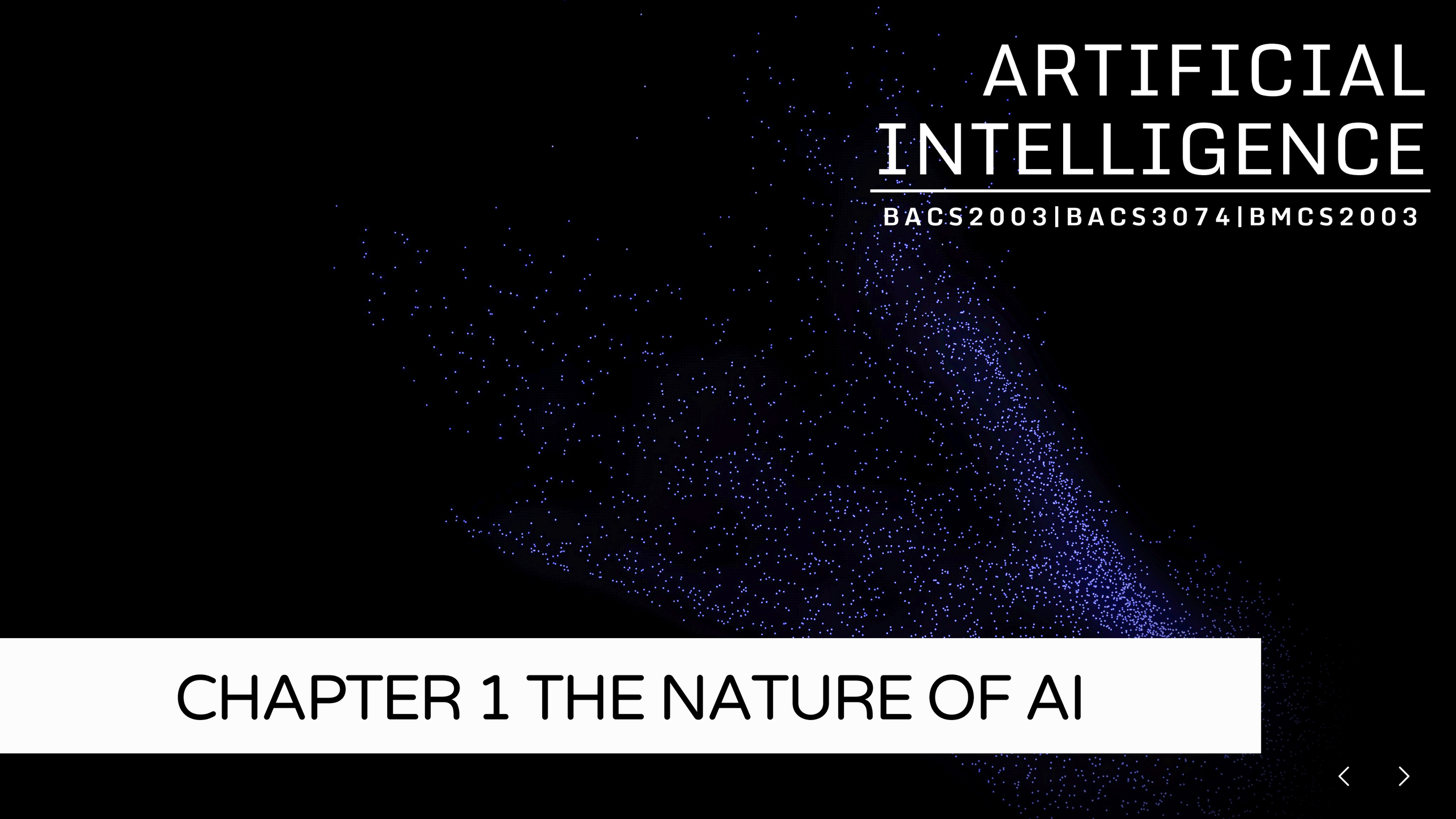


ARTIFICIAL INTELLIGENCE

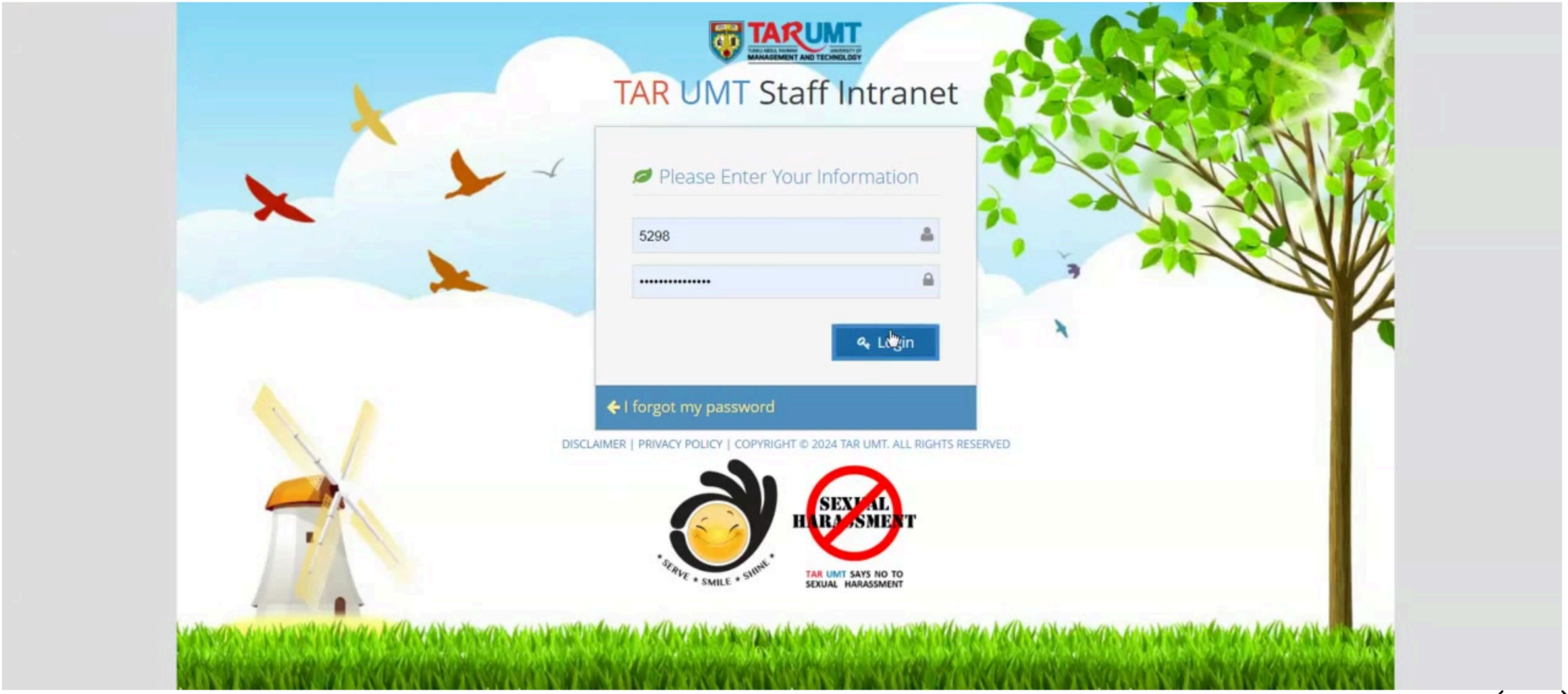
BACS2003|BACS3074|BMCS2003

CHAPTER 1 THE NATURE OF AI

BMCS 2003: 46ftl6o
BACS 3074: jkuhmvi
