Business Dashboard Fundamentals

Ben Sullins
bensullins.com
@bensullins

Course Outline

Visual Perception

Planning

Building in Excel

Common Charts

Design

Building in Tableau

Overview

- **Visual Perception Exercises**

- **Dashboard Examples**

- **Why stats aren't enough**

- **How to make data beautiful**

- **Eliminating Chart Junk (exercise)**

Visual Perception

" Beauty is about perception, not about make-up "

Kevyn Aucoin

(makeup artist / photographer)

Count How Many Times the Number "5" Appears

9873497902756479028947286240924060370705 70279072
8032080290073025012702370083740820787202 72007083
2478026027037937757090707377970667462097094702780
9279797097230972309795927509272979873497 2608027

Now Count the Number of Times "5" Appears in the Same Set of Numbers

9873497902756479028947286240924060370705702790728032080290073025012702370083740820787202720070832478026027037937570970737970667462097094702780927979709723097230979592750927279798734972608027

Attentive Processing

98734979027564790289472862409240603707057 0279072
80320802900730250127023700837408207872027 2007083
24780260270379377570970737797066746209709 4702780
92797970972309723097959275092727979873497 2608027

Pre-attentive Processing

9873497902**5**64790289472862409240603707057**5**0279072
80320802900730**5**0127023700837408207872027 2007083
24780260270379377**5**70970737797066746209709 4702780
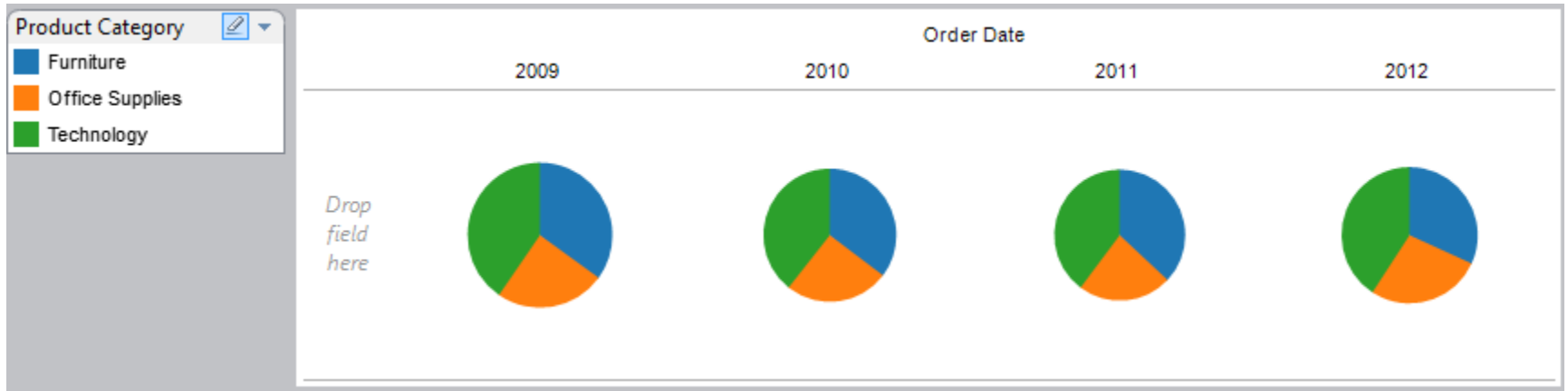9279797097230972309795927**5**092727979873497 2608027
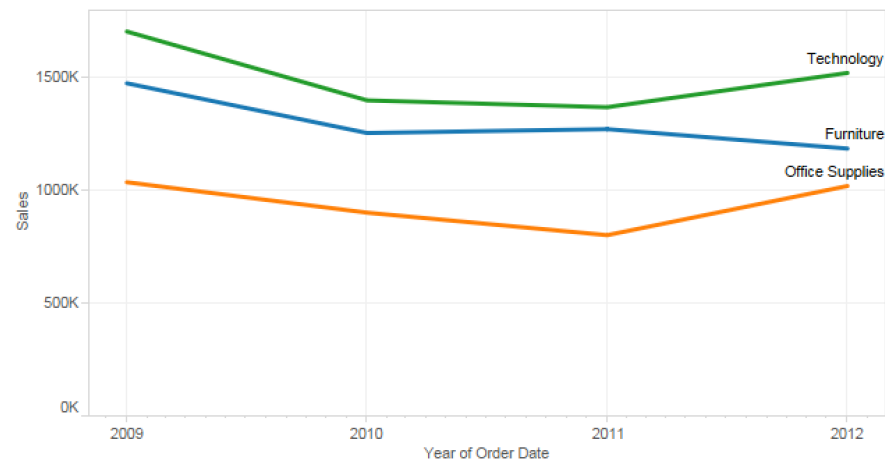
Which Product Categories Are Trending Up?
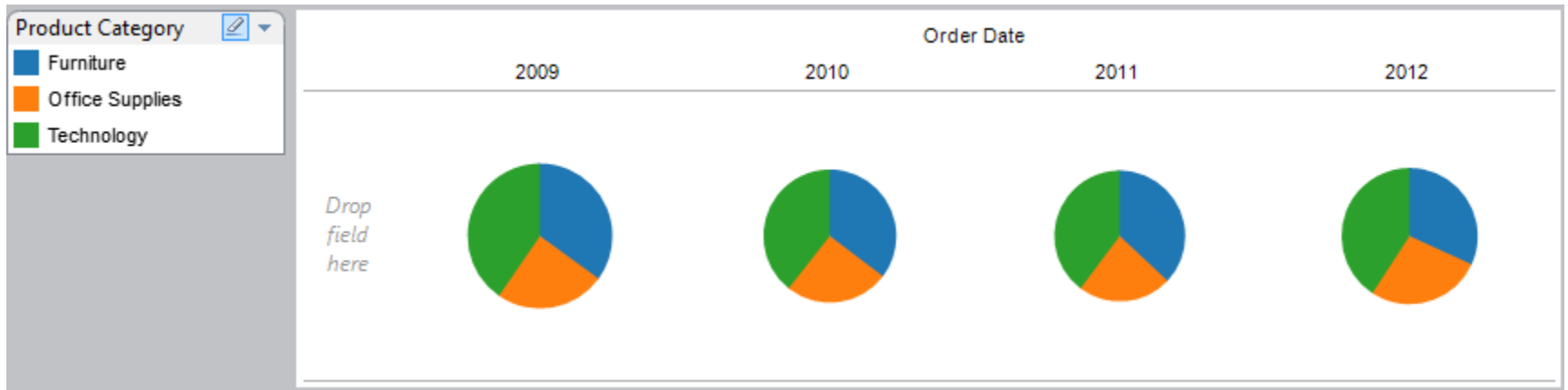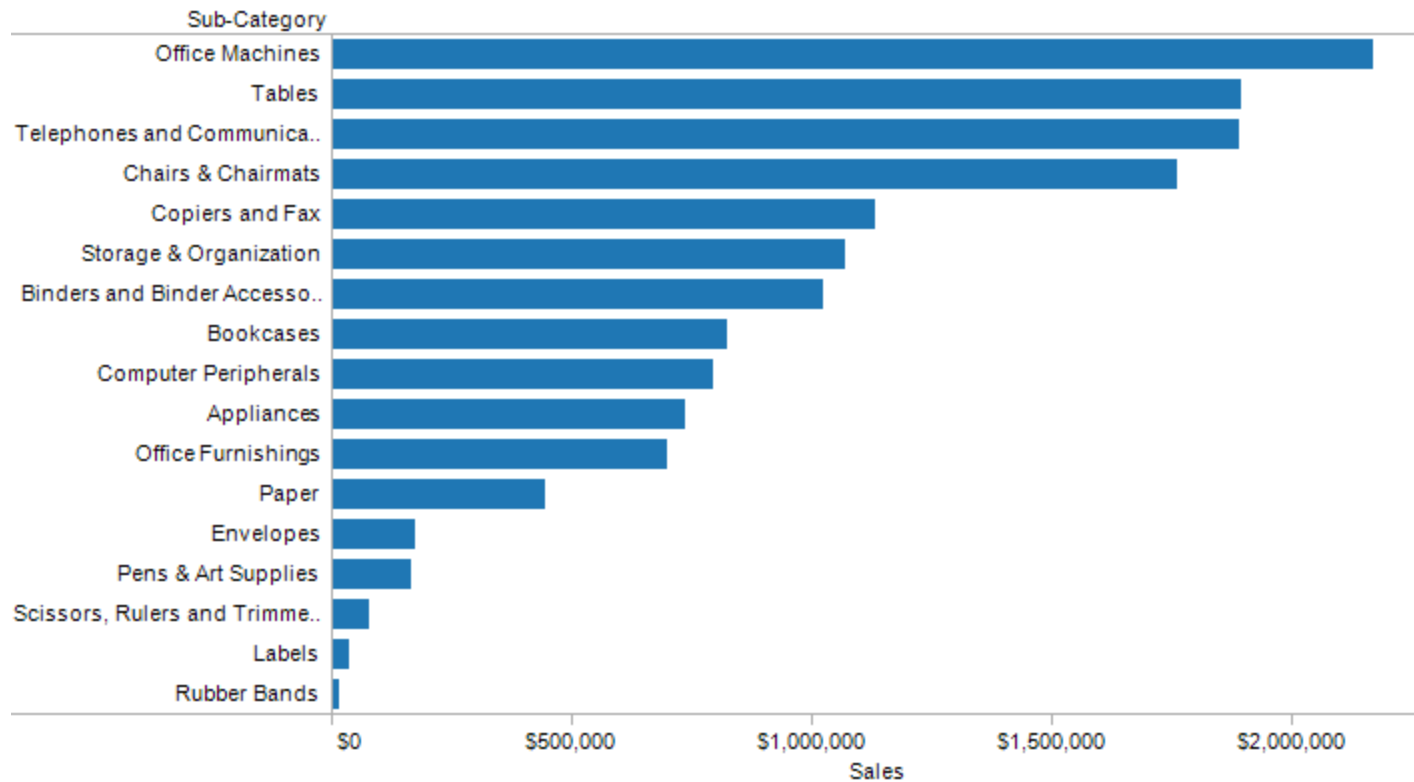
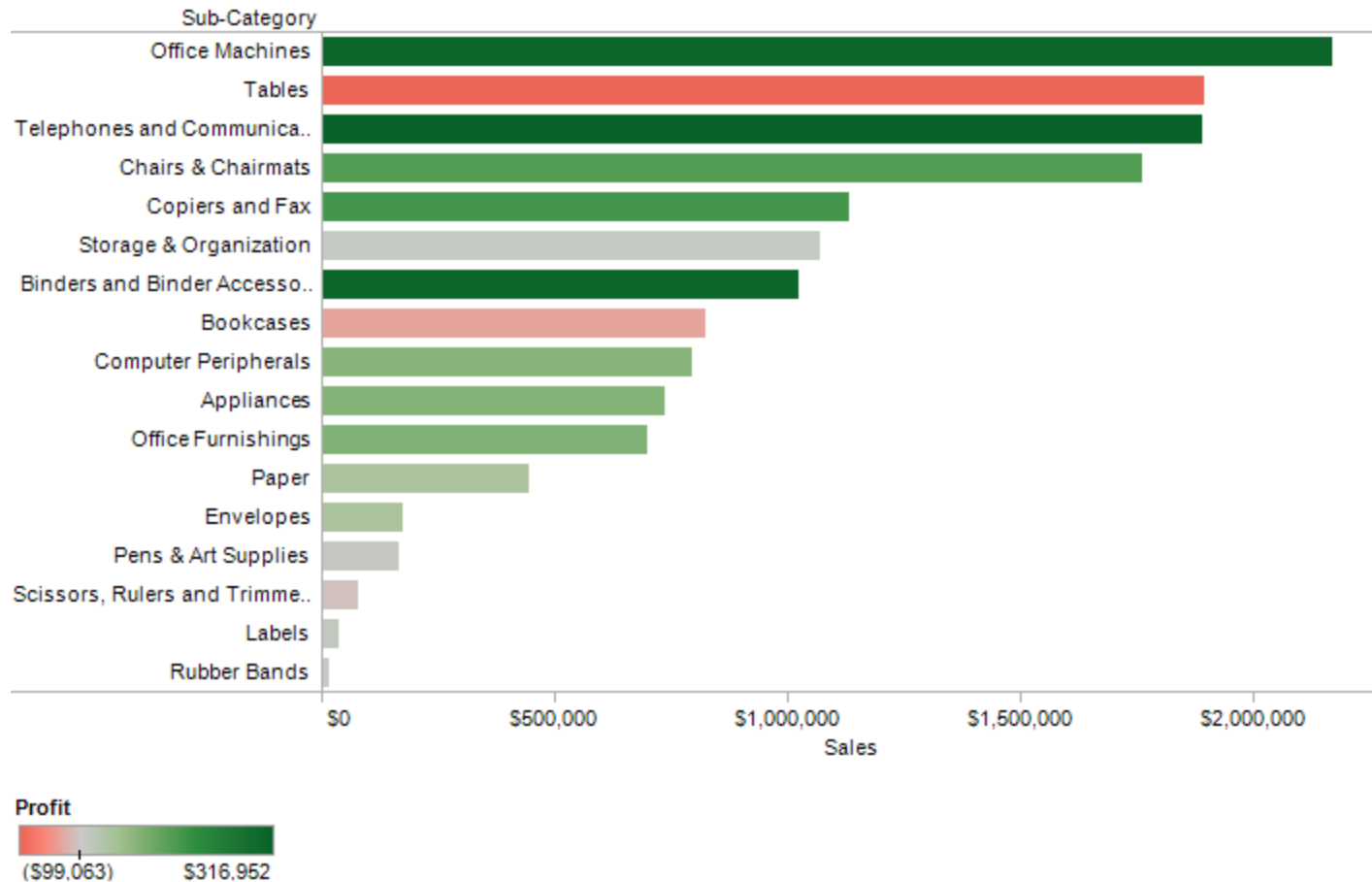# Which Product Categories Are Trending Up?
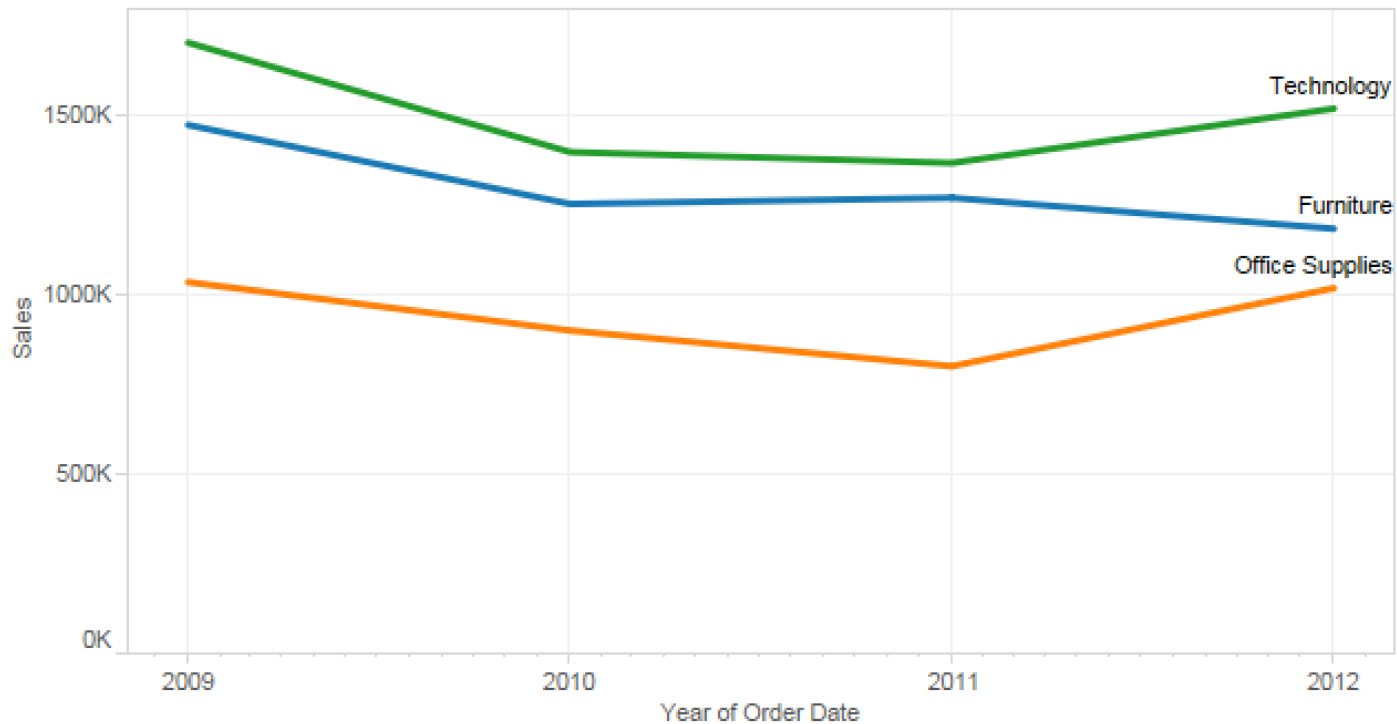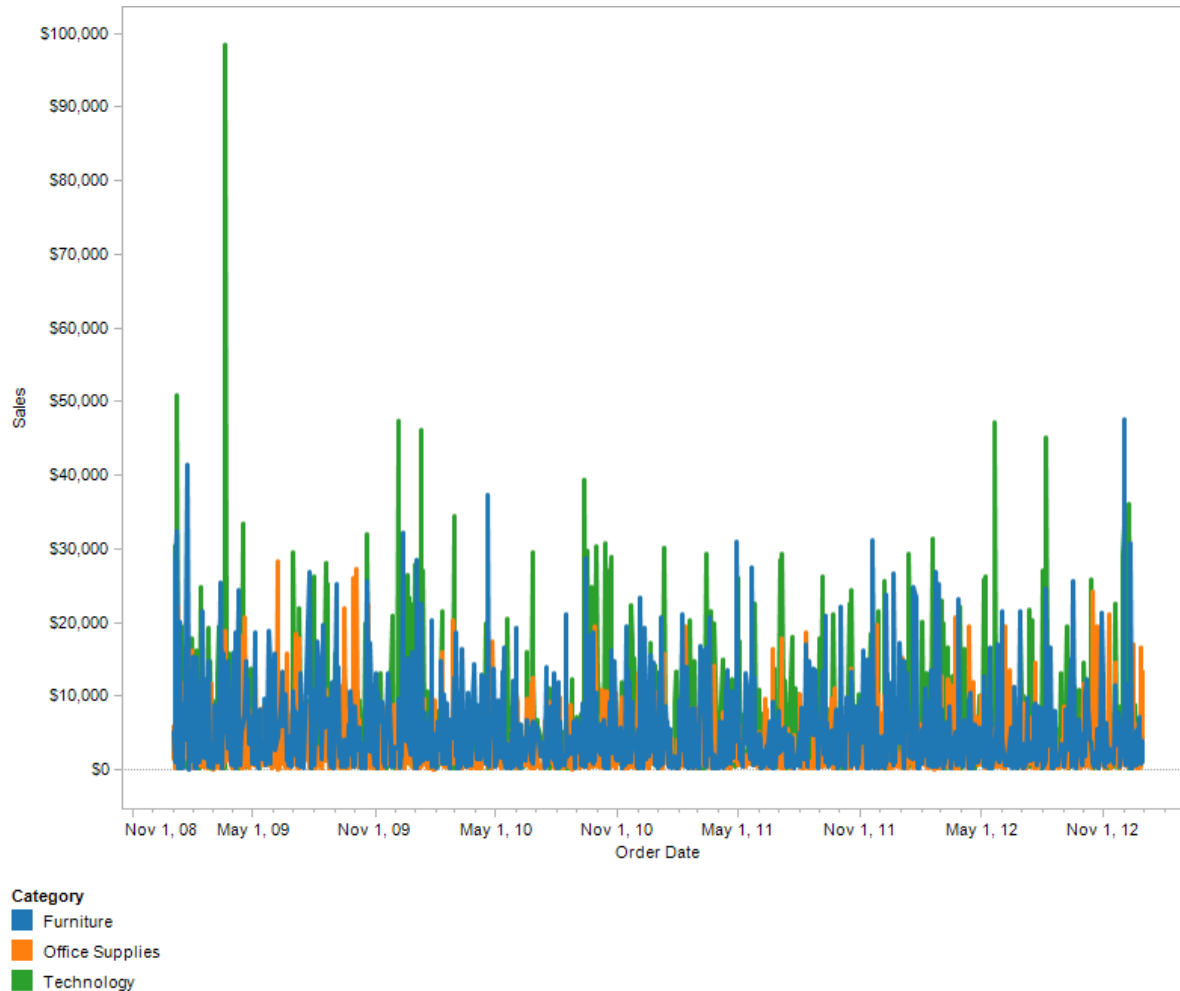
Attentive

