

GUIDELINES ON THE USE OF GRAPHS

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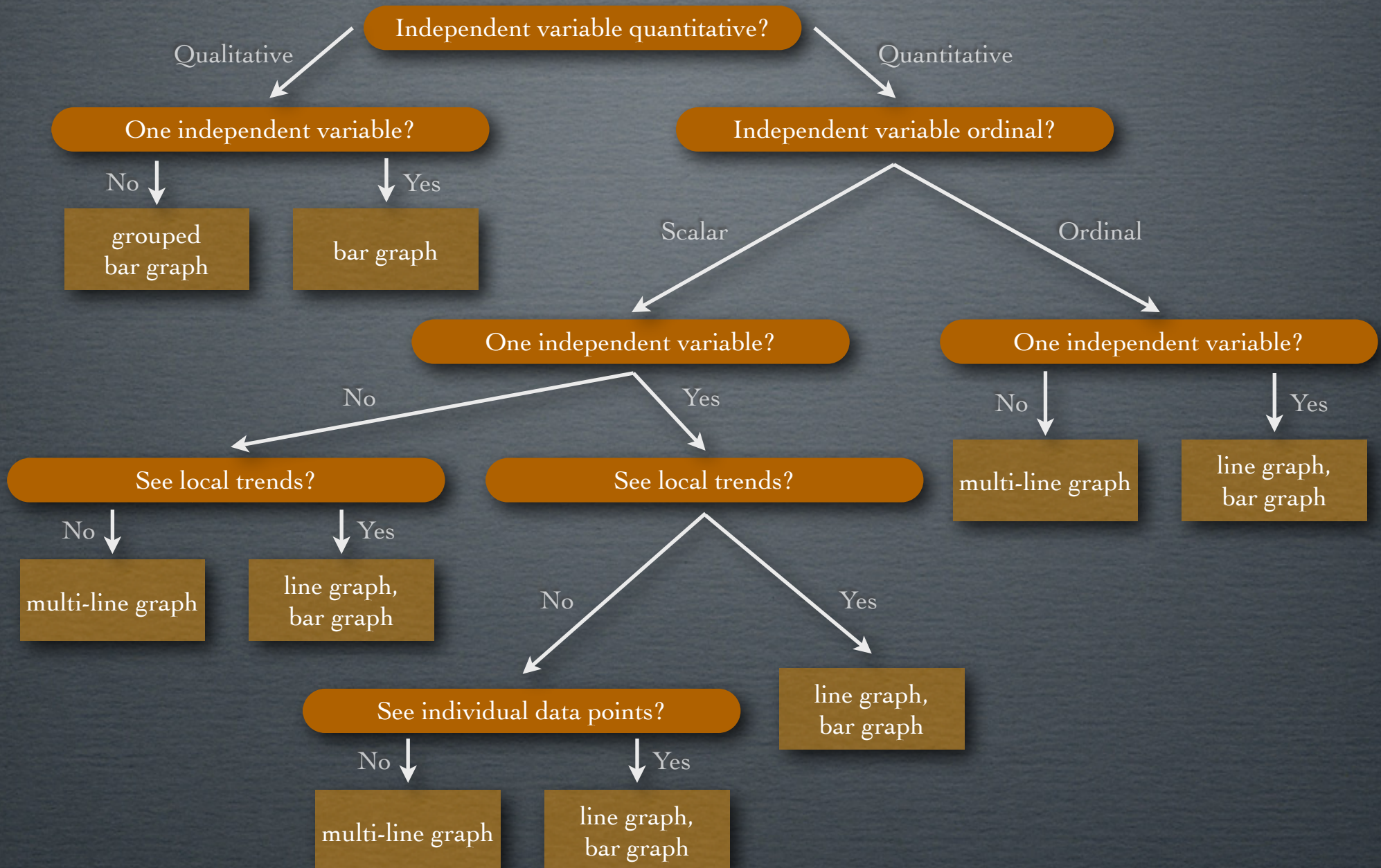
CHARTS AND GRAPHS

- Well known, well recognized presentation technique
- Basic types of charts and graphs are recognized by most viewers
 - ✦ line graph, bar graph usually recognized
 - ✦ pie chart, histogram, scatterplot, Venn less common
- Different graphs are designed for different types of data and analysis tasks
 - ✦ important to choose the “correct” graph for the data and task
- Graphs are meant to provide insight to your viewers
- Understand your audience and their needs

GRAPH TYPES

- Different graphs are used for different tasks:
 - ✦ tracking changes (line graph)
 - ✦ correlations, relationships (X-Y plot)
 - ✦ correlations, clustering (scatterplot)
 - ✦ category comparison (bar chart)
 - ✦ distributions (pie chart)
 - ✦ uniqueness and overlap (Venn diagram)
- Graphs are not meant for absolute value determination
 - ✦ tables should be used if determining exact values is important
- Graph elements can represent multiple attribute values

GRAPH SELECTION



DEFINE TARGET AUDIENCE

- Who is your target audience?
 - ✦ Defines the presentation type(s) they are familiar with
- What do they know about the data?
 - ✦ May want to include known data to define context
 - ✦ May want to leave out known data if its presentation is redundant
- What do they want to know about the data?
 - ✦ Defines which data to show, which presentation type(s) to use
- What do they expect to see?
 - ✦ Defines “uninteresting” results
- What will they do with the information?
 - ✦ e.g., exploring the data, validating known results, presenting results?
 - ✦ Defines which presentation type(s) to use

DEFINE MESSAGE

- What do the data show?

- ✦ Depends on analysis task(s) and result(s) found
- ✦ Exploration, show new results
- ✦ Validation, show that expected results are correct
- ✦ Presentation, show important results in an easy-to-comprehend manner

- Is there more than one main message?

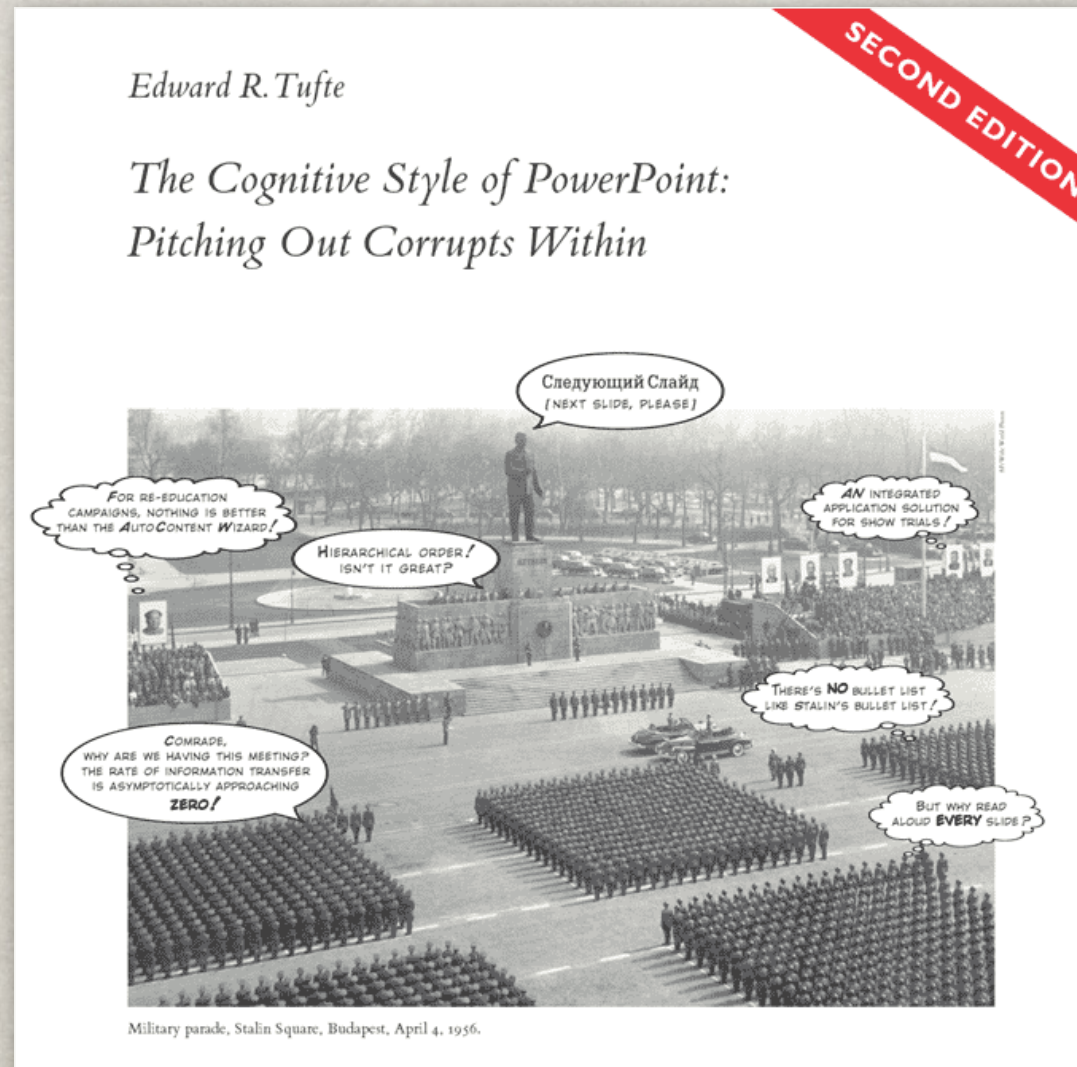
- ✦ Ensure individual messages are clear and memorable
- ✦ Do not use a single presentation for multiple messages unless necessary

- What aspects of the message should be highlighted?

