Crafting with Data

Reality, Illusions, Truth & the Future

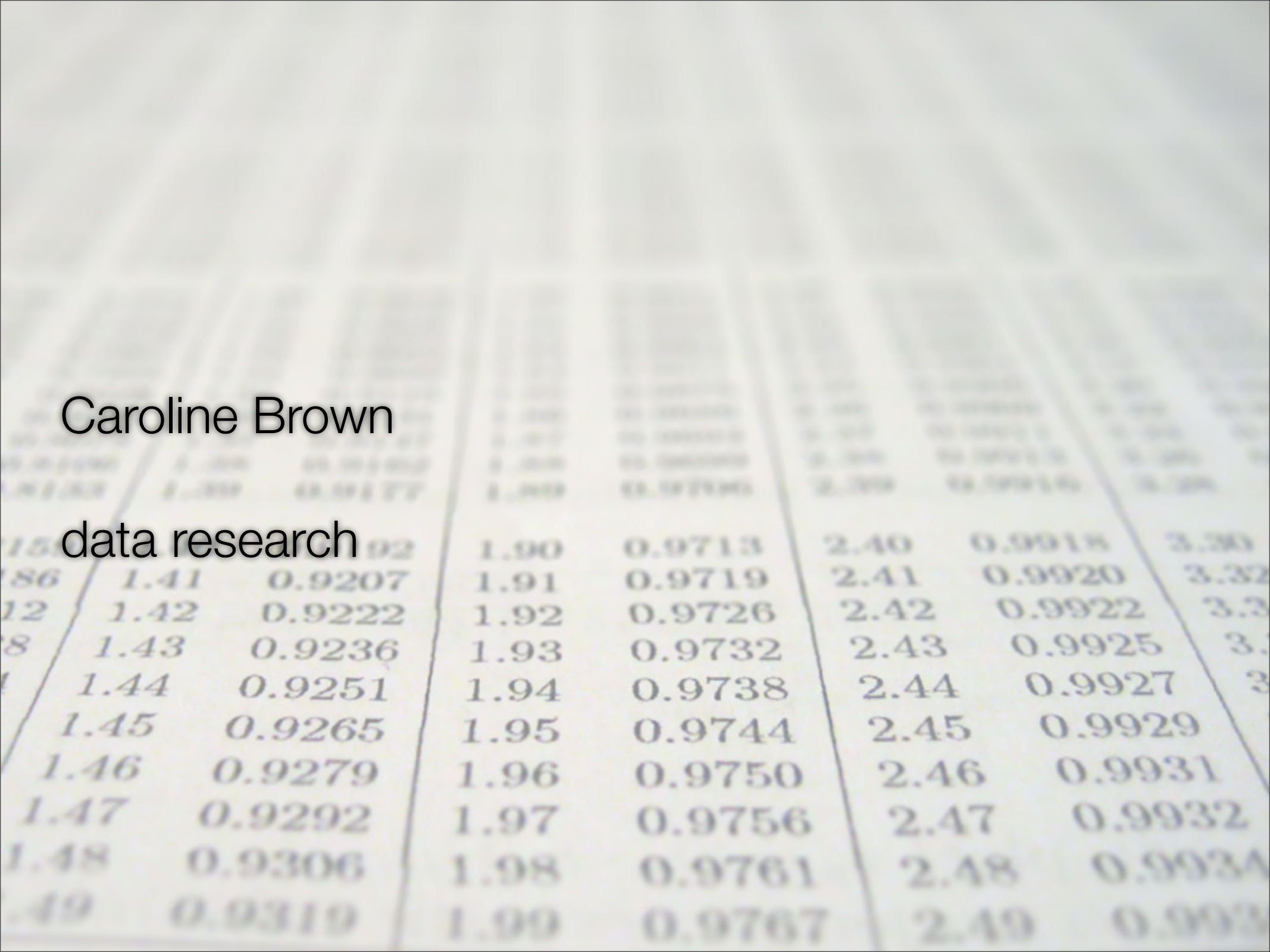
Instructor: Rob Faludi

Plan for Today

- Caroline Brown
- Exercise One: Families
- Exploratory Data Analysis
- Central Tendency & Measures of Spread
- Present New York Data project pilot results
- Exercise Two: Measuring (maybe)
- Readings & Assignments

Caroline Brown

data research



Exercise One: Families

- How many people in your family?
- Average in US is about 2.0
- How do we compare?

