

# Central Limit Theorem

## A Demonstration of SOCR

*It's Online, Therefore It Exists!*



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[www.SOCR.ucla.edu](http://www.SOCR.ucla.edu)

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New Orleans, Louisiana

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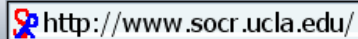
# Outline

- What is SOCR?
- How to access SOCR
- Components of SOCR
  - Distributions
  - Experiments (CLT)
- Activities (Wiki)
- Future Research and Development

# Accessing SOCR

 **SOCR: Statistics Online Computational Resource - Netscape**

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 <http://www.socr.ucla.edu/>

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[Tools](#)

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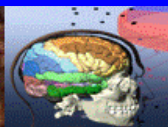
[Games](#)

[Modeler](#)

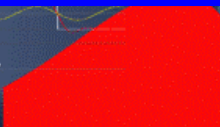
[Charts](#)

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[Translate SOCR](#)



**Statistics Online Computational Resource**



[SOCR News, Events, Announcements](#) [SOCR/CAUSEway 2007 Workshop](#) *It's online, therefore it exists!*

## What is SOCR?

The goals of the SOCR Resource are to design, validate and freely disseminate knowledge. Our Resource specifically provides portable online aids for probability and statistics education, technology based instruction and statistical computing. SOCR tools and resources include a repository of interactive applets, computational and graphing tools, instructional and course materials.



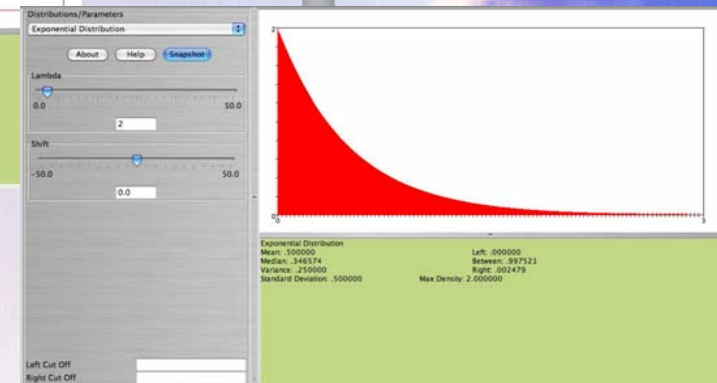
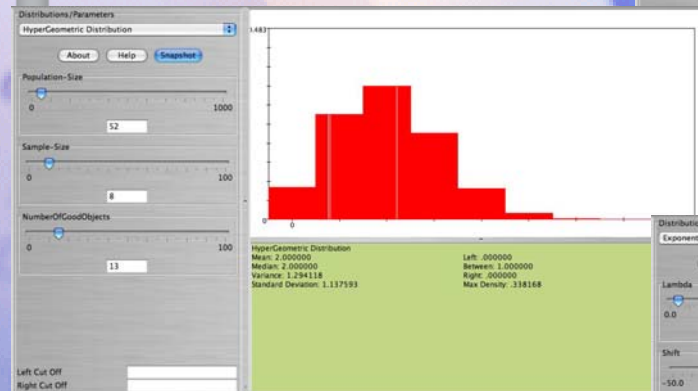
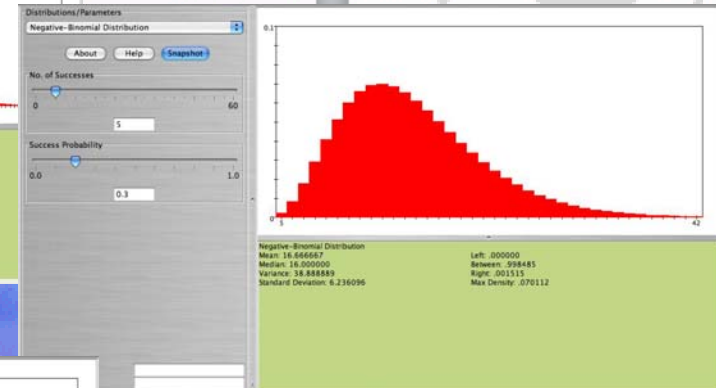
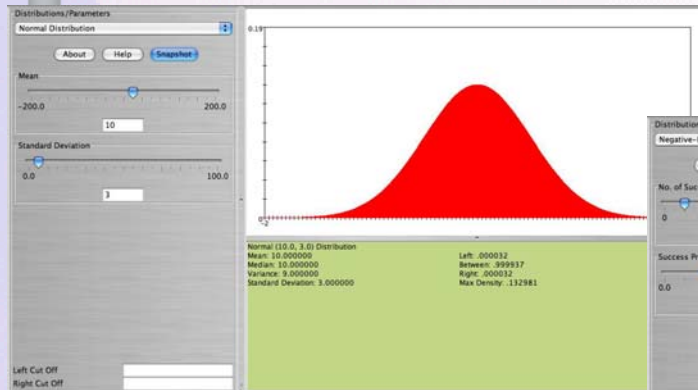
## INTERACTIVE SOCR TOOLS

