

# Week 2 - Lab 1: Charts and Visual Design Rules

Prepared by: Ealaf Selim

CPSC 203 - T16

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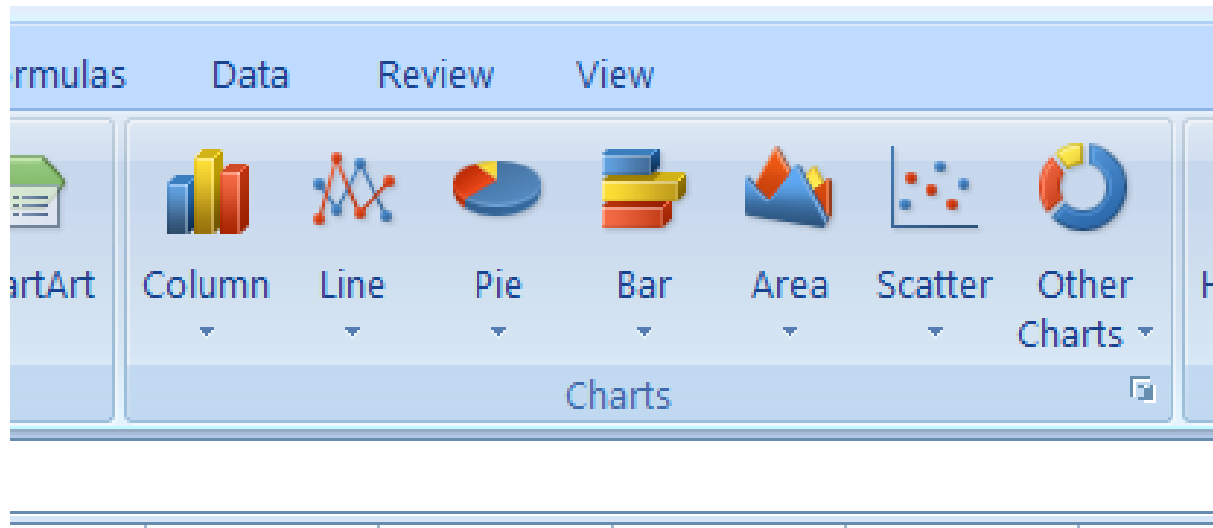


# Overview

- In Today's Tutorial we will learn the following:
  - Using Chart Wizard to create the default chart on a data set
  - Customizing a chart according to good chart design principles

# Chart Wizard

- In the top menu bar, select 'Insert' and you will see a group of icons labelled 'Charts', under the top menu bar.



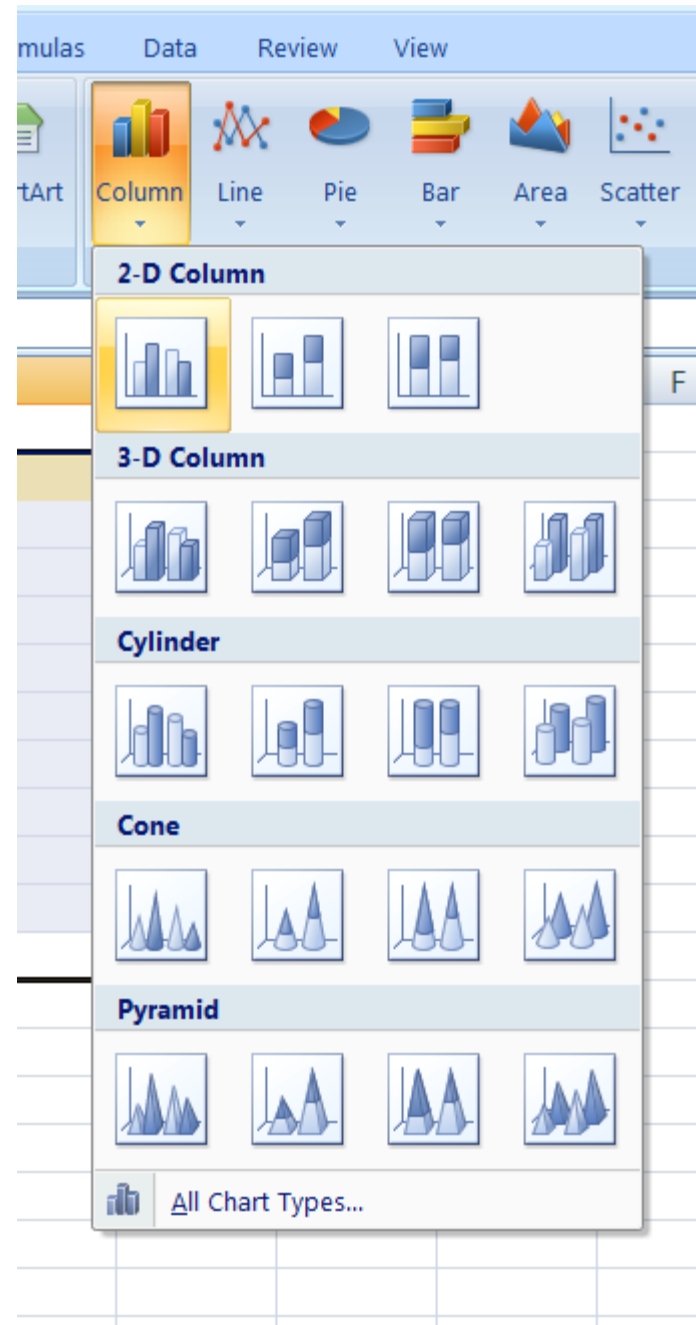
# Chart Wizard

- Select the data to be included in the chart.

	A	B
1		
2	Grade	Number of Students
3	A	3
4	A-	4
5	B+	2
6	B	1
7	B-	5
8	C+	6
9	C	4
10	C-	3
11	D	2
12	F	2
13		

