



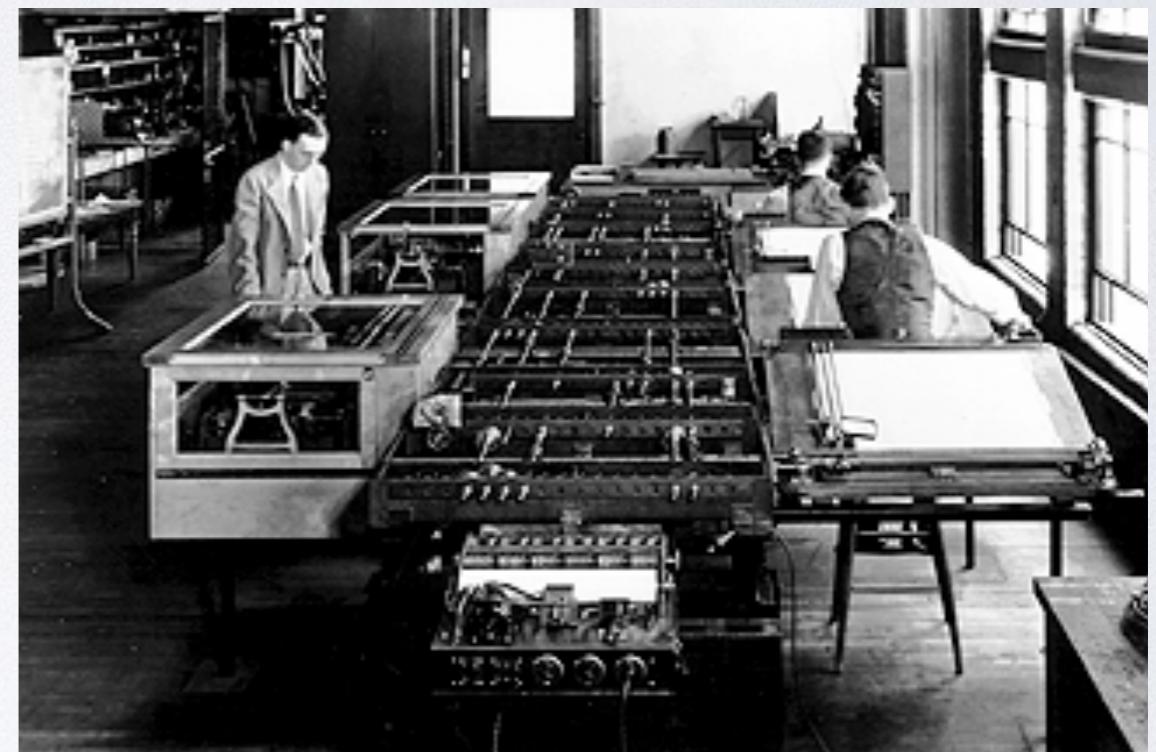
# SETTING THE STAGE: VANNEVAR BUSH & THE MILITARY-INDUSTRIAL COMPLEX

PHILOSOPHY 366-F16 JOHN SIMPSON

# HIGHLIGHTS

- Inspired by Bush
- Inventor of the Computer Mouse and the principal mind behind the oN-Line System (NLS) demo aka...

“The Mother of All Demos”



The Differential Analyzer, Bush's Analog Computer

# AS WE MAY THINK

Creating

What **technologies**  
does Bush propose?

Finding

How can technology  
help us think?



Cover of The Atlantic From July 1945,  
the issue where Bush's article first appeared

Storing

How do they **solve**  
information overload?

Reading

# EISENHOWER'S WARNING



# MILITARY-INDUSTRIAL COMPLEX / IRON TRIANGLE

GOVERNMENT



CORPORATIONS

Taken from <http://www.occurcards.com>

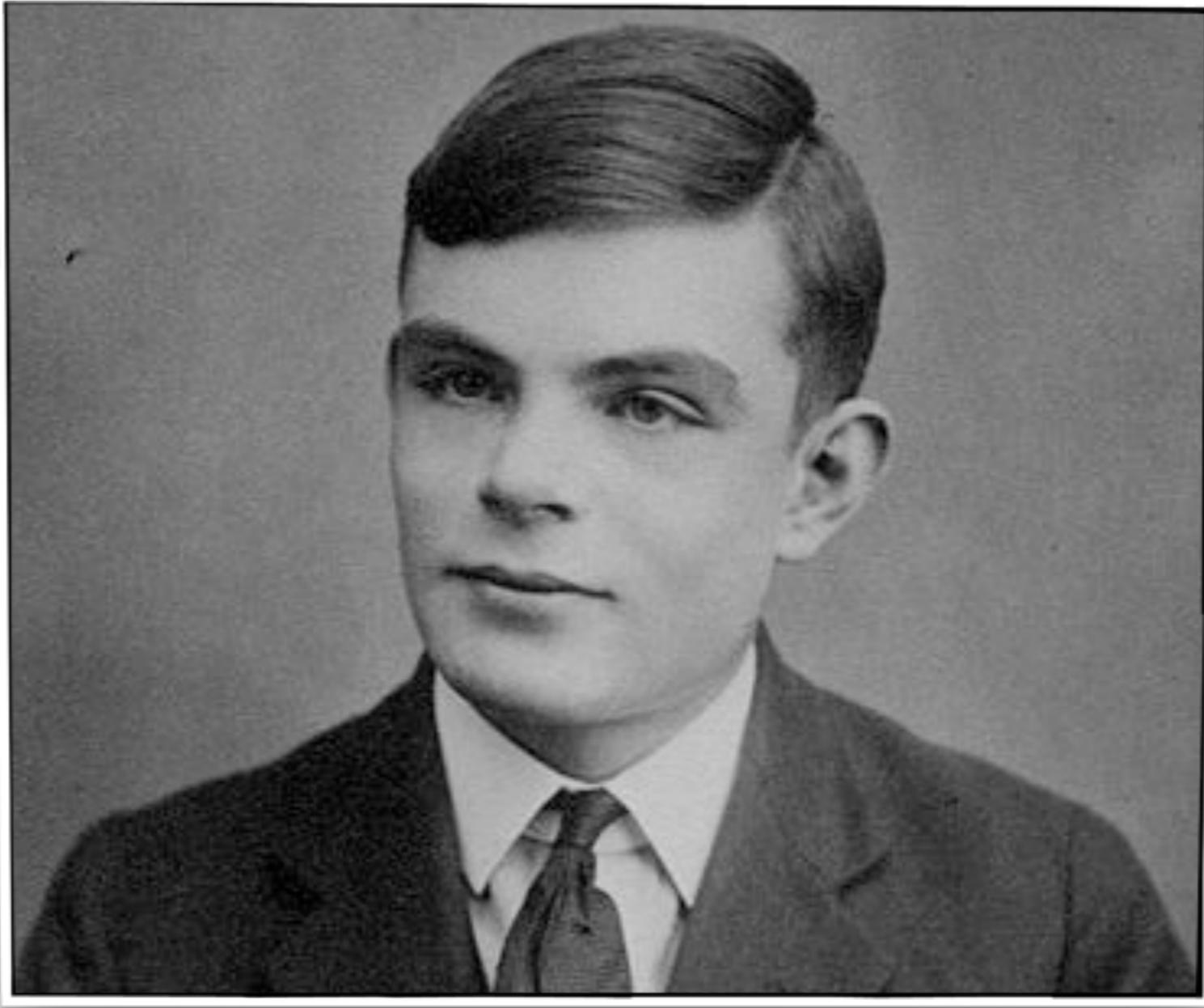
MILITARY

# TAKE AWAY PROBLEMS

How much of modern computing owes its existence  
to the military-industrial complex?

What pieces specifically?

