Keegan Moynahan ***** Worked with Steph

Lab 9

1) The null hypothesis of the Chi-squared test is that there is no relationship between Brown Creeper presence/absence in edge and interior habitats.
2) After running the test, I would say Brown Creepers significantly prefer interior habitats instead of edge habitats. I say this because there were 29 brown creepers seen in edge habitats versus 314 in Interior habitats.
3)

```
require(palmerpenguins)

fit_species =

 lm(

   formula = body_mass_g ~ species,

   data = penguins)
```

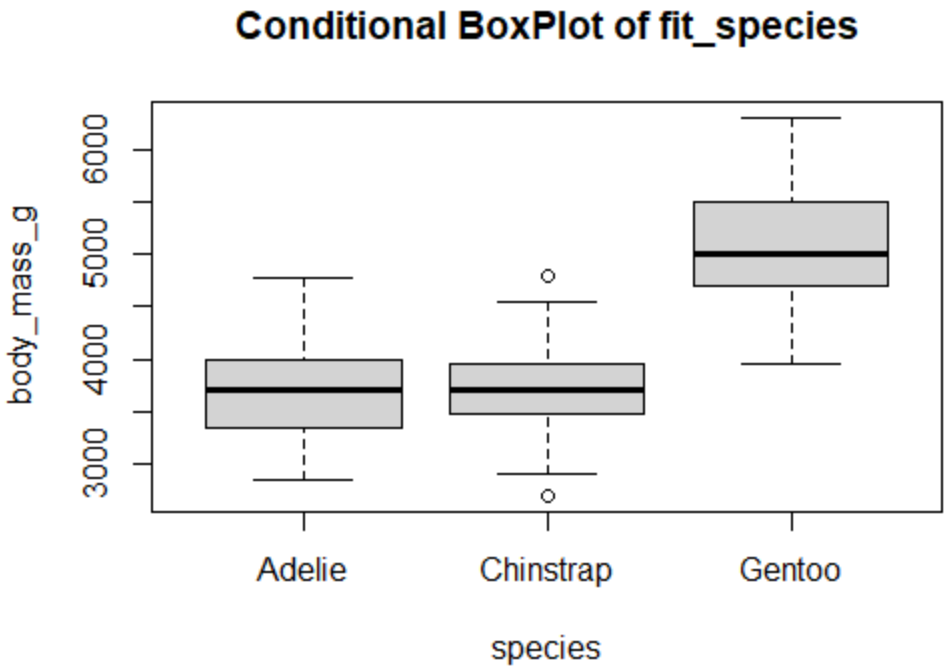
4)

```
fit_sex =

 lm(

   formula = body_mass_g ~ sex,

   data = penguins)
```

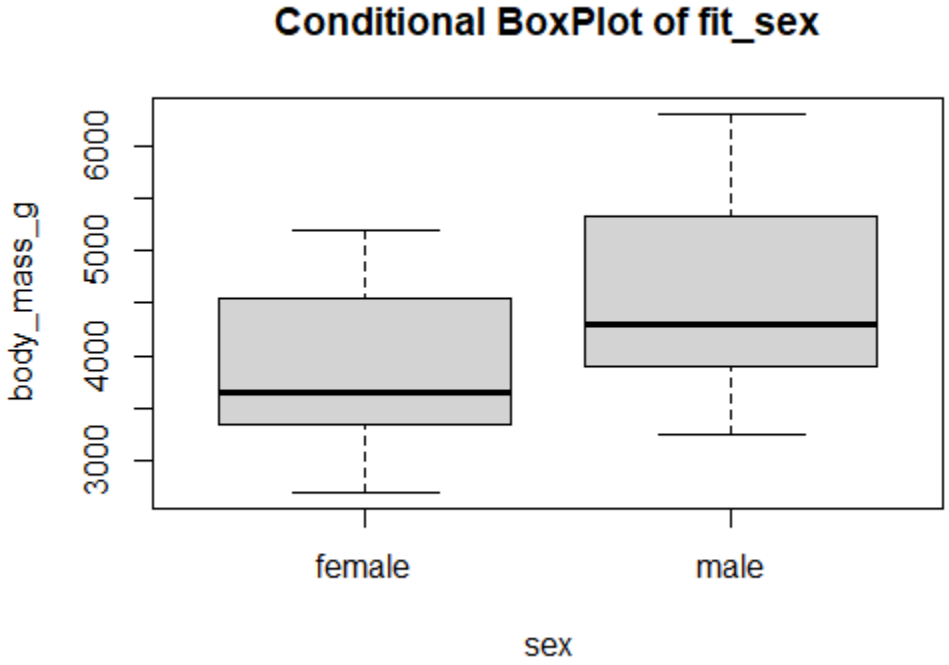
5)

```
fit_both =

 lm(

   formula = body_mass_g ~ species + sex + species:sex,

   data = penguins)
```

