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Discussion Section A01 & A02
Nov 2, 2022

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Visualization Goals

- Explanatory (Communicate)
  - Present data
  - Explain and inform
  - Provide evidence
  - Influence and persuade
- Exploratory (Analyze)
  - Explore the data
  - Assess a situation
  - Determine how to proceed
  - Decide what to do

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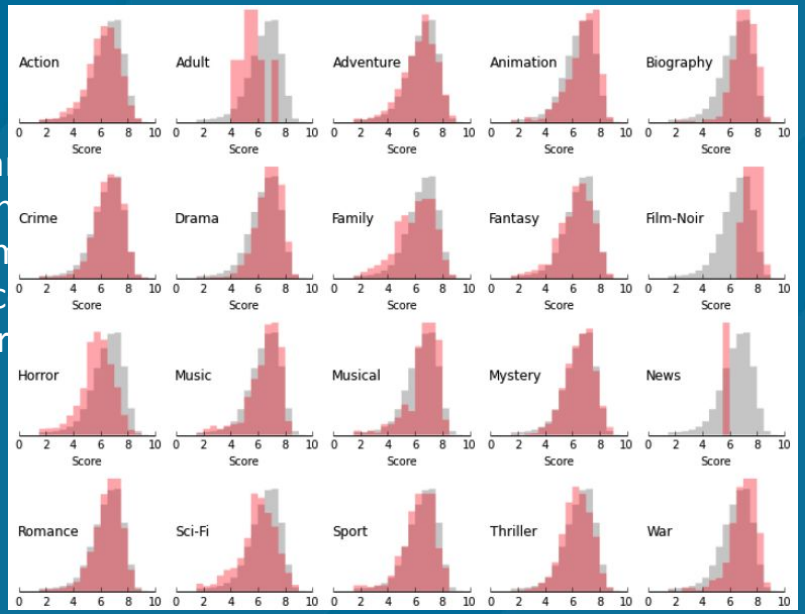
Exploratory Data Analysis (EDA)

- Exa
- Har
- Ren
- Enc
- Nor



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But how?

- **Build** a DataFrame (pandas) from the data
- **Clean** the DataFrame, i.e,
  - Each row describes a single object
  - Each column describes a property of that object
- Explore **summary** of the data (histograms, scatterplots, aggregation functions)
- Explore **subsets** of data (groupBy)

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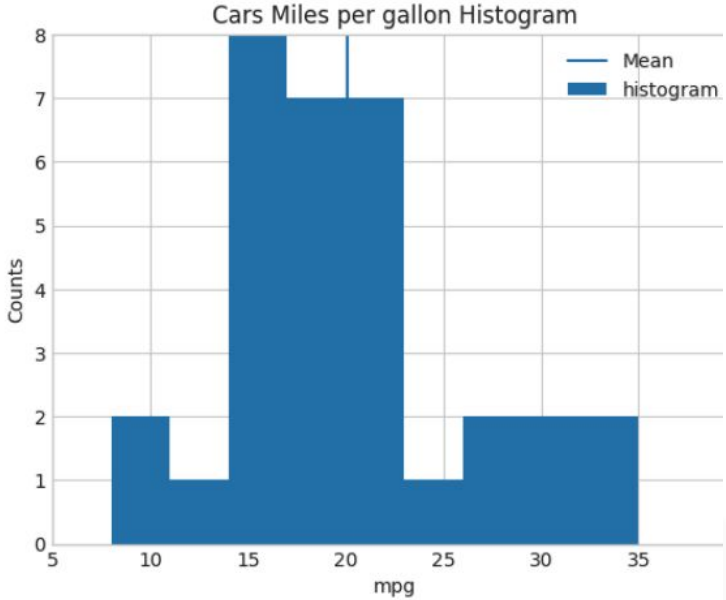
But how?

	name	mpg	cyl	disp	hp	drat	wt	qsec	vs	am	gear	carb	maker
0	Mazda RX4	21.0	6	160.0	110	3.90	2.620	16.46	0	1	4	4	Mazda
1	Mazda RX4 Wag	21.0	6	160.0	110	3.90	2.875	17.02	0	1	4	4	Mazda
2	Datsun 710	22.8	4	108.0	93	3.85	2.320	18.61	1	1	4	1	Datsun
3	Hornet 4 Drive	21.4	6	258.0	110	3.08	3.215	19.44	1	0	3	1	Hornet
4	Hornet Sportabout	18.7	8	360.0	175	3.15	3.440	17.02	0	0	3	2	Hornet



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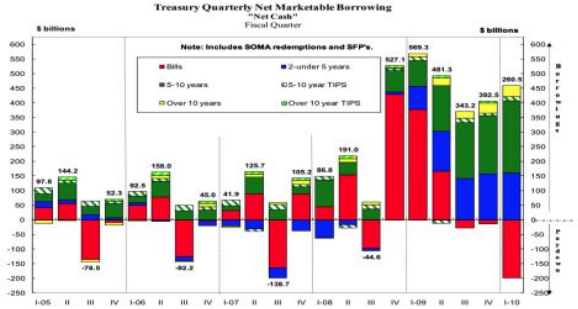
Not “Effective”



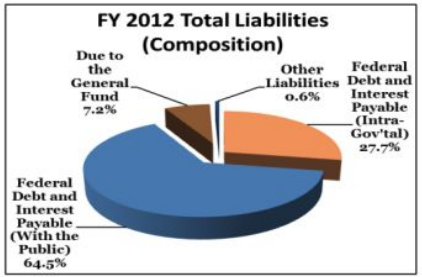
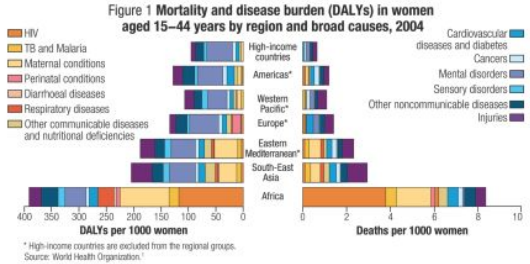
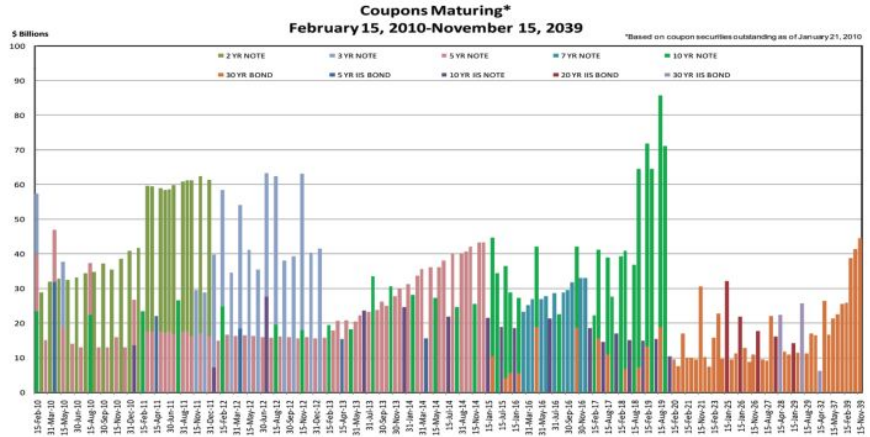