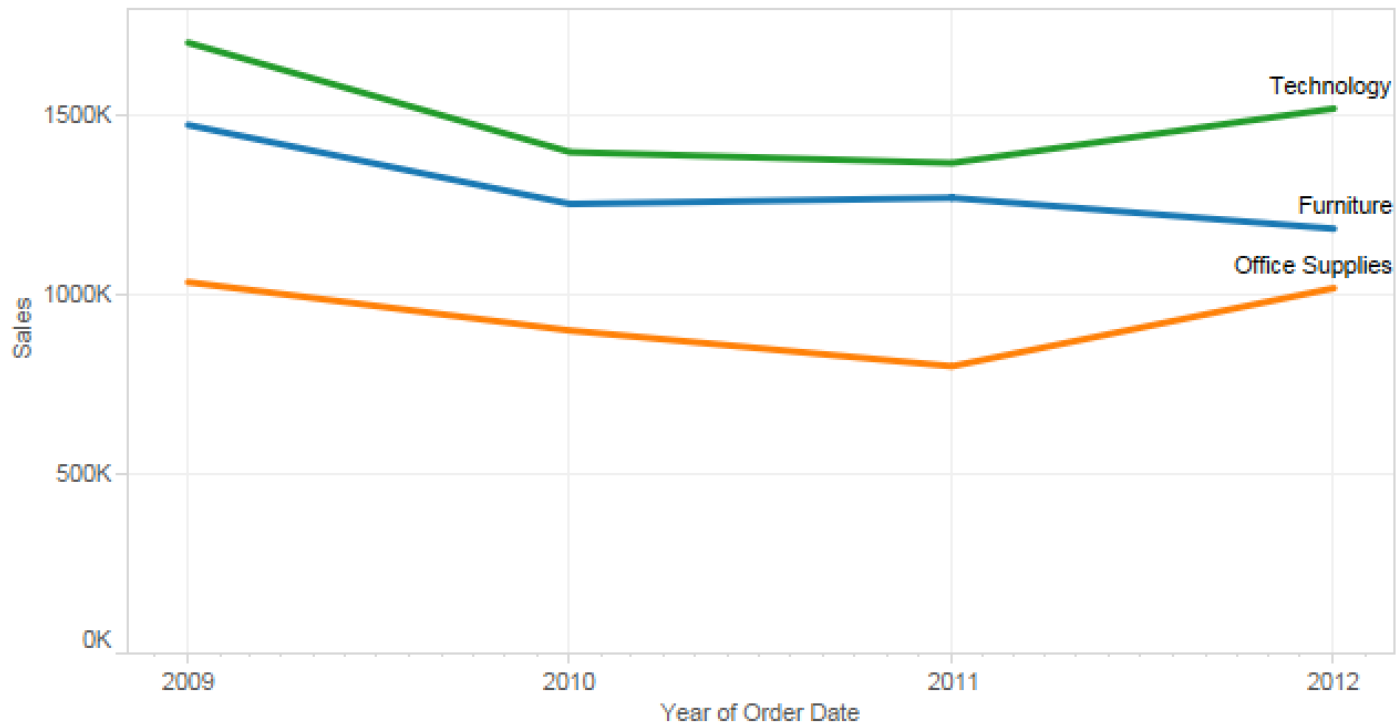# Pre-attentive

What Are Our Best Product Sub-categories?

What Are Our Best Product Sub-categories?

Which Product Categories Are Doing Good This Year?

Which Product Categories Are Doing Good This Year?

Dashboard Examples

Cognos

Microstrategy

Housing's Rise and Fall in 20 Cities

If you bought an average home in [San Diego ▾] around **October, 2005** it would be worth **30% less today**

