M13 Problem Set: Multiple Linear Regression for TAs

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In this problem set, we'll utilize the same dataset from Module 12 (simple linear regression). Here, our focus is on exploring the potential relationship between plant growth and two key variables: temperature and rainfall.

With two factors influencing plant growth across various locations, your task is to conduct a multiple linear regression analysis to unveil this relationship.

Assume that the data is normal (normally distributed).

1. Based on the multiple linear regression analysis, write the regression equation that models the relationship between log-transformed plant height, temperature, and rainfall.

2. Summarize: Write a concise one paragraph summary of this analysis. Remember that any summary should include the following:

a. Statement of the research hypothesis or study objectives.

b. Brief summary of methods (one sentence or less).

c. Statement of the statistical results (including type of test and shorthand: R-squared= obtained value, p = 0.xxx).

d. Description of any differences, if meaningful, along with an interpretation of why these results make sense (or don't make sense).

1. Based on the multiple linear regression analysis, write the regression equation that models the relationship between log-transformed plant height, temperature, and rainfall.

```
# log(Plant_Height)= -0.3295 + (0.02832*Temperature) + (0.0002463*Rainfall)
```

#1. Import libraries and load packages

```
library(tidyverse)
library(dplyr)
library(readxl)
```

#2. importing our data

```
Plant_height <- read.csv(file = "Plant_height.csv", header = TRUE)
```

#3. Run a Simple Regresion

```
model <- lm(loght ~ temp + rain, data = Plant_height)
summary(model)
```

```
##
## Call:
```

```
## lm(formula = loght ~ temp + rain, data = Plant_height)
##
## Residuals:
##      Min      1Q   Median      3Q      Max
## -1.84556 -0.49216  0.00175  0.40639  1.62168
##
## Coefficients:
##               Estimate Std. Error t value Pr(>|t|)
## (Intercept) -3.295e-01  1.031e-01  -3.197 0.001648 **
## temp         2.832e-02  6.441e-03   4.396 1.91e-05 ***
## rain         2.463e-04  6.208e-05   3.968 0.000106 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.6578 on 175 degrees of freedom
## Multiple R-squared:  0.3085, Adjusted R-squared:  0.3006
## F-statistic: 39.03 on 2 and 175 DF,  p-value: 9.616e-15
```