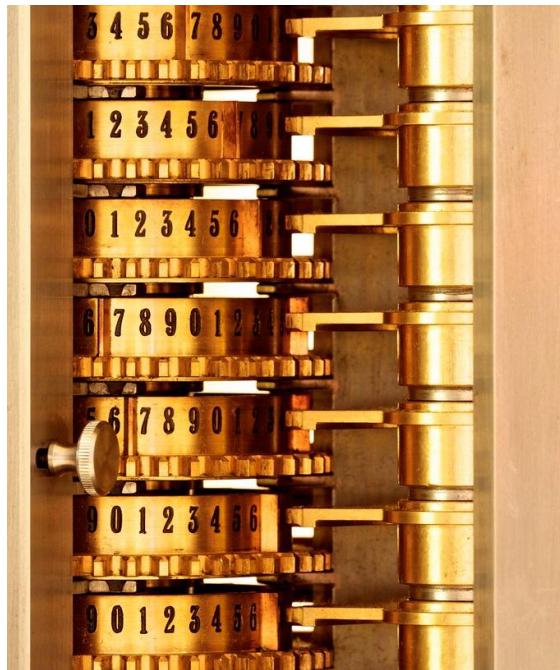
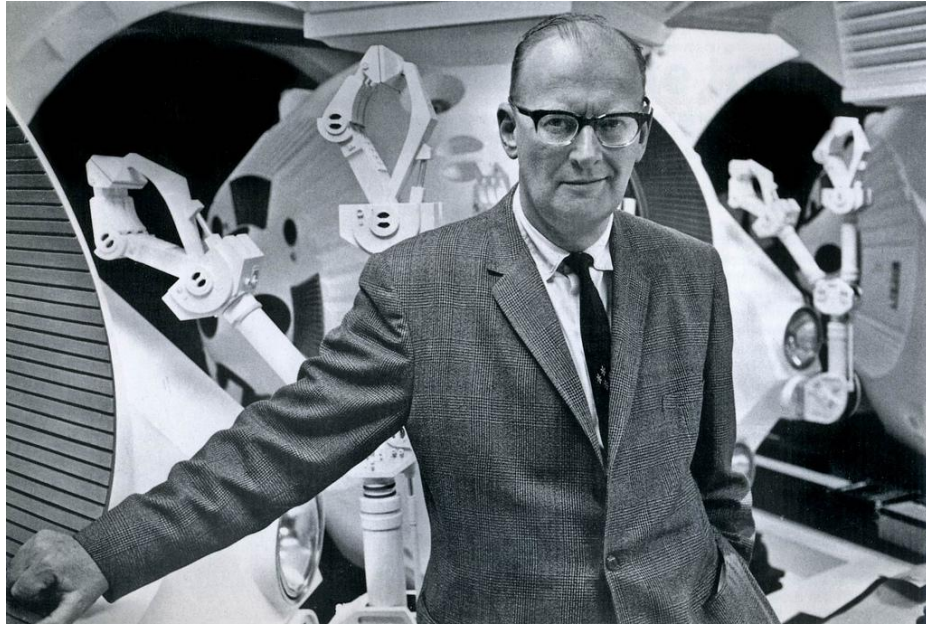


Computers, brains and AI

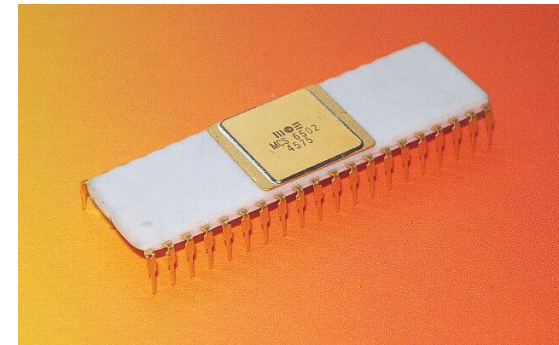
1: Intro



Arthur C. Clarke



“... indistinguishable from magic”



