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Comp 150: Visualization
Assignment 5: Part A & B
November 24, 2014

Hypotheses
1. Displaying a larger bar chart will increase accuracy of two elements being compared, compared to a smaller bar chart.
2. Displaying a larger pie chart will increase accuracy of two elements being compared, compared to a smaller pie chart.

Confidence Interval Calculation Method
The code begins with the initialization of variables representing the population mean value, standard deviation, sample size, z value for $\alpha/2$ (**z <- qnorm(.975)** ), the array of sample upper confidence levels (**ucl**), the array of sample lower confidence levels (**lcl**), and the array of sample means (**x**). The code then enters a loop which populates the lower confidence level array by calculating $\bar{x} - z_{\frac{\alpha}{2}} \frac{\sigma}{\sqrt{n}}$ where $\bar{x}$ is the sample mean, $z_{\alpha/2}$ is the aforementioned **z**, $\sigma$ is the standard deviation, and $n$ is the sample size (**lcl[i] <-(x[i]) - z*sig/sqrt(n)**).This loop populates the upper confidence level in a similar manner (using + instead of -). The following section of the code plots, on the output graph, horizontal lines which represent the confidence interval of a particular sample (**lines(c(lcl[i],ucl[i]),c(i,i))**), and points on each of those which represent the mean of a particular sample (**points(x[i],i,pch=16,cex=.5,)**).

Error Analysis
The 95% confidence intervals of do not seem to show a significant correlation between error and the size of the charts. As can be seen in the graph, the medium pie chart confidence interval estimates less error compared to the tiny and large versions, while the medium bar chart confidence interval estimates much more.

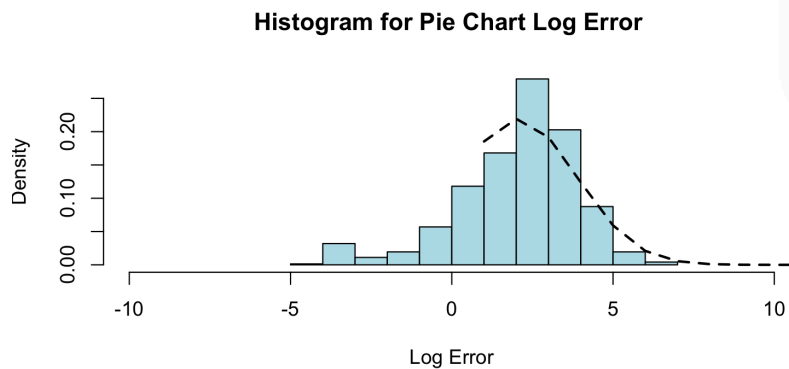On the other hand, this plot seems to show a correlation between the chart types and error.

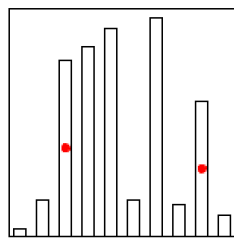**100 95% Confidence Intervals of Log Error**

