Programar antes de hacer matemáticas?

Federico J. Zertuche
DIDE, UTA

Qué son las matemáticas?

Draw a diagram to represent each mixed number. Write each mixed number as an improper fraction.

5. $1\frac{1}{2}$ 6. $2\frac{2}{5}$ 7. $5\frac{1}{3}$

8. $2\frac{1}{4}$ 9. $3\frac{2}{3}$ 10. $1\frac{7}{8}$

Write each improper fraction as a mixed number.

11. $\frac{7}{2}$ 12. $\frac{11}{4}$ 13. $\frac{19}{5}$ 14. $\frac{23}{7}$

15. $\frac{63}{8}$ 16. $\frac{100}{9}$ 17. $\frac{13}{3}$ 18. $\frac{15}{6}$

Write each mixed number as an improper fraction.

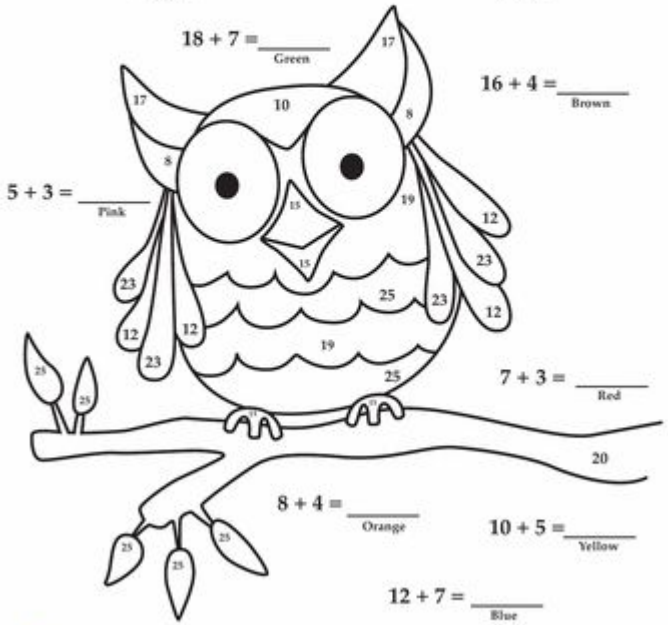
19. $3\frac{1}{2}$ 20. $2\frac{2}{3}$ 21. $3\frac{4}{5}$ 22. $5\frac{1}{4}$

23. $2\frac{1}{8}$ 24. $4\frac{3}{8}$ 25. $8\frac{1}{3}$ 26. $6\frac{2}{5}$

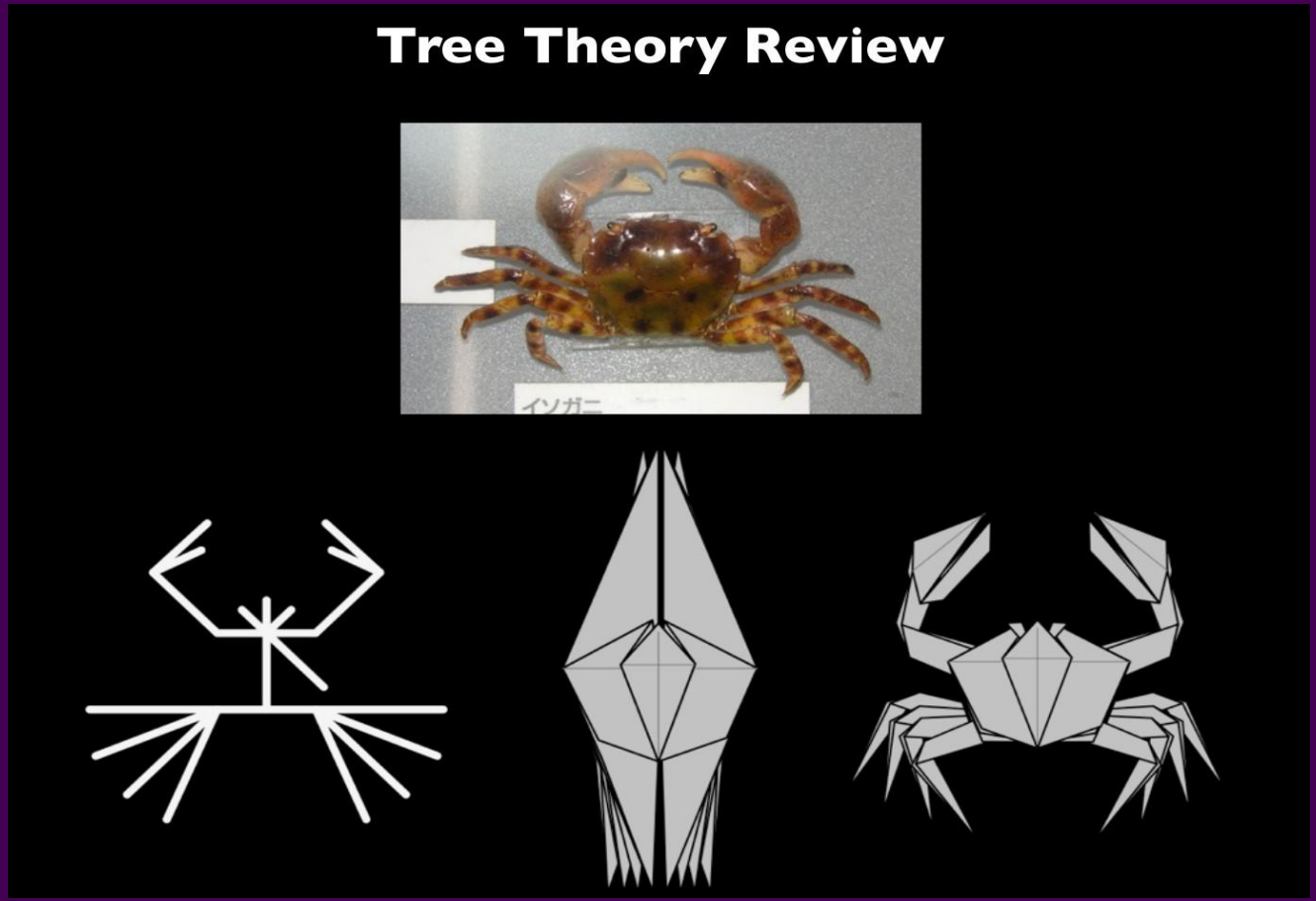
Problems and Applications

Addition Color by Number

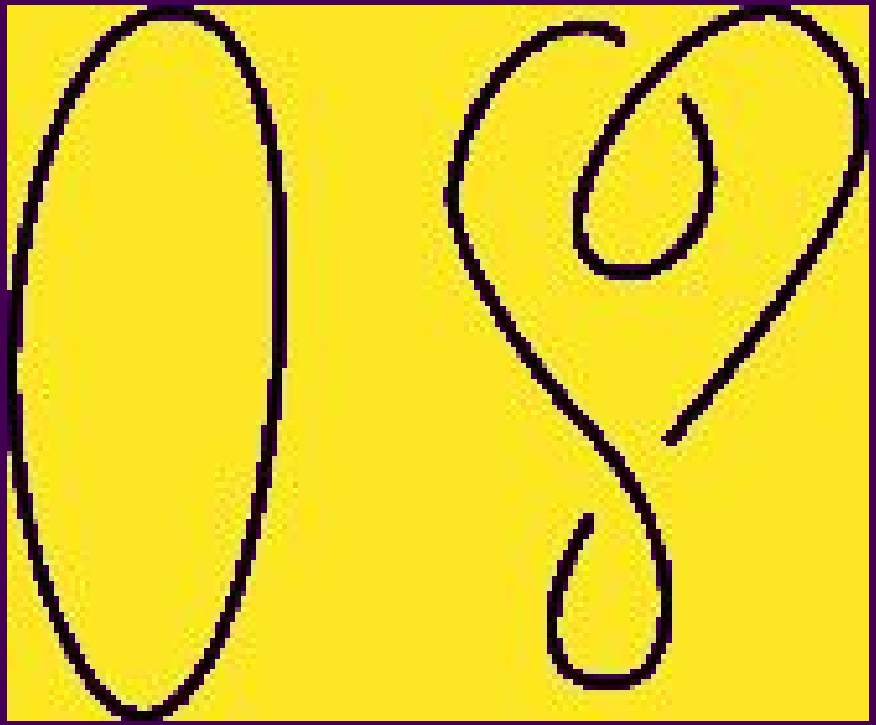
Solve the addition problems then color the owl using the color that matches the answer.

