

Designing Data Visualizations

Part 2: Lab

Noah Iliinsky • @noahi

Strata Santa Clara • February 28, 2012

Two Phases

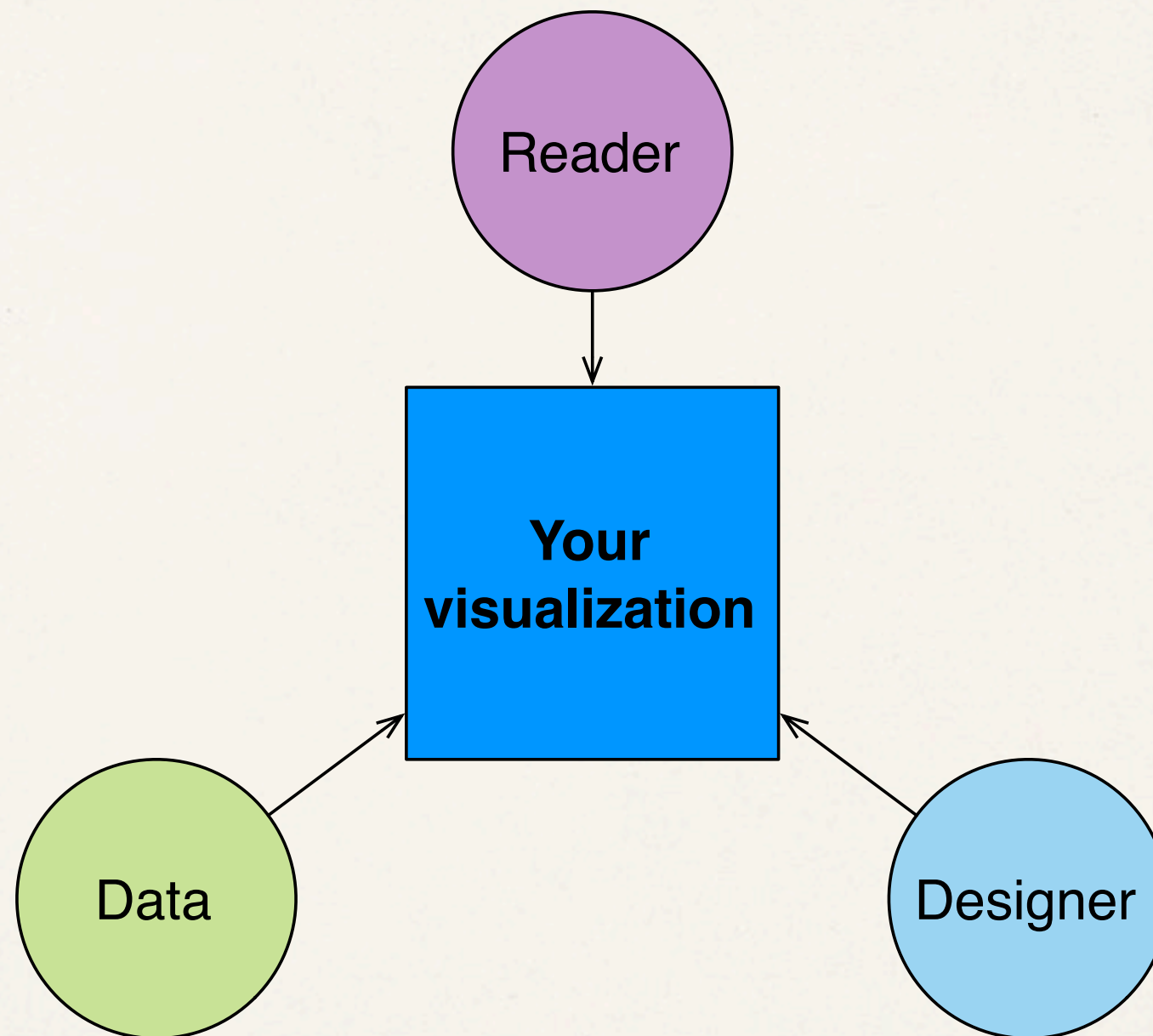
1. What to visualize

- ✧ Consider your inputs
- ✧ your goals
- ✧ their needs
- ✧ shape of the data
- ✧ Write a spec for your visualization
- ✧ select data to include

2. How to visualize

- ✧ Select axes for your most important data & relationship
- ✧ Consider & apply encodings for all other data dimensions
- ✧ Experiment, iterate, etc.

Three inputs.



Define Desired Knowledge *Before* Structure

What do you want to show?

What do you want to show?

What questions are you trying to answer?

What do you want to show?

What questions are you trying to answer?

What actions/decisions are you trying to enable?

Who is consuming this data?

What are their needs?

Who is consuming this data?

If not you:

- * What are their priorities?
- * What are there biases?
- * What are their limitations?
- * What don't you know about them?

What data dimensions do you have to play with?

Data has properties.



- * Wheel size: numeric (actually categorical)
- * Tire width: continuous
- * Price: continuous
- * Anti-puncture: binary
- * Foldable: binary

What types of data do you have?

- * categorical (grouped)
- * ordinal (ranked, time)
- * quantitative (numeric)
- * relational (hierarchy, influence, etc.)
- * location (... it's complicated...)

**What are the key relationships?
(probably)**

What are the key relationships?

What data is required to show them?

Statement of Goals

**Show the relationship between A and B
[and C...] across X [and Y] from m to n.**

Show the relationship between A and B
[and C...] across X [and Y] from m to n.

("in order to determine our best and
worst performing widgets.")

What data are you actually going to use, based on that goal?

[A, B, X (from m to n)]

Now we start designing.


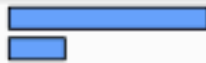










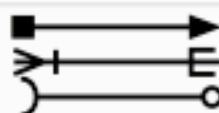

Design strategies

- * Limit the data you include
- * Use position for your most important relationship(s)
- * Try different axes
- * Consider default formats
- * Use color for categories, not rank
- * Encode other data and relationships with appropriate properties

Appropriate Encodings

Appropriate encodings

Properties and Best Uses of Visual Encodings

Example	Encoding	Ordered	Useful values	Quantitative	Ordinal	Categorical	Relational
	position, placement	yes	infinite	Good	Good	Good	Good
1, 2, 3; A, B, C	text labels	optional (alphabetical or numbered)	infinite	Good	Good	Good	Good
	length	yes	many	Good	Good		
	size, area	yes	many	Good	Good		
	angle	yes	medium/few	Good	Good		
	pattern density	yes	few	Good	Good		
	weight, boldness	yes	few		Good		
	saturation, brightness	yes	few		Good		
	color	no	few (< 20)			Good	
	shape, icon	no	medium			Good	
	pattern texture	no	medium			Good	
	enclosure, connection	no	infinite			Good	Good
	line pattern	no	few				Good
	line endings	no	few				Good
	line weight	yes	few		Good		



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<http://ComplexDiagrams.com/properties>

Position is Everything.

How can you use position to reveal your key relationship(s)?

Is there a good default format for this kind of relationship?

List (at least) three possible combinations of axes.

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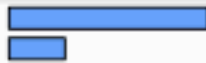









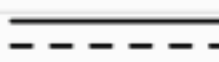
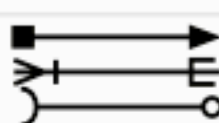

If you have a tool, try graphing each of these permutations.

Appropriate Encodings

**What are good options for encoding
your other data dimensions?**

Appropriate encodings

Properties and Best Uses of Visual Encodings

Example	Encoding	Ordered	Useful values	Quantitative	Ordinal	Categorical	Relational
	position, placement	yes	infinite	Good	Good	Good	Good
1, 2, 3; A, B, C	text labels	optional (alphabetical or numbered)	infinite	Good	Good	Good	Good
	length	yes	many	Good	Good		
	size, area	yes	many	Good	Good		
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	pattern density	yes	few	Good	Good		
	weight, boldness	yes	few		Good		
	saturation, brightness	yes	few		Good		
	color	no	few (< 20)			Good	
	shape, icon	no	medium			Good	
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	line endings	no	few				Good
	line weight	yes	few		Good		



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<http://ComplexDiagrams.com/properties>

Pick encodings for your remaining data dimensions.

See how that looks.

Design strategies

- * Limit the data you include
- * Use position for your most important relationship(s)
- * Try different axes
- * Consider default formats
- * Use color for categories, not rank
- * Encode other data and relationships with appropriate properties

Iterate, iterate, iterate.

Tools

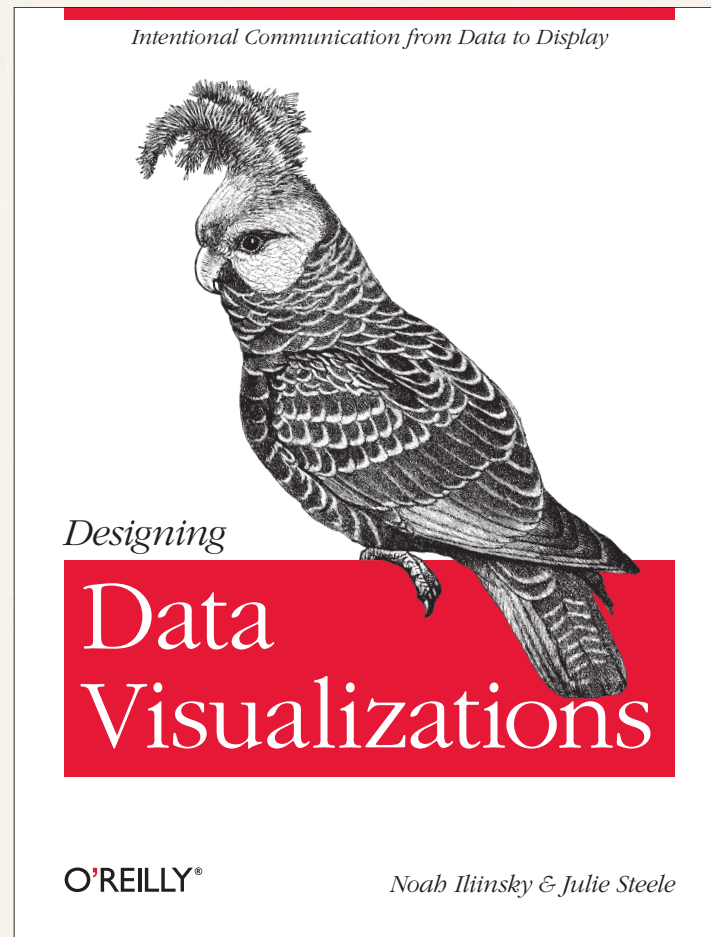
- * D3.js / protovis: structured frameworks
- * processing: flexible, great for data art
- * R + ggplot2: stats & analytics
- * Tableau: visual exploration & analytics

Thank you!

