A Short History of Scratch, Computers, Language, Programming, the Universe, and Everything
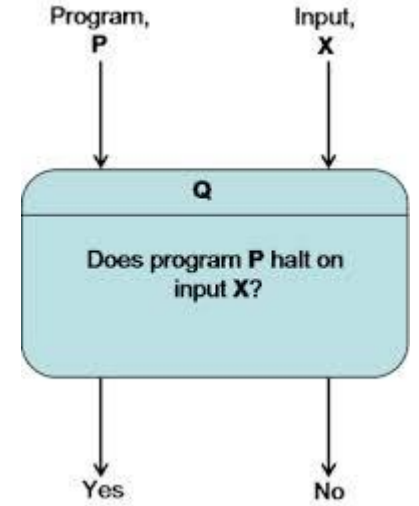
Alan Turing
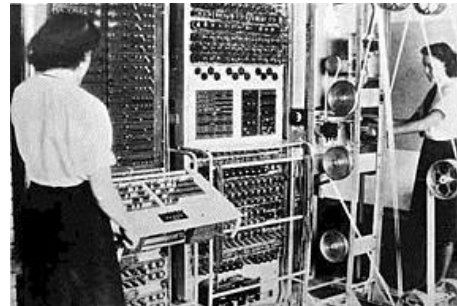

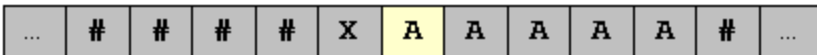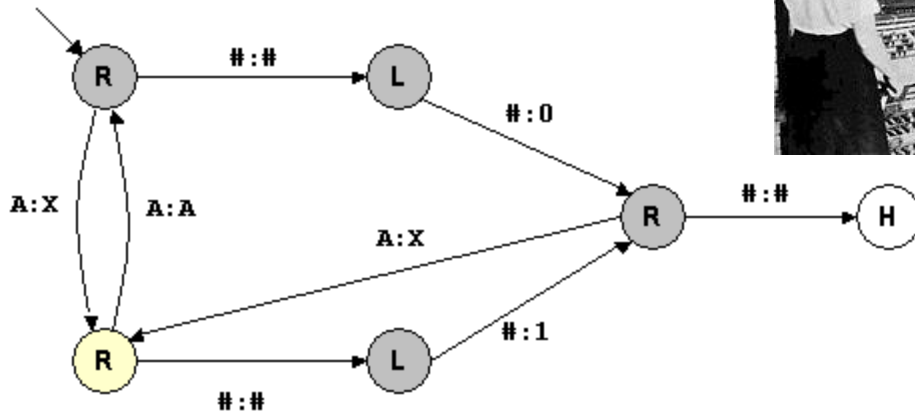1912-1941

Bletchley Park -- WWII

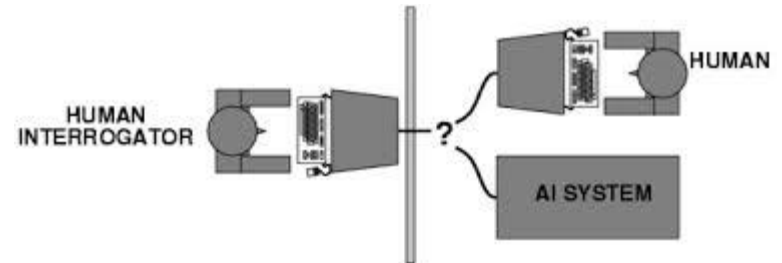Colossus

Does program P halt on input X?

The "Halting Problem"

Turing Machine

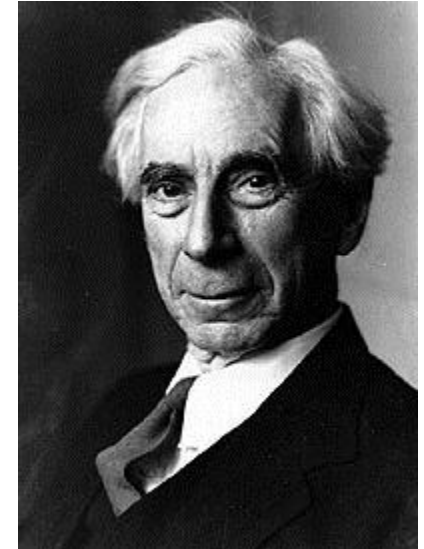The "Turing Test"

