

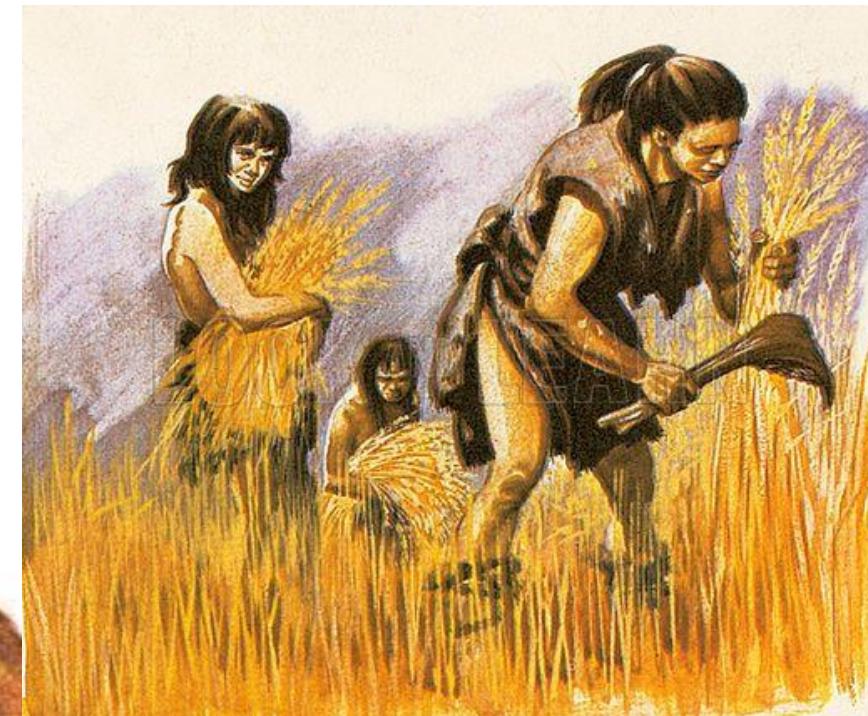
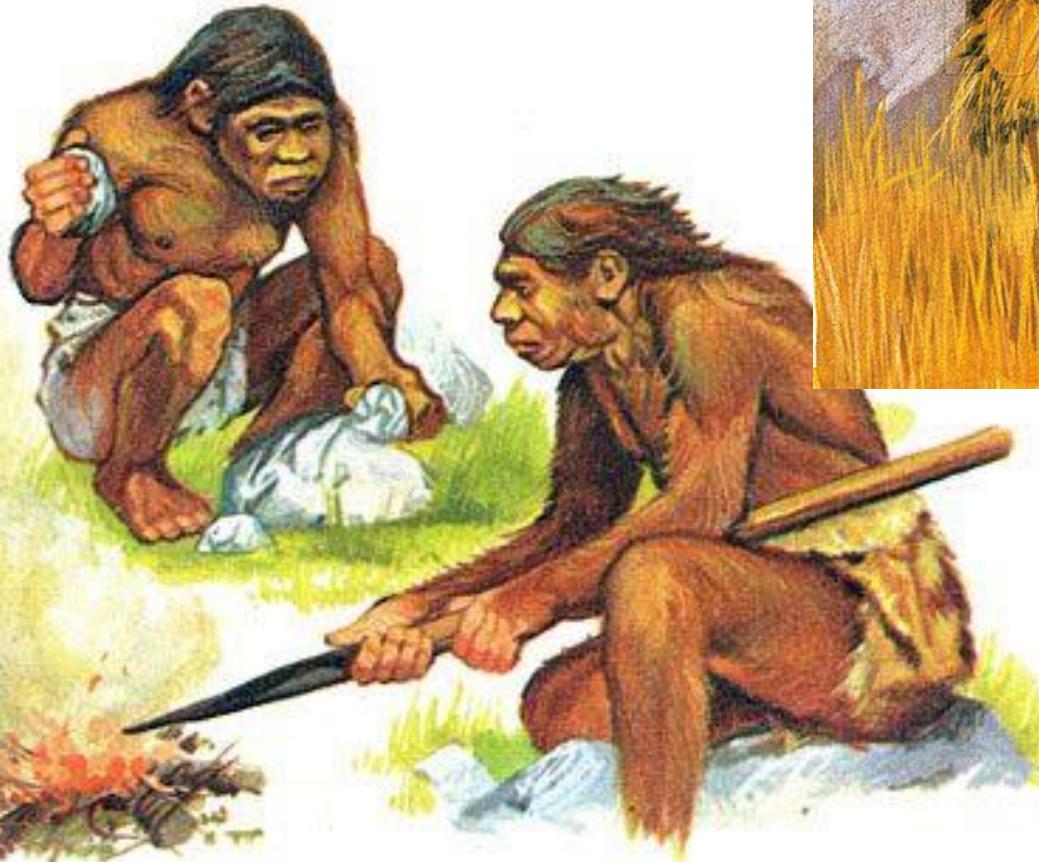
# Introduction to Artificial Intelligence

پیشہ کی پیہ ک لہ بارہ پی  
زرنگی دہستکر دھوہ

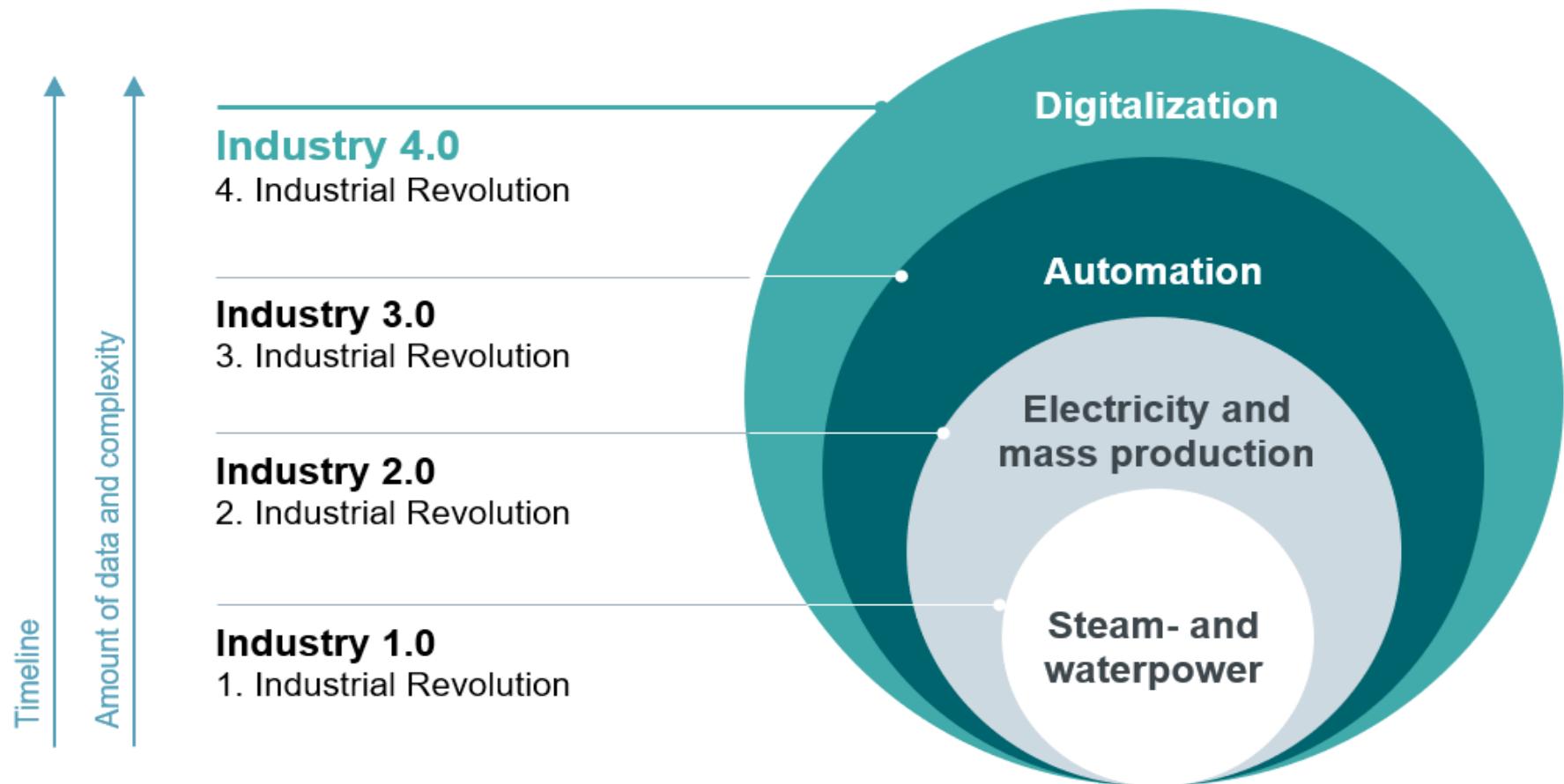
Prepared by: Engineer [Aso Abdallah Salih]

