

# Data visualization

Python for AI

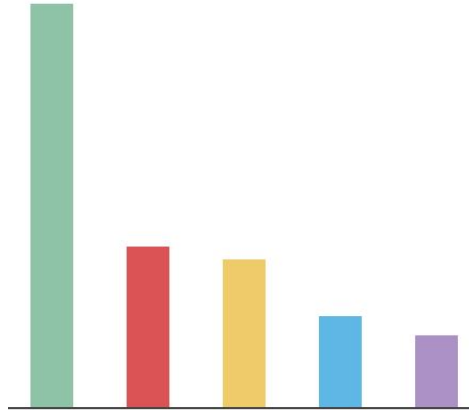
# Goals of the Presentation

You will learn:

- What makes a data visualization
- Why they can be effective
- How to plan

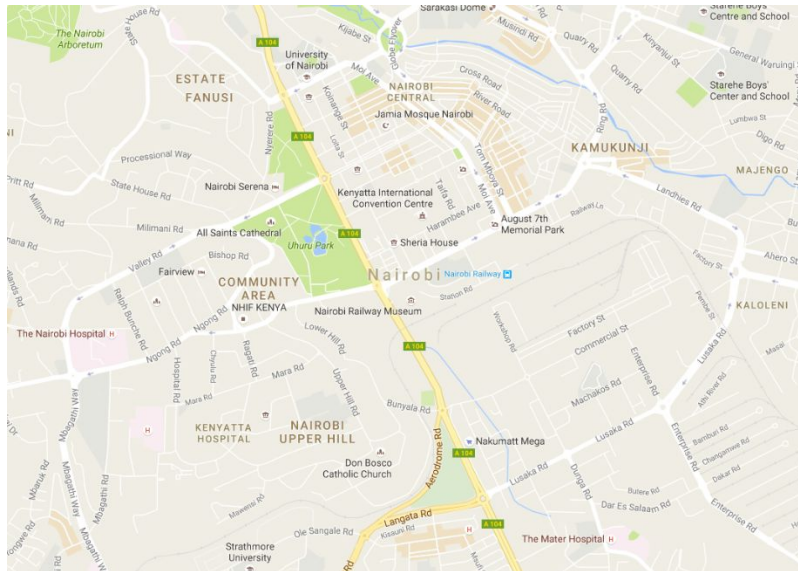
# WHAT IS **DATA VISUALIZATION?**

# Name the Data Visualization

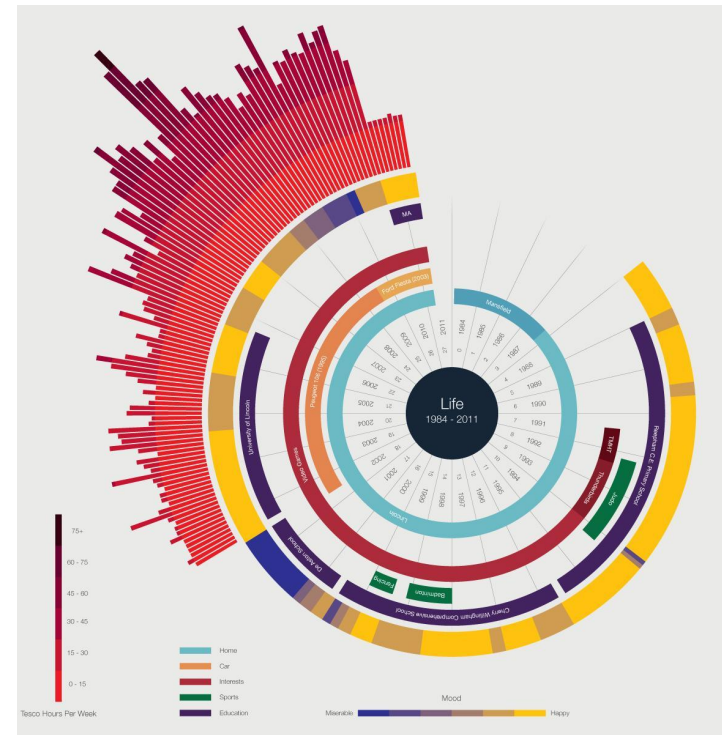


👍 58%

George Patterson, The Noun Project



Map data © 2016 Google

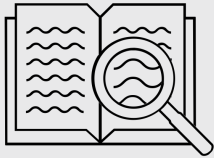


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**“Nicely designed posters  
with a few numbers on them  
aren’t really data viz.”**