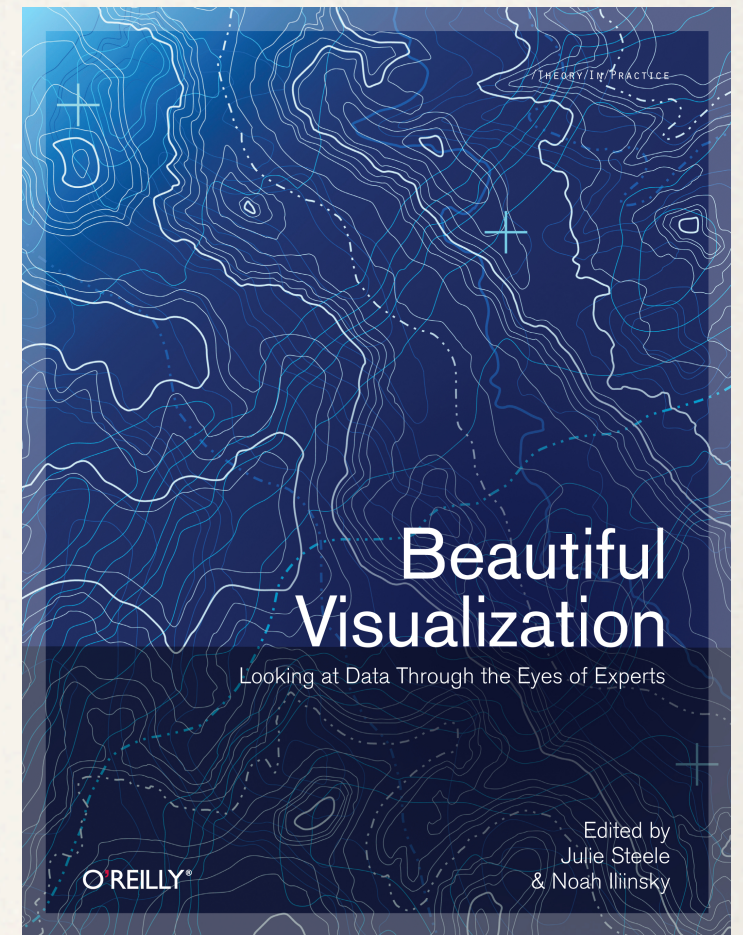
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gmail: iliinsky

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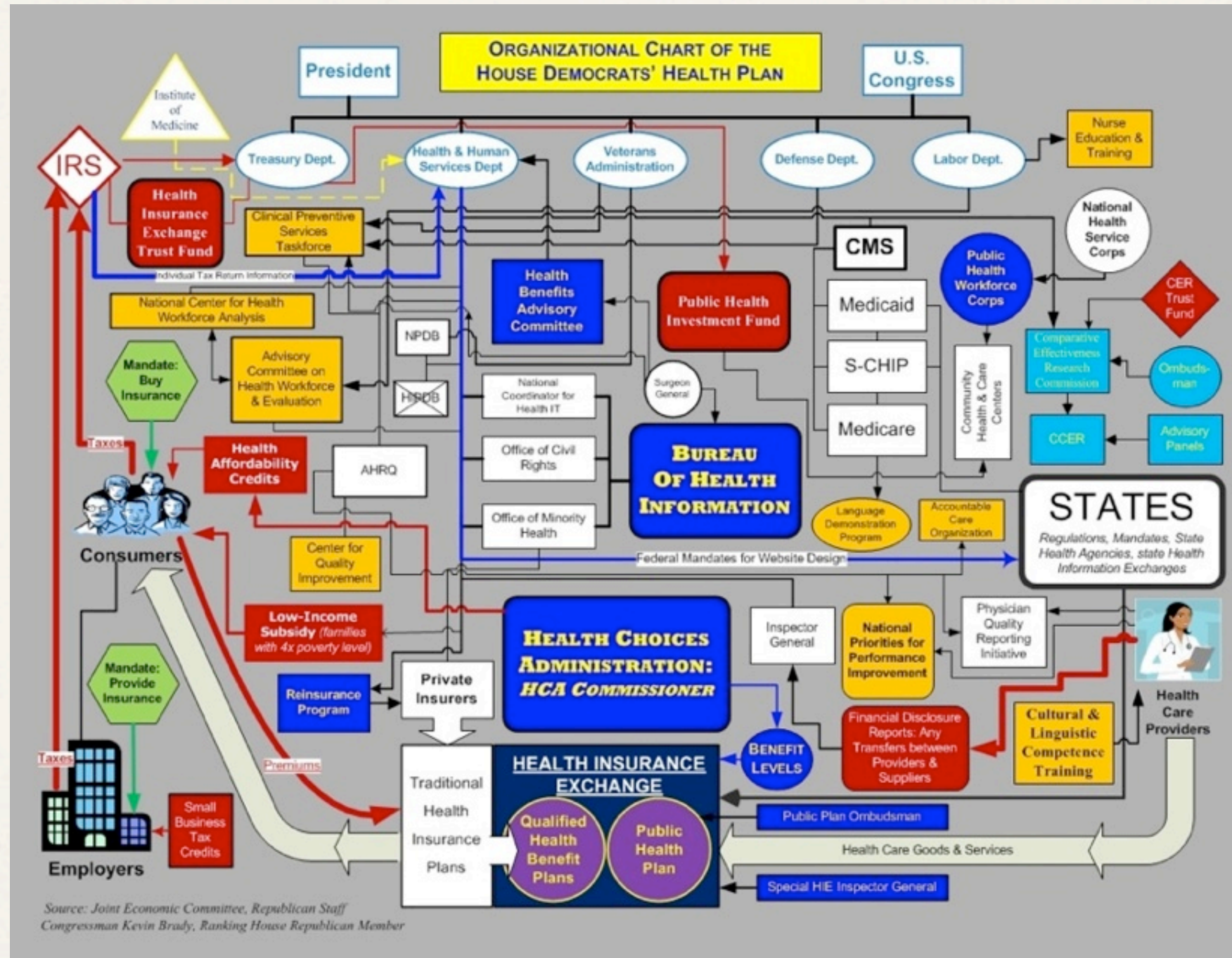


How to do it
(this talk)

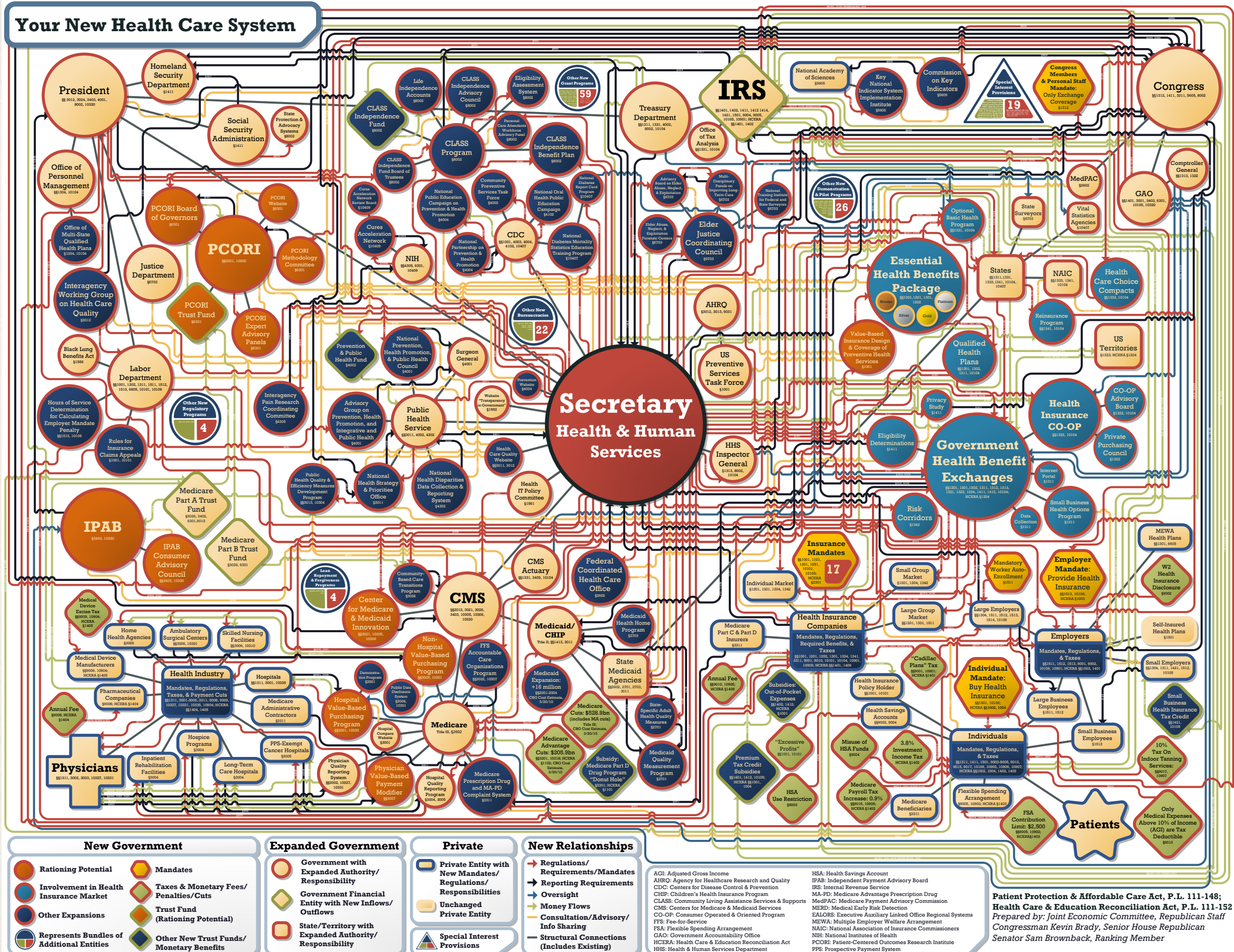


How they did it
(20 case studies)

Visualization for *persuasion* (or *propaganda*)

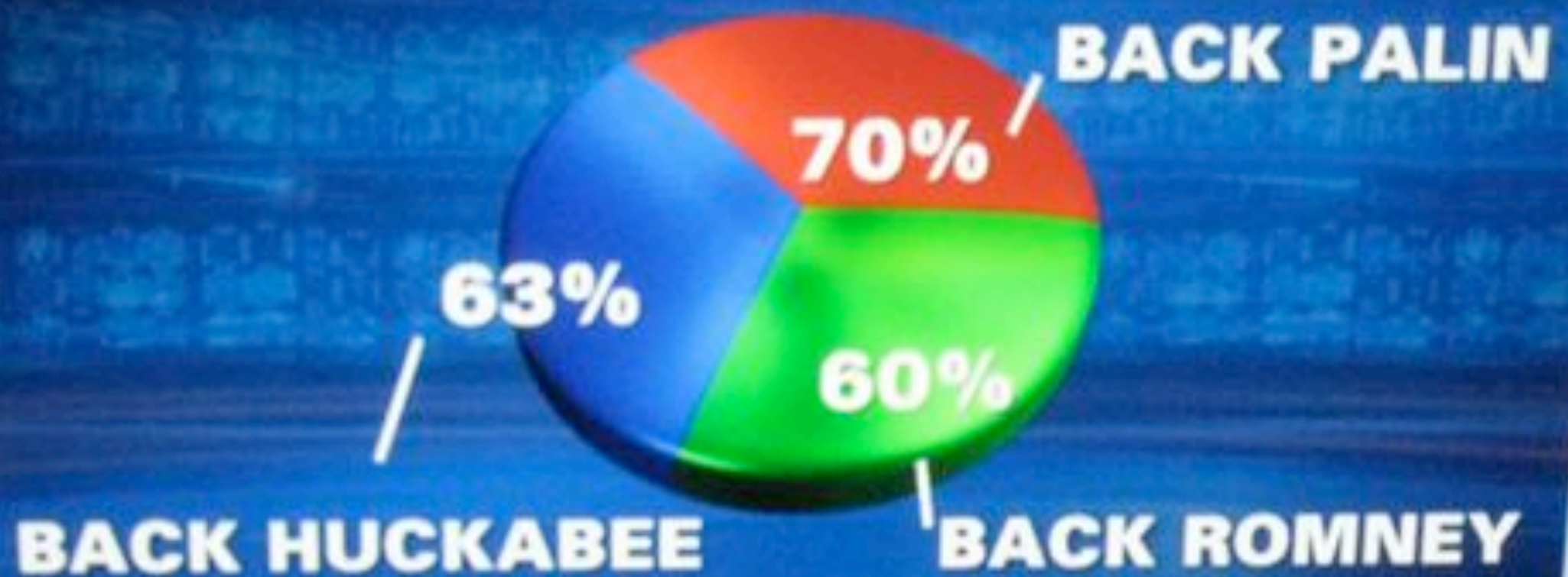


Visualization for *persuasion* (or *propaganda*)