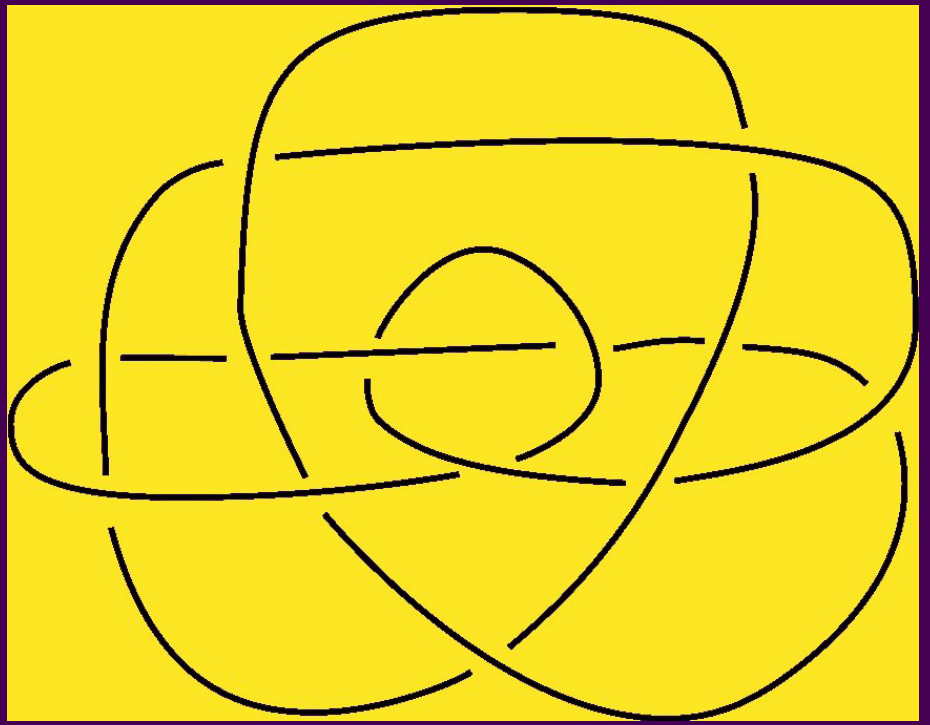


Definir forma



Jason Ku
http://courses.csail.mit.edu/6.849/spring17/lectures/L01.html

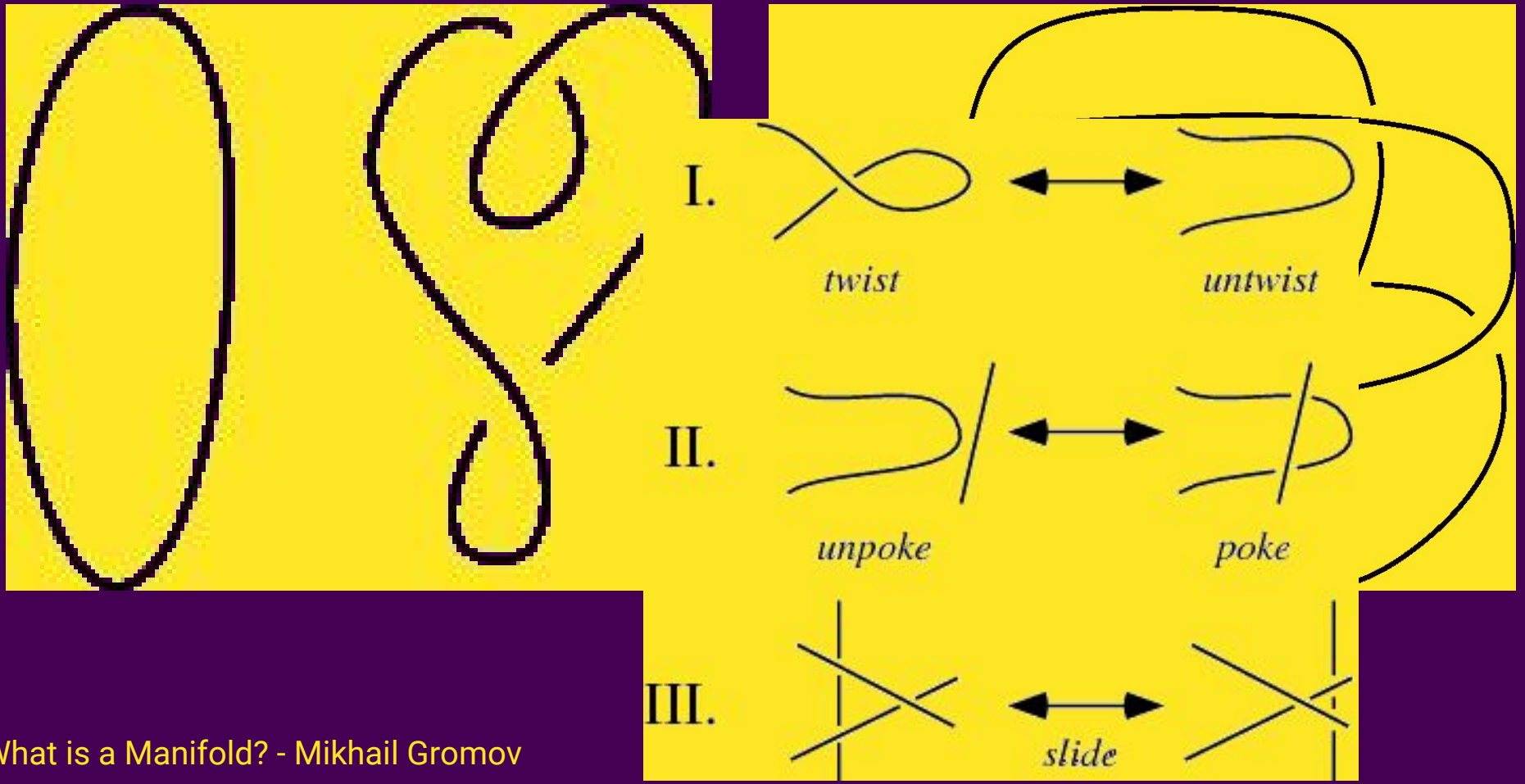




What is a Manifold? - Mikhail Gromov

https://www.youtube.com/watch?v=u5DLpAqX4YA

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



What is a Manifold? - Mikhail Gromov

https://www.youtube.com/watch?v=u5DLpAqX4YA

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

Thurston, Knots to Narnia

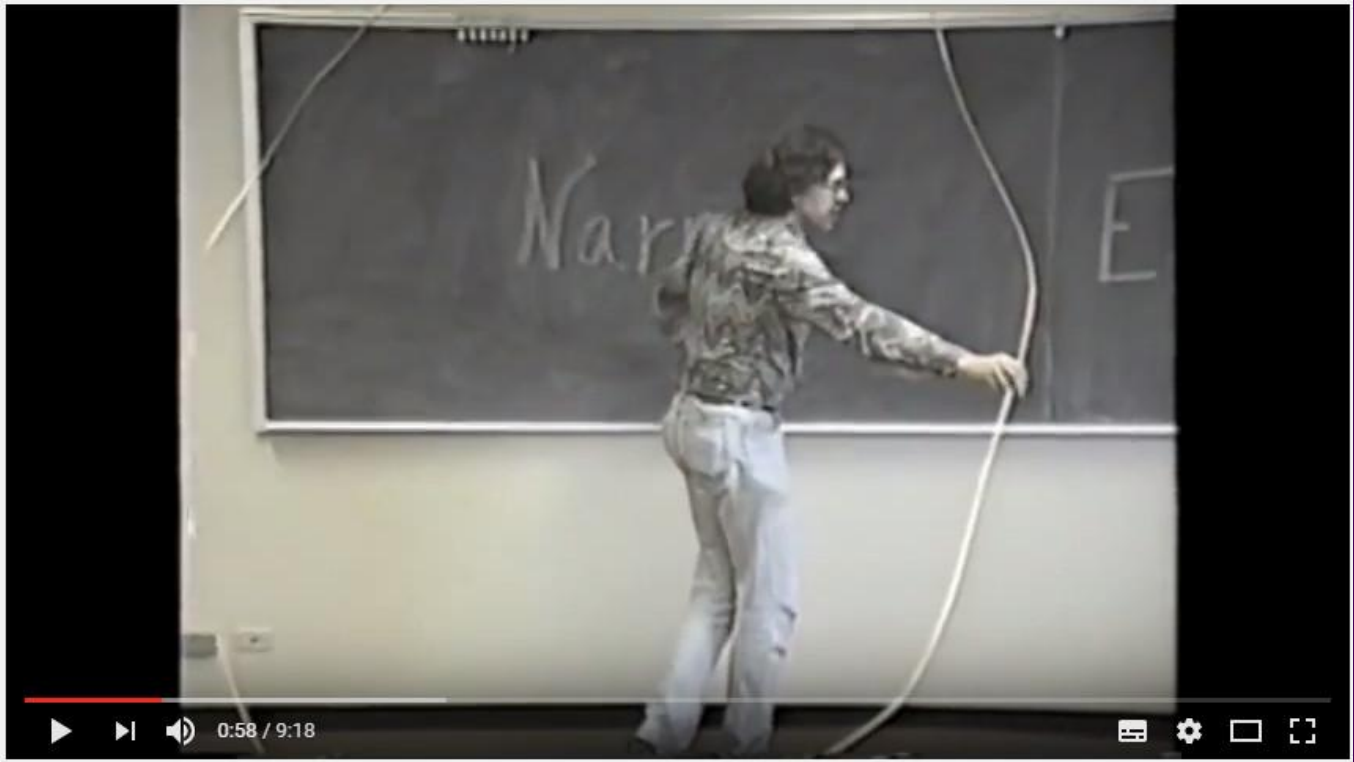