- ✦ Ensure main point(s) are obvious point in the presentation

TUFTE'S POWERPOINT FOLIO

- Basic guidelines on computer presentation



GRAPH RECOMMENDATIONS

- Pie chart

- ✦ comparison of relative amounts, description of components

- Bar graph

- ✦ comparison of items, relationships between items
- ✦ time series data

- Line graph

- ✦ time series and frequency distribution

- Scatterplot

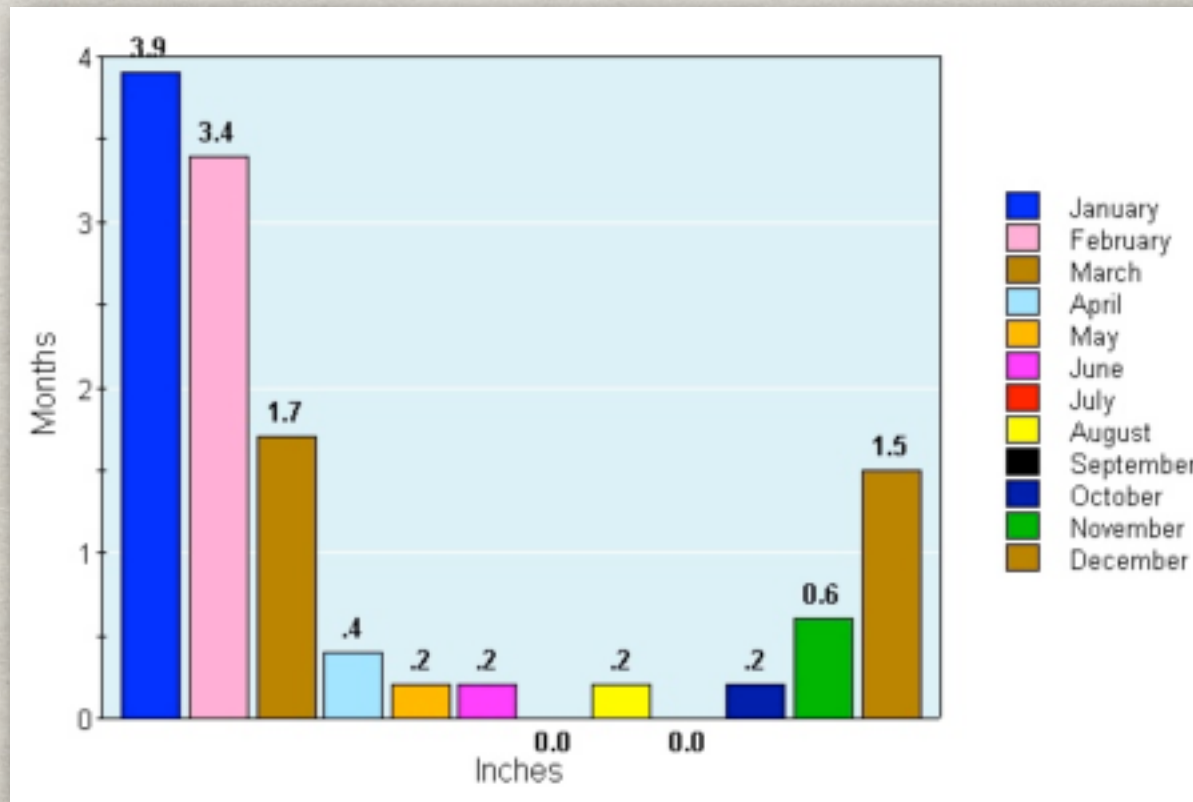
- ✦ analysis of relation

- Venn diagram

- ✦ analysis of uniqueness and commonality (overlap)

BAR GRAPH

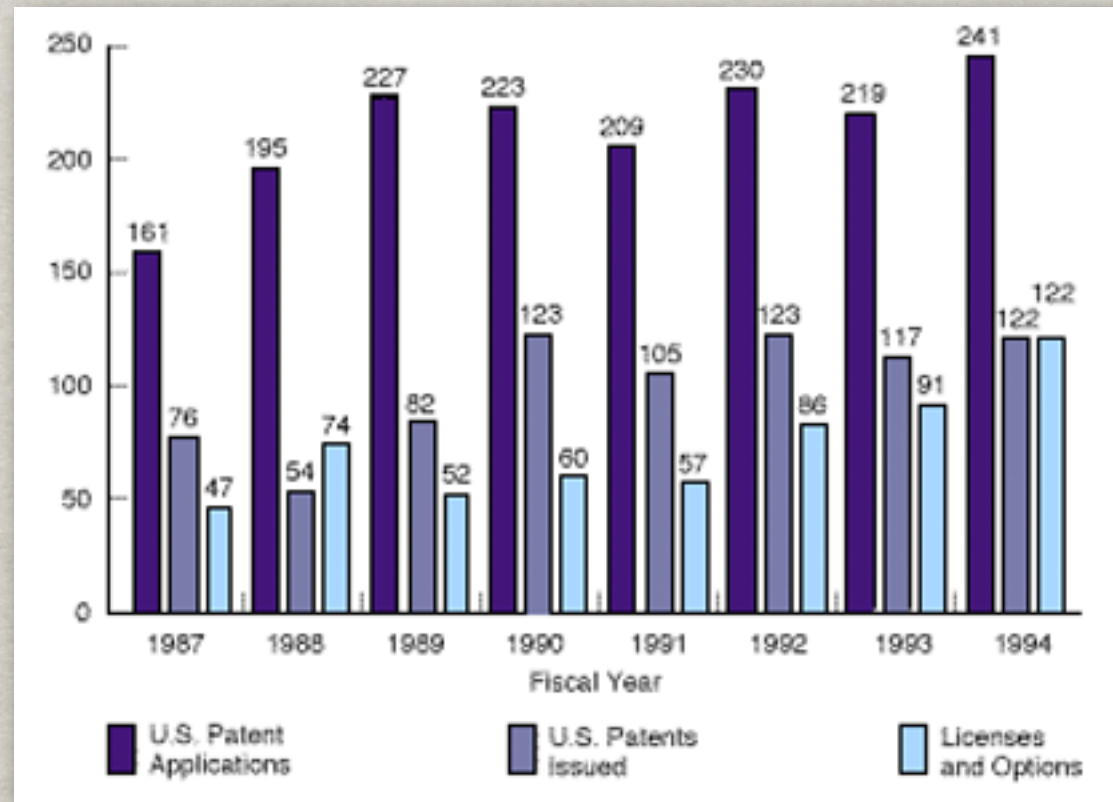
- Composed of discrete bars
- Represents categorical data for comparison across categories



Bar graph of ice, sleet, and snow in Knoxville, categorized by month

BAR GRAPH

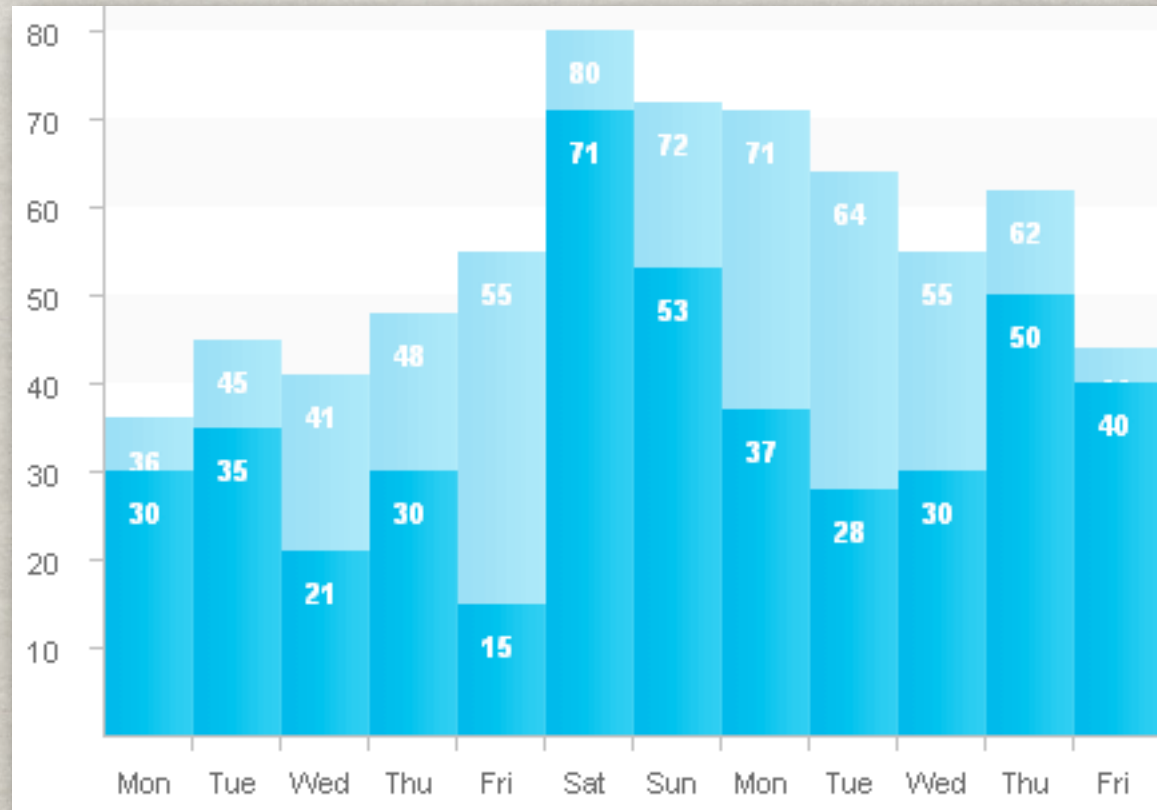
- Composed of discrete bars
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Grouped bar graph of US patent applications, patents issued, licenses signed, categorized by year

