Julian Burgoff

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Analysis of Environmental Data

Lab 9

1. The null hypothesis is that there is no difference in brown creeper presence in edge vs interior habitats.

2. Based on the chi-square test, brown creepers do show a significant habitat preference. The differences between observed and expected values reveal that there are fewer than expected owls present in edge habitats.

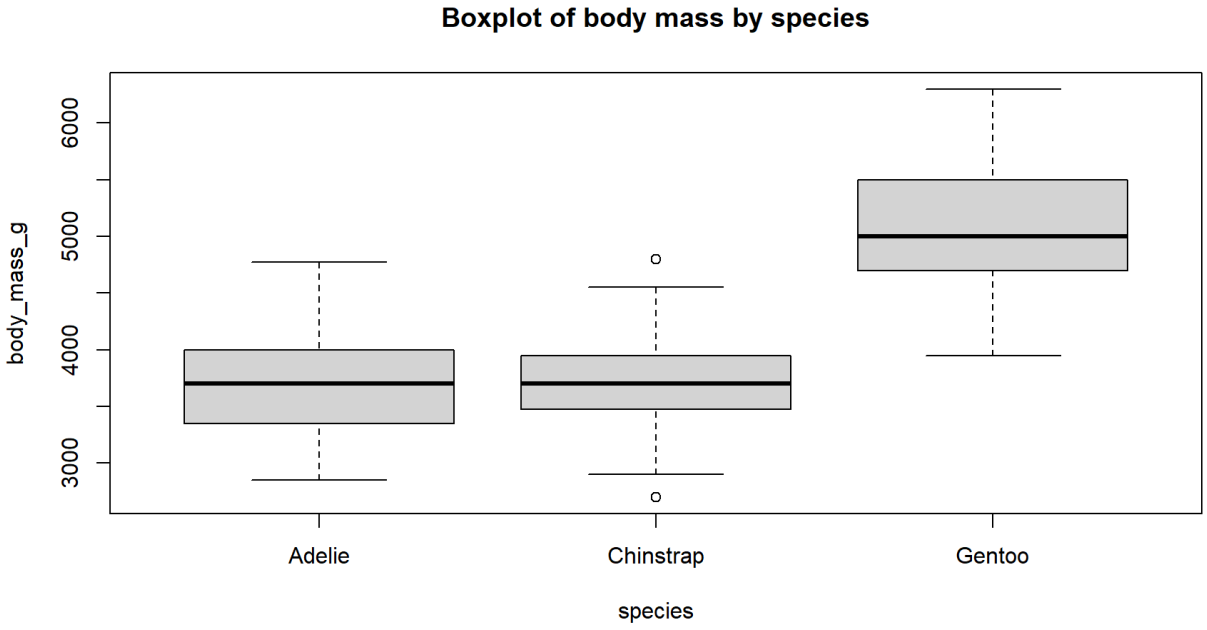
   ```
   round(
     chisq_creepers$observed - chisq_creepers$expected,
     digits = 1)
   TRUE FALSE
     E -27.7  27.7
     I  27.7 -27.7
   ```

3. ```
   fit_species =
     lm(
       formula = body_mass_g ~ species,
       data = penguins)
   ```

4. ```
   fit_sex =
     lm(
       formula = body_mass_g ~ sex,
       data = penguins)
   ```