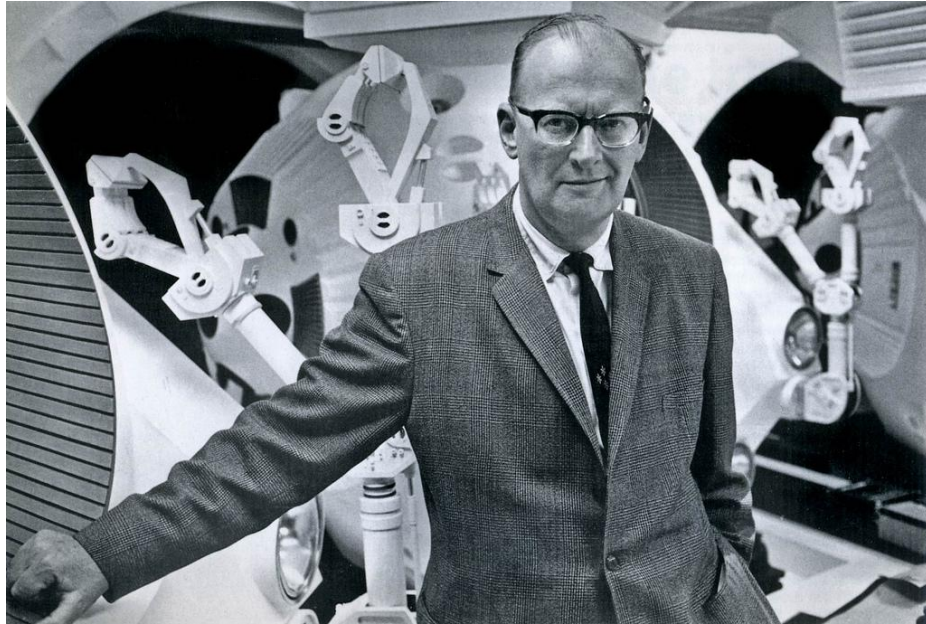
[Chip](#) by Christian Bassow / [CC BY-SA 4.0](#)

[Arthur C. Clarke](#) by ITU Pictures / [CC BY 2.0](#)

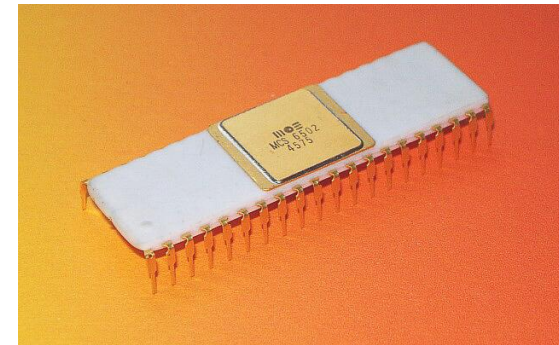
[Tractor](#) by Kharkiv Tractor Plant / [CC BY 4.0](#)



Arthur C. Clarke



“... indistinguishable from magic”



[Chip](#) by Christian Bassow / [CC BY-SA 4.0](#)

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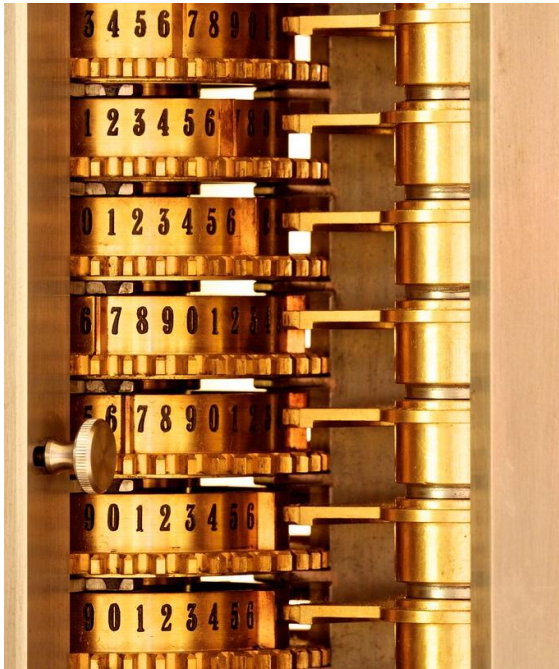
→ Computers, brains and AI ←

1: Intro

Charles
Babbage

Difference
Engine

Analytical
Engine



Ada
Lovelace

*the first
computer
program*

1843



Don't be shy

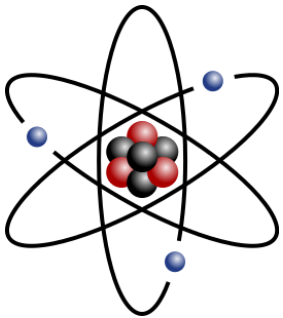
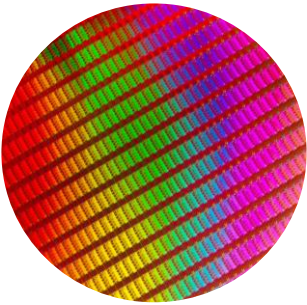


Can you say
that again?