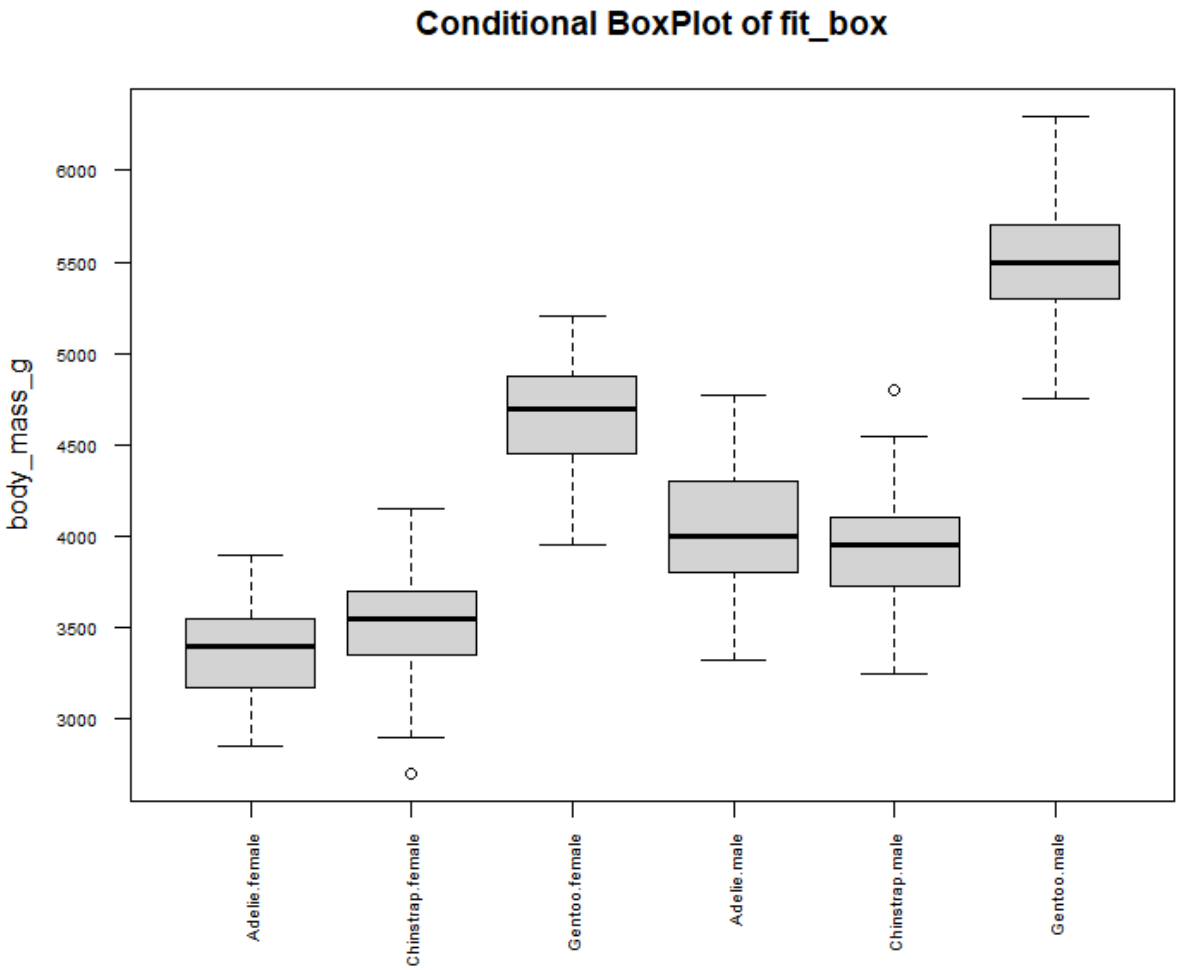
6)


Conditional BoxPlot of fit_species
body_mass_g
3000
4000
5000
6000
Adelie
Chinstrap
Gentoo
species