2012 PRESIDENTIAL RUN

GOP CANDIDATES

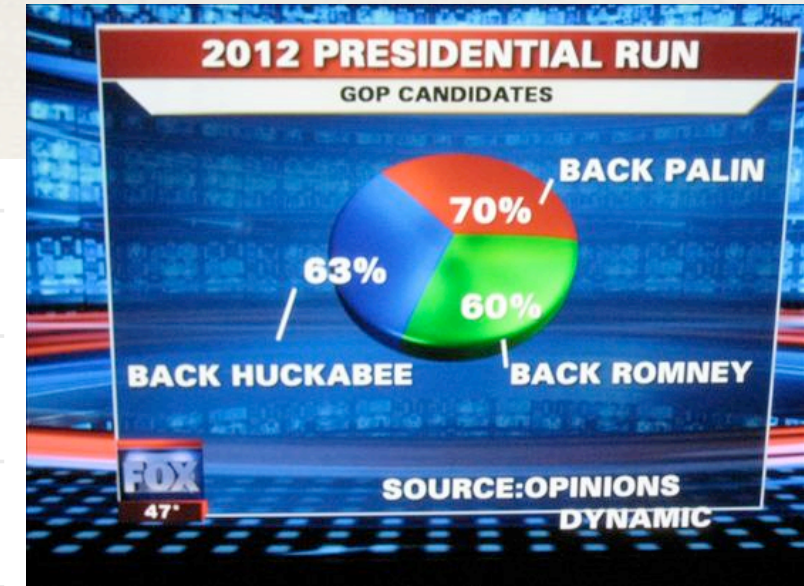
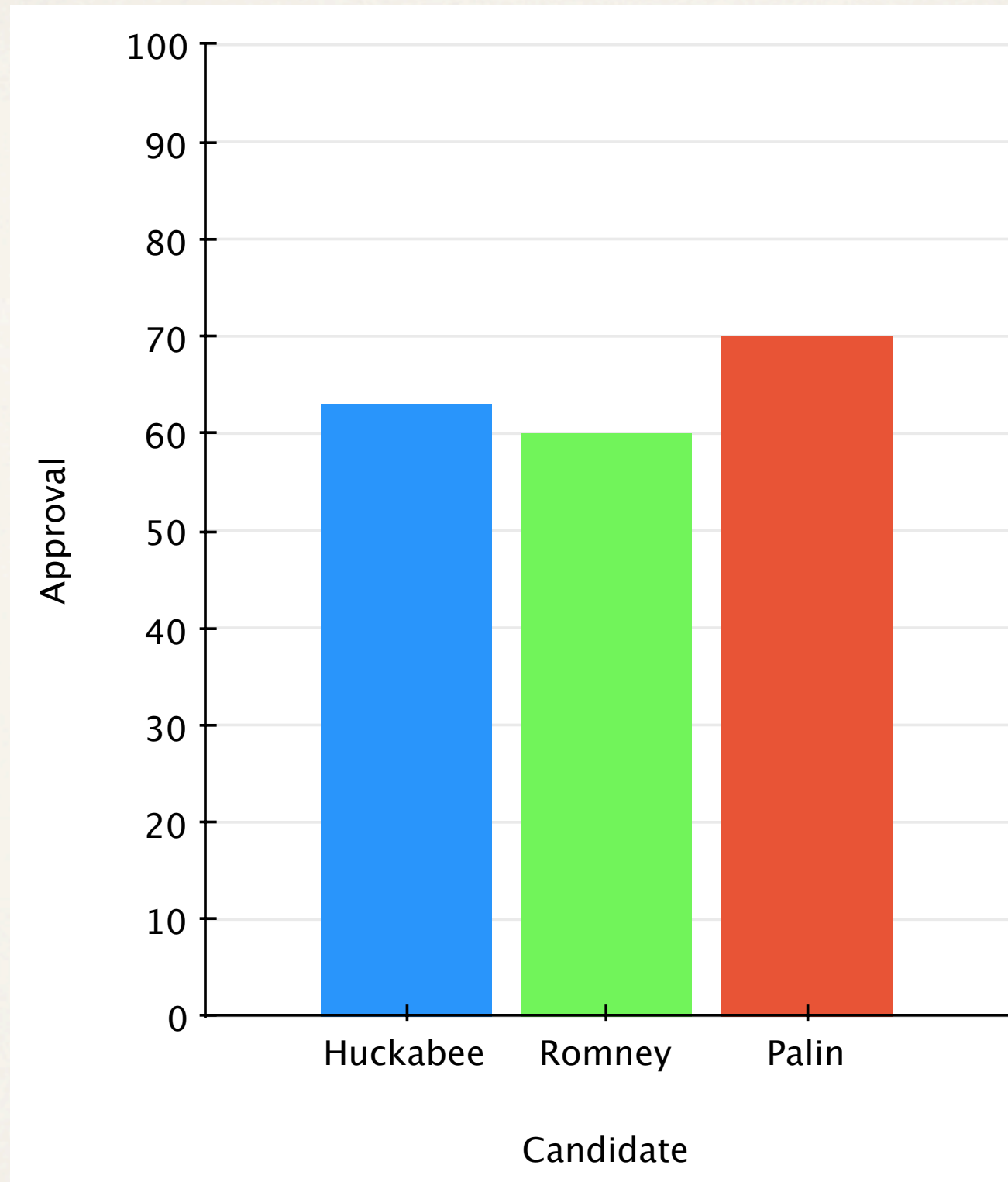


FOX

47°

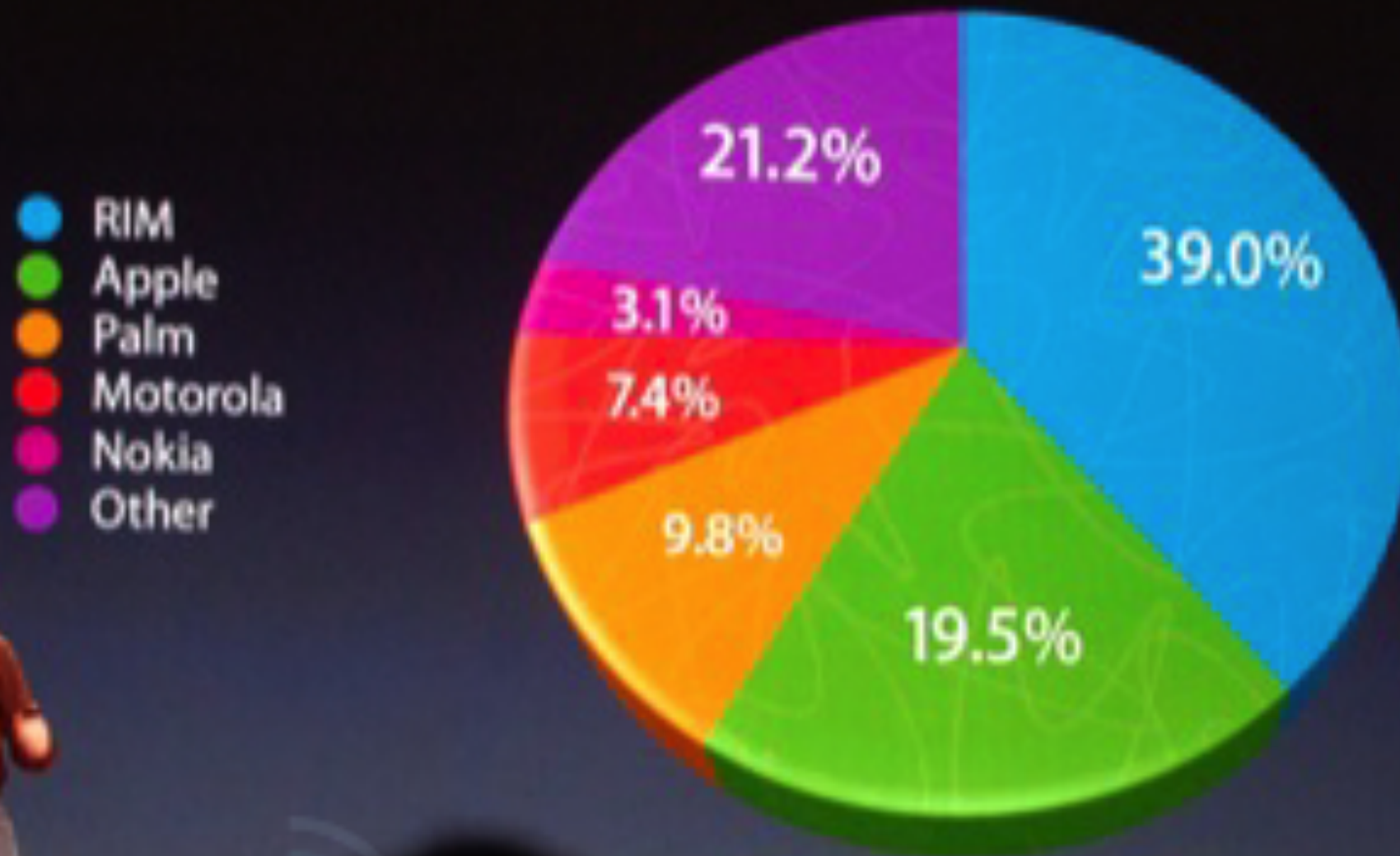
**SOURCE: OPINIONS
DYNAMIC**

Wrong!



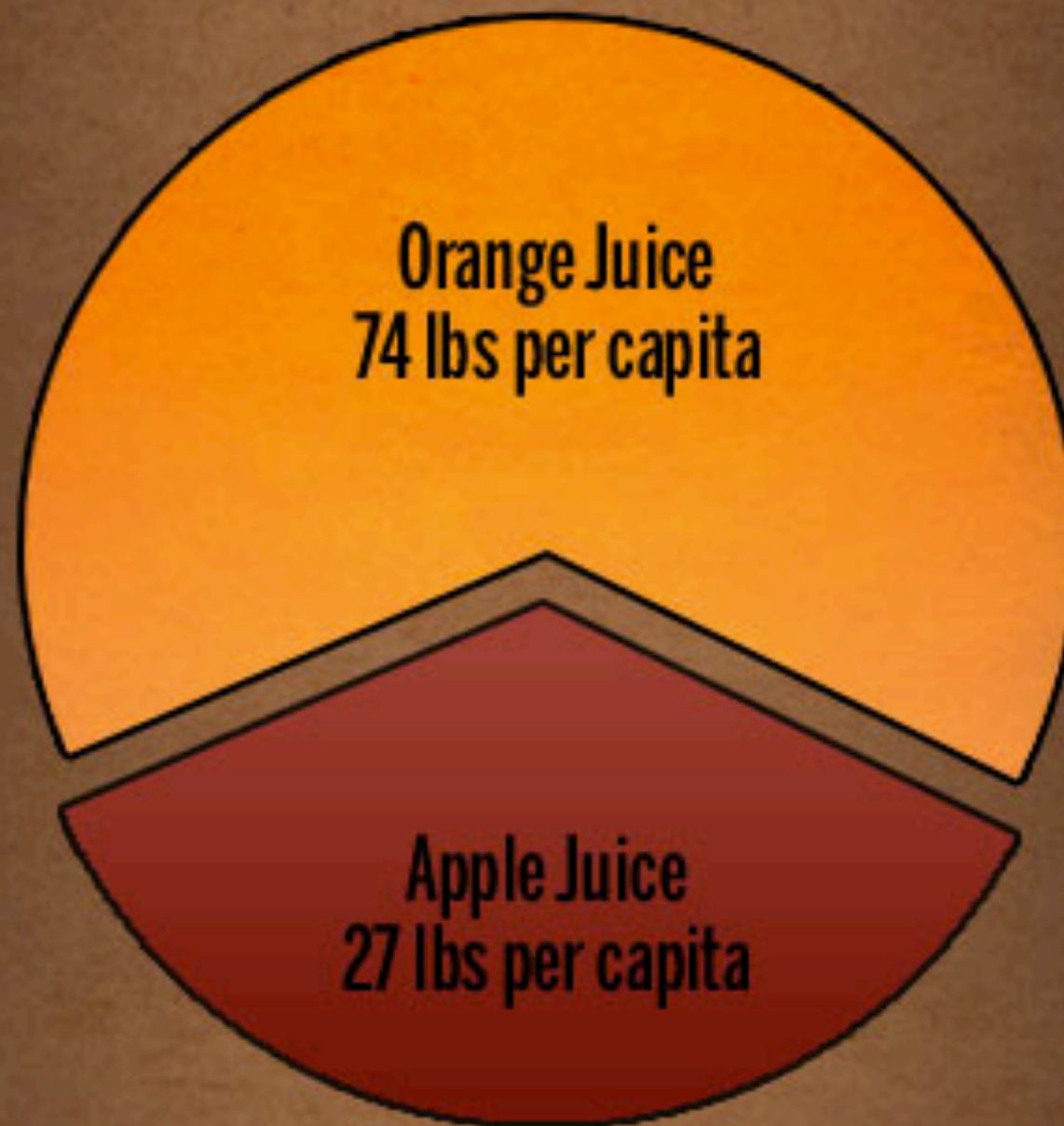
Right!