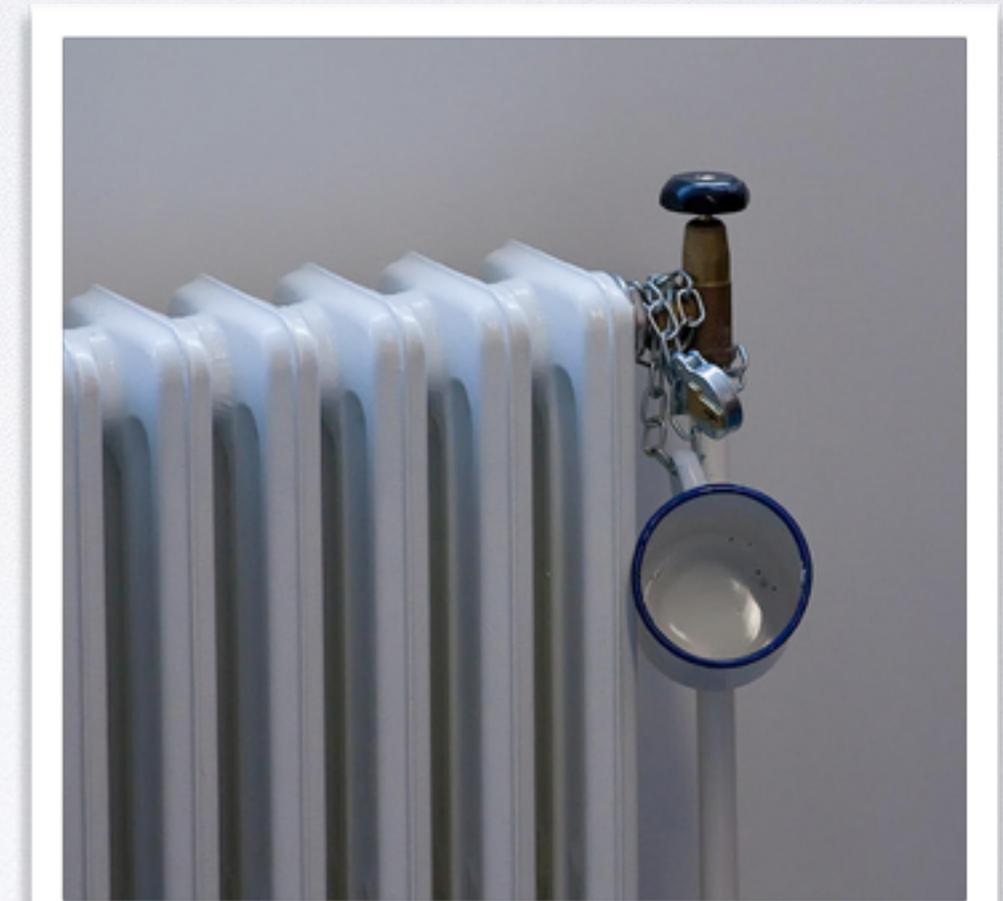
What ethical obligations--if any--do we have given  
this?



# ALAN TURING: GAME CHANGER

# HIGHLIGHTS

- WW-II Code Breaker
- Turing Machine  
(A(utomatic)-Machine)  
Devisor
- Turing Test



Turing's mug, chained to a radiator by his desk

Can computers think?



# The Imitation Game

Can 'I' determine which of 'A'  
and 'B' is the man and the  
woman by simply asking  
questions and reading the  
responses?



A



|

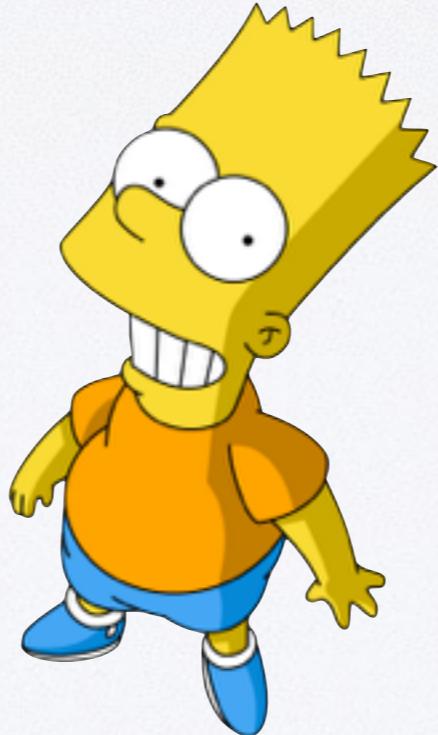


B

# The Imitation Game



A



|

'A' is trying to make 'I' guess  
incorrectly



B

# The Imitation Game



# The Imitation Game



I have luxurious blonde hair  
to just past my shoulders?



A

B

# The Imitation Game



I have luxurious blonde hair  
to just past my shoulders?



A

B

# The Imitation Game



A

B, when in your anniversary?



|



B

# The Imitation Game



A



July 23



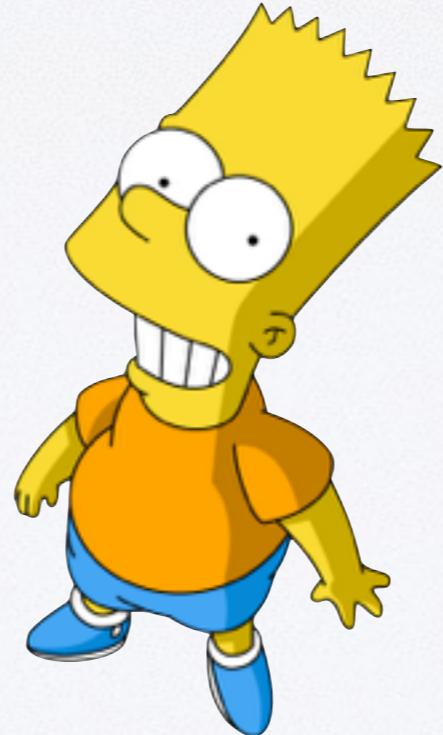
B

# The Imitation Game



A

A, when is your anniversary?



|



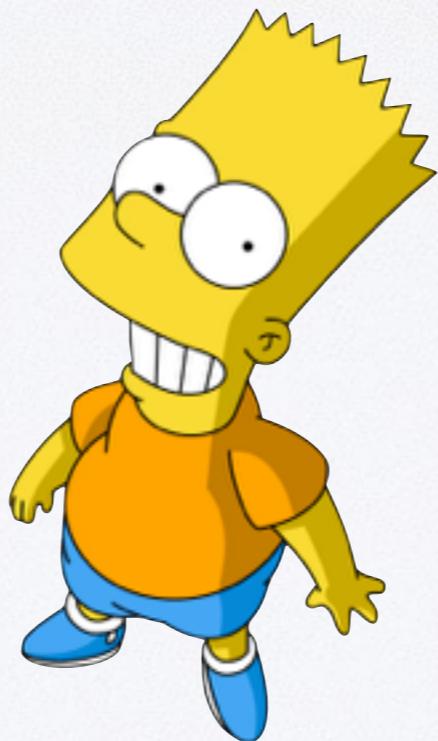
B

# The Imitation Game



A

Umm... It was the  
day that my  
wife and... err... HUSBAND  
and I got married...

