COURSEWARE

EDF

Data Visualization Professional Courseware

Auteur: Michel Dekker

Effective DATA Foundation

DATA VISUALIZATION

Certified by Van Haren CERTIFY

Van Haren PUBLISHING

EDF Data Visualization
Professional Courseware

Colophon

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Publisher about the Courseware

The Courseware was created by experts from the industry who served as the author(s) for this publication. The input for the material is based on existing publications and the experience and expertise of the author(s). The material has been revised by trainers who also have experience working with the material. Close attention was also paid to the key learning points to ensure what needs to be mastered.

The objective of the courseware is to provide maximum support to the trainer and to the student, during his or her training. The material has a modular structure and according to the author(s) has the highest success rate should the student opt for examination. The Courseware is also accredited for this reason, wherever applicable.

In order to satisfy the requirements for accreditation the material must meet certain quality standards. The structure, the use of certain terms, diagrams and references are all part of this accreditation. Additionally, the material must be made available to each student in order to obtain full accreditation. To optimally support the trainer and the participant of the training assignments, practice exams and results are provided with the material.

Direct reference to advised literature is also regularly covered in the sheets so that students can find additional information concerning a particular topic. The decision to leave out notes pages from the Courseware was to encourage students to take notes throughout the material.

Although the courseware is complete, the possibility that the trainer deviates from the structure of the sheets or chooses to not refer to all the sheets or commands does exist. The student always has the possibility to cover these topics and go through them on their own time. It is recommended to follow the structure of the courseware and publications for maximum exam preparation.

The courseware and the recommended literature are the perfect combination to learn and understand the theory.

-- Van Haren Publishing

Other publications by Van Haren Publishing

Van Haren Publishing (VHP) specializes in titles on Best Practices, methods and standards within four domains:

- IT and IT Management
- Architecture (Enterprise and IT)
- Business Management and
- Project Management

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Topics are (per domain):

IT and IT Management

ABC of ICT
ASL®
CATS CM®
CMMI®
COBIT®
e-CF
ISO/IEC 20000
ISO/IEC 27001/27002
ISPL
IT4IT®
IT-CMF™
IT Service CMM
ITIL®
MOF
MSF
SABSA
SAF
SIAM™
TRIM
VeriSM™

Enterprise Architecture

ArchiMate®
GEA®
Novius Architectuur
Methode
TOGAF®

Business Management

BABOK® Guide
BiSL® and BiSL® Next
BRMBOK™
BTF
EFQM
eSCM
IACCM
ISA-95
ISO 9000/9001
OPBOK
SixSigma
SOX
SqEME®

Project Management

A4-Projectmanagement
DSDM/Atern
ICB / NCB
ISO 21500
MINCE®
M_o_R®
MSP®
P3O®
PMBOK® Guide
Praxis®
PRINCE2®

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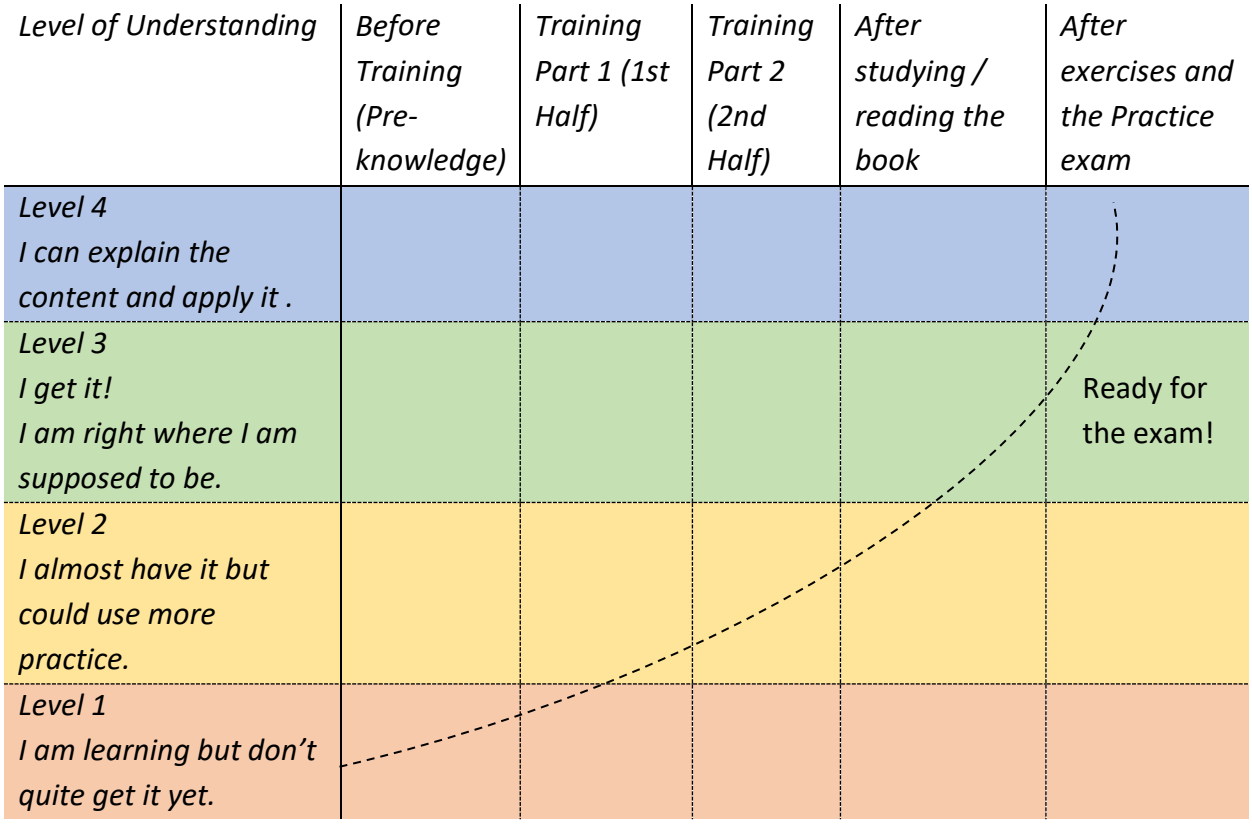
Self-Reflection of understanding Diagram

'*What you do not measure, you cannot control*.'' – Tom Peters

Fill in this diagram to self-evaluate your understanding of the material. This is an evaluation of how well you know the material and how well you understand it. In order to pass the exam successfully you should be aiming to reach the higher end of Level 3. If you really want to become a pro, then you should be aiming for Level 4. Your overall level of understanding will naturally follow the learning curve. So, it's important to keep track of where you are at each point of the training and address any areas of difficulty.

Based on where you are within the Self-Reflection of Understanding diagram you can evaluate the progress of your own training.



(Self-Reflection of Understanding Diagram)

Write down the problem areas that you are still having difficulty with so that you can consolidate them yourself, or with your trainer. After you have had a look at these, then you should evaluate to see if you now have a better understanding of where you actually are on the learning curve.

Troubleshooting

Problem areas:	*Topic:*
Part 1	
Part 2	
You have gone through the book and studied.	
You have answered the questions and done the practice exam.	