Figure 10





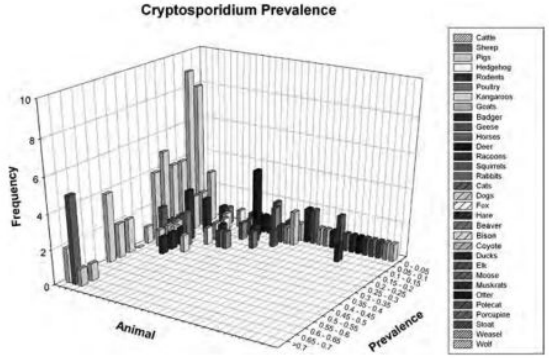


Figure 5.2 Mean prevalence rates of *Cryptosporidium* oocysts by animal species.

Sources: US Treasury and WHO reports

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Effective EDA Viz

- Have graphical integrity
- Keep it simple
- Use the right chart
- Use the right colors

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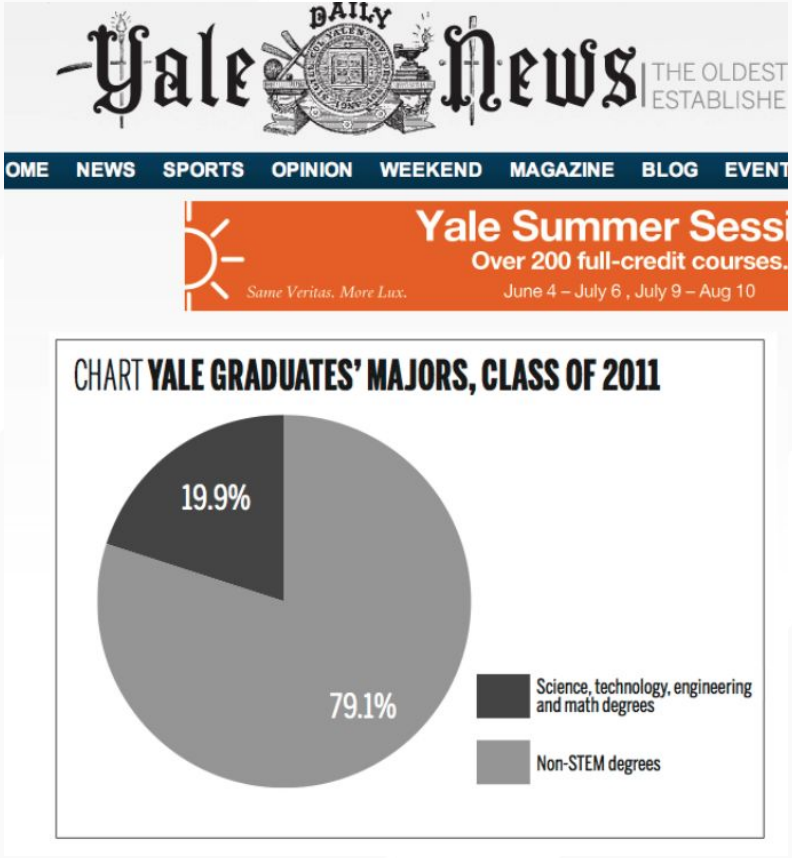
Graphical Integrity



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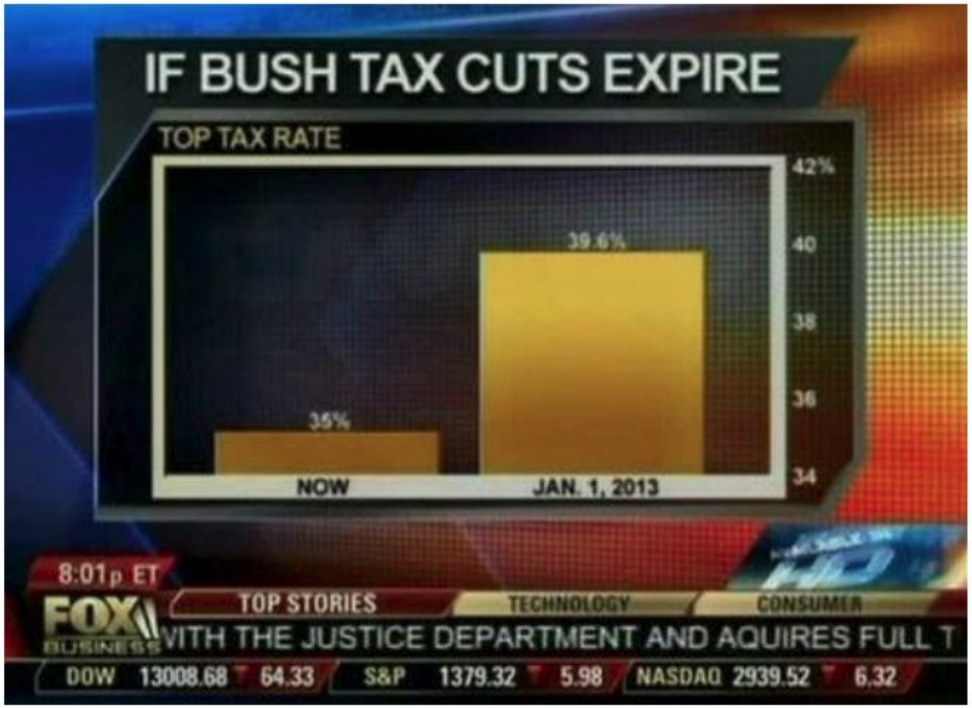
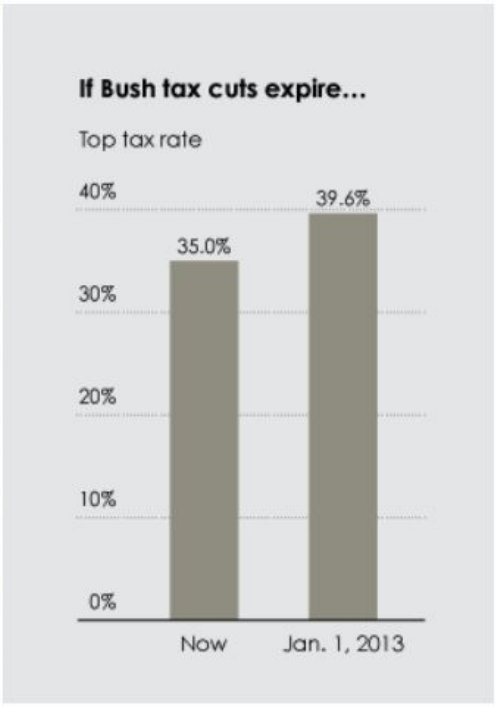
Graphical Integrity





