

# Interaction and Dashboarding

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MODULE 4 – ISOM 675 DATA VISUALIZATION

# The world at seven billion

[What's your number?](#) | [How many more?](#) | [Seven stories](#) | [Population control](#) | [Is seven billion accurate?](#)

The world's population is expected to hit seven billion in the next few weeks. After growing very slowly for most of human history, the number of people on Earth has more than doubled in the last 50 years. Where do you fit into this story of human life? Fill in your date of birth below to find out.



1. DATE OF BIRTH



2. COUNTRY



3. GENDER



4. RESULTS

Where do you fit into 7 billion? Enter your date of birth to find out:

dd

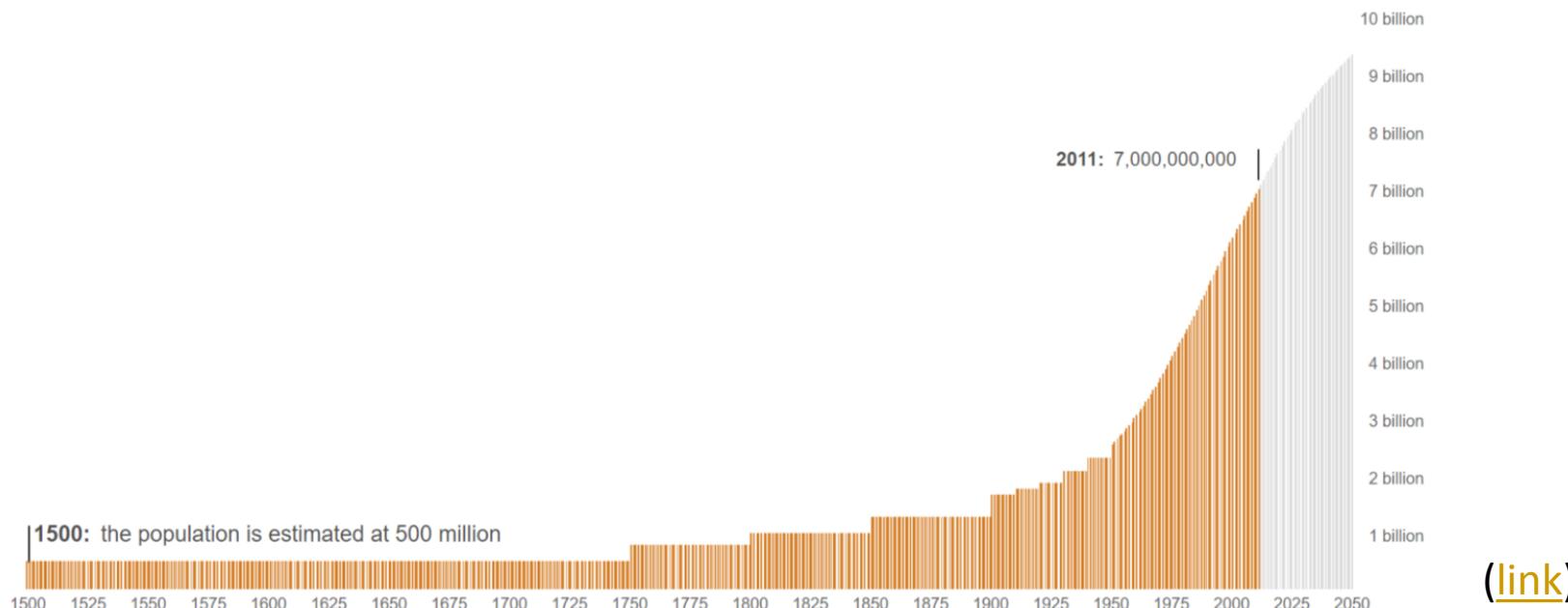
mm

yyyy

GO

<

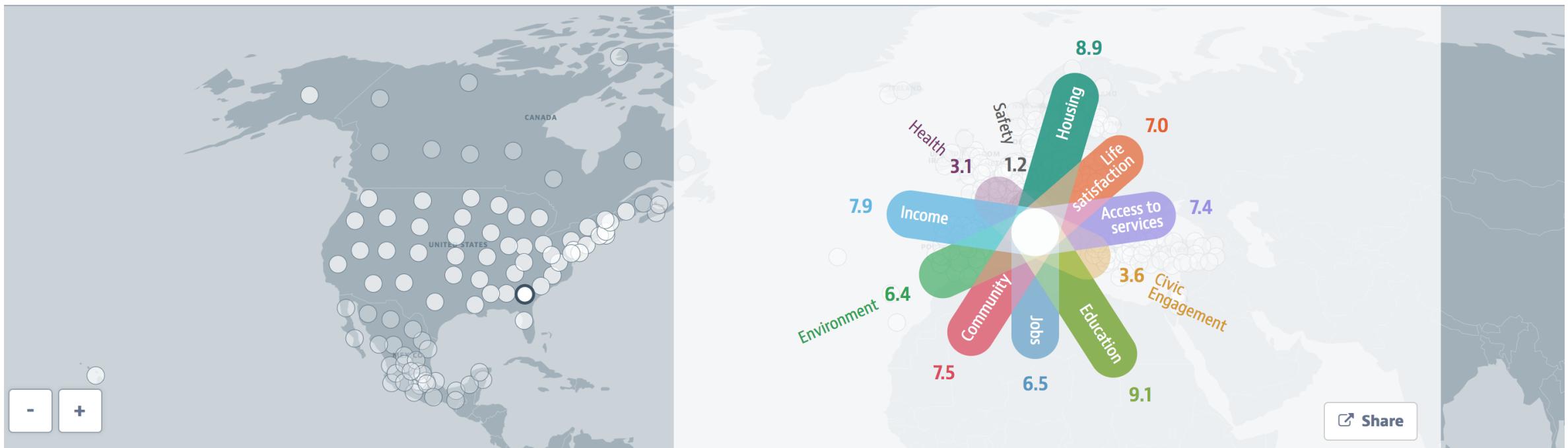
NEXT >



# Georgia



Search for a region...



Explore the map to find out how life is across OECD regions and discover regions with similar well-being.

Each region is measured in eleven topics important for well-being. The values of the indicators are expressed

Regions with similar well-being in other countries



(link)

# Presidential Election Results: Donald J. Trump Wins

AUG. 9, 2017, 9:00 AM ET

Donald J. Trump won [the Electoral College](#) with 304 votes compared to 227 votes for Hillary Clinton. Seven electors voted for someone other than their party's candidate.

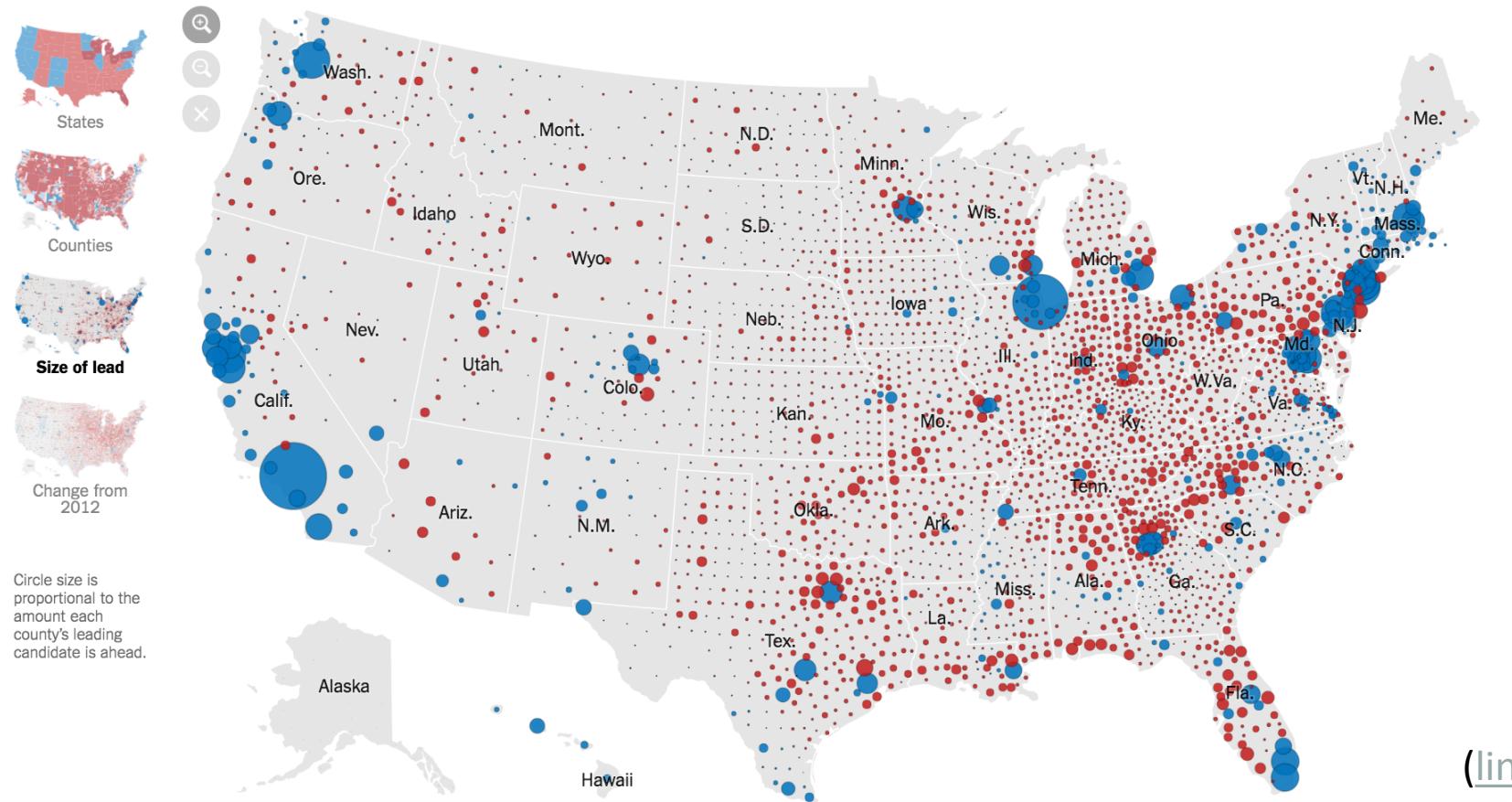
**232** Hillary Clinton

65,853,625 votes (48.0%)

270 to win

✓ Donald J. Trump **306**

62,985,106 votes (45.9%)



# Why Interaction?

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Give control to the user

Guide the user through your story

Handle too much data or too many variables

Allow for data exploration and new questions

# Interactions (Few, 2009)

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Compare

Sort

Add  
variables

Filter

Highlight

Aggregate

Re-  
express

Re-  
visualize

Zoom/pan

Re-scale

Access  
details

Annotate

Bookmark

# Visual Information-Seeking Mantra

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Ben Shneiderman,  
University of Maryland  
(1996)

Overview, zoom and filter, then details-on-demand

....

Overview, zoom and filter, then details-on-demand

# Heer and Shneiderman (2012)

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TABLE 1: Taxonomy of interactive dynamics for visual analysis

<b>Data &amp; View Specification</b>	<p>Visualize data by choosing visual encodings.</p> <p>Filter out data to focus on relevant items.</p> <p>Sort items to expose patterns.</p> <p>Derive values or models from source data.</p>
<b>View Manipulation</b>	<p>Select items to highlight, filter, or manipulate them.</p> <p>Navigate to examine high-level patterns and low-level detail.</p> <p>Coordinate views for linked, multi-dimensional exploration.</p> <p>Organize multiple windows and workspaces.</p>
<b>Process &amp; Provenance</b>	<p>Record analysis histories for revisit, review and sharing.</p> <p>Annotate patterns to document findings.</p> <p>Share views and annotations to enable collaboration.</p> <p>Guide users through analysis tasks or stories.</p>

# Sorting

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Sorting often uncovers much more meaning in the data.

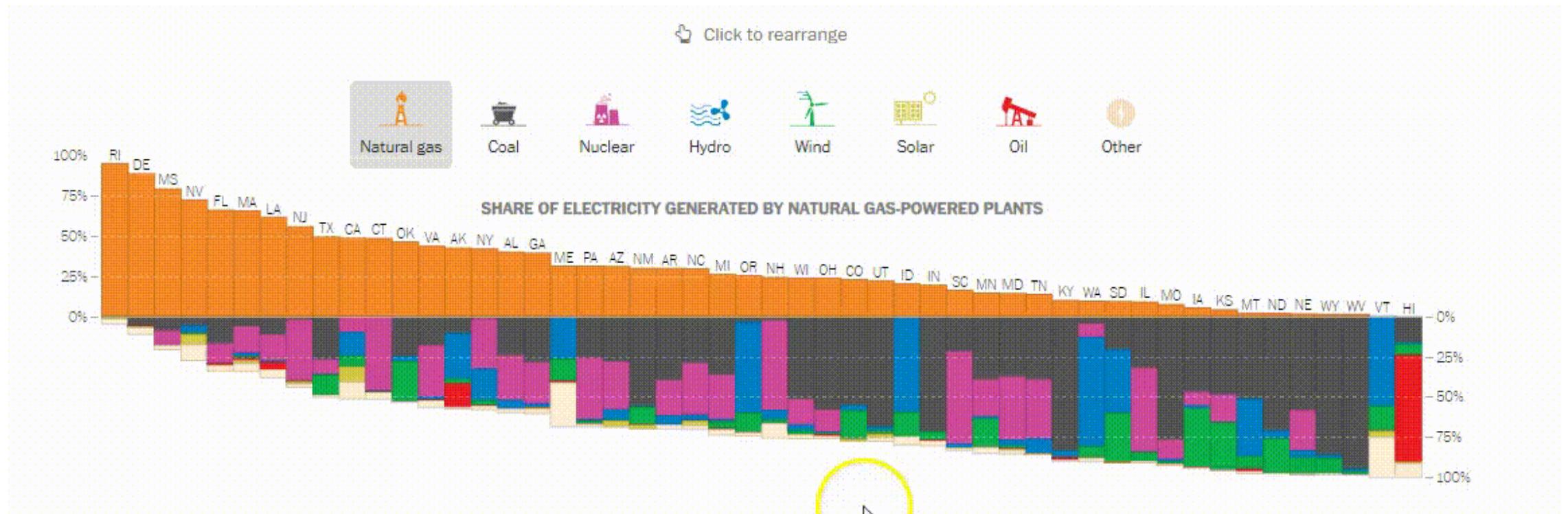
Provide the means to sort items in a graph based on various values, especially the values that are featured in the graph.