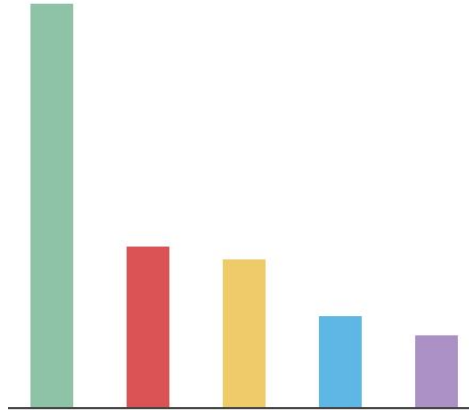
**– Amanda Cox**  
**Editor of Upshot, New York Times**

# Defining the Medium



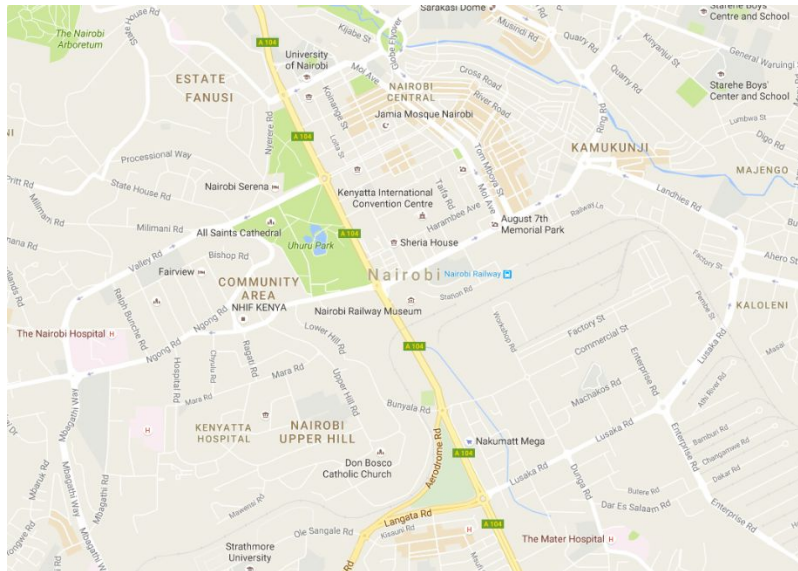
**Data visualization:** A nontext-based representation of data that enhances the understanding of that data.