Timetable

Part 1: Visual and Quantitative Thinking

What is data visualisation and where does it come from?

How does our brain process visual information?

What type of data do we have and how can we best visualize it?

Part 2: Visualising data effectively

How do you make data easy and understandable to read?

What are the basic principles and guidelines?

What are the main pitfalls in data visualisation?

Part 3: Building blocks of data visualizations

Which basic blocks do data visualisations consist of?

When is it better to use a table and when a graph?

What type of table/graph works best in a given situation?

How do you create a composite visualisation, the management dashboard?

Part 4: Arguing with data, data storytelling.

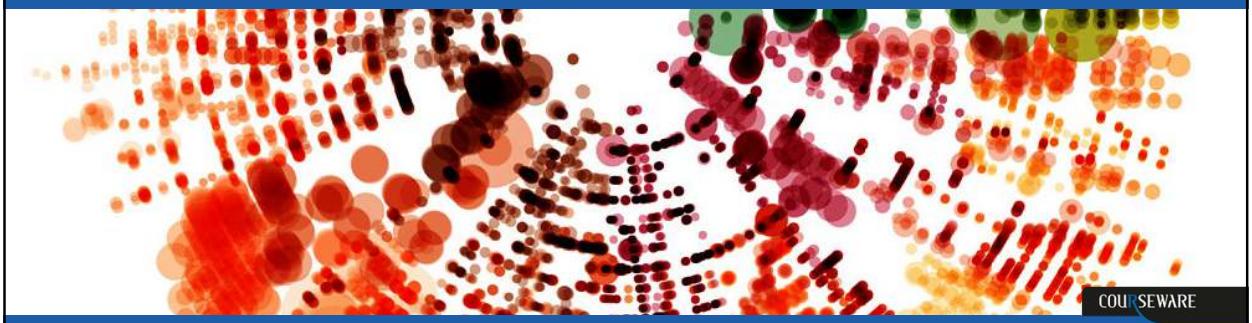
What is the data visualisation process like?

Arguing with data, data storytelling.

Making agreements within your organisation, the data visualization style guide.

Data Visualization

design effective data visualizations



COURSEWARE

Effective Data Foundation

not-for-profit collective,
who enables **professionals** to
leverage data to make
sustainable business decisions

Effective DATA Foundation

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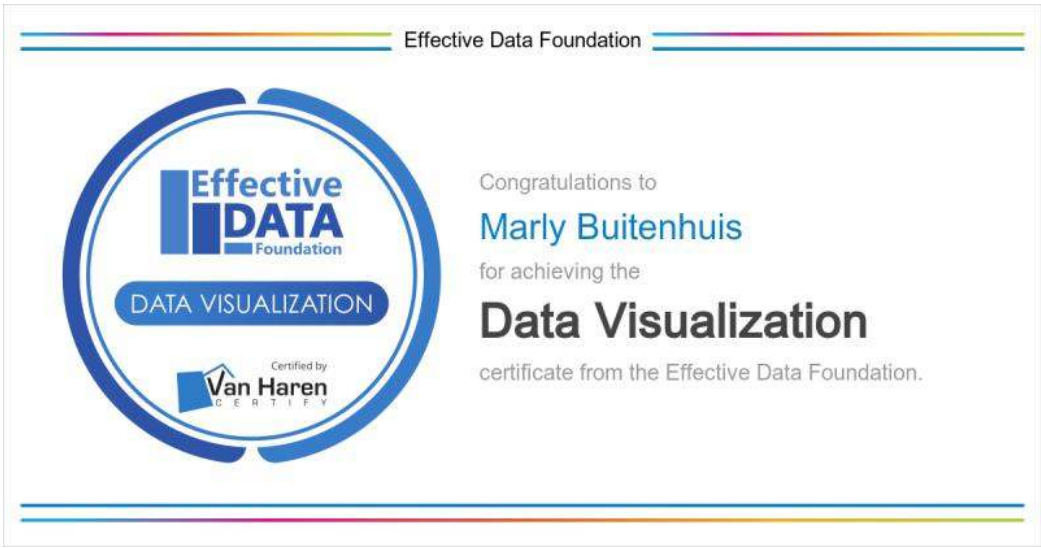
DATA