05   06   07   08   09   10   11   12   13

October, 2005

-30%
San Diego
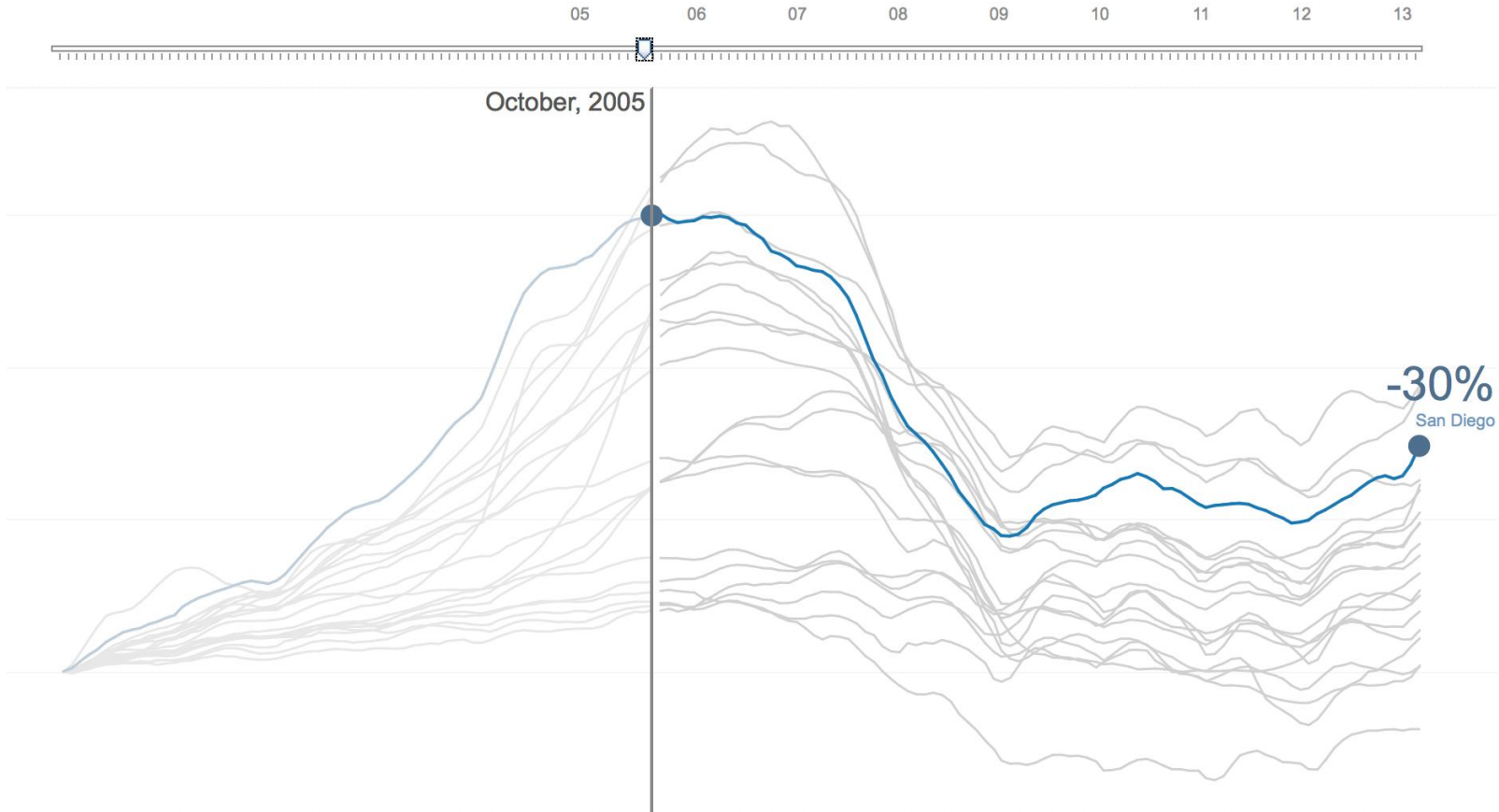
The Data

The S&P/Case-Shiller Home Price Indices are the leading measures of U.S. residential real estate prices, tracking changes in the value of residential real estate both nationally as well as in 20 metropolitan regions.
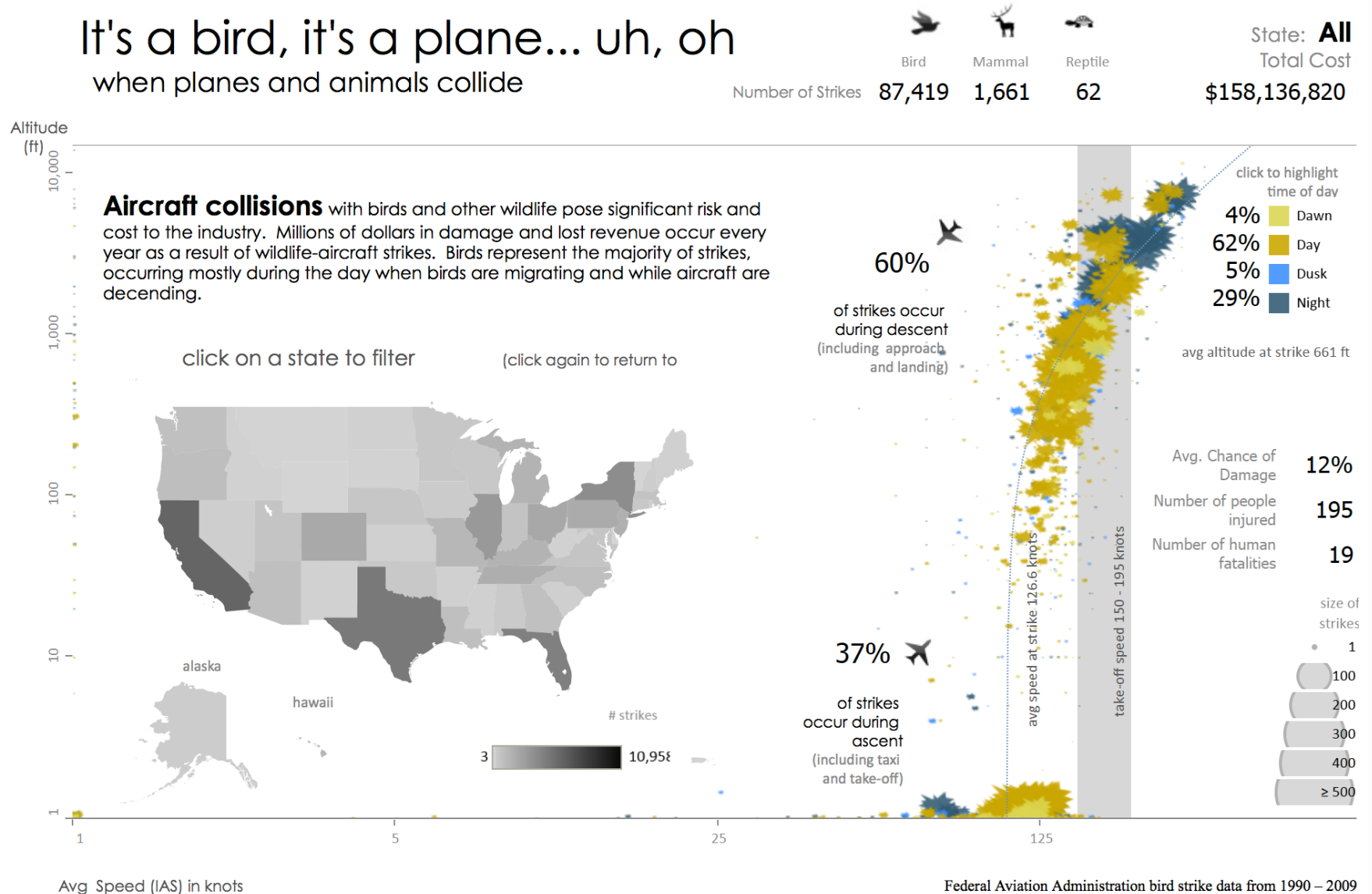
S&P DOW JONES INDICES
McGRAW HILL FINANCIAL

dashboards by **VizCandy**

http://vizcandy.blogspot.com/2013/07/replicating-new-york-times-d3js-chart.html

Oracle PeopleSoft

It's a bird, it's a plane... uh, oh
when planes and animals collide

	Bird	Mammal	Reptile	State: **All**
				Total Cost
Number of Strikes	**87,419**	**1,661**	**62**	**$158,136,820**

Aircraft collisions with birds and other wildlife pose significant risk and cost to the industry. Millions of dollars in damage and lost revenue occur every year as a result of wildlife-aircraft strikes. Birds represent the majority of strikes, occurring mostly during the day when birds are migrating and while aircraft are decending.

click on a state to filter   (click again to return to

alaska

hawaii

strikes

3 ▭▬▬▬▬ 10,958

60%

of strikes occur during descent
(including approach and landing)

37%

of strikes occur during ascent (including taxi and take-off)

click to highlight time of day

4%	Dawn
62%	Day
5%	Dusk
29%	Night

avg altitude at strike 661 ft

Avg. Chance of Damage	**12%**
Number of people injured	**195**
Number of human fatalities	**19**

size of strikes

●	1
◯	100
◯	200
◯	300
◯	400
◯	≥ 500

avg speed at strike 126.6 knots

take-off speed 150 - 195 knots

Altitude (ft): 10,000 / 1,000 / 100 / 10 / 1

Avg Speed (IAS) in knots: 1 / 5 / 25 / 125

Federal Aviation Administration bird strike data from 1990 – 2009

http://vizcandy.blogspot.ca/p/tableau-8-redoux.html

Business Objects

QlickView

Provider Search

Range of Charges (select to filter map)

$96.8K $929.1K

Cost by Zip in CA (select to see providers)

Nevada

Utah

California

Arizona
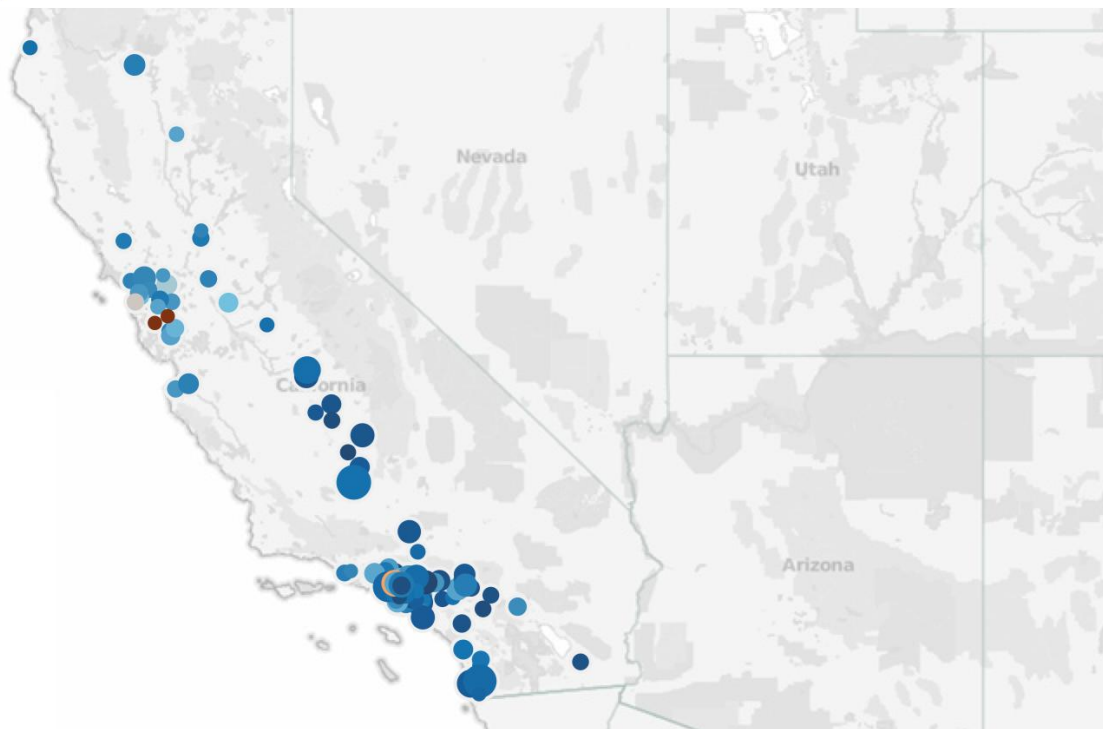
About Tableau maps: www.tableausoftware.com/mapdata

src: http://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Medicare-Provider-Charge-Data/index.html

http://bensullins.com

Why stats aren't enough

Data

I		II		III		IV	
x	y	x	y	x	y	x	y
10.0	8.04	10.0	9.14	10.0	7.46	8.0	6.58
8.0	6.95	8.0	8.14	8.0	6.77	8.0	5.76
13.0	7.58	13.0	8.74	13.0	12.74	8.0	7.71
9.0	8.81	9.0	8.77	9.0	7.11	8.0	8.84
11.0	8.33	11.0	9.26	11.0	7.81	8.0	8.47
14.0	9.96	14.0	8.10	14.0	8.84	8.0	7.04
6.0	7.24	6.0	6.13	6.0	6.08	8.0	5.25
4.0	4.26	4.0	3.10	4.0	5.39	19.0	12.50
12.0	10.84	12.0	9.13	12.0	8.15	8.0	5.56
7.0	4.82	7.0	7.26	7.0	6.42	8.0	7.91
5.0	5.68	5.0	4.74	5.0	5.73	8.0	6.89