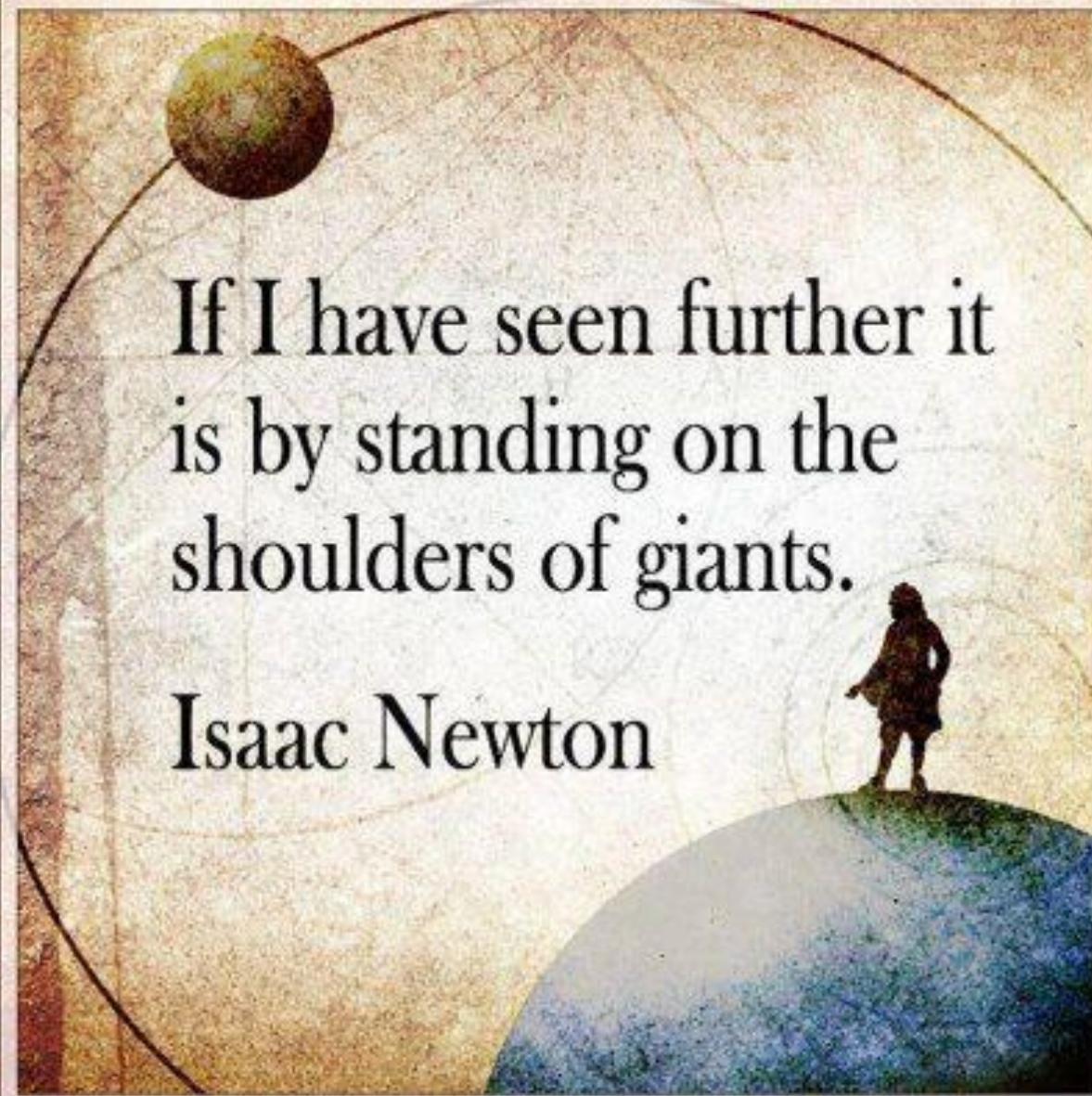






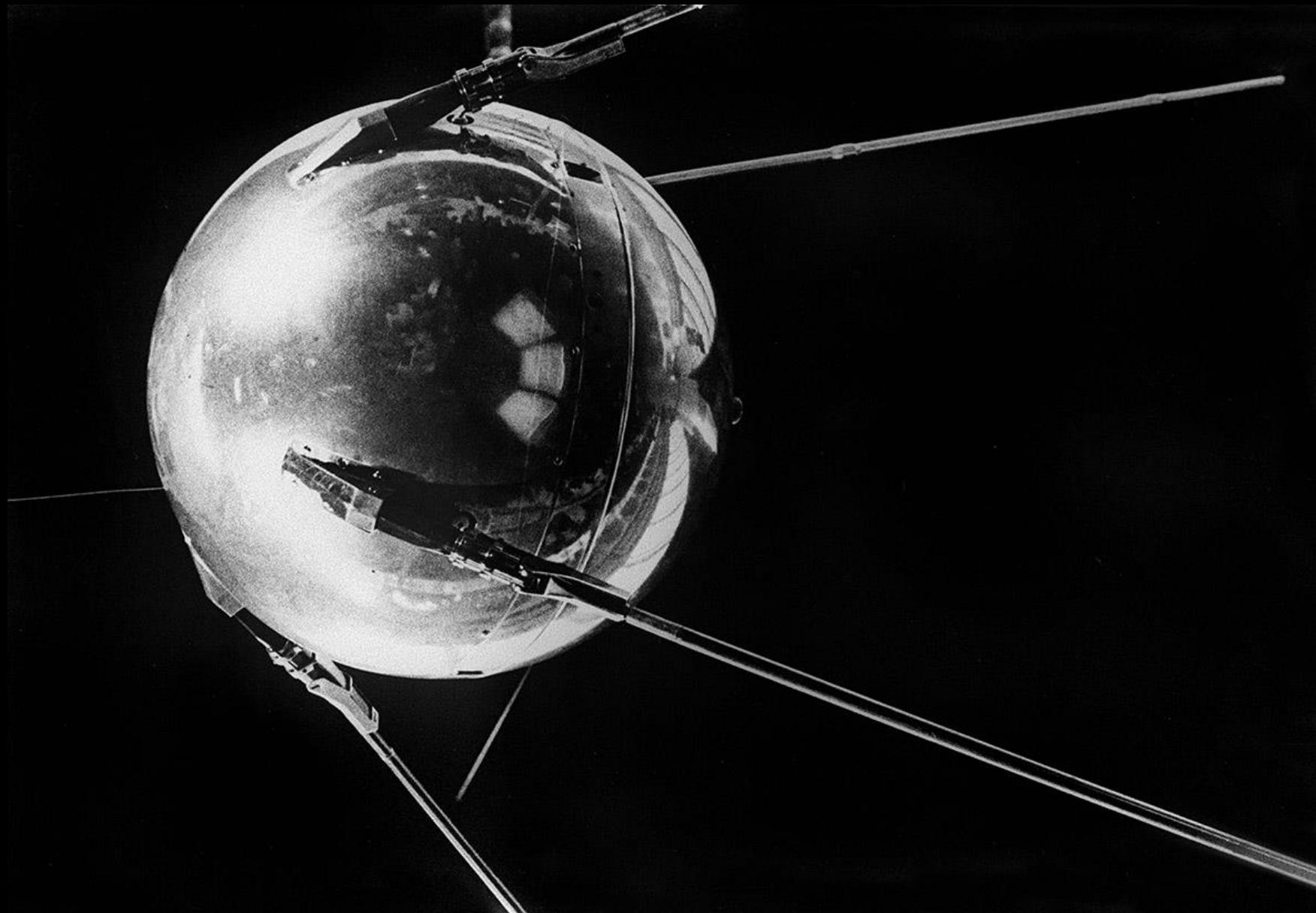
# Industrial Revolution





If I have seen further it  
is by standing on the  
shoulders of giants.

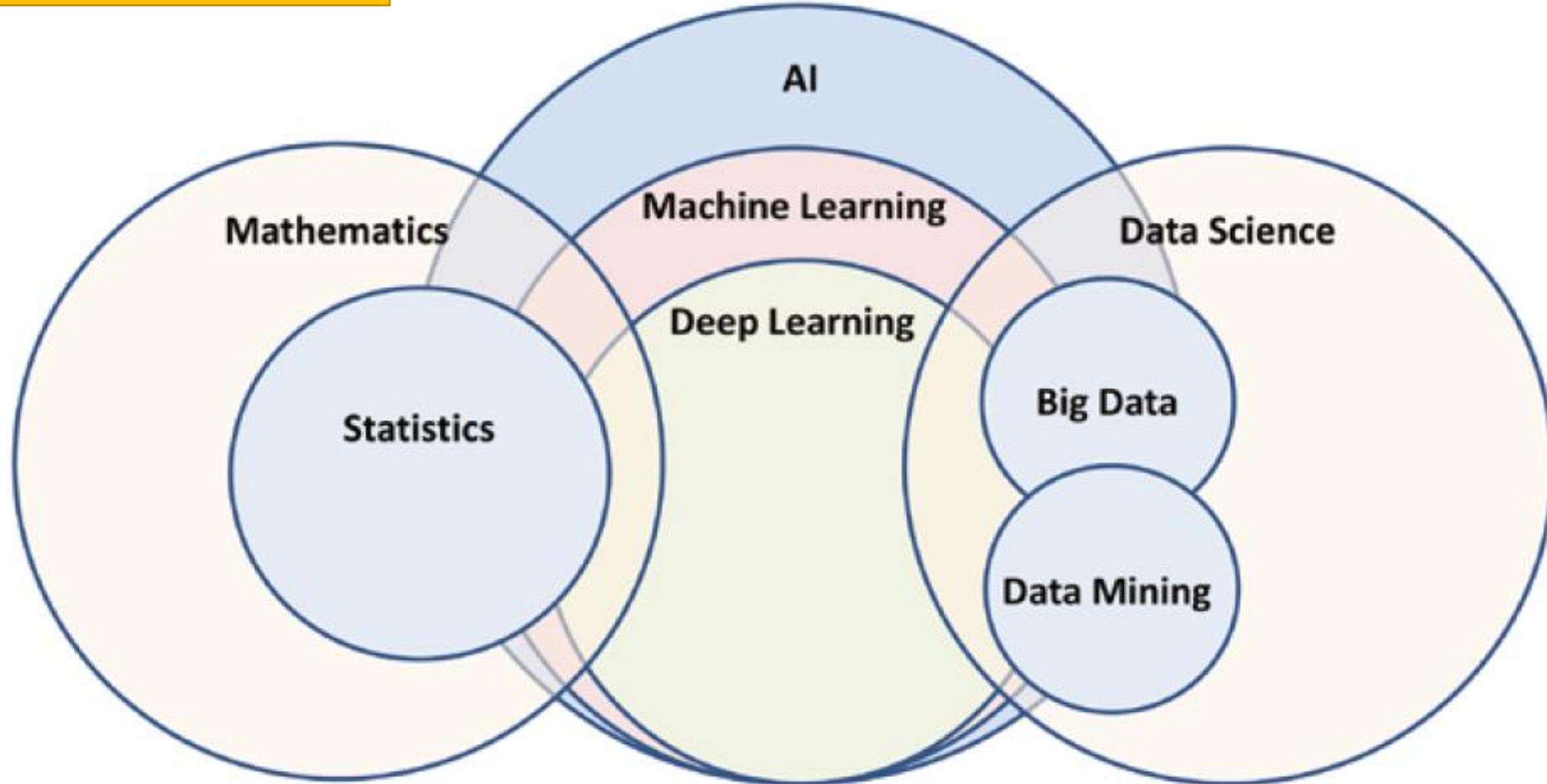
Isaac Newton





The age of AI,  
“OPEC”  
up with the US  
elligence (AI)  
one of the  
uthorities  
ion.

# AI is a discipline



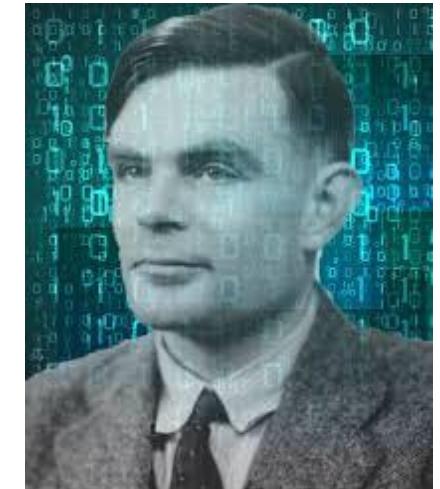
## What is AI?

- AI means enabling a machine to do intelligent things to mimic humans.
- Machine learning is a subset of AI and consists of algorithms that can automate data analysis.
- Deep learning is a subset of machine learning. It is a neural network with more than one hidden layer.



# History of AI

**AI can be traced back to the 1940s, during World War II, when Alan Turing, a British mathematician and computer scientist, developed a code-breaking machine called bombe in Bletchley Park, United Kingdom, that deciphered German Enigma-encrypted messages**



The Hollywood movie *The Imitation Game* (2014) has vividly captured this period of history

# History of AI

## JOHN McCARTHY

The father of Artificial Intelligence



AI as a research discipline was established at a workshop at Dartmouth College in 1956, organized by John McCarthy, a young assistant professor of mathematics at the college.

