


VISUAL EXPLAINERS

CS 448B | Fall 2024

MANEESH AGRAWALA

1

© The New York Times



See How the Dixie Fire Created Its Own Weather

This year's largest blaze generated powerful storm clouds. We show you in 3-D.

By Nadja Popovich, Noah Planer, Nicholas Bartolozzi, Evan Greifson,
Daniel Margulies, Kartheik Prasad and Scott Peckham

Oct. 20, 2021

2

ANNOUNCEMENTS

4

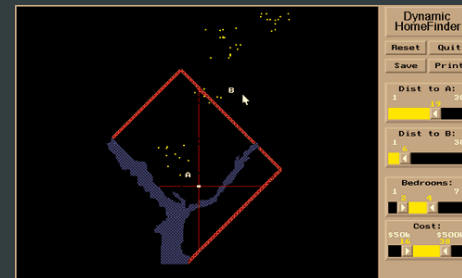
ASSIGNMENT 3: INTERACTION

Due 10/28 10:30am

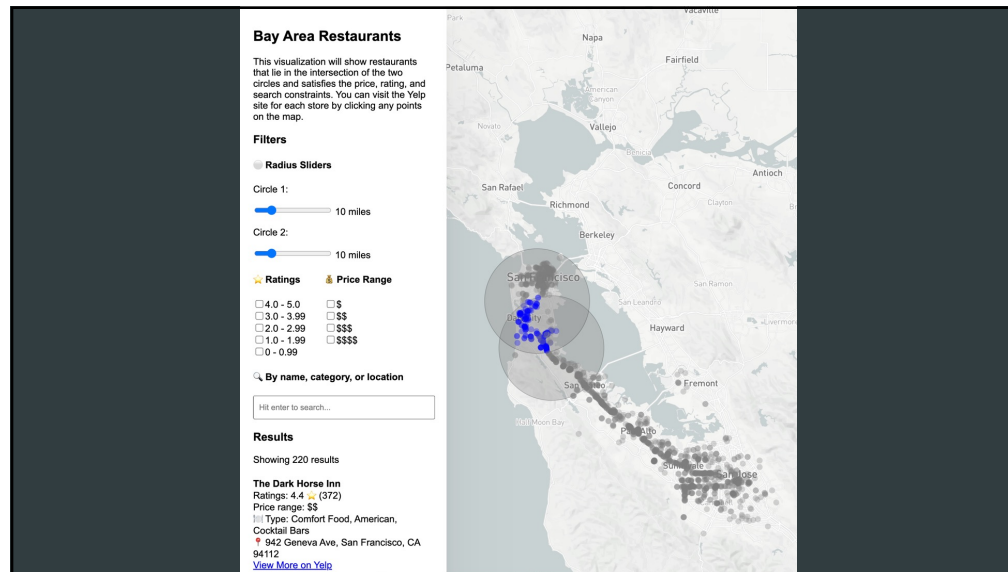
Create a small interactive dynamic query application similar to HomeFinder, but for Bay Area restaurants.

1. Implement interface
2. Submit the application as a website and a short write-up on canvas

Can work alone or in pairs



5



6

TODAY

Learning Objectives

1. How stories are constructed in journalism and especially with data.
2. Using interactivity and sequencing to visually convey narrative.

7



8



10

narrative (n): An account of a series of events, facts, etc., given in order and with the establishing of connections between them

"... require[s] skills like those familiar to movie directors, beyond a technical expert's knowledge of computer engineering and science."

- Gershon & Page '01

11

August 26, 2010

Generals Wary of Move to Cut Their Ranks

By GINGER THOMPSON and THOM SHANKER

WASHINGTON — Maj. Gen. Paul D. Eaton, a retired Army officer, is familiar with the perks and pitfalls of power, having commanded tens of thousands of troops at Fort Benning, Ga., managed budgets exceeding \$2 billion in Iraq, and overseen layers upon layers of staff members who helped manage both his professional duties and his personal life.

He has experienced the full range of lifestyles that come with military leadership, living at one point in an elegant antebellum mansion, and at another, with eight other officers crowded in a marble bathhouse behind one of Saddam Hussein's old palaces.

When he traveled, he was occasionally able to justify the use of military aircraft, but most times, he said, he flew coach. And today he lives on a pension worth 75 percent of his military salary, with health benefits that cover everything except dental and eye care for himself and his wife.

"We are well compensated, and we live very comfortable lives," General Eaton said, referring to the military's most senior leaders. "But when you look at all the things going on around a general, the nation is getting a very, very high return on its money."

Not everyone at the Pentagon agrees. Two weeks ago, Defense Secretary Robert M. Gates announced a sweeping effort to improve efficiency that, among other things, takes aim at the military's sacrosanct corps of generals and admirals, ordering his staff to cut at least 50 positions, and making clear that he would be happier if they cut more.