Analysis / Literacy / Management / Visualization

Certification



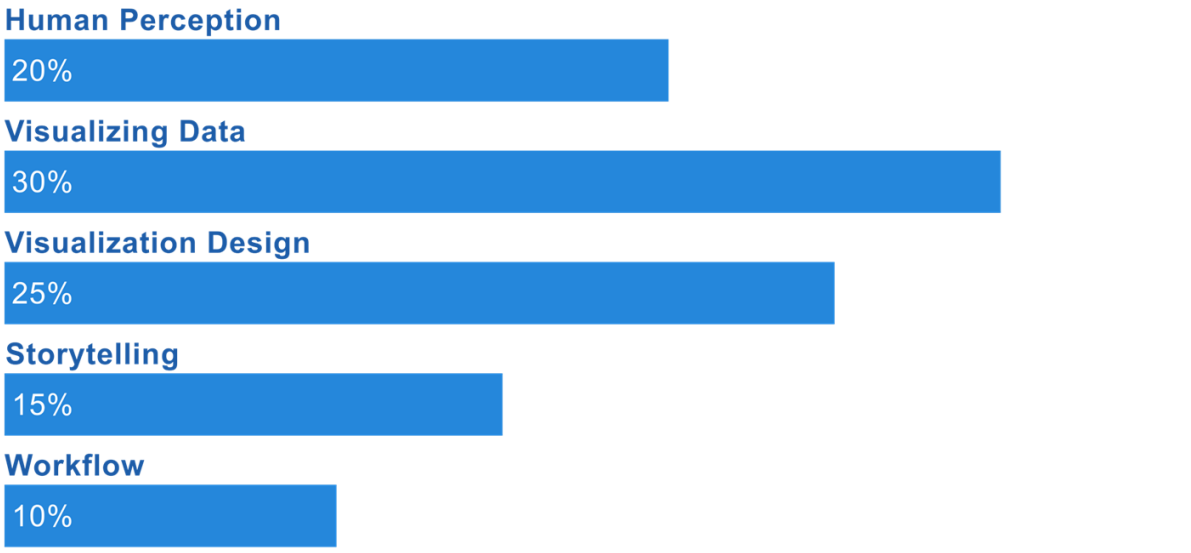
Certification

60 multiple choice questions

within **60** minutes

at least **65%** correct to pass

Training Structure



Introduction

It's ***less*** *a* ***technology*** *problem,*
more *a* ***people*** *problem*

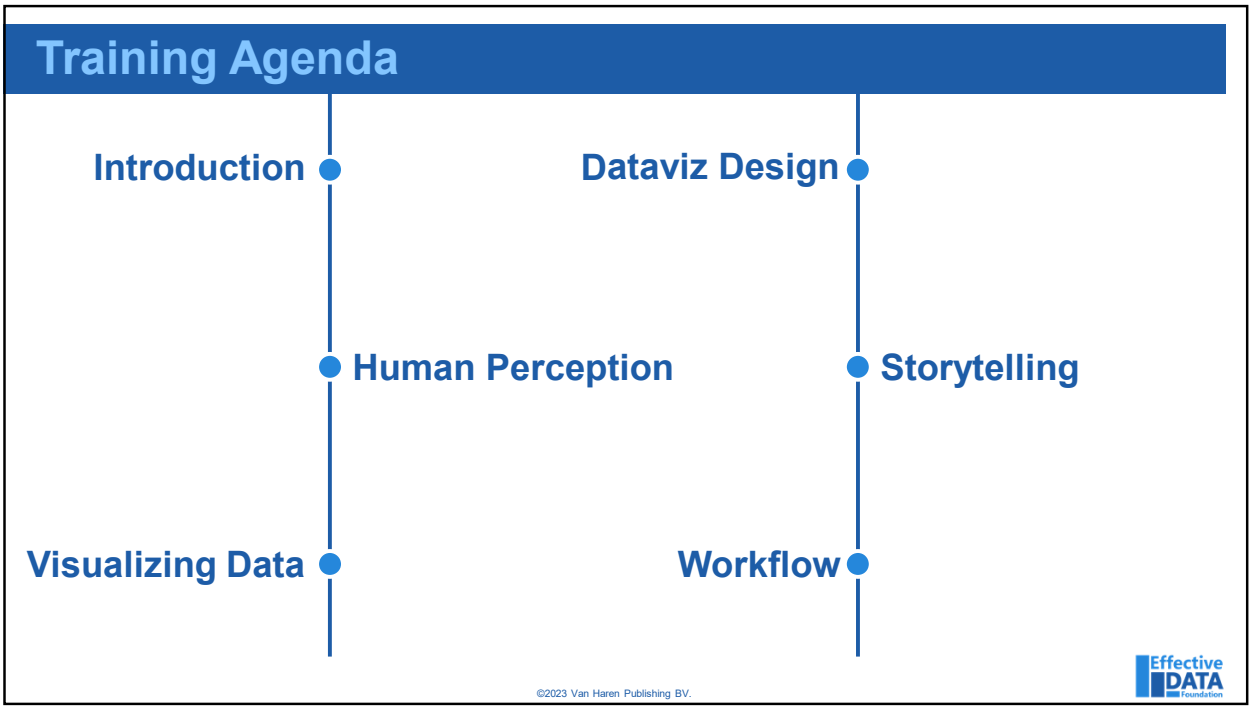
Aron Pilhofer – Executive Director of Digital for the Guardian

Why do we visualize data?

To facilitate **understanding**

Allow **people to act** on data

Visually **identify & compare**
patterns, trends and outliers in data


Training Agenda
Introduction
Dataviz Design
Human Perception
Storytelling
Visualizing Data
Workflow
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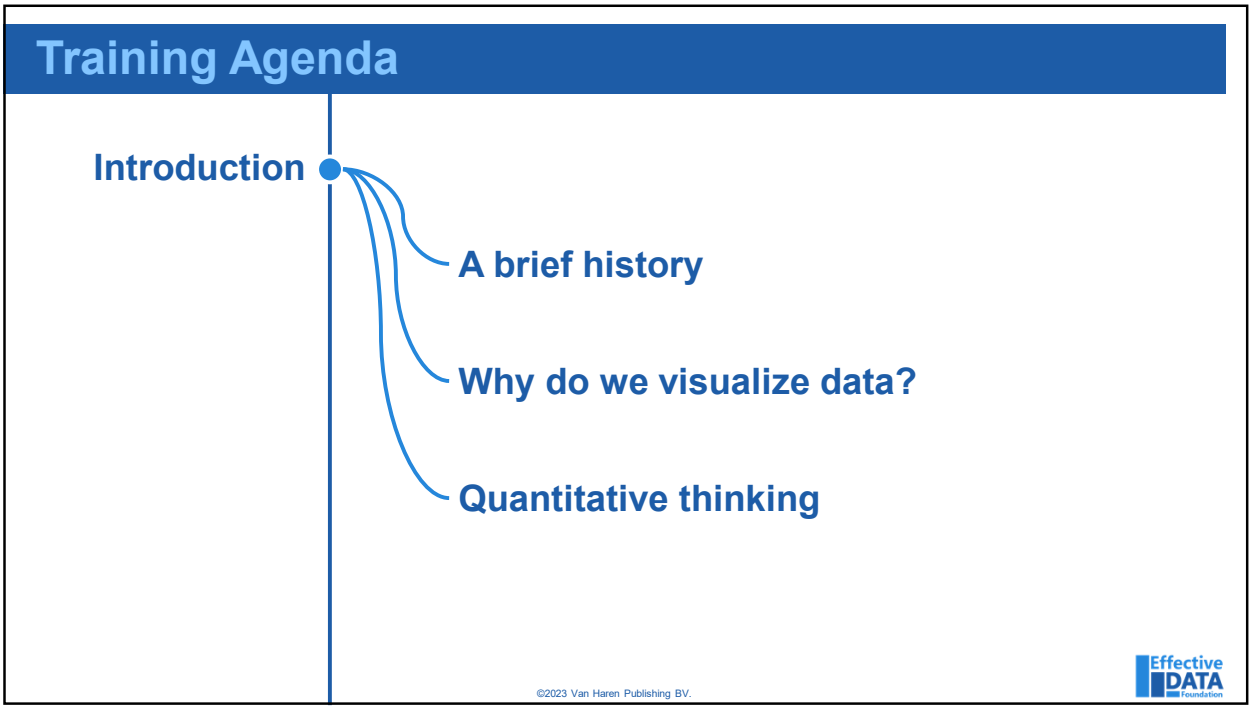
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Quantitative thinking
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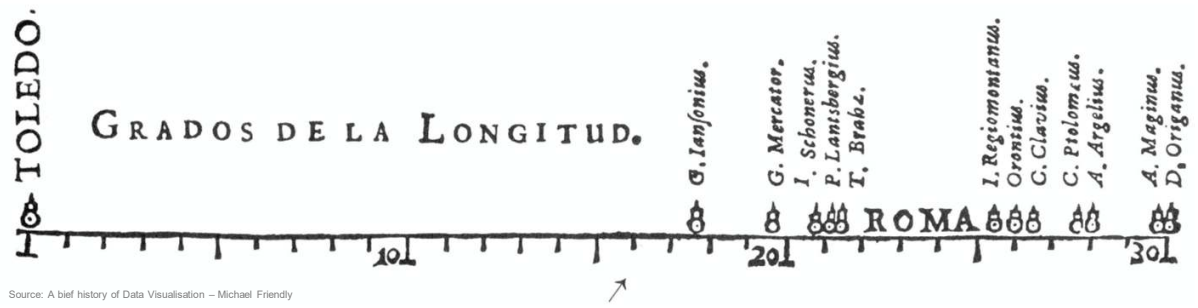
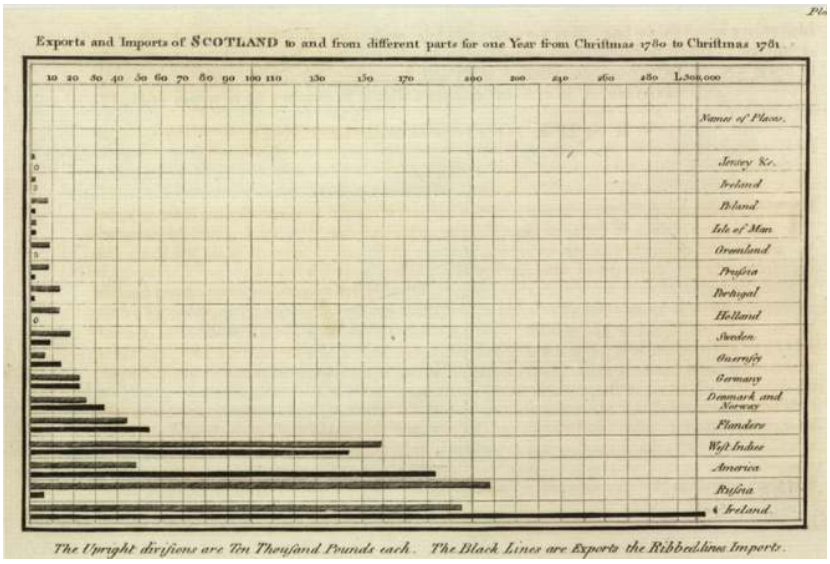
A brief history…