# Normal Distribution

### Histogram for Bar Chart Log Error
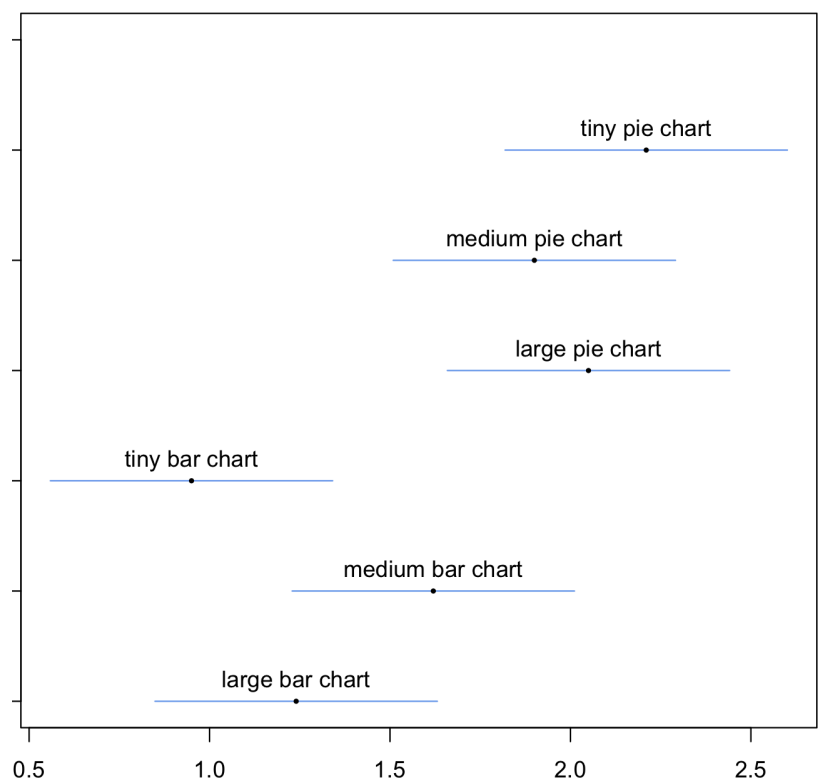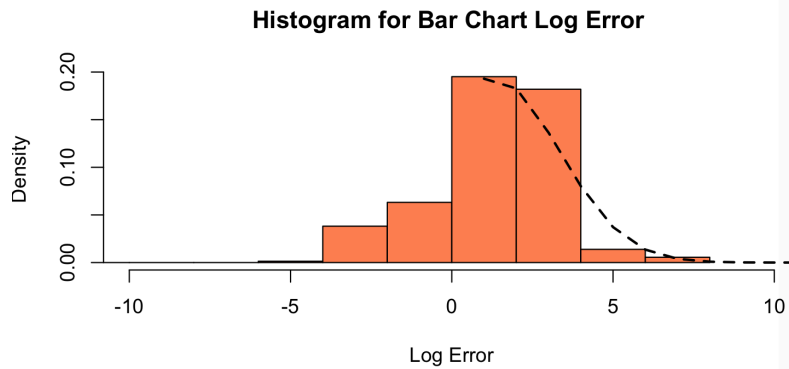


The dotted line drawn on top of the histogram indicates the shape of normally distributed data. These graphs are similar enough to the curve that they can be called normally distributed.

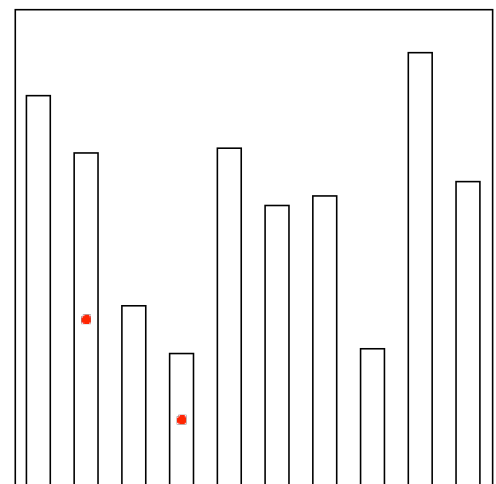### Histogram for Pie Chart Log Error



# Examples of Conditions



Two values are marked with dots.
What percentage is the smaller of the larger?
Please put your answer below.
e.g. If you think the smaller is exactly a half of the larger,
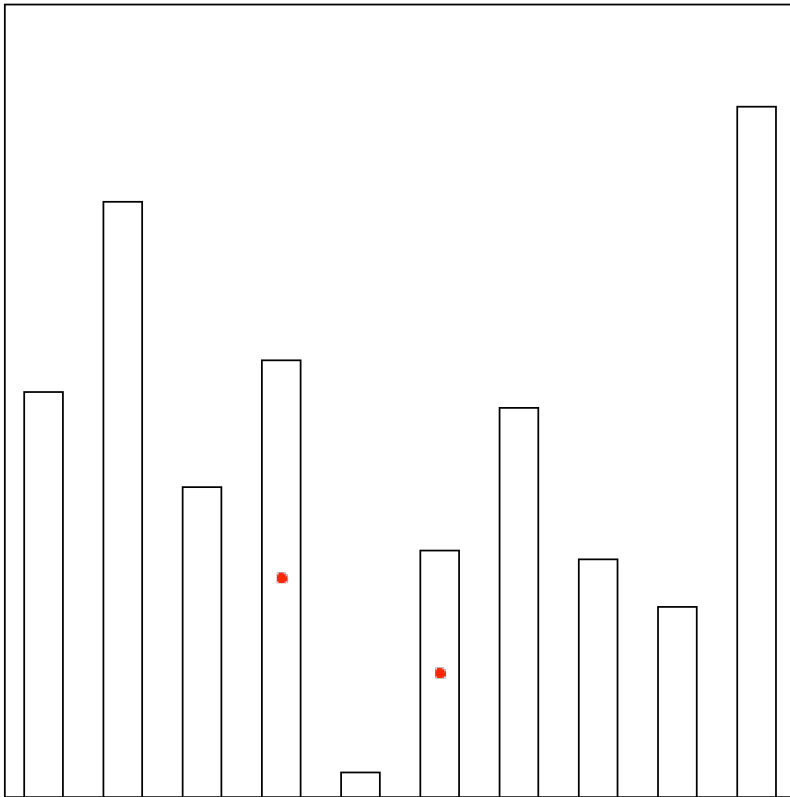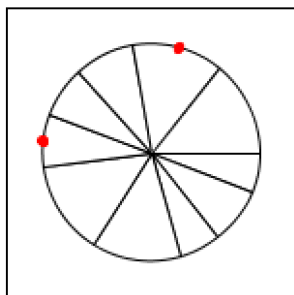please input "50".