# History of AI

## The history of AI can be divided into three stages

### 1950s–1970s, neural networks (NNs) → Artificial Neural Network

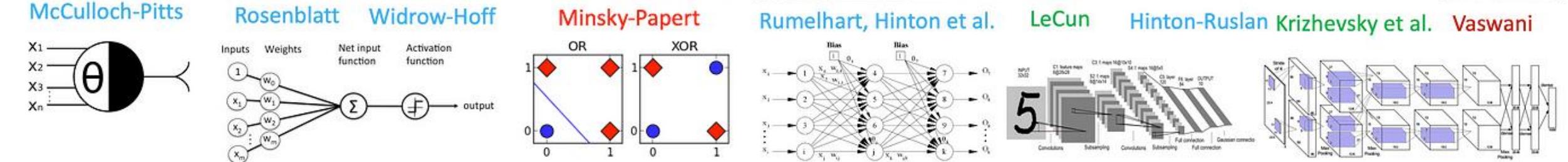
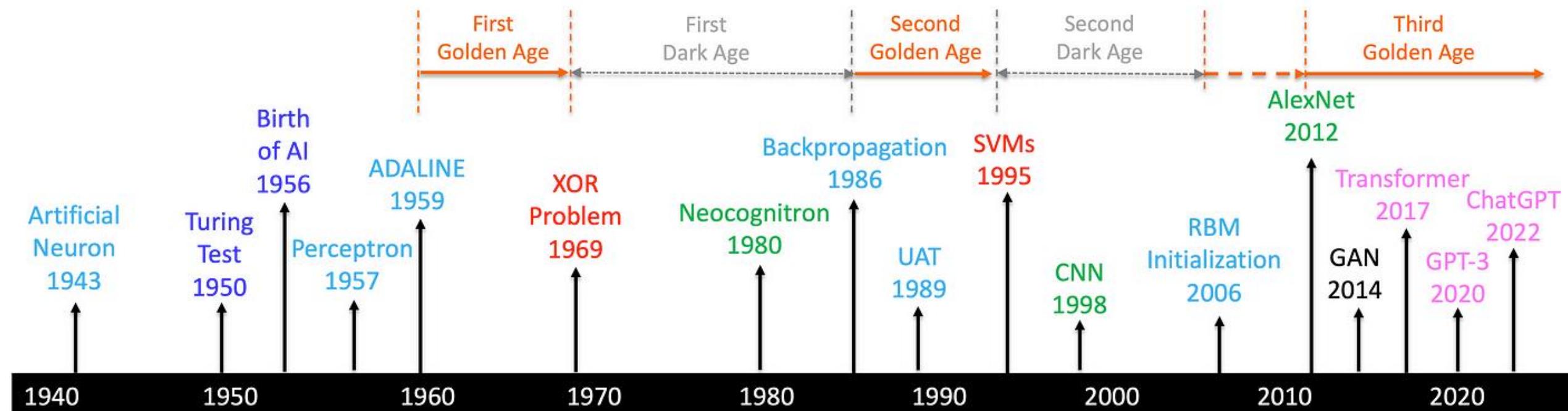
After the 1970s, when NNs failed to live up to their promises, known as *AI hype*, funding and research activities were dramatically cut. This was called an *AI winter*.

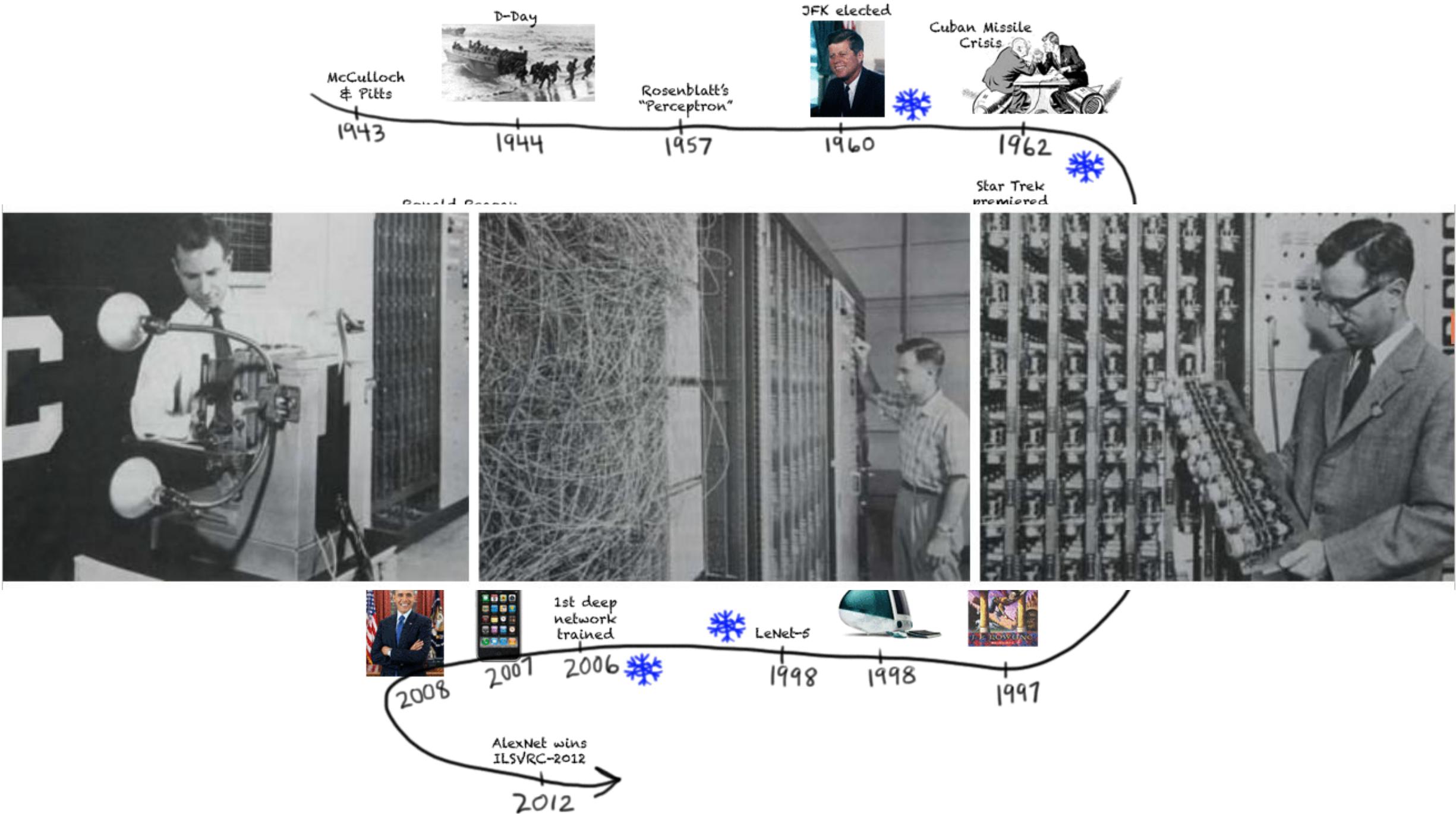
### 1980s–2010s, machine learning (ML) →

This is the period when machine learning flourished. ML is a subset of AI and consists of a set of mathematical algorithms that can automatically analyze data.

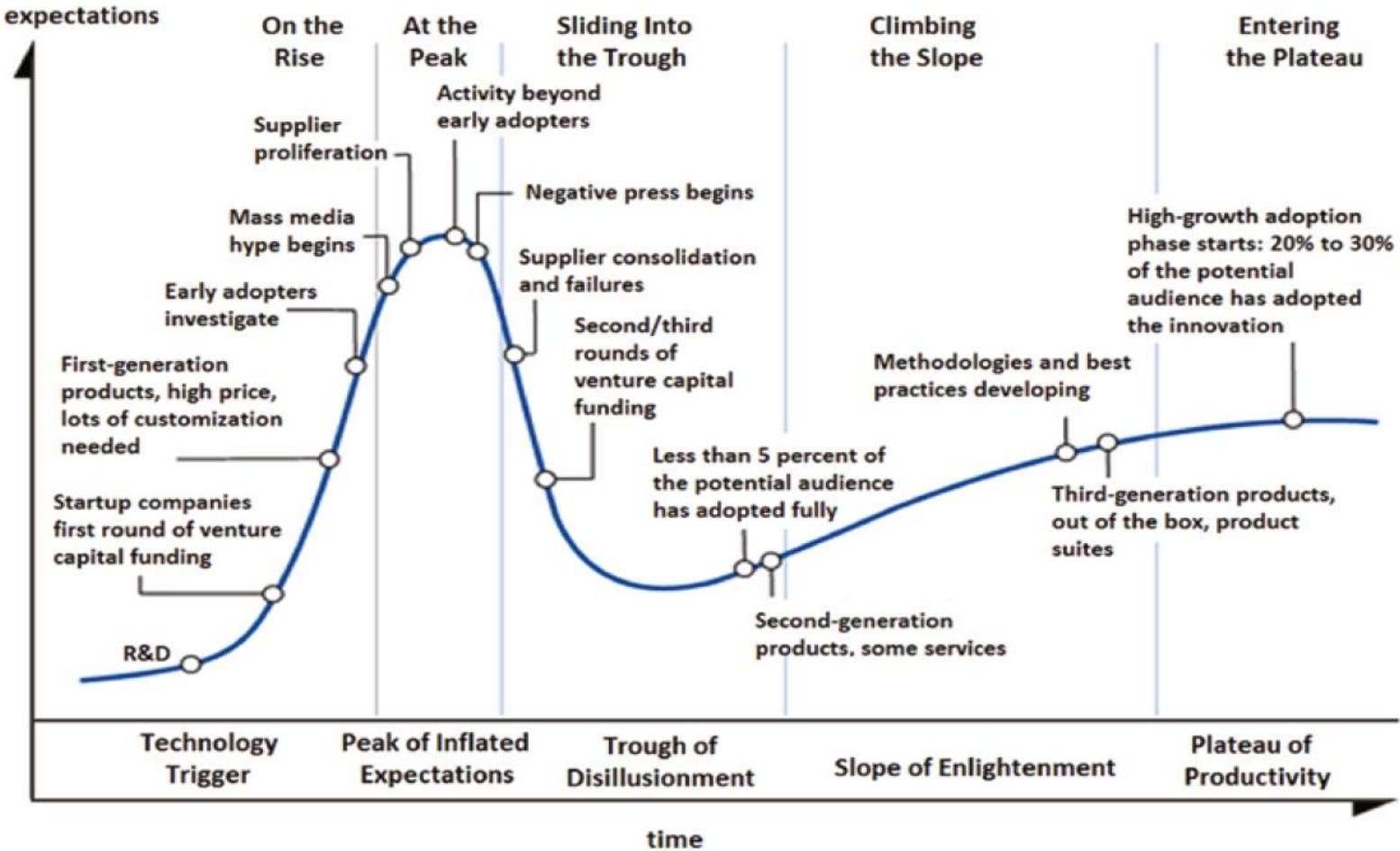
### 2010s–present, deep learning (DL) →

This is the period when deep learning (DL) was developed. DL is a special type of neural network that has more than one layer of hidden layers.





# Hype!



Like many other technologies, AI has a hype. An AI hype can be divided into several stages. In the first stage (1950s–1970s), called Technology Trigger, AI developed quickly, with increased funding, research activities, enthusiasm, optimism, and high expectations. In the second stage (1970s), AI reached the peak, called the Peak of Inflated Expectations. After the peak, in the third stage (1970s–1980s), when AI failed to deliver on its promises, AI reached the bottom, called the Trough of Disillusionment. This is the point at which an AI winter occurred. After the trough, AI slowly recovered; this is the fourth stage (1980s–present), which we are in now, called the Slope of Enlightenment. Finally, AI will reach the fifth stage, the Plateau of Productivity, where AI development becomes more stable.