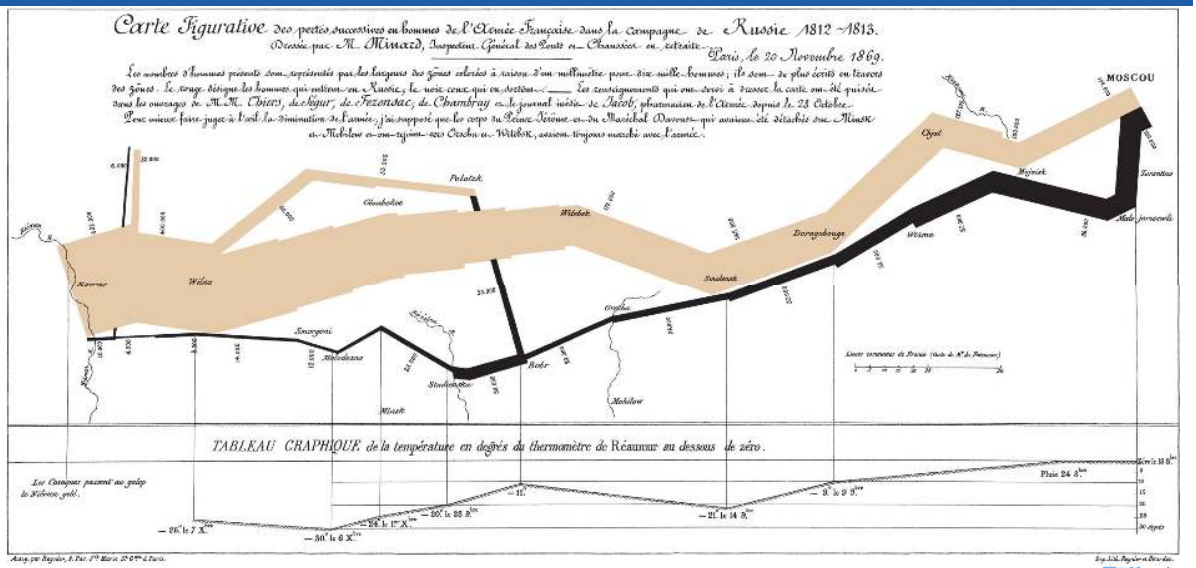
Source: A bief history of Data Visualisation – Michael Friendly

A brief history…



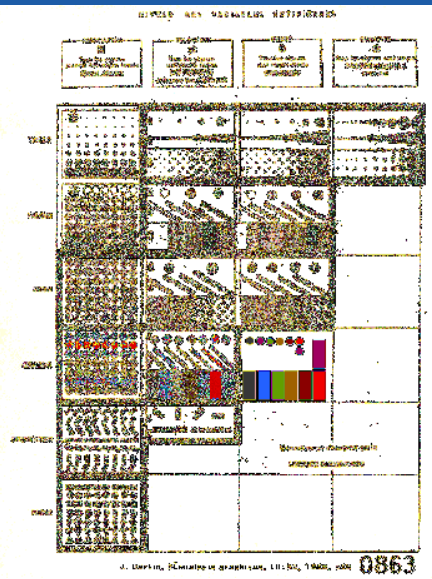
Source: https://www.historyofinformation.com/image.php?id=3375

A brief history…



Source: A bief history of Data Visualisation – Michael Friendly

A brief history…



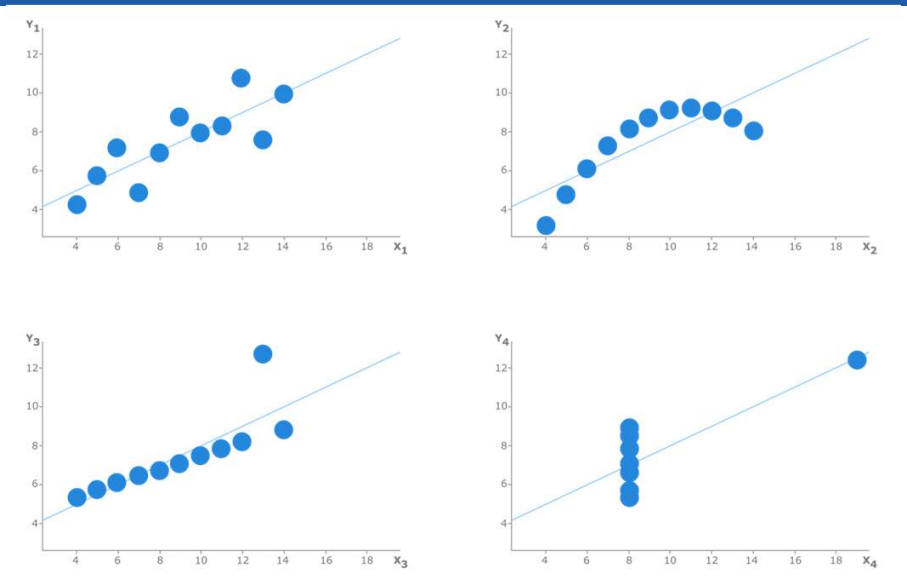
Source: A bief history of Data Visualisation – Michael Friendly

Why do we visualize data?

Dataset I		Dataset II		Dataset III		Dataset IV	
X	Y	X	Y	X	Y	X	Y
10.0	8.04	10.0	9.14	10.0	7.46	8.0	6.58
8.0	6.95	8.0	8.14	8.0	6.77	8.0	5.76
13.0	7.58	13.0	8.74	13.0	12.74	8.0	7.71
9.0	8.81	9.0	8.77	9.0	7.11	8.0	8.84
11.0	8.33	11.0	9.26	11.0	7.81	8.0	8.47
14.0	9.96	14.0	8.10	14.0	8.84	8.0	7.04
6.0	7.24	6.0	6.13	6.0	6.08	8.0	5.25
4.0	4.26	4.0	3.10	4.0	5.39	19.0	12.50
12.0	10.84	12.0	9.13	12.0	8.15	8.0	5.56
7.0	4.82	7.0	7.26	7.0	6.42	8.0	7.91
5.0	5.68	5.0	4.74	5.0	5.73	8.0	6.89

Source: https://en.wikipedia.org/wiki/Anscombe%27s_quartet

Why do we visualize data?



