4-8)
    - Code website/fix bugs
- Week 13 (Nov 11-15)

    - Finish coding website/fix bugs
- Week 14 (Nov 18-22) Project Screencast Submission Due
    - Record and submit Project Screencast
- Week 15 (Nov 25-29)
- Week 16 (Dec 2-6) Final Project Submission / Group Member Feedback Due
- Week 17 (Dec 9-13) Final Exam

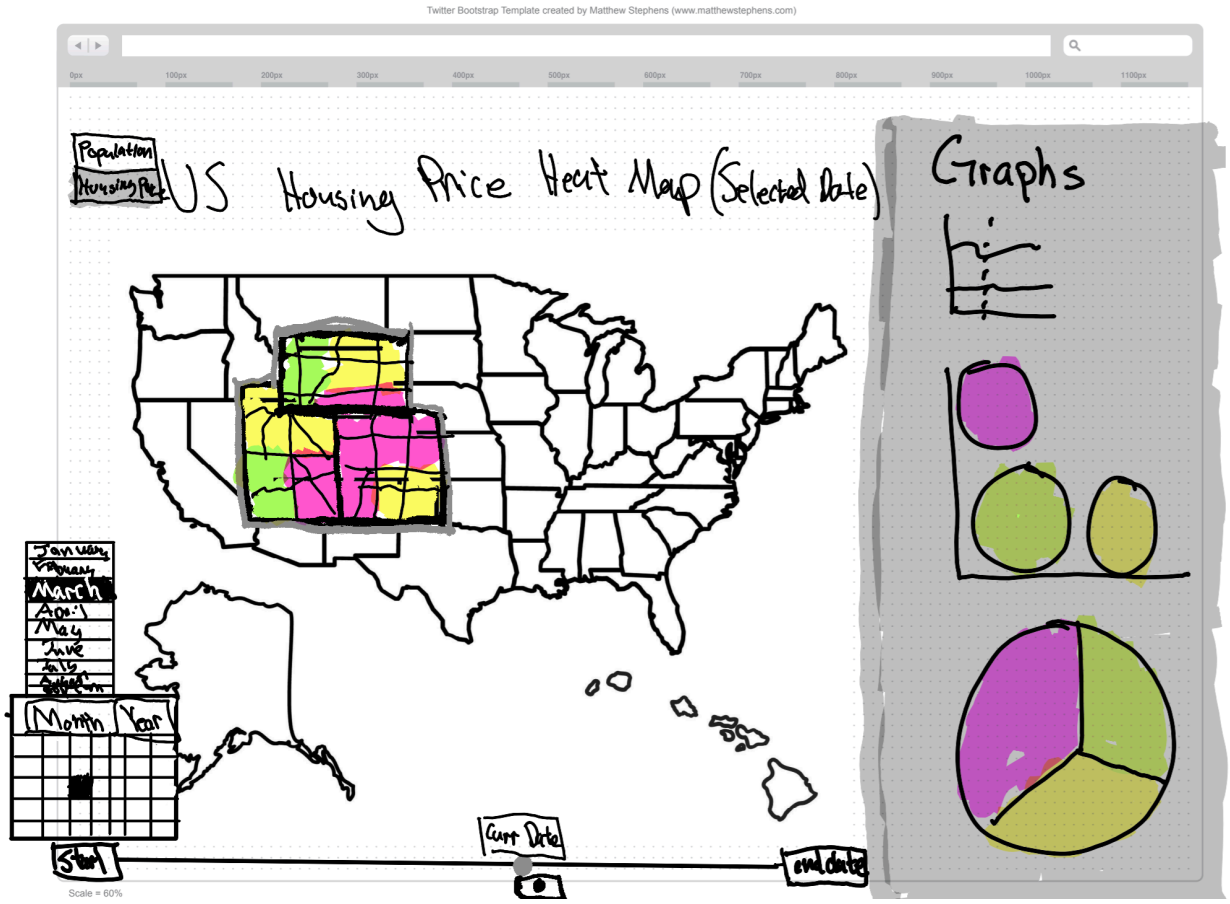
Opening View



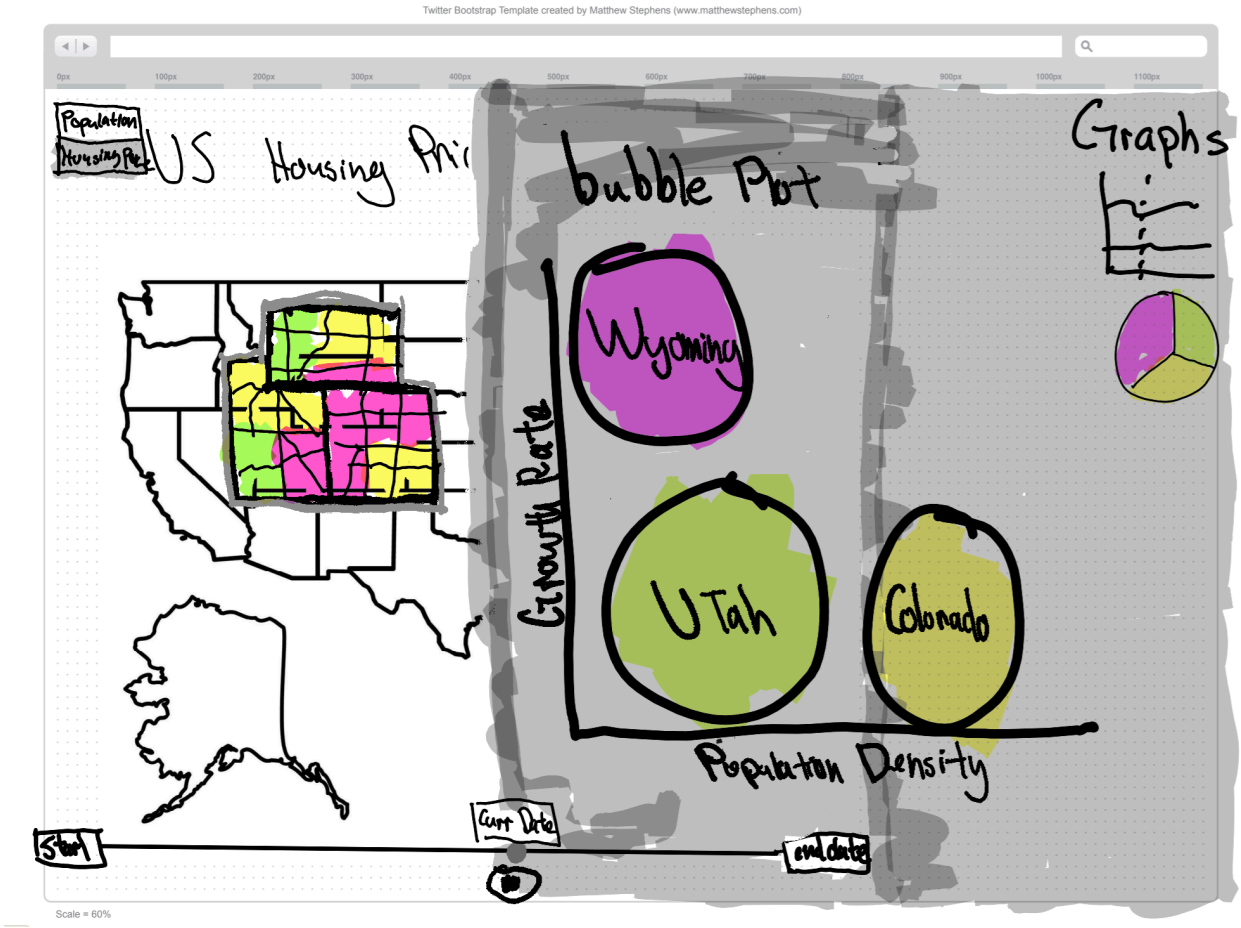
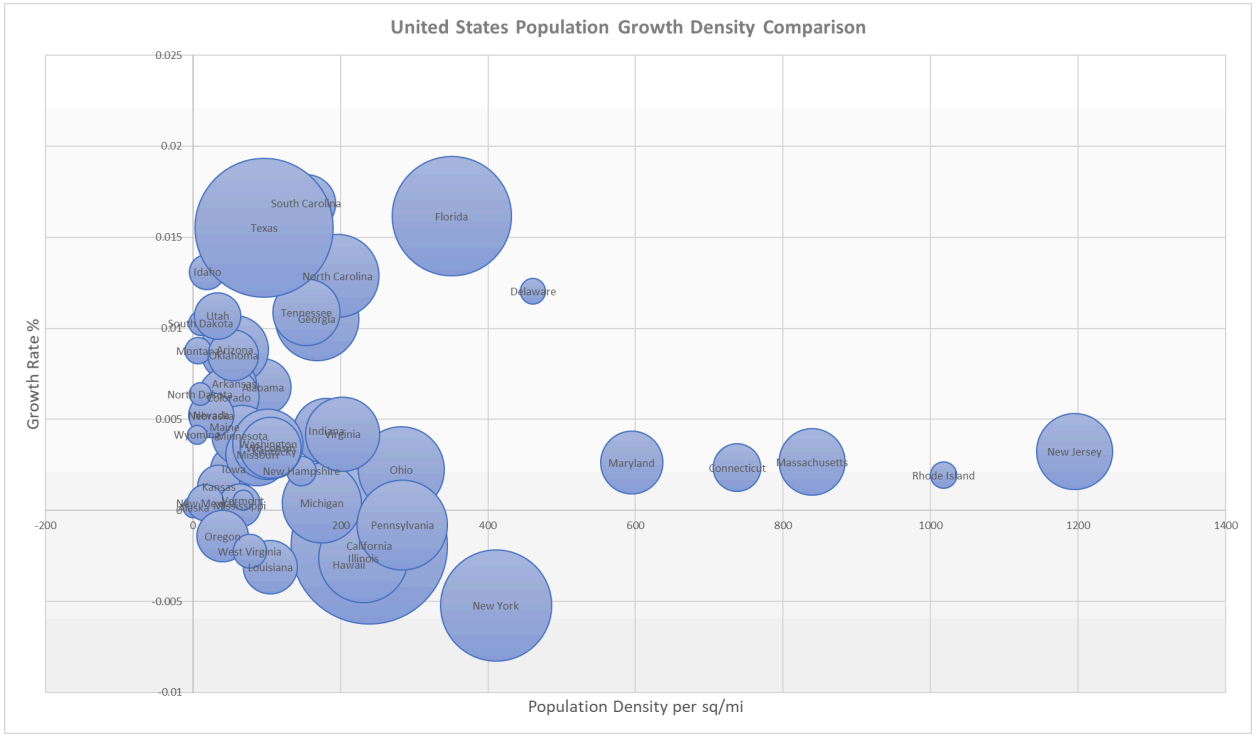
Region Selection



Choose starting dates for animation



Enlarging a graph



Bubble plot example of the states with population vs growth rate vs density