U.S. SmartPhone Marketshare



Wrong!

Apple or Orange Juice Consumption



It looks as if orange juice is the clear winner, but

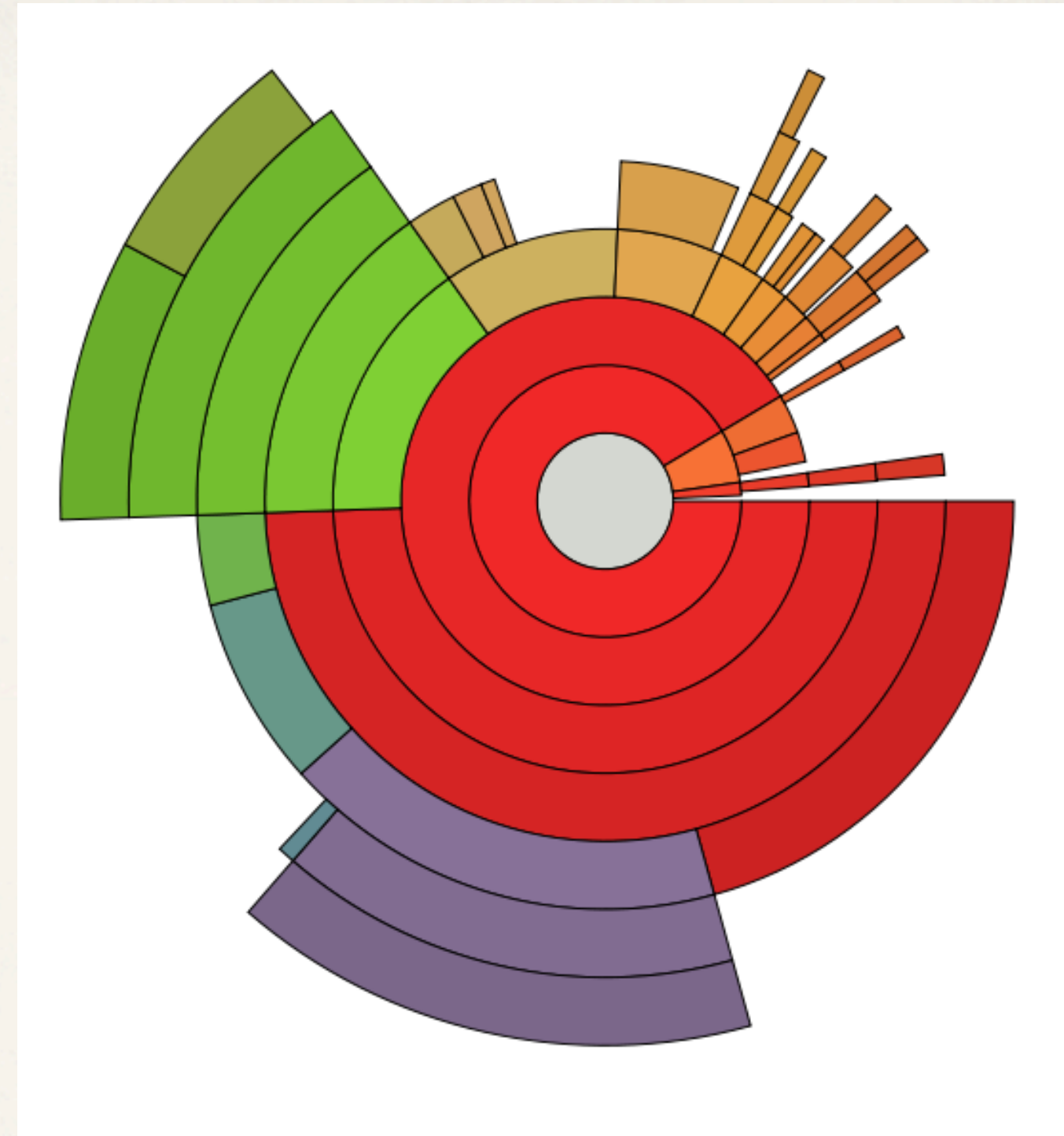
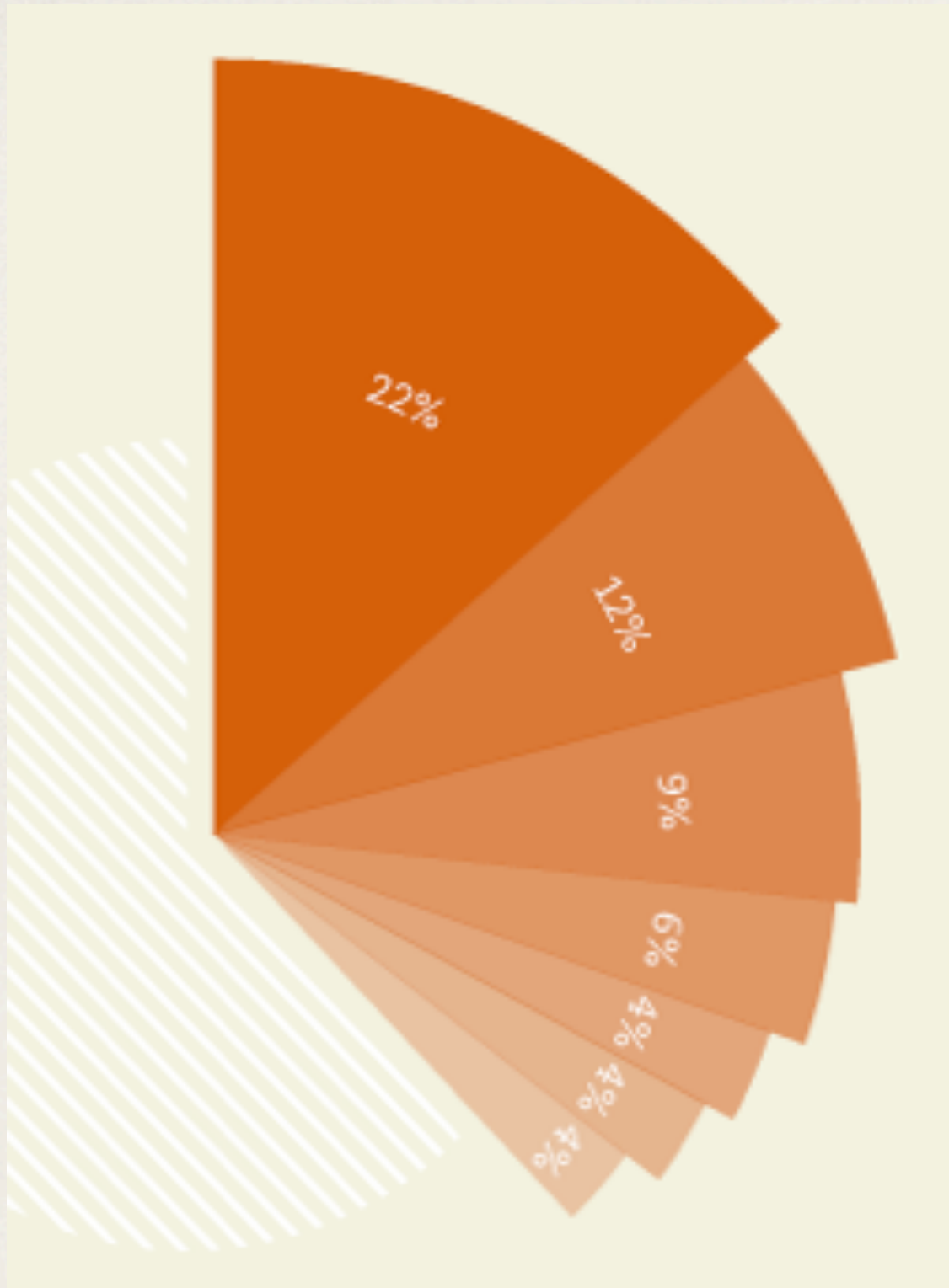
Right...

first lets take this chart into the 3rd dimension
for a deeper understanding.



As you can clearly see, only the science of 3D
can reveal that apple juice is indeed greater.

Wrong!



Wrong!

facebook vs. twitter

a breakdown of 2010 social demographics

500 Million
total users

88% of all people are aware of facebook

41% login everyday

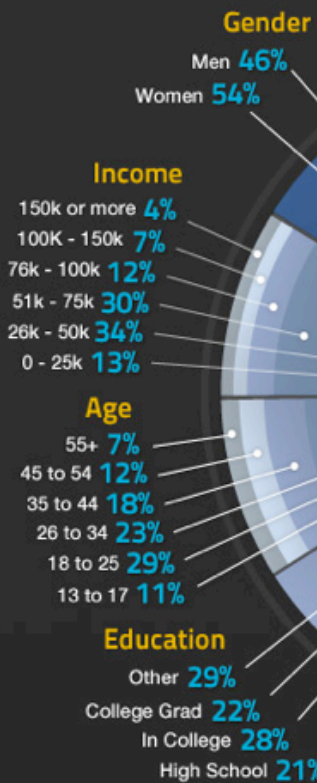
30% login via mobile device

40% follow a brand

51% of brand followers will purchase that specific brand

12% of logins update their status everyday

70% are located outside the U.S



facebook

106 Million
total users

87% of all people are aware of Twitter

27% login everyday

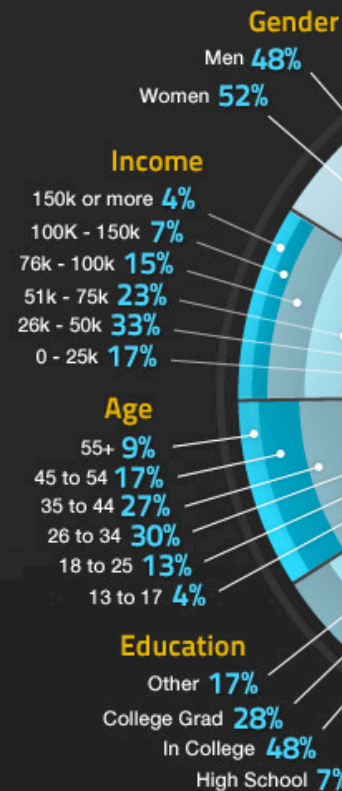
37% login via mobile device

25% follow a brand

67% of brand followers will purchase that specific brand

52% of logins update their status everyday

60% are located outside the U.S



twitter

All stats are based in U.S.
unless specified otherwise.

