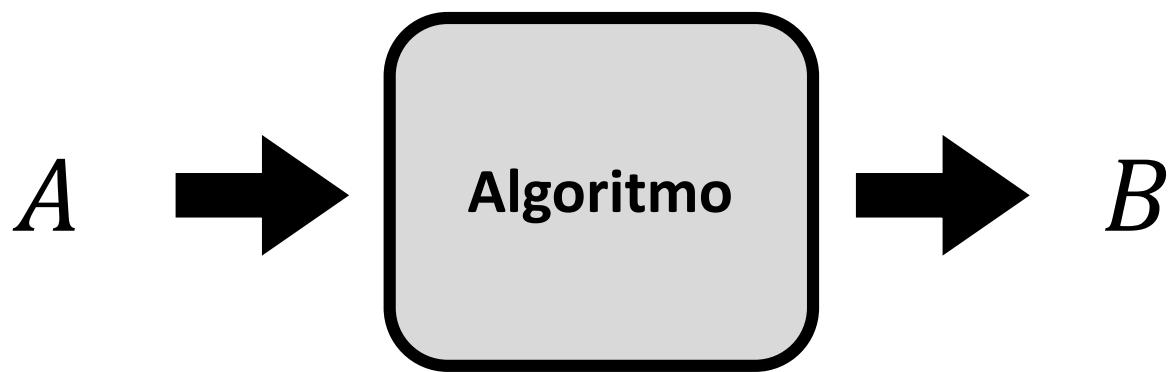
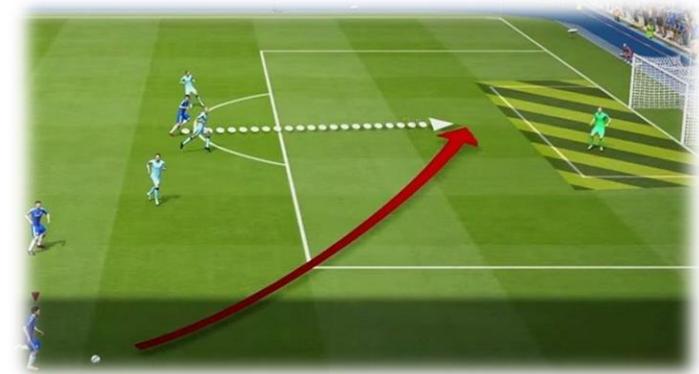
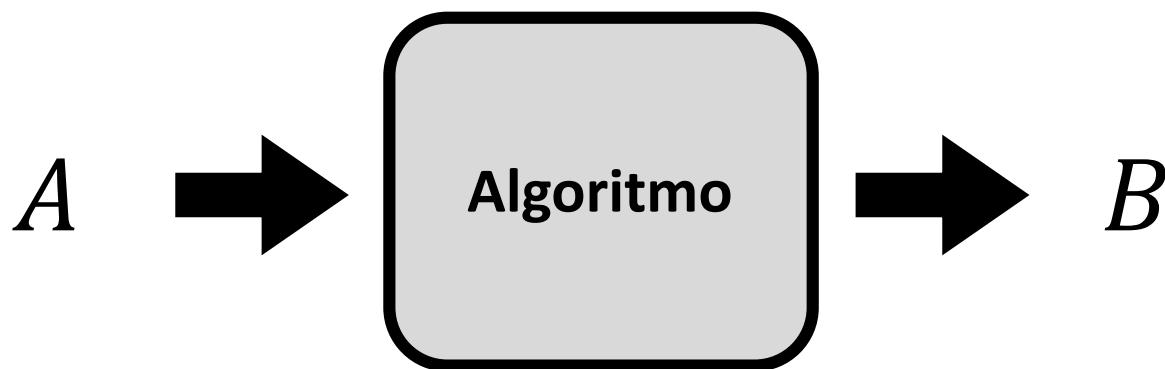
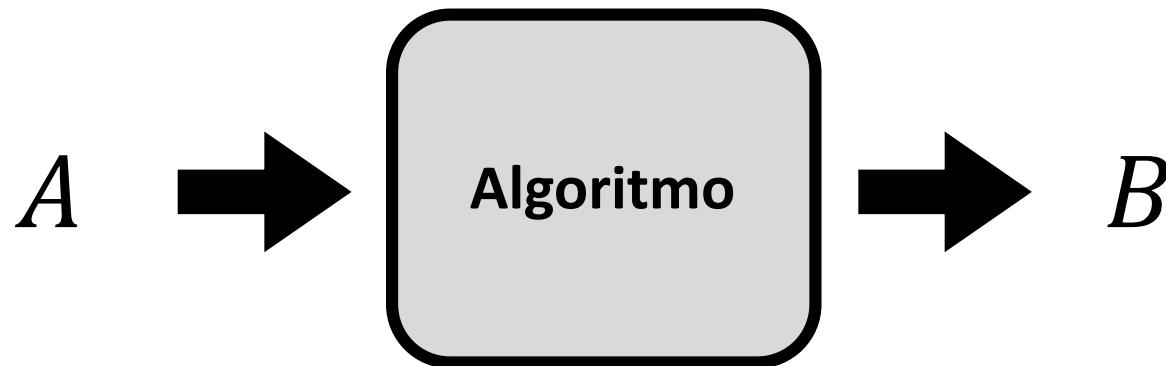


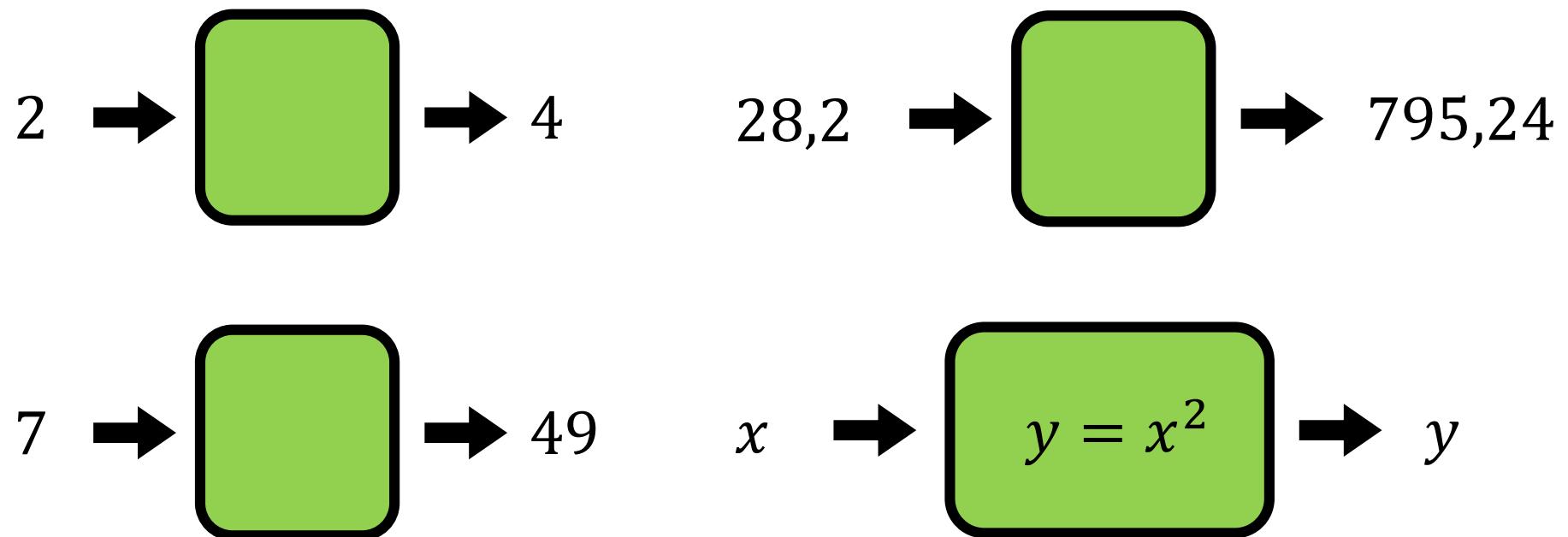
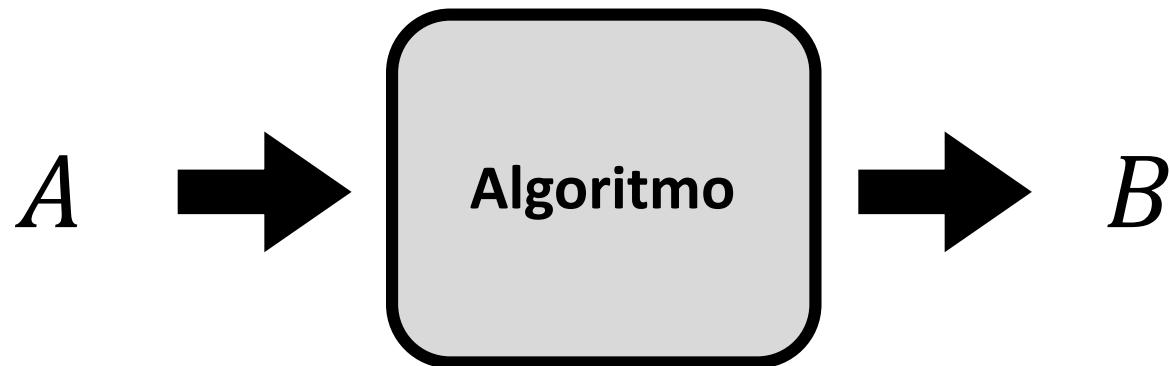
1.- PRELIMINARES: ALGORITMOS Y FUNCIONES

