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Northeastern University

Data Types and Tasks, Tableau

Checking In

TABLEAU TUTORIAL

~15 min total

In-Class Exercise

In-Class Tool Introduction—Tableau

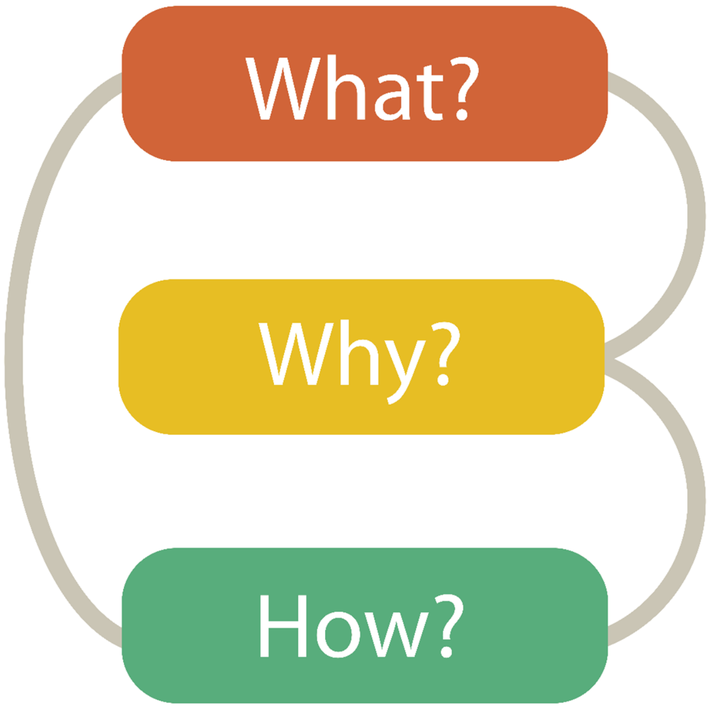
30 min

Data Types

Goals for Today

- Learn what are data types and dataset types
- Learn what are attribute types
- Learn how to pick appropriate visual representations based on attribute type and perceptual properties

Analysis

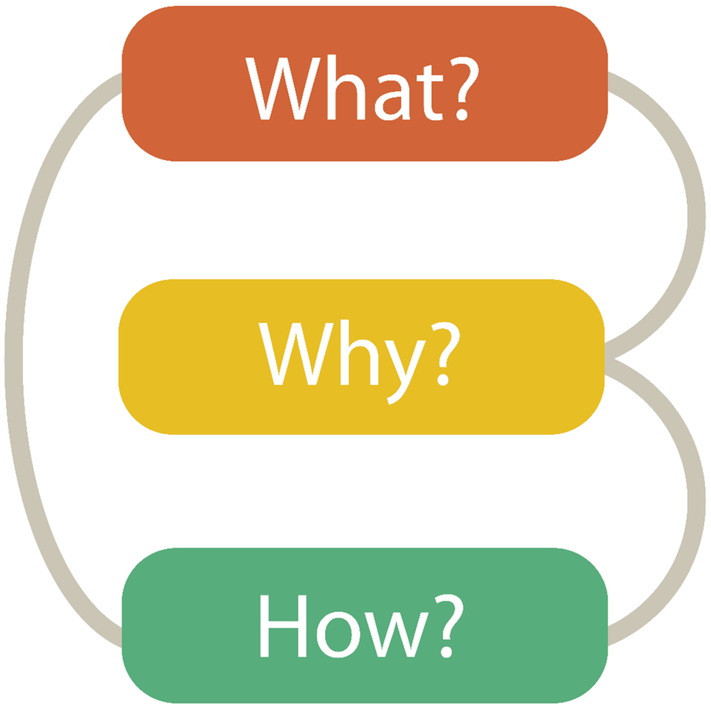


What data is shown?

Why is the user analyzing / viewing it?

How is the data presented?

Analysis



What data is shown?