BACS 2003: xgd7anu

ENROL

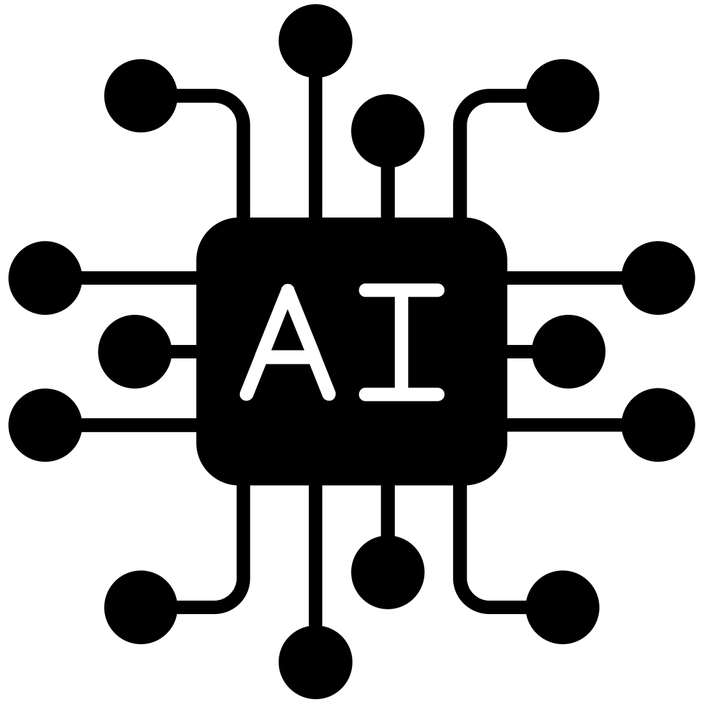
COURSE PLAN & COURSE SYLLABUS



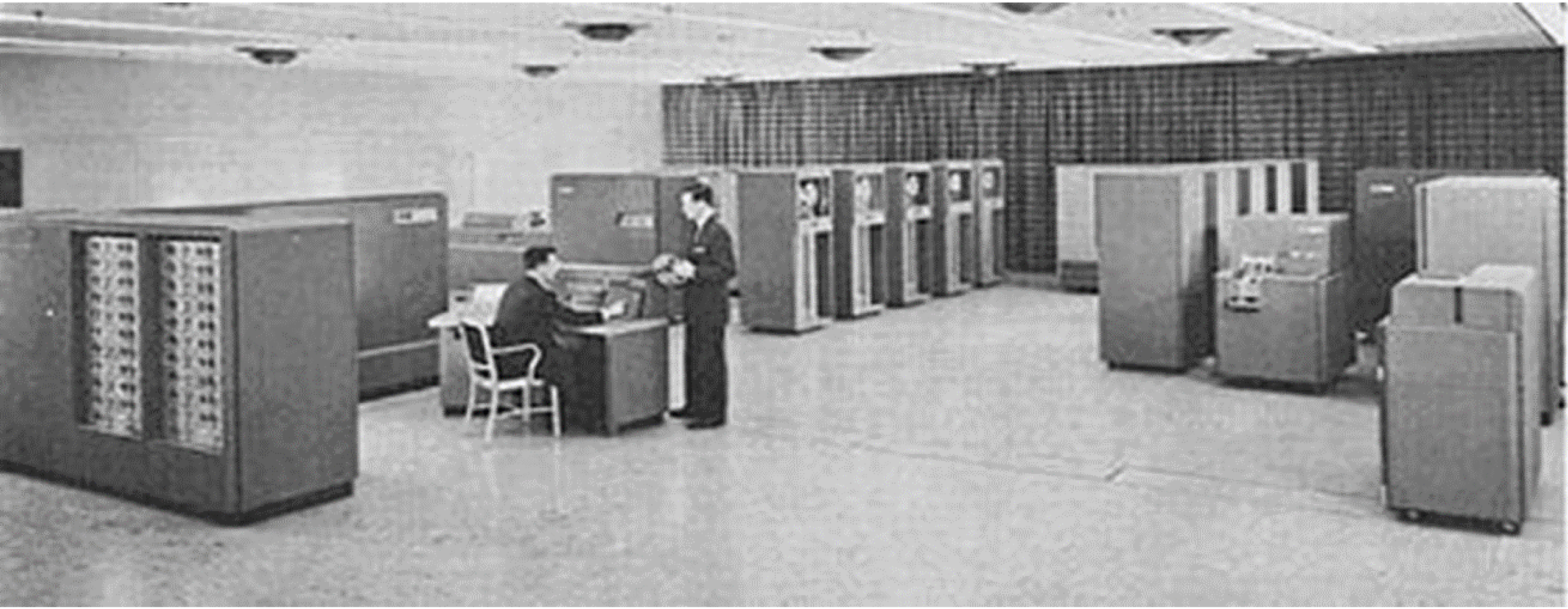
https://drive.google.com/drive/u/1/folders/11pG-o-LGcrLSQoOe8Glly_WbyJ-RWuee