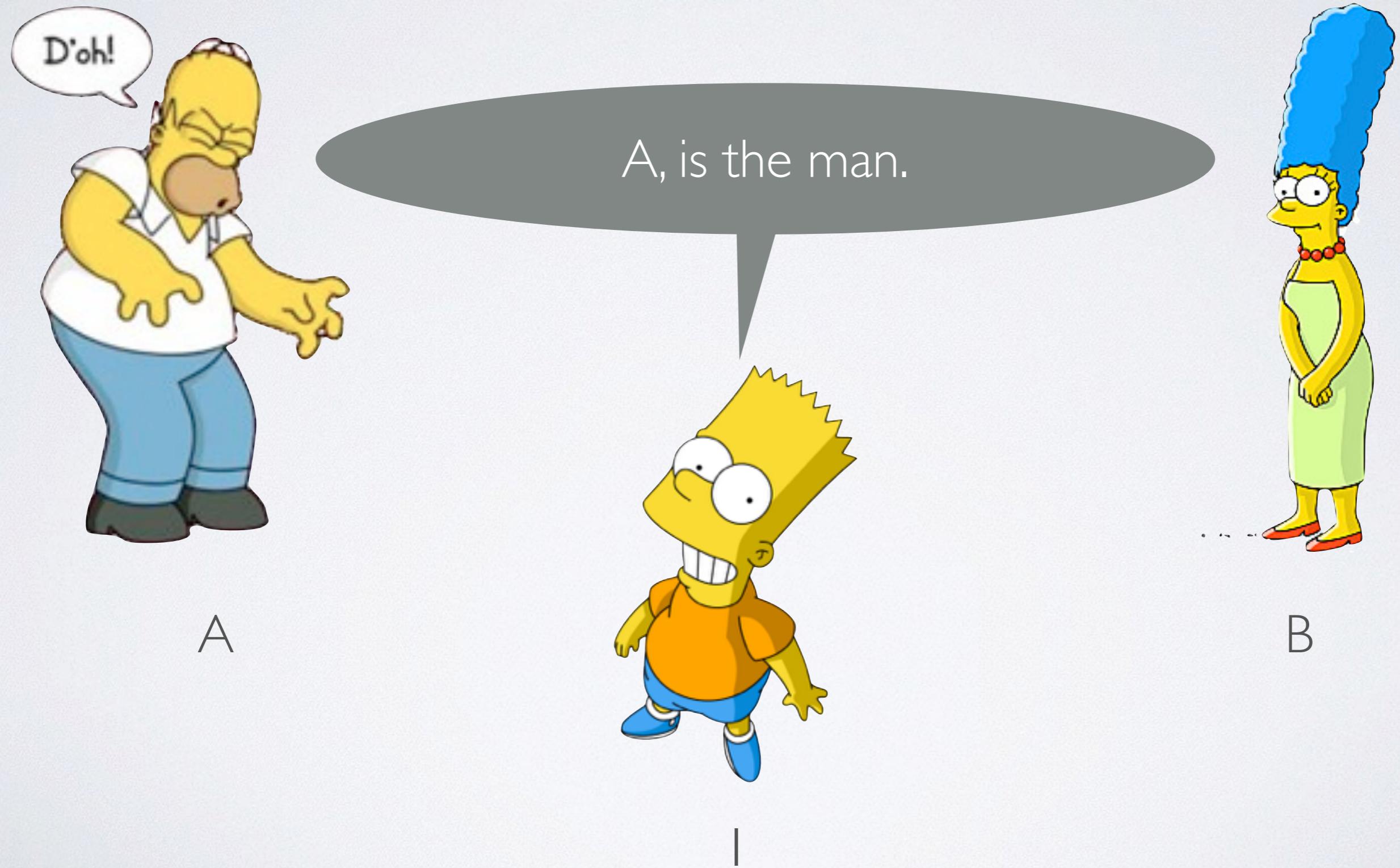


|



B

# The Imitation Game



LET'S PLAY

We now ask the question, ‘What will happen when a machine takes the part of A in this game?’ Will the interrogator decide wrongly as often when the game is played like this as he does when the game is played between a man and a woman? These questions replace our original, ‘Can machines think?’

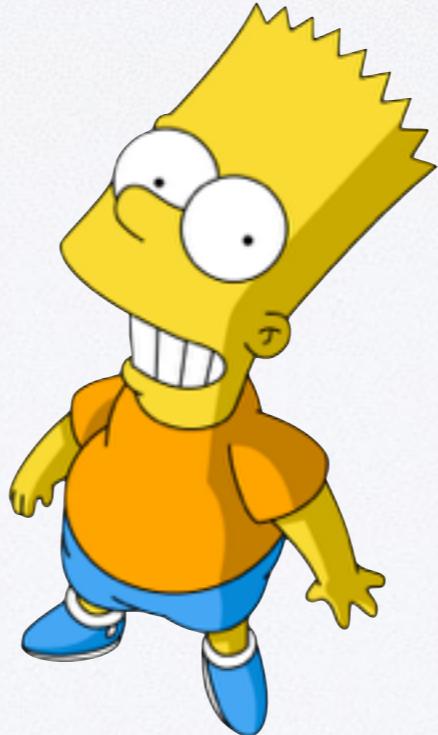
Could a machine imitate behaviour well-enough to fool a sufficient number of humans (or an average human with sufficient regularity) into thinking that a human was responsible for its behaviours (and thus that an actual human was a computer)?

# The Imitation Game

Can 'I' determine which of 'A'  
and 'B' is the computer and the  
human by simply asking questions  
and reading the responses?



A



|



B

TURING TEST EXTRA CREDIT:  
CONVINCE THE EXAMINER  
THAT HE'S A COMPUTER.

YOU KNOW, YOU MAKE  
SOME REALLY GOOD POINTS.

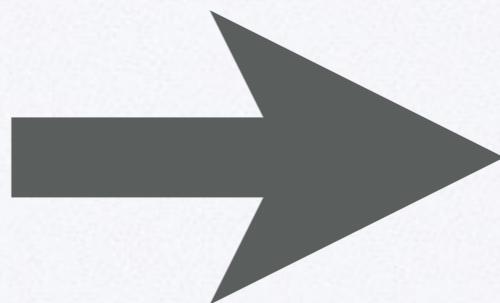
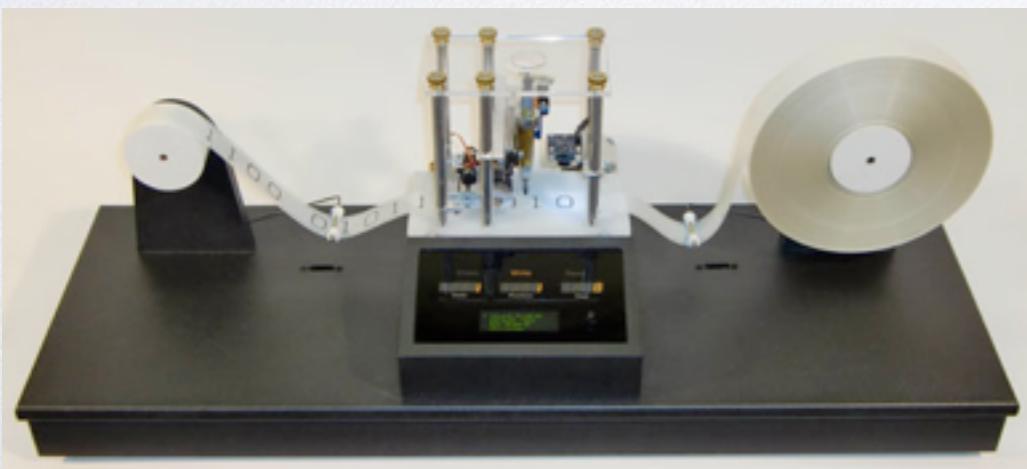
I'M ... NOT EVEN SURE  
WHO I AM ANYMORE.



What computers can play?

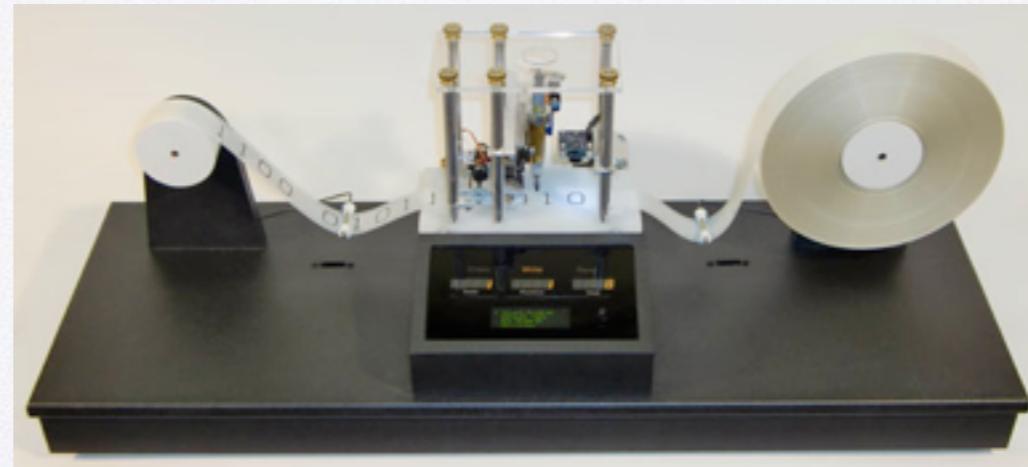
# What computers can play?