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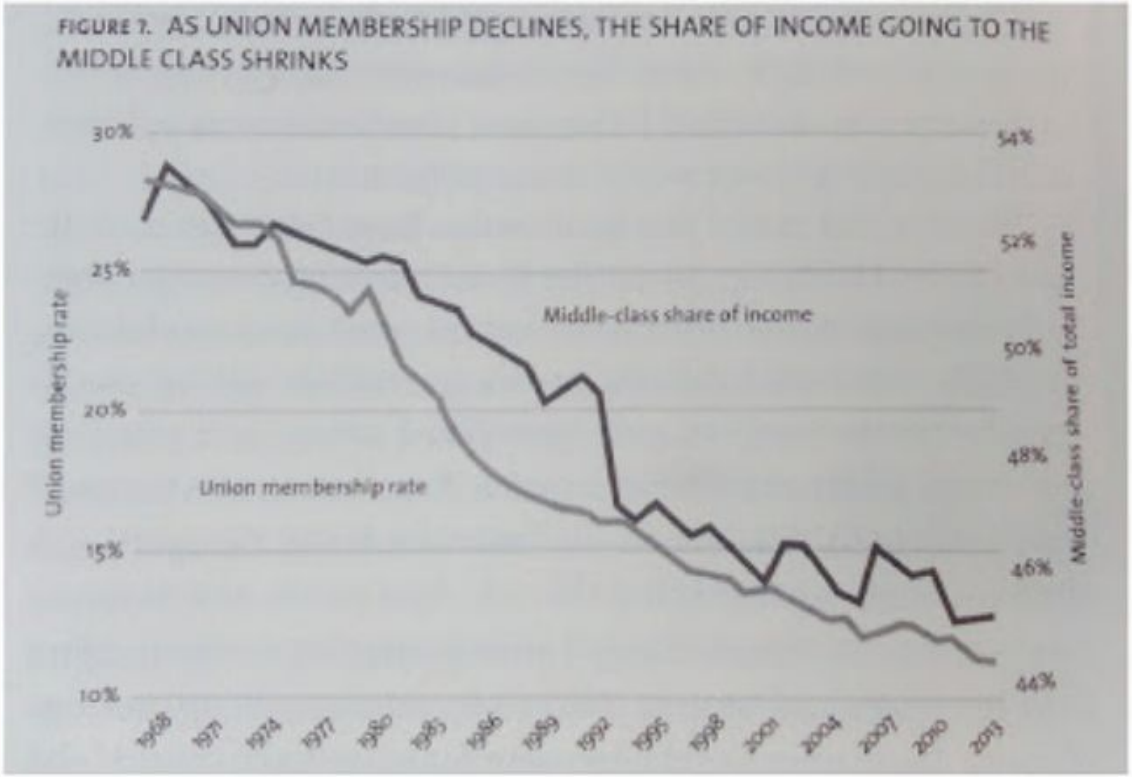
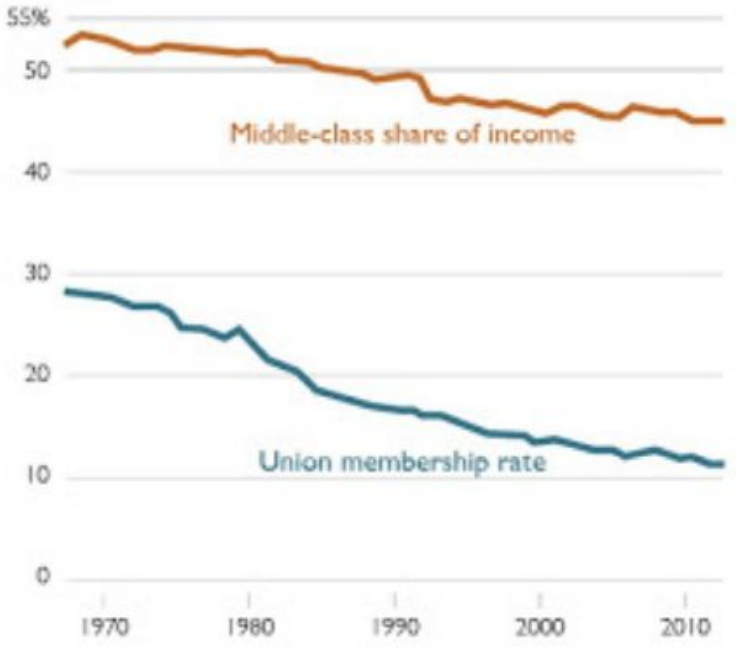
Graphical Integrity