Stats

Property	Value
Mean of x in each case	9 (exact)
Variance of x in each case	11 (exact)
Mean of y in each case	7.50 (to 2 decimal places)
Variance of y in each case	4.122 or 4.127 (to 3 decimal places)
Correlation between x and y in each case	0.816 (to 3 decimal places)
Linear regression line in each case	$y = 3.00 + 0.500x$ (to 2 and 3 decimal places, respectively)

Stats Visualized
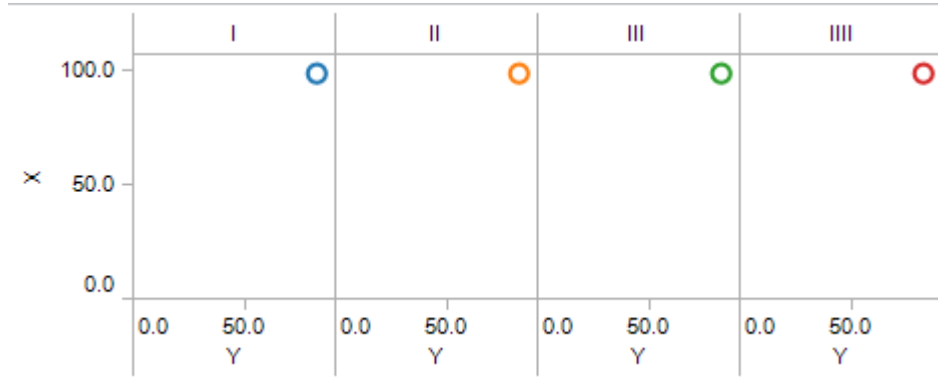
Data Visualized
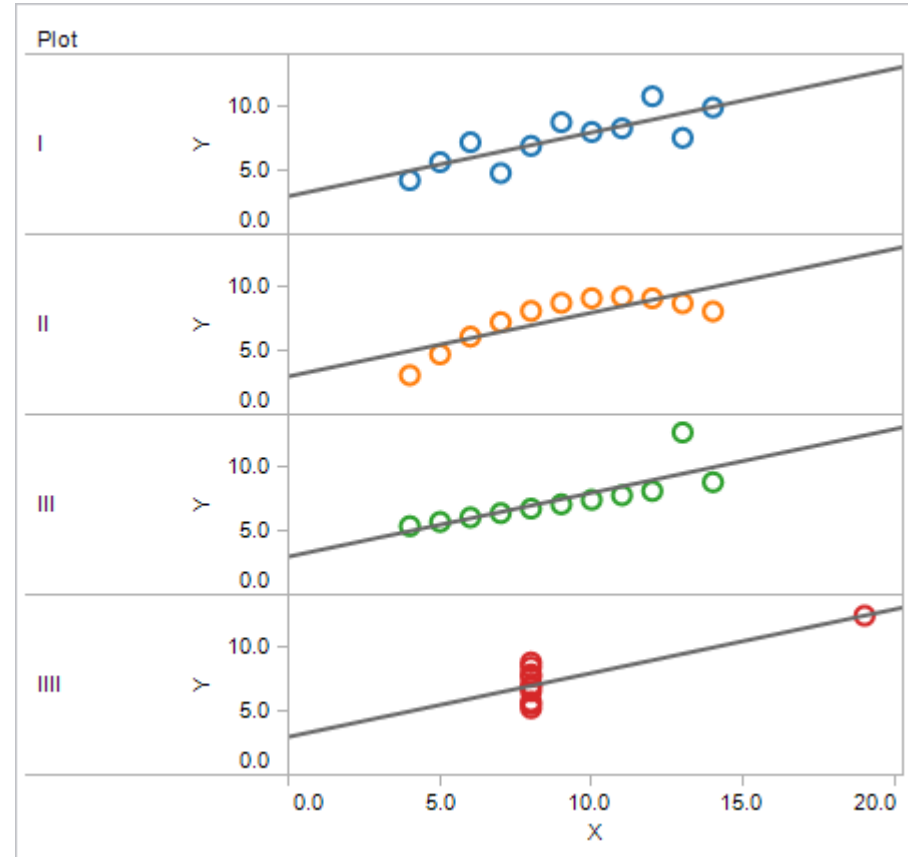
Francis Anscombe, 1973

How to make data beautiful

Reduce non-data pixels
then
Enhance data pixels

"Above all else, show the data

Edward Tufte, 1983

Data-ink ratio

Edward Tufte, 1983

Data-pixel ratio

Stephen Few, 2004

Data-pixel ratio: data pixels / non-data pixels

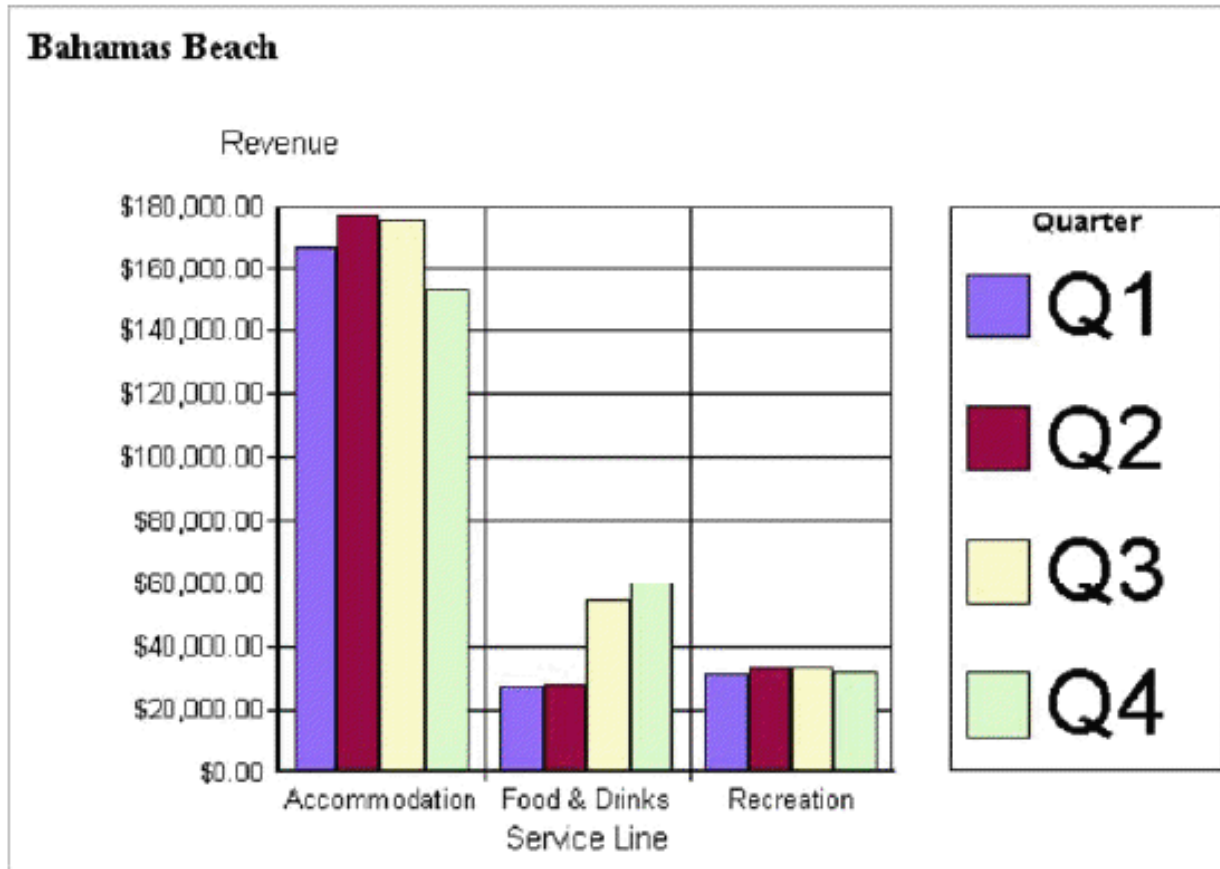Stephen Few, 2004

How Can We Increase the Data-pixel Ratio?

Figure 1: Example of a graph (taken from Business Objects' user documentation) with a low data-ink ratio.

How Can We Increase the Data-pixel Ratio?

