

# VISUALIZATION DESIGN PROCESS SKETCHING

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# WE HAVE SO FAR

- Seen visualization examples
- Defined research questions
- Found data

# IDEATION

How do we come up with a new visualization  
(or visual analytics) system / tool ?

IDEATION =  
the formation of ideas or concepts

# SKETCHING

As an important part in ideation

# SKETCHES ARE...

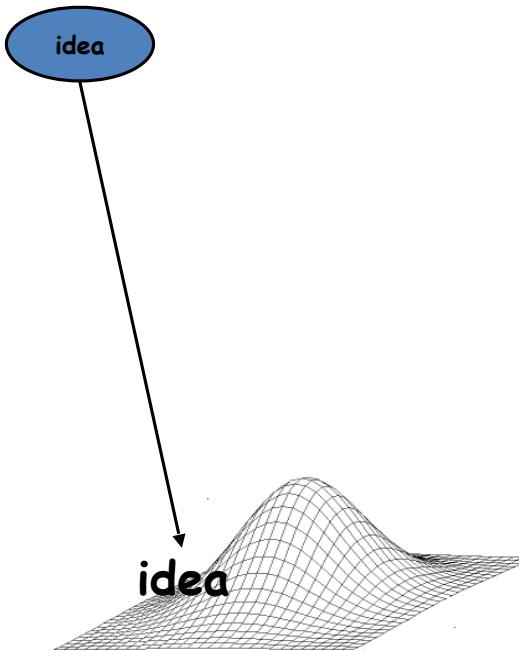
- quick, freehand drawings
- can include labels or captions
- don't need to be pretty
- goal:
  - for communication
  - for brainstorming

*try to communicate ideas with  
as few lines (as little "ink") as  
possible!*

# WHY SKETCH

getting the design right

- generate an idea

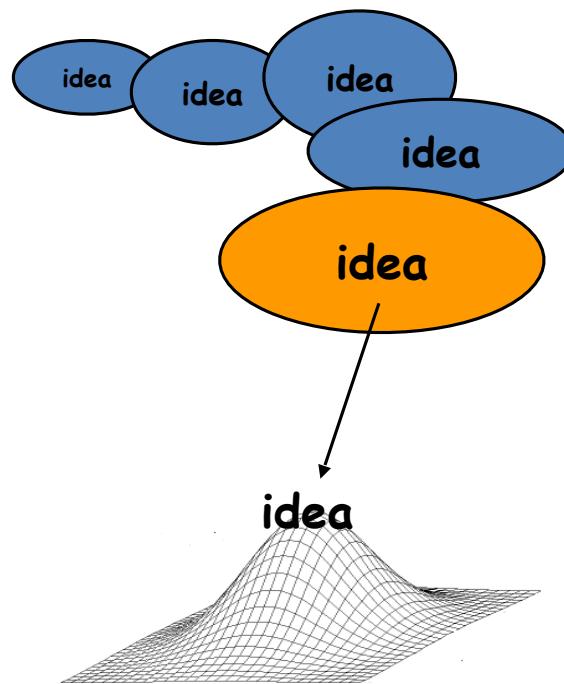


Graphs on the next few slides were modified from images found in the Sept. 2009 Wikipedia entry: *hill climbing*

# WHY SKETCH?

getting the design right

- generate an idea
- iterate and develop it



*but is it the best idea?*

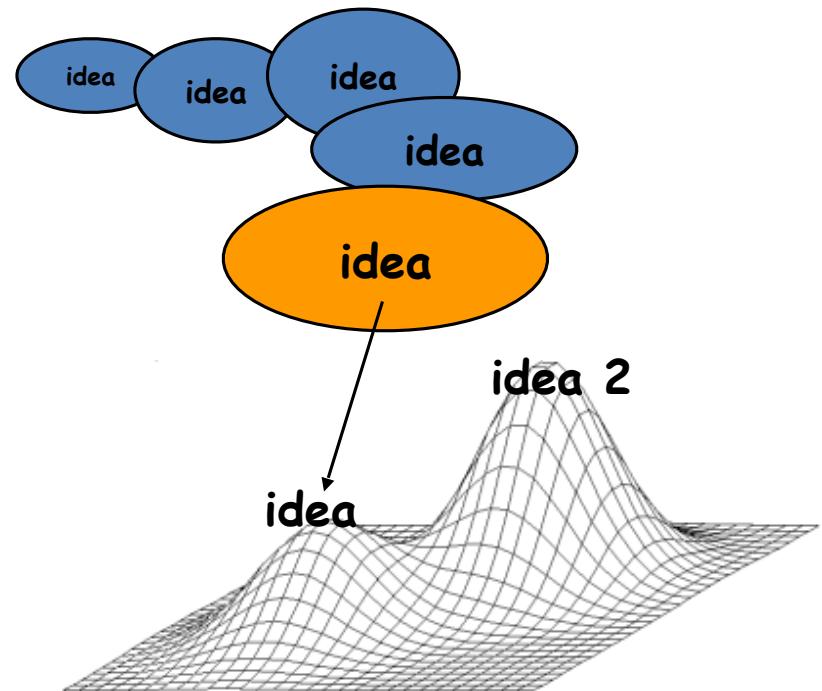
# WHY SKETCH?

## getting the design right

- generate an idea
- iterate and develop it

## The problem

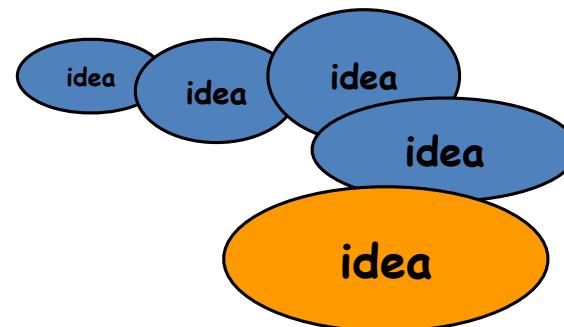
- other better solutions may be available in different ideas
- local vs. global maxima (local hill climbing)
- often results from fixating on a single idea



# WHY SKETCHES?

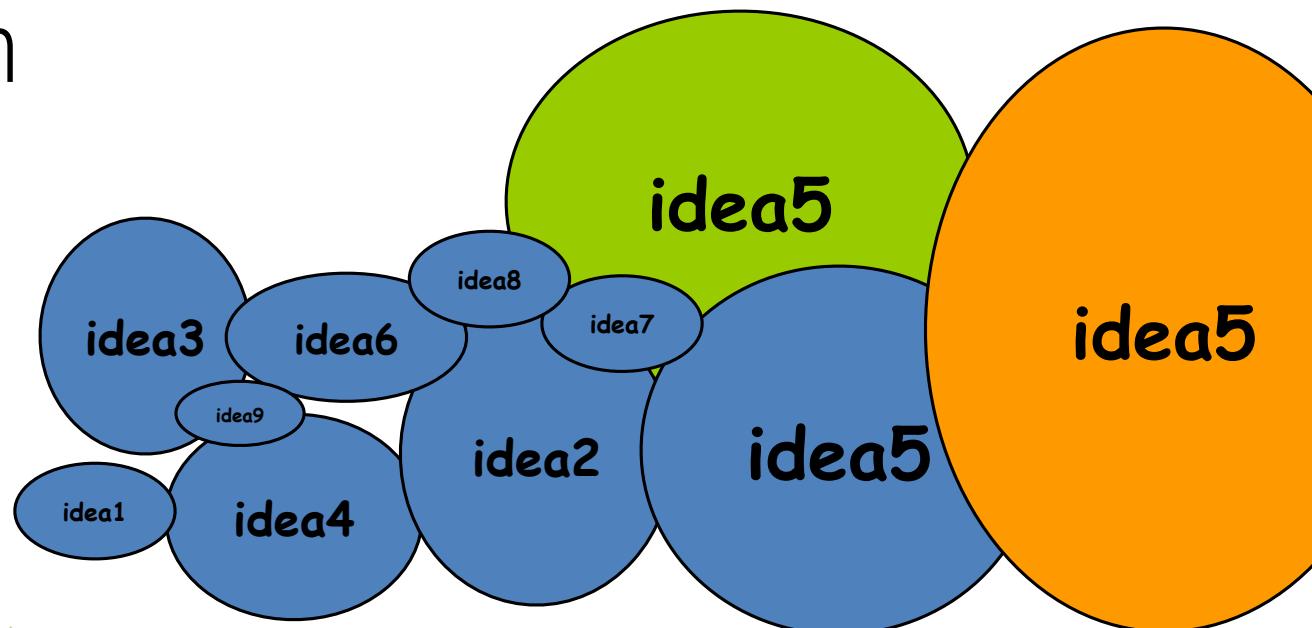
## getting the design right

- generate an idea
- iterate and develop it



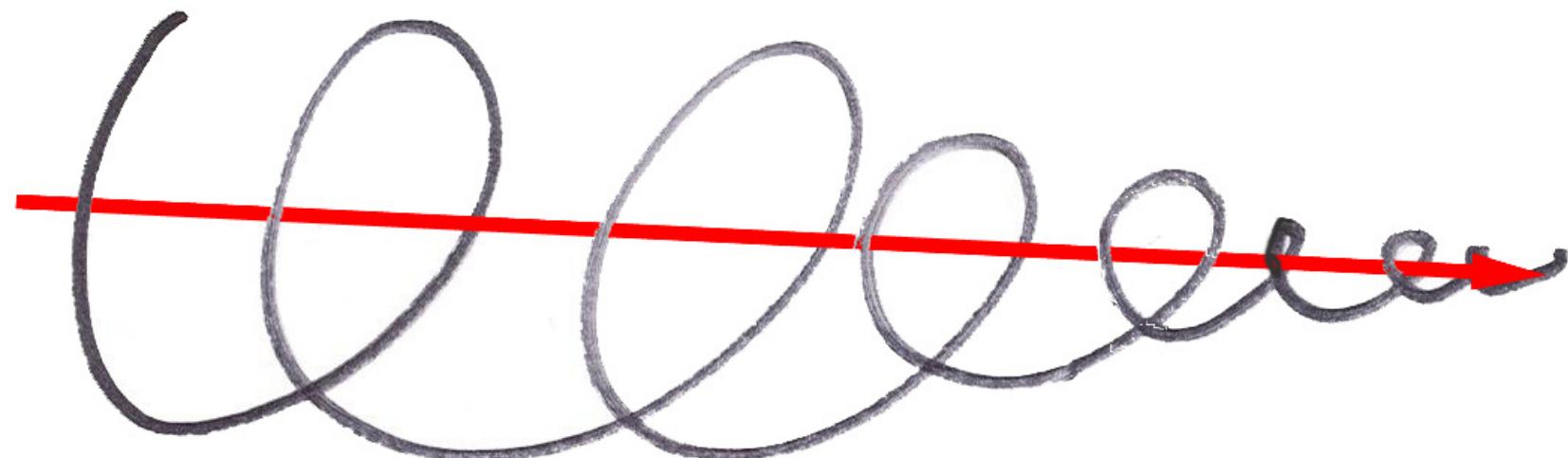
## getting the right design

- generate many ideas and variations
- reflect and choose
- *then* iterate and develop your choice

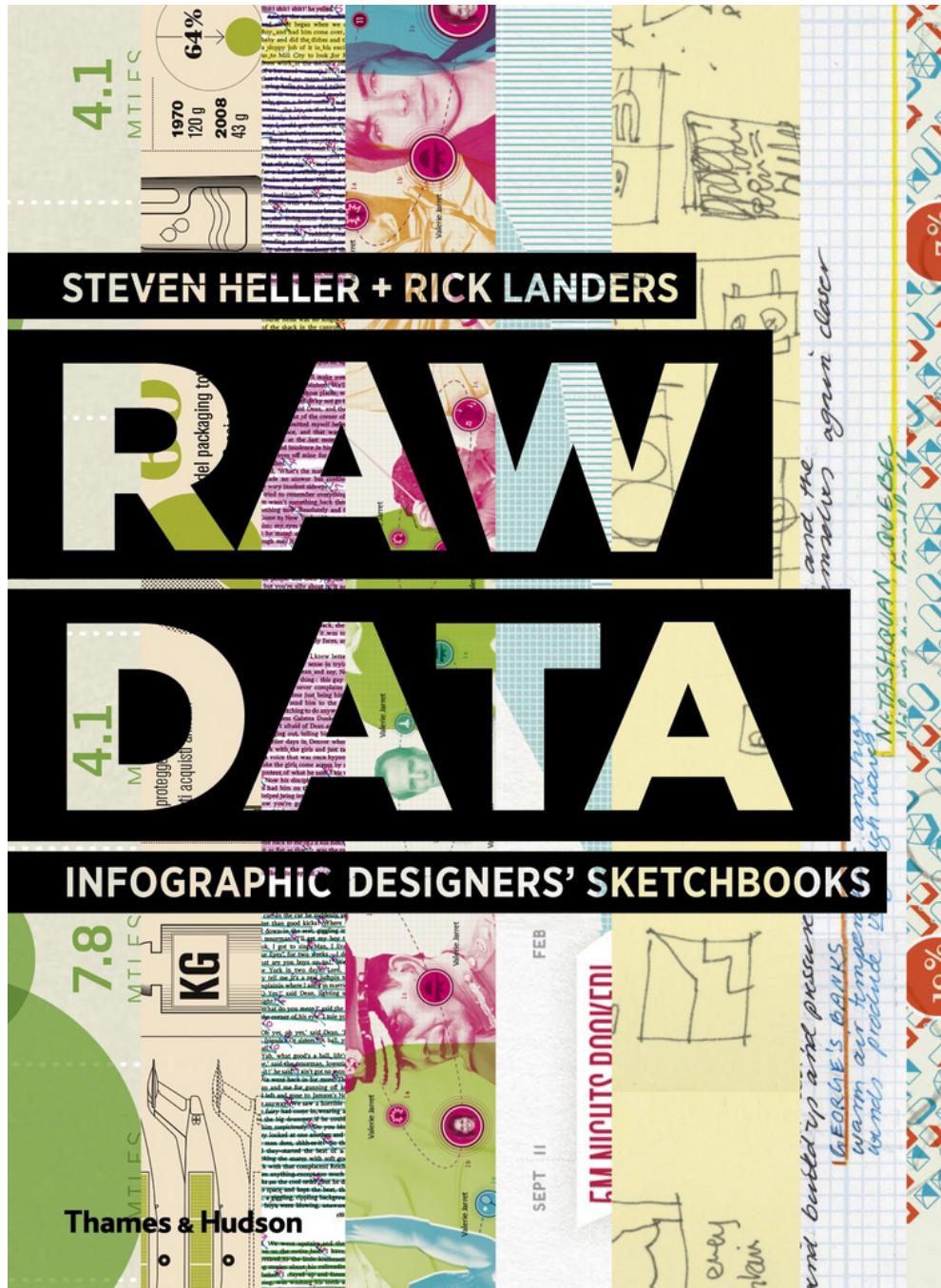


Bill Buxton coined the expression 'Getting the Design Right vs. Getting the Right Design'

# EXPLORATION OF A SINGLE IDEA



Slide contributed by Bill Buxton



'Drawing plays an important role in the production and communication of knowledge, and in the genesis of new ideas,' says design director Giorgia Lupi, founder of Accurat, an information design agency with offices in Milan and New York. 'In addition, the act of drawing and the fact we choose to stop and draw focuses the attention. When I'm sketching, I always try to find a way to interpret both the single visual elements and the overall composition.'