Provide extremely quick and easy means to re-sort data in different ways.

Provide the means to link multiple graphs and easily sort the data in each graph the same way.

# Sorting

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([link](#))

# Filtering

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Allow easy filtering based on any info in the connected data, not just currently displayed.

Give some visible reminder that a filter is in effect.

Allow multiple graphs to be linked such that filters apply across graphs.

Allow data to be filtered rapidly using controls, such as:

- Sliders
- Radio Buttons
- Check Boxes
- View Actions (See in-class exercise).

Provide means to directly select and remove items from a graph

Provide ability for complex logic with multiple filters

# Filtering

Reducing the data we're viewing to a subset.



# Highlighting

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Provide the means to highlight a subset of data by selecting from lists of categorical items.

Provide the means to highlight a subset of data by directly selecting it in the graph.

Selected information should stand out and be seen independently when highlighted, while still allowing viewers to see the entire set of data.

Link graphs and views such that highlighting in one graphs automatically highlight the values in a linked graph.

“Brushing” - when a user selects items in the visualization with an input device (e.g., mouse), which can then be highlighted or used as a filter, etc.

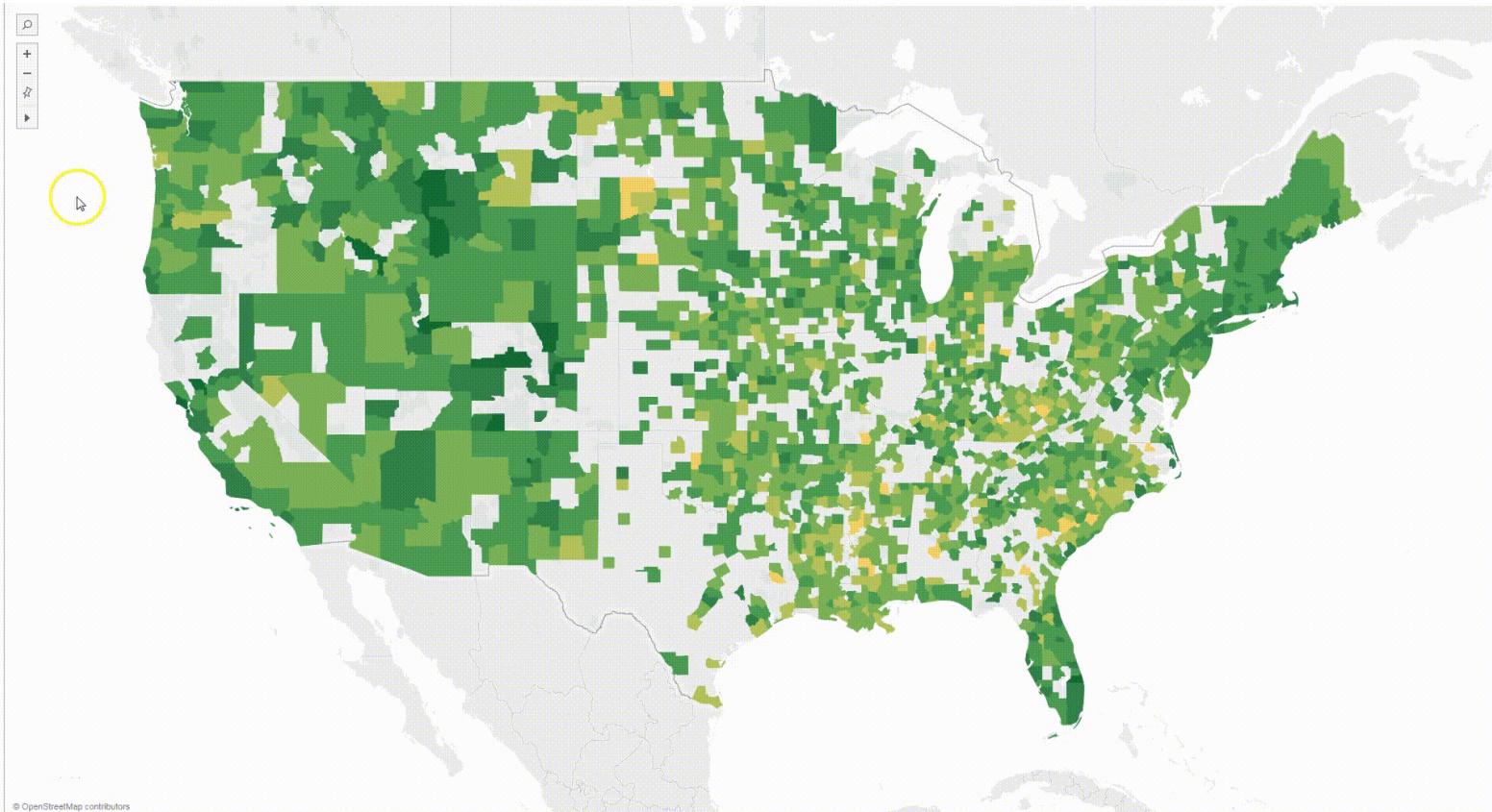
# Highlighting

Cause particular data to stand out in a visualization.



# Highlighting by Selecting (“Brushing”)

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# Details on Demand

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Provide an easy means to view details related to an item in a visualization when needed.

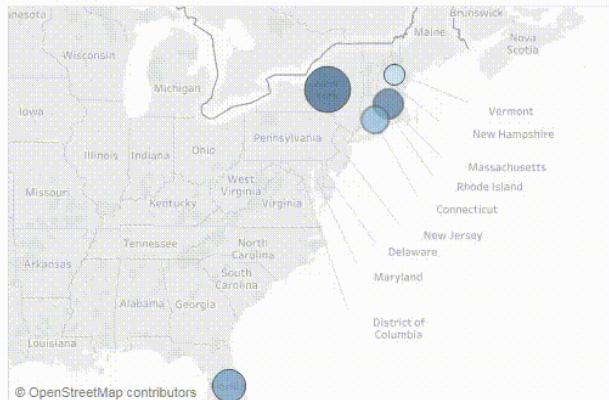
Provide an easy means to make details disappear from view when they are no longer needed.

Common approaches

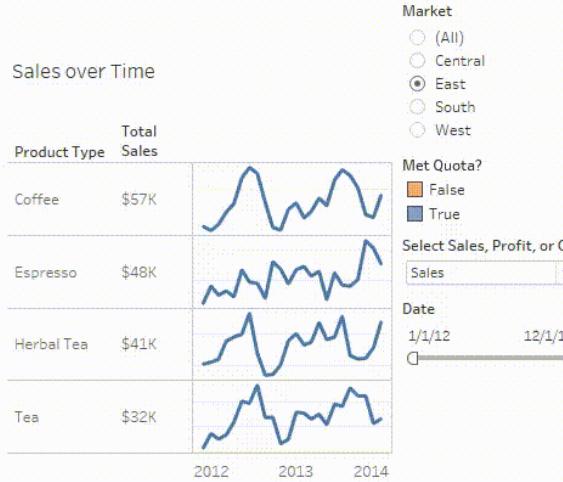
- Tool Tips
- Linked Crosstabs

## Coffee Chain Analysis By Region

Profitability by State



Sales over Time



Market

- (All)
- Central
- East
- South
- West

Met Quota?

- False
- True

Select Sales, Profit, or C...

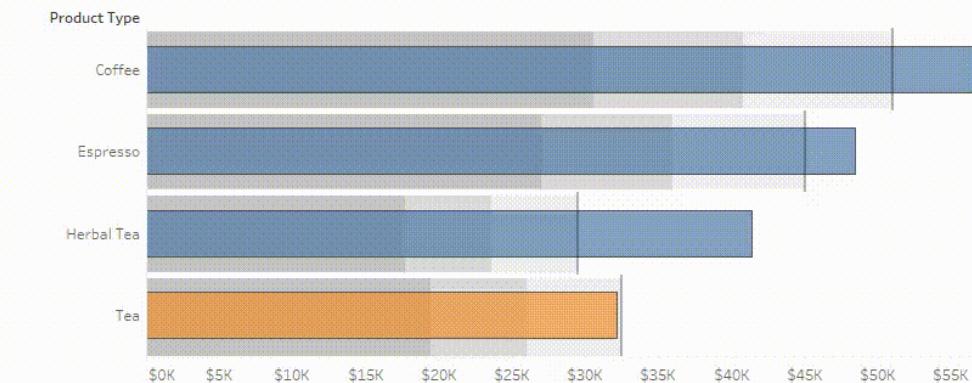
Sales

Date

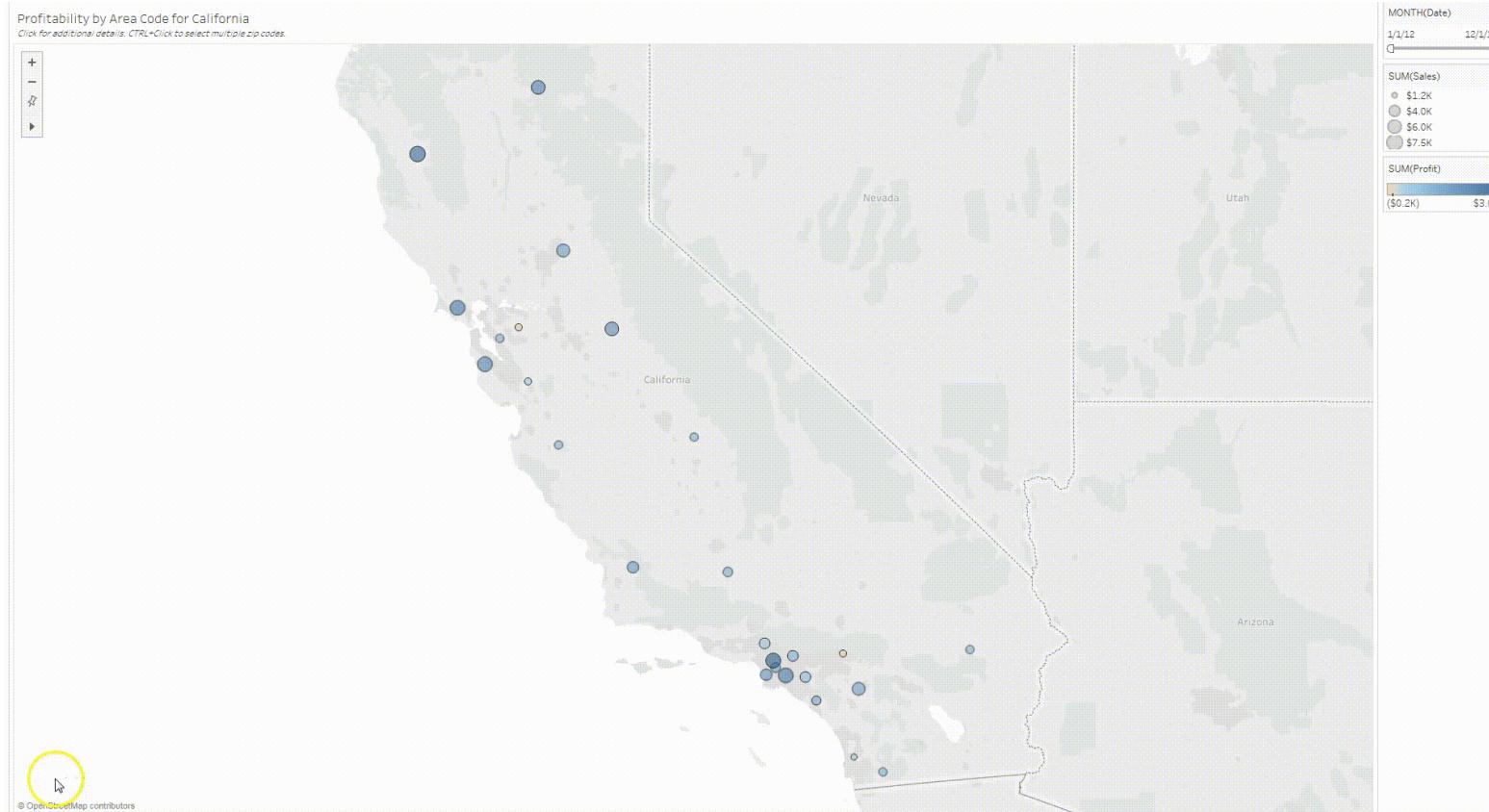
1/1/12      12/1/13  
Date Range



Budget vs Actual Sum of Sales



# Details on Demand



# Zoom / Pan

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Take a closer look at a specific section of a graph.

