

MIS 0855 Fall 2016 – Data Science

Week 7 – Data Visualization (III)

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Data Visualization Principles

- Principle #1 – Have a clear message to deliver.
- Principle #2 – Select a delivery method based on the message to deliver.
- Principle #3 – Use as little ink as possible.
- Principle #4 – Do not mislead your audience.

Which is the largest U.S. state by land area?



<http://www.mapsofworld.com/usa/usa-state-and-capital-map.html>



United States

An **interactive** list of U.S. States, including their (2012) populations, as well as land sizes and densities.

Click on any of the bolded headings to sort this state list.

Type the name of a state you're looking for in the search bar to find its individual stats.

Show entries

Search:

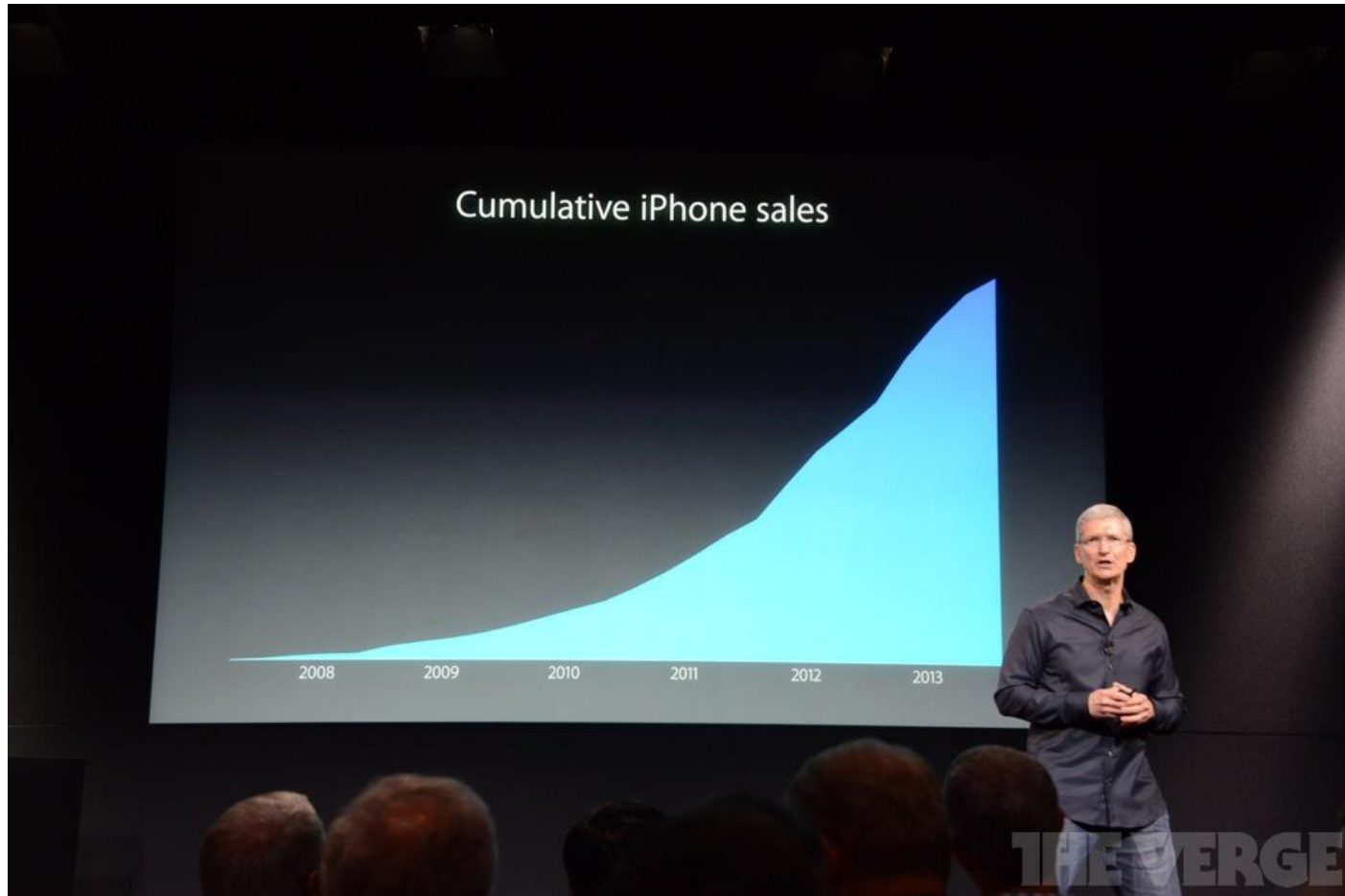


	STATE ⬆	Abbr. ⬆	Population ⬆	Land Area (sq. km.) ⬇	Pop. Density (per sq. km.) ⬆	Land Area (sq. mi.) ⬆	Pop. Density (per sq. mi.) ⬆
1	Alaska	AK	731,449	1,481,346.00	0.46	571,951	1.20
2	Texas	TX	26,059,203	678,051.12	35.88	261,797	92.92
3	California	CA	38,041,430	403,931.96	91.00	155,959	235.68
4	Montana	MT	1,005,141	376,977.95	2.57	145,552	6.65
5	New Mexico	NM	2,085,538	314,310.60	6.31	121,356	16.35

Don't mess with Alaska!