~~we are not asking whether all digital computers would do well in the game nor whether the computers at present available would do well, but whether there are imaginable computers which would do well. But this is only the short answer. We shall see this question in a different light later.~~



# Seriously, any digital computer

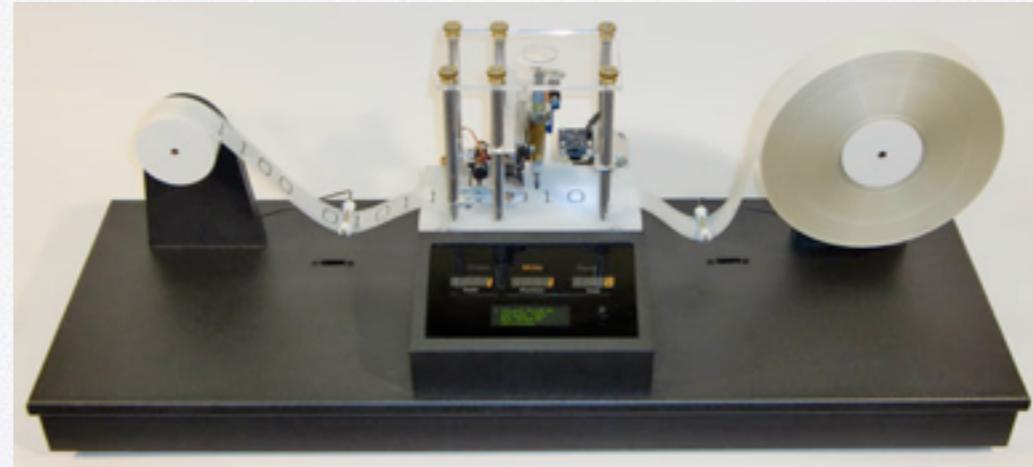
This special property of digital computers, that they can mimic any discrete state machine, is described by saying that they are *universal* machines. The existence of machines with this property has the important consequence that, considerations of speed apart, it is unnecessary to design various new machines to do various computing processes. They can all be



# Church-Turing Thesis

Anything that can be computed can  
be computed on a Turing Machine

(Although it may take a long time)



Why would Turing suggest the  
change in questions?

What are the consequences of this  
shift no matter how subtle or  
initially opaque?

Our standards of assessing intelligence  
are called into question.

Our standards of assessing intelligence  
are called into question.



Our assessment of our own intelligence  
is called into question.

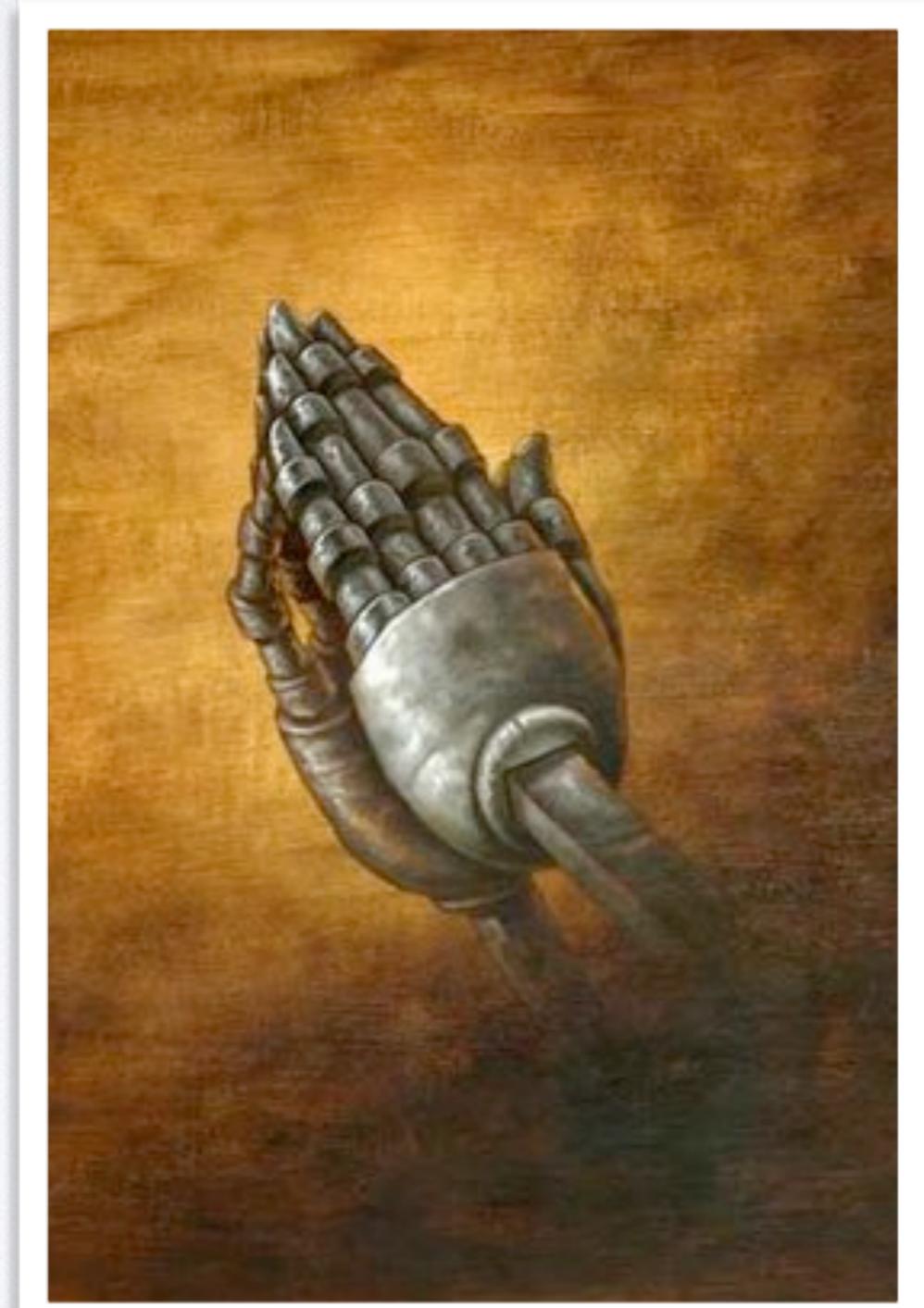
Before we get to the nine objections that Turing considers against his position, let us make sure that we're clear just what is on the table...

**Machines** can have  
—*at least in principle*—  
**minds** that are **as good as**  
(whatever that means)  
**ours**  
(and very likely better).

It would be helpful (hint, hint) for you to think about how you might formally argue for this position (whether you believe it or not) given what Turing says in his paper and our experiences in class throughout the term.

# THE THEOLOGICAL OBJECTION

Only things with  
souls can think and  
machines ain't got  
no soul.