# Name the Data Visualization (Revisited)



👍 58%

George Patterson, The Noun Project



Map data © 2016 Google



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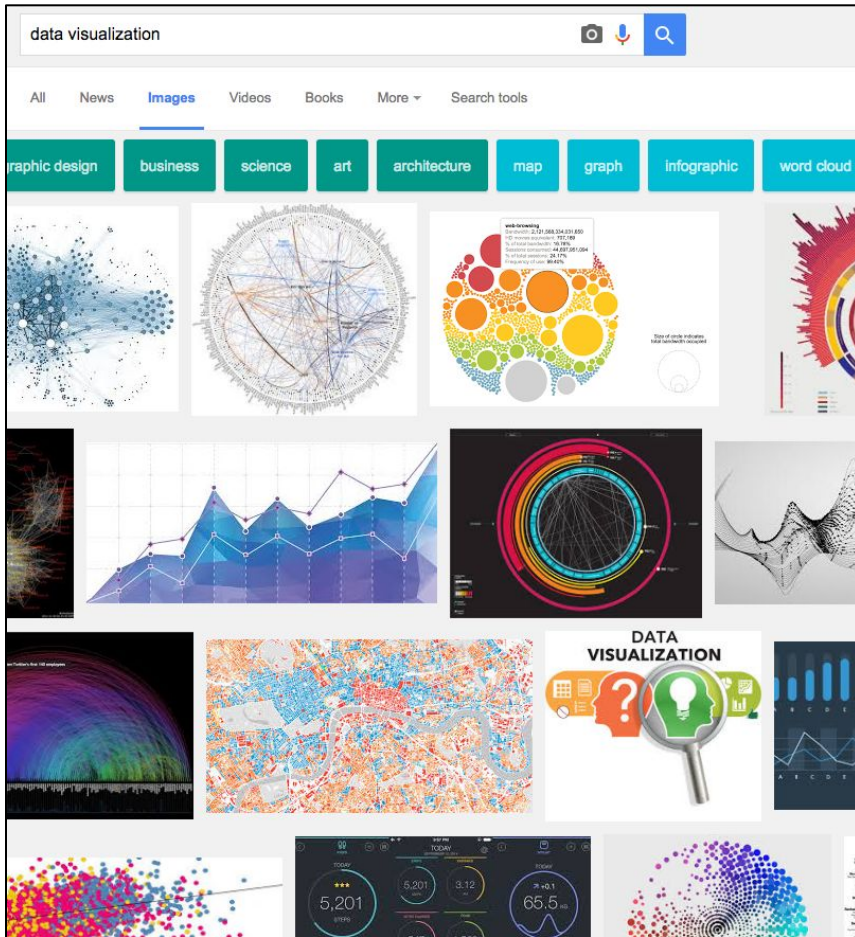
# Data Visualization vs. Infographic

These terms are sometimes used interchangeably.

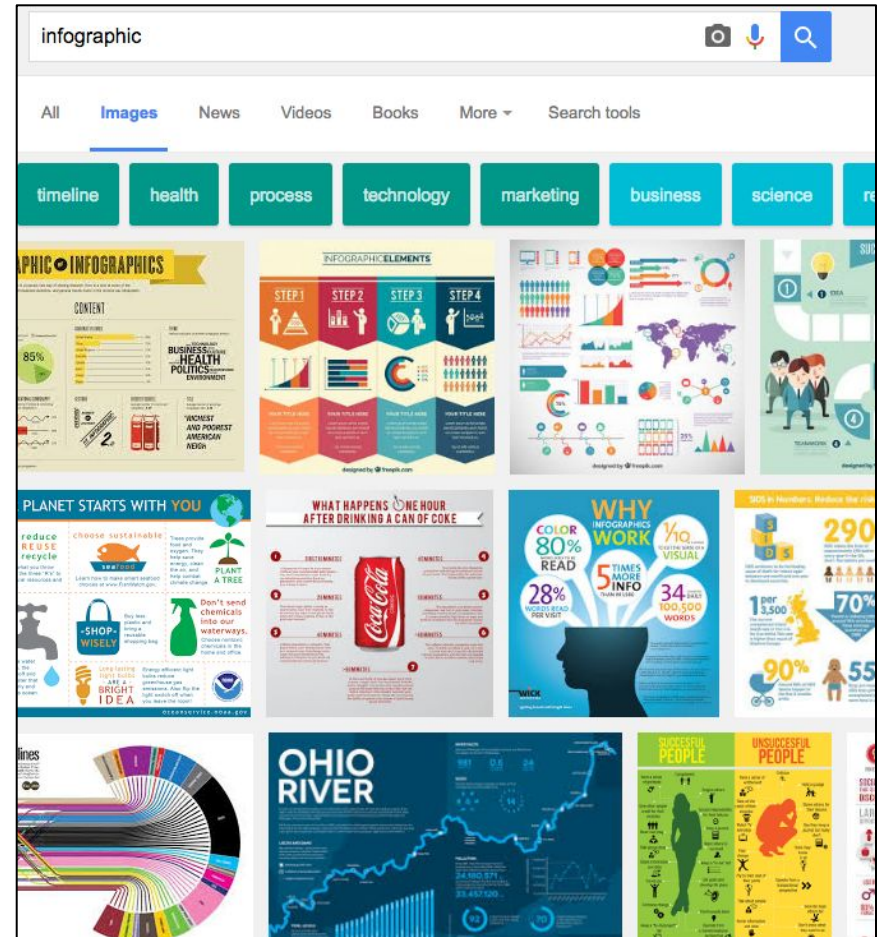
Just remember: You need DATA plus a visual representing the data to make a data viz!