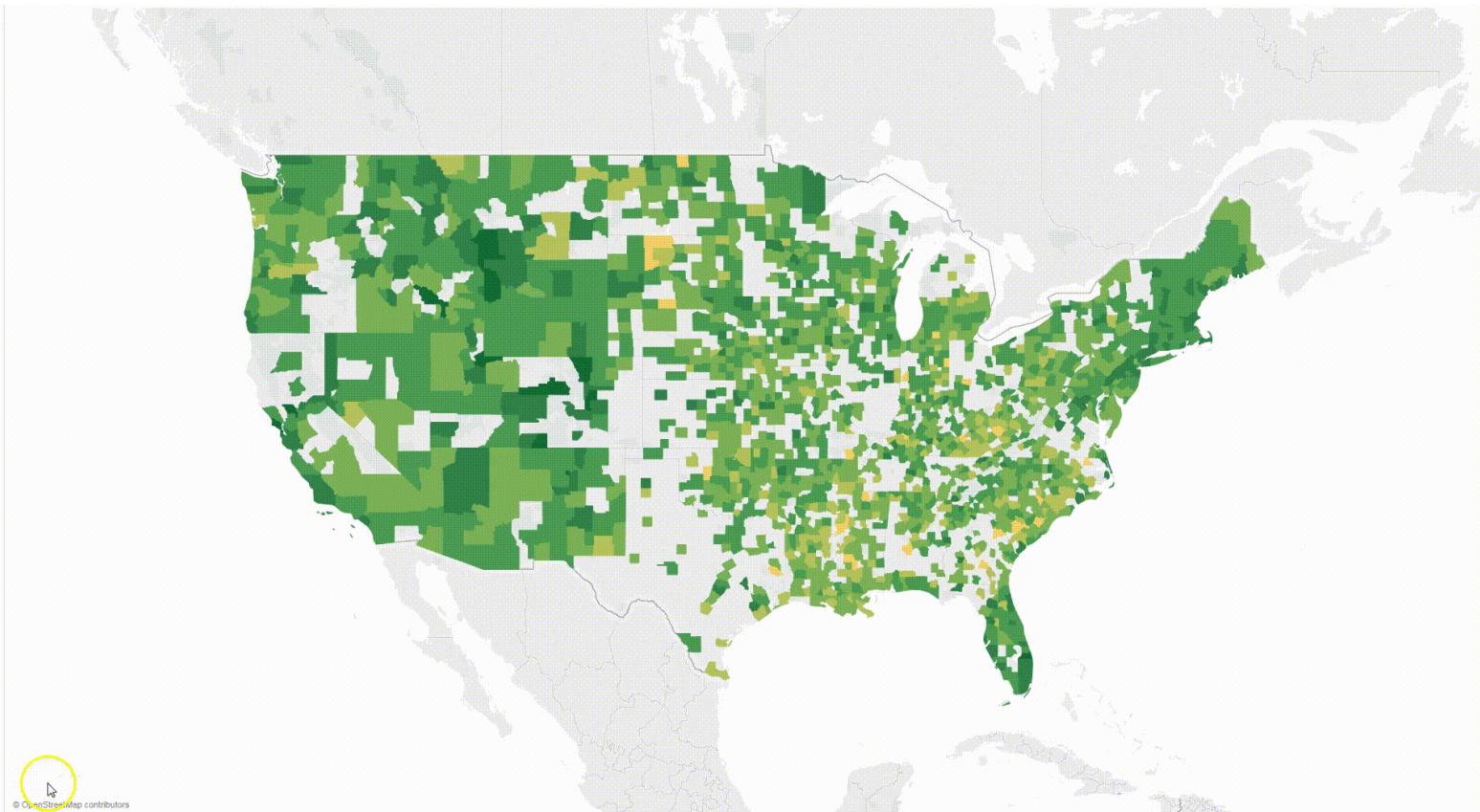
Provide the means to directly select an area of a graph and then zoom into it with a single click.

Provide the means to zoom back out just as easily.

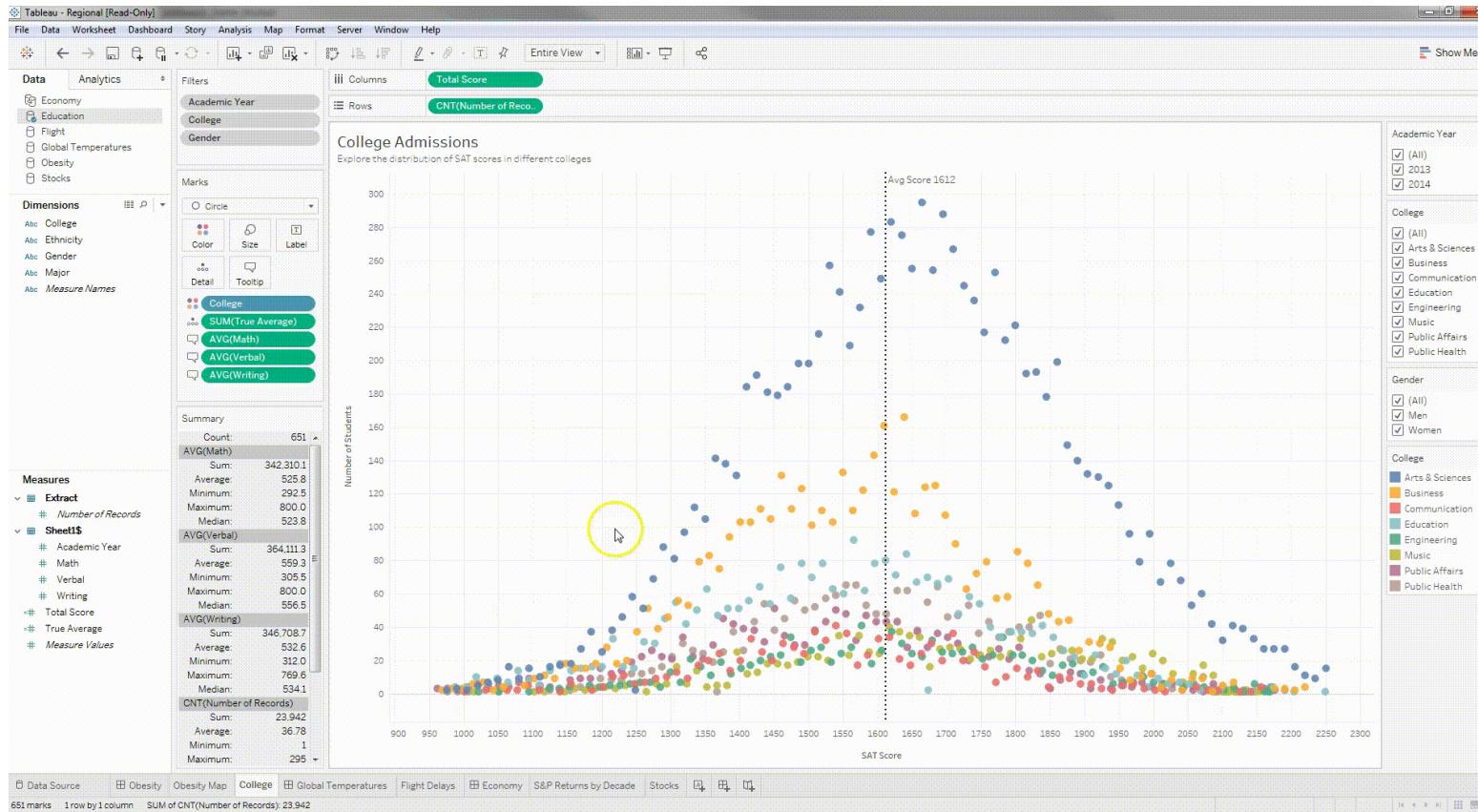
Provide the means, whenever a portion of what's in a graph is out of view, to pan in any direction directly with the mouse.

# Zoom / Pan

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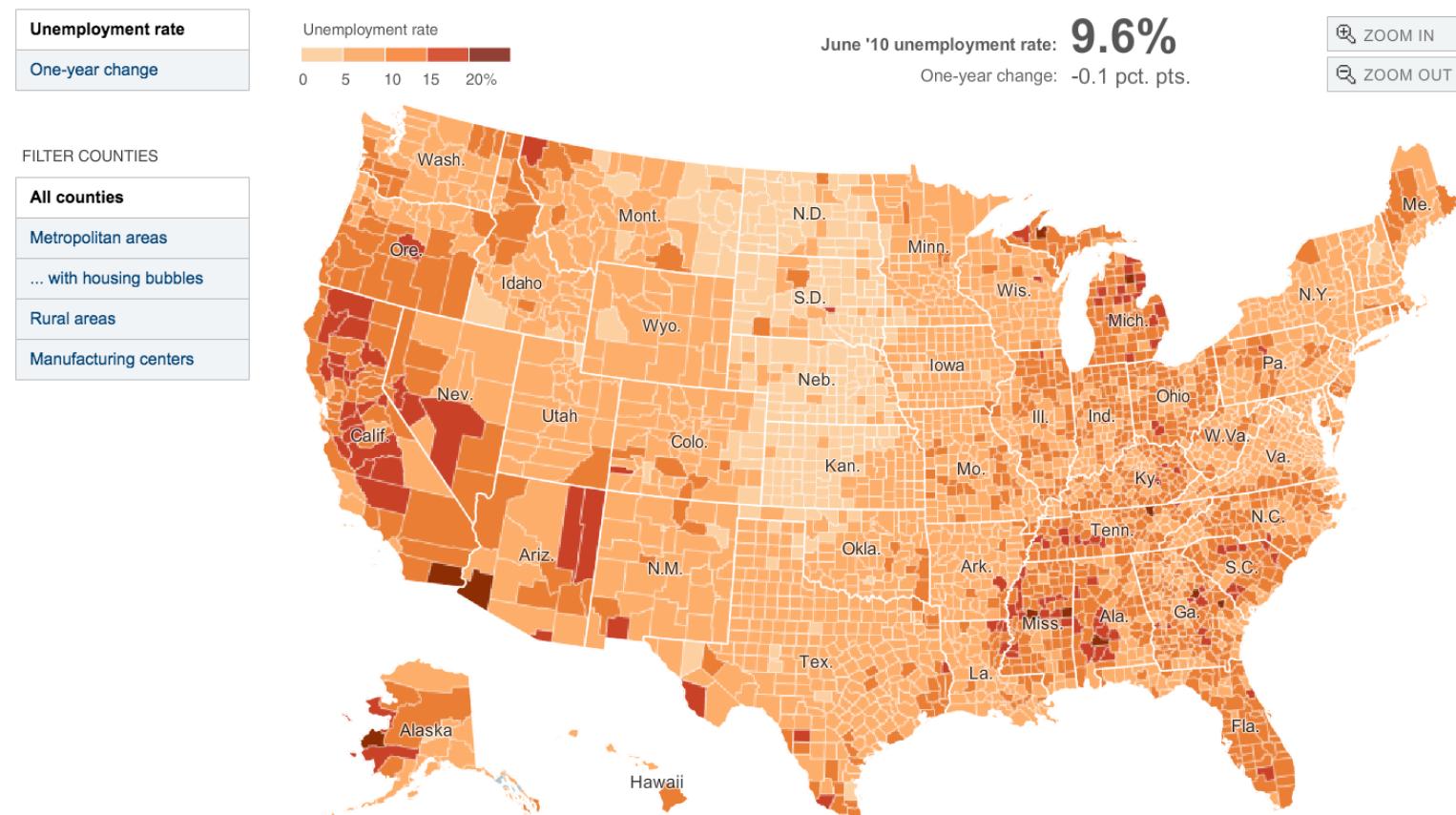
# Zoom / Pan



Published: May 3, 2010

## Geography of a Recession

The hardest-hit parts of the country have been manufacturing regions, like Michigan, Ohio and Rhode Island, and areas that had huge housing bubbles, like California, Florida and Nevada. (Updated August 10, 2010 with June data. Figures are not seasonally adjusted.)



The New York Times | Send Feedback

Source: Bureau of Labor Statistics

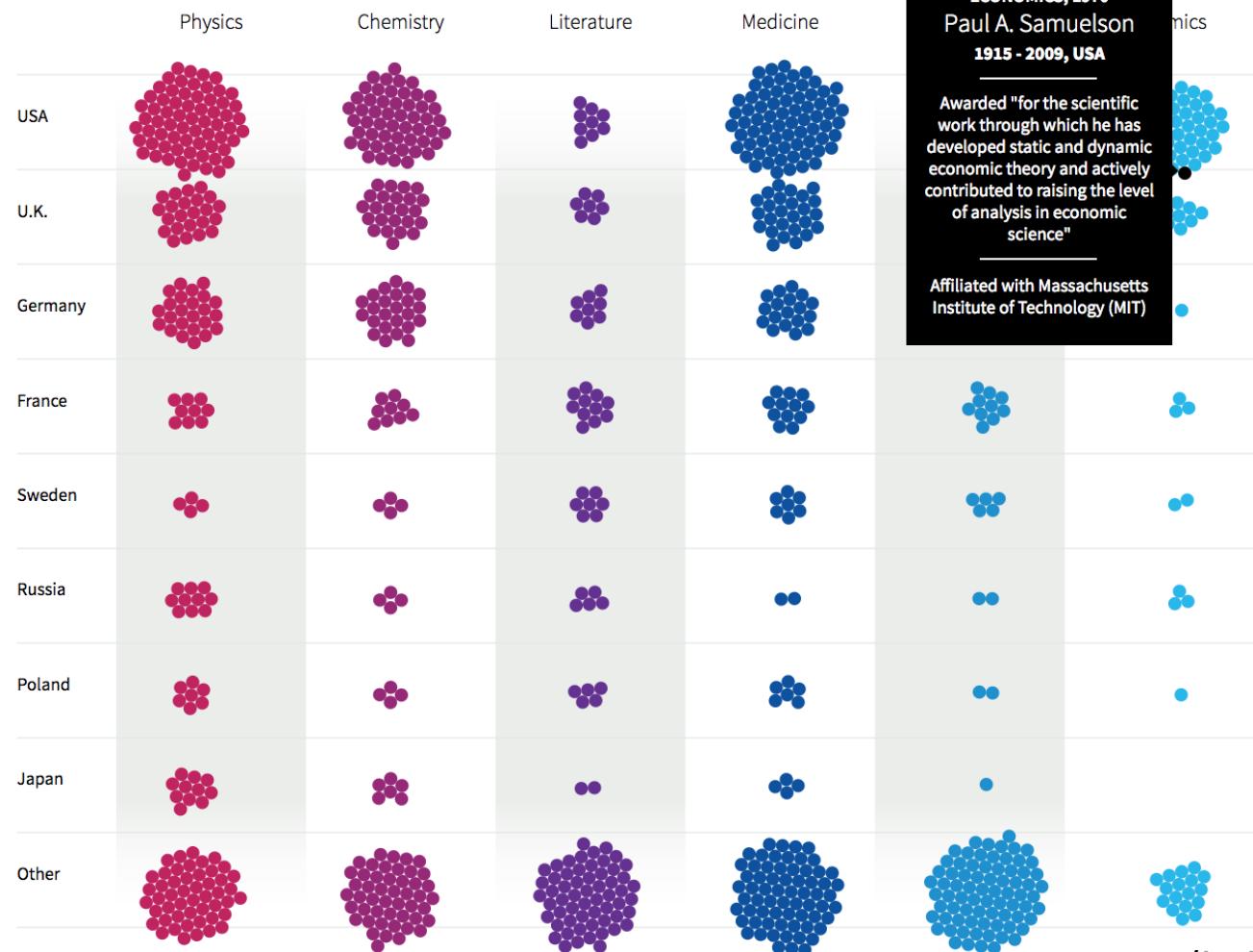


(link)

# NOBEL LAUREATES

ALL    WOMEN    ALIVE    SHARED    MULTIPLE    2015

COUNTRIES   PRIZES



Source: The Nobel Foundation  
By Matthew Weber | REUTERS GRAPHICS

(link)

(link)

