

Summary:

The main purpose of showing students the demonstration about central limit theorem was to let them know the importance of normal curve. At the beginning of the class, I asked them a question that why the normal curve look like the way it is, why not some other shape. In order to answer that question, I asked student to divide into eight groups, and give them one lane of highway per group. Then they started counting cars passing by in an in 15 secs. They repeated this experiment for about 10 times, and collected data. These data were plotted using a histogram, and it turned out that they started to look like a Poisson distribution. Then I explained them that how this distribution is used to model arrival and departure process. Then using MATLAB, Poisson distribution was generated for couple of times, and added these distributions to create a normal distribution. I did the same thing with different distributions, and all of them converged to normal distribution. Since students were going to cover central limit theorem late in February, I avoided going deep into what is the reason behind this. However, I explained them why the normal curve is important and been used in book for many different reasons.

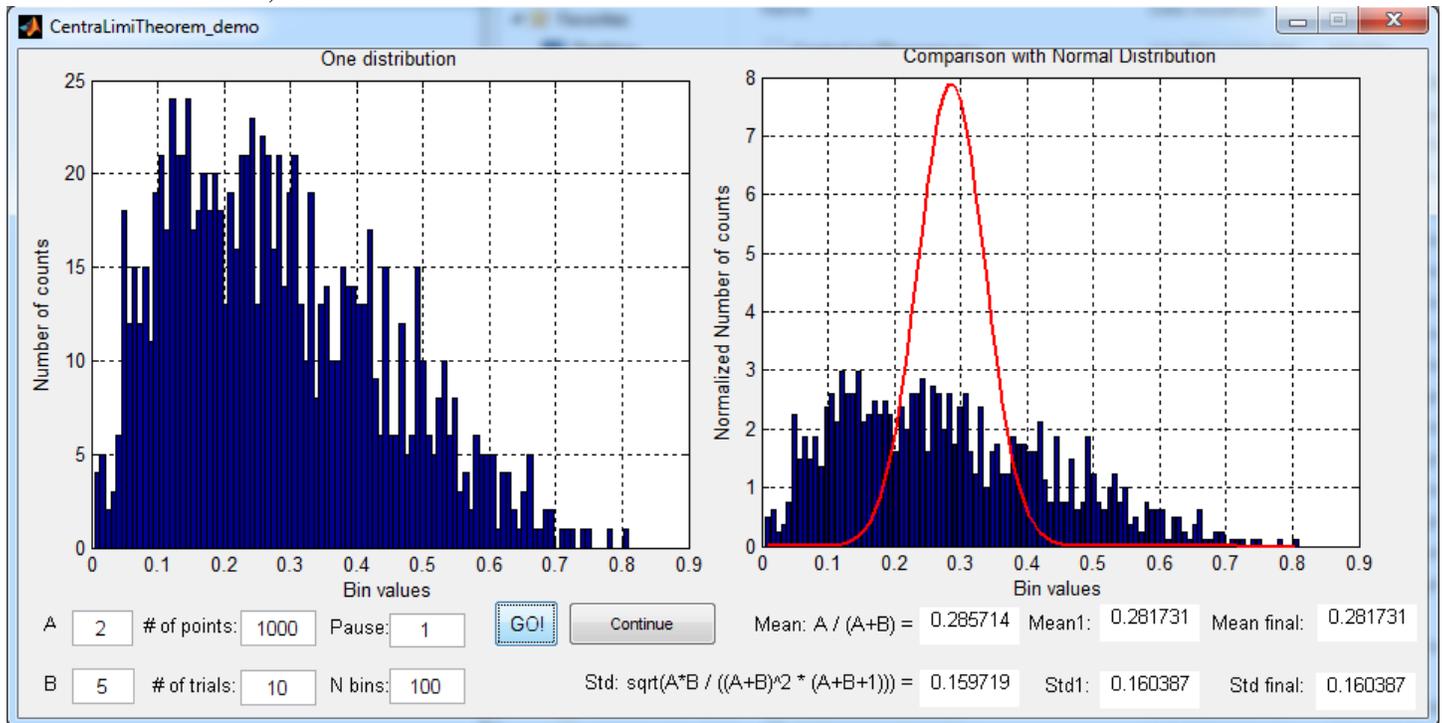
Period: **Class: Normal curve (Central Limit Theorem)**