12

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Anecdotal Lead (1st paragraph called Lede)

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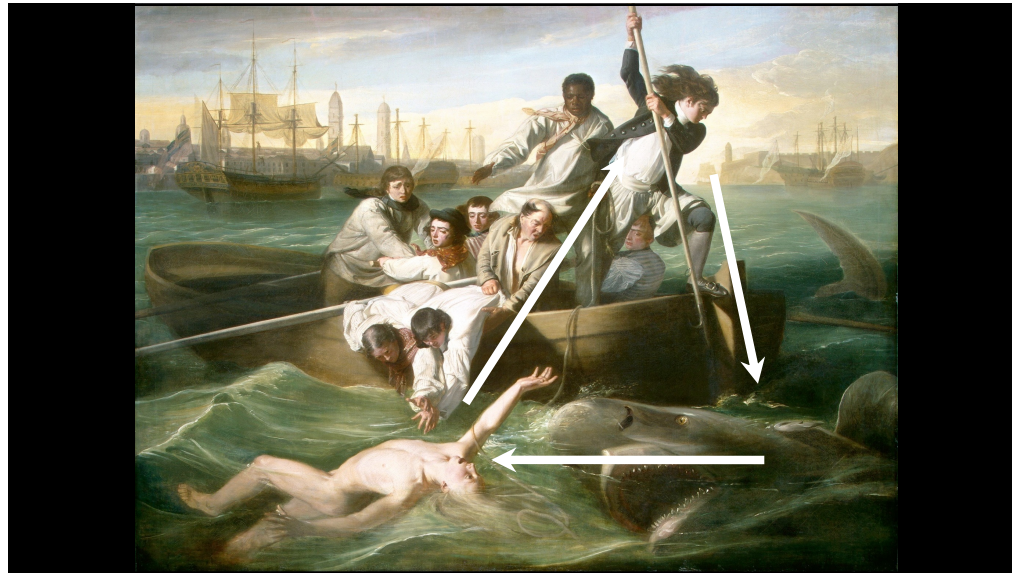
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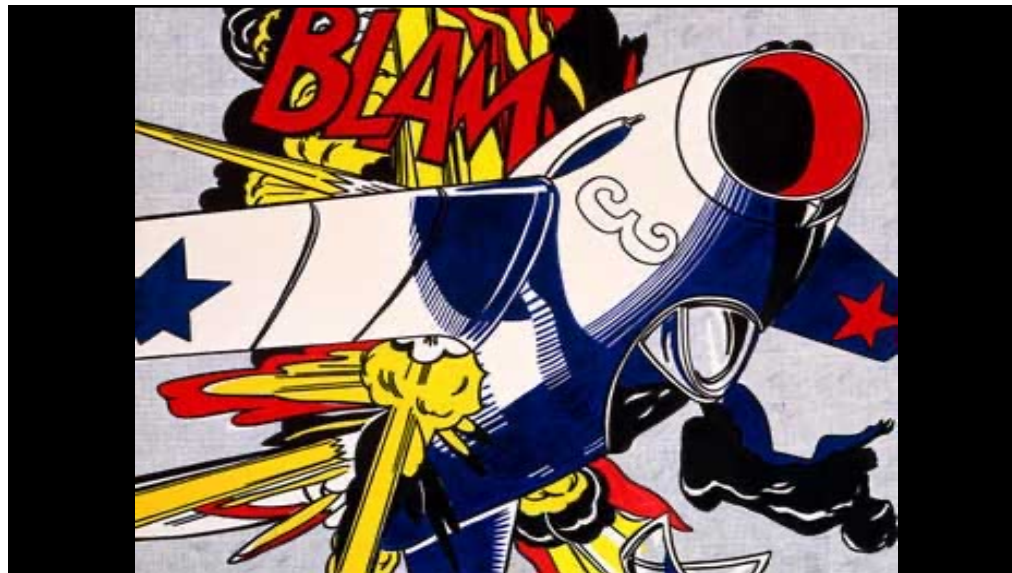
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Nut Graph

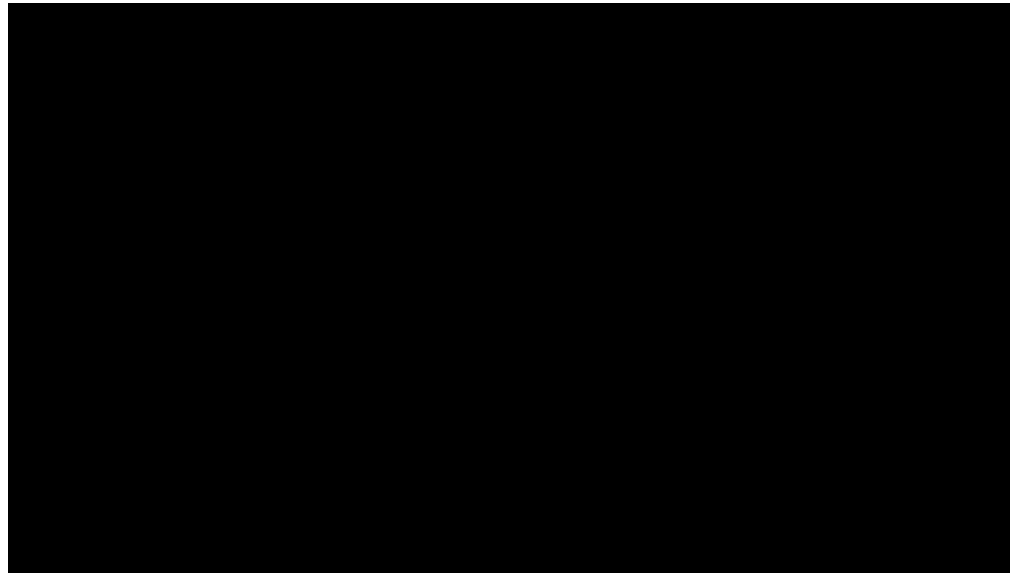
14




15



16




19



Montage / editing

- Prescribed order
- Where you look explicitly directed
- Little reader/viewer agency