Bahamas Beach Resort
2003 Revenue by Quarter and Service Line

U.S. $

- Accommodation
- Food & Drink
- Recreation
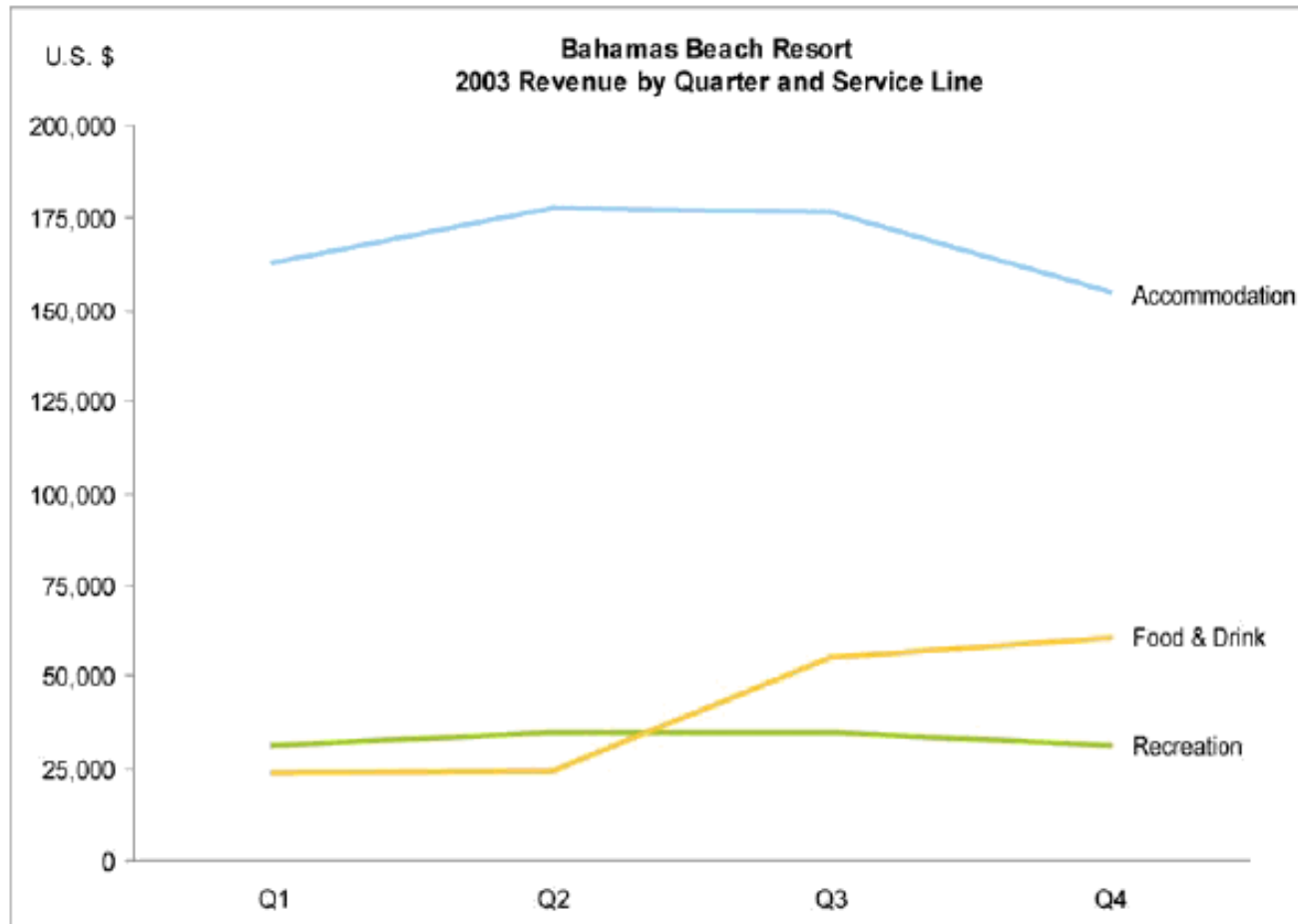
Figure 2: Example of a graph with a high data-ink ratio.

How Can We Increase the Data-pixel Ratio?

Enhance data-pixels

Granularity

Granularity, Which is Right?
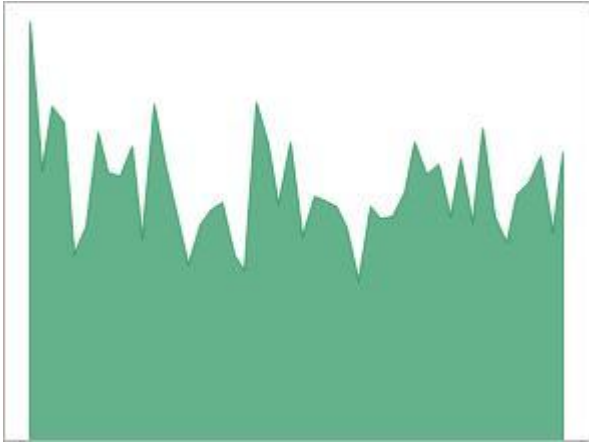
Monthly
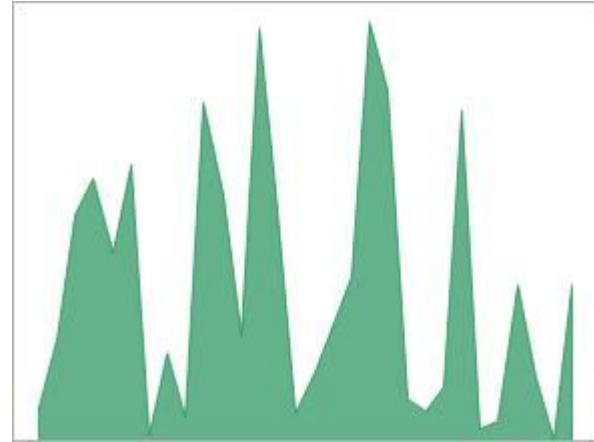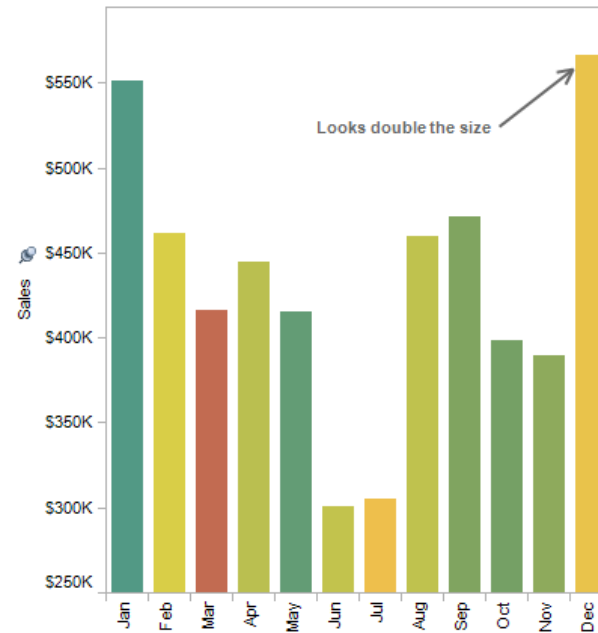

Daily

Granularity, Which is Right?
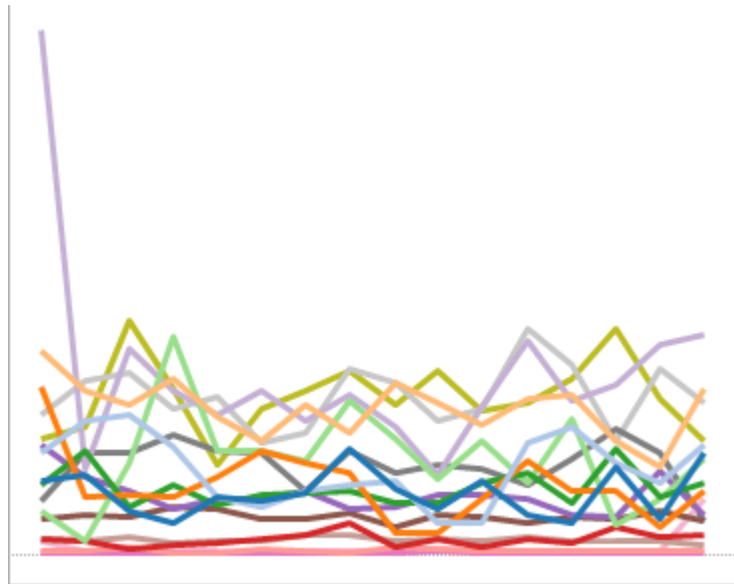
Sub-Category
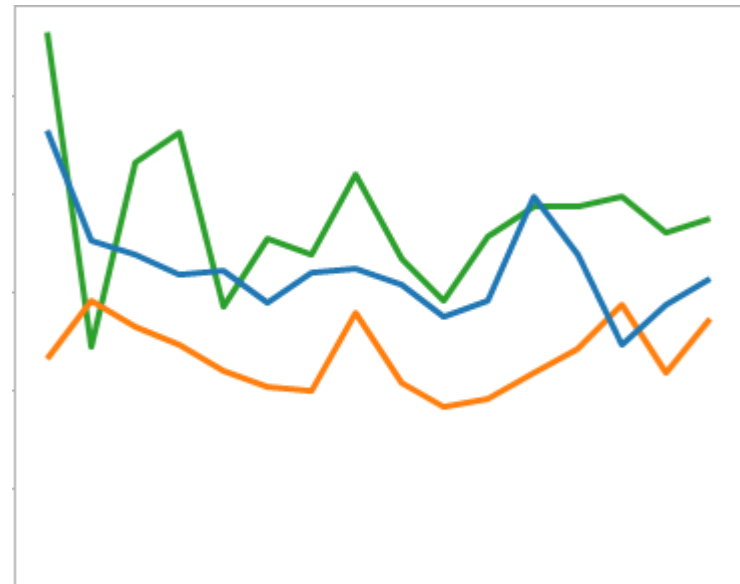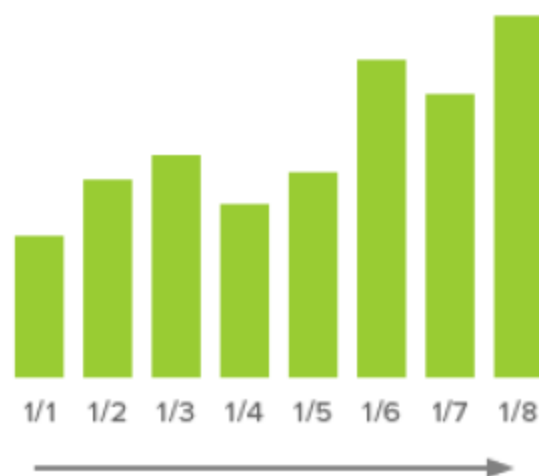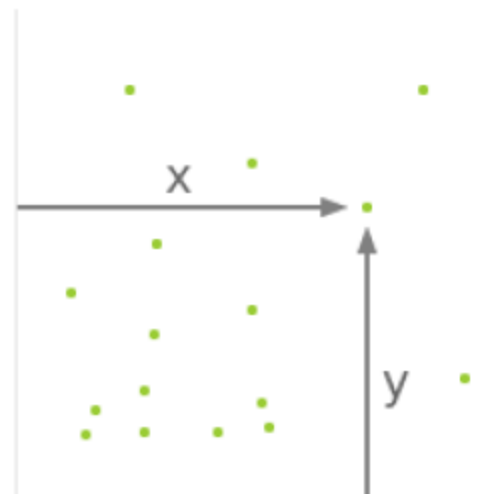
Category