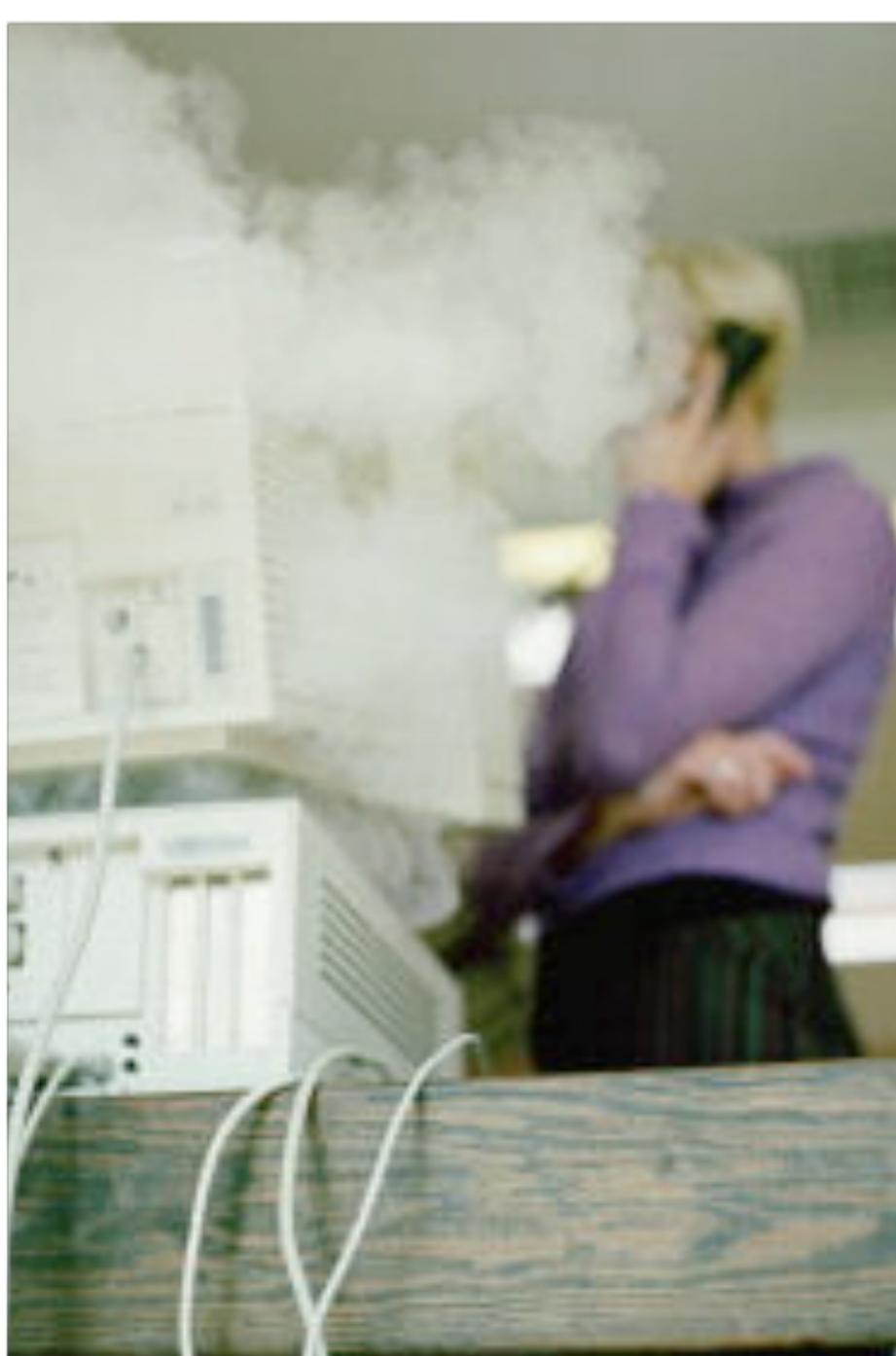


# THE OSTRICH OB



It's too scary to even think of!

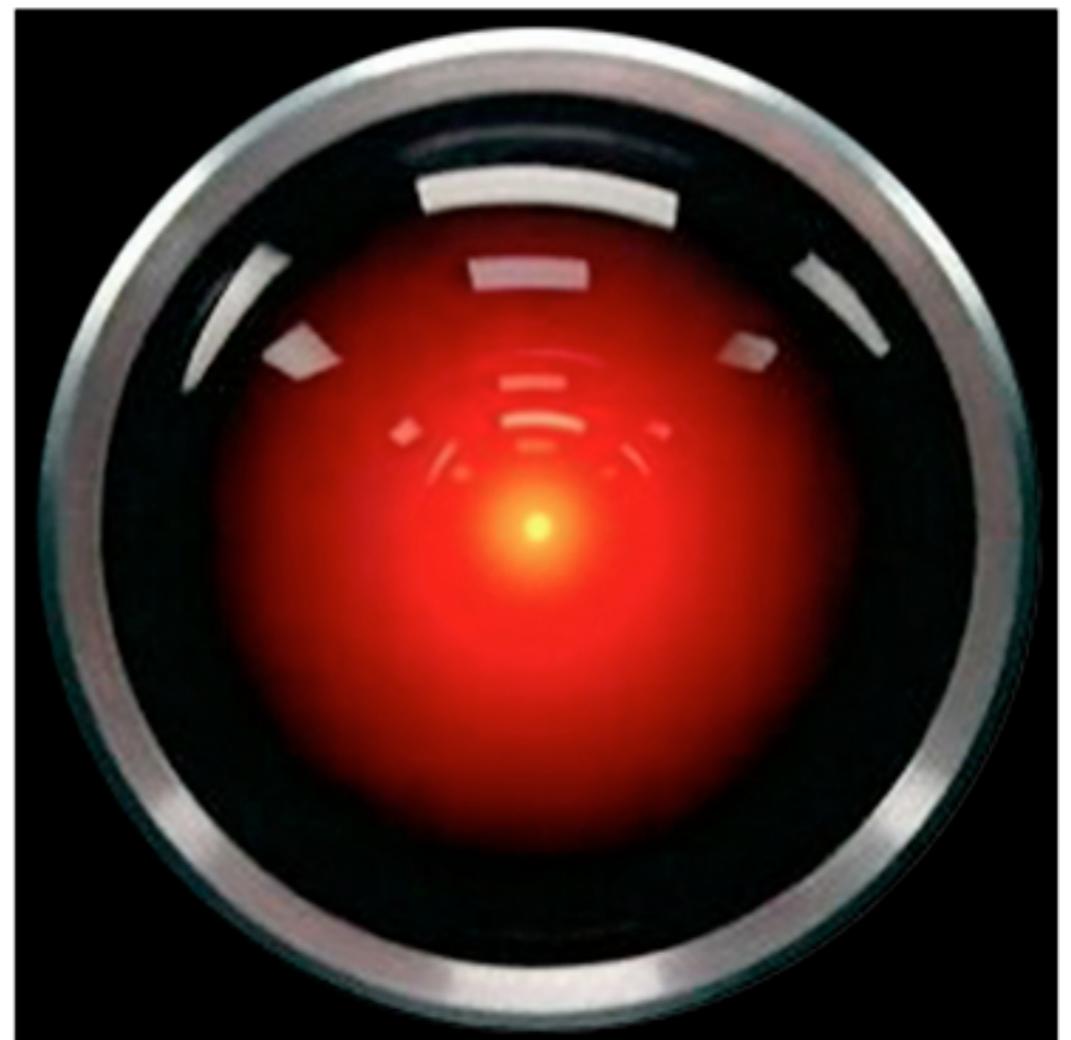
# THE MATHEMATICAL OBJECTION



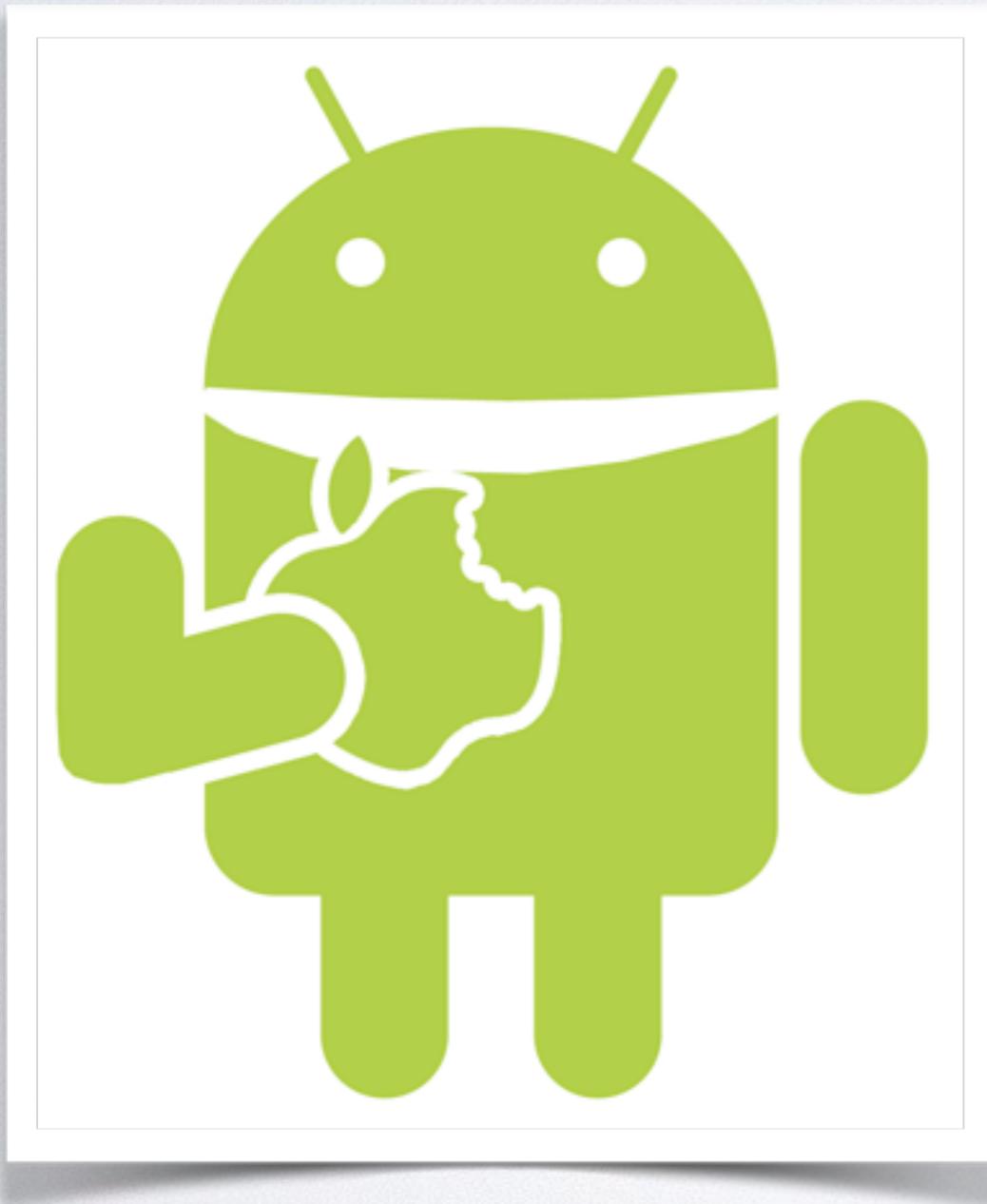
Machines can't  
answer every  
question.