# What Google Thinks



Graphs, geometric shapes, color coded, number driven



Collection of facts, icons, pictorials, text driven

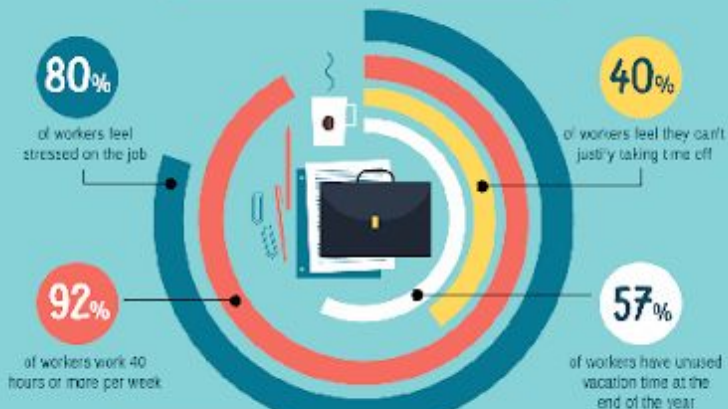


As the saying goes, if you work hard, then you should play hard – but are we getting the balance right? Many of us save up our vacation time but then don't follow through on taking time off, leaving our brains tired and overstretched.

No matter the time of year, a vacation is good for clearing out the cobwebs upstairs – here are some of the top reasons why.

## HOW HARD ARE WE WORKING?

THE NUMBERS BEHIND WORK AND PLAY



## WHY VACATION TIME IS GOOD...

### ...FOR A SMARTER BRAIN

#### 1 BOOSTS BRAIN POWER

When your brain is completely relaxed, experiments have shown that it consolidates knowledge and brain power – improving and memorizing new skills learned the week before. (Harvard Medical School, 2009).



#### 2

#### PROMPTS A FULL RECHARGE

Unfortunately we don't have a mental reserve pool of power, so vacations are crucial in returning a well-functioning brain back to its prime (University of California, 2014).



#### 3 SOLVES PROBLEMS

When we're not actively tackling a task, our brain connects and consolidates current ideas with prior knowledge. This creates new ideas and solutions to problems while improving brain performance (University of Nijmegen, 2005).



### ...FOR THE MIND/BODY CONNECTION

#### 4 YOU'LL LIVE LONGER

Workers who take frequent annual vacations can reduce their risk of disease by 21%, based on clinical trials. (National Heart, Lung, and Blood Institute, 2009)