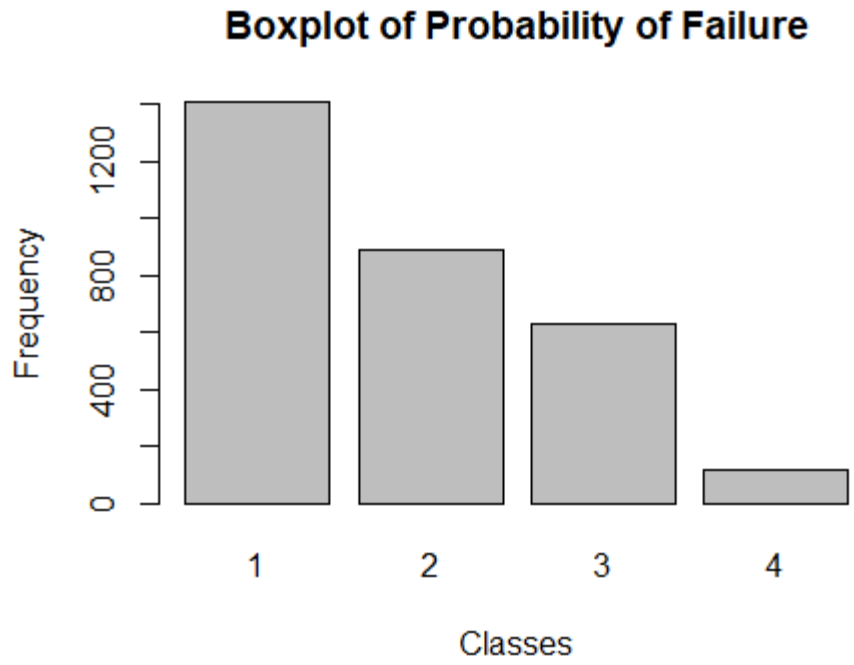
7)

