



CPSC203 WEEK-2 LAB-1

CHARTS AND VISUAL DESIGN RULES

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USE CHART WIZARD TO DO A DEFAULT CHART ON A DATA SET

- A chart can be made easily using the Chart Wizard in Excel. There are a number of chart types (line, bar, pie, etc.) to choose from, and each can be customized, using various options. The data for a chart can either be arranged in rows or columns in a worksheet. It should be noted that some types of charts require particular formatting of the data (consult the Help function in Excel for specific data arrangement pertaining to a particular chart type). Also, data may be included from several worksheets.
- More information regarding charts in Excel 2007 can be found here:
 - <http://office.microsoft.com/en-us/excel/CH100648161033.aspx>
- The types of charts available in Excel 2007 can be found here:
 - <http://office.microsoft.com/en-us/excel/HA012337371033.aspx>



USE CHART WIZARD TO DO A DEFAULT CHART ON A DATA SET

The following is an example of how to use the Chart Wizard in Excel 2007

Step 1

Open the following spreadsheet in Excel

Step 2

In the top menu bar, select 'Insert' using your mouse. You should now see a group of icons labeled 'Charts', under the top menu bar.

Step 3

Select the data to be included in the chart.

Step 4

Use your mouse to 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'.

Step 5

A new column chart should have been added to your current worksheet. You can move the new chart by clicking-and-dragging it to a new location in the worksheet. Also, notice that a new contextual menu has appeared under the main toolbar. This contextual menu allows for customization to be performed to the chart.



USE CHART WIZARD TO DO A DEFAULT CHART ON A DATA SET

The screenshot shows a Microsoft Excel spreadsheet with the following data:

	A	B	C	D	E	F	G	H	I	J	K
	SPECIES	SPECIES_NAME	SEPALLEN	SEPALWID	PETALLEN	PETALWID	SEPALRATIO	PETALRATIO	PETALSEPALRATIO	SPECIESCLASSIFIER1	SPECIESCLASSIFIER2
1											
2	1	Iris setosa	5.1	3.5	1.4	0.2	1.46	7.00	4.80	Species1	Species1
3	1		4.9	3	1.4	0.2	1.63	7.00	4.29	Species1	Species1
4	2	Iris virginica	7	3.2	4.7	1.4	2.19	3.36	1.53	Hybrid	Hybrid
5	2		6.4	3.2	4.5	1.5	2.00	3.00	1.50	Hybrid	Hybrid
6	2		6.9	3.1	4.9	1.5	2.23	3.27	1.47	Hybrid	Hybrid
7	2		5.5	2.3	4	1.3	2.39	3.08	1.29	Hybrid	Hybrid
8	2		6.5	2.8	4.6	1.5	2.32	3.07	1.32	Hybrid	Hybrid
9	3	Iris versicolor	6.5	3.2	5.1	2	2.03	2.55	1.26	Hybrid	Hybrid
10	3		6.4	2.7	5.3	1.9	2.37	2.79	1.18	Species 3	Species3
11	3		6.8	3	5.5	2.1	2.27	2.62	1.16	Species 3	Species3
12	3		5.7	2.5	5	2	2.28	2.50	1.10	Species 3	Species3
13	3		5.8	2.8	5.1	2.4	2.07	2.13	1.03	Species 3	Species3
14	3		6.4	3.2	5.3	2.3	2.00	2.30	1.15	Species 3	Species3
15	3		6.5	3	5.5	1.8	2.17	3.06	1.41	Hybrid	Hybrid
16											
17											
18	Summary										
19	Statistics										
20	Count		14.00								
21	Sum		86.40								
22	Min		4.90								
23	Max		7.00								
24	Range		2.10								
25	Mean		6.17								
26	Median		6.40								
27	Standard Deviation		0.66								
28	Mode		6.40								
29											
30	Mean2		6.17								
31											
32											
33											

The bottom of the screenshot shows the Windows taskbar with the following open applications: start, Courses/Computer..., University of Calgar..., My Documents, CPSC 203 materials, TA rules [Compatib..., Microsoft PowerPol..., Microsoft Excel - Sp..., chart-2 - Paint, Search Desktop, and the system clock showing 11:30 AM on 11/30/2015.