#### 6

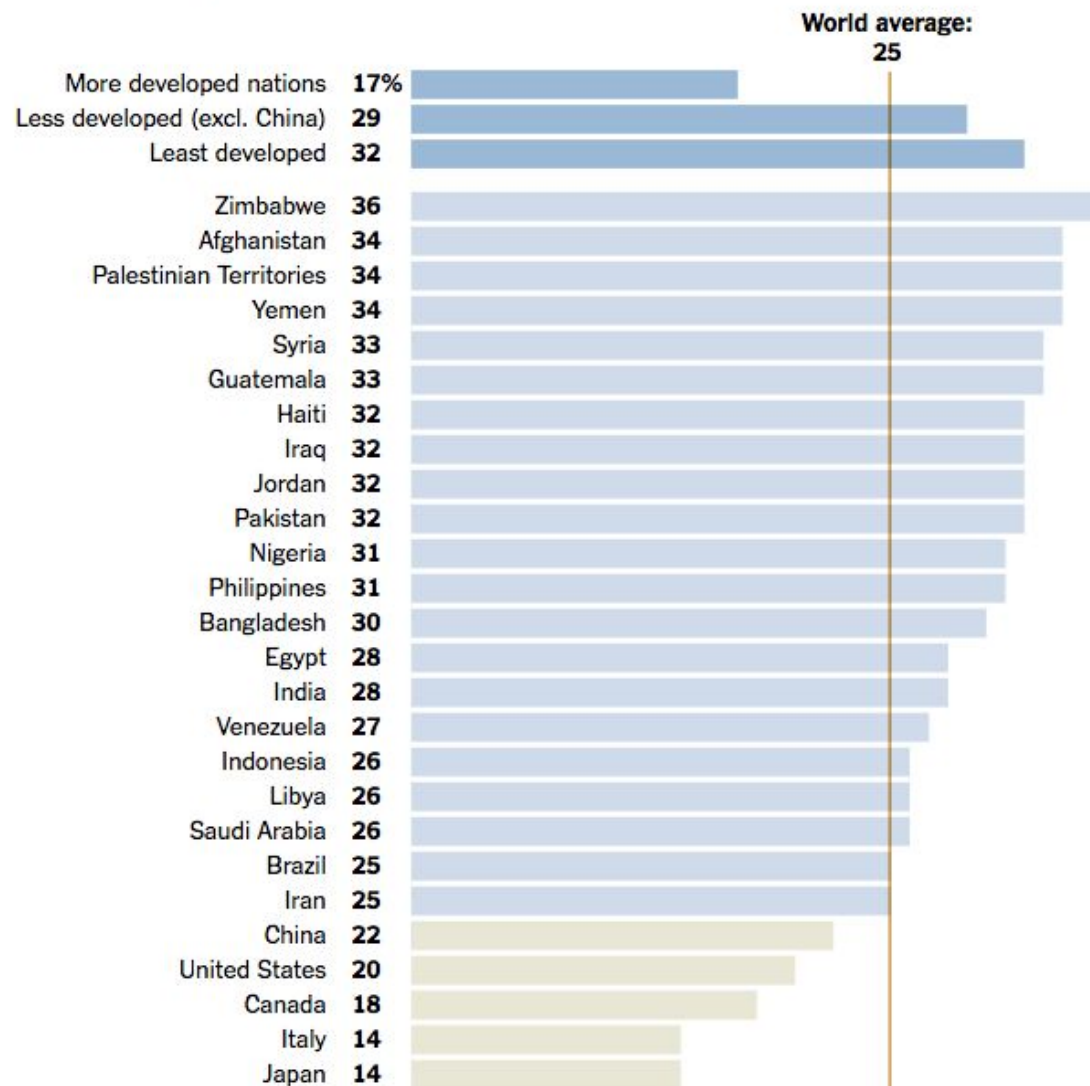
#### PREVENTS DISEASE

Prolonged exposure to stress without a vacation can damage your heart. Those working long hours are thought to increase their risk of coronary heart disease by 40% (Finnish Institute of Occupational Health, 2012).



## The Youth Bulge

Percent of total population ages 10–24 in 2013.