# See what others paid near Atlanta, GA

**2 people paid between  
11.62% and 12% below  
MSRP**

**This represents a range  
of \$42,647 and \$42,835.**

Loan

Lease



**Estimate your monthly payment**

**Get Payment**

Exceptional Price  
Less than \$40,324

**Great Price**  
Less than \$41,294

Good Price  
Less than \$41,986

Above Market  
\$41,986 or more



**TRUECar Average**  
**\$41,280**

**3 Certified Dealers found!**

**View Inventory**

**Local** | **National**  
Showing 16 Sales

**Market Average**  
**\$41,427**

**Factory Invoice**  
**\$46,423**

**MSRP**  
**\$48,465**

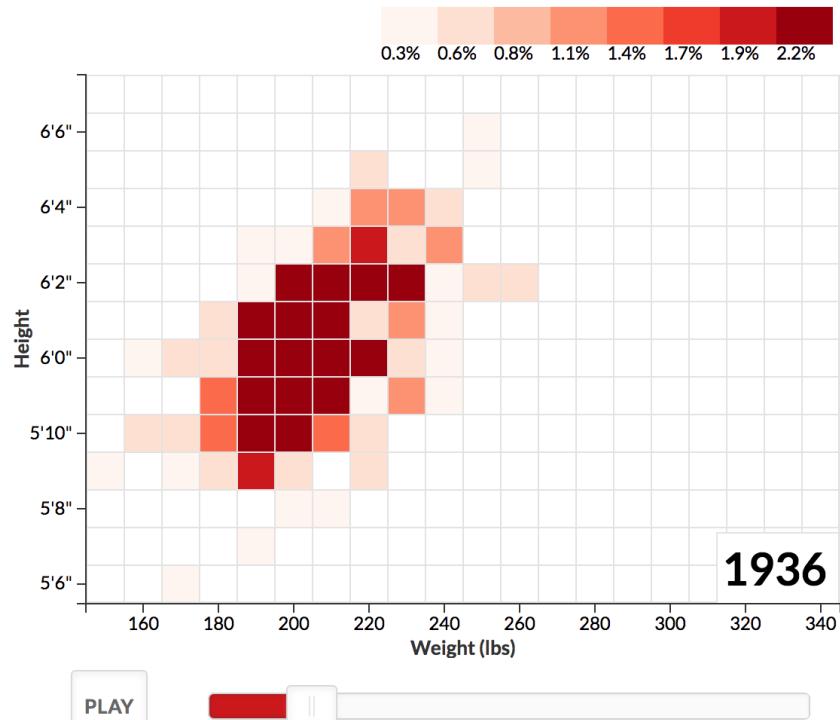
**Price Certainty**  
**99.7%**

# Animation to show change over time

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## NFL players: height & weight over time

By [Noah Veltman](#)



([link](#))

# The Growth of Newspapers Across the U.S.: 1690-2011

1690

1790

1833

1849

1846

1860

1890

1909

1930

1950

1970

1990

2000

2011

1774

1808

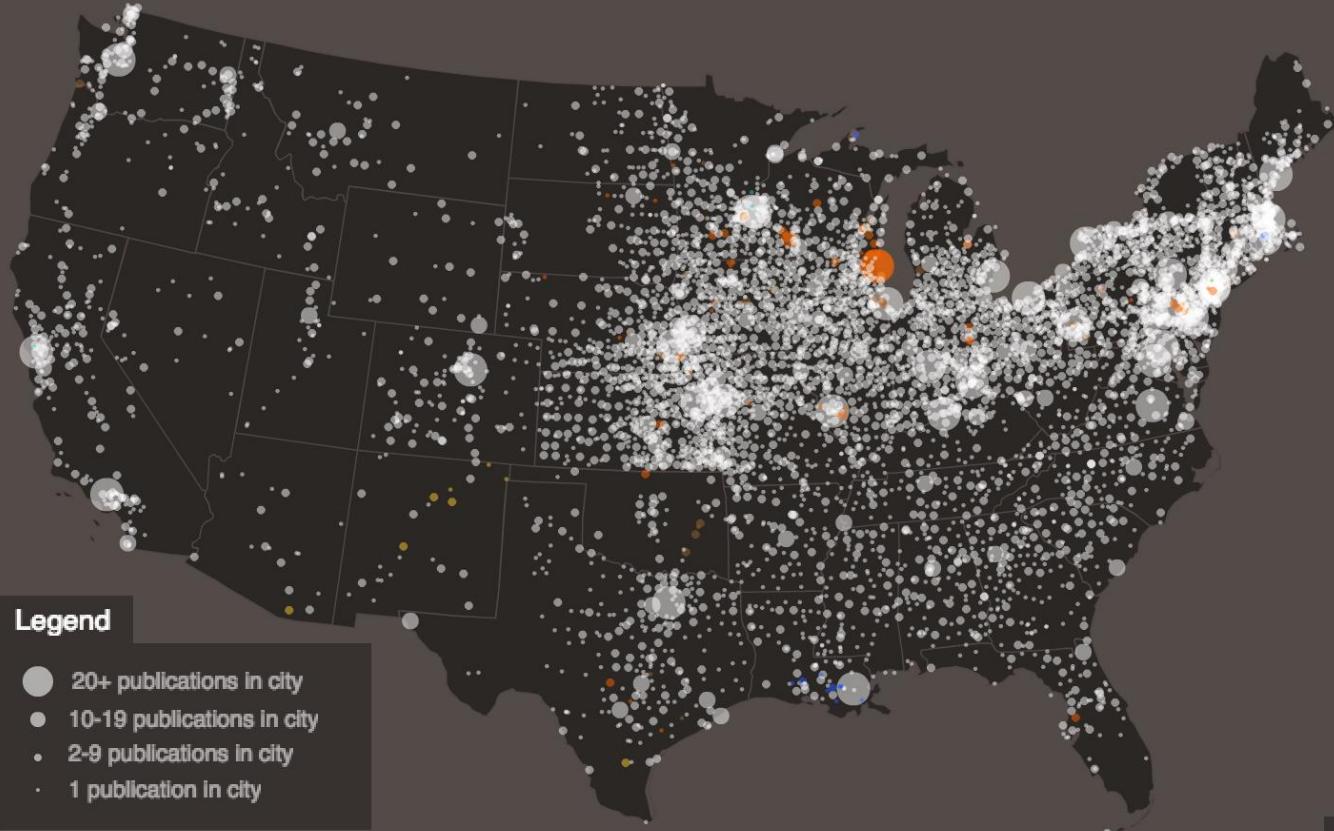
1891

1891

13718 listings

« Back: 1890 | Next: 1900 »

ZOOM:1.1x



## Legend

- 20+ publications in city
- 10-19 publications in city
- 2-9 publications in city
- 1 publication in city

▼ Hide details (click listings to open newspaper info in a new window)

Loading Complete

## Filter publications...

### ▼ By language

All Languages

- English
- Spanish
- German
- Chinese
- Swedish
- Italian
- French
- Other

### ► By publication frequency

(link)

U.S. GUN KILLINGS IN 2010 2013

9,595

PEOPLE KILLED

414,046

STOLEN YEARS ?

207 | 2%

Northwest



AGE 0

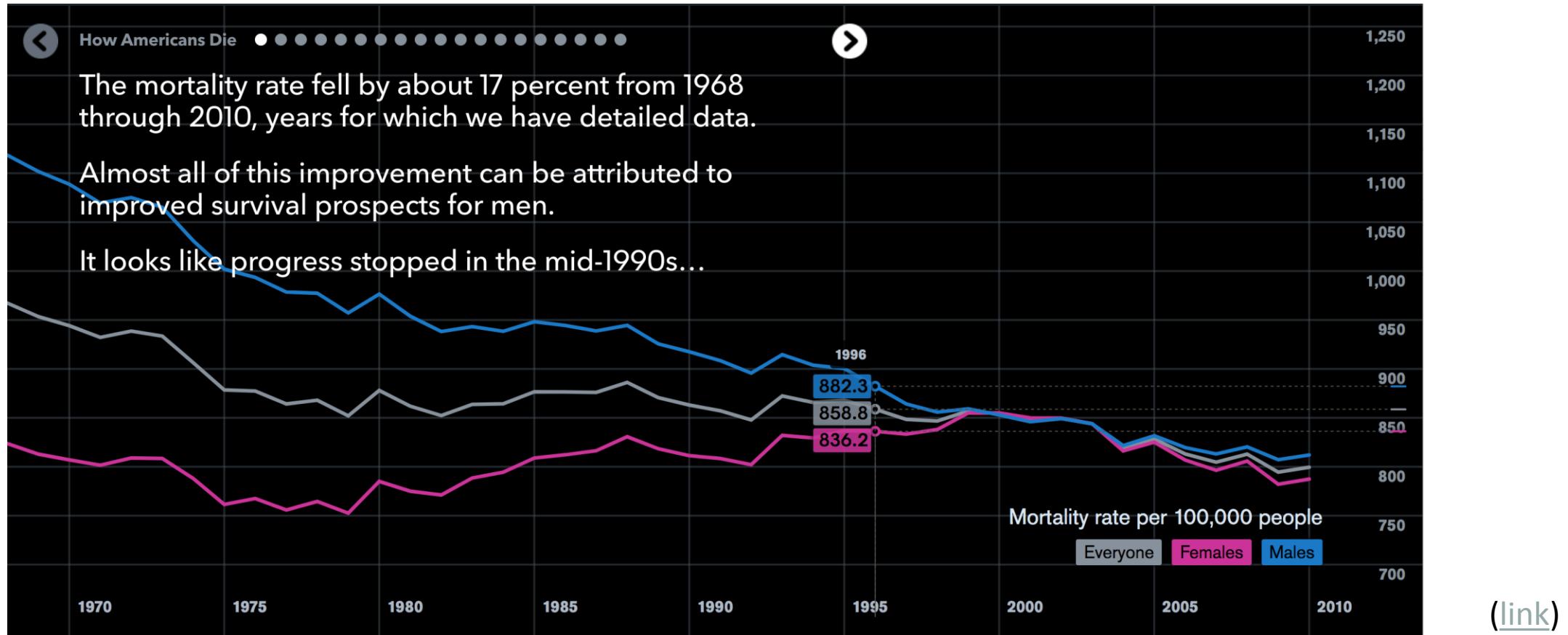
9,388 | 98%

All Other Victims

108

(link)

# Tell Stories



## Is there trouble brewing?

Coffee products are our top sellers.  
Growth is similar in tea and coffee sales.  
But profitability for product types is somewhat volatile.



# In Class Tutorial

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Tableau Animation and “Viz in Tooltip”

# Directed vs Exploratory Navigation

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“A graphic display has many purposes, but it achieves its highest value when it forces us to see what we are not expecting.” William Cleveland

Information Visualization is ideal for exploratory data analysis; however, sometimes you want to direct your viewer through a certain process.

Directed

?



Exploratory



?



# The Death of Interactive Graphics?

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**“If you make a tooltip or  
rollover, assume no one  
will ever see it.”**

*Archie Tse, NYT*

**Only 10 to 15 percent of  
readers who visit an interactive  
visualization on their site  
actually click on anything.**

*Gregor Aisch NYT*

# Purposeful Interactions

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**Focus on the needs of  
the audience, not on the  
novelty/innovativeness/  
newness/coolness of  
the interaction.**

# Dashboards

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# Dashboards: A definition

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A dashboard is a visual display of the most important information needed to achieve one or more objectives, consolidated and arranged on a single screen so the information can be monitored at a glance. (Few 2013)

# What dashboards are.

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Dashboards are visual.

Dashboards display the information needed to achieve specific objectives.

A dashboard fits on a single computer screen.

Dashboards are used to monitor information at glance.

Dashboards present information using small, concise, direct, and clear display media.

Dashboards are customized.

# What dashboards are not.

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A display that is primarily used for data exploration and analysis

A portal

A scorecard

A report that people use to look up specific facts

# Why Dashboards?

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Maintaining Situation Awareness

Performance Monitoring Process

1. Update high-level situation awareness.
2. Identify and focus on particular items that need attention.
  - a. Update awareness of this item in greater detail
  - b. Determine whether action is required
3. If action is required, access additional information that is needed, if any, to determine an appropriate response.
4. Respond

# Tools for Interactive Dashboards

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Data-Driven Documents



# 13 Common Mistakes in Dashboard Design (Few 2013)

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- |   |  |
|---|--|
| #1: Exceeding the Boundaries of a Single Screen | #8: Encoding Quantitative Data Inaccurately        |
| #2: Supplying Inadequate Context for the Data   | #9: Arranging the Data Poorly                      |
| #3: Displaying Excessive Detail or Precision    | #10: Ineffectively Highlighting What's Important   |
| #4: Expressing Measures Indirectly              | #11: Cluttering the Screen with Useless Decoration |
| #5: Choosing Inappropriate Media of Display     | #12: Misusing or Overusing Color                   |
| #6: Introducing Meaningless Variety             | #13: Designing an Unappealing Visual Display       |
| #7: Using Poorly Designed Display Media         |  |

# Exceeding Boundary of a Single Screen

This sales dashboard fragments the data into many slices by requiring the viewer to select individual pieces without any means to see the whole.

