MATH 3080 Lab Project 5

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- Problem 1 (10.8)

Remember: I expect to see commentary either in the text, in the code with comments created using `#`*, or (preferably) both!* ***Failing to do so may result in lost points!***

Problem 1 (10.8)

A study of the properties of metal plate-connected trusses used for roof support("Modeling Joints Made with Light-Gauge Metal Connector Plates," Forest Products J., 1979:39-44) yielded the following observations on axial-stiffness index (kips/in.) for plate lengths 4, 6, 8, 10, and 12 in: (Use the following R codes to create the data frame.)

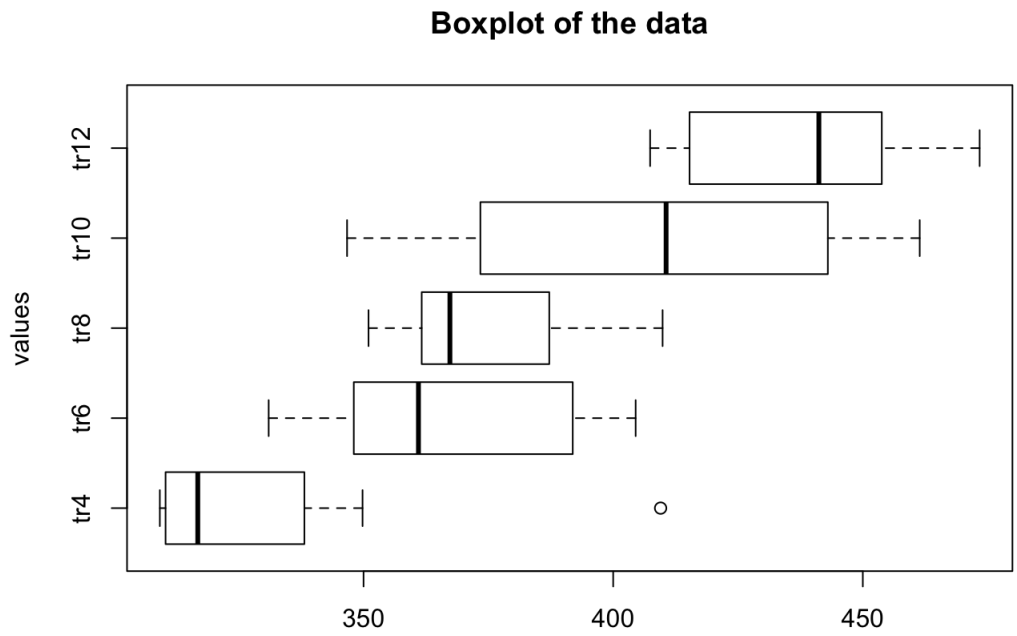
```
tr4 = c(309.2, 409.5, 311, 326.5, 316.8, 349.8, 309.7)
tr6 = c(402.1, 347.2, 361, 404.5, 331, 348.9, 381.7)
tr8 = c(392.4, 366.2, 351, 357.1, 409.9, 367.3, 382)
tr10 = c(346.7, 452.9, 461.4, 433.1, 410.6, 384.2, 362.6)
tr12 = c(407.4, 441.8, 419.9, 410.7, 473.4, 441.2, 465.8)
axial.data = stack(list(tr4 = tr4, tr6 = tr6, tr8 = tr8, tr10 = tr10, tr12 = tr12))
# anova:
a <- aov(lm(values ~ ind, data = axial.data))

summary(a)
```

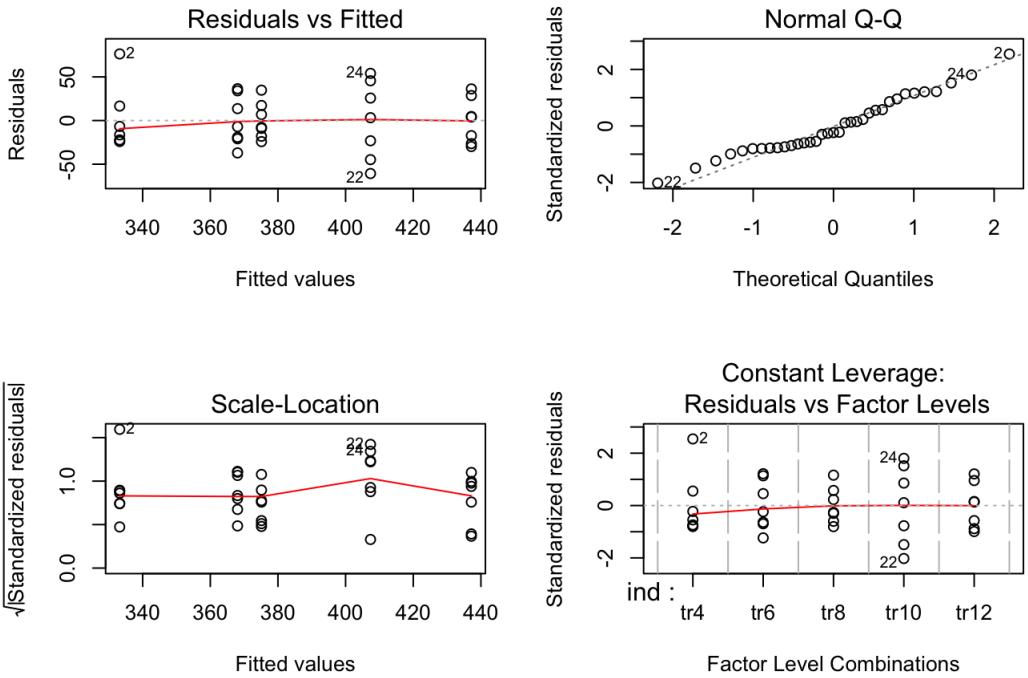
```
##             Df Sum Sq Mean Sq F value   Pr(>F)
## ind          4  43993   10998   10.48 1.96e-05 ***
## Residuals   30  31475    1049
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
# colr <- c('yellow3','slateblue1','sienna3','wheat1','palegreen')

# plot:
boxplot(values ~ ind, data = axial.data, ylab = "values", main = "Boxplot of the data",
    horizontal = TRUE)
```



```
par(mfrow = c(2, 2))
plot(a)
```



Does variation in plate length have any effect on true average axial stiffness? State and test the relevant hypotheses using ANOVA with alpha=0.01. Display your results in an ANOVA table. And make sure to test the assumptions for using ANOVA.

```
# Your code here
```