1.- ПОПЕРЕДНІЙ: АЛГОРИТМИ ТА ФУНКЦІЇ





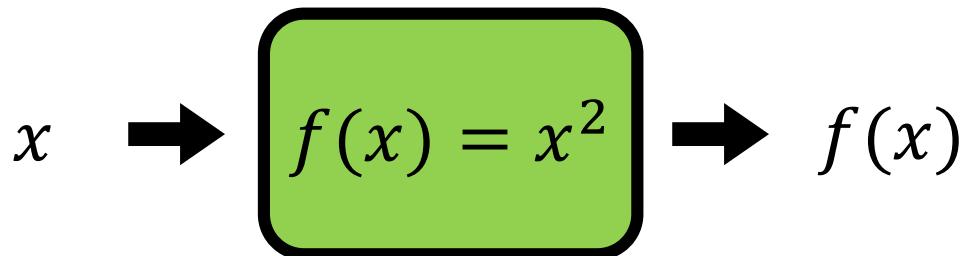
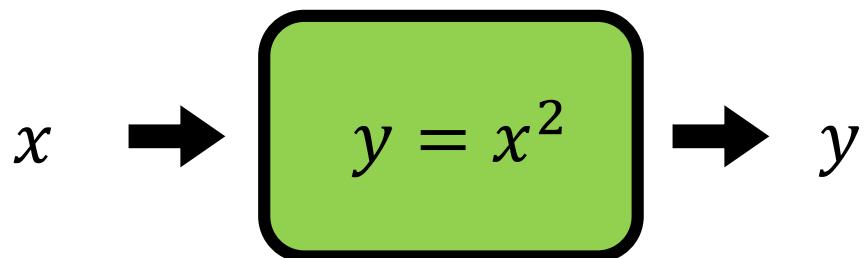