# THE CONSCIOUSNESS OBJECTION

Computers can't  
know, can't feel  
what they're doing.



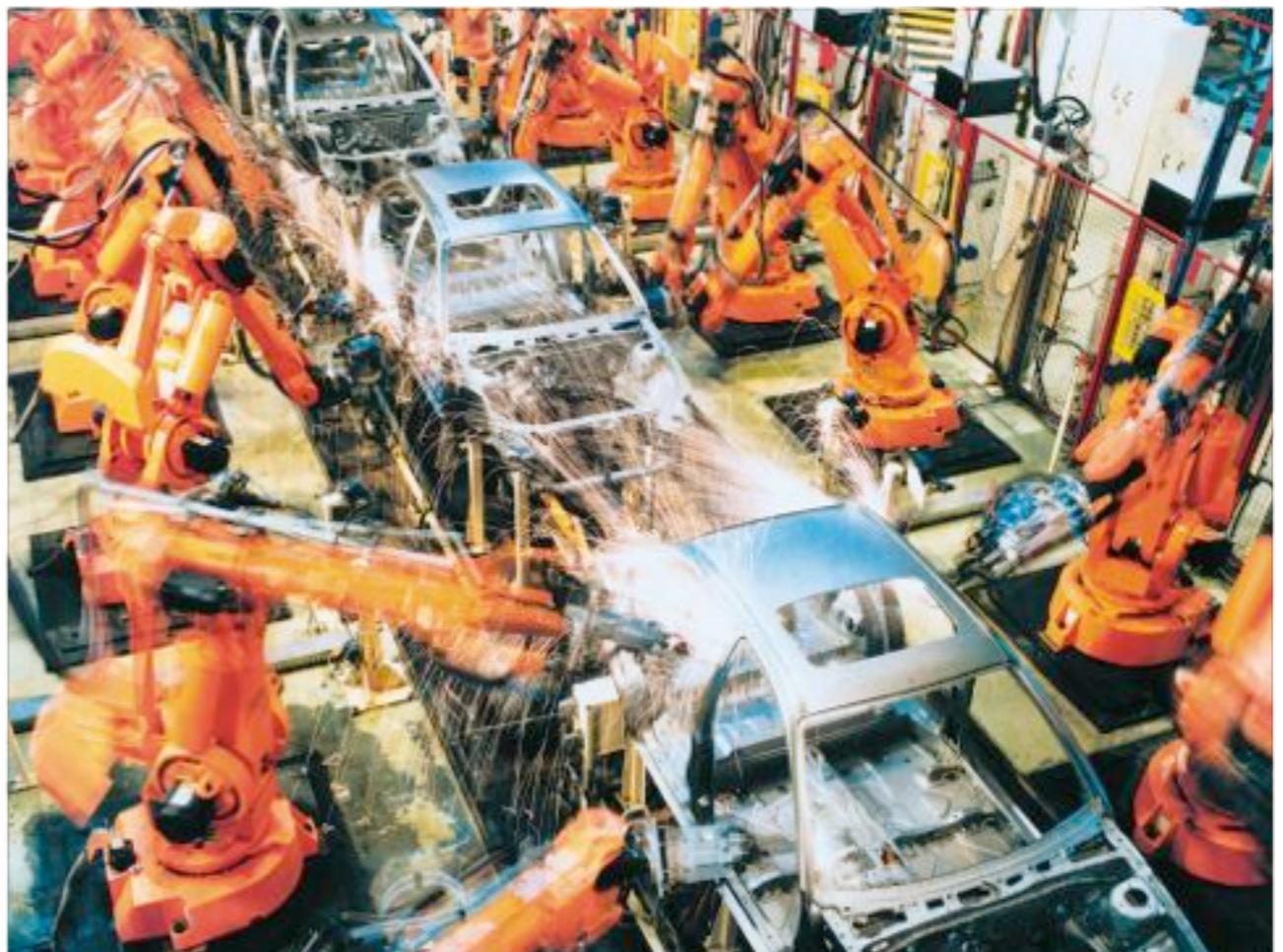
# THE DISABILITY OBJECTION



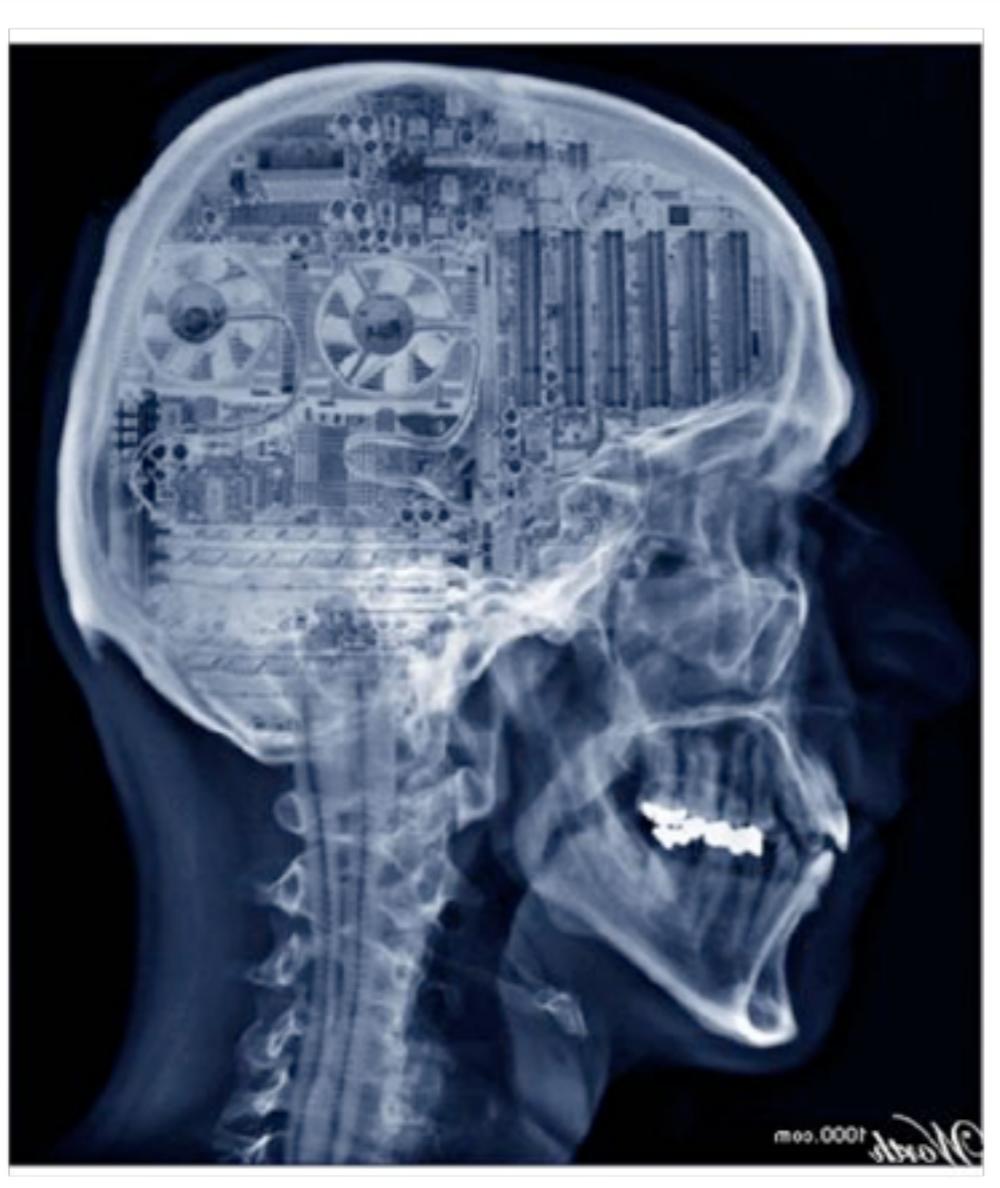
Computers can't  
do \_\_\_\_\_ (e.g.  
enjoy apples or  
make mistakes)

# THE LADY LOVELACE OBJECTION

Machines can only do what they are told, aka machines can't do anything really new.



