

## Assignment 6: $\chi^2$ (Coin) Testing

Follow the instruction below and use the data that you collected for Assignment 5 to perform a  $\chi^2$  test of the fairness of the coins that were flipped. Due—with Assignment 5—in class on March 6.

1. Treat each flip as a single trial, adding up all the heads and tails from all the sets of flips that you collected. E.g., if you got two (1, 0)s, two (1, 1)s, and one (0, 1) as your data for flipping a coin twice, then you would just count that as contributing 4 heads and 3 tails to your total dataset.
2. Clearly indicate what you observed—the  $O_i$  values.
3. Clearly indicate what you expected—the  $E_i$  values—and explain how you calculated them (hint: you'll need to state your null hypothesis to do this).
4. Show your work when calculating the  $\chi^2$  statistic.
5. State the degrees of freedom for the experiment, and say how you determined it.
6. Using the table or calculator linked in the notes for Lecture 7, determine the  $p$ -value associated with your experiment.
7. Explain what the  $p$ -value means and say whether you think there is a significant difference between the data and your null hypothesis.
8. Don't forget to include Assignment 5 (which contains your raw data and a graph of that data) when turning this one in.