NOTACIÓN

$$y = y(x)$$

$$y = f(x)$$



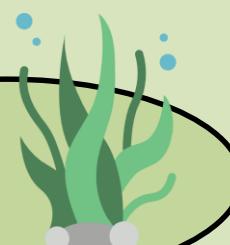
2.- EL MAPA DE LAS MATEMÁTICAS

2.- МАТЕМАТИЧНА КАРТА

BIOLOGÍA

Botánica

Algas



Zoología

Reptiles



FÍSICA

Astrofísica

Estrellas



Óptica

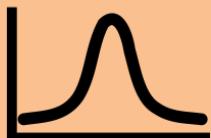
Lentes



MATEMÁTICAS

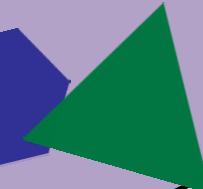
Análisis

Funciones



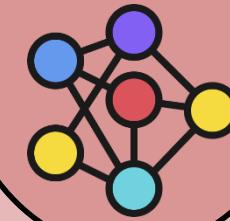
Geometría

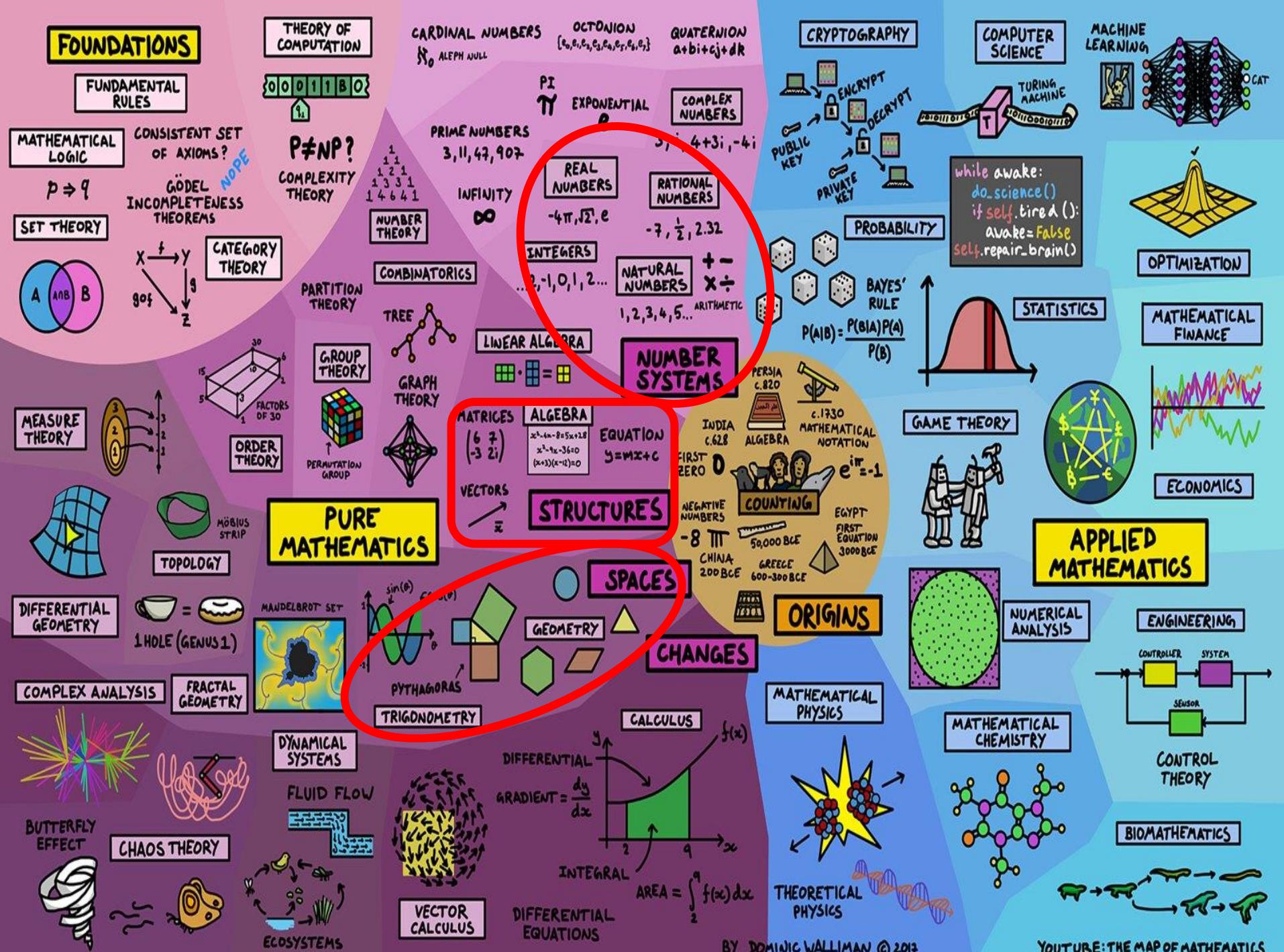
Áreas

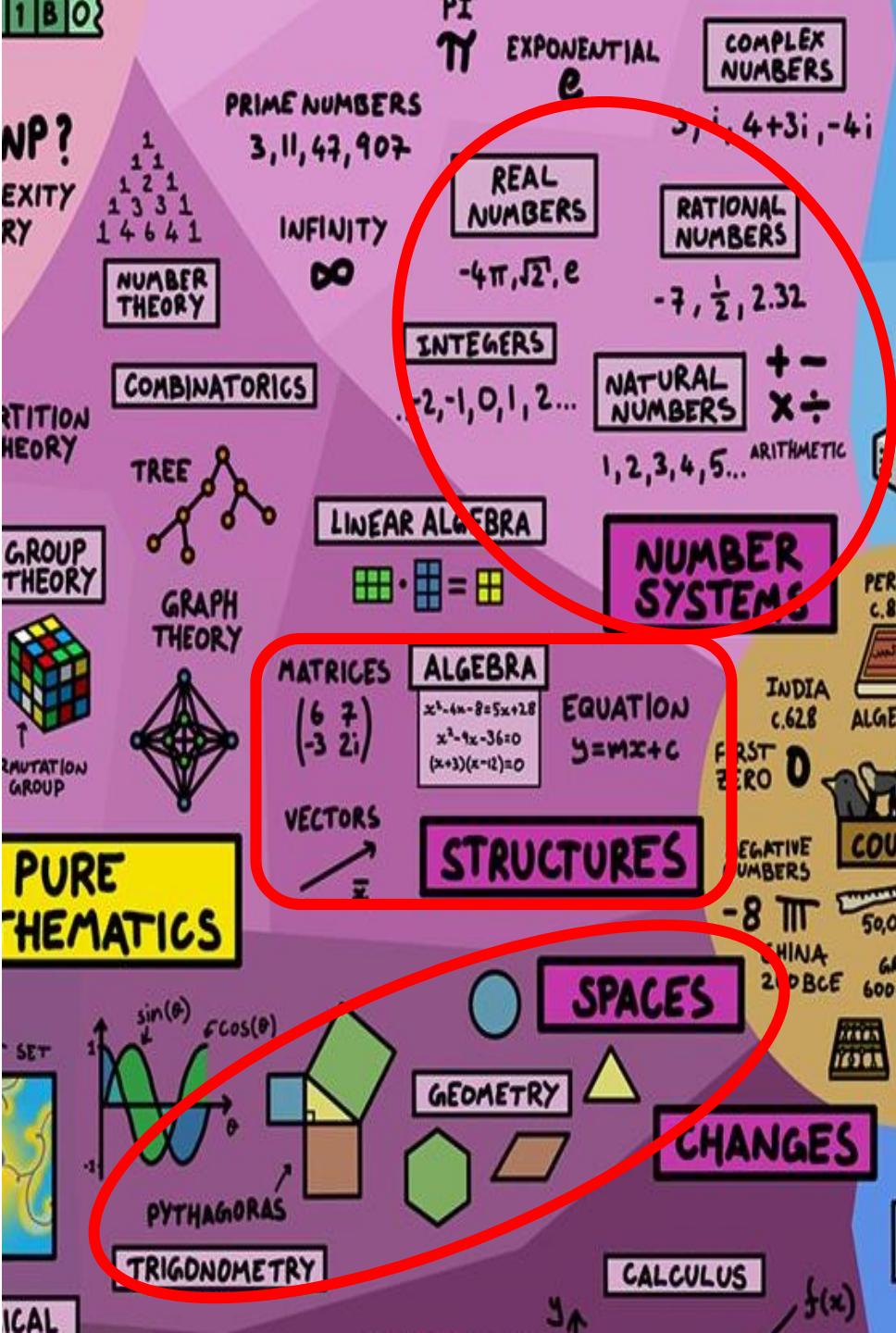


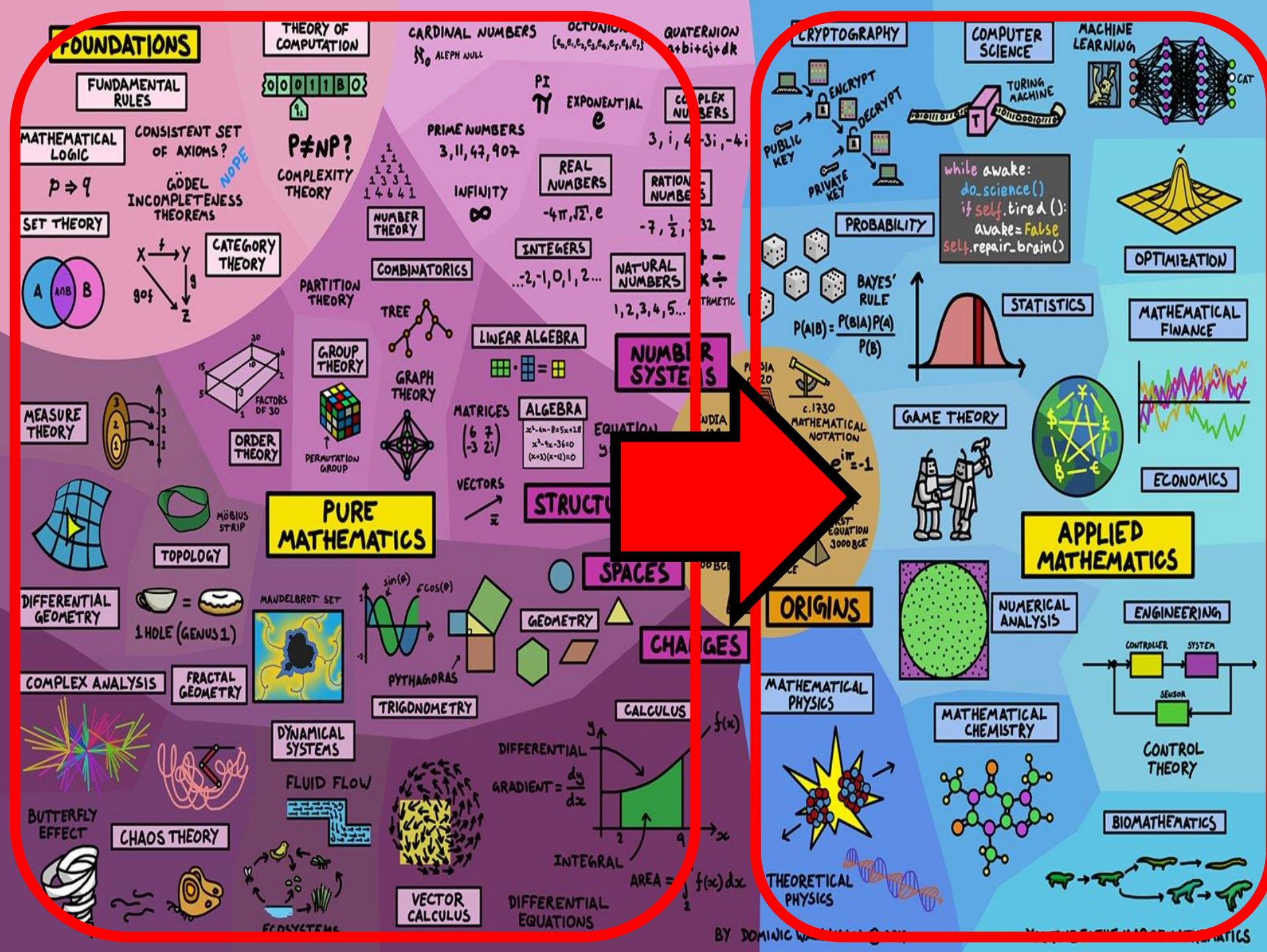
Aprendizaje
automático

Redes
neuronales









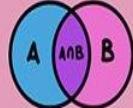
FOUNDATIONS

FUNDAMENTAL RULES

MATHEMATICAL LOGIC

$P \Rightarrow Q$

SET THEORY



CONSISTENT SET OF AXIOMS?
GÖDEL INCOMPLETENESS THEOREMS
 $\text{NP} \neq \text{P}$

GÖDEL INCOMPLETENESS THEOREMS

THEORY OF COMPUTATION

{0001100}

$P \neq NP?$

COMPLEXITY THEORY

CARDINAL NUMBERS
 \aleph_0 ALEPH NULL

OCTONION
 $[e_0, e_1, e_2, e_3, e_4, e_5, e_6, e_7]$

QUATERNION
 $a+bi+cj+dk$

PI
TY

EXPONENTIAL
 e

COMPLEX NUMBERS

$3, i, 4+3i, -4i$

REAL NUMBERS

RATIONAL NUMBERS

INTEGERS

NATURAL NUMBERS

ARITHMETIC

$+ - \times \div$

1, 2, 3, 4, 5...