Where we are
going?



hardware

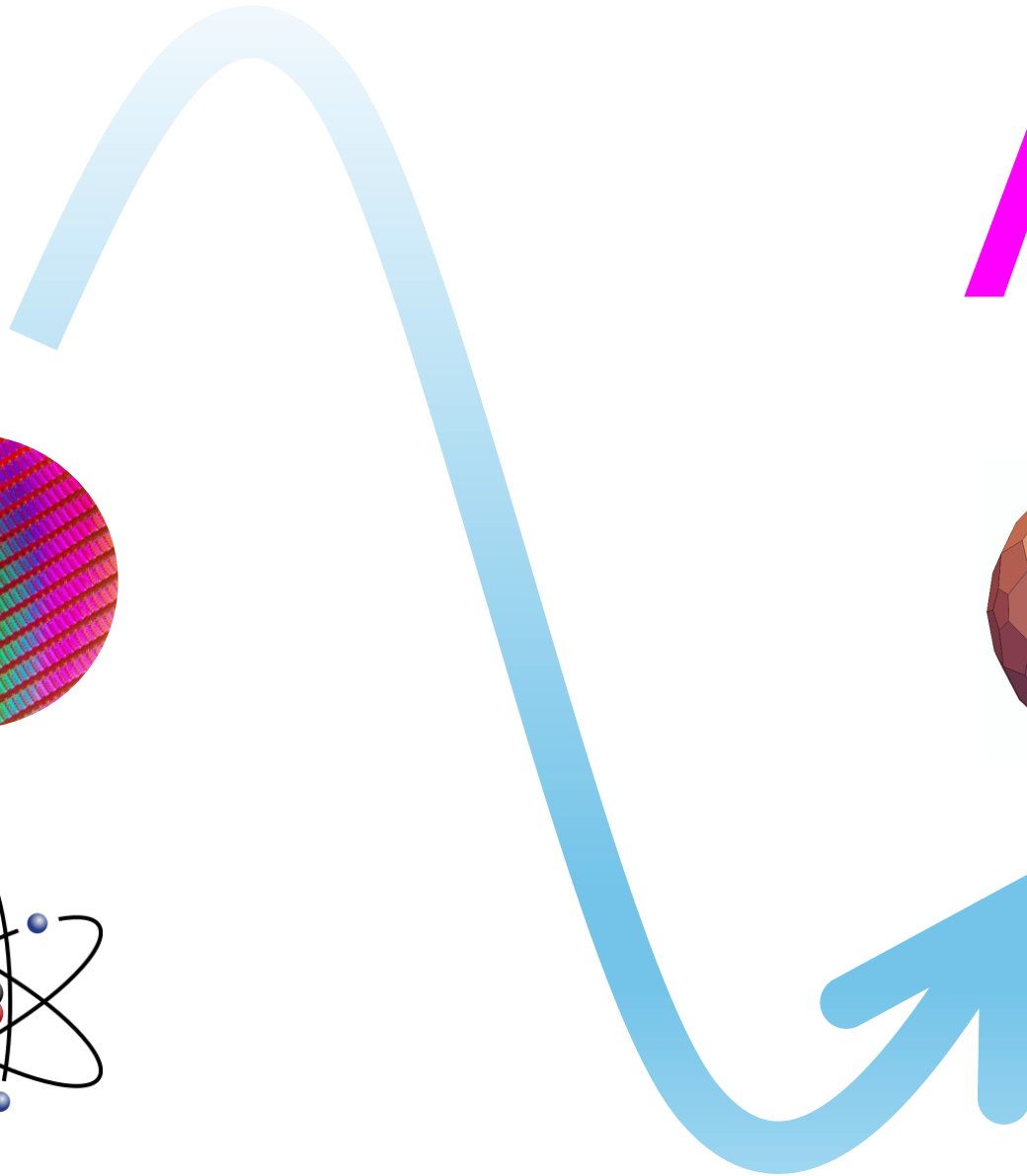
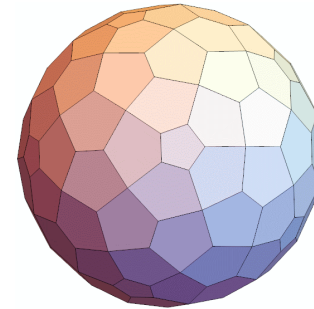