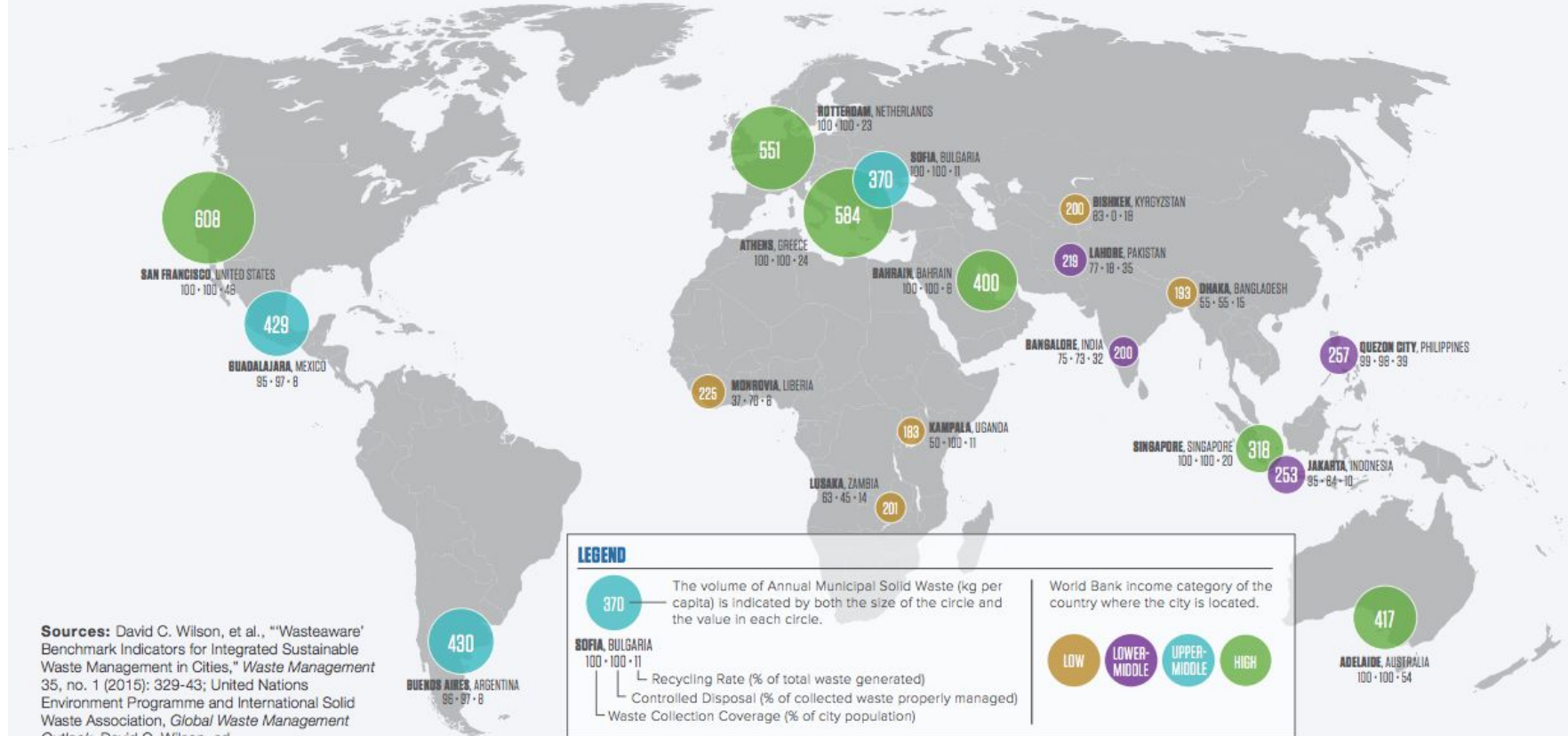


Source: Population Reference Bureau

By The New York Times

# Municipal Waste Volumes per Capita Rise With Income

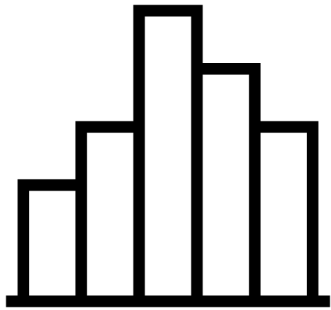
Proper municipal waste disposal is a public health and environmental priority as urban populations grow. City residents without regular refuse collection services risk exposure to contaminants that spread into soil, streets, and water. Uncontrolled dumpsites taint water tables and release airborne toxins as unsorted refuse is burned. Global municipal waste data show that per capita volumes tend to rise with average income levels but negative impacts lessen as wealthier cities improve waste processing systems. While some cities in lower-income countries have expanded collection coverage, many still lag in proper waste processing—or controlled disposal. Collection in Lahore, Pakistan covers 77 percent of the population but only 18 percent of collections go to a controlled disposal facility. Lusaka, Zambia has 63 percent coverage and a 45 percent rate of controlled disposal. Recycling rates reach relatively high levels in some lower-income countries, often due to informal recycling networks.