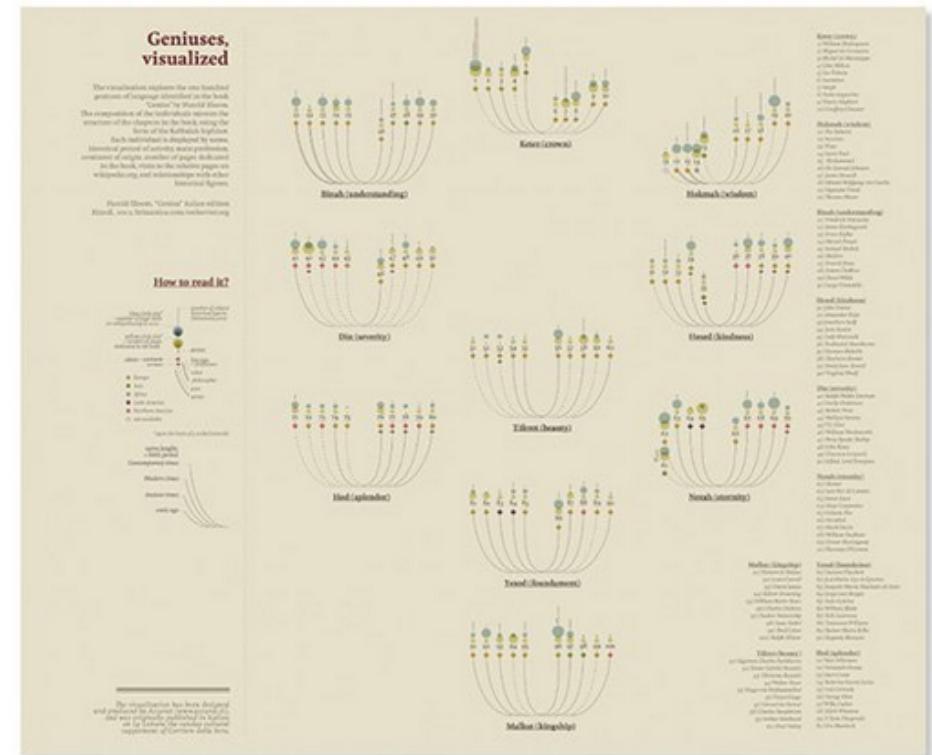
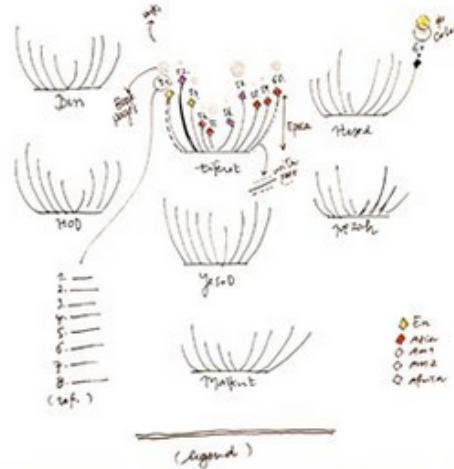
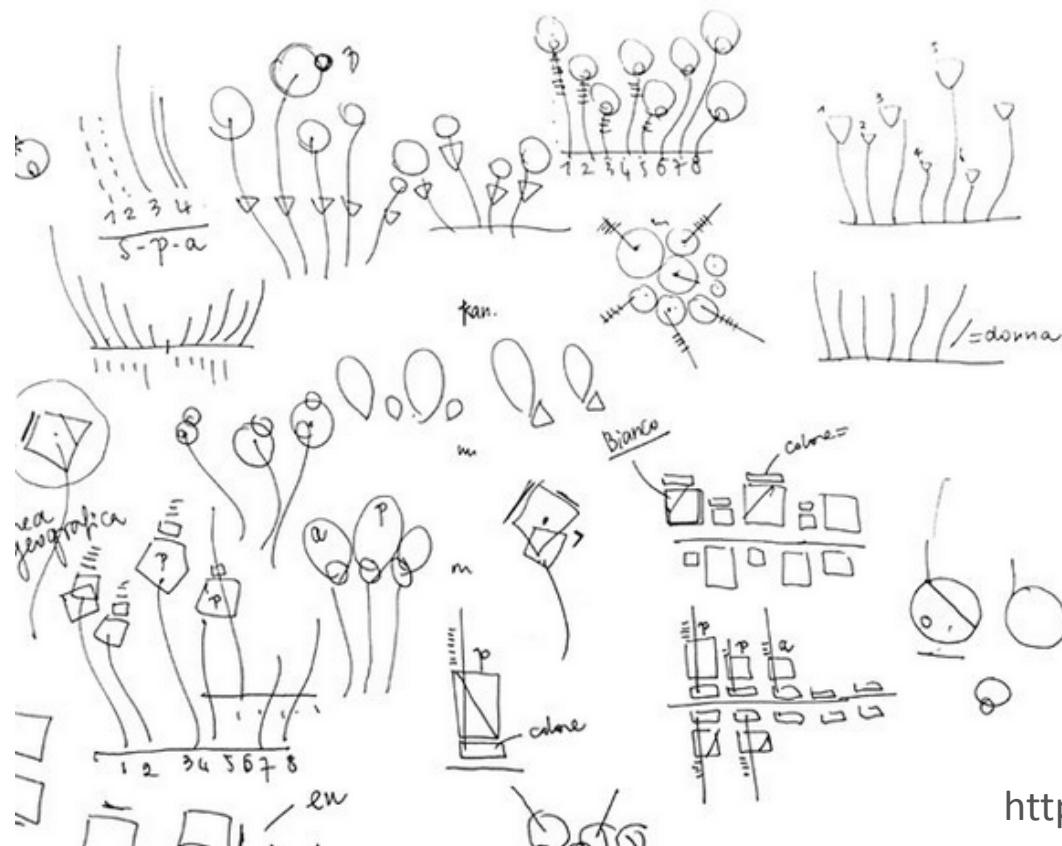
Lupi draws on white paper with Muji black-ink pens. Drawing is her primary expression, a 'functional tool for capturing

and exploring thoughts and exploring ideas towards the production of the final piece'. Her team approaches problems in the way that journalists would, rather than as data analysts, understanding in which contexts they must interpret their data.

When describing Geniuses, Visualized, the company's project for *La Lettura*, a magazine supplement in the Italian newspaper *Corriere dello Sera*, Lupi says: 'We aim to deliver rich visual narratives, able to maintain the complexity of the data but still making this complexity more accessible and understandable through the visualization.'

They also provide several layers of exploration on the data set being analysed. 'We call it "non-linear storytelling", Lupi says, 'where people can get lost in singular elements, minor tales and "last-mile" textual elements within the greater visualization.'

Lupi and her team regularly push the boundaries on how to 'compose' data-visualizations that achieve aesthetic beauty and elegance through new visual metaphors, intentionally avoiding the more usual and already tested styles of representation.



<https://www.behance.net/gallery/18723575/Geniuses-visualized>

## Geniuses, Visualized

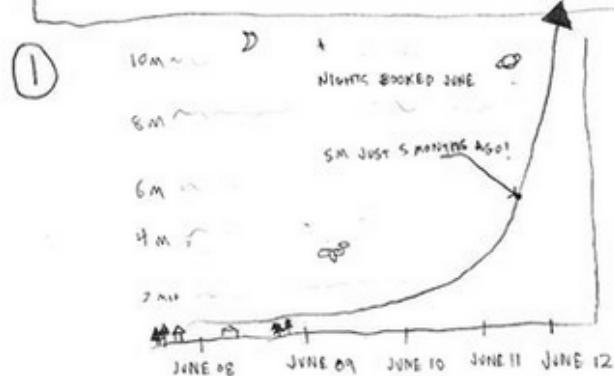
*La Lettura*, 2012

This infographic looked at the 100 'exemplary creative minds' identified in literary critic Harold Bloom's book *Genius*. Playing off Bloom's use of the Sephirot, the ten emanations of the Kabbalah, to organize the taxonomy of his chosen 'geniuses' of language - from Shakespeare to Lewis Carroll - the visualization depicts the geographic origin, time period and field of each genius, correlated with number of Wikipedia hits and connection to related historical figures.



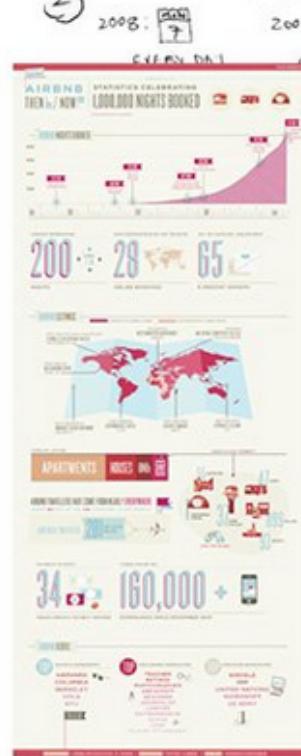
AIRBNB

BEGINNING THE WORLD TOGETHER

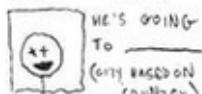


10 MILLION  
GUEST  
NIGHTS  
BOOKED

2 A NIGHT ON AIRBNB IS BOOKED...



READ THIS, '38,000 PEOPLE ARE STAYING ON AIRBNB  
AVING? 



WHERE ARE THEY FROM?

36,000 STAMPING ON PHONE RIGHT NOW

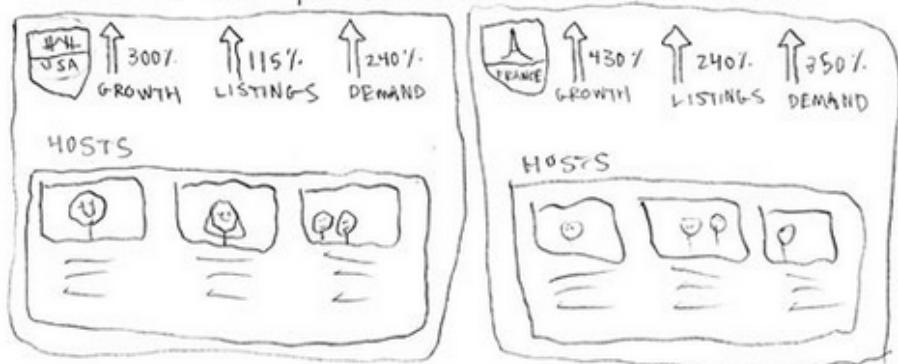
COUNTRY	NUMBER OF STAMPING STATIONS
USA	15,000
FRANCE	2000
ES	1000
UK	5000
GERMANY	2500
ITALY	1000
CANADA	2500
AUSTRALIA	2500

④ TONIGHT, IN LONDON, 1200 PEOPLE WILL BE STAYING ON AIRBNB.  
WHERE ARE THEY COMING FROM? SPAIN



## ⑤ INTERNATIONAL GROWTH -

IN THE LAST YEAR THE AIRBNB COMMUNITY HAS GROWN...