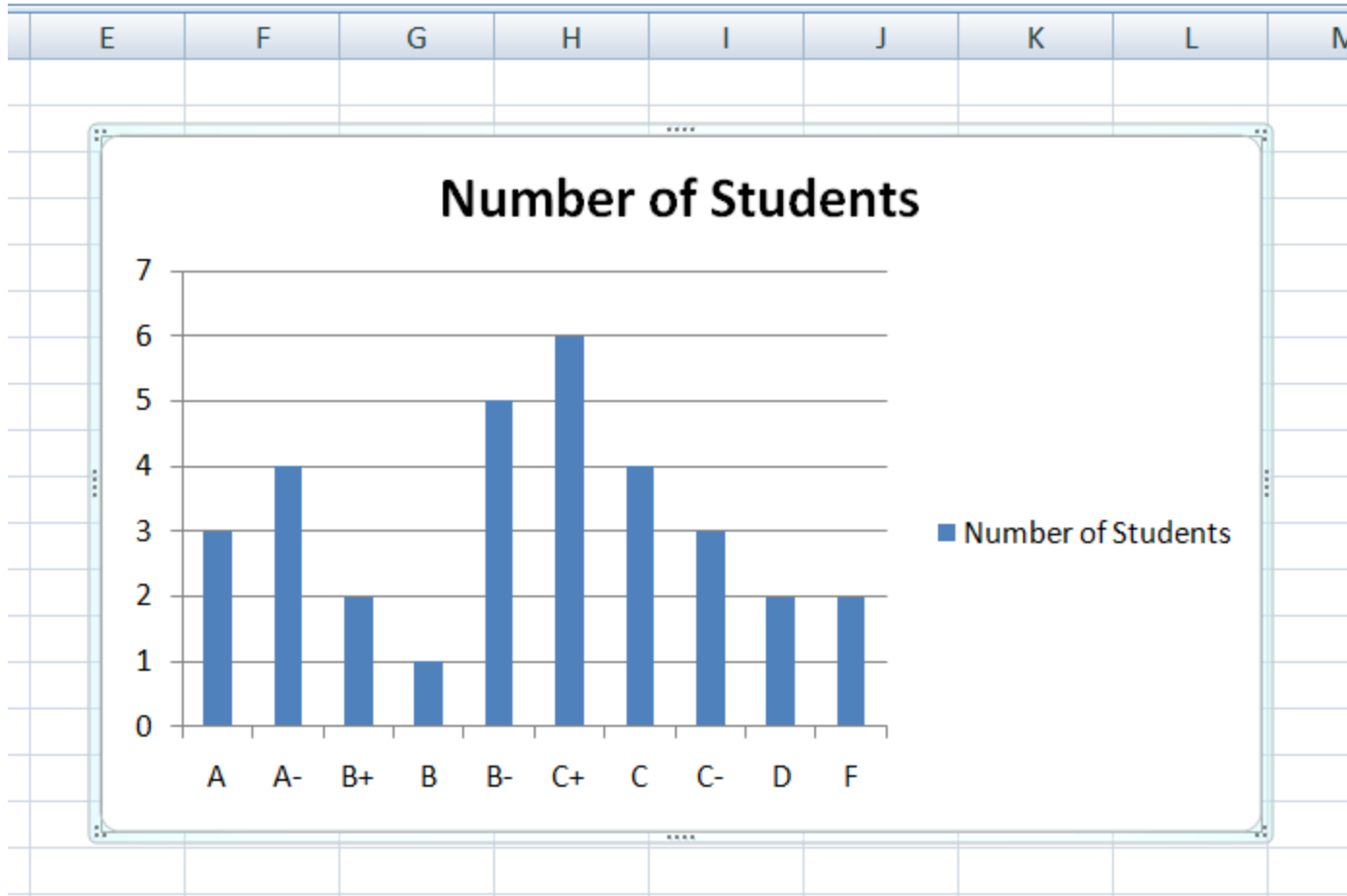
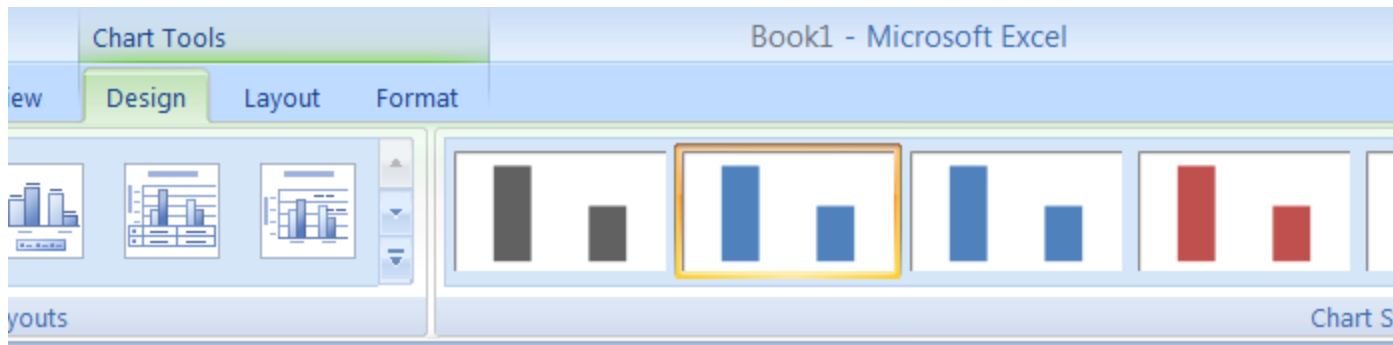
# Chart Wizard

- Select the 'Column' chart. A drop down menu should appear showing the different types of column charts available. Select the first type of '2-D Column'.



# Chart Wizard

- You can move the new chart by clicking-and-dragging it to a new location in the worksheet.
- Notice that a new contextual menu has appeared under the main toolbar. This contextual menu allows for customization to be performed to the chart.



# Chart Types

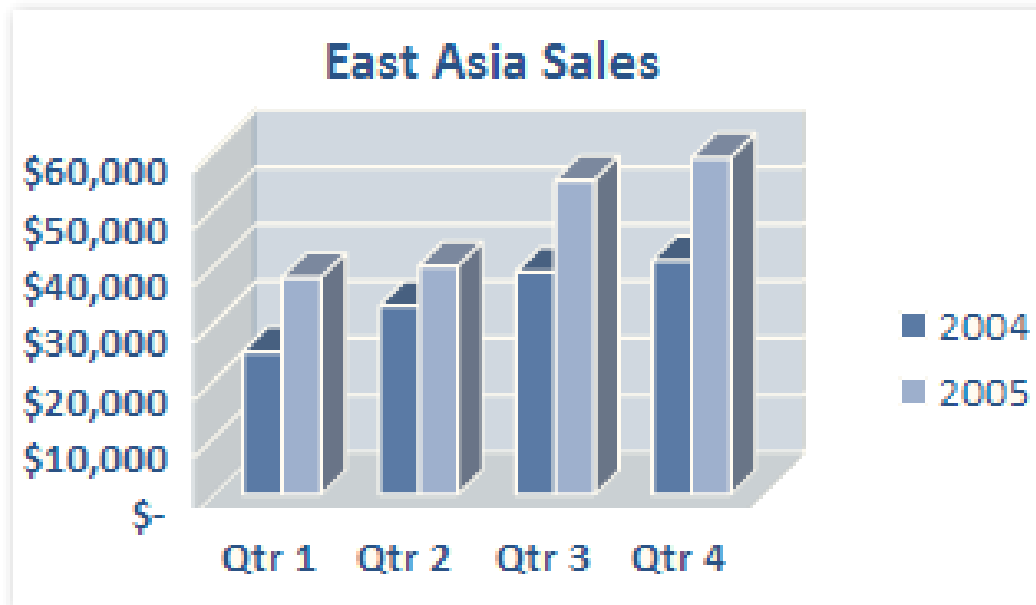
- The following Chart Types and more explanation are available at:

<http://office.microsoft.com/en-us/excel/HA012337371033.aspx>



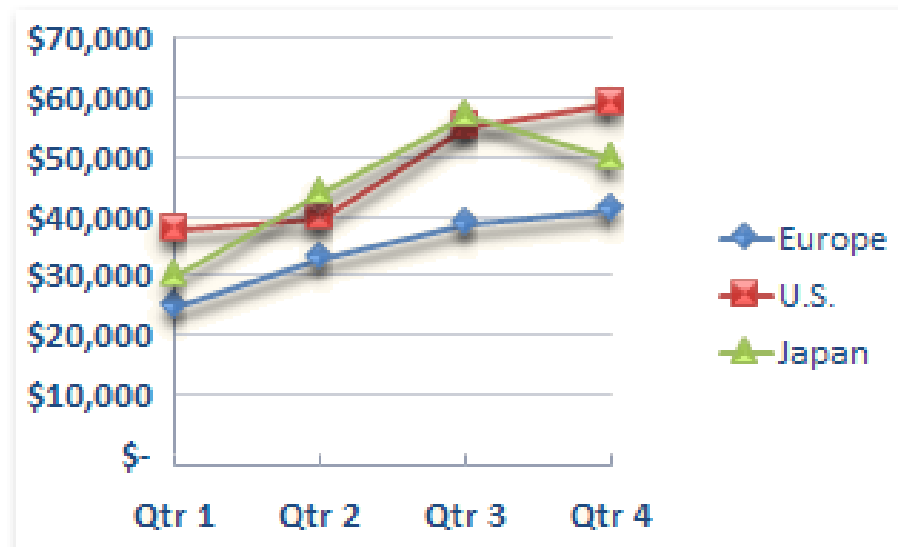
# Chart Types

- Column Charts:
  - Useful for showing data changes over a period of time or for illustrating comparisons among items.
  - Categories are typically organized along the horizontal axis and values along the vertical axis.



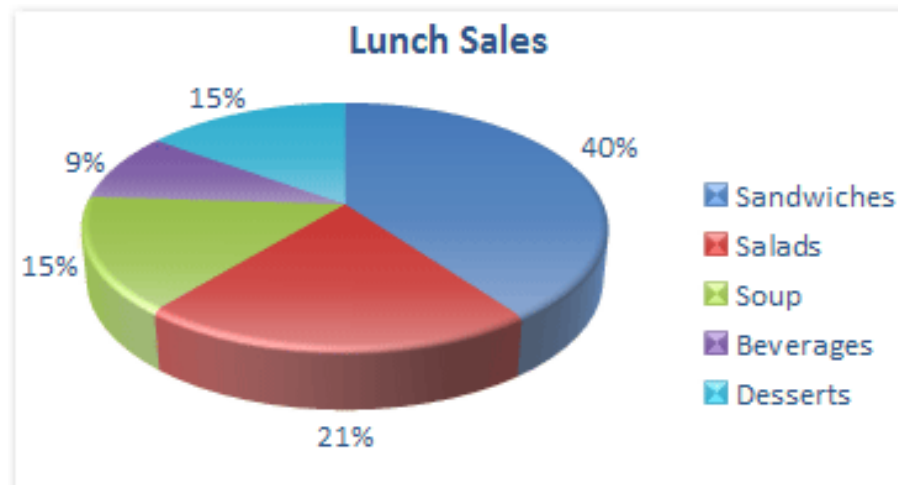
# Chart Types

- Line Charts:
  - Ideal for showing trends in data at equal intervals.
  - Category data is distributed evenly along the horizontal axis, and all value data is distributed evenly along the vertical axis.



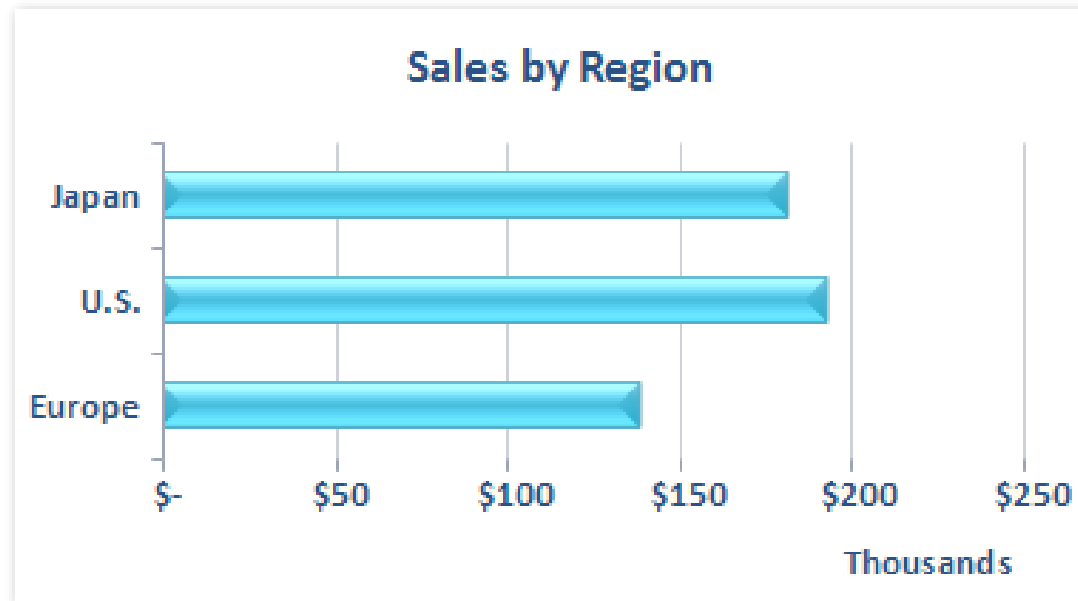
# Chart Types

- Pie Charts:
  - Show the size of items in one data series, proportional to the sum of the items.
  - Data points in a pie chart are displayed as a percentage of the whole pie.



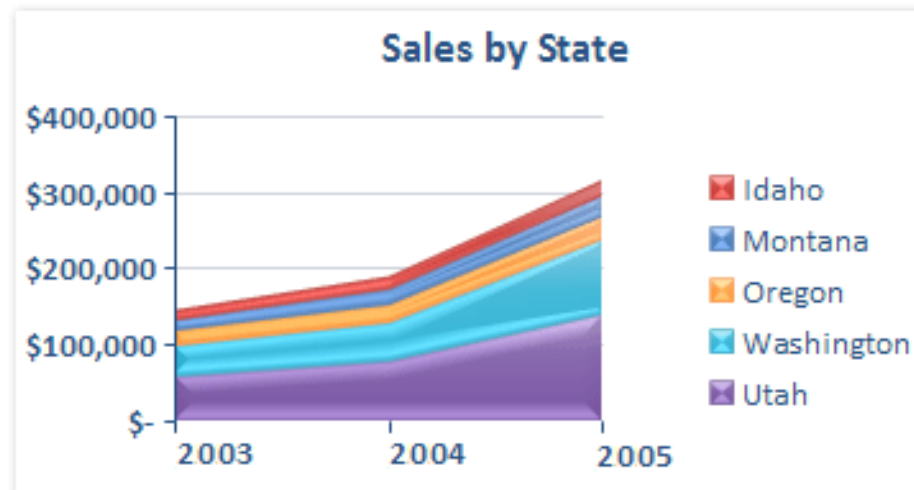
# Chart Types

- Bar Charts:
  - Illustrate comparisons among individual items.
  - Best used when the axis labels are long and/or the values that are shown are duration values.