# THE NERVOUS SYSTEM CONTINUITY OBJECTION



The nervous system is not a discrete state system.

# THE BEHAVIOURAL INFORMALITY OBJECTION

Machines can only follow rules and no set of rules is sufficient to capture enough possibilities.

## The Three Laws of Robotics

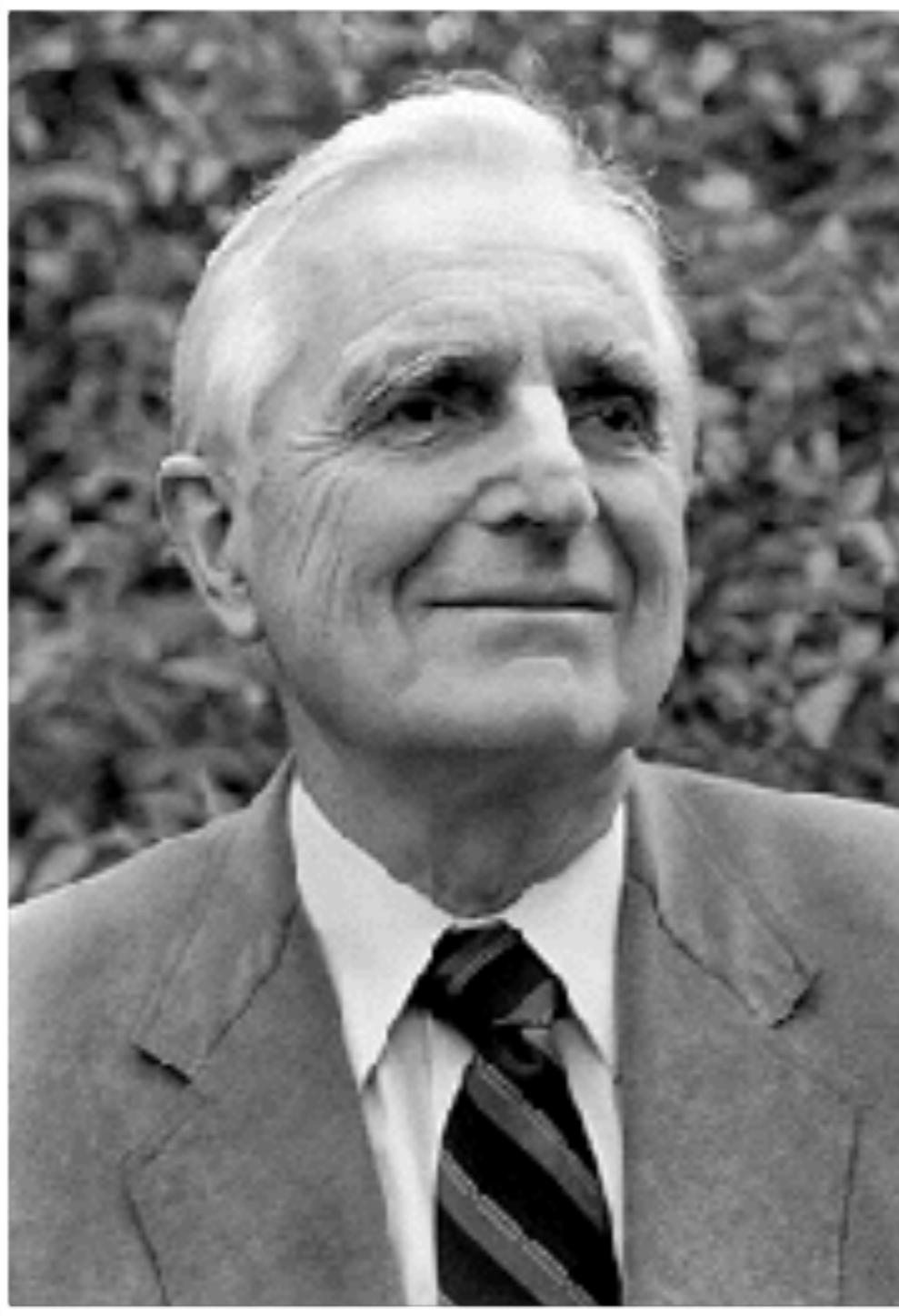
1. A robot may not injure a human being, or, through inaction allow a human being to come to harm.
2. A robot must obey the orders given it by human beings except where such orders would conflict with the First Law.
3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

*Handbook of Robotics, 56th edition, AD 2058*

# THE ESP OBJECTION



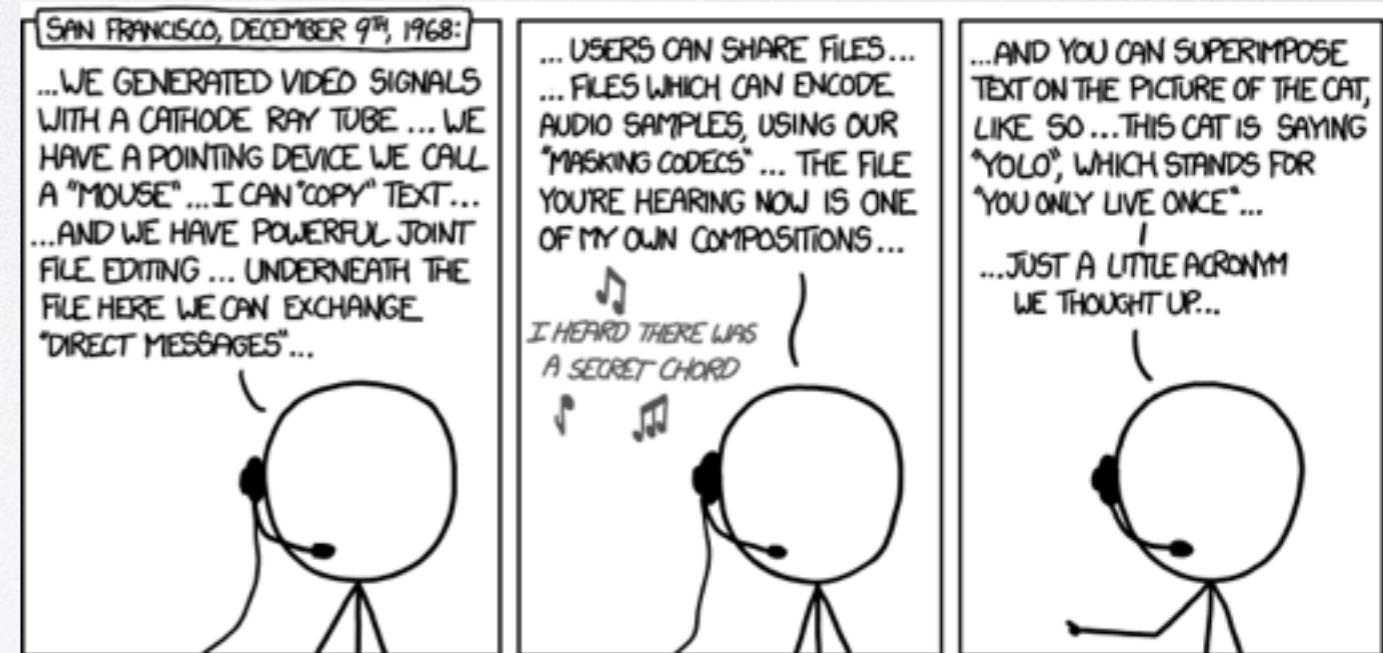
Machines don't have ESP!