Anthony Phillips

S'abonner 20

7 406 vues

Ajouter à Partager ••• Plus

104 0



Thurston, Knots to Narnia

Anthony Phillips

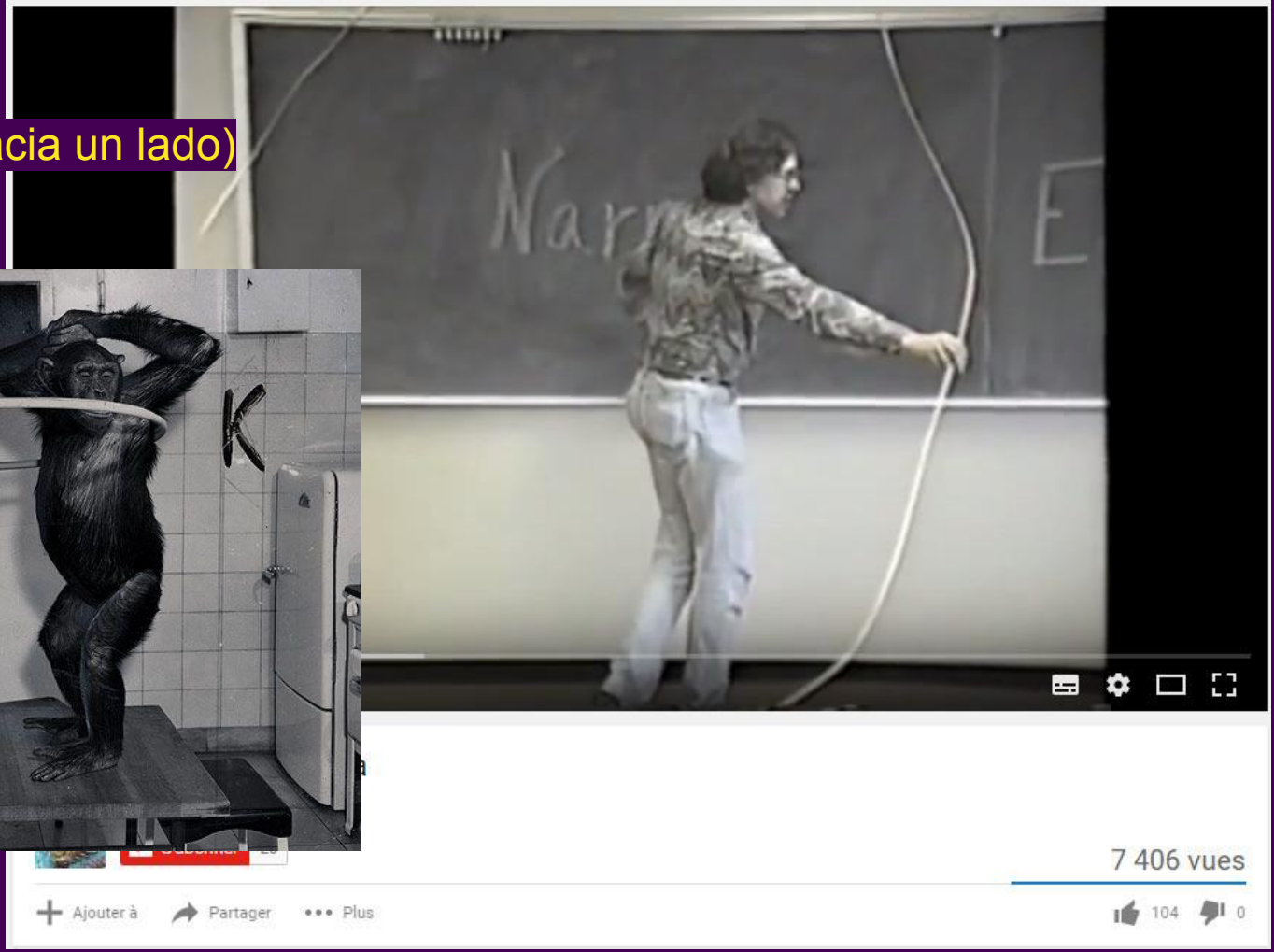
S'abonner 20

7 406 vues

Ajouter à Partager ••• Plus

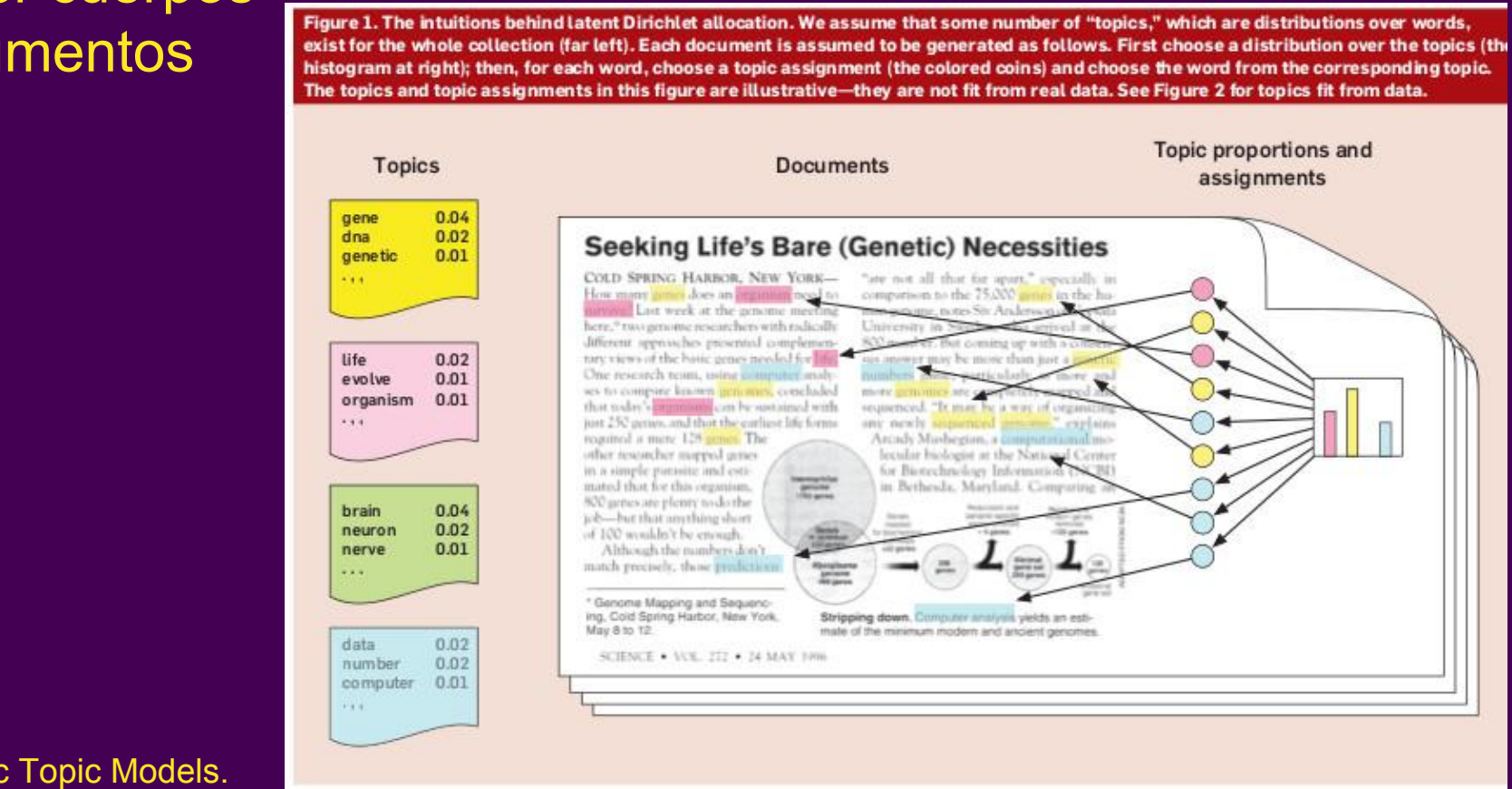
104 0

Perspectiva:
30 Millones de años (hacia un lado)



Nota: En realidad quería un orangután

Entender cuerpos de documentos



Probabilistic Topic Models.
doi:10.1145/2133806.2133826

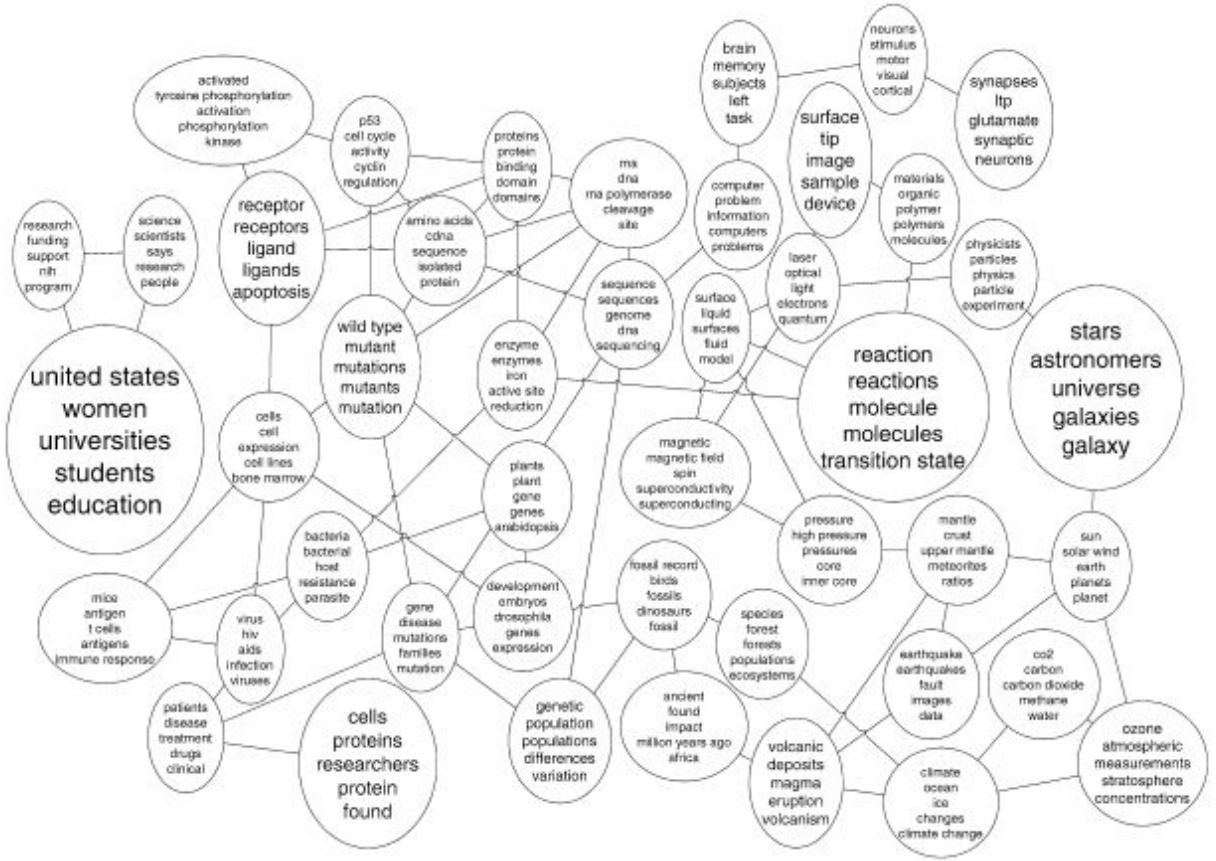
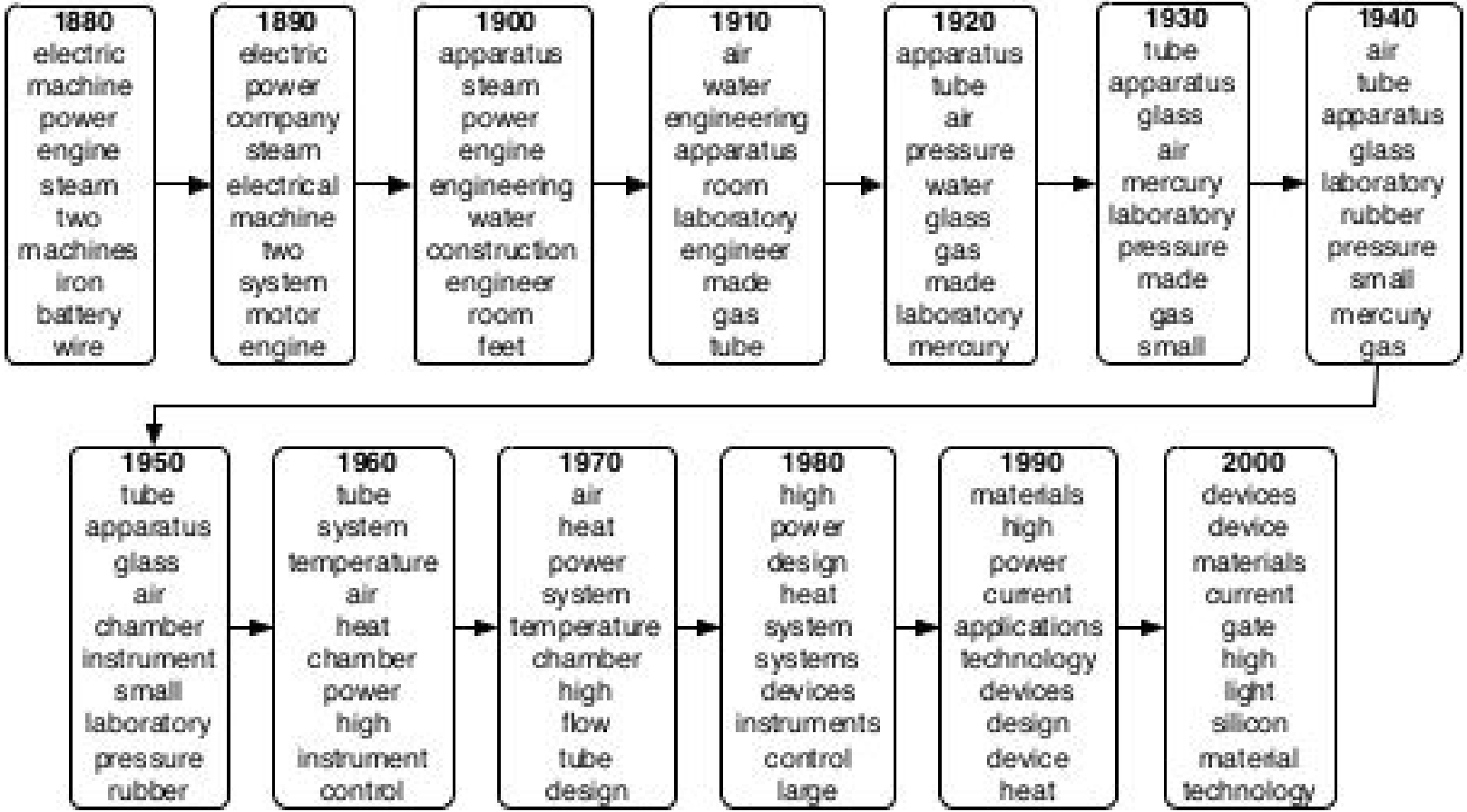


