

Introduction to Data Visualisation

Introduction to Data Visualisation

- History
- Types
- Principles
- Tools

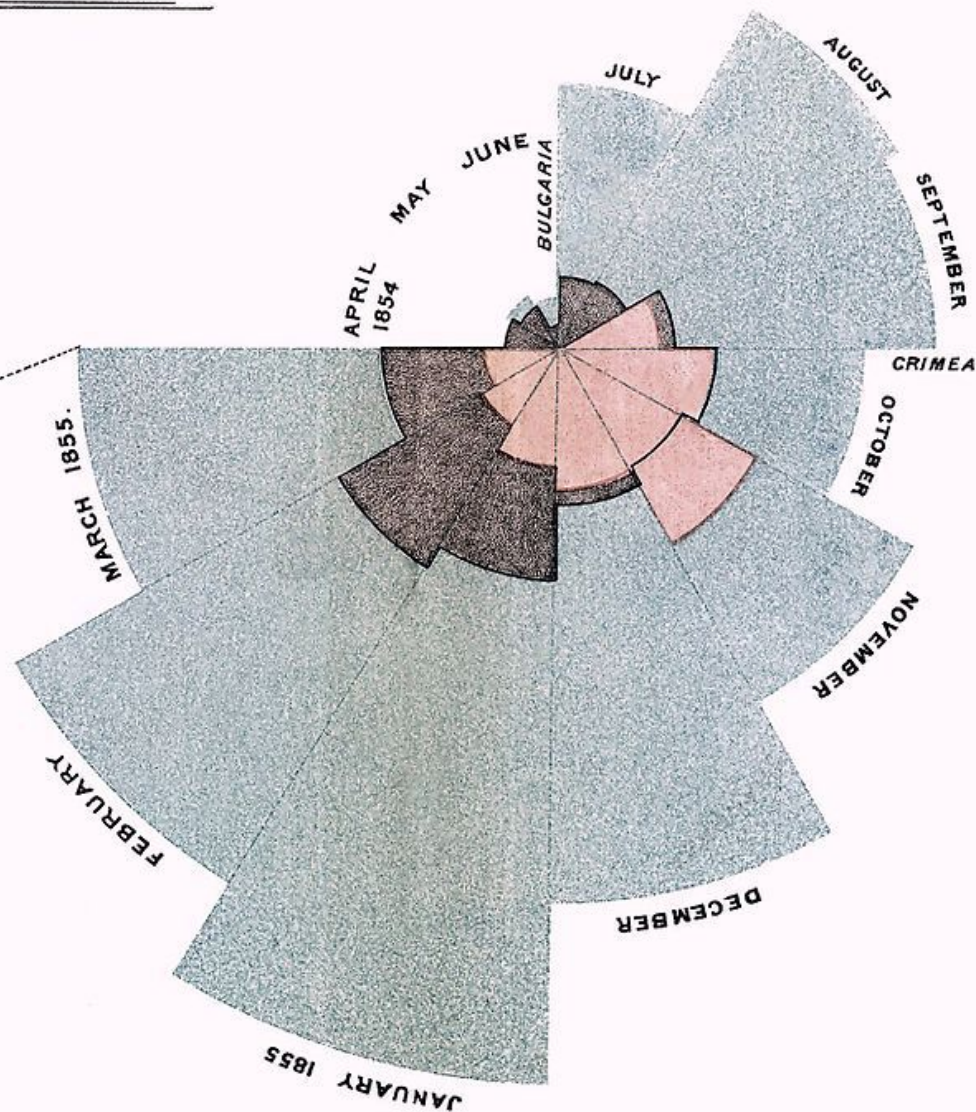
Cholera Map, London, 1854

Introduction to Data Visualisation: History

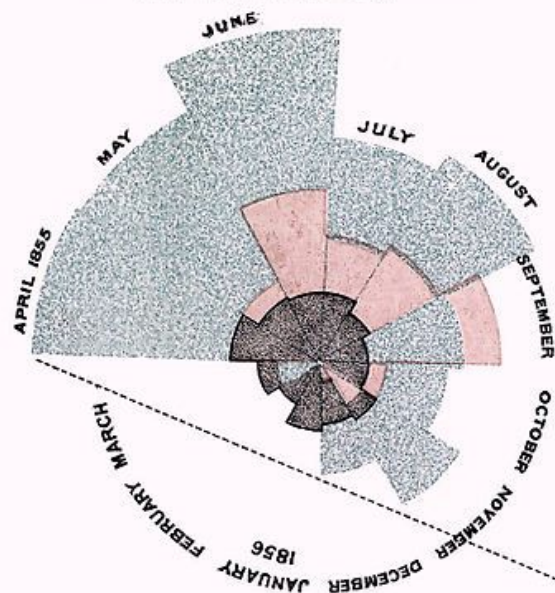
Visualisation of mortality data of British army, Crimean War, 1856

DIAGRAM OF THE CAUSES OF MORTALITY IN THE ARMY IN THE EAST.

1.
APRIL 1854 TO MARCH 1855.



2.
APRIL 1855 TO MARCH 1856.



The Areas of the blue, red, & black wedges are each measured from the centre as the common vertex.

The blue wedges measured from the centre of the circle represent area for area the deaths from Preventable or Mitigable Zymotic diseases; the red wedges measured from the centre the deaths from wounds; & the black wedges measured from the centre the deaths from all other causes.

The black line across the red triangle in Nov. 1854 marks the boundary of the deaths from all other causes during the month.

In October 1854, & April 1855, the black area coincides with the red; in January & February 1856, the blue coincides with the black.

The entire areas may be compared by following the blue, the red & the black lines enclosing them.

Introduction to Data Visualisation: History

Napoleon's March, 1861

Carte Figurative des pertes successives en hommes de l'Armée Française dans la campagne de Russie 1812-1813.

Dressée par M. Minard, Inspecteur Général des Ponts et Chaussées en retraite

Paris, le 20 Novembre 1869.

Les nombres d'hommes présents sont représentés par les largeurs des zones colorées à raison d'un millimètre pour dix mille hommes; ils sont de plus écrits en travers des zones. Le rouge désigne les hommes qui entrent en Russie, le noir ceux qui en sortent. — Les renseignements qui ont servi à dresser la carte ont été puisés dans les ouvrages de M. M. Thiers, de Ségur, de Fozensac, de Chambray et le journal inédit de Jacob, pharmacien de l'Armée depuis le 28 Octobre.

Pour mieux faire juger à l'œil la diminution de l'armée, j'ai supposé que les corps du Prince Jérôme et du Maréchal Davoust qui avaient été détachés sur Minsk et Mohilow et qui rejoignent vers Orscha et Witebsk, avaient toujours marché avec l'armée.

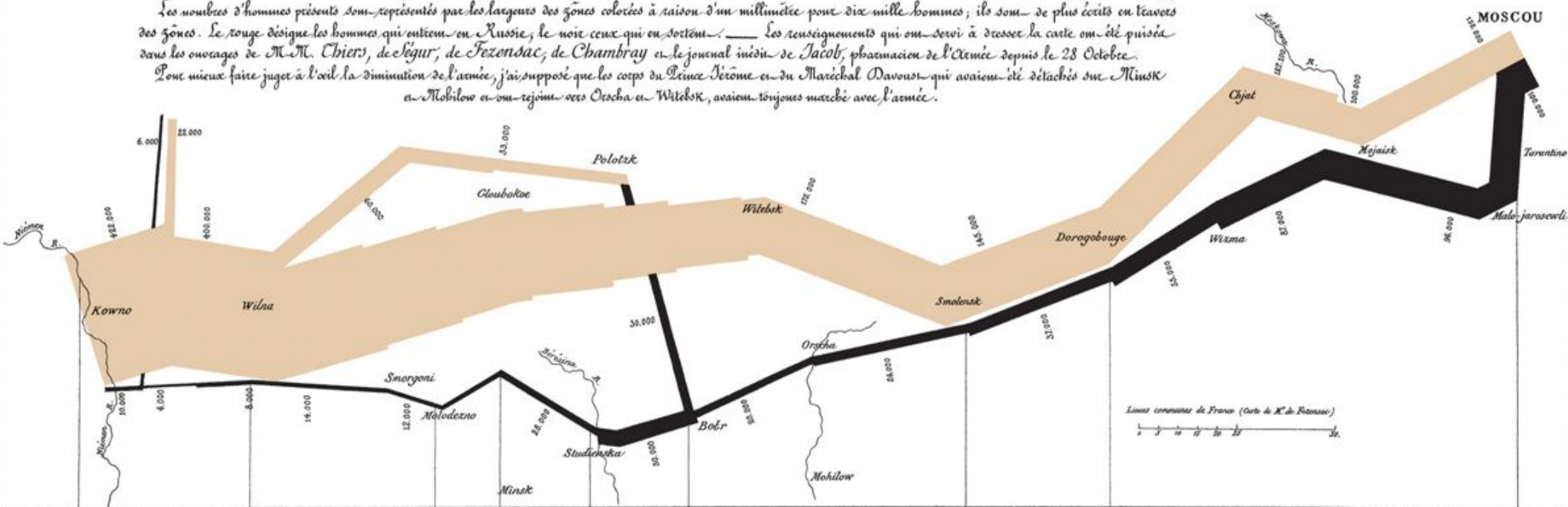
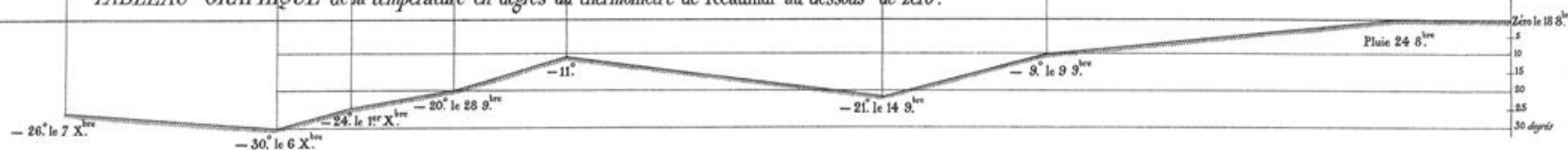


TABLEAU GRAPHIQUE de la température en degrés du thermomètre de Réaumur au dessous de zéro.



Introduction to Data Visualisation: History

What is data?

- it depends upon the context
- it depends upon the question
- it depends upon the answer

Introduction to Data Visualisation: History

Uses of data

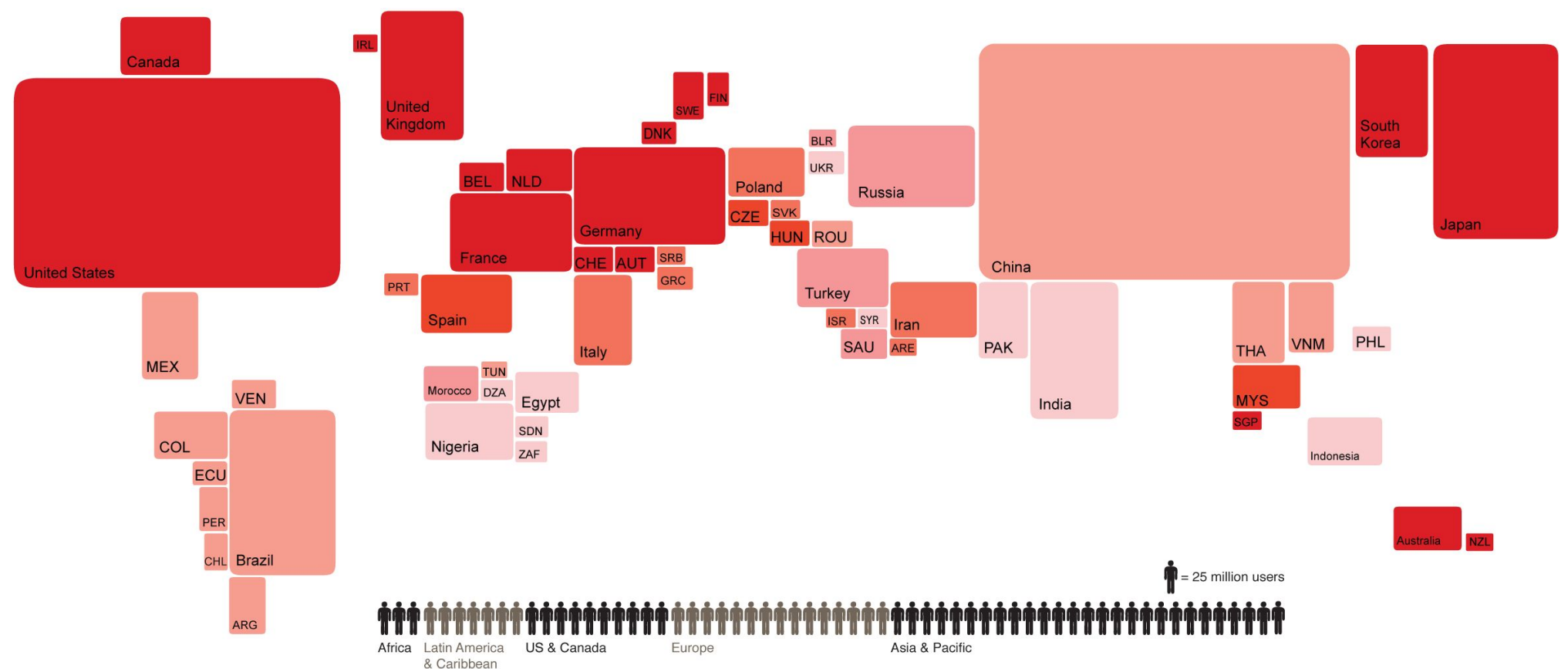
- description
- argument
- documentation or archival

Introduction to Data Visualisation: History

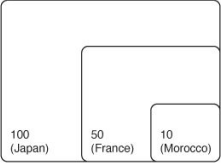
Types of data

- quantitative (textual)
- qualitative (textual)
- spatial
- media (sensory)

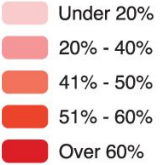
Introduction to Data Visualisation: History



Total number of Internet users (in millions), 2008



Internet penetration (% population)



Internet Penetration

Visualization and analysis by Dr Mark Graham, Scott A. Hale and Monica Stephens in collaboration with Dr Corinne M. Flick and the Convoco Foundation.

This map and other visualizations can be found on the OII visualization website at <http://www.oii.ox.ac.uk/vis/>

Copyright © Oxford Internet Institute in cooperation with Dr. Corinne M. Flick and the Convoco Foundation 2011

This publication is released under the Creative Commons Attribution-NonCommercial-NoDerivs [CC BY-NC-ND] license.



