Vis Exercise 01
Introduction to Data Sketching

Coming up with ideas for visual representations through sketching

CS5044 – Information Visualization

why sketching?

- Helps to familiarise yourself with the data
- Helps to come up with ideas and to capture these
  - Generate ideas navigating the design space
  - A single data set can be visualised in many different ways
  - → We need to consider many possibilities
- Make informed choices about your visualisation design
- Communicate ideas to others

sketching tools

- Sketching should be
    - Quick
    - Easy
    - Not get in the way of thinking about your problem
    - Not constrain your ideas too much

sketching tools

- Pencil & paper – first choice!

- Pros
  - Easy and quick
  - Cheap

- Cons
  - Can be tedious
  - Inaccurate
  - Difficult to capture many datapoints

  → Use data samples (small number of data points to try out ideas)
  → The idea matters: don't worry about accuracy or beauty!

sketching tools

- Digital tools
  - Photoshop, illustrator, ... – digital drawing tools
  - Excel, Tableau Desktop, ... – digital visualisation tools
  - D3.js, ...
- Pros
  - → Can help you explore visual representation of large-scale data sets
  - → Quick process (if you know how to use the tool)
- Cons
  - → Constraints your creative process by
    - The available visualisation techniques
    - How the visualisation process is dictated
    - Required technical expertise

→ Use paper to capture ideas for your visualisation

→ Use digital tools to get a feel of the entire data set

sketching visualisations

- Everyone can sketch

- A visualisation sketch does not have to look good, just has to convey an idea

- Sketching flexible

- Sketching can serve multiple purposes

The sketcher is ..

Programmer
Person with the challenge
Understands the data
Interacts with client
Working alone /
   working in a group
Makes quick renditions
Draws lots of designs
Follows FdS structure
Tidy drawings not artistic
No need to color-in

The sketch appearance is

Outline	Representation
Rough	An impression
Unfinished	Bare bones
Sketchy	
Not strict	

.. has multiple purposes

Presentation	Communication
Evidence	Mediating
Articulation	Help us think
Alternatives	Organise thoughts
Possibilities	To preserve
Expressive	Record

The physical medium is ..

Tangible	Manifest
Tactile	Evident
Disposable	Clear
Visible	Common place
Explicit	Sharable
Obvious	Cheap
Signifier	

Allows change, it's ..

Dynamic	Persistent
Changes	Organic
Evolves	No wrong answer
Quick	Forgiving
Transitive	Creative
Playful	

WHERE ARE THEY FROM?

38,000 STAYING ON AIRBNB RIGHT NOW

15,000. USA

2000 FRANCE
1000 ES
UK 3000
GERM 2500
CANADA 2500
2500 AUSTRALIA
1000 IT
1000 RUSSIA
1000 BRAZIL
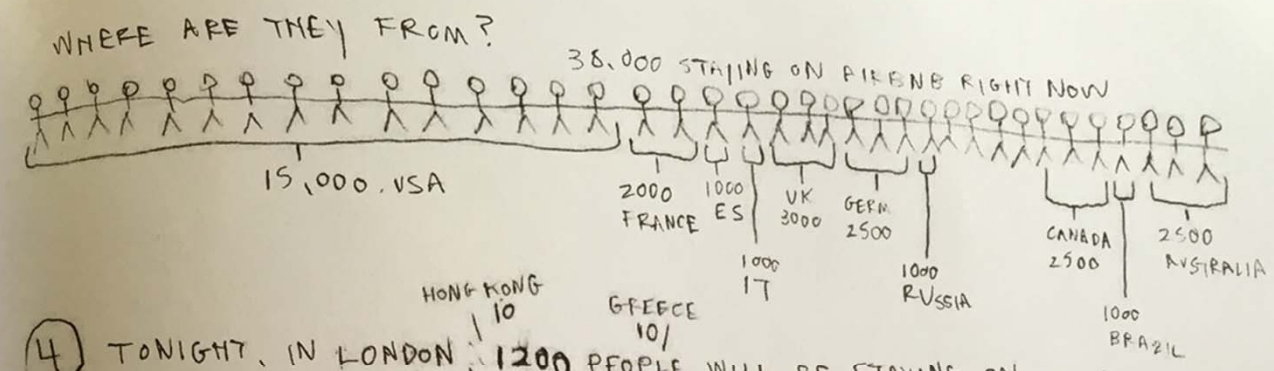
④ TONIGHT, IN LONDON, 1200 PEOPLE WILL BE STAYING ON AIRBNB. WHERE ARE THEY COMING FROM?

HONG KONG 10
GREECE 10

USA — 300
BRAZIL — 20
ITALY — 30
FRANCE — 120
SWITZERLAND — 30
ISRAEL — 5
SWEDEN — 10
SOUTH AFRICA — 5

LONDON MAP

25 — SPAIN
90 — AUSTRALIA
60 — CANADA
80 — GERMANY
20 — DENMARK
35 — SINGAPORE
15 — NETHERLANDS
20 — RUSSIA
25 — AUSTRIA
10 — ICELAND

5 POLAND
25 ARGENTINA
10 MEXICO
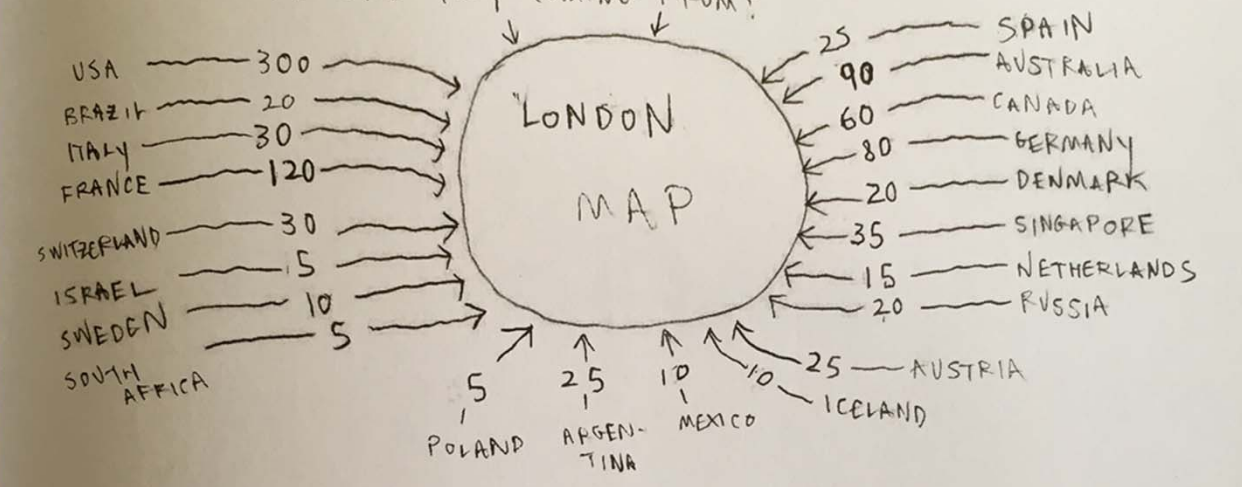
⑤ INTERNATIONAL GROWTH —
IN THE LAST YEAR, THE AIRBNB COMMUNITY HAS GROWN...