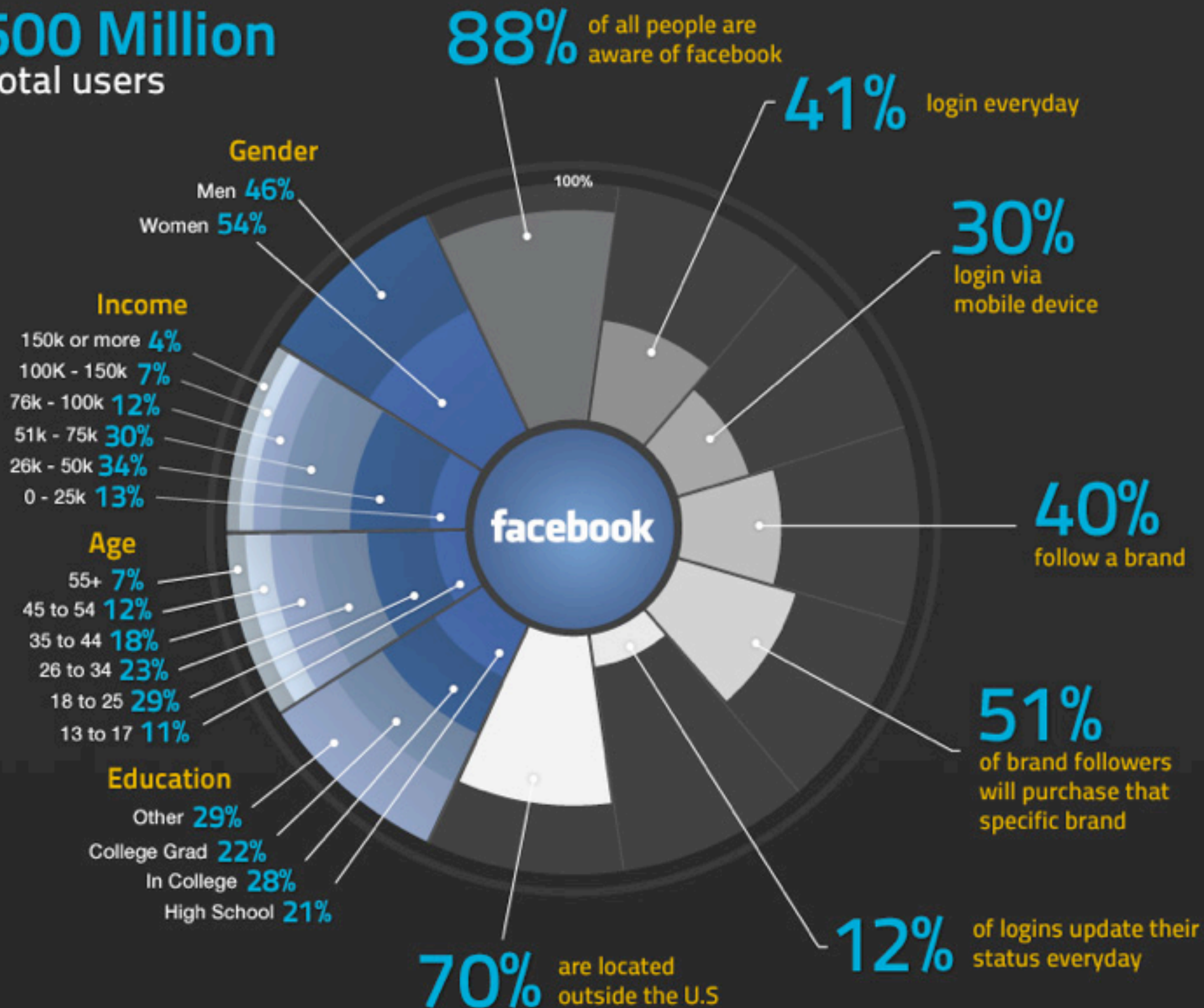
brought to you by
digitalsurgeons

Wrong!

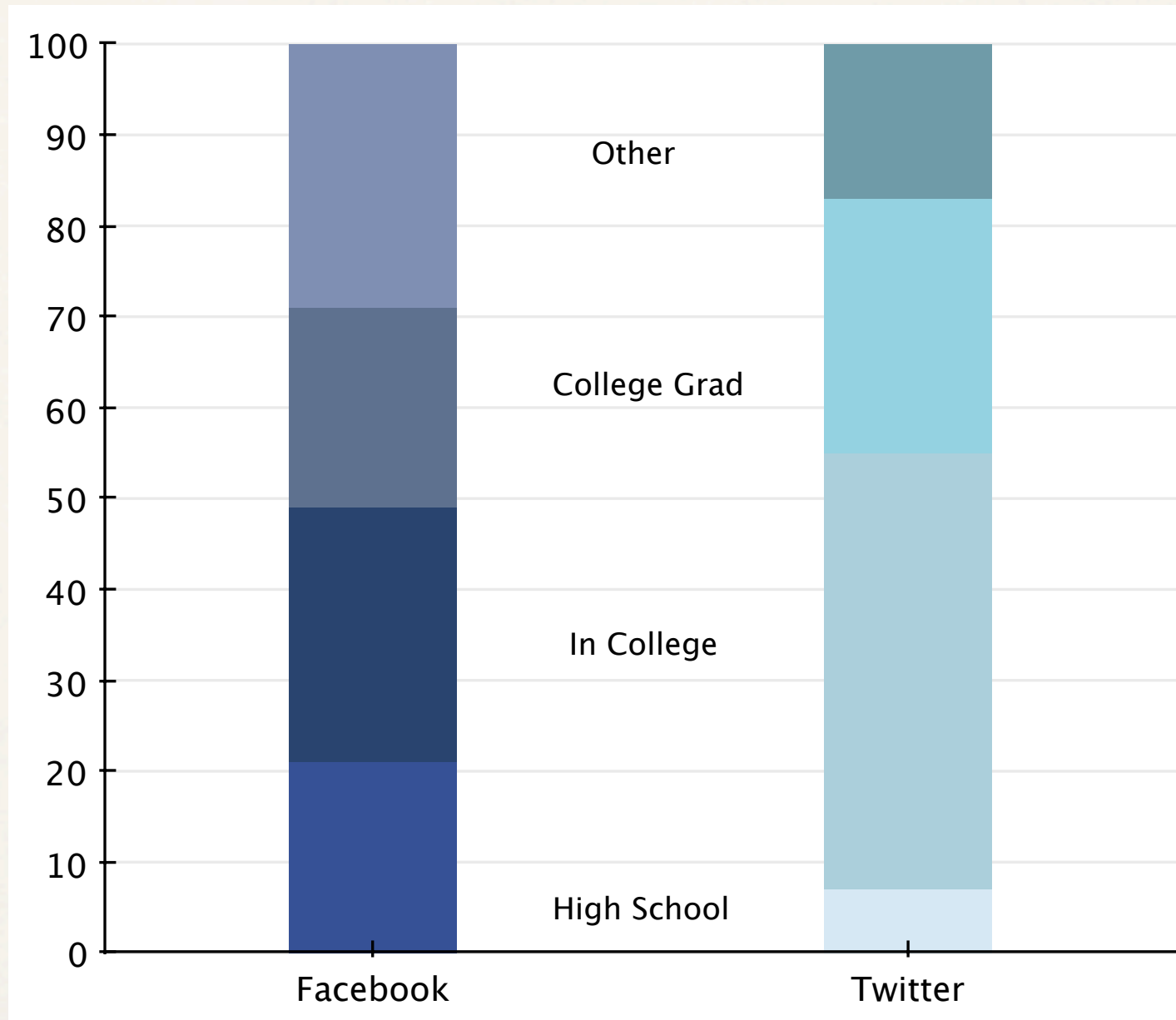
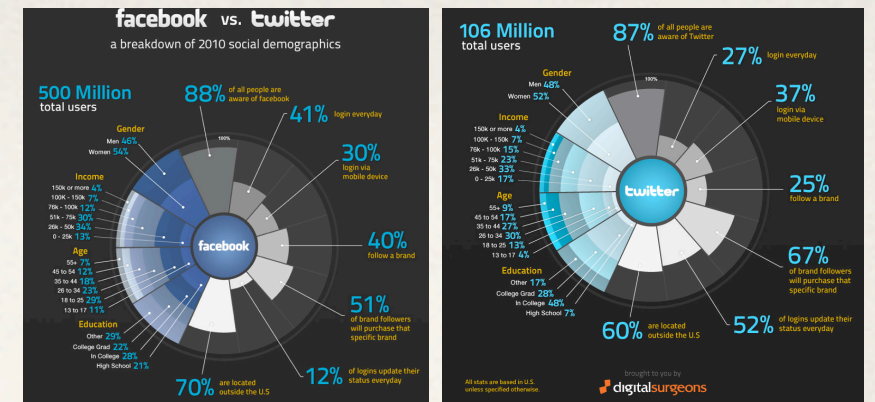
facebook vs. twitter

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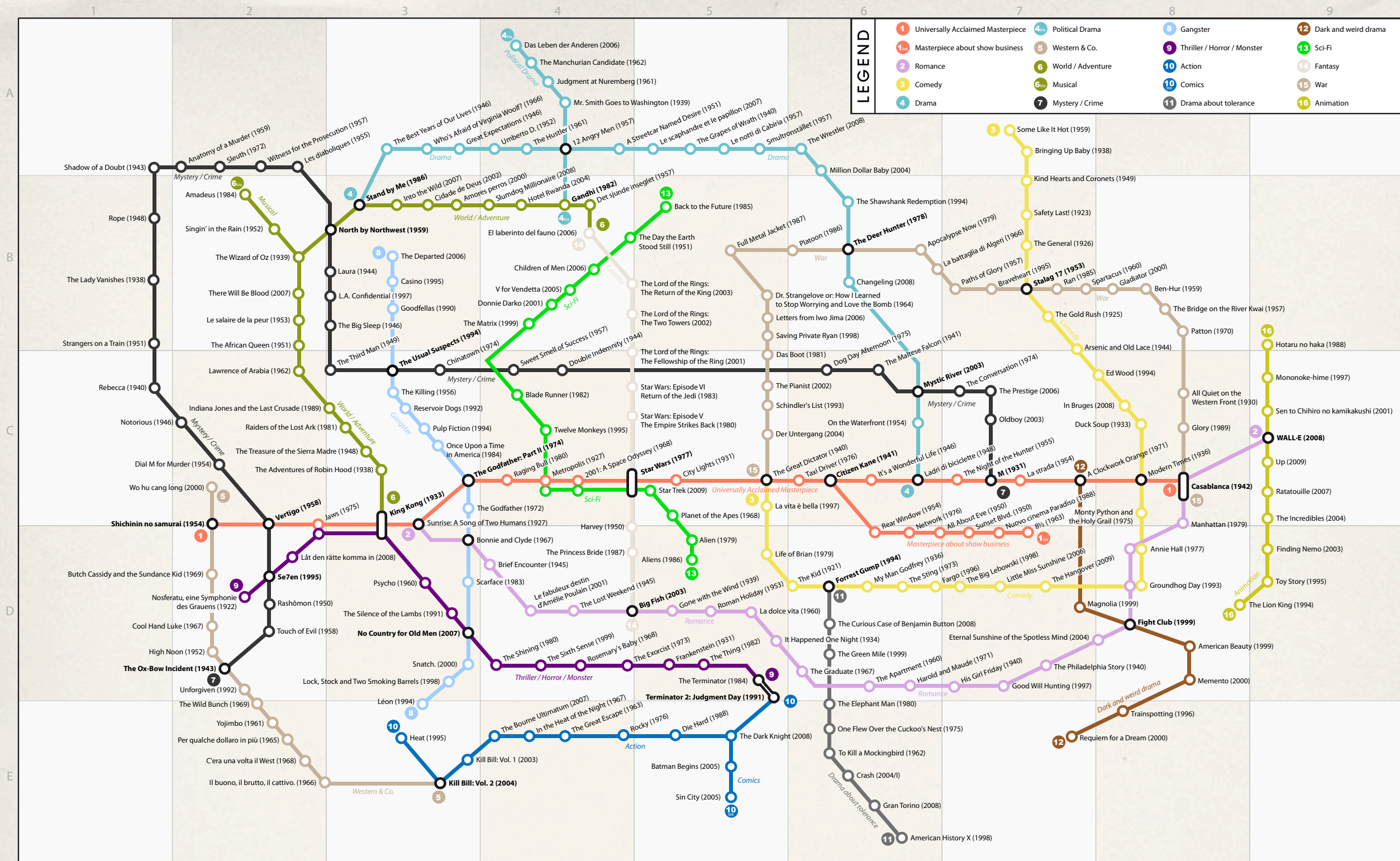
500 Million
total users



Use a format that fits the data



Better.



