Question 1.2. State the null hypothesis. It should reflect the position of either Dr. DeNero or Dr. Sahai. **(4 points)**

Note: Check out 11.3 for a refresher on hypotheses.

The null hypothesis is that the chances of people getting the Vaccine 1 is equivalent to receive a head when tossing a coin with probability of 3 / 5.

1

Question 1.3. State the alternative hypothesis. It should reflect the position of the doctor you did not choose to represent in Question 1.2. **(4 points)**

Note: Check out 11.3 for a refresher on hypotheses.

The alternative hypothesis rejects the null hypothesis, claiming that the process of giving out vaccinations is not like tossing a coin

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Question 1.7. Simulate 10,000 values of the test statistic under the assumption you picked in Question 1.6.
(4 points)

As usual, start by defining a function that simulates one value of the statistic. Your function should use
`sample_proportions`. (You may find a variable defined in Question 1.1 useful here!) Then, write a `for` loop
to simulate multiple values and collect them in the array `simulated_statistics`.

Use as many lines of code as you need. We have included the code that visualizes the distribution of the
simulated values. The red dot represents the observed statistic you found in Question 1.5.

```
In [27]: def one_simulated_statistic():
             model_proportion = [0.6, 0.4]
             proportions = sample_proportions(sample_size, model_proportion)
             return abs(100 * proportions[0] - 60)
```

```
In [28]: # Run the this cell a few times to see how the simulated statistic changes
         one_simulated_statistic()
```

```
Out[28]: 2.5786163522012515
```

```
In [29]: num_simulations = 10000

         simulated_statistics = make_array()
         for i in np.arange(num_simulations):
             simulated_statistics = np.append(simulated_statistics, one_simulated_statistic())
         simulated_statistics
```

```
Out[29]: array([ 3.08176101,  1.50943396,  2.26415094, …,  1.32075472,
                 2.45283019,  1.50943396])
```

```
In [30]: # Run this cell to produce a histogram of the simulated statistics

         Table().with_columns('Simulated Statistic', simulated_statistics).hist()
         plt.scatter(observed_statistic, -0.002, color='red', s=40);
```
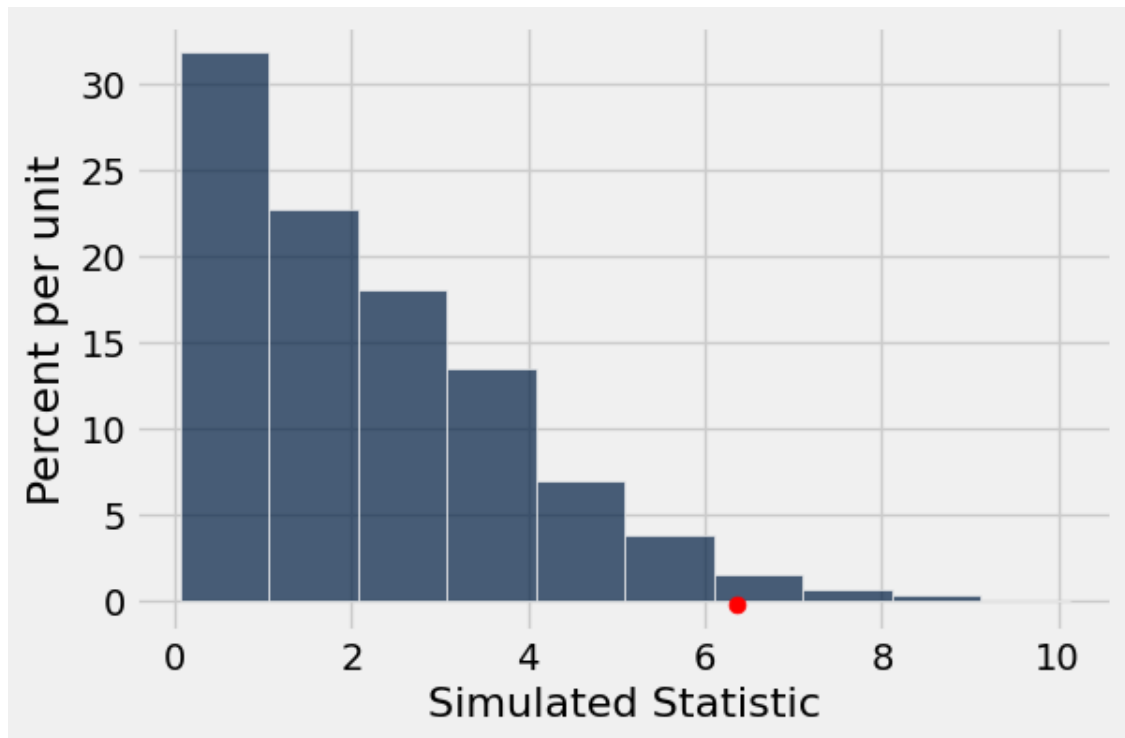
Question 2.1. Suppose we want to test whether or not each factor contributes the same amount to the overall Happiness Score. Define the null hypothesis, alternative hypothesis, and test statistic in the cell below. **(4 points)**

Note: Please format your answer as follows: - Null Hypothesis:... - Alternative Hypothesis: .... - Test Statistic: ...

- Null Hypothesis: All factors contribute equally to the Happiness Score.

- Alternative Hypothesis: Some factors contribute more to Happiness Score.
- Test Statistic: TVD

Question 2.5. What can you conclude about how each factor contributes to the overall happiness score in the US? Explain your answer using the results of your hypothesis test. Assume a p-value cutoff of 5%. **(4 points)**

Type your answer here, replacing this text.