[SOCR Distributions](#)  
[SOCR Experiments](#)  
[SOCR Analyses](#)  
[SOCR Games](#)  
[SOCR Data Modeler](#)  
[SOCR Plots & Charts](#)

# Distributions

## FEATURES

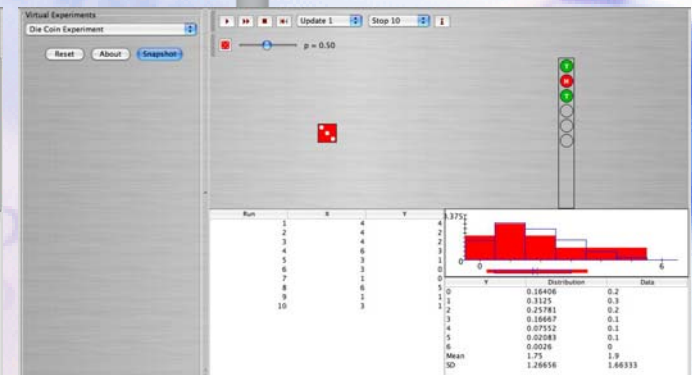
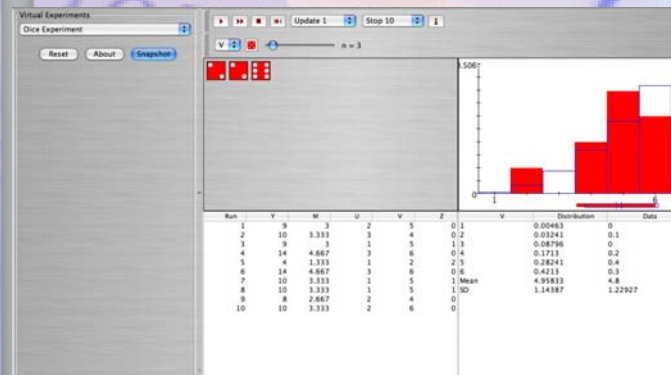
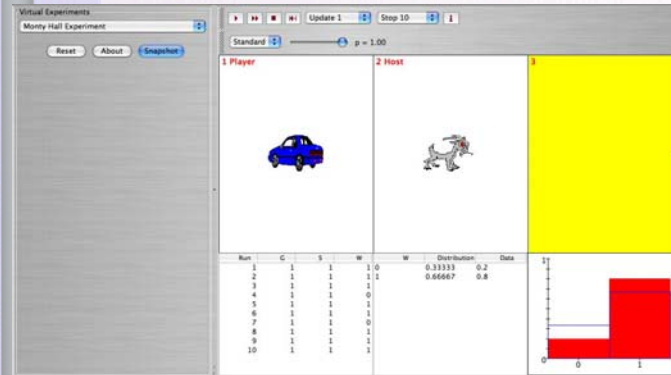
- 45+ Distributions
- Graphs
- PDFs
- CDFs
- Inverse CDFs
- Moments