Introduction to Data Visualisation: History

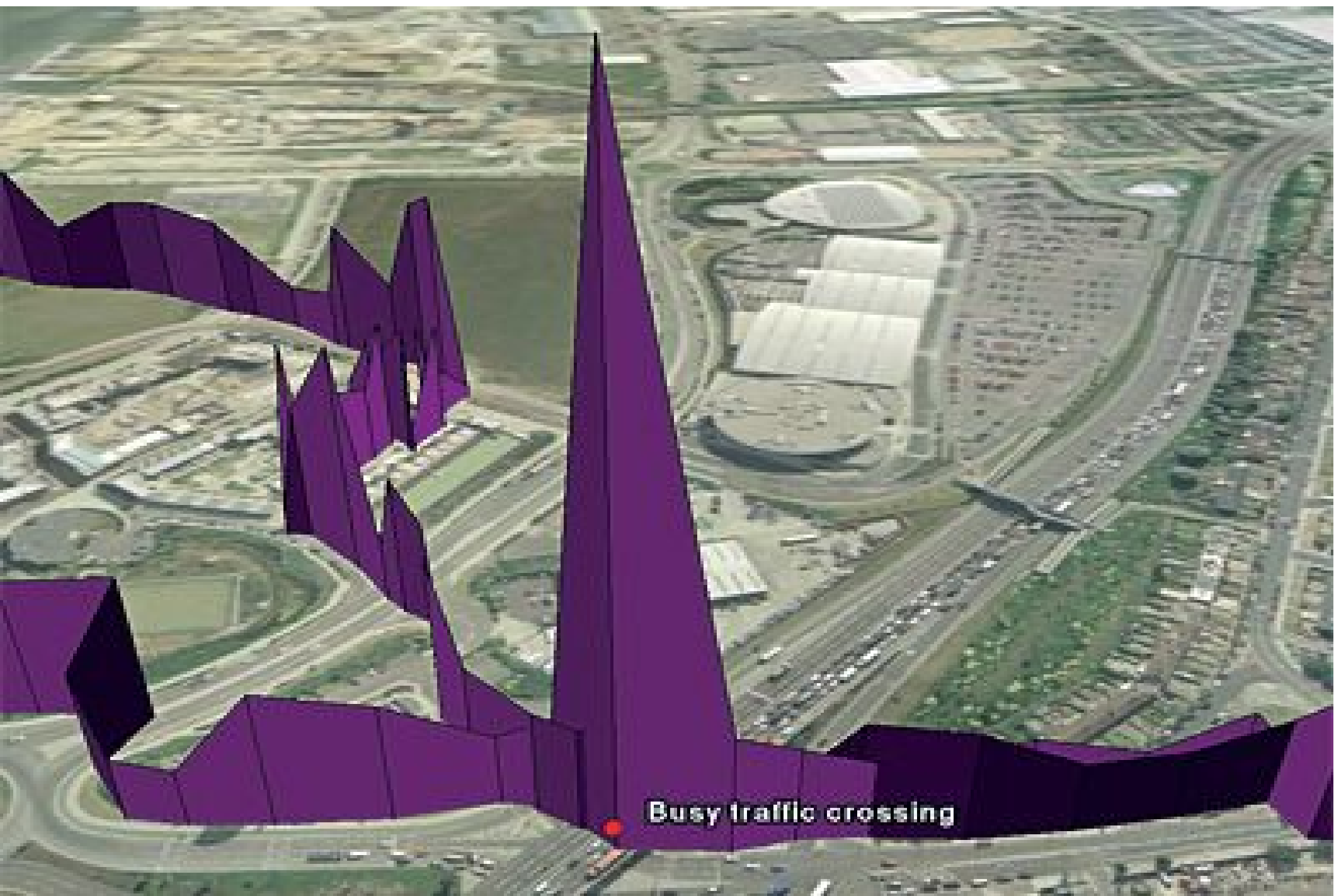
The Spatial Distribution of the Occupy Campaign

Links between cities are based on 'occupy*' hashtags co-used in the same tweets (i.e. #occupywallstreet for New York and #occupylsx for London).

Data aggregated for the period April 30 to May 30 2012.



Introduction to Data Visualisation: History



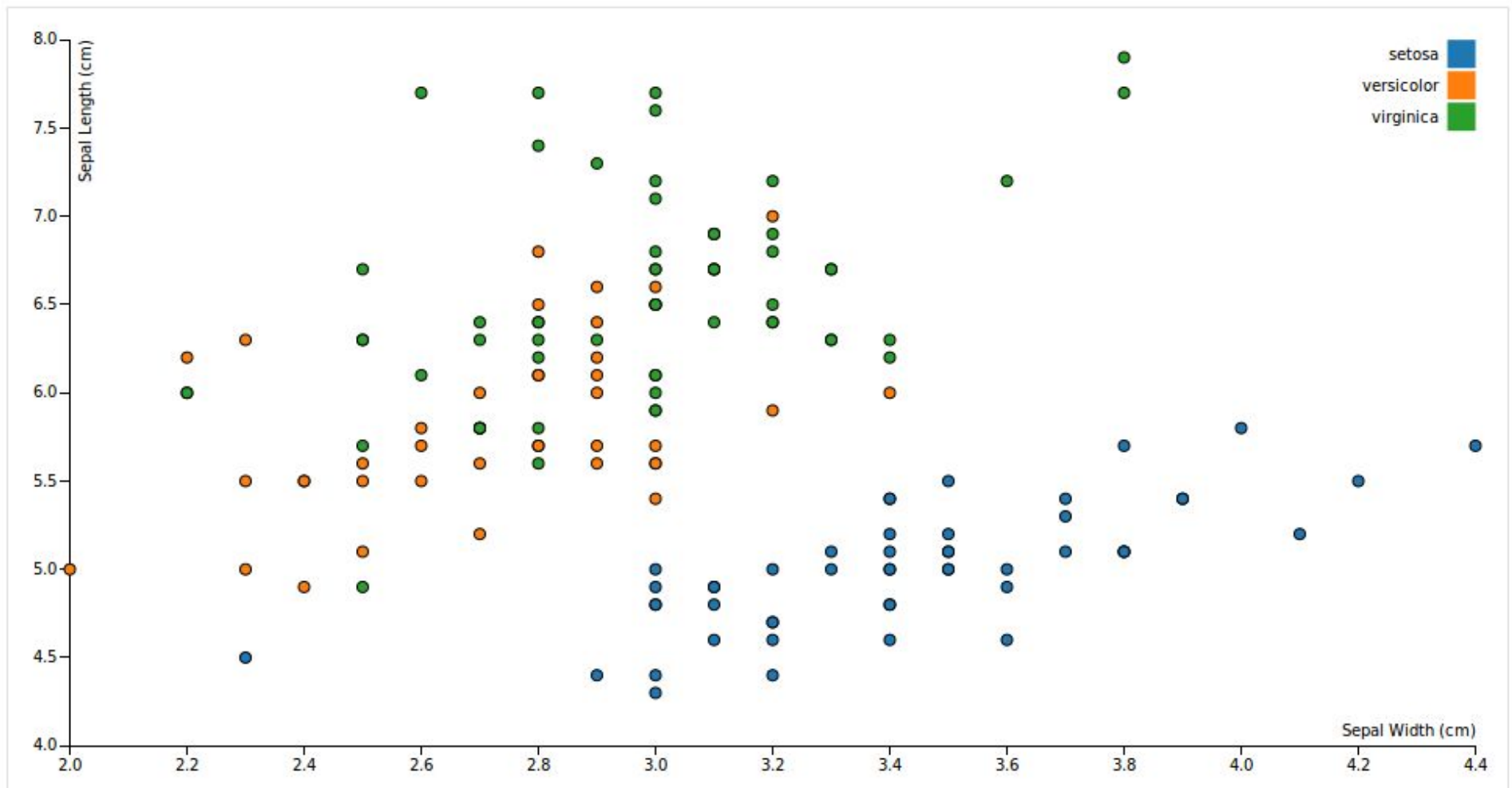
Introduction to Data Visualisation: Types

Types of charts

- scatterplot, line chart, area chart, bar chart
- pie chart, tree map, parallel sets
- bubble chart, radar chart
- time line, flow chart, steamgraph
- choropleth, flow map, cartogram

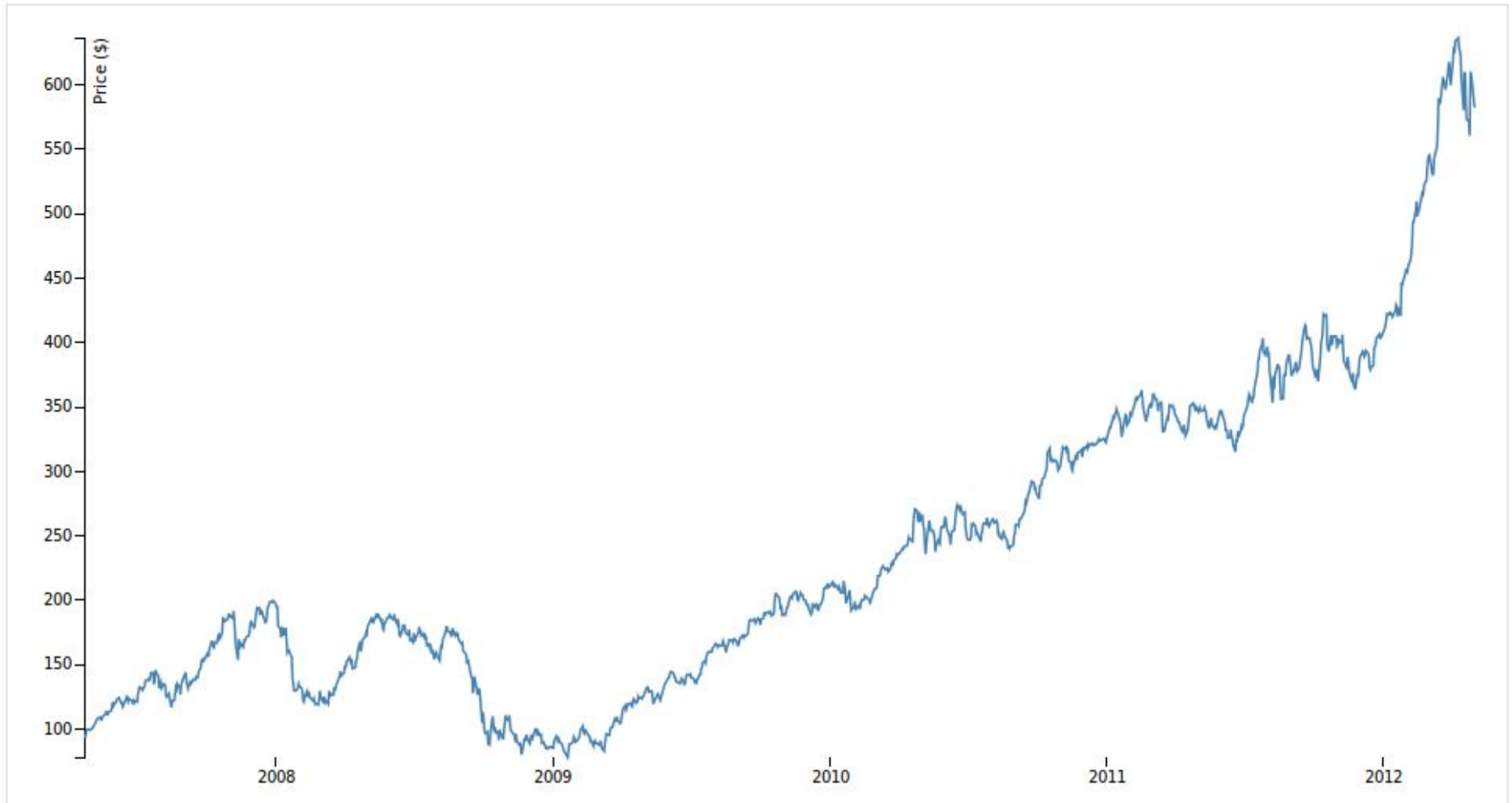
Introduction to Data Visualisation: Types

Scatterplot



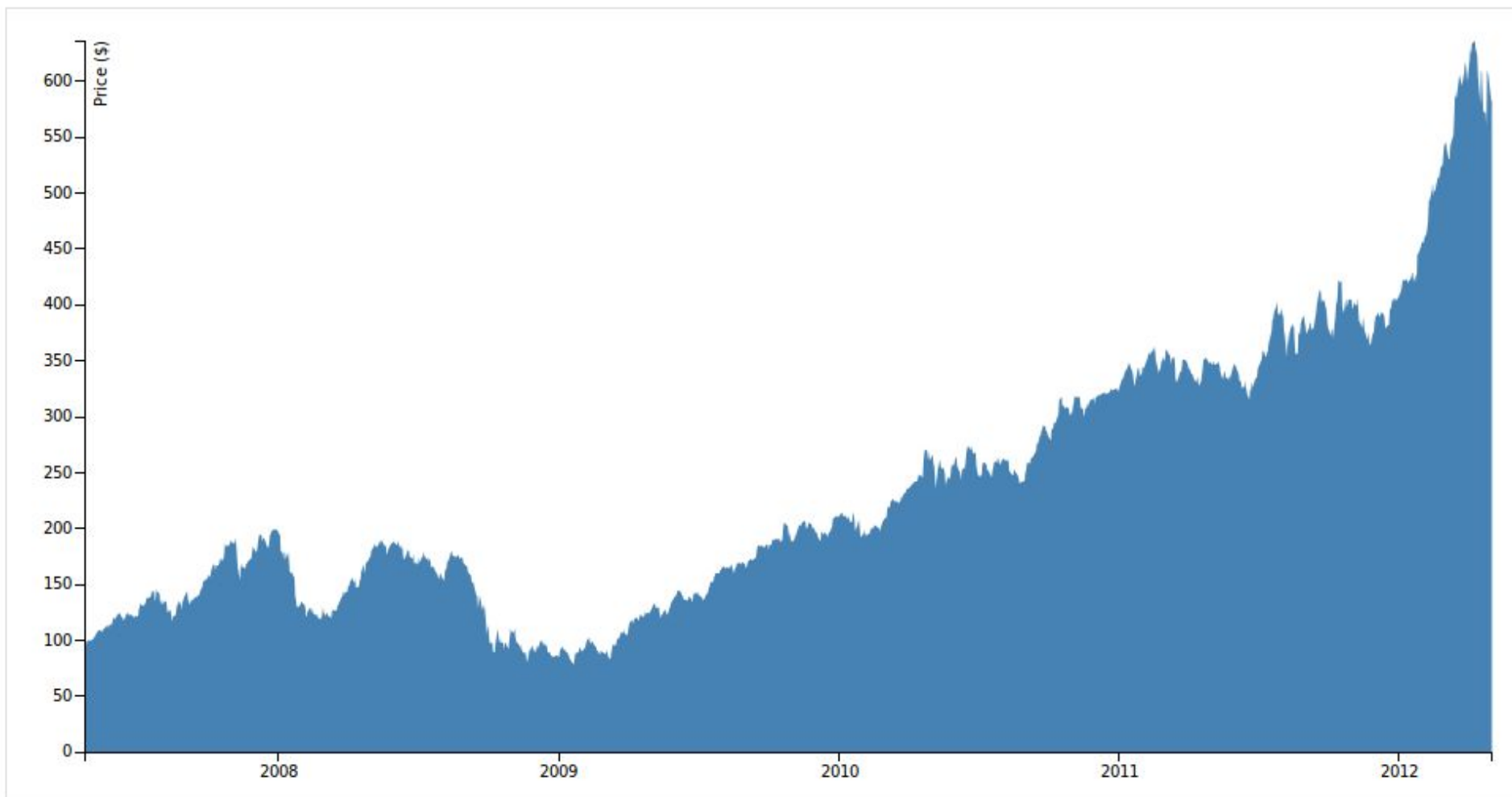
Introduction to Data Visualisation: Types