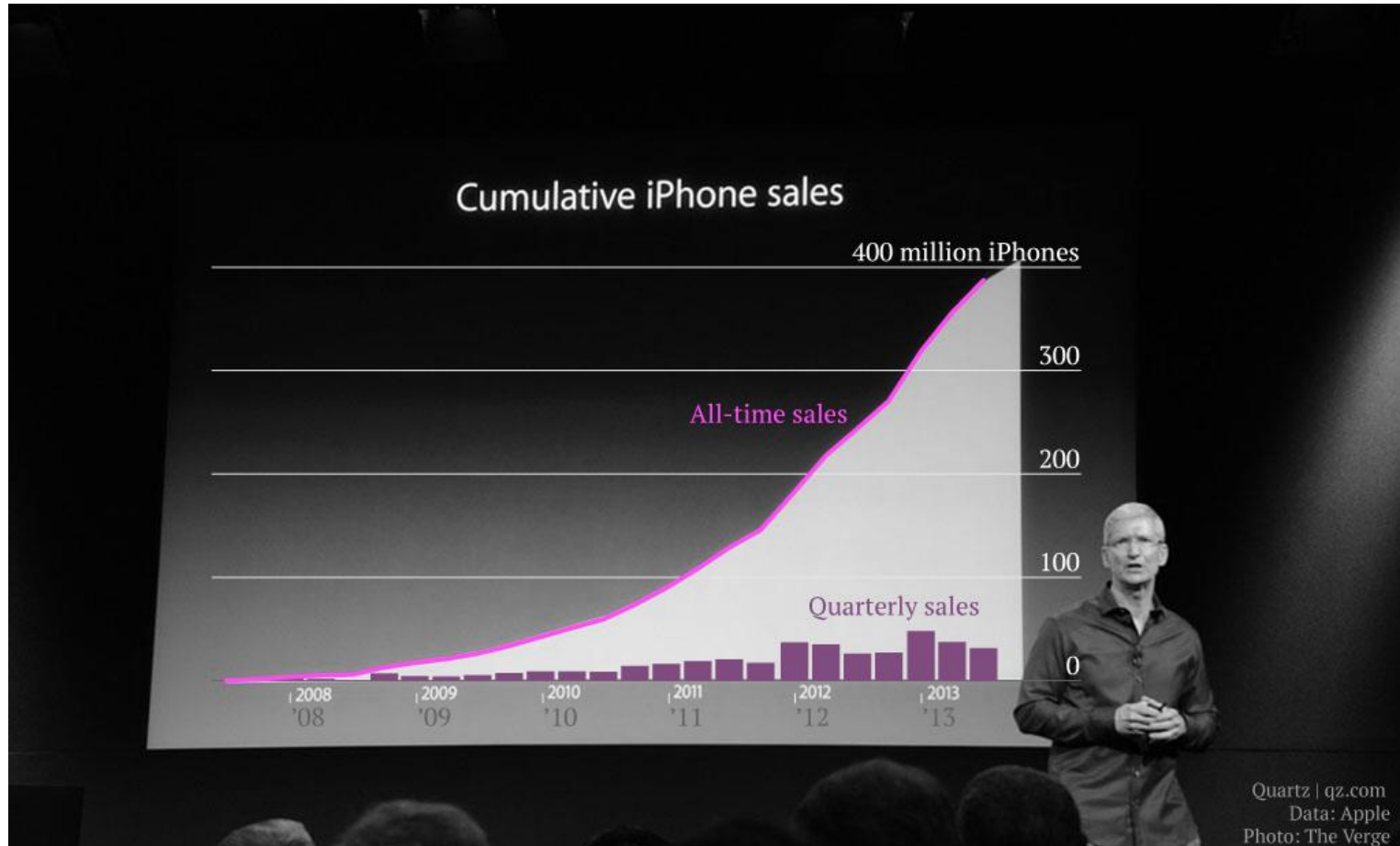


Tim Cook is Cooking His Graph!



<http://qz.com/122921/the-chart-tim-cook-doesnt-want-you-to-see/>

