Let’s estimate the average mass of a Peanut M&M...
We make the modeling assumption that these Peanut M&Ms were drawn at random from all the Peanut M&Ms in the world. This is false, but we can comment on that further in our assessment at the end of the analysis. With this assumption, we will now estimate the average mass of all Peanut M&Ms in the world, both with a single-number estimate and a 95% confidence interval...
Let $X$ be the random variable whose value is the mass of a Peanut M&M selected at random from all the Peanut M&Ms in the world. We denote the random variable mean of $X$ by $\mu[X]$. As usual, we set the confidence level to 95%.
2. Collect and inspect the data

Our data set contains $n = 153$ observations of $X$. For modeling purposes, we will assume that these observations are independent (although they may not be). We can view a histogram of our data set. We note the shape, center, spread, and outliers of this histogram and investigate if we notice anything noteworthy.
As an estimator of $\mu[X]$, we use the random variable $M$, which we define to be the sample mean of a 153-sample of $X$. We *compute* that $m$, the value of $M$ for our particular 153-sample of $X$, is:

$$m = 2.5977 \text{ grams}.$$
4. Standard error

To help us compute the standard error of $M$, we define $S$ to be the random variable whose value is the sample standard deviation of a 153-sample of $X$.

By a mathematical theorem, the standard error of $M$ is:

$$\text{se}[M] = \frac{S}{\sqrt{n}}.$$ 

To compute the value of the standard error of $M$, we first compute the value of $S$ for our particular 153-sample to be:

$$0.3384\text{ grams}.$$ 

For our sample, the value of $\text{se}[M]$ equals

$$\frac{0.3384\text{ grams}}{\sqrt{153}} = 0.0274\text{ grams.}$$
By a mathematical theorem, the distribution used in this confidence interval construction is $T[n - 1]$, which in this particular example is $T[153 - 1] = T[152]$. We use a $T$ distribution calculator to compute that the central 0.95 quantile of $T[152]$ is

$$t_*=1.9757.$$
6. Endpoints

To compute the endpoints of a 95% confidence interval for \( \mu \), we use the formula that they are:

\[
\begin{align*}
  c_{\text{low}} &= m - t \cdot se[M], \\
  c_{\text{high}} &= m + t \cdot se[M].
\end{align*}
\]

For our particular data set this means that

\[
\begin{align*}
  c_{\text{low}} &= 2.5977 \text{ grams} - (1.9757)(0.0274 \text{ grams}) \\
                  &= 2.5437 \text{ grams} \\
  c_{\text{high}} &= 2.5977 \text{ grams} + (1.9757)(0.0274 \text{ grams}) \\
                    &= 2.6518 \text{ grams}.
\end{align*}
\]
We estimate that the average mass out of all the Peanut M&Ms in the world is 2.5977 grams, with a 95% confidence interval from 2.5437 grams to 2.6518 grams.

[Aside, not to be included in a write-up: the single-number estimate above is $m$, and the confidence interval is from $c_{\text{low}}$ to $c_{\text{high}}$.]
6. Report and assess

Of course, we should comment on the strengths and weaknesses of our test. One weakness is that these M&Ms are definitely not selected at random from all the Peanut M&Ms in the world. We should think about limiting our model in both space and time. Another weakness is that these M&Ms were not drawn independently either. We need to investigate how this might affect the validity of our conclusions.