ANSWER          NEXT



Two values are marked with dots.
What percentage is the smaller of the larger?
Please put your answer below.
e.g. If you think the smaller is exactly a half of the larger,
please input "50".

NEXT

Two values are marked with dots.
What percentage is the smaller of the larger?
Please put your answer below.
e.g. If you think the smaller is exactly a half of the larger,
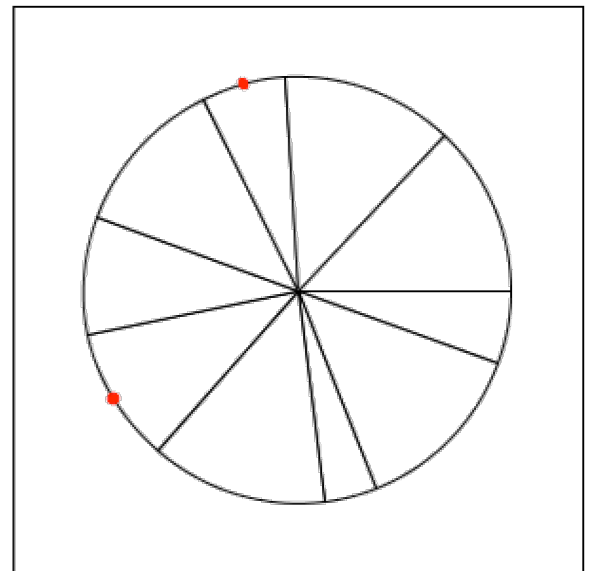please input "50".

NEXT

ANSWER

Two values are marked with dots.
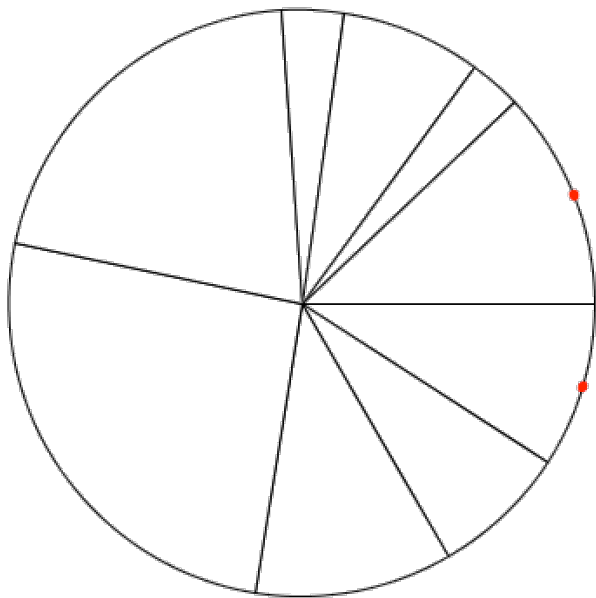What percentage is the smaller of the larger?
Please put your answer below.
e.g. If you think the smaller is exactly a half of the larger,
please input "50".

NEXT

Two values are marked with dots.
What percentage is the smaller of the larger?
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ANSWER

NEXT

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