This looks less cool, but less misleading.



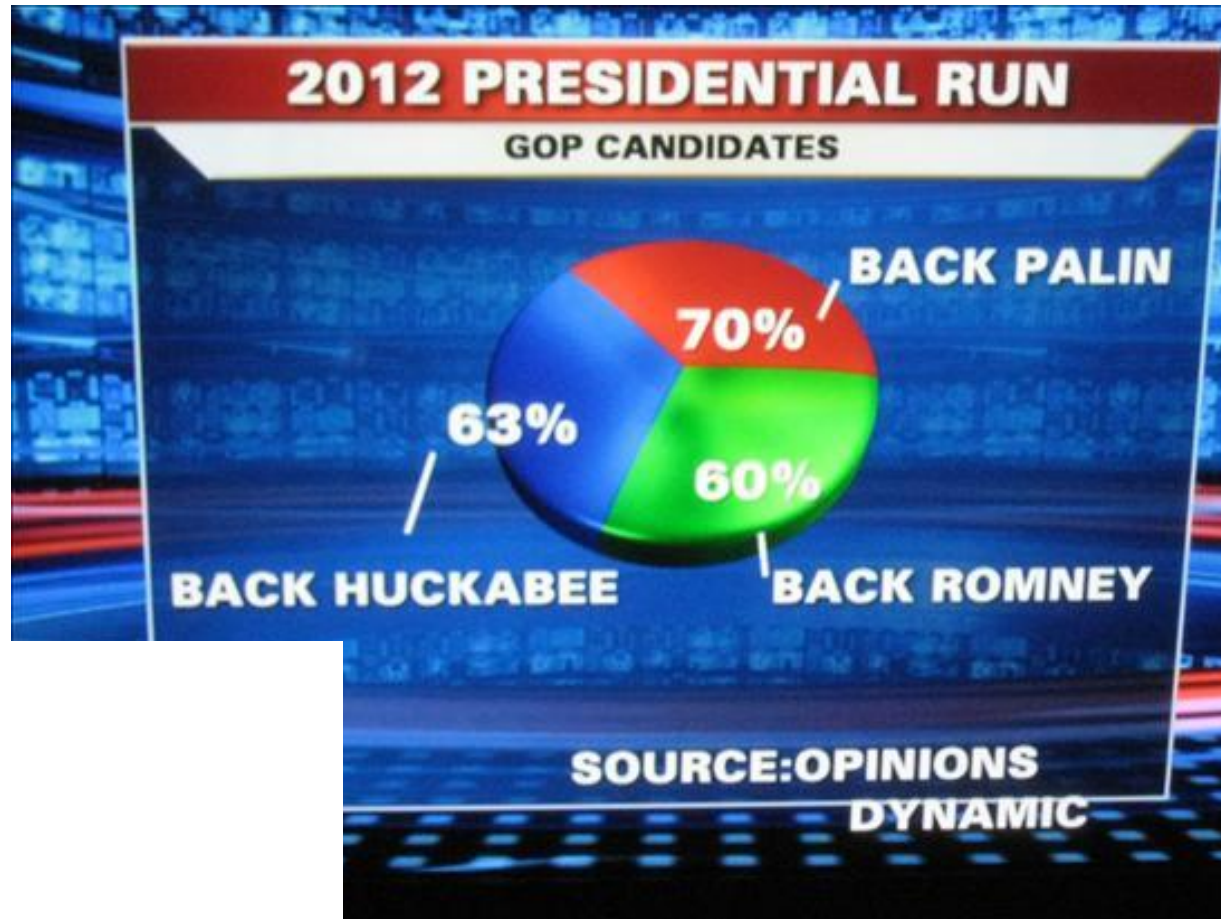
<http://qz.com/122921/the-chart-tim-cook-doesnt-want-you-to-see/>

What are Misleading Graphs?