LINEAR ALGEBRA

MATRICES

ALGEBRA

EQUATION

$y=mx+c$

STRUCTURES

SPACES

CHANGES

ORIGINS

MATHEMATICAL PHYSICS

CALCULUS

DIFFERENTIAL

GRADIENT

$\frac{dy}{dx}$

INTEGRAL

$\text{AREA} = \int_a^b f(x) dx$

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DIGITAL LOGIC

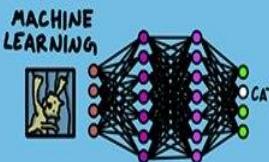
COMPUTER SCIENCE

MACHINE LEARNING

TURING

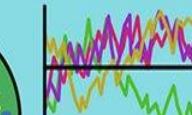
LOGIC

CAT



OPTIMIZATION

MATHEMATICAL FINANCE



ECONOMICS

APPLIED MATHEMATICS

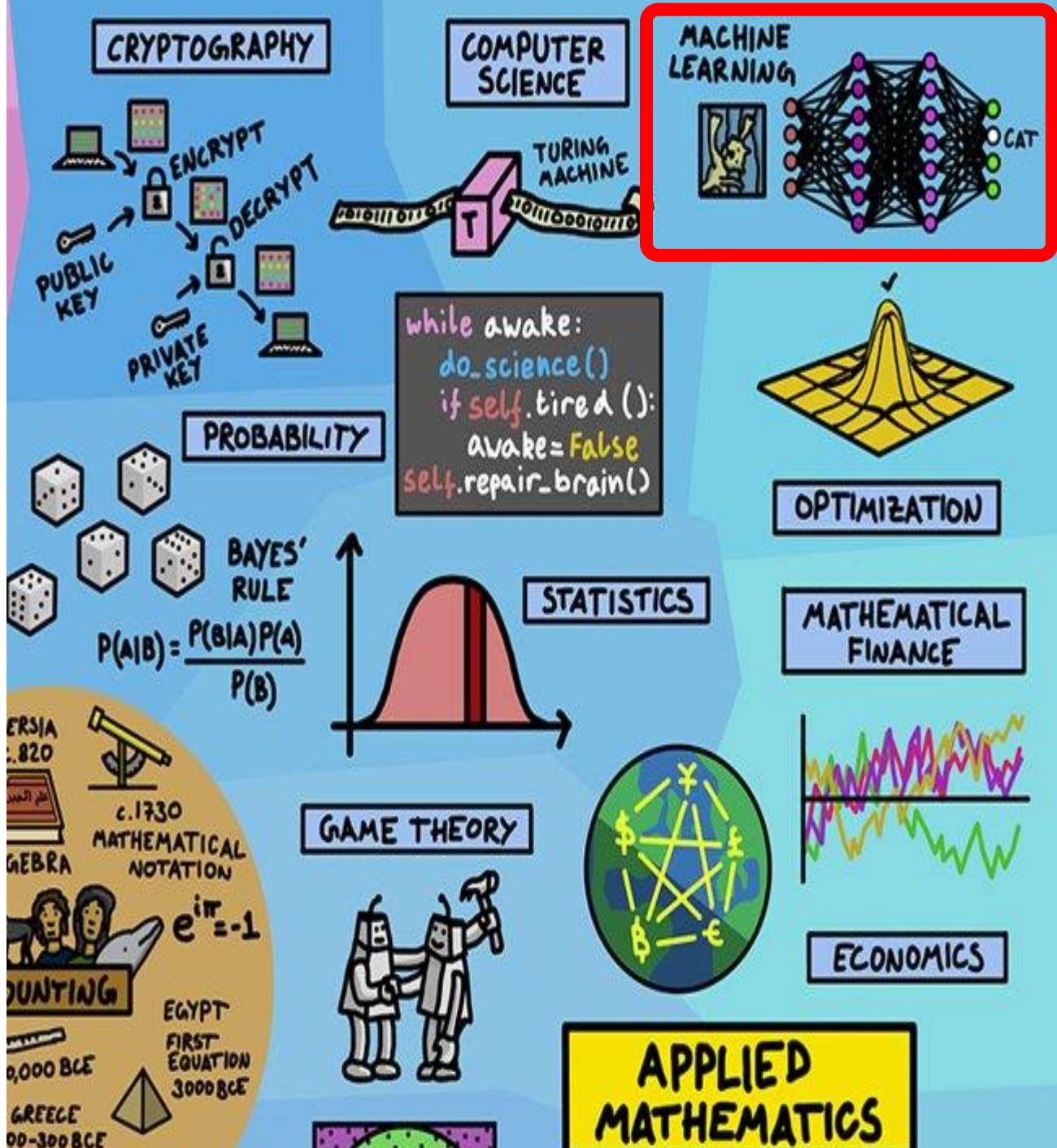
ENGINEERING



CONTROL THEORY

BIO MATHEMATICS





3.- INTELIGENCIA ARTIFICIAL, APRENDIZAJE AUTOMÁTICO Y REDES NEURONALES

**3.- ШТУЧНИЙ ІНТЕЛЕКТ, МАШИННЕ НАВЧАННЯ ТА
НЕЙРНІ МЕРЕЖІ**

Kasparov has Deep Blues after losing

Chess champ: I was rooked

By MICHELE MCPHEE,

K.C. BAKER

and CINDY SIEMASZKO

Daily News Staff Writers

The world's greatest human chess player threw a tantrum and cried foul yesterday after being thrashed by a supercomputer.

It took IBM's Deep Blue just 19 moves to defeat world chess champion Garry Kasparov — a stunning finale to an epic week-long battle of man versus machine.

Not mollified by his \$400,000 loser's share, Kasparov stormed off like a sore loser after resigning. He later accused IBM of unfairly programming the high-speed computer to beat him specifically.

He suggested that Deep Blue, which was supposed to play on its own, was coached during the match.

He offered slugs of saying the computer team cheated.

"I suspect there were things in the match that were well beyond my understanding," Kasparov said. "And when a big corporation with unlimited resources would like to do so, there are many ways to achieve the result, and the result was achieved."

IBM team leader C.J. Tan denied the computer was coached. "Once the clock started, it relied on Deep Blue's system itself," he said.

Kasparov's pal, Michael Khodarkovsky, blamed Kasparov's graceless exit on a lack of practice — he said Kasparov had never lost a match.

Kasparov came close to losing to Anatoly Karpov in a 1994-95 championship match, but he depended without a victory on either side.

Kasparov, 34, considered by some chess experts as the greatest player in the history of the game, last year defeated Deep Blue 4-2.

After losing the opening game of the rematch at the Equitable Center in Manhattan, the computer won the second game and fought Kasparov to draws in the next three.

The year ended — with a swiftness that stunned the chess world — Deep Blue took advantage of Kasparov's clumsy opening moves and placed him in a no-win situation after less than an hour of play.

Unable to find a way out, Kasparov — playing the black pieces — tipped his king and resigned. He buried his head in his hands and didn't look at IBM's Tan when they shook hands.

The final score was 3½ points for the computer and 2½ points for Kasparov.

Kasparov said he "cracked under the pressure."

"I am ashamed," said Kasparov, who would have won \$700,000 if he had been able to continue.

Patrick Wolff, author of "The Complete Idiot's Guide to Chess," said the world champ "basically cracked."

Kasparov, playing black, used a standard defense known as the "Caro-Kann," forcing white to sacrifice a piece. But for some reason he botched his seventh move and "he became lost," Wolff said.

This is not a position he wanted to get into, said Wolff, a grand master from Manhattan. "It's a pure calculating position where the computer has a big advantage. The computer's strength is tactics."

The computer Kasparov battled was capable of analyzing 200 million positions per second — twice as many positions per second as the IBM model he defeated in Philadelphia a year ago.

One expert said he was surprised when Kasparov resigned. "It didn't seem lost," said grand master John Fedorowicz of the Bronx, who helped the IBM team prepare its game plan.

At Chess Forum on Thompson St. in Greenwich Village, die-hard chess fans expressed shock at Kasparov's loss.

"This is a historic event," said Mark Wieder, 46, also a computer programmer. "The greatest human player of all time lost to a machine."