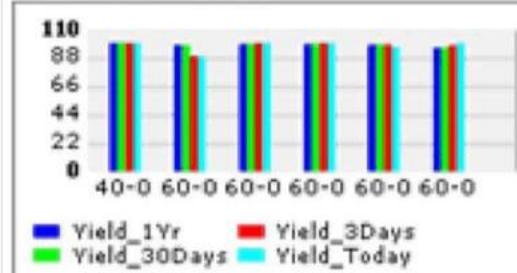


# Displaying Excessive Detail or Precision

Active Alert Messages		
Subject	Importance	Alert Activated
8/16/2003 Yield Drop in ESS on 60-00...	Normal	03/15/2004 17:10:08
8/16/2003 Yield Drop on 60-0001663 ...	High	03/15/2004 17:10:08
8/13/2003 Yield Drop in ESS on 60-0002000...	Normal	03/15/2004 17:10:01
8/13/2003 Critical Component Failure (60-0...	High	03/15/2004 17:10:00
8/13/2003 Impacted Boards for 11-0000040...	High	03/15/2004 17:09:59
8/1/2003 Yield Drop in ESS on 60-000...	Normal	03/15/2004 17:09:46

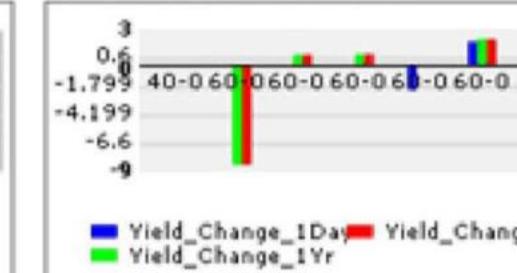
[Detail View](#)

Board Yield Barchart



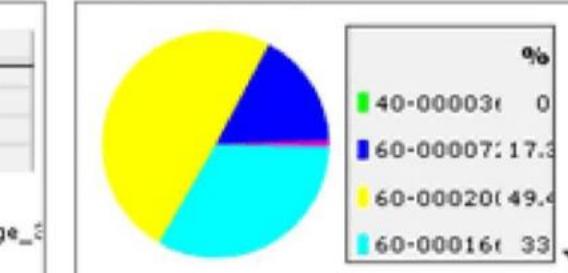
[Detail View](#)

Board Yield Change Barchart



[Detail View](#)

Tests Breakdown Pie

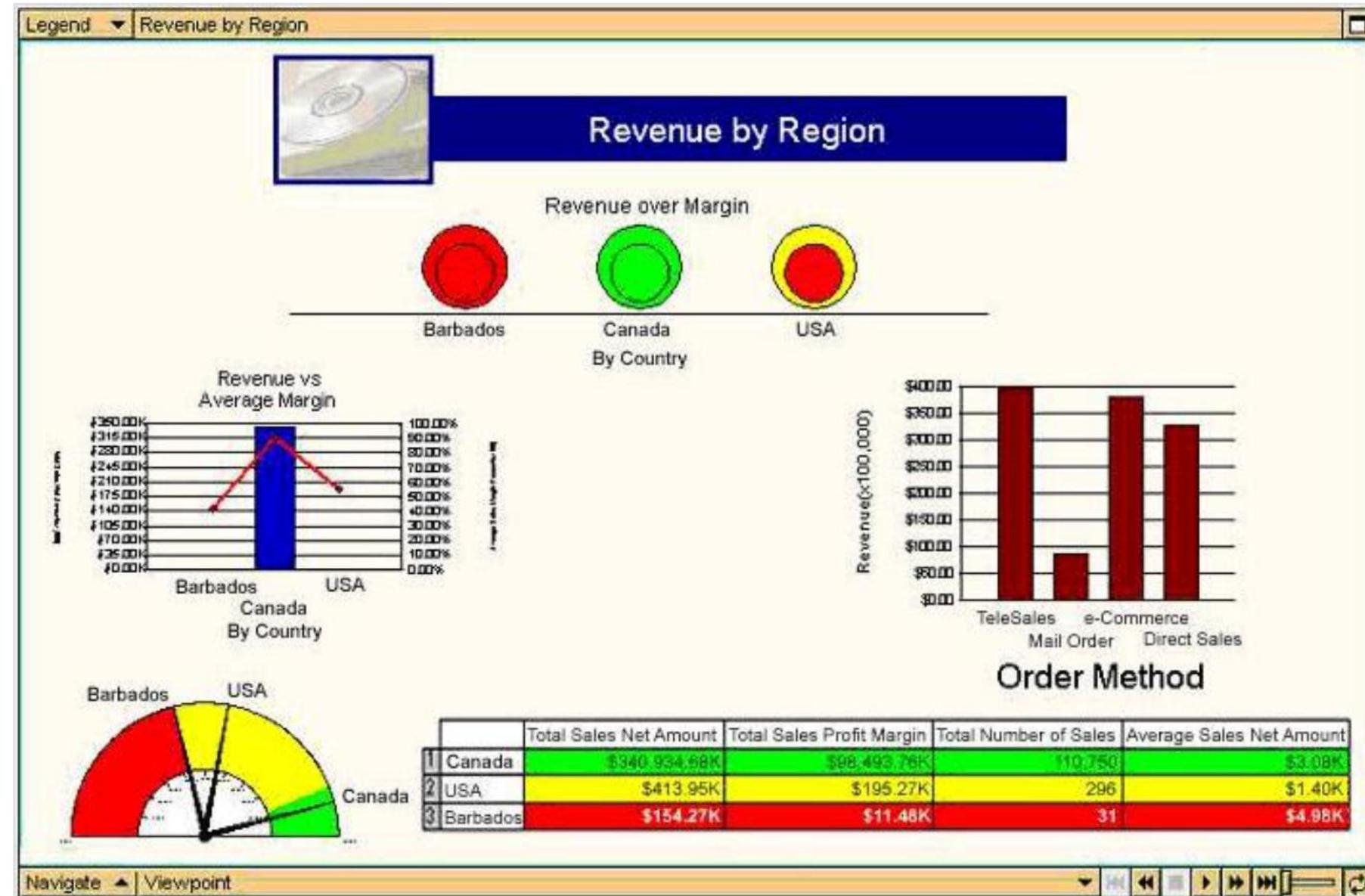


Board Yield Table Summary

PRODUCT_NUM	PRODUCT_DESC	YIELD_TODAY	YIELD... 100.0000000000	YIELD... 100.0000	YIELD... 100.0000	YIELD... 100.0000	YIELD... 0.0000	YIELD_CHAN... 0.0000000000	YIELD... 0.0000
40-0000364-05	PCBA,EROS,AP7420	100.0000000000	100.0000	100.0000	100.0000	0.0000	0.0000000000	0.0000	
60-0000720-01	ASSY,16 PORT CARD,SI,SW12000	89.4308943100	89.6000	98.0535	98.0535	-8.4535	-0.1691056900	-8.4535	
60-0001624-06	ASSY,CP,FULL LENGTH	100.0000000000	100.0000	99.1549	99.1549	0.8451	0.0000000000	0.8451	
60-0001663-03	ASSY, INNER BOX W/MB, SW3600	100.0000000000	100.0000	99.1111	99.1111	0.8889	0.0000000000	0.8889	

# Introducing meaningless variety

The display media on this dashboard appear to have been chosen for the sake of variety rather than based on clear choices of the most appropriate medium for each type of data



# Arranging the data poorly

MacroBridge Business Resources

My Analytics

My Business My KPIs

Add a page Delete this page Customize

Order Size\$ Sales Order Size Trend Count Profit Trends

Avg. Order Size \$ Online Sales Migrants from Active to Dormant

Alert Pareto of computer returns

Do Action... Show: Default View

Subject Date

Attrition of Collectors exceeds 4% Jun 6, 2001

Leavers have exceeded Joiners for Collectors Jun 6, 2001

Average fulfillment time has doubled for Collectible wines Jun 6, 2001

Revenue pipe for quarter 5% below target Jun 6, 2001

Large orders below plan Jun 6, 2001

Stocks at 5% of re-order level Jun 6, 2001

Profit trend information updated Nov 21, 2001

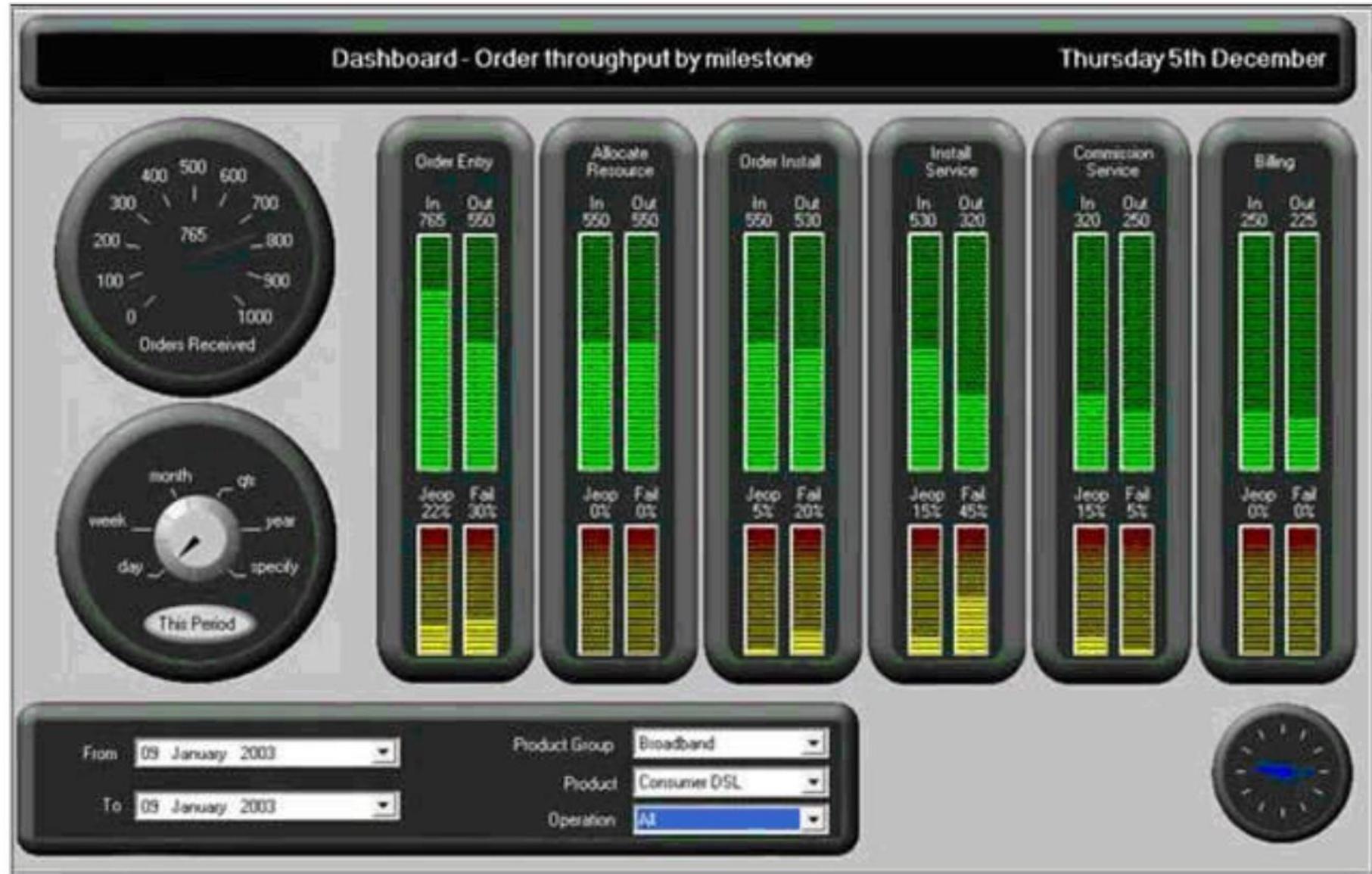
Leavers Trend increasing Nov 21, 2001

COMPUTERS RETURNS ACROSS MODELS

DESKTOP MODEL 1 DESKTOP MODEL 2 DESKTOP MODEL 3

A: Setup Difficulty - B: Not Easy to Use - C: Won't Print - D: Not Fast Enough - E: Wrong Manual  
F: Won't Start - G: Internet Inoperative - H: Missing Cord - I: Screen Small - J: Too Heavy  
K: Incompatible - O: Others

Cluttering the screen with useless decoration (i.e., chart junk)



# Designing an unappealing display



# **“Simplify, simplify, simplify!”**

- Henry David Thoreau

# In Class Tutorial

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Dashboard Actions in Tableau

# Dashboard Design

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# Determining a Dashboard Design

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Dashboards that communicate clearly, accurately, and efficiently are the result of careful and informed visual design. Given the purpose that dashboards serve, as defined above, they must be designed to support the following process of visual monitoring:

1. See the big picture.
2. Focus in on the specific items of information that need attention.
3. Quickly drill into additional information that is needed to take action.

# Fundamental Usage Requirements

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Feature	Requirement	Feature	Requirement
Update Frequency	Daily Hourly Real Time	Technology Platform	Desktop/laptop Web/Browser Mobile
User Expertise	Novice J Journeyman Expert	Screen type	Extra Large Standard Small Screens Variable
Audience Size	One person Multiple people (same req.) Multiple people (diff req.)	Data types	Quantitative Non-quantitative

# Dashboard Design Best Practices

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Organize information to support meaning and use.

Maintain consistency to enable quick and accurate interpretation.

Put supplementary information within reach.

Make the experience aesthetically pleasing.

Expose lower-level conditions.

Prevent excessive alerts.

Keep viewers in the loop.

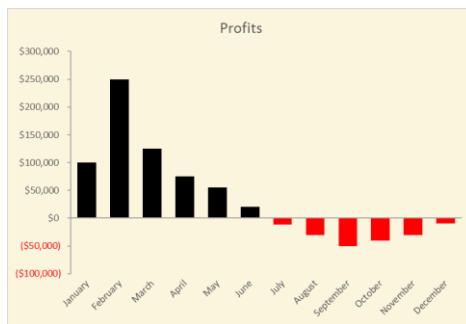
Accommodate real-time monitoring (when needed).

# Aesthetics

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Choose appropriate and meaningful colors.