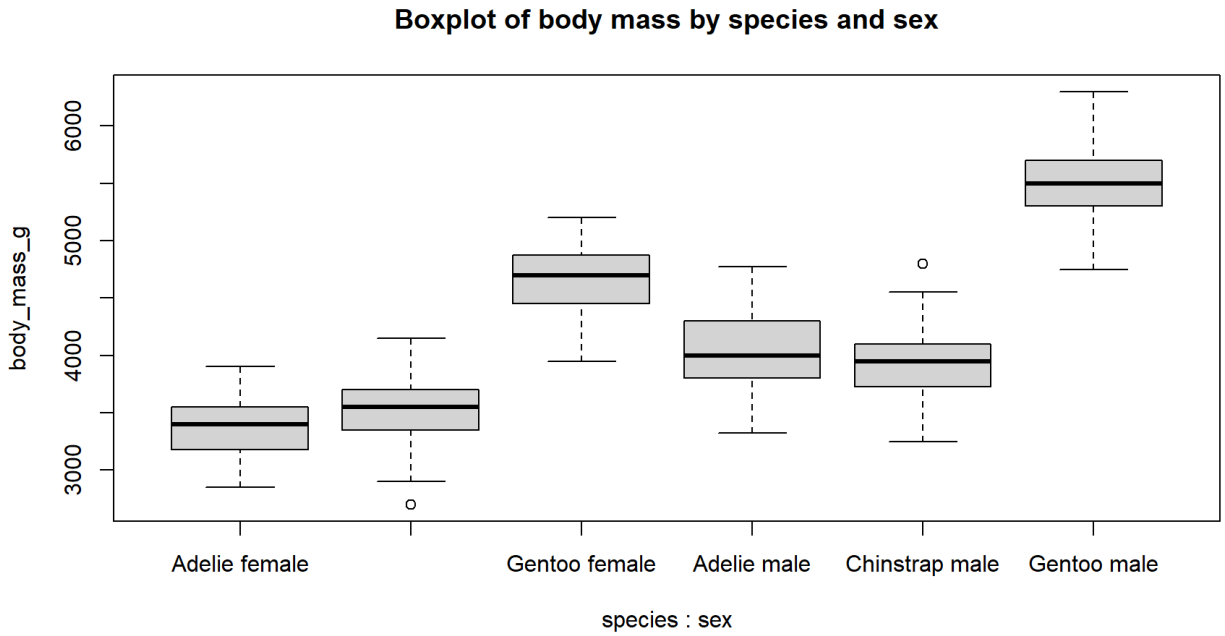
5. ```
   fit_sex =
    lm(
       formula = body_mass_g ~ species:sex,
       data = penguins)
   ```
   ```

6.


Boxplot of body mass by species
body_mass_g
3000
4000
5000
6000
Adelie
Chinstrap
Gentoo
species

7.


Boxplot of body mass by sex
body_mass_g
3000
4000
5000
6000
female
male
sex



8.