USA
300% GROWTH
115% LISTINGS
240% DEMAND

HOSTS

FRANCE
430% GROWTH
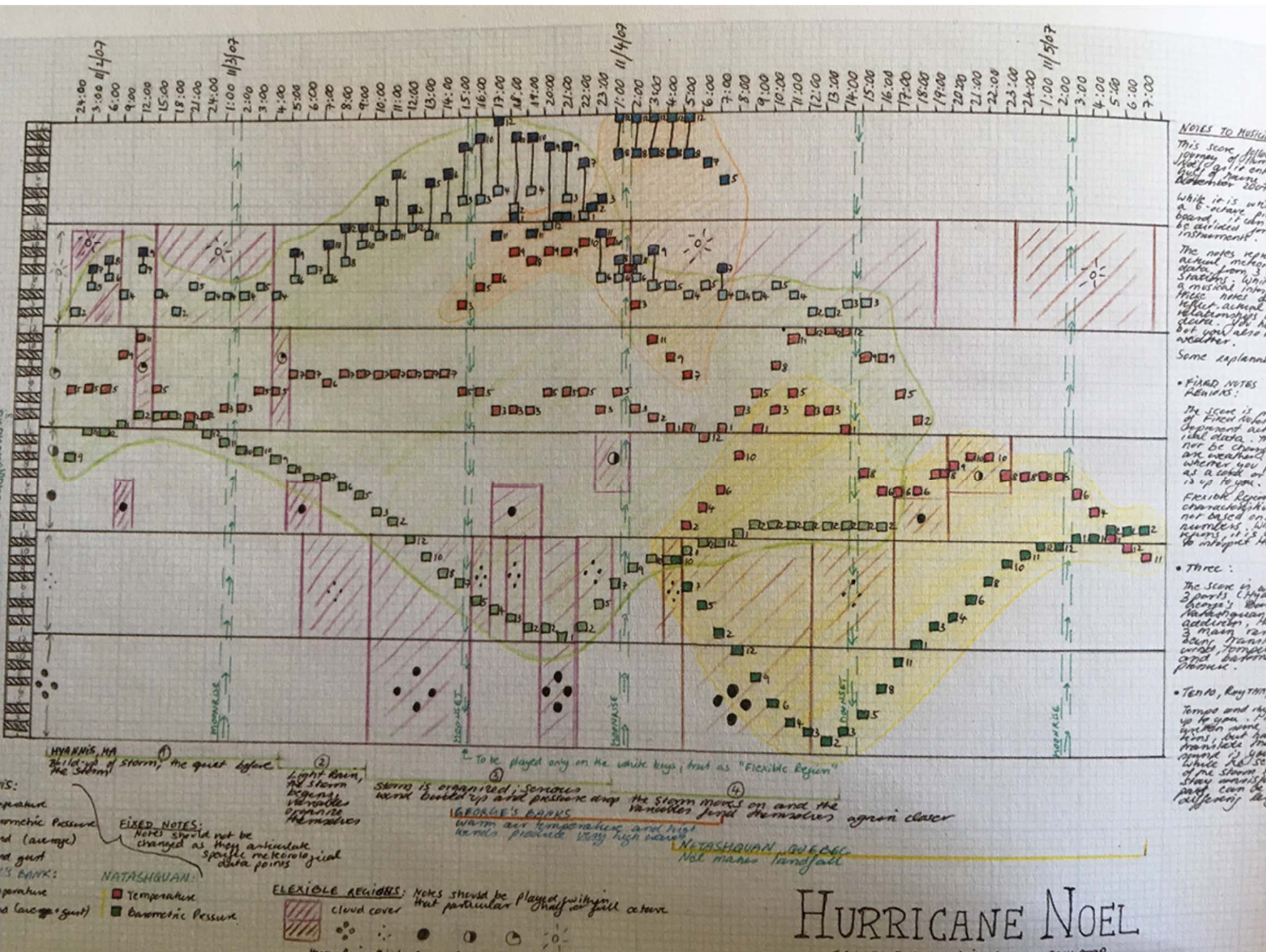240% LISTINGS
350% DEMAND

