LARSON—MATH 255–CLASSROOM WORKSHEET 19
Experiments.

1. (a) Start the Chrome browser.
   (b) Go to `http://cocalc.com`
   (c) Login using **your VCU email address** .
   (d) Click on our class Project.
   (e) Click "New", then "Worksheets", then call it **c19**.
   (f) For each problem number, label it in the Sage cell where the work is. So for Problem 2, the first line of the cell should be `#Problem 2`.

   It is often useful to generate **random integers**. It only makes sense to generate random integers from within some range of integers. We do this with `randint()`.

2. Evaluate `randint(5,100)` a few times; your results will vary. This will generate random integers in the range $[5, 100]$, including both endpoints.

3. **Investigate**. Does `randint()` produce a *uniform distribution*? (That is, as you repeat experiments of `randint(a,b)` are the number of produced outcomes of each possible integer roughly the same? Do some experiments! How will you keep track of the data?)

4. **Problem.** Find the sum of the *even* Fibonacci numbers that are no more than four million.

Coin Flip Questions

- If you flip a coin 100 times, you would expect about 50 heads. Its possible that you could get 100 heads. But this would be rare. How rare? We can *simulate* flipping a coin a hundred times, write down how many heads we got, and then repeating this experiment. This will give us a *distribution* of various possible outcomes.

5. Use your `coin_flip()` function (from previous classes) to define a new function `coin_flips(n)` which *returns* a **list** of n random H's or T's (representing the result of n coin flips).
   Check that it works.

6. Now define a function `number_of_heads(n)` that counts and *returns* the number of heads you get after flipping a coin n times.

7. Write a function `heads_tails(n)` which *prints* the numbers of both heads and tails you get after flipping a coin n times.

8. **Problem: If you flip a coin 100 times, you would expect about 50 heads. Its possible that you could get 100 heads. But this would be rare. How rare?** Let one *experiment* be a flip of 100 coins. Do the experiments and record the number of heads in a list called `experiment_results`. Do 1000 experiments total (that is, 1000 repetitions of a single 100-flip experiment) and record each result (how many heads there were) in your list.

Getting your classwork recorded

When you are done, before you leave class...

(a) Click the "Make pdf" (Adobe symbol) icon and make a pdf of this worksheet. (If Cocalc hangs, click the printer icon, then "Open", then print or make a pdf using your browser).

(b) Send me an email with an informative header like "Math 255 - c19 worksheet attached" (so that it will be properly recorded).

(c) Remember to attach today's classroom worksheet!