Problem: Predicting building permit issue time in urban areas
A building permit is an official approval issued by the local governmental agency that allows you or your contractor to proceed with a construction or remodeling project on your property. Those who would like to construct, enlarge, alter, repair, move, remove, improve, convert, or demolish a building or other structure typically apply for a building permit. Unfortunately, building permits are often times the longest item in a project schedule; e.g. 2-3 years for a newly constructed low-rise building). Cities review applications on a first-come, first-serve basis and must check relevant plans to ensure they meet local building codes. I would like to predict the building permit issue time for SF and/or NYC.

Sources:
https://www.thespruce.com/what-is-a-building-permit-1398344
http://laramielive.com/ask-the-city-why-do-building-permits-take-so-much-time/
Client: Urban Real Estate Developers / homeowners / Building departments

1. Real estate developers may use the prediction to better optimize their project portfolio to consider reduced project timelines, which should improve their bottom line.
2. Homeowners, especially those inexperienced in the building permitting process, will obtain more accurate time estimates for permitting and reduce reliance on anecdotal advice from building contractors/building department.
3. Building departments could better triage requests to potentially reduce response turnaround time.

Sample Data: Major urban areas with high housing costs
Data will be obtained from large urban areas, such as NYC and/or SF.
https://data.cityofnewyork.us/Housing-Development/DOB-Permit-Issuance/ipu4-2q9a
https://www.kaggle.com/aparnashastry/building-permit-applications-data

Methodology:
- Wrangle the data from major city websites (e.g. NYC, SF, etc.)
- Clean data sources from each city. The dependent variable is building permit time.
- Exploratory Data Analysis:
    - Visualizations of building permit frequencies
    - What is the variance between and within cities for building permit issue times (ANOVA or t-test)?
    - How is affordable housing prioritized compared to luxury housing developments?
    - How does the local building code affect permitting issue times? E.g. evaluating building plans to comply with seismic requirements may require longer wait times.
- Building permit data typically contains both numerical and categorical data, so both regression and supervised classification algorithms shall be used to predict the building permit time.
    - Regression: # of days to obtain a permit
    - Classification: Small, moderate, large wait time categories, or binary (less than one week, or more than one week)
- Document and summarize results

Deliverables:
- PPT to present at a Springboard office hour
- Jupyter Notebook for detailed explanation and analysis
- Github repository