ECON 57: Economic Statistics - R Programming Lab 1

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The labs in ECON 57: Economic Statistics are designed to solidify your comprehension of course concepts while fostering problem-solving skills. By engaging in hands-on coding exercises, you'll reinforce your understanding of variables, data types, conditionals, and more. As exercises progressively increase in complexity, you'll develop the analytical mindset required for addressing intricate economic questions. These labs also encourage independent learning by introducing concepts not yet covered in class. Utilizing external resources like Google, Stack Overflow, or ChatGPT mirrors real-world problem-solving scenarios, empowering you to effectively apply your existing knowledge. Embrace these challenges as opportunities to grow, both in coding prowess and in your grasp of the dynamic relationship between statistics and economics.

All of these exercises can be solved with chatGPT. I encourage you to take the hard route and first give them a genuine try yourself, utilizing chatGPT as an assistant to help you brainstorm, fix bugs or test ideas instead of having it do all the work for you.

Submission guidelines: All of your work should be done in an R notebook. Create an R notebook in Rstudio and name it with the following format "firstName_LastName_Lab1.rmd". Write your solutions in separate code cells and use markdown to format the notebook. **This lab is due Friday September 22 at 11:59pm.**

Exercise 1: Define and provide an example for each of the following R data types: integer, float, string, boolean, vector, factor. How might these data types be used to represent economic data?

Exercise 2: Create a boolean variable `isStudent` and set it to `TRUE`. Use an if-else statement to print "You are a student" if `isStudent` is true, otherwise print "You are not a student."

Exercise 3: Create a vector `testScores` with 9 sample test scores from 0 to 100 (e.g., 85, 92, 78, 60). Calculate and print the average test score.

Exercise 4: Create a matrix `sales` representing sales data for three products over four quarters. Populate it with sample sales figures. Calculate and print the total sales for each product and quarter.

Exercise 5: Write a function that takes in a vector of incomes and prints out the income along with the income group they belong to (low-income less than 20000, middle-income greater than 20000 but less than 75000, and high-income if greater than 75000). Test you function with the following vector c(12000, 10000, 45222, 4500, 120000, 60000, 87000). Hint: You will need to implement your knowledge of conditionals and the paste() function to combine strings with variables. A sample output may look like "12000 - low income, 10000 - low income, 45222 - middle income, ...".

Exercise 6: Create a bar chart to visualize the distribution of categorical data representing the preferred mode of transportation among students. For this, set on 3 methods of transportation and collect data by interviewing at least 10 of your friends or classmates.

Exercise 7: Write a function that calculates the factorial of a given positive integer. Test the function with different values.

Exercise 8: Create a loop to print the first 10 even numbers.

Exercise 9: Calculate the mean, median, standard deviation, and range of a vector of 20 test scores. You must create this vector. Hint: 20 is a lot of numbers to write manually, can you think of a way to use loops to make your life easier?

Exercise 10: Generate a scatter plot using two vectors: one representing the number of hours studied and the other representing corresponding test scores.