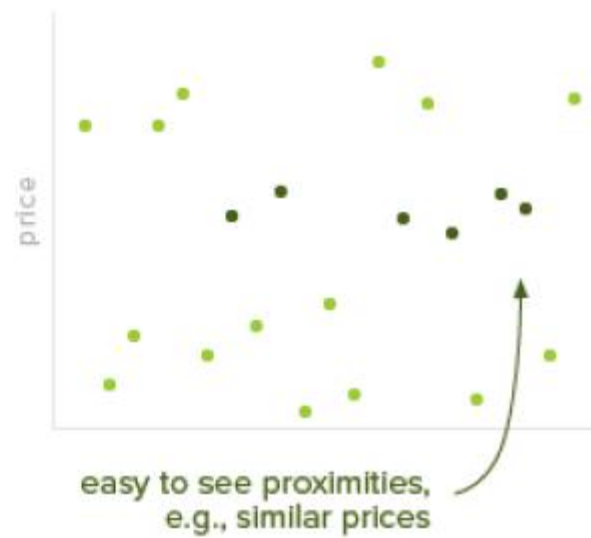# Size & Scale

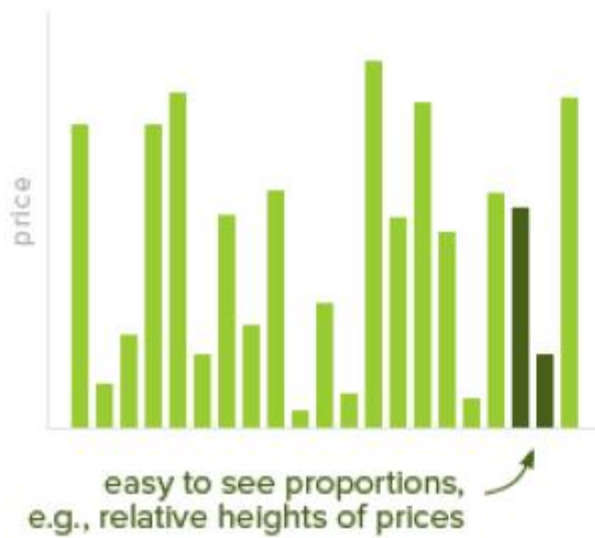# Bubbles on a Map

Sizing Bars – Preserve True Portions

Position

bars in a certain order

dots at a certain distance

outliers

clusters

similar values

USING SIZE VS. POSITION: PRICE

price

easy to see proportions,
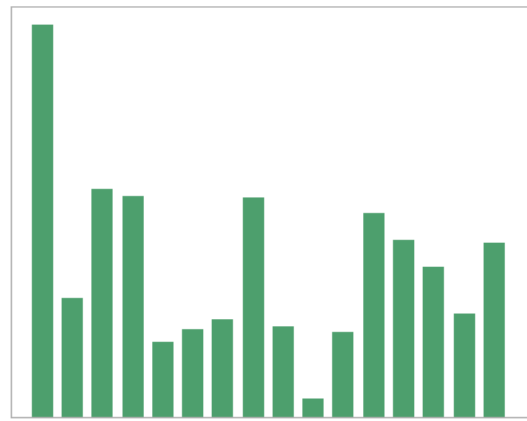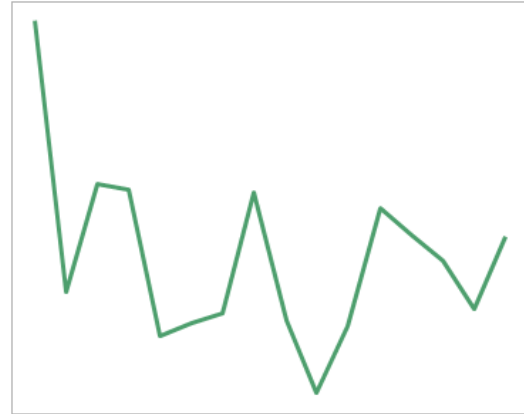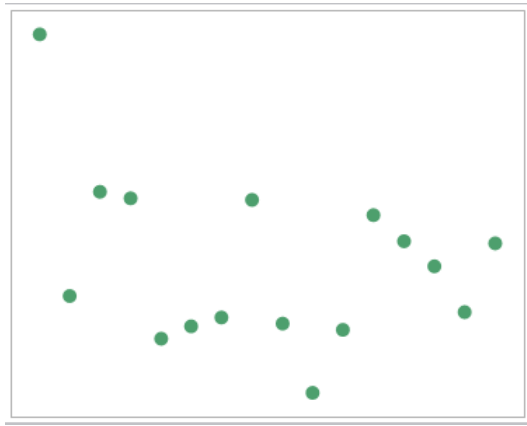e.g., relative heights of prices

price

easy to see proximities,
e.g., similar prices

Angle

Connect Dots/Bars to Show Trends over Time
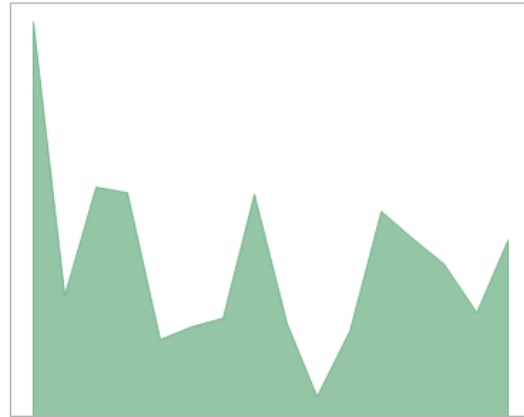
Color