USE CHART WIZARD TO DO A DEFAULT CHART ON A DATA SET

Chart Tools: Scatter

Insert a Scatter chart, also known as an X Y chart.
This type of chart compares pairs of values.
Use it when the values being charted are not in X-axis order or when they represent separate measurements.

1	A	B	C	F	G	H	I	J	K	
	SPECIES	SPECIES_NAME	SEPALLEN	LEN	PETALWID	SEPALRATIO	PETALR	PETALSEPALRATIC	SPECIESCLASSIFIER1	SPECIESCL
2	1	Iris setosa	5.1	1.4	0.2	1.46	7.00	4.80	Species1	Species1
3	1		4.9	1.4	0.2	1.63	7.00	4.29	Species1	Species1
4	2	Iris virginica	7	4.7	1.4	2.19	3.36	1.53	Hybrid	Hybrid
5	2		6.4	4.5	1.5	2.00	3.00	1.50	Hybrid	Hybrid
6	2		6.9	4.9	1.5	2.23	3.27	1.47	Hybrid	Hybrid
7	2		5.5	4	1.3	2.39	3.08	1.29	Hybrid	Hybrid
8	2		6.5	4.6	1.5	2.32	3.07	1.32	Hybrid	Hybrid
9	3	Iris versicolor	6.5	5.1	1.5	2.23	2.55	1.26	Hybrid	Hybrid
10	3		6.4					1.18	Species 3	Species3
11	3		6.8					1.16	Species 3	Species3
12	3		5.7					1.10	Species 3	Species3
13	3		5.8					1.03	Species 3	Species3
14	3		6.4					1.15	Species 3	Species3
15	3		6.5					1.41	Hybrid	Hybrid
16										
17										
18	Summary									
19	Statistics									
20	Count		14.00							
21	Sum		86.40							
22	Min		4.90							
23	Max		7.00							
24	Range		2.10							
25	Mean		6.17							
26	Median		6.40							
27	Standard Deviation		0.66							
28	Mode		6.40							
29										
30	Mean2		6.17							
31										
32										
33										

SEPALWID

Chart 12

Ready

Average: 2.660714286 Count: 30 Sum: 74.5 140%

start Courses/Computer ... University of Calgar ... 203 pics CPSC 203 materials TA rules [Compatibil... Microsoft PowerPol... Microsoft Excel - Sp... chart-4 - Paint Search Desktop 11:41 AM

USE CHART WIZARD TO DO A DEFAULT CHART ON A DATA SET

The screenshot shows Microsoft Excel with a data set in columns A through J. A scatter plot is visible, and the 'Format Chart Area' dialog box is open, showing options for fill, border, and shadow. The data set includes species names and various measurements.

SPECIES	SPECIES_NAME	SEPALLEN	SEPALWID	PETALLEN	PETALWID	SEPALRATIO	PETALRATIO	PETALSEPALRATIO	SPECIESCLASSIFIER1	SPECIESCLASSIFIER2
1	1	5.1	3.5	1.4	0.2	1.46	7.00	4.80	Species1	Species1
2	1	4.9	3	1.4	0.2	1.46	7.00	4.29	Species1	Species1
3	2	7	3.2	4.7	0.2	1.46	7.00	1.53	Hybrid	Hybrid
4	2	6.4	3.2	4.5	0.2	1.46	7.00	1.50	Hybrid	Hybrid
5	2	6.9	3.1	4.9	0.2	1.46	7.00	1.47	Hybrid	Hybrid
6	2	5.5	2.3	4	0.2	1.46	7.00	1.29	Hybrid	Hybrid
7	2	6.5	2.8	4.6	0.2	1.46	7.00	1.32	Hybrid	Hybrid
8	3	6.5	2.2	4.6	0.2	1.46	7.00	1.26	Hybrid	Hybrid
9	3	6.4	2.2	4.6	0.2	1.46	7.00	1.18	Species 3	Species3
10	3	6.8	2.2	4.6	0.2	1.46	7.00	1.16	Species 3	Species3
11	3	5.7	2.2	4.6	0.2	1.46	7.00	1.10	Species 3	Species3
12	3	5.8	2.2	4.6	0.2	1.46	7.00	1.03	Species 3	Species3
13	3	6.4	2.2	4.6	0.2	1.46	7.00	1.15	Species 3	Species3
14	3	6.5	2.2	4.6	0.2	1.46	7.00	1.41	Hybrid	Hybrid
15	3	6.5	2.2	4.6	0.2	1.46	7.00			
16										
17										
18	Summary									
19	Statistics									
20	Count		14.00							
21	Sum		86.40							
22	Min		4.90							
23	Max		7.00							
24	Range		2.10							
25	Mean		6.17							
26	Median		6.40							
27	Standard Deviation		0.66							
28	Mode		6.40							
29										
30	Mean2		6.17							
31										
32										
33										