BAR GRAPH

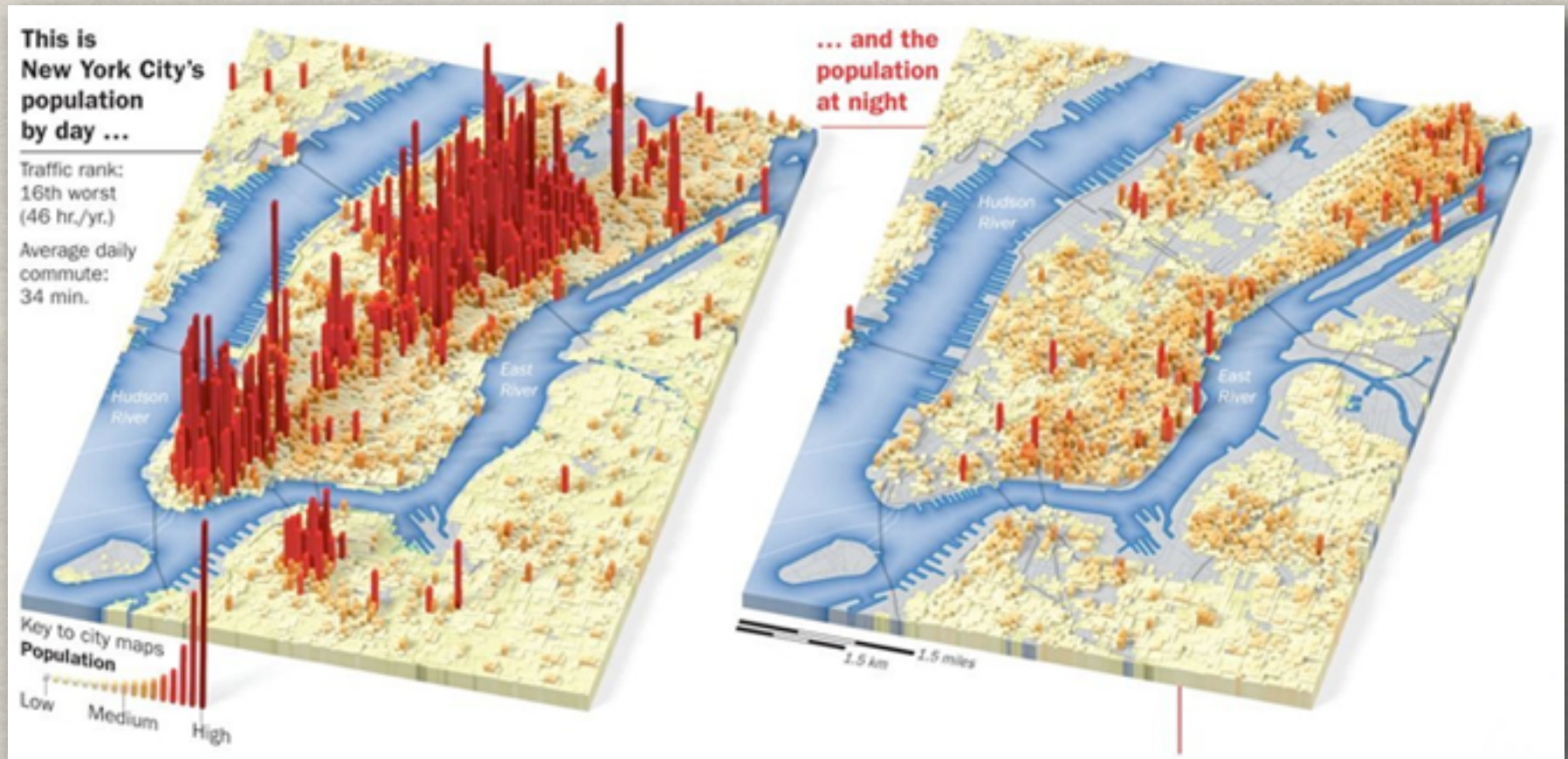
- Composed of discrete bars
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Stacked or composite bar graph of production on two lines, categorized by day of week

BAR GRAPH

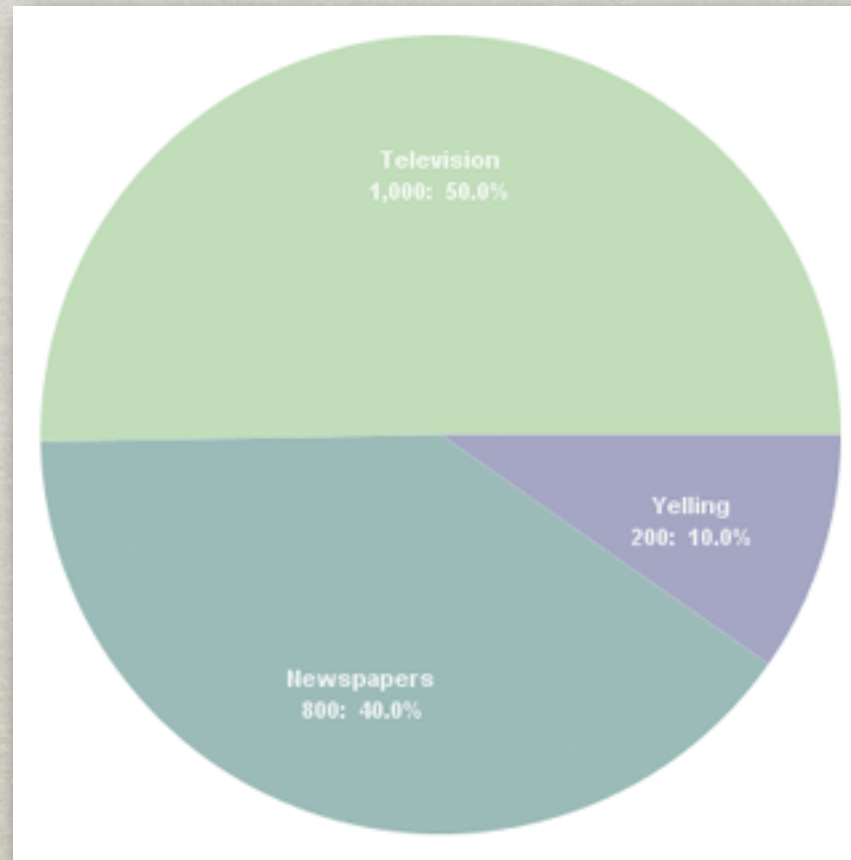
- Composed of discrete bars
- Represents categorical data for comparison across categories



