CSCI 3900C Project V (50 points)

Write an R Markdown document to perform and report the analysis described below. Your report should explain (in paragraph form using full sentences) the process you followed, the results you obtained, and some interpretation of those results. Embedded in the report should be the code that was used to obtain the results, as well as appropriate figures and plots to illustrate those results. Each result should have some accompanying verbal explanation (do NOT just show code and results!)

Publish your final compiled html file in RPubs, and submit your work as follows:

- Upload your .Rmd source file to the Project V D2L drop box.
- With your dropbox submission, include the URL for your published file on RPubs

Analysis Tasks

- Load the ToothGrowth data set (included with R data sets). [Read the help file for this data set to familiarize yourself with the data; you will need to include some of this information in your report to provide context and explain what you are doing.]
- Create plots to compare growth. Make a ***single plot*** for each bullet item below. Each plot should show side-by-side boxplots to allow comparison.
    - By delivery method of supplement
    - By dosage
    - By both variables combined
- Describe any trends evident in the plots.
- Construct a 95% confidence interval for mean amount of growth one could expect for
    - Guinea pigs who receive a supplement as ascorbic acid (any dosage)
    - Guinea pigs who receive 2 mg of the supplement, delivered via orange juice
- Conduct t-tests* to compare mean growth between the following pairs.
    - Between guinea pigs who receive ascorbic acid and those who receive orange juice, regardless of dosage (2-sided test)
    - Between guinea pigs who receive a 1 mg dose from orange juice and those who receive a 2 mg dose from orange juice (1-sided test)
    - Between guinea pigs who receive a 1 mg dose from ascorbic acid and those who receive a 2 mg dose from ascorbic acid (1-sided test)
    - Between guinea pigs who receive a 1 mg dose from ascorbic acid and those who receive a 1 mg dose from orange juice (2-sided test)
    - Between guinea pigs who receive a 2 mg dose from ascorbic acid and those who receive a 2 mg dose from orange juice (2-sided test)

  For each of the above hypothesis tests, include the following in your report:

    1. A statement of null and alternative hypotheses, using appropriate symbols
    2. The code used to run the report, with output
    3. A sentence that tells the reader the value of the test statistic and p-value from the test
    4. 1-2 sentences explaining ***what the test result means***. The explanation should address ***at a minimum*** the following questions:
        - ✓ Is the result significant at a standard significance level of .05?
        - ✓ Does the result lead you to reject the null hypothesis?
        - ✓ What 2 populations are being compared, and does the result suggest that there is a true difference between these two populations?

* *There are certain assumptions about the data that should be checked before a t-test is conducted. You may assume these assumptions have been checked and the required conditions are met.*