Any graph that distracts the reader from fully understanding what he/she is viewing can be considered misleading.

- ✓ *graphs with no title*
- ✓ *graphs with no labels on the axes*
- ✓ *graphs with no key - when one is required*
- ✓ *graphs with a vertical axis that doesn't start at 0*
- ✓ *graphs with different sized graphing icons or bars*
- ✓ *graphs without equal intervals on any axis*
- ✓ *graphs with a "broken" or "squished" axis*

70% + 63% + 60% = ?



Can you guess the source of this?



2 X 2 = 4, not 2!



**WIDTH of A is twice width of B,
but AREA of A is 4x area of B!**

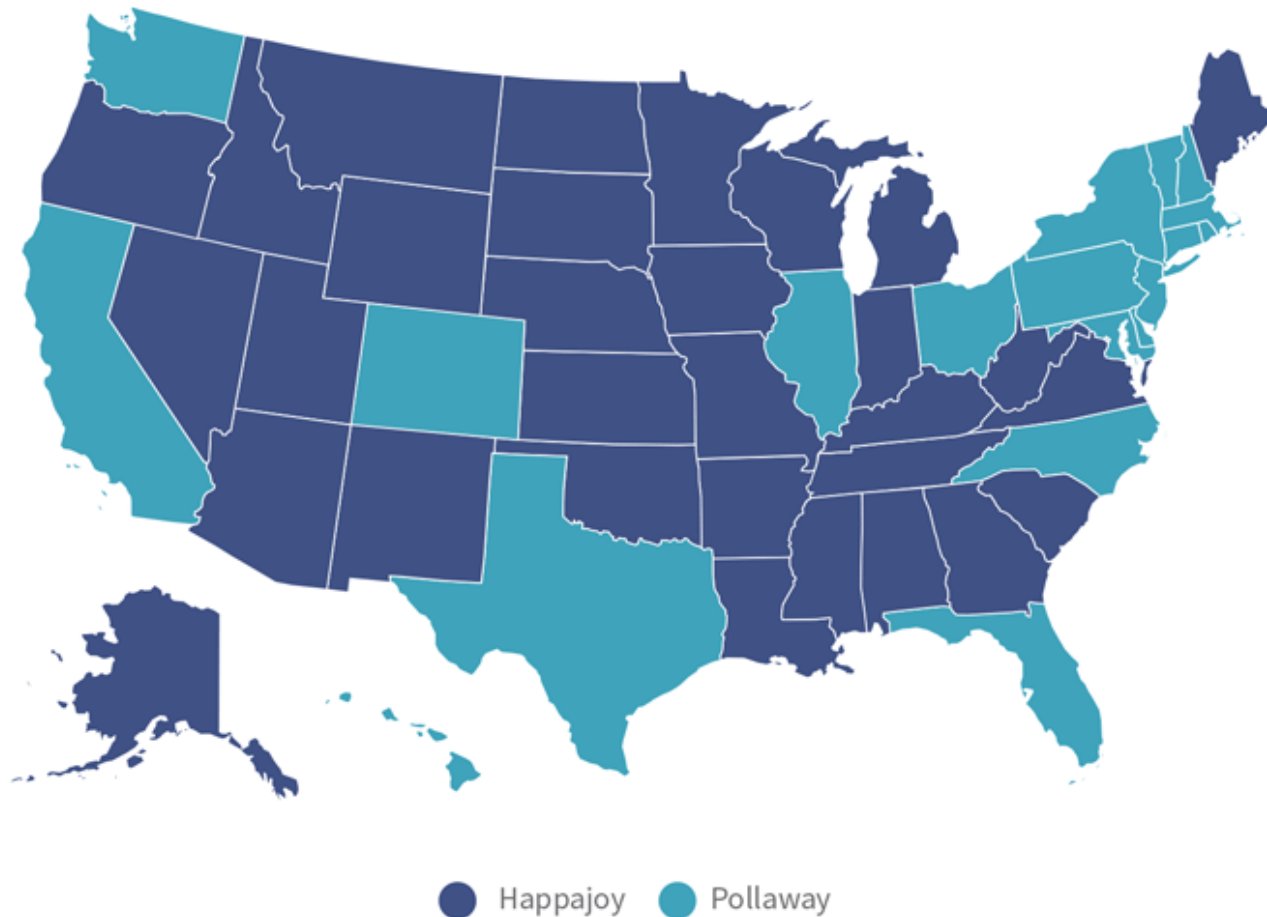
**Overstates relative value by
factor of two!**



