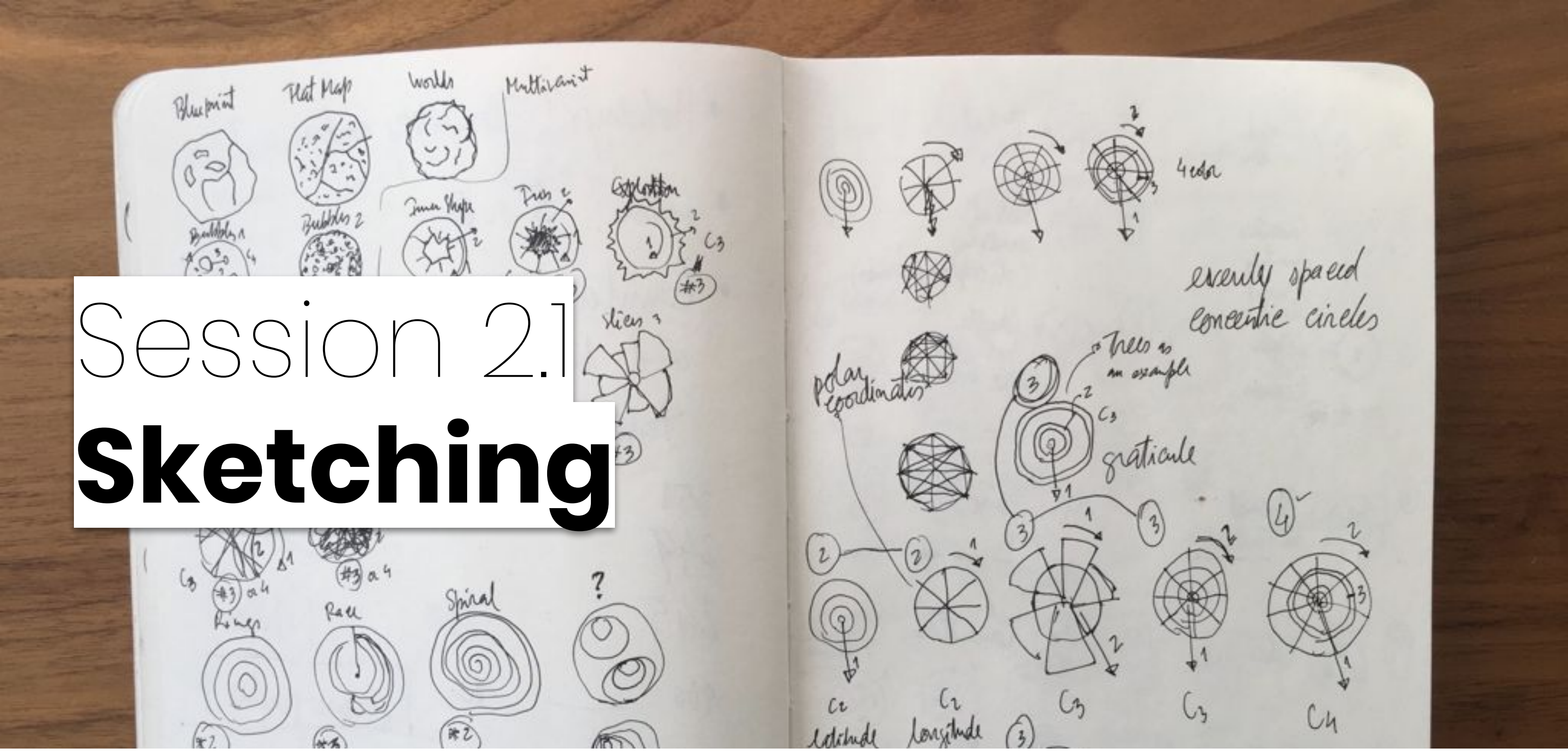
Blueprint
Flat Map
Worlds
Multivariate
Bubbles 1
Bubbles 2
Spiral
?
evenly spaced concentric circles
polar coordinates
here as an example
graticule
latitude
longitude
C3
C4

Session 2.1
Sketching

Online Course
Data Visualization for Professionals

THE UNIVERSITY of EDINBURGH

Benjamin Bach
June 2020
http://benjbach.me
https://datavis-online.github.io

-- Not for external use --

In a nutshell

1. What sketching is about?
2. Why do we need sketching for visualization?
3. What do we sketch?
4. How do we sketch?

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In a nutshell

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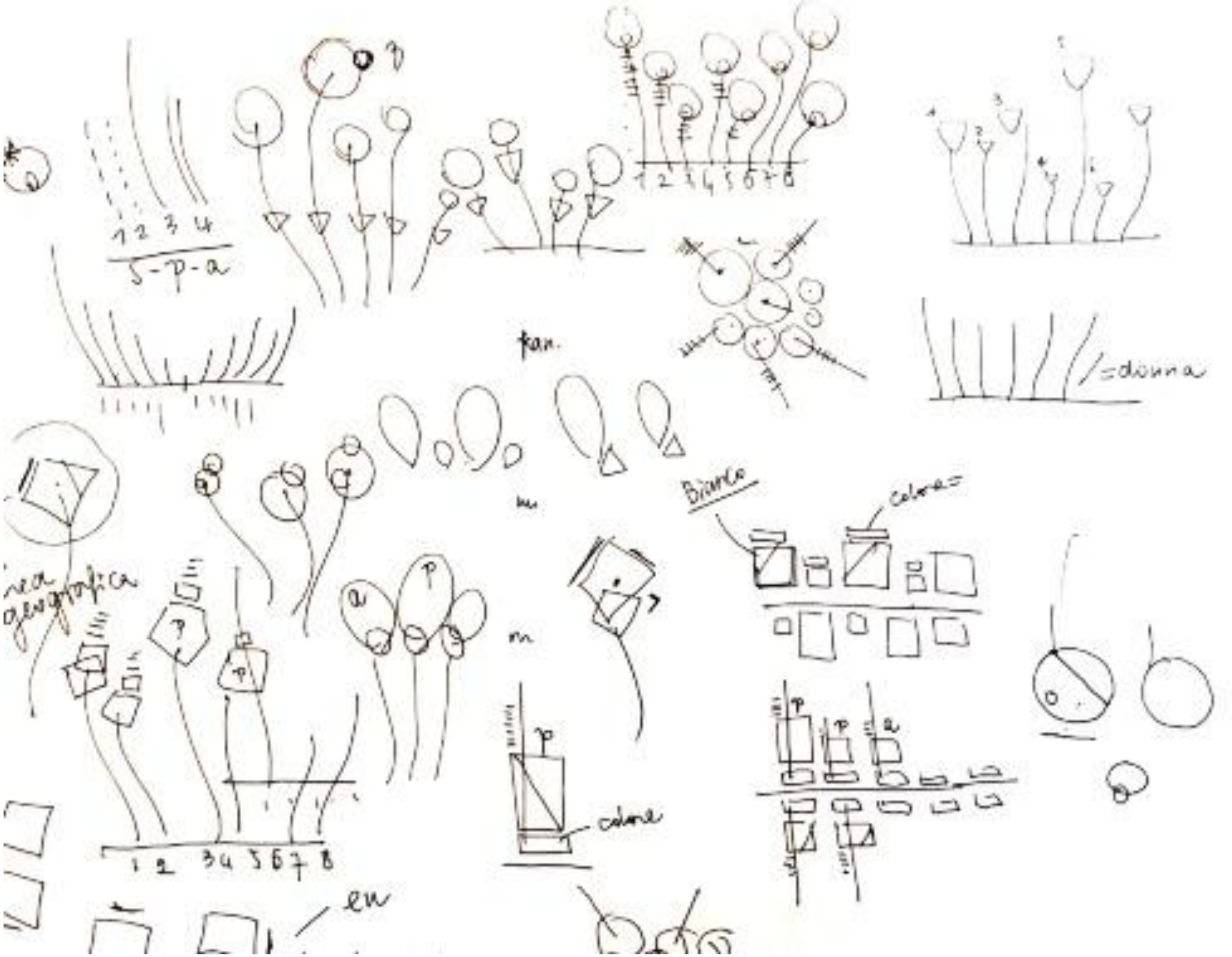
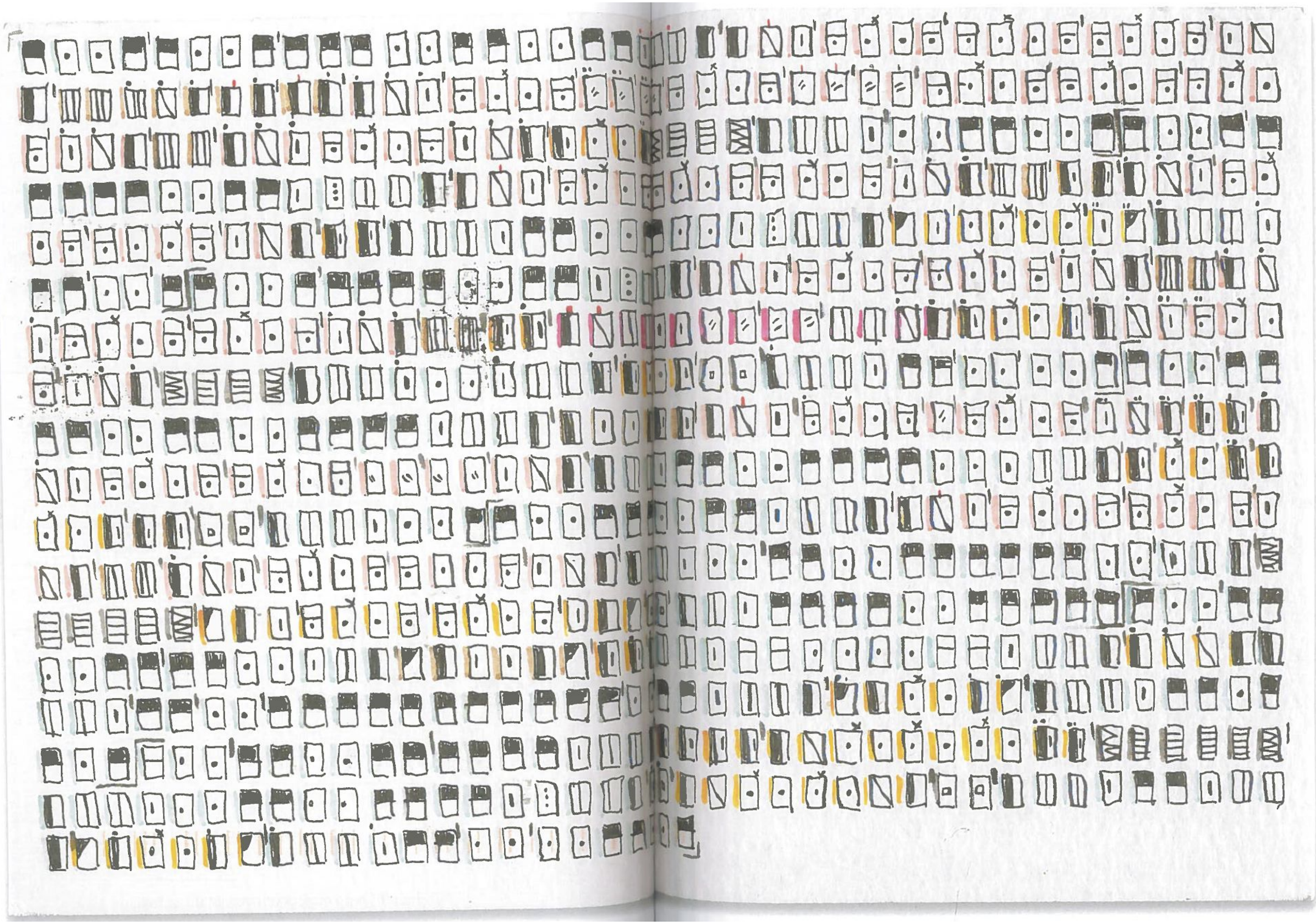
Idea Generation *Doodles*