Source: https://en.wikipedia.org/wiki/Anscombe%27s_quartet

Why do we visualize data?


Paul Grice

Be informative

- Make your contribution **as informative as is required**.
- Do **not** make your contribution **more informative than is required**.

Be truthful

- Do **not** say what you believe **to be false**.
- Do **not** say that for which you **lack evidence**.

Be clear

- Avoid **obscurity** of expression.
- Avoid **ambiguity**.
- Be **brief**.
- Be **orderly**.

Be relevant

- Make sure that all the information is **relevant** to the current exchange.

Source: https://effectiviology.com/principles-of-effective-communication/

Why do we visualize data?


Jock Mackinlay

Expressiveness

if the **relevant information** of a dataset is expressed by the visualization, and **only this**.

Effectiveness

a visualization addresses the **capabilities** of the **human visual system**: it's **easier to understand**.

Source: Jock Mackinlay. Automating the Design of Graphical Presentations of Relational Information.

Why do we visualize data?

Jock Mackinlay

Expressiveness

tell the **truth** and nothing but the truth.
(don't lie, not even by **omission**)

Effectiveness

use code that **humans** are **best** at **decoding**.
(best = faster and/or more accurate)

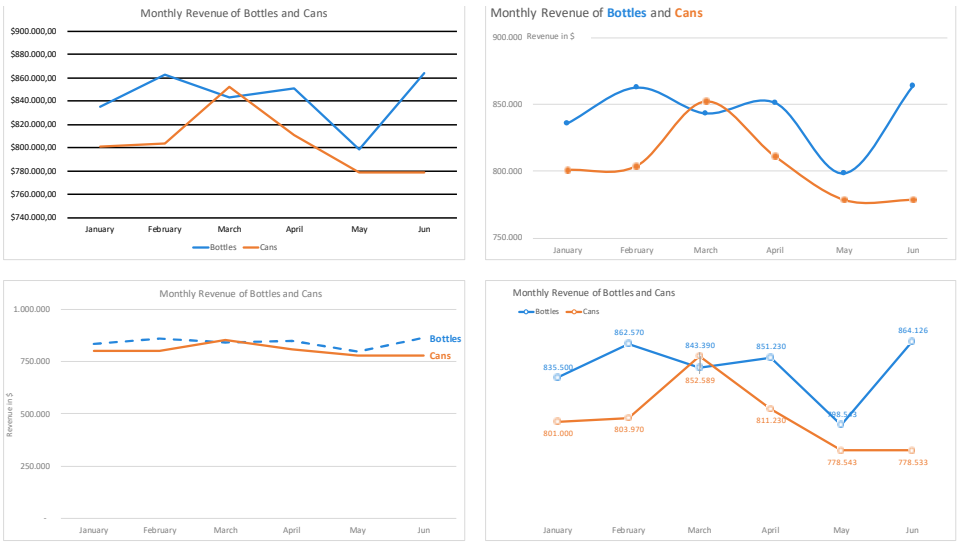
Source: Jock Mackinlay. Automating the Design of Graphical Presentations of Relational Information.

Exercise 1

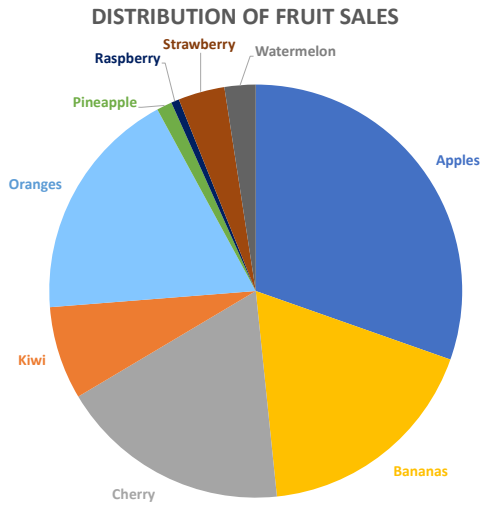
let's PRACTICE

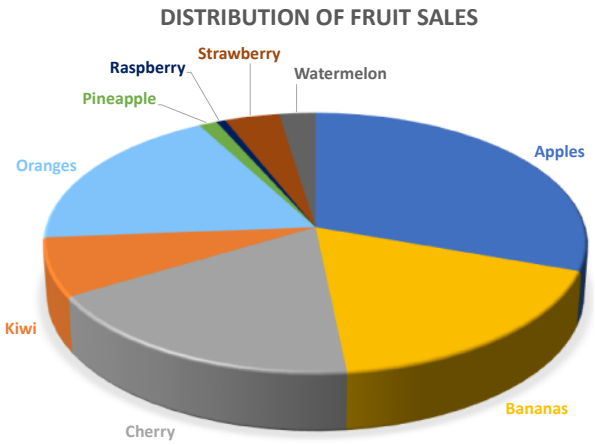
Exercise: Four Column Charts

Exercise: Four Line Charts



Distribution of Fruit sales





Quantitative thinking

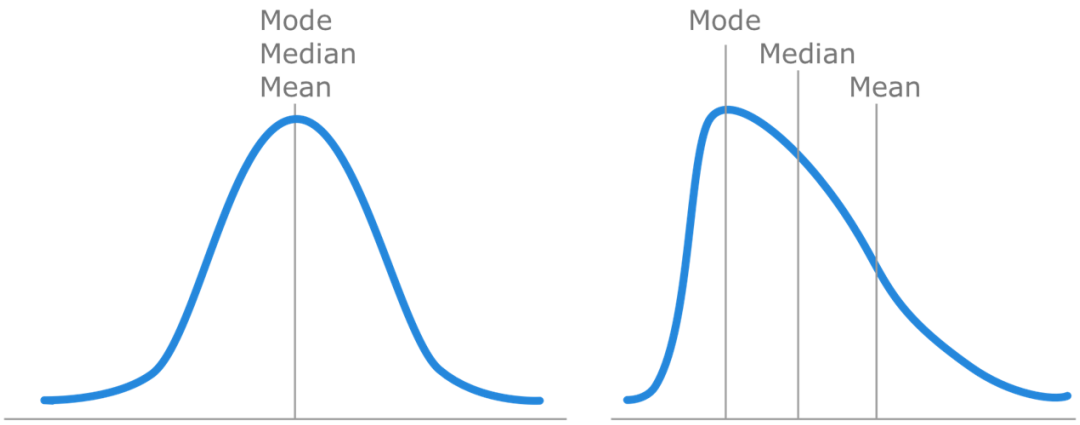
Discipline that concerns the **collection**, **organization**, **analysis**, **interpretation**, and **presentation** of **data**