Date(s): December 20th, 2012

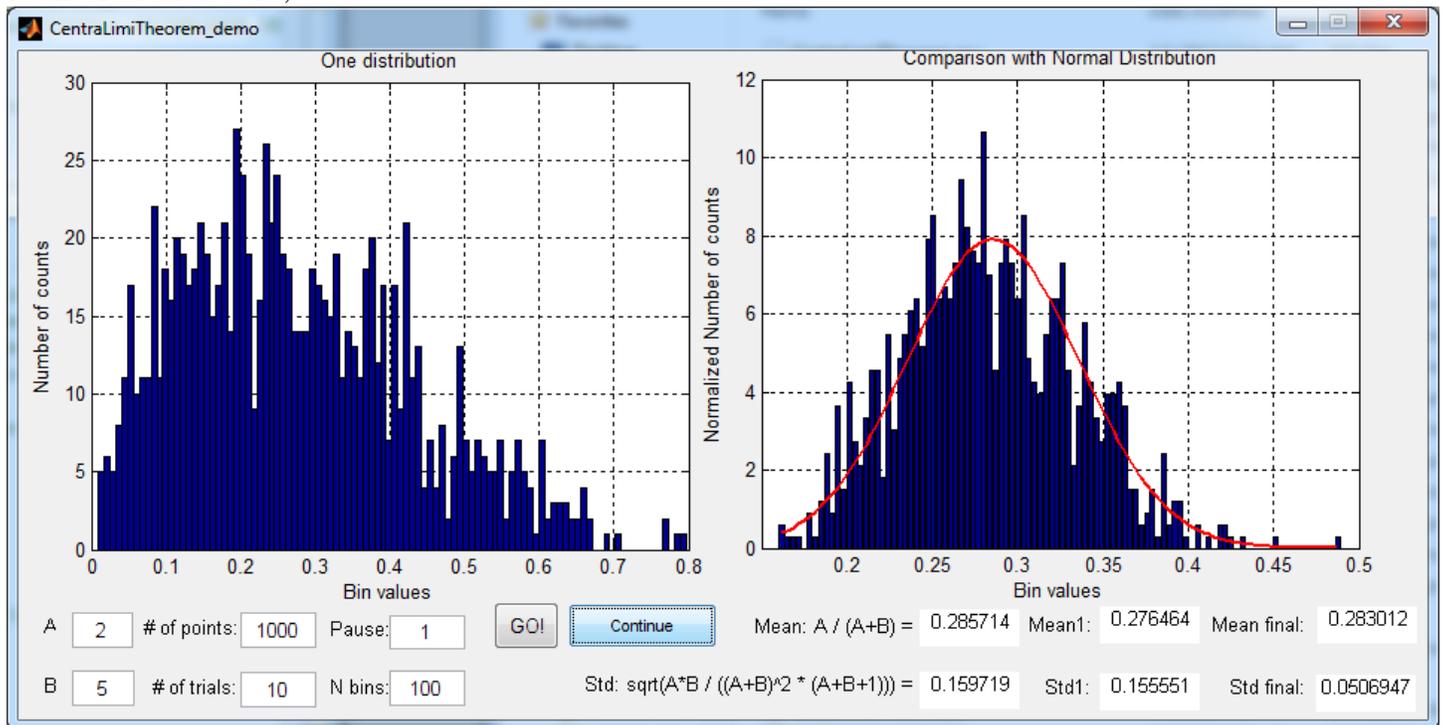
SETTING THE STAGE	
<u>Essential Question</u>	What makes millions of people around the world to talk to each other on cell phones
<u>Content Objective(s)</u> (Student-friendly)	We should be able to understand the importance of normal curve.
<u>Connection to previous or future lessons</u>	Previous knowledge of normal distribution, probability, mean and variance
<u>Critical Thinking Questions</u>	How does one type of distribution added several times could converge to normal curve?
<u>Key Vocabulary</u>	Central Limit Theorem
<u>Materials Needed/Safety</u>	MATLAB, CentraLimiTheorem_demo.m