# Chart Types

- Area Charts:
  - Emphasize the magnitude of change over time, and can be used to draw attention to the total value across a trend.
  - By displaying the sum of the plotted values, an area chart also shows the relationship of parts to a whole.

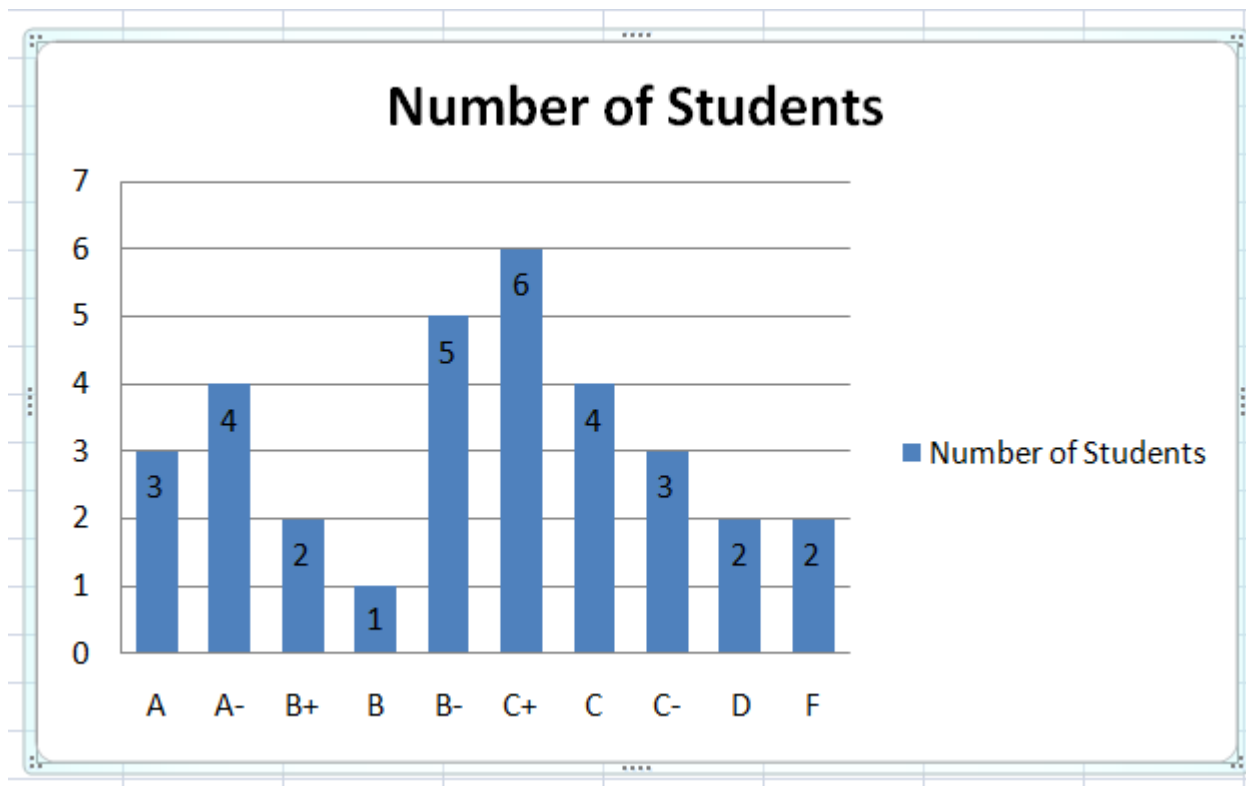


# Chart Types

- Check Also:
  - XY (scatter) charts
  - Stock charts
  - Surface charts
  - Doughnut charts
  - Bubble charts
  - Radar charts
- <http://office.microsoft.com/en-us/excel/HA012337371033.aspx>

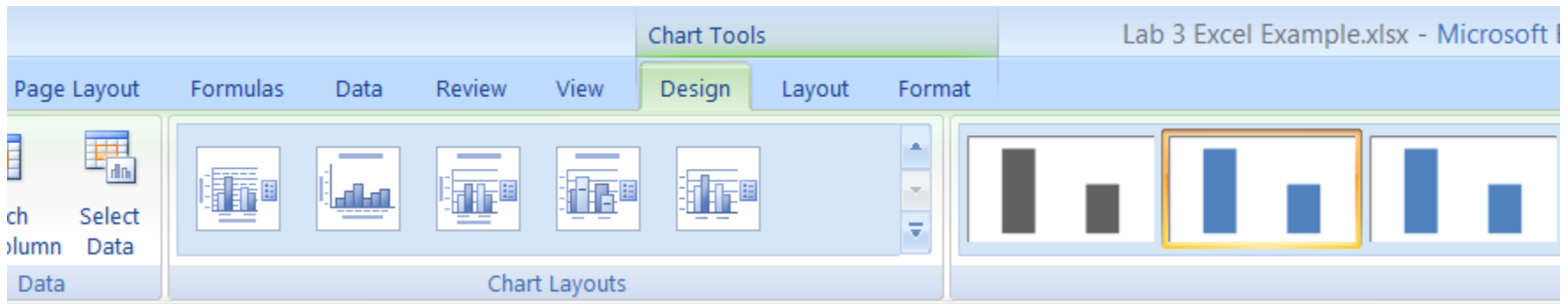
# Customize a Chart

- A Chart consists of many elements, such as:
  - chart area, plot area, data points/series, horizontal/vertical axis, legend, title, and data label



