Graph types

- Time series
    - An ***index chart*** is an interactive line chart that shows percentage changes for a collection of time-series based on a selected index point. For example, the image above shows the percentage change of selected stock prices if purchased in January 2005
    - **Stacked/Stream Graphs** depict aggregate patterns and often support drill-down into a subset of individual series. The chart above shows the number of unemployed workers in the United States over the last decade, subdivided by industry. An alternative approach is to use small multiples: showing each series in its own chart. In this case we again see the number of unemployed workers, but normalized within each industry category.
    - A **Horizon Graph** increases the data density yet again by dividing the chart into bands and layering the bands to create a nested form. If a point exceeds the ceiling, the curve above is drawn from the base with a darker shade. This helps represent data in a tight space.
- Statistical Distributions
    - **Stem-and-Leaf Plot** bins numbers according to their first significant digit, and then stacks the values within each bin by the second significant digit. This minimalistic representation uses the data itself to paint a frequency distribution, replacing the "information-empty" bars of a traditional histogram bar chart and allowing one to assess both the overall distribution and the contents of each bin. (0: Bin for values <10, 1: Bin for teen values, 10: Bin for values >= 100)
    - **Q-Q Plots** compare two probability distributions by graphing their quantiles against each other. If the two are similar, the plotted values will roughly lie along the central diagonal. If the two are linearly related, values will again lie along a line, though with varying slope and intercept
    - **Scatter Plot Matrixes** enable visual inspection of correlations between any pair of variables. A grid with an empty diagonal shows a scatter plot for each X-Y cell in the grid, comparing X against Y. Additionally, interaction techniques such as **brushing-and-linking** (in which a selection of points on one graph highlights the same points on all the other graphs) can be used to explore patterns within the data.
    - **Parallel Coordinates Plots** repeatedly plot the data on parallel axes and then connect the corresponding points with lines. Each poly-line represents a single row in the database and line crossings between dimensions often indicate inverse correlation.
- Maps
    - By placing stroked lines on top of a geographic map, a **Flow Map** can depict the movement of a quantity in space and (implicitly) in time. Flow lines typically encode a large amount of multivariate information: path points, direction, line

thickness, and color can all be used to present dimensions of information to the viewer.
    - **Choropleth Map** paints each region (districts, states, countries) in a map depending on their value. It's best to normalize the data based on population density.
    - **Graduated Symbol Maps** draw a symbol (pie chart, rings) over each region to represent their own data depending on the symbol's size, shape and color. For example, a pie chart over each state to represent obesity rates.
    - **Cartograms** distort the shape of geographic regions so that the area directly encodes a data variable. A common example is to redraw every country in the world sizing it proportionally to population or GDP
- Hierarchies
    - **Node-Link Diagrams** are self-explanatory. Graphs that connect entities.
        - Reingold-Tilford algorithm (Tree)
        - Dendrogram/Cluster Algorithm (leaf nodes located on a circle, parents and root located inside the circle)
        - indented trees (File system directory tree)
    - **Adjacency Diagrams** are space-filling variants of node-link diagrams; rather than drawing a link between parent and child in the hierarchy, nodes are drawn as solid areas (either arcs or bars), and their placement relative to adjacent nodes reveals their position in the hierarchy
        - Icicle (rectangles with spike leafs underneath)
        - Sunburst (spiky circles growing outwards)
    - Enclosure Diagrams are squares or circles that contain their children nodes, and those also contain their children. It helps get an idea of the size of each node.
- Networks
    - **Force-Directed Layouts** have nodes united by their arcs to represent relationships (who is friends with who)
    - An **Arc Diagram** has all nodes lined up and their arcs are circular, going above other nodes' heads. It helps easily identify cliques. The problem of sorting the nodes in a manner that reveals underlying cluster structure is formally called ***seriation***.
    - **Matrix Views** are like the Pokémon type weakness chart.