Chess Forum owner Imad Khanian, 31, said Kasparov was following in the footsteps of other sore losers by suggesting his fail.

"This is not uncommon in chess," he said. "When Viktor Korchnoi was playing Karpov in the '70s, Korchnoi made the accusation that the KGB was sending him telepathic messages to destroy his concentration."



LARRY ZUMWALT
RESIGNED: Chess champion Garry Kasparov was disappointed yesterday after losing to IBM's Deep Blue supercomputer. IBM's team leader C.J. Tan (left) denied the computer had been coached, as Kasparov charged after his historic loss in Manhattan. Kasparov will get \$400,000 for his efforts.

Artificial intelligence not black and white

DAILY NEWS
FORGET ABOUT THE Garden or the Meadowlands. The real action was outside the Equitable Center on Seventh Ave., where Garry Kasparov, with a name like a hockey player, did battle with Deep Blue, an IBM supercomputer whose name suggests some shlepp who did her best work on 42d St. in those halcyon days before Disney.

The scalpers were asking as much as \$500 for a \$25 seat. "Actually, I'd settle for a couple of hundred," said Ze Ayala. "I have extras."

In the history of New York, there's never been a scalper so hopelessly well mannered as Ze Ayala, Ph.D. Instead of the usual hawker's cry —

"Who got tickets?" — Ayala was content to let the business come to him as he burnished his new henna tattoo with a cotton ball doused in lemon juice. "The lemon juice helps the absorption of the dye," he said. The tattoo bore the name of his band, "Flashpot," for whom, that tall, long-haired Ayala plays guitar.

It should be noted that in lieu of a day job, he works at the Institute of Molecular Evolutionary Genetics at Penn State. His mission wasn't even merce-

nary; it was professional. He said he wouldn't have sold his own seat for a million bucks.

"My field is artificial intelligence," he said. "And this is the coolest thing to happen in my life-time."

In such a spirit, the 28-year-old scientist had come to witness the inevitable conclusion: Man mangled by Machine.

He couldn't help but root for Kasparov. The sentimental part of him was taken with the charms of obsoles-

cence. But he knew better than to bet against technology.

Kasparov is the best chess player in the world; but unlike Deep Blue, he can also be vain, angry, neurotic, panting, feverish, and delusional. "Chess is fundamentally psychological," Ayala said. "And that's precisely what Kasparov has working against him."

I asked him how long before Deep Blue is playing lead guitar in his band.

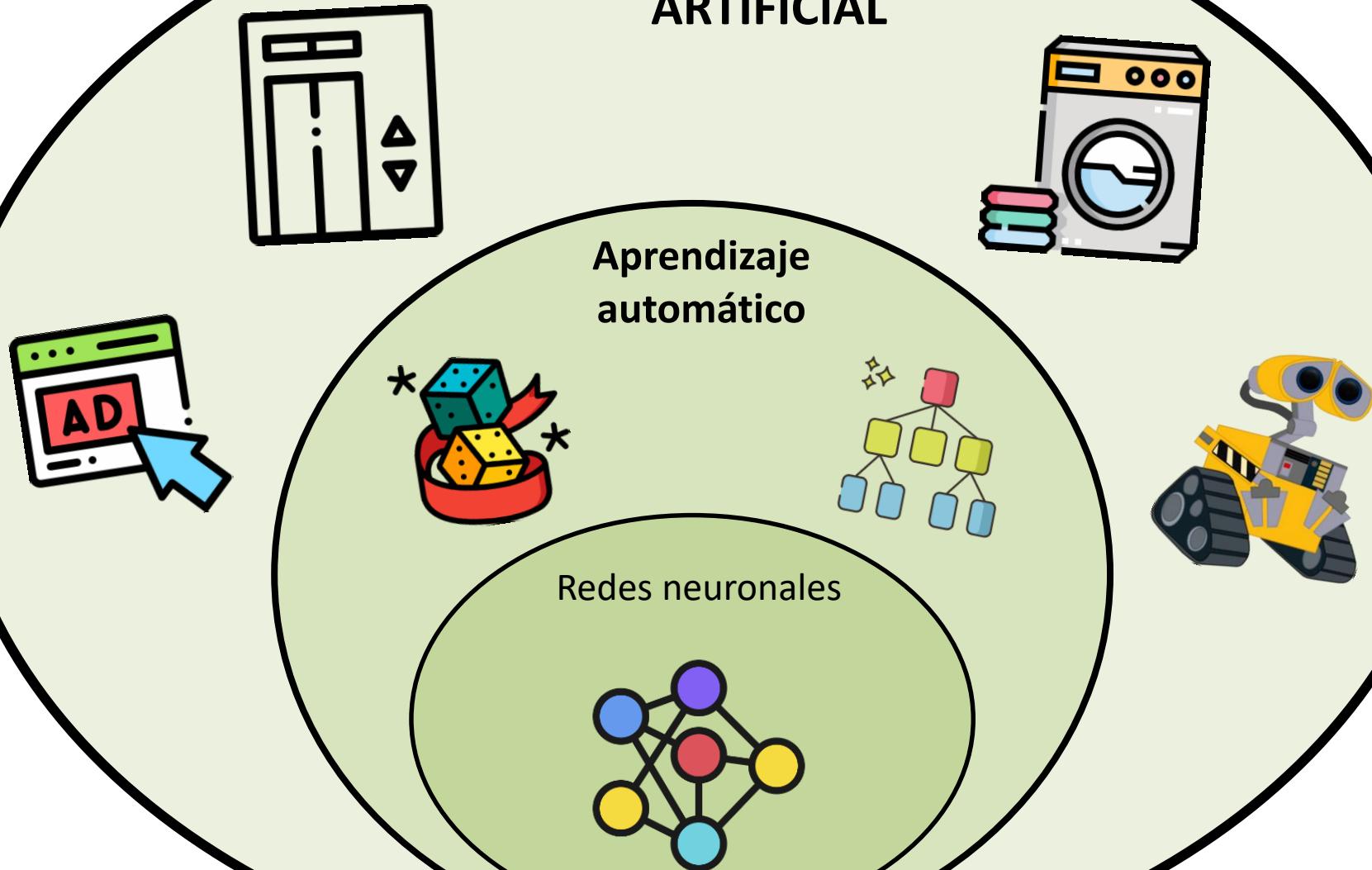
That day will come, he said, and it won't be too long. "You know the band Nine Inch Nails?" he said. "That's all computers. But what you're really asking is: Will a computer be able to write