FIG. 2. *A portion of the topic graph learned from* 16,351 *OCR articles from Science* (1990–1999). *Each topic node is labeled with its five most probable phrases and has font proportional to its popularity in the corpus. (Phrases are found by permutation test.) The full model can be found in http://www.cs.cmu.edu/~lemur/science/ and on STATLIB.*


1880
electric
machine
power
engine
steam
two
machines
iron
battery
wire
1890
electric
power
company
steam
electrical
machine
two
system
motor
engine
1900
apparatus
steam
power
engine
engineering
water
construction
engineer
room
feet
1910
air
water
engineering
apparatus
room
laboratory
engineer
made
gas
tube
1920
apparatus
tube
air
pressure
water
glass
gas
made
laboratory
mercury
1930
tube
apparatus
glass
air
mercury
laboratory
pressure
made
gas
small
1940
air
tube
apparatus
glass
laboratory
rubber
pressure
small
mercury
gas
1950
tube
apparatus
glass
air
chamber
instrument
small
laboratory
pressure
rubber
1960
tube
system
temperature
air
heat
chamber
power
high
instrument
control
1970
air
heat
power
system
temperature
chamber
high
flow
tube
design
1980
high
power
design
heat
system
systems
devices
instruments
control
large
1990
materials
high
power
current
applications
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devices
design
device
heat
2000
devices
device
materials
current
gate
high
light
silicon
material
technology

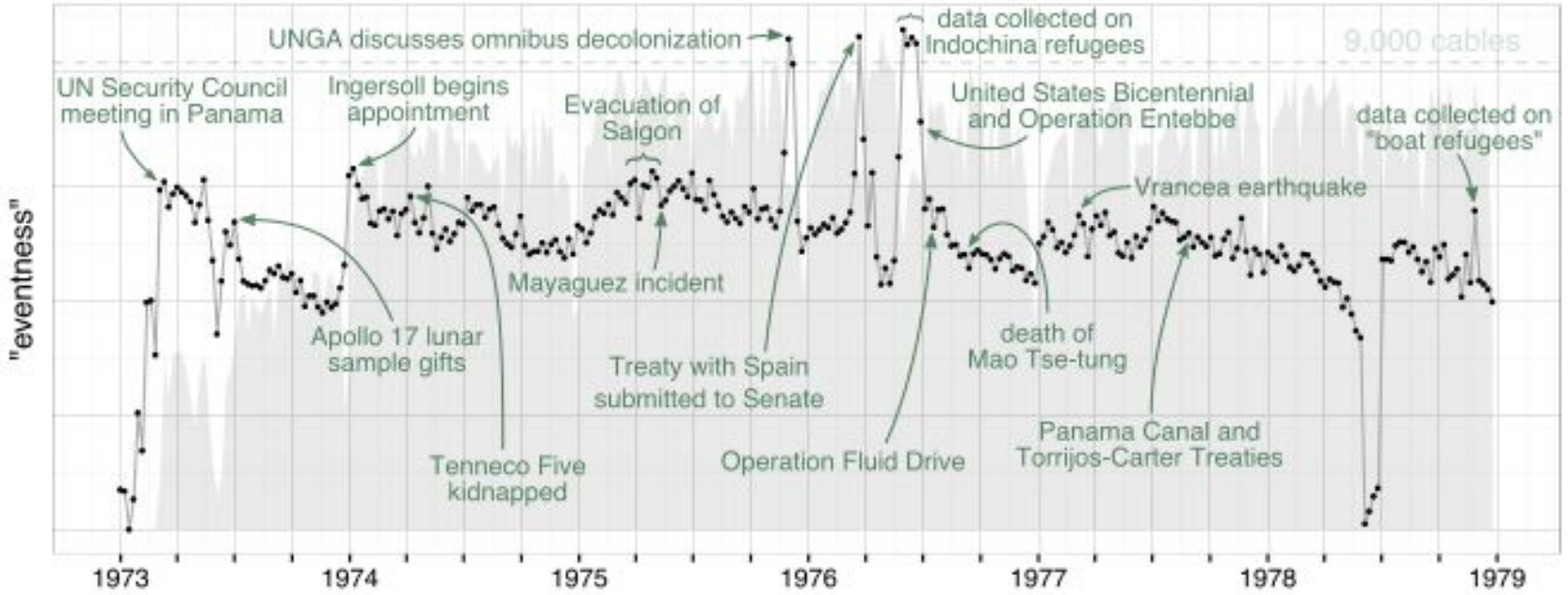


Figure 1: Capsule's analysis (described in detail in section 5) of two million cables from the National Archives' corpus. The y-axis represents a loose measure of "eventness" (equation (5)). The gray background depicts the number of cables sent over time.

Figure 1. The intuitions behind latent Dirichlet allocation. We assume that some number of "topics," which are distributions over words, exist for the whole collection (far left). Each document is assumed to be generated as follows. First choose a distribution over the topics (th histogram at right); then, for each word, choose a topic assignment (the colored coins) and choose the word from the corresponding topic. The topics and topic assignments in this figure are illustrative—they are not fit from real data. See Figure 2 for topics fit from data.