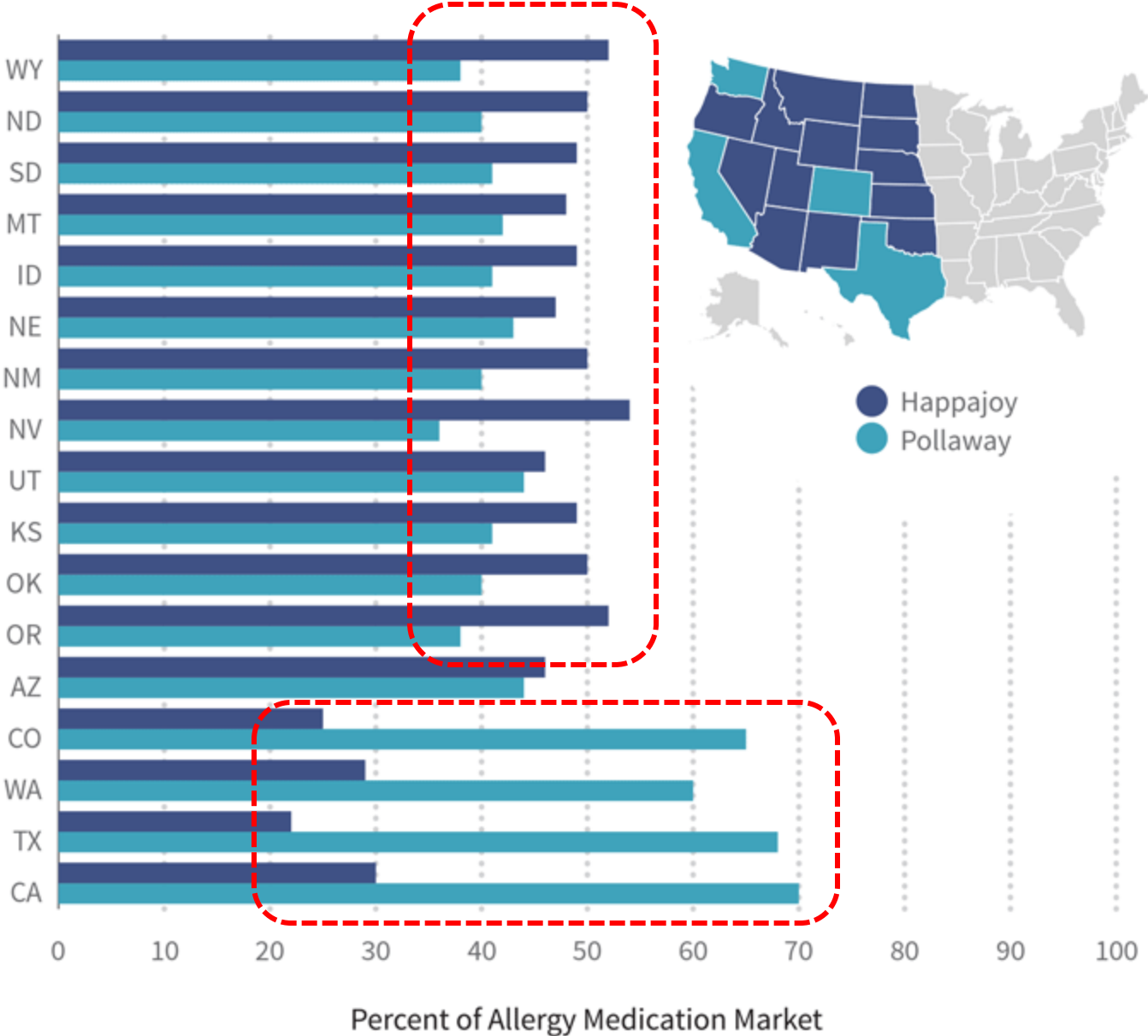
**WIDTH of A is 1.4x width of B,
so area of A is now 2x area of B!**

Which company is the market leader?