THE BEST MOVIES OF ALL TIME MAP

Designed by David Honnorat / Ranking based upon IMDb.com top 250 as voted by users on the 19th of 2009

1	The Shawshank Redemption (1994)	B6	31	... a Wonderful Life (1946)	D8	91	Once Upon a Time in America (1984)	D8	91	Once Upon a Time in America (1984)	B3	101	Stand by Me (1986)	B3	201	Beverly Hills Cop (1989)	C8	260	City (1989)	C8
2	The Godfather (1972)	D2	32	... So Close (1997)	D8	92	Full Metal Jacket (1987)	D8	92	Full Metal Jacket (1987)	D2	102	Batman Returns (1992)	C3	202	Safety Last! (1954)	C3	261	Runaway Bride (1999)	C8
3	The Godfather: Part II (1974)	D2	33	... The Untouchables (1960)	D8	93	Die Hard (1988)	D8	93	Die Hard (1988)	D2	103	Batman Returns (1992)	C3	203	Letter from Iowa (2006)	C3	262	Good Will Hunting (1997)	C8
4	... Bambi (1939)	D2	34	... The Untouchables (1960)	D8	94	Alvin & the Chipmunks (2007)	D8	94	Alvin & the Chipmunks (2007)	D2	104	... The Untouchables (1960)	D8	95	The Untouchables (1960)	C3	263	The Untouchables (1960)	C8
5	... The Untouchables (1960)	D2	35	... The Untouchables (1960)	D8	95	... The Untouchables (1960)	D8	95	... The Untouchables (1960)	D2	105	... The Untouchables (1960)	D8	96	... The Untouchables (1960)	C3	264	... The Untouchables (1960)	C8
6	... The Untouchables (1960)	D2	36	... The Untouchables (1960)	D8	96	... The Untouchables (1960)	D8	96	... The Untouchables (1960)	D2	106	... The Untouchables (1960)	D8	97	... The Untouchables (1960)	C3	265	... The Untouchables (1960)	C8
7	... The Untouchables (1960)	D2	37	... The Untouchables (1960)	D8	97	... The Untouchables (1960)	D8	97	... The Untouchables (1960)	D2	107	... The Untouchables (1960)	D8	98	... The Untouchables (1960)	C3	266	... The Untouchables (1960)	C8
8	... The Untouchables (1960)	D2	38	... The Untouchables (1960)	D8	98	... The Untouchables (1960)	D8	98	... The Untouchables (1960)	D2	108	... The Untouchables (1960)	D8	99	... The Untouchables (1960)	C3	267	... The Untouchables (1960)	C8
9	... The Untouchables (1960)	D2	39	... The Untouchables (1960)	D8	99	... The Untouchables (1960)	D8	99	... The Untouchables (1960)	D2	109	... The Untouchables (1960)	D8	100	... The Untouchables (1960)	C3	268	... The Untouchables (1960)	C8
10	... The Untouchables (1960)	D2	40	... The Untouchables (1960)	D8	100	... The Untouchables (1960)	D8	100	... The Untouchables (1960)	D2	110	... The Untouchables (1960)	D8	101	... The Untouchables (1960)	C3	269	... The Untouchables (1960)	C8
11	... The Untouchables (1960)	D2	41	... The Untouchables (1960)	D8	101	... The Untouchables (1960)	D8	101	... The Untouchables (1960)	D2	111	... The Untouchables (1960)	D8	102	... The Untouchables (1960)	C3	270	... The Untouchables (1960)	C8
12	... The Untouchables (1960)	D2	42	... The Untouchables (1960)	D8	102	... The Untouchables (1960)	D8	102	... The Untouchables (1960)	D2	112	... The Untouchables (1960)	D8	103	... The Untouchables (1960)	C3	271	... The Untouchables (1960)	C8
13	... The Untouchables (1960)	D2	43	... The Untouchables (1960)	D8	103	... The Untouchables (1960)	D8	103	... The Untouchables (1960)	D2	113	... The Untouchables (1960)	D8	104	... The Untouchables (1960)	C3	272	... The Untouchables (1960)	C8
14	... The Untouchables (1960)	D2	44	... The Untouchables (1960)	D8	104	... The Untouchables (1960)	D8	104	... The Untouchables (1960)	D2	114	... The Untouchables (1960)	D8	105	... The Untouchables (1960)	C3	273	... The Untouchables (1960)	C8
15	... The Untouchables (1960)	D2	45	... The Untouchables (1960)	D8	105	... The Untouchables (1960)	D8	105	... The Untouchables (1960)	D2	115	... The Untouchables (1960)	D8	106	... The Untouchables (1960)	C3	274	... The Untouchables (1960)	C8
16	... The Untouchables (1960)	D2	46	... The Untouchables (1960)	D8	106	... The Untouchables (1960)	D8	106	... The Untouchables (1960)	D2	116	... The Untouchables (1960)	D8	107	... The Untouchables (1960)	C3	275	... The Untouchables (1960)	C8
17	... The Untouchables (1960)	D2	47	... The Untouchables (1960)	D8	107	... The Untouchables (1960)	D8	107	... The Untouchables (1960)	D2	117	... The Untouchables (1960)	D8	108	... The Untouchables (1960)	C3	276	... The Untouchables (1960)	C8
18	... The Untouchables (1960)	D2	48	... The Untouchables (1960)	D8	108	... The Untouchables (1960)	D8	108	... The Untouchables (1960)	D2	118	... The Untouchables (1960)	D8	109	... The Untouchables (1960)	C3	277	... The Untouchables (1960)	C8
19	... The Untouchables (1960)	D2	49	... The Untouchables (1960)	D8	109	... The Untouchables (1960)	D8	109	... The Untouchables (1960)	D2	119	... The Untouchables (1960)	D8	110	... The Untouchables (1960)	C3	278	... The Untouchables (1960)	C8
20	... The Untouchables (1960)	D2	50	... The Untouchables (1960)	D8	110	... The Untouchables (1960)	D8	110	... The Untouchables (1960)	D2	120	... The Untouchables (1960)	D8	111	... The Untouchables (1960)	C3	279	... The Untouchables (1960)	C8
21	... The																			

cluster

TAKE A MOVIE SHOT

vodkaster.com
TAKE A MOVIE SHOT

Wrong!

<http://blog.vodkaster.com/2009/06/25/the-top-250-best-movies-of-all-time-map/>



Bird Island

Alcatraz Island

Treasure Island

Yerba Buena Island

TIME OF DAY

Show All | Hide All

Light | Dark [nearest hour]

Commute | Nightlife

Day | Night | Swing Shift



DATE

Past Week

Feb

2010

JAN 10 2011

JAN 17 2011

JAN 24 2011

JAN 31 2011

FEB 7

W Th F S S M T W Th F S S M T W Th F S S M T

CRIME TYPE [Show All](#) | [Hide All](#)

AA	Aggravated Assault	<input checked="" type="checkbox"/>
Mu	Murder	<input checked="" type="checkbox"/>
Ro	Robbery	<input checked="" type="checkbox"/>
SA	Simple Assault	<input checked="" type="checkbox"/>
DP	Disturbing the Peace	<input checked="" type="checkbox"/>
Na	Narcotics	<input checked="" type="checkbox"/>
Al	Alcohol	<input checked="" type="checkbox"/>
Pr	Prostitution	<input checked="" type="checkbox"/>
Th	Theft	<input checked="" type="checkbox"/>
VT	Vehicle Theft	<input checked="" type="checkbox"/>
Va	Vandalism	<input checked="" type="checkbox"/>
Bu	Burglary	<input checked="" type="checkbox"/>
Ar	Arson	<input checked="" type="checkbox"/>

Right!

Periodic Table of Beer Styles

I		II		III		IV		V		VI		VII		VIII		IX		X		XI		XII		XIII																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
1	1.026-1.036 1.006-1.009	2	1.044-1.056 1.006-1.012	3	1.065-1.085 1.014-1.020	4	1.042-1.055 1.008-1.012	5	1.044-1.056 1.006-1.012	6	1.070-1.100 1.016-1.024	7	1.035-1.055 1.008-1.018	8	1.040-1.056 1.008-1.012	9	1.052-1.080 1.010-1.015	10	1.043-1.056 1.008-1.012	11	1.035-1.050 1.008-1.014	12	1.044-1.050 1.008-1.012	13	1.066-1.074 1.011-1.020	14	1.040-1.056 1.008-1.012	15	1.040-1.056 1.008-1.012	16	1.040-1.056 1.008-1.012	17	1.045-1.056 1.010-1.015	18	1.030-1.038 1.006-1.012	19	1.030-1.035 1.006-1.012	20	1.030-1.038 1.004-1.012	21	1.035-1.050 1.008-1.014	22	1.050-1.075 1.010-1.017	23	1.044-1.050 1.006-1.012	24	1.040-1.046 1.006-1.010	25	1.048-1.056 1.010-1.014	26	1.074-1.080 1.020-1.028	27	1.048-1.056 1.008-1.012	28	1.042-1.060 1.008-1.016	29	1.065-1.098 1.014-1.024	30	1.050-1.075 1.010-1.018	31	1.039-1.045 1.006-1.014	32	1.035-1.040 1.010-1.014	33	1.040-1.055 1.010-1.018	34	1.040-1.050 1.008-1.014	35	1.035-1.066 1.010-1.022	36	1.075-1.090 1.020-1.030	37	1.044-1.056 1.014-1.020	38	1.046-1.050 1.010-1.014	39	1.052-1.056 1.010-1.014	40	1.066-1.074 1.018-1.024	41	1.066-1.080 1.016-1.028	42	1.042-1.060 1.008-1.016	43	1.065-1.085 1.012-1.018	44	1.043-1.056 1.008-1.012	45	1.046-1.065 1.010-1.018	46	1.040-1.050 1.010-1.018	47	1.040-1.050 1.008-1.014	48	1.050-1.065 1.012-1.018	49	1.035-1.060 1.008-1.021	50	1.075-1.100 1.018-1.030	51	1.045-1.060 1.012-1.018	52	1.040-1.050 1.008-1.012	53	1.044-1.052 1.012-1.016	54	1.090-1.116 1.023-1.035	55	1.042-1.046 1.006-1.010	56	1.060-1.080 1.012-1.016	57	1.050-1.056 1.012-1.016	58	1.044-1.055 1.007-1.010	59	1.050-1.055 1.012-1.016	60	1.060-1.090 1.015-1.022	61	1.044-1.048 1.008-1.014	62	1.048-1.056 1.010-1.014	63	1.040-1.055 1.012-1.018	64	1.085-1.120 1.024-1.032	65	1.072-1.085 1.016-1.028																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
Berliner weisse		Lambic		Belgian gold ale		Belgian white		Gueuze		Tripel		American wheat		Faro		Saison		Pale ale		Dry stout		Foreign extra stout		German pilsner		American standard		Dortmunder		Doppelbock		Weizenbier		Fruit beer		Belgian pale ale		American pale ale		Ordinary bitter		Scottish light 60/-		English mild		Scottish heavy 70/-		American brown		Brown porter		Sweet stout		Imperial stout		Bohemian pilsner		American premium		Munich dunkel		Traditional bock		Dunkelweizen		Flanders red		Belgian dark ale		India pale ale		Special bitter		Scottish Export 80/-		English brown		Robust porter		Oatmeal stout		Russian imperial stout		American pilsner		American dark		Schwarzbier		Eisbock		Weizenbock		Oud bruin		Dubbel		American amber ale		Extra special bitter		Scottish Export 80/-		English brown		Robust porter		Oatmeal stout		Russian imperial stout		American pilsner		American dark		Schwarzbier		Eisbock																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
2.5-3.6 3-12		4.7-6.4 5-15		7.0-9.0 25-35		4.5-5.5 15-28		4.7-6.4 5-15		7.0-10.0 20-30		3.5-5.0 5-20		4.5-5.5 5-15		4.5-8.1 25-40		4.5-5.5 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15		4.7-7.0 15-21		3.9-5.6 20-35		4.5-5.7 20-40		3.0-3.8 20-35		2.8-4.0 9-20		2.5-4.1 10-24		4.6-5.4 25-45		4.1-4.8 5-17		5.1-6.1 23-29		6.6-7.9 20-30		4.3-5.6 8-15	