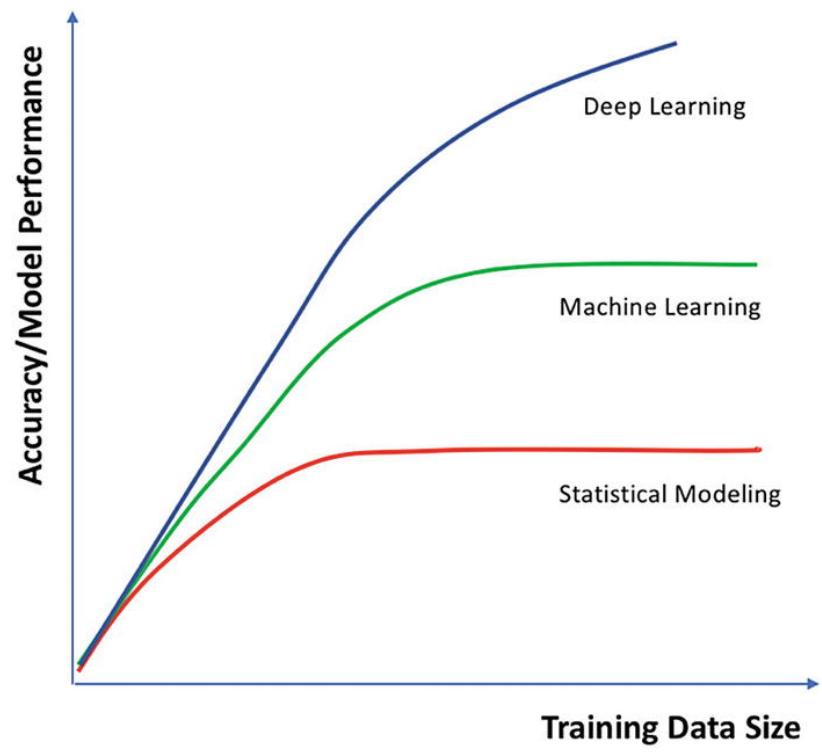
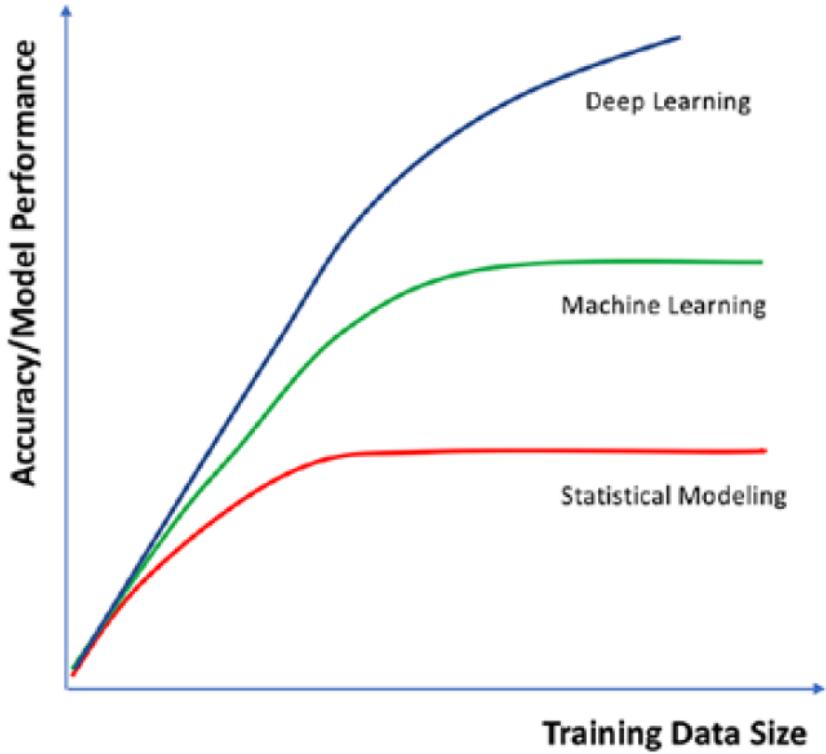