AI



u3ac.org.uk

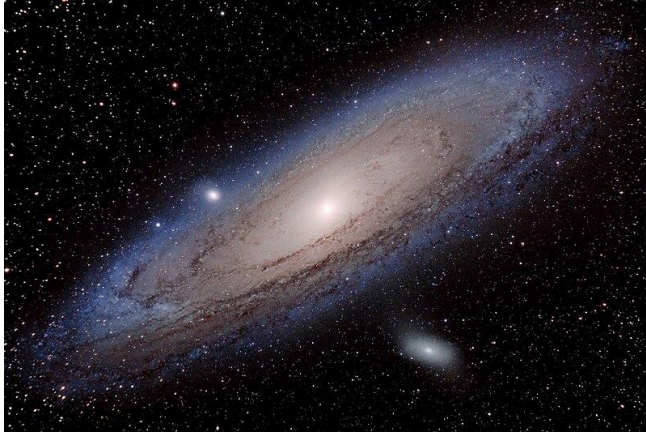
software



[Atom](#) by Unknown Author / [CC BY](#)

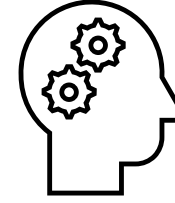
[Wafer](#) by Unknown Author / [CC BY-SA](#)

[Polyhedron](#) by Unknown Author / [CC BY-SA](#)



maths

AI



ChatGPT

November 2022



- 1) Intro
- 2) Foundations
- 3) Logic
- 4) Deep learning
- 5) Deep learning
- 6) ChatGPT
- 7) ChatGPT
- 8) ChatGPT
- 9) The future of AI
- 10) The future of AI



brains

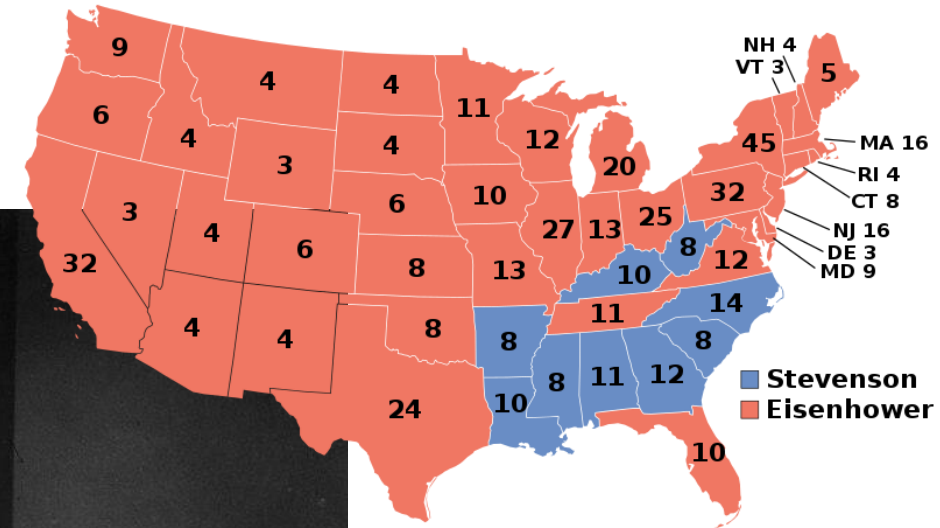
Slides



captions



The UNIVAC



1960



GOFAI

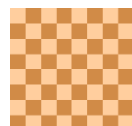
ELIZA
chatbot



1980

Good old-fashioned AI

Easy
is hard



Deep Blue



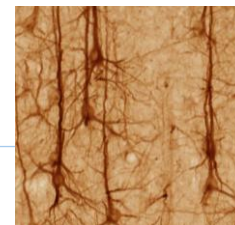
2000

2020



Machine learning

Perceptron



Birds fly



AlexNet



2012

Chess

Jeopardy

Book / CC0

Swan from pxhere / CC0

Bus by Martin49 / CC BY 2.0

Cat by Von.grzanka / CC BY-SA 3.0

Dog by Kyfishfishfish / CC BY-SA 4.0

The thinker by CrisNYCa / CC BY-SA 4.0

Tractor by Kharkiv Tractor Plant / CC BY 4.0

Penguin by Christopher Michel / CC BY 2.0

Neurons by UC Regents Davis campus / CC BY 3.0

Duckling by Luis Miguel Bugallo Sánchez / CC BY-SA 3.0

Get ready ...