Topographical bar chart of New York City population during the day, and at night

PIE CHART

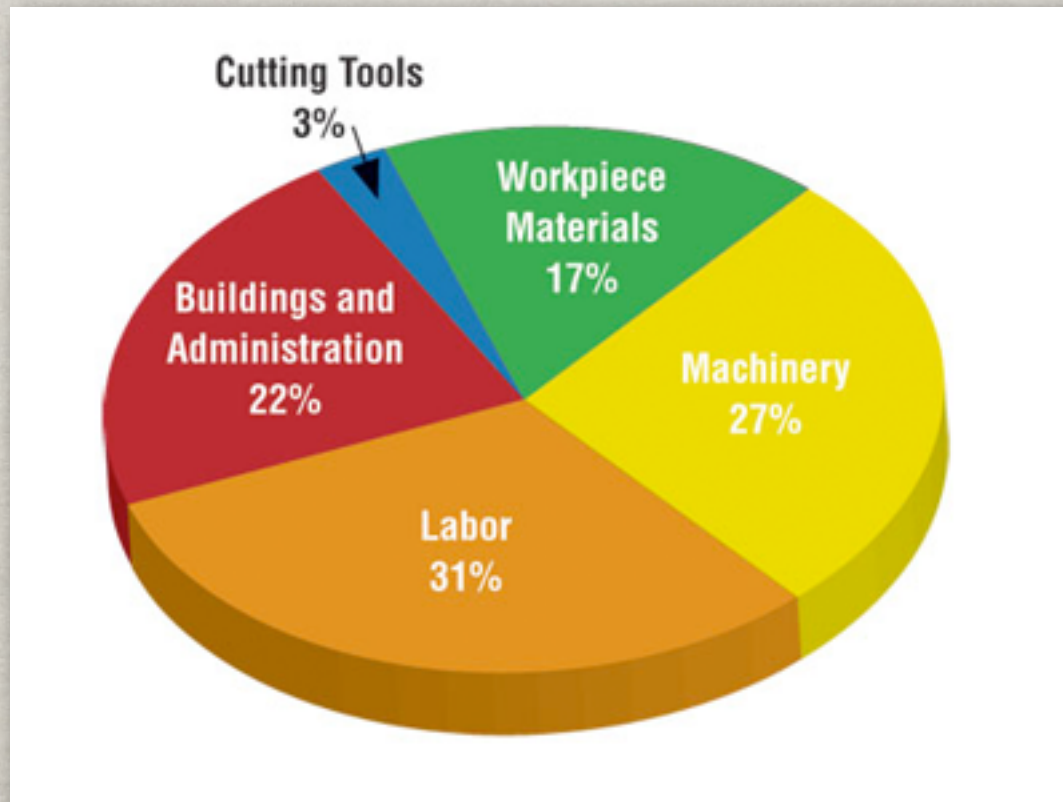
- Circular chart
- Relative comparison of amounts of parts of a whole



Pie chart of advertising dollars
categorized by media type

PIE CHART

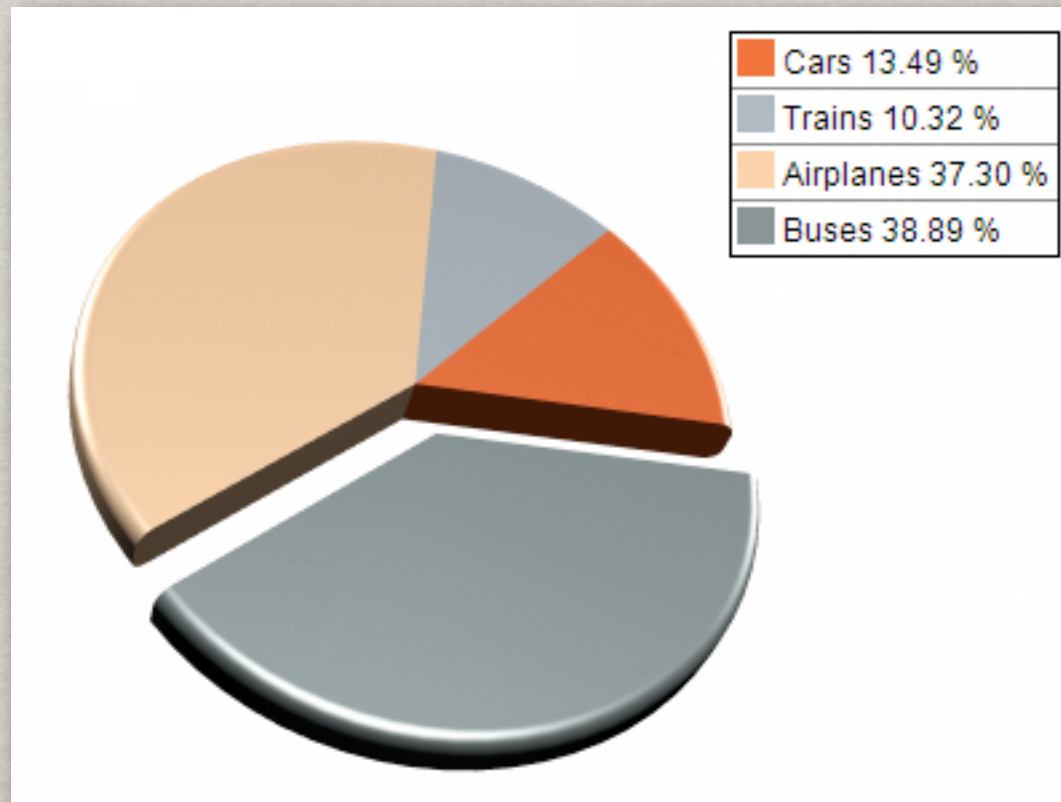
- Circular chart
- Relative comparison of amounts of parts of a whole



3D pie chart of expenditure costs,
categorized by expenditure type

PIE CHART

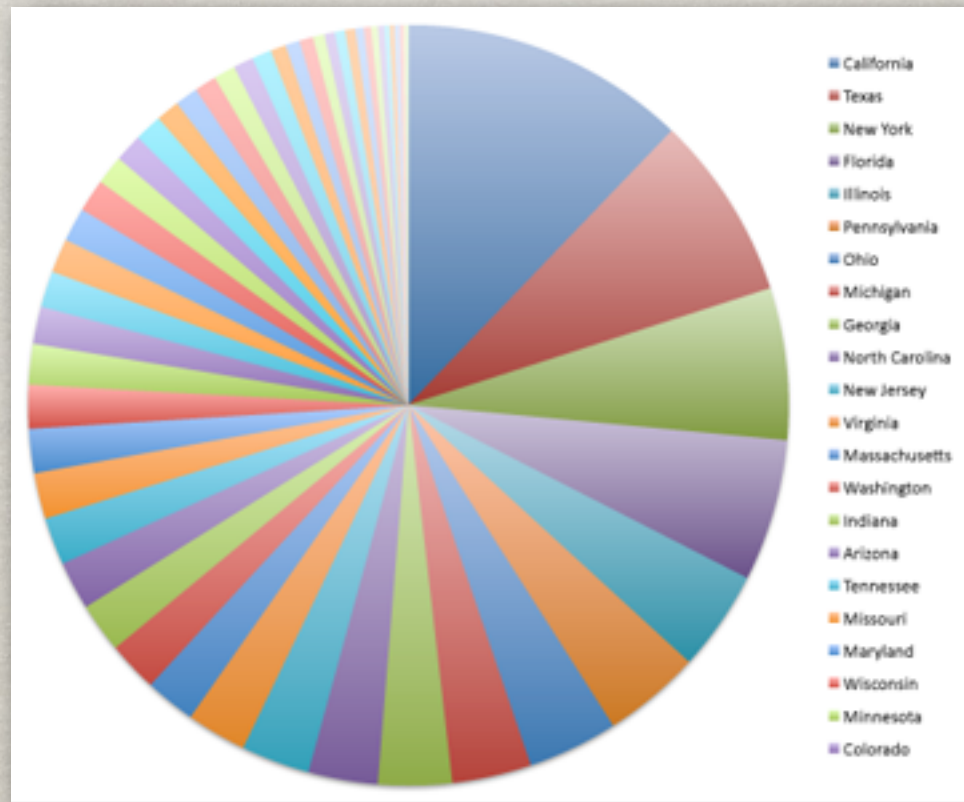
- Circular chart
- Relative comparison of amounts of parts of a whole