Line Chart



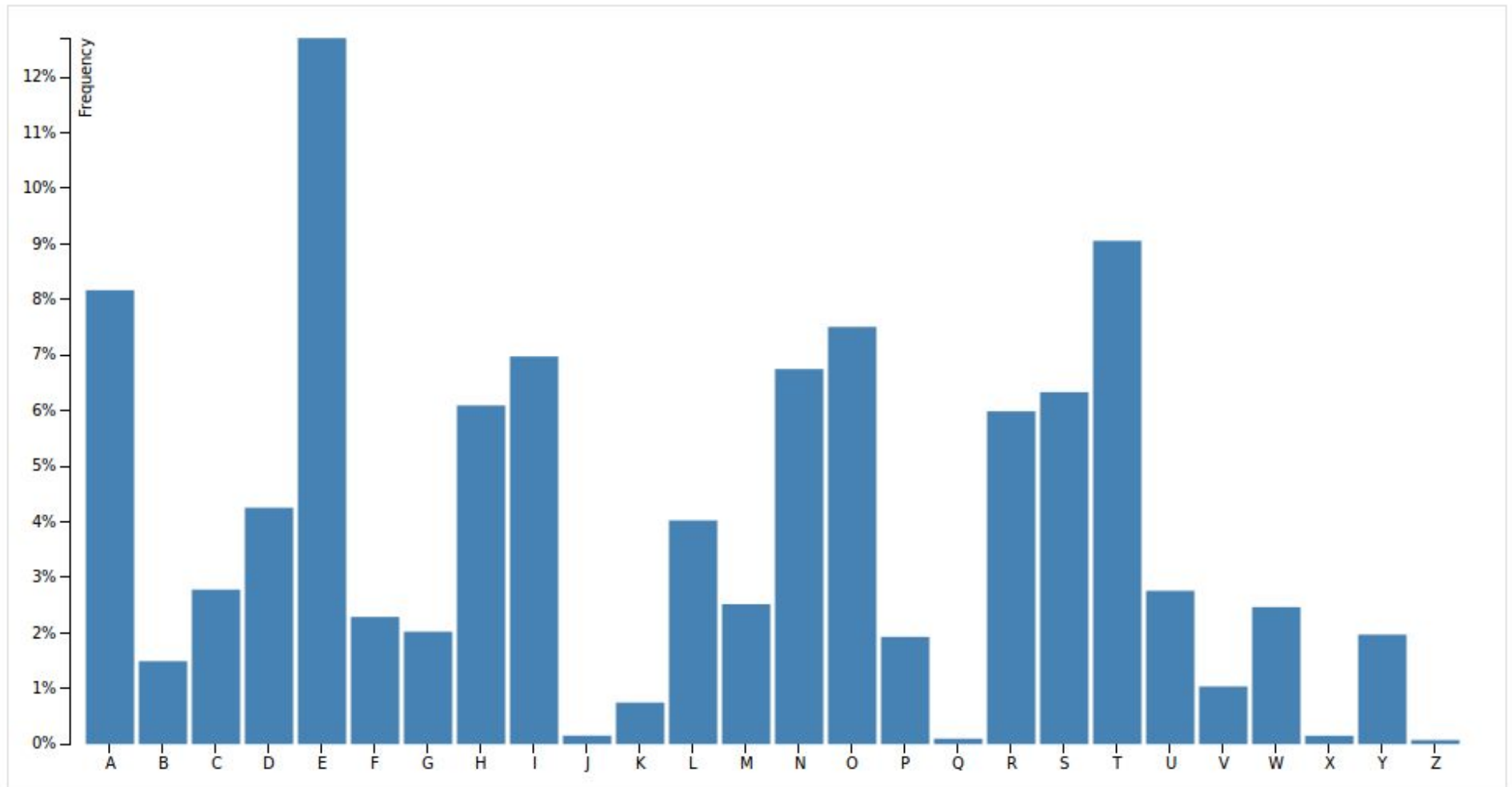
Introduction to Data Visualisation: Types

Area Chart



Introduction to Data Visualisation: Types

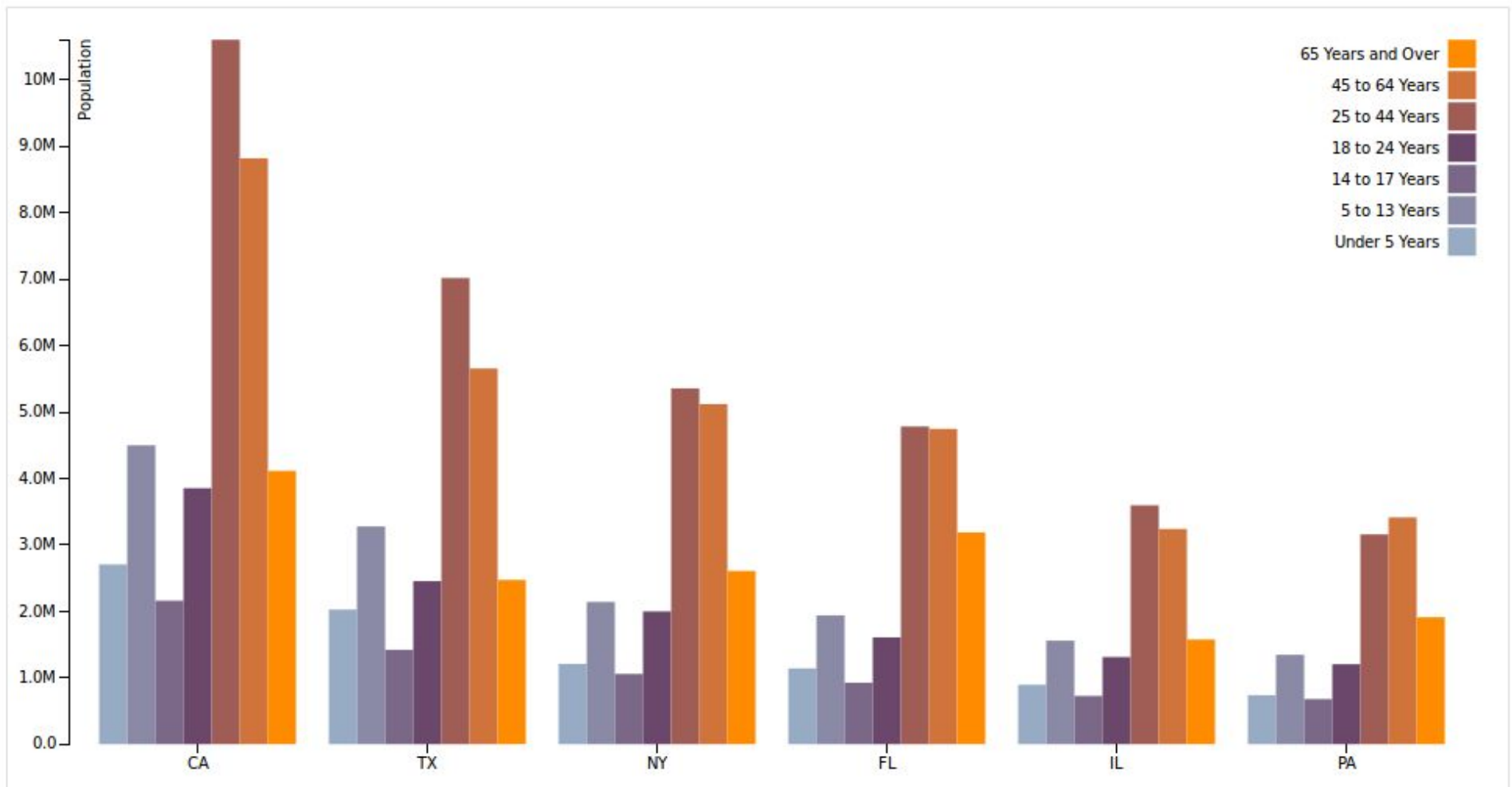
Bar Chart



Introduction to Data Visualisation: Types

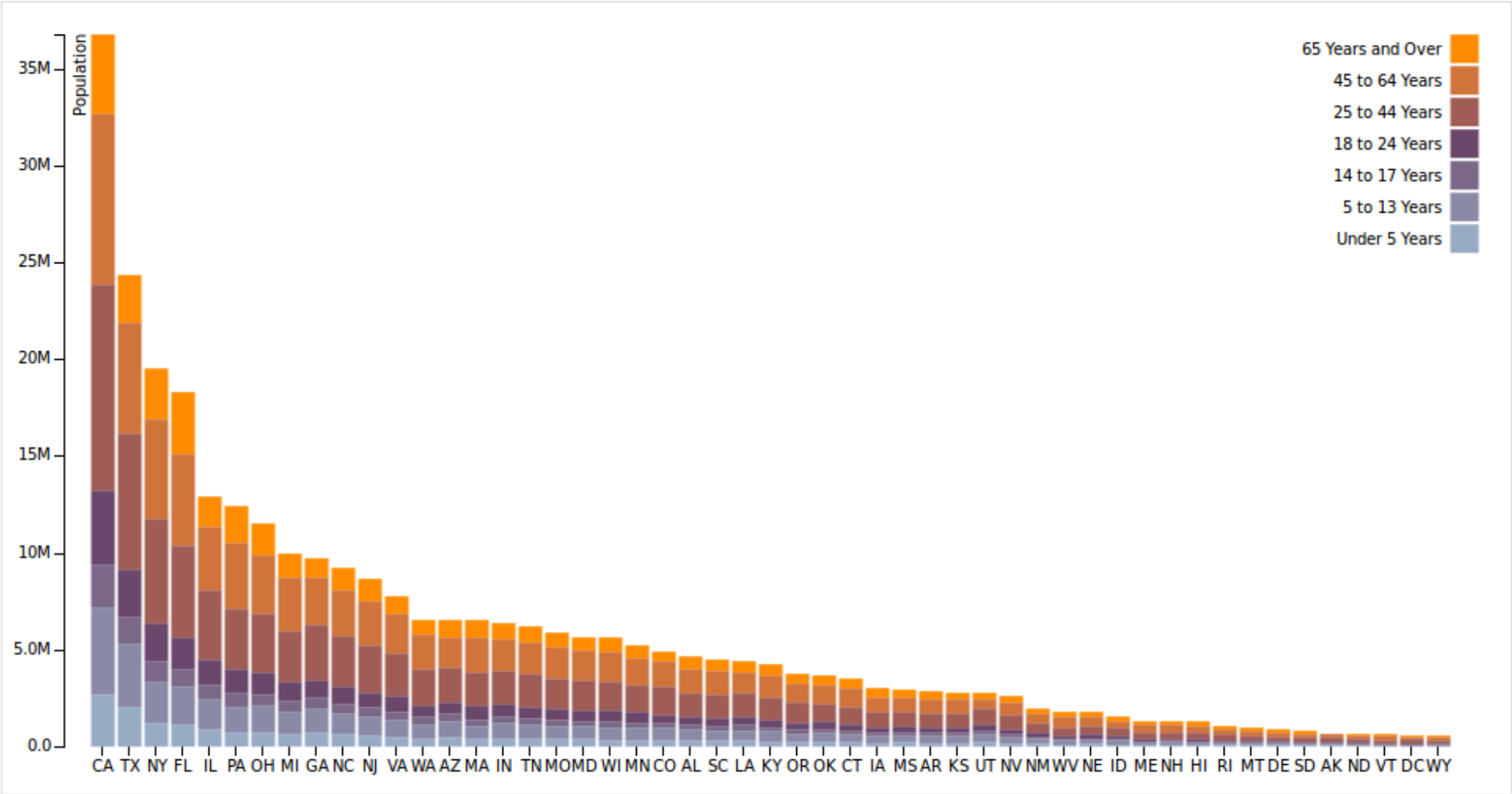
Grouped Bar Chart

Types



Introduction to Data Visualisation: Types

Stacked Bar Chart



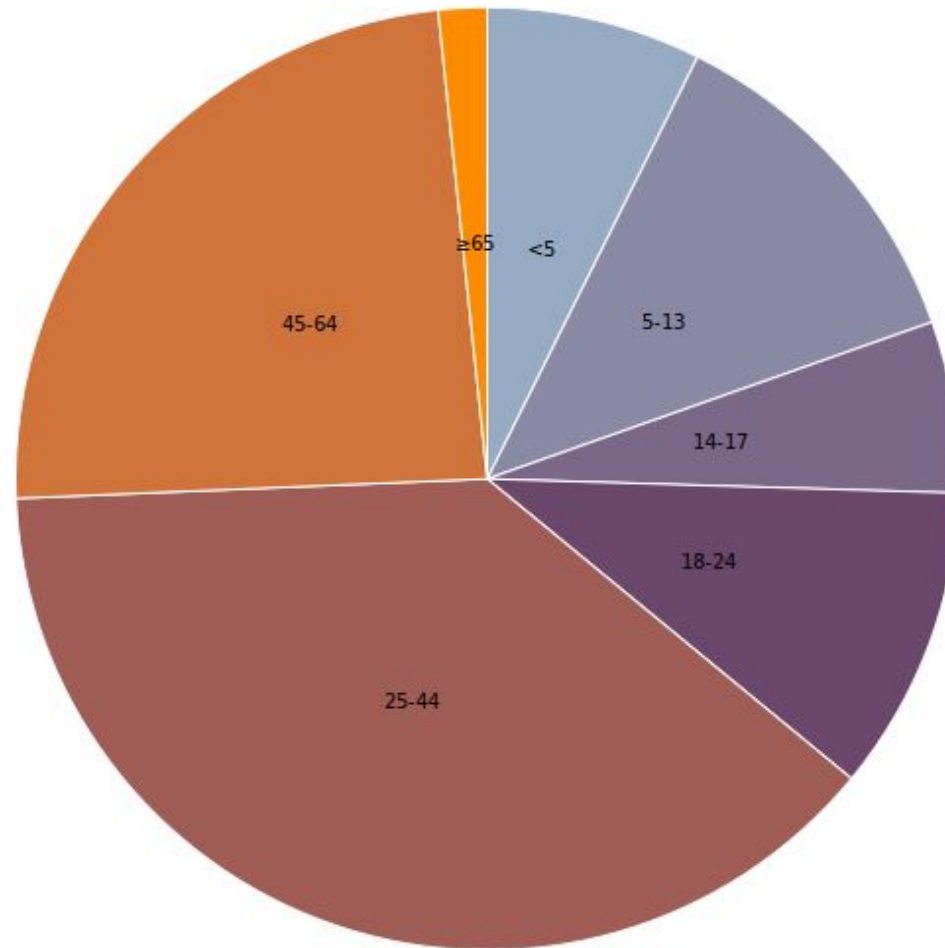
Introduction to Data Visualisation: Types