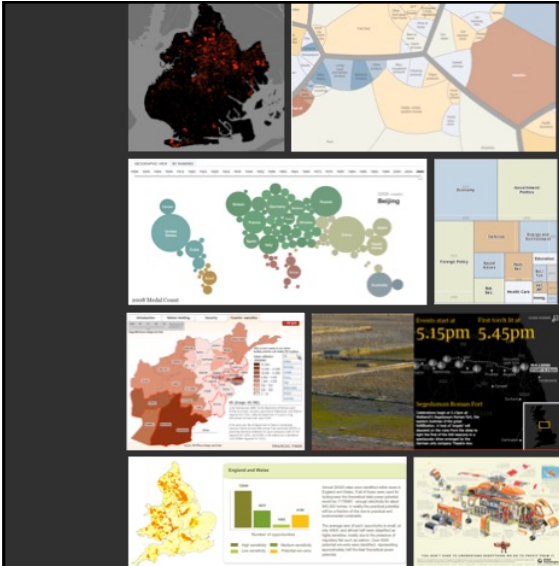
Ensemble staging / direction

- Less prescribed order
- Salience, structure nudges you to look
- More reader/viewer agency

20

DESIGN SPACE OF NARRATIVE VISUALIZATION

21




58
CASE STUDIES

- 70% Journalism
- 20% Business
- 10% Research

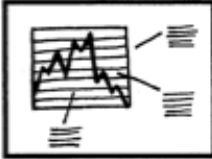
[Segel & Heer 2010]

22


Seven Genres



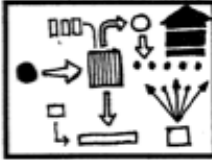
Magazine Style



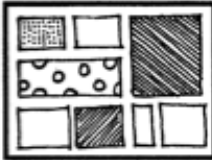
Annotated Chart




Partitioned Poster




Flow Chart



Comic Strip




Slide Show



Film/Video/Animation

Genres for Narrative Visualization (Segel & Heer 2010)

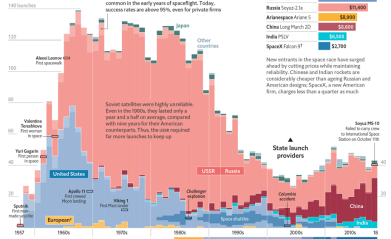
23



MAGAZINE STYLE

Space launches

Launch volume, shown in a lighter colour, were common in the early years of spaceflight. Today, success rates are about 90% over the period from 1957 to 2013.



Soviet conditions were highly restrictive. Even in 1968, the Soviet Union's payload and a half of its range, compared with the payload and range of American counterparts. This, the size required for space agencies to grow up.

New entrants in the space race have targeted high altitude communications satellite launching capability. China and India have been considered by analysts as emerging markets. In space launch, China and India plan to follow suit in Asia. Both off-lance services began to grow.

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*United Launch Alliance's partnership of Boeing and Lockheed Martin. This includes various forms of rockets from heavy-lift (ULA).

Sources: ESA, Launches, McDonnell Douglas/Spaceflight International press reports.

Cost to reach low Earth orbit in 2018

1.9 kg of cargo, payload launch weight

ULA's Vulcan	\$150
Russia Soyuz-2.1s	\$850
AtlasSpace Falcon 9	\$650
China Long March 2D	\$1000
India ISRO	\$150
SpaceX Falcon 1	\$1200

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Commercial launch providers

ULA's Vulcan, AtlasSpace Falcon 9, China Long March 2D, India ISRO, SpaceX Falcon 1.

Other off-lance providers

China, India, Russia, USA, Japan.

A modern space race

The next generation

Private businesses and rising powers are replacing the cold-war duopoly

reaching orbit was hard. Between 1957 and 1981, 5% of American launches and 30% of Soviet ones failed. Accidents will happen, even shortly after launch. Both countries landed unhurt. Only states could assume such risks—and even if. American firms had wanted to lead them, but the government would not let them on its national security grounds. Competition began to swell across the globe, including from other states, but this is a side with space.

This changed when European countries set up state-owned company called Astirspace, which later became the contractor of state-makers around the world. When the space race began, companies in Asia, Europe and space agencies. Now it is mostly private business and the governments of developing countries.

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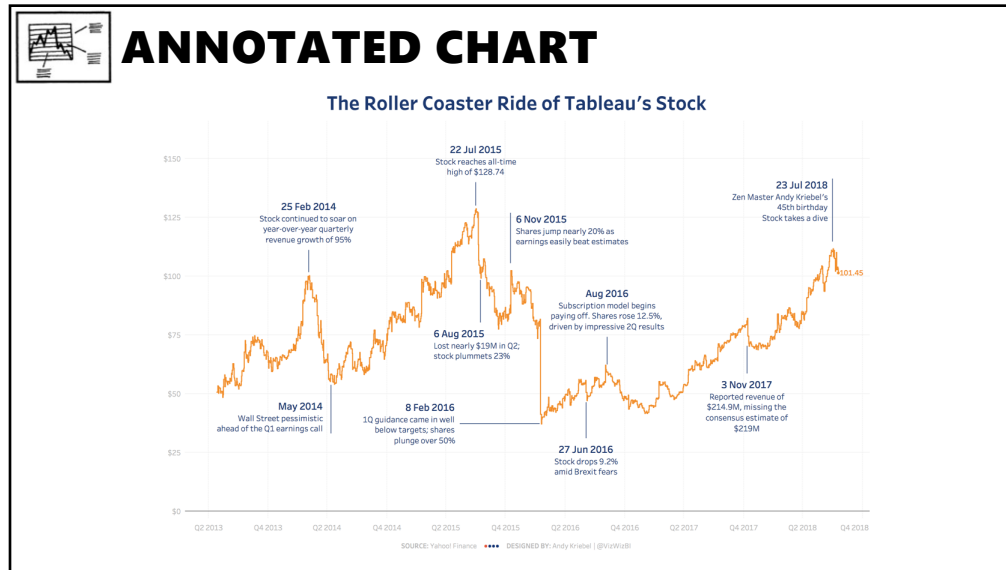
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During the early years of the space race, came new customers for private launch firms, alongside the satellite operators. In the past decade the world's space launch market has become more competitive thanks to an innovative new entrant, SpaceX. But state-run programmes will still lead the way in emerging markets. In space launch, China and India plan to follow suit in Asia. Both off-lance services began to grow.

