Data Physicalization Library Workshop

Welcome!

- Instructors:
  - Alex Wong
  - Priscilla Carmini
- Introduce yourself:
  - Name
  - Pronouns
  - When/How do you work with data (if at all) (e.g., census data, administrative healthcare data, survey data)

Data Fundamentals

Data are a collection of facts, such as numbers, words, measurements, and/or observations.

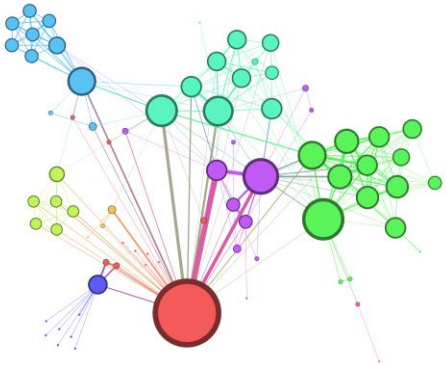
- Organized in numeric files created for the purposes of analysis, when digital are machine readable
- Can include geographic information, which can then be used to make maps
- Can include temporal information, which can be used to study patterns and changes through time

Statistics are types of information obtained through mathematical operations on numerical data; statistics are processed data, or data that have been analyzed in some way.

Data visualization is the visual representation of information or data by any means. Data visualizations come in many forms, spanning written text as a form of information visualization to graphical user interfaces and beyond.

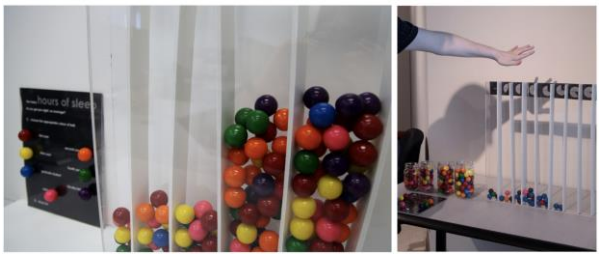
- Examples include tables, pie charts, word clouds, network graph, infographics, and more.

Word Cloud from Jane Austen, Pride and Prejudice, 1813



Network Graph from Gephi

Data physicalizations are physical artifacts whose geometry or material properties encode data; the physical counterpart to data visualization.



Physical visual sedimentation:
"Participatory representation of hours of sleep for a university population, with different colours of gumballs representing different groups present on a university campus (i.e. blue gumballs for graduate students, violet gumballs for faculty, etc.)."

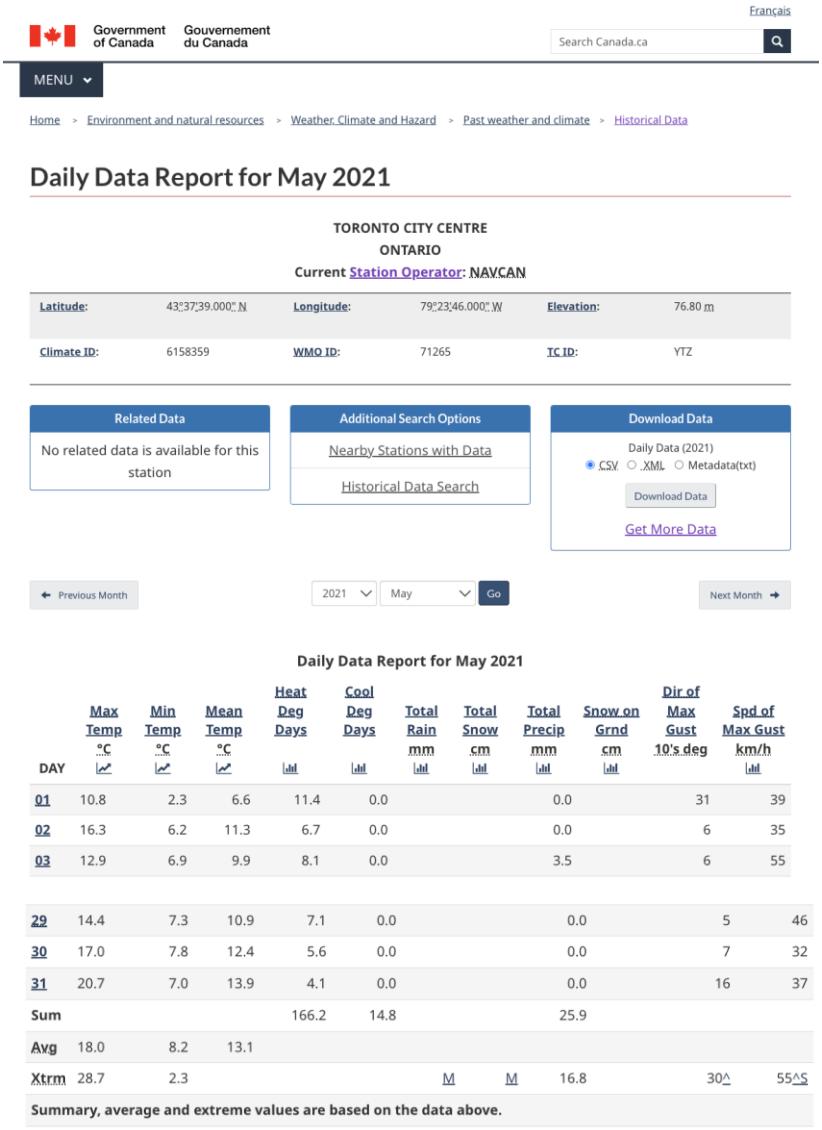
Yakahama time ball: "Women from the Yakama Native American tribe used strings of hemp as personal diaries. Each major event in their life was represented by a knot, a bead or a shell."