Types of charts

- scatterplot, line chart, area chart, bar chart
- pie chart, tree map, parallel sets
- bubble chart, radar chart
- time line, flow chart, steamgraph
- choropleth, flow map, cartogram

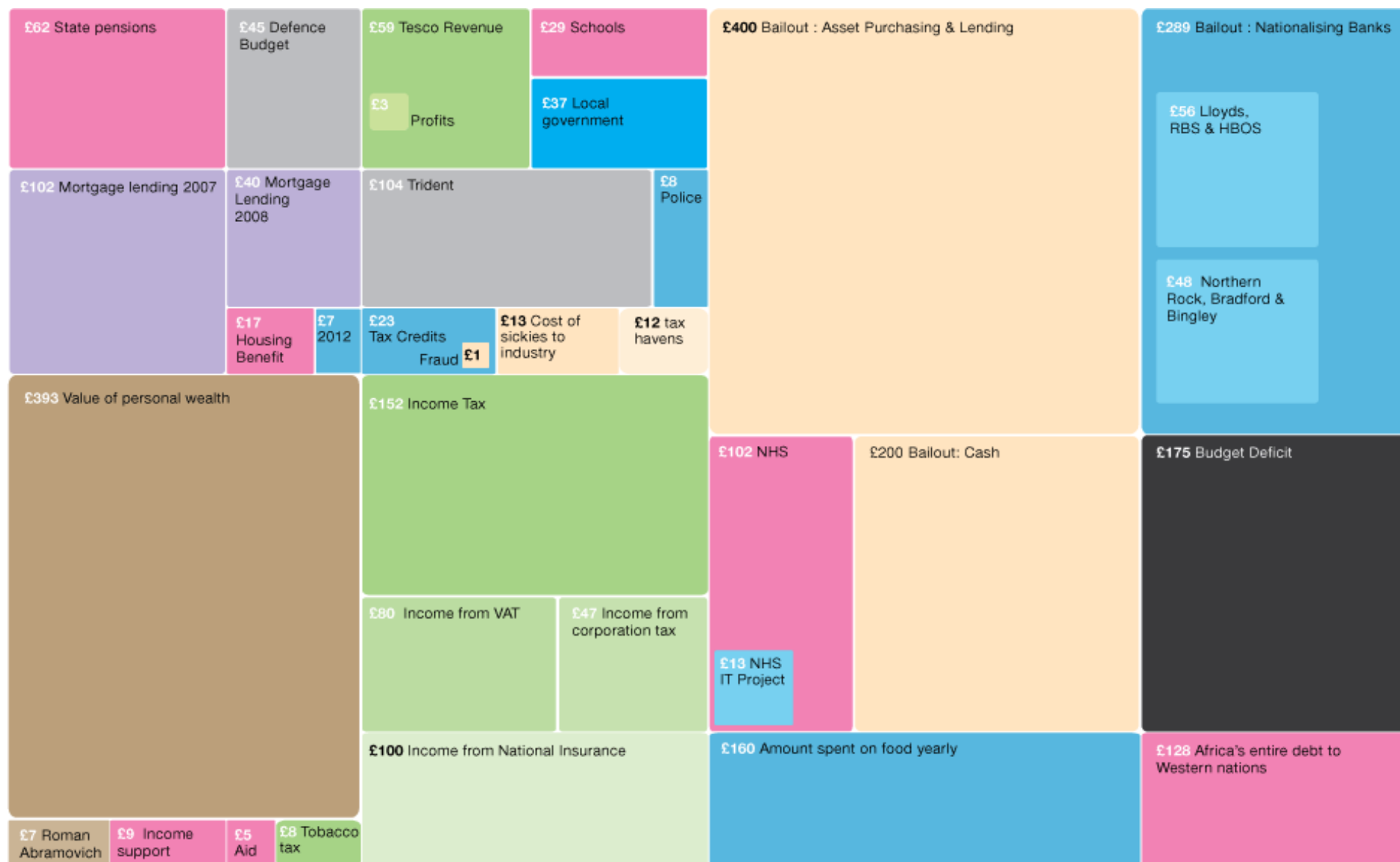
Introduction to Data Visualisation: Types

Pie Chart



Introduction to Data Visualisation: Types

Tree Map



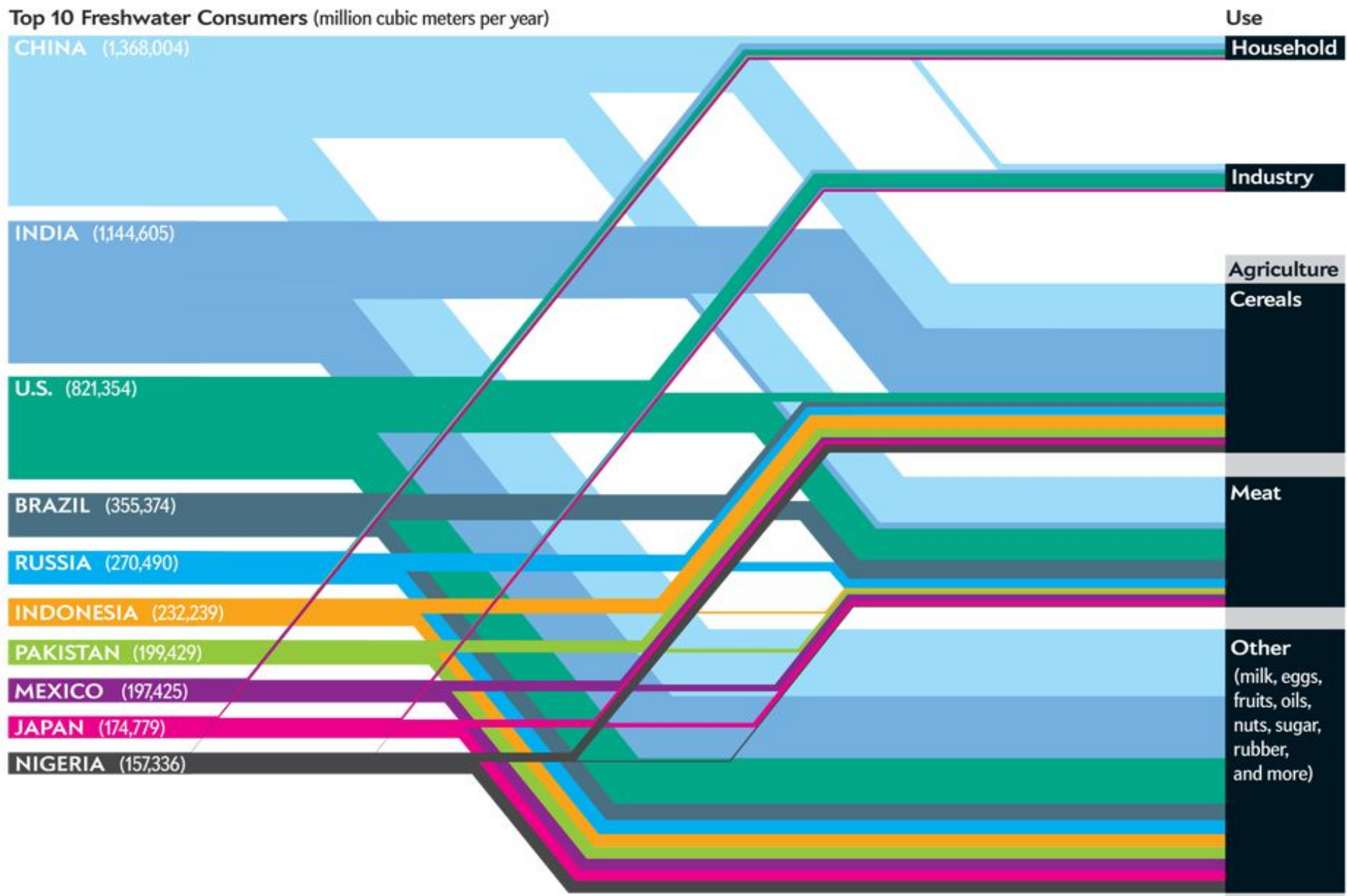
The Billion Pound-O-Gram

■ Giving
 ■ Spending
 ■ Fighting
 ■ Hoarding
 ■ Lending
 ■ Bailing
 ■ Earning

Introduction to Data Visualisation: Types

Parallel Sets

Top 10 Freshwater Consumers (million cubic meters per year)



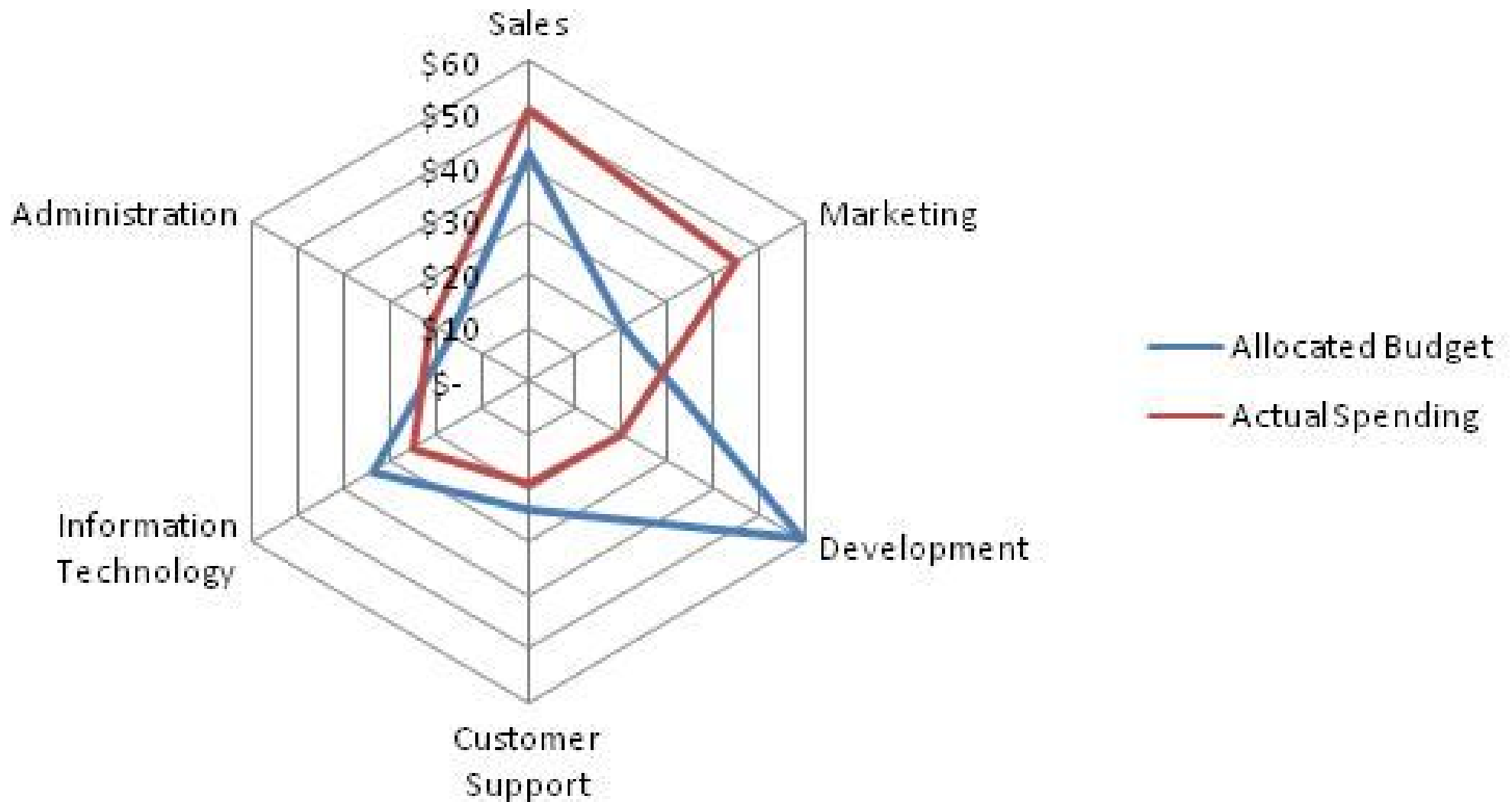
Introduction to Data Visualisation: Types

Types of charts

- scatterplot, line chart, area chart, bar chart
- pie chart, tree map, parallel sets
- **bubble chart, radar chart**
- time line, flow chart, steamgraph
- choropleth, flow map, cartogram