Exploded 3D pie chart of transportation use categorized by transportation type

PIE CHART

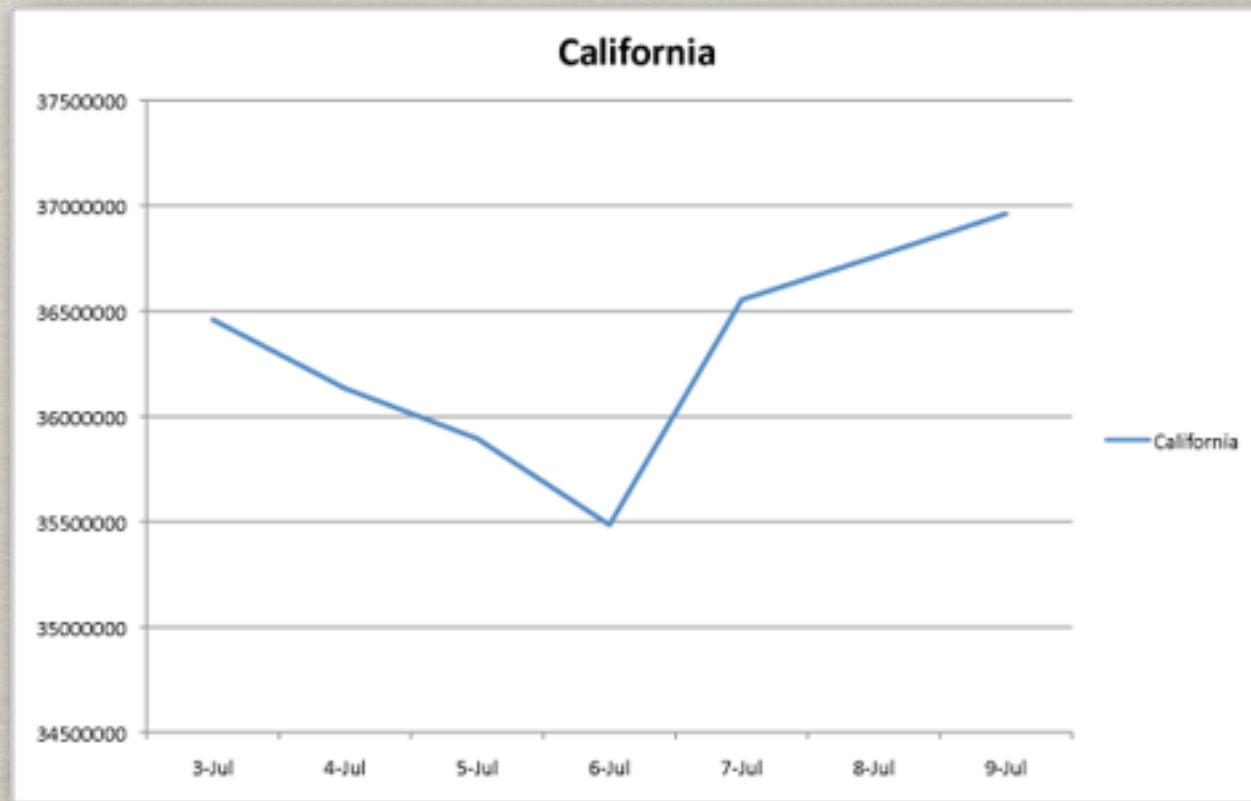
- Circular chart
- Relative comparison of amounts of parts of a whole



Pie chart of population by US state

LINE GRAPH

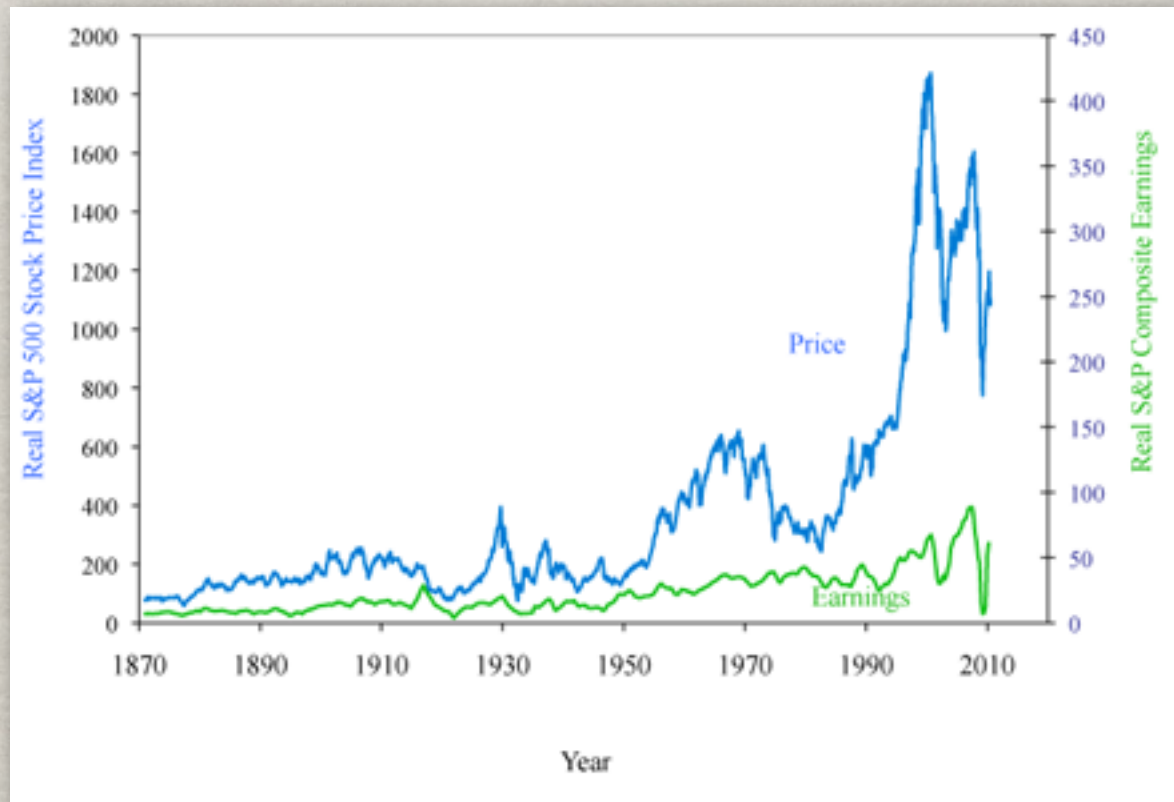
- Displays the relationship between two types of information
- Also useful for time-series trends



Line graph of California's population by year

LINE GRAPH

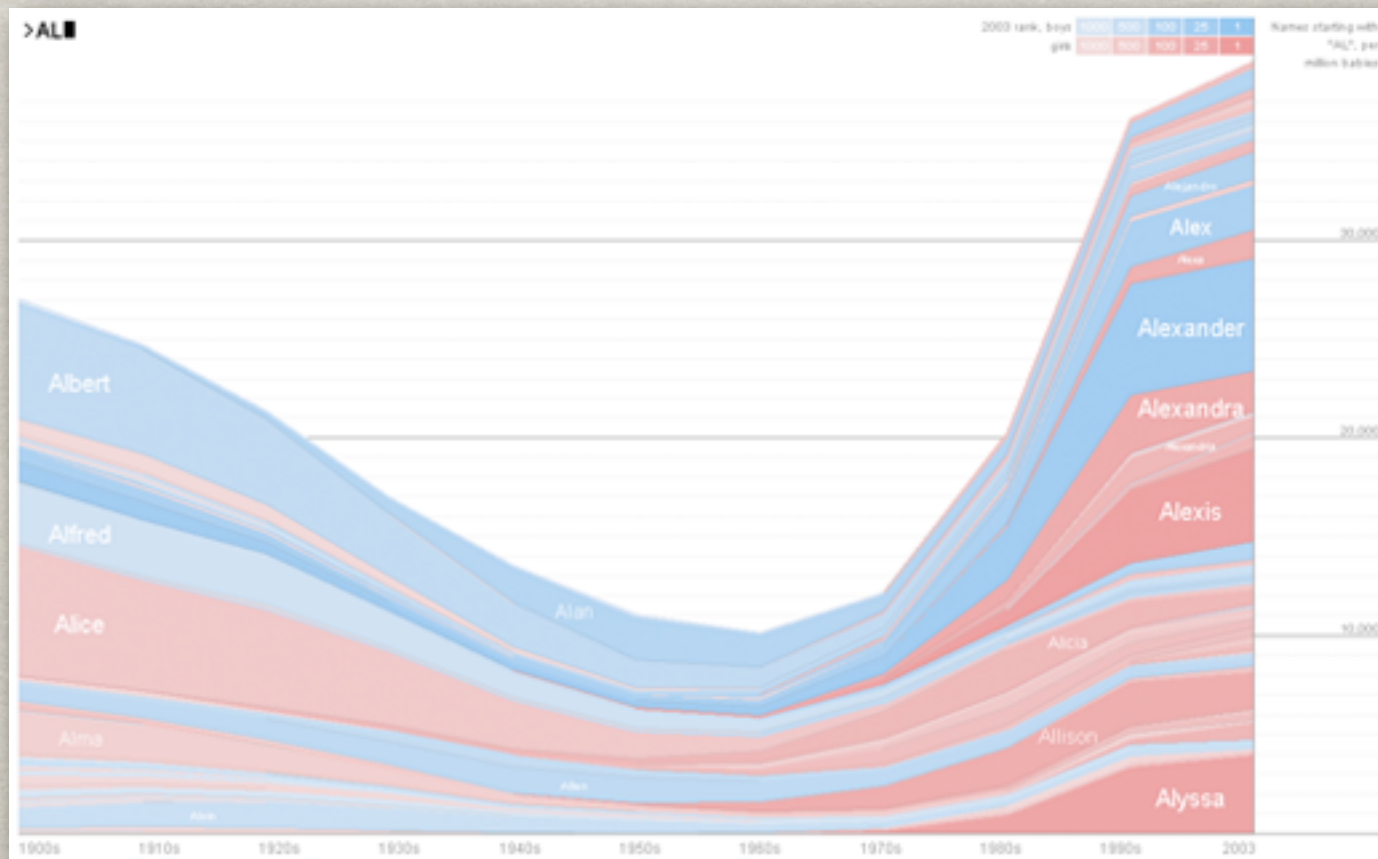
- Displays the relationship between two types of information
- Also useful for time-series trends