MARK KRIEGL



INTELIGENCIA ARTIFICIAL

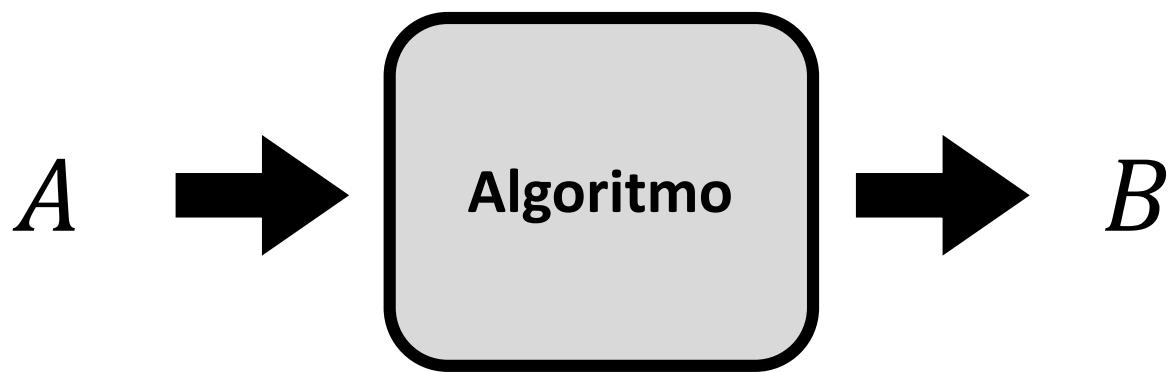


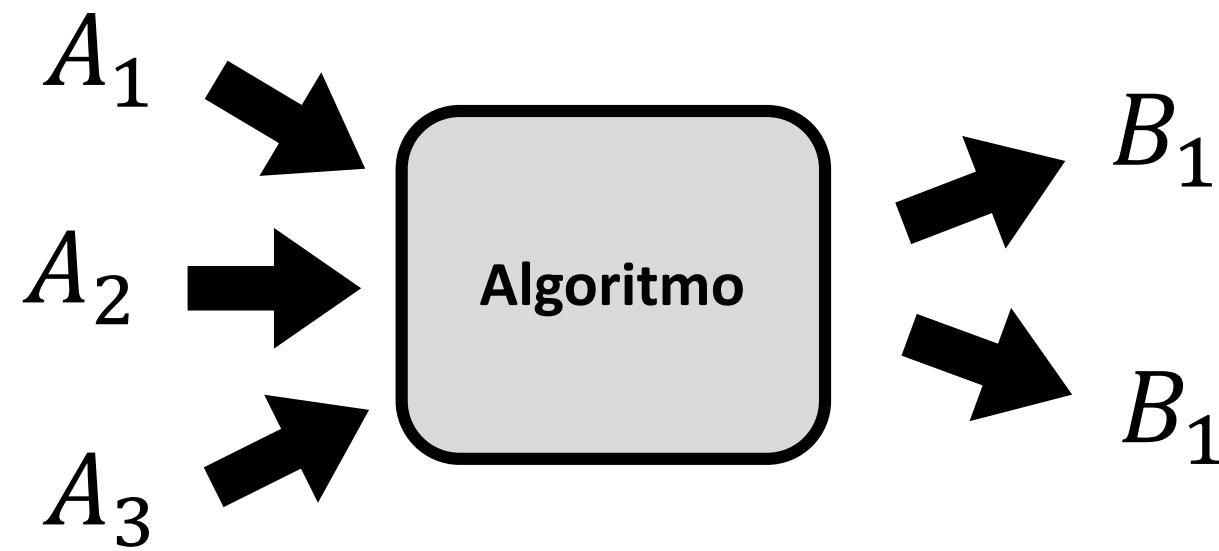


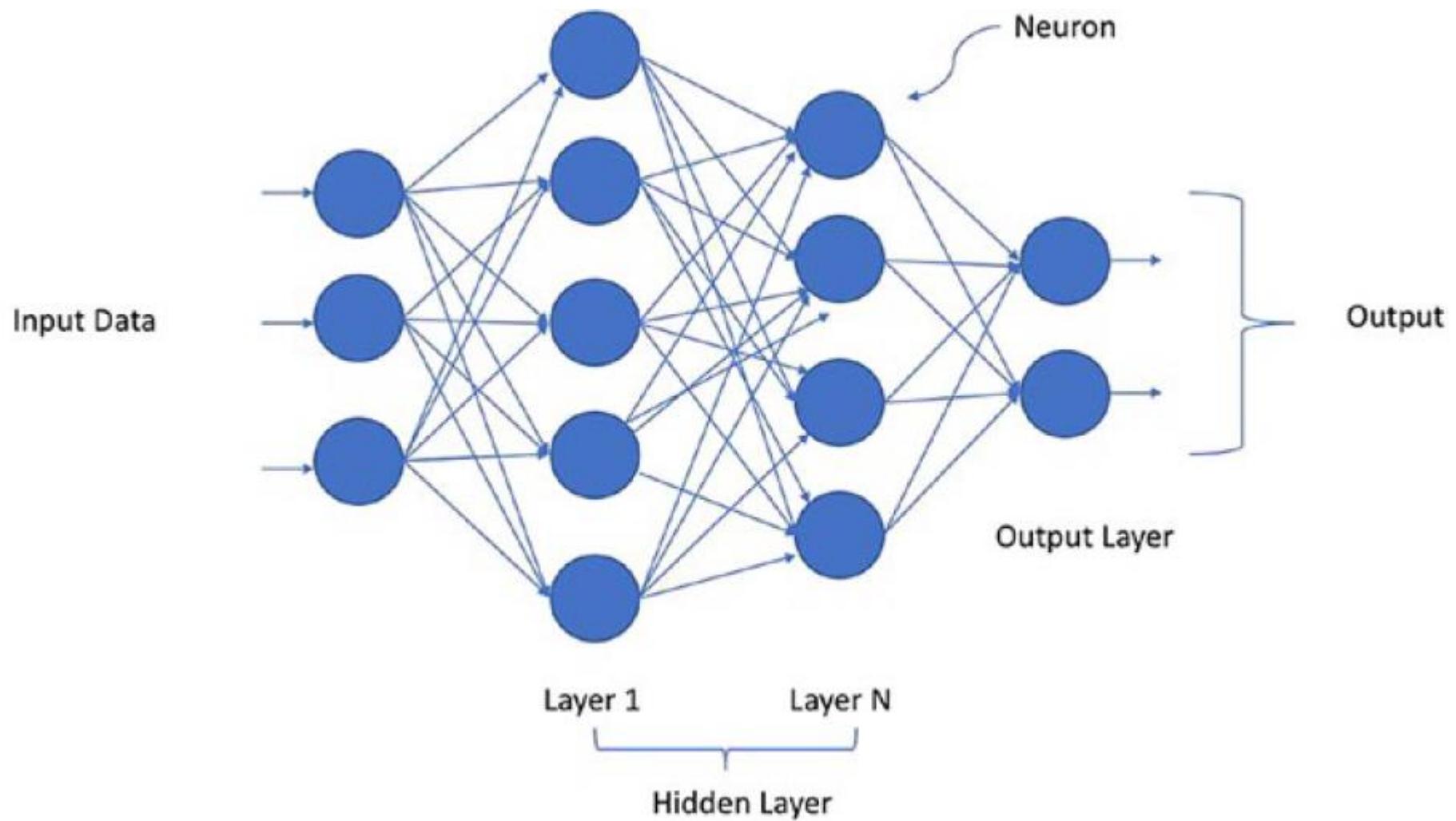


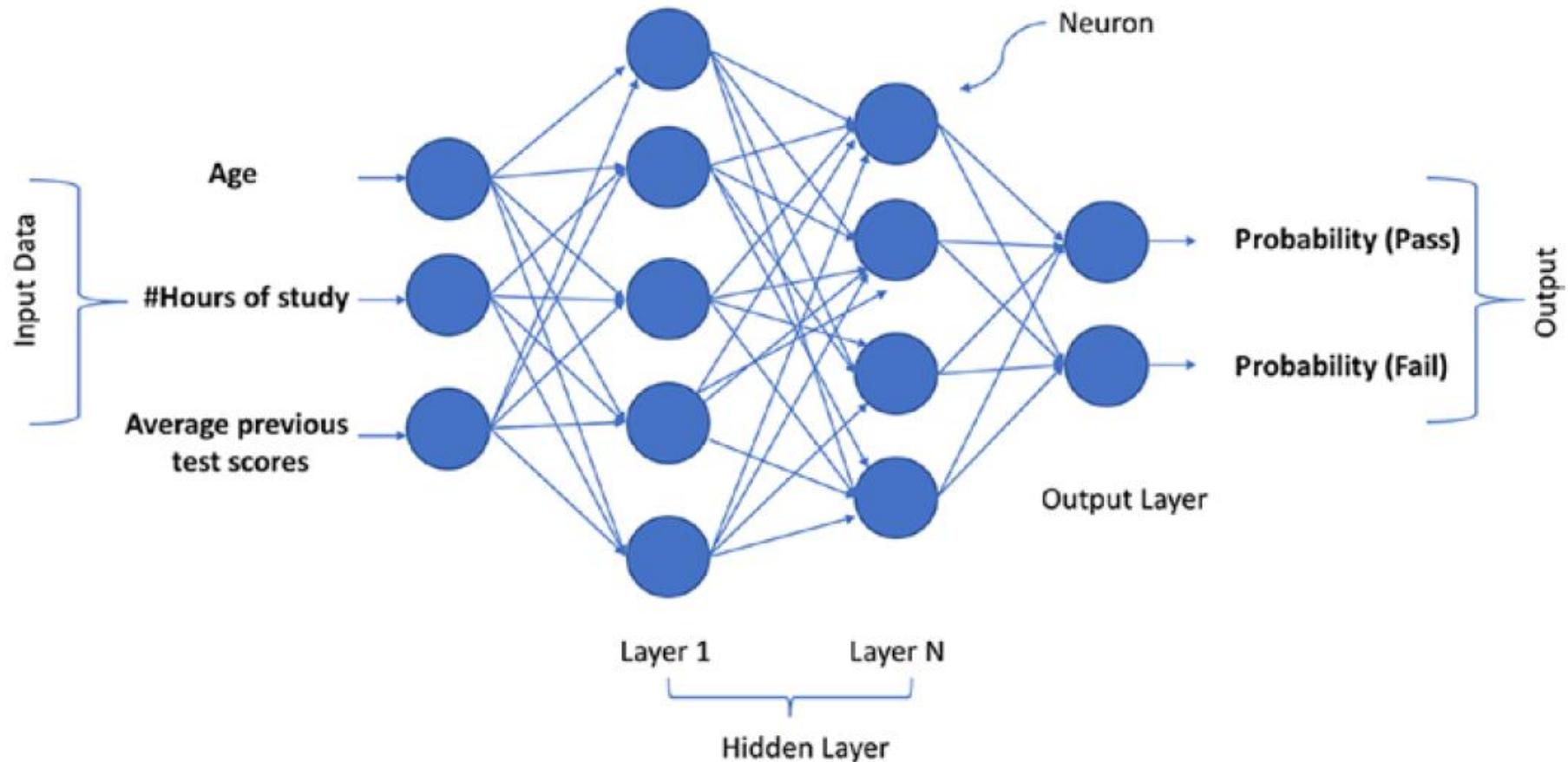
4.- INTRODUCCIÓN A LAS REDES NEURONALES

4.- ВСТУП В НЕЙРНІ МЕРЕЖІ

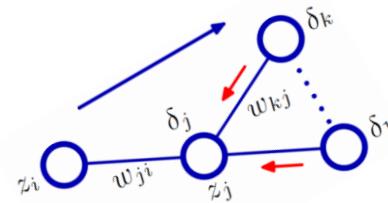
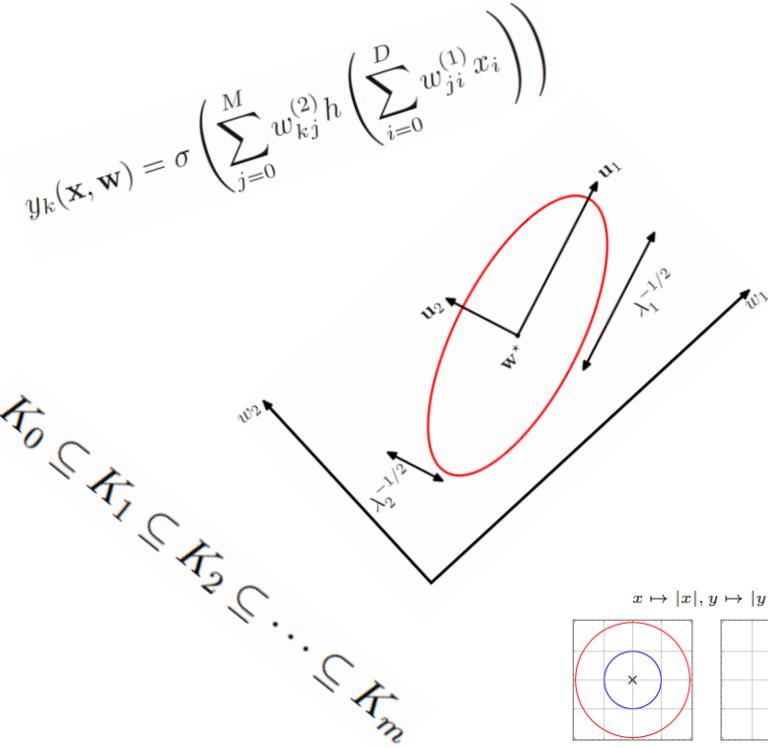




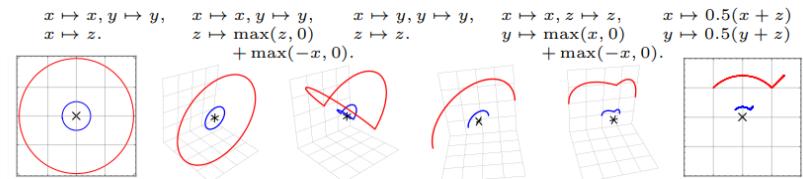
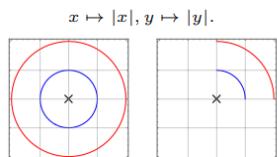
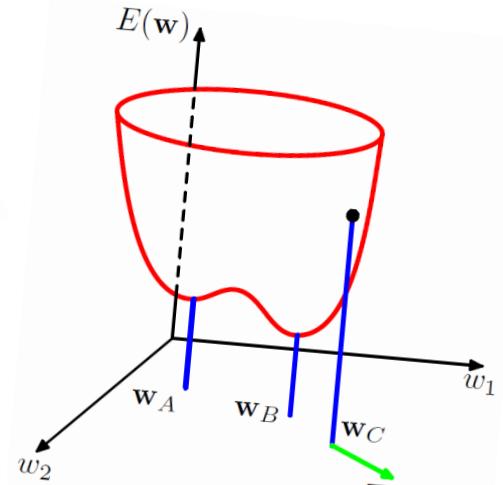




REALIDAD



$$\frac{\partial^2 E}{\partial w^2} \Big|_{w^*} > 0$$



REALIDAD \neq Ecuaciones y gráficas aleatorias y sin sentido que no entiende nadie.