OUTCOMES

1. **Timeline of AI**
2. **Define AI**
3. **Explain Turing Test**
4. **Explain Chinese Room**



IBM 702

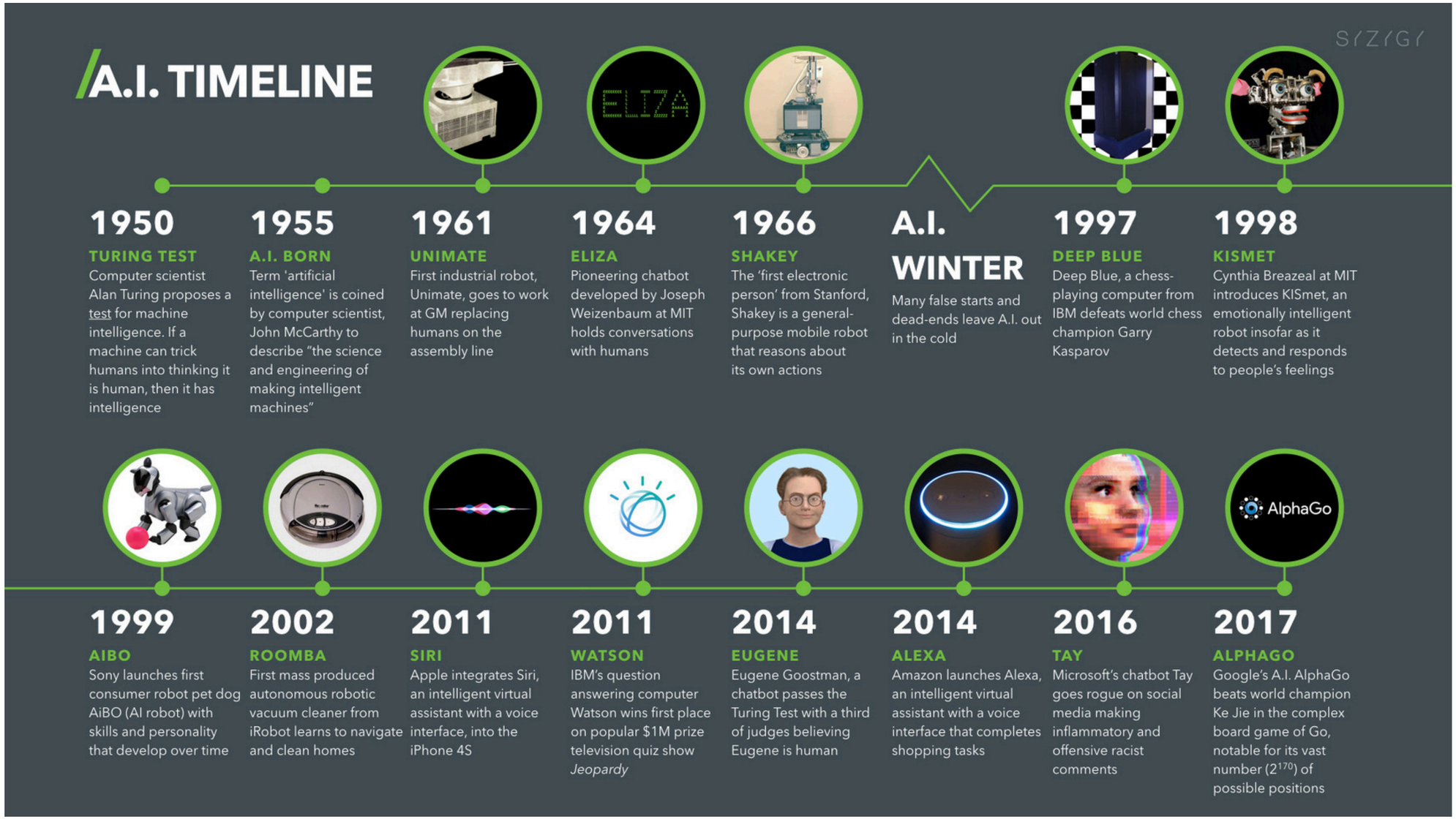


The IBM 702 in 1953: a computer used by the first generation of AI researchers

EVOLUTION OF COMPUTERS

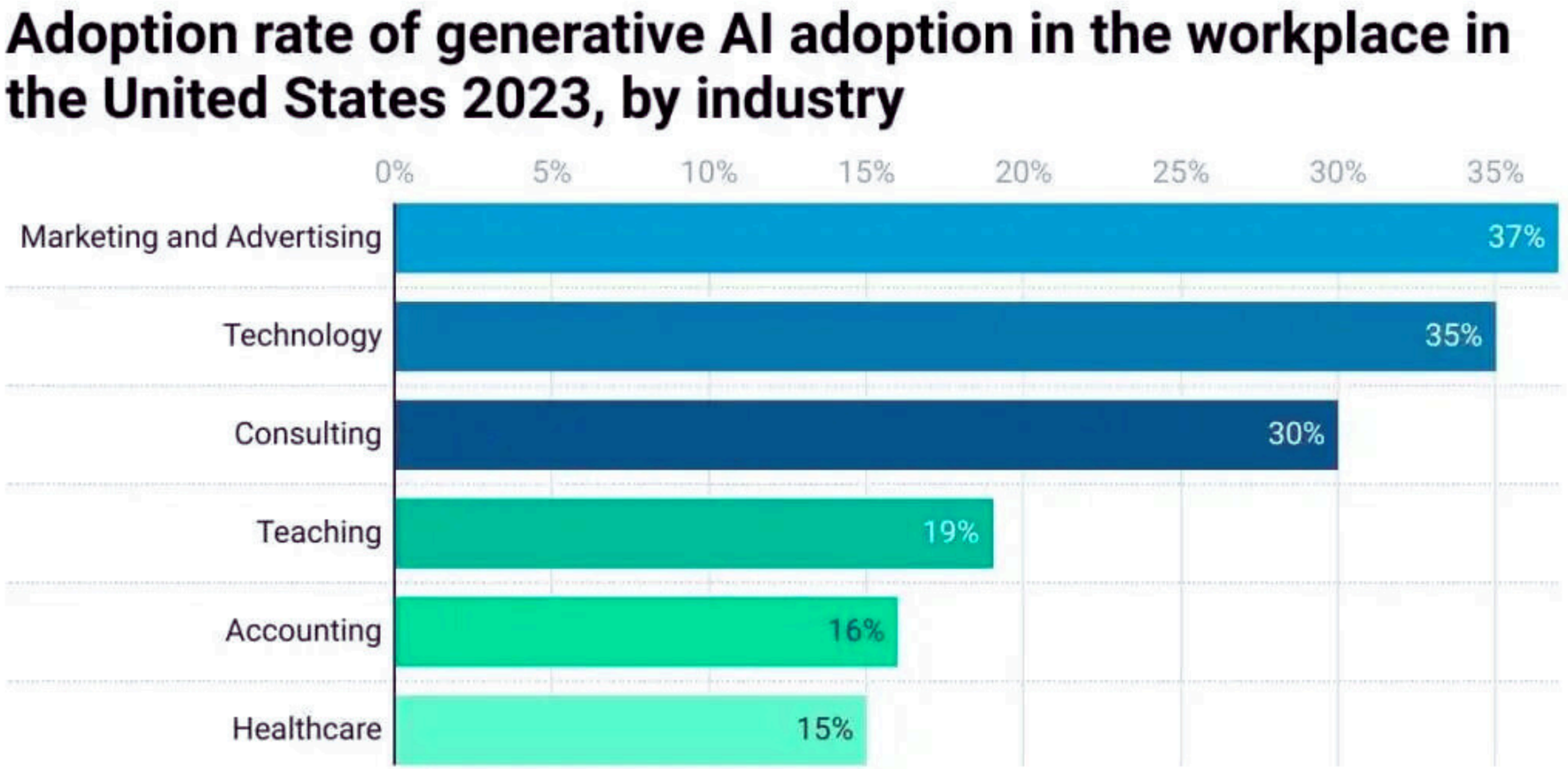
Resource: https://www.youtube.com/watch?v=gjVX47dLIN8

A.I. TIMELINE



Resource: https://digitalwellbeing.org/wp-content/uploads/2017/08/Artificial-Intelligence-AI-Timeline-Infographic.jpeg

ADOPTION OF A.I. CAPABILITIES

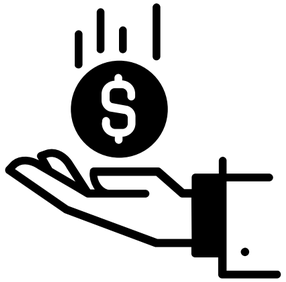


Resource: https://www.mlyearning.org/generative-ai-statistics/

HOW A.I. CAN BE ADOPTED IN...

Education

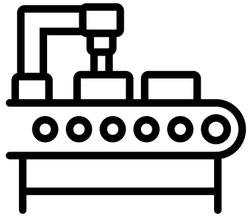
Marketing



Finance

Entertainment

Healthcare



Manufacturing

Food Industry

Designing

WHAT IS A.I.

DEFINITION OF ARTIFICIAL INTELLIGENCE

Artifice:

clever or cunning devices or expedients, especially as used to trick or deceive others.

+

Intelligence: ?

