

Stat 101L: Lecture 4

Quantitative Data

- ◆ For a Statistics' project, students weighed the contents of cans of cola.
- ◆ In 2000, 24 cans of cola were weighed (full and empty). The difference (full – empty) is the weight of the contents. The units are grams.

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Quantitative Data

- ◆ Who? Cans of cola.
- ◆ What? Weight (g) of contents.

368, 351, 355, 367, 352, 369, 370, 369
370, 355, 354, 357, 366, 353, 373, 365
355, 356, 362, 354, 353, 378, 368, 349

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Weight of Contents

- ◆ What can we say about the weight of contents of a can of cola?
 - Variation!
 - Smallest value?
 - Largest value?
 - Middle value?

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Display of Data

- ◆ Stem-and-Leaf Display
or Stem Plot
 - Orders the data and creates a display of the distribution of values.

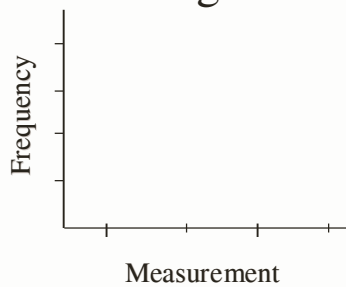
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Display of Data

- ◆ Histogram
 - A picture of the distribution of the data.
 - Collects values into bins.
 - Bins should be of equal width.
 - Different bin choices can yield different pictures.

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Histogram



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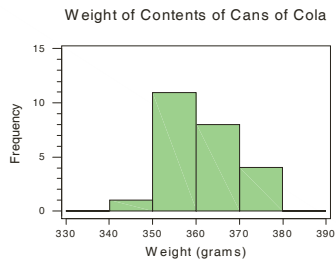
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Constructing a Histogram

- ◆ Order data from smallest to largest using a stem and leaf display.
- ◆ Determine bins.
 - equal width
 - more data → more bins

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Weight of Contents



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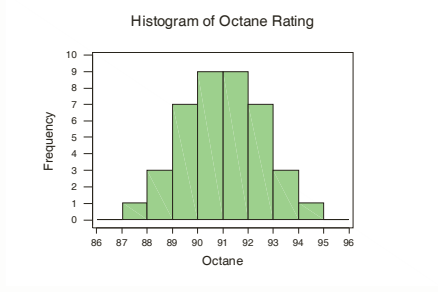
Shape

- ◆ Symmetry
 - Mounded, flat
- ◆ Skew
 - Right, left
- ◆ Other
 - Multiple peaks, outliers

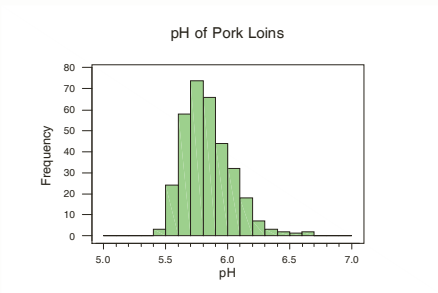
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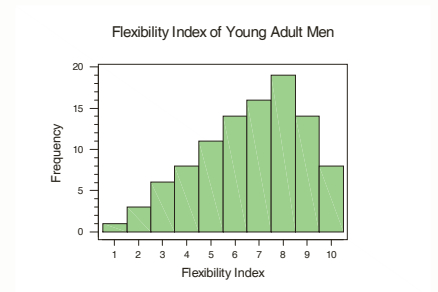
Symmetric, mounded in middle



Skew - Right

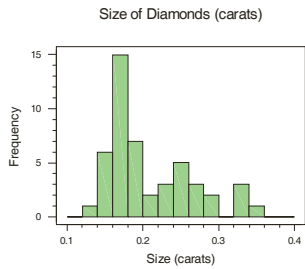


Skew - Left



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Multiple Peaks



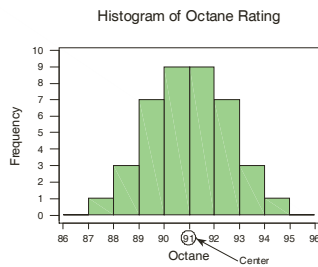
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Center

- ◆ A typical value.
- ◆ Summary of the whole batch of numbers.
- ◆ For symmetric distributions – easy.

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Histogram of Octane



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Spread

- ◆ Variation matters.
 - Tightly clustered?
 - Spread out?
 - Low and high values?

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Numerical Summaries

Weights of contents of cans of cola.

34		9
35		12334455567
36		25678899
37		0038

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Numerical Summaries

- ◆ What is a “typical” value?
- ◆ Look for the center of the distribution.
- ◆ What do we mean by “center”?

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Measures of Center

◆ Sample Midrange

– Average of the minimum and the maximum.

$$(349+378)/2=363.5 \text{ grams}$$

– Greatly affected outliers.

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Measures of Center

◆ Sample Median

– A value that divides the data into a lower half and an upper half.

– About half the data values are greater than the median about half are less than the median.

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Sample Median

34 | 9

35 | 12334455567

36 | 25678899

37 | 0038

$$\text{Median} = (357+362)/2 \\ = 359.5 \text{ grams}$$

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