# Customize a Chart

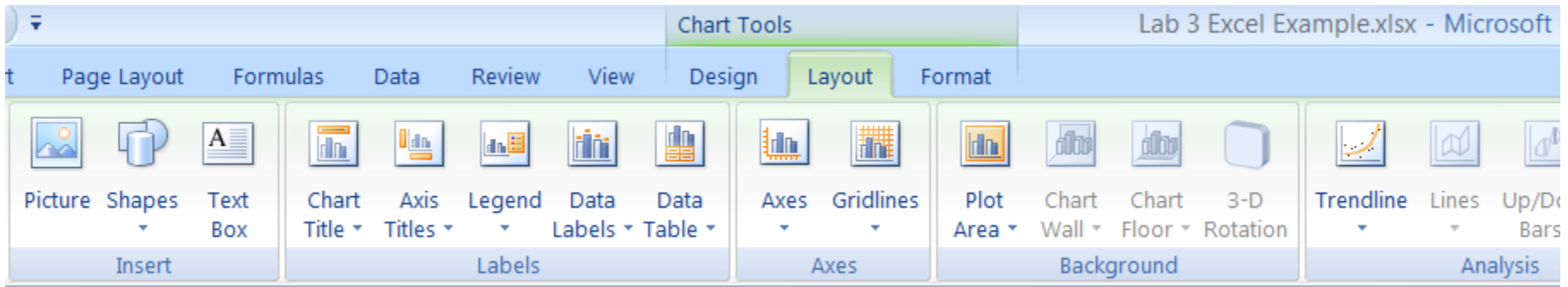
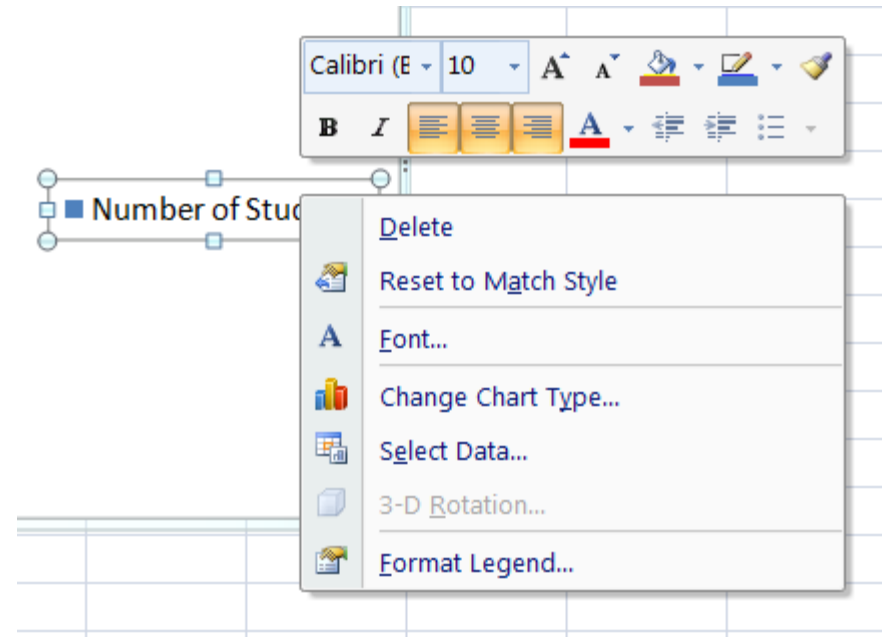
- These elements can be displayed or hidden, moved, resized and/or formatted.
- When a chart is selected, a new contextual menu appears under the main toolbar.





# Customize a Chart

- An individual element can also be customized by right-clicking on it, and selecting Format <element name> at the bottom of the drop down menu.
- You can also use the Design, Layout and Format Tabs of the Chart Tools.



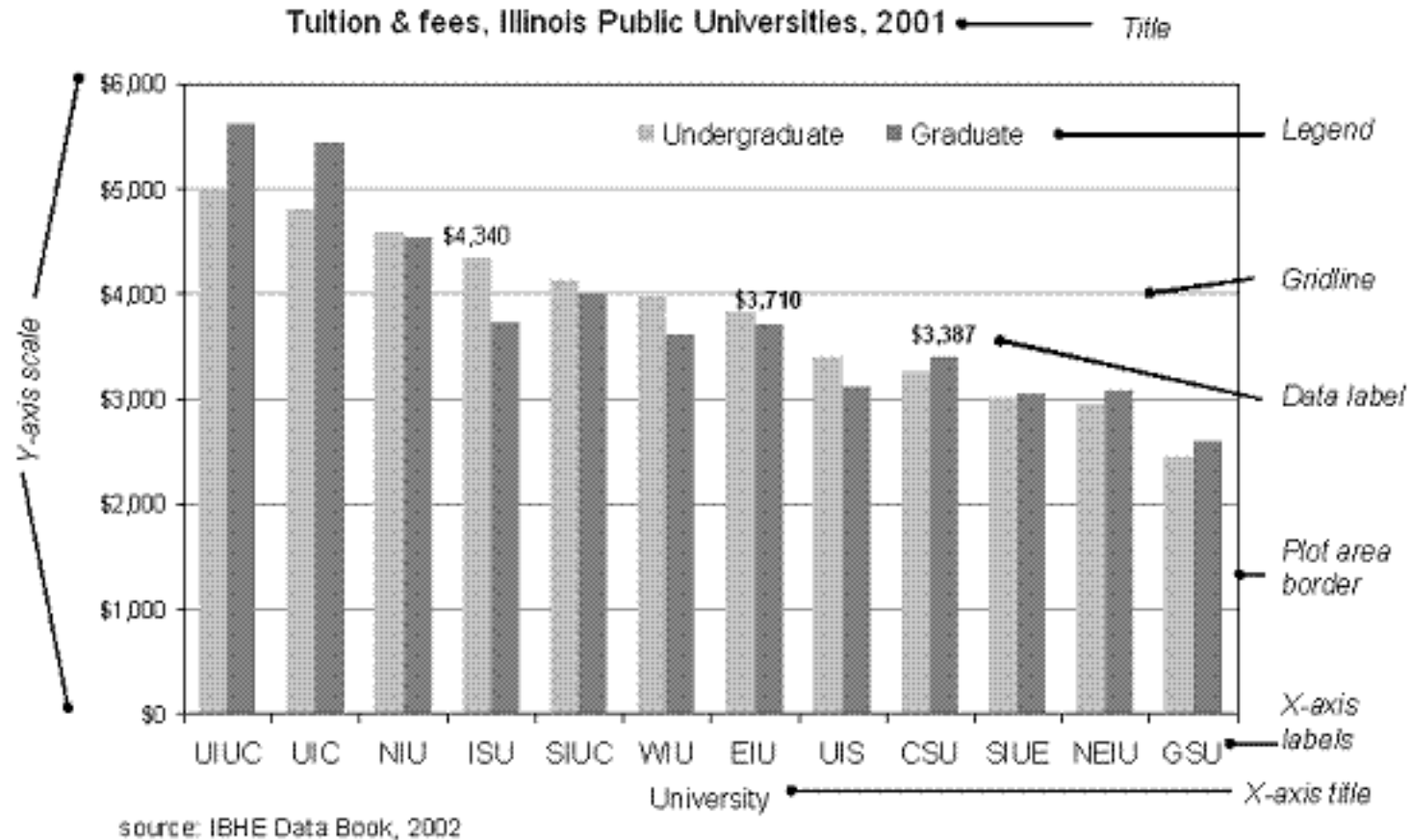
# Visual Design Rules

- How well does your chart visually communicate the message you would like to send?
- Two Critical Principles in the Visual Display of Information are:
  - **Statistical Accuracy:** Use the correct numbers and calculations
  - **Cognitive Effect:** Make the pattern of the data very Clear.