Time series line graphs of S&P 500 earnings versus price index from 1870-2010

LINE GRAPH

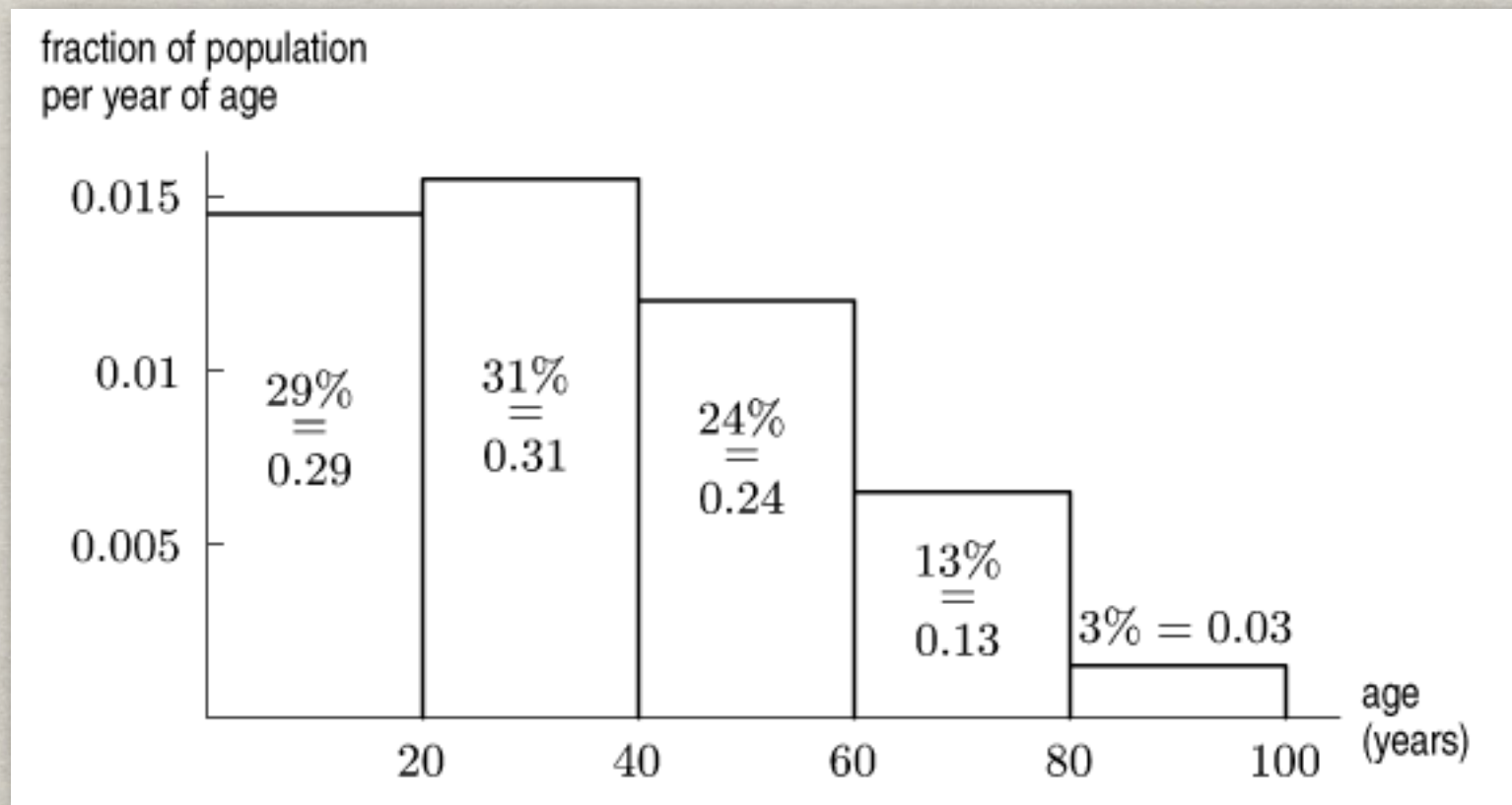
- Displays the relationship between two types of information
- Also useful for time-series trends



Stacked time series line graph of
baby name popularity from 1900–2003

HISTOGRAM

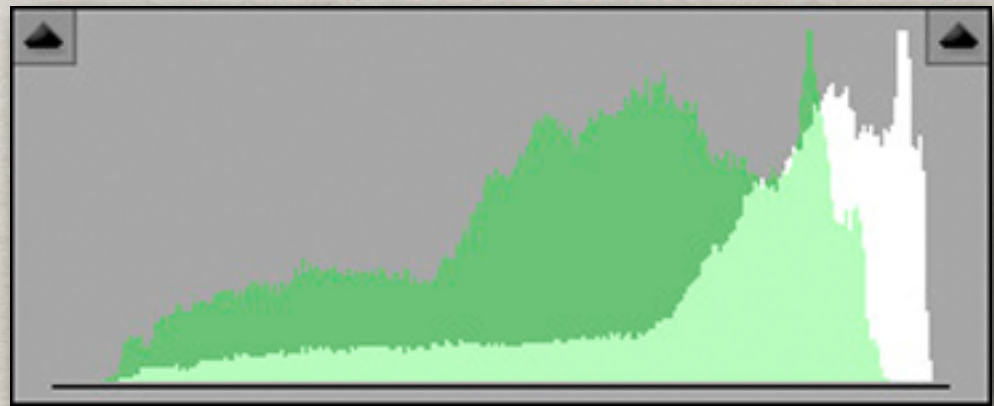
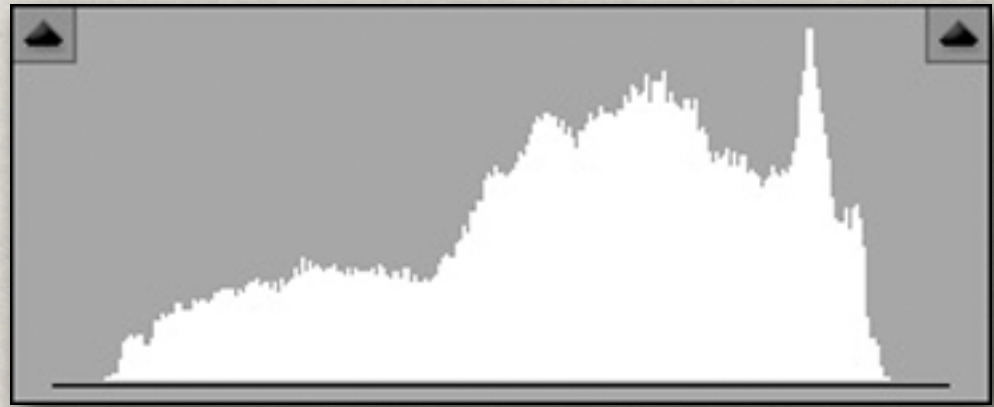
- Bars that display frequency of continuous data divided into interval “bins”



Histogram of population age
binned by age 20 year age intervals

HISTOGRAM

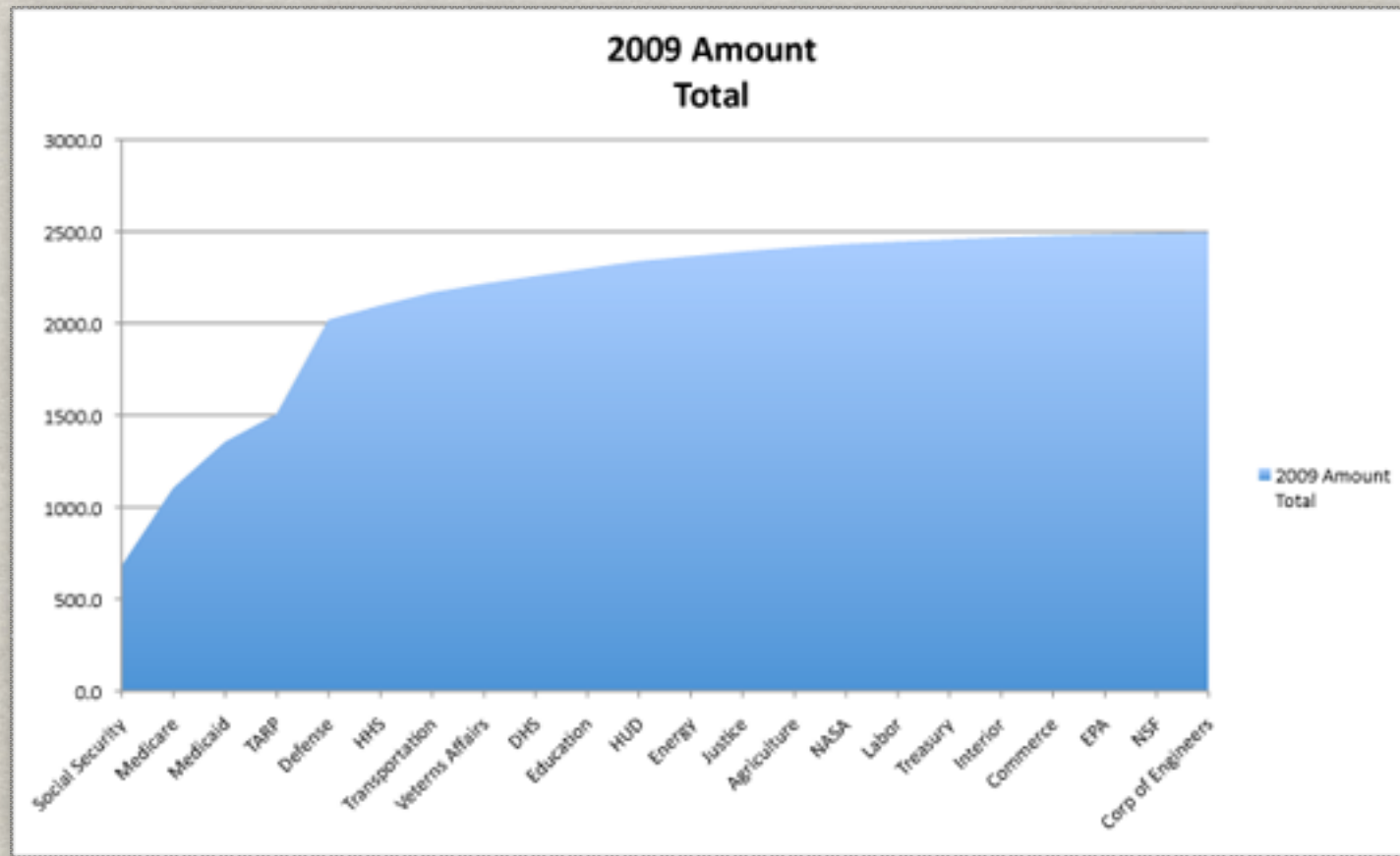
- Bars that display frequency of continuous data divided into interval “bins”