Quantitative thinking

Source: The Simpsons, Much Apu About Nothing, Season 7, Episode 23, May 1996

Quantitative thinking

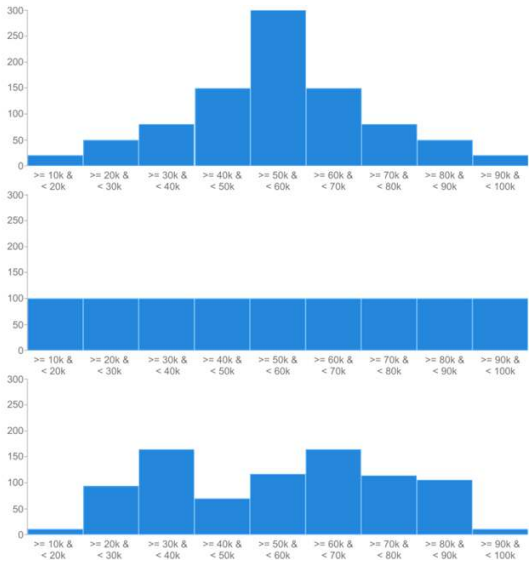
Quantitative thinking



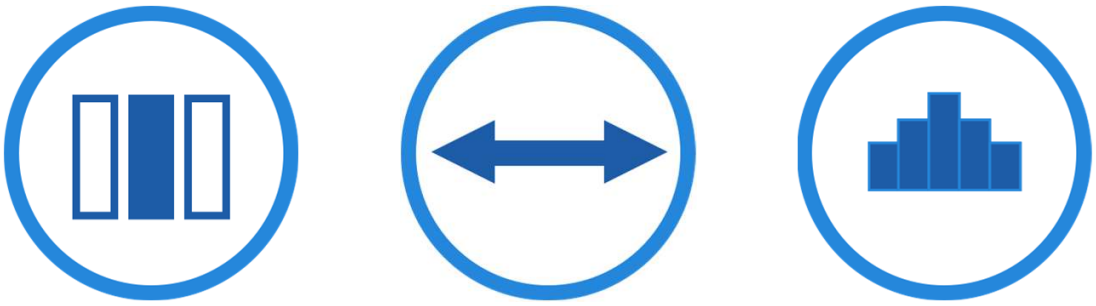
Quantitative thinking

Mean income

55k



Quantitative thinking



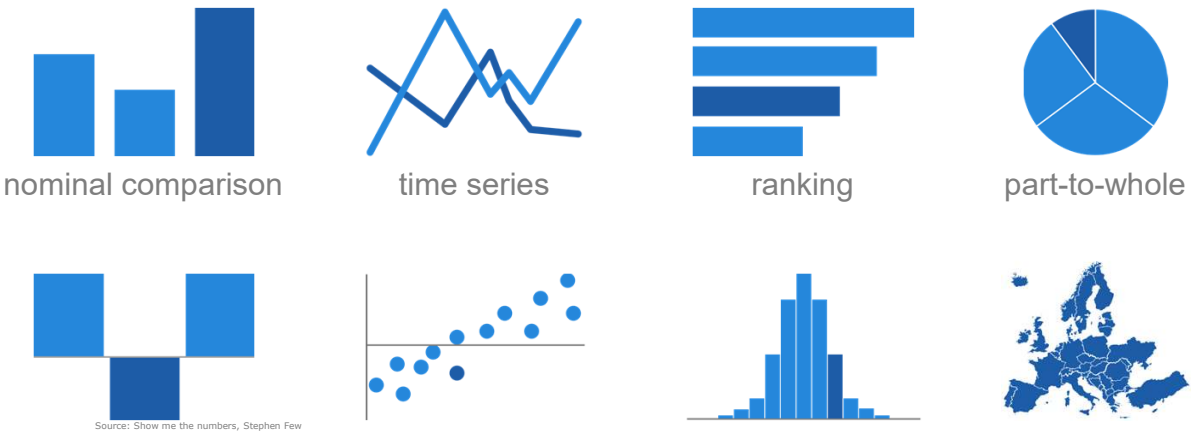
Central Tendency

Spread

Shape

Source: Stephen S. Few, Now you see it, 2009

Quantitative thinking



nominal comparison

time series

ranking

part-to-whole

Source: Show me the numbers, Stephen Few

deviation

correlation

distribution

geospatial

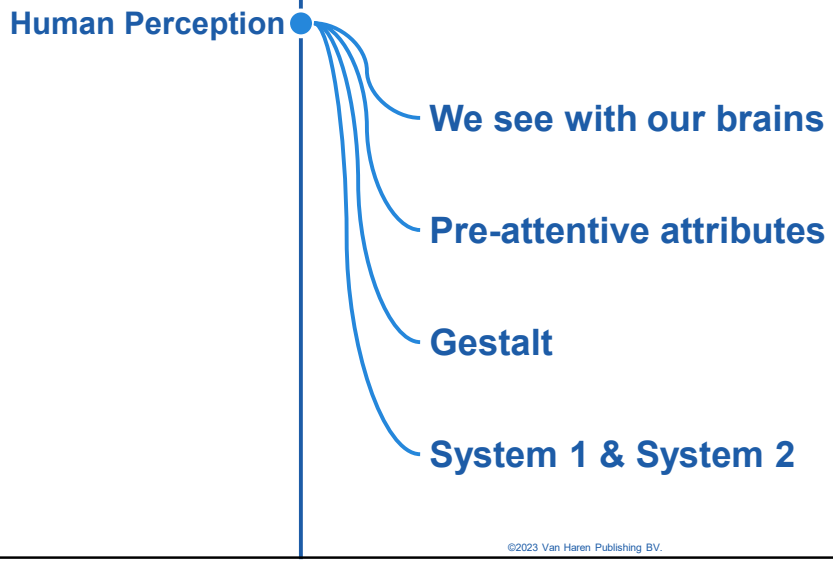
Source: Stephen S. Few, Show me the Numbers, 2004

Human perception

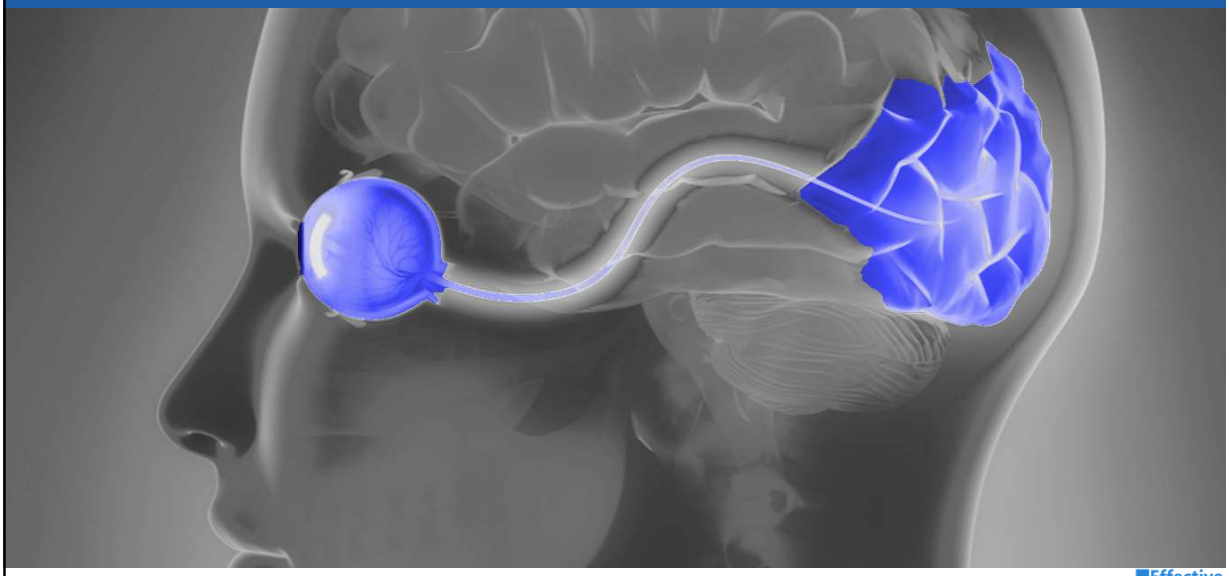
*Getting **visualization** right is much **more a science** than an art, which we can only achieve by **studying human perception**.*

