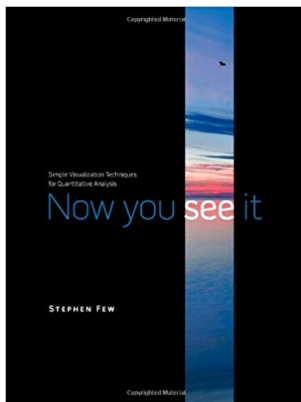


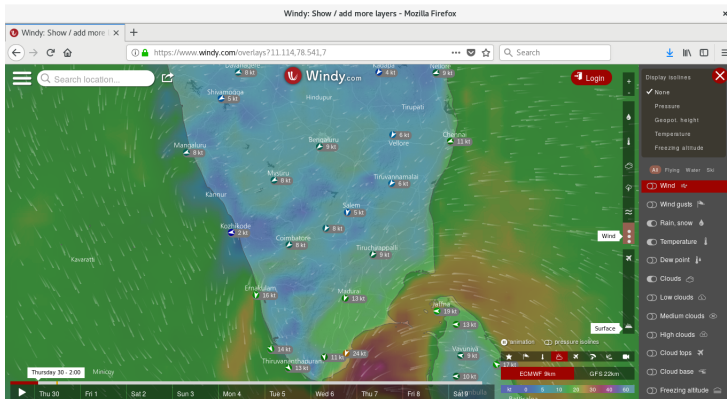
Data Visualisation

- **Now You See It** by Stephen Few



- **Examples:**

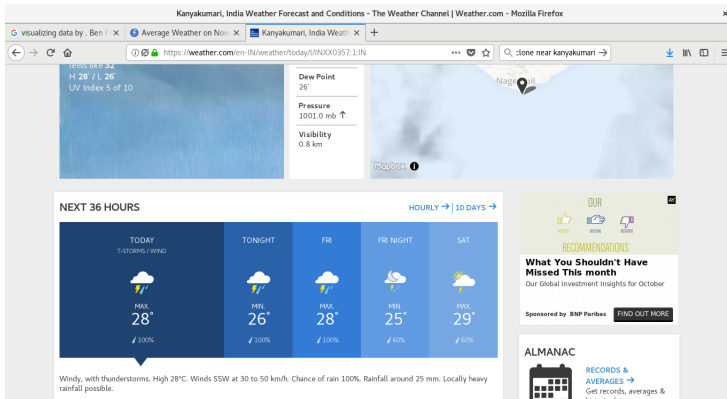
- Weather Forecasting
 - URL is *https://www.windy.com/*



- **Examples:**

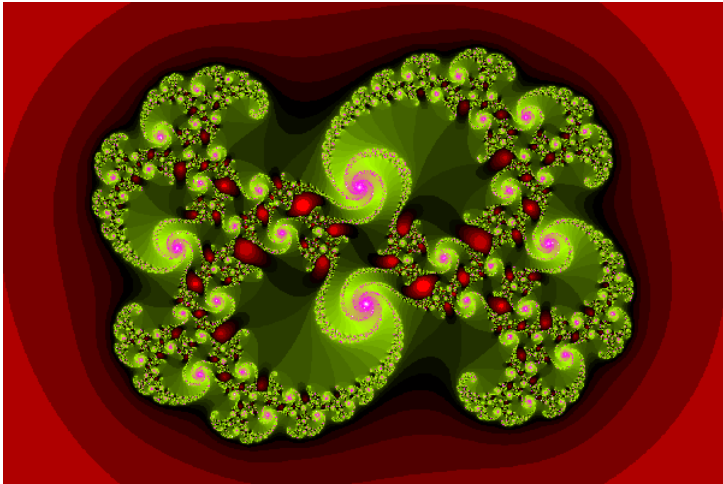
- Weather Forecasting

- The URL is *https://weatherspark.com/*



- **A picture is worth more than a thousand words** -editor Tess Flanders
- **A picture is worth more than a thousand numbers**
- **A good sketch is better than a long speech** - Napoleon