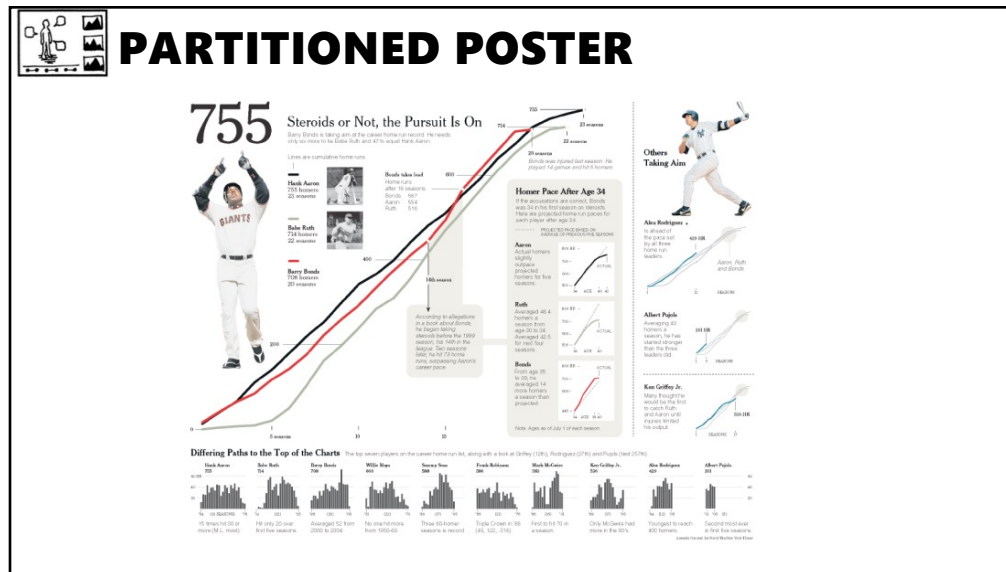
China did launch private space flight in 2014, but its companies have their eye on the future. They need independent Asian firms have strategic goals as well as their own priorities. They need independent access to space for communication, intelligence and navigation. However, commercial space goes, the competition will never be evenly economic.