REALIDAD = Herramientas y conceptos matemáticos, que con estudio e investigación, cualquiera puede dominar y usar.

FOUNDATIONS

FUNDAMENTAL RULES

MATHEMATICAL LOGIC

$P \Rightarrow Q$

CONSISTENT SET OF AXIOMS?
GÖDEL INCOMPLETENESS THEOREMS

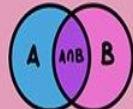
THEORY OF COMPUTATION

{0001100}

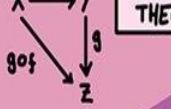
$P \neq NP?$

COMPLEXITY THEORY

SET THEORY



$f: X \rightarrow Y$



CATEGORY THEORY

PARTITION THEORY

NUMBER THEORY
COMBINATORICS

TREE
LINEAR ALGEBRA

GRAPH THEORY
GROUP THEORY

PERMUTATION GROUP

MEASURE THEORY
ORDER THEORY

MÖBIUS STRIP
TOPOLOGY

DIFFERENTIAL GEOMETRY

COMPLEX ANALYSIS
FRACAL GEOMETRY

MANDELBROT SET
PYTHAGORAS

DYNAMICAL SYSTEMS
FLUID FLOW

CHAOS THEORY
BUTTERFLY EFFECT

ECOSYSTEMS

VECTOR CALCULUS

TRIGONOMETRY

CARDINAL NUMBERS
 \aleph_0 ALEPH NULL

OCTONION
 $[e_0, e_1, e_2, e_3, e_4, e_5, e_6, e_7]$

QUATERNION
 $a+bi+cj+dk$

PI
TY

EXPONENTIAL
 e^x

COMPLEX NUMBERS
 $x + iy$

REAL NUMBERS
 \mathbb{R}

RATIONAL NUMBERS
 \mathbb{Q}

INTEGERS
 \mathbb{Z}

NATURAL NUMBERS
 \mathbb{N}

ARITHMETIC
 $+ - \times \div$

NUMBER SYSTEMS

MATRICES
 $\begin{pmatrix} 6 & 7 \\ -3 & 2 \end{pmatrix}$

ALGEBRA
 $x^2 - 4x - 8 = 5x + 28$
 $x^2 - 9x - 36 = 0$
 $(x+3)(x-12) = 0$

EQUATION
 $y = mx + c$

STRUCTURES

VECTORS
 \vec{v}

SPACES

GEOMETRY

CHANGES

CALCULUS

DIFFERENTIAL
GRADIENT = $\frac{dy}{dx}$

INTEGRAL
AREA = $\int_a^b f(x) dx$

DIFFERENTIAL EQUATIONS

CRYPTOGRAPHY

ENCRYPT
DECRYPT

PUBLIC KEY
PRIVATE KEY

TURING MACHINE

DIGITAL LOGIC

COMPUTER SCIENCE

MACHINE LEARNING

NEURAL NETWORKS

OPTIMIZATION

STATISTICS

BAYES' RULE
 $P(A|B) = \frac{P(B|A)P(A)}{P(B)}$

ARITHMETIC

STATISTICS

GAME THEORY

ECONOMICS

NUMERICAL ANALYSIS

ENGINEERING

CONTROL THEORY

SYSTEM

SENSOR

CONTROLLER

THEORETICAL PHYSICS

MATHEMATICAL CHEMISTRY

BIOMATHEMATICS

EVOLUTION

YOUTUBE: THE MAP OF MATHEMATICS

BY DOMINIC WALLMAN © 2017

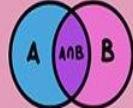
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GÖDEL INCOMPLETENESS THEOREMS
 $\text{NP} \neq \text{P}$

THEORY OF COMPUTATION

{0001100}

$P \neq NP?$

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 $[e_0, e_1, e_2, e_3, e_4, e_5, e_6, e_7]$

QUATERNION
 $a+bi+cj+dk$

PI
 π

EXPONENTIAL
 e

COMPLEX NUMBERS

$3, i, 4+3i, -4i$

REAL NUMBERS

RATIONAL NUMBERS

INTEGERS

NATURAL NUMBERS

$+ - \times \div$

PRIME NUMBERS
 $3, 11, 47, 907$

INFINITY
 ∞

NUMBER

THEORY

COMBINATORICS

TREE

GRAPH

THEORY

LINEAR

ALGEBRA

EQUATION

$y=mx+c$

VECTORS

\vec{v}

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SPACES

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MACHINE LEARNING



ENCRYPT
DECRYPT

PUBLIC KEY
PRIVATE KEY

PROOF

AWAKE: FALSE
SELF.REPAIR: TRUE

BAYES' RULE

$P(A|B) = \frac{P(B|A)P(A)}{P(B)}$

HISTOGRAM

OPTIMIZATION

MATHEMATICAL FINANCE

GAMBLING

ALGEBRA

INDIA
FIRST ZERO
 0

EGYPT
FIRST EQUATION

CHINA
200 BCE

GREECE
600-300 BCE

CANONS

NUMERICAL ANALYSIS

MATHEMATICAL PHYSICS

MATHEMATICAL CHEMISTRY

CONTROL THEORY

BIOMATHEMATICS

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PURE MATHEMATICS

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DIFFERENTIAL GEOMETRY

COMPLEX ANALYSIS

FRACTAL GEOMETRY

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FLUID FLOW

THEORY

MANDELBROT SET

SIN(θ)

COS(θ)

PYTHAGORAS

RIGONOMETRY

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GRADIENT

$\frac{dy}{dx}$

INTEGRAL

AREA

$\int_a^b f(x) dx$

Differential Equations

Theoretical Physics

Evolution

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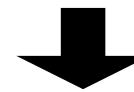
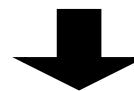
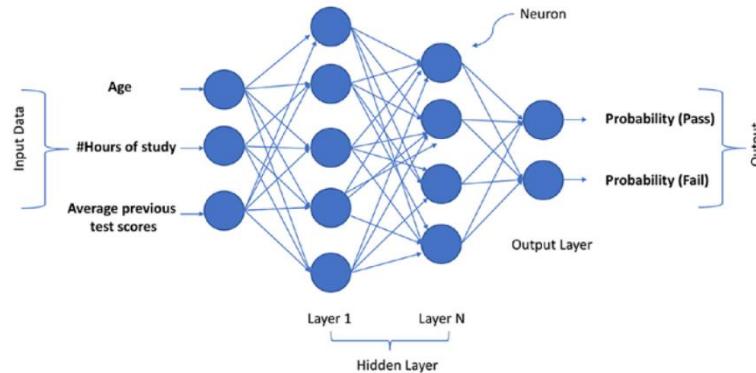
THEORETICAL PHYSICS

EVOLUTION

YOUTUBE: THE MAP OF MATHEMATICS

5.- MI PRIMERA RED NEURONAL

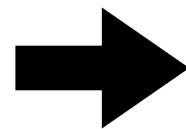
5.- МОЯ ПЕРША НЕЙРНА МЕРЕЖА



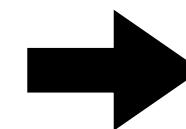
INGREDIENTES

Datos

Estructura



Entrenamiento
y testeо



RN lista para
predecir



RN entrenada y testeada



RN entrenada



RN sin entrenar