DEFINITION OF ARTIFICIAL INTELLIGENCE

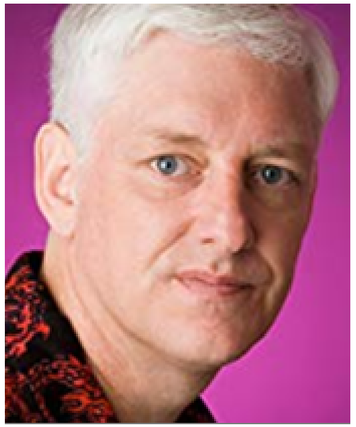
"making a machine to behave in ways that would be called intelligent if a human were so behaving."

John McCarthy

at the Dartmouth Conference in 1956

INTRODUCTION TO AI: A MODERN APPROACH

Prof S.J. Russell,
University of California, Berkeley



Peter Norvig,
Director of Research at Google, Inc.

Systems that act like human

- Automation
- Chatbot

Systems that think like human

- Machine learning
- Recommender

Artificial Intelligence

Systems that act rationally

- Adaptive Systems
- Planning & Optimisation

Systems that think rationally

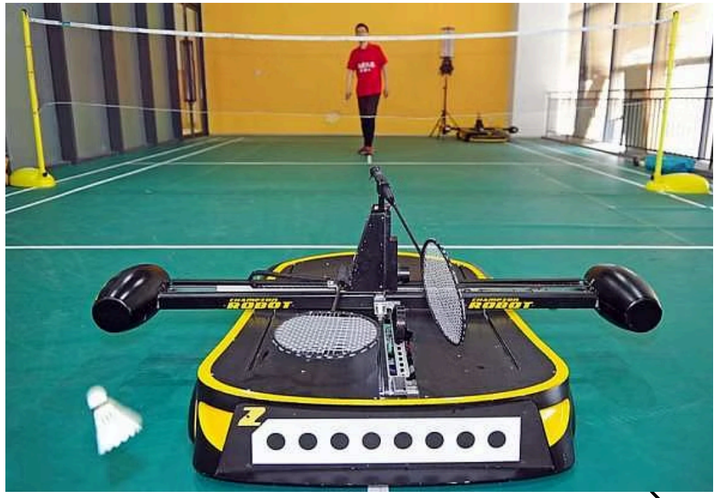
- Expert system

MACHINE THAT ACTS LIKE A HUMAN

The Turing Test approach

With human characteristics

Reflects human condition



https://edition.cnn.com/2022/01/14/sport/futuristic-high-tech-sports-spc-intl/index.html
https://www.sportskeeda.com/badminton/robomintoner-robot-badminton

MACHINE THAT ACTS LIKE A HUMAN: SOPHIA

https://bit.ly/2MIHH1g

MACHINE THAT THINKS LIKE A HUMAN

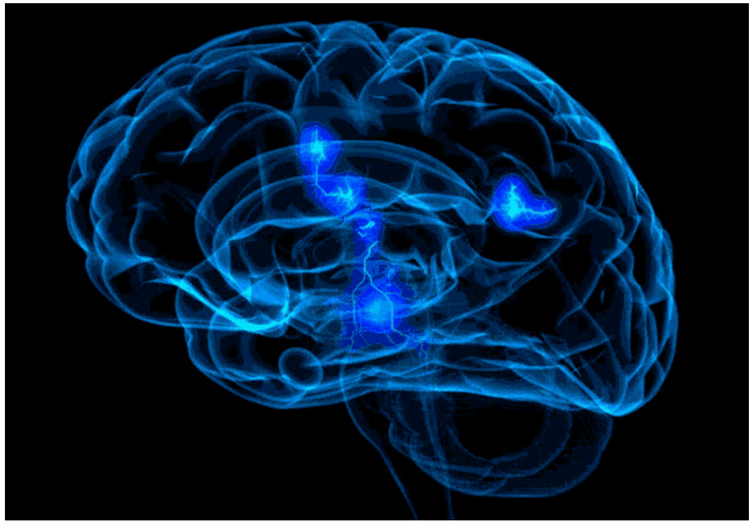
The cognitive modelling approach

Neural network →

Natural language processing →

Pattern recognition →

Self-learning →



Designed to solve problems by thinking, reasoning, and remembering, to mimic the way the human brain works