Introduction to Data Visualisation: Types

Radar Chart



Introduction to Data Visualisation: Types

Radar Chart



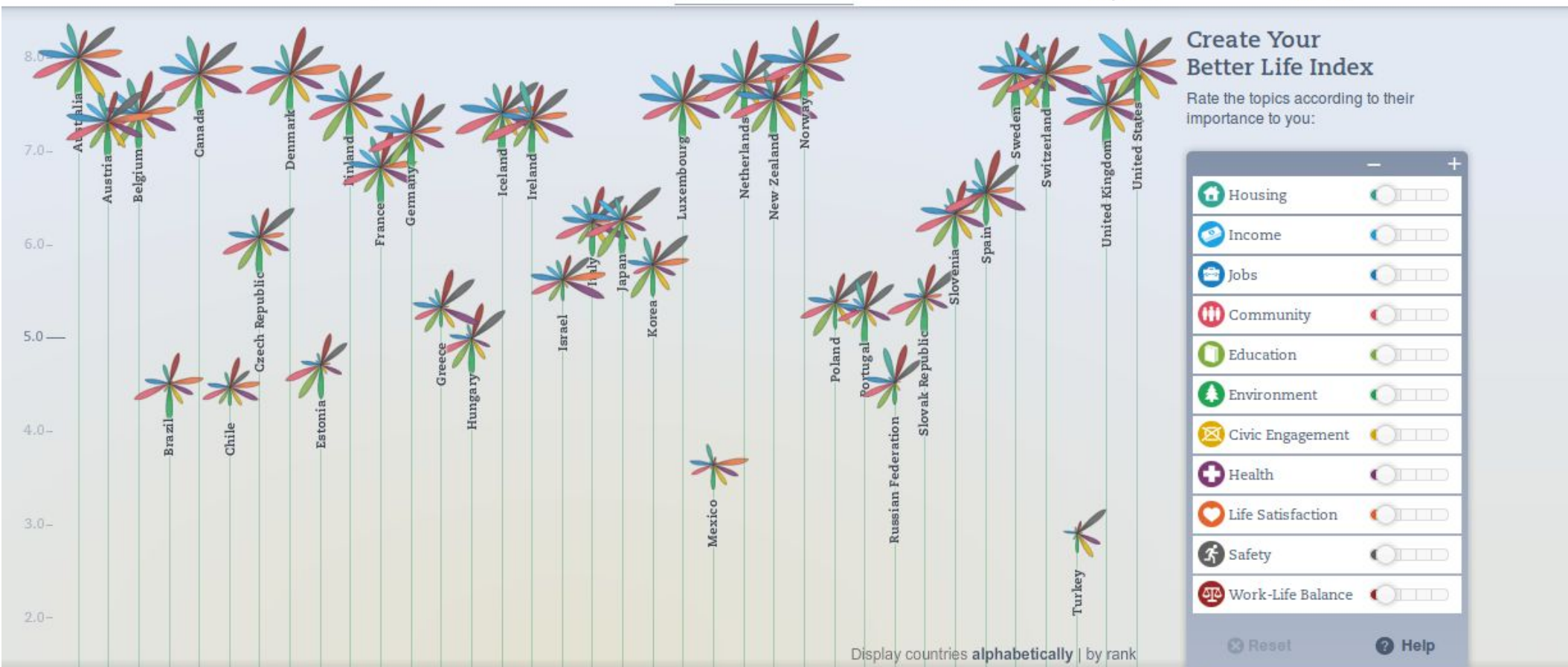
EN | [FR](#) | [contact](#) | [oecd.org](#)

Index

Countries ▾

Topics ▾

About



How's life?

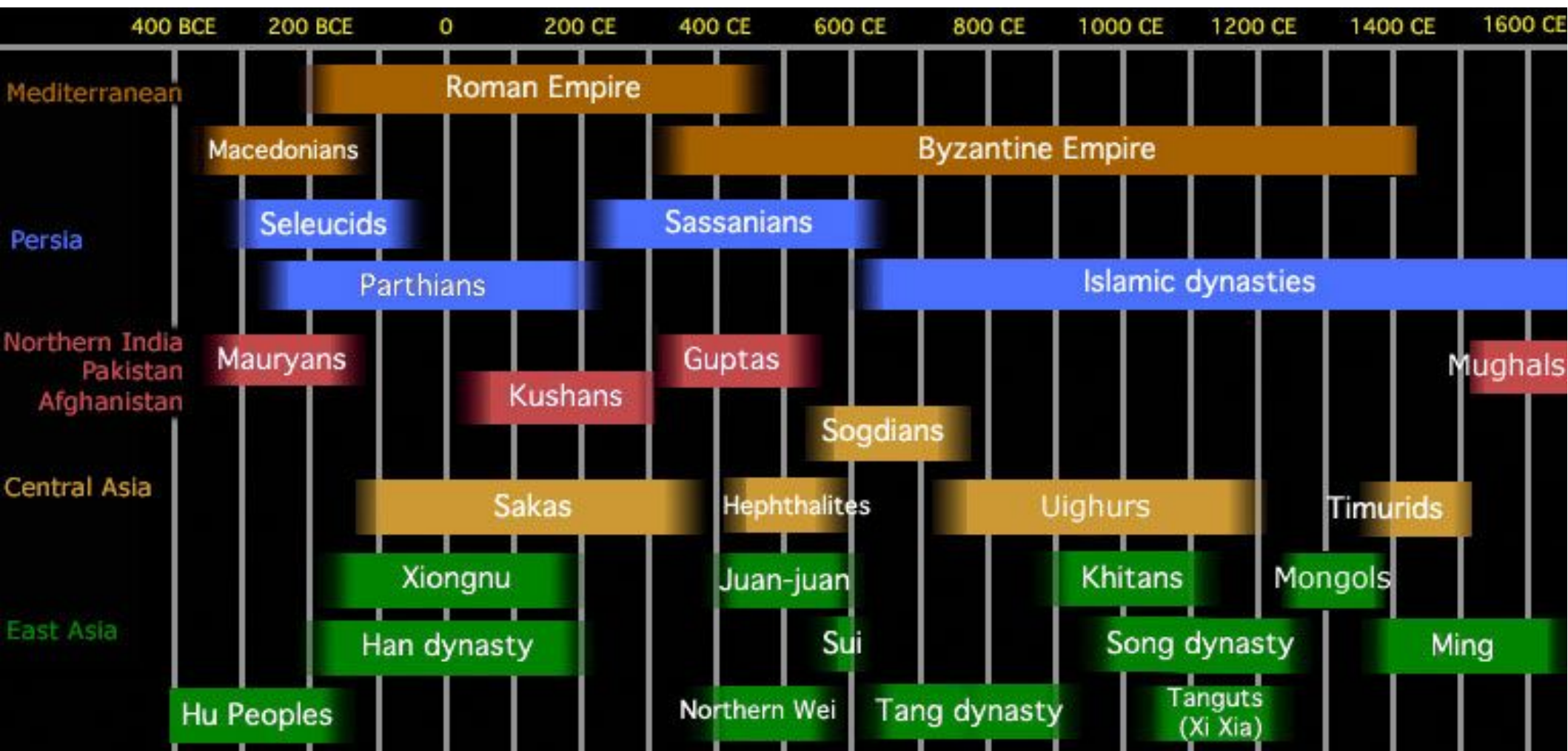
Introduction to Data Visualisation: Types

Types of charts

- scatterplot, line chart, area chart, bar chart
- pie chart, tree map, parallel sets
- bubble chart, radar chart
- time line, flow chart, steamgraph
- choropleth, flow map, cartogram

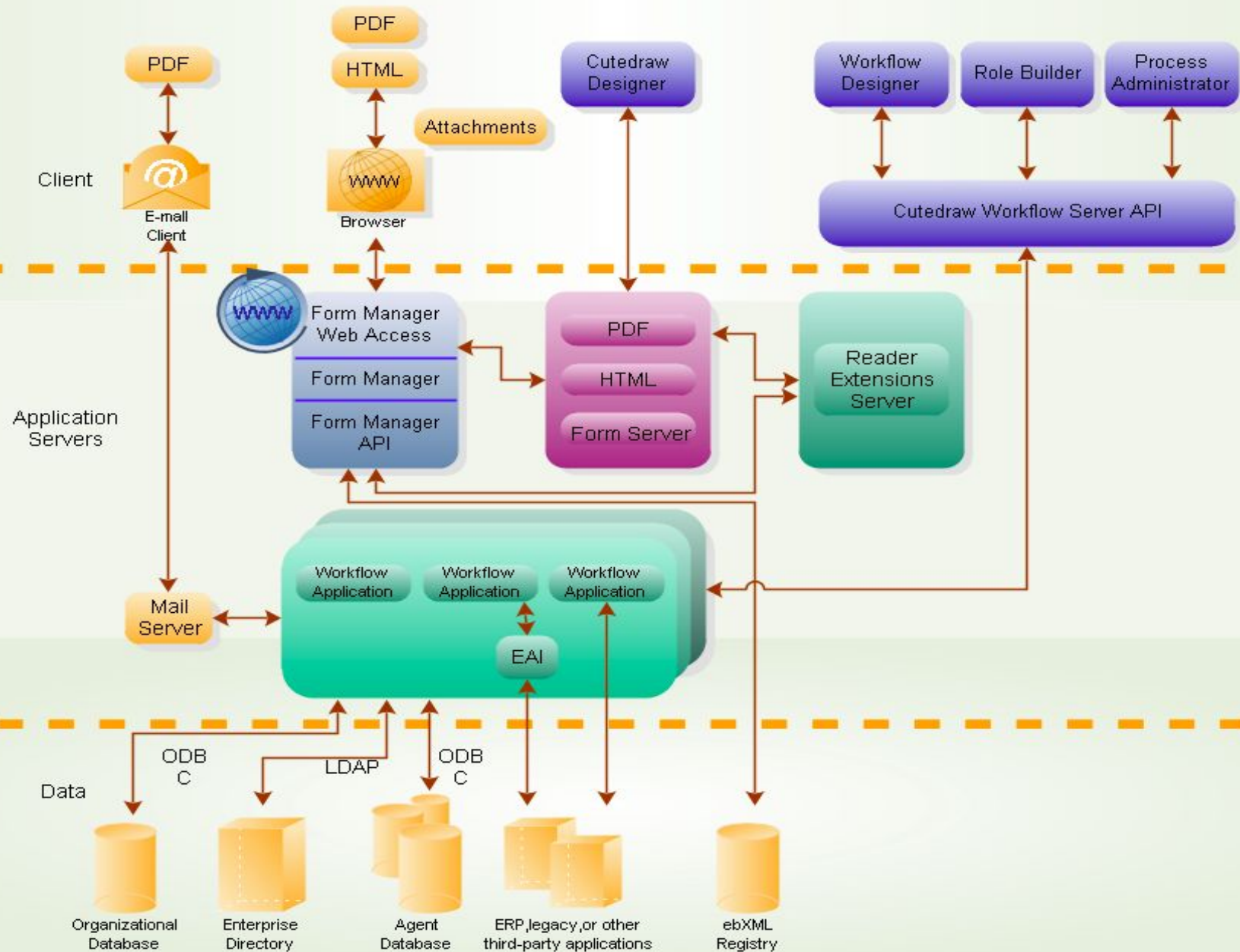
Introduction to Data Visualisation: Types

Timeline



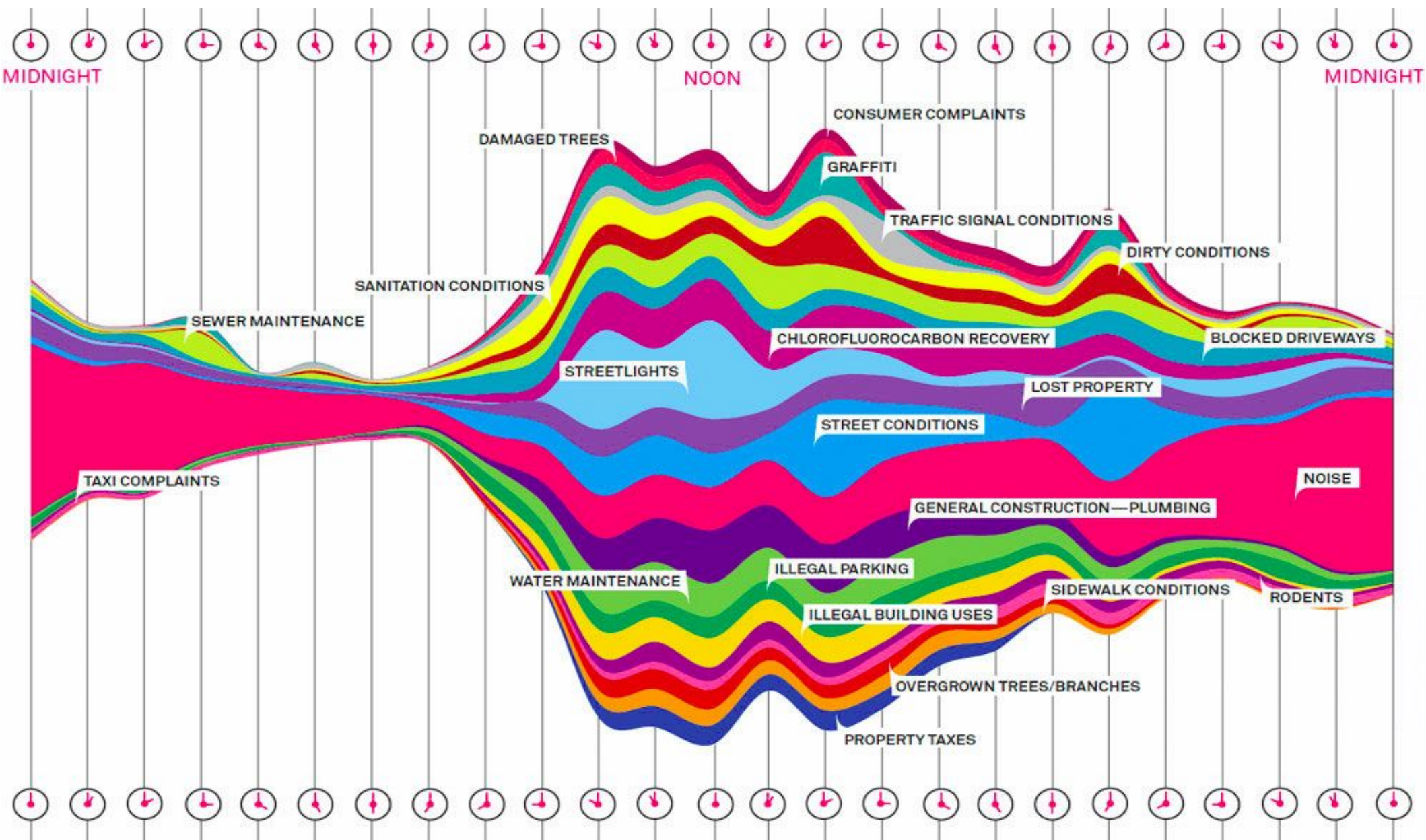
Introduction to Data Visualisation: Types