Other very famous old guys

Kurt Gödel

Haskell Curry
(lambda calculus)

Alonzo Church
(lambda calculus)

Bertrand Russell

- What is a number?
- What is a computation?
- What computations are possible?
- What mathematical proofs are possible?
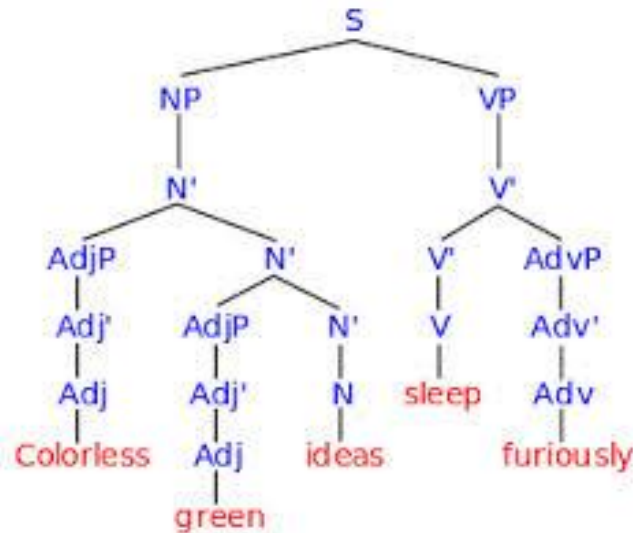
```
0 := λf.λx.x

1 := λf.λx.f x

2 := λf.λx.f (f x)

3 := λf.λx.f (f (f x))
```

MIT Artificial Intelligence Laboratory

- Lisp → Logo
- Chess Playing (search)
- Natural Language Processing
- Symbolic Math
- Garbage Collection
- MULTICS → Unix → Linux

Noam Chomsky -- MIT

S
- NP
  - N'
    - AdjP
      - Adj'
        - Adj
          - Colorless
    - N'
      - AdjP
        - Adj'
          - Adj
            - green
      - N'
        - N
          - ideas
- VP
  - V'
    - V'
      - V
        - sleep
    - AdvP
      - Adv'
        - Adv
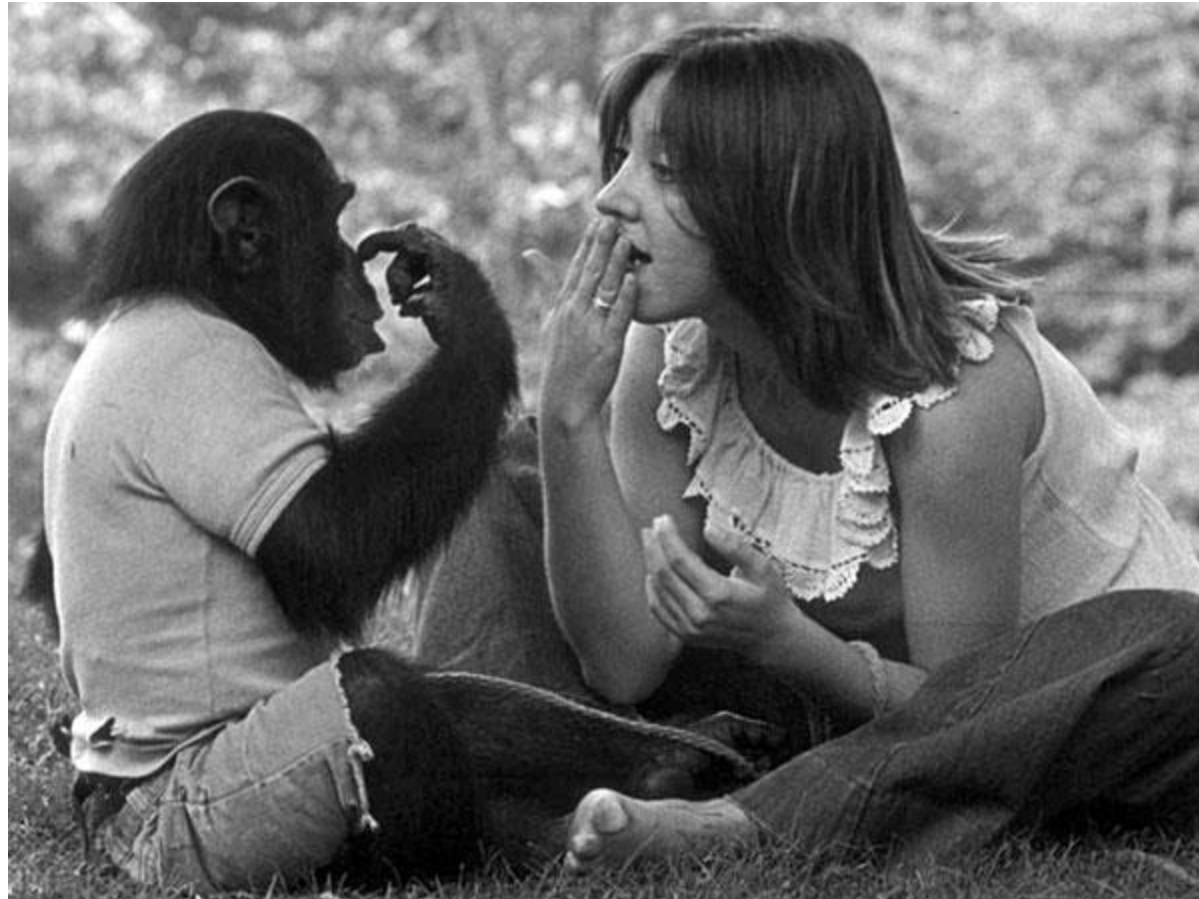   - furiously