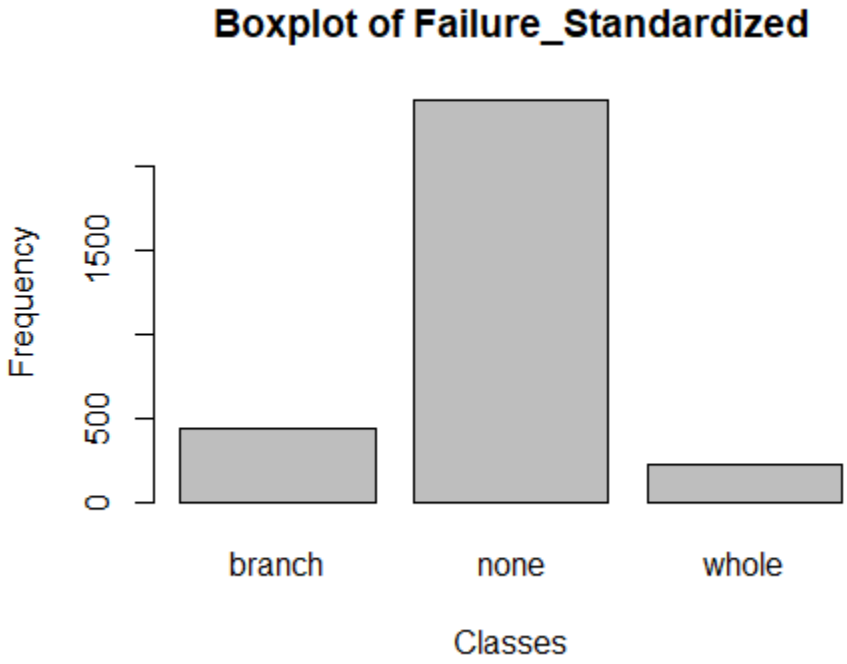

Conditional BoxPlot of fit_sex
body_mass_g
3000
4000
5000
6000
female
male
sex

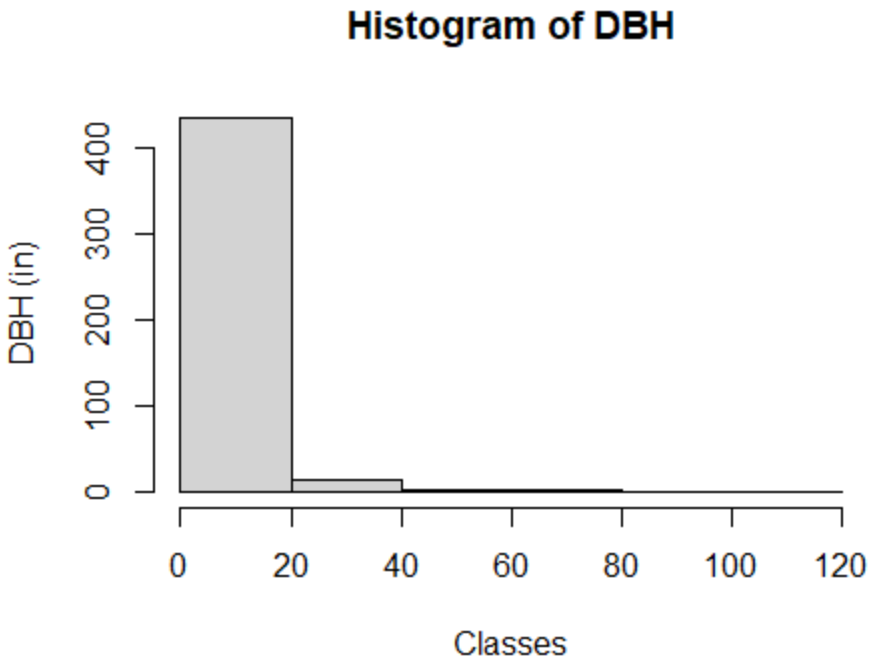
8)

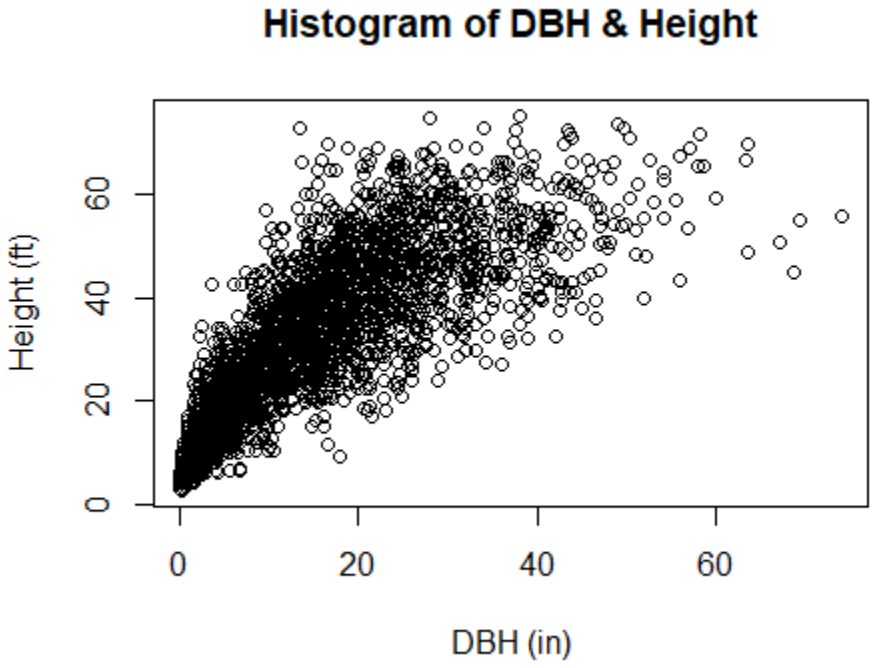


9) The boxplots in my opinion all look relatively the same size, the only ones that could have a difference from the rest are the Gentoo male and Adelie Male, but neither have drastic differences.
10) The null hypothesis of the Bartlett test is that the variables are orthogonal or not correlated.
11) The p-value from the Bartlett test of homogeneity for observations grouped by species is 0.0500
12) The p-value from the Bartlett test of homogeneity for observations grouped by sex is 0.0319
13) p-value = 0.1741
14) The I would see an issue with heterogeneity with the first and second bartlett test in the sex test because the p-value is less than 0.05 so I would reject the null and say they are correlated.
15)


Boxplot of Probability of Failure
Frequency
0
400
800
1200
1
2
3
4
Classes


Boxplot of Failure_Standardized
Frequency
0
500
1500
branch
none
whole
Classes





16) The datasets are from the same continuous distribution.
17) p-value = 0.02125, which is lower than 0.05 so I would reject the null hypothesis. Meaning the datasets are not the same.
18) I would say it is a positive curved monotonic relationship.

19) Spearman
20) p-value < 2.2e-16 so I would say they are correlated because they reject the null hypothesis of the bartlett test.
21) X-squared = 202.65, p-value < 2.2e-16
22) The number of failures for probability group 1 is -7.7 rounded up = -8
23) There were about 8 less failures than expected in probability group 1
24) There were about 8 more failures than expected in probability group 4
25) The fail system is effective because it gives a way to check the difference from the residuals to the expected.