Flow Chart



Introduction to Data Visualisation: Types

Steamgraph



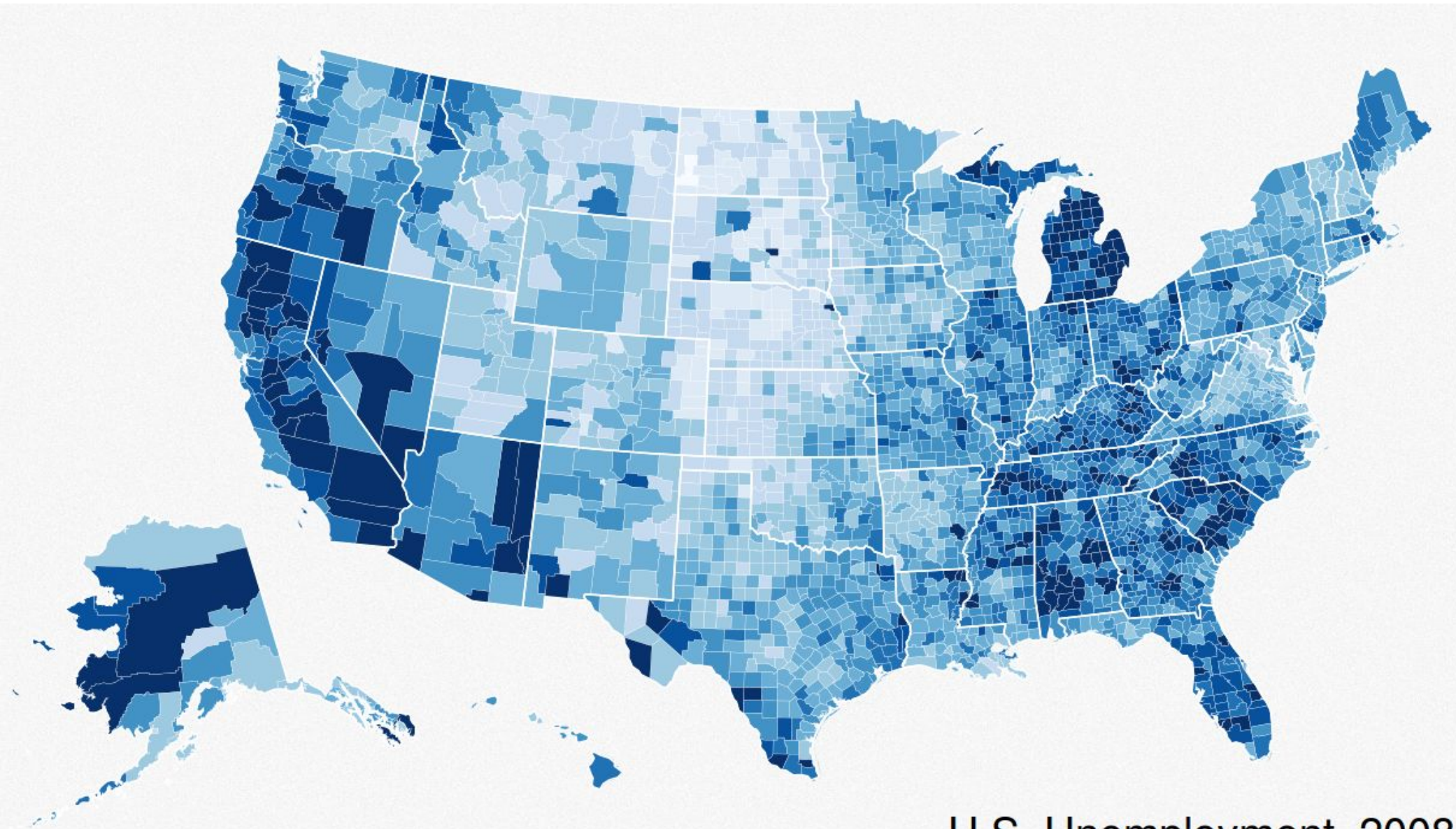
Introduction to Data Visualisation: Types

Types of charts

- scatterplot, line chart, area chart, bar chart
- pie chart, tree map, parallel sets
- bubble chart, radar chart
- time line, flow chart, steamgraph
- choropleth, flow map, cartogram

Introduction to Data Visualisation: Types

Choropleth



U.S. Unemployment, 2008

Introduction to Data Visualisation: Types

Flow Map

Carte Figurative des pertes successives en hommes de l'Armée Française dans la campagne de Russie 1812-1813.

Dressée par M. Minard, Inspecteur Général des Ponts et Chaussées en retraite

Paris, le 20 Novembre 1869.

Les nombres d'hommes présents sont représentés par les largeurs des zones colorées à raison d'un millimètre pour dix mille hommes; ils sont de plus écrits en travers des zones. Le rouge désigne les hommes qui entrent en Russie, le noir ceux qui en sortent. Les renseignements qui ont servi à dresser la carte ont été puisés dans les ouvrages de M. M. Thiers, de Ségur, de Fozensac, de Chambray et le journal inédit de Jacob, pharmacien de l'Armée depuis le 28 Octobre.

Pour mieux faire juger à l'œil la diminution de l'armée, j'ai supposé que les corps du Prince Jérôme et du Maréchal Davoust qui avaient été détachés sur Minsk et Mohilow et qui rejoignent vers Orscha et Witebsk, avaient toujours marché avec l'armée.

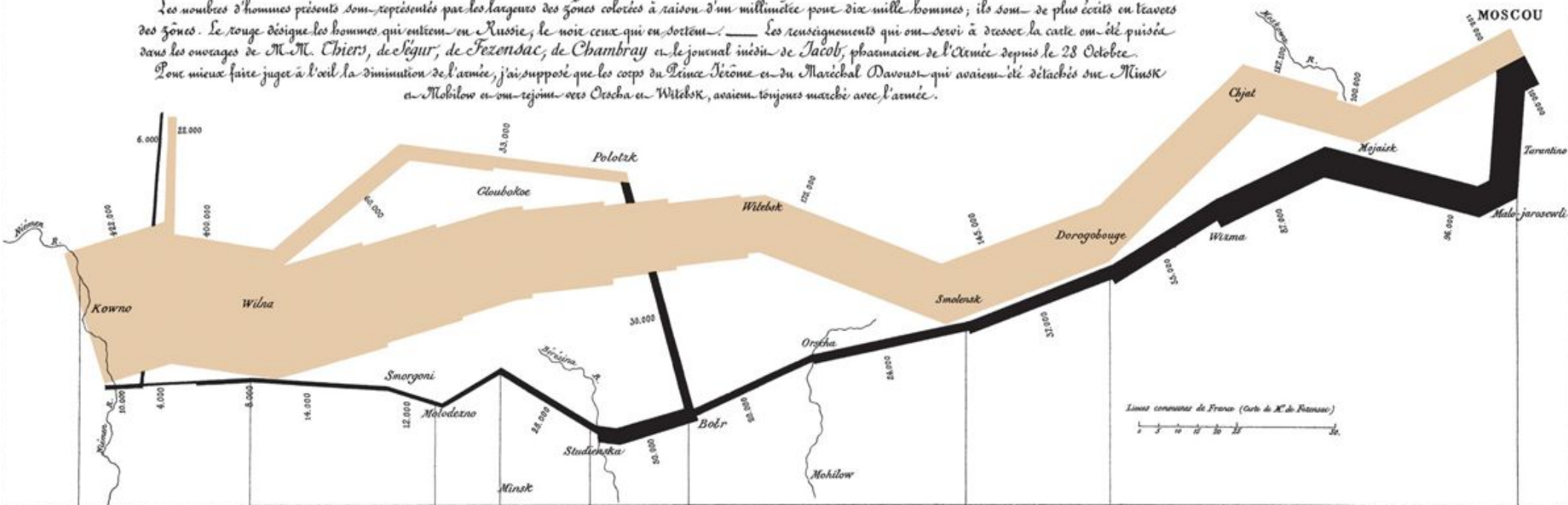
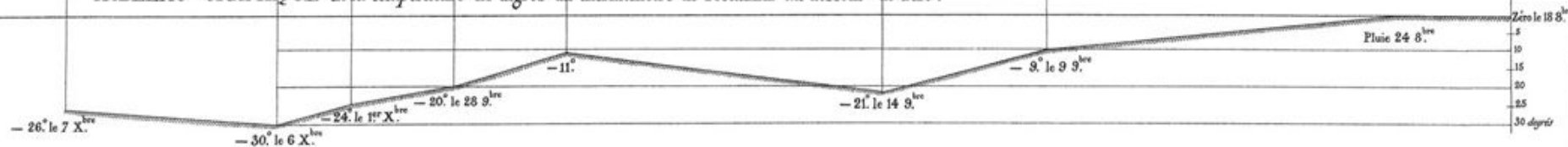


TABLEAU GRAPHIQUE de la température en degrés du thermomètre de Réaumur au dessous de zéro.



Les Cosaques passent au galop le Niémen gelé.

Introduction to Data Visualisation: Types

Cartogram



Introduction to Data Visualisation: Principles

Gestalt principles of visual perception

- law of proximity
- law of similarity
- law of enclosure
- law of closure
- law of continuity

Introduction to Data Visualisation: Principles

Manuel Lima's information visualisation manifesto (selection)

- form follows function
- start with a question
- cite your source
- the power of narrative
- embrace time
- avoid gratuitous visualisations

source: www.visualcomplexity.com

Introduction to Data Visualisation: Principles

Subjective guiding principles

- juxtapose, compare and relate
- combine/collect data to challenge existing views
- making complicated visualisation is easy but not effective
- assume that the audience knows the context of the work

Introduction to Data Visualisation: Tools

Data Organisation – Google Refine

Google refine students Permalink

Open... Export ▾ Help

Facet / Filter Undo / Redo 60

Refresh Reset All Remove All

410 rows Extensions: Freebase ▾

Show as: rows records Show: 5 10 25 50 rows « first < previous 1 - 50 next > last »

▾ All ▾ Full Name ▾ Graduate University

Facet

Text filter

Edit cells

Edit column ▸ Split into several columns...

Transpose ▸ Add column based on this column...

Sort... Add column by fetching URLs...

View ▸ Add columns from Freebase ...

Reconcile ▸ Rename this column

Remove this column

Move column to beginning

Move column to end

Move column left

Move column right

Graduate University: judgment change invert reset

1 choices Sort by: name count

matched 410 exclude

Facet by choice counts

Graduate University: best candidate's score change reset

20.00 — 190.00

☒ Numeric 409 ☐ Non-numeric 0 ☐ Blank 0

☒ Error 1

1. College Park

2. College Park

3.

4.

5.

6.

7.

8. George Washington University

9. Brown University

10. University College London

11. University of Maryland, College Park

12. Johns Hopkins University

13. University of Pennsylvania

14. George Washington University

15.

javascript:({

Introduction to Data Visualisation: Tools

Data Organisation – Data Wrangler

SplitCutExtractEditFillTranslateDropMergeWrapDeletePromoteFoldUnfoldTranspose

afterbeforecolumnmaxonpositionsquote characterresultrow

oncecolumn

Suggestions

rows: 408prevnext

#	split	#	split1
1	Reported crime in Alabama		
2			
3	2004	4029.3	
4	2005	3900	
5	2006	3937	
6	2007	3974.9	
7	2008	4081.9	
8			
9	Reported crime in Alaska		
10			
11	2004	3370.9	
12	2005	3615	
13	2006	3582	
14	2007	3373.9	
15	2008	2928.3	
16			
17	Reported crime in Arizona		
18			
19	2004	5073.3	
20	2005	4827	
21	2006	4741.6	
22	2007	4502.6	
23	2008	4087.3	
24			
25	Reported crime in Arkansas		

ScriptExport

Split data repeatedly on newline into rows

Split data repeatedly on ','

Introduction to Data Visualisation: Tools

Data Organisation – Mr. Data Converter

Mr. Data Converter

I will convert your Excel data into one of several web-friendly formats, including HTML, JSON and XML.

Email me at mr.dataconverter@gmail.com.

News and updates available via [Twitter](#).

Source available on [github](#).

SETTINGS

Delimiter: ☒ Auto ☐ Comma ☐ Tab

☒ First row is the header

Transform: ☐ lowercase ☐ upcase ☒ none

☒ Include white space in output

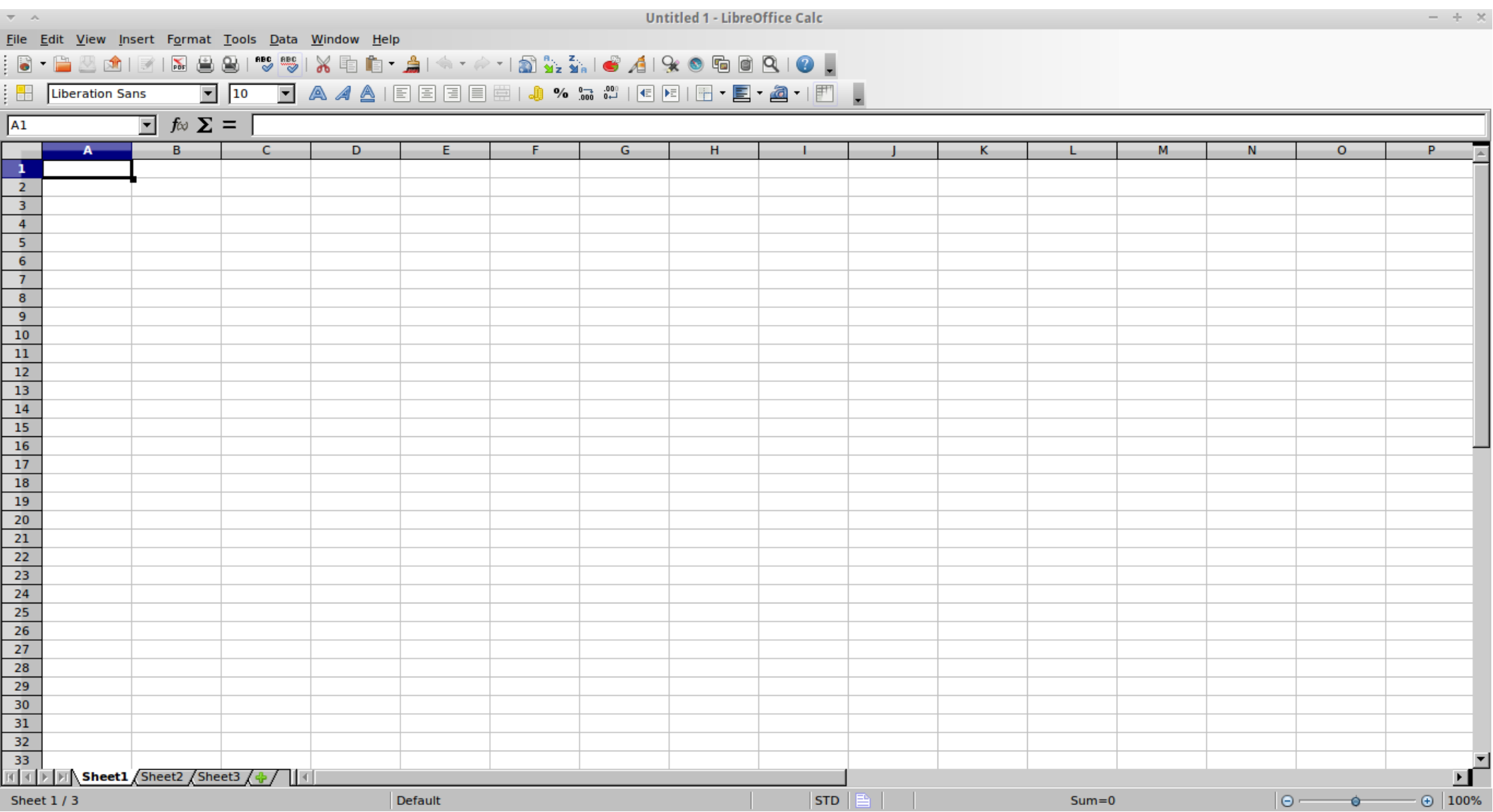
Indent with: ☐ tabs ☒ spaces

Input CSV or tab-delimited data. Using Excel? Simply copy and paste. No data on hand? [Use sample](#)