CUSTOMIZE A CHART IN ACCORDANCE WITH GOOD CHART DESIGN PRINCIPLES

- There are many elements to a chart. Depending on the type of chart, some elements are displayed by default and others can be added as required. Elements that are not required can be removed. There are many options available to change the look of a chart, by adjusting the various elements. Elements may be moved to other areas of the chart, resized, or reformatted (all dependent on the specific element).
- For example, such elements include: chart area, plot area, data points/series, horizontal/vertical axis, legend, title, and data label.
- To customize a chart, you must first select it. A blue rectangle will appear to indicate that the chart has been selected.
- When a chart is selected, a new contextual menu appears under the main toolbar. In addition to the contextual menu, new items are also added to the main menu bar Chart Tools. There are three items included in the Chart Tools: design, layout, and format.



CUSTOMIZE A CHART IN ACCORDANCE WITH GOOD CHART DESIGN PRINCIPLES

- 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.
- A chart is automatically adjusted, if changes to the included data occur.
- More information on formatting charts can be found here:
 - <http://office.microsoft.com/en-us/excel/CH100648761033.aspx>
- It is important to remember to evaluate the effectiveness of your chart, after you have made the necessary adjustments. How well does your chart visually depict your data, and communicate the message you would like to send? Sometimes a different chart type is required. A chart can be changed to a different type by selecting Change Chart Type as part of the Design contextual menu under Chart Tools.



VISUAL DISPLAY OF INFORMATION

Two Critical Principles in the Visual Display of Information are:

- Statistical Accuracy (the numbers are the "right" numbers, correctly calculated given the data population/sample you are using).
- Cognitive Effect (the pattern in the data is made clear as possible to the viewer).

Design Issues in the Visual Display of Information (or the World According to Tufte)

- Maximize Data Ink -- Ink that directly conveys information about data points
- Minimize Chart Junk -- All additional glyphs, bells, whistles, 3D effects that do not directly convey data information.
- 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.

Example: http://en.wikipedia.org/wiki/Small_multiple



VISUAL DISPLAY OF INFORMATION

- Data Density -- Very large data sets or very complex data sets require us to find visual techniques that maintain the content of the data, but allow us to get a "gestalt" view that can not be obtained from reading a massive data table.
- Multiple Use -- If possible put visual elements to multiple uses. Data points, could also be numbers reflecting data values. Data glyphs could reflect relationships between the data attributes in frame, and other data attributes.
- Aesthetics -- The same principles that make various art constructs effective apply also to visualization of data. Example -- use of the "Golden Rectangle" for 2 D displays. http://en.wikipedia.org/wiki/Golden_rectangle



VISUAL DISPLAY OF INFORMATION

Bad Chart Examples

- http://j-walkblog.com/index.php?/weblog/posts/bad_charts/
- <http://lilt.ilstu.edu/gmklass/pos138/datadisplay/badchart.htm>

Good Chart Examples

- <http://lilt.ilstu.edu/gmklass/pos138/datadisplay/sections/goodcharts.htm>
- <http://www.compassgr.com/sites/mark/index.htm>



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

Few's 13 Mistakes in Dashboard Design:

- Exceeding the Boundaries of a Single Screen
- Supplying Inadequate Context for the Data
- Displaying Excessive Detail or Precision
- Choosing a Deficient Measure
- Choosing an Inappropriate Display Media
- Introducing Meaningless Variety (more..)



INFORMATION DASHBOARD

Few's 13 Mistakes in Dashboard Design(Contd.):

- Using Poorly Designed Display Media
- Encoding Quantitative Data Inaccurately
- Arranging the Data Poorly
- Highlighting Important Data Ineffectively or Not at All
- Cluttering the Display with Useless Decoration
- Misusing or Overusing Color
- Designing an Unattractive Visual Display