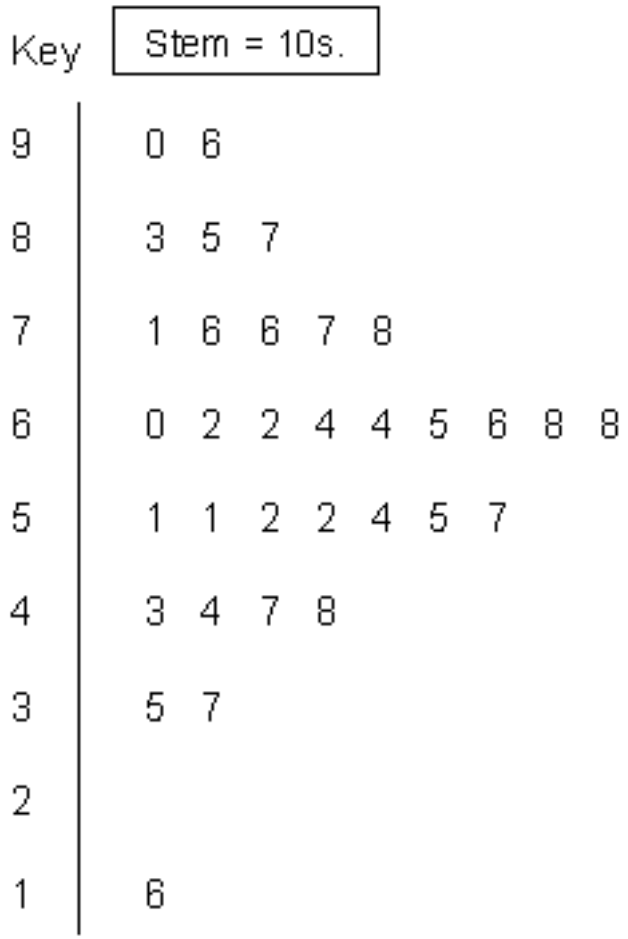
Exploratory Data Analysis

- many wells, many routes
- state of mind
- data as a source of new ideas
- skepticism for summaries
- openness to new patterns and views
- not by statistical summary alone, that’s not open

EDA

- Smooth vs. Rough
- inductive methods
- re-expression, scales
- visualization
- resistant or robust statistics
- outliers, include or exclude?

Visualization: Stem & Leaf



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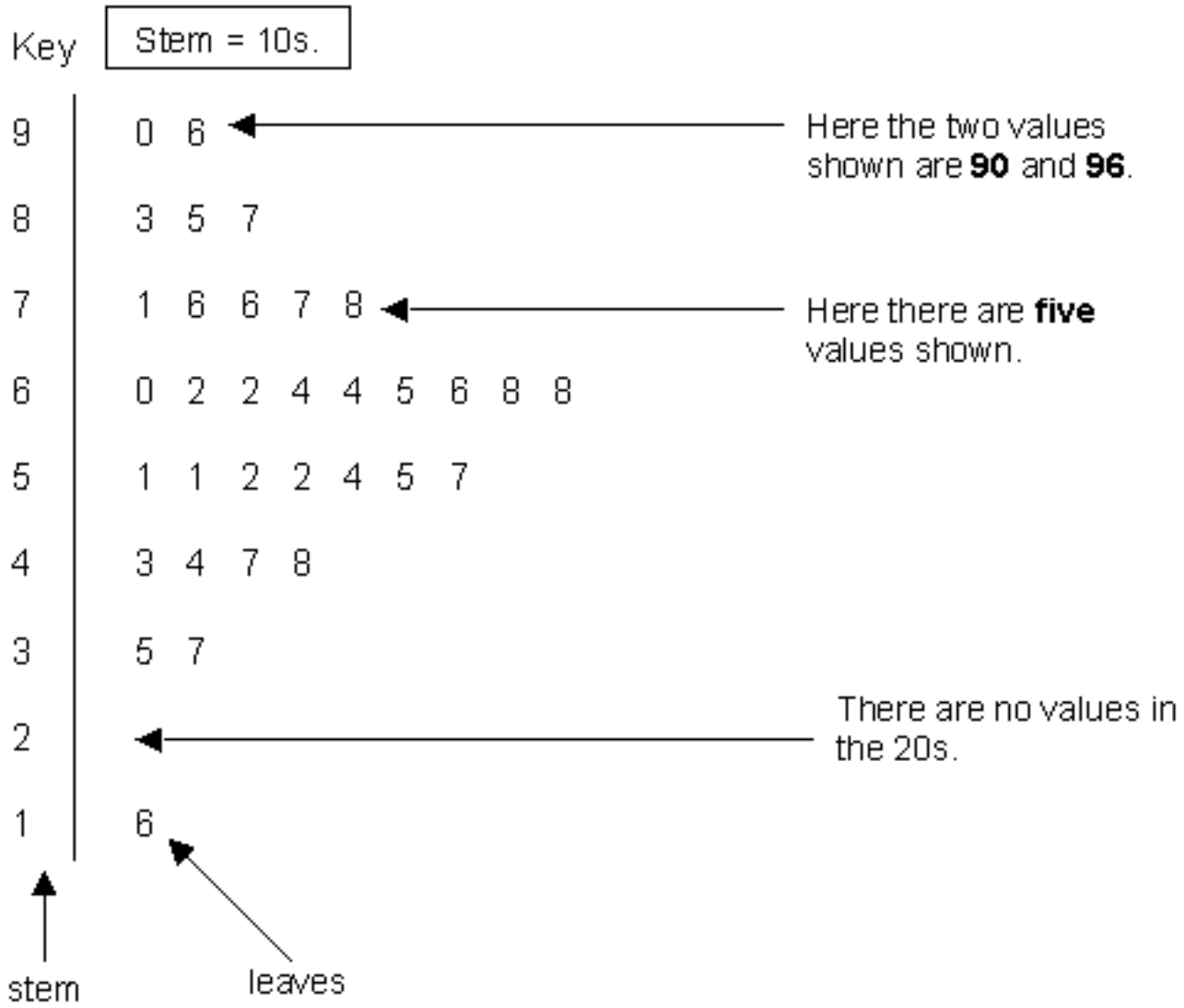