# DOUGLAS ENGLEBART: REALIZER

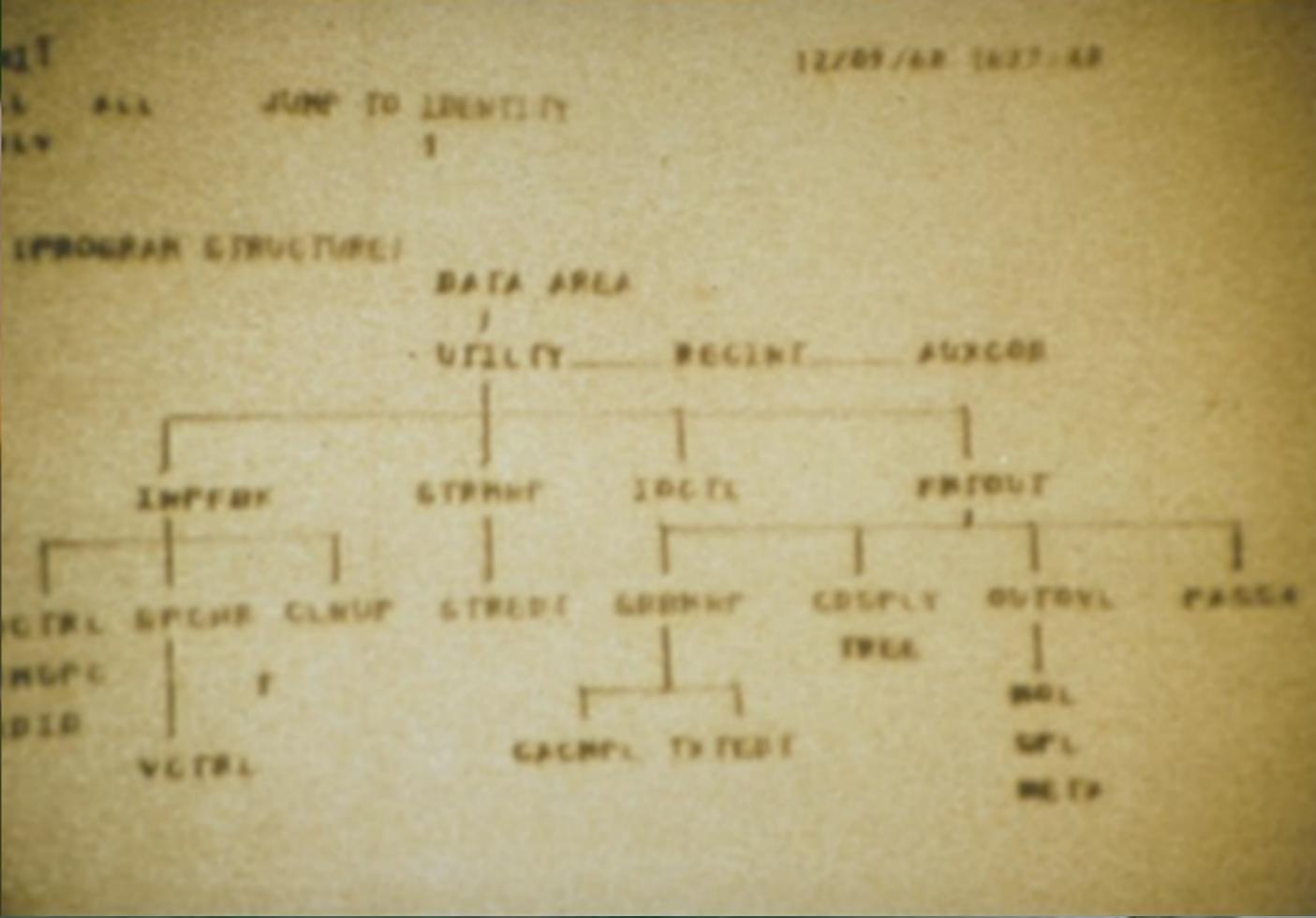
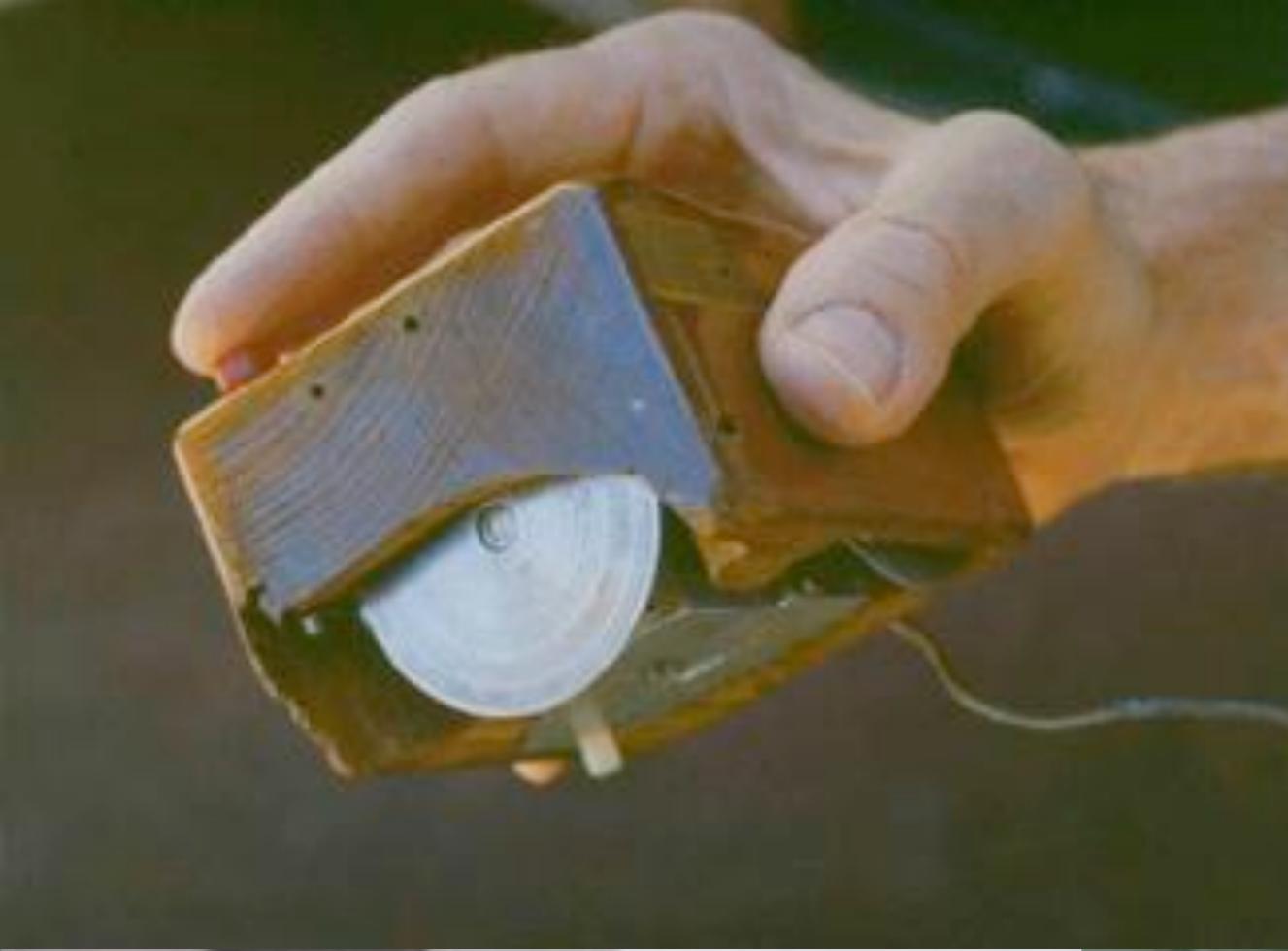
# HIGHLIGHTS

- Inspired by Bush and funded by Licklider (ARPA Project Director)
- Inventor of the computer mouse, revealed to the world at the oN-Line System (NLS) demo, aka...



Homage to Englebart from XKCD

“The Mother of All Demos”



12/09/68

ALL  
BULY

JUMP TO S  
1

'COLD' RETRIEVAL -- UNKNOWN DESTINATION  
DIRECT -- HIERARCHY -- CATEGORIZATION  
FOR EXAMPLE, WHAT IS THE DIRECTIVE  
ROMAN NUMERALS FOR PAGE NUMBERS?  
| INLS, DIREC, 1:56DB  
INDIRECT -- KEYWORDS -- ASSOCIATIVE  
SEE INLS, SY56D, DOCIND:56XBNZ