# The Dunning-Kruger Effect Cognitive bias

4/1/95

10:00 AM

MAIN CAMERA



## Hype !

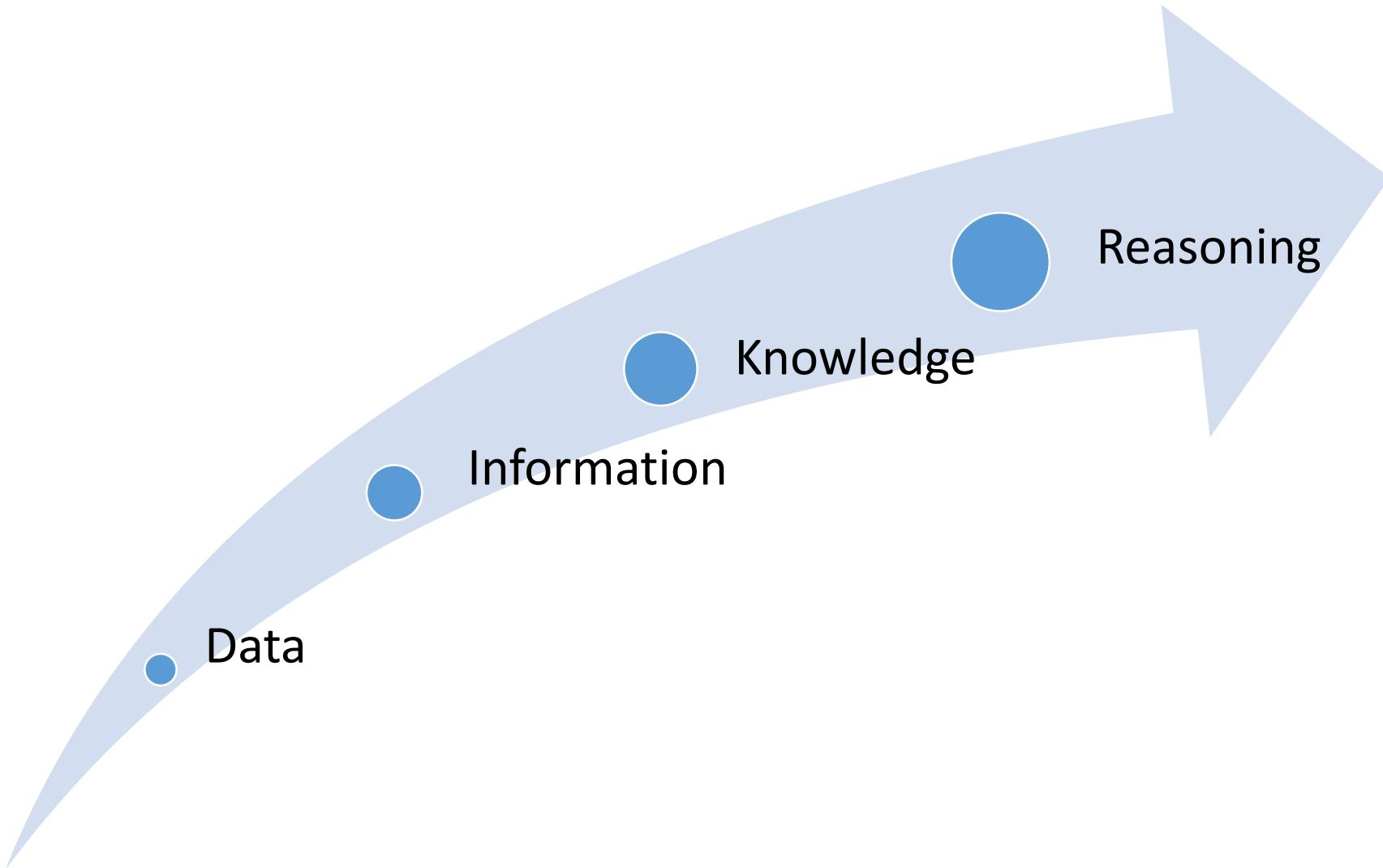
A famous case was the failure of machine translation in 1966. After spending \$20 million to fund a research project, the National Research Council (NRC) concluded that machine translation was more expensive, less accurate, and slower than human translation, so the NRC ended all support. The careers of many people were destroyed, and the research ended.

Another example is the Fifth Generation project. In 1981, the Japanese Ministry of International Trade and Industry invested \$850 million for the Fifth Generation computer project to build machines that could carry on conversations, translate languages, interpret pictures, and reason like humans. By 1991, the project was discontinued, because the goals penned in 1981 had not been met.

**Why Now ?**

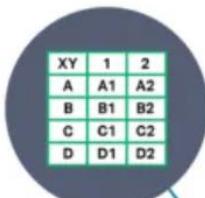
Huge data  
Computation Power  
Algorithms  
Huge Investment

# Huge Data

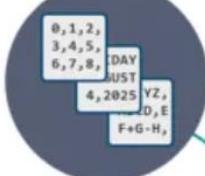


# Structured Data vs Unstructured Data

Can be displayed in rows, columns and relational databases



Numbers, dates and strings



Estimated 20% of enterprise data (Gartner)



Requires less storage



Easier to manage and protect with legacy solutions



vs

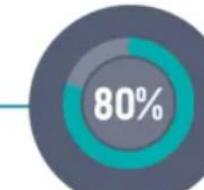
# Structured Data vs Unstructured Data

Cannot be displayed in rows, columns and relational databases



Images, audio, video, word processing files, e-mails, spreadsheets

Estimated 80% of enterprise data (Gartner)