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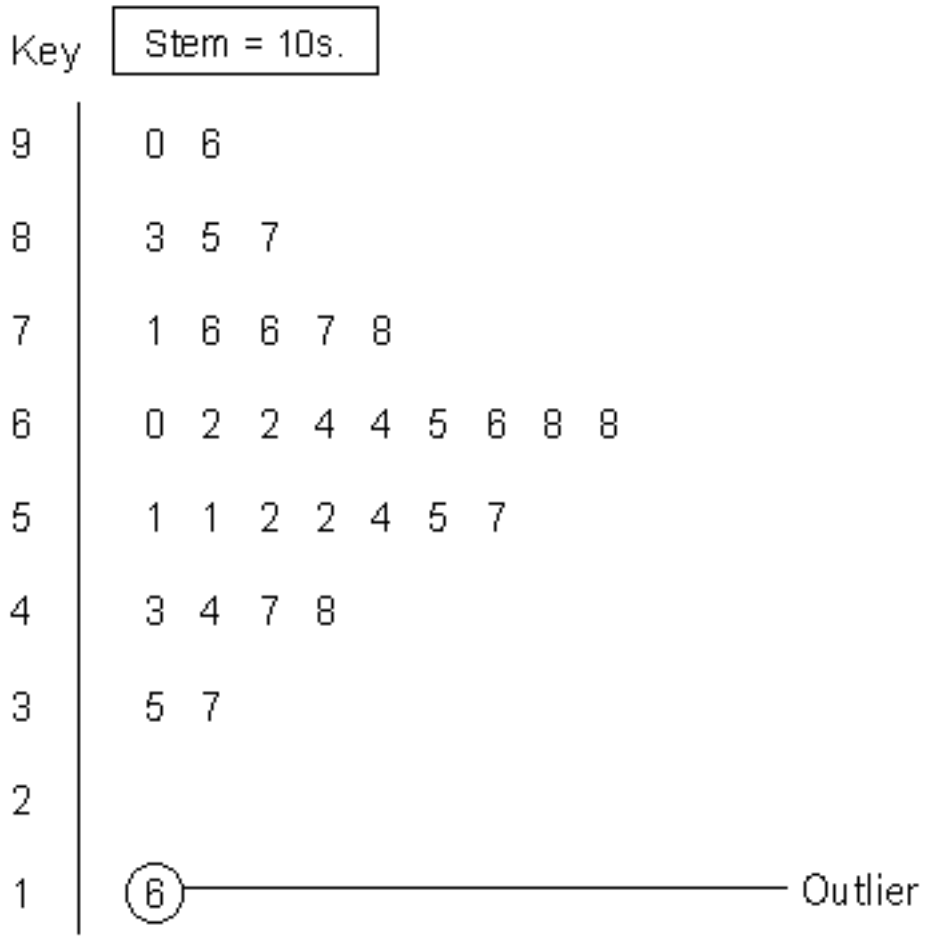
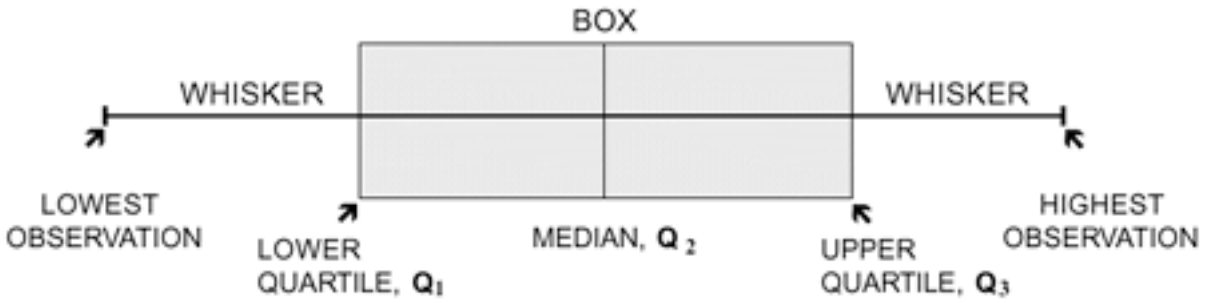