THINKING HUMANLY - COGNITIVE MODELING APPROACH

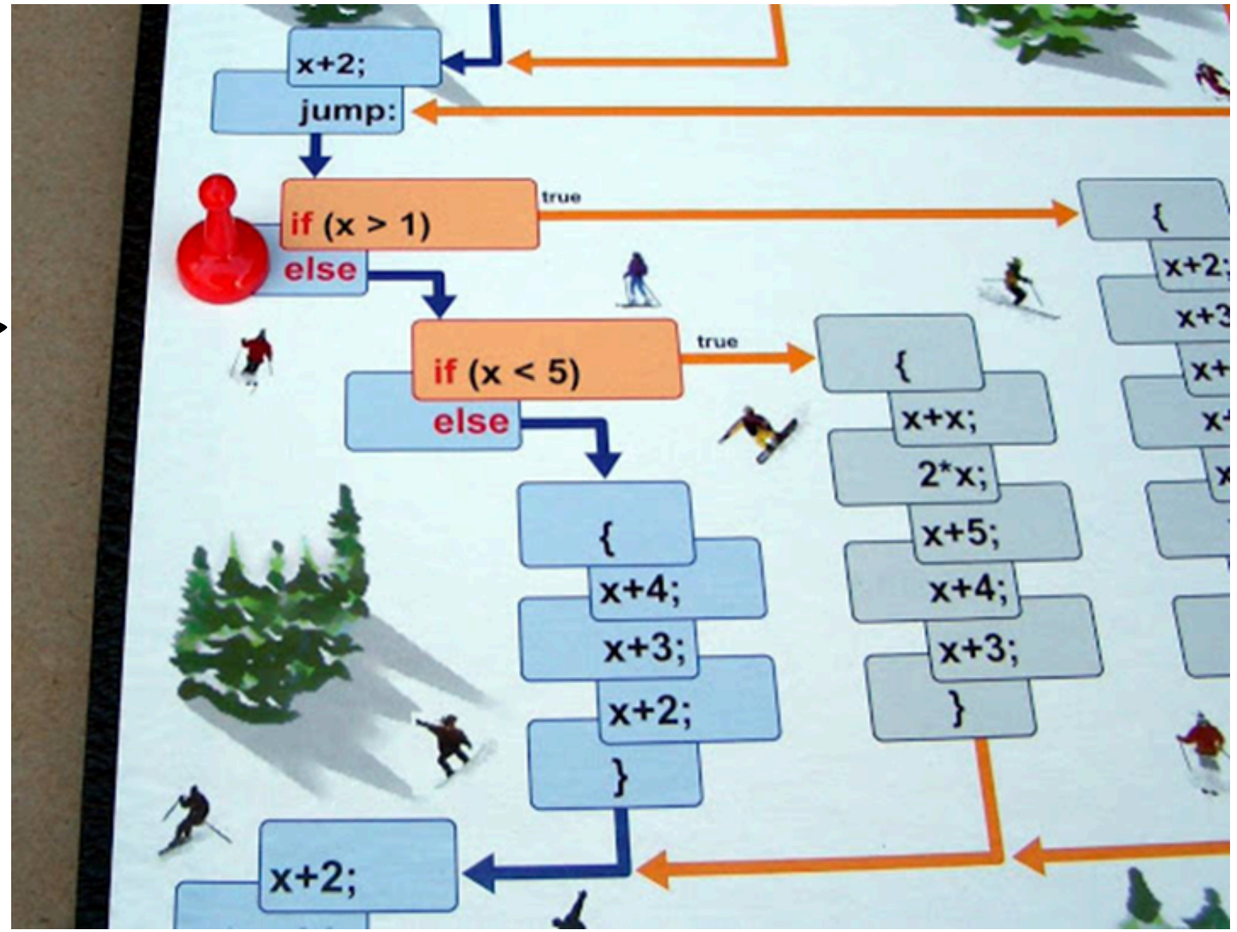
1. A study on **how computer models could be used to address the psychology of memory, language, and logical thinking**.
2. If the program's input–output behaviour matches corresponding human behaviour, that is evidence that some of the program's mechanisms could also be operating in humans.
3. The interdisciplinary field of cognitive science brings together computer models from AI and experimental techniques from psychology to construct theories of human mind.