Stephen Few – Data Visualization for Human Perception

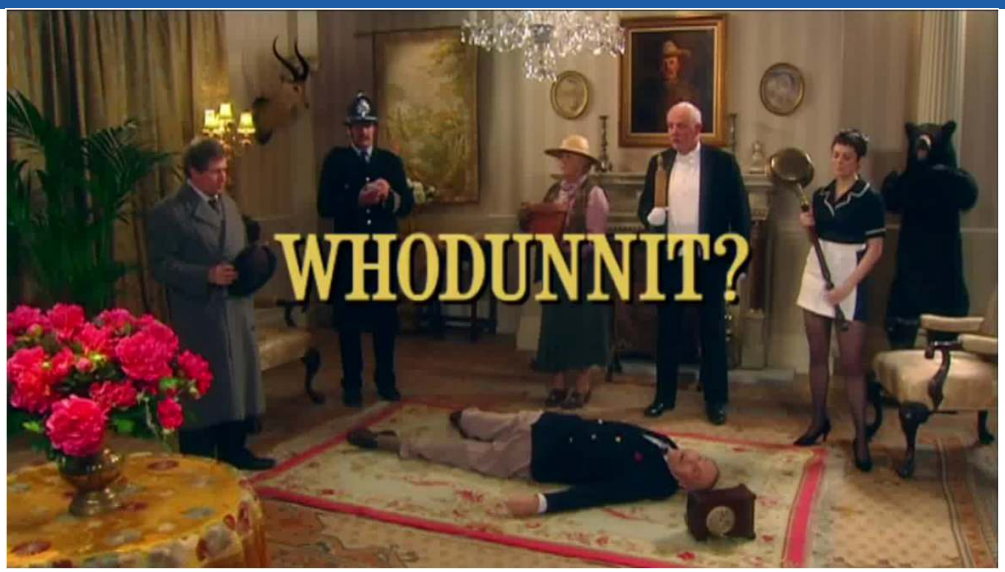
Training Agenda



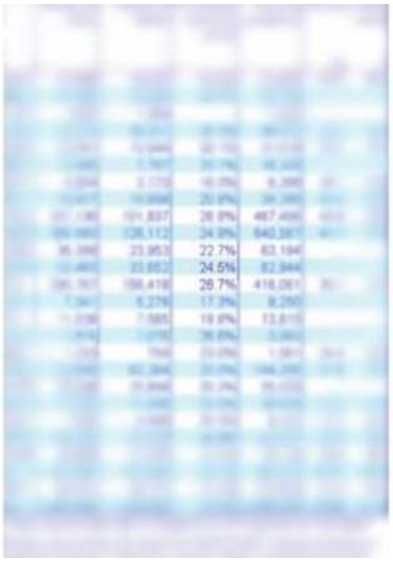
We see with our brains



Human perception



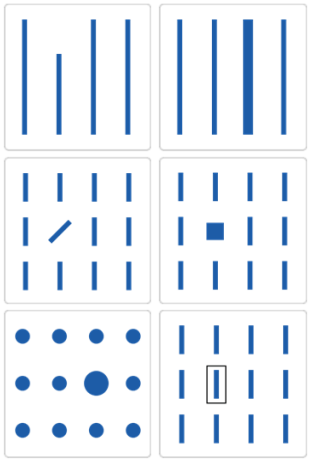
Human perception



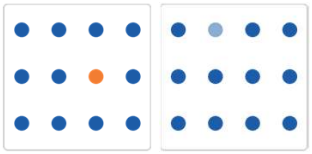
Source: Colin Ware – 2008 – Visual Thinking for design