24

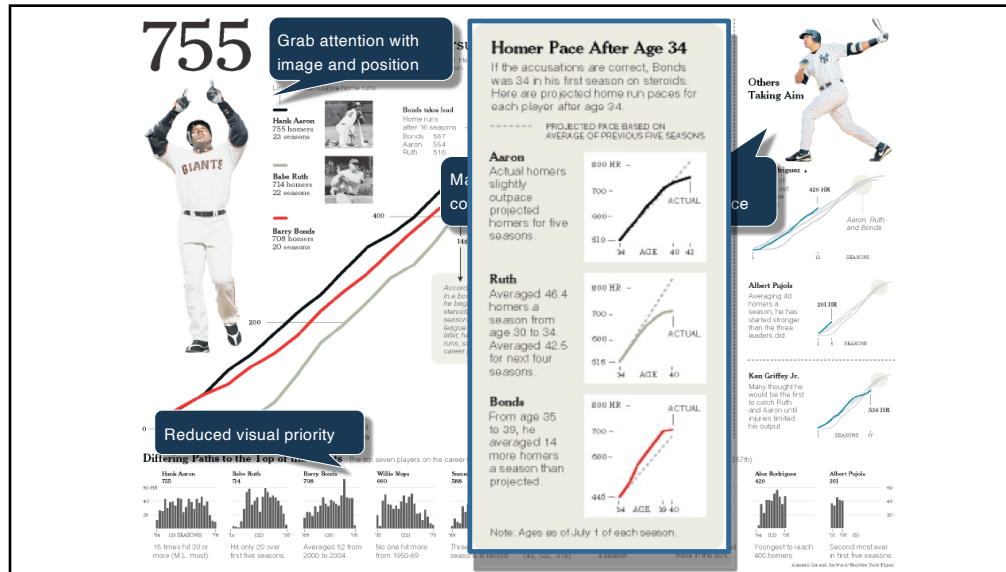
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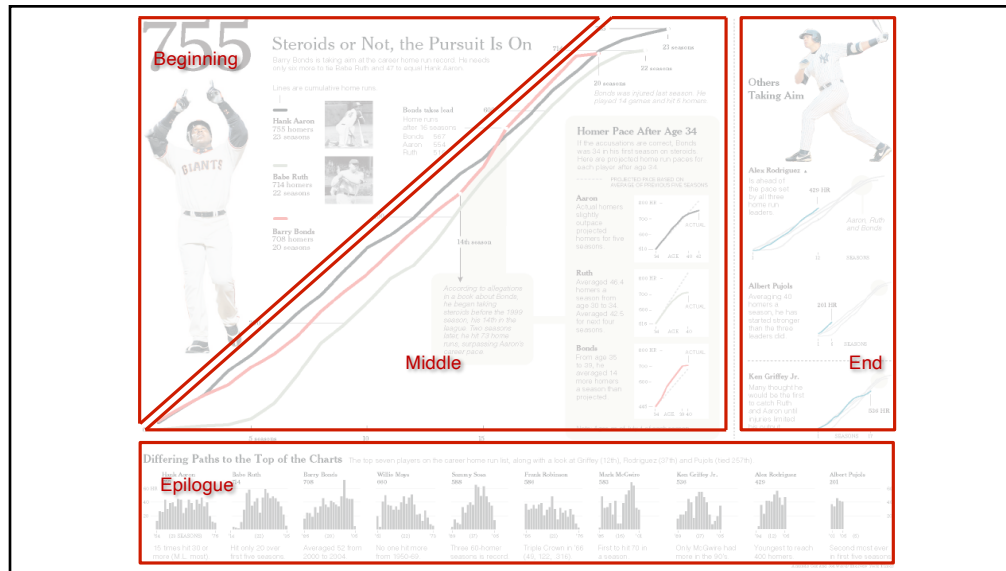
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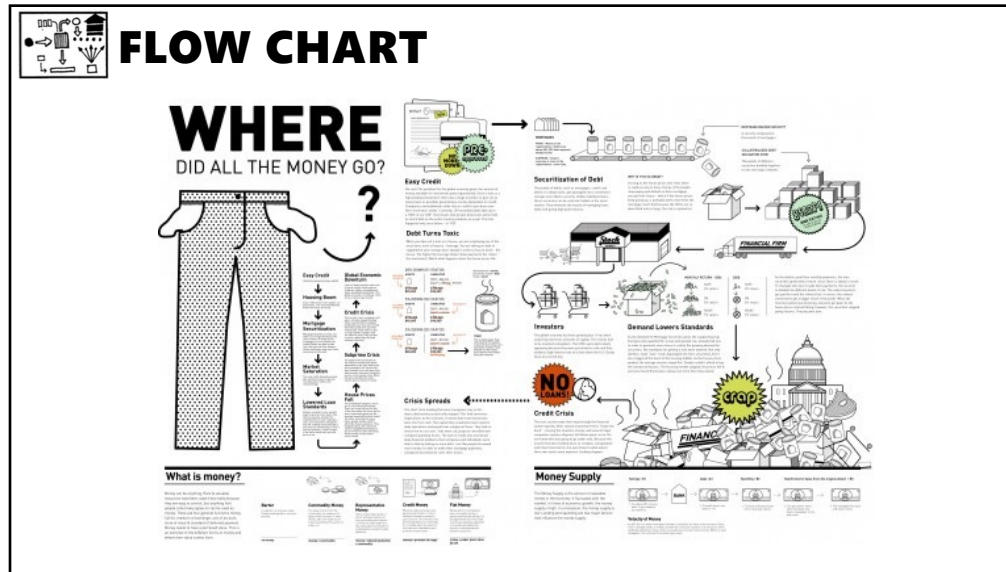
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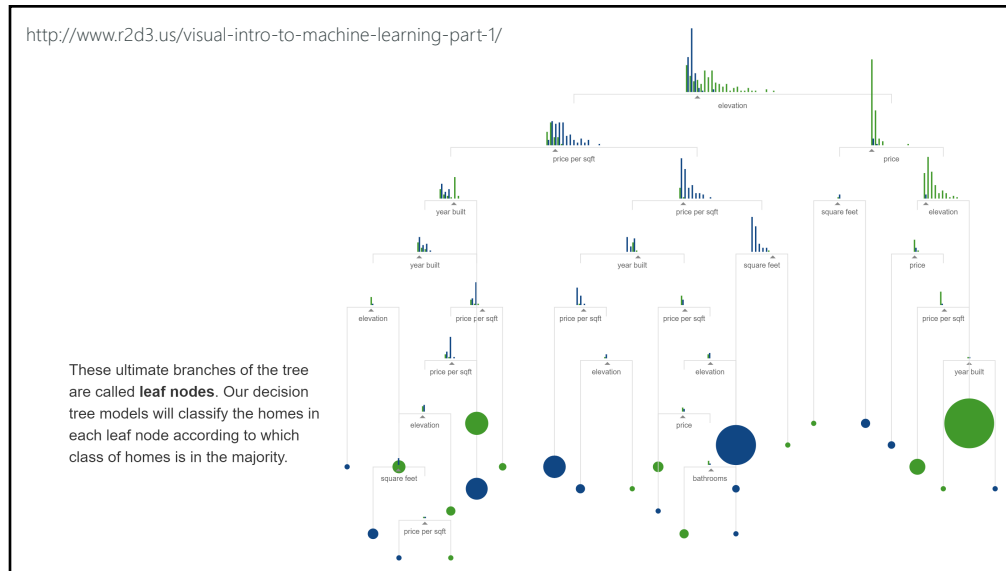
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28



29



30

COMIC STRIP

THE US CENSUS POPULATION DATA
Population Pyramid data for US baby boom in 1960. Peak - Female Blue - Male

BABIES BORN IN 1960
In 1960, the babies born reached 1st peak for both females (pink) and males (blue) and formed a generation of baby boom.

BABIES BORN IN 1975
In 1975, babies born dropped to a normal level.

BABIES BORN IN 1985
In 1985, babies born kept dropping.

BABIES BORN IN 2000
In 2000, the number of babies born recovered a bit.

BIRTH RATE 1960-2000
The birth rate dropped in 1960 and 1975, and then increased in 2000 again.

