Homework Assignment: Week 4

Assignment Due: Sunday, January 30, 2022 by Midnight CT

Submit electronic solutions to drop box in BrightSpace

For each question, you must turn in the R code as well as the answer. You may turn in one code file with the answers to each question (in fact, that is encouraged and probably easiest).

1. Enter the matrix in R Find the transpose of this matrix.

2. Enter the vector [6, 2, 5] and find the product of this vector with the matrix in problem 1. Think about the order.

3. Enter the following matrices in R: . Complete the following operations: A+ B, A\*B and B\*A.

4 Find the determinant of matrix A in problem 3.

5. Solve the following system of linear equations for x1, x2, and x3, in R.

6. A study is done to test the effect of vitamin C on tooth growth. The following data were collected:

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Dose [mg/kg] | 0.10 | 0.20 | 0.25 | 0.30 | 0.45 | 0.55 | 0.70 | 0.90 | 1.00 |
| Length of tooth | 1.01 | 1.73 | 1.82 | 2.01 | 3.12 | 3.78 | 6.38 | 7.91 | 9.12 |

a) Make a scatter plot of the data

b) Complete a linear regression of the data and plot the best-fit line on the scatter plot

c) Report the p value for the slope an intercept.

d) Using the fit results as a model, what tooth growth would be expected for a dose of 0.65 mg/kg?

7. Project

The final project, due at the end of the course, will be an analysis of health data for City X. The mayor has come to you and asked if you could provide: 1) a general statement regarding the health of City X and 2) some sort of way of predicting illness, especially the more drastic illnesses. If you think these are vague descriptions you are correct, but they are real!

For this homework, you have been provided with a dataset called Health of CityX.csv. Implement the Exploratory Data Analysis (EDA) process and use it to help focus the mayor’s questions and at the same time provide you with an interesting question or two to tackle (Note, you are not bound to these questions and may change these questions as you see fit as the project progresses through the remainder of the term.)

Turn in a statement of the question(s), a brief description of the EDA tasks you did to arrive at the question(s), and plots and summary statistics that you feel make the question(s) both interesting and what the mayor wants.