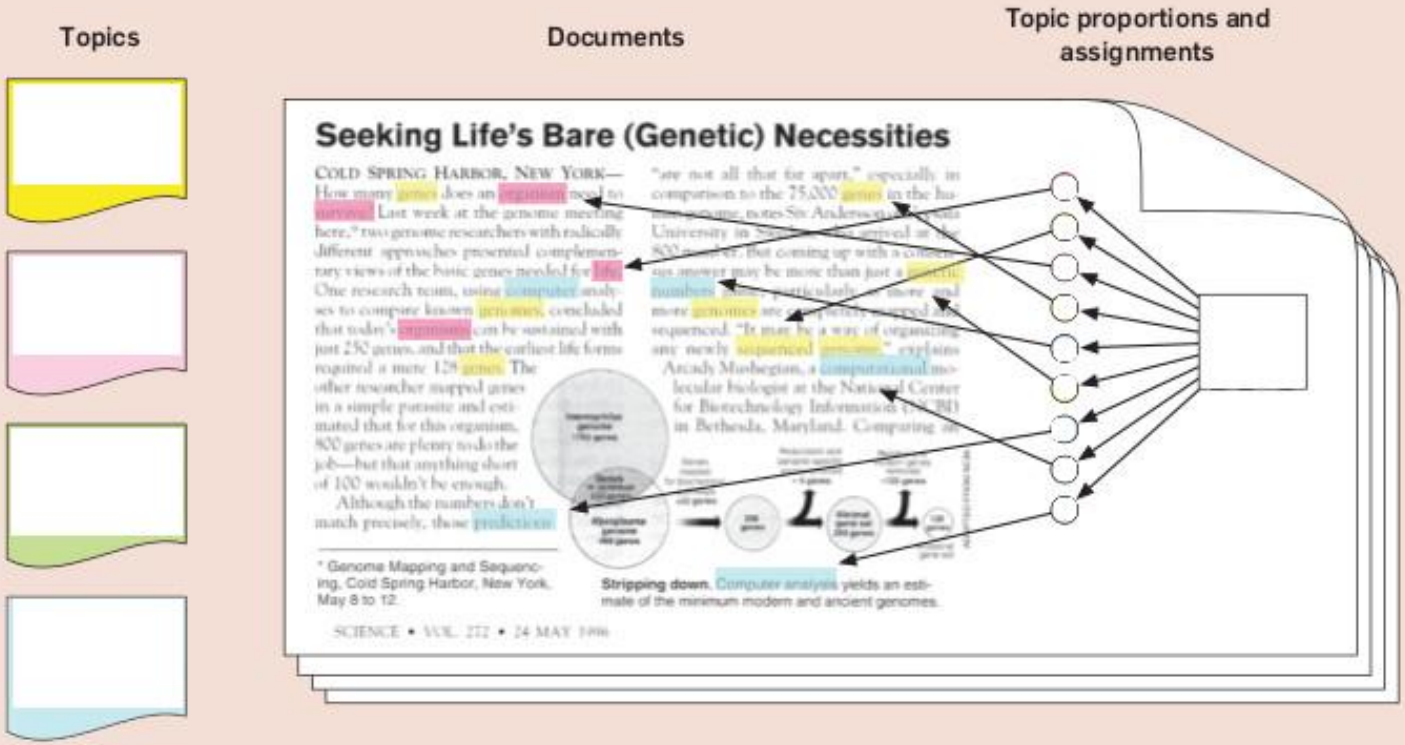
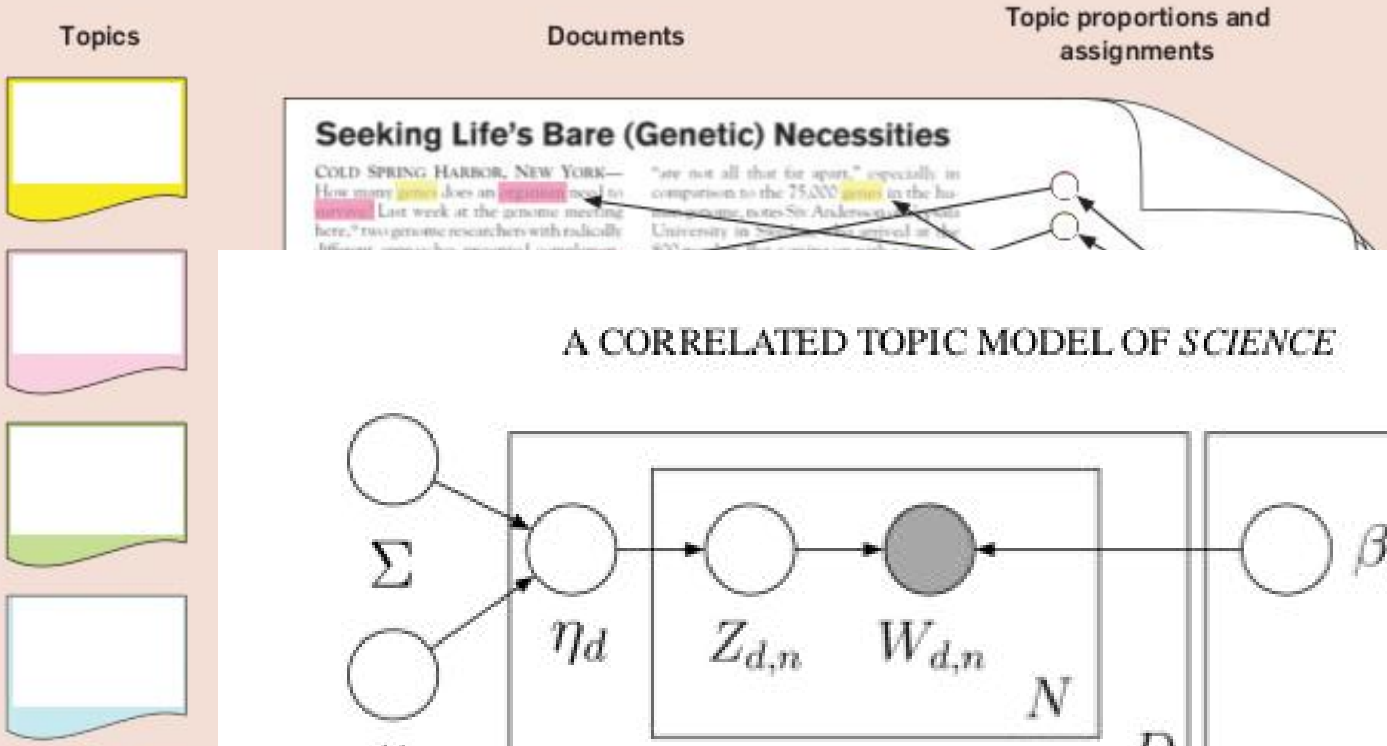


Figure 1. The intuitions behind latent Dirichlet allocation. We assume that some number of "topics," which are distributions over words, exist for the whole collection (far left). Each document is assumed to be generated as follows. First choose a distribution over the topics (th histogram at right); then, for each word, choose a topic assignment (the colored coins) and choose the word from the corresponding topic. The topics and topic assignments in this figure are illustrative—they are not fit from real data. See Figure 2 for topics fit from data.



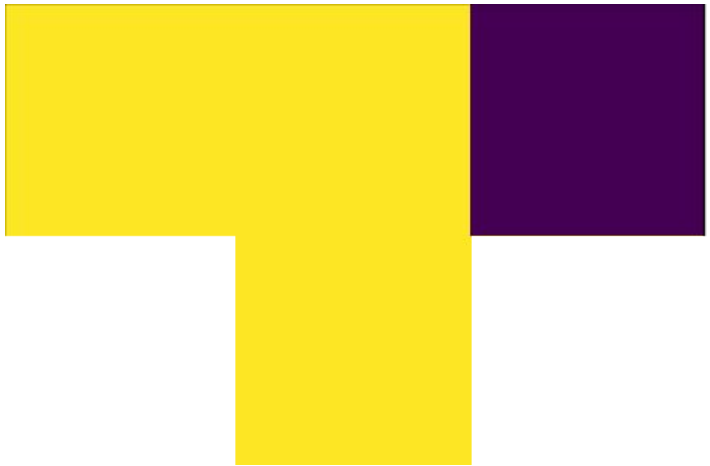
Se trata de conceptos

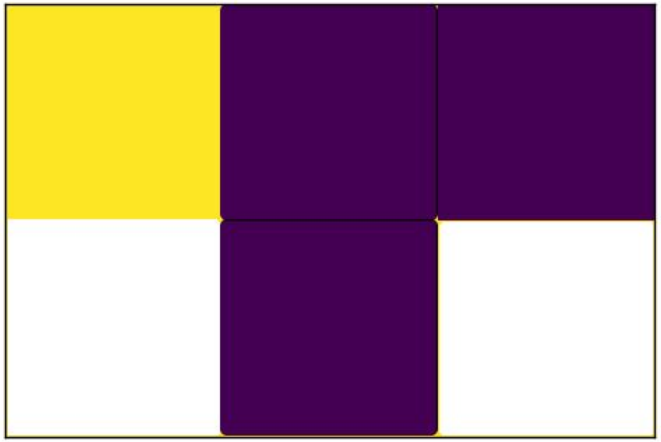
y de las relaciones entre conceptos

Por qué enseñamos números y operaciones?

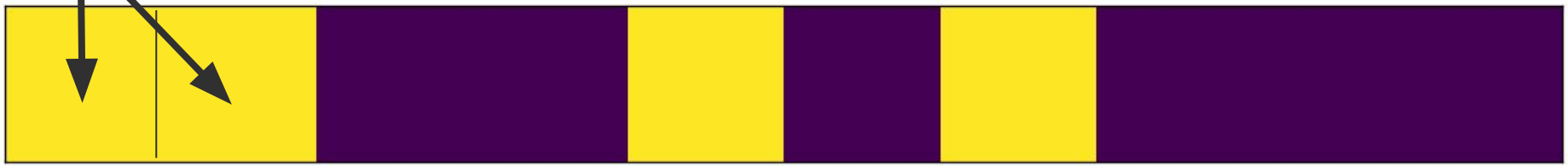
Cómo trabajar con conceptos sin muchos prerrequisitos?