<https://datacomics.github.io/>

31

The number of flights was dramatically decreased in 2020. But do you remember how many flights you took in 2019? (Move the slider to input the times)

0 times of inner continental flights
0 times of cross continental flights

In 2019, you travel 0 times, a total of 0 km by plane.

That's about 0 times around the globe.

Which produced around 0 tons of CO₂.

How much is 0 tons of CO₂ indicate? Click one panel from following options to compare the amount:

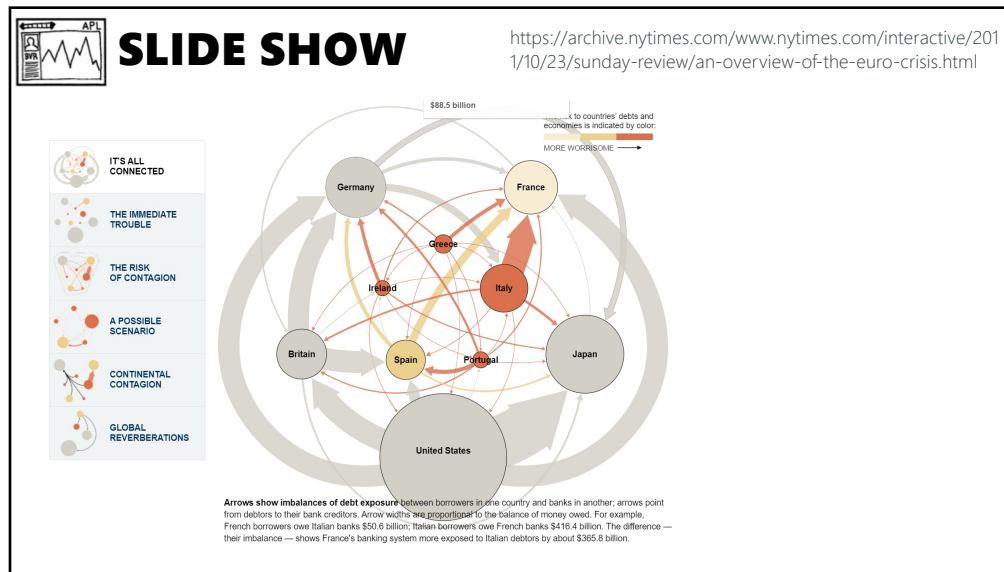
Average CO₂ production by human

CO₂ absorbed by trees

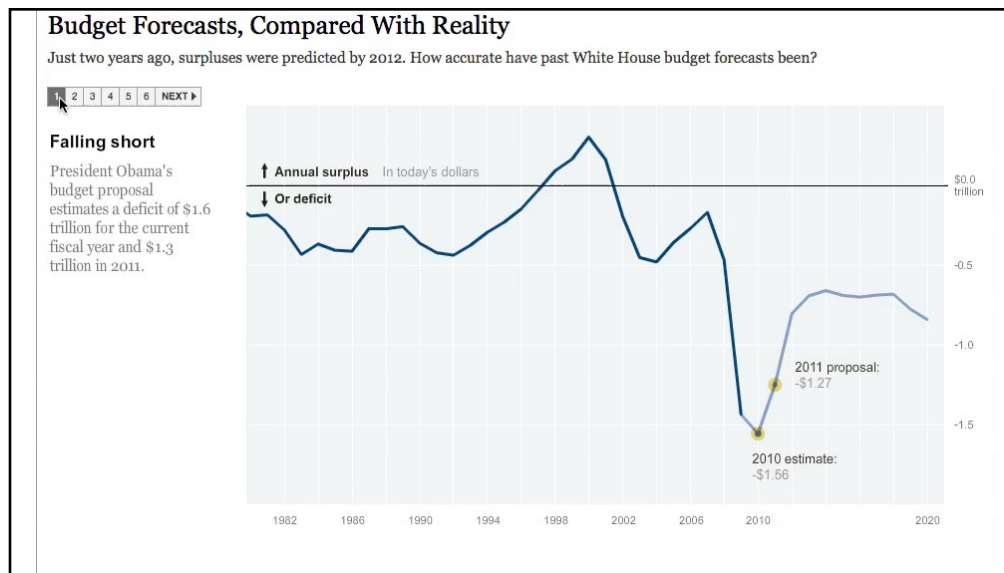
Equivalent greenhouse gasses by cows' farts and burps

<https://interactivedatacomics.github.io/examples.html>


32

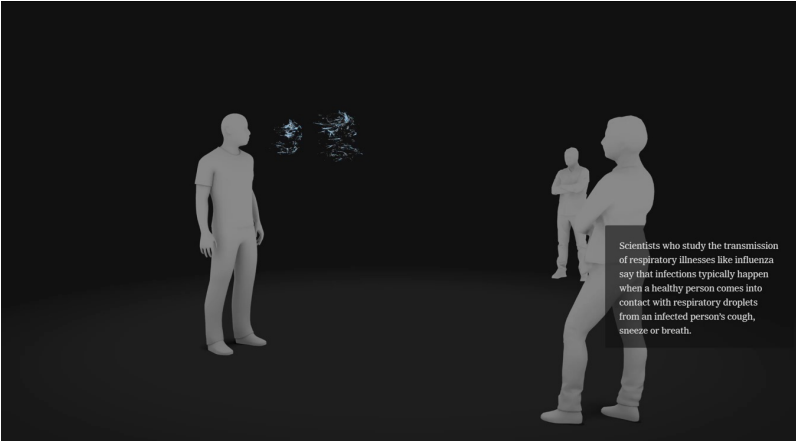


34



35

 **FILM/VIDEO/ANIMATION**



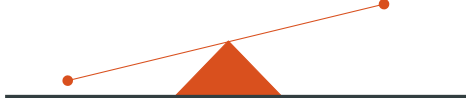
Scientists who study the transmission of respiratory illnesses like influenza say that infections typically happen when a healthy person comes into contact with respiratory droplets from an infected person's cough, sneeze or breath.