ACTIVE INSTRUCTION	
<ul style="list-style-type: none"> • Launch (Engage) 	<p>Discuss the importance of normal curve in probability and statistics. Beta distribution will be used. Different beta and alpha values can generate different types of distributions. MATLAB demo will be presented to let them see how adding independent and identically distributed random variables has a distribution similar to normal distribution.</p>
<ul style="list-style-type: none"> • Investigation (Explore) 	<p>What happens if another distribution is added together? Does it converge to normal distribution?</p>
TIME FOR REFLECTION	
<ul style="list-style-type: none"> • Summarization (Explain & Extend) 	<p>Summarize them the importance of normal curve, and where it is used.</p>
<ul style="list-style-type: none"> • Assessment (Evaluate) 	<p>Ask them to discuss about what they learned about normal curve and its applications.</p>
<ul style="list-style-type: none"> • Homework 	<p>None.</p>

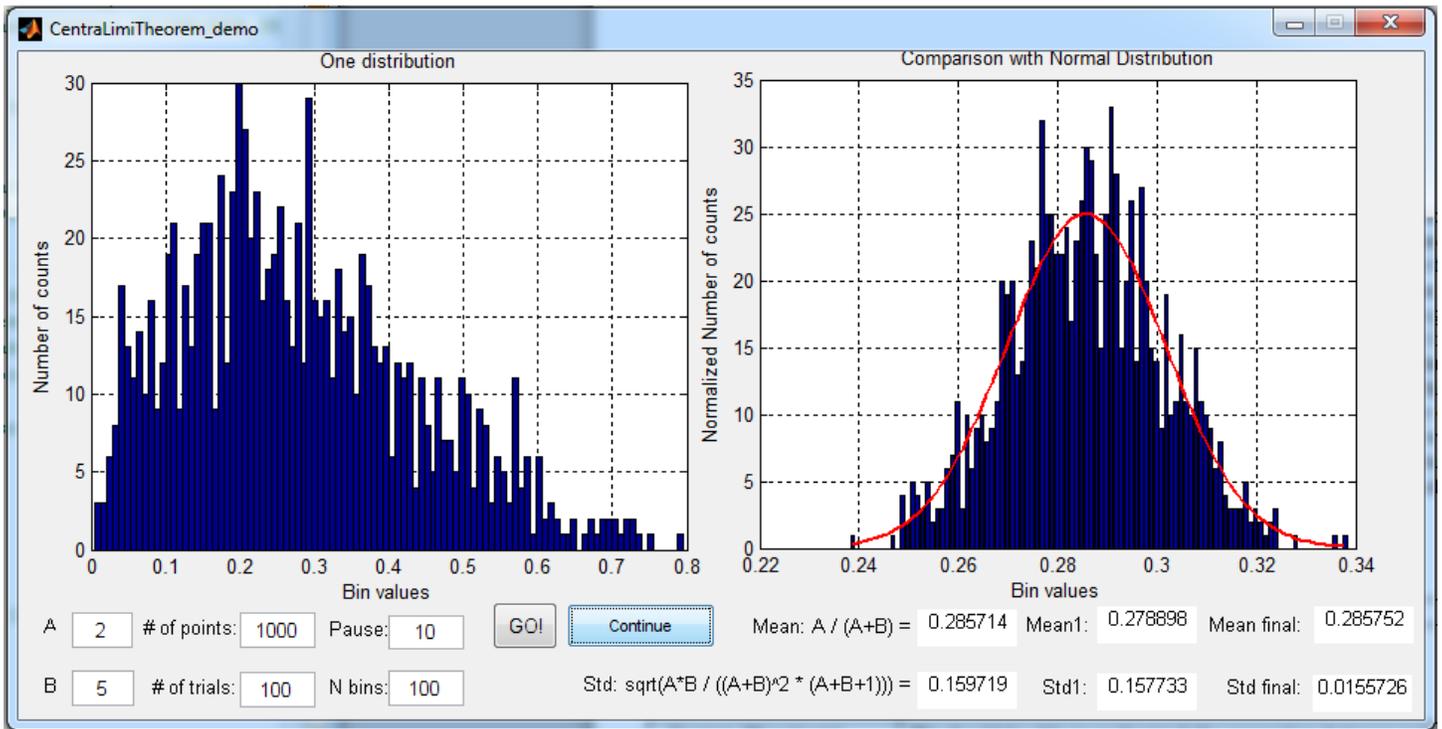
Number of trials = 1;