HOSTS
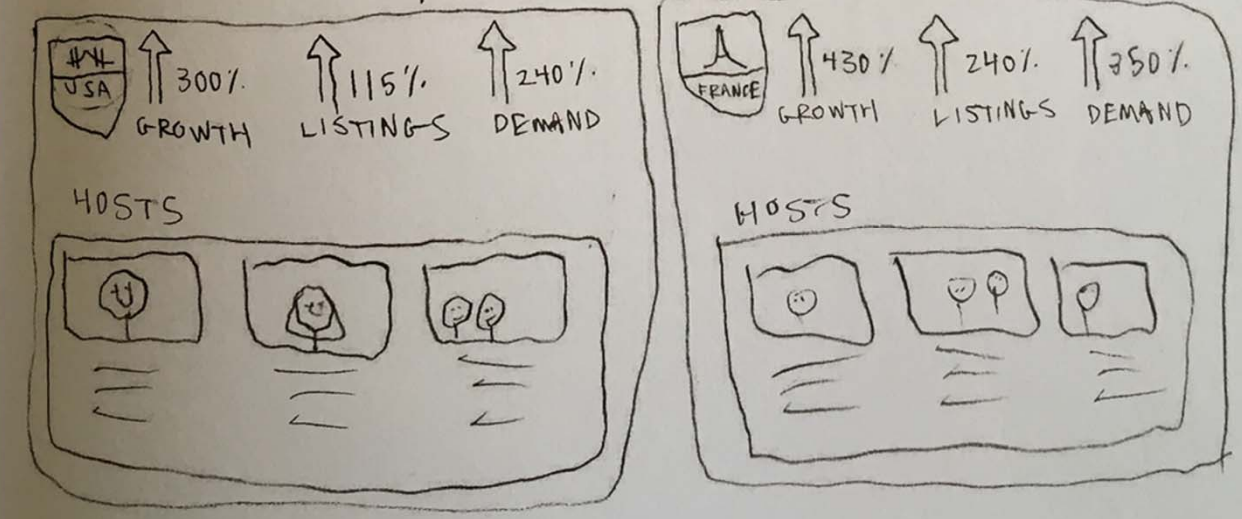
0-TIER COUNTRIES

Raw Data: Infographic Designers' Sketchbooks.
Steven Heller and Rick Landers
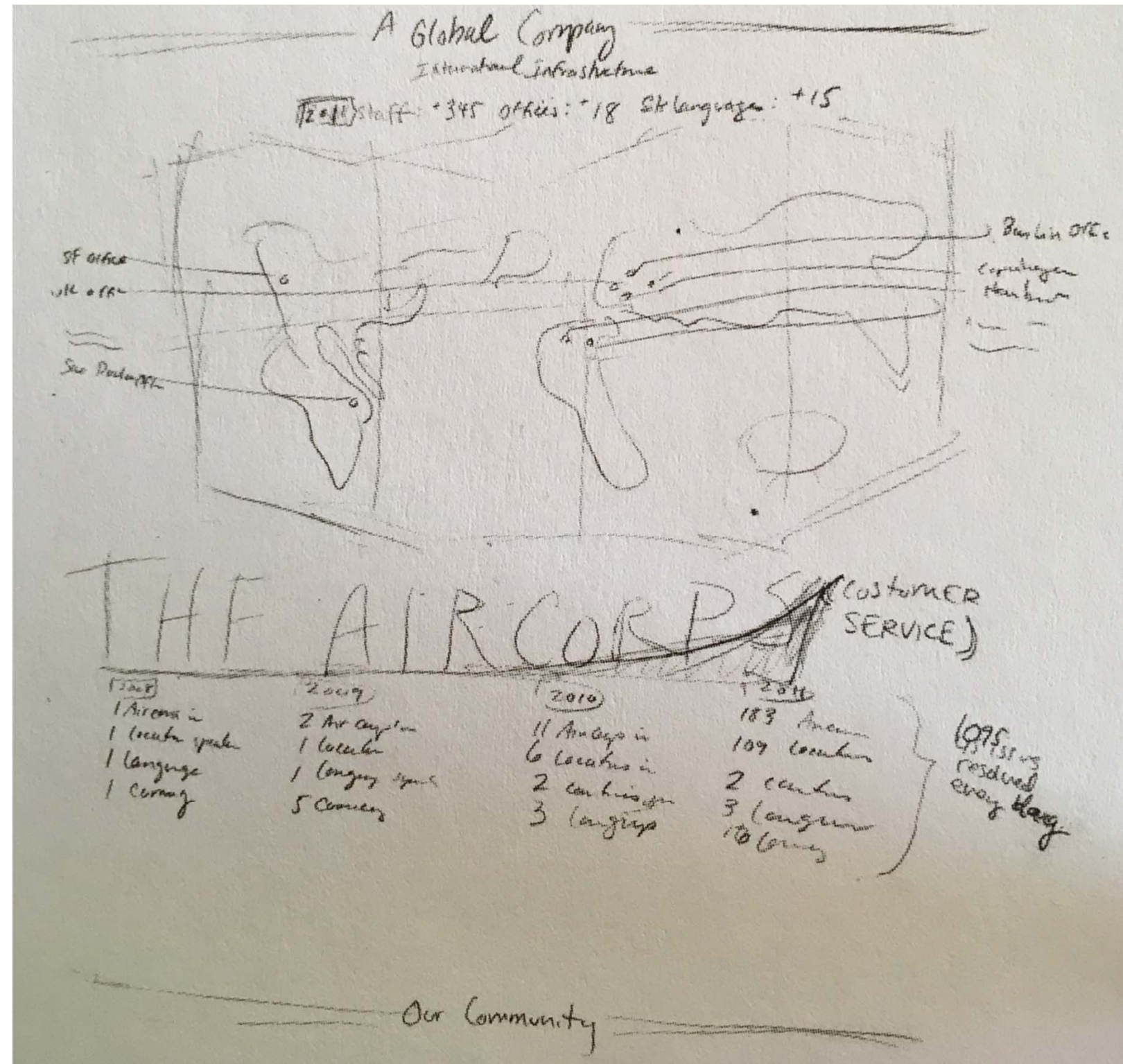
Raw Data: Infographic Designers' Sketchbooks.
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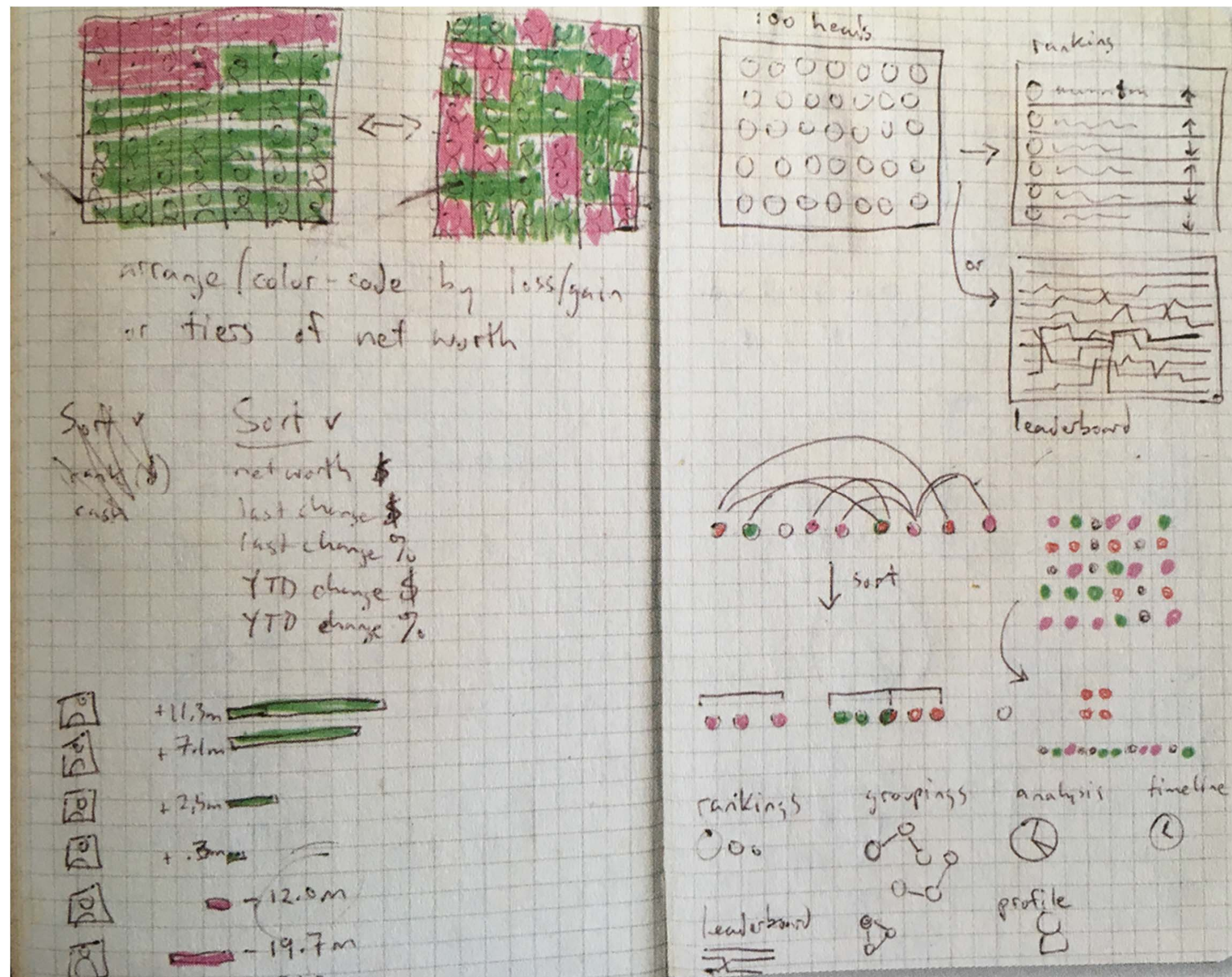
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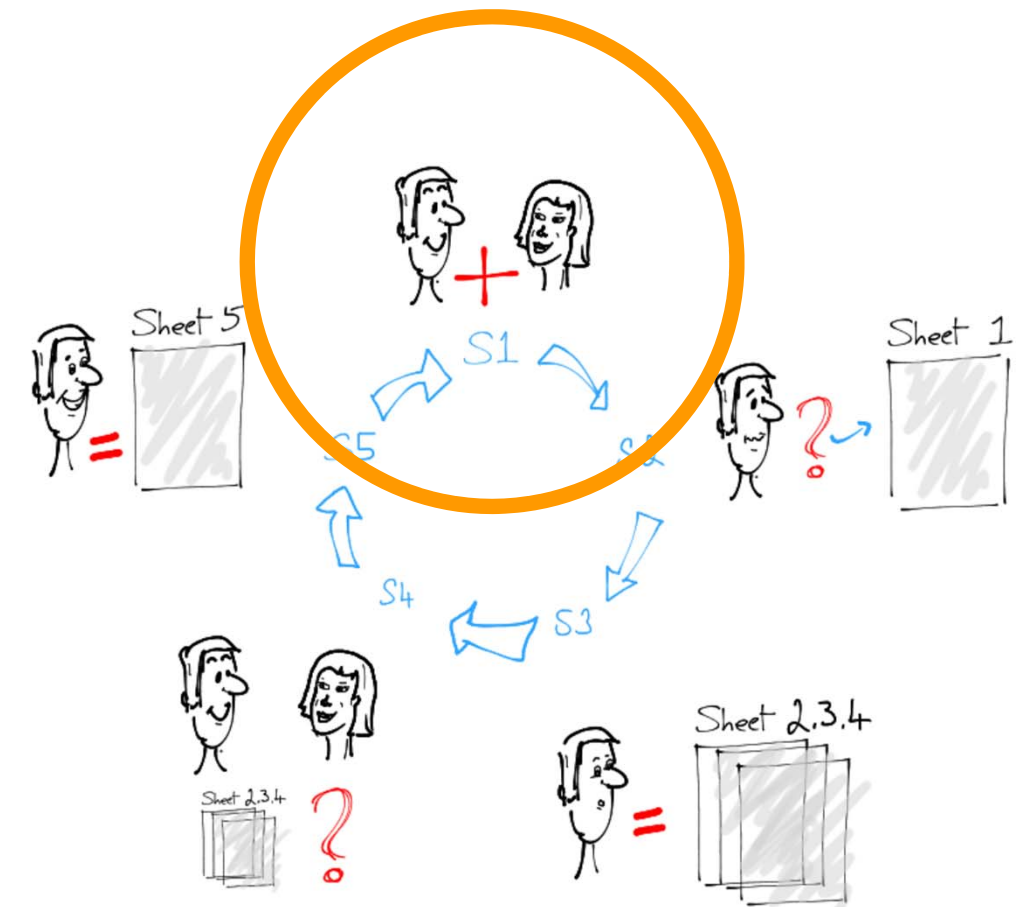
five design sheet method

five design sheet method

- The 5 design sheet method can help you
  - Structure your ideation process
  - Document your process (important for all practicals throughout this term!)
- 5 stages
- 5 visualisation design "sheets"
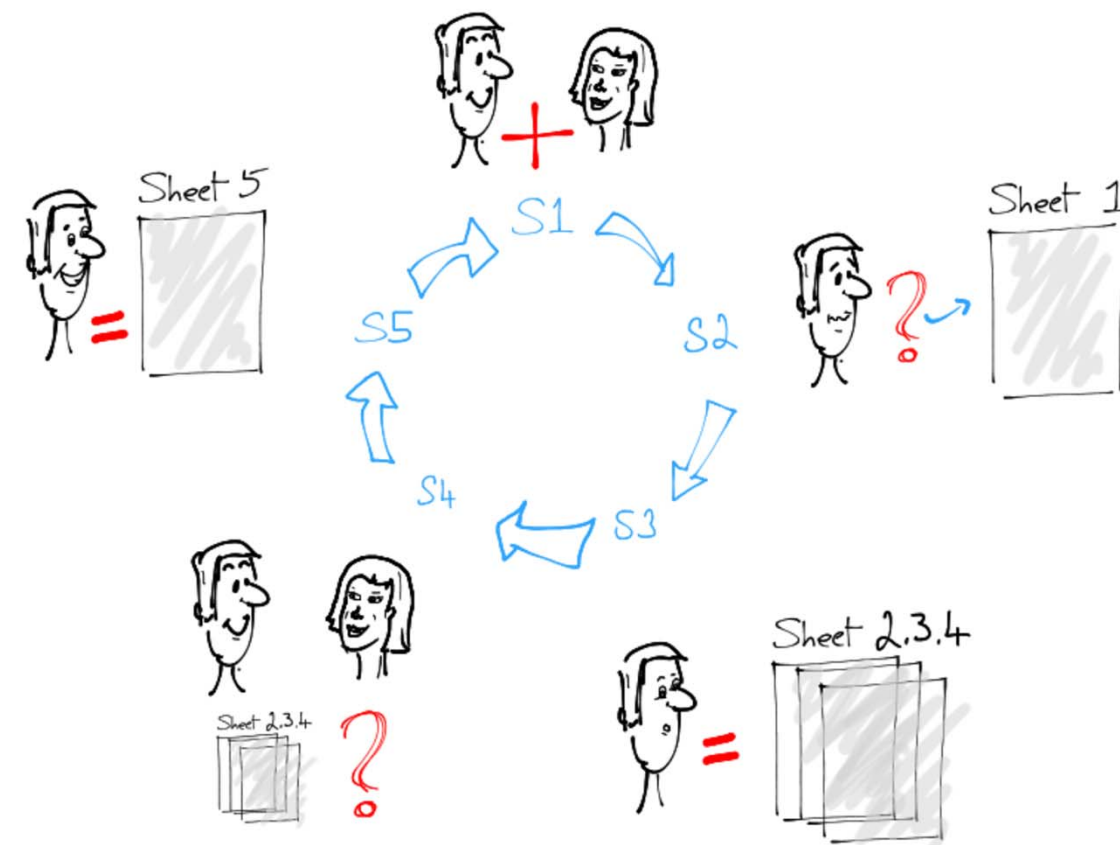
stage 1
5 design sheet method

