**Overview**

In this assignment you will practice using the regression algorithm to create a model for explaining the interest rate for home loans that were granted in the state of Illinois.

**Instructions**

1. **(1 point)** Create a code chunk to complete the following tasks:
   1. Load the following packages: tidyverse, magrittr, lubridate, and corrplot. (You may need to install those packages if you have not already done so.)
   2. Read in the hmdaInterestRate.rds file.
   3. Report the structure of the dataframe. (No need to comment on the structure.)
2. **(1 point)** Data preparation:
   1. Replace the values in the following columns with the same value divided by 1,000: loan\_amount, property\_value, and income. (This will make it easier to see the impact on the interest rate.)
   2. Create a new column, ltp, that is equal to the values in the loan\_amount column divided by the values in the property\_value column.
   3. Filter the data to keep observations for which income is less than 300 (i.e., $300,000).
   4. Report a summary of all columns. (No need to comment on the summary of the columns.)
3. **(2 points)** Create a correlation plot of the following columns: interest\_rate, ltp, income, applicant\_age, property\_value, and loan\_amount.
   1. Below the plot, identify what variable has the strongest negative correlation with interest\_rate. Comment on what might explain why that correlation is negative.
4. **(2 points)** Regress interest rate on ltp. Interpret the coefficient estimate on ltp.
5. **(2 points)** Regress interest rate on ltp and loan\_amount. Comment on the change in the adjusted R-squared, as well as the change in the coefficient on ltp.
6. **(2 points)** Regress interest rate on ltp, loan\_amount, and aus\_1. Interpret the new coefficients.

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**Submission\***

1. You are given one data file: hmdaInterestRate.rds.
2. Familiarize yourself with the selected data columns by reading about the data on this website:<https://ffiec.cfpb.gov/documentation/2018/lar-data-fields/>
3. Open RStudio and set the folder that contains the hmdaInterestRate.rds file as your working directory.
4. Open a new RMD file and set the title as “HE Assignment 5 – Regression”.
5. Respond to each requirement with a separate header and code chunk in the RMD file.
6. Save your file as a .rmd file, and name it \_HW5.rmd.
7. Compress the .rmd file as a .zip or .rar file.
8. Submit the .zip or .rar file on Compass2g before the deadline.