Interval histogram (with overlay for comparison)
of pixel brightnesses binned by greyscale

HISTOGRAM

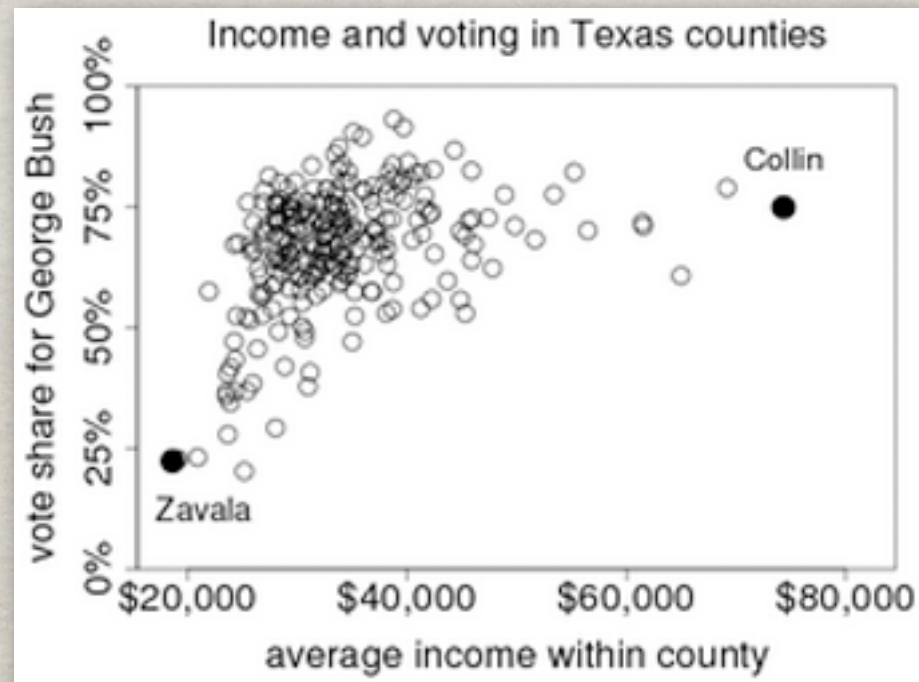
- Bars that display frequency of continuous data divided into interval “bins”



Cumulative histogram of federal spending
binned by agency

SCATTERPLOT

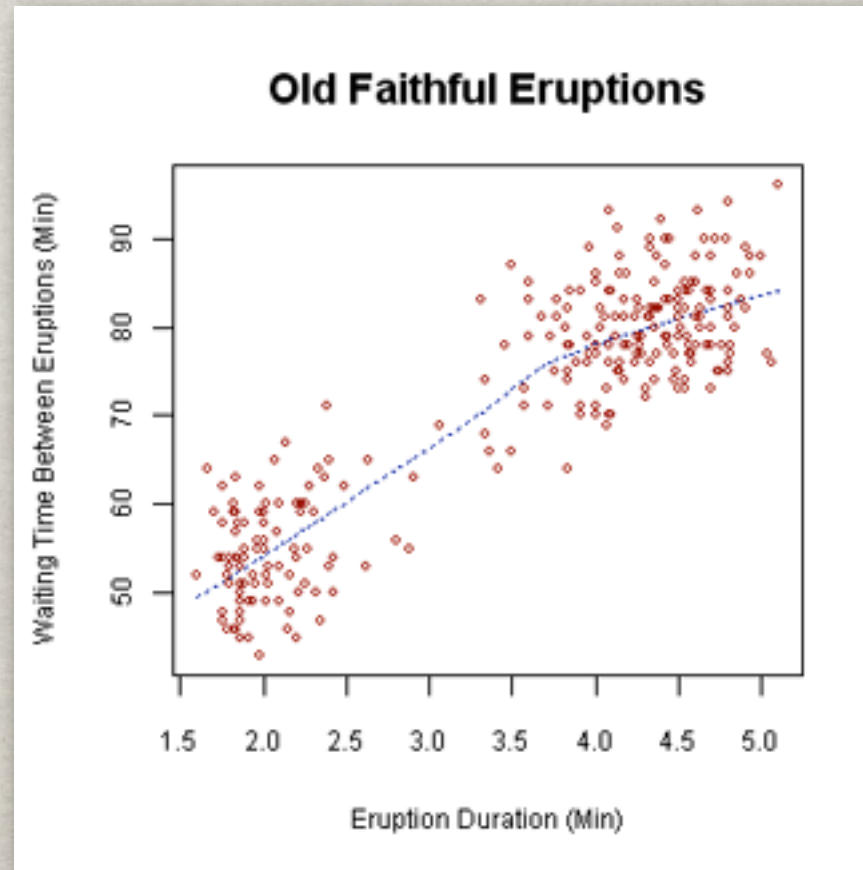
- Explore relationship between two variables



Scatterplot of county's average income
versus vote percentage for George Bush

SCATTERPLOT

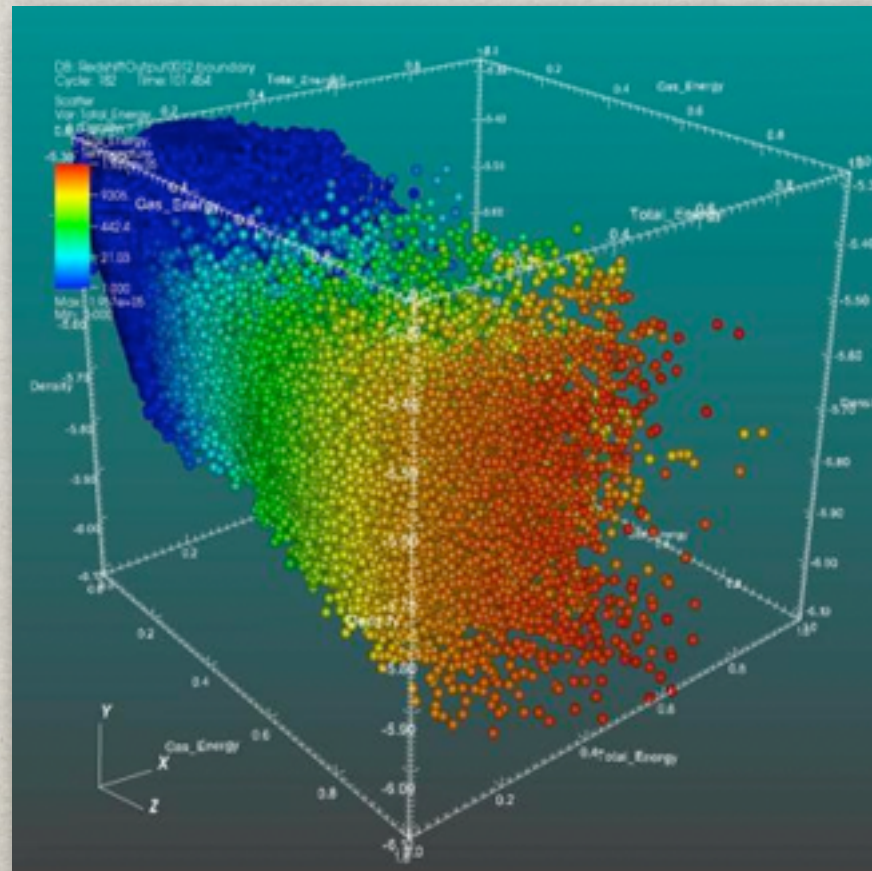
- Explore relationship between two variables