- How do you know how to speak?
- How did you learn?
- What did you know before you were born?

- Where is the store at?
- Him and me went to the store.
- I ain't got nothing but trouble.

Is that bad grammar?

- I put **the sweater** on.
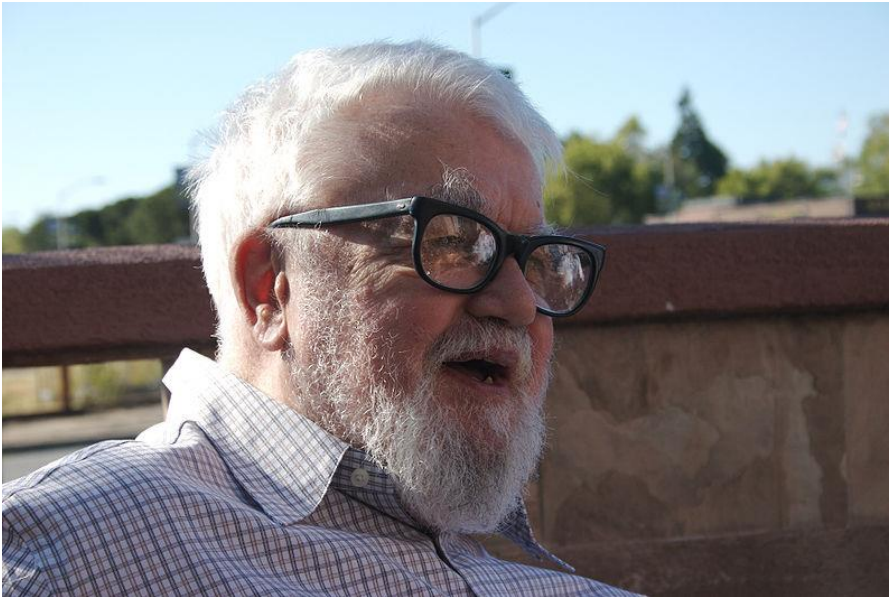- I put **it** on.
- I put on **the sweater**.
- I put on **it**.