Cambio de Opinión

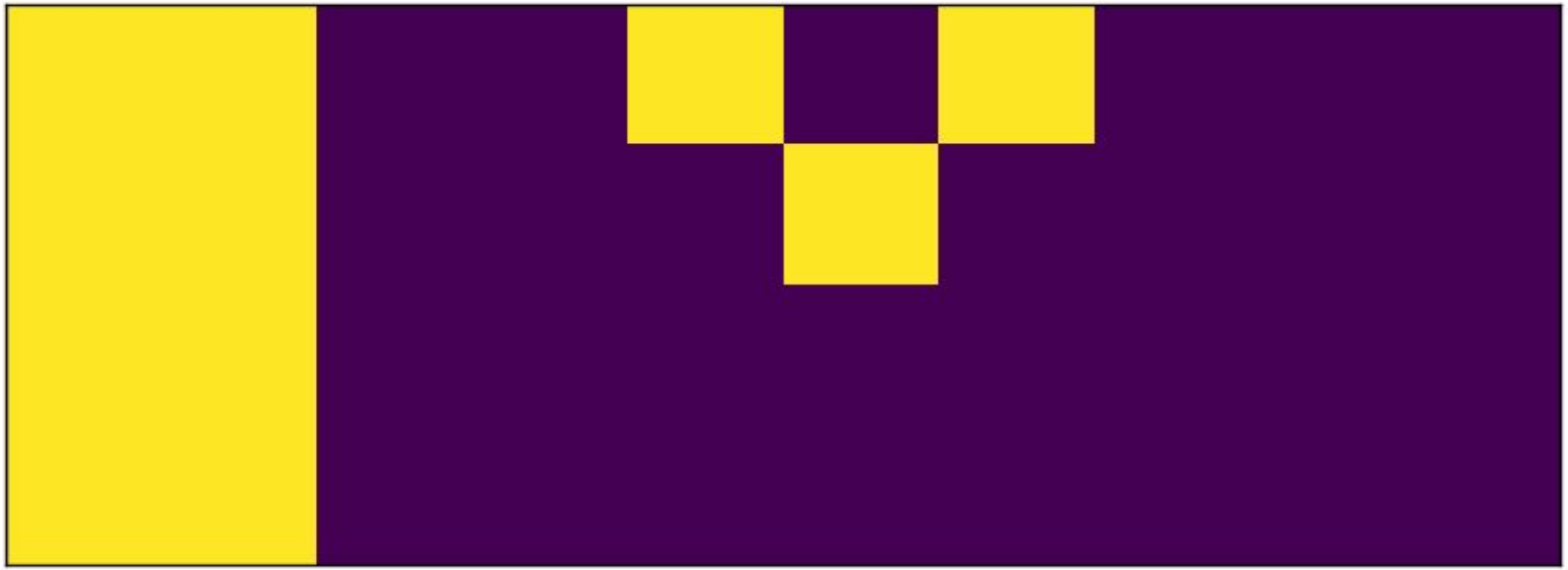




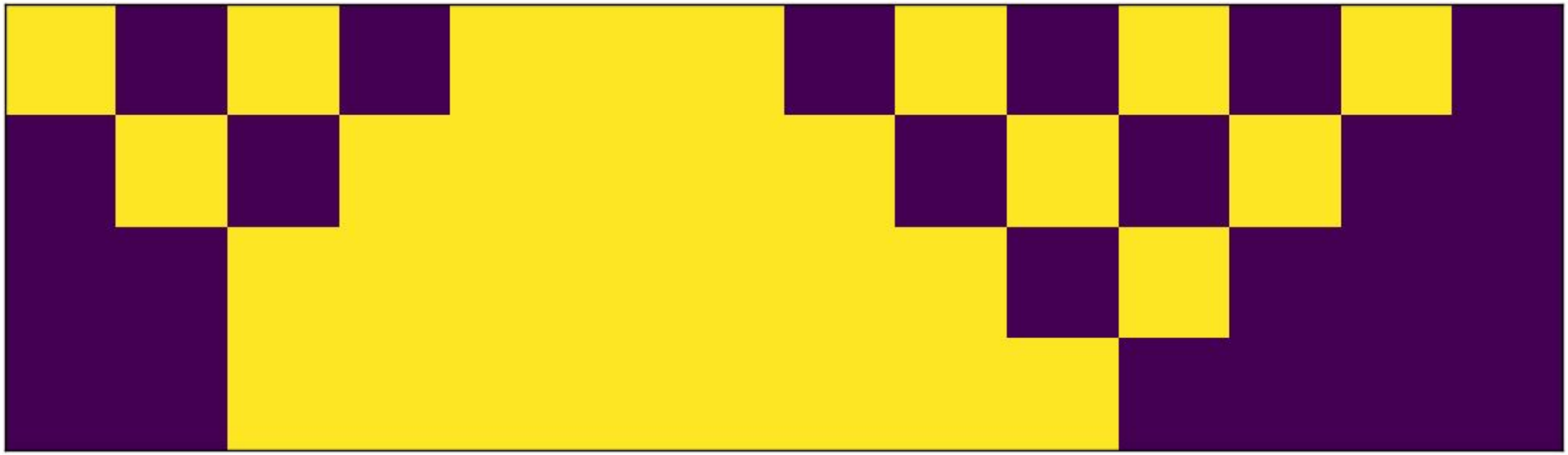
Dos
Amigos



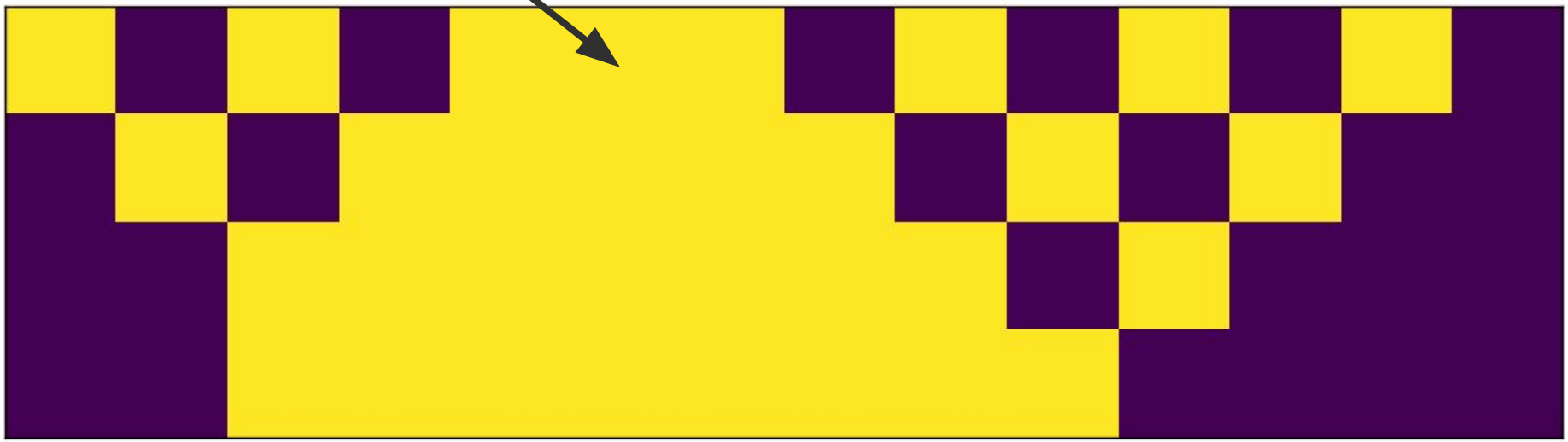
Dos Amigos



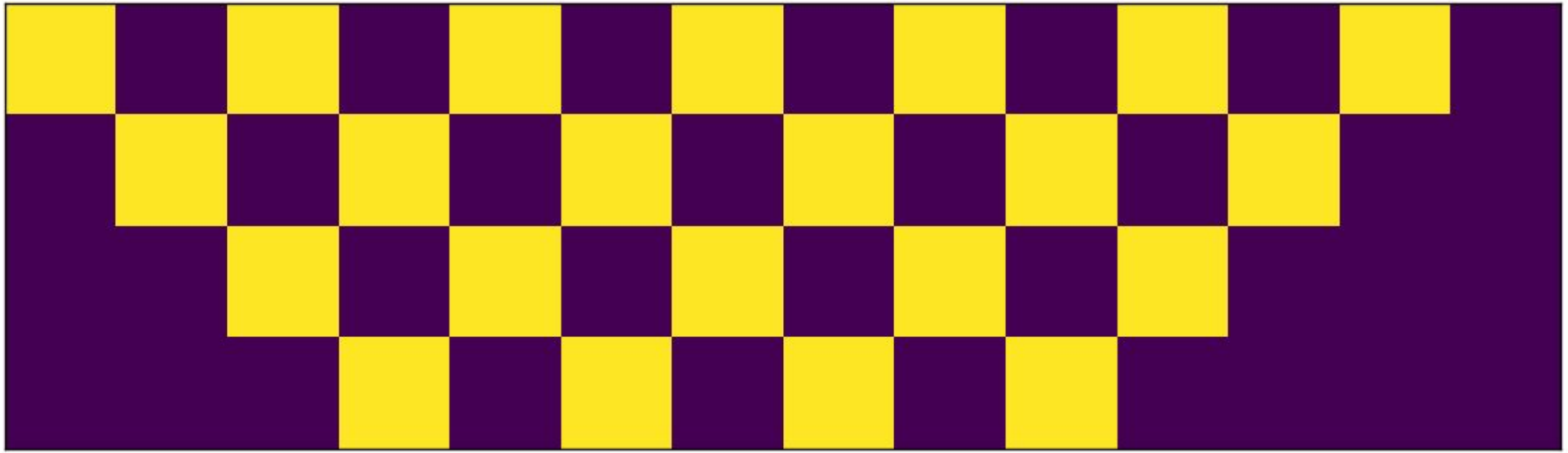
Qué pasa con 3 amigos?



Si él cambia de opinión?



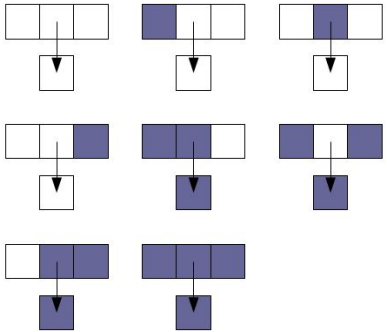
Si él cambia de opinión?



Una hoja y fichas

Changement d'opinion

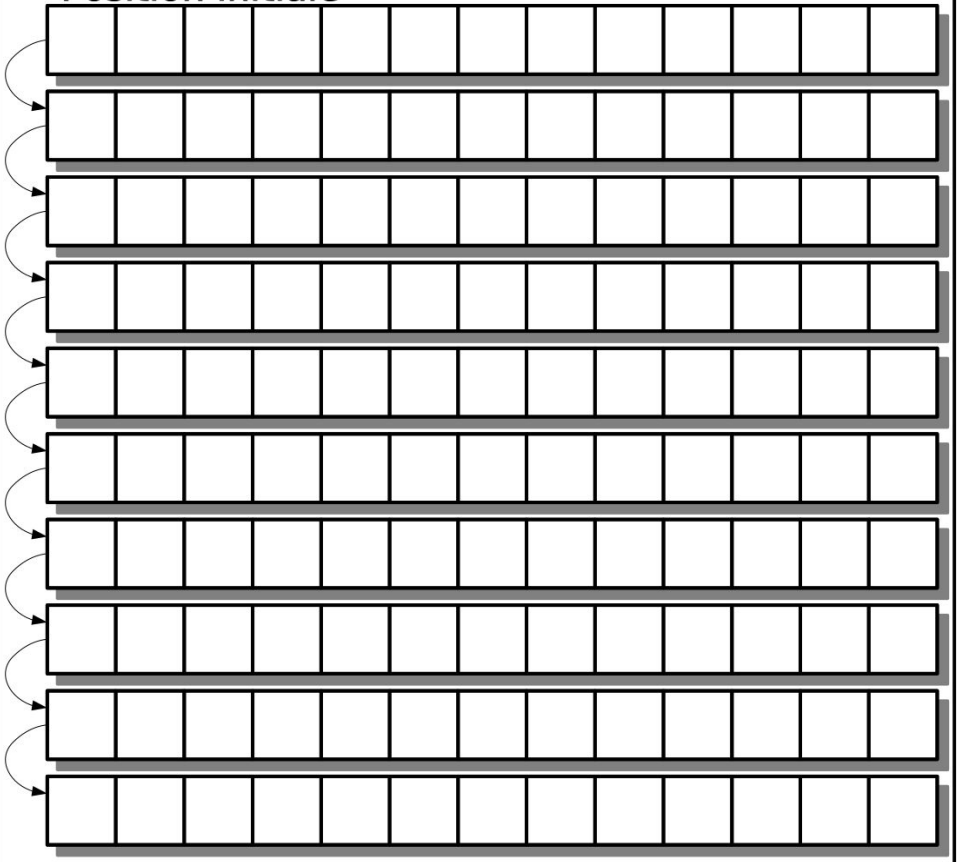
Règles : à l'étape suivante, la case adopte la couleur majoritaire du groupe formé par ses voisins et elle-même.



Pour les cases du bord, on peut décider que leur voisin manquant est toujours blanc ou bien qu'elles sont voisines l'une de l'autre (la bande se boucle en cercle).

Cet automate est un modèle extrêmement simple d'évolution des opinions, des modes, des idées...
On constate que les opinions minoritaires disparaissent et que la situation finit par se stabiliser en grands blocs d'opinions distinctes.

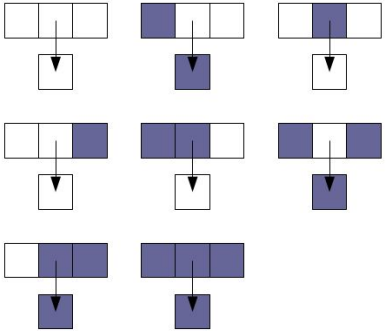
Position initiale



Un modelo para los autos

Règle 184

Règles : une case colorée avance vers la droite si la case devant est blanche.