## OTHER COUNTRIES

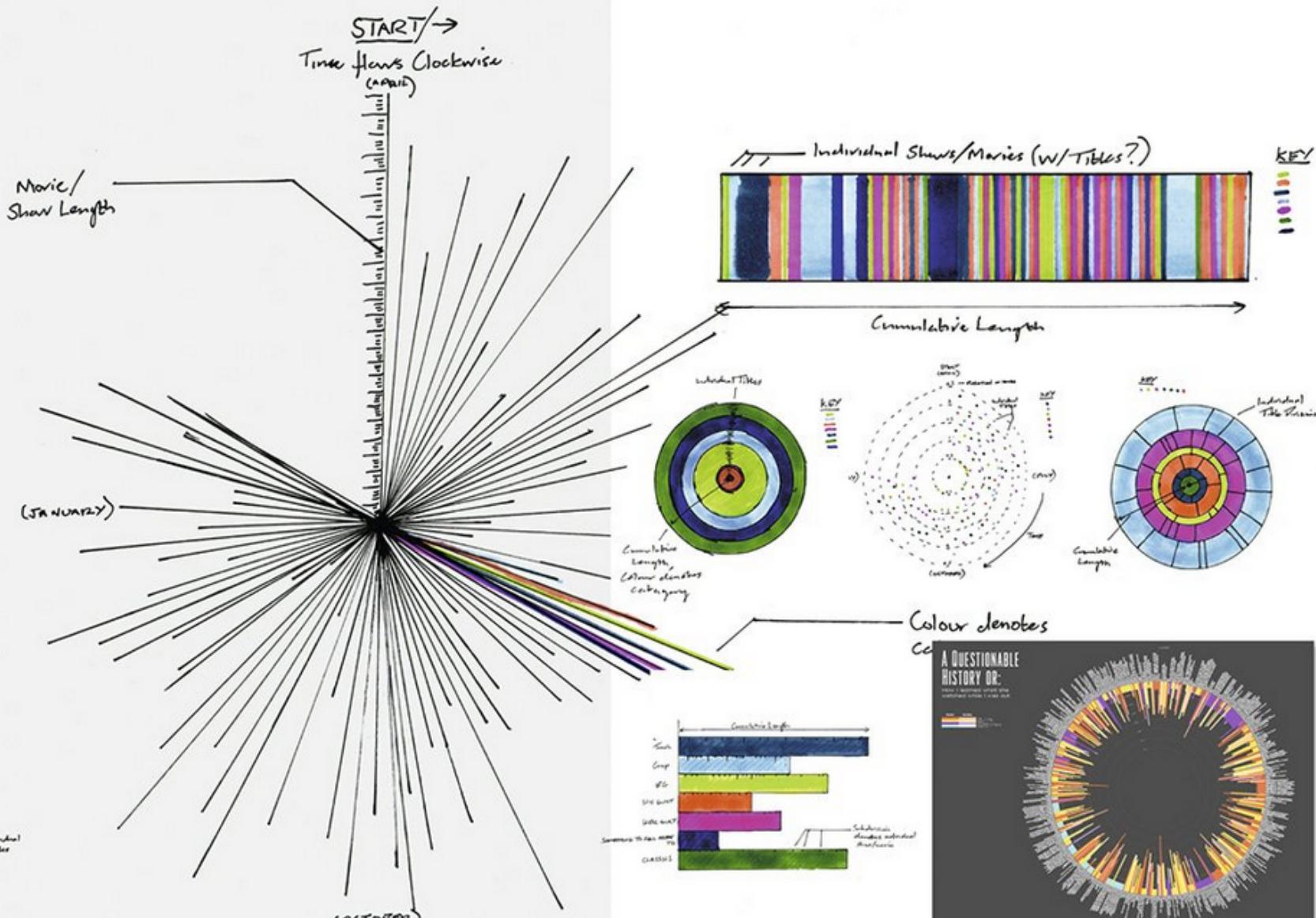
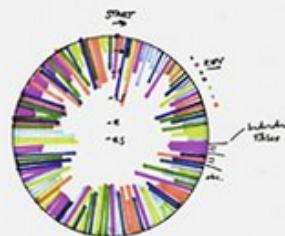
## Tim Hucklesby

- Charting his own movie viewing over a year

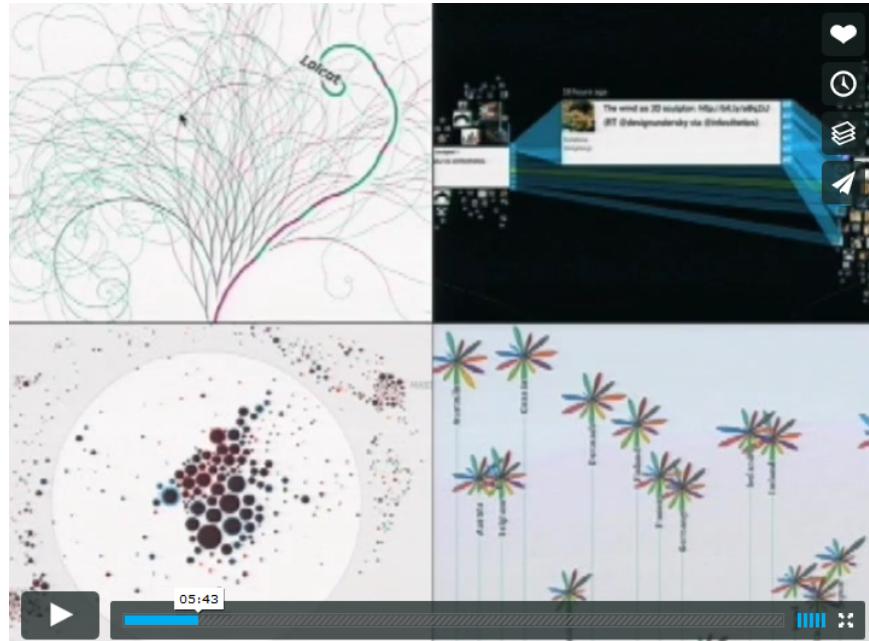
British-born Tim Hucklesby, now a designer at Doyle Partners in New York, first began designing infographics a few years ago, when he wanted to round out his portfolio before applying to the MFA Design programme at the School of Visual Arts. 'I kept designing them because I wasn't happy with the first one, and discovered that they were, in fact, pretty tough to make,' he admits. 'I always want the core idea to be a quick read, as well as encouraging the viewer to keep digging. I tend to slip up at least one of these criteria, so will keep trying.'

Hucklesby always embarks on a project by sketching in pen or pencil, whatever is to hand. 'I want get the concept pinned down before moving to the computer,' he says. 'I've found going straight to the machine tends to pull me down certain avenues, using techniques that I've used in the past. If I start on paper, I worry far less about how I'm going to make the finished piece and aim for something a bit more ambitious as a result.'

Of the visualization of his Netflix streaming consumption, *A Questionable History* (these pages), Hucklesby says: 'In the process of sorting the data, I found a great number of movie titles I didn't recognize, which turned out to be what my wife was watching while I was out. She was catching up on TV and films I wouldn't watch with her. In the end, the project was a public shaming of both of us and our viewing habits. It also served as a wake-up call to get out more.'



# Watch this video at home



<https://vimeo.com/28443920>

## SKETCHING ACTIVITY (30 MINS)

- sketch a number of different things
- *DO NOT* put your name on your sketches
  - One page per sketch
- we will then put the sketches together on a shared location online

BUT: “I CAN’T DRAW...”

# SOME PRINCIPLES FOR SKETCHING

- use as few lines as you can
- communicate the essence of the idea
- details only if they are important
- choose the detail you put in deliberately
- one piece of paper per sketch!!!!

# SKETCHING

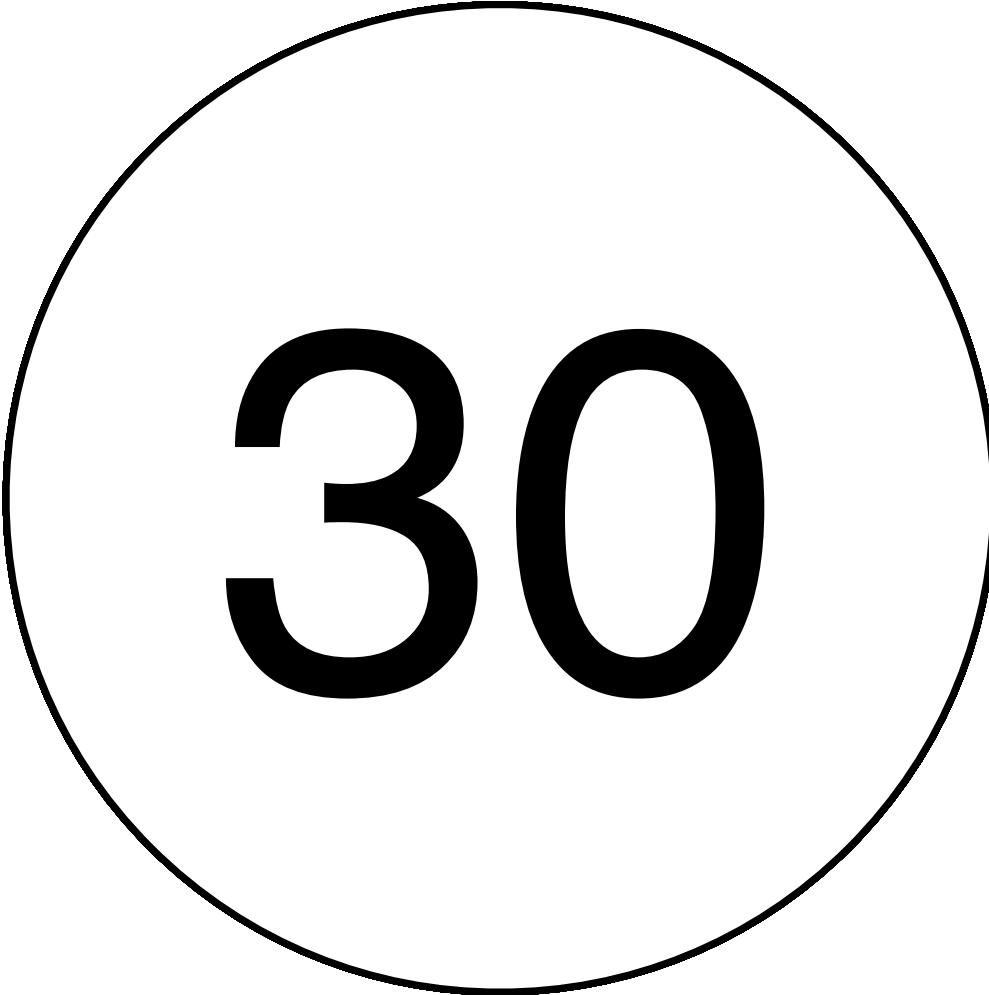
## Principles

- Use as few lines as you can
- Communicate the essence of the idea
- Details only if they are important
- Choose the detail you put in deliberately
- One piece of paper per sketch!!!!

## Exercise

Sketch a  
cellphone  
(30s)

Sketch a  
cellphone (30s)



30

# SKETCHING

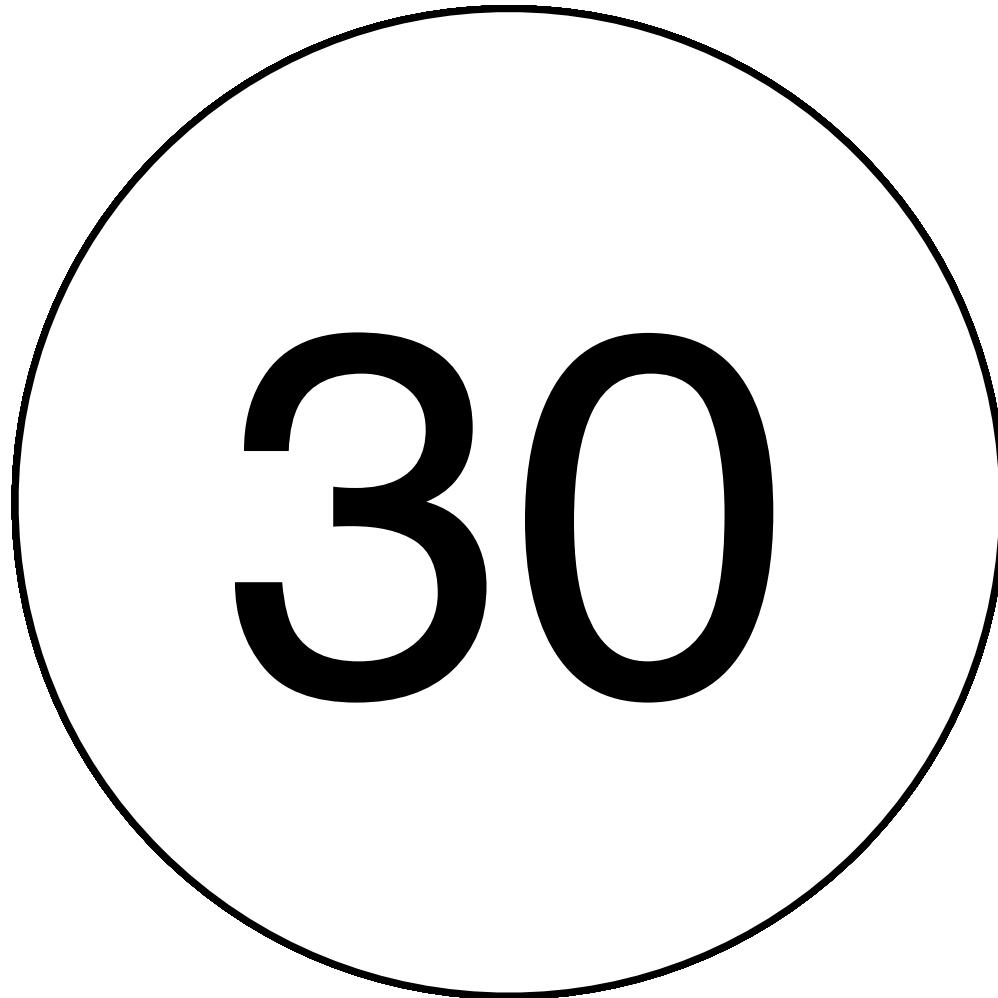
## Principles

- Use as few lines as you can
- Communicate the essence of the idea
- Details only if they are important
- Choose the detail you put in deliberately
- One piece of paper per sketch!!!!

## Exercise

A game (30s)

A game (30s)



# DISCUSSION (10-15 MINS)

- take a photo and post up your sketches on the google slides
- <https://tinyurl.com/3fnxkpv3>



25

# DISCUSSION (10 MINS)

- post up your sketches on the slide (one for cellphone and one for game)
- what worked well?
- what didn't work well?
- what things were important to communicate the idea?
- what wasn't important to communicate the idea?
- Note: DO NOT “defend” your sketch (better yet: don’t identify it is yours). Remember that your peers are the “users” of your sketch. If they find something incomprehensible, this is telling you something.

# SKETCHING DATA

# GET MORE PAPER READY

# SKETCH THE RELATIONSHIP BETWEEN TWO NUMBERS

(10 MINUTES - BUT WE'LL BE FASTER IN CLASS)

75

37

(there are at least 45 different ways)

# PHASE 1: MAKE (10) 2 SKETCHES

Generate (10) 2 sketches **individually** that relate to the design problem

- These sketches must be meaningfully different (i.e. avoid variations on the same idea)
- *Take risks: do not limit yourself to the things you know how to implement*
- Avoid judging the quality of these ideas now; the point is to get diversity

# IF YOU GET STUCK

If you get stuck think of brainstorming think of past examples we saw in class and ...

## Opposites:

space / time  
few / many  
monochrome / colourful  
slow / fast  
mobile / static  
big / small  
serious / funny  
text / graphic  
good / bad  
vertical / horizontal  
...

## Powers of 10:

costs 1 euro / 1 million  
size of ... pixel / watch / page / room  
1 min to look at / 1 h to look at  
...

# SKETCH THE RELATIONSHIP BETWEEN TWO NUMBERS

(10 MINUTES - BUT WE'LL BE FASTER IN CLASS)

75

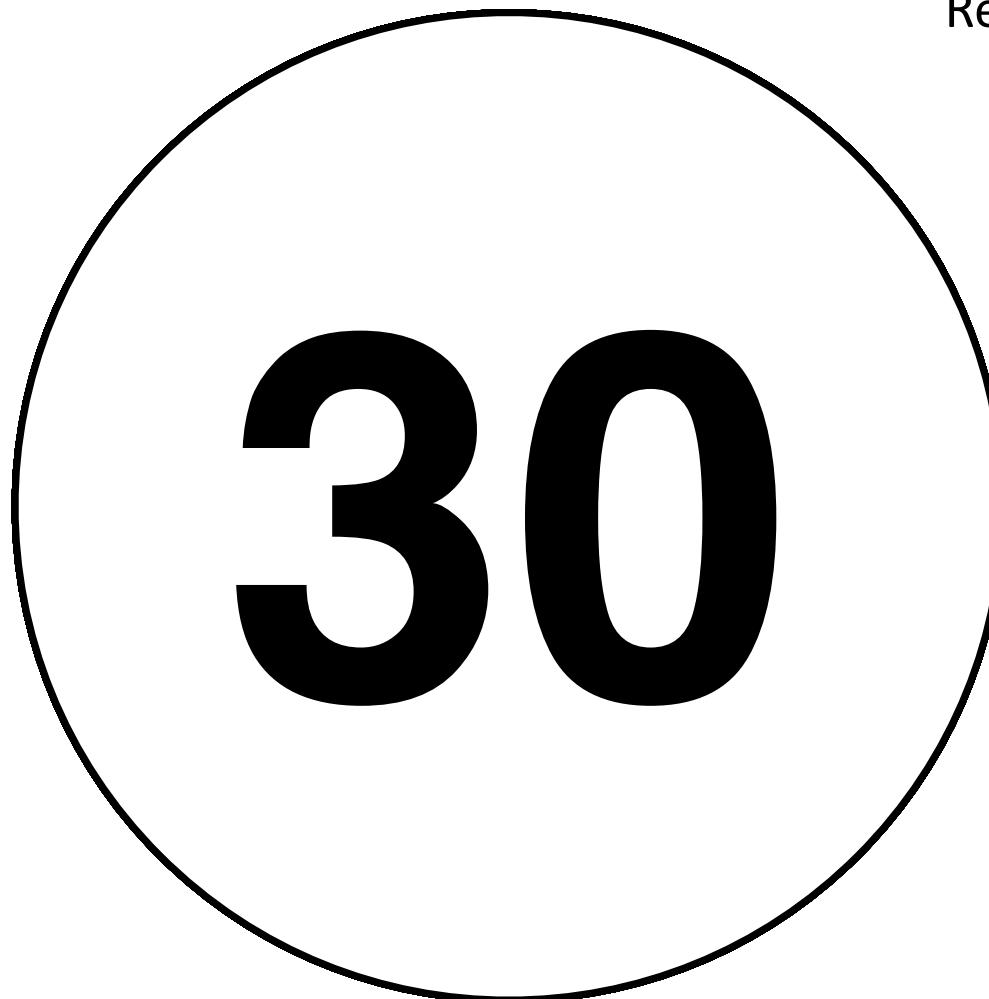
37

You should generate 3 different sketches  
one every 30 sec !!!

(there are at least 45 different ways)

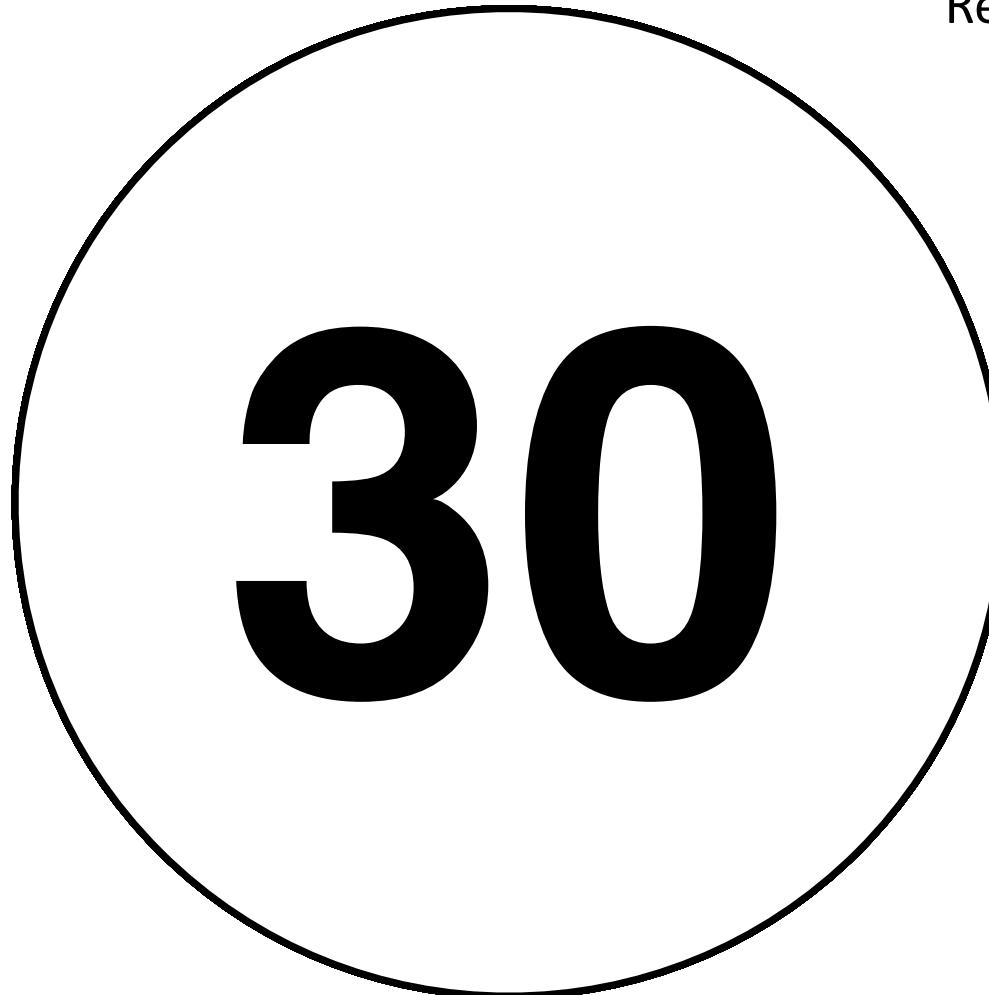
1st sketch

Relationship between 75 & 37



2nd sketch

Relationship between 75 & 37



34

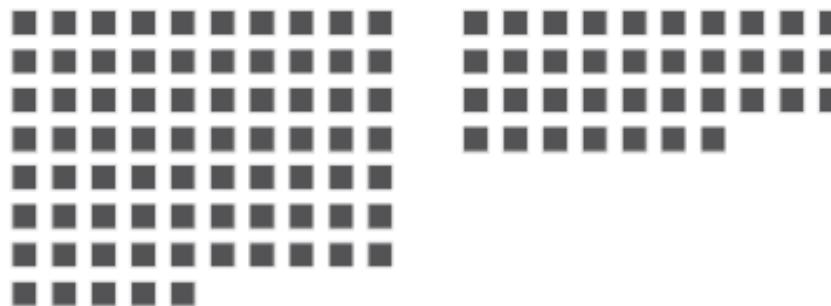
<http://www.scribblelive.com/blog/2012/07/27/45-ways-to-communicate-two-quantities/>

# 75 and 37

## 1. writing, number notation



## 2. squares



## 3. repeated icon

<http://www.scribblelive.com/blog/2012/07/27/45-ways-to-communicate-two-quantities/>



# PHASE 2: REFLECT & GROUP

- upload your sketches on the google slides
- let's go there and start grouping our sketches
  - i.e., do affinity diagrams / card-sorting
- take a photo and post up your sketches on the google slides
- <https://tinyurl.com/3fnxkpv3>

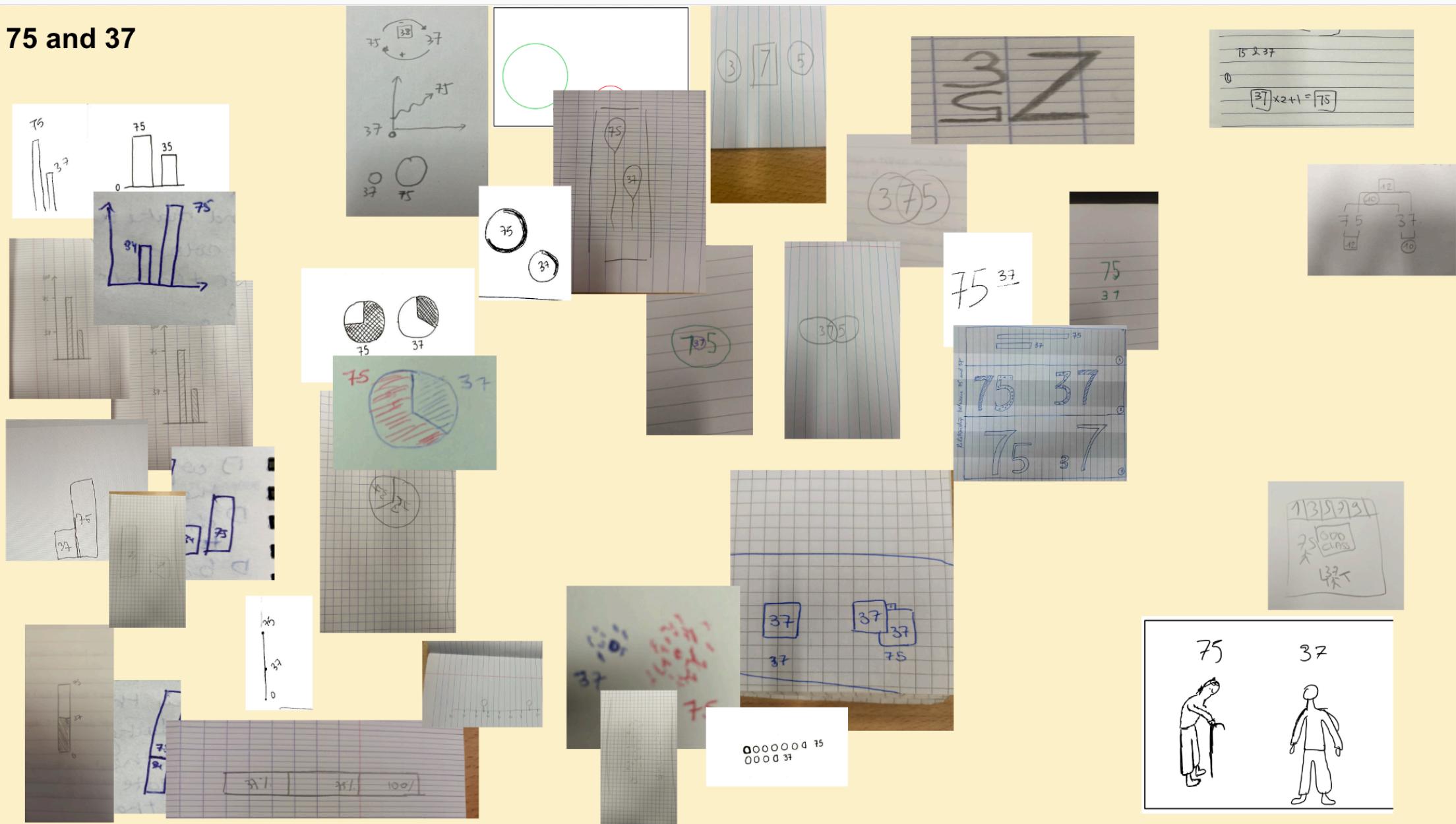


# PHASE 2: REFLECT & GROUP

- the groups we created in past classes ...

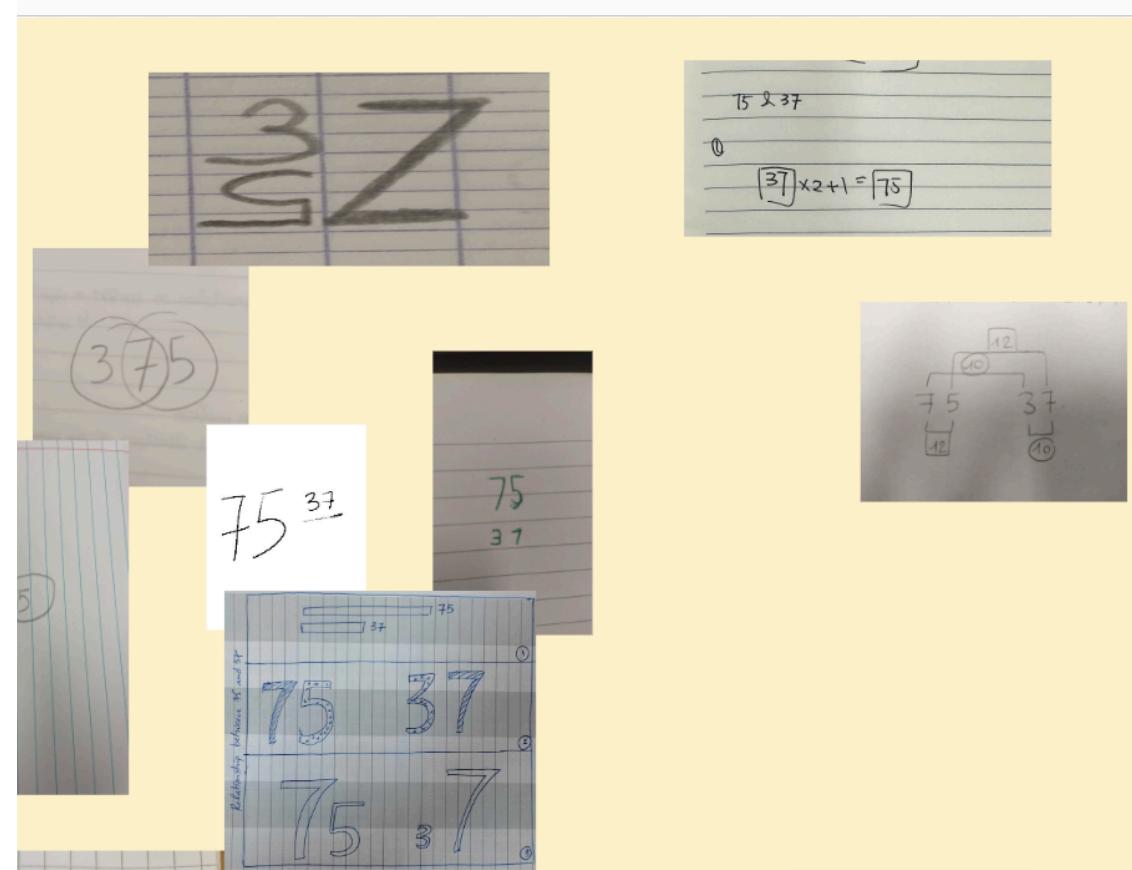
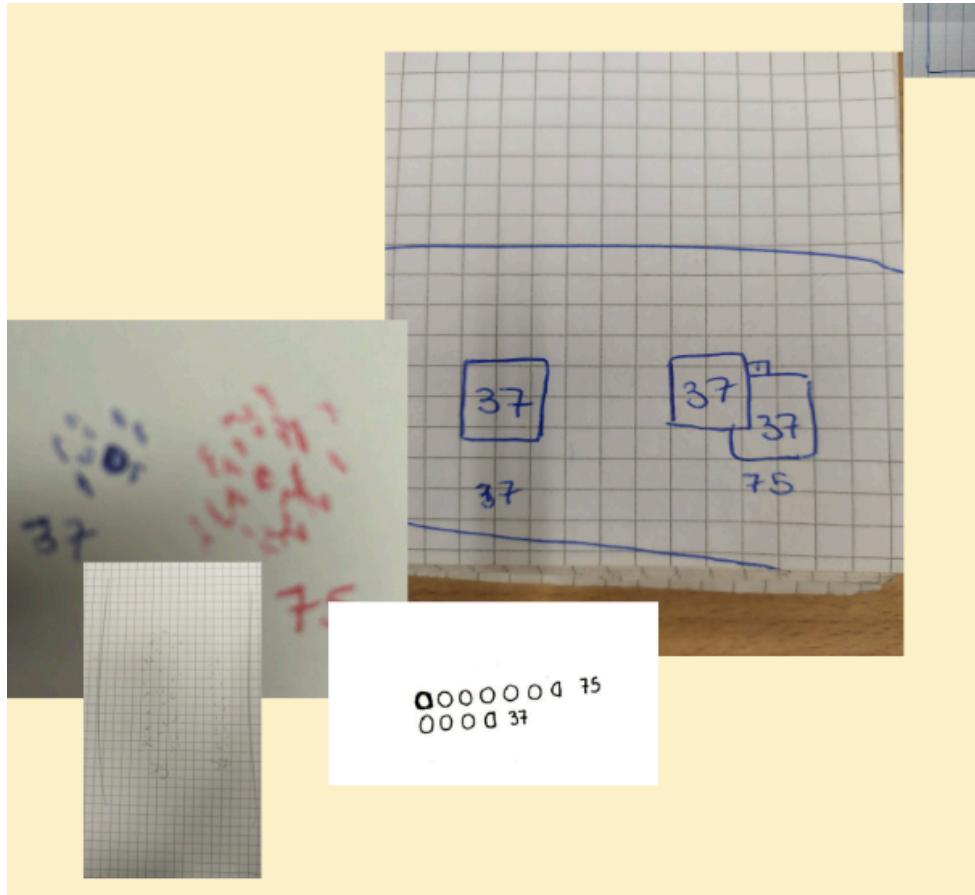
... ALL GROUPS - GROUPS OFTEN OVERLAP

75 and 37

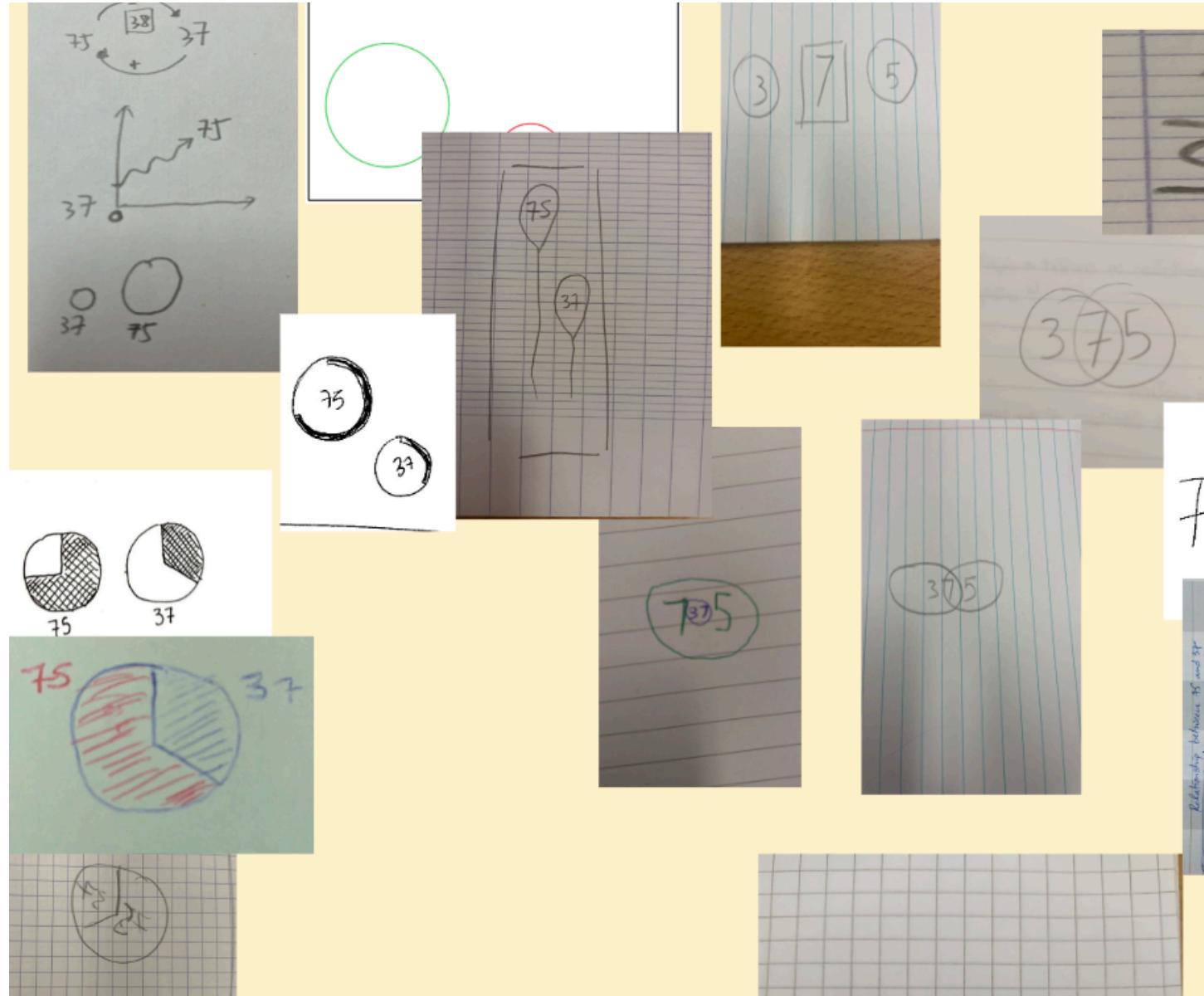


# 1. REPEAT GLYPHS / UNITS (SAME GLYPH OR DIFFERENT)

# 2. DIGIT OR MATH RELATIONSHIPS

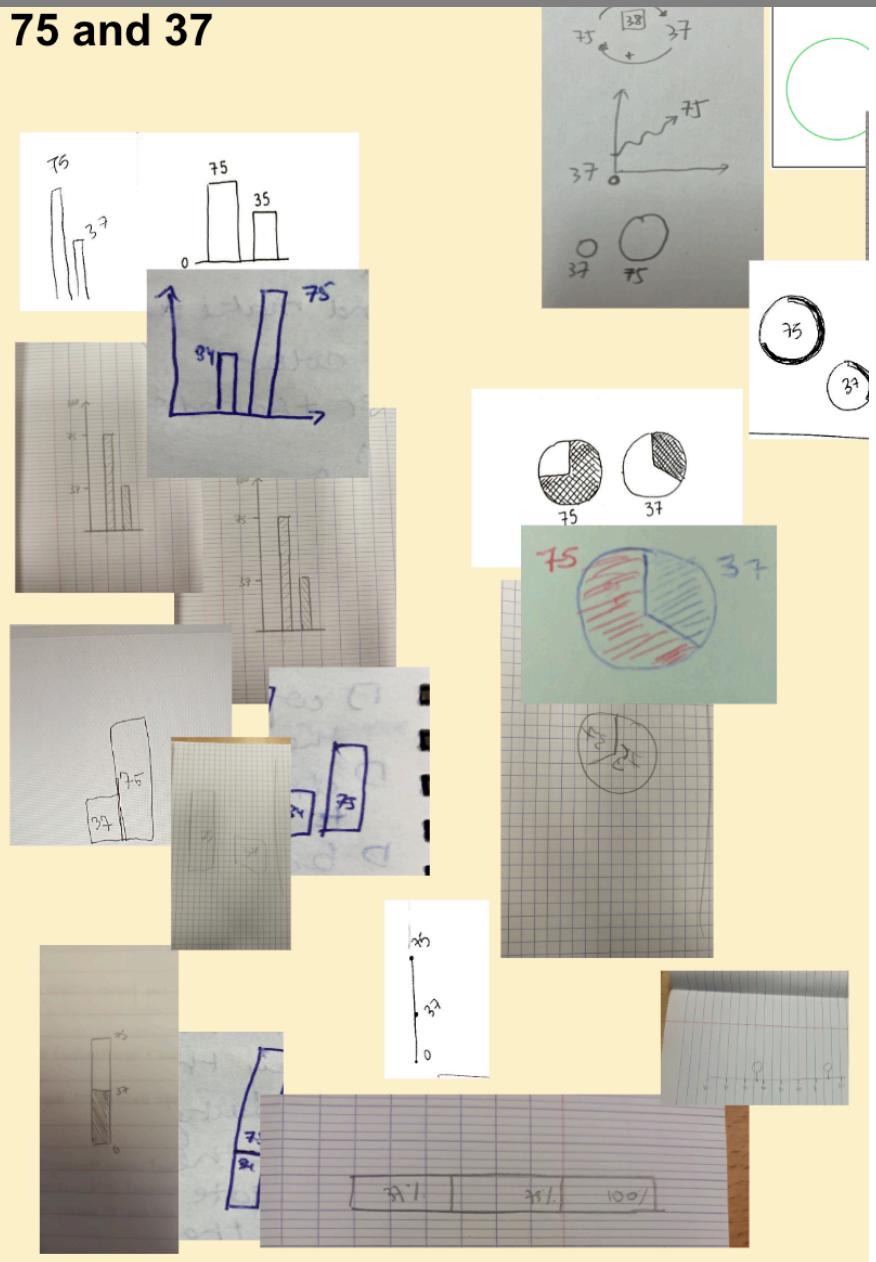


## 2. USE AREA OR ANGLE



## 3. USE LENGTH (+ AREA OR POSITION)

75 and 37



## 4. ABSTRACT



# PHASE 3: “PLUS (10 )2”

- Using the 2 promising design ideas, generate an additional (10)2 sketches that are variations of these 2 design ideas
- On a per-person basis, it might be best to stick to one of the design ideas

# LET'S DO ANOTHER 2 !!!

- from the generated affinity diagram categories
  - vote / pick your favourite
    - but let's distribute interest across categories, see it as a challenge !!!)
  - Create 2 variations of your favourite

# DO ANOTHER 2 !!!

If you get stuck think of brainstorming think of...  
...BUT NOW focus on creating variations rather than completely new designs

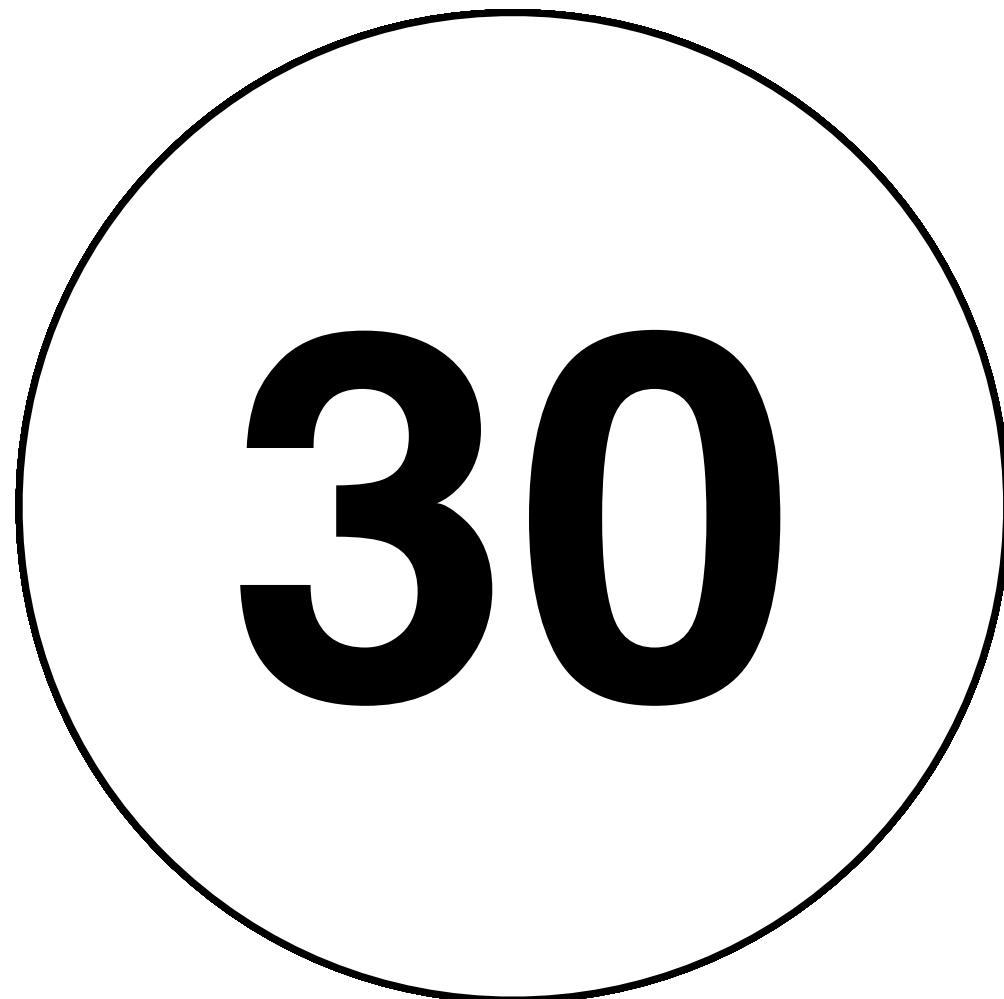
## Opposites:

space / time  
few / many  
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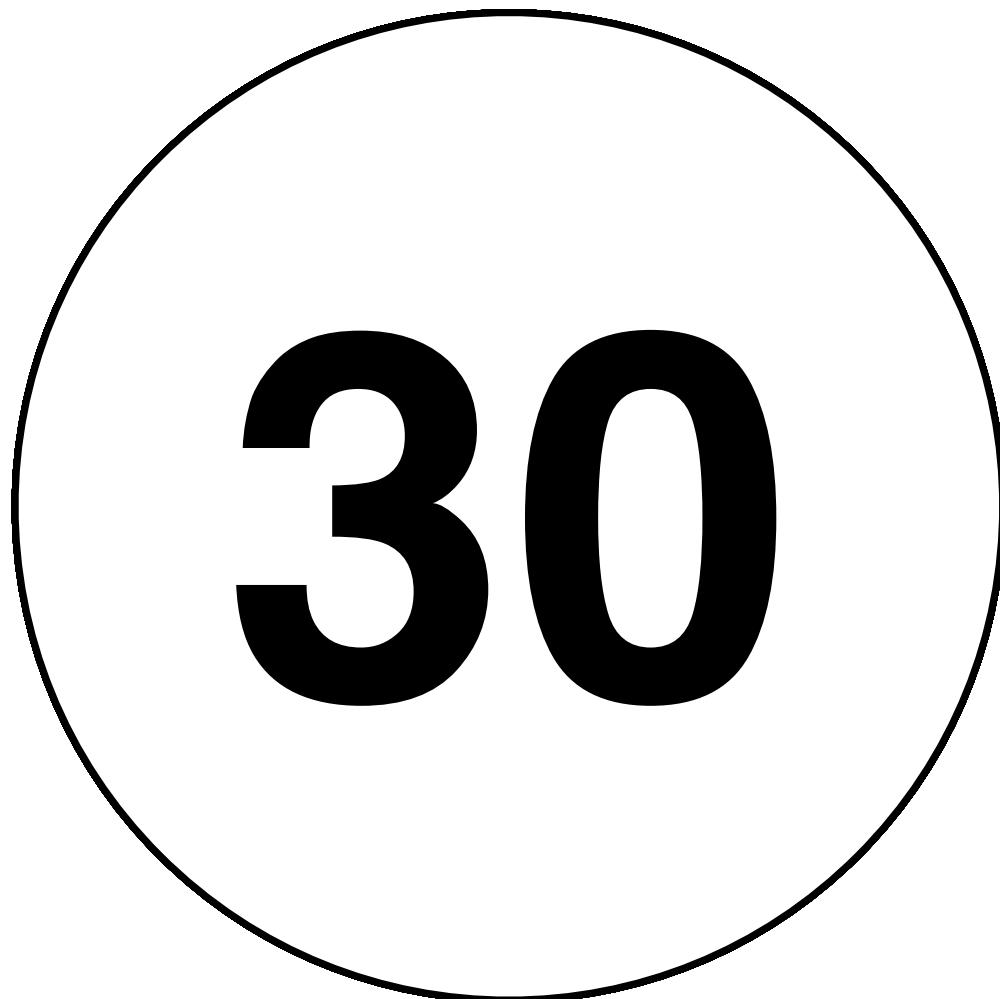
## Powers of 10:

costs 1 euro / 1 million  
size of ... pixel / watch / page / room  
1 min to look at / 1 h to look at  
...

1/2 variations



2/2 variations



# PHASE 3: DISCUSSION

- Discuss within your group each of the design ideas represented in the sketches
- Select the most promising design ideas

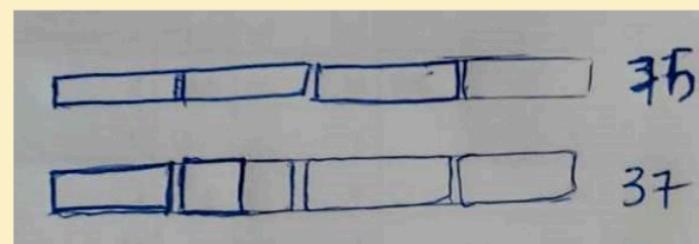
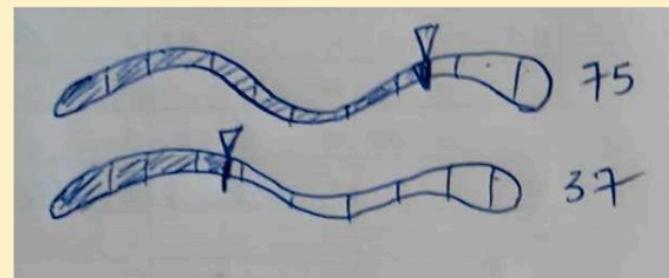
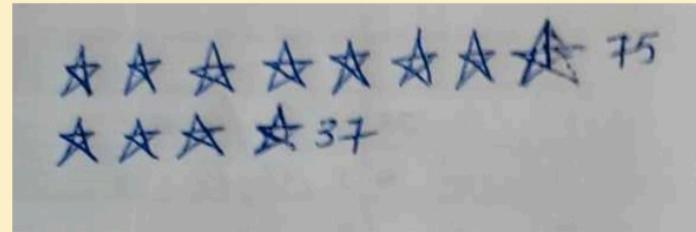
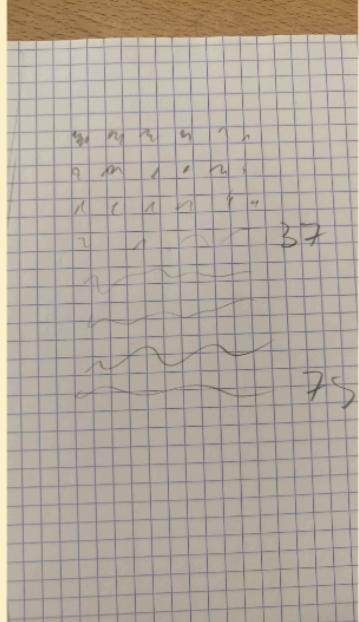
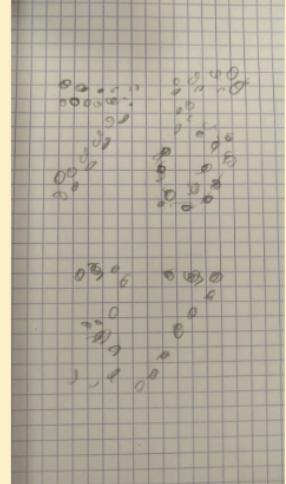
# UPLOAD YOUR SKETCHES

- on the shared google slide deck
- let's go there and start grouping our sketches
  - i.e., do affinity diagrams / card-sorting

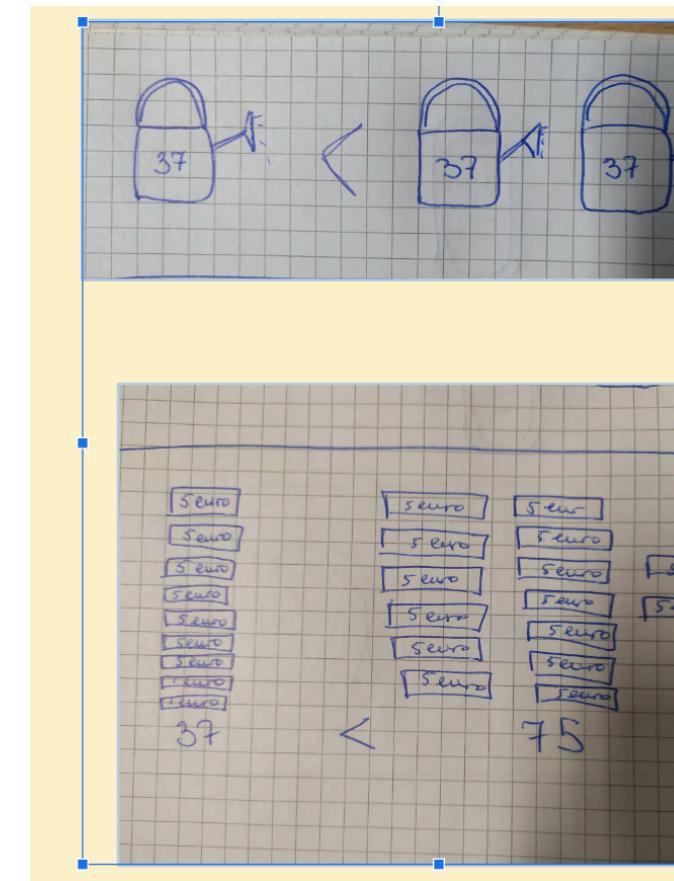
# PHASE 3:

- the variations we created ...

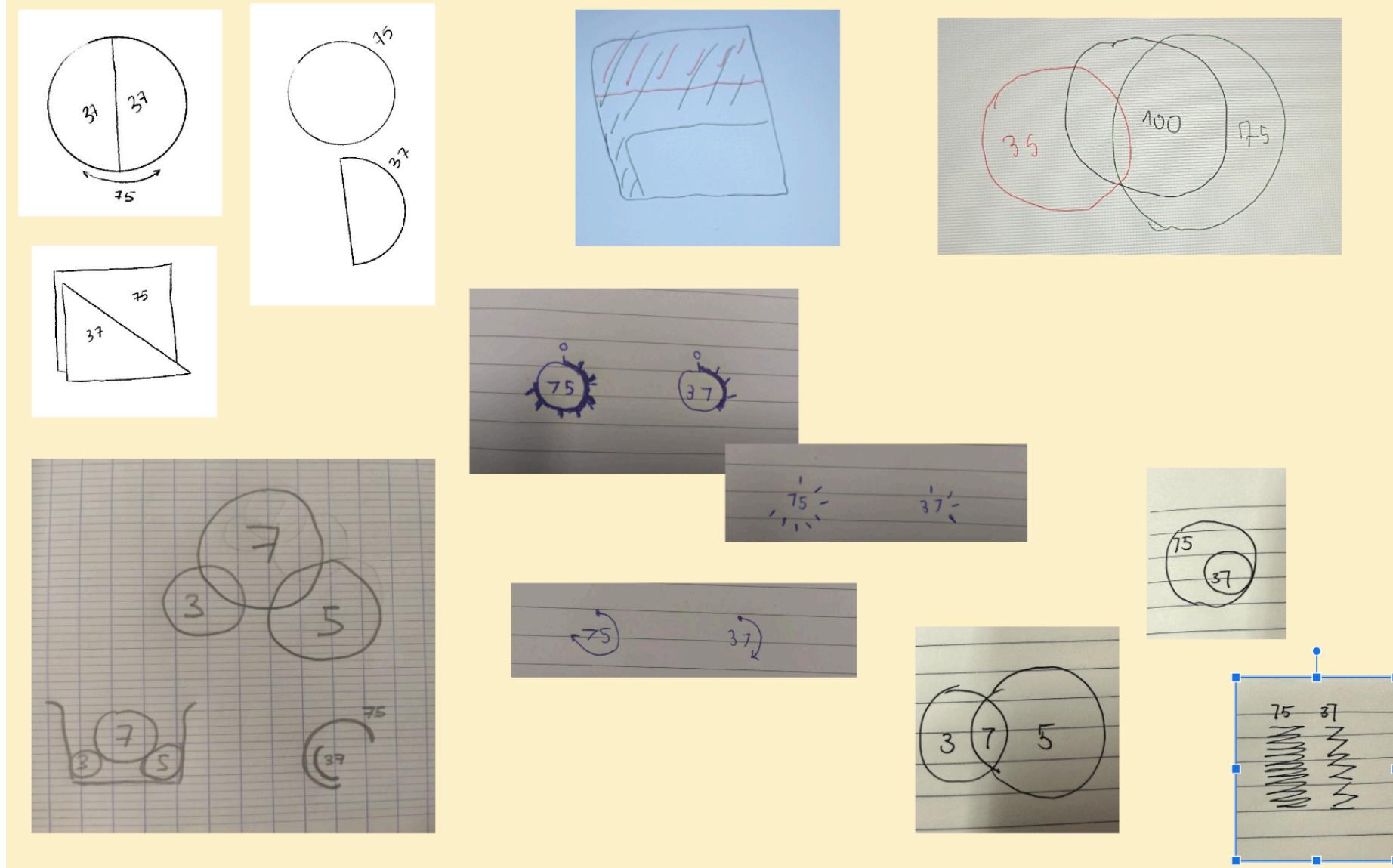
# VARIATIONS OF GLYPHS / UNITS



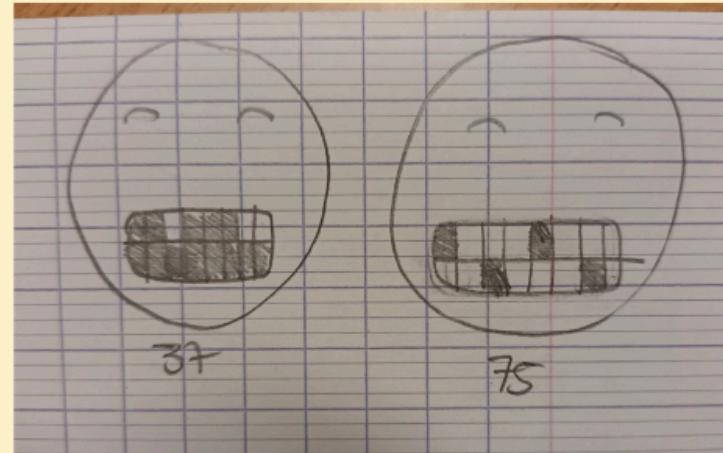
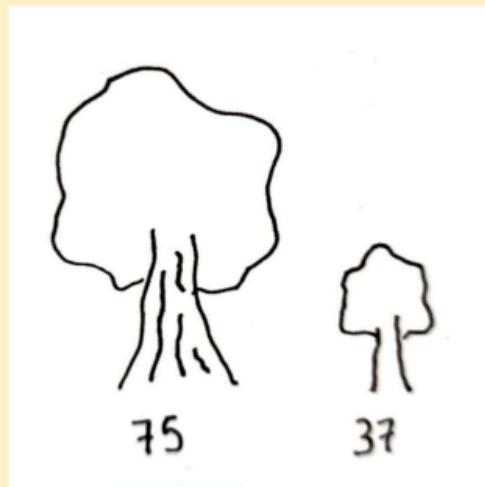
... AND  
MATHS



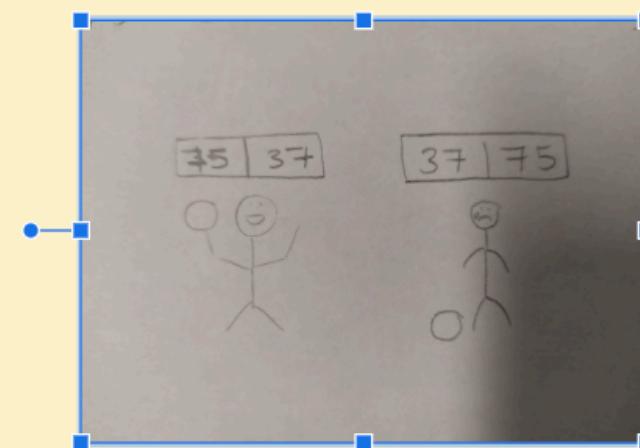
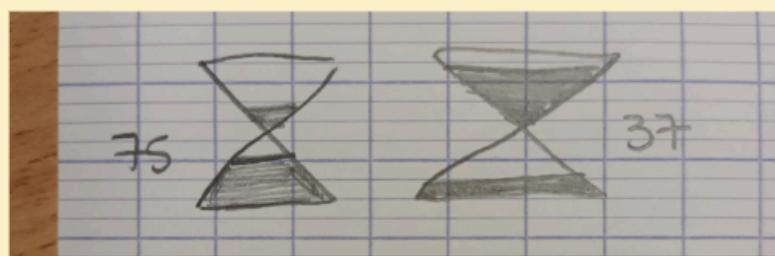
# VARIATIONS OF AREAS OR ANGLES



# VARIATIONS OF METAPHORS



can relate  
to area or  
units



# VARIATIONS OF DIGITS OR SPECIFIC RELATIONSHIPS

75

375

375

375

375

375

375

375

375

# PHASE 4: INTERNAL DISCUSSION

- Discuss within your group each of these variations
- Select the best variations for each design idea

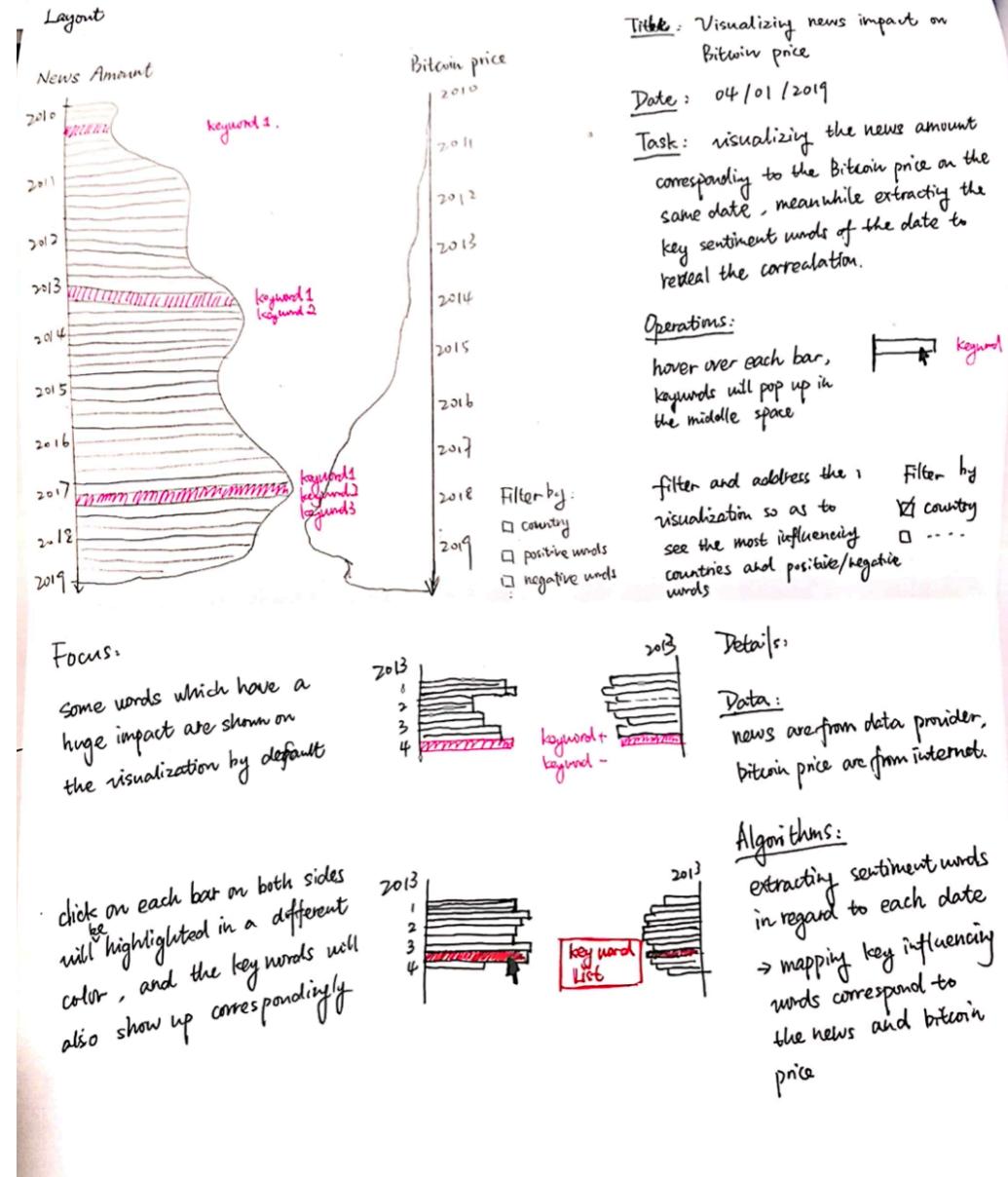
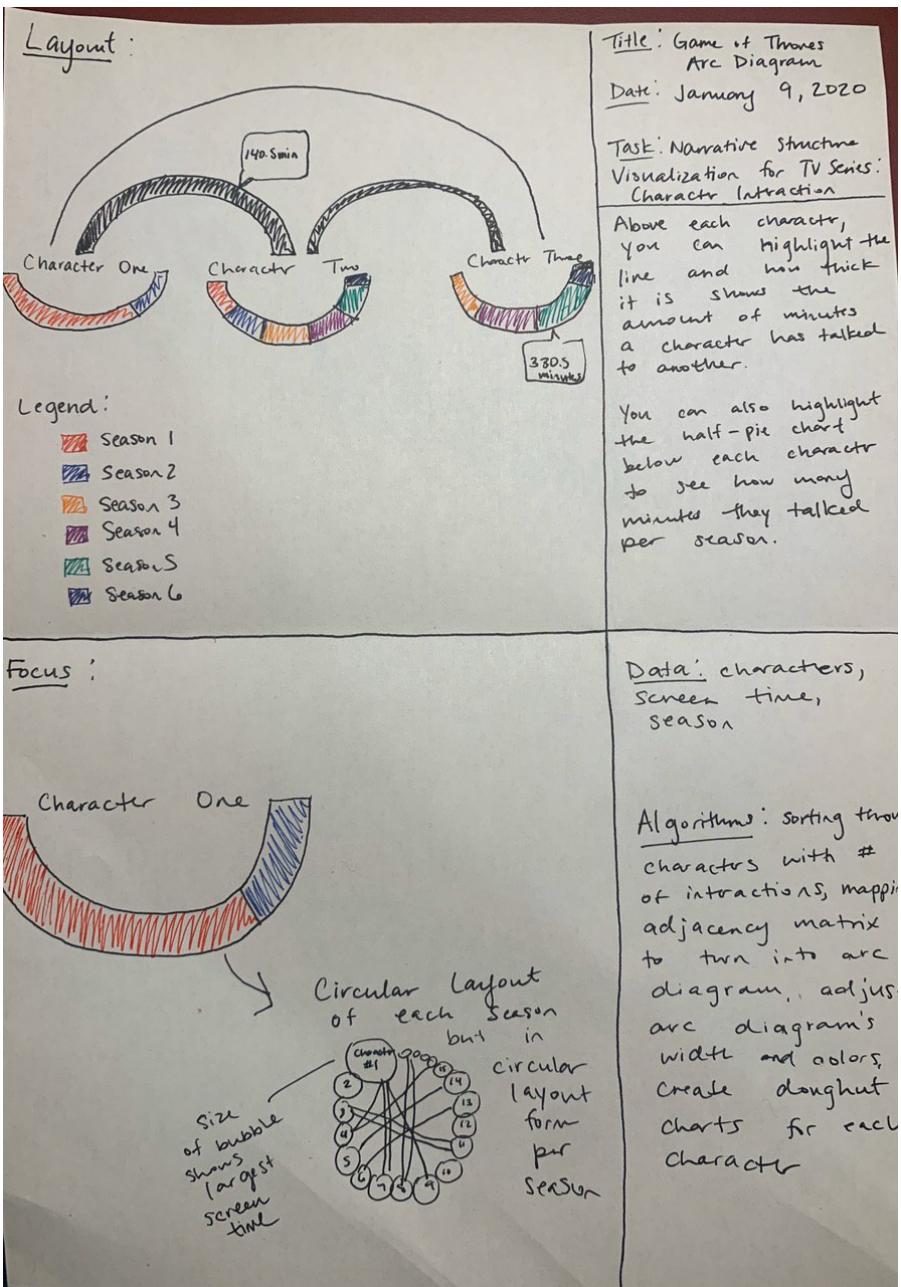
# PICK ONE ...

- on the shared google slide deck
- let's divide into groups for each variation
  - discuss what you like and don't like
- pick one to focus on (does not have to be yours, better if not everyone chooses the same ...)

# NOW RE-SKETCH

- clean your sketch
  - Re-sketch it so others can interpret it. Add a title, some labels, don't add your name

<p><b>Layout</b></p> <p>a version of what the final visualization will look like</p> <p>imagine a sketched screenshot of the main interface</p>	<p>Title: of your tool</p> <p>Date: when sketch created</p> <p>Task: what project are you working on</p> <p><b>Operations</b></p> <p>add a brief description or sketch of how the user interacts with the tool</p>
<p><b>Focus</b></p> <p>focus in on something you think is particularly novel or interesting about your tool</p>	<p><b>Detail</b></p> <p>any specific detail required for your tool</p> <p>e.g. what data do you need, what algorithms you need to write, what metrics you need to define,...</p>



## Layout

a version of what the final visualization will look like

imagine a sketched screenshot of the main interface

Title:  
of your tool  
Date:  
when sketch created  
Task:  
what project are you working on

### Operations

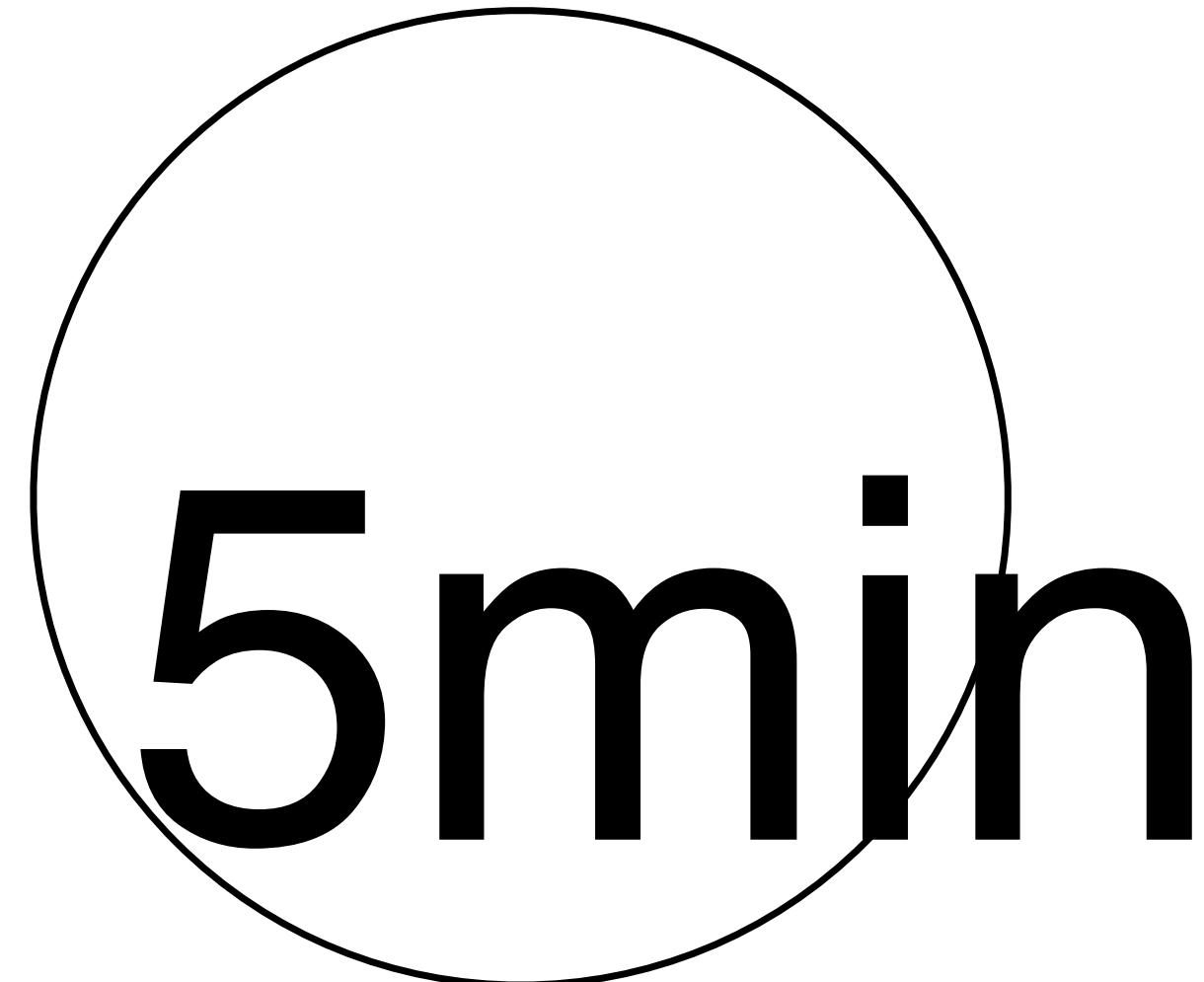
add a brief description or sketch of how the user interacts with the tool

## Focus

focus in on something you think is particularly novel or interesting about your tool

## Detail

any specific detail required for your tool  
e.g. what data do you need, what algorithms you need to write, what metrics you need to define,...



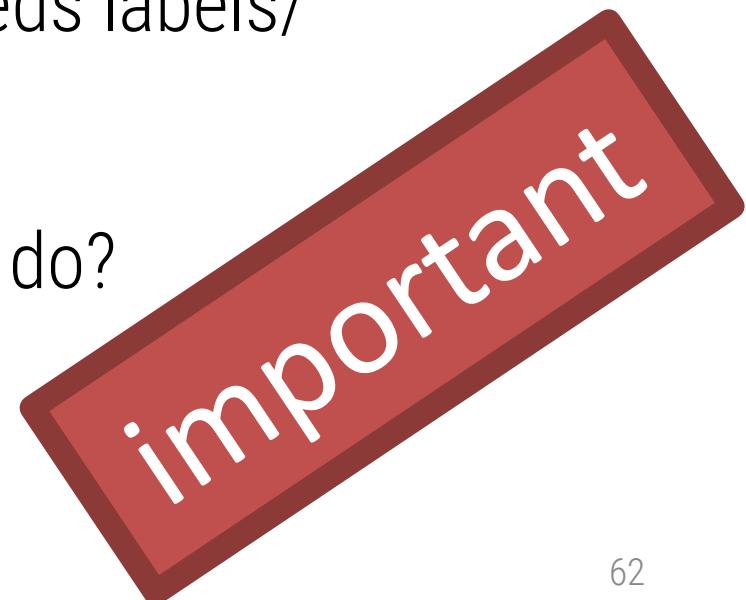
# UPLOAD YOUR FINAL SKETCHES

- on the shared slides
- let's go there and discuss the level of detail and clarity

# FINAL SKETCHES

Things to look out for:

- What are the tasks people can do with your representation?
  - What *questions* can they answer? You may find more than the one you designed it for
- What information may be unclear (and needs labels/annotations to explain)?
  - Hidden assumptions / choices
- What operations (interactions) can people do?
  - These can affect the tasks.
- What is interesting / new (focus)?
- Don't forget the title!



# WHAT WE JUST DID: 10 PLUS 10 TECHNIQUE (... 2 PLUS 2)

- Generate 10 sketches individually that relate to the design problem (individually) (10 mins)
  - These sketches must be meaningfully different (i.e. avoid variations on the same idea)
  - Take risks: do not limit yourself to the realities of “today”
  - Avoid judging the quality of these ideas now; the point is to get diversity
- Discuss within your group each of the design ideas represented in the sketches, then select the most promising 3 design ideas (10 mins)
- Using these promising design ideas, generate each an additional 10 sketches that are variations of these 3 design ideas (20 mins)
- Discuss within your group each of these variations, and select the 2 best variations for each design idea (5 mins)
- Re-sketch the best ideas, present and discuss (5 mins for each presentation, plus 5 mins of discussion - the Re-sketching time depends on the complexity of the interface)

# **SKETCHING ASSIGNMENT**

you are asked to deliver some sketches (we ask for final results)  
consider using the 10+10 methodology (or a reduced version, eg 5+5) to produce them

... also, you will be asked to provide feedback to sketches of others !!!

# YOUR NEXT ASSIGNMENT

- Due on THURSDAY
- brainstorming session (spend 1h together)
  - sketch ideas, each on single sheet of paper
  - Sketch at least 5 ideas each, discuss
  - Pick your favorite ones (1 per student in team)
  - (optional) Create 5 variations of your favorites each, discuss
  - Pick your favorite idea
  - Each person get one idea. Re-sketch it so others can interpret it. Add a title, some labels, don't add your name
  - Submit

# GENERAL ADVICE

Get to know your data first

- what attributes are included? How do the attributes relate to each other?
- what are the types of attributes included?
- can I derive new attributes from the existing attributes?
- what questions does the data trigger in you? Write them down. These can motivate your sketches (the equivalent of “relationship between 75 and 37”)

# ANOTHER ASSIGNMENT

Later this week (Friday) you will also receive another assignment :

Provide feedback to the sketch(es) of other students.

This contributes to your grade

# LESSONS FROM 10 PLUS 10

- 10+10 is a great technique for brainstorming
- This is a great way to “unstick” yourself if you feel stuck on a design problem.
- **Note:** there are phases where you discuss with others—in principle, you can do this on your own.
- But, one thing to remember is that it is always valuable to discuss the sketches with others—forces you to communicate something, and forces you to be concrete.

# COMPLETE 10 PLUS 10 GUIDE

- (just a summary)

# PROCESS

- brainstorming session (spend 1h together)
  - sketch ideas, each on single sheet of paper
  - Sketch at least 10 ideas, discuss
  - Pick your favourite one (1 per person in team)
  - Create 10 variations of your favourite (each), discuss
  - Pick your favourite idea
  - Re-sketch it so others can interpret it. Add a title, some labels, don't add your name. Use the template.
  - Present to your team and/or others for feedback

# 10 PLUS 10 TECHNIQUE

- the 10 plus 10 technique is a great way to generate ideas,  
PLUS refine those ideas
- This is a technique that you can use in generating ideas/  
refining them for the purpose of a visualization project

# 10 PLUS 10 TECHNIQUE

- Generate 10 sketches individually that relate to the design problem (individually) (10 mins)
  - These sketches must be meaningfully different (i.e. avoid variations on the same idea)
  - Take risks: do not limit yourself to the realities of “today”
  - Avoid judging the quality of these ideas now; the point is to get diversity
- Discuss within your group each of the design ideas represented in the sketches, then select the most promising 3 design ideas (10 mins)
- Using these promising design ideas, generate each an additional 10 sketches that are variations of these 3 design ideas (20 mins)
- Discuss within your group each of these variations, and select the 2 best variations for each design idea (5 mins)
- Present these best ideas to the class and discuss (5 mins for each presentation, plus 5 mins of discussion)

# PHASE 1: MAKE 10 SKETCHES (30 MINS)

Generate 10 sketches **individually** that relate to the design problem

- These sketches must be meaningfully different (i.e. avoid variations on the same idea)
- *Take risks: do not limit yourself to the things you know how to implement.*
- Avoid judging the quality of these ideas now; the point is to get diversity

# PHASE 2: INTERNAL DISCUSSION (5MINS)

- Discuss within your group each of the design ideas represented in the sketches
- Select the most promising 3 design ideas (for your assignment it is one per student)

# PHASE 3: “PLUS 10” (10 MINS)

- Using the 3 promising design ideas, generate an additional 10 sketches that are variations of these 3 design ideas
- On a per-person basis, it might be best to stick to one of the design ideas

# PHASE 4: INTERNAL DISCUSSION

## 5MINS

- Discuss within your group each of these variations
- Select the 2 best variations for each design idea

## PHASE 5: PRESENT (5 MINS/GROUP)

Present these best ideas and discuss (5 mins for each presentation, plus 5 mins of discussion)

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