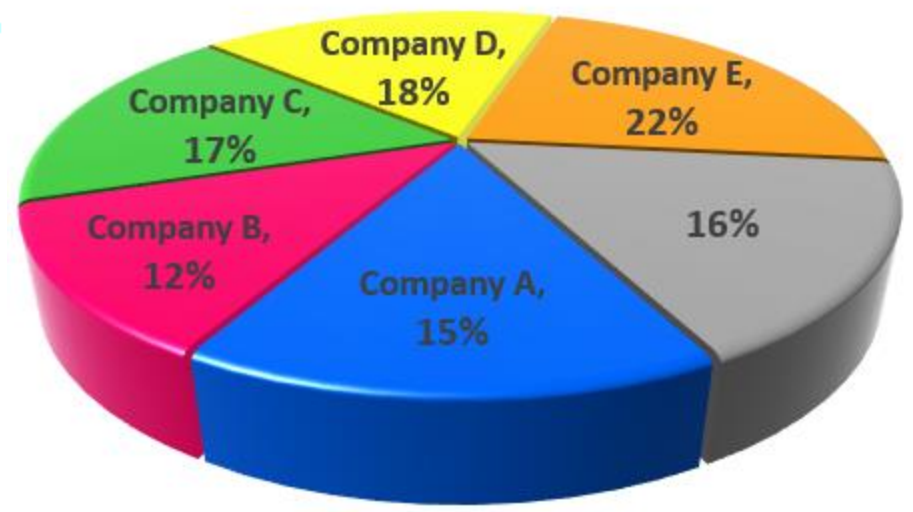
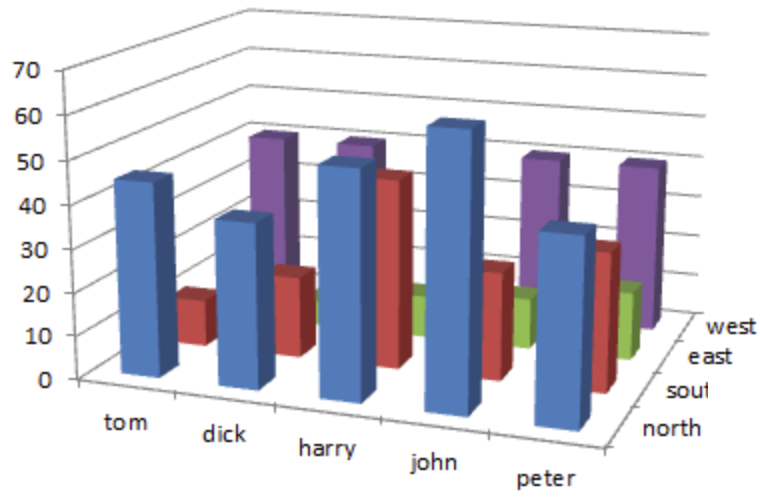
Leading Allergy Medication in Each State