# Experiments

## FEATURES

- 60+ Experiments
- Simulations
- Summary Stats
- Model vs. Sample



# Demonstration of CLT

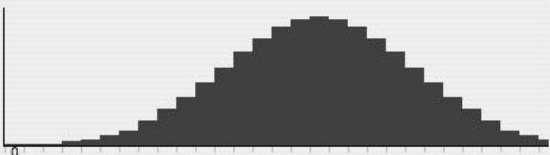
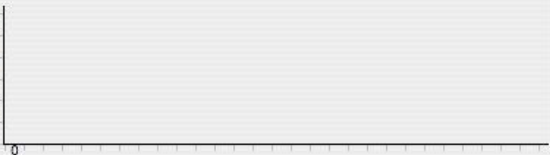
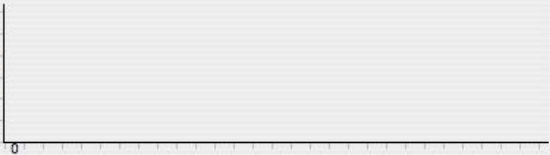

Let  $X_1, X_2, \dots, X_n$  be an i.i.d. (independent and identically distributed) sample from a population that has mean  $\mu$  and standard deviation  $\sigma$ . Then, for large  $n$  (usually  $n > 30$ ) the following statement is approximately true regardless of the shape of the population:

$$\bar{X} \sim N\left(\mu, \frac{\sigma}{\sqrt{n}}\right)$$

<http://www.socr.ucla.edu/>

# Default Setting for SOCR CLT Applet

Fit normal (1)
 Mean 
 Fit normal (2)
 Variance

Native Populaton	Sample Distribution	Sampling Dist. of Means, N=16	Sampling Dist. of Variances, N=16
			

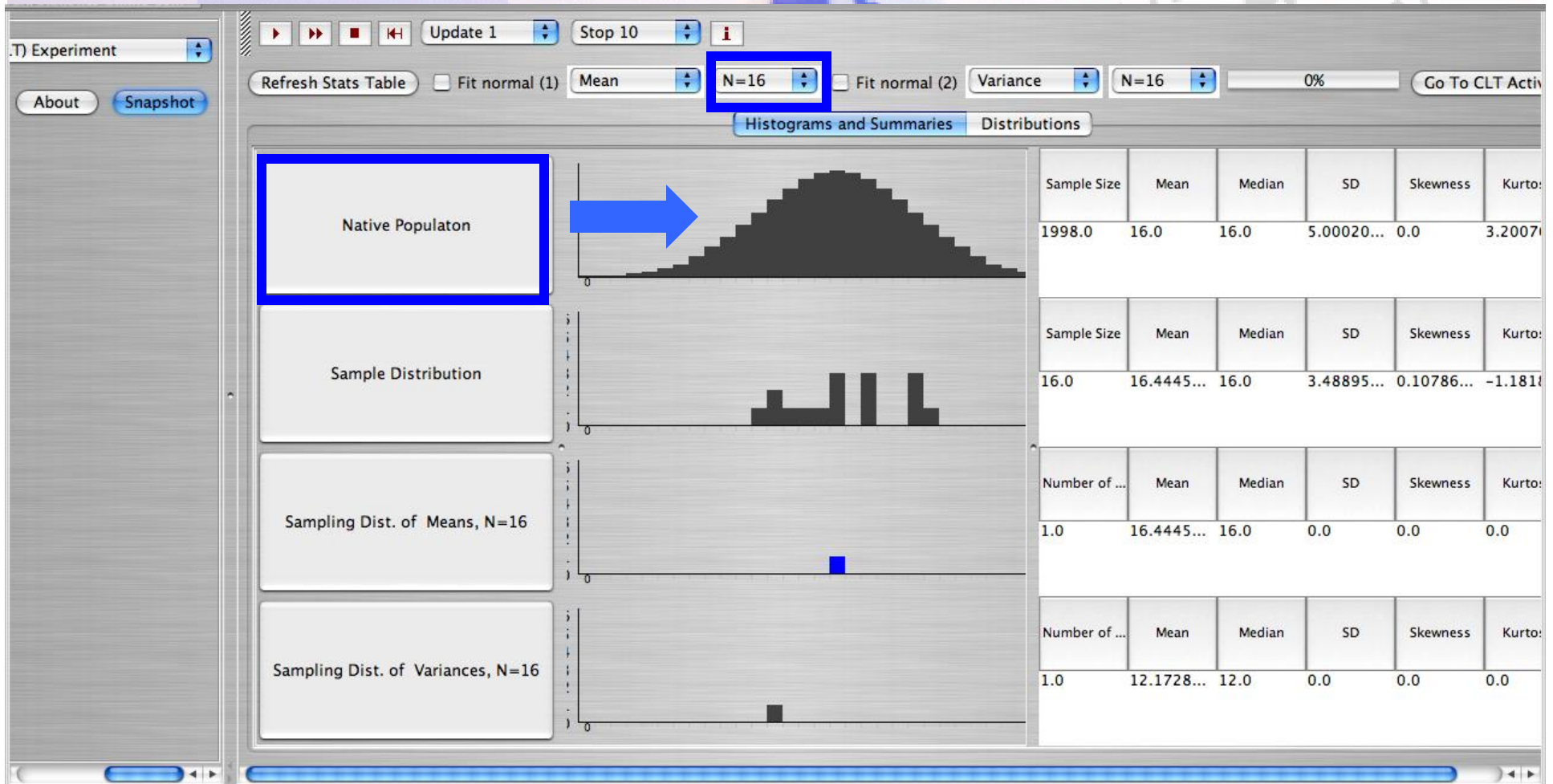
Sample Size	Mean	Median	SD	Skewness	Kurtosis
1998.0	16.0	16.0	5.000200...	0.0	3.200766...

