STAT 400 - Discussion 7

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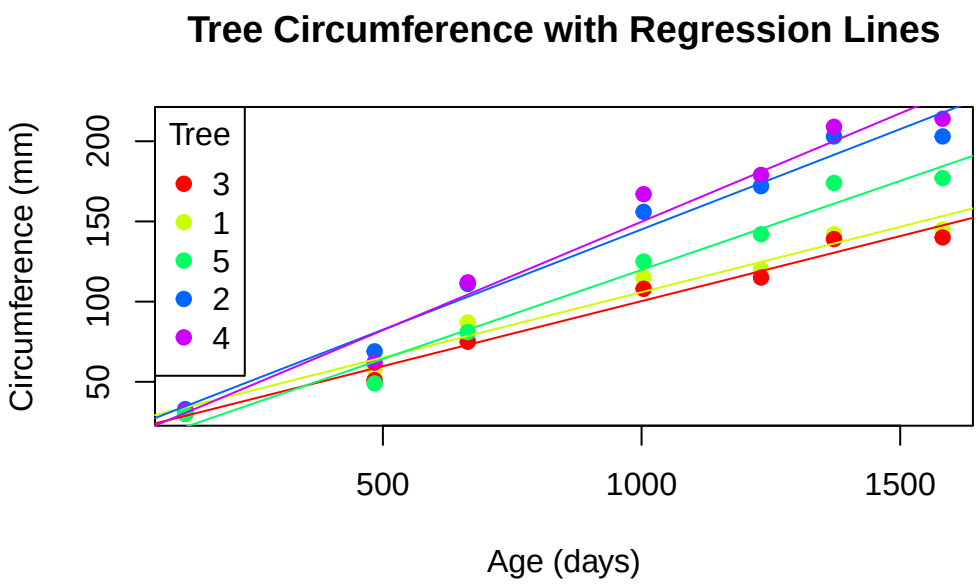
Relatable Variables - Orange Age and Circumfrence

```
data("Orange")
head(Orange)
```

```
  Tree  age circumference
1    1  118            30
2    1  484            58
3    1  664            87
4    1 1004           115
5    1 1231           120
6    1 1372           142
```

```
# Assign specific colors to each tree level
tree_levels <- levels(Orange$Tree)
tree_colors <- setNames(rainbow(length(tree_levels)), tree_levels)

plot(Orange$age, Orange$circumference,
     main = "Tree Circumference with Regression Lines",
     xlab = "Age (days)",
     ylab = "Circumference (mm)",
     col = tree_colors[Orange$Tree], pch = 19)

for (tree in tree_levels) {
  tree_data <- Orange[Orange$Tree == tree, ]
  abline(lm(circumference ~ age, data = tree_data), col = tree_colors[tree])
}
```

```
legend("topleft", legend = tree_levels,
       col = tree_colors, pch = 19,
       title = "Tree")
```



ANOVA - Data

```
set.seed(123)

group_a <- rnorm(10, mean = 85, sd = 5)
group_b <- rnorm(10, mean = 75, sd = 5)
group_c <- rnorm(10, mean = 90, sd = 5)

data <- data.frame(
  Scores = c(group_a, group_b, group_c),
  Group = factor(rep(c("A", "B", "C"), each = 10))
)

print(head(data))
```

```
    Scores Group
```

```
1 82.19762     A
2 83.84911     A
3 92.79354     A
4 85.35254     A
5 85.64644     A
6 93.57532     A
```

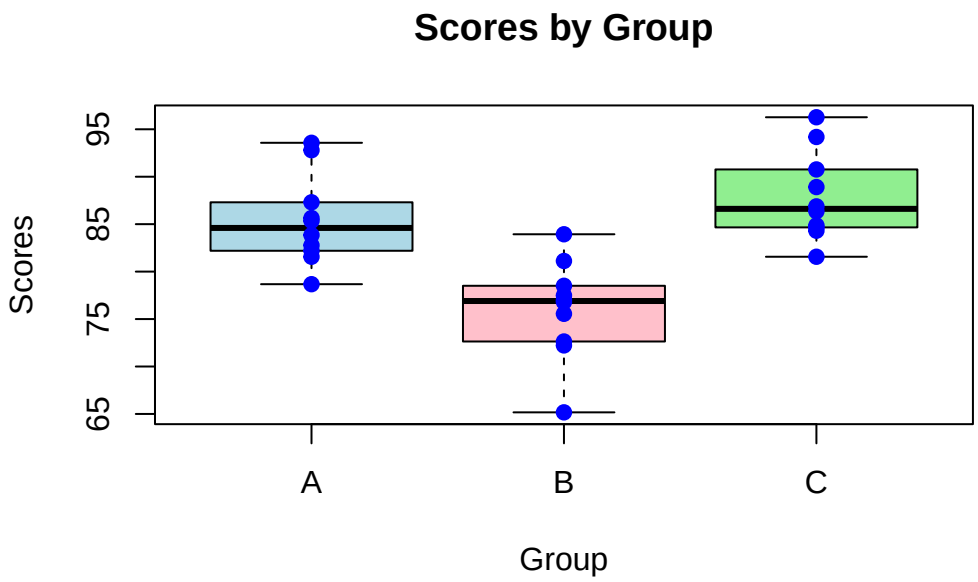
#ANOVA - Performing ANOVA

```r
anova_result <- aov(Scores ~ Group, data = data)

summary(anova_result)
```

```
            Df Sum Sq Mean Sq F value   Pr(>F)
Group        2  777.9   388.9   16.36 2.22e-05 ***
Residuals   27  642.1    23.8
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

ANOVA - Visualizing Results

```r
boxplot(Scores ~ Group, data = data,
        main = "Scores by Group",
        xlab = "Group", ylab = "Scores",
        col = c("lightblue", "pink", "lightgreen"))

stripchart(Scores ~ Group, data = data,
           vertical = TRUE, add = TRUE, pch = 19, col = "blue")
```


Scores by Group
Scores
95
85
75
65
A
B
C
Group