Google APIs & Developer Products – January 2011

Android		Google APIs & Developer Products – January 2011										Chromium								
Mobile		Search	Gadgets	Data APIs	Social	Misc	Ads	Geo	Tools	Chrome										
Google Custom Search API	Gadgets API										KML	Google Latitude API	Google Earth API	Google Transit Feed	Closure Tools	Google Chrome Frame				
Image Search API	iGoogle Developer Home										Google AdWords API	Google Javascript Maps API	Google Maps API For Flash	Google Maps API Premier	Google App Engine	Google Chrome Extensions				
News Search API	iGoogle Themes API	Google Data Protocol	Google Analytics	Blogger Data API	Gmail APIs and Tools	Google Calendar APIs and	Google Buzz API	Google Friend Connect	Google Feed API	Feedburner APIs	Google Language API	Google Translator Toolkit	Google Prediction API	BigQuery	Google AdSense API	AdSense for Search Ads Only	Google Static Maps API	Google Geocoding API	Google Web Toolkit	Installable Web Apps
Blog Search API	Google Desktop APIs	Google Contacts APIs	Google Apps	Google Webmaster Tools Data	Google Sidewiki API	Content API for Shopping	PubSubHubb	Orkut Developer Home	Google Checkout	Google Commerce Search	Chart Tools	Google SketchUp Ruby API	Google Storage for	Google Fusion Tables API	AdSense for Ajax	AdSense for Mobile Applications	AdMob	Google Directions API	Google Plugin for Eclipse	Chrome Web Store
Video Search API	Google Apps Marketplace	Google Documents List Data	Google Spreadsheet Data API	Google Finance Data API	Google Health API	Google Sites Data API	Social Graph API	OpenSocial	Google PowerMeter API	Google Moderator API	Google Safe Browsing	Mobile Homepage	Google Cloud Print	Google TV Optimization Guides	Google Interactive Media Ads	Google's DoubleClick for	Google's DoubleClick for	Google Analytics for Mobile	Google Java Developer	V8
Patent Search API	Google Web Elements	Picasa Web Albums	Google Book Search	YouTube APIs	Google Code Search	Google Secure Data	Google Wave API	Google Talk for Developers	Google Account Authenticati	reCAPTCHA	Google Libraries API	Google Project Hosting	Google Apps Script	Google APIs Console						

Wrong!

A PERIODIC TABLE OF VISUALIZATION METHODS

<div><div>>☀<</div><div>C</div><div>continuum</div></div>																<div><div>☀</div><div>G</div><div>graphic facilitation</div></div>	
<div><div>>☀<</div><div>Tb</div><div>table</div></div>	<div><div>>☀<</div><div>Ca</div><div>cartesian coordinates</div></div>																<div><div>☐</div><div>Ct</div><div>cartoon</div></div>
<div><div>>☀<</div><div>Pi</div><div>pie chart</div></div>	<div><div>>☀<</div><div>L</div><div>line chart</div></div>																<div><div>☀</div><div>Ri</div><div>rich picture</div></div>
<div><div>>☀<</div><div>B</div><div>bar chart</div></div>	<div><div>>☀<</div><div>Ac</div><div>area chart</div></div>	<div><div>>☀<</div><div>R</div><div>radar chart cobweb</div></div>	<div><div>>☀<</div><div>Pa</div><div>parallel coordinates</div></div>	<div><div>>☀<</div><div>Hy</div><div>hyperbolic tree</div></div>	<div><div>>☀<</div><div>Cy</div><div>cycle diagram</div></div>	<div><div>>☀<</div><div>T</div><div>timeline</div></div>	<div><div>>☀<</div><div>Ve</div><div>venn. diagram</div></div>	<div><div><☀></div><div>Mi</div><div>mindmap</div></div>	<div><div><☀></div><div>Sq</div><div>square of oppositions</div></div>	<div><div>>☀<</div><div>Cc</div><div>concentric circles</div></div>	<div><div>>☀<</div><div>Ar</div><div>argument slide</div></div>	<div><div>>☀<</div><div>Sw</div><div>swim lane diagram</div></div>	<div><div>>☀<</div><div>Gc</div><div>gantt chart</div></div>	<div><div><☀></div><div>Pm</div><div>perspectives diagram</div></div>	<div><div>>☀<</div><div>D</div><div>dilemma diagram</div></div>	<div><div><☀></div><div>Pr</div><div>parameter ruler</div></div>	<div><div>☀</div><div>Kn</div><div>knowledge map</div></div>
<div><div>>☀<</div><div>Hi</div><div>histogram</div></div>	<div><div>>☀<</div><div>Sc</div><div>scatterplot</div></div>	<div><div>>☀<</div><div>Sa</div><div>sankey diagram</div></div>	<div><div>>☀<</div><div>In</div><div>information lense</div></div>	<div><div>>☐<</div><div>E</div><div>entity relationship diagram</div></div>	<div><div>>☀<</div><div>Pt</div><div>petri net</div></div>	<div><div>>☀<</div><div>Fi</div><div>flow chart</div></div>	<div><div><☀></div><div>Cl</div><div>clustering</div></div>	<div><div>>☀<</div><div>Lc</div><div>layer chart</div></div>	<div><div>>☀<</div><div>Py</div><div>minto pyramid technique</div></div>	<div><div>>☀<</div><div>Ce</div><div>cause-effect chains</div></div>	<div><div>>☀<</div><div>Tl</div><div>toulmin map</div></div>	<div><div>>☀<</div><div>Dt</div><div>decision tree</div></div>	<div><div>>☐<</div><div>Cp</div><div>cpm critical path method</div></div>	<div><div><☀></div><div>Cf</div><div>concept fan</div></div>	<div><div>>☀<</div><div>Co</div><div>concept map</div></div>	<div><div>☀</div><div>Ic</div><div>iceberg</div></div>	<div><div>☀</div><div>Lm</div><div>learning map</div></div>
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Data Visualization
Visual representations of quantitative data in schematic form (either with or without axes)

Strategy Visualization
The systematic use of complementary visual representations in the analysis, development, formulation, communication, and implementation of strategies in organizations.

Information Visualization
The use of interactive visual representations of data to amplify cognition. This means that the data is transformed into an image, it is mapped to screen space. The image can be changed by users as they proceed working with it.




Metaphor Visualization
Visual Metaphors position information graphically to organize and structure information. They also convey an insight about the represented information through the key characteristics of the metaphor that is employed.

Concept Visualization
Methods to elaborate (mostly) qualitative concepts, ideas, plans, and analyses.

Compound Visualization
The complementary use of different graphic representation formats in one single schema or frame.

Cy **Process Visualization**





























Hy **Structure Visualization**

 **Overview**
 **Detail**
 **Detail AND Overview**
< > **Divergent thinking**
> < **Convergent thinking**

Note: Depending on your location and connection speed it can take some time to load a pop-up picture.

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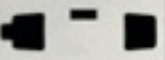
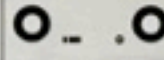
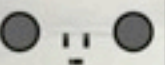
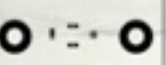
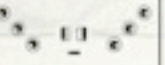



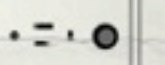
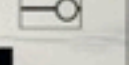



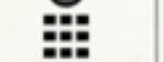


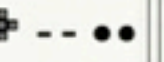




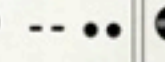
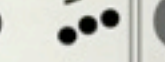
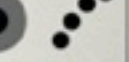
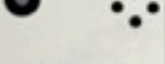
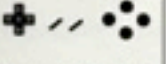
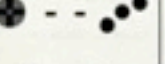
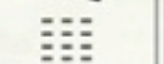

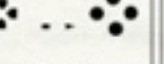
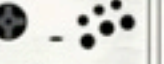


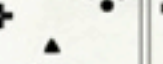


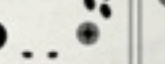
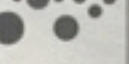

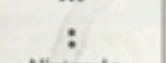
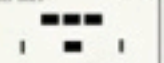


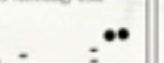
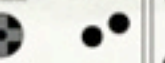
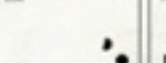
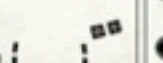

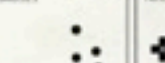
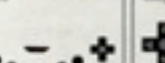
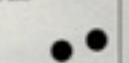



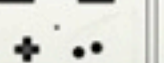
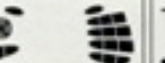
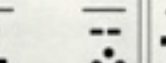
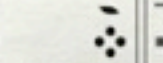
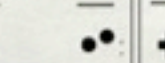
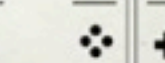

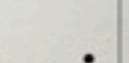
version 1.5

 Su supply demand curve	 Pc performance charting	 St strategy map	 Oc organisation chart	 Ho house of quality	 Fd feedback diagram	 Ft failure tree	 Mq magic quadrant	 Ld life-cycle diagram	 Po porter's five forces	 S s-cycle	 Sm stakeholder map	 Is ishikawa diagram	 Tc technology roadmap
 Ed edgeworth box	 Pf portfolio diagram	 Sg strategic game board	 Mz mintzberg's organigraph	 Z zwicky's morphological box	 Ad affinity diagram	 De decision discovery diagram	 Bm bcg matrix	 Stc strategy canvas	 Vc value chain	 Hy hype-cycle	 Sr stakeholder rating map	 Ta taps	 Sd spray diagram

Wrong!