Scatterplot of Yellowstone's Old Faithful wait time versus eruption duration

SCATTERPLOT

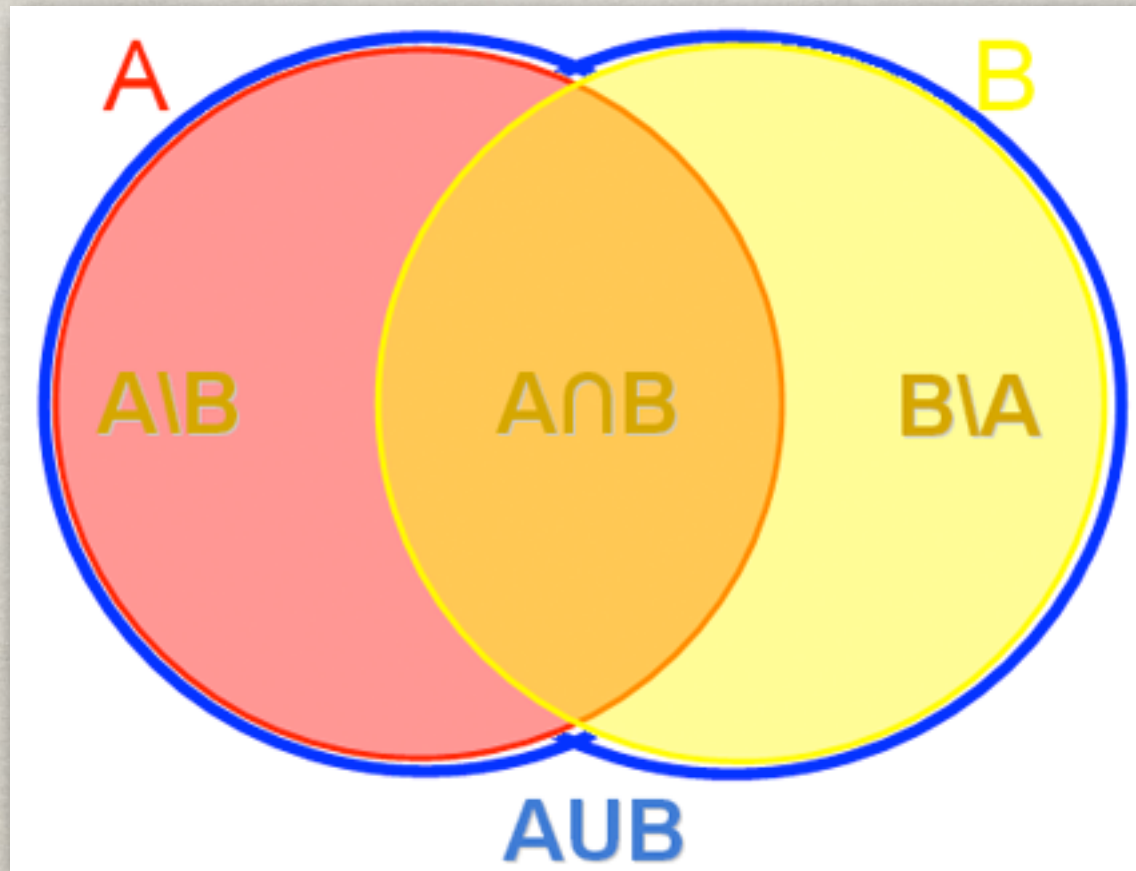
- Explore relationship between two variables



3D scatterplot (3 axes)
with a fourth variable visualized using colour

VENN DIAGRAM

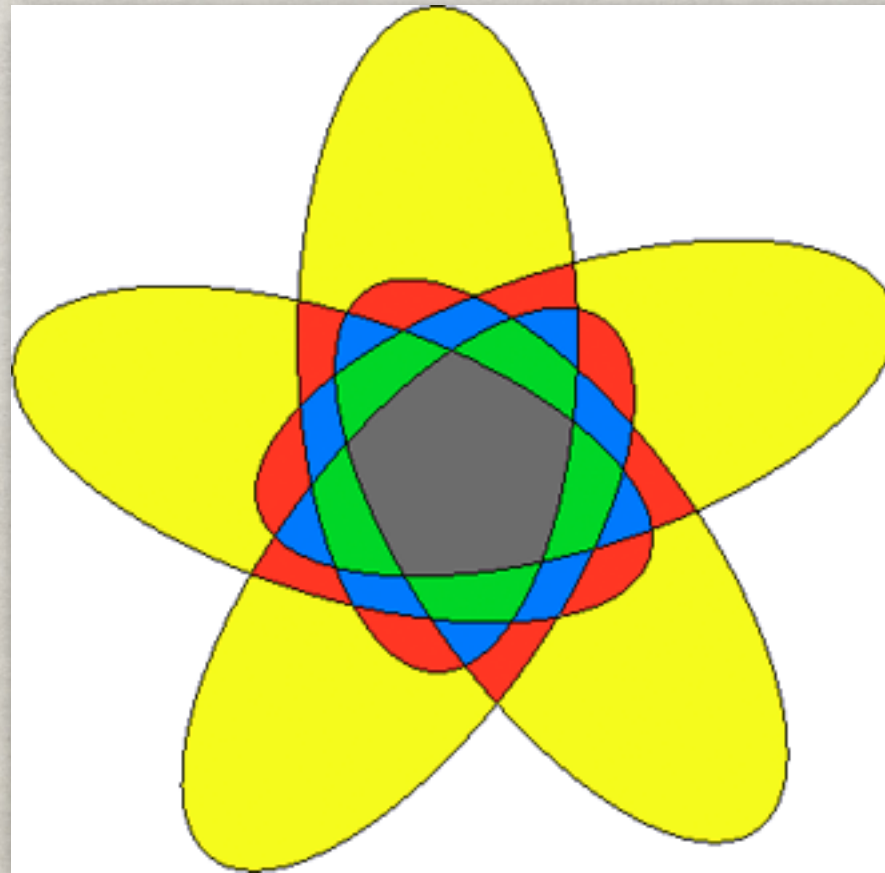
- Show commonality and overlap



Mathematical description of Venn diagram's areas of intersection, union, and single item

VENN DIAGRAM

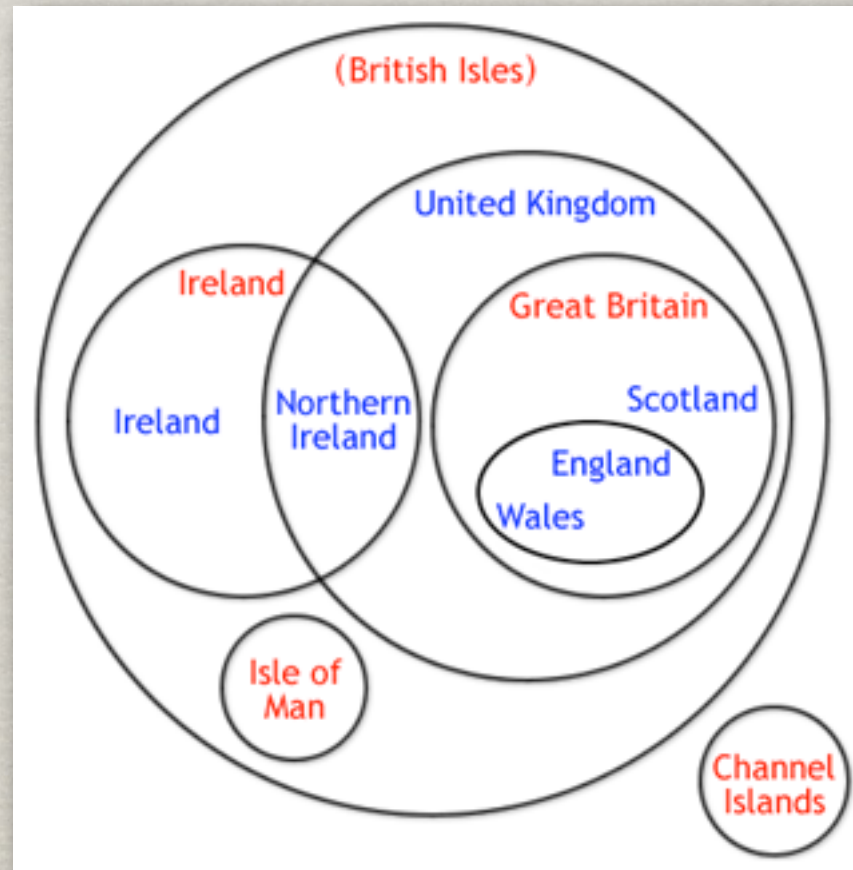
- Show commonality and overlap



Venn diagram for $n=5$ sets
with five-fold rotational symmetry

VENN DIAGRAM

- Show commonality and overlap



British Isles Venn diagram

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