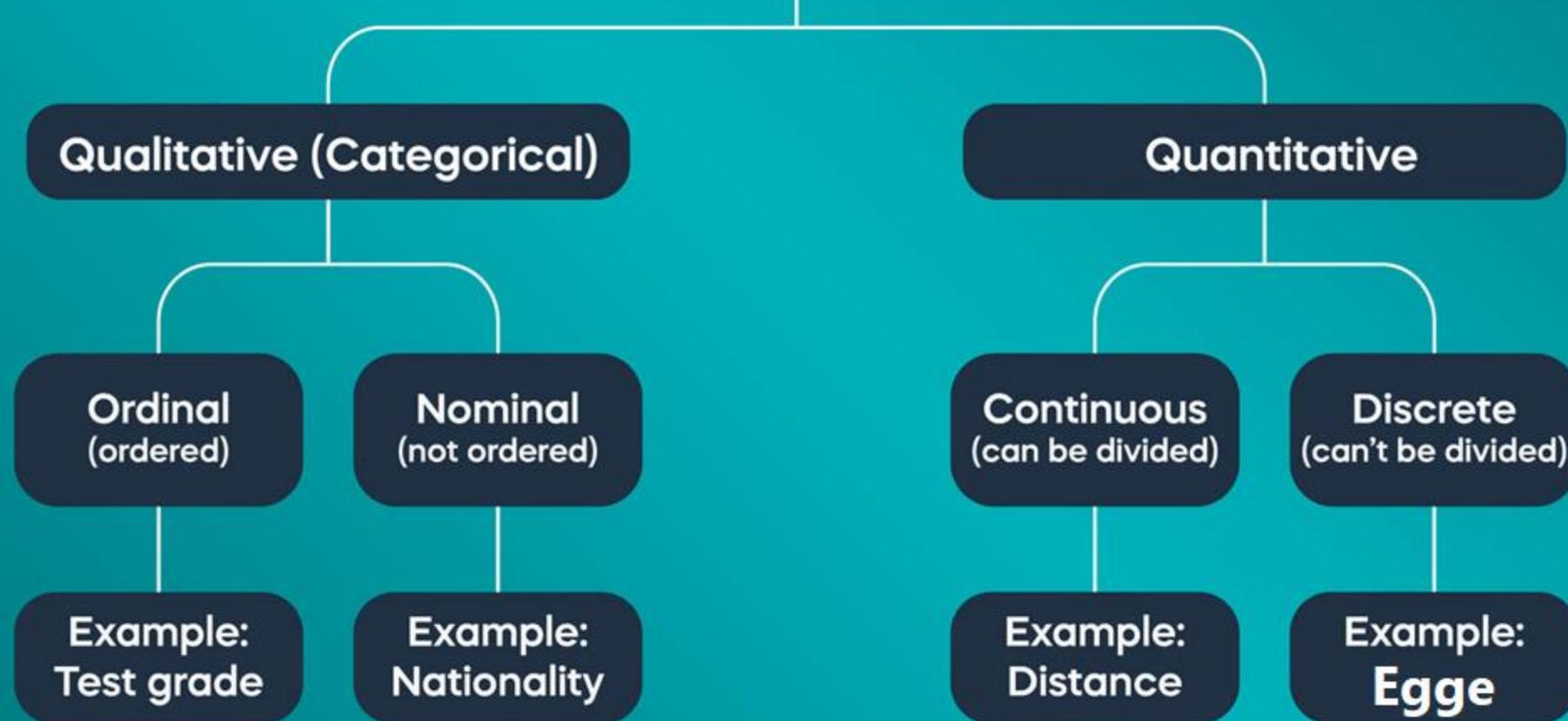
Requires more storage



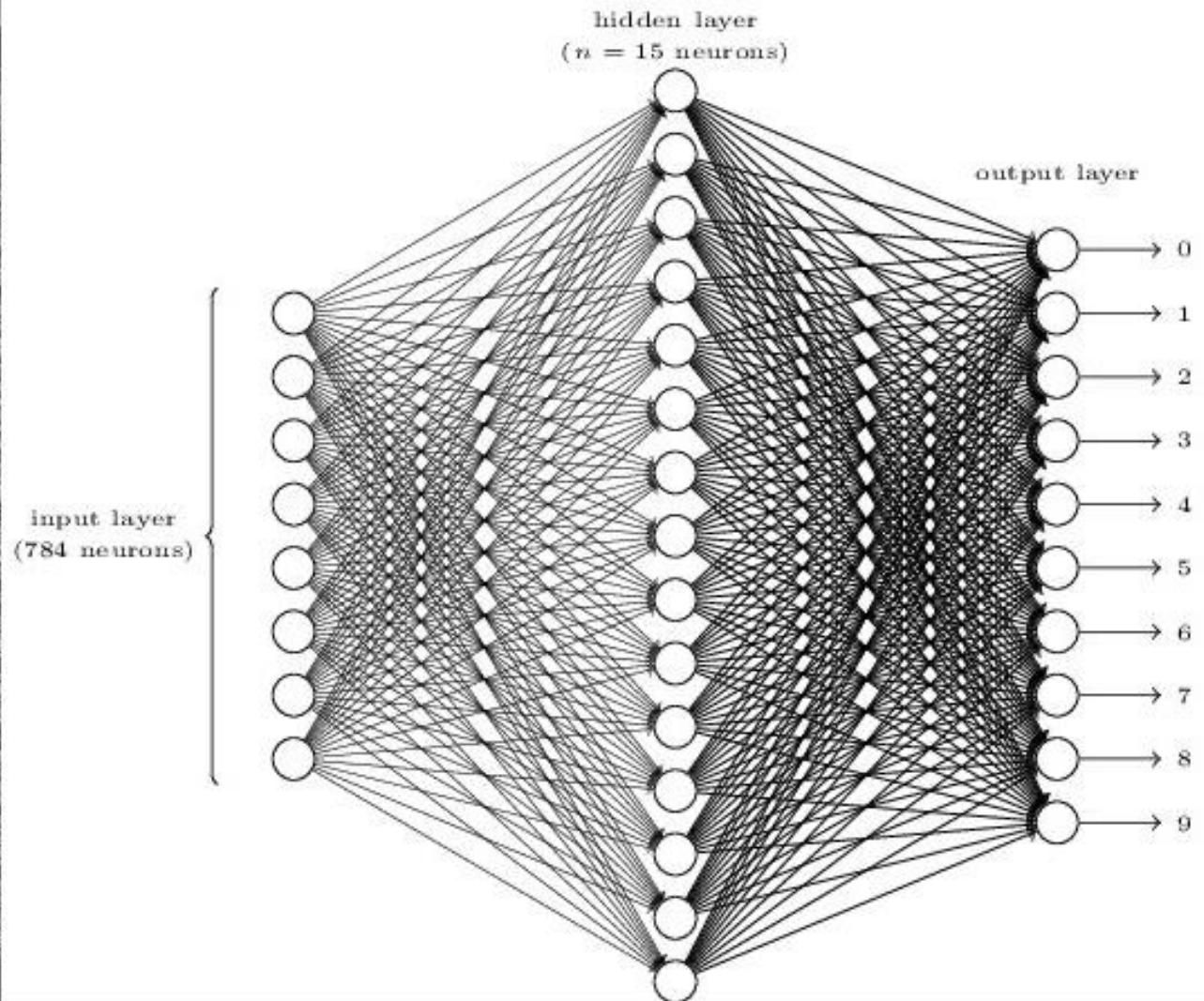
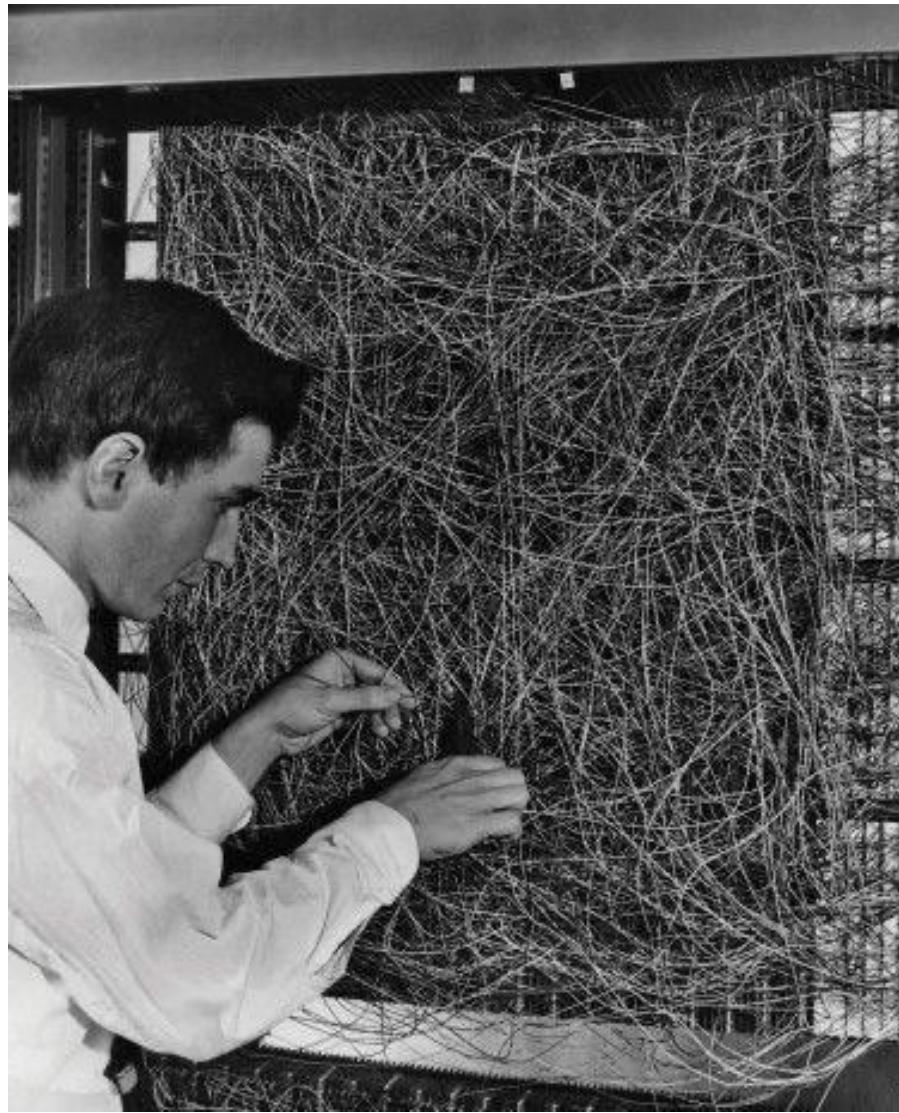
More difficult to manage and protect with legacy solutions



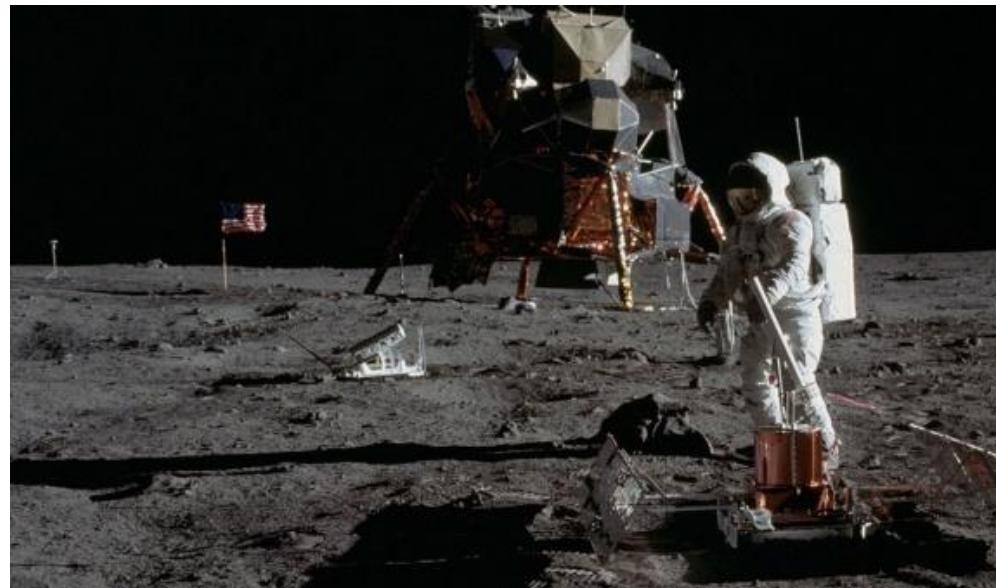
# Data Types



# Computational Power



# Computational Power



# Computational Power



# Computational Power





## Roundworm

Fruit Fly  
*Drosophila melanogaster*



100,000 Neurons

Completed 2023

Mouse  
*Mus musculus*



71,000,000 Neurons

20\_\_

Completed 1992

# Algorithms



## Type of AI

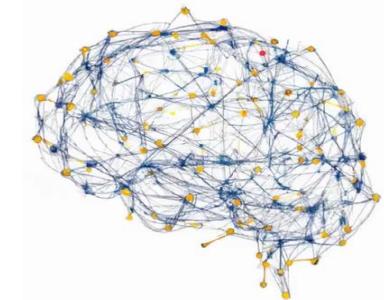
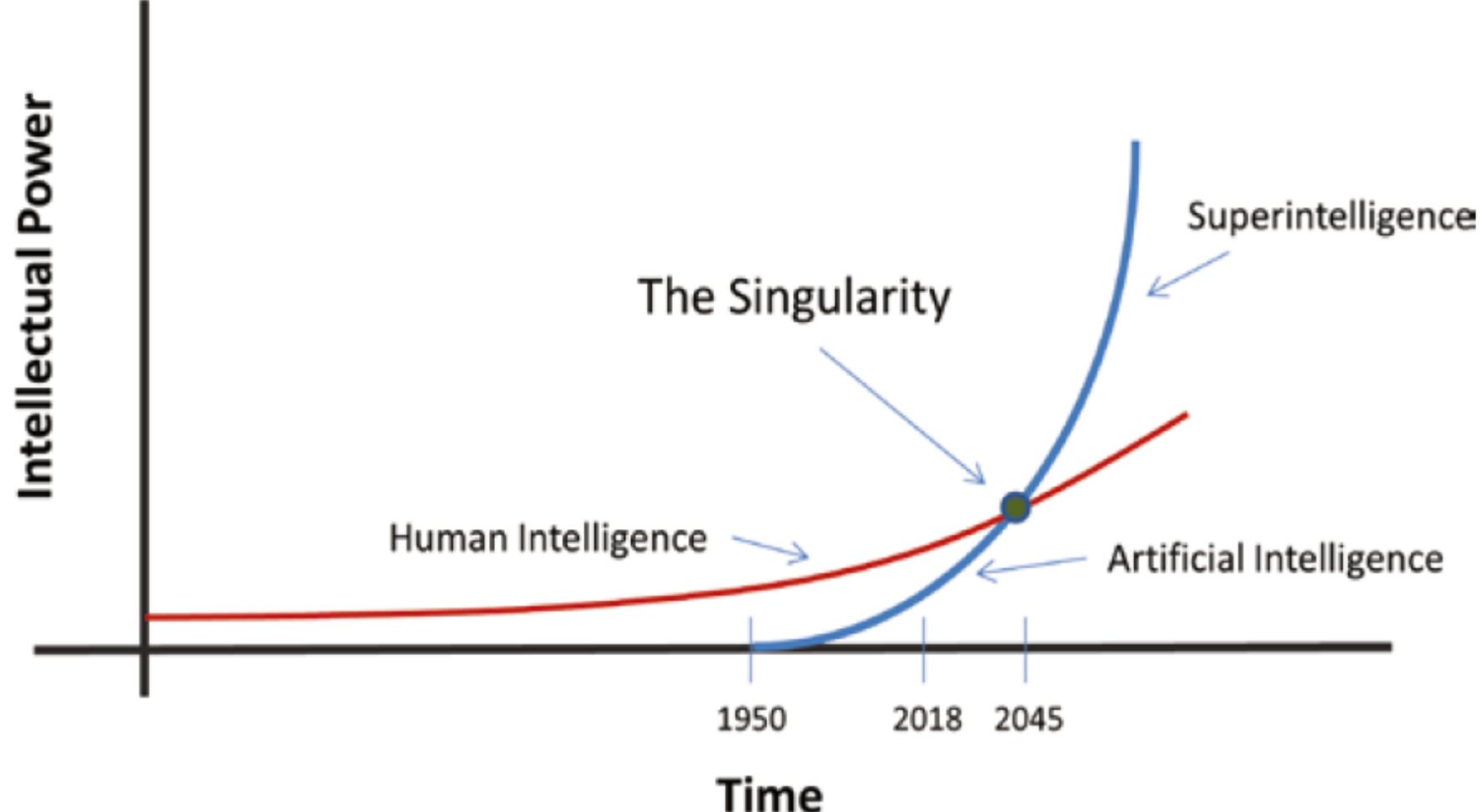
According to many resources, AI can be divided into three categories.