NEW VERSION



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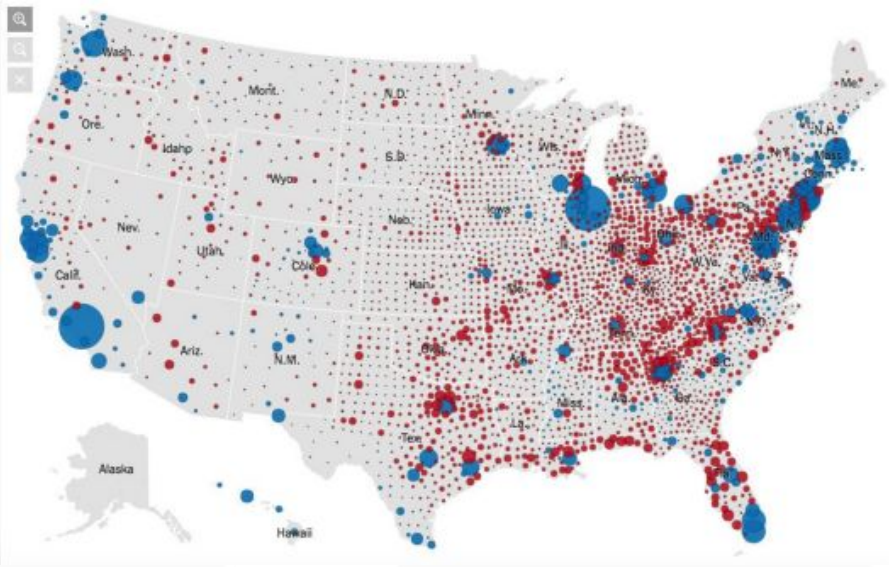
Graphical Integrity



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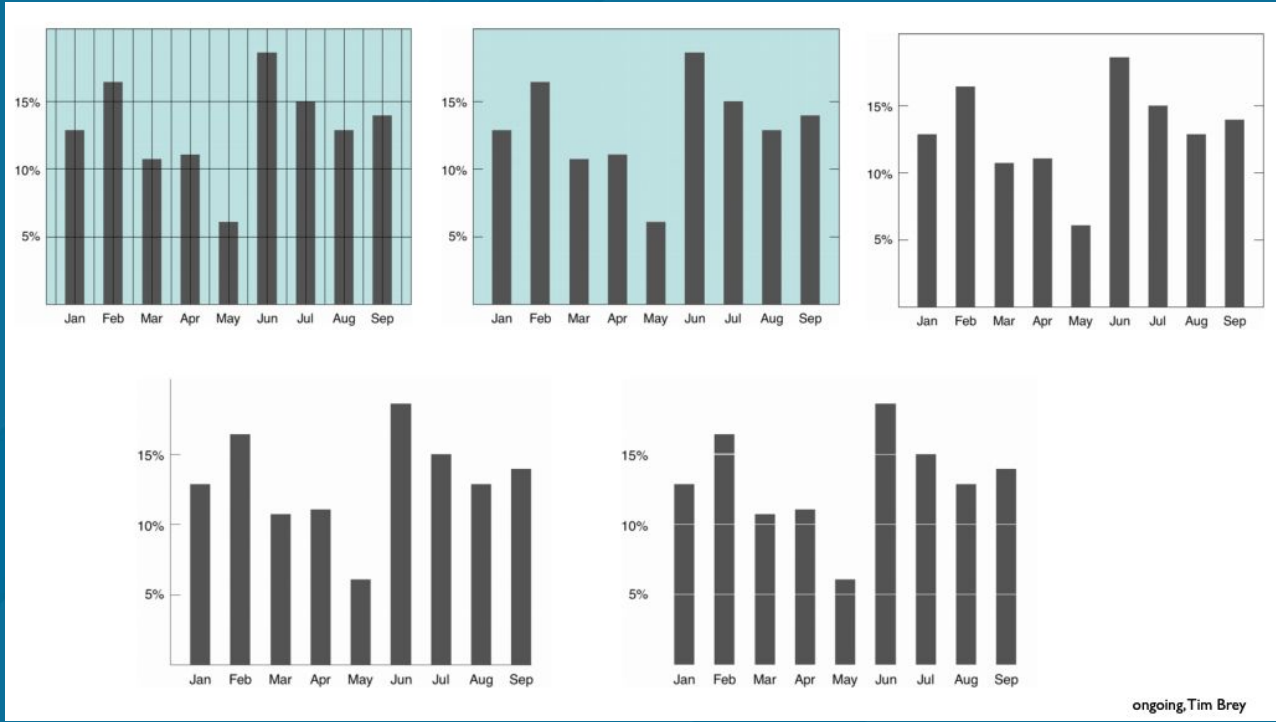
Keep it simple



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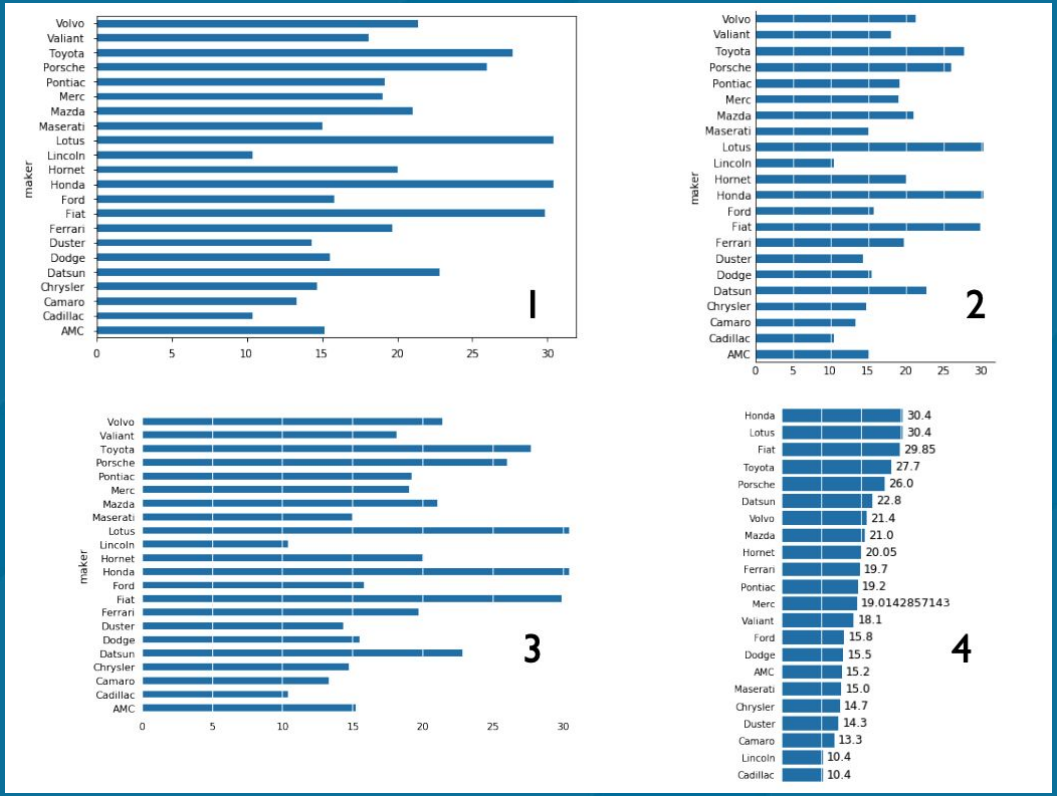
Keep it simple



