Question 1.1. Let's run a hypothesis test using confidence intervals to see if there is a linear relationship between egg weight and bird weight. Define the null and alternative hypotheses that will allow you to conduct this test. **(8 points)**

Note: Please write your answer **in the cell below** in the following format: - **Null Hypothesis:** - **Alternative Hypothesis:**

    Hint: Reminder your null hypothesis should be about the relationship in the population.

Null Hypothesis: There is no linear relationships between egg weight and bird weight, therefore the slop of the regression line would be 0. Alternative Hypothesis: The slope is not 0, and there is indeed a linear relationship.

Question 1.4. Create an array called `resampled_slopes` that contains the slope of the best fit line for 1000 bootstrap resamples of `birds`. Plot the distribution of these slopes. **(8 points)**

```
In [12]: resampled_slopes = make_array()

         for i in np.arange(1000):
             birds_bootstrap = birds.sample()
             bootstrap_line = fit_line(birds_bootstrap, "Egg Weight", "Bird Weight")
             bootstrap_slope = bootstrap_line[0]
             resampled_slopes = np.append(resampled_slopes, bootstrap_slope)

         # DO NOT CHANGE THIS LINE
         Table().with_column("Slope estimate", resampled_slopes).hist()
```
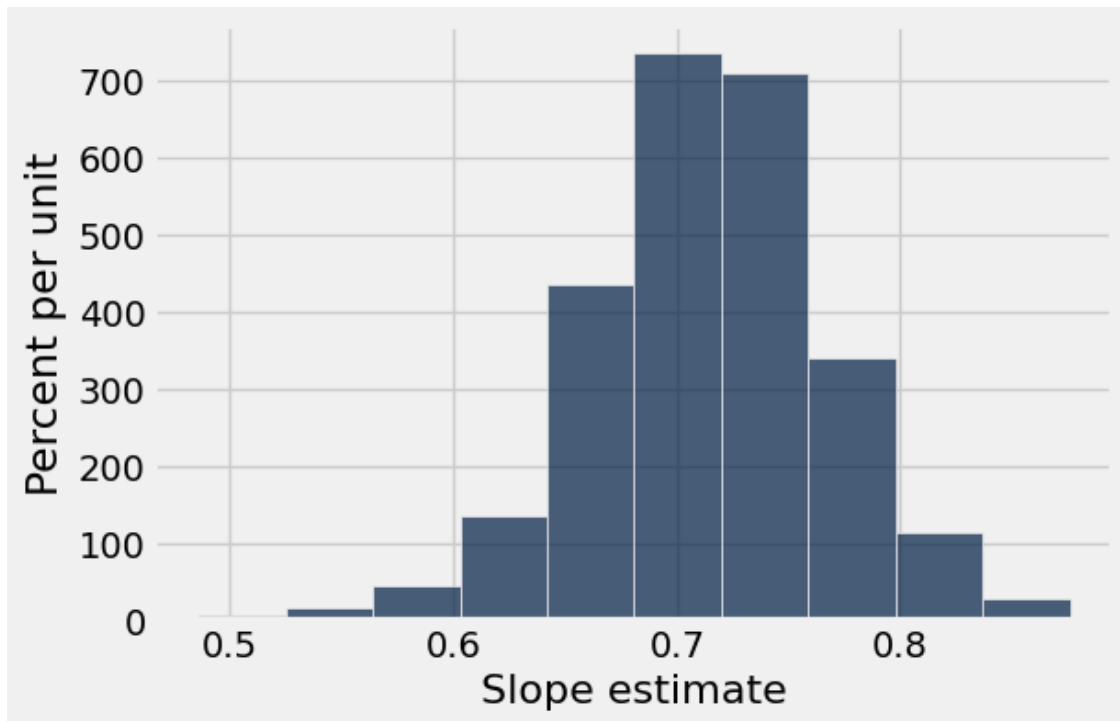


```
In [13]: grader.check("q1_4")
```

```
Out[13]: q1_4 results: All test cases passed!
```

Question 1.6. Based on your confidence interval, would you reject or fail to reject the null hypothesis that the true slope is 0? Why? What p-value cutoff are you using? **(8 points)**

Hint: Read the introduction of this homework!