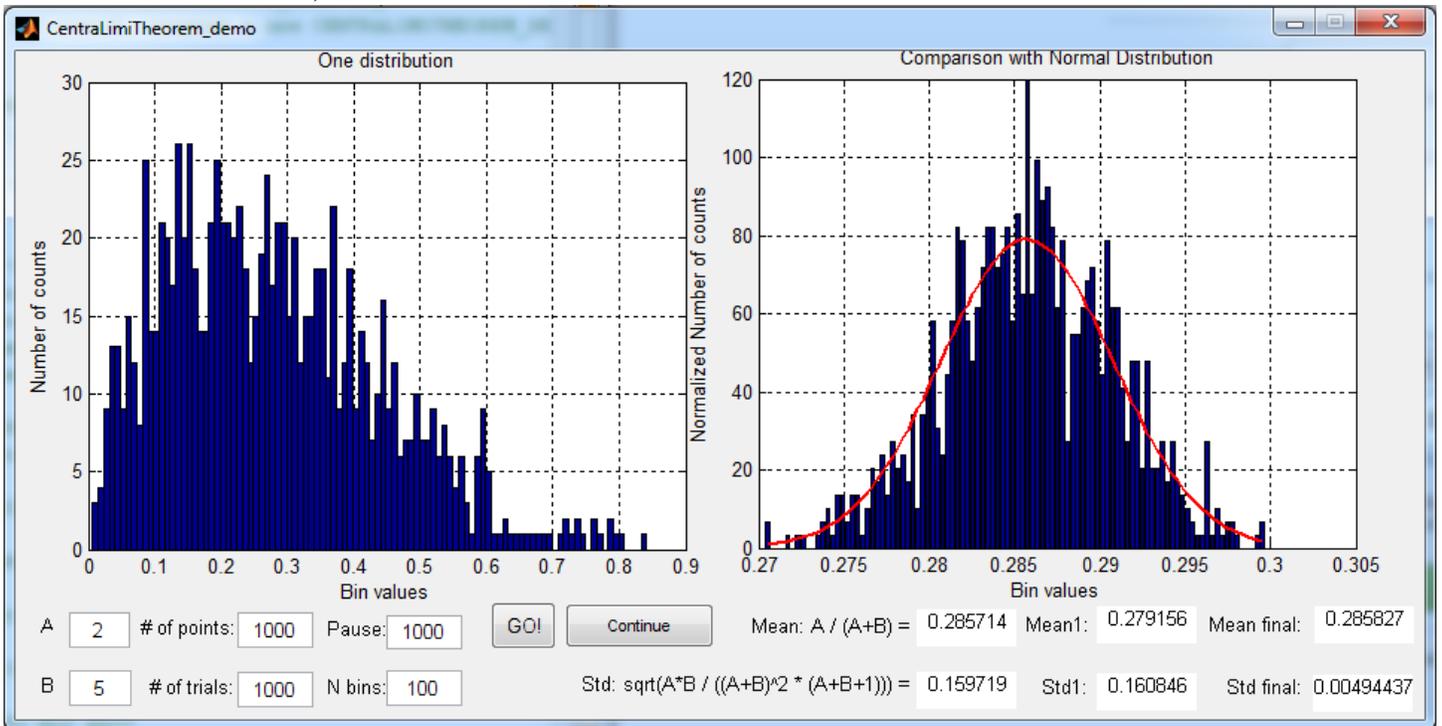
Number of trials = 10;



Number of trials = 100;



Number of trials = 1000;



Number of trials = 10000;