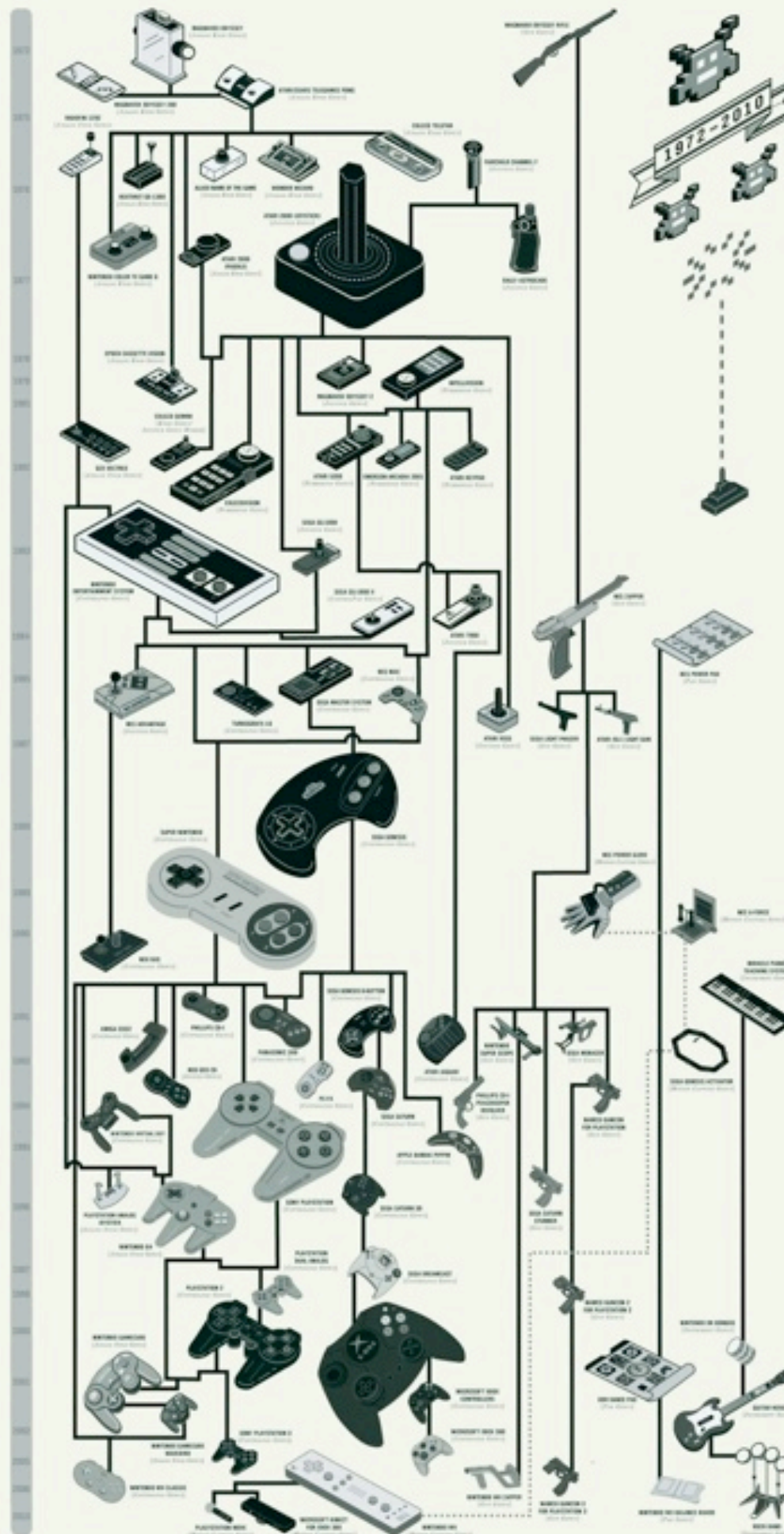
The Periodic Table of Controllers

Console and handheld
mikevasilev.com

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<div>11972</div> <div>n/a</div> <div></div> <div>Magnavox Odyssey</div> <div>Ralph Baer Brown Box</div>										<div>21975</div> <div>Oscilloscope</div> <div></div> <div>Atari Pong</div> <div>Harold Lee Pong</div>																	
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<div>111978</div> <div>Intel 8048</div> <div></div> <div>Magnavox Odyssey2</div> <div>n/a n/a</div>		<div>121980</div> <div>U1 CP16015</div> <div></div> <div>Mattel Intellivision</div> <div>Gabriel Baum n/a</div>		<div>131982</div> <div>Motorola MC68009</div> <div></div> <div>Vectrex</div> <div>n/a n/a</div>		<div>141982</div> <div>6502C</div> <div></div> <div>Atari 5200</div> <div>n/a 5200</div>		<div>151982</div> <div>Synetics 2650</div> <div></div> <div>Emerson Arcadia 2001</div> <div>n/a n/a</div>		<div>161982</div> <div>Zilog Z80</div> <div></div> <div>Colecovision</div> <div>n/a n/a</div>		<div>171983</div> <div>Rush 2403 8-bit</div> <div></div> <div>Nintendo Family Computer</div> <div>Masayuki Uemura/Famicon</div>		<div>181985</div> <div>MOS Technology 6510</div> <div></div> <div>Commodore 64</div> <div>n/a C64</div>		<div>191985</div> <div>Rush 2403 8-bit</div> <div></div> <div>Nintendo Entertainment System</div> <div>Masayuki Uemura NES</div>		<div>201986</div> <div>6502C</div> <div></div> <div>Atari 7800</div> <div>Steve Golson 7800</div>		<div>211986</div> <div>8-bit Zilog Z80</div> <div></div> <div>Sega Master System</div> <div>n/a SMS</div>		<div>221989</div> <div>HuC6280</div> <div></div> <div>NEC TurboGrafx 16</div> <div>n/a PC Engine</div>		<div>231989</div> <div>Motorola 68000</div> <div></div> <div>Sega Genesis</div> <div>Hayao Nakayama Genesis</div>		<div>241990</div> <div>Motorola 68000</div> <div></div> <div>SNK NEO-Geo</div> <div>Eikichi Kawasaki NEO-Geo</div>	
<div>251991</div> <div>Philips SNECPS</div> <div></div> <div>Philips CD-i</div> <div>n/a CD-i</div>		<div>261991</div> <div>10-bit 65C816</div> <div></div> <div>Super Nintendo Entertainment System</div> <div>Masayuki Uemura SNES</div>		<div>271993</div> <div>ARMAD</div> <div></div> <div>Panasonic 3DO</div> <div>Dave Needle 3DO</div>		<div>281993</div> <div>multi-processor</div> <div></div> <div>Atari Jaguar</div> <div>Martin Brennan Jaguar</div>		<div>291994</div> <div>Motorola 68000</div> <div></div> <div>SNK NEO-Geo CD</div> <div>n/a CDZ</div>		<div>301995</div> <div>MPS 43000A</div> <div></div> <div>Sony PlayStation</div> <div>Ken Kutaragi PS1</div>		<div>311995</div> <div>2 x Hitachi SH-2 32-bit RISC</div> <div></div> <div>Sega Saturn</div> <div>n/a Saturn</div>		<div>321995</div> <div>33.75 MHz NEC VR4300</div> <div></div> <div>Nintendo 64</div> <div>James H. Clark N64</div>		<div>331996</div> <div>PowerPC 603 RISC</div> <div></div> <div>Apple Bandai Pippin</div> <div>n/a Pippin</div>		<div>341999</div> <div>Hitachi SH4 RISC</div> <div></div> <div>Sega Dreamcast</div> <div>Hideki Sato Dreamcast</div>		<div>352000</div> <div>64 bit Emotion Engine</div> <div></div> <div>Sony PlayStation Two</div> <div>Ken Kutaragi PS2</div>		<div>362001</div> <div>PowerPC Gekko</div> <div></div> <div>Nintendo GameCube</div> <div>Kumateki Matsushita/GCN</div>		<div>372001</div> <div>Custom Intel Celerone</div> <div></div> <div>Microsoft Xbox</div> <div>Seamus Blackley xbox</div>		<div>382005</div> <div>PowerPC Tri-Core Ramon</div> <div></div> <div>Microsoft Xbox 360</div> <div>Jonathan Hayes 360</div>	
<div>392006</div> <div>Cell Broadband Engine</div> <div></div> <div>Sony PlayStation 3</div> <div>Ken Kutaragi PS3</div>		<div>402006</div> <div>800 MHz PowerPC-based</div> <div></div> <div>Nintendo Wii</div> <div>Kenichiro Ashida Wii</div>		<div>411979</div> <div>Intel 8021</div> <div></div> <div>Milton Bradley Microvision</div> <div>Jay Smith n/a</div>		<div>421980</div> <div>n/a</div> <div></div> <div>Nintendo Game & Watch</div> <div>Gunpei Yokoi n/a</div>		<div>431989</div> <div>8-bit Sharp LR35902</div> <div></div> <div>Nintendo Game boy</div> <div>Gunpei Yokoi Game boy</div>		<div>441989</div> <div>MOS Technology 6502</div> <div></div> <div>Atari Lynx</div> <div>n/a Lynx</div>		<div>451990</div> <div>HuC6280</div> <div></div> <div>NEC TurboExpress</div> <div>n/a PC Engine GT</div>		<div>461990</div> <div>Zilog Z80</div> <div></div> <div>Sega Game Gear</div> <div>n/a Game Gear</div>		<div>471991</div> <div>n/a</div> <div></div> <div>Atari Lynx II</div> <div>n/a Lynx</div>		<div>481995</div> <div>Motorola 68000</div> <div></div> <div>Sega Nomad</div> <div>n/a Nomad</div>		<div>491997</div> <div>Sharp SM5C21</div> <div></div> <div>Tiger game.com</div> <div>n/a n/a</div>		<div>501995</div> <div>NEC V850</div> <div></div> <div>Virtual Boy</div> <div>n/a VR-32</div>		<div>511998</div> <div>Zilog Z80 clone</div> <div></div> <div>Nintendo Gameboy Color</div> <div>n/a GBC</div>			
<div>521999</div> <div>Toshiba TLCS900H</div> <div></div> <div>Neo Geo Pocket Color</div> <div>n/a n/a</div>		<div>531999</div> <div>SPC11002</div> <div></div> <div>Bandai WonderSwan Color</div> <div>n/a n/a</div>		<div>542001</div> <div>ARM7TDMI</div> <div></div> <div>Nintendo Game boy Advanced</div> <div>n/a GBA</div>		<div>552003</div> <div>32-bit RISC-CPU</div> <div></div> <div>Nintendo Game boy Advanced SP</div> <div>n/a GBASP</div>		<div>562003</div> <div>ARM7</div> <div></div> <div>Nokia N-Gage</div> <div>n/a N-gage</div>		<div>572004</div> <div>ARM746EJ-S/ARM7TDMI</div> <div></div> <div>Nintendo DS</div> <div>n/a The Fat</div>		<div>582004</div> <div>MPS W4000-based</div> <div></div> <div>Sony PlayStation Portable</div> <div>n/a PSP</div>		<div>592005</div> <div>32-bit ARM7TDMI</div> <div></div> <div>Game boy Micro</div> <div>n/a Micro</div>		<div>602006</div> <div>ARM7 / ARM7T</div> <div></div> <div>Nintendo DS Lite</div> <div>n/a DS Lite</div>		<div>612008</div> <div>1.33 GHz ARM</div> <div></div> <div>Nintendo DSi</div> <div>Masato Kamekura DSi</div>		<div>622009</div> <div>MPS 313 MHz</div> <div></div> <div>Sony PlayStation Portable</div> <div>n/a PSP GO</div>							

Wrong!

GENERAL:



Right!