

Alan Turing (1950)

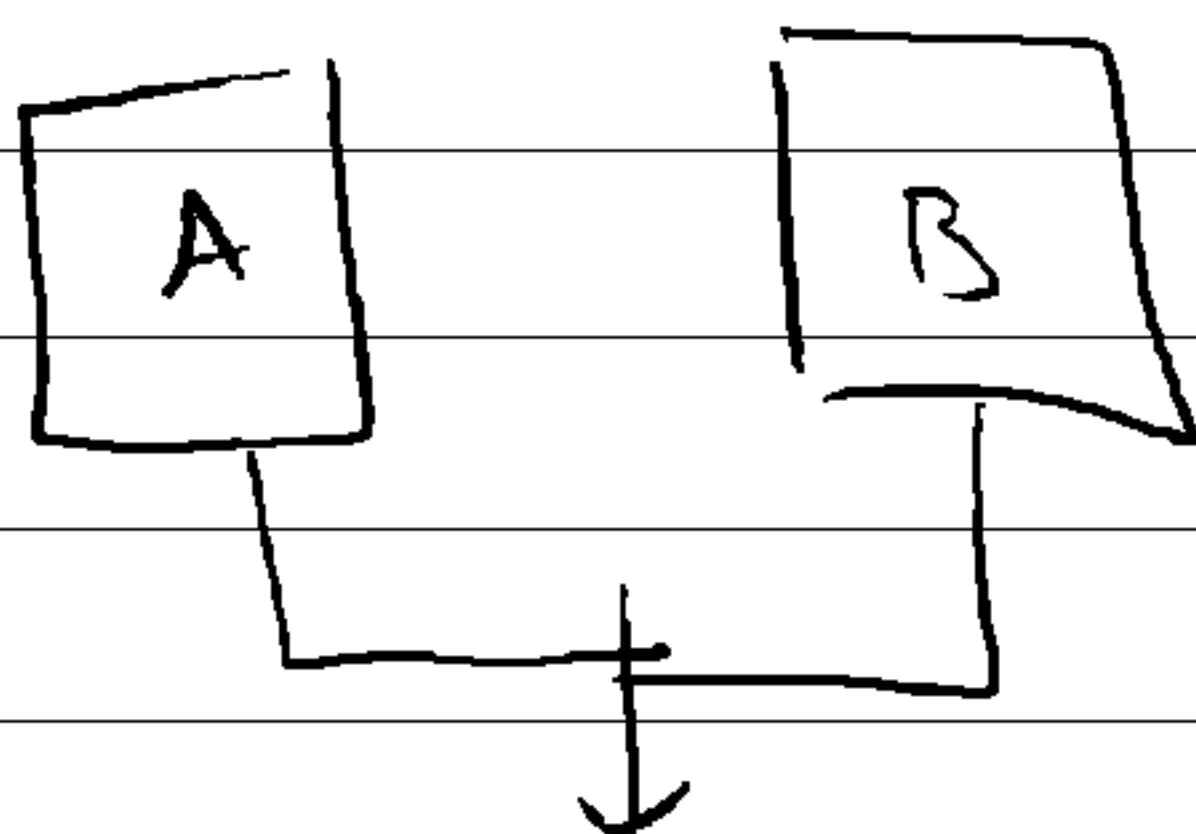
* Computing Machinery & Intelligence

* The Imitation game



2 players, a man A & a woman B

An interrogator C



Ask questions
[Type written]

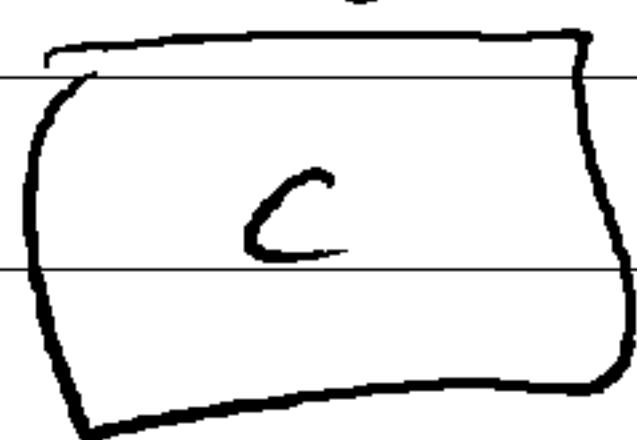


figure out which one is
the man.

* A → Confuse the interrogator

* B → Help the interrogator

* Opposing objectives

* Replace A with a machine

C must figure out which is the human

"MACHINE": A hypothetical computer programmed to produce answers similar to humans.

PARADOX: Machine may 'seem' like it is thinking but have a very different underlying mechanism.

↳ Hardcoded Rock-paper-scissors sequence

↳ Random number generator

↳ Is that free will?

↳ digits of π

PARADOX #2 : Could you construct a machine whose workings you can't explain?