Now that's bad grammar!
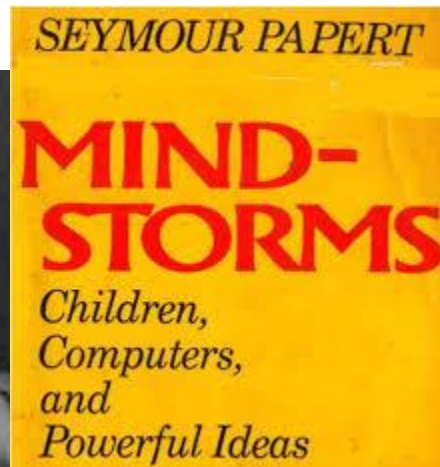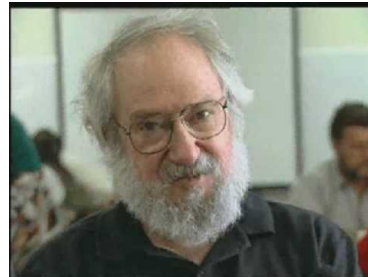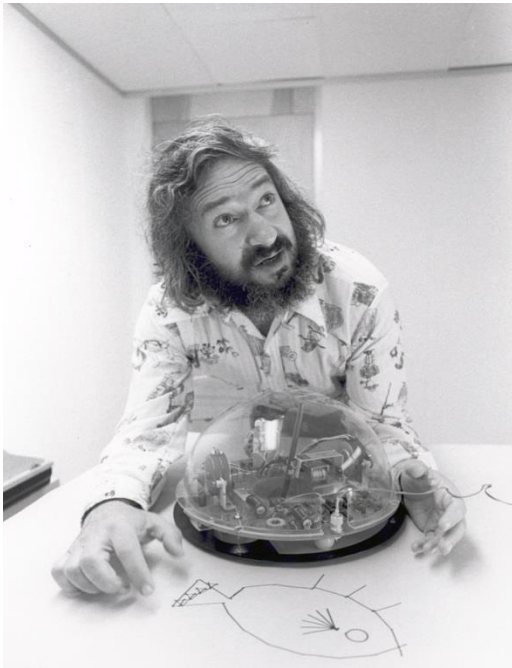
Nim Chimpsky

Lisp – a "list processing" language

```
(defun factorial (n)
  (if (<= n 1)
      1
      (* n (factorial (- n 1)))))
```

It's just like lambda calculus!

John McCarthy -- MIT

Seymour Papert – MIT

Logo: 1967

It's just like Lisp!

Turtle Graphics

"Mindstorms"
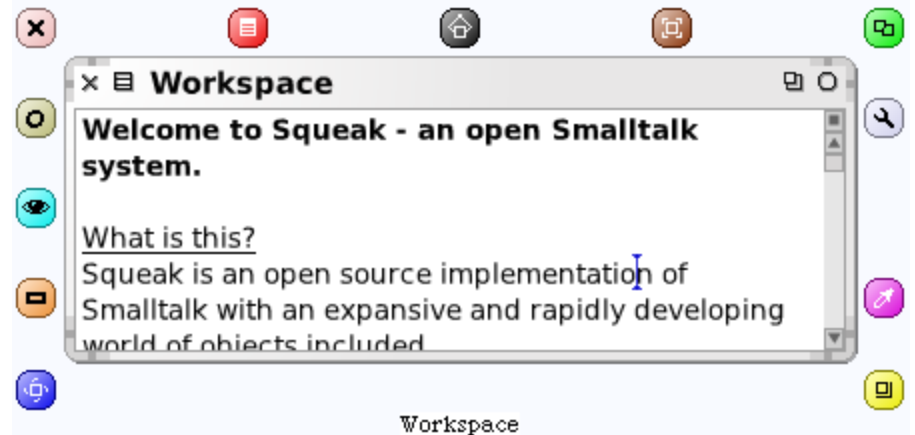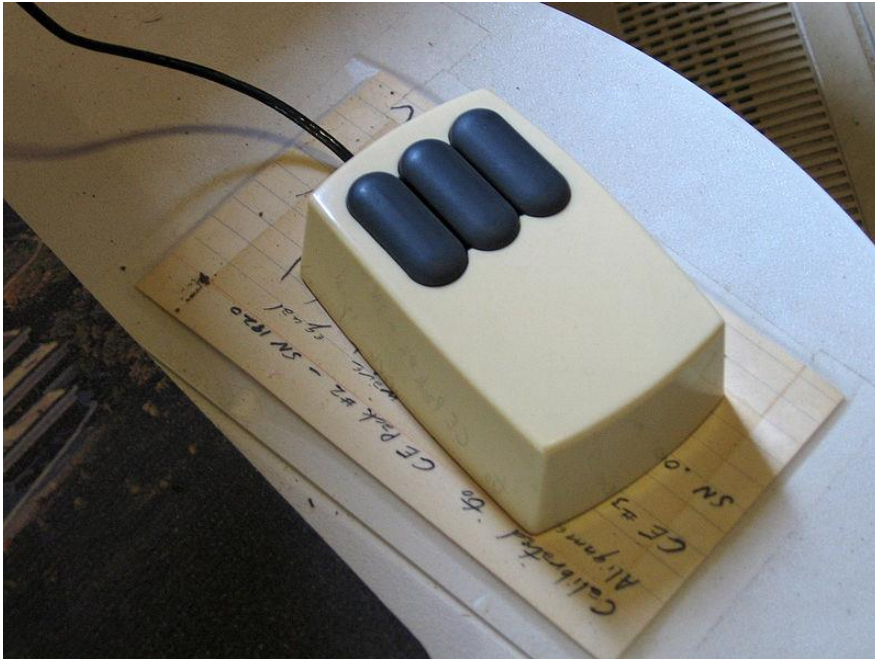