Total number of student marks = 33

Visualization: Box & Whiskers



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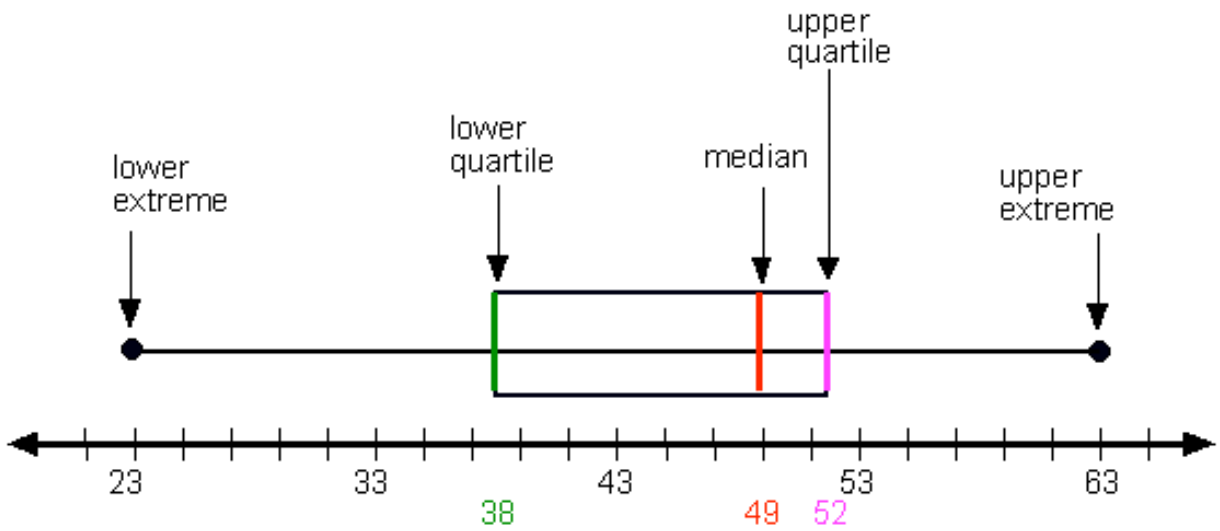

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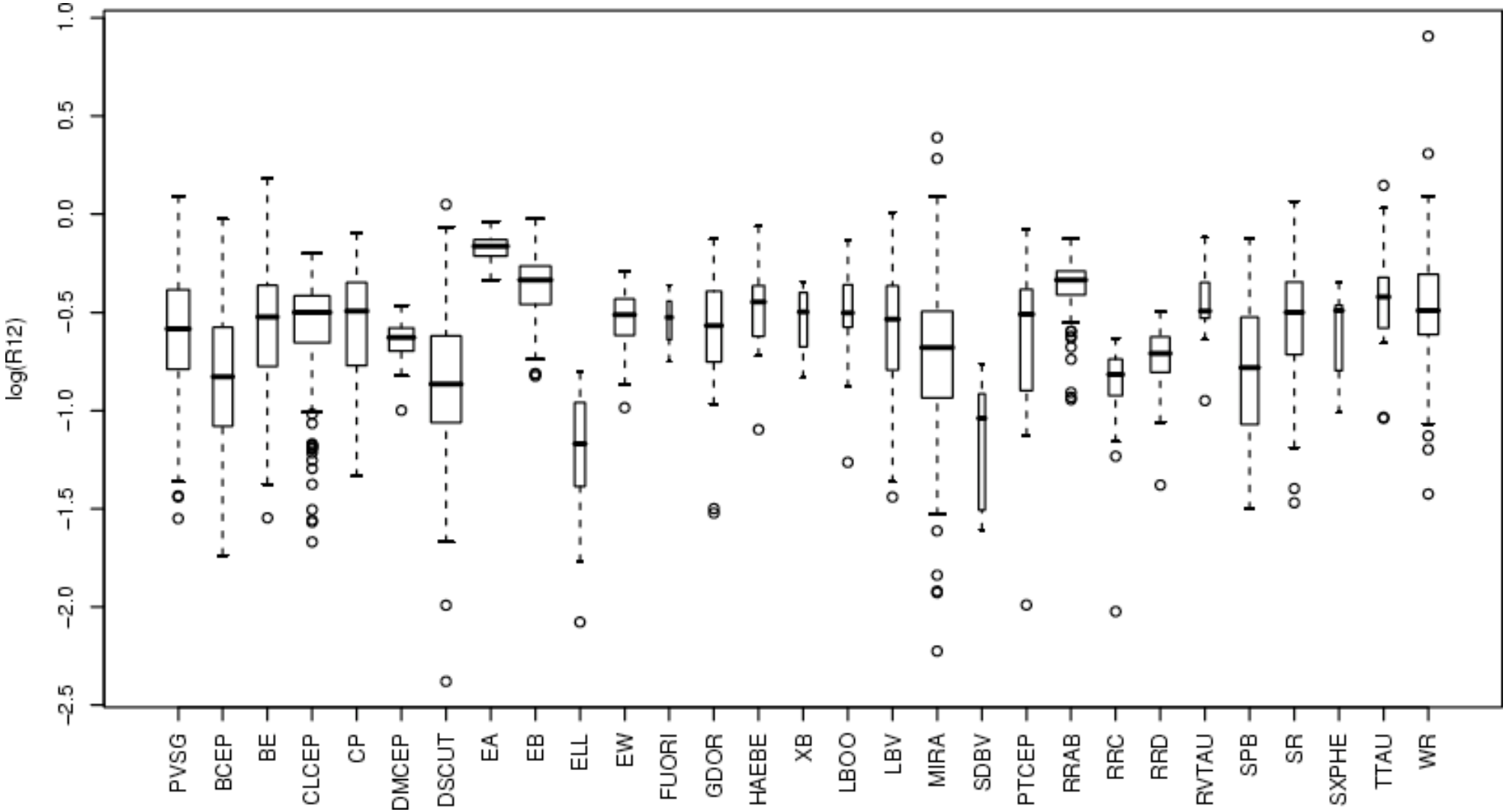

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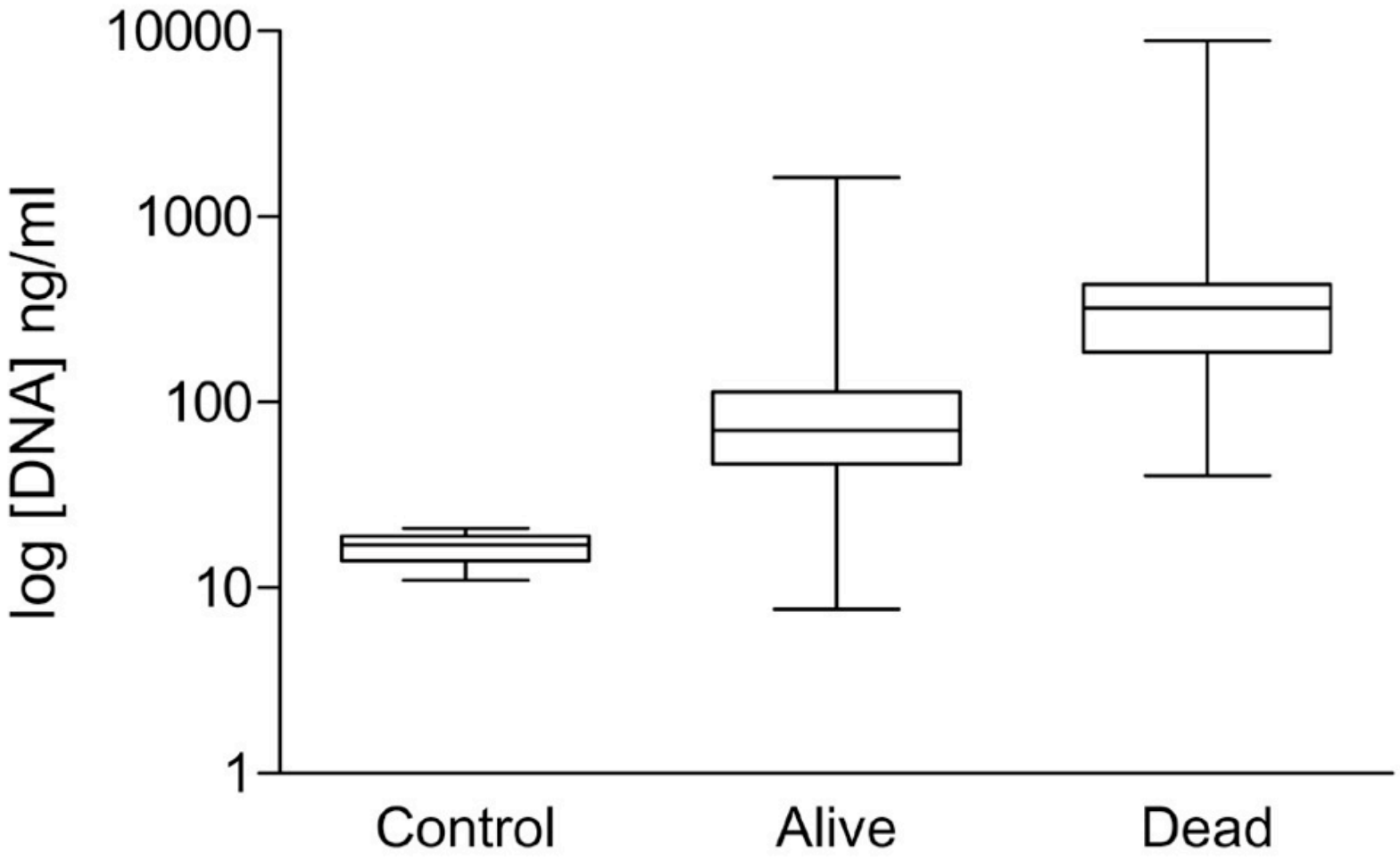
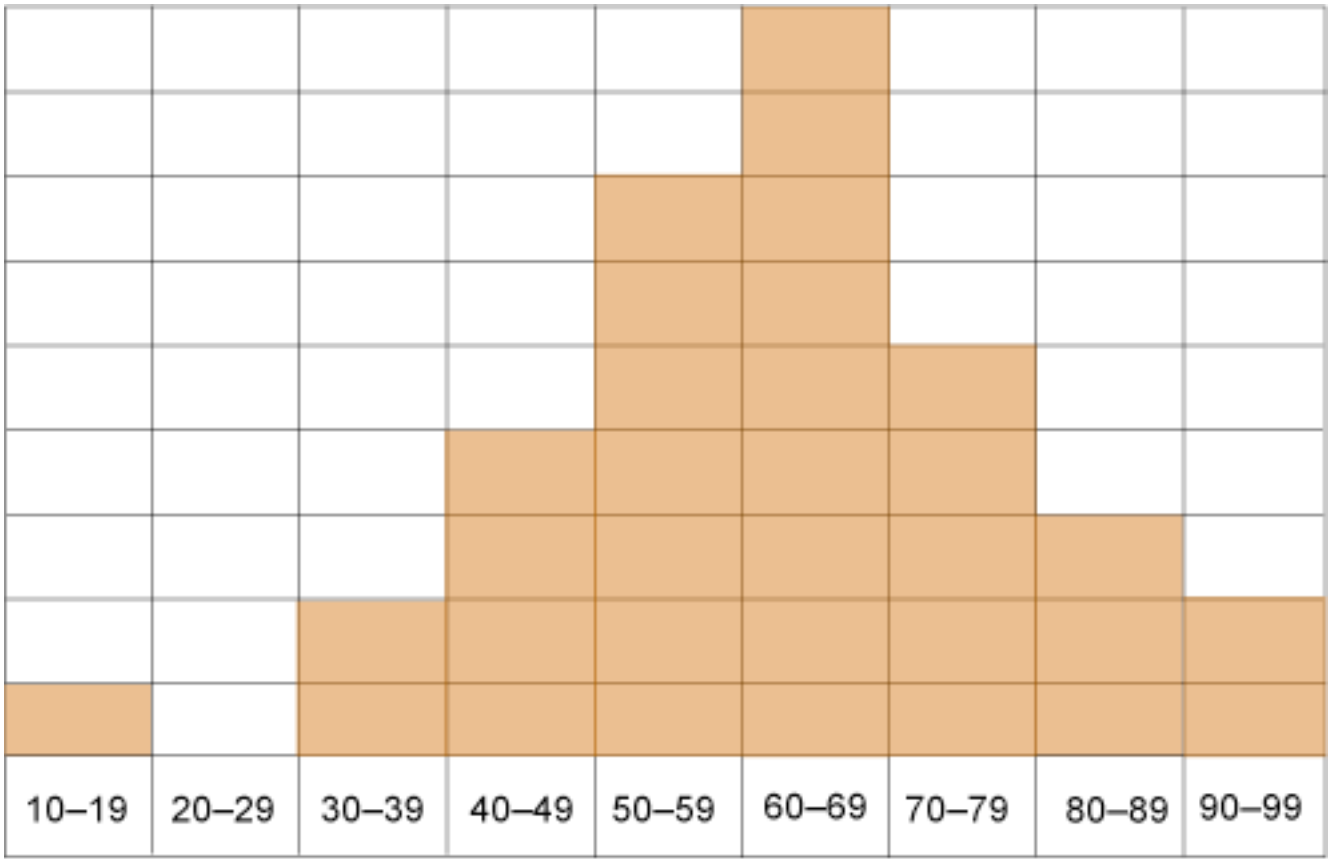


Visualization: Histograms



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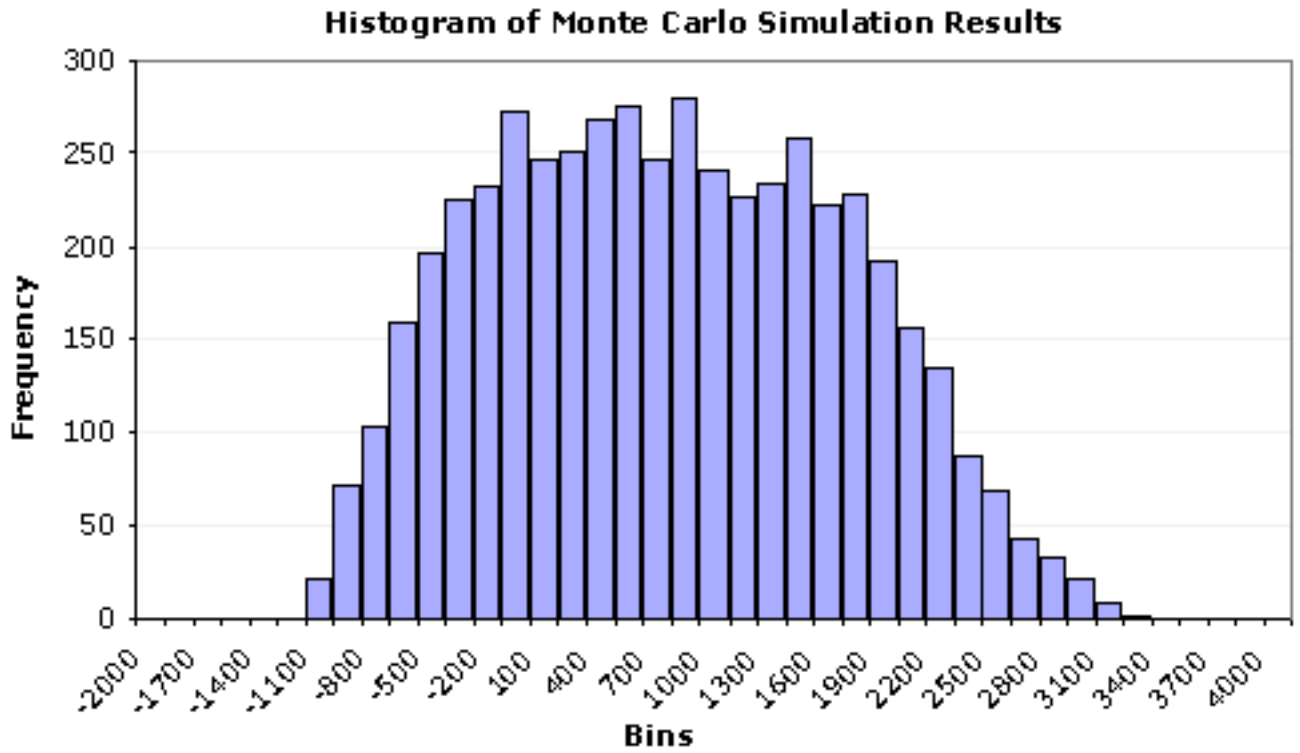

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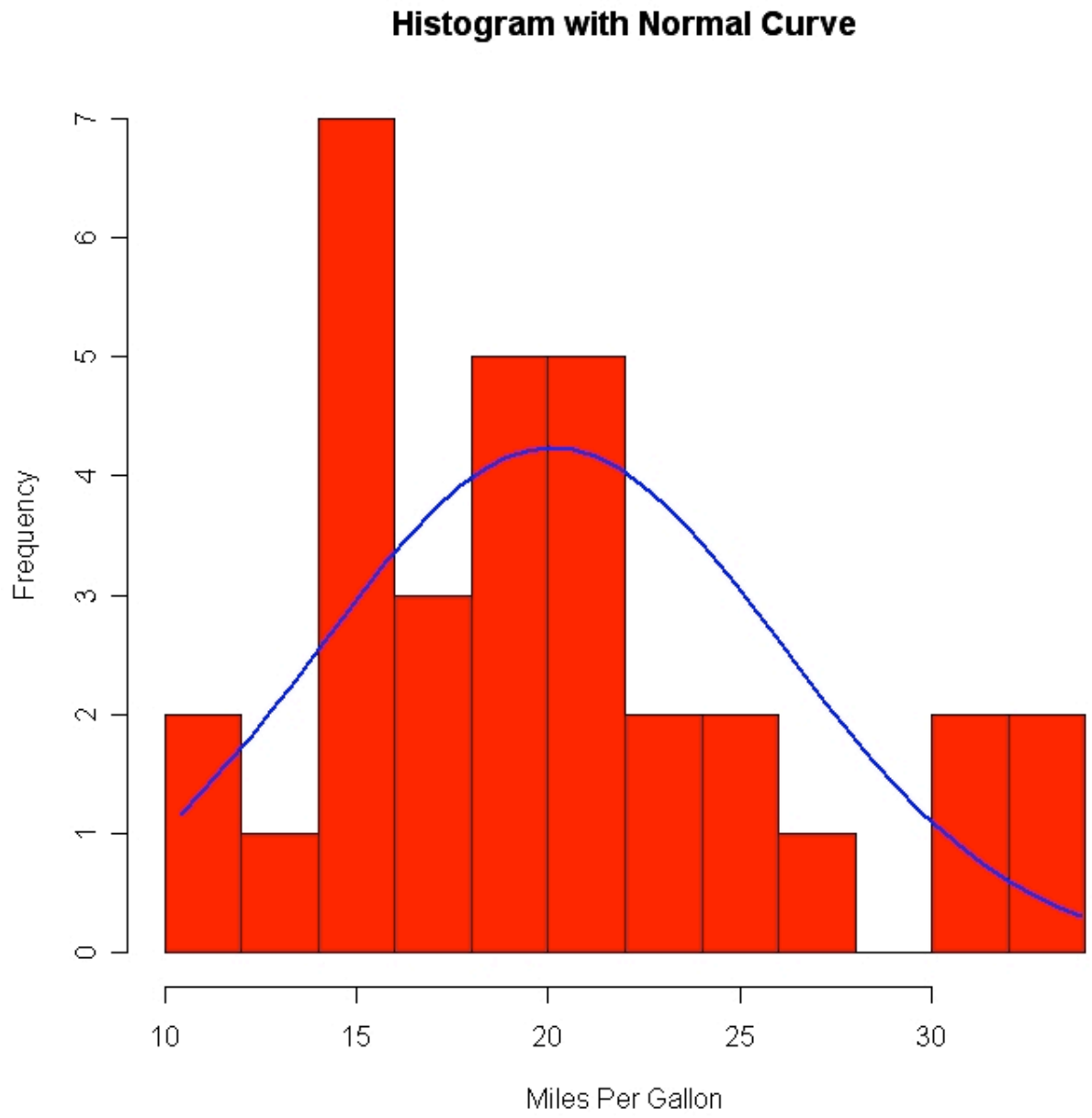

Central Tendency

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- Mean $\overline{X} = \frac{\sum X_i}{n}$
- Median position (n + 1) / 2 and if no number then the mean of the nearest
- Mode most frequent number, but if none repeat there is no mode

Variation and Measures of Spread

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- range high - low

- variance $\sigma^2 = \frac{(1-2)^2 + (2-2)^2 + (3-2)^2}{3} = 0.667$

$$S^2 = \frac{\Sigma (X - \bar{X})^2}{n-1}$$

- standard deviation

$$\sigma = \sqrt{\frac{\Sigma\ (x - \bar{x})^2}{n - 1}}$$

σ = lower case sigma
Σ = capital sigma
$\bar{x}$ = x bar

New York Data: Proposals

- what you wanted to study
- what you expected to find
- how you collected the data

Readings and Assignments

- Readings
  - The Canon, by Natalie Angrier — Chapter 2: *Probabilities*
- Assignments
  - Question about New York assignment: revise method and gather final data. You'll be presenting your work at the next class, taking a first pass at analysis and visualization. After your presentation, you'll revise and re-present a final view.
  - Toss a coin 100 times and write down the results OR imagine tossing a coin 100 times and write down the results. You'll be assigned to one task.