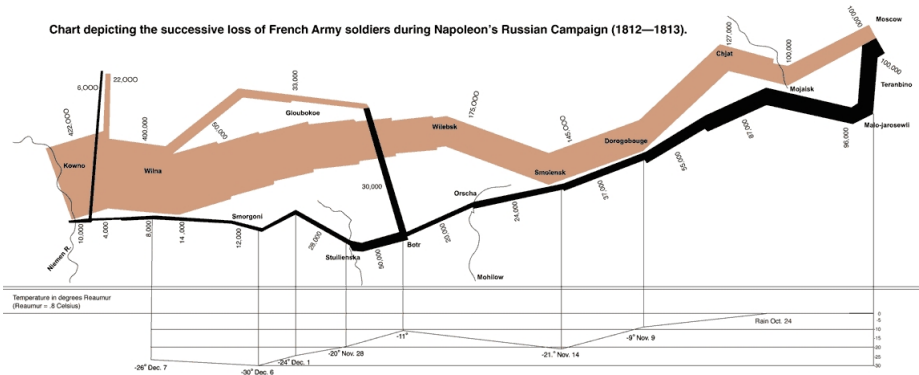
- What did you understand from the picture:



- Looks like a swirl.
- Small swirls at the edges
- It has different shades, red @ outside ,, green @ inside
- The smaller swirls have purple highlights.
- The green has also different shades.
- Each small swirl is composed of even smaller ones.
- The swirls go clockwise.
- Inside the object, there are also red highlights. Those have different shades of red also.
- The green shades vary in a fan, while the purple ones are more uni-color.
- The green shades get darker towards the outside of the fan...

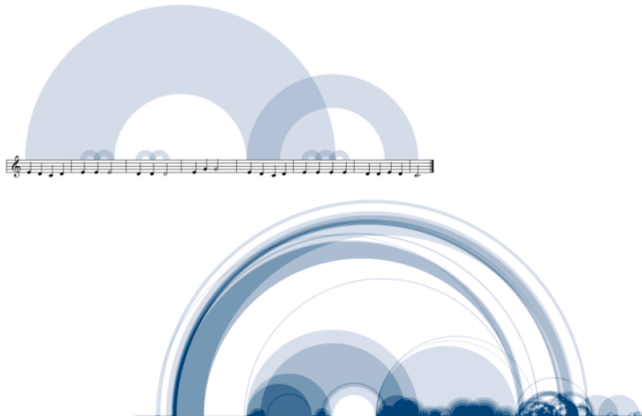
What will be the story, from the figure:

Chart depicting the successive loss of French Army soldiers during Napoleon's Russian Campaign (1812—1813).



- Map and line chart showing Napoleon's retreat from Moscow
Click for full size Famous visualisation showing Napoleon's advance on Moscow (in brown), and subsequent retreat (in black).
- The X and Y coordinates shows the armies position over time.
- The Width of the line is showing the Napoleon's army size.
- The line-chart at the bottom shows the temperature during the retreat.
- The crossing of river Stultienska on November 28th, with the temperature at -20 'Reamur' (-16 Celsius).

- Visualization in audio system



Shape of Songs: “Like a Prayer” (Madonna)
Martin Wattenberg

- Fried asked help make sense from simulated Data:

Set A		Set B		Set C		Set D	
X	Y	X	Y	X	Y	X	Y
10	8.04	10	9.14	10	7.46	8	6.58
8	6.95	8	8.14	8	6.77	8	5.76
13	7.58	13	8.74	13	12.74	8	7.71
9	8.81	9	8.77	9	7.11	8	8.84
11	8.33	11	9.26	11	7.81	8	8.47
14	9.96	14	8.1	14	8.84	8	7.04
6	7.24	6	6.13	6	6.08	8	5.25
4	4.26	4	3.1	4	5.39	19	12.5
12	10.84	12	9.11	12	8.15	8	5.56
7	4.82	7	7.26	7	6.42	8	7.91
5	5.68	5	4.74	5	5.73	8	6.89