Digital computers

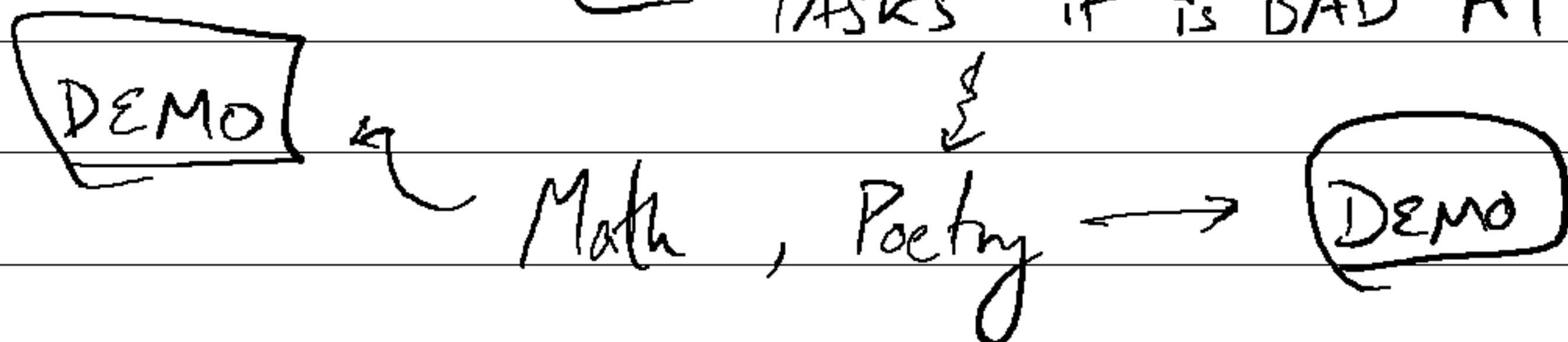
- 1) Store
 - 2) Executive Unit
 - 3) Control
-

A sufficiently powerful computer can play the imitation game convincingly || 50 Years \Rightarrow 70%

Does Chat GPT pass the Turing Test?

↳ ORIGINAL Test

↳ TASKS it is BAD AT



ARGUMENTS AGAINST TURING MACHINES

① Theological - God has given only humans an immortal soul, but not to animals or machines, so machines can't think.

COUNTER: Then God can not be omnipotent.

In Galileo's time, texts said the Earth was at the center of the universe.

② Head in the Sand:

Too scary, so let's hope it doesn't happen.

"Not substantial enough to refute. Consolation would be more appropriate."

③ Mathematical Objection

Goedel's Incompleteness Theorem

In a sufficiently powerful theory, there are axioms that can't be proved.

↳ Sufficiently powerful computers

⇒ ∃ ques. w. wrong answers.

COUNTER: Humans get things wrong all the time

④ CONSCIOUSNESS: A machine can't compose a concerto or write a poem out of an emotional experience.

COUNTER: The only way to truly know that the person is thinking is to be that person & experience it.

Otherwise - viva/oral exam to determine understanding

⑤ - ⑧ → Left for reading

⑨ ESP

Telepathy → Turing Test is in shambles.

1956 - Dartmouth AI workshop

↳ John Mc.Carthy

↳ Marvin Minsky

↳ Claude Shannon

↳ Nathaniel Rochester

Not modern NNs

Proposal included NLP, neural nets, ML, reasoning

Rockefeller foundation - 1/2 the funding

Logistics

↳ Differences in opinion

Led to univs. establishing AI labs
Stanford, MIT,

1960s - Predictions

① McCARTHY (STANFORD):

We have a goal of building a fully intelligent machine in a decade

② Nobel Laureate Herbert Simon:

Machines will be, in 20 years, capable of doing any work that a man can do

③ MARVIN MINSKY (MIT):

Within a generation, the problem of creating artificial intelligence will be substantially solved.

What makes an agent intelligent?

PERCEPTION : (Model or Representations) of state space [deterministic]

Computer Vision [Non-Deterministic] Robots/Roomba
Language as input — combined with reasoning capabilities
[APT]

INTERACTIONS :

Language Processing
Image Generation

LEARNING : Rule Based Expert Systems

★ Supervised Learning

★ Unsupervised Learning

★ Learning from DATA v/s COMPUTATION ⇒ SEARCH

Can do updates too

REASONING & RATIONALITY

Objective Design — Utility, Fairness, Biases

MISSIONARIES & CANNIBALS

State-space diagram - $2^6 = 64$ configurations

Symbolic AI

v/s

Subsymbolic AI

- Search through state-space
- Rules about 'valid' moves
- Rules about goal state / Defeat state

- Machine Learning / NNs
- Learn from interaction
- RL paradigm
- Reward good behaviour, Punish or ignore others.

Maze Solving?
Tic Tac Toe?

Maze Solving?

Pacman / Snake
Mario

CHES?

Search Space Reduction