Evan Krause
ECO 634
Prof. Michael Nelson
10/19/22

1.

```
rm(list = ls())

sse_mean = function(x)
{
  x <- x[!is.na(x)]
  n <- length(x)

  sse <- sd(x) / sqrt(n)

  return(sse)
}

sse_mean(penguins$body_mass_g)
sse_mean(mtcars$mpg)
```

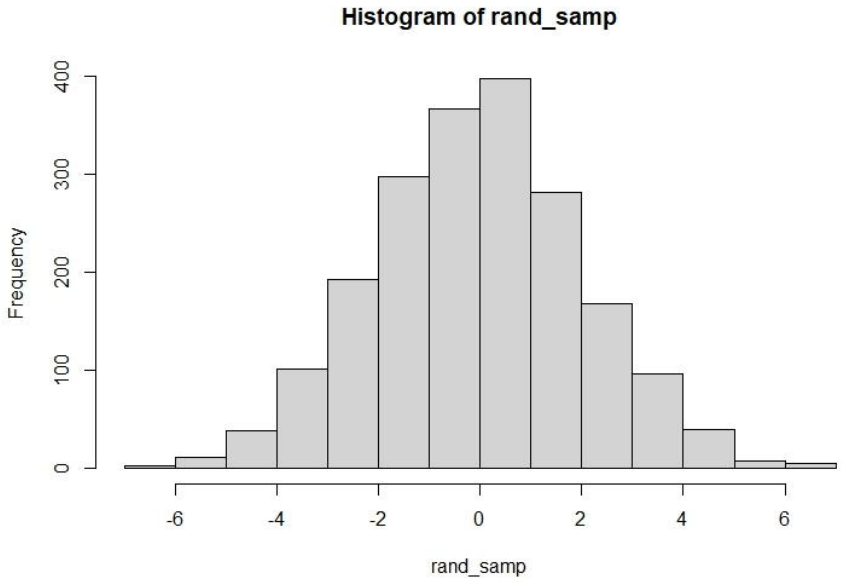
2.

```
two_group_resample_diff = function(x, n_1, n_2)
{
  a <- mean(sample(x, n_1, replace = T), na.rm = T)
  b <- mean(sample(x, n_2, replace = T), na.rm = T)

  difference_in_means <- diff(c(a, b))


  return(difference_in_means)
}
```

3.

This is a monte carlo sampling

4.