Pre-attentive attributes

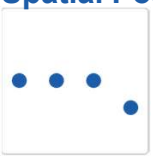
Form



Color

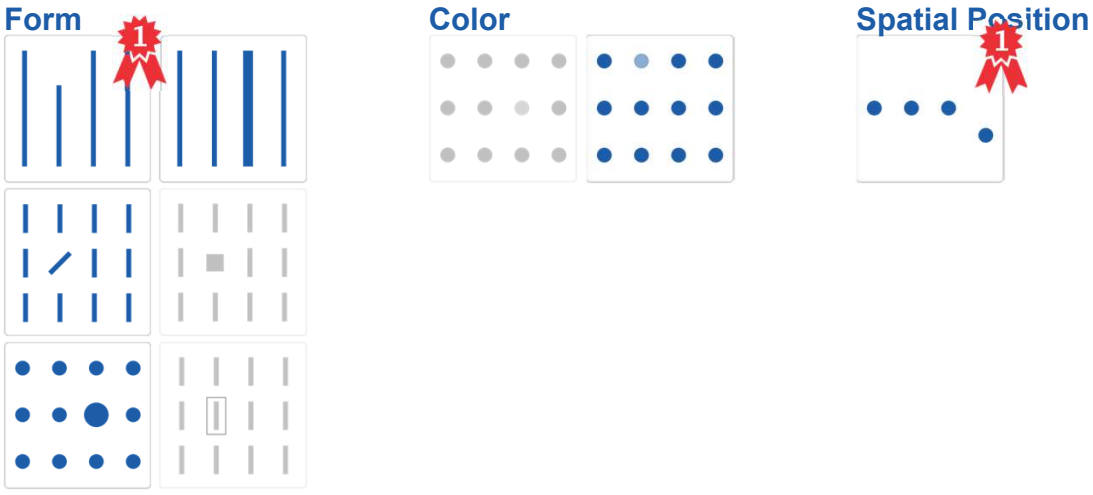


Spatial Position



Source: Information Visualization: perception for design – Colin Ware

Pre-attentive attributes



Source: Information Visualization: perception for design – Colin Ware

Human perception

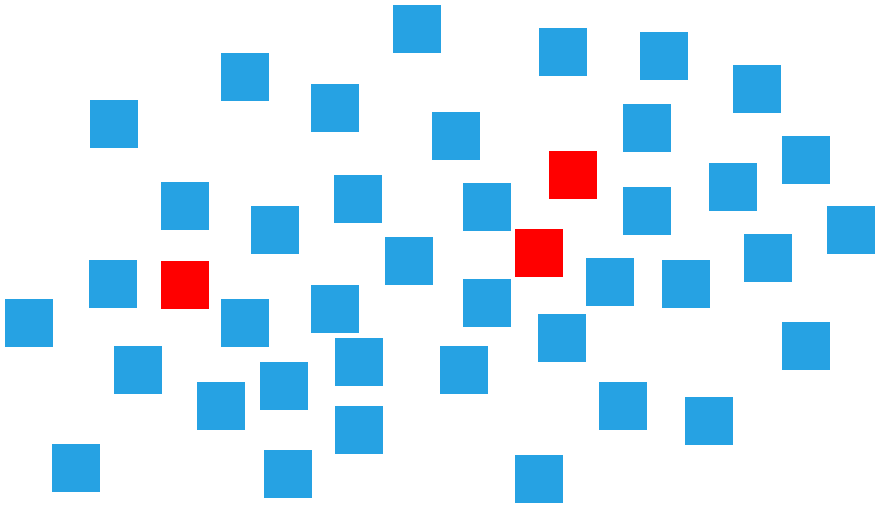
Sensory Memory – Iconic Memory

Short-term Memory – Working Memory

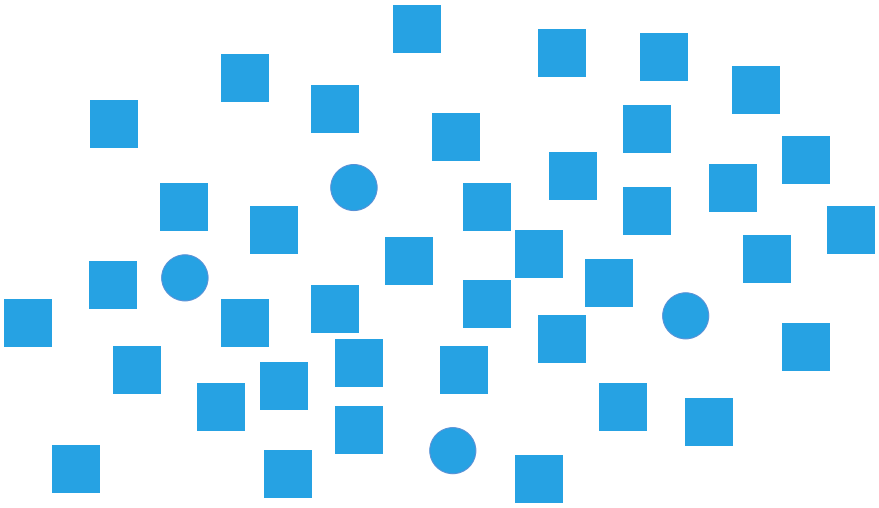
Long-term Memory

Source: https://www.verywellmind.com/different-types-of-memory-and-their-functions-5194859

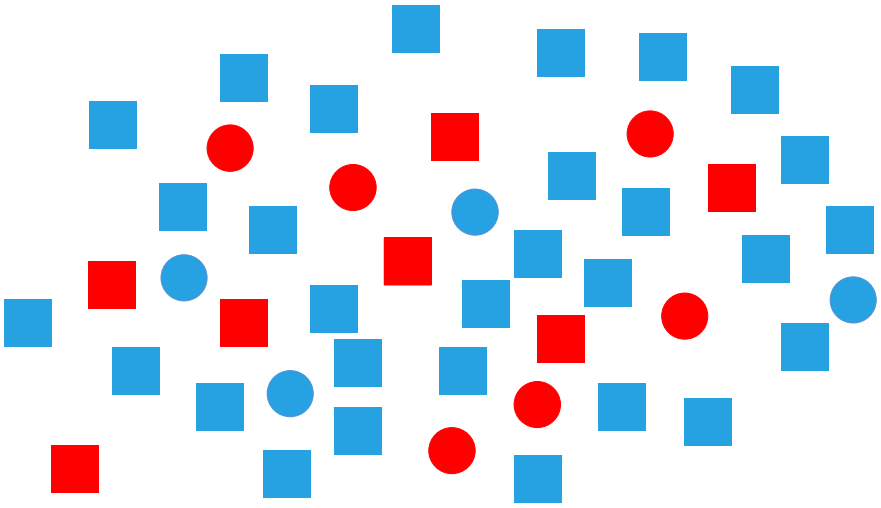
Test: How many red squares?



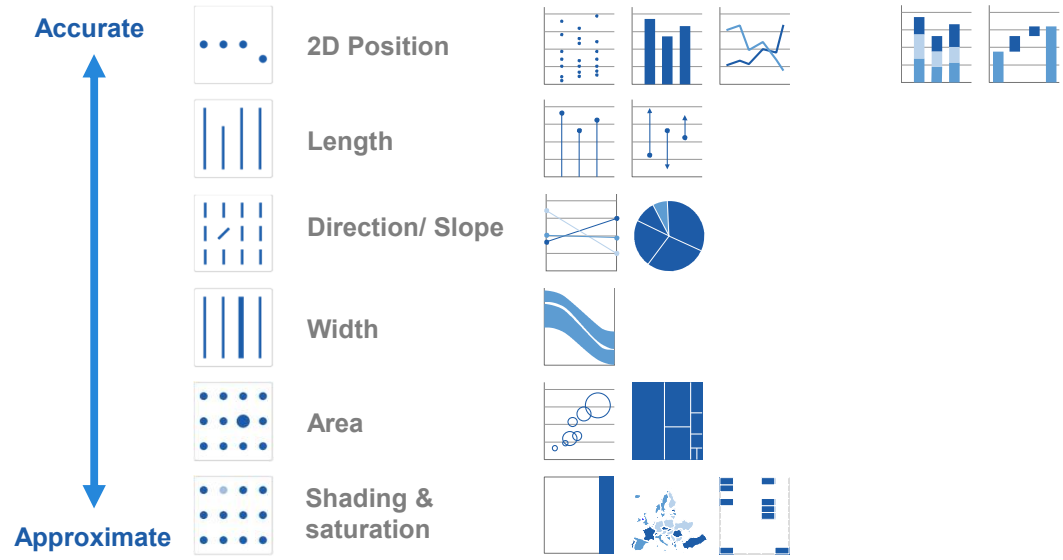
Test: How many circles?



Test: How many blue circles?

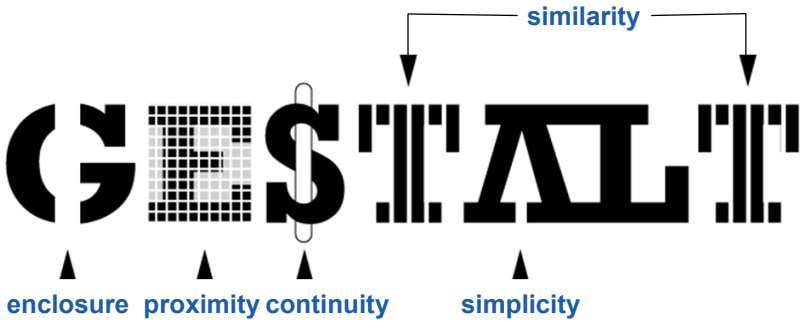


Scale of elementary perceptual tasks



Source: The truthful art, Albert Cairo

Human perception



Gestalt - Simplicity