Color in Nature

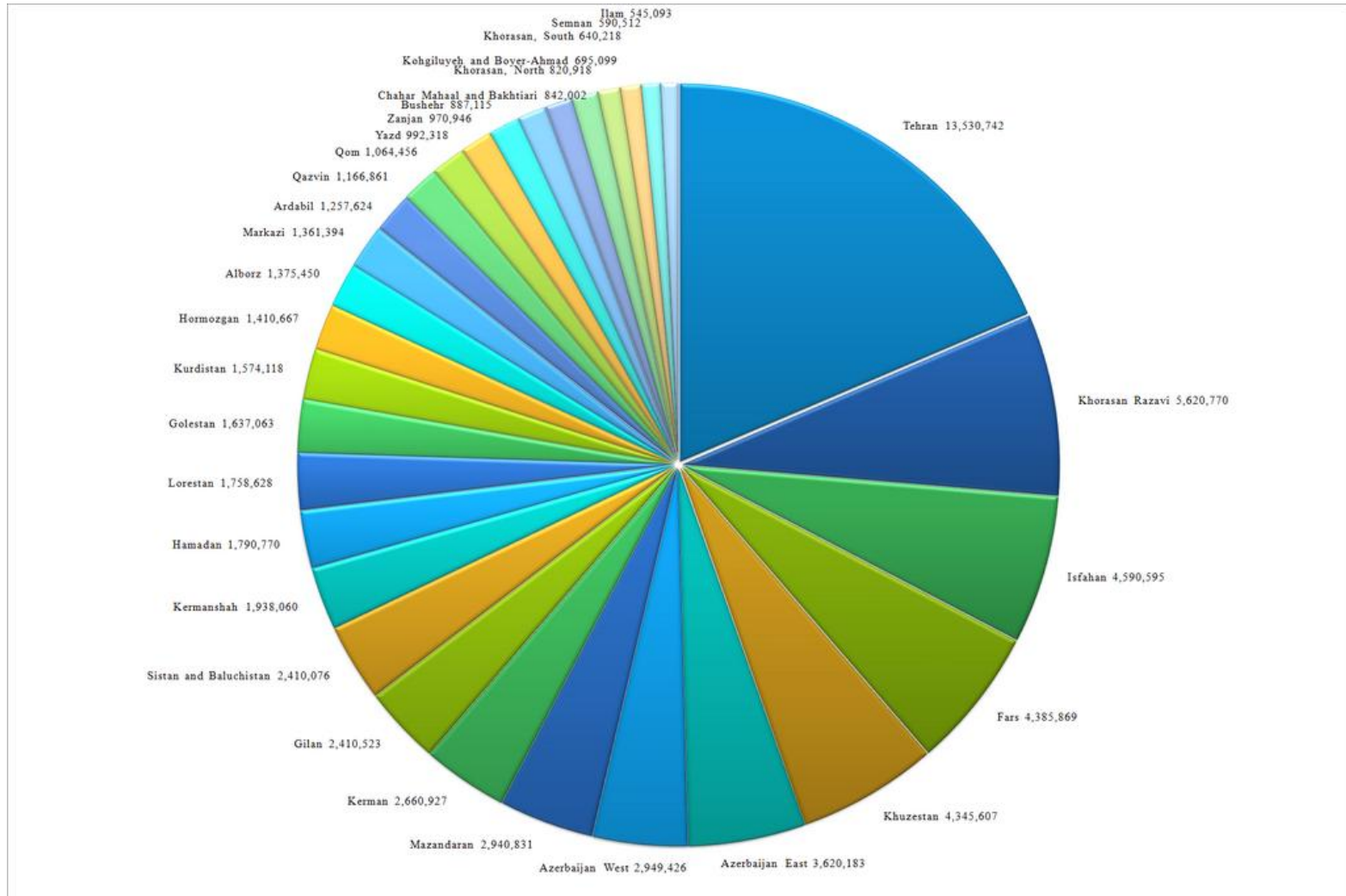**Golden Dart Frog**
2 micrograms can kill an adult human

Hala Fruit
Sweet fruit

Color – Proper Use

Key Metrics YTD (— Actual; | Target; ▓ Poor, ░ Satisfactory, ░ Good)

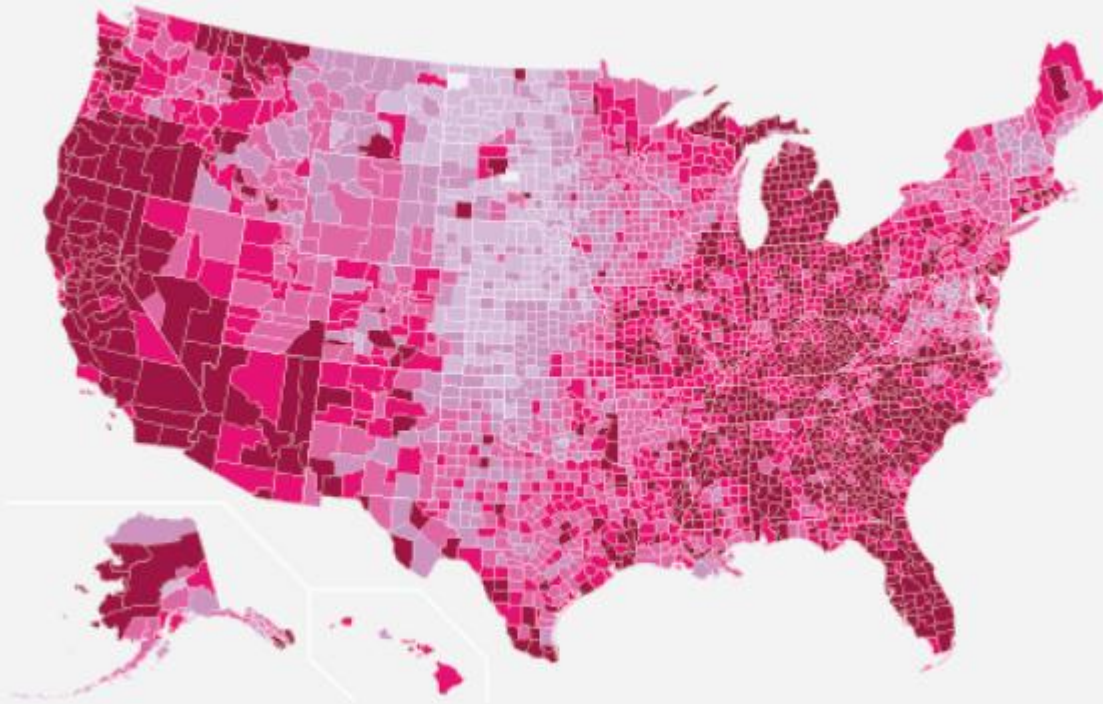| Past 12 Months	Metric	% of Target	Actual
	Revenue		$913,394
	Profit		$193,865
	Avg Order Size		$5,766
	On Time Delivery		104%
	New Customers		1,247
	Cust Satisfaction		4.73 / 5
	Market Share		19%
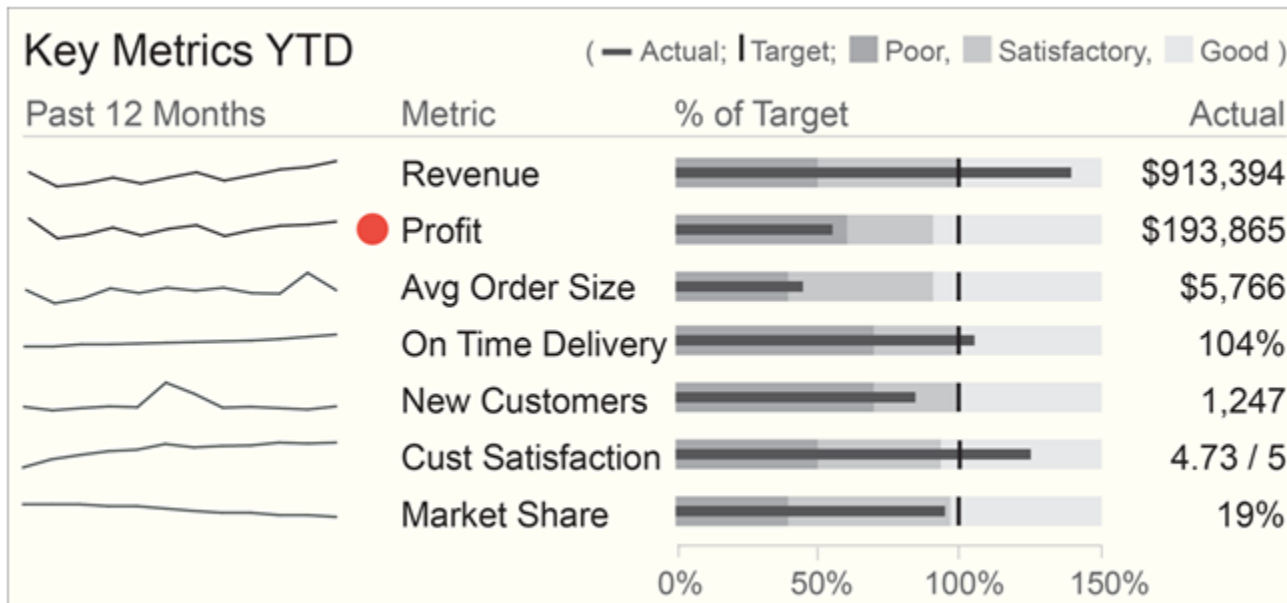
Color – Improper Use

Color – What's Happening Here?

September 2010, 9.6% National Unemployment Rate

Annotation

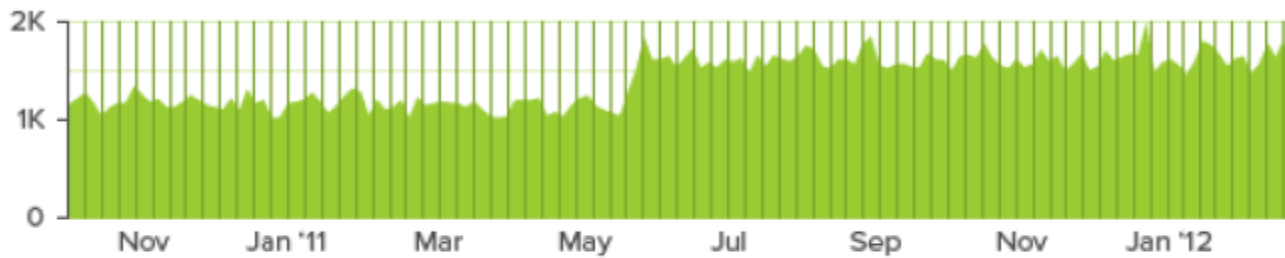# Annotation – Reference Lines

WORKING WITH ANNOTATION

Chart of Metric

important event

Annotation – Grid Lines

MINIMIZING ANNOTATION

Annotation – Grid Lines

50% increase following change on May 18

Eliminating Chart Junk (exercise)

Summary – Visual Perception

- **Visual Perception Exercises**

- **Dashboard Examples**

- **Why stats aren't enough**

- **How to make data beautiful**

- **Eliminating Chart Junk (exercise)**