MACHINE THAT THINKS RATIONALLY

The laws of thought approach

Logic & Rule-based System

Example: Expert System

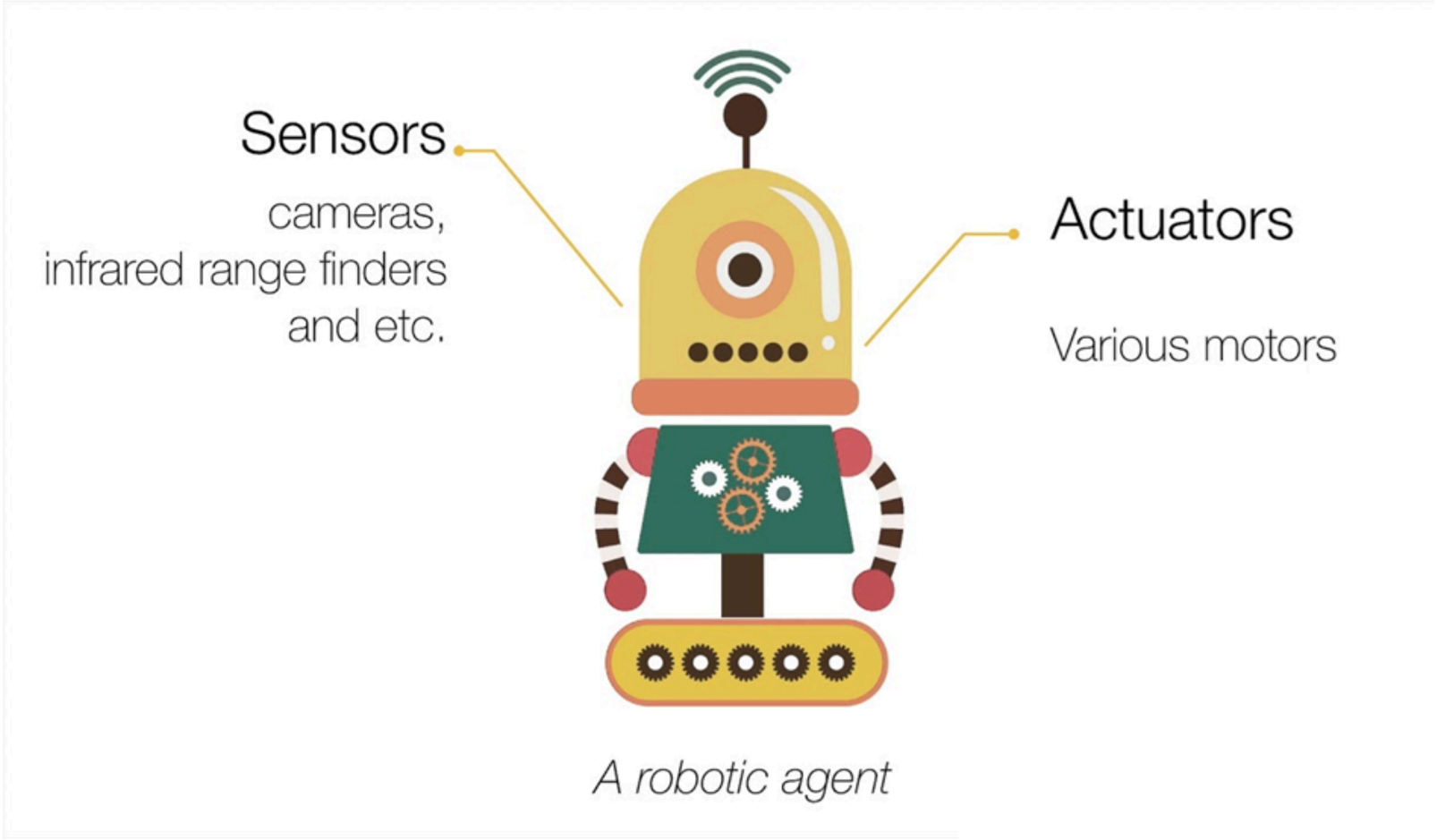


THINKING RATIONALLY

1. This is about how to codify “rational thinking”.
2. **Rational thinking = Logic**
3. Logic uses a **process of inference** to derive new representations about the world, and use these new representations to deduce what to do.
4. **Example: Socrates is a man; all men are mortal; therefore Socrates is mortal.**

MACHINE THAT ACTS RATIONALLY

The rational agent approach



A robotic agent

ACTING RATIONALLY – THE AGENT APPROACH

- **Agent is something that acts autonomously, sensitive (sense) to its environment, adapt to change, and create/pursue goals.**
- Rational act may involve rational thinking
- But if there is no provably correct thing to do (the thinking may not be rational), the best expected outcome must still be done.

Example: Autonomous car

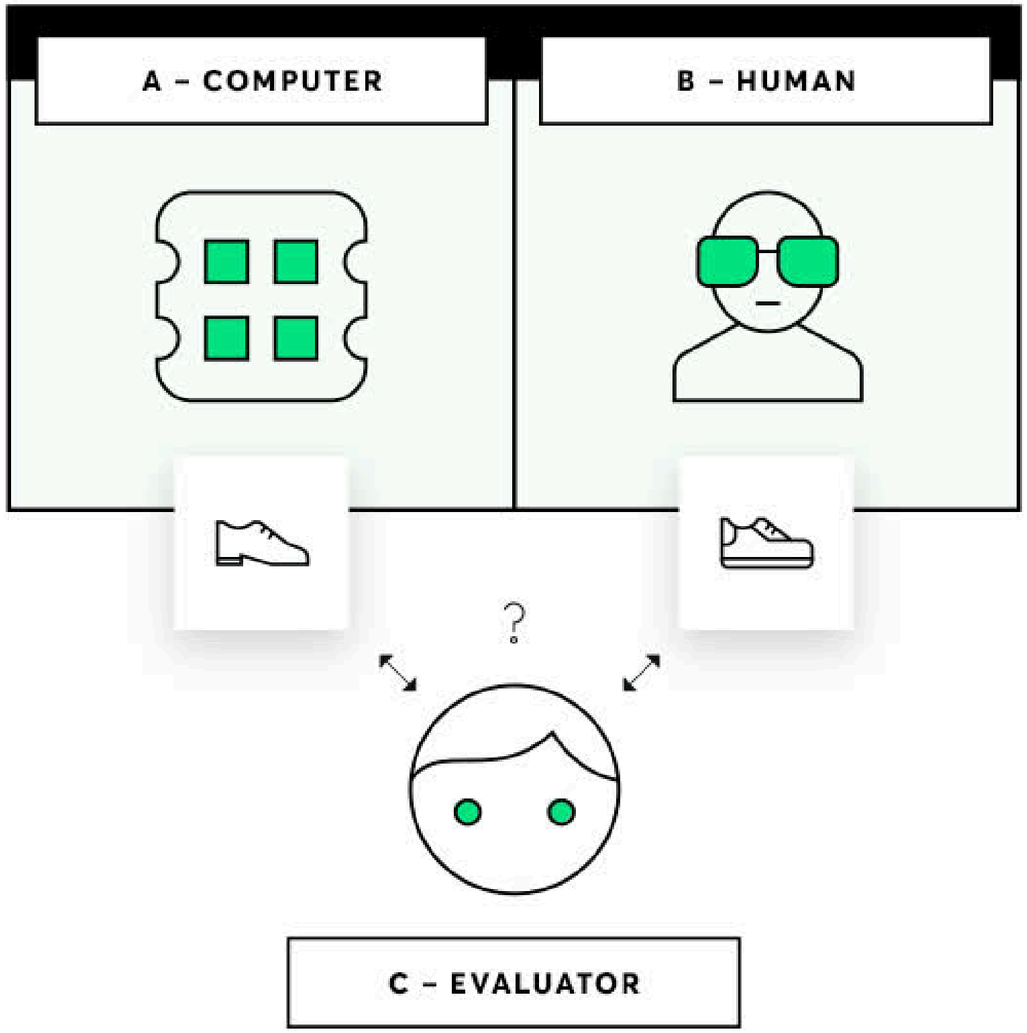
ACTING HUMANLY – TURING TEST APPROACH

a.k.a.Turing Imitation Game.

Can machines think?