- Use subdued colors over bright colors
- Use off-whites instead of stark whites in background



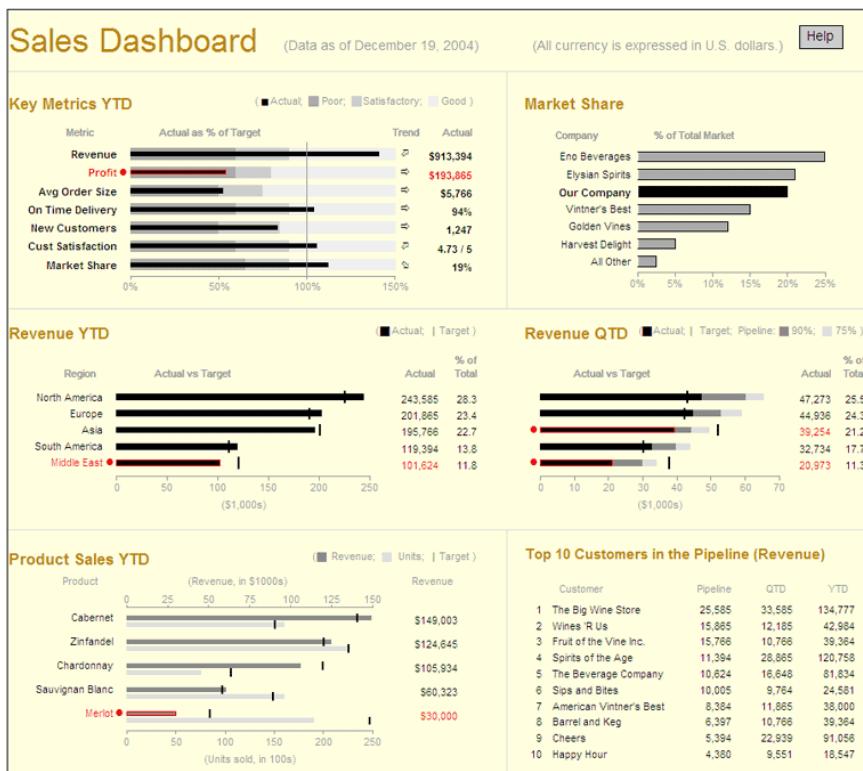
Use high-resolution text and images



University

# Aesthetics

Align content and follow good layout principles



Use a legible font

*Dear god, why does my computer come with Brush Script?! Oh, right: this is MS Word.*

# An Ideal Library of Graphs

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Bullet Graphs

Bar Graphs

Dot Plots

Line Graphs

Sparklines

Box Plots

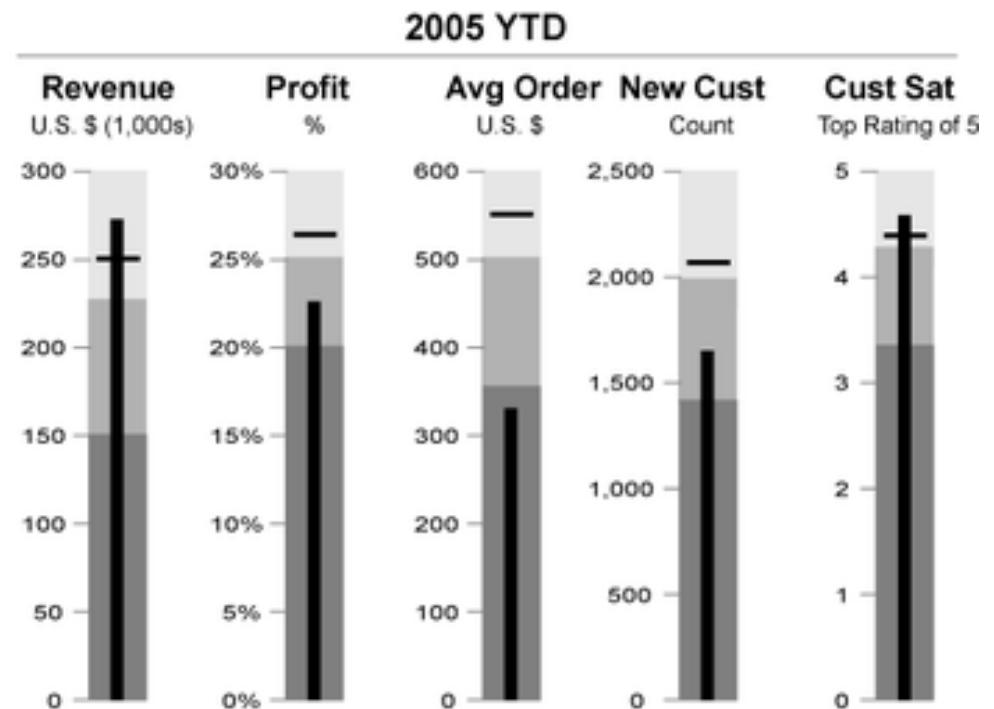
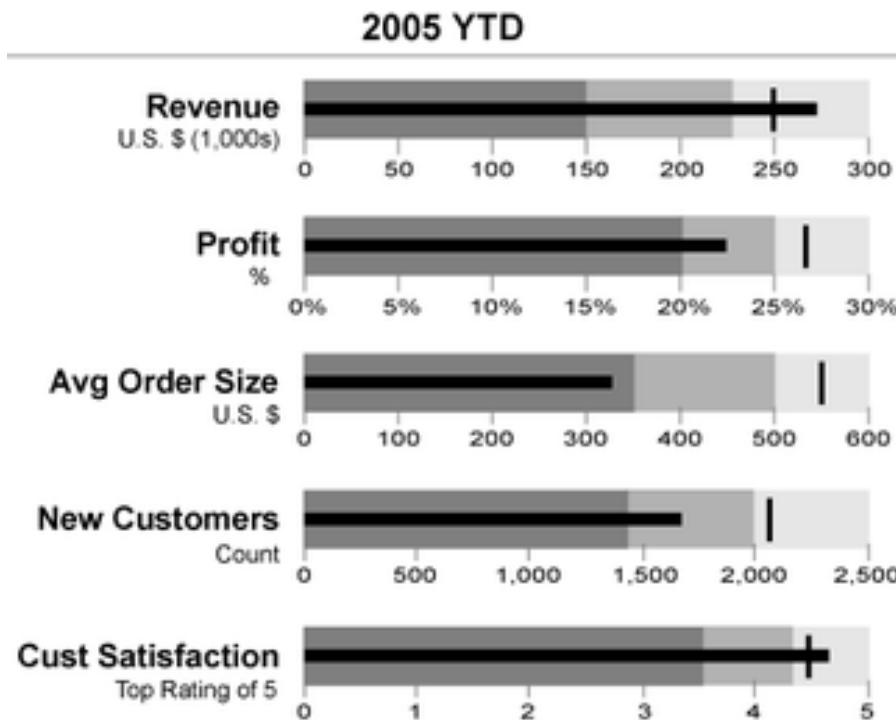
Spatial Maps

Heat maps

Tree Maps

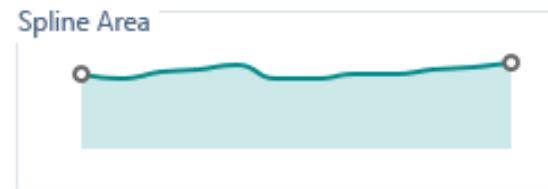
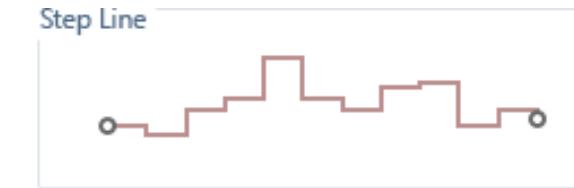
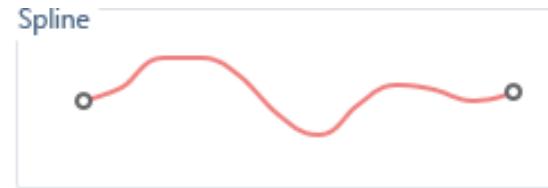
# Bullet Graphs

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# Sparklines

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# Sparklines

Closing Stock Prices, for last 120 trading-days

			19apr2012		08oct2012	low	high
Microsoft	MSFT	31.01		29.78	-4.0%	28.45	32.42
Intel	INTC	27.69		22.51	-18.7%	22.47	29.18
IBM	IBM	199.51		209.82	5.2%	183.09	210.59
Apple	AAPL	587.44		638.17	8.6%	530.12	702.10
Google	GOOG	599.30		757.84	26.5%	559.05	768.05
Amazon	AMZN	191.10		259.06	35.6%	188.24	261.68
Sirius XM	SIRI	2.24		2.67	19.2%	1.82	2.73
Panera Bread	PNRA	151.16		166.89	10.4%	136.45	173.10
Sony	SNE	16.70		11.91	-28.7%	11.07	16.83
Ford Motor Company	F	11.66		10.05	-13.8%	8.92	11.87
Netflix Inc	NFLX	107.09		73.52	-31.3%	53.80	107.09
WD-40 Company	WDFC	43.38		53.08	22.4%	43.38	53.47
Verizon	VZ	38.15		46.57	22.1%	38.15	47.26
Bank of America	BAC	8.77		9.28	5.8%	6.83	9.55
British Petroleum	BP	42.50		42.26	-0.6%	36.46	43.86
General Motors	GM	24.01		24.57	2.3%	18.80	24.80
Hewlett-Packard	HPQ	24.71		14.46	-41.5%	14.46	25.25
Time Warner	TWTC	21.28		27.22	27.9%	21.11	27.43
Duke Energy Corp	DUK	20.87		65.23	213%	20.87	68.69
Facebook	FB	38.23		20.40	-46.6%	17.73	38.23

Note: Each sparkline is independently auto-scaled.

# In Class Tutorial

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Sparklines, Bullet Graphs, and Layout

# Putting it all together

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## Lithuania Population (aged 15 years and older)

Economic activity: **Employed**

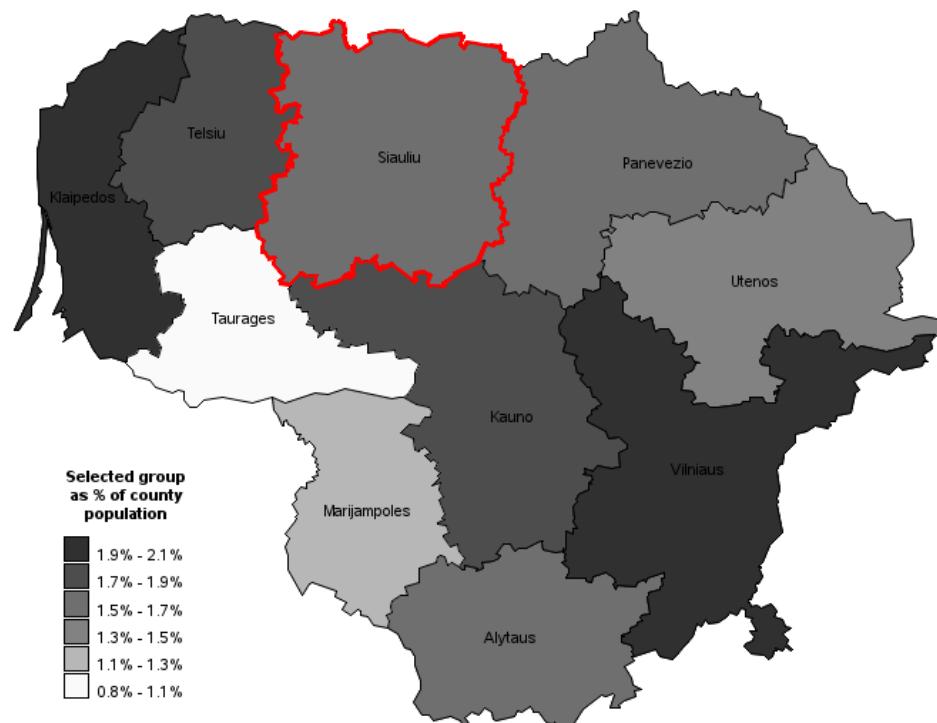
Gender: **Male**

Economic activity (subcategory): **Employees**

Age Bucket: **30-34**

County: **Siauli**

Area Type: **Urban areas**



### Selected group as % of county population

County	Selected group as % of county population	Number of Employees in county group	County group as % of total Lithuania group
Vilnius	2.1%	14,427	30.1%
Klaipeda	1.9%	5,876	12.3%
Kauno	1.8%	10,091	21.1%
Telsiu	1.7%	2,314	4.8%
Alytaus	1.6%	2,357	4.9%
Panevezio	1.6%	3,726	7.8%
<b>Siauli</b>	<b>1.5%</b>	<b>4,357</b>	<b>9.1%</b>
Utenos	1.4%	2,143	4.5%
Marijampoles	1.2%	1,760	3.7%
Taurages	0.8%	845	1.8%
<b>Total</b>		<b>47,896</b>	

■ Red color indicates the selected county, gender, area type, age bucket and economic activity.

Source: Department of Statistics to the Government of the Republic of Lithuania (Statistics Lithuania); data: population and housing census 2001; <http://www.stat.gov.lt/lit>

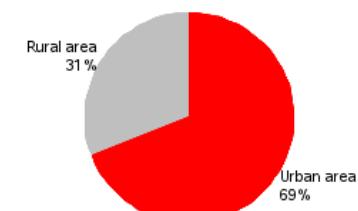
### Siauli county Males in Urban areas, age 30-34

Employed	Employees	4,357	52.0%
	Employers owners, with employees	285	3.4%
	Own-account workers, without employees	479	5.7%
	Family workers	19	0.2%
	Other employed	0	0.0%
	Not indicated (employed)	776	9.3%
Unemployed	Unemployed	1,694	20.2%
	Pupils, students	17	0.2%
	Pensioners	120	1.4%
	Homemakers	113	1.3%
Inactive	Other inactive	399	4.8%
	Not indicated (inactive)	0	0.0%
	Not indicated	124	1.5%
<b>Total</b>		<b>8,383</b>	

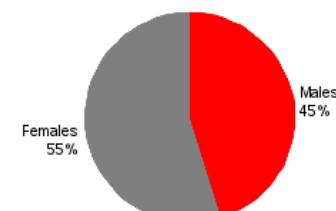
### Siauli county Employees in Urban areas, by age bucket and gender

Age Bucket	Female	Male	Total
	351	65+	
351	351	65+	280
794	794	60-64	1,006
2,480	2,480	55-59	2,468
4,033	4,033	50-54	2,848
4,945	4,945	45-49	3,505
6,330	6,330	40-44	4,636
5,947	5,947	35-39	4,513
5,236	5,236	30-34	4,357
4,548	4,548	25-29	4,053
2,451	2,451	20-24	2,651
190	190	15-19	390

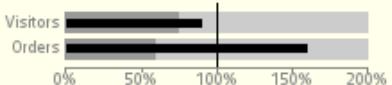
### Distribution by area type



### Distribution by gender



MTD Compared to Target

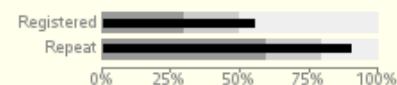


# Web Marketing Dashboard

Data as of 2:00 PM (PST), April 13, 2005

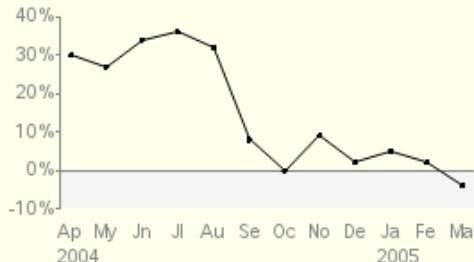
[Help](#)

Percent of Total Visitors Today

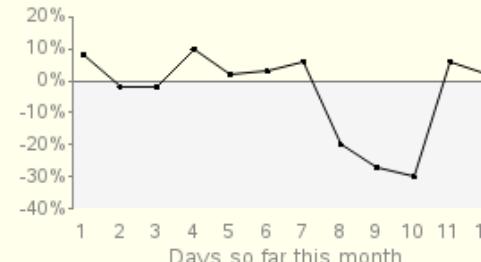


## Visitors

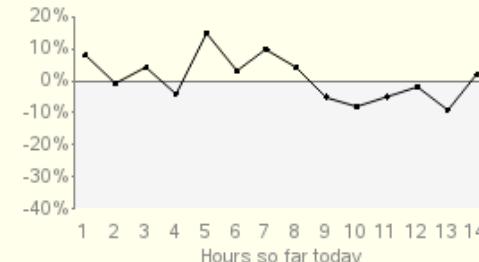
Last 12 months' average daily visitors deviation relative to same month in the prior year