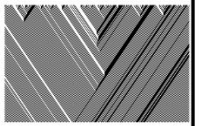
Pour les cases du bord, on peut décider que leur voisin manquant est toujours blanc ou bien qu'elles sont voisines l'une de l'autre (la bande se boucle en cercle).

Cet automate est un modèle simple de simulation du trafic routier. On peut tester des situations particulières :

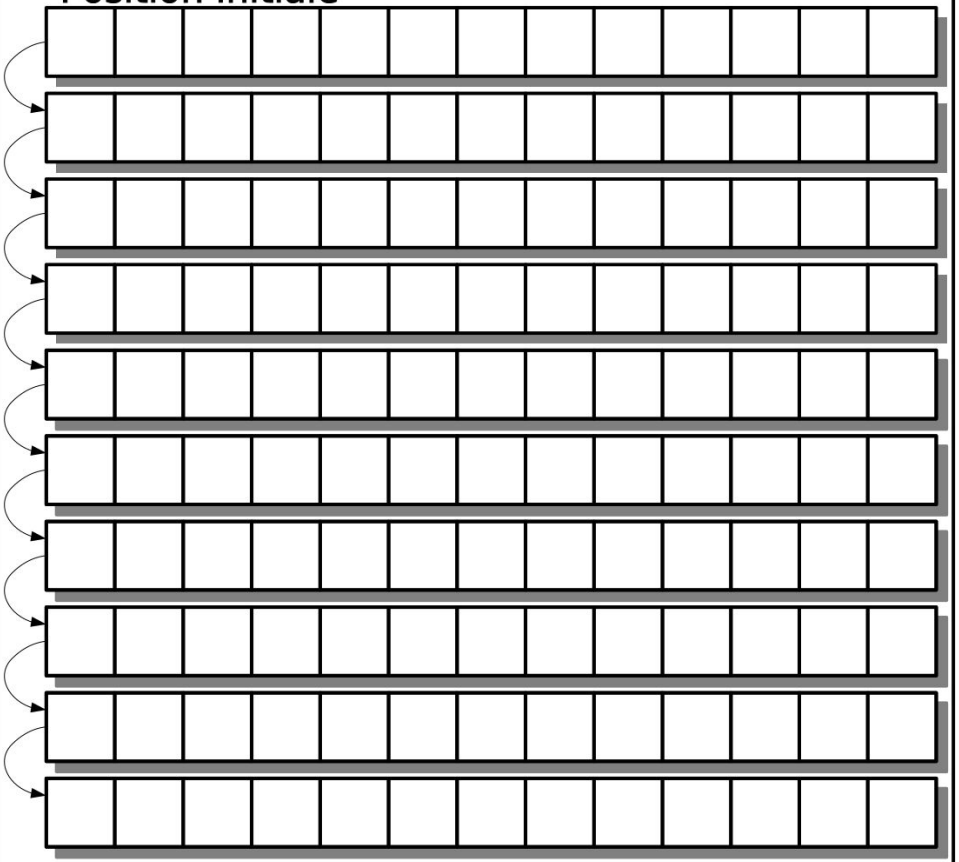
- démarrage à un feu rouge

- propagation d'un ralentissement

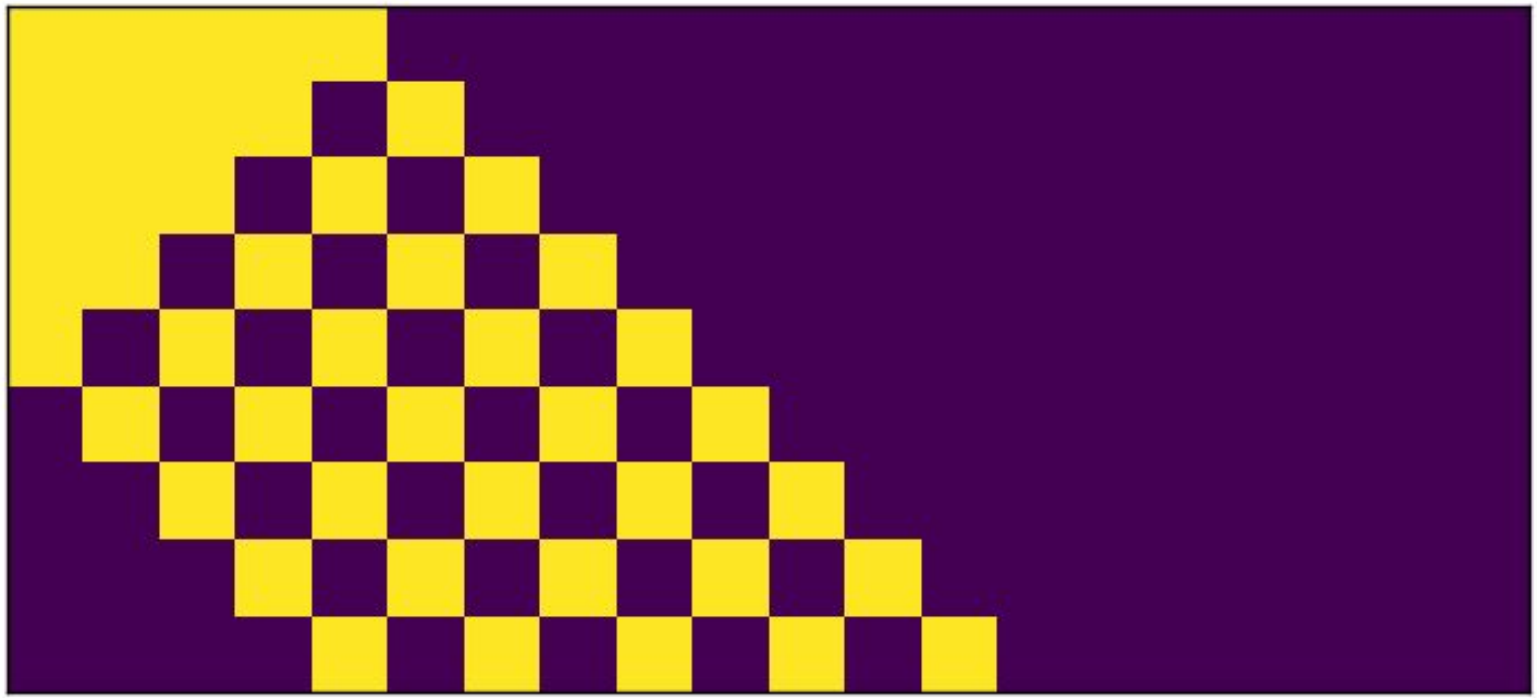
En simulant la règle 184 sur des grandes grilles, on obtient un modèle très simple d'annihilation particule/antiparticule (voir ci-contre).