**“[I emphasize] visualizations that do some work; they persuade, they explain, they explore. Beauty is desirable, but I’m not excited by pretty charts that are also pretty useless.”**

**– Graham Wills, Data Science and Visualization Expert at IBM**

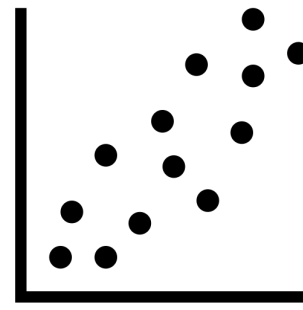
# Basic Data Visualizations



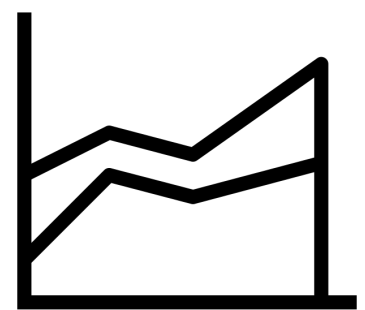
Bar chart



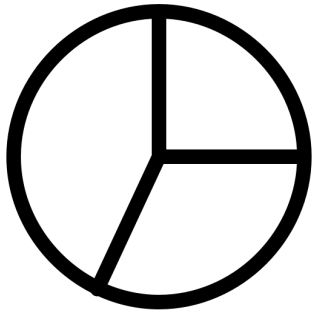
Line chart



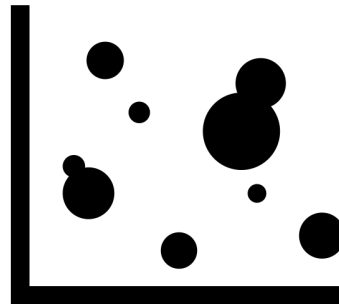
Scatter plot



Area chart



Pie chart



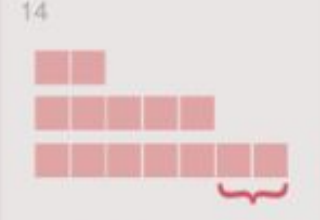
Bubble chart



Heat map



bar chart



tape diagram



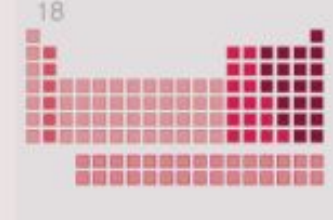
gantt chart



tree map



grid



periodic table



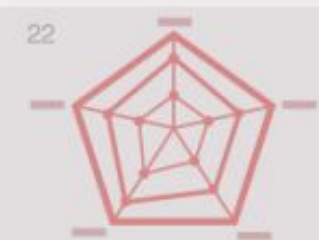
arc diagram



sankey chart



chord chart



radar chart



polar grid



spiral graph



timeline



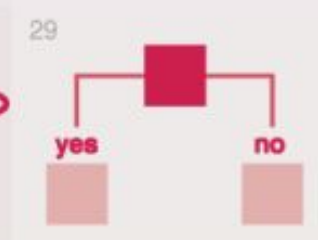
flow chart



binary tree



mind map



decision tree



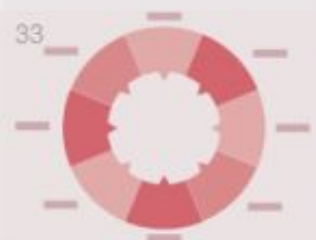
block scheme



pyramid



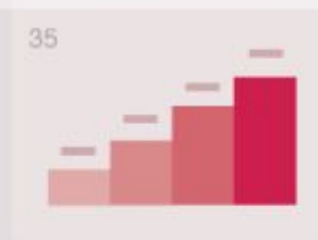
funnel



spoke wheel



cycle wheel



staircase



game strategy sketch



# Example and code

- Download code in the classroom
- On class: follow a step by step tutorial