This month's daily visitors deviation relative to 13-week running average for the same weekday



Today's hourly visitors deviation relative to 13-week running average for the same hour



## Products

Last 30 Days

Top 10 this Month by Revenue

Revenue %

Viewed %



0% 2% 4% 6% 8% 10% 12% 14% 16%

Top 10 products purchased together but not displayed together

% Product1

Product2

27%	Shirt - Oxford - White	Men's Pants - Chino - Tan
24%	Skirt - Pleated - Beige	Blouse - Business Dress - White
22%	Skirt - Business Casual - Black	Blouse - Business Dress - White
17%	Men's Pants - Dress - Black	Shirt - Fitted Dress - White
14%	Men's Pants - Chino - Beige	Shirt - Oxford - Blue
13%	Men's Pants - Dress w/ Cuffs - Blue	Shirt - Fitted Dress - White
12%	Women's Pants - Dress - Black	Blouse - Business Casual - White
11%	Dress - Summer Casual - White	Shoes - Sandals - White
10%	Women's Pants - Chino - White	Blouse - Business Casual - Blue
10%	Men's Pants - Outdoors - Brown	Shirt - Outdoors - Beige

## Referral Sites

Last 12 Months

Top 10 Referrers this Month

Referral Count

Referral % of Total

Since Yr Ago

Average Revenue \$



Top 10 products displayed together but rarely purchased together

% Product1

Product2

0%	Men's Pants - Dress - Blue	Shirt - Sport Tee - Black
0%	Skirt - Pleated - White	Women's Sweater - Casual - Brown
1%	Dress - Business Casual - Beige	Blouse - Business Dress - Black
1%	Women's Pants - Dress - Brown	Blouse - Business Casual - Black
1%	Dress - Summer Casual - White	Shoes - Pumps - Blue
1%	Men's Pants - Dress w/ Cuffs - Tan	Shirt - Fitted Dress - Blue
2%	Skirt - Dress - Black	Blouse - Business Casual - Black
2%	Dress - Formal - Blue	Shoes - Pumps - White
3%	Shirt - Fitted Dress - Blue	Men's Pants - Jeans - Blue
3%	Shirt - Sport Tee - Brown	Men's Pants - Jeans - Brown

## Finance Dashboard: August

Current Position	
Savings	25,020
Equity	142,720
Mortgage Principal	213,580

Current Month

Activity	Actual		Actual:Budget		Actual:Budget %					
	Actual	Budget	Variance	0	1000	2000	0%	100%	200%	300%
House Expense	1,927	1,924	3	0	1,000	2,000	0%	100%	200%	300%
Savings	1,000	1,000	0	0	1,000	2,000	0%	100%	200%	300%
Grocery	590	500	90	0	1,000	2,000	0%	100%	200%	300%
Car Expense	421	403	17	0	1,000	2,000	0%	100%	200%	300%
Dine Out	393	400	-7	0	1,000	2,000	0%	100%	200%	300%
Entertainment	221	200	21	0	1,000	2,000	0%	100%	200%	300%
Misc	100	-	100	0	1,000	2,000	0%	100%	200%	300%
Travel	98	400	-302	0	1,000	2,000	0%	100%	200%	300%
Interest	87	-	87	0	1,000	2,000	0%	100%	200%	300%
Bank Fees	11	9	2	0	1,000	2,000	0%	100%	200%	300%
Clothes	-	100	-100	0	1,000	2,000	0%	100%	200%	300%

c. Month Expenses

#	Expense Detail	0	500	1,000
1	Grocery	590	0	500
2	Condo Fees	440	0	500
3	Gas	267	0	500
4	Golf	221	0	500
5	Car Insurance	153	0	500
6	Pub Dining	132	0	500
7	Fast Food	128	0	500
8	Cable / Internet	110	0	500
9	ATM withdrawal	100	0	500
10	Car Rental	98	0	500
	others	254	0	500

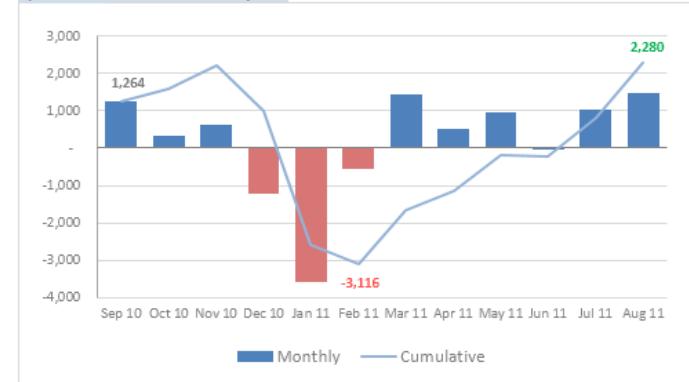
Savings Projection



p12 Months

Activity	12m trend		12m trend		Actual		Budget		Variance		Actual:Budget		Variance		Actual:Budget %	
	Actual	Budget	Actual	Budget	\$	\$	\$	\$	0	10	20	%	0%	100%	200%	300%
Savings	11,500	12,000	-500	0	11,500	12,000	-500	0	0	10	20	96%	0%	100%	200%	300%
Dine Out	8,864	4,800	4,064	0	8,864	4,800	4,064	0	0	10	20	185%	0%	100%	200%	300%
Entertainment	6,556	2,400	4,156	0	6,556	2,400	4,156	0	0	10	20	273%	0%	100%	200%	300%
Misc	5,635	-	5,635	0	5,635	-	5,635	0	0	10	20	100%	0%	100%	200%	300%
Travel	4,466	4,800	-334	0	4,466	4,800	-334	0	0	10	20	93%	0%	100%	200%	300%
Car Expense	3,839	4,839	-1,000	0	3,839	4,839	-1,000	0	0	10	20	79%	0%	100%	200%	300%
Grocery	3,682	6,000	-2,318	0	3,682	6,000	-2,318	0	0	10	20	61%	0%	100%	200%	300%
Clothes	1,875	1,200	675	0	1,875	1,200	675	0	0	10	20	156%	0%	100%	200%	300%
Interest	348	-	348	0	348	-	348	0	0	10	20	100%	0%	100%	200%	300%
Bank Fees	134	107	27	0	134	107	27	0	0	10	20	125%	0%	100%	200%	300%

p12 Months Residual Pay



p12M > Budget

#	Activity	Var.	0	2000	4000	6000
1	Entertainment	4,156	0	2000	4000	6000
2	Dine Out	4,064	0	2000	4000	6000
3	Clothes	675	0	2000	4000	6000
4	Interest	348	0	2000	4000	6000
5	House Expense	222	0	2000	4000	6000
		9,465	0	2000	4000	6000

Unbudgeted (misc)

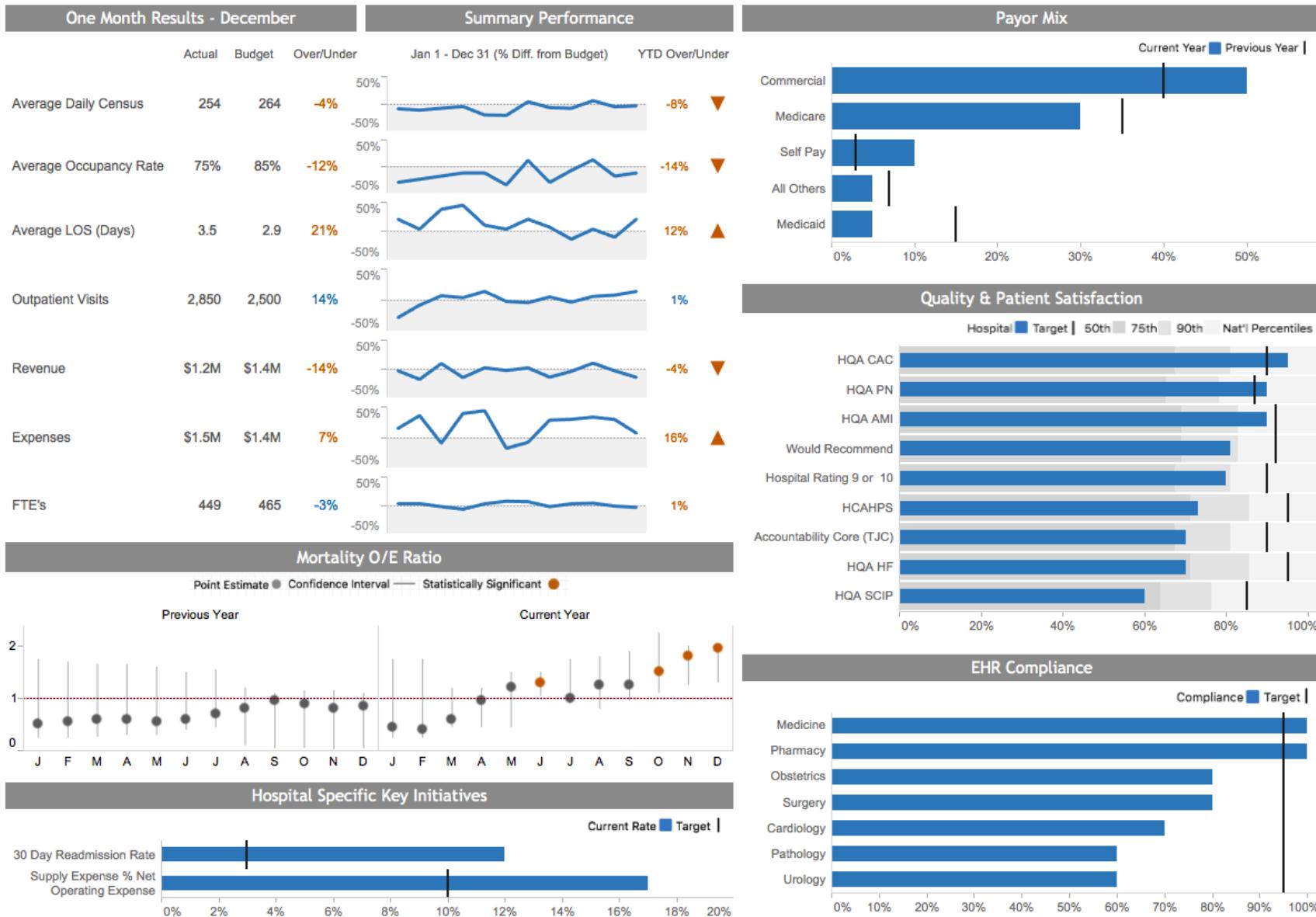
#	Activity	Var.	0	2000	4000	6000
1	ATM withdrawal	4,689	0	2000	4000	6000
2	Mortgage Payment	676	0	2000	4000	6000
3	Books	201	0	2000	4000	6000
4	Dry Cleaning	37	0	2000	4000	6000
5	Tools	32	0	2000	4000	6000
		5,635	0	2000	4000	6000

p12M < Budget

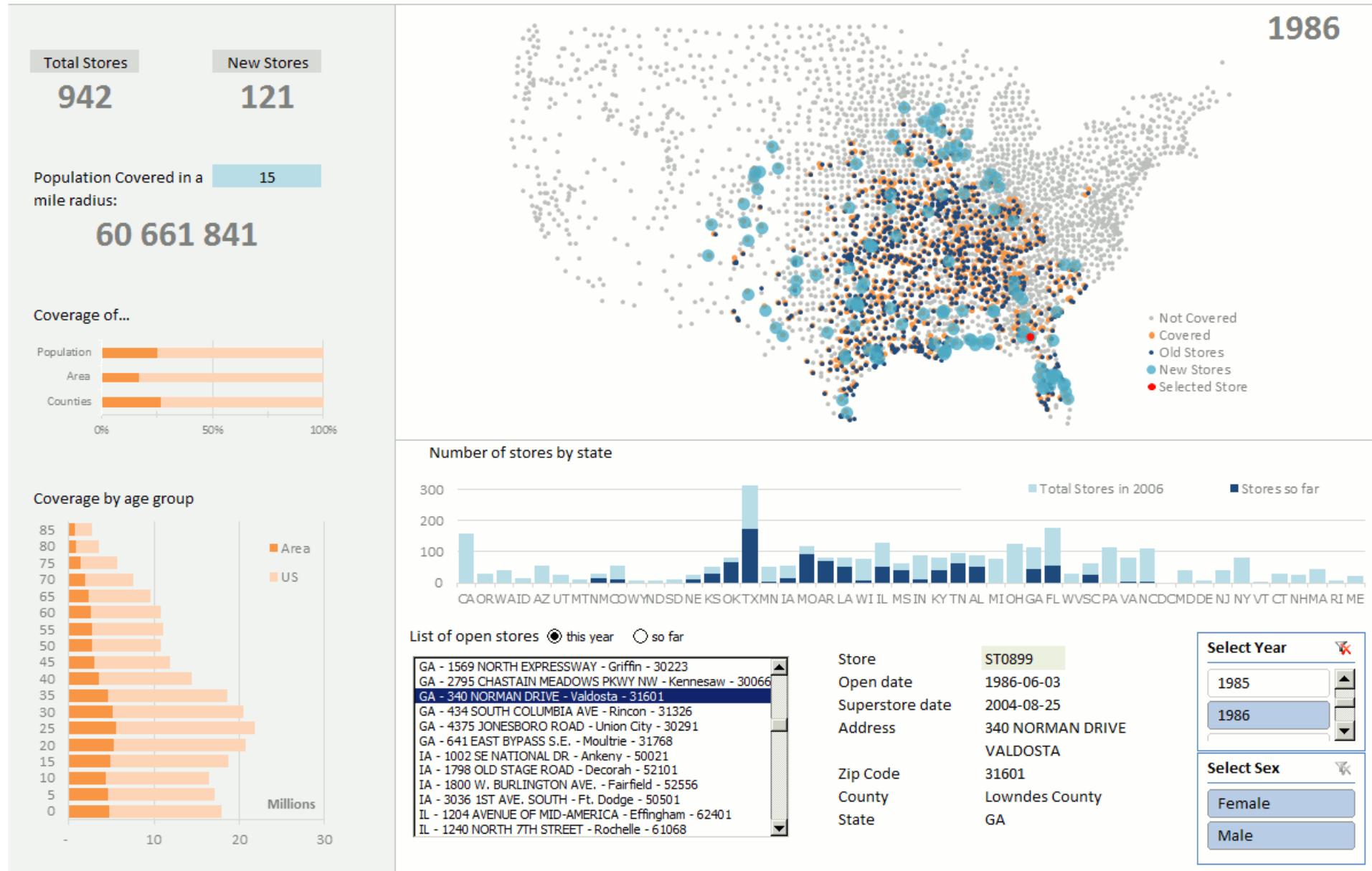
#	Activity	Var.	0	1000	2000	3000
1	Grocery	2,318	0	1000	2000	3000
2	Car Expense	1,000	0	1000	2000	3000
3	Savings	500	0	1000	2000	3000
4	Travel	334	0	1000	2000	3000
		4,152	0	1000	2000	3000

# Hospital CEO

## YTD Performance: January 1 to December 31



# Growth of Walmart and Population Coverage



# Dashboard Case Study 1

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## Perceptual Edge Dashboard Competition 2012

Create a dashboard for classroom/student data, which includes behavior, aptitude, and achievement information for students in a single high school mathematics class.