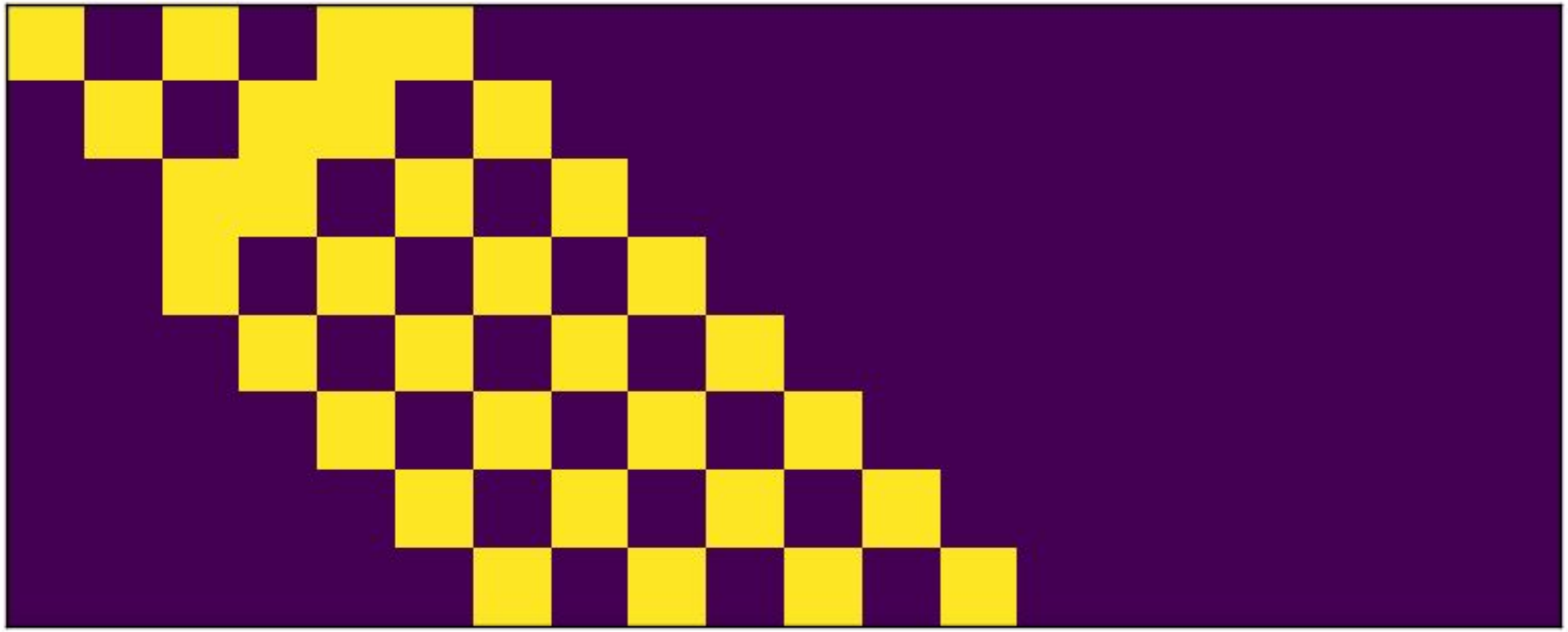
Position initiale



Semáforo



Frenazo

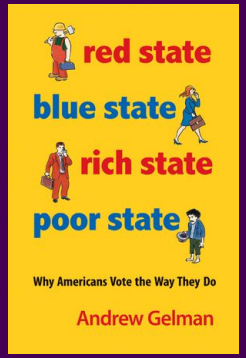


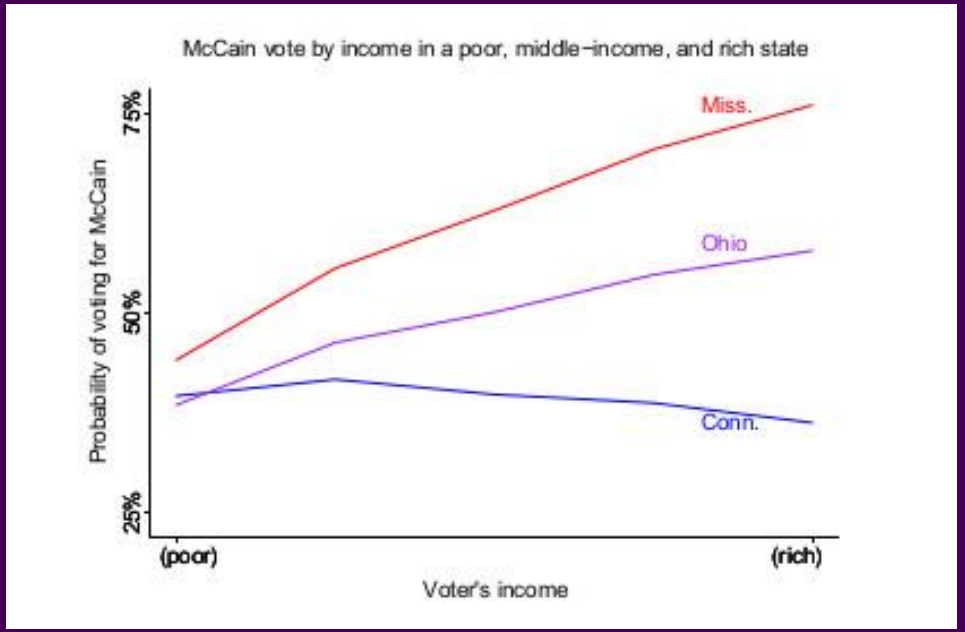

GRACIAS

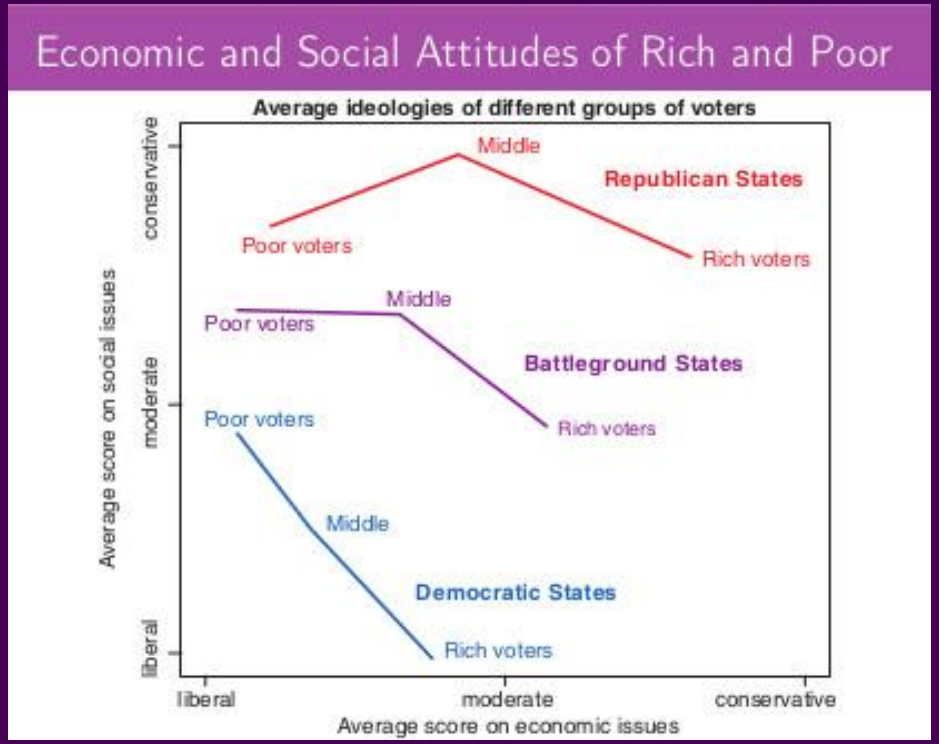
Bibliografía

- Les plantes font-elles des mathématiques? https://www.youtube.com/watch?v=QPB-j2O9J6I&t=544s
- Probabilistic Topic Models and User Behavior https://www.youtube.com/watch?v=FkckgwMHP2s
- Studying the History of Ideas Using Topic Models David Hall, Daniel Jurafsky and Christopher D. Manning.
- Knots to Narnia, Bill Thurston https://www.youtube.com/watch?v=IKSrBt2kFD4&t=59s
- TEDxObserver, Cédric Villani https://www.youtube.com/watch?v=U3kKjGKp9rA
- The shape of space, Jeff Weeks http://www.cornell.edu/video/jeff-weeks-the-shape-of-space

Resolver paradojas políticas (y entendernos)



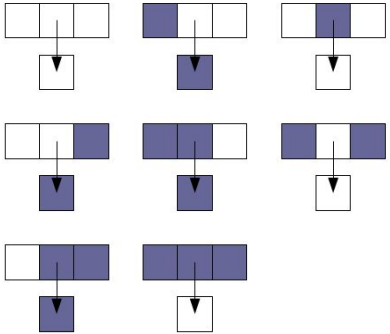




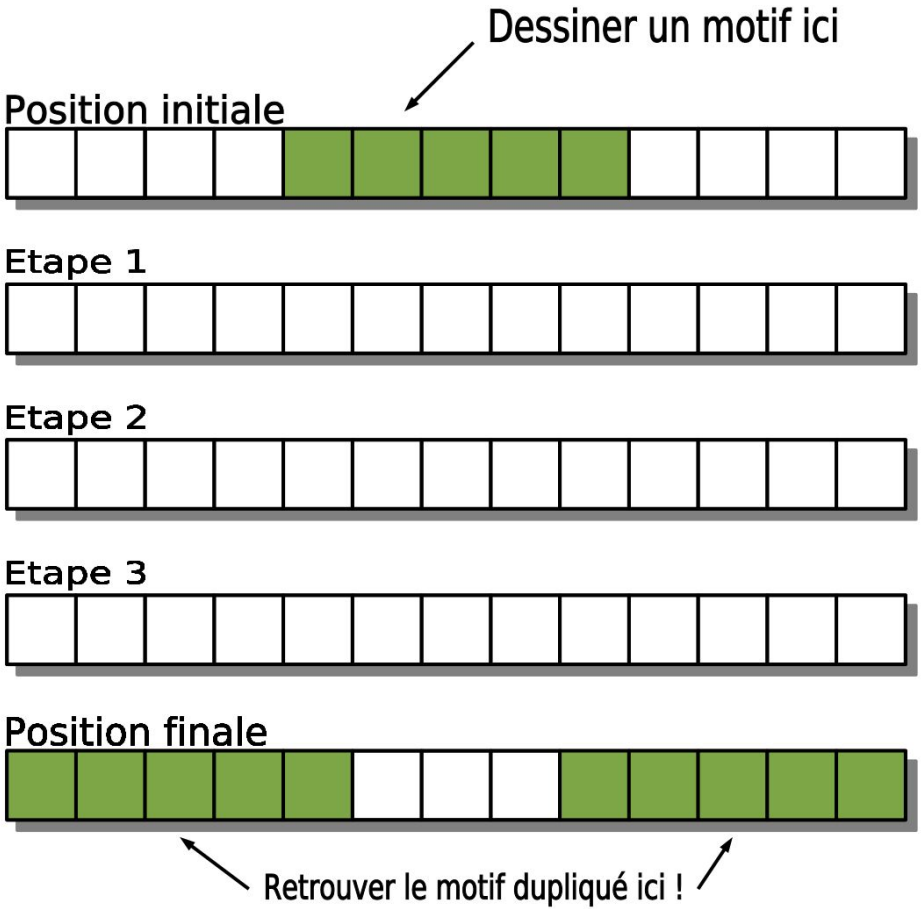
Copiar una forma

Compteur de Fredkin

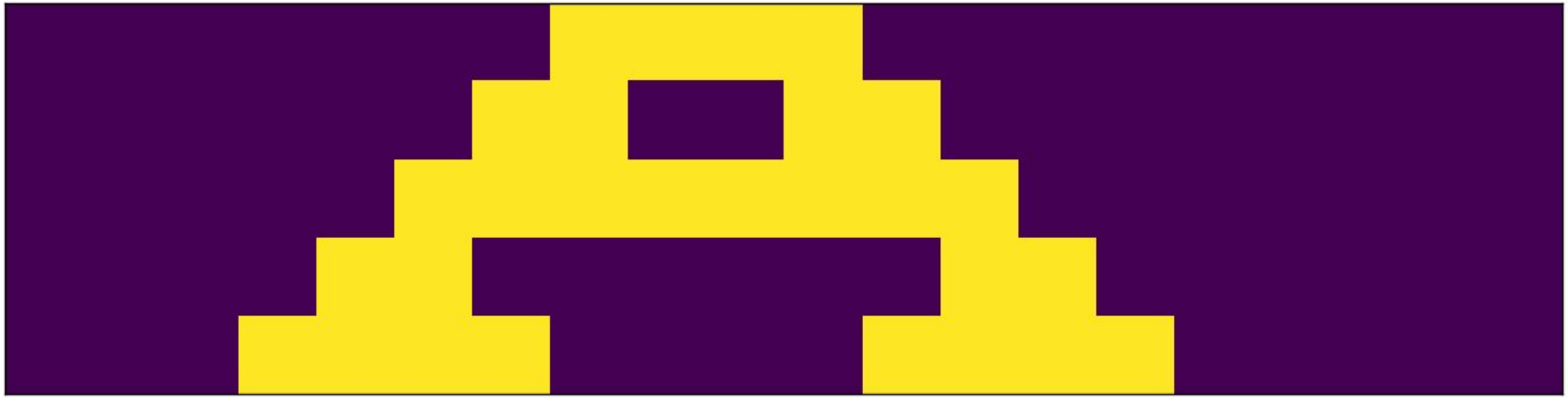
Règles : si les cases voisines sont de couleurs différentes, la case devient noire, si les cases voisines sont de même couleur, la case devient blanche.



On peut généraliser cet automate afin de gérer les couleurs ou les images en deux dimensions. On peut aussi adapter la règle en utilisant des voisins plus éloignés et obtenir un plus grand nombre de copies du motif initial.



Copia AAA



Copia AMA