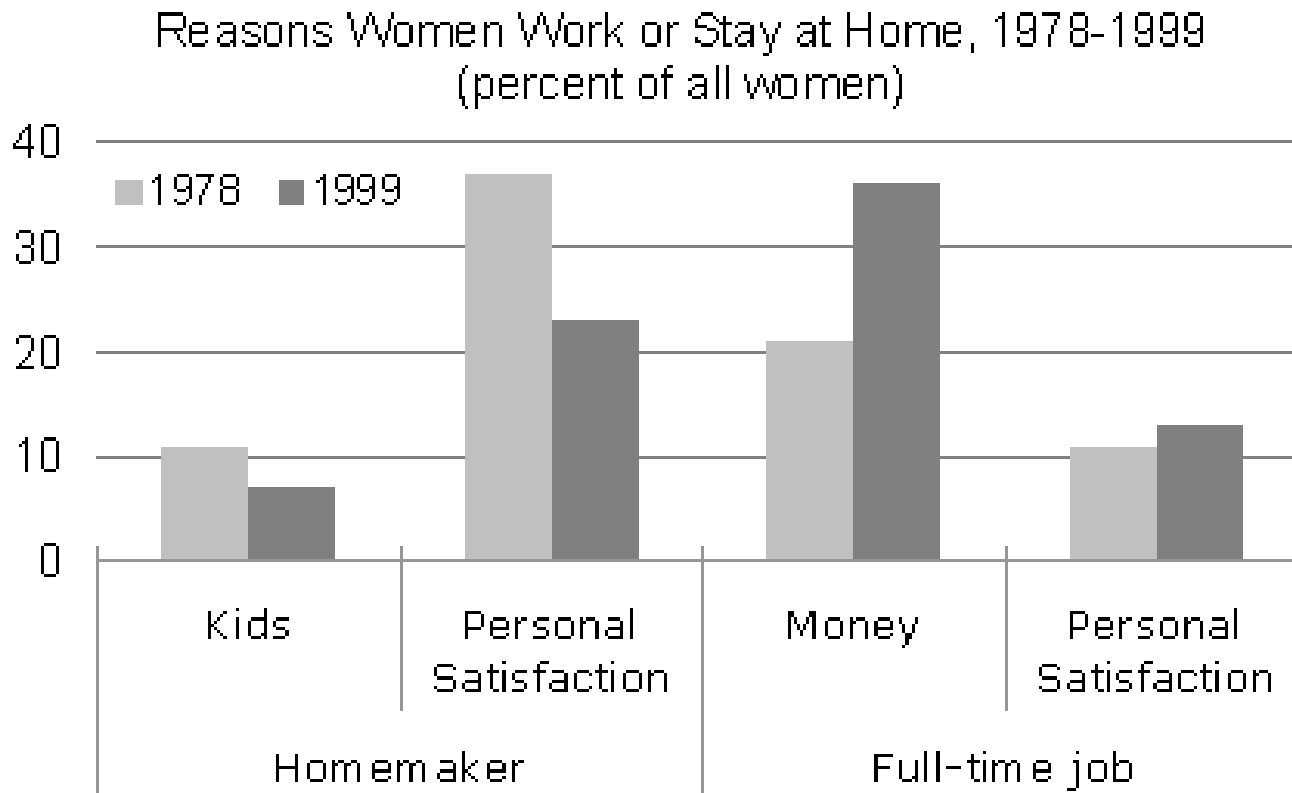
# Visual Display of Information

- Design Issues:
  - **Maximize Data Ink:** Display what directly conveys information about data.
  - **Minimize Chart Junk:** Remove all effects which do not directly convey data information. Ex: All distractions like extra colors, additional glyphs, bells, whistles, 3D effects.

# Visual Display of Information



# Visual Display of Information

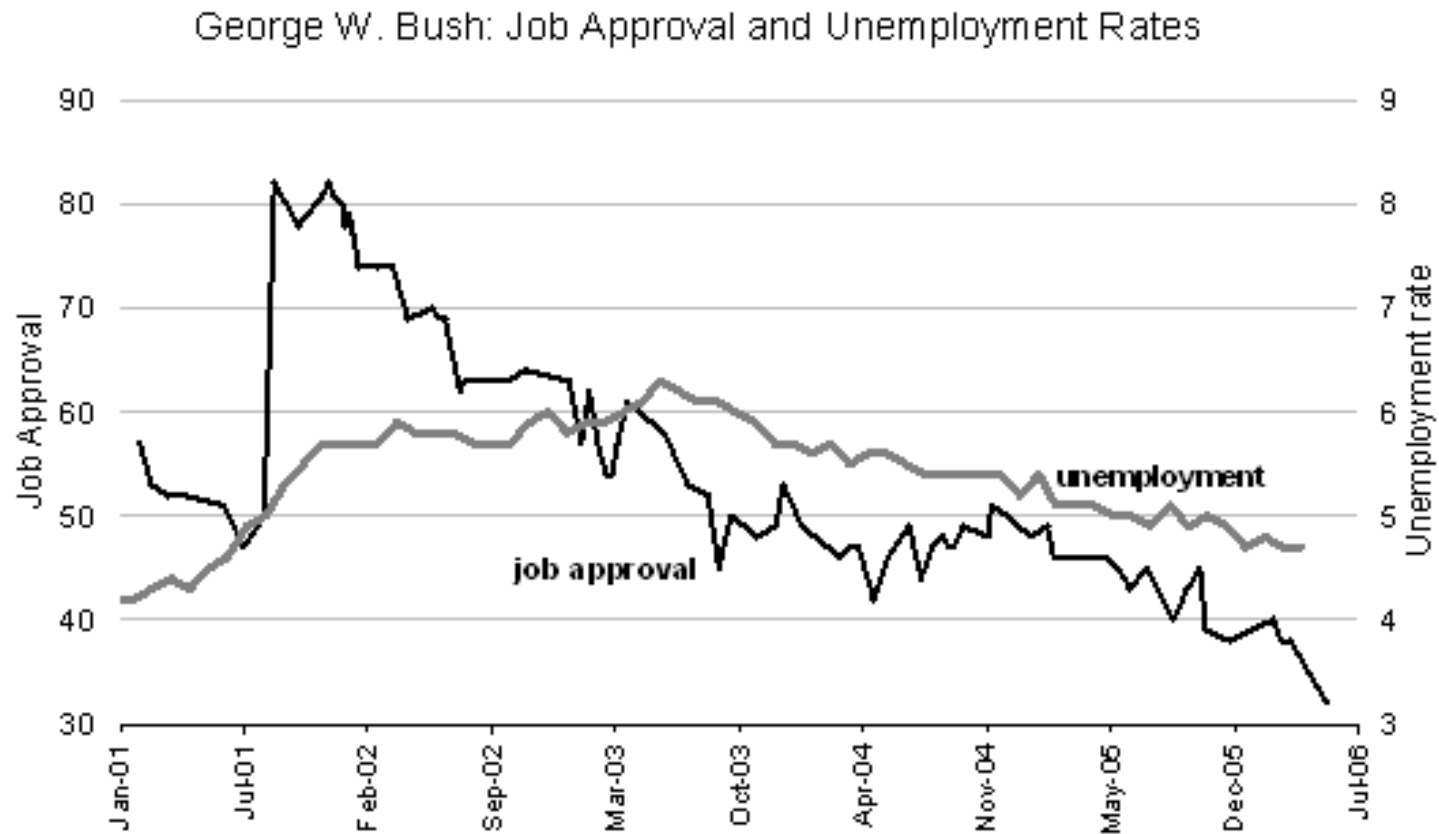


source: Putnam (2000, 197-8)