.**Narrow AI** refers to the AI that is used to solve a specific problem. Almost all AI applications we have today are narrow AI. For example, image classification, object detection, speech recognition (such as Amazon's Alexa, iPhone's Siri, Microsoft's Cortana, and Google Assistant), translation, natural language processing, weather forecasting, targeted advertisements, sales predictions, email spam detection, fraud detection, face recognition, and computer vision are all narrow AI.

.**General AI** *strong AI* or *artificial general intelligence* (AGI), refers to the AI that is for solving general problems. It is more like a human being, which is able to learn, think, invent, and solve more complicated problems. The singularity, also called *technological singularity*, is when AI overtakes human intelligence, According to Google's Ray Kurzweil, an American author, inventor, and futurist, AI will pass the Turing test in 2029 and reach the singularity point in 2045.

.**Super AI** *super-intelligence*, refers to the AI after the singularity point. Nobody knows what will happen with super AI. One vision is human and machine integration through a brain chip interface. In August 2020, Elon Musk, the most famous American innovative entrepreneur, has already demonstrated a pig with a chip in its brain. While some people are more pessimistic about the future of AI, others are more optimistic.

# Type of AI



## Summery:

- Alan Turing proposed the imitation game (1950).
- Dartmouth held an AI workshop (1956).
- Frank Rosenblatt built the Perceptron (1957).
- The first AI winter (1970s).
- The second AI winter (1987).
- IBM's Deep Blue beats Kasparov (1997).
- Geoffrey Hinton unleashed deep learning networks (2012).
- AlphaGo defeated a human Go champion (2016).
- OpenAI released GPT-3(2020).
- AlphaFold predicted protein folding (2020).





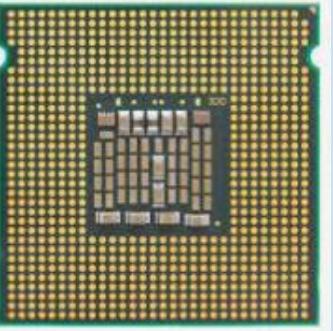
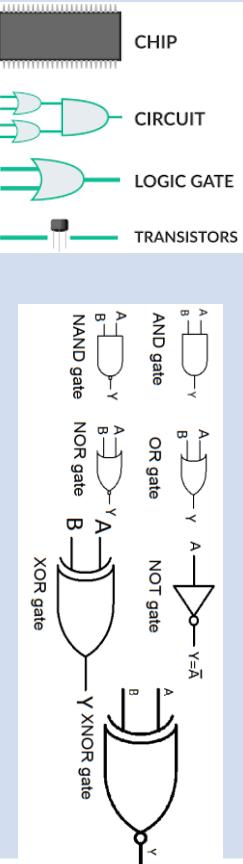
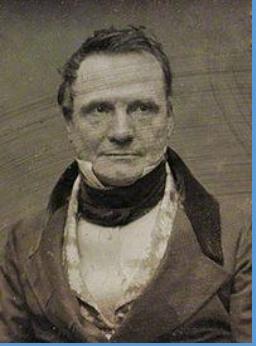
# Archology







# Computer History

Quantum Computer	Micro-processor	Logic Gate	Valve and Transistor	Relay Contactor	Mechanical Computer
		<p>CHIP CIRCUIT LOGIC GATE TRANSISTORS</p> 	<p>Valve</p>  <p>Transistors</p> 	  	 

بھوئی، کلینی نام ھیکلایو

لای دھنہ پل، رہنمائی مور نہو

خواہ بھر کرنے پر باری وہ بھو

زمارہ نادیاں کے سیوستے و دادا

لیان. وہ لو 21، 18، 15، سیوستے و

$$x = \frac{N=15, 18, 21}{3}$$

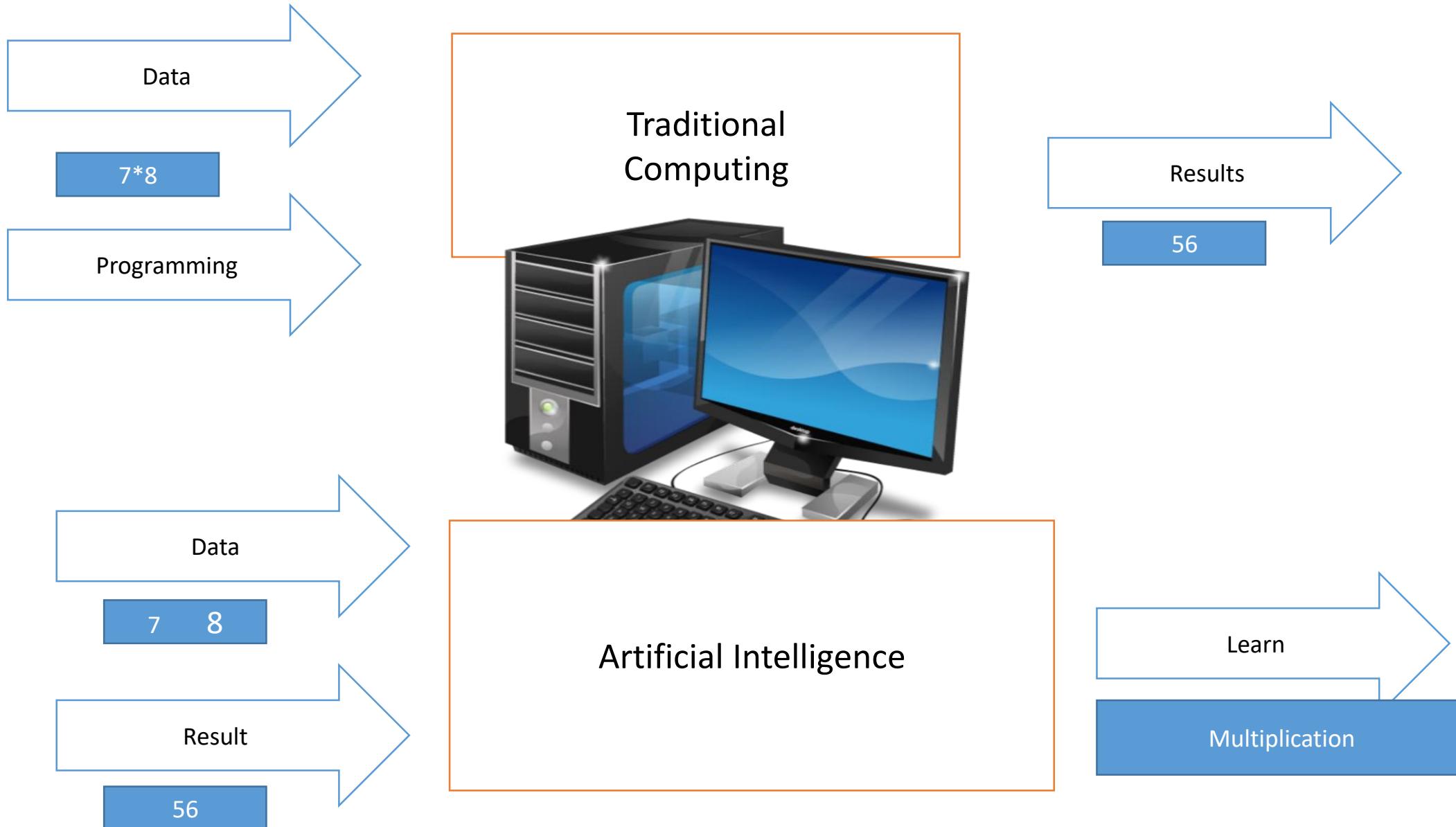
لیچیان لی نامیتھے وہ بی باقی

لیان. وہ 21، 18، 15، سیوستے و

$$x = \frac{N=15, 18, 21}{3}$$

لیچیان لی نامیتھے وہ بی باقی

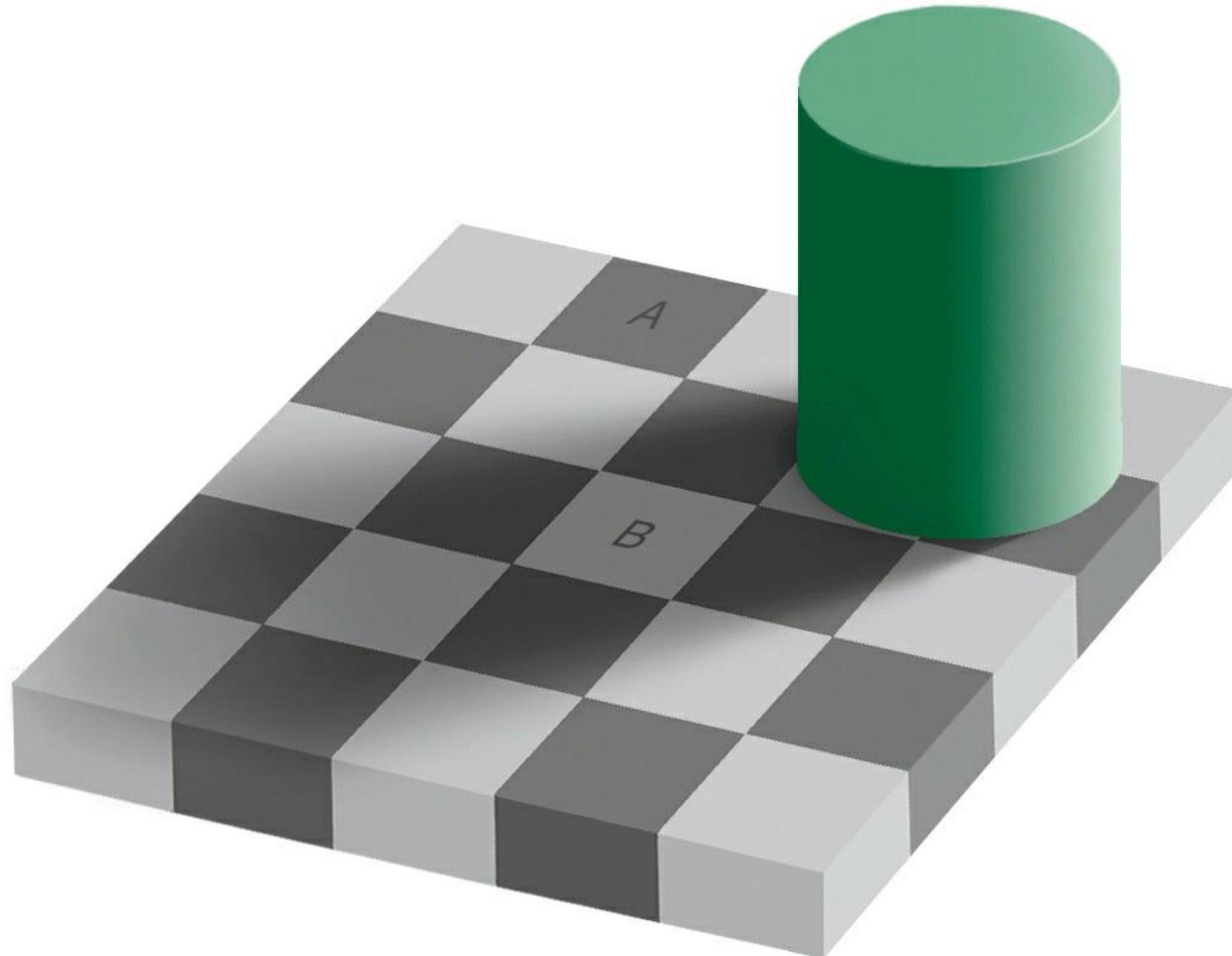
# What is the big picture?