How we think

How we think we think





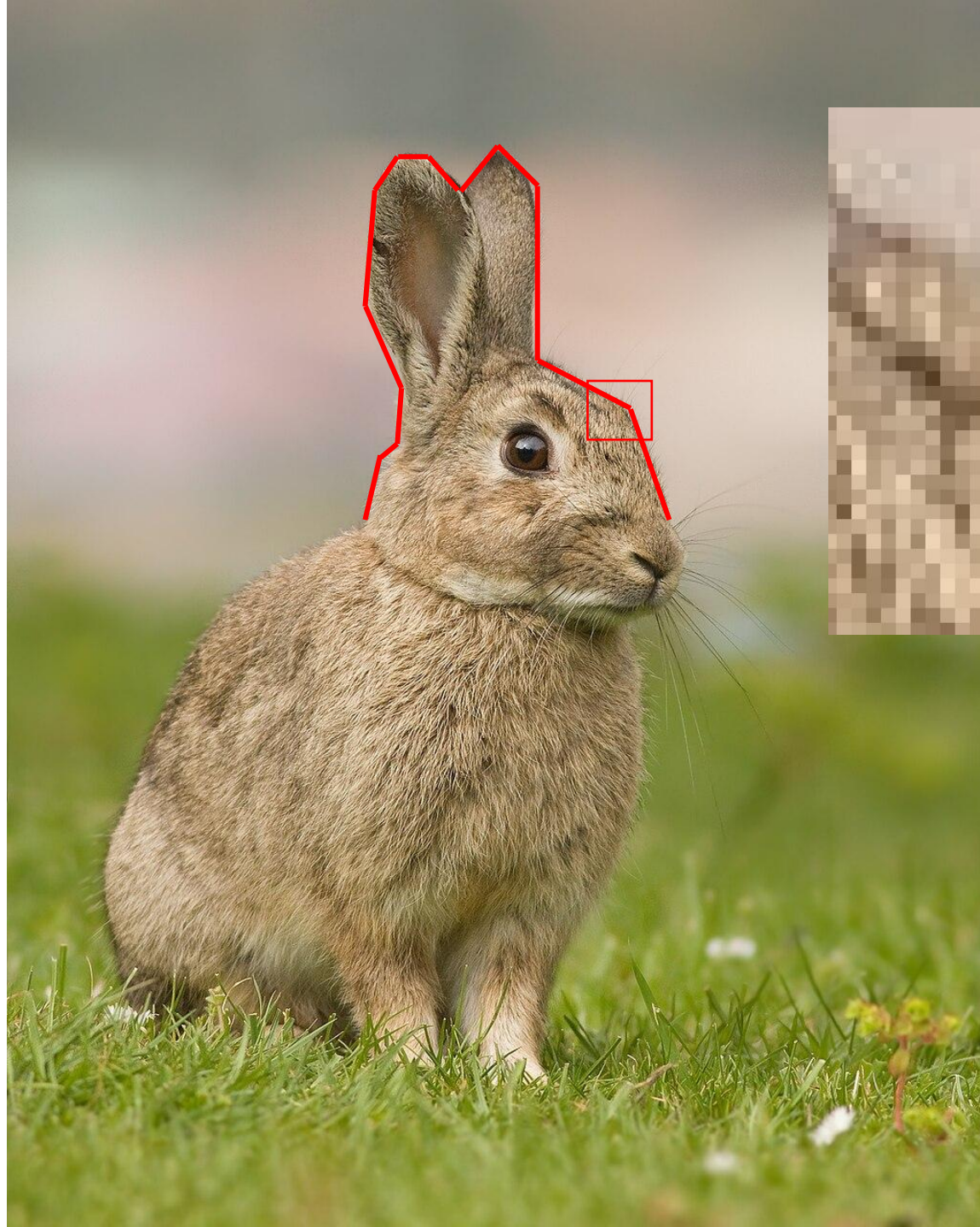
?