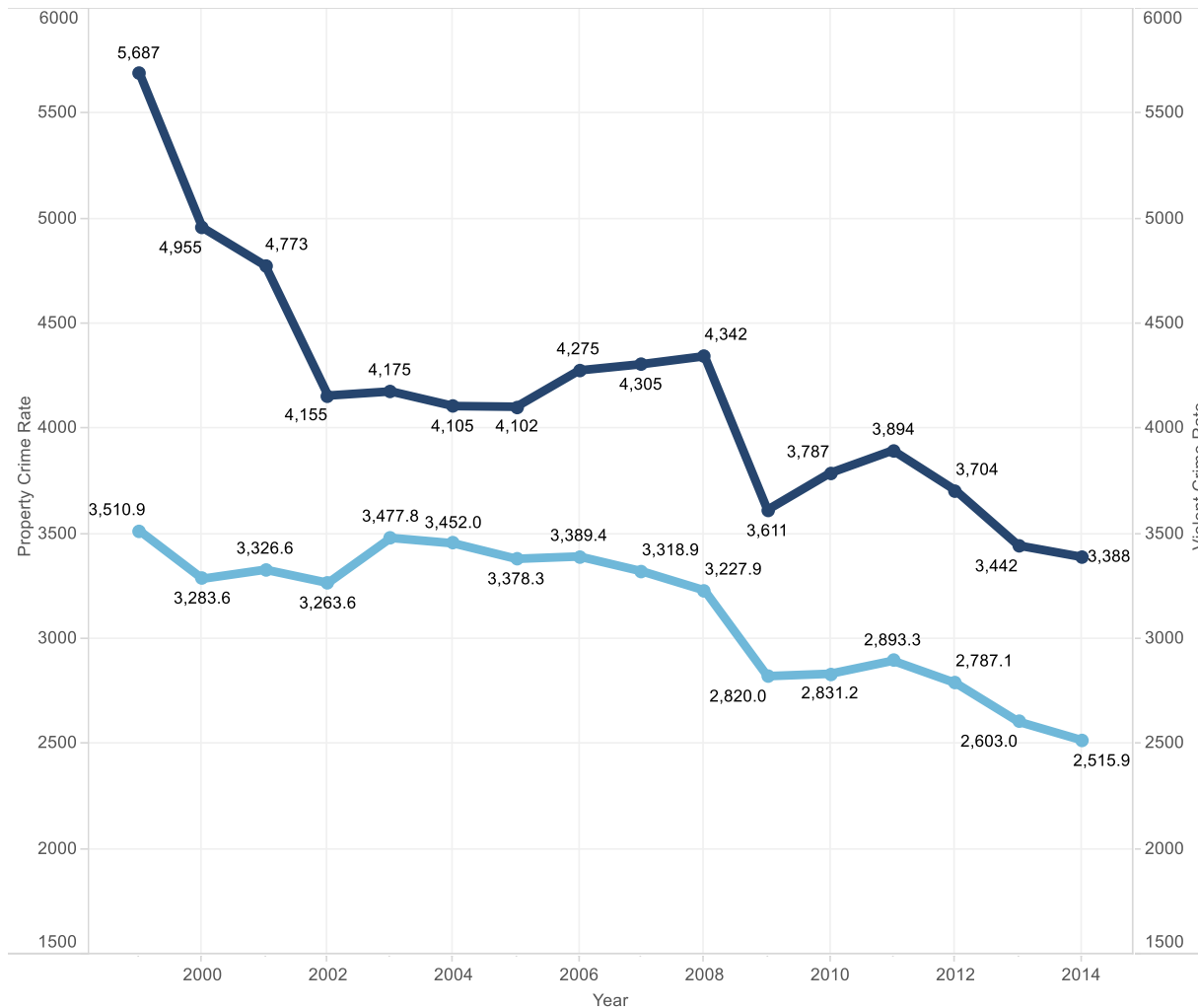
Market Share in Each State



Avoid 3-D charts!



Use as little ink as possible.



Use as little ink as possible.

state	city	Avg. murder_rate	Avg. violent_r...	Avg. property_rate
CA	Oakland	25	3,210	5,679
	Stockton	14	2,533	5,945
	Fresno	9	2,309	5,390
	Sacramento	9	1,788	5,176
	Los Angeles	11	1,696	2,847
	Riverside	6	1,669	
	Modesto	6	1,546	
	San Francisco	9	1,425	
	Long Beach	9	1,386	
	San Diego	4	1,216	
	Chula Vista	3	1,139	
	Bakersfield	8	1,095	
	San Jose	3	1,058	
	Santa Ana	6	931	
	Anaheim	4	896	
Glendale	2	518		
Total		8	1,526	

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	Sacramento	9	1,788	5,176
	Los Angeles	11	1,696	2,847
	Riverside	6	1,669	3,882
	Modesto	6	1,546	5,415
	San Francisco	9	1,425	4,708
	Long Beach	9	1,386	2,909
	San Diego	4	1,216	3,016
	Chula Vista	3	1,139	2,963
	Bakersfield	8	1,095	4,720
	San Jose	3	1,058	2,401
	Santa Ana	6	931	2,427
	Anaheim	4	896	2,735
Glendale	2	518	1,905	
Total		8	1,526	3,882

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