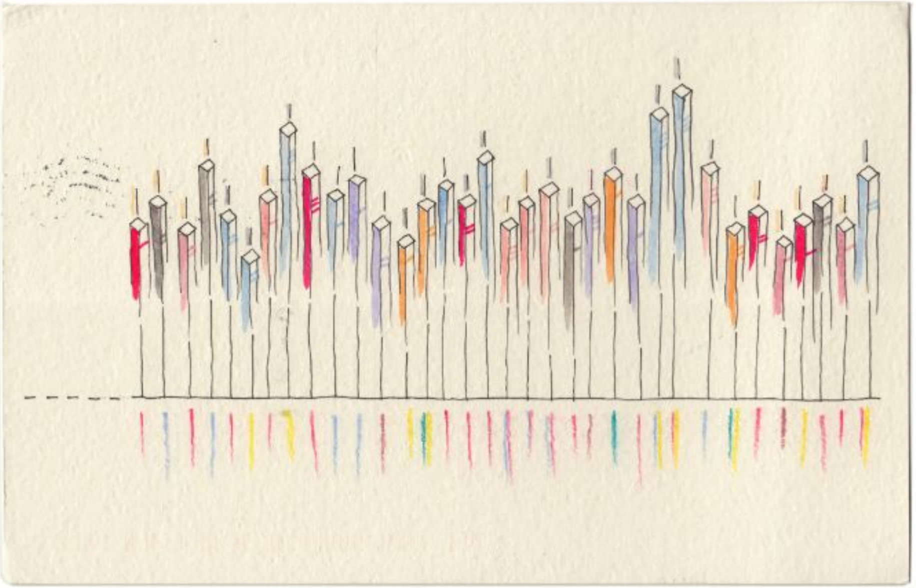

1 2 3 4
5 - p - a
1 2 3 4 5 6 7 8
=donna
Bianco
colore
p
a
p
p
p
p
a
colore
1 2 3 4 5 6 7 8
en

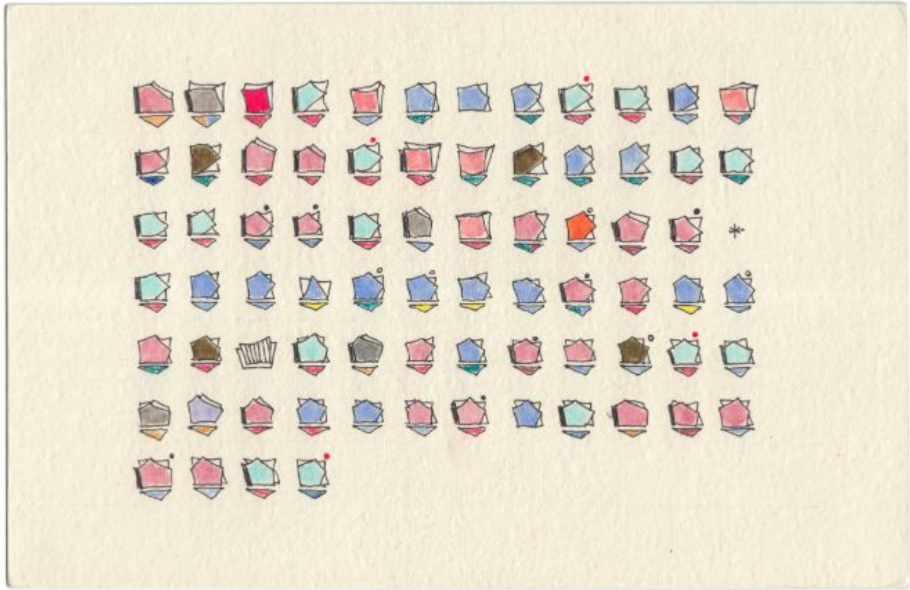
Visual Marks & Glyphs

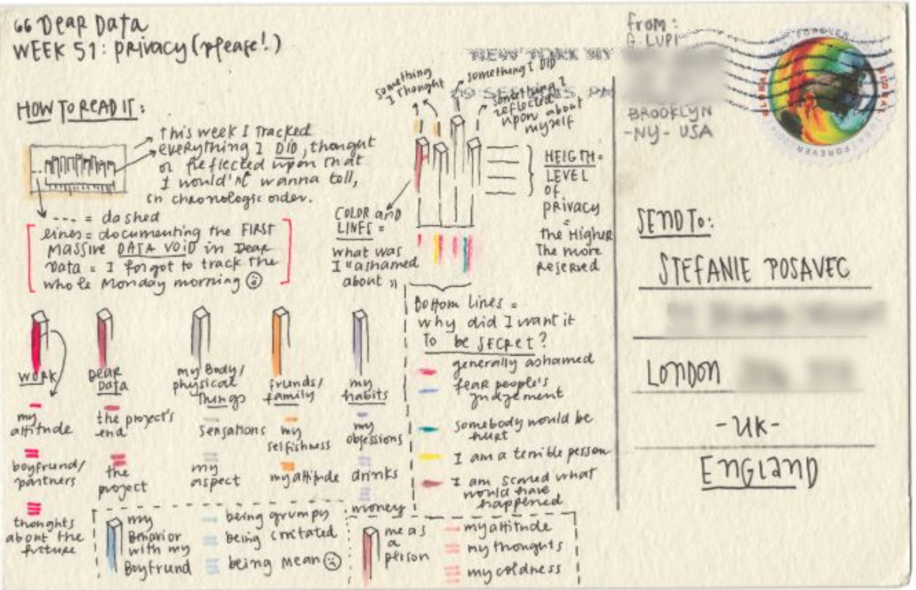


http://www.dear-data.com

Visual Language *Dear Data*







66 Dear Data
WEEK 51: privacy (please!)

HOW TO READ IT:

This week I tracked everything I DID, thought or reflected upon that I wouldn't wanna tell, in chronologic order.

--- = dashed lines = documenting the FIRST MASSIVE DATA VOID in Dear Data = I forgot to track the whole Monday morning ☹

something I thought

something I DID

something I reflected upon about myself

HEIGTH = LEVEL of privacy = the Higher the more reserved

COLOR and LINES = what was I "ashamed about"

Bottom lines = why did I want it to be SECRET?

- generally ashamed
- fear people's judgement
- somebody would be hurt
- I am a terrible person
- I am scared what would have happened

WORK
- my attitude
- boyfriend/partners
- thoughts about the future

Dear Data
- the project's end
- the project

my Body/physical Things
- sensations
- my aspect

friends/family
- my selfishness
- my attitude

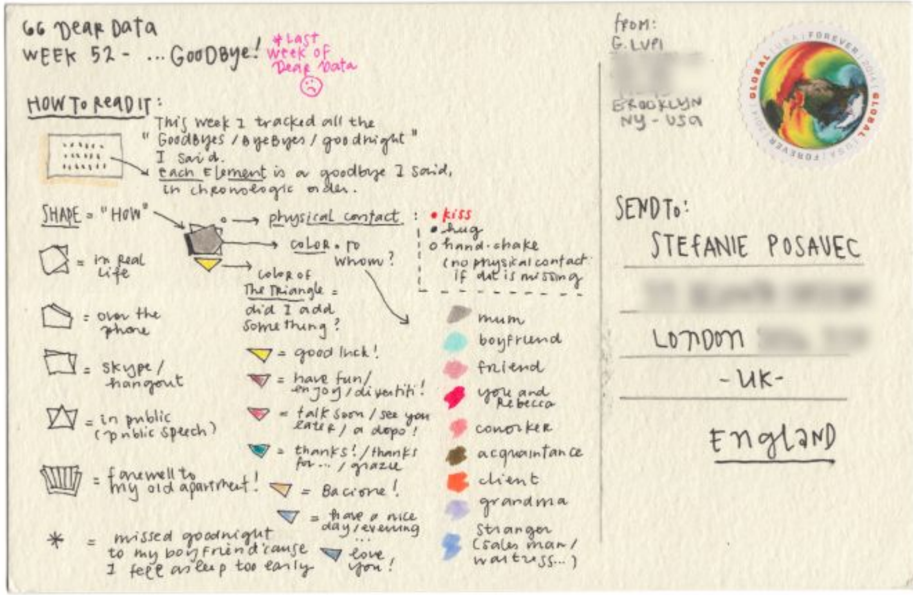
my habits
- my obsessions
- drinks
- money

my Behavior with my Boyfriend
- being grumpy
- being irritated
- being mean ☹

me as a person
- my attitude
- my thoughts
- my coldness

from:
G. LUPI
[redacted]
BROOKLYN
-NY- USA

SEND To:
STEFANIE POSAVEC
[redacted]
LONDON [redacted]
-UK-
England



66 Dear Data
WEEK 52 - ...GoodBye! *Last week of Dear Data ☹

HOW TO READ IT:

This week I tracked all the "Goodbyes / ByeByes / goodnight" I said.
each Element is a goodbye I said, in chronologic order.

SHAPE = "HOW"
- = in Real Life
- = over the phone
- = Skype / hangout
- = in public (public speech)
- = farewell to my old apartment!

● → physical contact:
- ● kiss
- ● hug
- ○ hand-shake
- (no physical contact if dot is missing)

COLOR = to whom?
- mum
- boyfriend
- friend
- you and Rebecca
- coworker
- acquaintance
- client
- grandma
- stranger (sales man / waitress...)

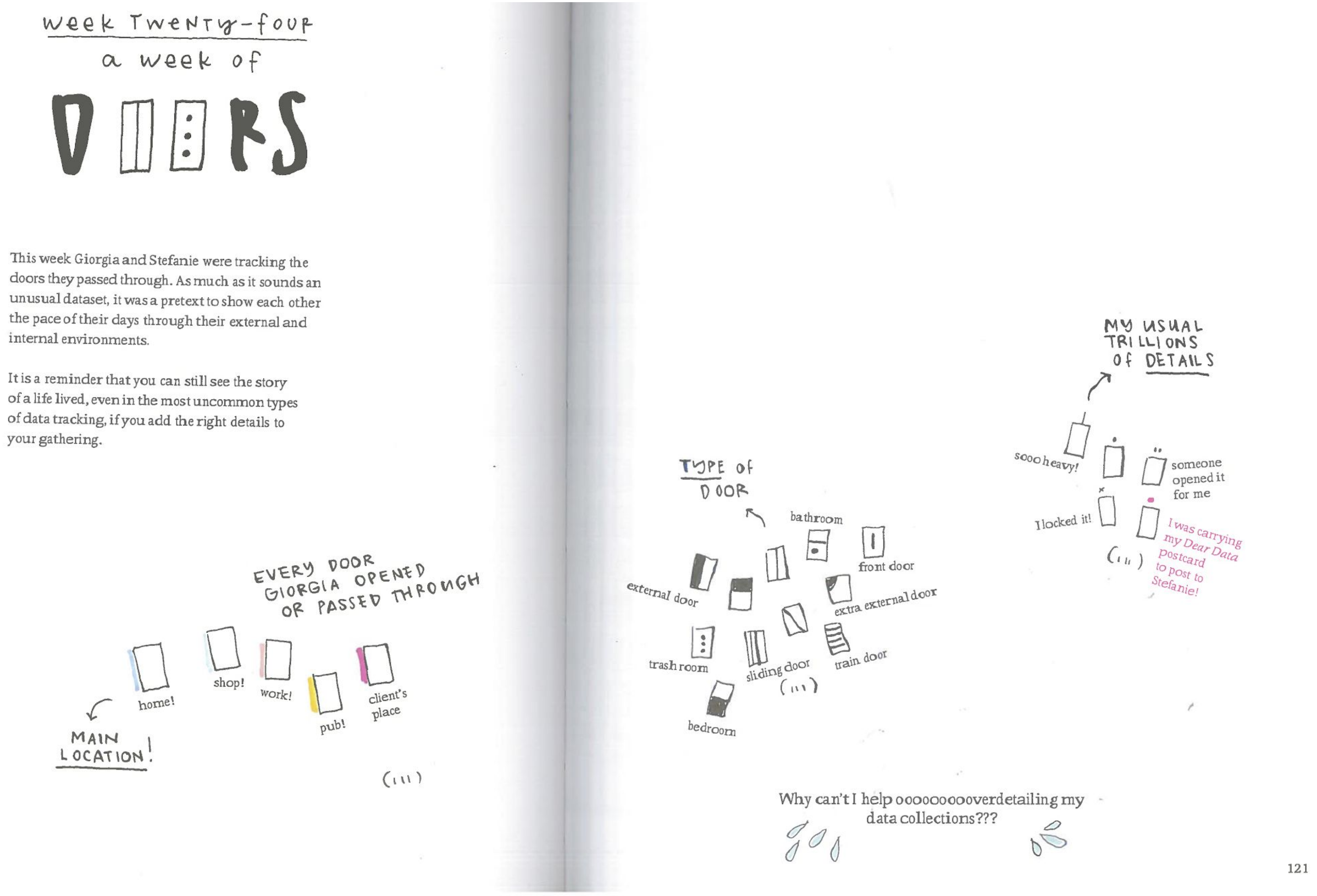
color of The Triangle = did I add something?
- ▽ = good luck!
- ▽ = have fun / enjoy / divertiti!
- ▽ = talk soon / see you later / a dopo!
- ▽ = thanks! / thanks for... / grazie
- ▽ = Bacione!
- ▽ = have a nice day / evening ...
- ▽ love you!

* = missed goodnight to my boyfriend 'cause I fell asleep too early

from:
G. LUPI
[redacted]
BROOKLYN
NY - USA

SEND To:
STEFANIE POSAVEC
[redacted]
LONDON [redacted]
-UK-
England

Visual Marks & Glyphs



week Twenty-four

a week of

DOORS

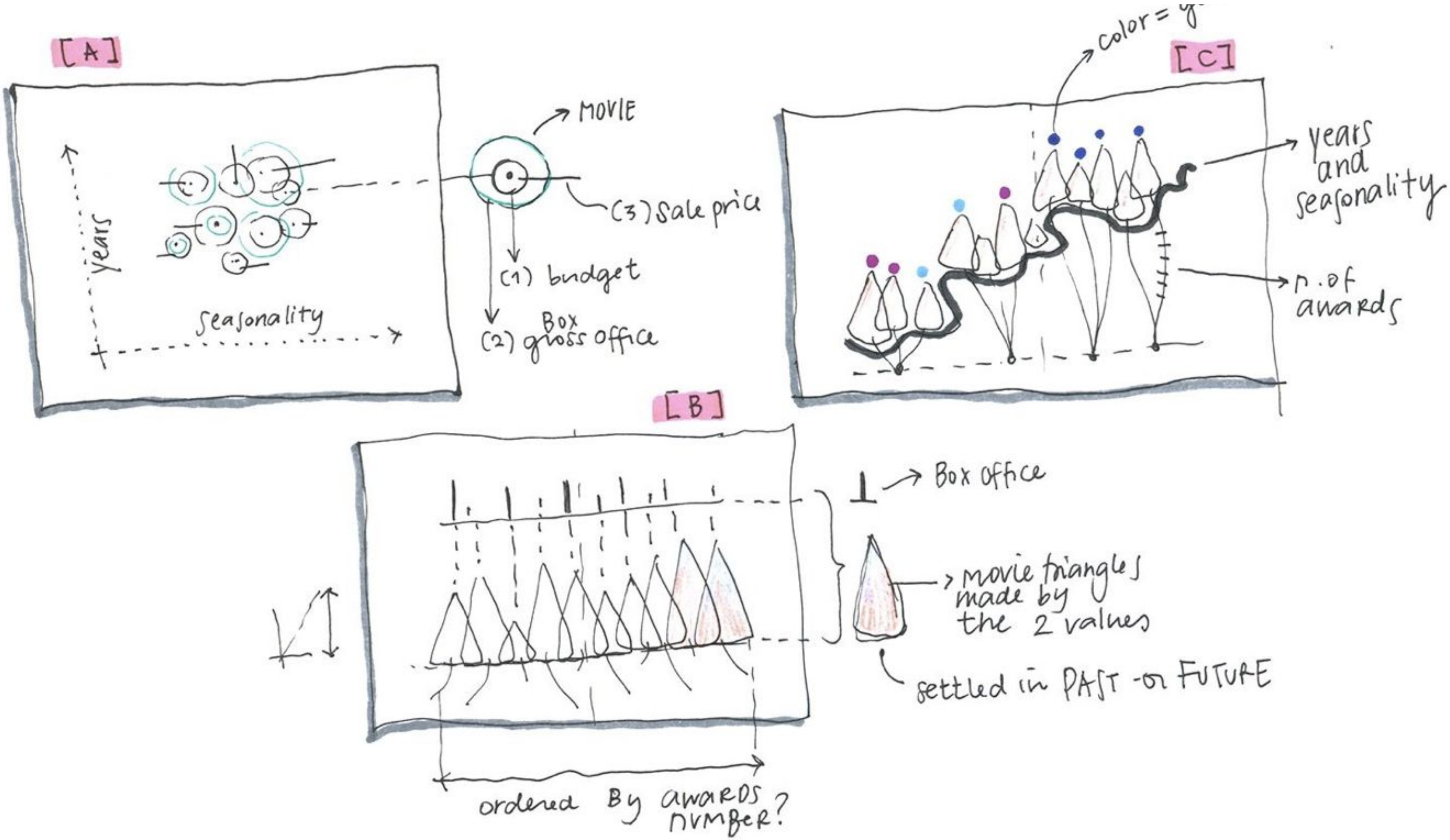
This week Giorgia and Stefanie were tracking the doors they passed through. As much as it sounds an unusual dataset, it was a pretext to show each other the pace of their days through their external and internal environments.

It is a reminder that you can still see the story of a life lived, even in the most uncommon types of data tracking, if you add the right details to your gathering.

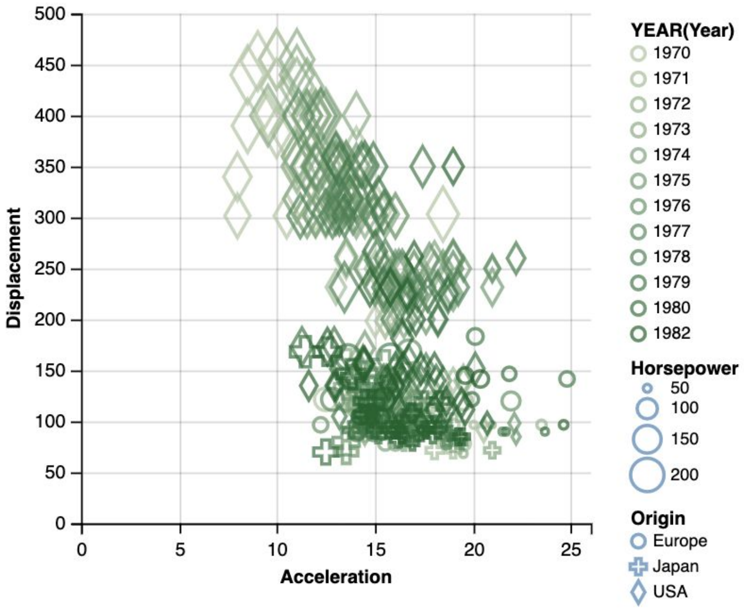
EVERY DOOR GIORGIA OPENED OR PASSED THROUGH
home!
shop!
work!
pub!
client's place
MAIN LOCATION!
(...)
TYPE OF DOOR
bathroom
front door
external door
extra external door
trash room
sliding door
train door
bedroom
(...)
MY USUAL TRILLIONS OF DETAILS
sooo heavy!
someone opened it for me
I locked it!
I was carrying my Dear Data postcard to post to Stefanie!
(...)
121

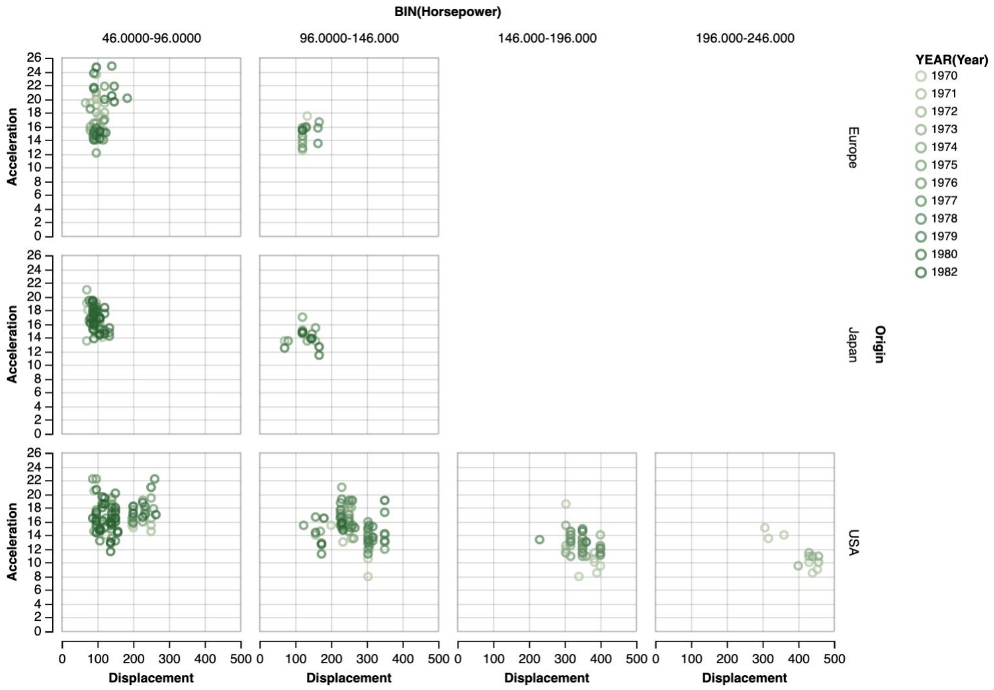
Why can't I help ooooooooverdetailing my data collections???

Visualizations


[A]
years
seasonality
MOVIE
(3) sale price
(1) budget
(2) Box gross office
color =
[C]
years and seasonality
n. of awards
[B]
Box office
movie triangles made by the 2 values
settled in PAST or FUTURE
ordered By awards number?

Visualizations: *Complex vs. multiples?*

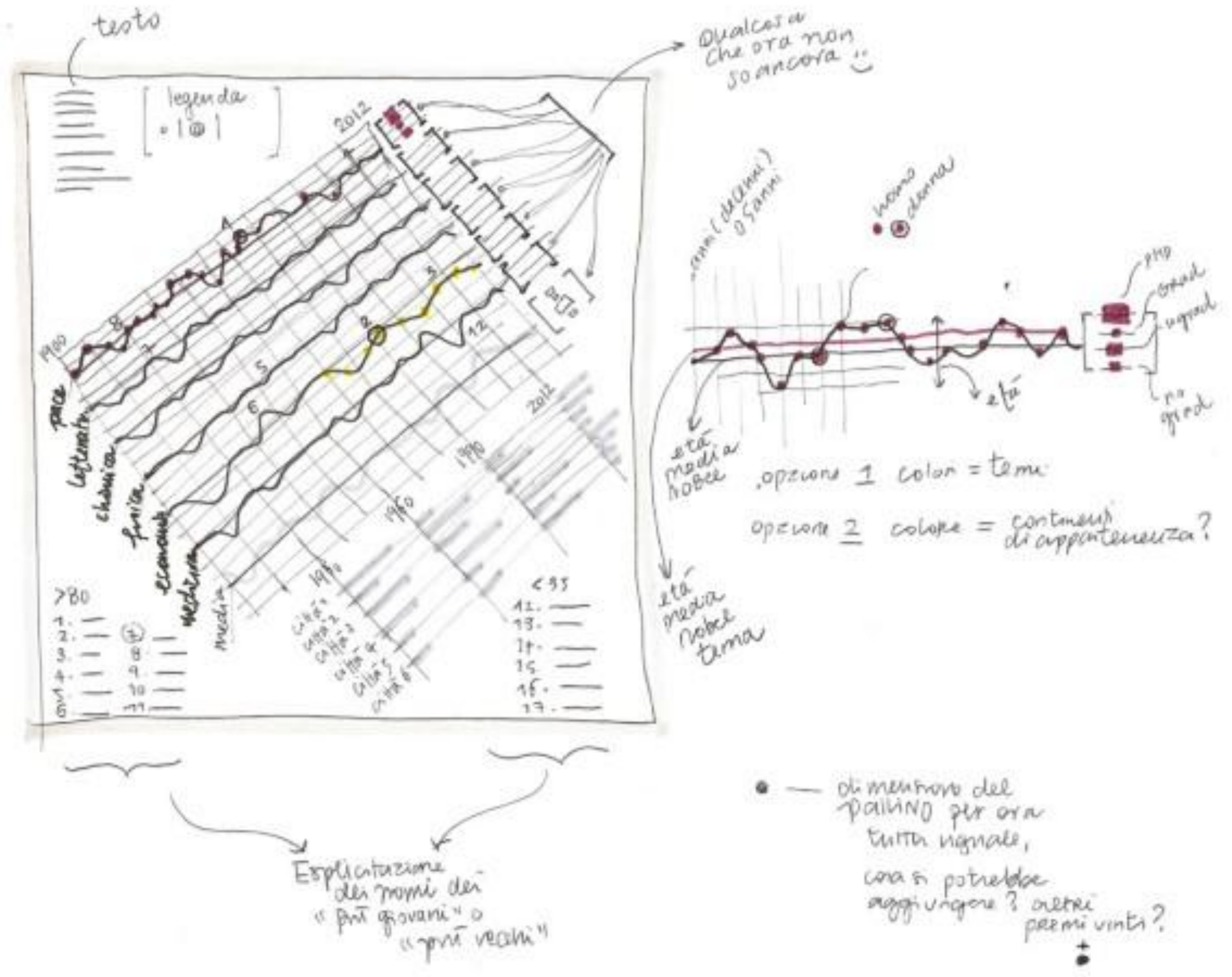




High ← → *Low*

Information density

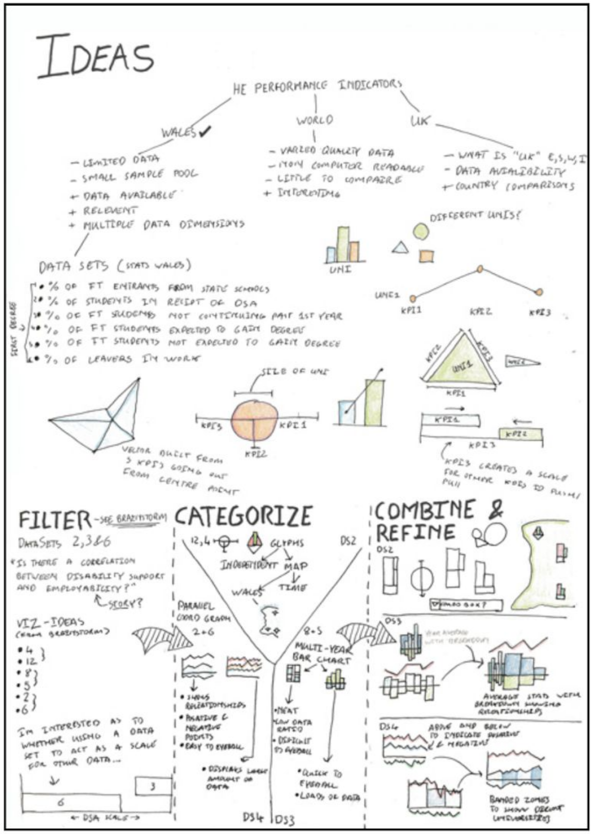
Structure


testo
legenda
2012
Qualcosa che ora non so ancora :)
1900
pace
letteratura
chimica
fisica
economia
medicina
media
1990
1960
2012
>80
<33
anni (decenni) o 5 anni
uomo
donna
PhD
grad
ungrad
no grad
età
età media nobel
età media nobel tema
opzione 1 color = tema
opzione 2 colore = continente di appartenenza?
Esplicitazione dei nomi dei «più giovani» o «più vecchi»
● — dimensione del pallino per ora tutta uguale, cosa si potrebbe aggiungere? altri premi vinti?

- Visualizations
- Space
- Layout
- Titles
- Legends
- Text
- Color schemes
- Pictures
- ...

(c) Accurat: Giorgia Lupi

Views and Layouts


IDEAS
HE PERFORMANCE INDICATORS
WALES ✓
WORLD
UK
DIFFERENT UNIS?
UNI
UNI1
KPI1
KPI2
KPI3
SIZE OF UNI
KPI3
KPI1
KPI2
UNI1
KPI1
KPI2
KPI3
FIRST DEGREE
12,4
GLYPHS
INDEPENDENT
MAP
WALES
TIME
DS2
PARALLEL COORD GRAPH
2+6
8+5
MULTI-YEAR BAR CHART
DS4
DS3
COMBINE & REFINE
DS2
DROPDOWN BOX?
DS3
YEAR AVERAGE WITH BREAKDOWN
DS4
6
3
← DSA SCALE →

IDEAS

HE PERFORMANCE INDICATORS

WALES ✓
- − LIMITED DATA
- − SMALL SAMPLE POOL
- + DATA AVAILABLE
- + RELEVENT
- + MULTIPLE DATA DIMENSIONS

WORLD
- − VARIED QUALITY DATA
- − NON COMPUTER READABLE
- − LITTLE TO COMPARE
- + INTERESTING

UK
- − WHAT IS "UK" E,S,W,I
- − DATA AVAILABILITY
- + COUNTRY COMPARISONS

DATA SETS (STATS WALES)
1. % OF FT ENTRANTS FROM STATE SCHOOLS
2. % OF STUDENTS IN RECEIPT OF DSA
3. % OF FT STUDENTS NOT CONTINUING PAST 1ST YEAR
4. % OF FT STUDENTS EXPECTED TO GAIN DEGREE
5. % OF FT STUDENTS NOT EXPECTED TO GAIN DEGREE
6. % OF LEAVERS IN WORK

VECTOR BUILT FROM 3 KPIS GOING OUT FROM CENTRE POINT

KPI3 CREATES A SCALE FOR OTHER KPIS TO PUSH/PULL

FILTER - SEE BRAINSTORM

DATASETS 2,3&6

"IS THERE A CORRELATION BETWEEN DISABILITY SUPPORT AND EMPLOYABILITY?" ← STORY?

VIZ-IDEAS (FROM BRAINSTORM)
- 4, 12
- 8, 5
- 2, 6

I'M INTERESTED AS TO WHETHER USING A DATA SET TO ACT AS A SCALE FOR OTHER DATA...

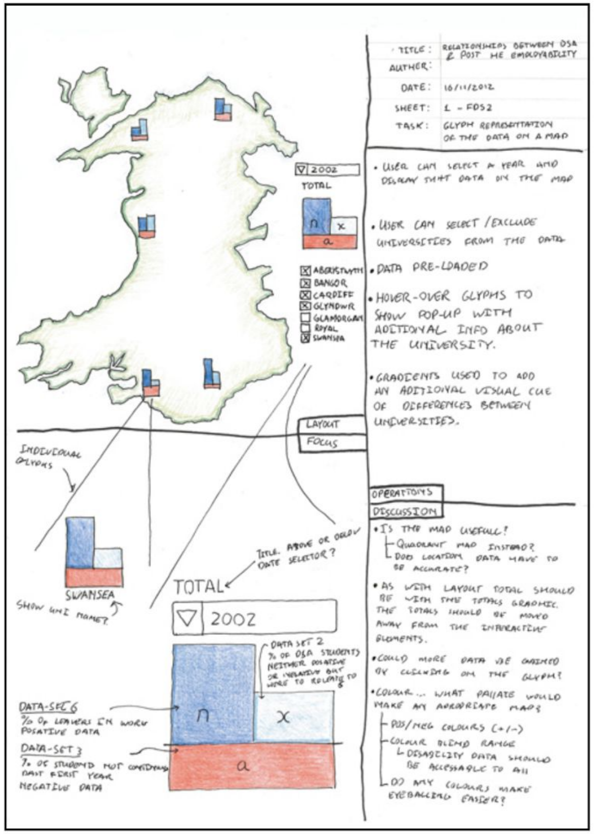
CATEGORIZE
- SHOWS RELATIONSHIPS
- POSITIVE & NEGATIVE POINTS
- EASY TO EYEBALL
- DISPLAYS LARGE AMOUNT OF DATA
- NEAT
- LOW DATA RATIO
- DIFFICULT TO EYEBALL
- QUICK TO EYEBALL
- LOADS OF DATA

COMBINE & REFINE

AVERAGE STATS WITH BREAKDOWN SHOWING RELATIONSHIPS

ABOVE AND BELOW TO INDICATE POSITIVE & NEGATIVE

BANDED ZONES TO SHOW DIFFERENT UNIVERSITIES


▽ 2002
TOTAL
n
x
a
☒ ABERYSTWYTH
☒ BANGOR
☒ CARDIFF
☒ GLYNDWR
☐ GLAMORGAN
☐ ROYAL
☒ SWANSEA
LAYOUT
FOCUS
INDIVIDUAL GLYPHS
SWANSEA
SHOW UNI NAME?
TITLE. ABOVE OR BELOW DATE SELECTOR?
TOTAL
▽ 2002
n
x
a

DATA SET 2: % OF DSA STUDENTS NEITHER POSITIVE OR NEGATIVE BUT WERE TO RELATE TO 5

DATA-SET 6: % OF LEAVERS IN WORK POSATIVE DATA

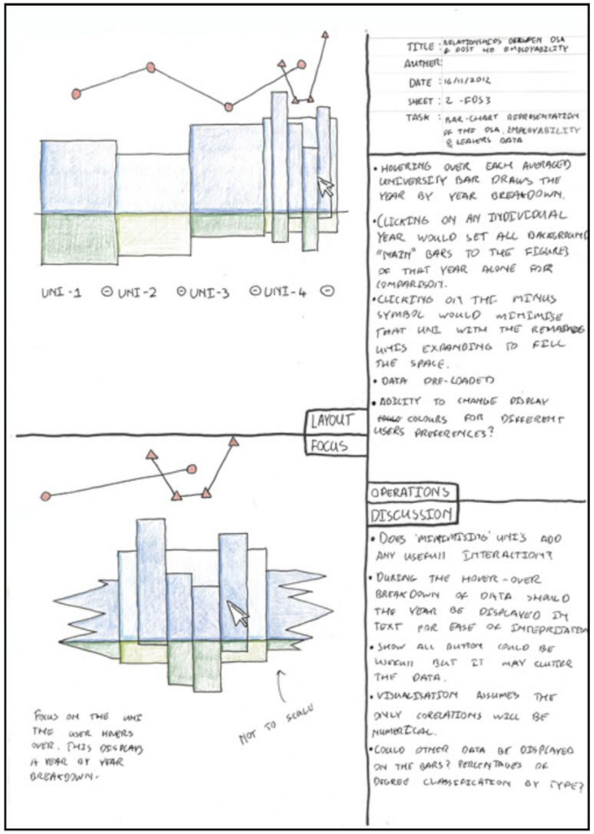
DATA-SET 3: % OF STUDENTS NOT CONTINUING PAST FIRST YEAR NEGATIVE DATA

TITLE: RELATIONSHIPS BETWEEN DSA & POST HE EMPLOYABILITY
AUTHER:
DATE: 16/11/2012
SHEET: 1 - FDS2
TASK: GLYPH REPRESENTATION OF THE DATA ON A MAP

- USER CAN SELECT A YEAR AND DISPLAY THAT DATA ON THE MAP
- USER CAN SELECT / EXCLUDE UNIVERSITIES FROM THE DATA
- DATA PRE-LOADED
- HOVER-OVER GLYPHS TO SHOW POP-UP WITH ADITIONAL INFO ABOUT THE UNIVERSITY.
- GRADIENTS USED TO ADD AN ADITIONAL VISUAL CUE OF DIFFERENCES BETWEEN UNIVERSITIES.

OPERATIONS

DISCUSSION
- IS THE MAP USEFULL?
  - QUADRANT MAP INSTEAD?
  - DOES LOCATION DATA HAVE TO BE ACCURATE?
- AS WITH LAYOUT TOTAL SHOULD BE WITH THE TOTALS GRAPHIC. THE TOTALS SHOULD BE MOVED AWAY FROM THE INTERACTIVE ELEMENTS.
- COULD MORE DATA BE GAINED BY CLICKING ON THE GLYPH?
- COLOUR... WHAT PALLATE WOULD MAKE AN APPROPRIATE MAP?
  - POS/NEG COLOURS (+/-)
  - COLOUR BLEND RANGE
    - DISABILITY DATA SHOULD BE ACCESSABLE TO ALL
  - DO ANY COLOURS MAKE EYEBALLING EASIER?


UNI-1 ⊖
UNI-2 ⊖
UNI-3 ⊖
UNI-4 ⊖
LAYOUT
FOCUS
NOT TO SCALE

FOCUS ON THE UNI THE USER HOVERS OVER. THIS DISPLAYS A YEAR BY YEAR BREAKDOWN.

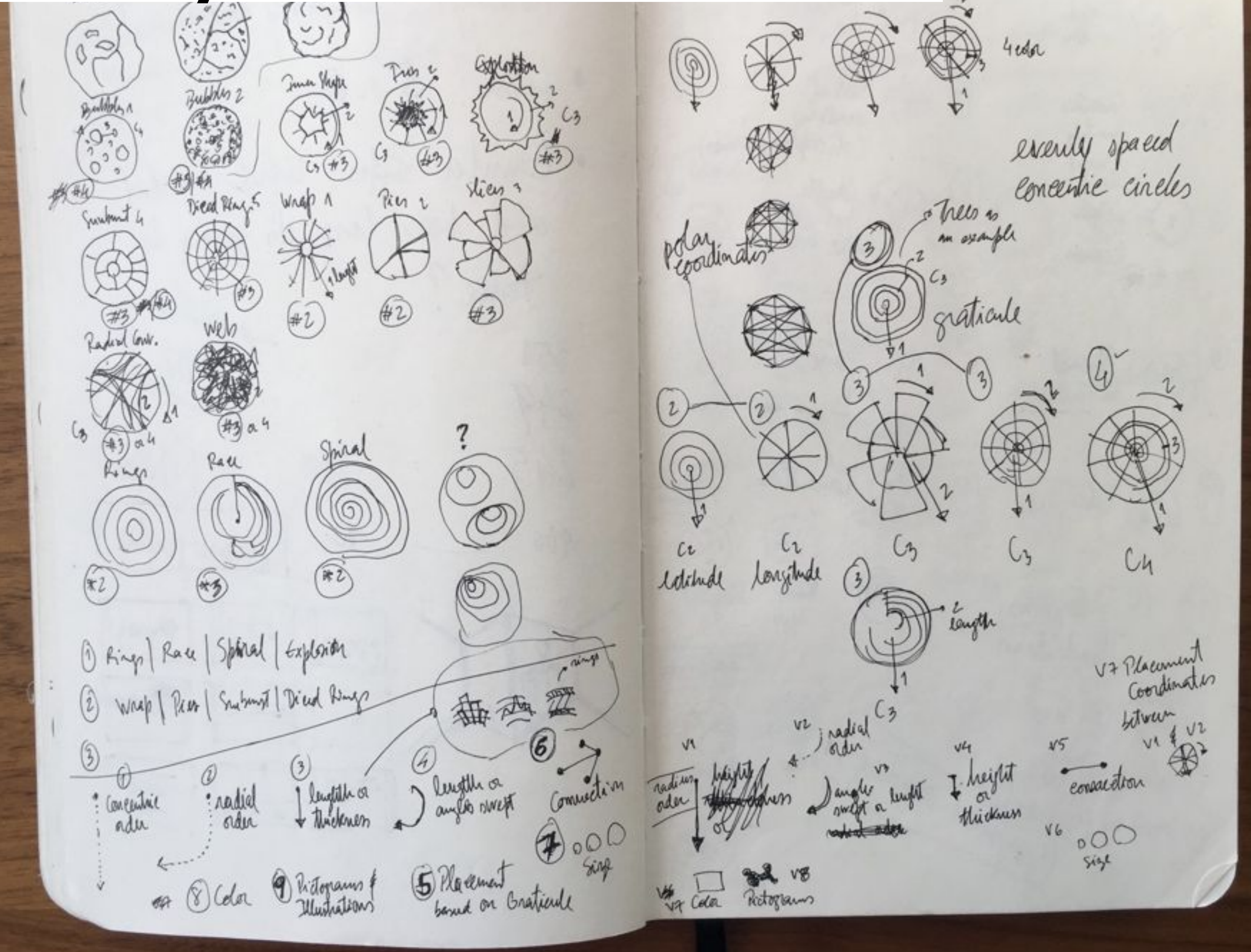
TITLE: RELATIONSHIPS BETWEEN DSA & POST HE EMPLOYABILITY
AUTHER:
DATE: 16/11/2012
SHEET: 2 - FDS3
TASK: BAR-CHART REPRESENTATION OF THE DSA, EMPLOYABILITY & LEAVERS DATA

- HOVERING OVER EACH AVERAGED UNIVERSITY BAR DRAWS THE YEAR BY YEAR BREAKDOWN.
- CLICKING ON AN INDIVIDUAL YEAR WOULD SET ALL BACKGROUND "MAIN" BARS TO THE FIGURES OF THAT YEAR ALONE FOR COMPARISON.
- CLICKING ON THE MINUS SYMBOL WOULD MINIMISE THAT UNI WITH THE REMAINING UNIS EXPANDING TO FILL THE SPACE.
- DATA PRE-LOADED
- ABILITY TO CHANGE DISPLAY COLOURS FOR DIFFERENT USERS PREFERENCES?

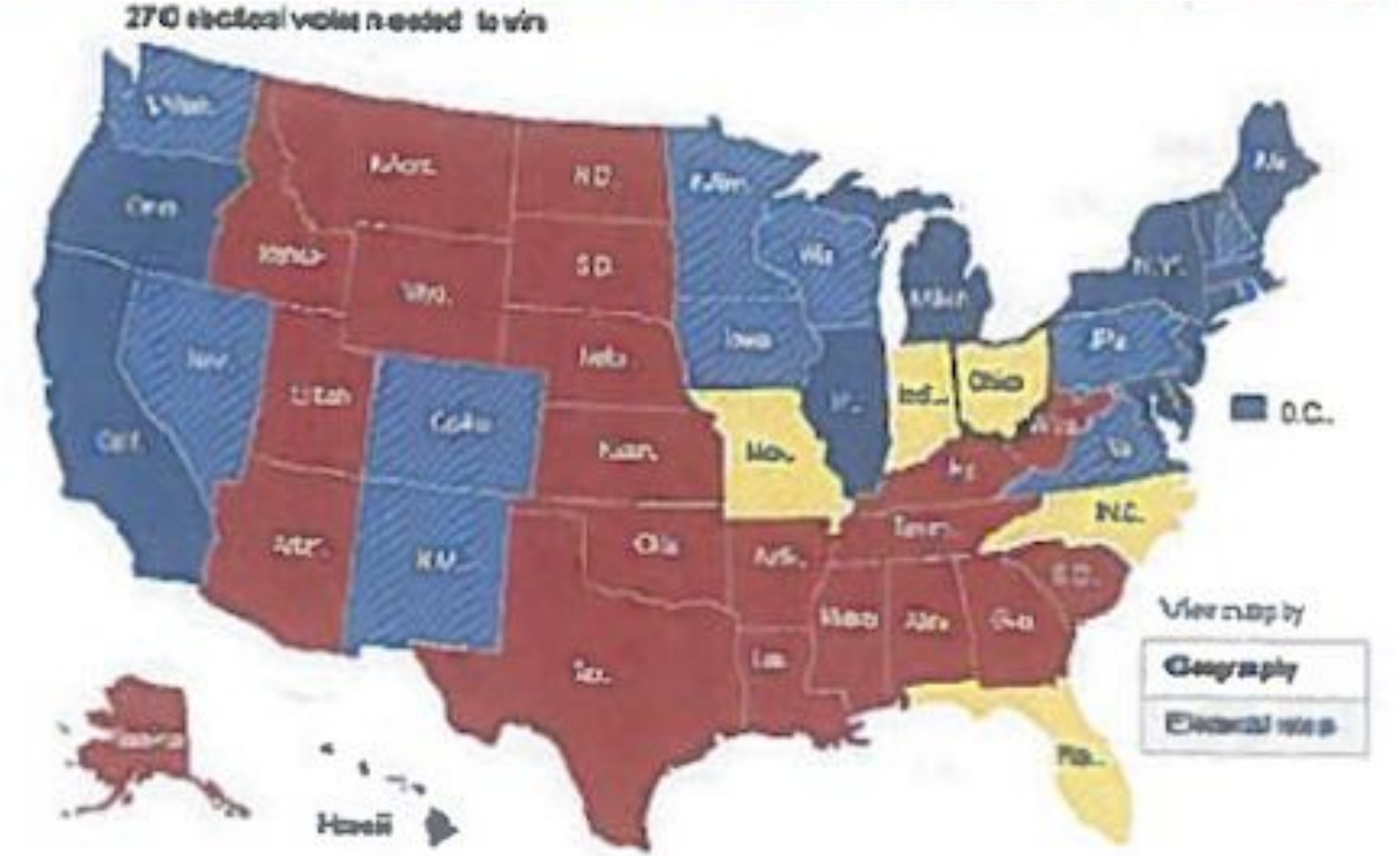
OPERATIONS

DISCUSSION
- DOES 'MINIMISING' UNI'S ADD ANY USEFULL INTERACTION?
- DURING THE HOVER-OVER BREAKDOWN OF DATA SHOULD THE YEAR BE DISPLAYED IN TEXT FOR EASE OF INTERPRETATION
- SHOW ALL BUTTON COULD BE USEFULL BUT IT MAY CLUTTER THE DATA.
- VISUALISATION ASSUMES THE ONLY CORELATIONS WILL BE NUMERICAL.
- COULD OTHER DATA BE DISPLAYED ON THE BARS? PERCENTAGES OF DEGREE CLASSIFICATION BY TYPE?

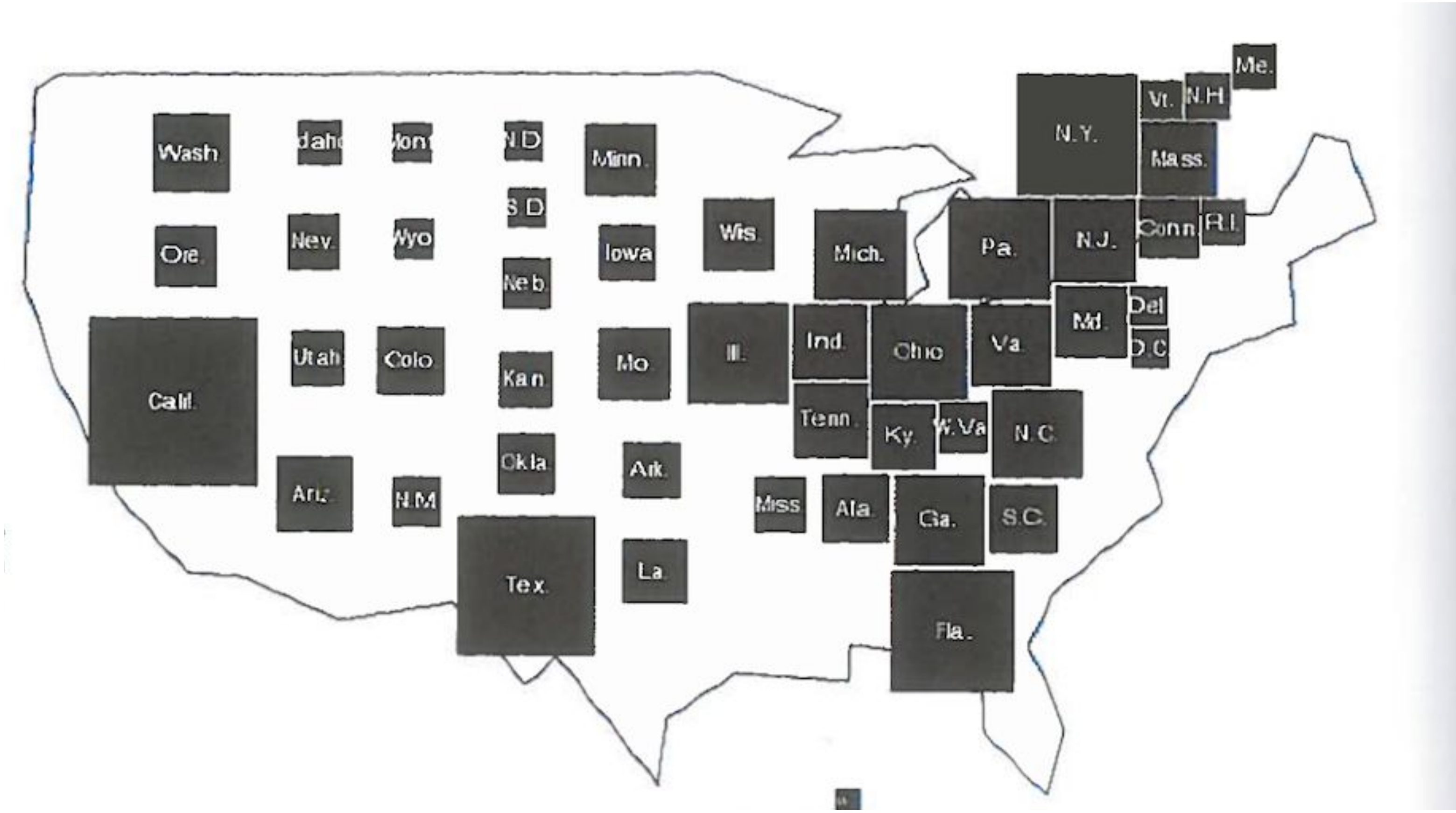
Quantity, Alternatives, & Iteration


Bubbles 1
Bubbles 2
Inner Shape
Pies
Explosion
Sunburst 4
Dived Rings 5
Wrap 1
Pies 2
Slices 3
Radial Conn.
web
Rings
Race
Spiral
?
1 Rings | Race | Spiral | Explosion
2 Wrap | Pies | Sunburst | Dived Rings
3
concentric order
radial order
length or thickness
length or angles swept
6 Connection
7 Size
8 Color
9 Pictograms & Illustrations
5 Placement based on Graticule
4 color
evenly spaced concentric circles
polar coordinates
trees as an example
graticule
C2 latitude
C2 longitude
C3
C4
length
V1 radius order
V2 radial order
V3 angle swept or length
V4 height or thickness
V5 connection
V6 size
V7 Placement Coordinates between V1 & V2
V7 Color
V8 Pictograms

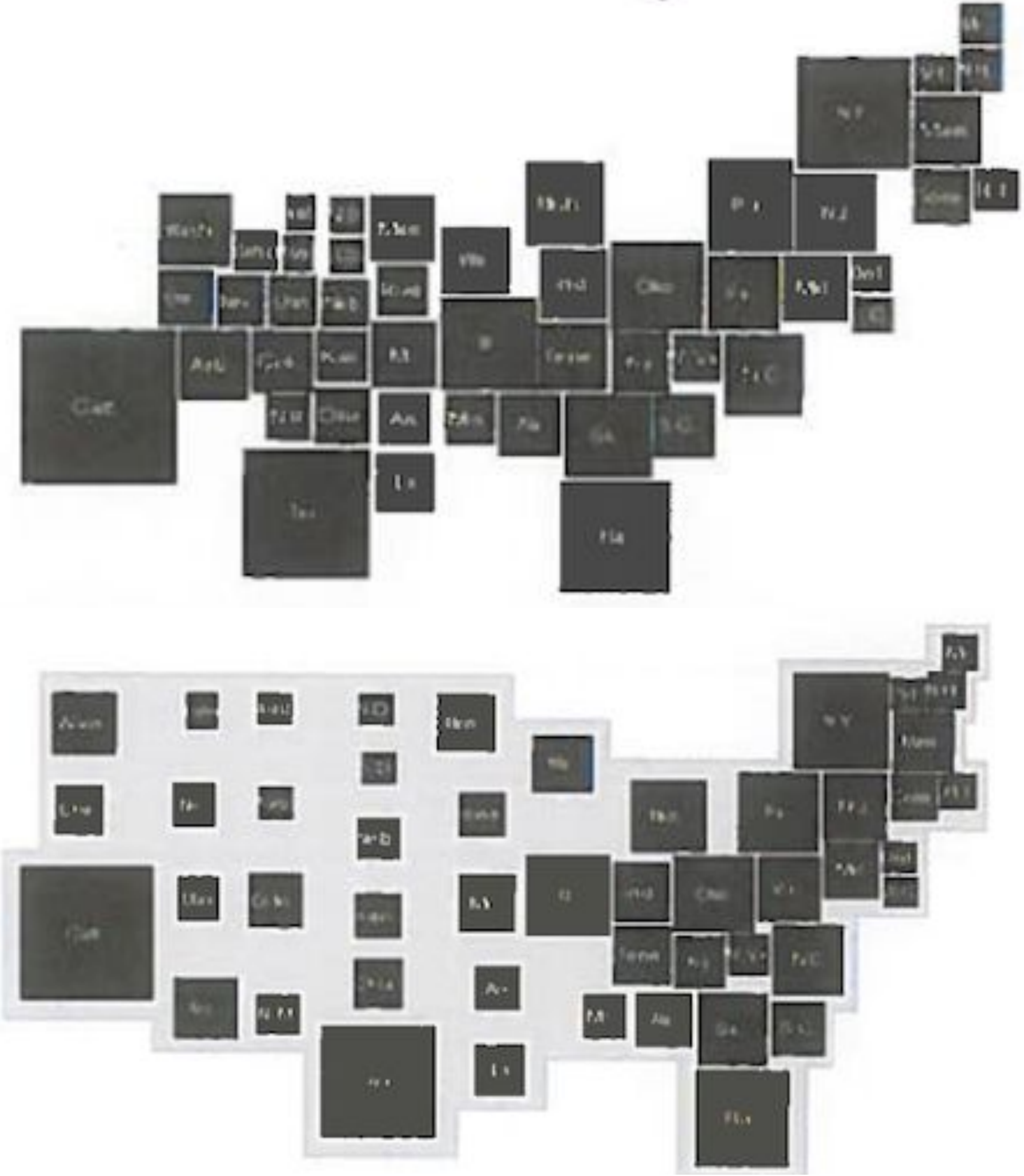
Idea Evolution


270 electoral votes needed to win
Wash.
Ore.
Calif.
Nev.
Idaho
Mont.
Wyo.
Utah
Colo.
Ariz.
N.M.
N.D.
S.D.
Neb.
Kan.
Okla.
Tex.
Minn.
Iowa
Mo.
Ark.
La.
Wis.
Ill.
Mich.
Ind.
Ohio
Ky.
Tenn.
Miss.
Ala.
Ga.
Fla.
S.C.
N.C.
Va.
W.Va.
Pa.
N.Y.
Me.
D.C.
Alaska
Hawaii
View map by
Geography
Electoral votes

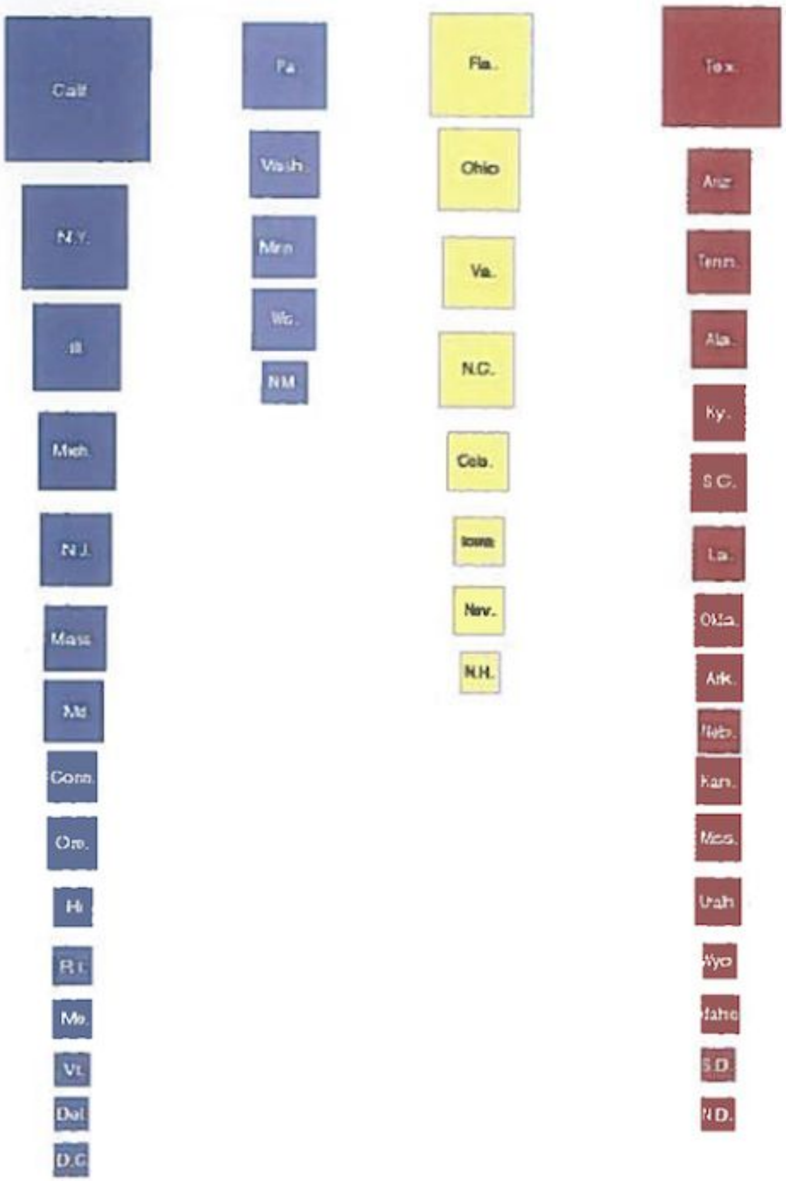
Idea Evolution


Wash.
dah
Mont
N.D.
Minn.
S.D.
Ore.
Nev.
Wyo
Iowa
Neb.
Wis.
Mich.
N.Y.
Vt.
N.H.
Me.
Mass.
Pa.
N.J.
Conn.
R.I.
Calif.
Utah
Colo
Kan.
Mo
Ill.
Ind.
Ohio
Va.
Md.
Del
D.C
Tenn.
Ky.
W.Va
N.C.
Okla.
Ark.
Ariz.
N.M.
Miss
Ala.
Ga.
S.C.
Tex.
La.
Fla.

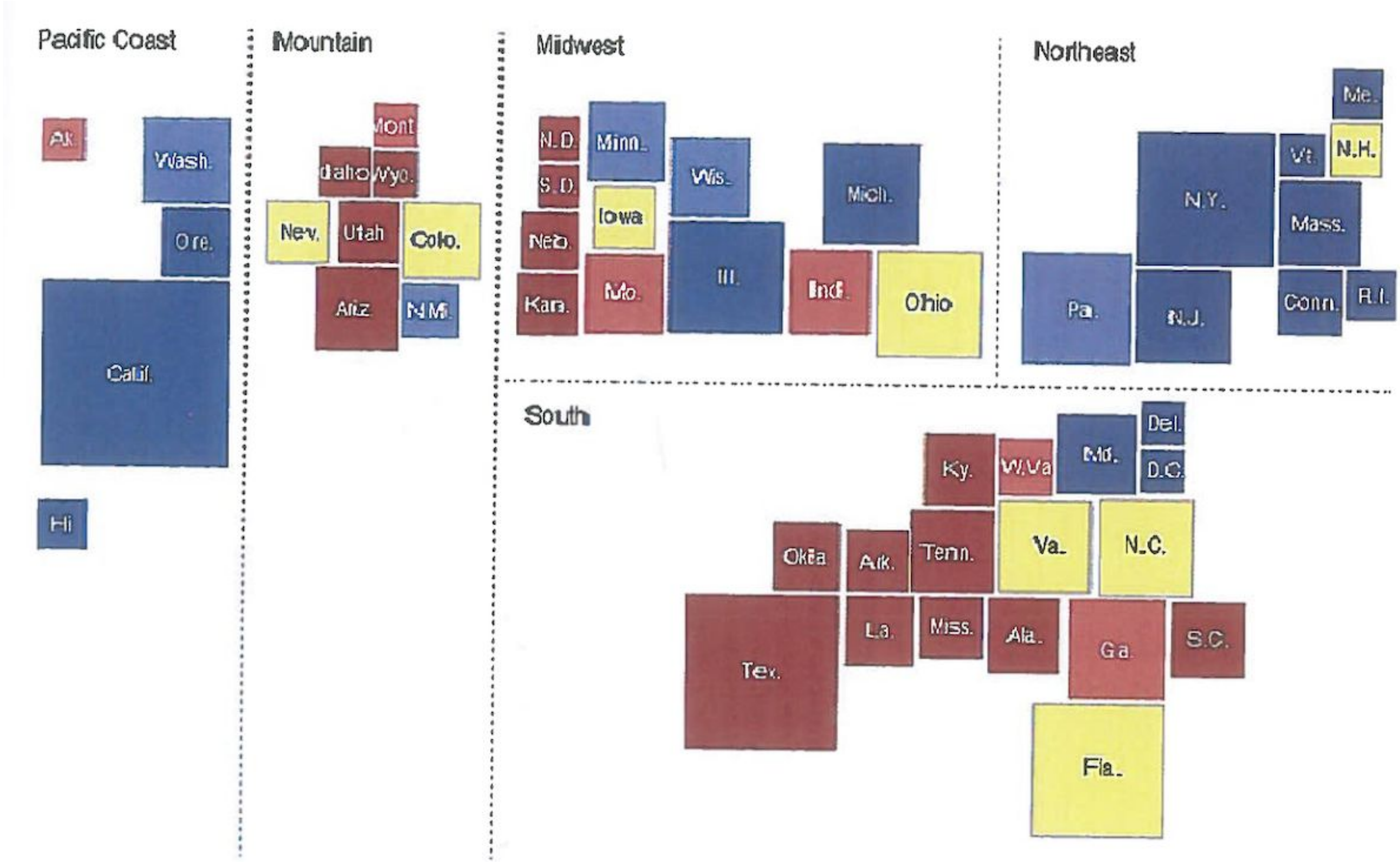
Idea Evolution



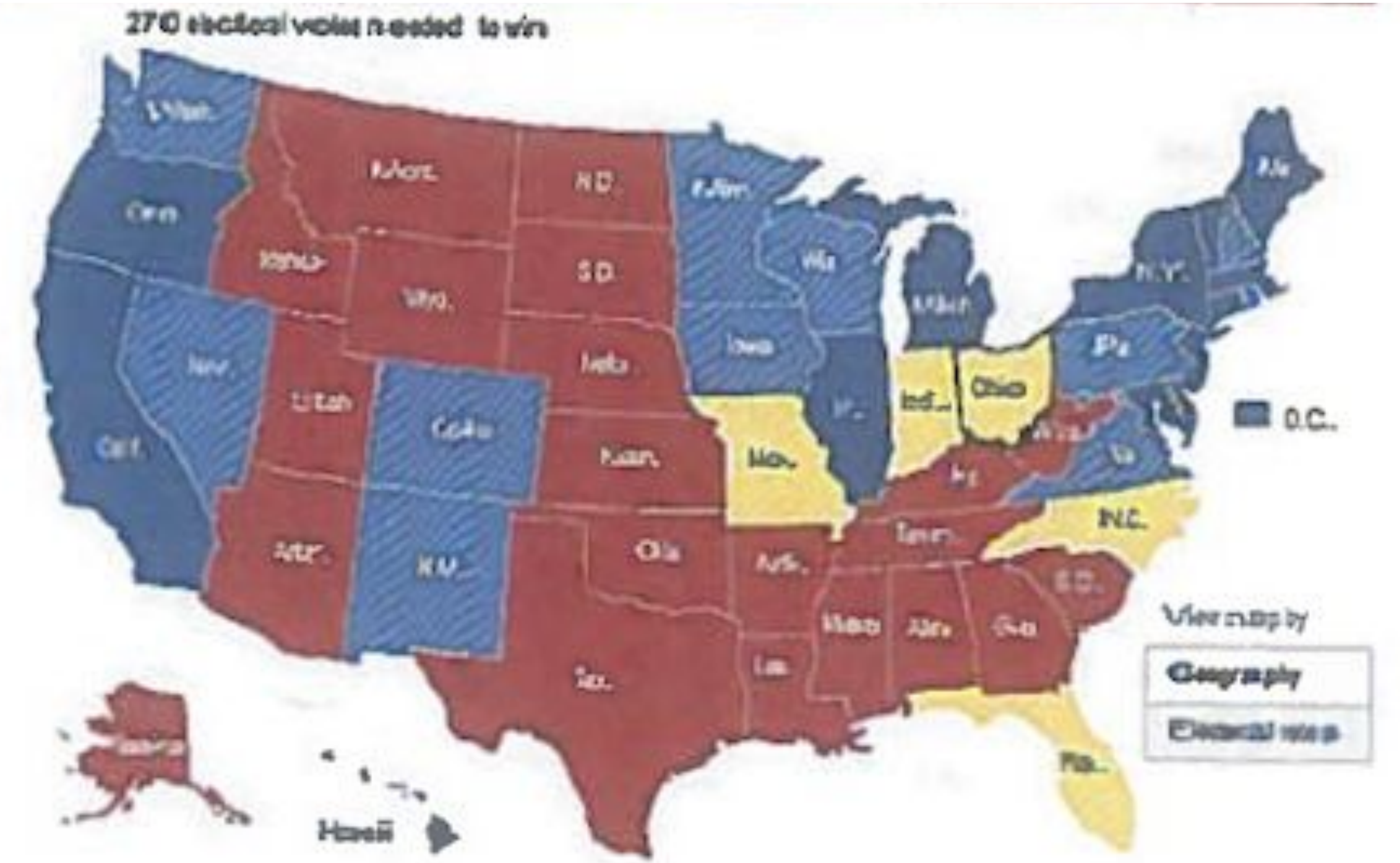
Idea Evolution



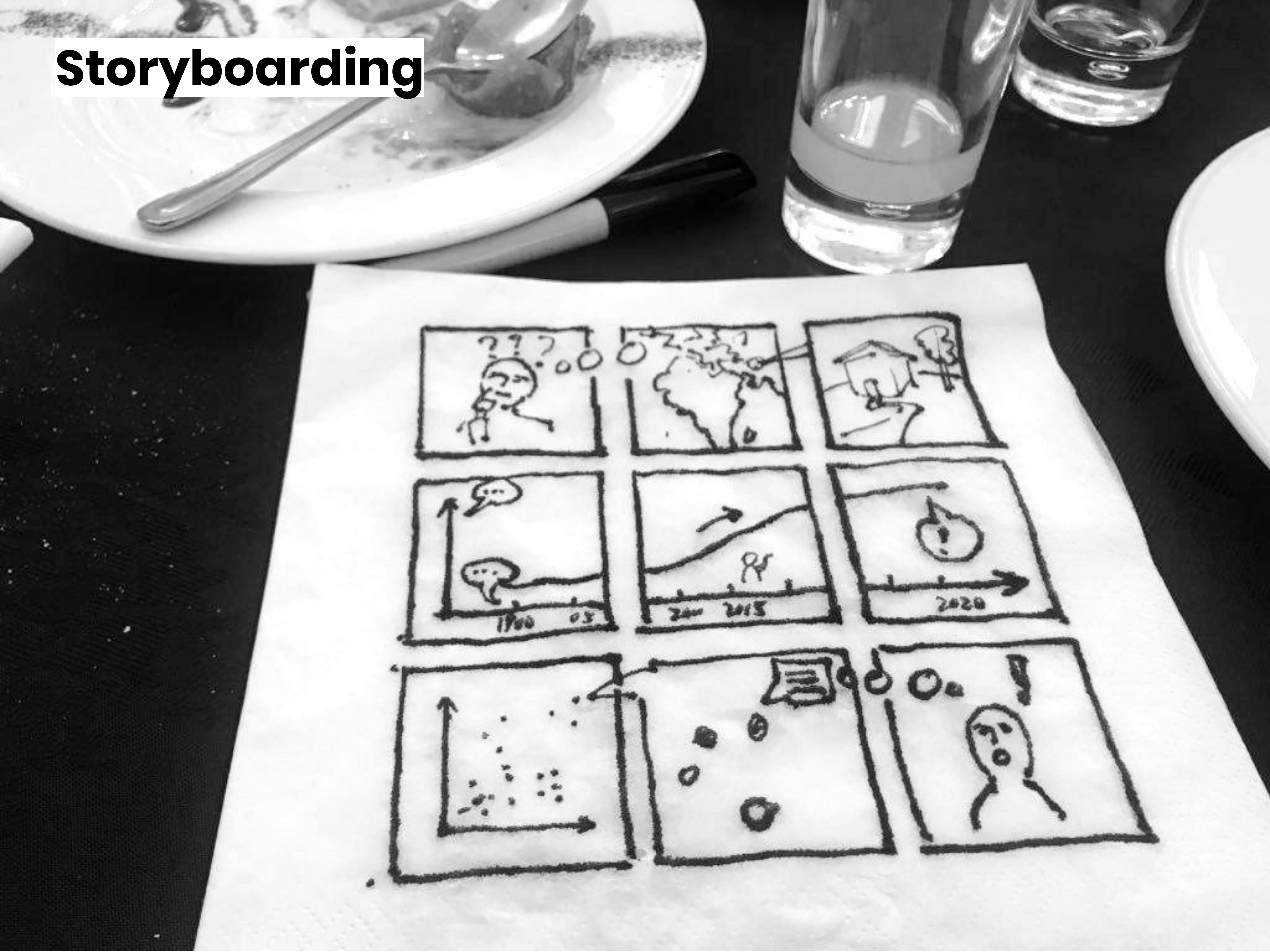
Idea Evolution


Pacific Coast
Ak
Wash.
Ore.
Calif.
Hi
Mountain
Mont
Idaho
Wyo.
Nev.
Utah
Colo.
Ariz
N.M.
Midwest
N.D.
S.D.
Minn.
Wis.
Mich.
Iowa
Neb.
Kan.
Mo.
Ill.
Ind.
Ohio
Northeast
Me.
Vt.
N.H.
N.Y.
Mass.
Pa.
N.J.
Conn.
R.I.
South
Del.
Md.
D.C.
Ky.
W.Va
Okla
Ark.
Tenn.
Va.
N.C.
Tex.
La.
Miss.
Ala.
Ga.
S.C.
Fla.

Idea Evolution


270 electoral votes needed to win
Wash.
Ore.
Calif.
Nev.
Idaho
Mont.
Wyo.
Utah
Colo.
Ariz.
N.M.
N.D.
S.D.
Neb.
Kan.
Okla.
Tex.
Minn.
Iowa
Mo.
Ark.
La.
Wis.
Ill.
Mich.
Ind.
Ohio
Ky.
Tenn.
Miss.
Ala.
Ga.
Fla.
S.C.
N.C.
Va.
W.Va.
Pa.
N.Y.
Me.
Alaska
Hawaii
D.C.
View map by
Geography
Electoral votes

Storyboarding


???
1900
03
2011
2015
2020
!

Sketching in a nutshell

Why:

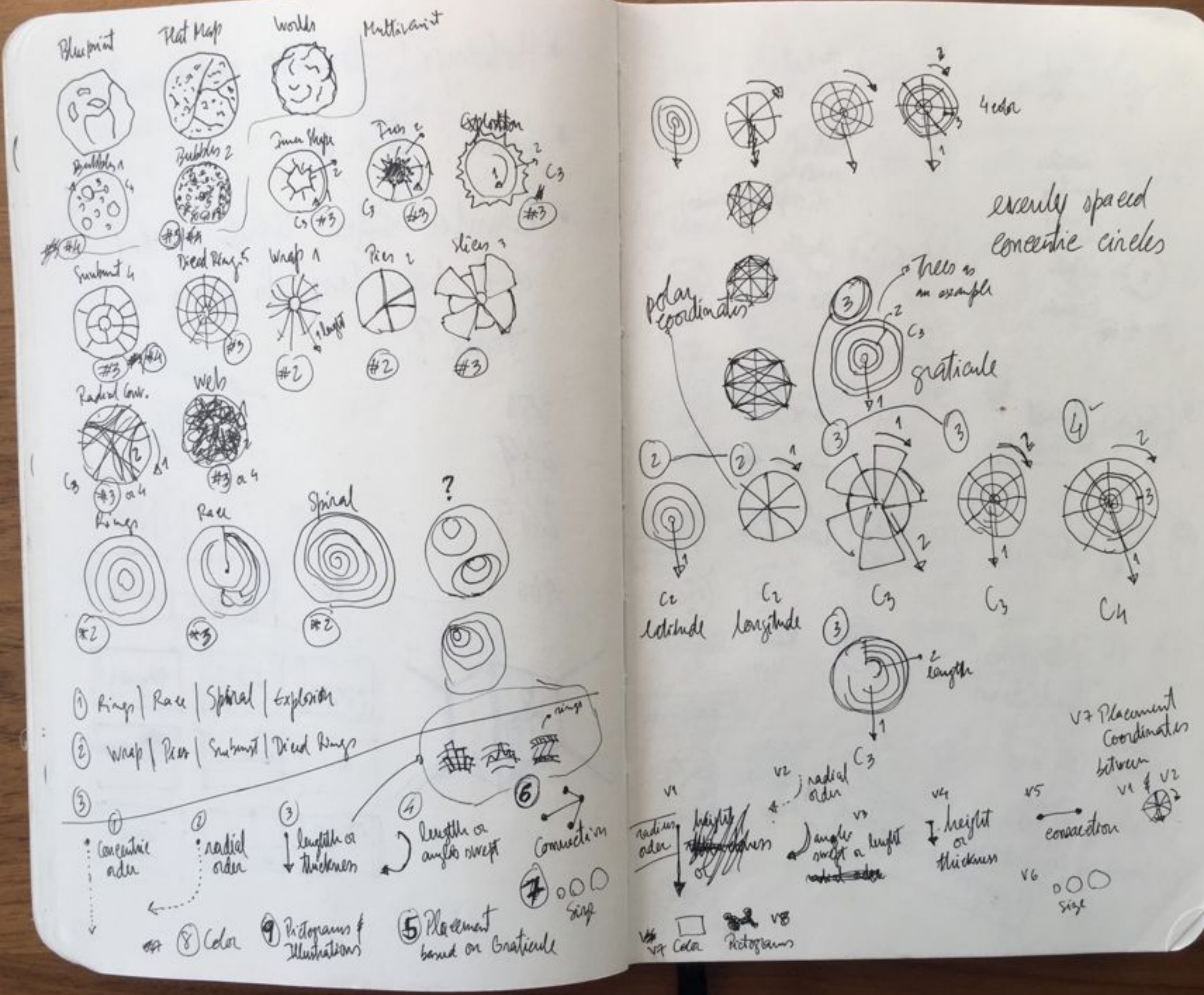
- Idea generation
- Explore visual marks, structures, layouts
- Communication
- Reflection

What:

- Fake data or real data
- Visualization types
- Visual patterns

How:

- Doodles & iterations
- Visualization types & visual variables,
- Layouts and page structures
- Views and complexity



Blueprint
Flat Map
Worlds
Multivariant
Bubbles 1
Bubbles 2
Inner Shape
Exploration
Sunburst 4
Dried Rings 5
Wrap 1
Pies 2
Slices 3
#2
#3
Radial Conv.
Web
#3 or 4
Rings
Race
Spiral
?
#2
#3
4 color
evenly spaced
concentric circles
polar coordinates
Trees as an example
graticule
C2
latitude
longitude
C3
C4
length
rings

① Rings | Race | Spiral | Explosion

② Wrap | Pies | Sunburst | Dried Rings

③

① concentric order

② radial order

③ length or thickness

④ length or angles swept

⑥ Connection

⑦ Size

⑧ Color

⑨ Pictograms & Illustrations

⑤ Placement based on Graticule

V1 radius order

~~height~~

V2 radial order

V3 angle swept or length ~~radial order~~

V4 height or thickness

V5 connection

V6 size

V7 Placement Coordinates between V1 & V2

~~V6~~ V7 Color

V8 Pictograms