**We can observe how the sample mean and variance tend to converge to the population mean and variance, respectively, as the sample size increases.** As the sample size increases, the sample distribution will become more similar to the population distribution and the sample statistics (mean and variance) will be closer estimates of the population statistics.

The first line reads in the data from the Excel file 'R1.xlsx' and assigns it to the variable 'data.'

Next, the variable R1 is assigned the value of 17, and 'my\_data' is assigned the 17th row of the 'data’.

The code then creates a figure with two subplots.

In the first subplot, a loop is used to iterate through the sample sizes from 1 to 30. At each iteration, a random sample of that size is drawn from the population data, and the histogram of that sample is plotted. This subplot will show the distribution of the samples for each sample size.

In the second subplot, a loop is used to iterate through the sample sizes from 1 to 30. At each iteration, a random sample of that size is drawn from the population data, and the mean of that sample is calculated and stored in the 'sample\_means' array. Then the plot of sample means for each sample size is plotted.

These two plots allow us to visualize the effect of sample size on the sampling distribution.  
Here my code:  
% Reads in the data from the Excel file 'R1.xlsx' and assigns it to the variable 'data'

data = xlsread("C:\Users\yusuf\Documents\MATLAB\R1.xlsx");

R1 = 18;

my\_population = data(R1, :);

for i = 1:30

sample\_size = i;

% draw a random sample of size i from the population data

my\_population = data(randi(size(data,1),i,1));

% Calculate the mean and variance for each sample

sample\_mean(i) = mean(my\_population);

sample\_variance(i) = var(my\_population);

fprintf('Sampling Mean (Sample Size: %d): %f\n', sample\_size, sample\_mean(i));

fprintf('Sampling Variance (Sample Size: %d): %f\n', sample\_size, sample\_variance(i));

end

% Plot the sample mean-size

subplot(2,1,1);

plot(1:30,sample\_mean);

grid minor;

title('Sample Means');

xlabel('Sample Size');

ylabel('Mean');

%Plot the sample variance-size

subplot(2,1,2);

plot(sample\_variance);

grid minor;

title('Sample Variances');

xlabel('Sample Size');

ylabel('Variance');

% Mean and variance of the population

mean\_of\_my\_population = mean(my\_population);

variance\_of\_my\_population = var(my\_population);

fprintf('Mean of the Population: %f\n', mean\_of\_my\_population);

fprintf('Variance of the Population: %f\n', variance\_of\_my\_population);