Microdata are observation data collected on an individual object or person. They provide observation data on individual people, objects, or entities like households or facilities.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	AGEGRP	BEDRM	BUILT	CFSTAT	CMA	DTYPE	NOS	PRESMORTG	REPAIR	ROOM	SEX	SHELCO	SUBSIDY	TENUR	TOTINC_AT
2	6	2	4	2	535	2	1	9	2	3	2	1700	0	2	47000
3	7	2	4	2	535	2	1	9	2	3	1	1700	0	2	7000
4	1	2	4	4	535	2	1	9	2	3	1	1700	0	2	99999999
5	11	4	3	6	535	1	1	1	1	11	2	600	9	1	30000
6	11	3	3	1	535	1	1	9	2	7	2	2000	0	2	96000
7	11	3	3	1	535	1	1	9	2	7	1	2000	0	2	44000
8	10	5	9	1	535	2	1	2	1	9	2	2600	9	1	25000
9	11	5	9	1	535	2	1	2	1	9	1	2600	9	1	99999999
10	6	5	9	1	535	2	1	2	1	9	2	2600	9	1	21000
11	5	5	9	1	535	2	1	2	1	9	1	2600	9	1	99999999

Data Visualization: Choosing Data and Visual Encodings

Data Source: https://climate.weather.gc.ca/historical_data/search_historic_data_e.html



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Daily Data Report for May 2021

TORONTO CITY CENTRE
ONTARIO
Current Station Operator: NAVCAN

Latitude:	43°37'39.000" N	Longitude:	79°23'46.000" W	Elevation:	76.80 m
Climate ID:	6158359	WMO ID:	71265	TC ID:	YTZ

Related Data
No related data is available for this station

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Daily Data (2021)
CSV XML Metadata(txt)
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Previous Month | 2021 | May | Go | Next Month

Daily Data Report for May 2021

DAY	Max Temp °C	Min Temp °C	Mean Temp °C	Heat Deg Days	Cool Deg Days	Total Rain mm	Total Snow cm	Total Precip mm	Snow on Grnd cm	Dir of Max Gust 10's deg	Spd of Max Gust km/h
01	10.8	2.3	6.6	11.4	0.0			0.0		31	39
02	16.3	6.2	11.3	6.7	0.0			0.0		6	35
03	12.9	6.9	9.9	8.1	0.0			3.5		6	55
29	14.4	7.3	10.9	7.1	0.0			0.0		5	46
30	17.0	7.8	12.4	5.6	0.0			0.0		7	32
31	20.7	7.0	13.9	4.1	0.0			0.0		16	37
Sum				166.2	14.8			25.9			
Avg	18.0	8.2	13.1								
Xtrm	28.7	2.3				M	M	16.8		30^	55^S

Summary, average and extreme values are based on the data above.

Data

Date	Mean Temperature
May 2021	13.1
June 2021	19.4
July 2021	21.1
August 2021	23.6
September 2021	18.5
October 2021	14.0
November 2021	5.3
December 2021	2.4
January 2022	-6.4
February 2022	-3.1
March 2022	1.6
April 2022	6.4
May 2022	12.4 *
June 2022	18.4 *
July 2022	20.9 *
August 2022	22.4
September 2022	17.8 *
October 2022	10.3 *
November 2022	5.5 *
December 2022	0.5

* Some data is missing

Group Activity: Visual Encoding

Visual encoding is the act of mapping data variables to visual cues. In data visualization and data physicalizations, this means constructing our data to be represented by visual elements like size, colour, and placement.

To make our temperature potholder, we are mapping temperature data to colours. Let's first decide on the temperature ranges for our temperature potholder. Temperature ranges for our potholder should vary from 2-10°C.

Minimum temperature = -6.4°C in January 2022

Maximum temperature = 23.6°C in August 2021

Instructions: Determine the appropriate temperature ranges for our potholder based on the average temperatures provided above. Assign a colour to each temperature range by cutting a piece of the yarn colour and taping it to your handout.

	Temperature Range	Colour
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

How to Crochet

Basic Skills for Crocheting:

- Knotting at the beginning
- Holding the crochet hook
- Chain stitch
- Single crochet
- Colour changes
- Weaving in ends

Further Crochet Resources:

Websites:

How to Crochet for Beginners - Instructables

How to Crochet for Beginners: A Complete Guide - Sarah Maker

Videos:

LEARN TO CROCHET (for real this time) | SLOW Step-By-Step How to Crochet Tutorial – TL Yarn Crafts

Make This Potholder Your Own!

- Use mean monthly averages from your hometown (if Toronto is your hometown, find another Canadian city!)
- Try replacing mean monthly data with another variable, like the maximum, minimum, median, or mode temperatures of the month
- Change the dates of your data from May 2021 – December 2022 to another timespan. It could be daily temperatures instead of monthly temperatures from the 1800's!

Contact Us!

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