- Consider the task – try to understand it
  - Meet the client (if applicable) and/or
  - Contemplate the task at hand

- Know about the data
  - Meaning of attributes
  - Types of attributes
  - Static/dynamic
  - Range & distribution

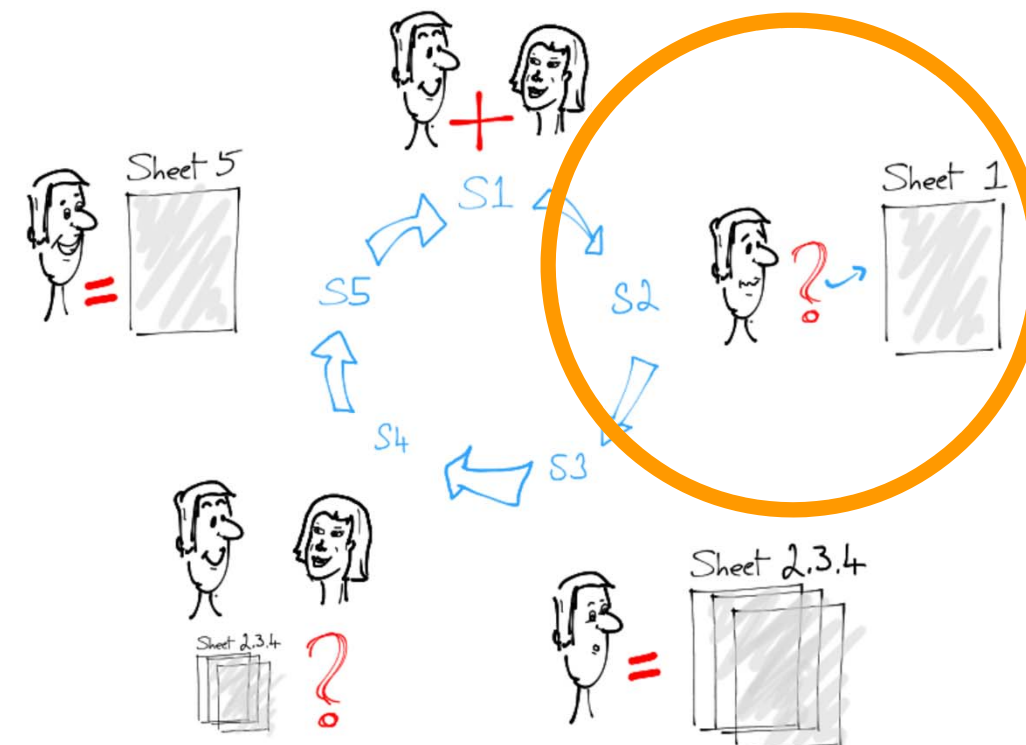- Start to come up with possible questions a vis could answer

stage 2
5 design sheet method

- Consider many alternative ideas
- Think divergently!

Design "Sheet 1"

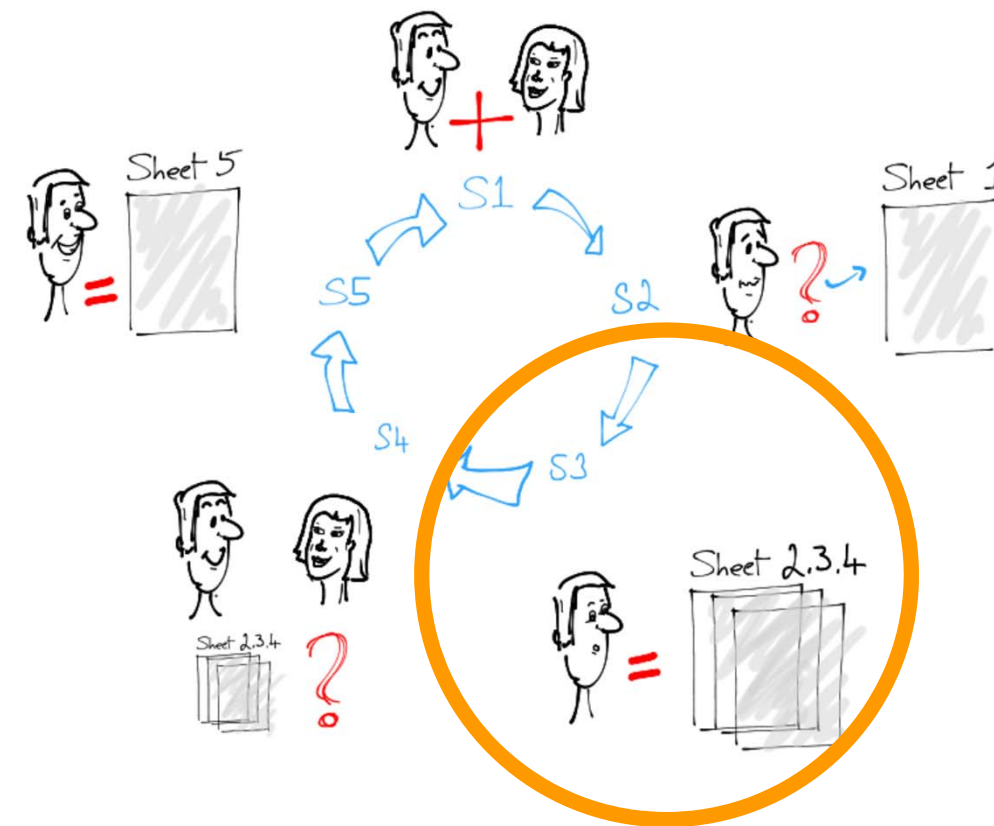Many of quick & dirty sketches on one or several sheets of paper

stage 3
5 design sheet method

- Create 3 alternative designs

Design "Sheets 2-4"

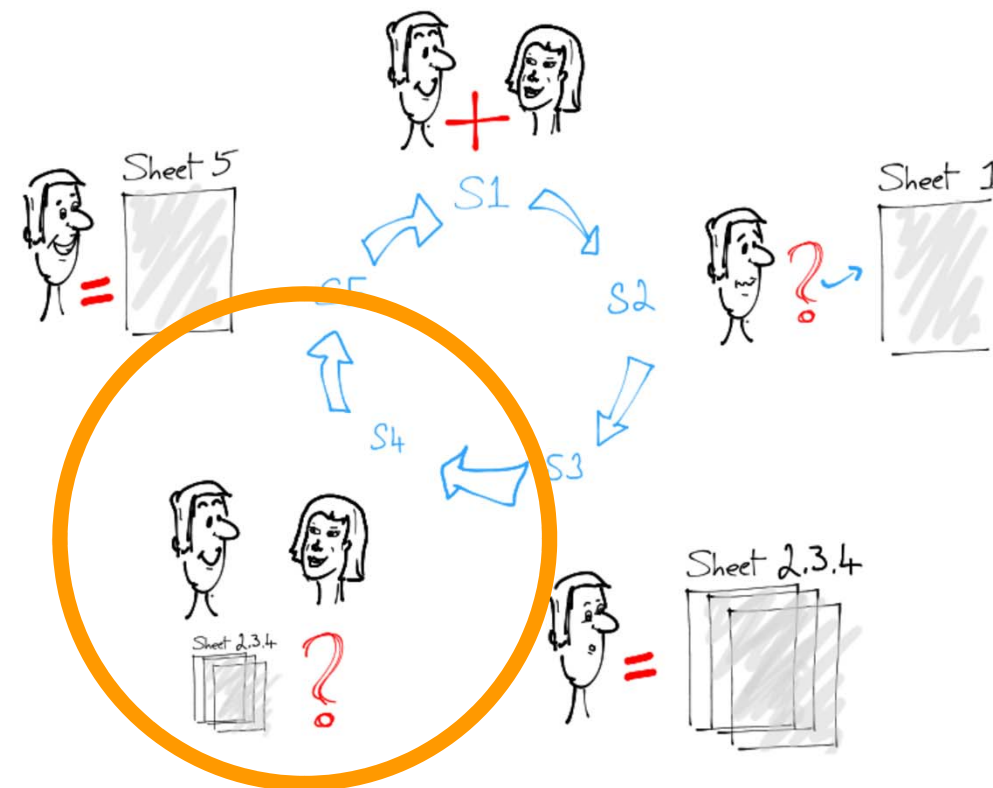Combine and further develop some of your ideas from the previous phase

stage 4
5 design sheet method

- Consider the created designs
  - Reflect
  - Discuss with the client (if applicable)

> Design "Sheets 2-4"
>
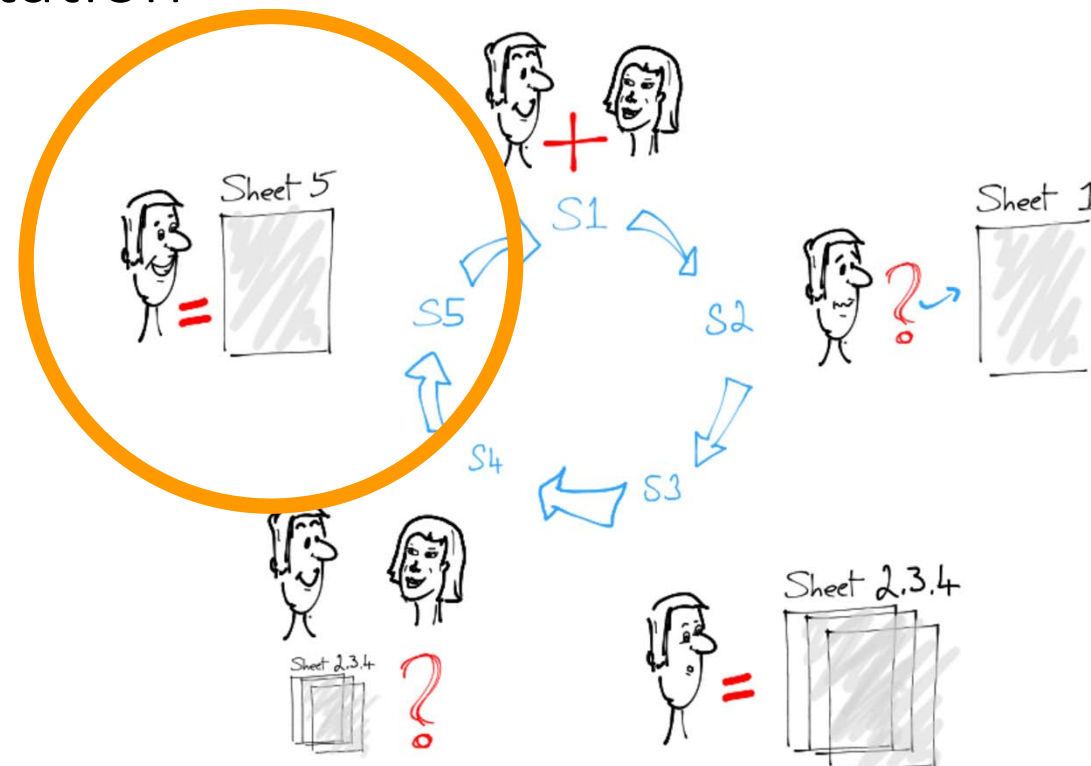> Combine and further develop some of your ideas from the previous phase

stage 5
five stages

- Refine and merge ideas into a final design
- Contains information about layout + interaction
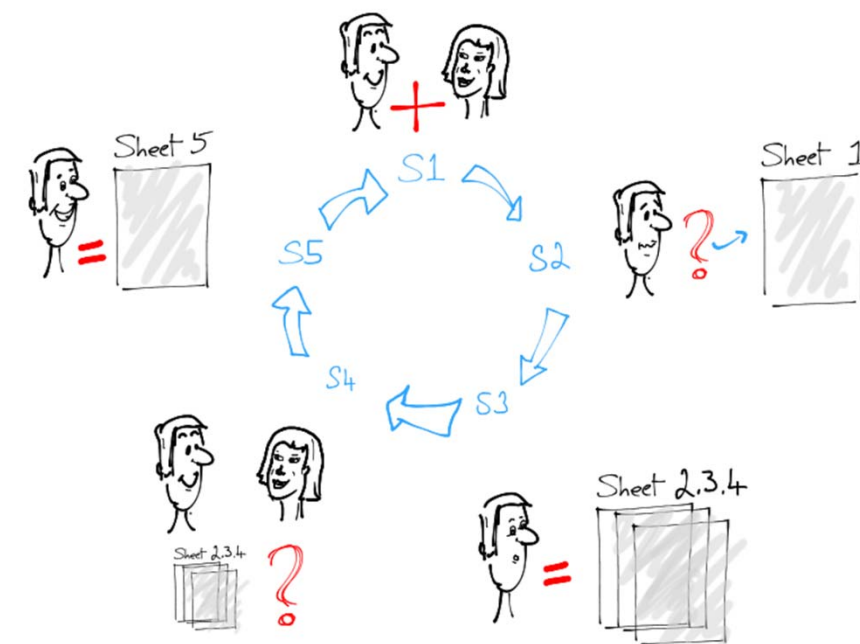- Contains considerations for implementation

Design "Sheet 5"

Detailed sketch of your final idea

five sheets

- Sheet 1 (stage 2)
    - Explore ideas; sketch many different concepts
- Sheets 2, 3, and 4 (stage 3)
    - Main design sheets for 3 different design alternatives
- Sheet 5 (stage 4 + 5)
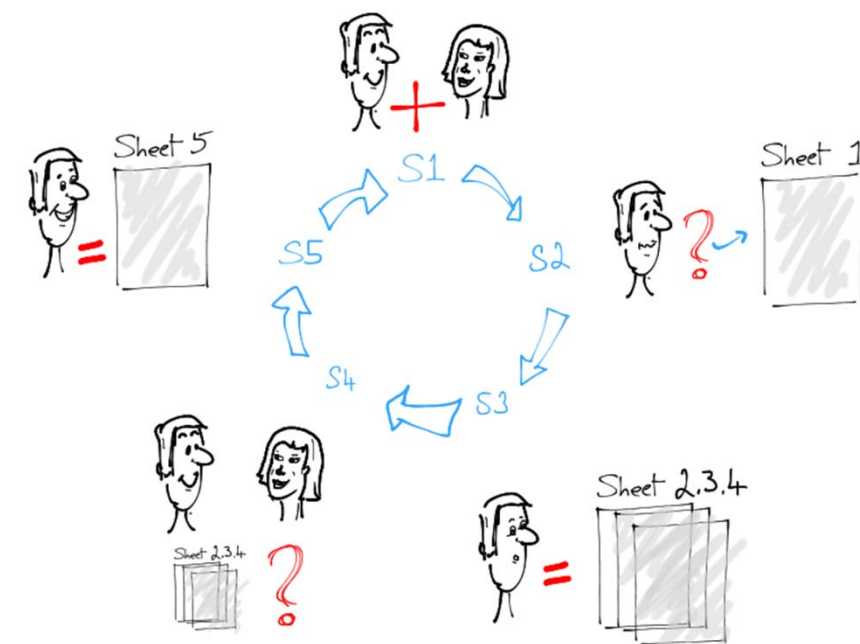   - Realization sheet with the final design

five sheets

- Sheet 1 (stage 2)
  - Explore ideas; sketch many different concepts
- Sheets 2, 3, and 4 (stage 3)
  - Main design sheets for 3 different design alternatives
- Sheet 5 (stage 4 + 5)
  - Realization sheet with the final design

Company Name	LiquidLoads		VinoTrans		SpiritsUnlimited		ExclusiveVine
Tanker Type	T1	T2	T1	T2	T1	T2	T2
Cargo	White Wine	Red Wine	White Wine	White Wine	Red wine	Red wine	Red Wine
Amount (in litres)	200,000	80,000	100,000	200,000	160,000	200,000	60,000
Origin	France	France	Germany	Germany	Spain	France	France
Stop 1	England	England	France	Montreal	Montreal	Germany	Florida, USA
Amount after Stop 1	140,000	70,000	80,000	160,000	110,000	150,000	50,000
Stop 2	Montreal	Montreal	England	New York	New York	Canada	New York
Amount after Stop 2	140,000	40,000	50,000	80,000	70,000	90,000	40,000
Stop 3	New York	New York	France	Florida	Florida	Florida	Montreal
Amount after Stop 3	140,000	20,000	empty	40,000	empty	40,000	empty
Stop 4	Florida	Florida		Spain		New York	
Amount after Stop 4	empty	empty		empty		empty	
Frequency	monthly	monthly	weekly	monthly	bi-weekly	bi-weekly	monthly

- How much wine and what type of wine gets transported to the different countries?

sheet 1 – brainstorm ideas

How much wine and what type of wine gets transported to the different countries?

- Generate ideas
  - Sketch as many ideas as possible!
  - Mini-ideas, lots of drawings, words, concepts, half-backed, wacky...
  - Do not judge yourself
  - Don't feel restricted – any idea is a good idea and deserves to be sketched
  - ~~"But I cannot implement this!"~~

[15 minutes]

sheet 1 – brainstorm ideas

How much wine and what type of wine gets transported to the different countries?

- Discuss your brainstorming with another student
  - Do the ideas meet the task?
  - Do you make good use of visual variables?
  - Is something missing?
  - What are their advantages or disadvantages?
  - Are there three or more different design concepts coming out of the ideas?

[10 minutes]

sheet 1 – brainstorm ideas

How much wine and what type of wine gets transported to the different countries?

- Categorize
  - Cluster similar ideas (annotate)
  - Observe the categories that are forming
  - What is missing? → possibly go back to Step 1 "Generate ideas"
  - → Converge

- Combine + Refine
  - Can certain ideas work together → multiple vis views
  - What visualizations complement each other?
  - Which ones provide overview?
  - Which ones provide detail?
  - Refine and change existing ideas as you see fit
  - Start to think about which ideas you want to flesh out further

[10 minutes]

sheets 2, 3, 4: initial designs

- Flesh out 3 detailed alternative concepts

- Concepts should be as different as possible

- Some concepts may still evolve

- Questions to guide the process
  - What data / visualization components are needed to support the task at hand?
  - How would the interface look like → layout?
  - What interaction techniques should be supported?
 - Don't worry about realization yet!
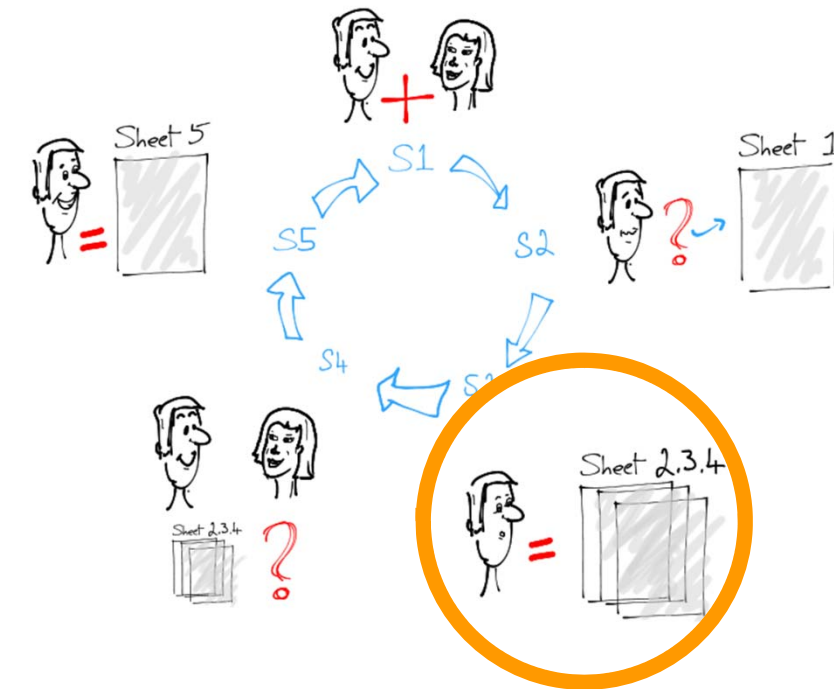
[20 minutes]

five design sheet method – disclaimer

- The 5 design sheet method can help you
  - Structure your ideation process
  - Document your process (important for all practicals throughout this term!)
- The process is not set in stone!
  - Restructure the sheets' layout as you see fit (you may need more space)
  - If you feel the method holds you back, modify it!
- The following guiding questions may help any ideation process
  - What aspects of the data do you want to show?
  - What type of attributes are you dealing with?
  - What will your visual representations look like?
  - Will you need multiple representations that work together?
  - What could be the layout
  - How will people interact with the visualization(s)?
  - What types of tasks/insights can be supported?

five design sheet method (optional material)
stages in more detail
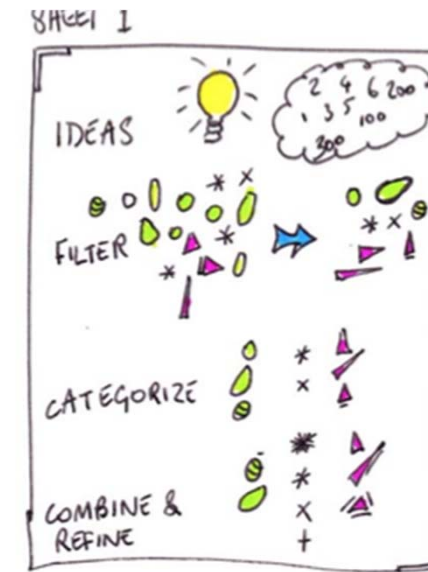
http://fds.design/
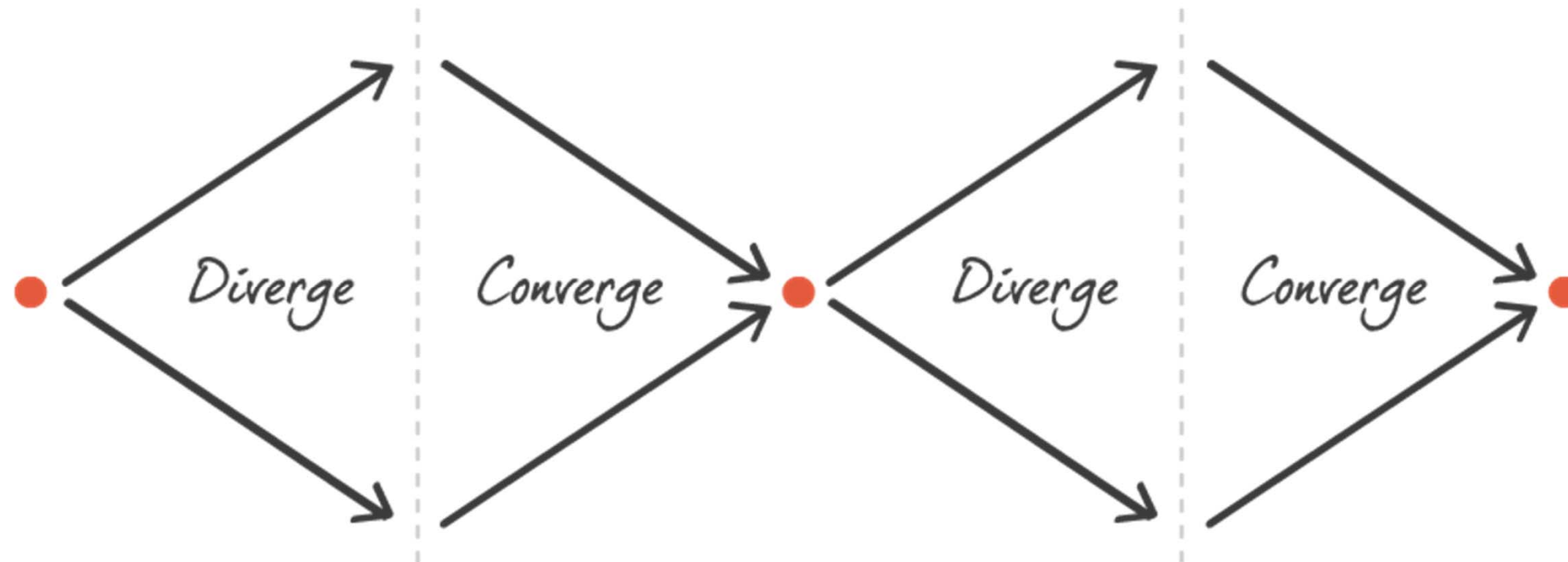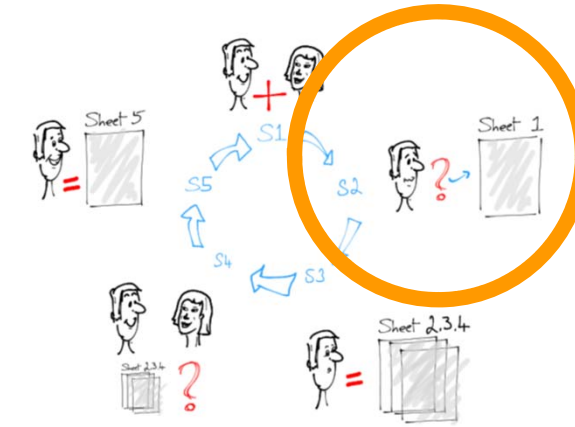
sheet 1: ideation

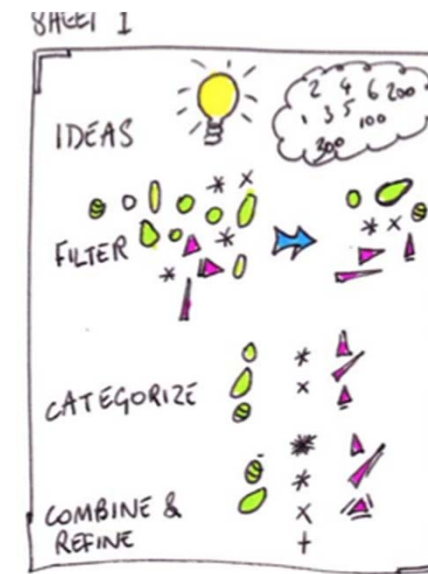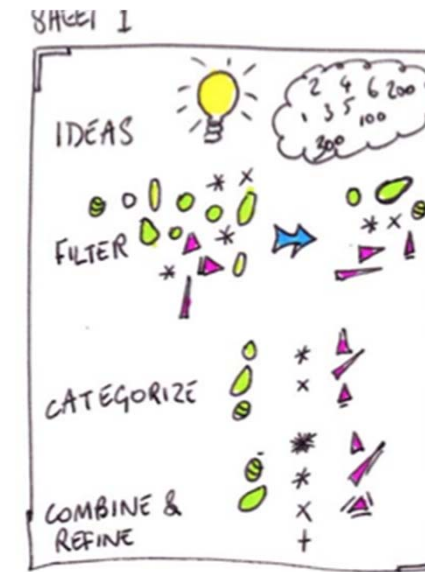
1. Generate ideas
   - Sketch as many ideas as possible!
   - Mini-ideas, lots of drawings, words, concepts, half-backed, wacky...
   - Do not judge yourself
   - Don't feel restricted by the visualization tools
   - ~~"But I cannot implement this!"~~
   - → Diverge!

sheet 1: ideation

- Brainstorm!

sheet 1: ideation

1. Generate ideas
   - Sketch as many ideas as possible!
   - Mini-ideas, lots of drawings, words, concepts, half-backed, wacky…
   - Do not judge yourself
   - Don't feel restricted by the visualization tools
   - ~~"But I cannot implement this!"~~
   → Diverge!

2. Filter the ideas
   - Remove duplicates
   - Modify some ideas (annotate, rather than delete!)

sheet 1: ideation

3. Categorize
   - Cluster similar ideas (annotate)
   - Observe the categories that are forming
   - What is missing? → possibly go back to Step 1 "Generate ideas"
   → Converge

4. Combine + Refine
   - Can certain ideas work together → multiple vis views
   - What visualizations complement each other?
   - Which ones provide overview?
   - Which ones provide detail?
   - Refine and change existing ideas as you see fit
   - Start to think about which ideas you want to flesh out further

sheet 1: ideation
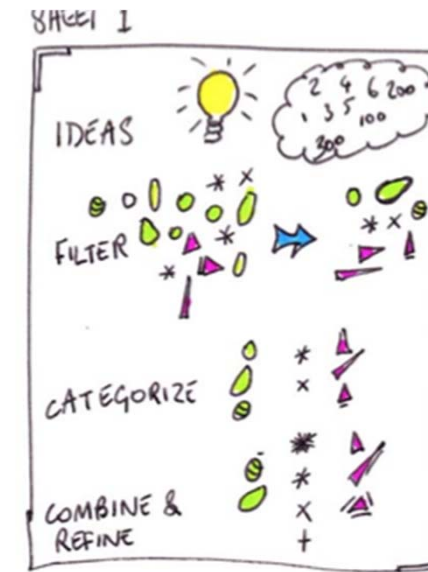
5. Question
   – Do the ideas meet the task?
   – Are they effective?
   – Is something missing?
   – What are their advantages or disadvantages?
   – Are there three or more different design concepts coming out of the ideas?

- Ideally several totally different design ideas should come out of this ideation process

→ Pick three design ideas you would like to further explore

sheets 2, 3, 4: initial designs

- Flesh out 3 detailed alternative concepts

- Concepts should be as different as possible

- Some concepts may still evolve

- Questions to guide the process
  - What data / visualization components are needed to support the task at hand?
  - How would the interface look like?
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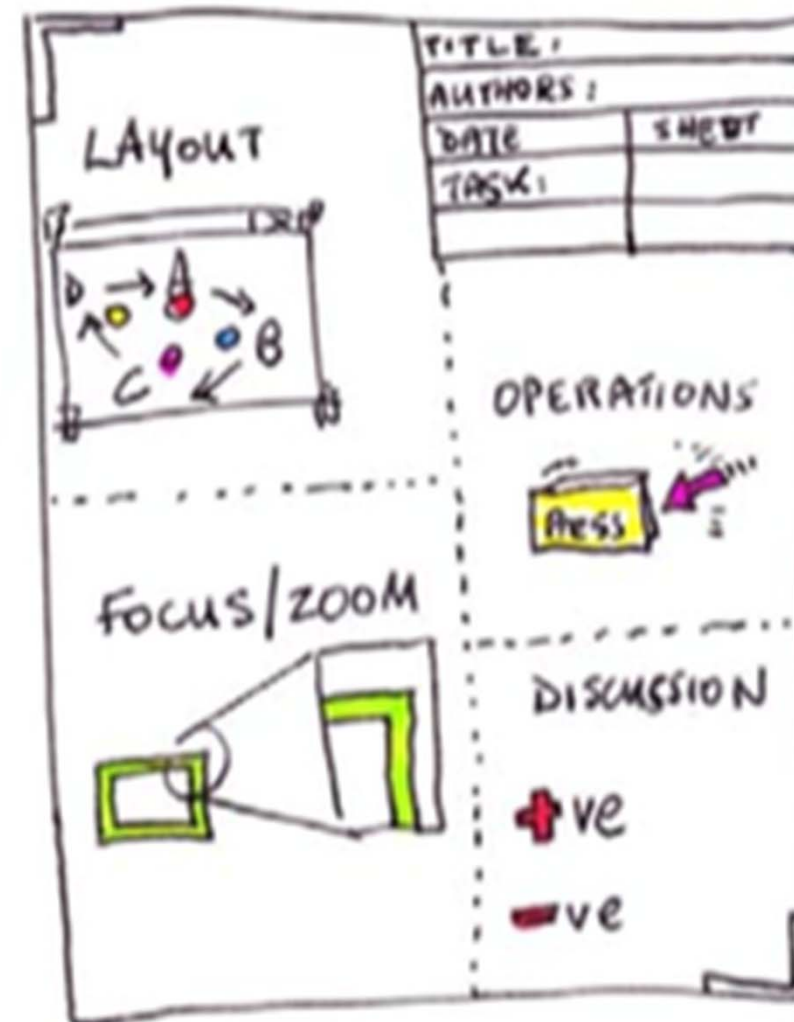 - Don't worry about realization yet!

sheets 2, 3, 4: initial designs
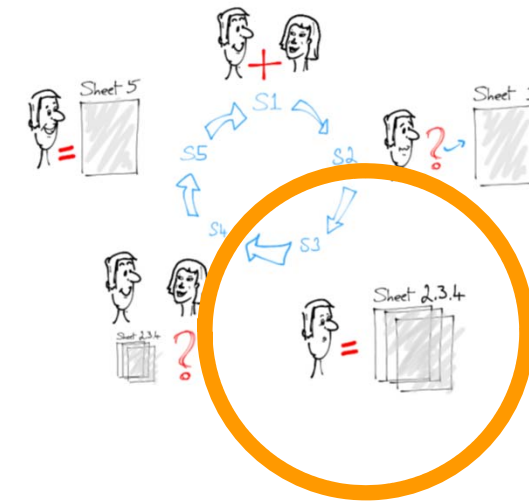
http://fds.design/index.php/2015/06/25/sheet-2-3-4-initial-designs/

- Information
- Layout
- Operations
- Focus
- Discussion

sheets 2, 3, 4: initial designs

- Information
  - Meta-information about sheet
  - Title, author, date, task and sheet number

- Layout
  - Overview of the interface / sketched "screen-shot" of the final app
  - Includes buttons, GUI elements, visualizations, menus...

- Operations/interactions
  - Action – Result pair of user input and system reaction
  - E.g. release of a button click → the data is loaded and is visualized
  - Multiple results can occur for one activation of an interface component

sheets 2, 3, 4: initial designs

- Focus
  - Central idea of the visualization
  - Visually describe, plan and detail this core concept
  - E.g., magnified view on one component of the →Layout
  - E.g., flow diagram of how people will interact with this particular component
- Discussion
  - Advantages and disadvantages of the designs
  - What questions about the data can the vis answer?
 - How do the visual representations scale to the entire dataset?
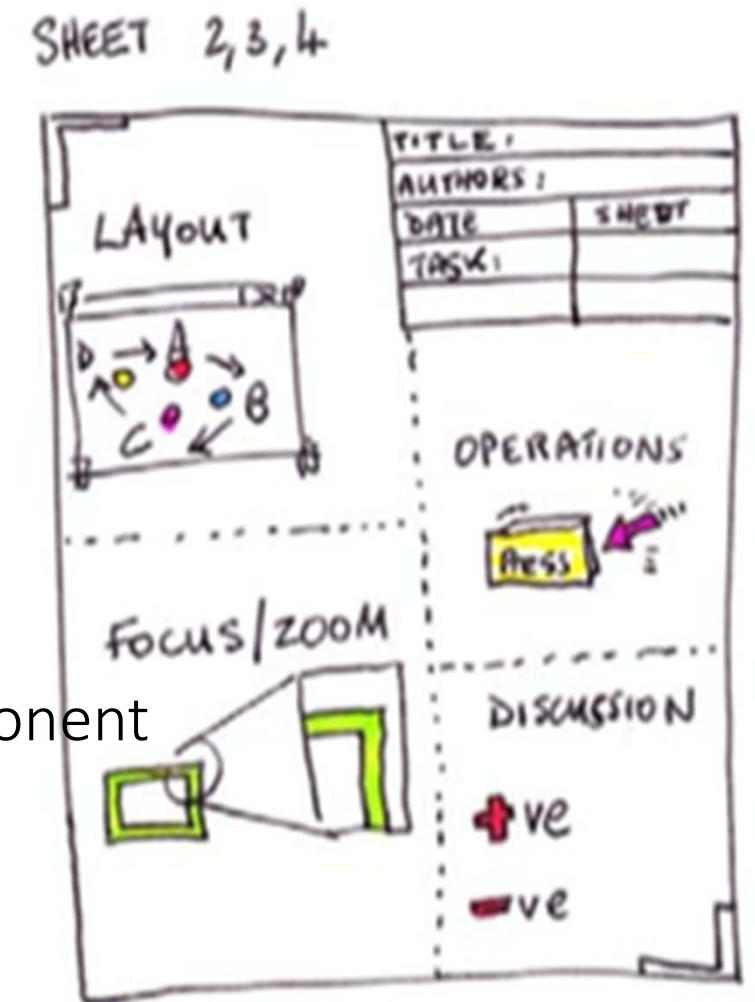
discussions with client/friends/supervisor/self
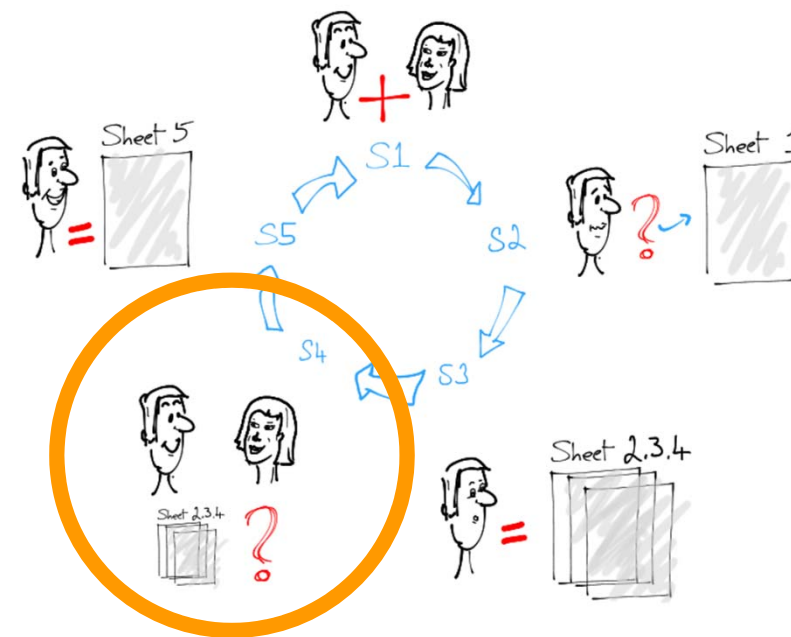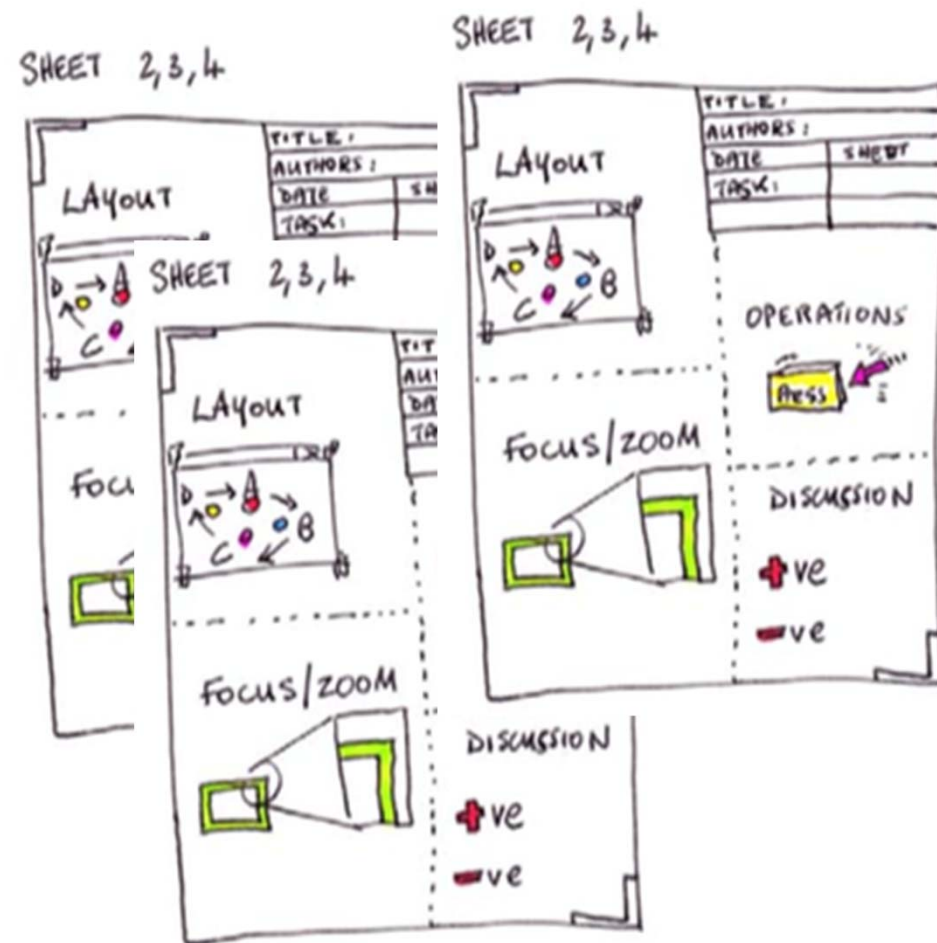
→ Let the ideas "sit" for a while; come back to them after a while; refine

sheet 5: realization design

- Final concept for delivery

- Shows enough information to imagine
  - What the main idea is
  - What the visualization will look like
  - How someone can interact with it

- Can look the same or similar as the design on Sheet 2, 3 or 4

- Can be a combination of different ideas from the previous 3 sheets
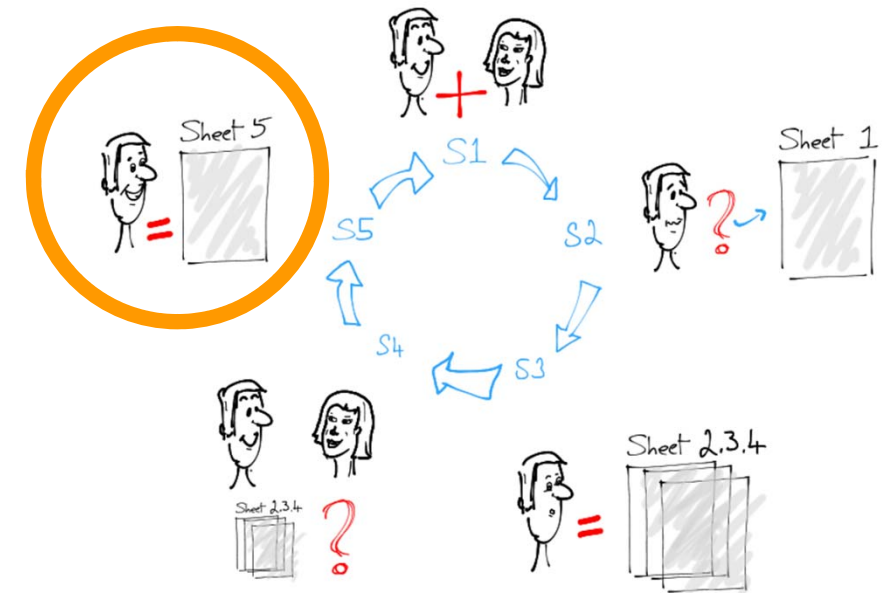
sheet 5: realization design

- Information
- Layout
- Operations
- Focus/Parti
- Detail

sheet 5: realization design

- Detail (optional, does not have to be included)
  - Description of the main data structures or algorithms (if applicable)
  - Maths and other measurements
  - Dependencies and requirements of software, libraries...
  - Estimates of costs and time
  - Any other requirements (e.g., hardware)