DATA ABSTRACTION

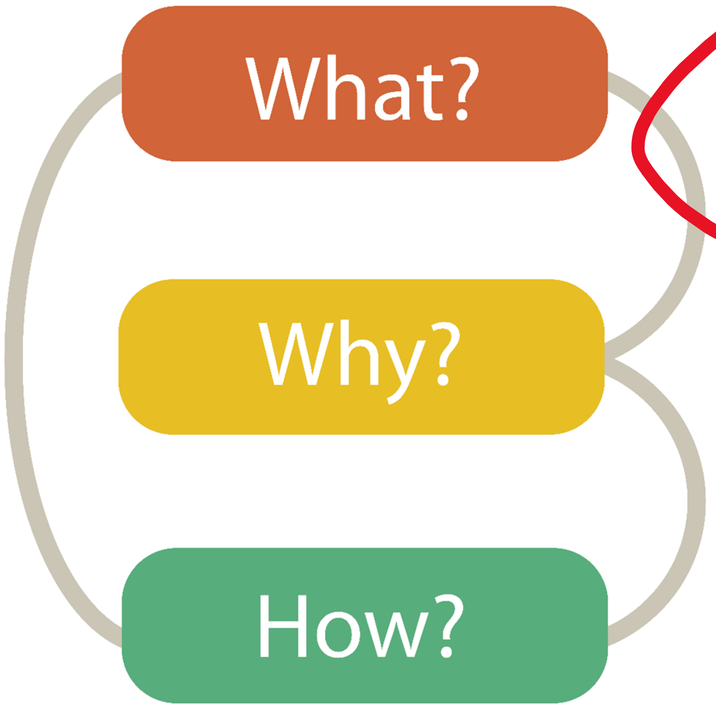
Why is the user analyzing / viewing it?

TASK ABSTRACTION

How is the data presented?

VISUAL ENCODING

Analysis



What data is shown?
DATA ABSTRACTION

Why is the user analyzing / viewing it?
TASK ABSTRACTION

How is the data presented?
VISUAL ENCODING

Data Types

TYPE = structural or mathematical interpretation of the data

Data Types

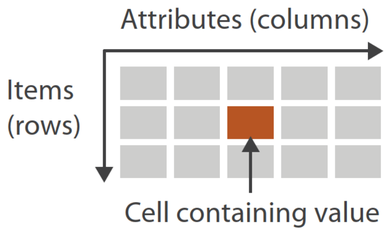
➔ Items	➔ Attributes	➔ Links	➔ Positions	➔ Grids
(row, node)	*(variable, data dimension)*	*(relationship)*	*(spatial location)*	*(sampling)*

Data Types

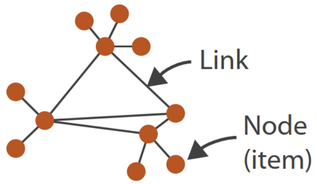
DATASET = collection of information that is the target of analysis

Dataset Types

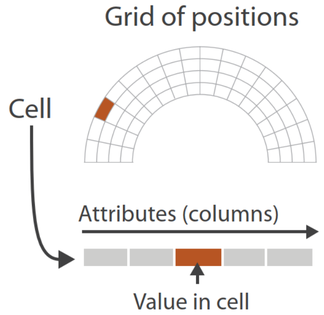
- Tables



- Networks

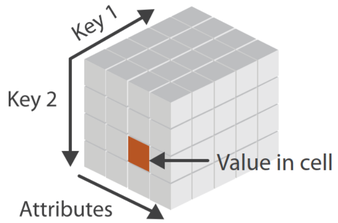


- Fields (Continuous)



- Geometry (Spatial)

- *Multidimensional Table*



- *Trees*

Data Types

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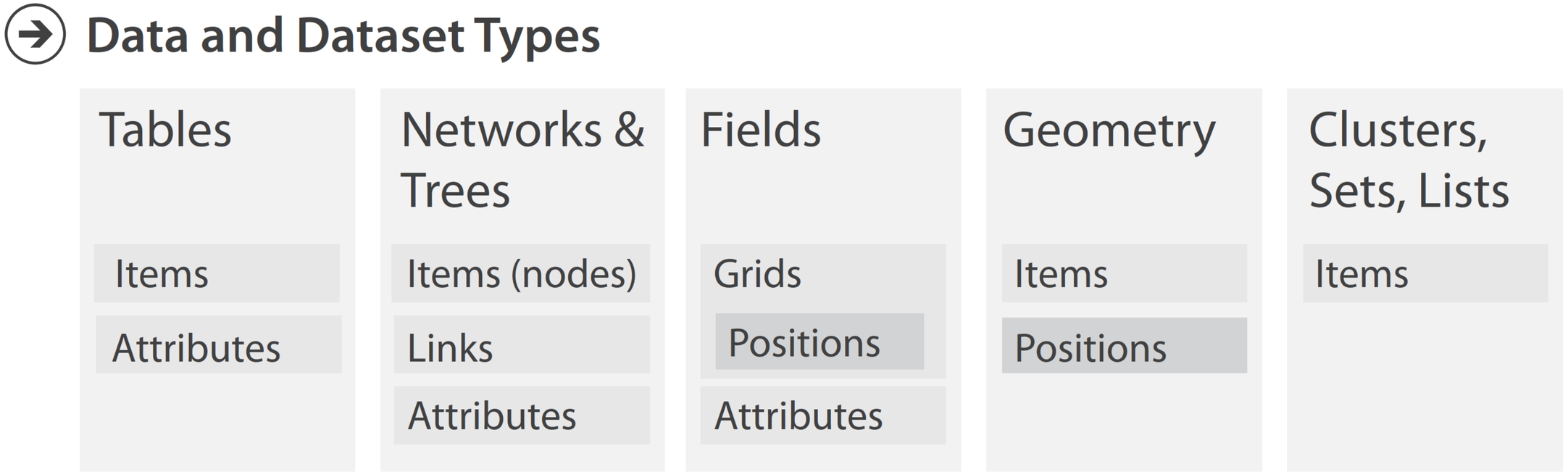
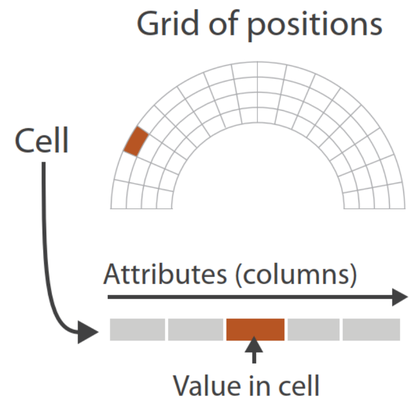


grid types

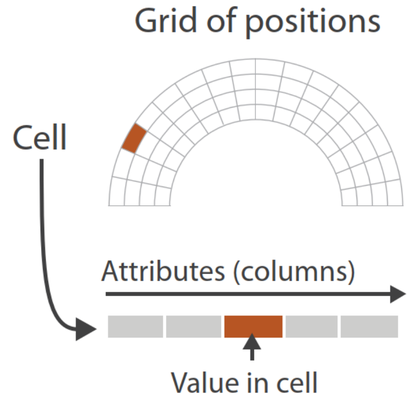
Relevant to anyone in the sciences!

➔ Fields (Continuous)



grid choices impact how continuous data is interpreted

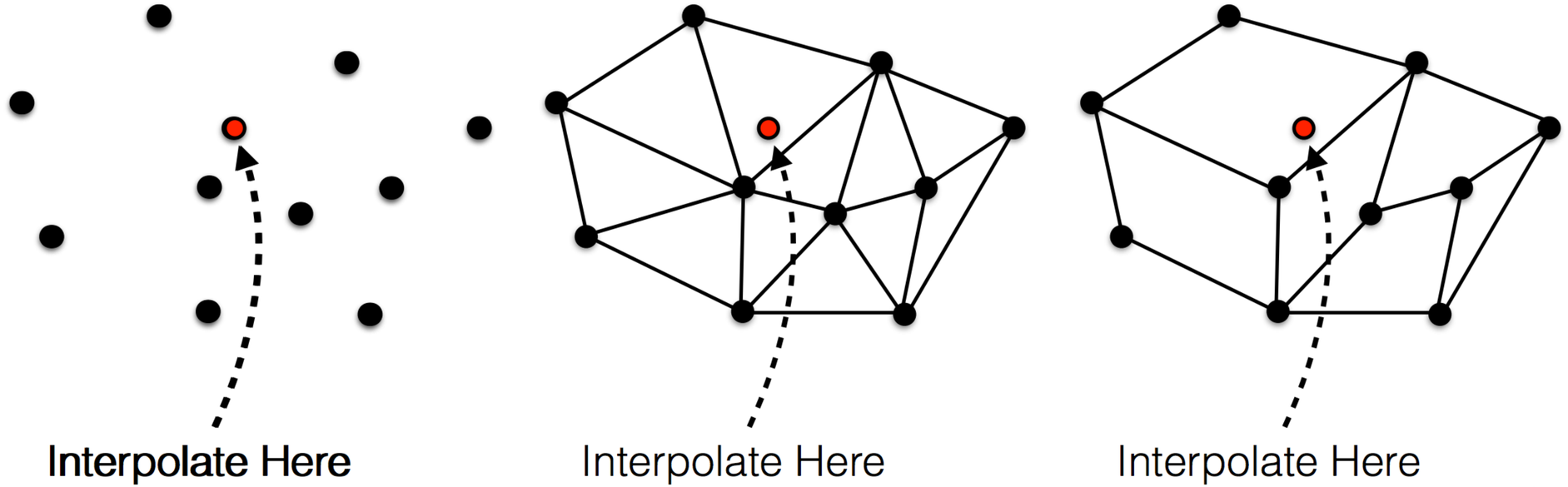
➔ Fields (Continuous)



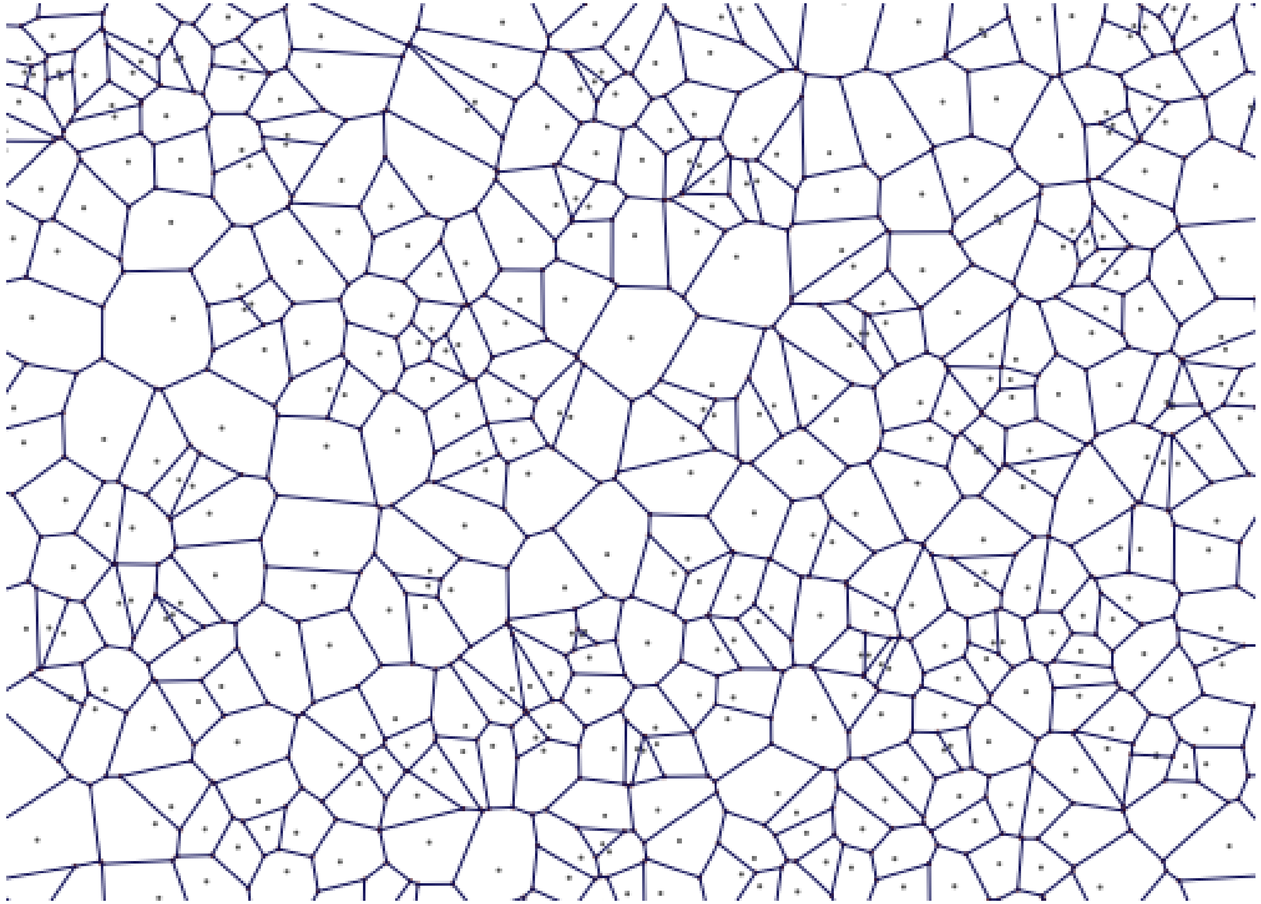
two key considerations:

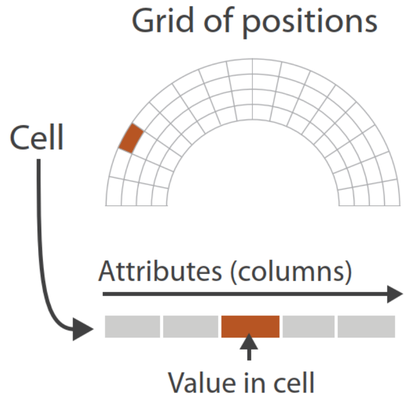
sampling, or the choice of where attributes are measured

interpolation, or how to model the attributes in the rest of space



“Voronoi Tessellation”

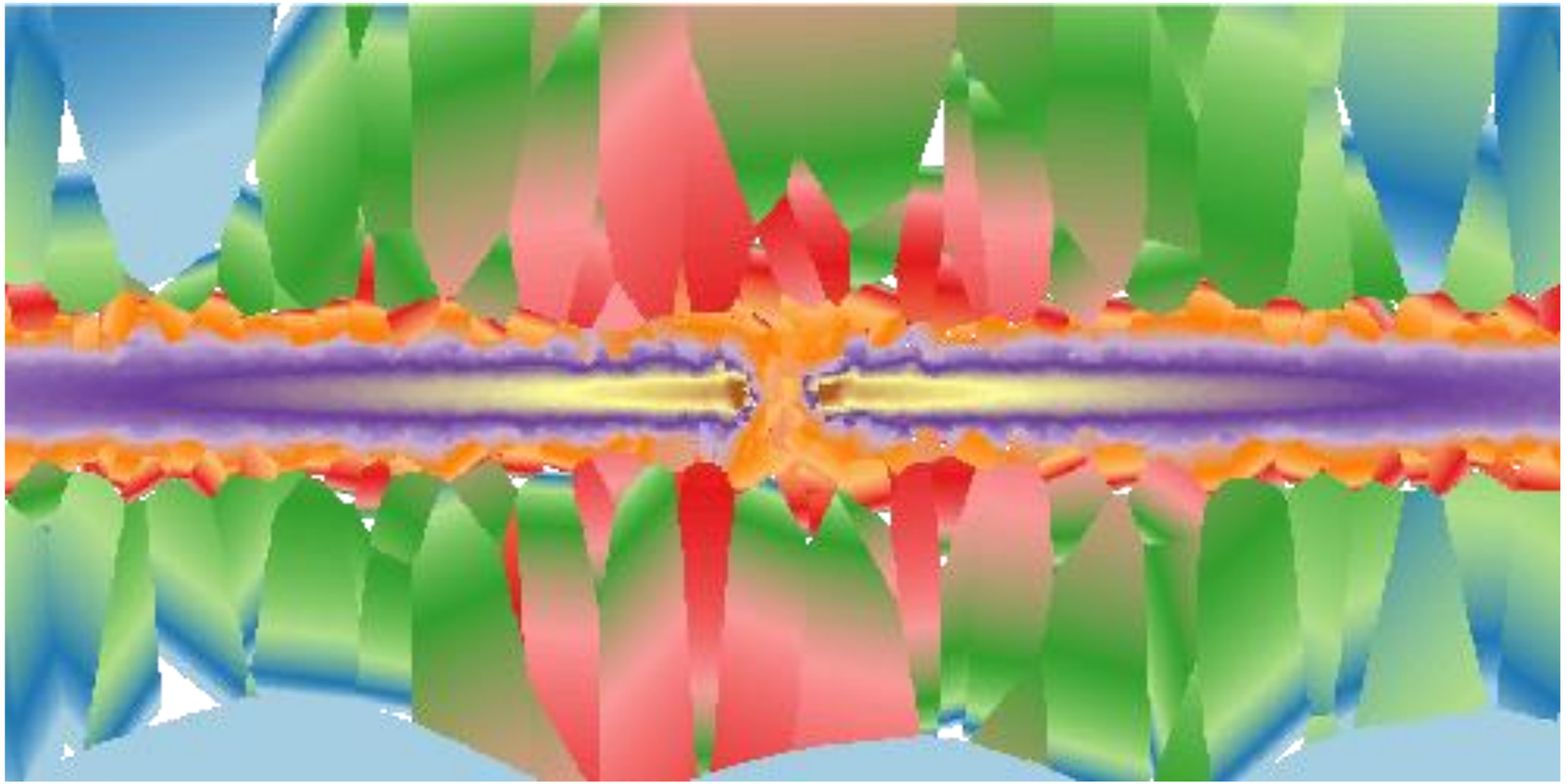




https://en.wikipedia.org/wiki/Voronoi_diagram

➔ Fields (Continuous)

Voronoi Tessellation for Galaxy Evolution Simulation



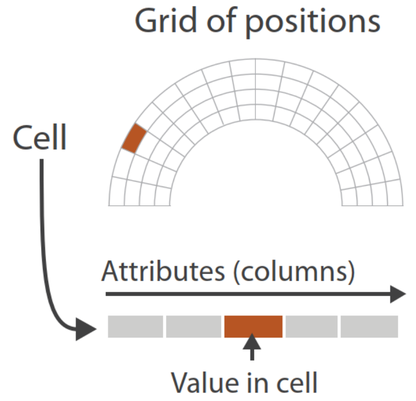
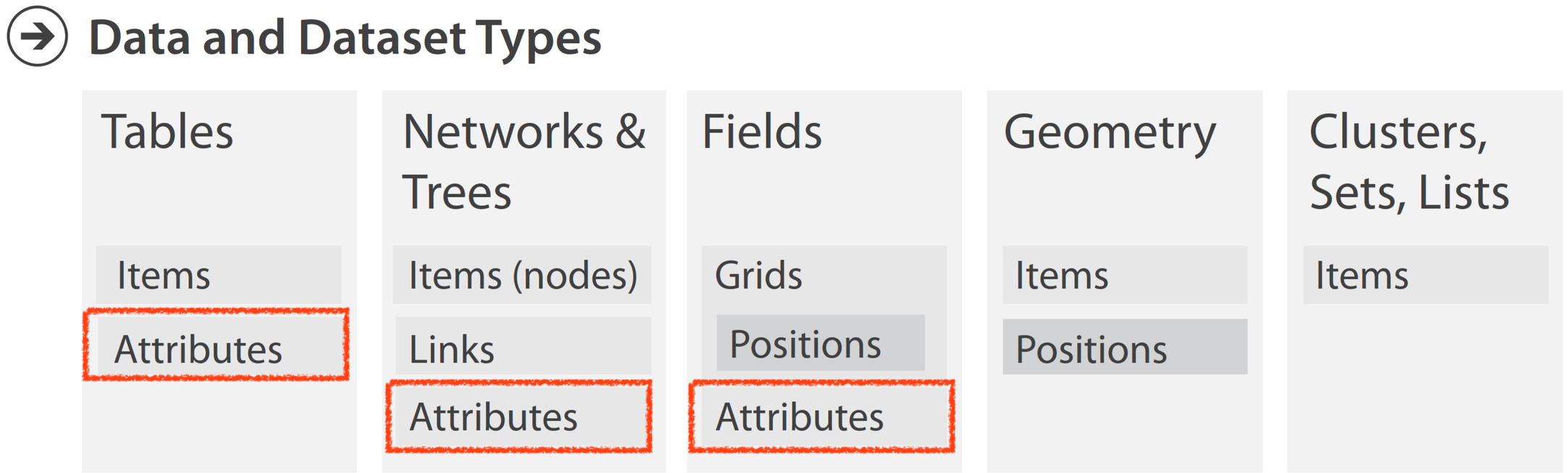


Image courtesy of Patrik Jonsson

Data Types

DATASET = collection of information that is the target of analysis



Attribute Types

➔ Categorical

e.g.,
fruit (apple, pear, grape),
colleges (CAMD, Khoury, COE)

➔ Ordered

➔ *Ordinal*

e.g.,
sizes (xs, s, m, l, xl),
months (J, F, M)

➔ *Quantitative* *(continuous)*

e.g.,
lengths (1’, 2.5’, 5’),
population

Ordering Direction

Sequential

e.g.,
height ≥ 0
time: ms since Unix epoch

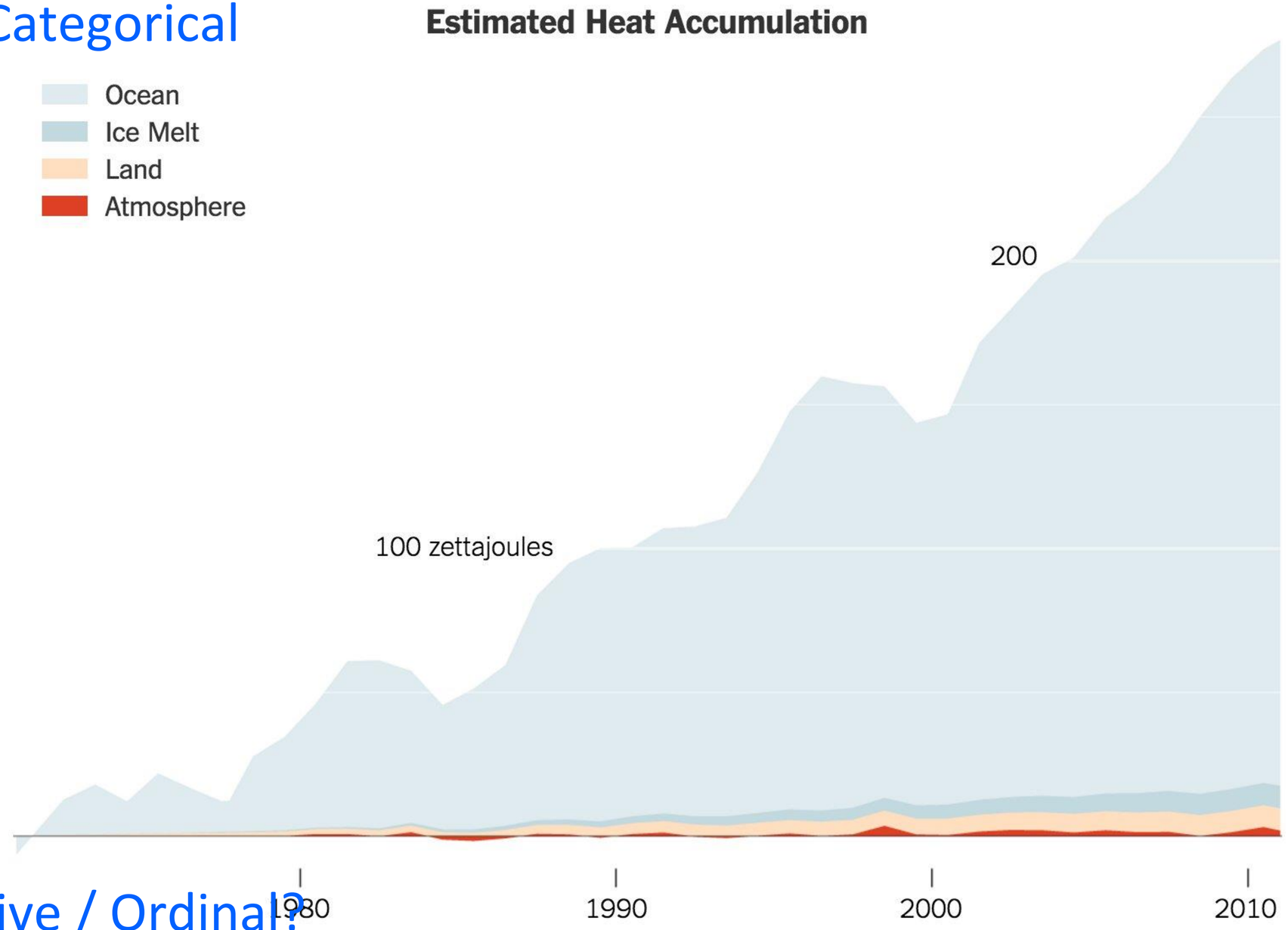
Diverging

e.g.,
elevation: above and below sea level
deltas: change in value since previous timestep

Cyclic

e.g.,
time: hour of the day
packet buffers: round robin
user studies: counterbalancing group

Categorical



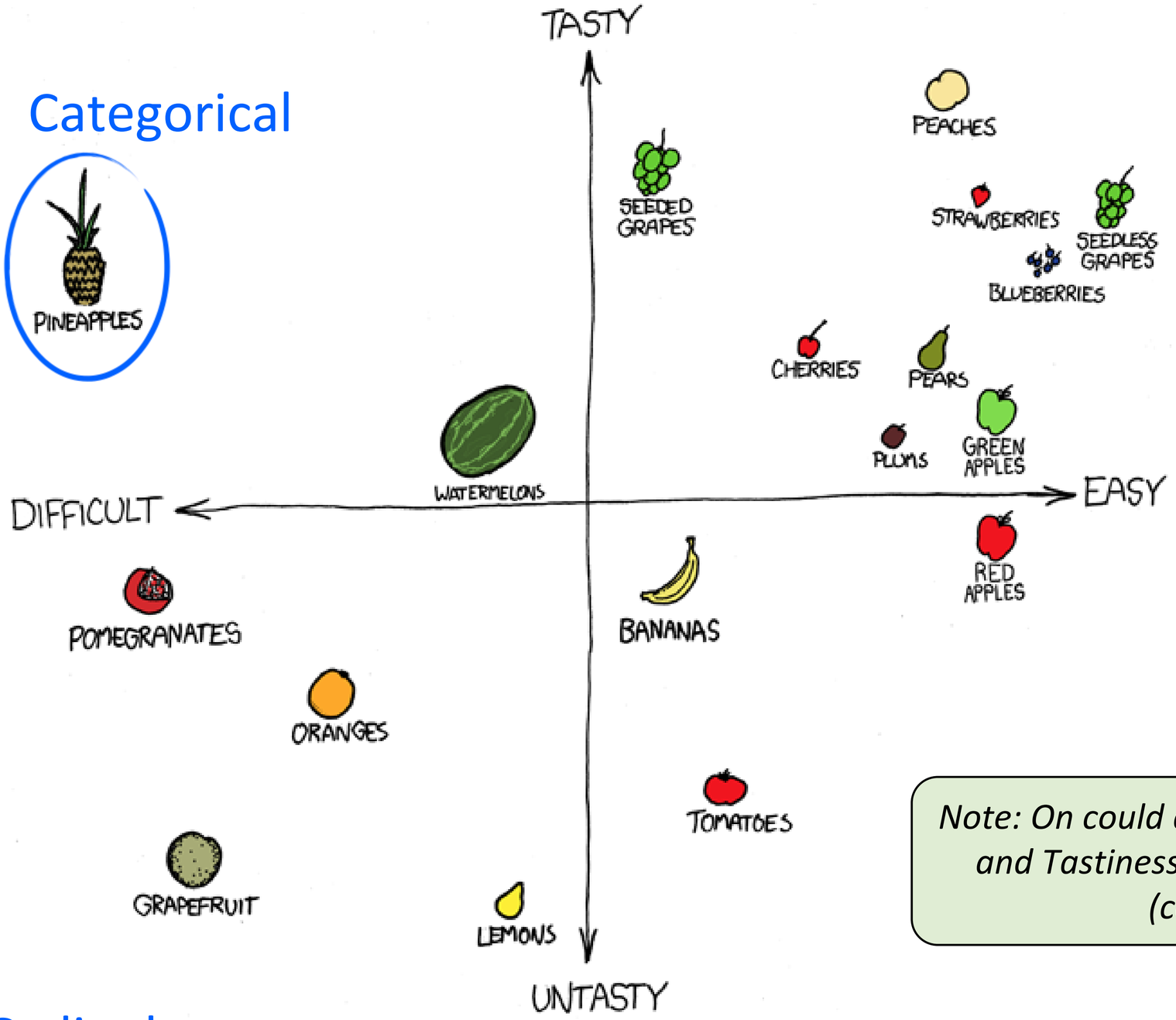
Quantitative

?Quantitative / Ordinal?

http://www.nytimes.com/interactive/2016/09/12/science/earth/ocean-warming-climate-change.html

Categorical

Ordinal



Ordinal

Note: On could also argue that Difficulty and Tastiness could be quantitative (continuous)

https://xkcd.com/388/

For Next Time

neu-ds-4200-s22.github.io/schedule

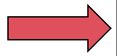
Look at the upcoming assignments and deadlines

- Textbook, Readings, & Reading Quizzes—Variable days
- In-Class Activities—If due, they are due 11:59pm the same day as class

Everyday Required Supplies:

- 5+ colors of pen/pencil
- White paper
- Laptop and charger

Use Canvas Discussions for general questions, email codydunne-and-tas@ccs.neu.edu for questions specific to you.



Week	Topics	Assignments
#1: Jan 17–21	What is visualization Design rules of thumb	A1—Setting up
#2: Jan 24–28	JS development, projects Marks & channels	A2—Encodings & xenographics
#3: Jan 31–Feb 04	Data types and tasks, Tableau D3 tutorial 1/2	P1—Pitches★
#4: Feb 07–11	In-class group formation D3 tutorial 2/2	A3—Tableau analysis P2—Proposal★
#5: Feb 14–18	Altair and JupyterLab Arrange tables	A4—D3 basic charts
#6: Feb 21–25	Color Pop-out, illusions	A5—Altair basic charts P3—Interview & tasks
#7: Feb 28–Mar 04	Interaction & animation (2)	A6—D3 event handling P4—Data, Initial sketches
#8: Mar 07–11	Trees & networks (2)	P5—Final sketches & plan★
Mar 14–18	*Spring Break*	
#9: Mar 21–25	Project feedback & work Spatial, 3D, and scientific vis.	A7—D3 Brushing & linking 1 P6—Implementation 1
#10: Mar 28–Apr 01	Validation & evaluation Flex day	A8—Brushing & linking 2 P7—Implementation 2
#11: Apr 04–08	Project usability testing, how to give a talk Storytelling	