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ECO 634 – Analysis of Environmental Data Lab

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Lab 6: Introduction to Inference

Q1:

```
rm(list = ls())
require(palmerpenguins)
sse_mean = function(x)
{
  sse = sd(x, na.rm = TRUE) / sqrt(length(na.omit(x)))

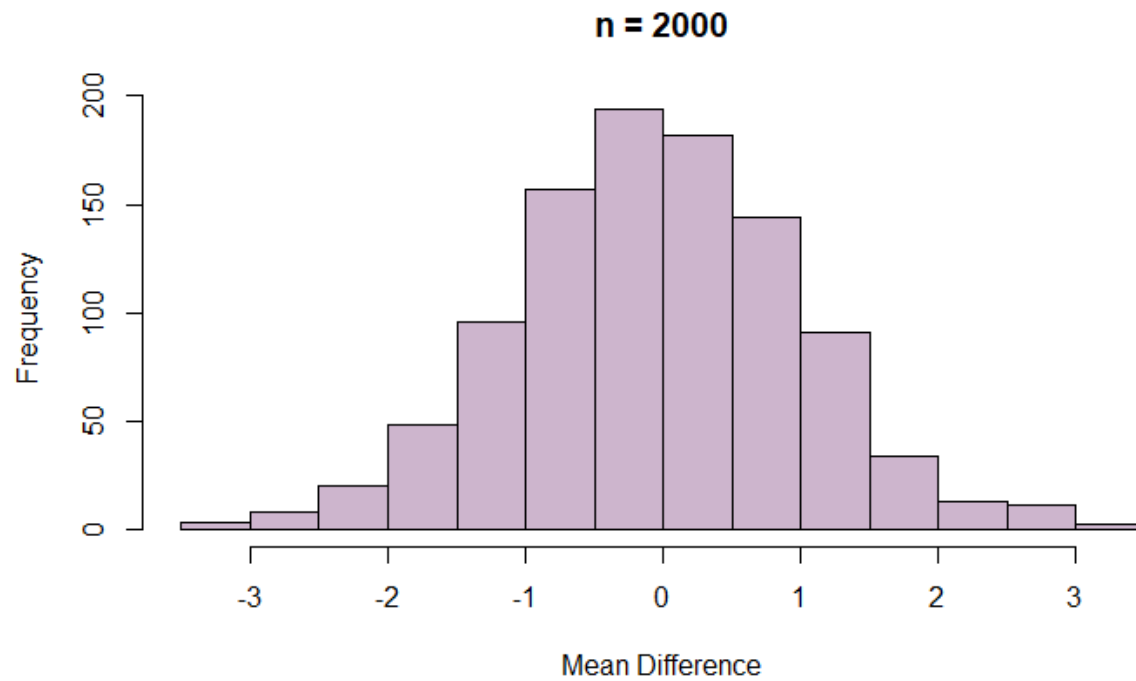
  return(sse)
}
sse_mean(penguins$body_mass_g)
sse_mean(mtcars$mpg)
```

Q2:

```
two_group_resample = function(x, n_1, n_2)
{
  diff_1 = sample(x, n_1, replace = TRUE)
  diff_2 = sample(x, n_2, replace = TRUE)
  difference_in_means = mean(diff_1, na.rm = TRUE) - mean(diff_2, na.rm = TRUE)
  return(difference_in_means)
}
```

Q3: I believe this is an example of Monte Carlo resampling and Null Hypotheses because the values are different every time and have no relation. Bootstrapping doesn't destroy the associations in data so I would accept to see similar values.

Q4:



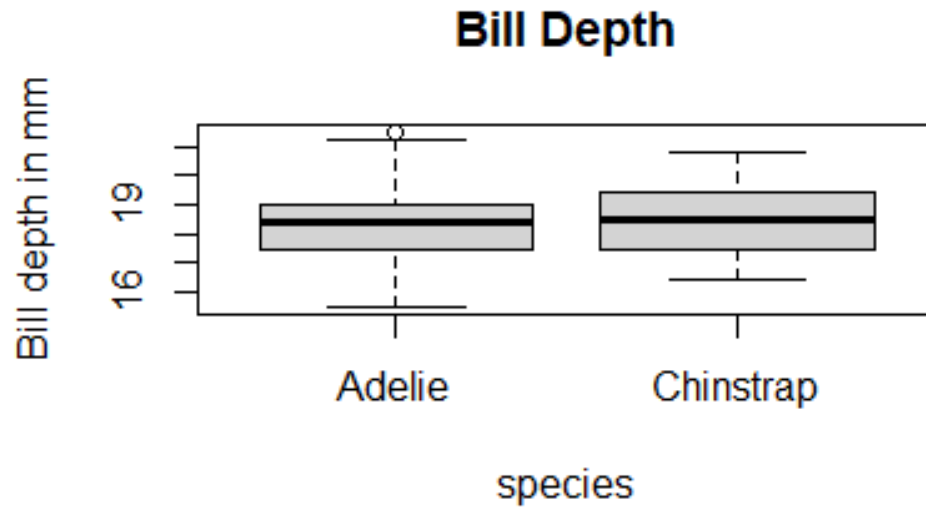
Q5: There are 10 resampled differences of means that are great than 5.8.

```
t_test = t.test(flipper_shuffled ~ dat_pen$species)
```

```
sum(abs(mean_differences) >= diff_observed)
```

Q6: 10 million simulations

Q7:



Q8: Bill Depth in mm

mean in group Adelie mean in group Chinstrap

18.34636

18.42059

Difference in mean = 0.07423

Q9: We cannot reject the null hypothesis because the p-value is greater than 0.05. This shows weak evidence to support that there is a difference between means of bill depth in mm for these two species.

Q10: 1,941 differences in means

Q11:

