



Quantitative Data: Histograms

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What are Quantitative Variables?

Variables that have a numerical value (quantity) that we can perform mathematical operations on

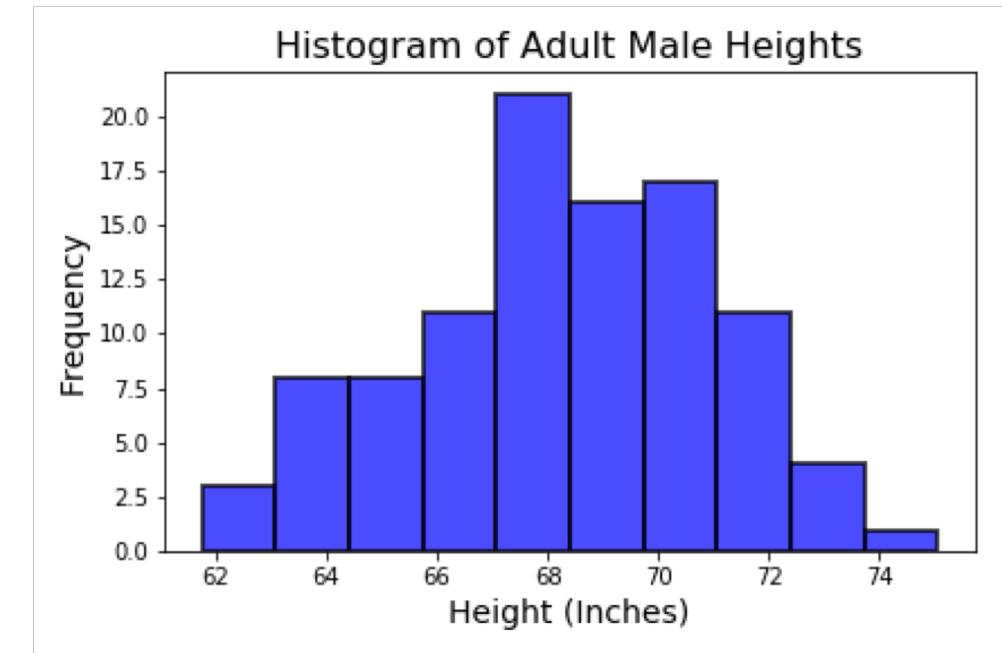
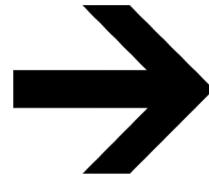
Examples: Height, weight, income, test scores, shoe size, number of “heads” after 10 coin flips



Why Use Histograms?

Adult Male Heights

66.3
75.1
67.9
67.6
70.0
69.9
64.8
...



4 Main Aspects

Shape - Overall appearance of histogram. Can be symmetric, bell-shaped, left skewed, right skewed, etc

Center - Mean or Median

Spread - How far our data spreads. Range, Interquartile Range (IQR), standard deviation, variance.

Outliers - Data points that fall far from the bulk of the data

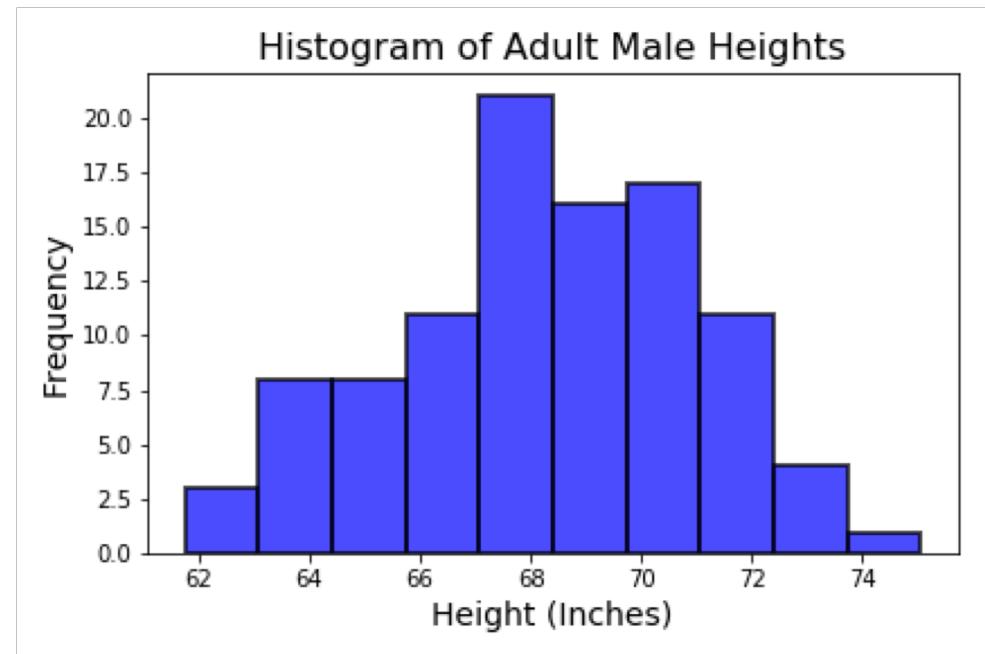
Adult Male Heights

Shape

Center

Spread

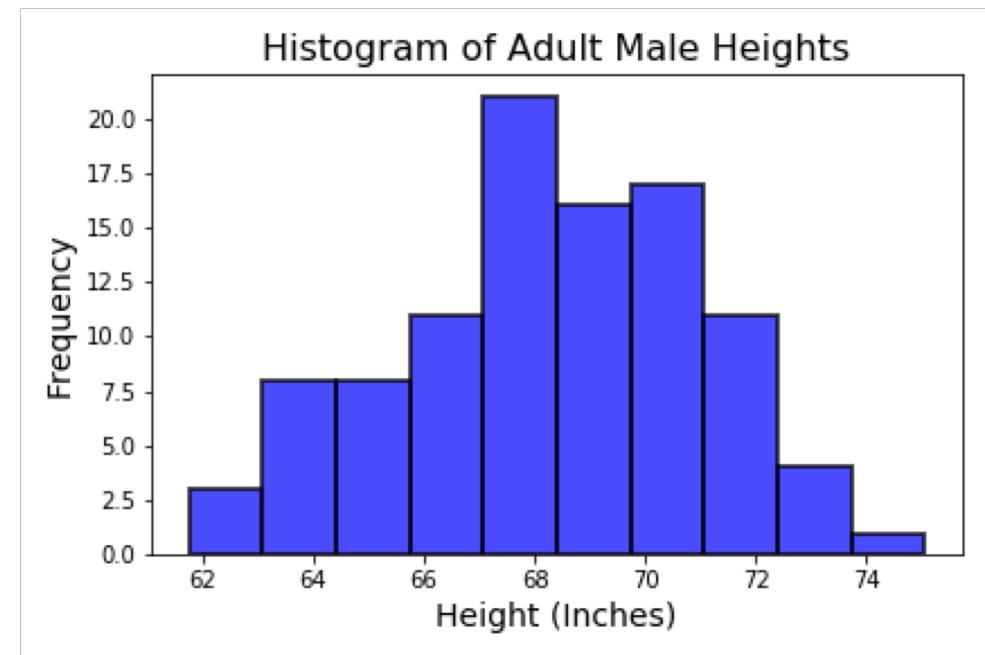
Outliers



Adult Male Heights

Putting it all together:

The distribution of adult male heights is roughly bell shaped with a center of about 68 inches, a range of 13 inches (62 to 75), and no apparent outliers.



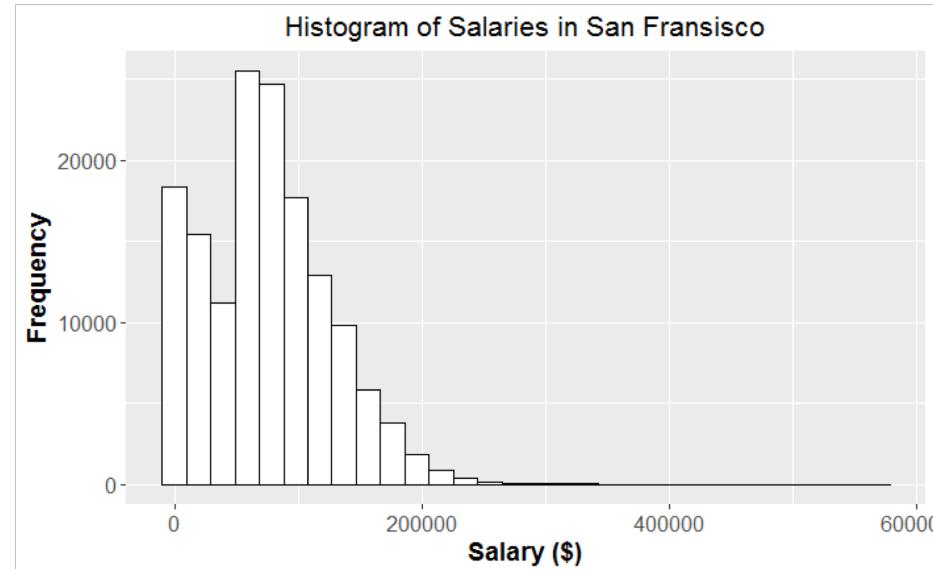
Salaries in San Francisco (2011-2014)

Shape

Center

Spread

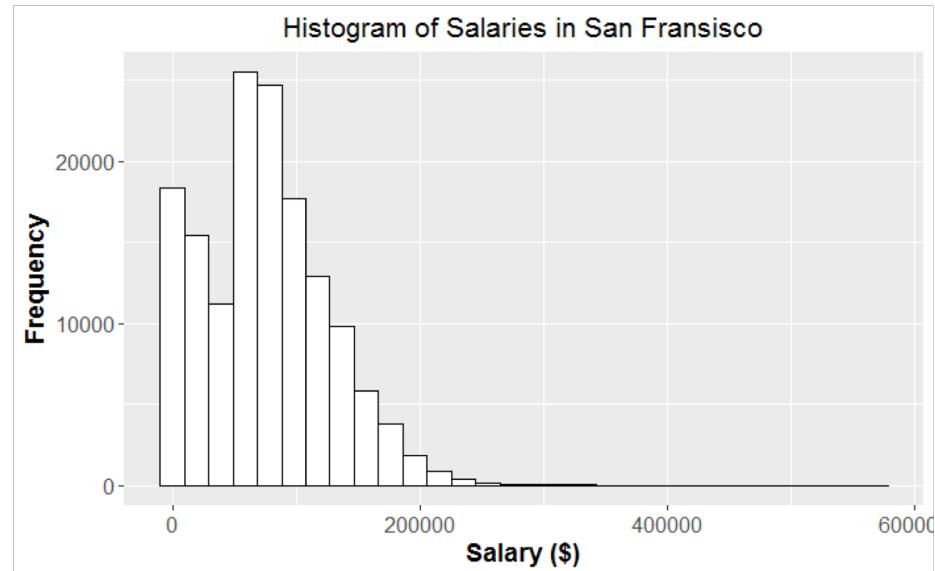
Outliers



Source: <https://www.kaggle.com/kaggle/sf-salaries/data>

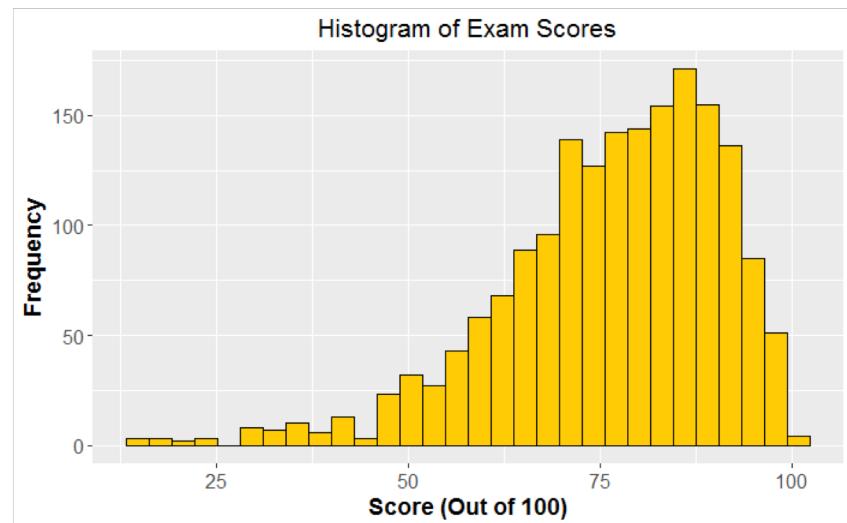
Salaries in San Francisco (2011-2014)

The distribution of salaries in San Francisco is bimodal and skewed to the right, centered at about \$80,000 with most of the data between \$40,000 and \$120,000, a range of roughly \$600,000, and outliers are present on the higher end.



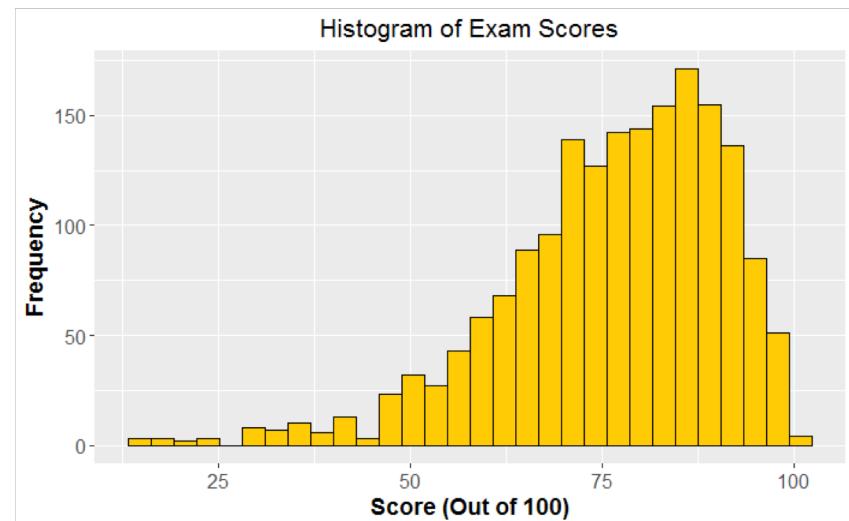
Source: <https://www.kaggle.com/kaggle/sf-salaries/data>

Exam Scores



Exam Scores

The distribution of exam scores is skewed left, centered at about 80 points with most scores being between 65 and 90 points, a range of roughly 85, and some outliers are present below 50 points.



Summary

- Histograms allow us to display data graphically
- 4 main aspects we use to describe the data
 - **Shape**
 - **Center**
 - **Spread**
 - **Outliers**
- Your one sentence summary should allow for any person to read it and have a general understand of what your data looks like

Attributions

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