Sample Size	Mean	Median	SD	Skewness	Kurtosis
0.0	NaN	0.5	NaN	0.0	0.0

Number of S	Mean	Median	SD	Skewness	Kurtosis
0.0	NaN	0.5	NaN	0.0	0.0

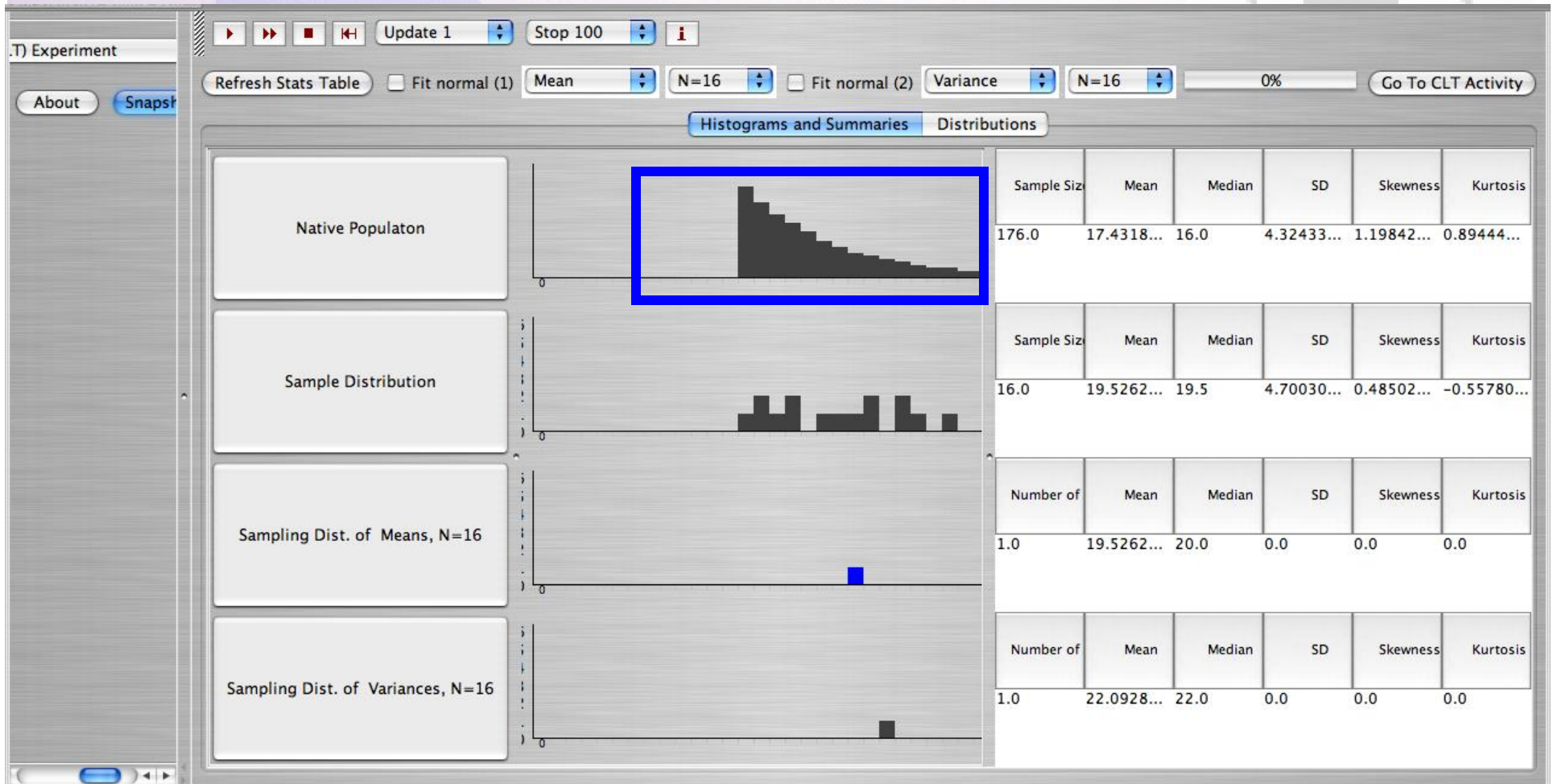
Number of S	Mean	Median	SD	Skewness	Kurtosis
0.0	NaN	0.5	NaN	0.0	0.0

