

Stat 104 – Lecture 2

Single Variable Data

- Categorical (Qualitative).
 - Display – Circle graph, bar graph, Pareto diagram.
- Numerical (Quantitative).
 - Display – dot plot, stem and leaf, histogram, box plot.
 - Summary – center, spread, position.

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Data

- Who?
 - Carnivores.
- What?
 - Family/species, Body mass, Bite force, Diet.

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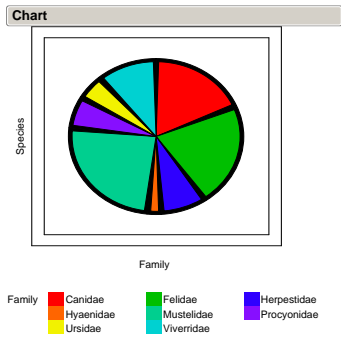
Categorical (Qualitative)

Family	Number of Species	Percentage
<i>Canidae</i>	28	18.5%
<i>Felidae</i>	33	21.9%
<i>Herpestidae</i>	13	8.6%
<i>Hyaenidae</i>	4	2.6%
<i>Mustelidae</i>	38	25.2%
<i>Procyonidae</i>	10	6.6%
<i>Ursidae</i>	8	5.3%
<i>Viverridae</i>	17	11.3%
Total	151	100%

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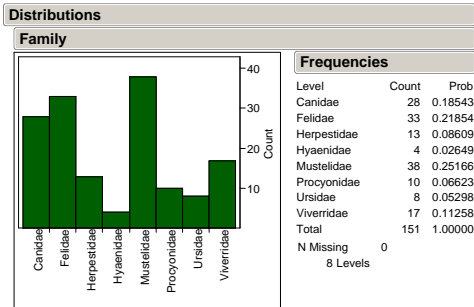
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Circle Graph (Pie Chart)



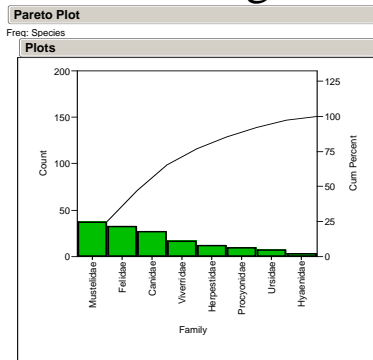
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Bar Graph



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Pareto Diagram



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Numerical (Quantitative)

Body Mass of *Canidae*
(rounded to nearest kg)

5, 10, 10, 9, 25, 11, 36,
9, 7, 23, 13, 1, 4, 22,
5, 5, 12, 6, 6, 6, 5,
4, 4, 5, 3, 3, 3, 8

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Dot Plot of Body Mass



Stem-and-Leaf Display

Body Mass (kg) of *Canidae*

0 | 1,3,3,3,4,4,4,5,5,5,5,5,6,6,6,7,8,9,9
1 | 0,0,1,2,3
2 | 2,3,5
3 | 6
4 |

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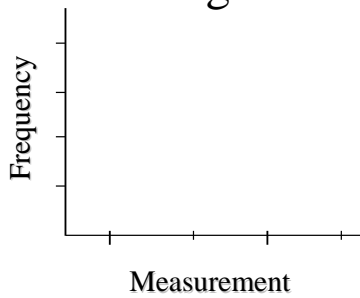
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Display of Numerical Data

- Histogram
 - A picture of the distribution of the data.
 - Collects values into intervals.
 - Intervals should be of equal width.
 - Different choices for intervals can yield different pictures.

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Histogram



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Constructing a Histogram

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

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Split Stem

Body Mass (kg) of *Canidae*

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0 | 1,3,3,3,4,4,4
0*| 5,5,5,5,5,6,6,6,7,8,9,9
1 | 0,0,1,2,3
1*|
2 | 2,3
2*| 5
3 |
3*| 6
    
```

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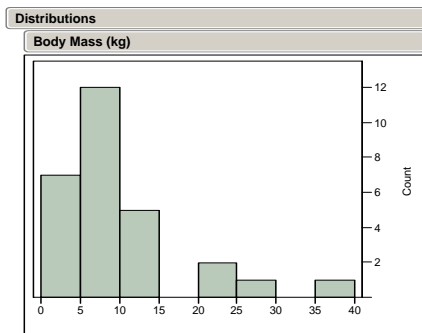
Interval

Freq

Interval	Freq
$0 \leq \text{Body Mass} < 5$	7
$5 \leq \text{Body Mass} < 10$	12
$10 \leq \text{Body Mass} < 15$	5
$15 \leq \text{Body Mass} < 20$	0
$20 \leq \text{Body Mass} < 25$	2
$25 \leq \text{Body Mass} < 30$	1
$30 \leq \text{Body Mass} < 35$	0
$35 \leq \text{Body Mass} < 40$	1

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Histogram



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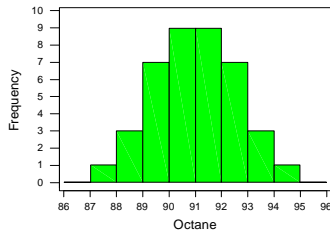
Shape

- Symmetry (mirror image)
 - Mounded, flat
- Skew (mounded on one side – skewed to the other side)
 - Toward higher values (right)
 - Toward lower values (left)
- Other
 - Multiple peaks, outliers

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Symmetric & Mounded

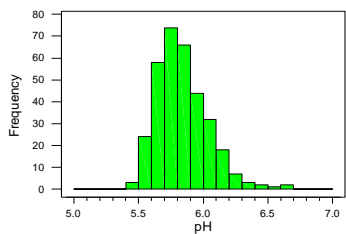
Histogram of Octane Rating



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Skewed to Right

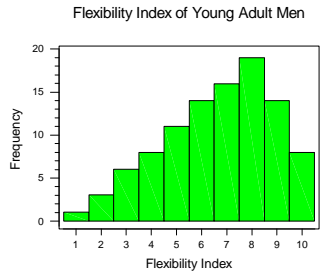
pH of Pork Loin



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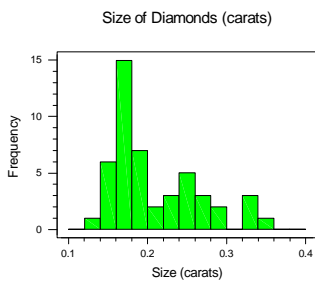
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Skewed to Left



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Multiple Peaks



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Summarizing Numerical Data

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

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