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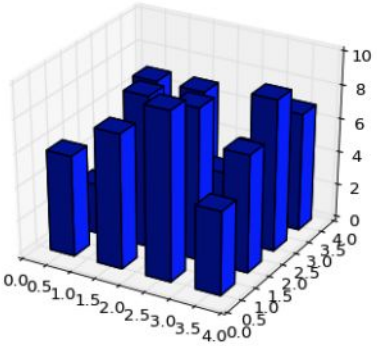
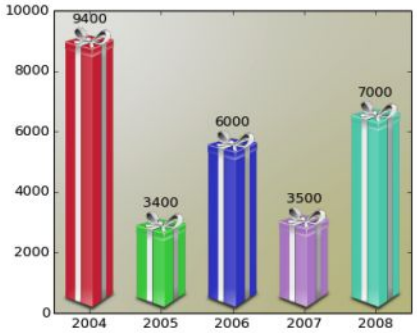
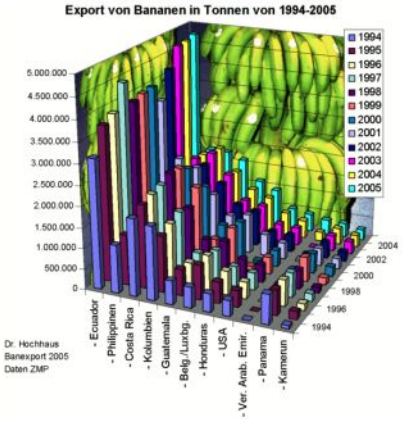
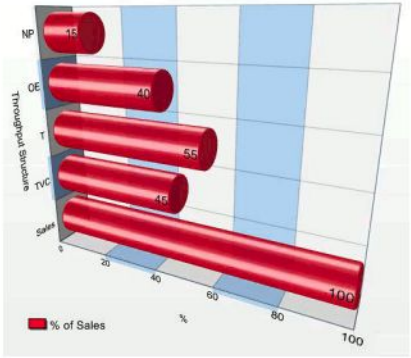
Nope…





matplotlib gallery





Excel Charts Blog

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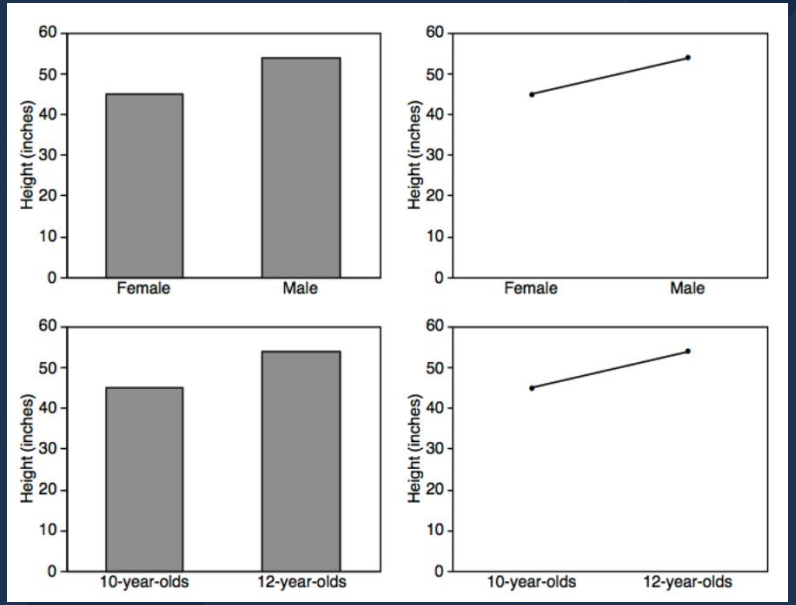
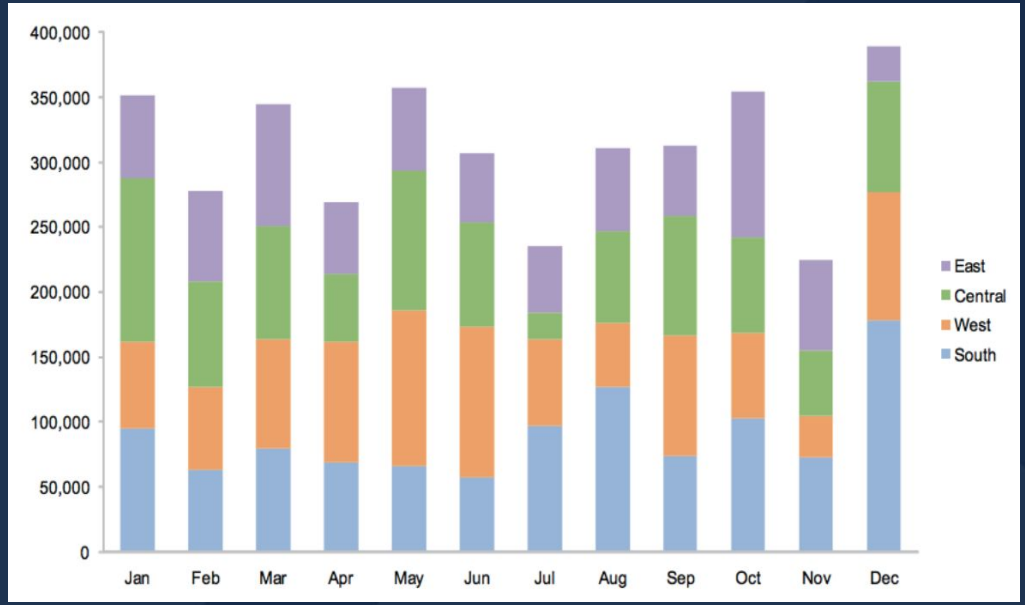
Use the right chart