Output as XML - Nodes

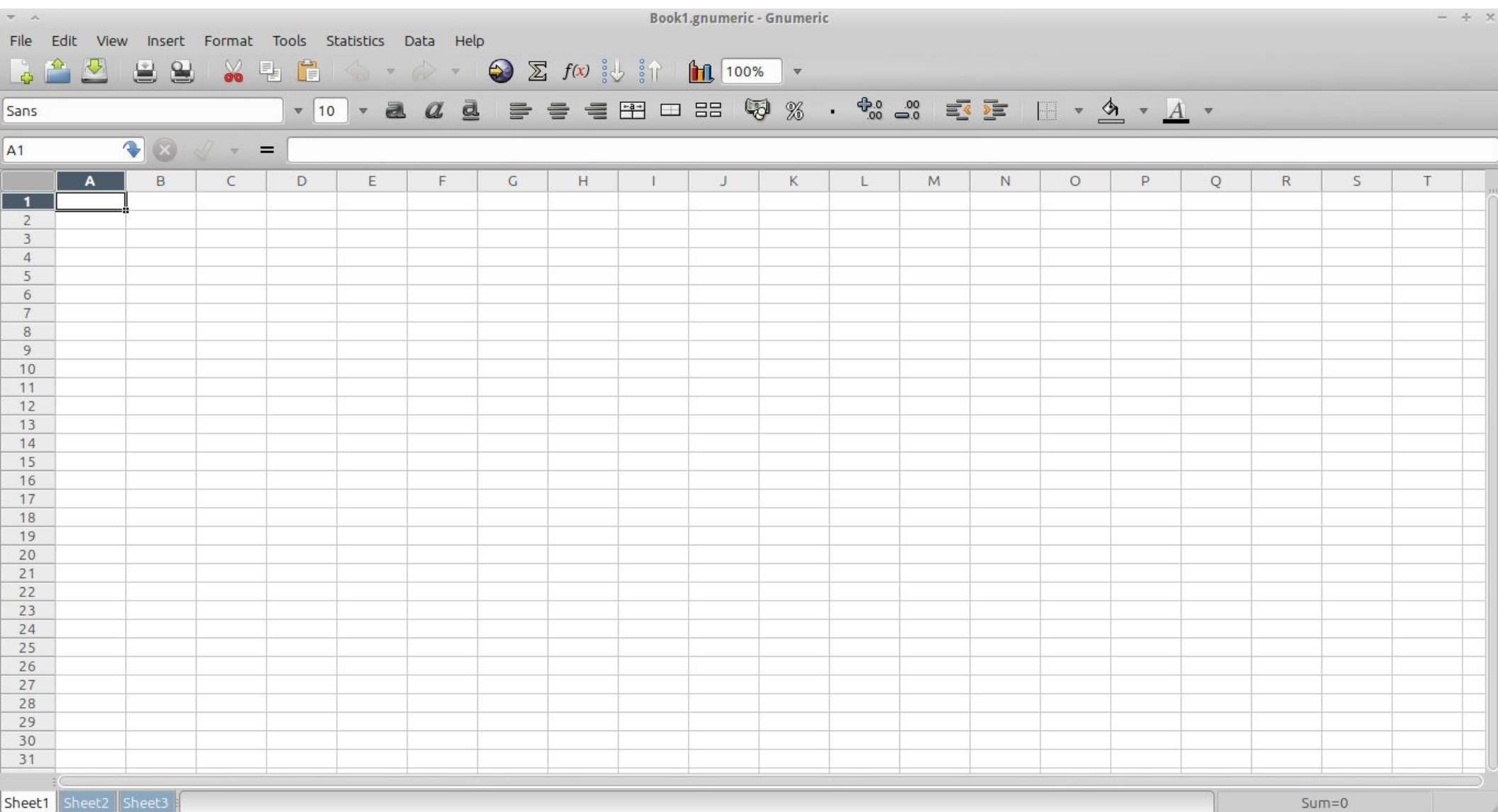
Introduction to Data Visualisation: Tools

Analysis – Libre Office Calc



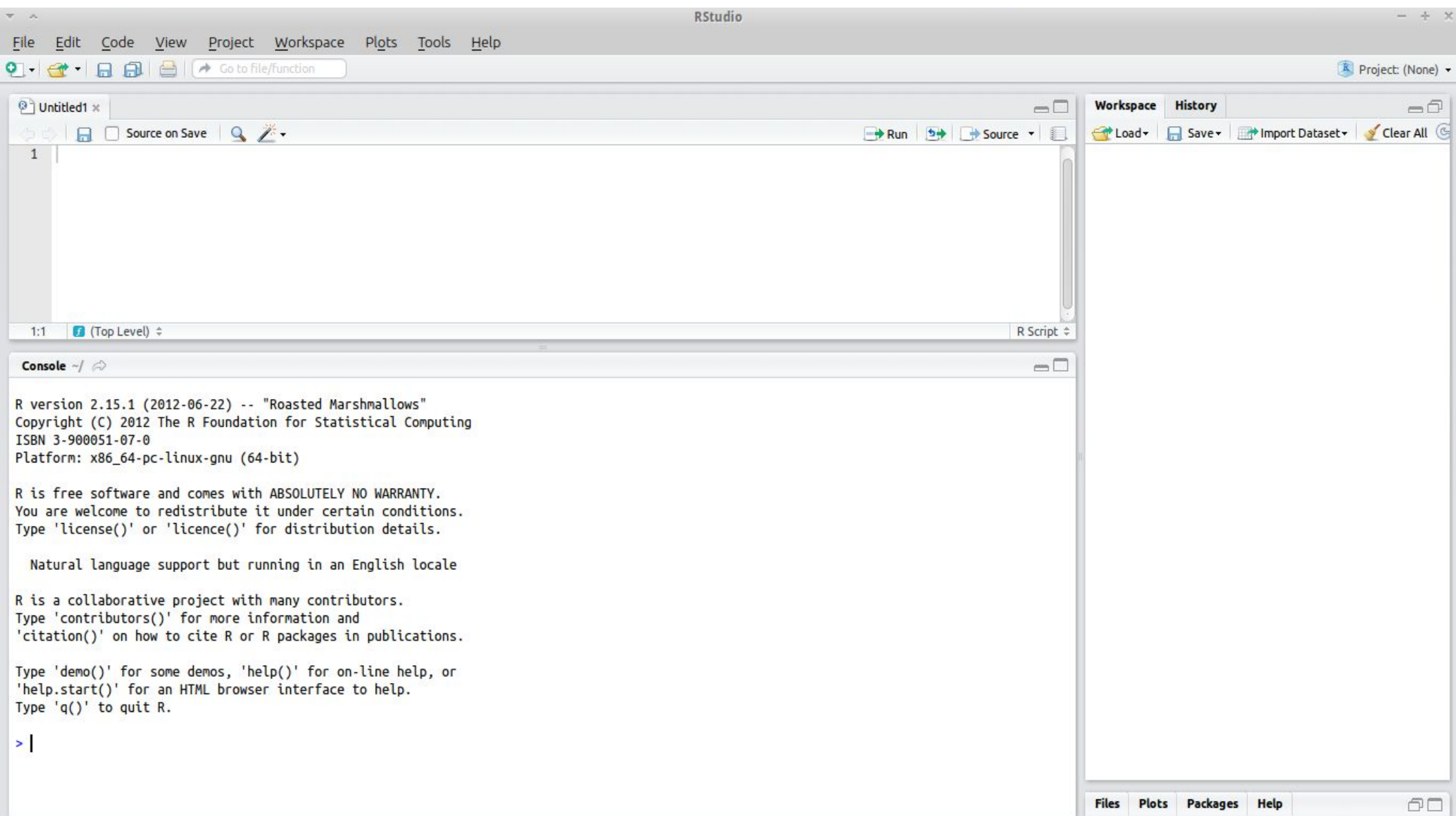
Introduction to Data Visualisation: Tools

Analysis – Gnumeric



Introduction to Data Visualisation: Tools

Analysis – R (and R Studio)



Introduction to Data Visualisation: Tools

Visualisation – Many Eyes

Log in



Explore

- Visualizations
- Data sets
- Comments
- Topic centers

Participate

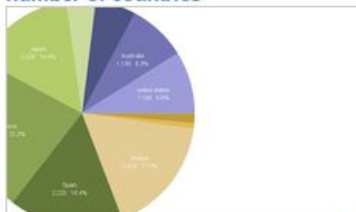
- Create a visualization
- Upload a data set
- Create a topic center
- Register

[Learn more](#)

- [Quick start](#)
- [Visualization types](#)
- [About Many Eyes](#)
- [Privacy](#)
- [Blog](#)

Try our featured visualizations

Amount of people that smoke in a number of countries



Amount of people that smoke in a number of countries

by Taylah

Interstate arrivals Australia
1981-1985

Interstate arrivals Australia 1981-1985

by wyattc

Policy on Evolution Education



By state - 2012

by [walkmagazine](#)

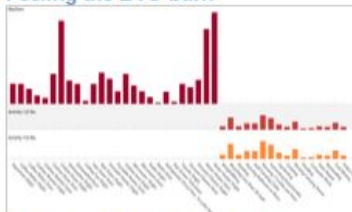
Number of unimmunized infants against DTP3



By country and continent - 2011

by StuartW

Feeling the BTU burn



Energy burned by machine and body

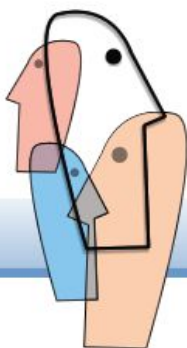
by Ian S

Digital Government Strategy 2013



Phrase Net visualization for Digital Government Strategy - May 2013.

by TLissauer



An experiment brought to you by IBM Research and the IBM Cognos software group

Introduction to Data Visualisation: Tools

Visualisation – Tableau Public



[Login](#) | [Tableau for Companies](#)

SEARCH [go](#)

HOW IT WORKS
see the magic happen

GALLERY
see what others visualized

COMMUNITY
join the conversation



Tale of 100

[Viz of the Day Gallery](#)



The

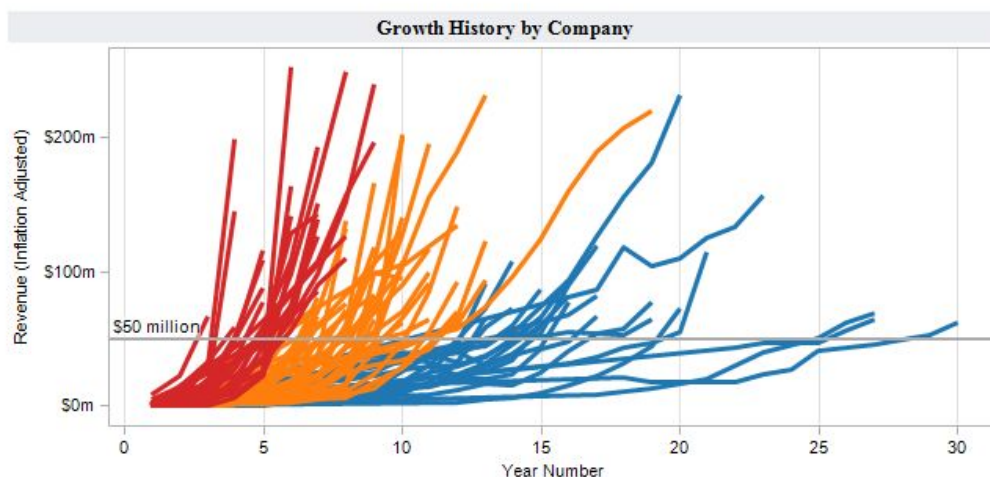
Author: Christian Chabot published on [Wall Street Journal](#)

How fast do successful tech companies grow? The Wall Street Journal posted this visualization that compares the performance of 100 fast growing software companies.

Tale of 100 Entrepreneurs

[Click to interact](#)

■ Rocket Ship ■ Hot Company ■ Slow Burner



Company Details

Growth Group	Company Name	Avg. Year Founded	Years to \$50m	Revenue (2008)
--------------	--------------	-------------------	----------------	----------------

Select Segment:

☒ (All)
☒ Business Intelligence
☒ CAD / EDA

GALLERY

[Business and Real Estate](#)

[Government and Public Data](#)

[Health and Science](#)

[Sports](#)

[Travel and Lifestyle](#)

[All](#)

Vizes in the wild showcase

[View Gallery](#)



Statistic charts on the web should really be interactive. Until Tableau Public, that had never been easy. But now, I have a tool with which I can explain large and complex datasets in a clear, simple and engaging way.