See <https://www.perceptualedge.com/blog/?p=1308> for description and link to data file.

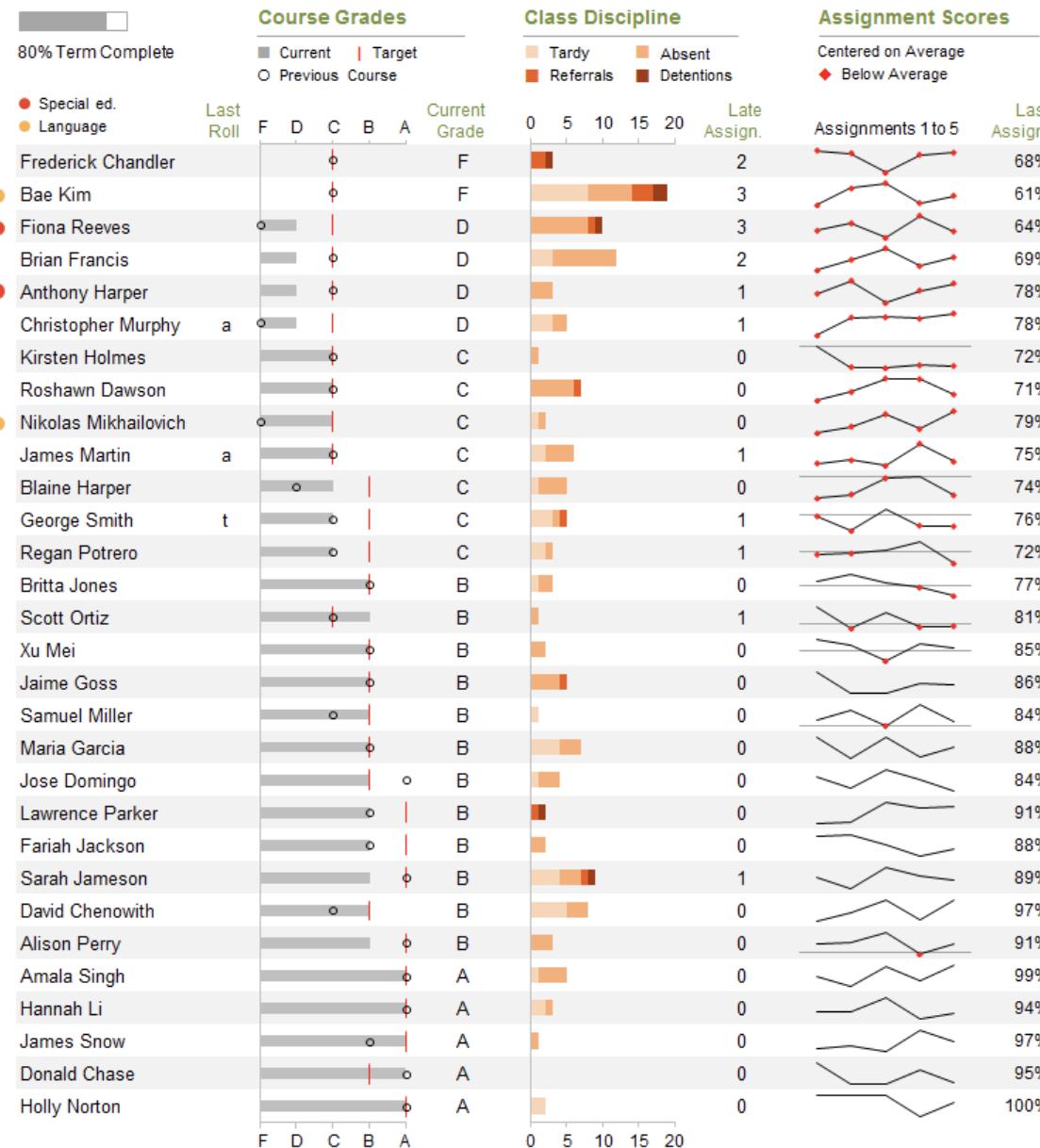
See <https://www.perceptualedge.com/blog/?p=1374> for results and Few's discussion of the entries.

May 1, 2012  
Tuesday

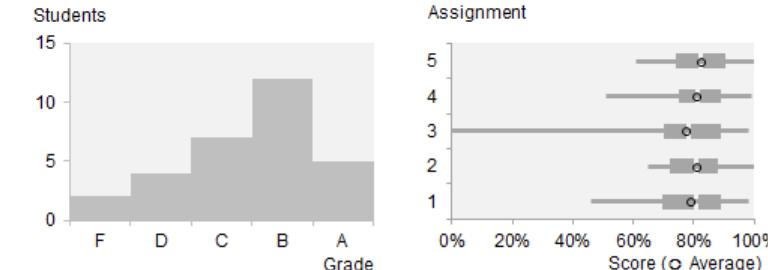
## Grade 10 Algebra Course

Note: All scores are expressed as percentage of points earned out of the total points possible.

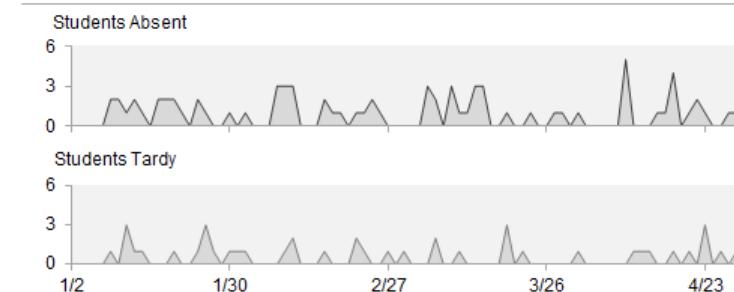
[HELP](#)



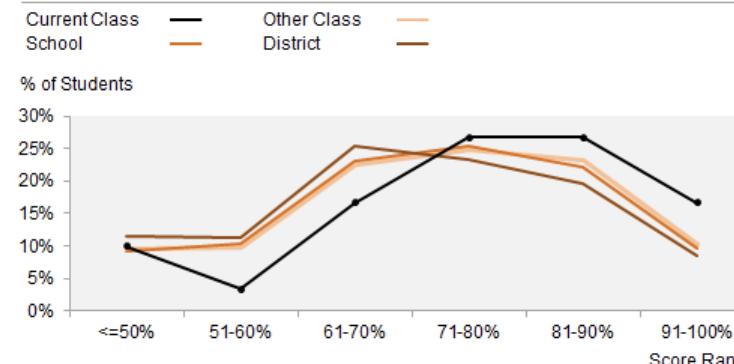
### Grade and Assignment Score Distribution



### Attendance (excluding weekends)



### Standardized Math Assessment Score Distribution



### Standardized Math Assessment Median Score

Current Class	Other Class	School	District
79.0%	77.4%	74.2%	71.9%

Class: Algebra 1 May 1st, 2012	Current grade	Target grade	Previous year	Last 5 yrs Standardized Math Assesments	Last 5 assignments	Assignments Completed Late	Days tardy / Days absent						Disc. referrals	Detentions	Class comparisions	
	●	●	●	●	●	●	●	○	+○	+	+	⊕○○	8/6	●	●	
Bae Kim*	●	●	●	39%	● ● ● ● ●	● ● ● ● ●	○○	○	+○ ○+○	+	+	⊕○○○	8/6	●	●	Latest standardized math assessment median score 40% 50% 60% 70% 80% 90% 100%
Frederick Chandler	●	●	●	41%	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	●	●	●	●	● ● ● ○○○	0/0	● ● ●	● ●	
Fiona Reeves†	●	●	●	47%	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	+	● +	●	●	● + +	0/8	● ●	●	This class My other class School District
Christopher Murphy	●	●	●	55%	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	+	● ○	● ○	● ○	● + + +	3/2			
Anthony Harper†	● ●	● ●	● ●	62%	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	●	●	●	●	● + + +	0/3			% of students with the following math assessment scores 40% .....
Brian Francis	● ●	● ●	● ●	67%	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	●	● +	● +	● +	● + + + ○	3/9			
Regan Potro	● ●	● ●	● ●	67%	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ○	● ○	●	●	● +	2/1			30%
Blaine Harper	● ●	● ●	● ●	71%	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	++	● +	● ○	● +	● + + +	1/4	●	●	
George Smith	● ●	● ●	● ●	76%	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ○	● +	● ○	● ○	● + + +	3/1	● ●	●	20%
Nikolas Mikhailovich*	● ●	● ●	● ●	63%	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	●	●	● ○	● ○	● + + +	1/1			
Kirsten Holmes	● ●	● ●	● ●	67%	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	●	●	● +	● +	● + + +	0/1	●		10% .....
James Martin	● ●	● ●	● ●	71%	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ○	● ○	● ○	● ○	● + + +	2/4			
Roshawn Dawson	● ●	● ●	● ●	78%	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● + +	● + +	● + +	● + +	● + + + +	0/6	● ●		10% .....
Sarah Jameson	● ●	● ●	● ●	78 %	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ○	● +	● ○	● +	● + + + ○	4/3	● ●	●	
Lawrence Parker	● ●	● ●	● ●	80%	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	●	●	●	●	● + + +	0/0	● ●	●	10% .....
Fariah Jackson	● ●	● ●	● ●	84%	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	●	●	●	●	● + + +	0/2			
Alison Perry	● ●	● ●	● ●	85%	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	●	●	●	●	● + + +	0/3			10% .....
Maria Garcia	● ●	● ●	● ●	72%	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ○	● ○	● +	● ○	● + + +	4/3	● ●	●	
David Chenowith	● ●	● ●	● ●	80%	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● + ○	● ○	● + ○	● ○	● + + +	5/3	●		10% .....
Samuel Miller	● ●	● ●	● ●	81%	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	●	●	●	●	● + + +	1/0			
Jaime Goss	● ●	● ●	● ●	82%	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● +	● +	● +	● +	● + + +	0/4	● ●	●	10% .....
Xu Mei	● ●	● ●	● ●	83%	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● +	● +	● +	● +	● + + +	0/2			
Jose Domingo	● ●	● ●	● ●	84%	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ○	● +	● +	● +	● + + +	1/3			10% .....
Britta Jones	● ●	● ●	● ●	85%	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ○	● +	● +	● +	● + + +	1/2			
Scott Ortiz	● ●	● ●	● ●	82%	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	●	●	●	●	● + + +	0/1			10% .....
Amala Singh	● ●	● ●	● ●	91%	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ○	● +	● +	● +	● + + +	1/4	●		
James Snow	● ●	● ●	● ●	91%	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	●	●	●	●	● + + +	0/1			10% .....
Hannah Li	● ●	● ●	● ●	94%	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● +	● +	● +	● +	● + + +	2/1			
Holly Norton	● ●	● ●	● ●	98%	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	● ○	● ○	● ○	● ○	● + + +	2/0			10% .....
Donald Chase	● ●	● ●	● ●	92%	● ● ● ● ●	● ● ● ● ●	● ● ● ● ●	●	●	●	●	● + + +	0/0	●	●	

\* No english language proficiency    † Special education

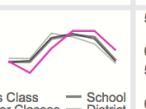
Note: Assessment and assignment scores are being expressed as the percentage of points that were earned out of the total points possible.

## First Period: Algebra 1

As of May 1, 2012 (80% complete)

Help

Student		Overall Course Grade		Assignments						Assessments		Attendance				Behavior		
		YTD	Spread	50%	Last	100%	Late	Last 5	Last	February	March	April	May	Ref	Det			
Bae Kim	E	F	●	X	59				3		39		3	2				
Fiona Reeves	S	D	X	●	65				3		47		1	1	1			
Brian Francis		D	●	X	65				2		67							
Frederick Chandler		F	●	X	66				2		41		2	2	1	1		
Anthony Harper	S	D	●	X	69				1		62							
Christopher Murphy		D	X	●	70				1		55							
Kirsten Holmes		C	●	X	72						67		1					
Nikolas Mikhailovich	E	C	X	●	72						63							
Roshawn Dawson		C	●	X	72						78		1	1				
James Martin		C	●	X	74				1		71							
Blaine Harper		C	X	●	75						71		1	1				
George Smith		C	X	●	78				1		76		1	1	1			
Regan Potro		C	X	●	79				1		67							
Britta Jones		B	●	X	81						85							
Scott Ortiz		B	X	●	82				1		82							
Xu Mei		B	●	X	83						83							
Jaime Goss		B	●	X	84						82		1	1	1			
Samuel Miller		B	X	●	84						81							
Maria Garcia		B	●	X	86						72		2	1				
Jose Domingo		B	●	X	86						84							
Lawrence Parker		B	●	X	87				1		80		1	1				
Fariah Jackson		B	●	X	88						84							
Sarah Jameson		B	●	X	88				1		78		1	1	1			
David Chenowith		B	X	●	88						80		1					
Alison Perry		B	●	X	89						85							
Amala Singh		A	●	X	92						91		1					
Hannah Li		A	●	X	94						94							
James Snow		A	X	●	94						91							
Donald Chase		A	●	X	94						92		1	1				
Holly Norton		A	●	X	98						98							

S = Special Ed student  
E = English language deficiency

(link)

# Dashboard Case Study 2

## Executive Sales Dashboard (Chapter 5 – Big Book of Dashboards)