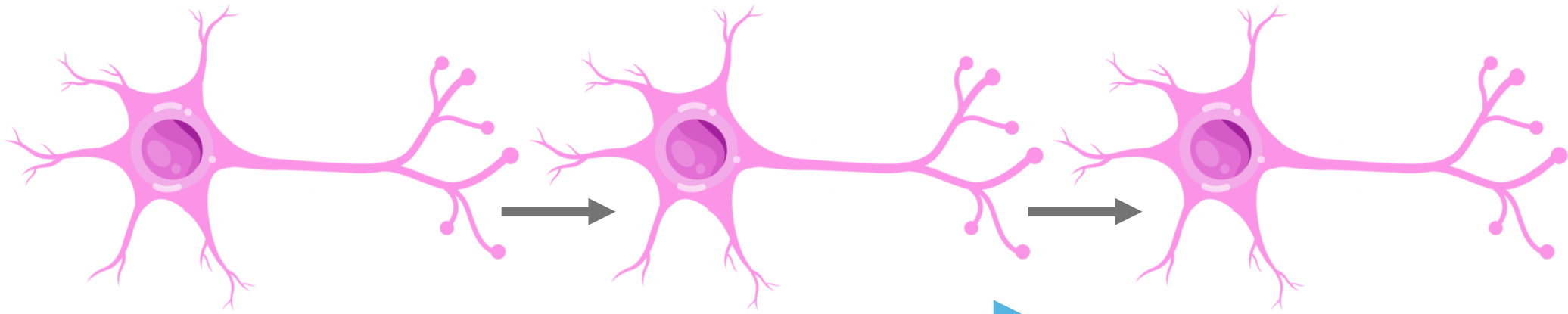


?



?





$\frac{1}{100}$ of a second

Transistor



$\frac{1}{50,000,000,000}$ of a second



$\frac{1}{4}$ of a second

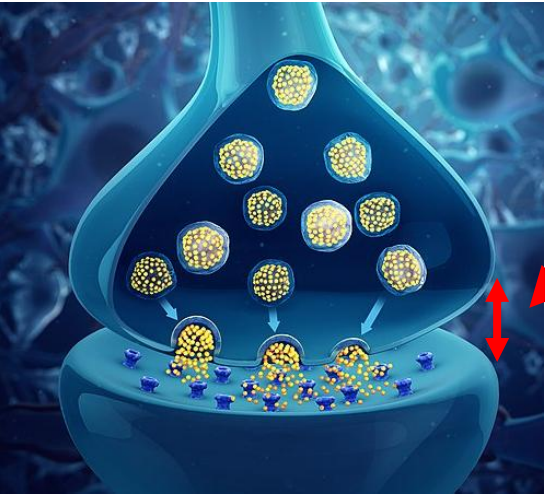


How do we recognize things?

