CS 147:
Computer Systems Performance Analysis
Introduction to Graphical Presentation
Overview

Reference Works

Types of Variables

Graphical Excellence

Guidelines for Good Graphics
Useful Reference Works

Types of Variables

- Qualitative
  - Ordered (e.g., modem, Ethernet, satellite)
  - Unordered (e.g., CS, math, literature)

- Quantitative
  - Discrete (e.g., number of terminals)
  - Continuous (e.g., time)
Charting Based on Variable Types

- Qualitative variables usually work best with bar charts or Kiviat graphs
  - If ordered, use bar charts to show order
- Quantitative variables work well in X-Y graphs
  - Use points if discrete, lines if continuous
  - Bar charts sometimes work well for discrete
Graphical excellence is the well-designed presentation of interesting data:

- Substance
- Statistics
- Design
Complex ideas get communicated with:

- Clarity
- Precision
- Efficiency
Graphical Excellence (3)

Viewer gets:
- Greatest number of ideas
- In the shortest time
- With the least ink
- In the smallest space
Excellence:

- Is nearly always multivariate
- Requires telling truth about data
Guidelines for Good Graphics

- Above all else show the data
- Maximize the data-ink ratio
- Erase non-data ink
- Erase redundant data ink
- Revise and edit
Above All Else Show the Data

Guidelines for Good Graphics

- Linear model

\[ y = 1 \times 10^{-5}x + 1.3641 \]

Time to fetch (seconds)

File size (bytes)

0 5000 10000 15000

0 1 2 3 4 5

0 5000 10000 15000

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Guidelines for Good Graphics

Above All Else Show the Data
Above All Else Show the Data

Guidelines for Good Graphics

$y = 1E-05x + 1.3641$

$R^2 = 0.0033$
Maximize the Data-Ink Ratio

Guidelines for Good Graphics

Maximize the Data-Ink Ratio
Maximize the Data-Ink Ratio

Guidelines for Good Graphics

Maximize the Data-Ink Ratio
Erase Non-Data Ink

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Erase Non-Data Ink

Sales

East West North

1st Qtr 2nd Qtr 3rd Qtr 4th Qtr

$0$ $20$ $40$ $60$ $80$

Sales
Guidelines for Good Graphics

Erase Redundant Data Ink

1st Qtr 2nd Qtr 3rd Qtr 4th Qtr
0 20 40 60 80 100
Sales
20.4 27.4 90.0 20.4
30.6 38.6 34.6 31.6
45.9 46.9 45.0 43.9
EastWestNorth

2015-06-15
CS147
Erase Redundant Data Ink

Guidelines for Good Graphics

Sales

East
West
North

1st Qtr
2nd Qtr
3rd Qtr
4th Qtr

2015-06-15

CS147

1st Qtr 2nd Qtr 3rd Qtr 4th Qtr
0 20 40 60 80 100
Sales

Erase Redundant Data Ink

Guidelines for Good Graphics
Guidelines for Good Graphics

Remove Decorative Effects

Quarterly Sales

- East
- West
- North

1st Qtr 2nd Qtr 3rd Qtr 4th Qtr
Remove Clutter

- East
- West
- North

Quarterly Sales

1st Qtr 2nd Qtr 3rd Qtr 4th Qtr
Make Legends and Titles Simple to Interpret

Sales

<table>
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<tr>
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<th>1st Qtr</th>
<th>2nd Qtr</th>
<th>3rd Qtr</th>
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Eliminate Superfluous Ink

Sales

1st Qtr 2nd Qtr 3rd Qtr 4th Qtr

East West North
Choose Better Fonts

Sales

1st Qtr  2nd Qtr  3rd Qtr  4th Qtr

East  West  North