<https://www.nytimes.com/interactive/2020/04/14/science/coronavirus-transmission-cough-6-feet-ar-ul.html>

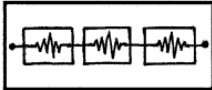
36

GUIDANCE

40




Author driven
Prescribed ordering
Stronger messaging
Limited interactivity



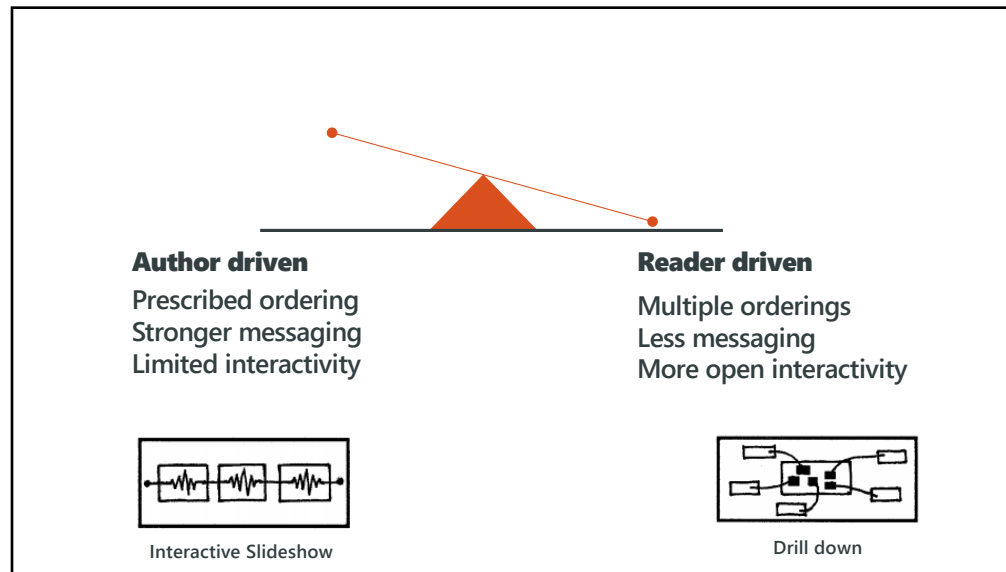
Interactive Slideshow

42



<https://archive.nytimes.com/www.nytimes.com/interactive/2013/10/09/us/yellen-fed-chart.html>

43



44

Now Viewing: Overview Up Close: Camp 15

Major Prison Camps

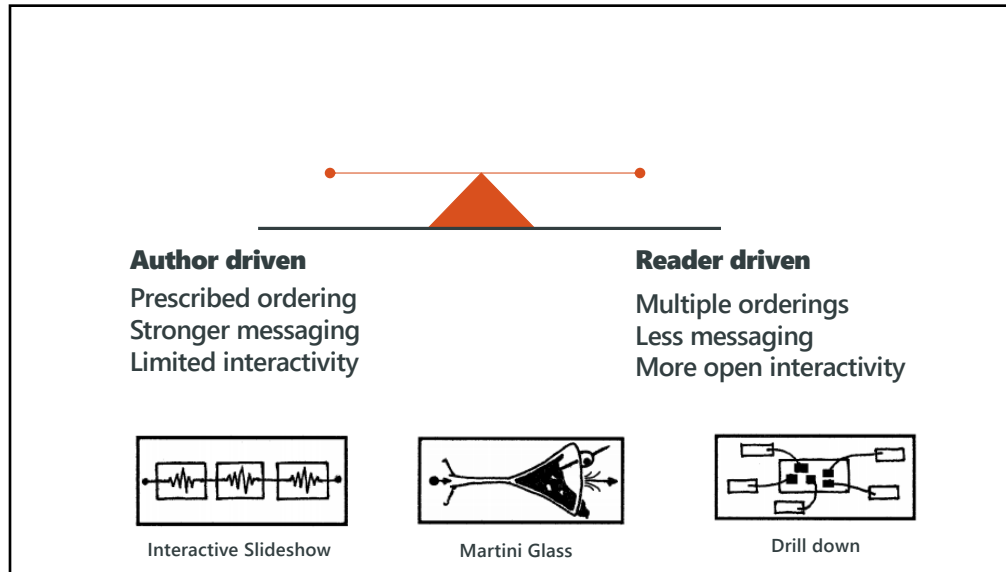
The existence of five main camps has been confirmed by survivors, escapees and former guards. Most prisoners work 12-hour days, making military uniforms, felling trees or tilling fields until they die of malnutrition-related illnesses, usually before the age of 50. North Korea allows no outsiders into the remote, mountainous camps.

Learn more about five major prison camps at right, or take a closer look at life in Camp 15.

Scale varies in this perspective.
 Distances from Pyongyang: 120 miles to Seoul, 427 miles to Vladivostok

<https://www.washingtonpost.com/wp-srv/special/world/north-korean-prison-camps-2009/>

45



46



47

DRAW YOUR EXPECTATIONS

TheUpshot



You Draw It: How Family Income Predicts Children's College Chances

By GREGOR AISCHE, AMANDA COX and KEVIN QUEALY MAY 28, 2015

How likely is it that children who grow up in very poor families go to college? How about children who grow up in very rich families?

