Midterm – URP-5393: Urban Planning Methods II

Objective: Assess students' knowledge and application of Urban Planning Methods
Instructions:

- Accept the midterm repository invite and create your private repository (sent to your UTSA email)
- Open the file "Midterm_Template_Neighborhood Change in San Antonio.Rmd" and complete each of the tasks required in part 1. When done click on 'knit' and the commit and push your part 1.
- Create a copy of the previous file and rename it "githubuser_URP5393project.Rmd". Complete each of the tasks required in part 2. When done click on 'knit' and the commit and push your part 2.
- All work is individual. All final answers are due on 03/13/2022 at 23:59. Only 2 commits will be reviewed. Commits pushed after the due date will not be reviewed.

1. [80 points] **Pre-defined research question based on ACS data.**

1.1. [5 points] Complete the conceptual framework to consider income as a new variable in the analysis. Provide a clear description explaining what type of variable income is and what potential biases could be present when analyzing the role of home values and income to measure neighborhood change.

1.2. [5 points] State a second Null Hypothesis ($H0_2$) in the same fashion as the provided example to investigate the growth in median household income between 2014-2019

1.3. [5 points] Look for the appropriate variable in the ACS data dictionary and provide an operationalization description detailing unit of analysis, timeframe and variable definitions.

1.4. [5 points] Download and merge the 2014 and the 2019 data in a single object. Change the variable names from "estimate" to "estimate_mhi_14" (same for 2019). Calculate two new variables following the same steps as it is shown for the income variable: "mhi_growth" and "disp_mhi_growth". Provide a summary statistics table.

1.5. [5 points] Merge the home value and income data into a single object (adding columns to the right).

1.6. [5 points] Provide a choropleth leaflet map of the variable "mhi_growth". Provide an interpretation.

1.7. [5 points] Provide a boxplot of the "mhi_growth" variable by disproportionate status. Provide an interpretation.

1.8. [10 points] Select and implement the appropriate statistical method to test if there is a significant association between the number of census tracts classified as having disproportionate income growth and disproportionate home value growth. Provide an interpretation.

1.9. [10 points] Select and implement the appropriate statistical method to test if there is a significant difference between the average values of the median *home value* growth across the disproportionate median *income* growth categorization. Provide an interpretation.

1.10. [5 points] Select and implement the appropriate statistical method to calculate the correlation between median *home value* growth and median *income* growth. Provide an interpretation.
1.11. [15 points] Merge your data with the council_districts.csv data. Filter your data dropping all census tracts that have missing values on the council-district variable. Select and implement the appropriate statistical method to test if there is a significant difference between the average values of the median *home value* growth across council districts. Provide an interpretation.
1.12. [5 points] Provide a scatter plot showing the relationship between the "median_homevalue_growth" and the "median_income_growth". Place the variable you think should be the "dependent variable" in the Y axis, and the independent variable in the X axis. Provide an interpretation.

2. [30 points] Student-lead research question based on ACS data.

2.1. [5 points] Write a short introductory paragraph providing the context of your topic and a description of the problem your research intends to address.
2.2. [3 points] Provide a short flow diagram of your conceptual framework. If possible, provide a paragraph describing the relationships between concepts (causal mechanism).
2.3. [2 points] State at least one main null hypothesis and one secondary null hypothesis that you would like to test (Hint: Null hypotheses are statements informed from your expectations (based on theories) about what you would expect to be the relationship between variables of interest)
2.4. [5 points] Provide a short paragraph describing your data. Include sources, chosen timeframe, unit of analysis, variables of interest (describing variable types and roles - dependent or independent). Provide a Table of Descriptive Statistics of the main variables to be used in your analysis.
2.5. [15 points] Provide at least two statistical tests based on your data. Provide a clear interpretation of the results.