# Visual Display of Information

- Design Issues:
  - **Multiple Use:** If possible put visual elements to multiple uses. Ex: Data points, could also be numbered reflecting data values.
  - **Data Density:** Use summarizing techniques which allow us to get a "gestalt" view that can not be obtained from reading a massive data table.

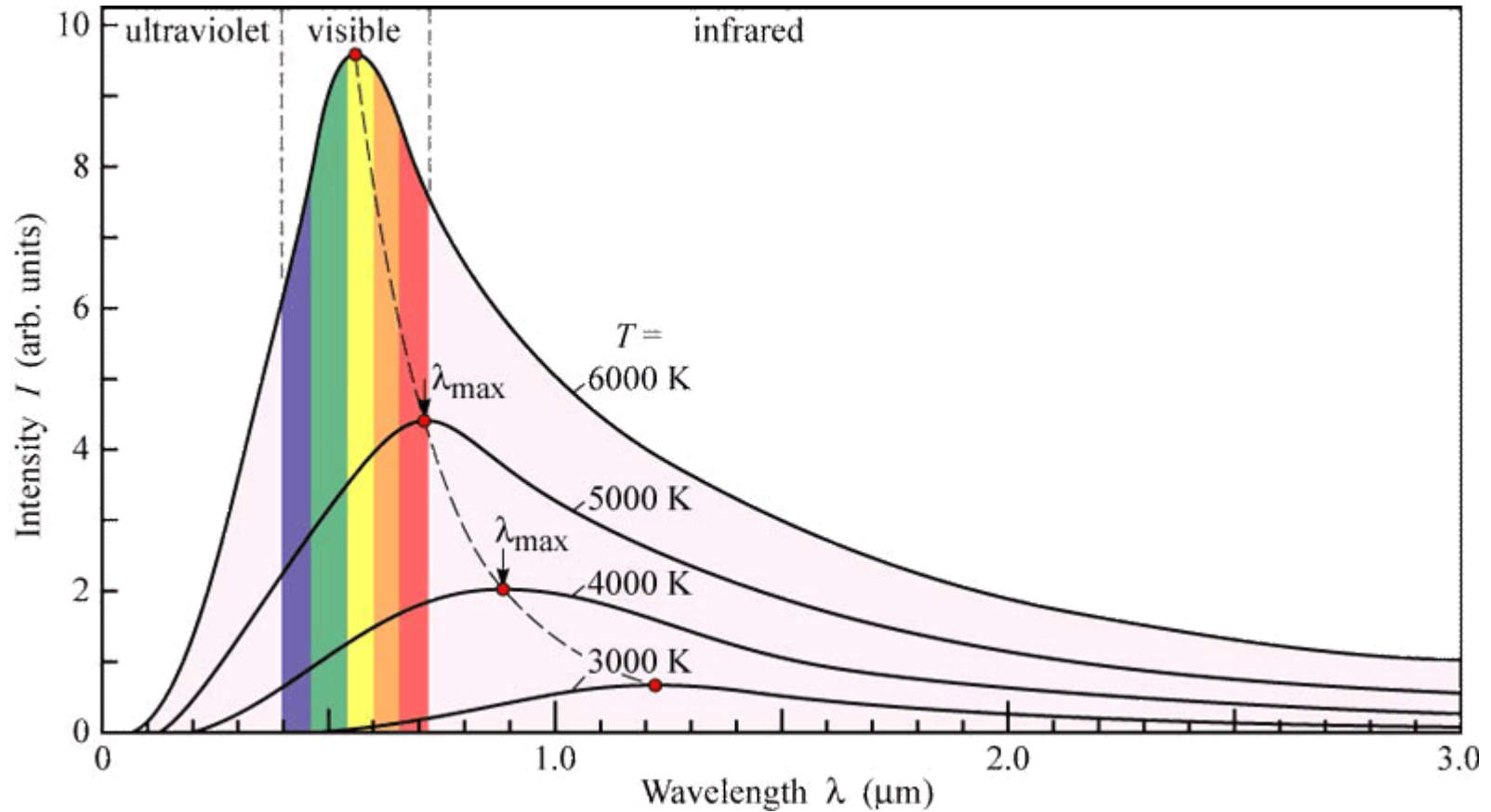
# Visual Display of Information



source: Zogby International, "George W. Bush - Job Performance Rating,"  
(Zogby special feature) <http://www.zogby.com/features/zogbytables4.cfm>  
unemployment: Bureau of Labor Statistics