https://extremepresentation.typepad.com/blog/files/choosing_a_good_chart.pdf





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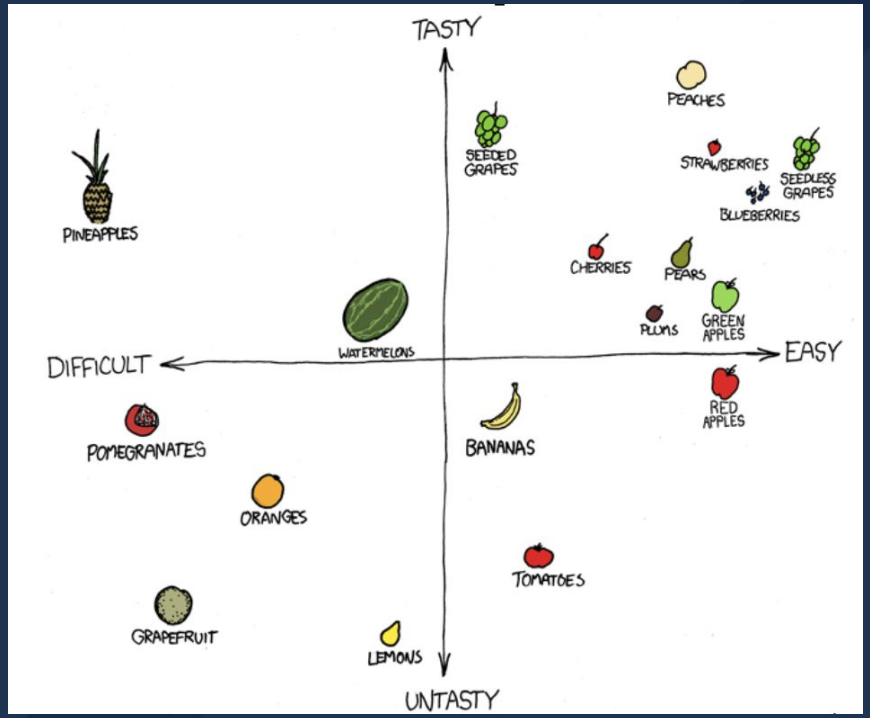
Use the right chart



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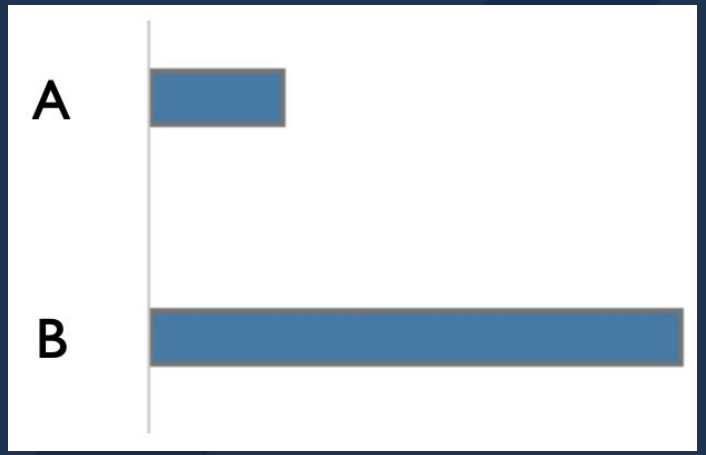
How much longer?



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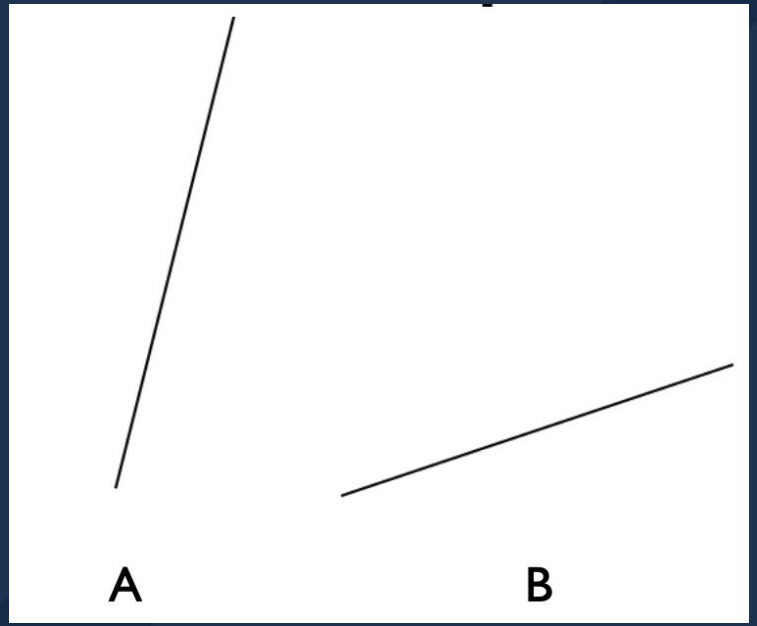
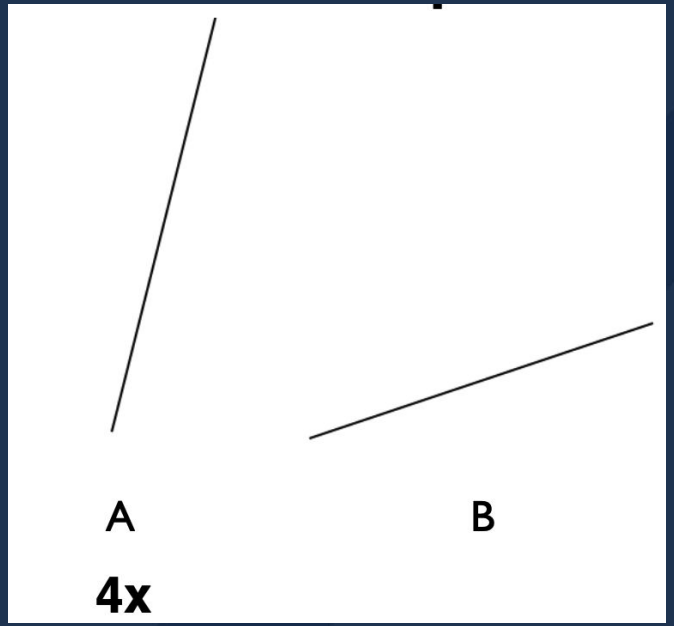
How much steeper?