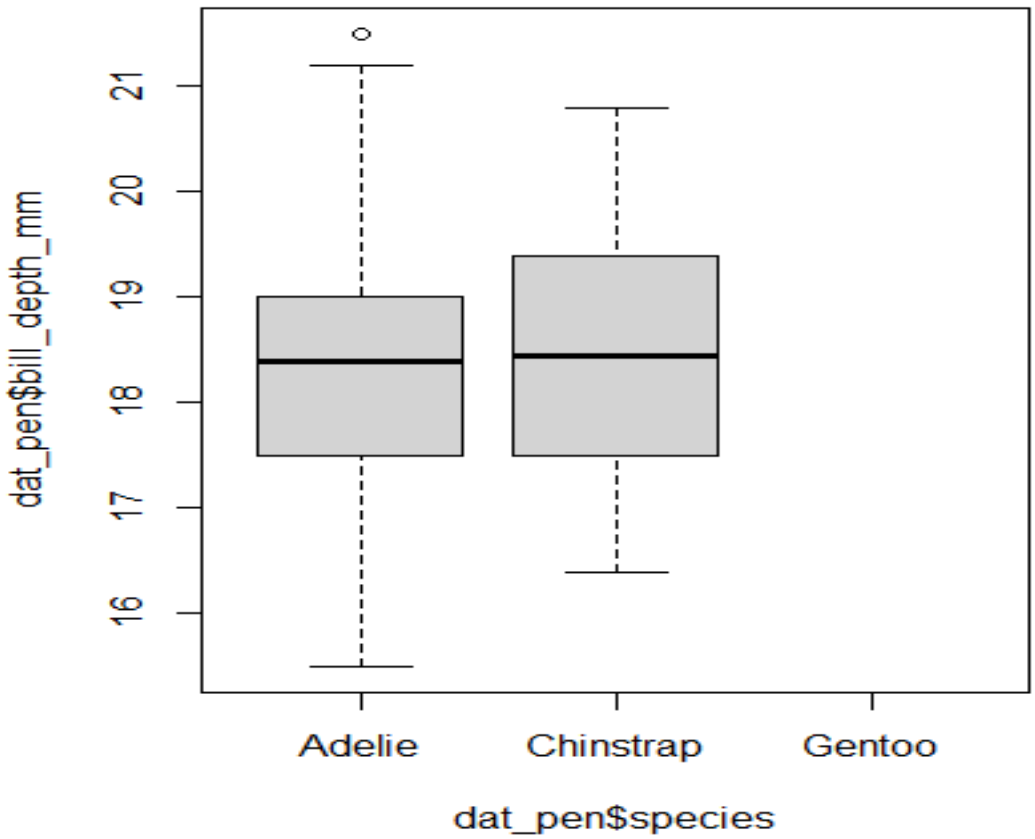


5.
Nine of the differences had a magnitude greater than 5.8

(I used dplyr)
rand_samp_df <- data.frame(rand_samp)
rand_58 <- filter(abs(rand_samp_df), rand_samp >= 5.8)

6.
You would have to perform a large number of simulations to see this result

7.



8.

Means

Adelie: 18.34636

Chinstrap: 18.42059

Difference

0.0742306

9.

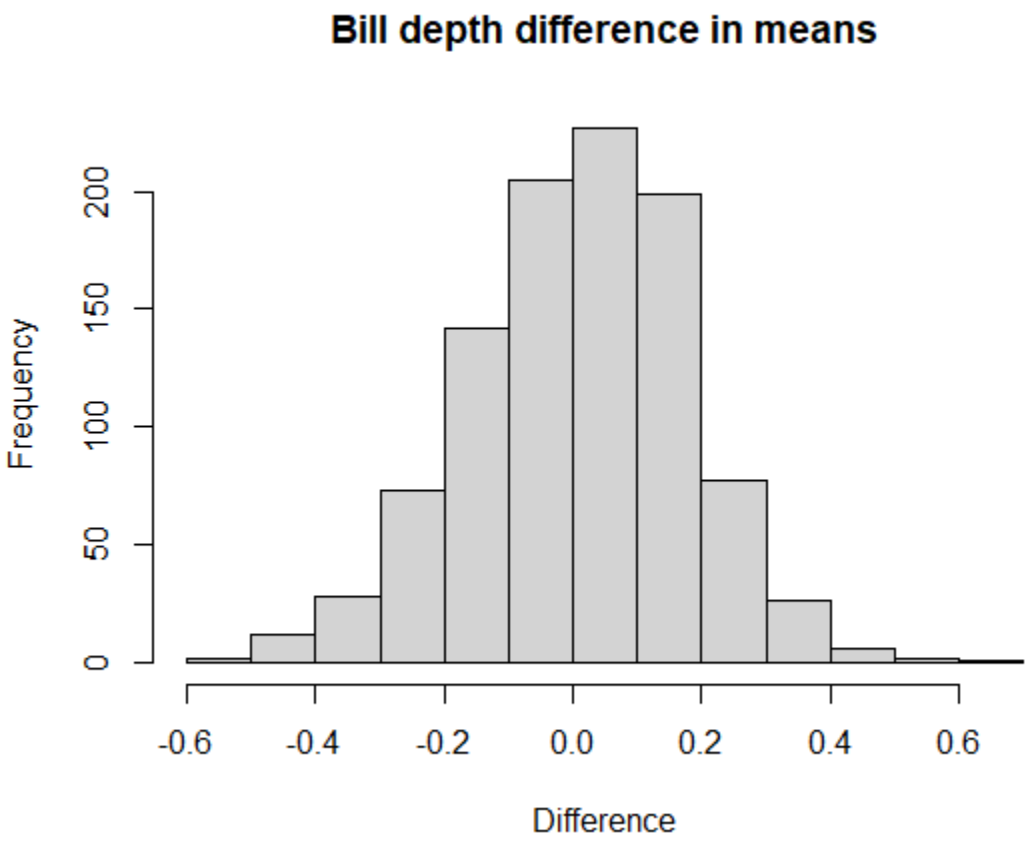
Technical: With a p-value of 0.6623, we are unable to reject the null hypothesis that the true difference in means is equal to zero.

Non-technical: when comparing the means of these groups, if the sampling was performed repeatedly then around ~66% of the time we would not see a difference in the mean values.

10.

658 out of 1000 means were greater than diff_crit

11.


Bill depth difference in means
Frequency
0
50
100
150
200
-0.6
-0.4
-0.2
0.0
0.2
0.4
0.6
Difference