# **Modeling...**

## **There is three type of Model**

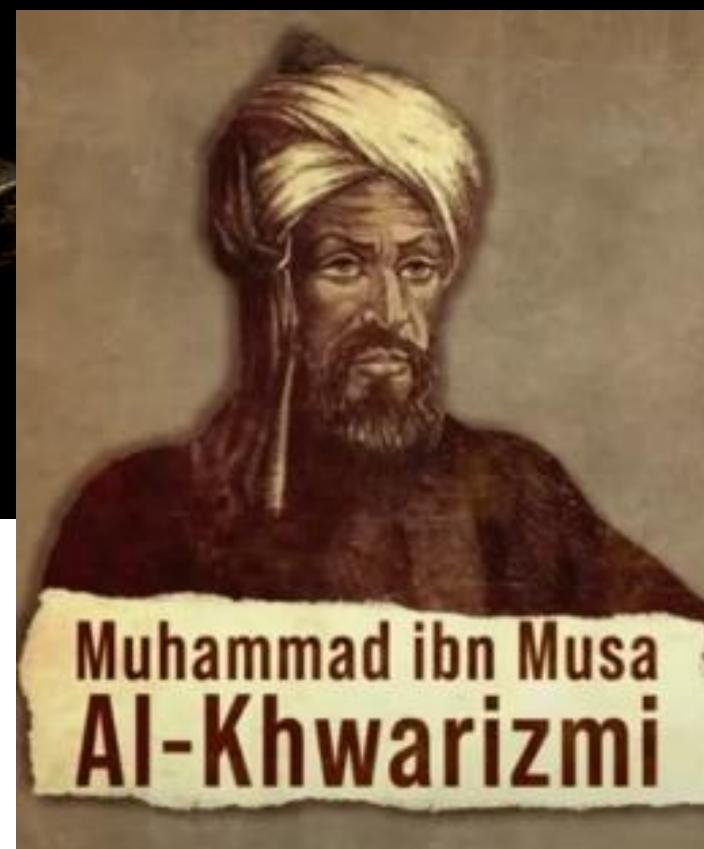
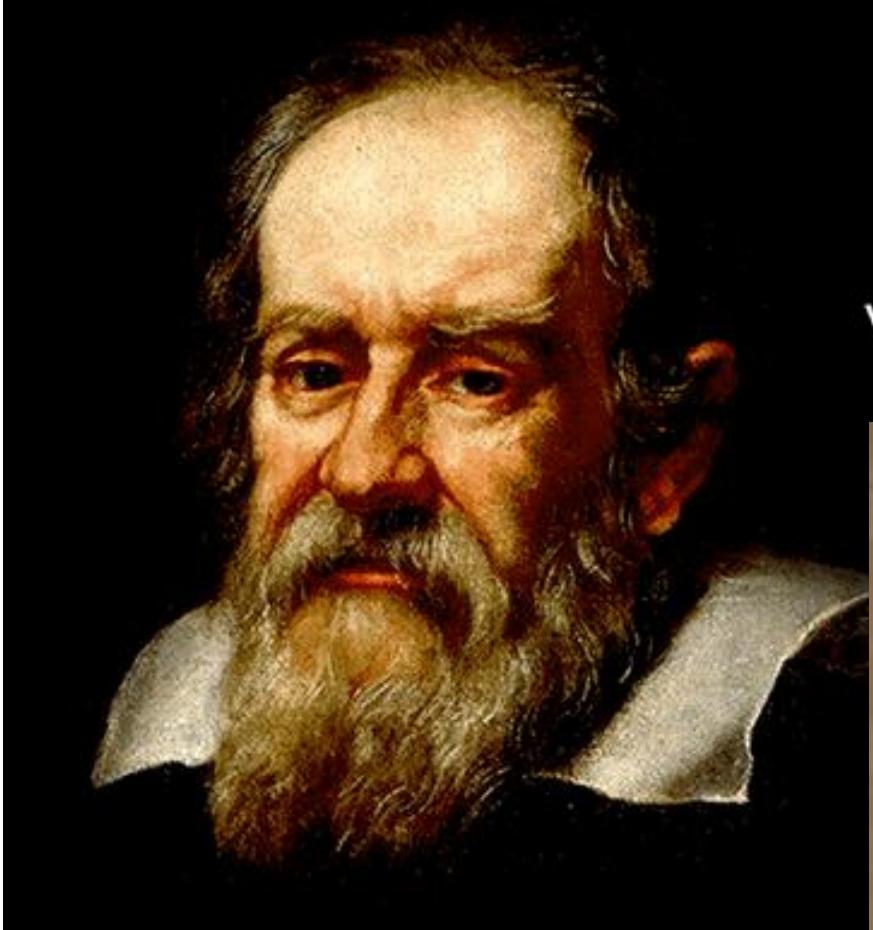
- 1- Physical model, like a status of an outstanding figure, which represent a person as shape made of stone, may be its bigger or smaller than the real person.
- 2- Mathematical Model: as we know it can be a formula or a mathematical rule like, F= ma.
- 3- Processing or To do list: flow chart is one of the example, we write it to make our job easier and know how to manage with a real problem.



■

+





"Mathematics is the language  
with which God has written the  
Universe."

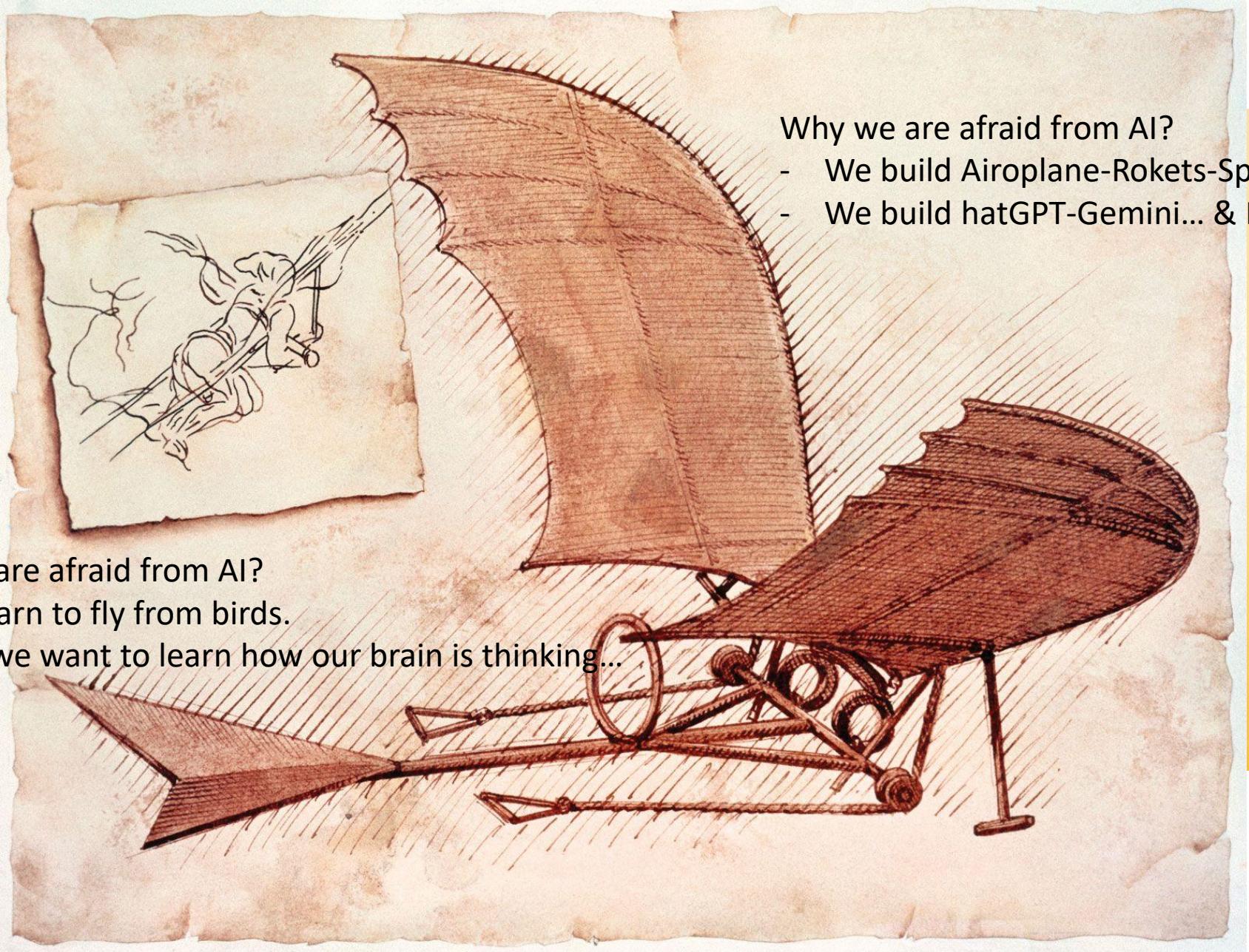
Beginning Algebra,  
J. S. Miller and E. John Hornsby,  
p. 2

- Galileo

Muhammad ibn Musa  
**Al-Khwarizmi**

Why we are afraid from AI?

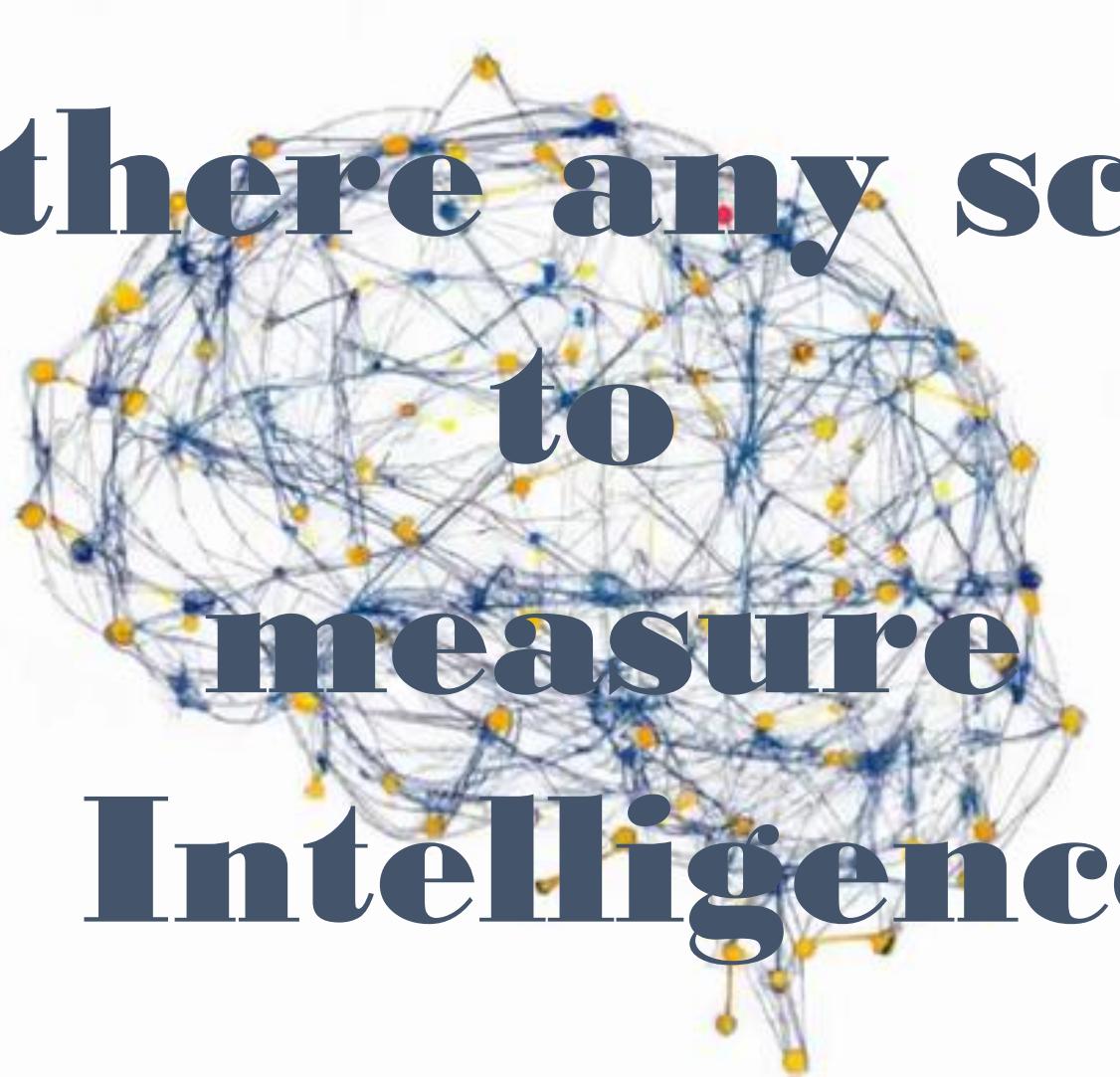
- We learn to fly from birds.
- Now we want to learn how our brain is thinking...