Alan Turing (1950), “Computing Machinery and Intelligence”

TURING IMITATION GAME



The "standard interpretation" of the Turing test:

An interrogator, who is a human, is given the task of trying to determine which player – A or B – is a computer and which is a human.

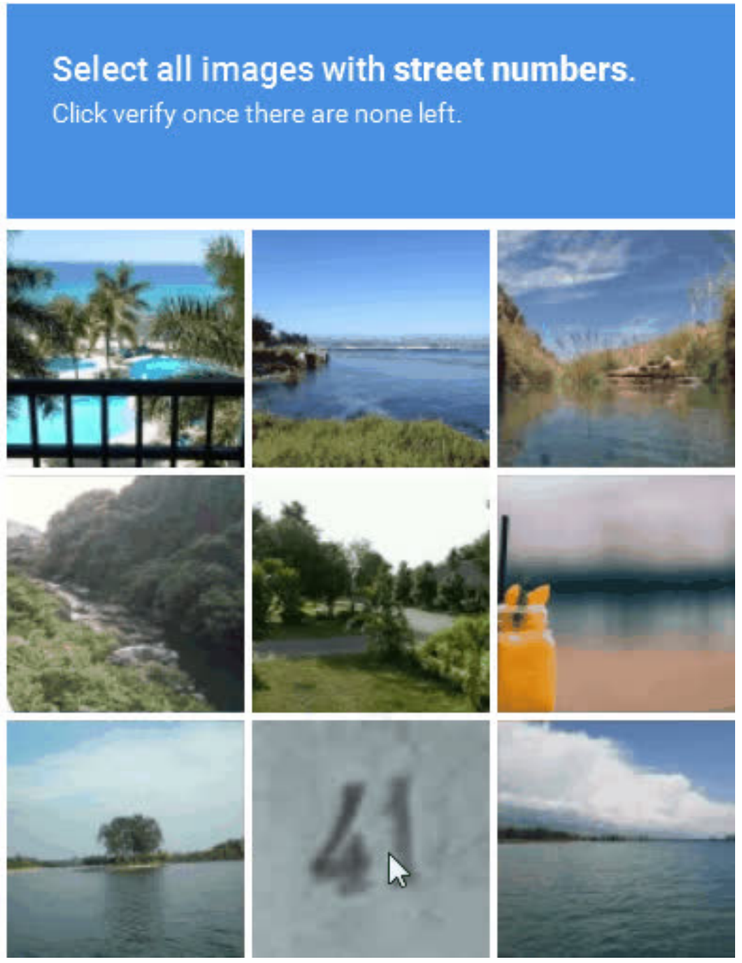
If the machine is able to deceive the interrogator, then the machine passes the Turing test and it is considered to be intelligent.

TURING TEST APPLICATION

CAPTCHA

- To prevent automated systems from being used to abuse the site

- If any software is able to read the distorted image accurately, so any system able to do so is likely to be a human.



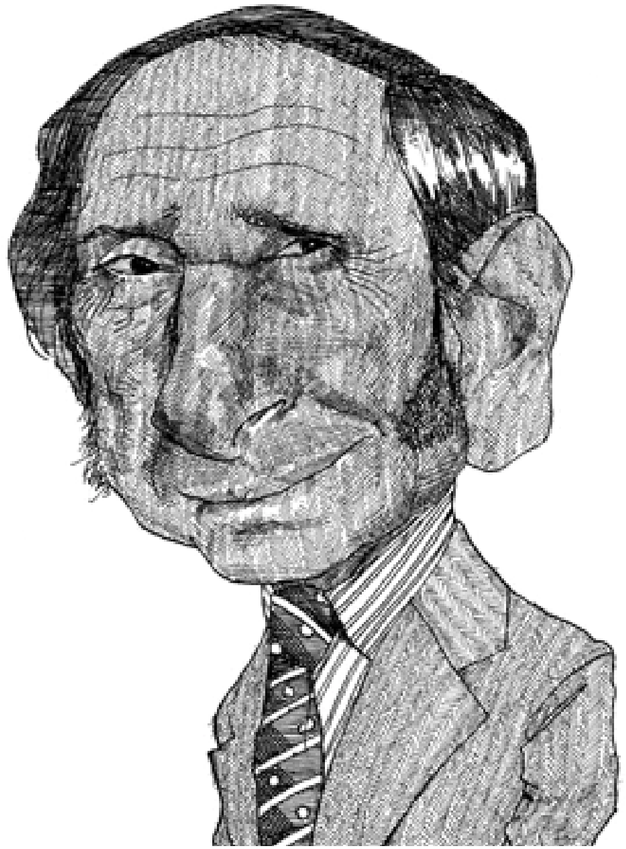
LOEBNER PRIZE FOR TURING TEST

- The Loebner Prize is the first formal instantiation of a Turing Test.

- In 1990 Hugh Loebner agreed with The Cambridge Center for Behavioral Studies to underwrite a contest designed to implement the Turing Test.

CRITICS ON TURING TEST - THE CHINESE ROOM

by John Searle (1980)



https://www.youtube.com/watch?v=TryOC83PH1g

EXAMPLE

RULE 1

```
If   x ==“Wie geht es Ihnen”
Then y = “Mir geht es gut”
```

RULE 2

```
If   x == “Auf Wiedersehen” || x == “Wiedersehen”
Then y = “Tschüss”
```

What is the output for “Wiedersehen”?

THINK ABOUT IT

1. If the system clearly runs a program and passes the Turing Test, does it really understand anything of its inputs and outputs?
2. Is it necessary for it to understand the inputs and outputs?

THE END

NEXT LECTURE

Problem Definition and Problem Solving