scale



synapse



20 nm

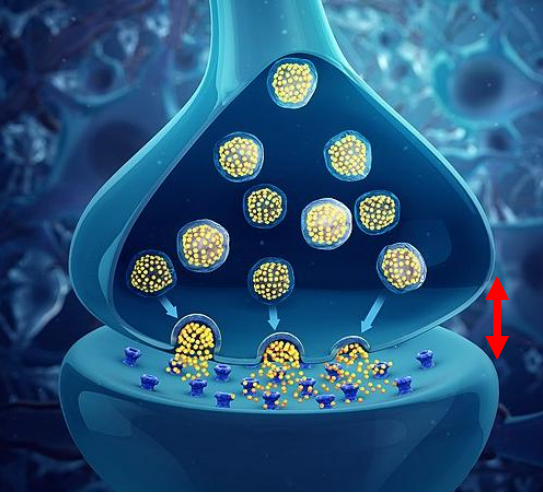
$\frac{1}{50,000}$ mm

$\frac{1}{50,000}$ mm : 1 mm

10 cm : 5 km



synapse



20 nm

$\frac{1}{50,000}$ mm

$\frac{1}{50,000}$ mm : 1 mm

10 cm : 5 km



Hamlet

how infinite in faculty

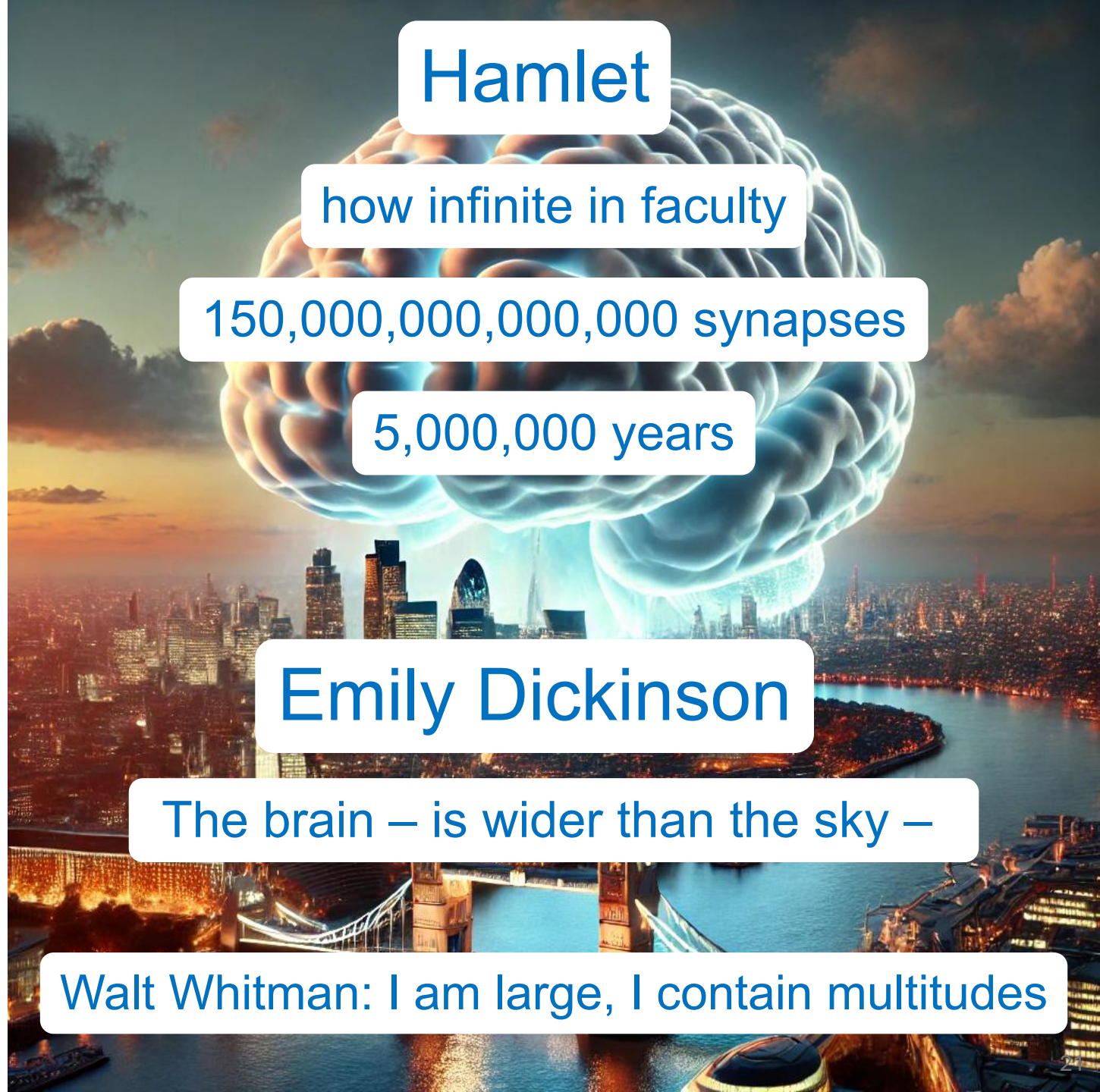
150,000,000,000,000 synapses

5,000,000 years

Emily Dickinson

The brain – is wider than the sky –

Walt Whitman: I am large, I contain multitudes



What did
we learn?