Why we are afraid from AI?

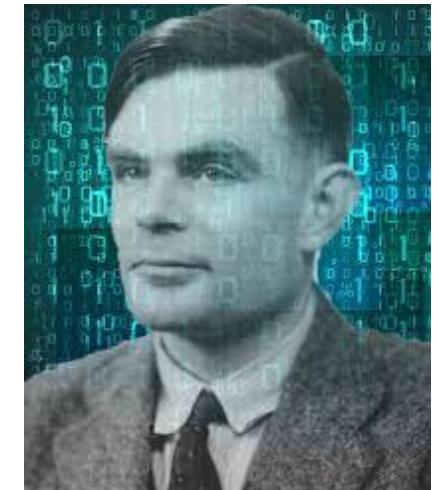
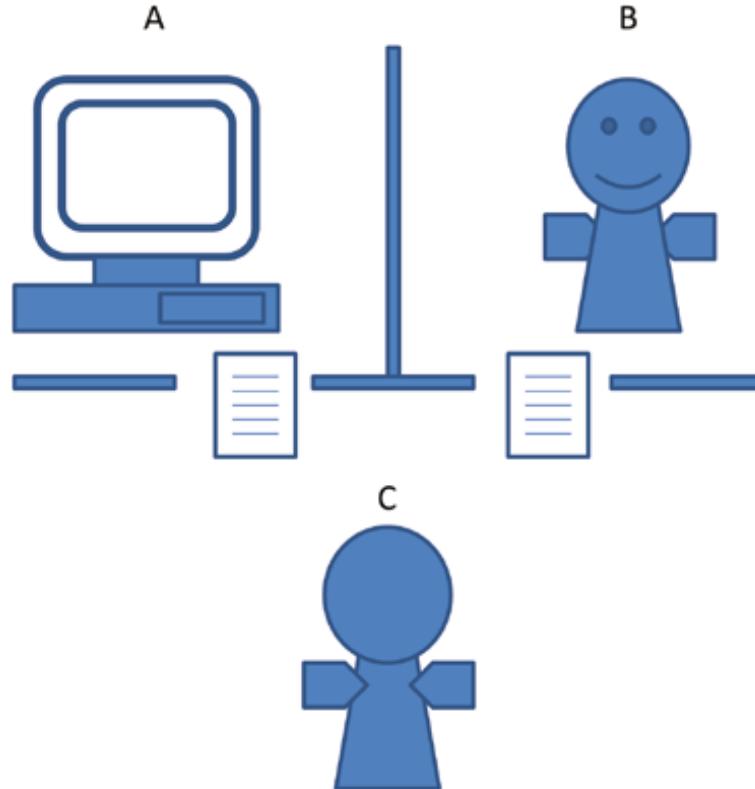
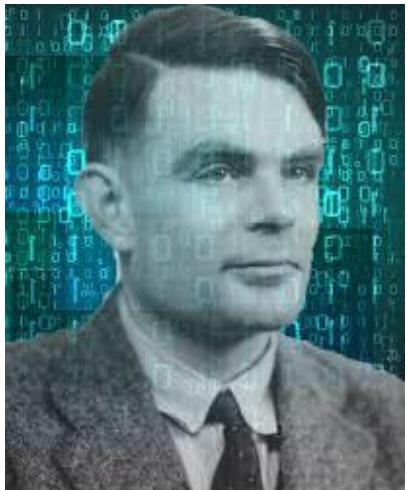
- We build Airplanes-Rockets-SpaceShips.
- We build ChatGPT-Gemini... & Robot

Is there any scale  
to  
measure  
Intelligence



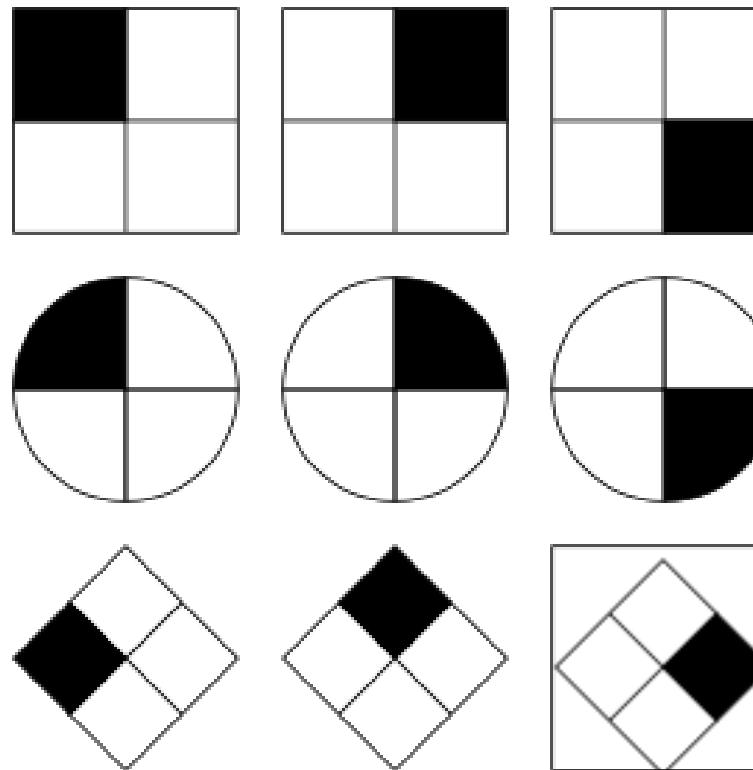
# Imitation game

The famous Turing test, also called the imitation game. Player C, the interrogator, is trying to determine which player—A or B—is a computer and which is a human



# IQ intelligence quotient

An intelligence quotient is a total score derived from a set of standardized tests or subtests designed to assess human intelligence.



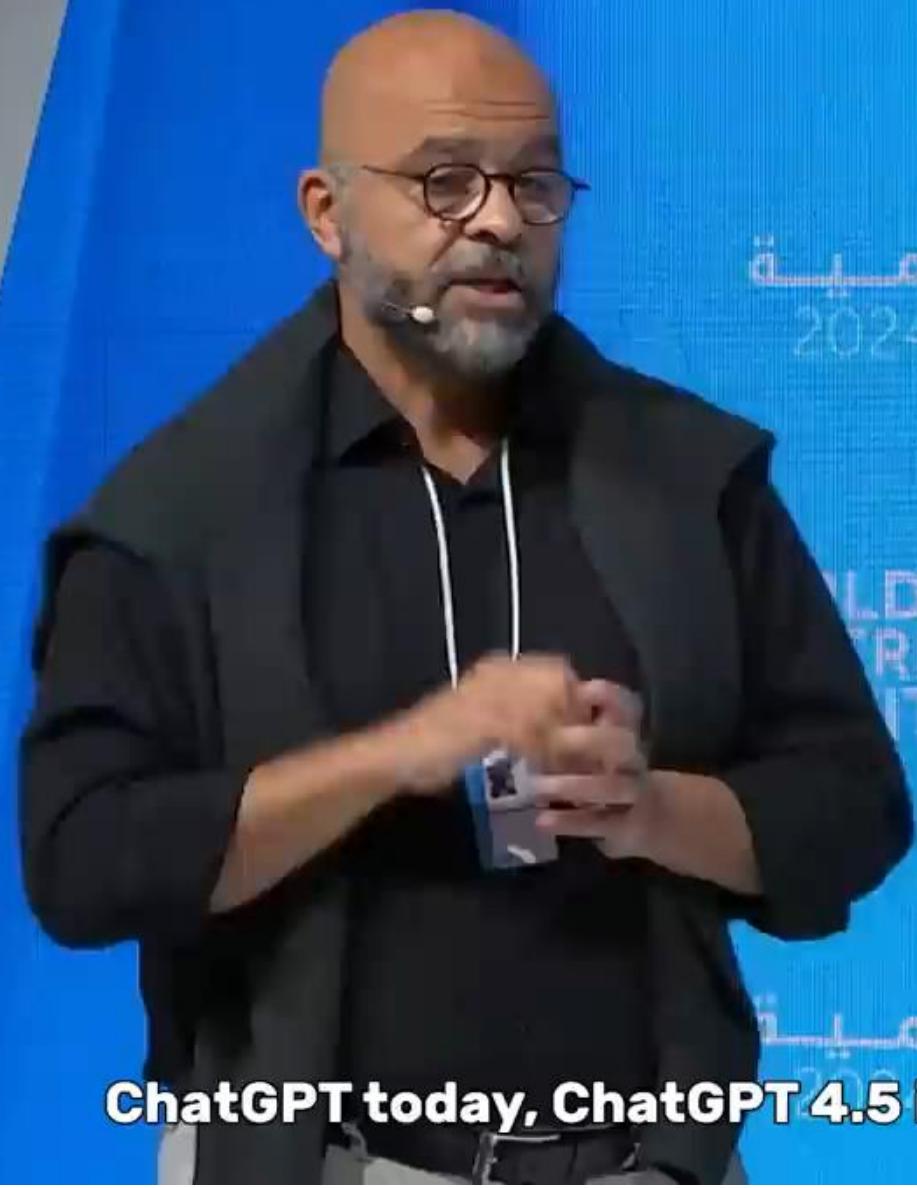
**Apes can learn sign language and communicate using it, they have never attempted to learn new knowledge by asking humans or other apes.**

Kanzi  
never  
ask...



**Why?**

**They don't seem to realize that other entities can know things they don't.  
It's a concept that separates mankind from apes.**



**ChatGPT today, ChatGPT 4.5 is at a**

