Outline
1. Examples:
   (a) left-handed Calvin students
   (b) spinning pennies

2. The new setting:
   (a) A population with one categorical variable.
   (b) One of the categories of the variable is called “success”.
   (c) $p$ is the proportion of successes in the population.
   (d) We have a SRS of size $n$ from the population.
   (e) $x$ is the number of successes in the sample.
   (f) $\hat{p} = x/n$ is an estimate of $p$. (hats are always estimates, i.e., statistics)

3. The sampling distribution of $\hat{p}$. In all possible samples of size $n$:
   (a) $\hat{p}$ has mean $p$
   (b) $\hat{p}$ has standard deviation $\sqrt{\frac{p(1-p)}{n}}$
      (Actually, this is not quite right. It is true when the sampling is with replacement and is approximately true when the sample size is small relative to the population size.)
   (c) $\hat{p}$ has an approximately normal distribution (when $n$ is large and $p$ and $1 - p$ are not too close to 0)

4. A 95% confidence interval for $p$ — first attempt
   \[ \hat{p} \pm 1.96 \sqrt{\frac{\hat{p}(1-\hat{p})}{n}} \]
   Note that this is of the form estimate ± critical value · standard error.