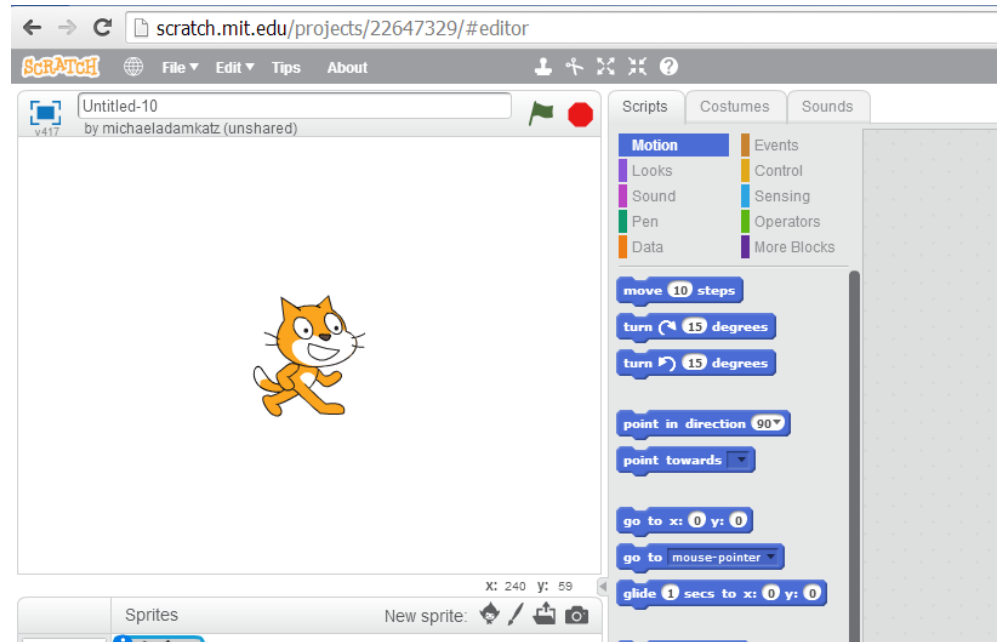SEYMOUR PAPERT
MIND-STORMS
Children,
Computers,
and
Powerful Ideas

Alan Kay

Smalltalk → Squeak

Scratch

Squeak + Logo = Scratch

Scratch + Flash = Us!

Two famous programs

Joseph Weizenbaum (MIT)
"Eliza / Doctor"

https://www.youtube.com/watch?v=CJWOOTMt4ko

http://scratch.mit.edu/projects/11376278/

John Conway

"Game of Life"

http://en.wikipedia.org/wiki/Conway%27s_Game_of_Life

http://scratch.mit.edu/projects/17166649/#editor