Reject the null hypothesis that the true slope is 0, p-value is 5%

Question 1.7. Using your results from previous questions, **provide an estimated range for the true slope**. How confident are you that the true slope falls within this range? **(8 points)**

The range would be [0.600576, 0.816586], I am confident that 95% of the time the true slope would fall into that range.

Question 2.4. Create an array called `predictions_for_eight` that contains the predicted bird weights based on an egg of weight 8 grams for each regression line in `regression_lines`. **(6 points)**

```
In [24]: regression_lines.take(0).column(0).item(0)
```

```
Out[24]: 0.737368572432968
```

```
In [25]: def predict(slope, intercept, given_x=8):
             return slope * given_x + intercept
```

```
In [26]: predictions_for_eight = regression_lines.apply(predict, "Slope", "Intercept")
         predictions_for_eight

         # This will make a histogram of your predictions:
         table_of_predictions = Table().with_column('Predictions at Egg Weight=8', predictions_for_eight
         table_of_predictions.hist('Predictions at Egg Weight=8', bins=20)
```
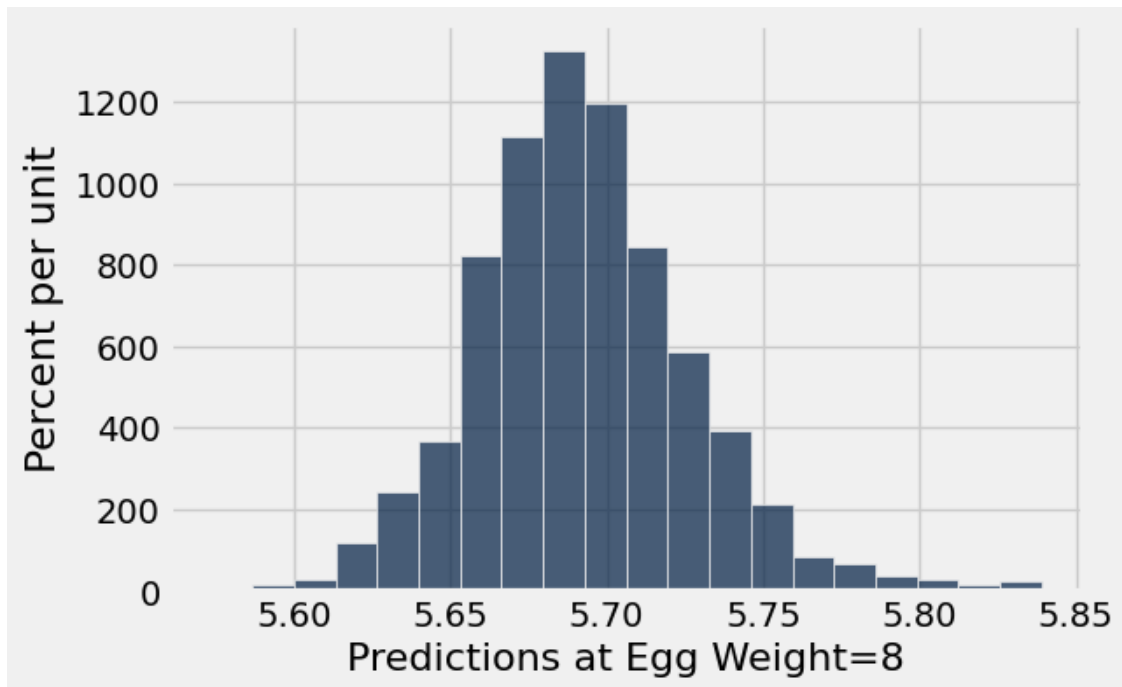
```
In [27]: grader.check("q2_4")
```

```
Out[27]: q2_4 results: All test cases passed!
```