UCLA Extension Data Science Intensive

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Project 1

- Submit your results (including R script and any output you got) through Canvas.

A. Using R to Write a Formula to Calculate the Mortgage Payment

- Taylor wanted to buy a house with a price $582,000. She could only afford the down payment 20% of the price, which is $116,400. Therefore she went to the bank to ask for a 30-years mortgage loan for $465,600. The banker told her the current (annual) fixed mortgage rate is 4.5%. The amortized mortgages have the following formula to show Taylor's future monthly repayment for this mortgage.
  x is the total amount of loan (in the case, x=465,600)
  z is the mortgage interest rate (in the case, z=0.045)
  y is the years of the loan (in the case, y=30)
  c is the monthly mortgage rate (in the case, c=z/12)
  n is the total months of the loan (in the case, n=y*12)
  p is the monthly repayment for Taylor

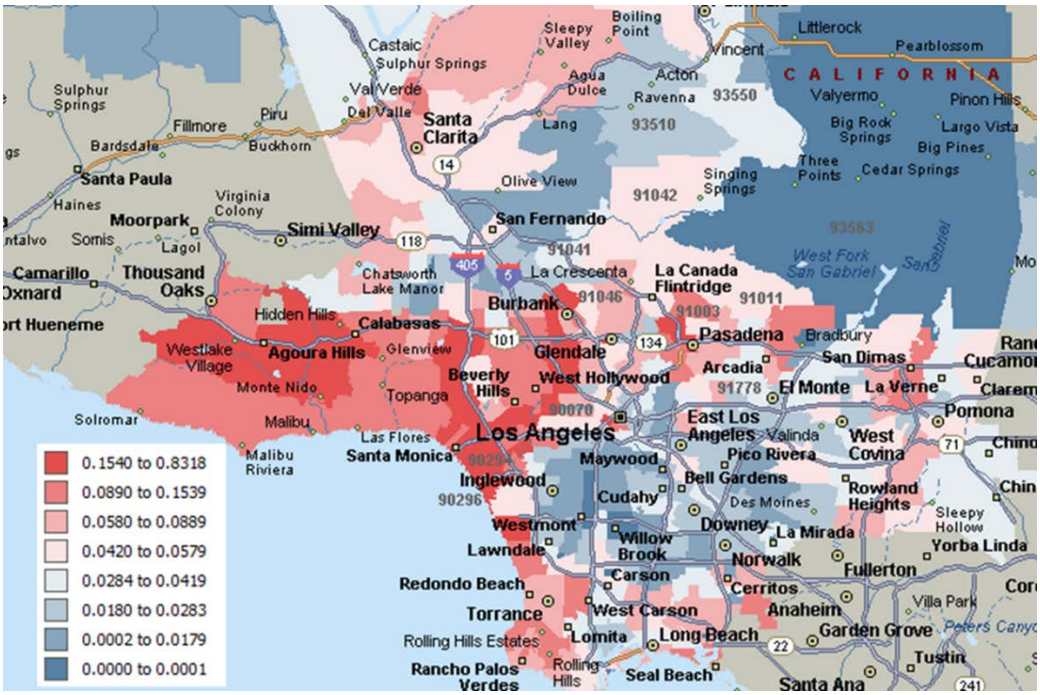
$$p = \frac{x \cdot [c \cdot (1+c)^n]}{(1+c)^n - 1}$$

- How much will be the monthly payment for Taylor?
- Use RStudio script to write a simple code to show the result for Taylor.
- [Note: R can only read data x=465600 instead of 465,600.]

B. Calculate the Density of Tech Job by Zip Code in Los Angeles

- Read my report: "The Tech Industry in California and Los Angeles," for Anderson Forecast Q3 Economic Outlook as well as my presentation slides.
- We are going to calculate the data I use for Figure 7 (as shown below) in the report or Slides page #9. We will learn to plot the data in the map for the future project in coming weeks.
- Download the data (P01_LA zipcode payroll.xlsx) into your computer.
- You need to produce the data output in which to show the payroll employment for the total industry, the information sector, and the professional, scientific, & technical skills sector aligned by zip code in 2017.
- And then calculate the percentage of tech job= (information jobs + professional scientific technical jobs) / total jobs
- Reminder and Hint:

- There might be a lot of data cleaning/management to do this project. For instance:
  - Replacing NA with some value.
  - Remove “Total” in Zip Code column.
  - Replace ***** with 0
  - Covert Column 5 and 6 from character to Numeric
  - E.g. laz2017[,c(1,5:6)]=sapply(laz2017[c(1,5:6)], as.numeric)
  - Install “dplyr) and use some function such as left_join in order to line up the zip code.
  - You can use functions such as “subset” and “gsub”.
  - If it doesn’t work in the beginning, try to convert the data you import to data.frame. Such as:
    laz2017 <- data.frame(read_excel("P01_LA zipcode payroll.xlsx", sheet="2017"))
- Don’t get frustrated if it doesn’t work! Almost many things will not work for everyone.



C. Bonus project

If you can modify D01b_hs R Script to make the Excel/CSV output more appealing and closer to a desirable one (such as W01d_hs1.all.xlsx), you will get a bonus.