Jerome Cukier
Communicating With Data

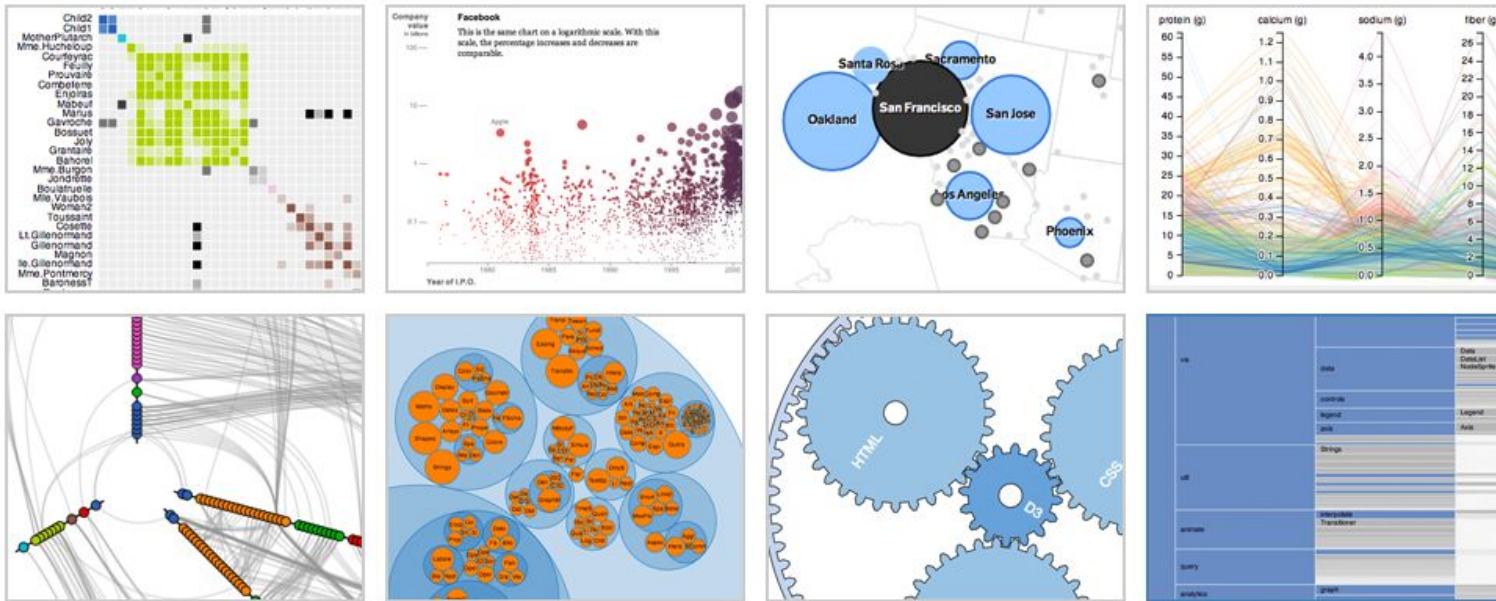
[Related Vizes](#)

Introduction to Data Visualisation: Tools

Visualisation – D3.js

[Overview](#) [Examples](#) [Documentation](#) [Source](#)

Data-Driven Documents



D3.js is a JavaScript library for manipulating documents based on data. **D3** helps you bring data to life using HTML, SVG and CSS. D3's emphasis on web standards gives you the full capabilities of modern browsers without tying yourself to a proprietary framework, combining powerful visualization components and a data-driven approach to DOM manipulation.

See [more examples](#).

Download the latest version here:

- [d3.v2.js](#) - development
- [d3.v2.min.js](#) - production (minified)

Fork me on GitHub

Introduction to Data Visualisation: Tools

Visualisation – Recline.js



Recline.js – relax with your data

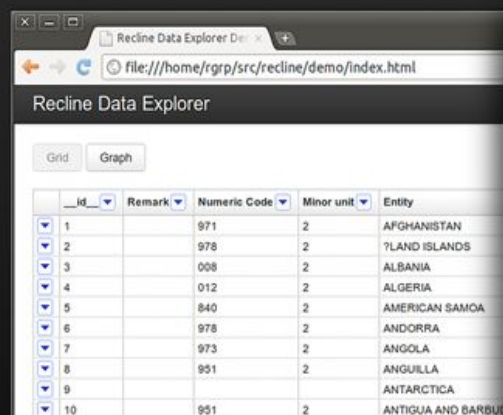
Documentation

Tutorials

Demos

Download

GitHub



Recline Data Explorer

Grid Graph

	Id	Remark	Numeric Code	Minor unit	Entity
1			971	2	AFGHANISTAN
2			978	2	7LAND ISLANDS
3			008	2	ALBANIA
4			012	2	ALGERIA
5			840	2	AMERICAN SAMOA
6			978	2	ANDORRA
7			973	2	ANGOLA
8			951	2	ANGUILLA
9					ANTARCTICA
10			951	2	ANTIGUA AND BARBUD



Recline.js
relax with your data

A simple but powerful library for building data applications in pure Javascript and HTML.

Use the Library »

Recline.js is freely redistributable under the terms of the MIT license.



- The DataHub
- OpenSpending.org
- DataCouch.com

- Open Knowledge Foundation Labs
- Open Definition
- Open Knowledge Foundation

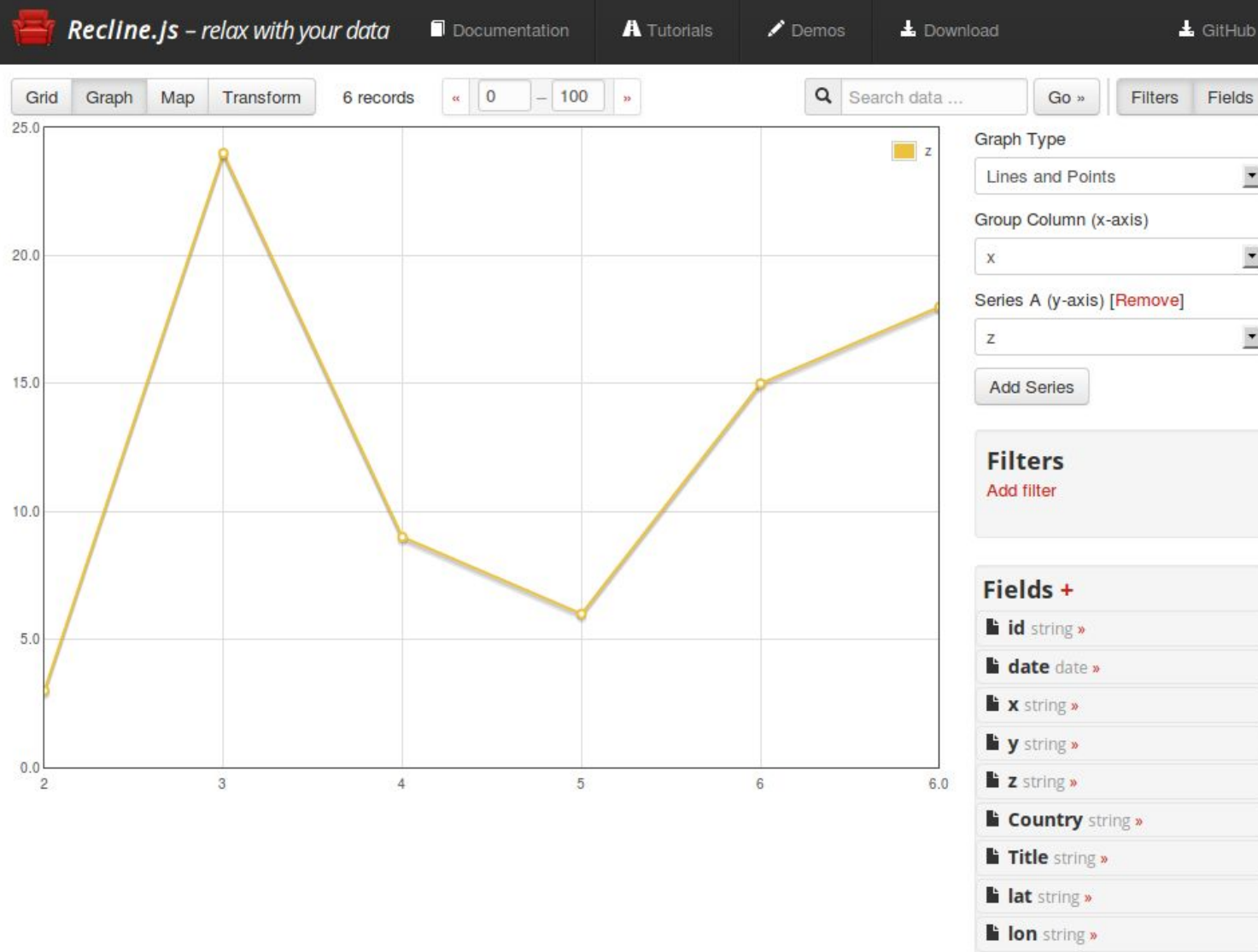
Contacts

@ReclineJS
@maxogden
@rufuspollock



Introduction to Data Visualisation: Tools

Visualisation – Recline.js



Introduction to Data Visualisation: Tools

Visualisation – Google Chart Tools

Home **Products** Events Showcase Live Groups

Google Chart Tools

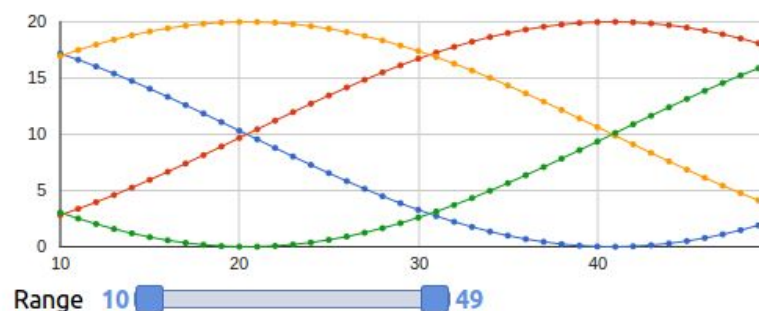
- Overview
- Examples and Tools
- Community
- About Chart Tools
- Related Chart Tools
- Terms of Service

Display live data on your site

Google chart tools are powerful, simple to use, and free. Try out our rich gallery of interactive charts and data tools.

Get Started

Controls and Dashboards - [view source](#)



      [more](#)

Rich Gallery

Choose from a variety of charts. From simple scatter plots to hierarchical treemaps, find the best fit for your data.

Customizable

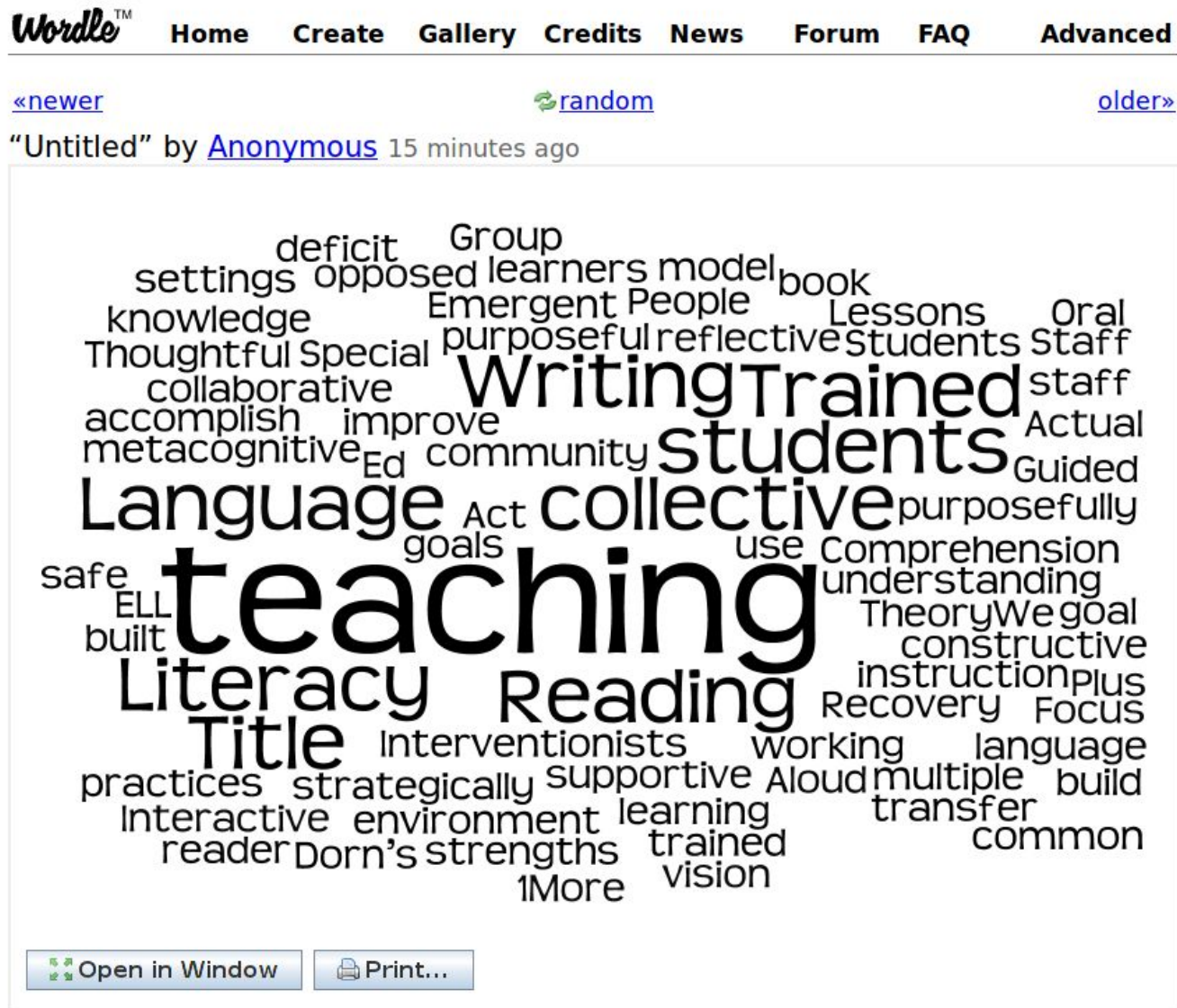
Make the charts your own. Configure an extensive set of options to perfectly match the look and feel of your website.

HTML5 / SVG

Cross-browser compatibility (adopting VML for older IE versions) and cross-platform portability to iOS and new Android releases. No plugins are needed.

Introduction to Data Visualisation: Tools

Visualisation – Wordle



Introduction to Data Visualisation: Tools

Visualisation – Inkscape