We'd like you to **draw your guess** for every income level on the chart below.

If you think the chances of enrolling in college (or vocational school) are about the same for everyone, you should draw something like this:

— If you think the odds are especially harsh for children from the poorest families, but higher for middle- and higher-income children, your drawing would instead look like this: Or here is one for a situation in which chances level off after a certain income threshold: Or for one that spikes or dips for the very richest.

When you've finished drawing, we'll compare your line to the reality for children born in the same years, based on research by a team of

<https://www.nytimes.com/interactive/2015/05/28/upshot/you-draw-it-how-family-income-affects-childrens-college-chances.html>

49



I'm comfortable if a social media website ...

collects detailed personal information about me, like my gender and interests

... and uses this information to target advertisements

[Click here to draw the line where shown](#)

... and lets companies upload customer lists, matching my phone or email with the one I've added to my profile, so they can send me targeted advertising

... and buys information about me from third parties, like my purchase history, to augment their profile about me

... and receives details about my activity from other websites on the internet, like things I buy and sites I visit

... and receives information on what I buy in physical stores

... and lets third parties download basic information on my friends without their consent

... and lets third parties download detailed information on my friends, like their relationship status and interests, without their consent

... and serves me targeted ads on a smart TV app that has a relationship with the website

<https://www.nytimes.com/interactive/2019/04/10/opinion/privacy-survey.html>

51

SIMULATIONS

Faster pickup times mean more idle drivers.
Change the number of drivers in this ride-share simulation. Faster pickup times for riders require a greater percentage of drivers to be idling unused.

50 DRIVERS | 75 | 125 | 250

5
Minutes passengers are waiting

18
Percent of drivers idling

Count

Recovered	8
Healthy	111
Sick	83

Change over time

<https://www.nytimes.com/interactive/2017/04/02/technology/uber-drivers-psychological-tricks.html>
<https://www.washingtonpost.com/graphics/2020/world/corona-simulator/>

53

Watch how the measles outbreak spreads when kids get vaccinated - and when they don't

👤 vaccinated
👤 susceptible
👤 vaccinated but susceptible
👤 infected
👤 contact with an infected person

NOT PROTECTED
10.0% vax rate

NOT PROTECTED
30.0% vax rate

50.0% vax rate

58.5% vax rate, similar to Okanogan County, WA

68.9% vax rate, similar to Thurston County, WA

74.4% vax rate, similar to Island County, WA

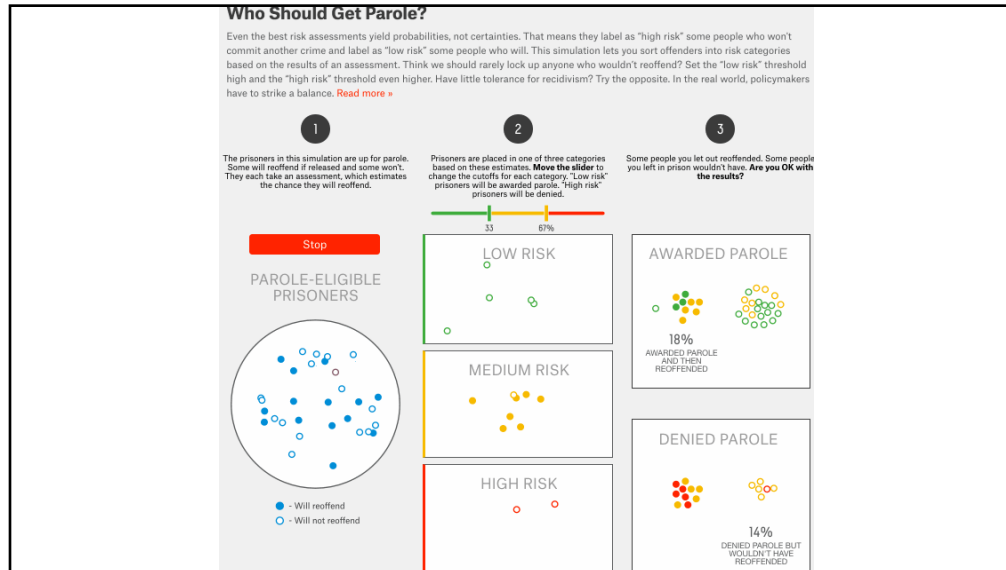
83.8% vax rate, similar to Santa Cruz County, CA

86.0% vax rate, similar to Los Angeles County, CA

90.0% vax rate, similar to Orange County, CA

99.7% vax rate, similar to Gadsden County, FL

54



55



57



58

Star 1,503

idyll

A toolkit for creating data-driven stories and explorable explanations.

INPUT (EDITABLE)

```
# Hello World
[var name:"x" value:5 /]
The value of x is [Display value:x format:"d" /].
[Range value:x min:0 max:10 /]
```

OUTPUT

Hello World

The value of x is 5.

[View Example Gallery](#)

Quick Start | Docs | GitHub | Chat | Twitter | Support Us

Idyll is a markup language and toolkit for writing interactive articles. Idyll's reactive document model and standard component library decrease the amount of code needed to create high quality multimedia narratives. Idyll uses web standards to produce output that will load quickly in any web browser and is fully extensible.

Idyll enables collaboration between programmers and journalists, researchers and designers. Those familiar with JavaScript can write custom components using tools like D3 or React.

59

SUMMARY

Narrative visualizations blend communication via **imagery and text** with interaction techniques

Specific strategies can be identified by studying what expert designers make

Tools to facilitate construction of effective explainers is an active area of Visualization research

60

61