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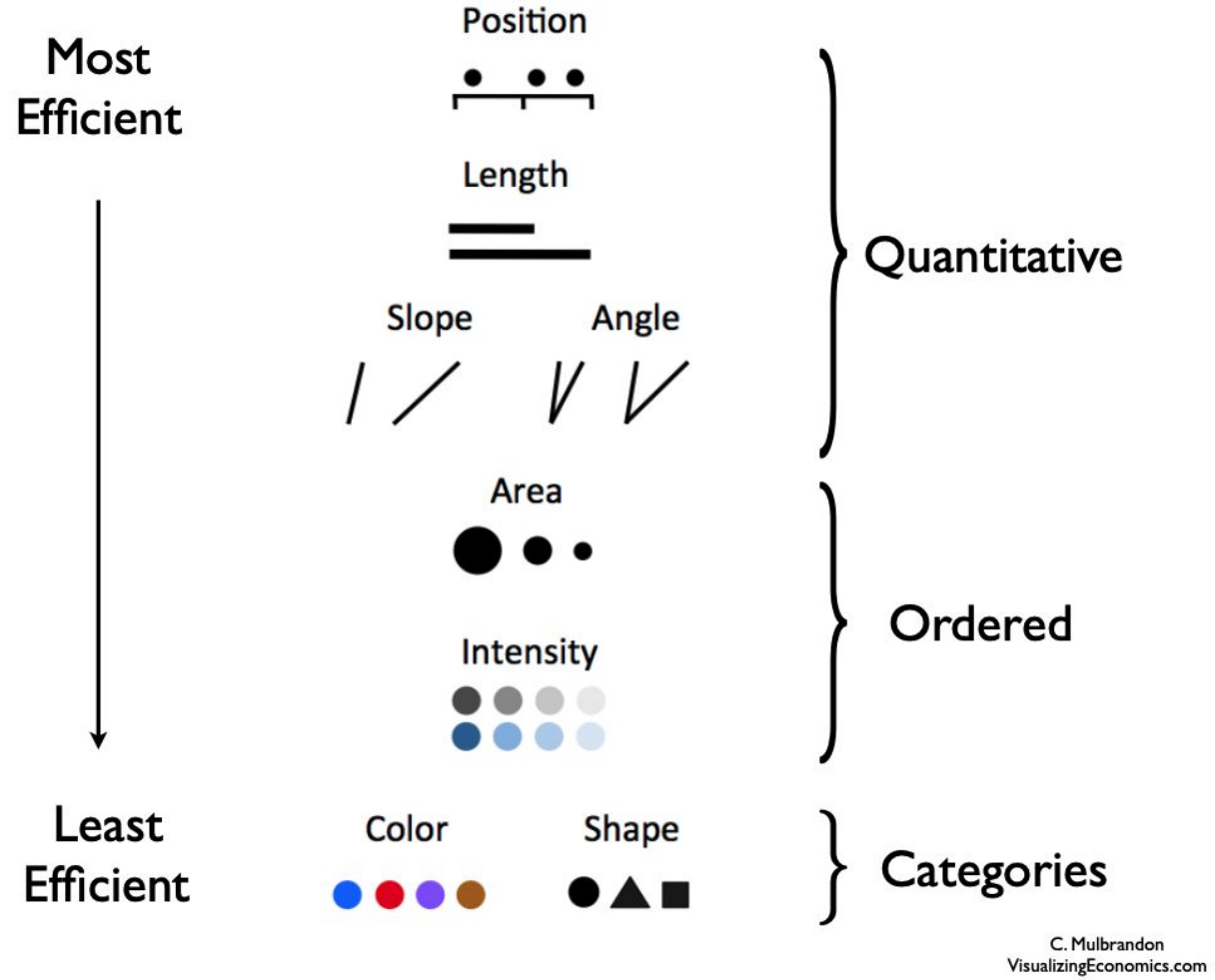
Most Efficient
Position
Length
Slope
Angle
Quantitative
Area
Intensity
Ordered
Least Efficient
Color
Shape
Categories
C. Mulbrandon
VisualizingEconomics.com

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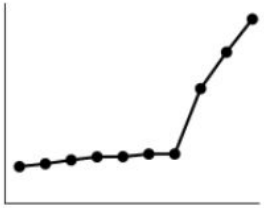
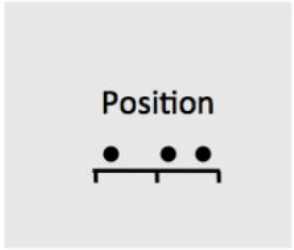
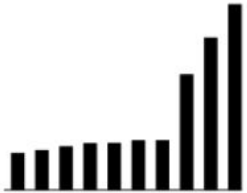
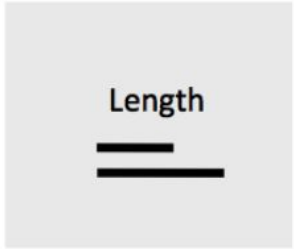
Most Effective









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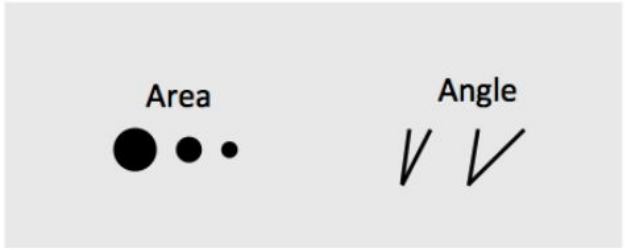
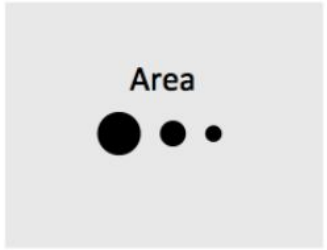
Less Effective





