**Data Bootcamp Project 1 – Climate Study**

**Team Members**

* Will Davis
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* Jessica Snowden

**Project Ideas**

* Question: How much has the average high temperature for the 5 largest cities in the USA changed over the past 10 years (2010-2019)?
* Question: How much has the average annual precipitation for the 5 largest cities in the USA changed over the past 10 years (2010-2019)?
* Question: Is there a relationship between average high temperature and average annual precipitation?

**Data Exploration**

* What are the largest 5 cities?
  + Use Census data to determine the 5 largest cities
    - Find .csv or API with population by city
    - Sort descending by population
    - Drop all but top 5
* What is the annual high temperature for each city?
  + Using VisualCrossingAPI, pull daily high temperature by city for years 2010-2019
  + Compress data into measure of central tendency
    - Max high temperature for each city for each year
* What is the annual precipitation by location?
  + Using VIsualCrossingAPI, pull daily precipitation by city for years 2010-2019
  + Compress data into measure of central tendency
    - Sum for each city for each year
* Notes / Considerations
  + 10 years of data = total of 18,261 values (1826-1827 per year)
  + We can compress/reduce this data to by choosing a way to represent each year with a single value of temperature and precipitation

**Proposed Analysis and Output Graphics**

* Map (1) showing 5 largest cities
  + Cities represented by dot where size = population
* Line graph (1) showing average temperature by year for all 5 cities (on same plot)
* Line graph (1) showing annual precipitation by year for all 5 cities (on same plot)
* Scatter plots (5) showing relationship between average temperature (x-axis) and annual precipitation (y-axis) for each city
  + Plot regression lines on each scatter plot

**Project Plan**

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| --- | --- | --- | --- | --- | --- |
| Date | Day | Will | Mohamed | Thaimu | Jessica |
| Oct 9 | Day 1: Define | Brainstorm ideas | Brainstorm ideas | Brainstorm ideas | Brainstorm ideas |
| Oct 10 | Day 2: Develop | Draft & submit proposal via Slack  Temperature Data   * Explore API (Open Weather) * Identify data fields for temperature * Understand parameters | Population Data   * Explore API * Identify data fields for population * Understand parameters | Precipitation Data   * Explore API (Open Weather) * Identify data fields for precipitation * Understand parameters | Temperature Data   * Explore API (Open Weather) * Identify data fields for temperature * Understand parameters |
| Oct 16 | Day 3: Develop | Develop dummy dataframe assuming values of precipitation and max temperature  Code approach to compress data   * Sum of precipitation data for annual value * Average of high temperature data for annual value   Output into dataframe | Identify API  Code data call to get population by city data  Identify 5 largest cities, capture these data elements:   * city\_name * city\_pop * city\_lat * city\_long   Output into .csv file for importing into a dataframe | Develop dataframe with timestamp values needed for API call; timestamps will be for 2023  Code data call to get precipitation data for NYC for 2023  Output into dataframe | Develop dataframe with timestamp values needed for API call; timestamps will be for 2023  Code data call to get max temperature data for NYC for 2023  Output into dataframe |
| Oct 17 | Day 4: Refine |  |  |  |  |
| Oct 21 | Day 5: Finalize |  |  |  |  |
| Oct 23 | Day 6: Deliver |  |  |  |  |

**Deliverables**

* Final code for project fully commented and annotated
* PowerPoint presentation that outlines approach, shows sample Dataframes, displays any output graphics, draws 2-3 observations/conclusions from the data analysis