<http://lilt.ilstu.edu/gmklass/pos138/datadisplay/sections/goodcharts.htm>

# Visual Display of Information



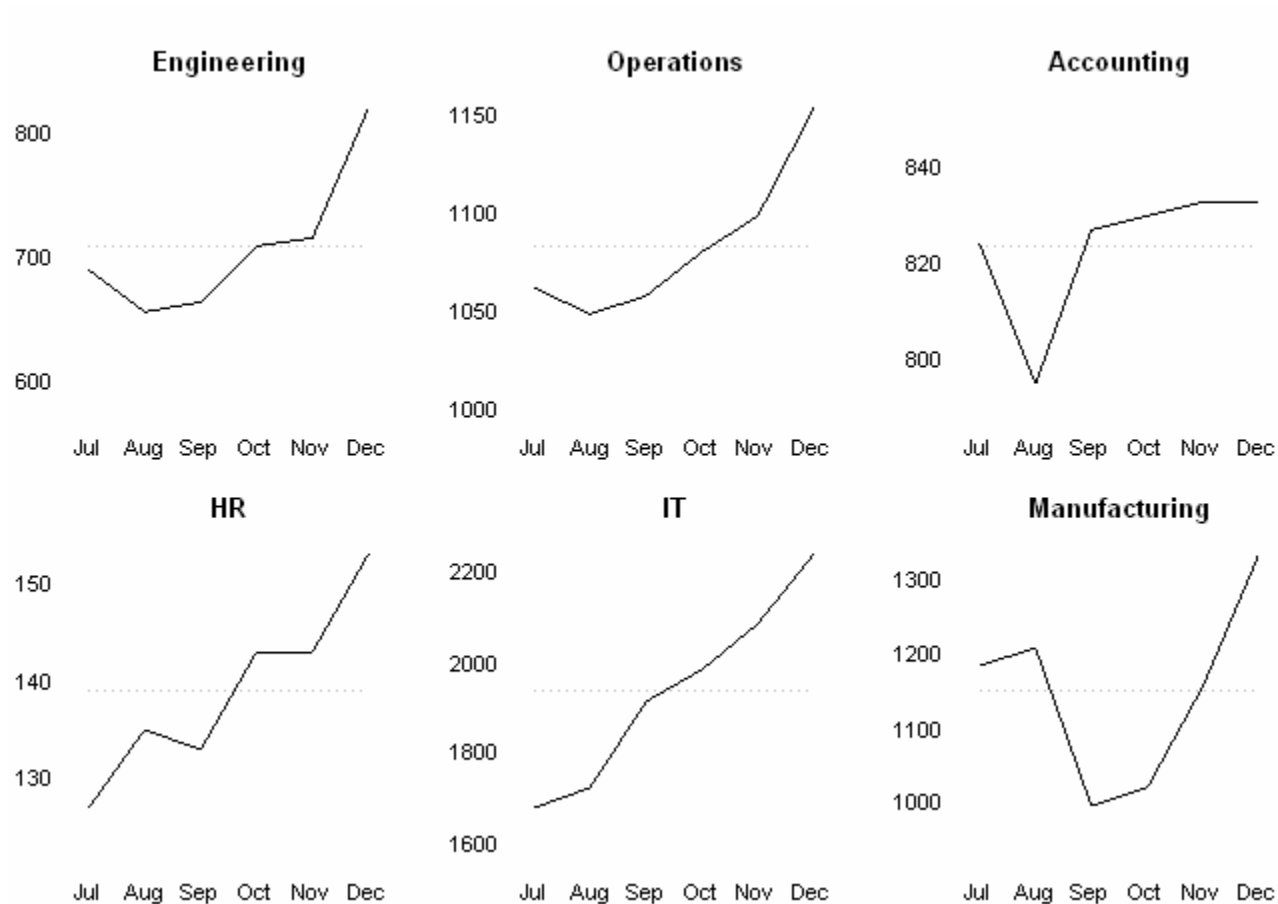
<http://quantumfreak.com/wp-content/uploads/2008/09/black-body-radiation-curves.png>



# Visual Display of Information

- Design Issues:
  - **Use Small Multiples to deal with Complexity:** Create a basis for comparison in large or complex data sets by creating simple diagrams with common axes or common design elements.
    - As Tufte writes: At the heart of quantitative reasoning is a single question: *Compared to what?* Small multiple designs, multivariate and data bountiful, answer directly by visually enforcing comparisons of changes, of the differences among objects, of the scope of alternatives. For a wide range of problems in data presentation, small multiples are the best design solution.

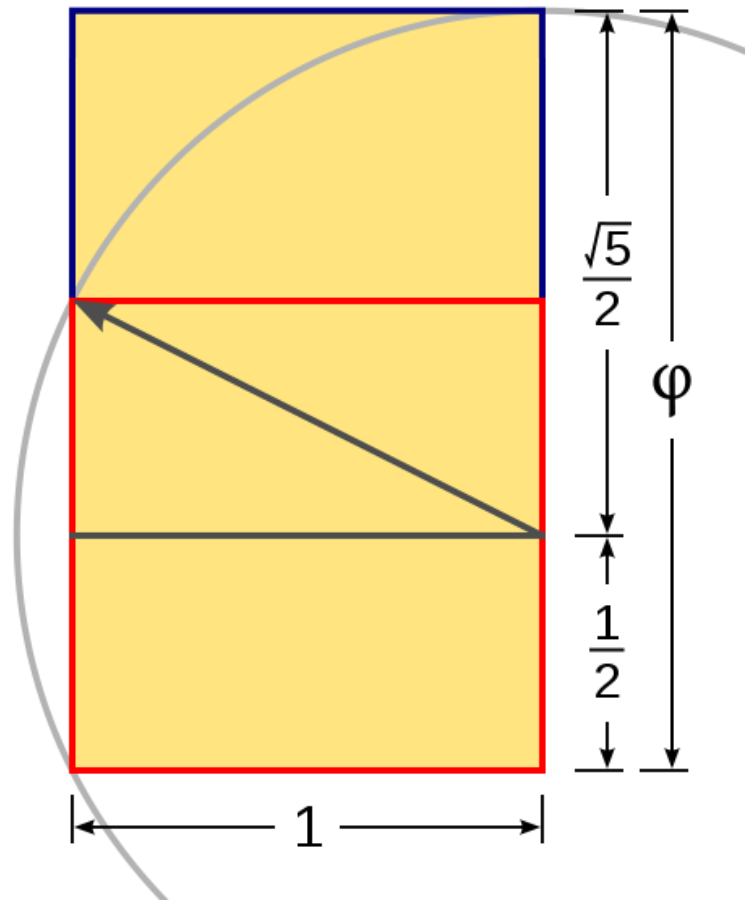
# Visual Display of Information



[http://en.wikipedia.org/wiki/Small\\_multiple](http://en.wikipedia.org/wiki/Small_multiple)

# Visual Display of Information

- Design Issues:
  - **Aesthetics:** Apply the same principles that make various art constructs effective.  
Ex: Golden Ratio: [http://en.wikipedia.org/wiki/Golden\\_ratio](http://en.wikipedia.org/wiki/Golden_ratio)



# Edward Tufte's Principles

- You can find more explanation and examples in: Graphics and Web Design Based on Edward Tufte's Principles:
  - <http://www.washington.edu/computing/training/560/zz-tufte.html>

# Information Dashboard

- **"Visual Display of the most important information needed to achieve one or more objectives which fits entirely on a single computer screen so it can be monitored at a glance" .... Stephen Few**

# Information Dashboard

- **Few's 13 Mistakes in Dashboard Design:**
  1. Exceeding the Boundaries of a Single Screen
  2. Supplying Inadequate Context for the Data
  3. Displaying Excessive Detail or Precision
  4. Choosing a Deficient Measure
  5. Choosing an Inappropriate Display Media
  6. Introducing Meaningless Variety

# Information Dashboard

- **Few's 13 Mistakes in Dashboard Design:**
  7. Using Poorly Designed Display Media
  8. Encoding Quantitative Data Inaccurately
  9. Arranging the Data Poorly
  10. Highlighting Important Data Ineffectively or Not at All
  11. Cluttering the Display with Useless Decoration
  12. Misusing or Overusing Color
  13. Designing an Unattractive Visual Display