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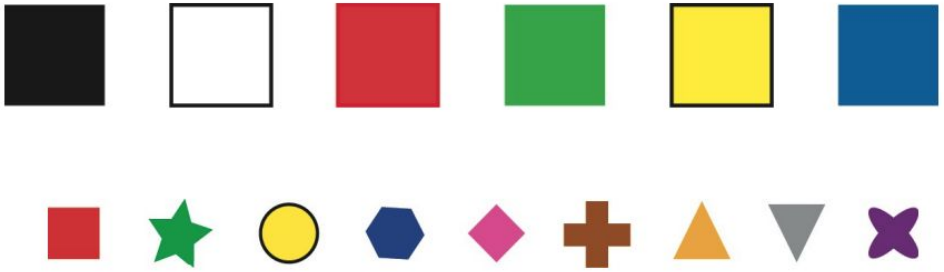
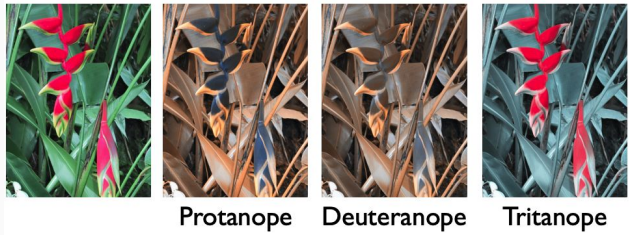
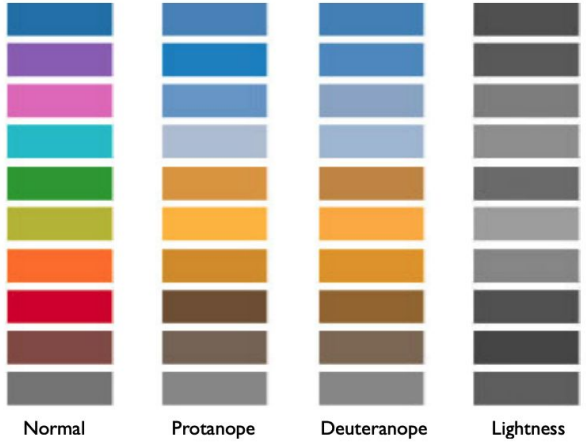
Use the right colors

Do not use more than 5-8 colors at once



Color Blindness





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Communicating

- Who:
  - Who is your audience?
  - What is your relationship to your audience?
- What:
  - What do you need your audience to know?
  - What do you want your audience to do?
  - What will your tone be?
- How:
  - How will you communicate this to your audience? Live or written?

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When NOT to do EDA?

- Identify/remove samples after analyzing data
- After running statistical test and obtaining p-value
- After getting an answer you don't like
- To improve the correlation between variables

EDA is NOT a tool to get your data analysis to give you the results you want.

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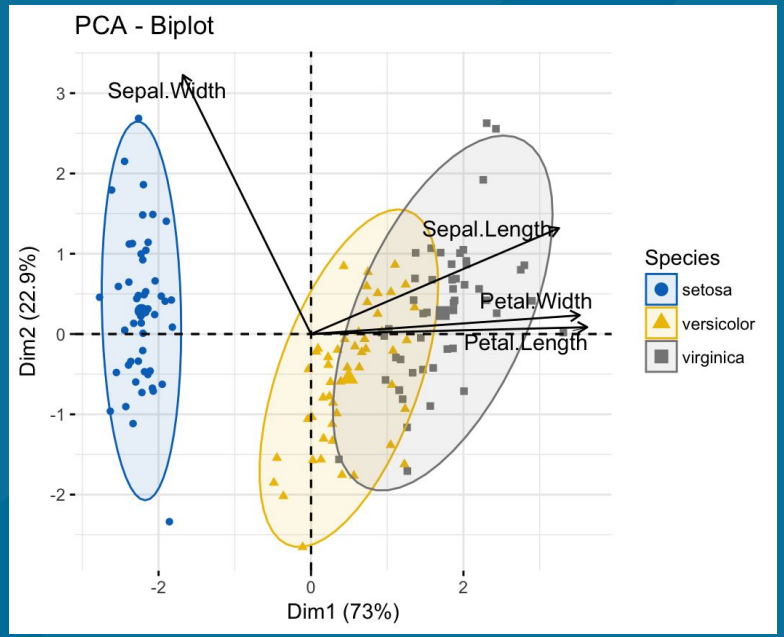
PCA Analysis

- Summarize and visualize the most important part of the data
- Pick the variables/features most closely related to the data



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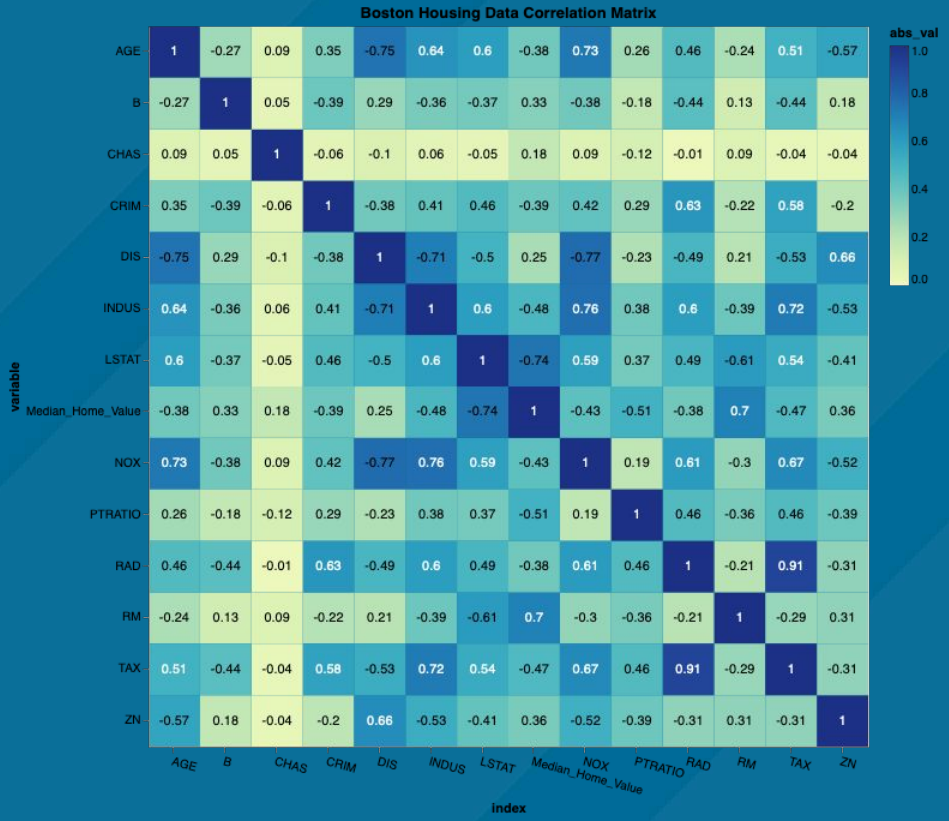
Correlation Matrix



Source: https://harvard-iacs.github.io/2018-CS109A/lectures/lecture-3/presentation/lecture3.pdf

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