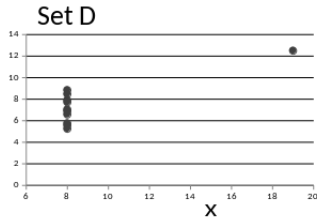
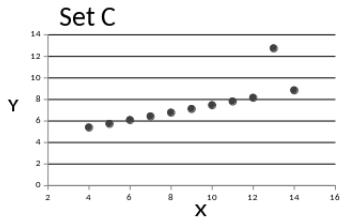
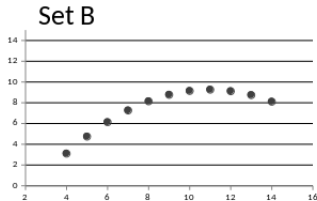
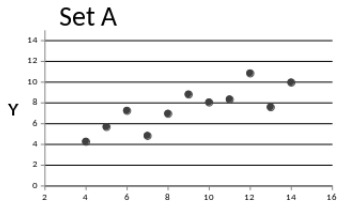
Summary Statistics Linear Regression

$$u_X = 9.0 \quad \sigma_X = 3.317 \quad Y^2 = 3 + 0.5 X$$

$$u_Y = 7.5 \quad \sigma_Y = 2.03 R^2 = 0.67$$

[Anscombe 73]

- Plots for each data set:



- **"Seeing is believing"** → We have to observe and draw conclusions
- **Seeing is also understanding** → beware of illusion(magicians)
- **What is going do:**
 - Transformation of data or information into pictures
 - It engages primary human sensory apparatus - vision
- **It's like a Tool**
 - Learning or Understanding
 - Compact Representation of Information
 - "Carrier" of Information

- "Visualization is the process of exploring, transform and represent data as images (or other sensorial forms) to gain insight into phenomena"
- "Computer-based Visualization Systems providing visual representations of datasets intended to help people carry out some task more effectively." -T Munzner
- Visualization links the human eye and computer, helping people to identify patterns and to extract insights from large amounts of data or information

- **IInd Definition:**

- Visual Representation: → Perception Vs Cognition
- Data Sets to help People: → Human in the loop needs the details
- Some task: → Intended Task
- More Efficiently: → Measurable definitions of effectiveness

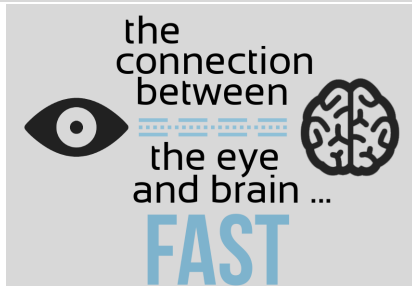
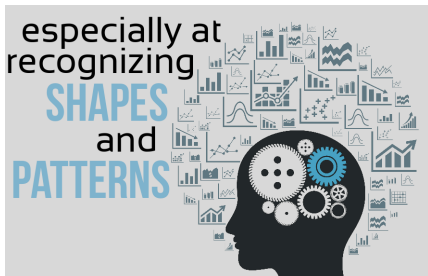
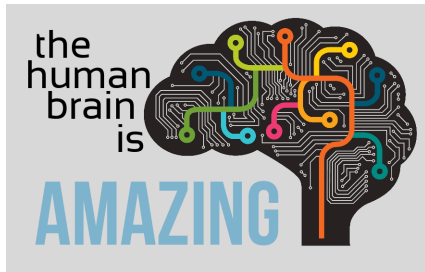
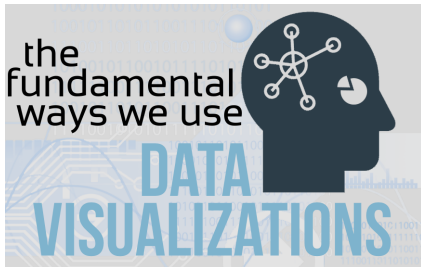
- **Cognition Vs Perception**

- **Cognitive Task Vs Perceptive Task**

- **eye beats memory**

- **Data Visualization:**
 - To Convey the information through visual representations
 - **"produces (interactive) visual representations of abstract data to reinforce human cognition; thus enabling the viewer to gain knowledge about the internal structure of the data and causal relationships in it"**

IMPORTANCE OF VISUALIZATION



IMPORTANCE OF VISUALIZATION

8.96
Mb/s

the brain
receives
8.96 megabits
of data
from the eye
every second



the average
person
comprehends
120 WORDS
per minute
reading

IMPORTANCE OF VISUALIZATION