1960



GOF AI

ELIZA



1980

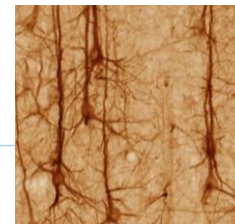
Good old fashioned AI

Easy
is hard



2000

Machine learning



Birds fly

AlexNet



2012



20



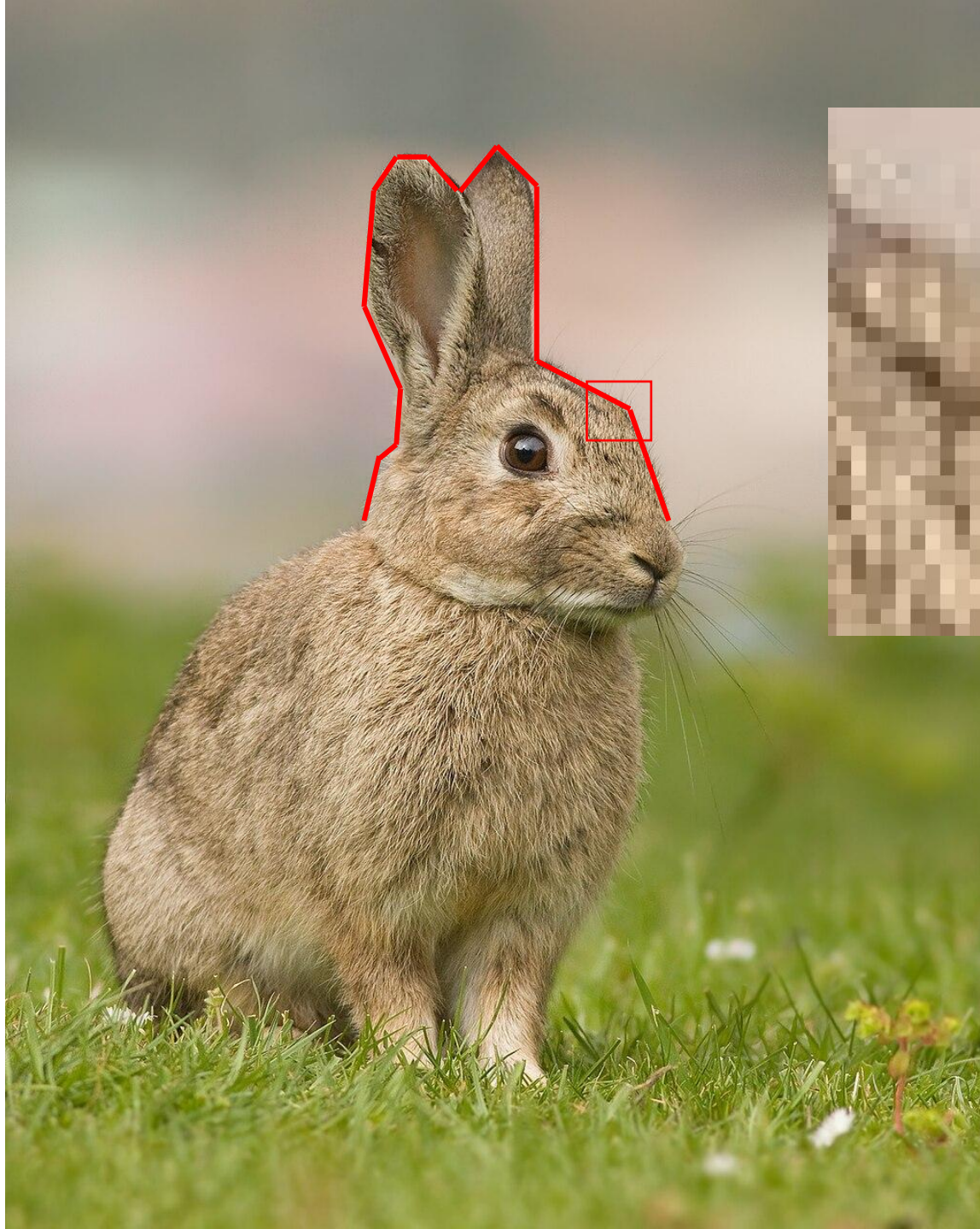
?



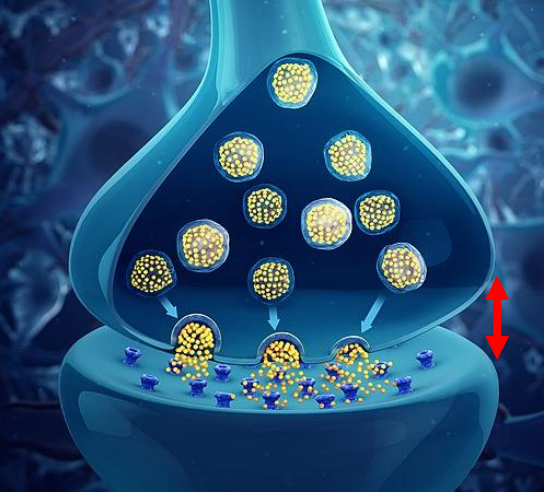
?



?



synapse



20 nm

$\frac{1}{50,000}$ mm

$\frac{1}{50,000}$ mm : 1 mm

10 cm : 5 km