# A single sample of size $n = 16$ Normal population

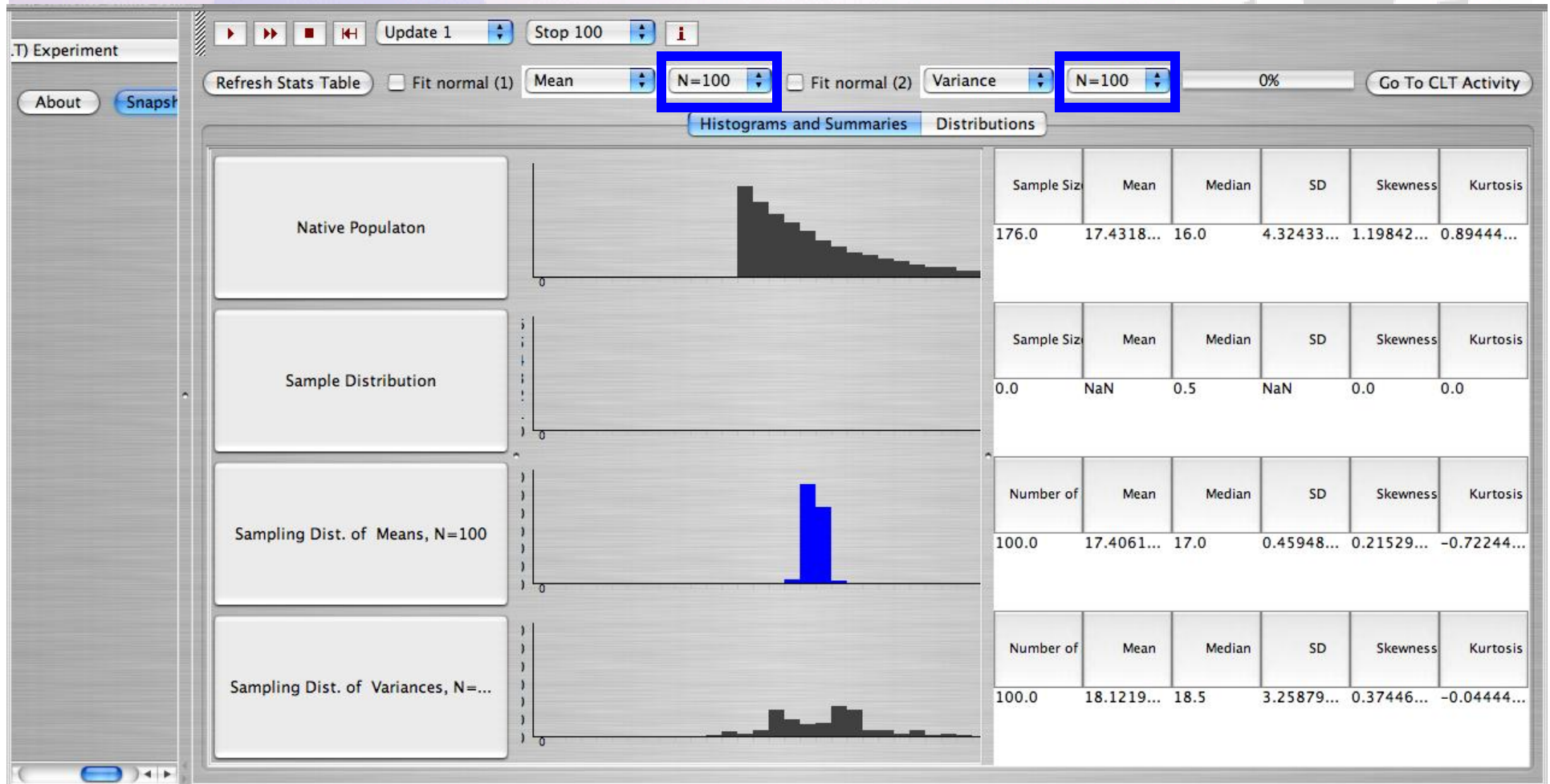




# A single sample of size $n = 16$ Exponential population



# 100 samples, each of size $n = 100$ Exponential population



# Activities

[http://wiki.stat.ucla.edu/socr/index.php/Main\\_Page](http://wiki.stat.ucla.edu/socr/index.php/Main_Page)



- navigation
- Main Page
  - Community portal
  - Current events
  - Recent changes
  - Random page
  - Help
  - Donations
  - Keyword Search

search

Go Search

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  - Printable version
  - Permanent link

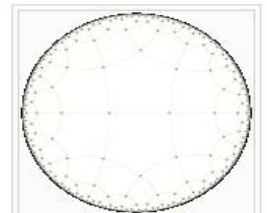
article discussion view source history

## Main Page

It's online, therefore it exists!

### Main SOCR Wiki Pages

- Interactive SOCR Resource Viewer
- SOCR Documentation
- SOCR Blog
- SOCR Educational Materials
- SOCR News, Events and Announcements
- SOCR Collaborators and Partners
- SOCR Projects
- SOCR Videos



Interactive SOCR Resource Viewer

■ SOCR Home page: <http://www.socr.ucla.edu> or <http://www.StatisticsResource.org>

Translate this page:



# Future Research and Development

- SOCR usage
- Classroom testing for the effectiveness of SOCR (2005-06, 2006-07)
- New tools under development
- More SOCR activities for Wiki page
- SOCR Workshop at UCLA, August 6-8, 2007