9. All of the groups in the models have pretty similar variability and should meet the homogeneity assumption.

10. The null hypothesis of the bartlett test is that all of the group variances are equal.

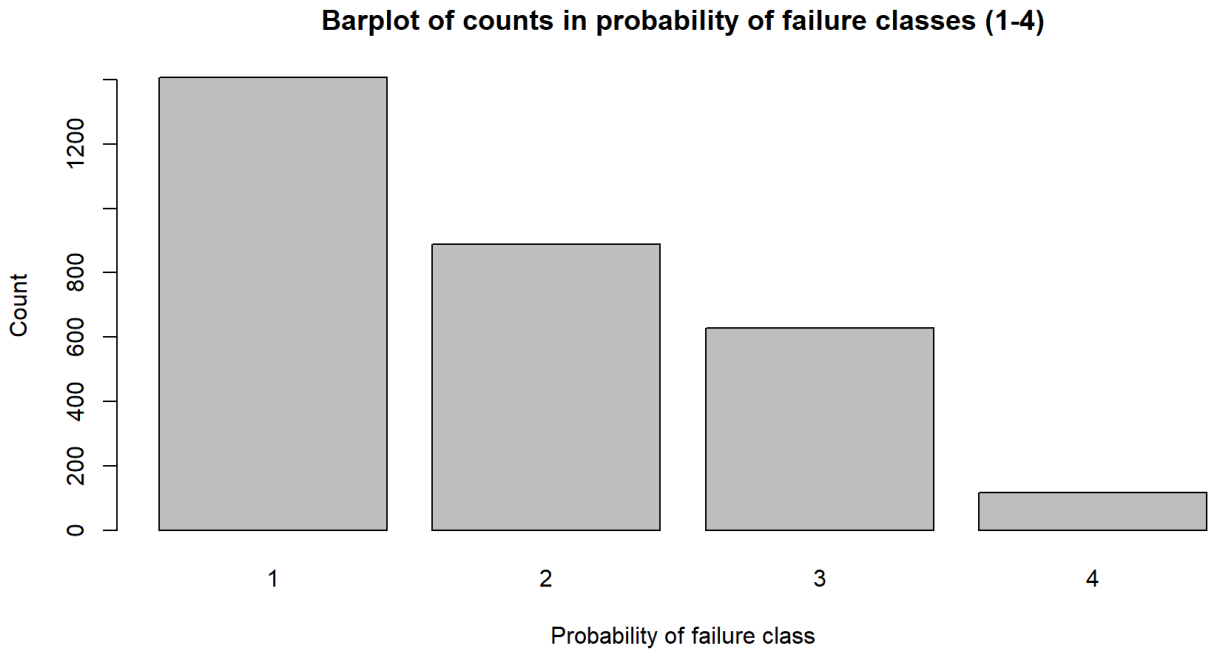
11. 0.0501

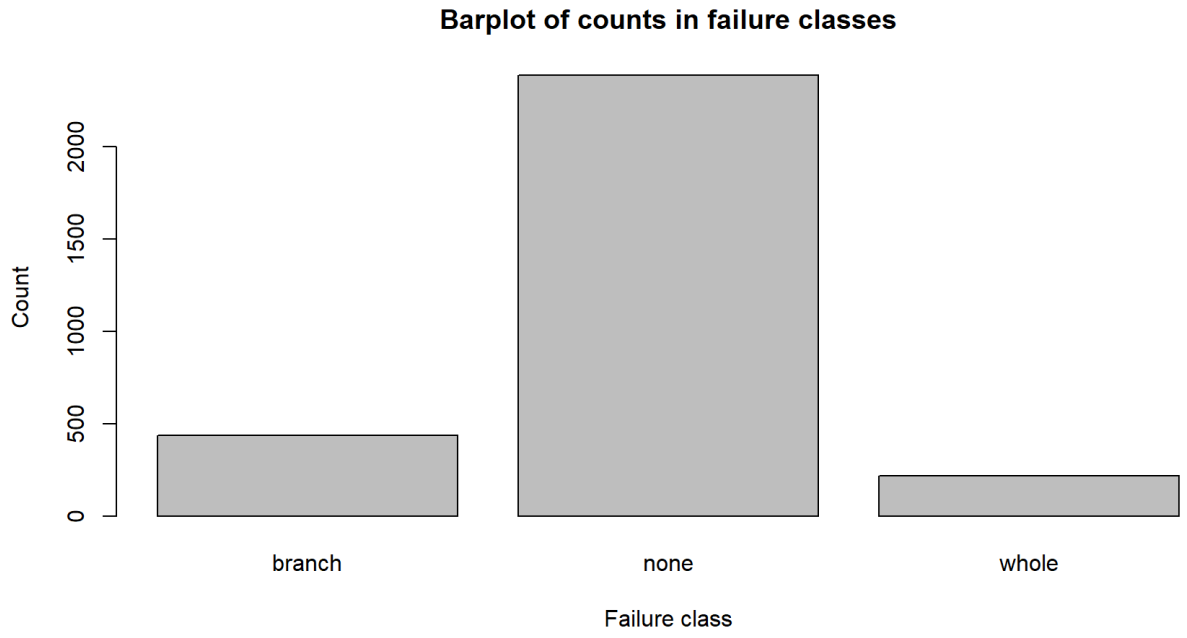
12. 0.0319

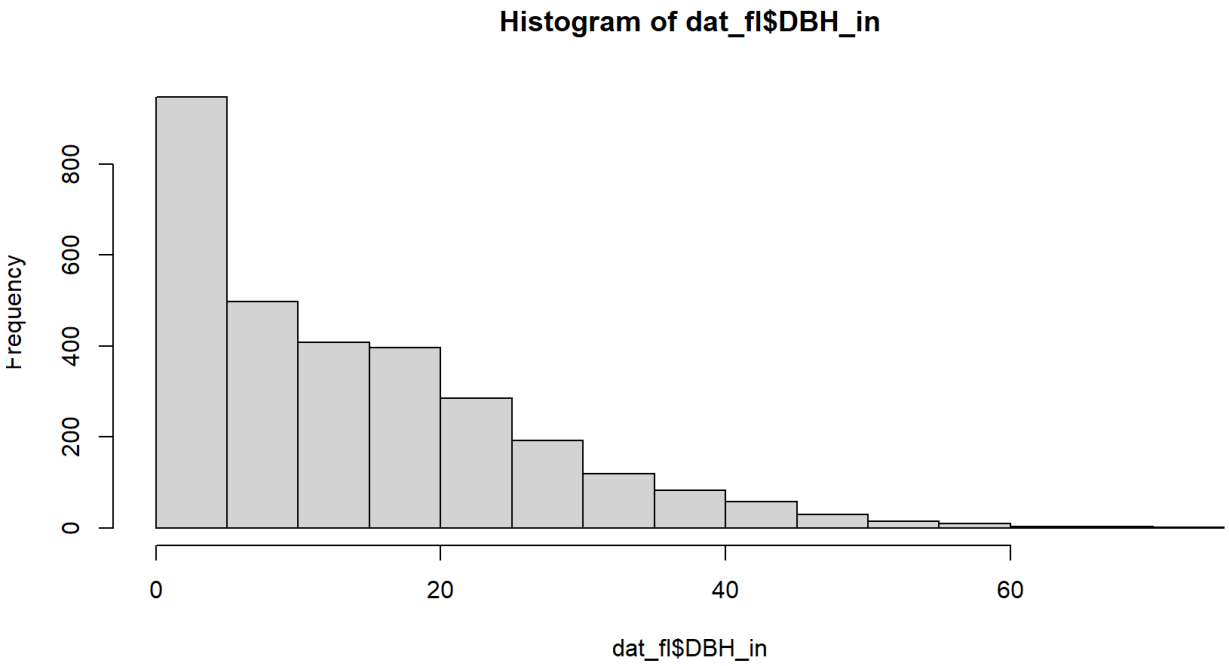
13. 0.1741

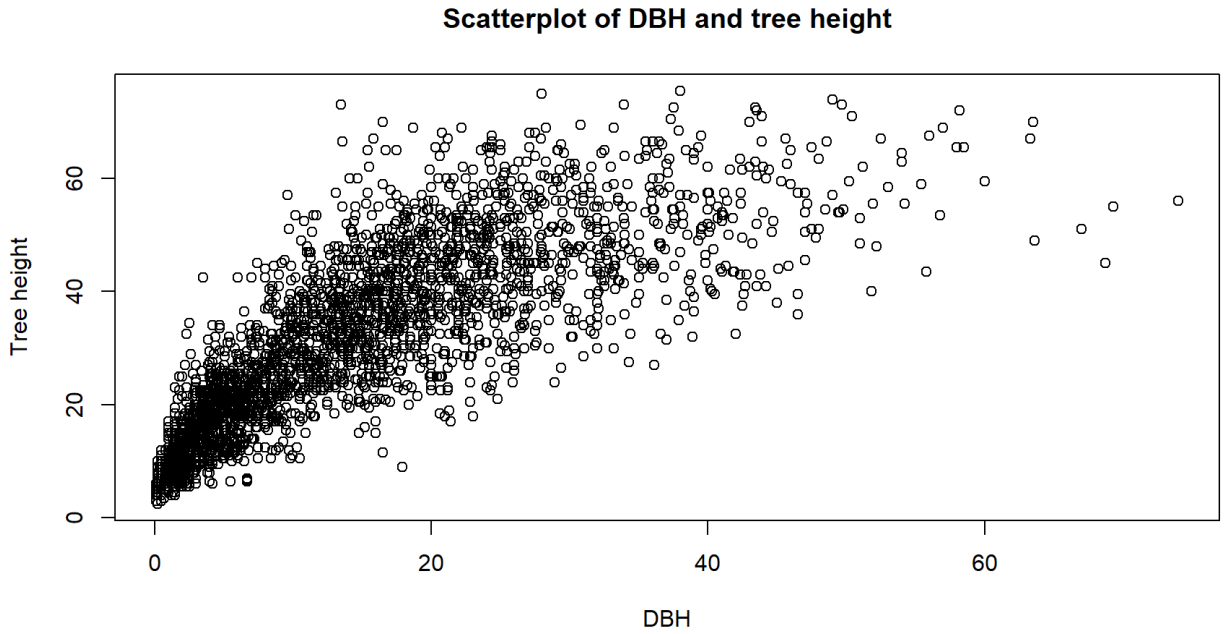
14. Since the p-value isn't less than .05, we fail to reject the null hypothesis which means that there is not sufficient evidence that the groups have different variances.

15.


Barplot of counts in probability of failure classes (1-4)
Count
0
200
400
600
800
1200
1
2
3
4
Probability of failure class


Barplot of counts in failure classes
Count
0
500
1000
1500
2000
branch
none
whole
Failure class





16. The null hypothesis is that there is no difference in the distribution of DBH for trees that are intact and trees that have whole-tree failures.

17. p-value = 0.02125. We can reject the null hypothesis and say that there is a statistically significant difference in the distribution of DBH between the two groups.

18. It looks like a positive relationship that is slightly curved.

19. Spearman

20. p-value < 2.2e-16. Based on the very small p value, the two variables appear to be highly correlated.

21. Pearson's Chi-squared test

    data: fl_table_2
    X-squared = 202.65, df = 3, p-value < 2.2e-16

22. -136

23. There were fewer tree failures than expected by chance in failure probability category 1.

24. There were more tree failures than expected by chance in failure probability category 4.

25. I think the probability of failure rating is effective for predicting trees that are more likely to experience failures.