how hard can it be?

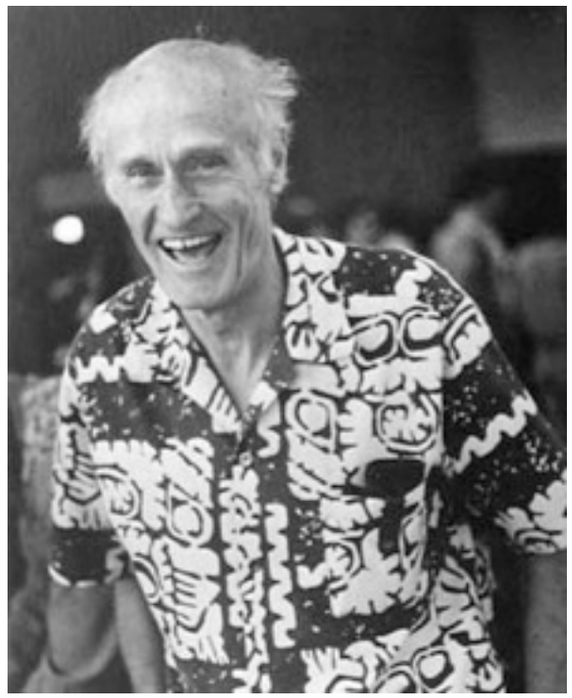
algorithms:

- what can they do?
- what can't they do?

regular expressions

- any character is a regexp
  - matches itself
- if R and S are regexps, so is RS
  - matches
    a match for R followed by a match for S
- if R and S are regexps, so is R|S
  - matches
    any match for R or S (or both)
- if R is a regexp, so is R*
  - matches
    any sequence of 0 or more matches for R

Kleene *



Stephen Kleene 1909-1994

http://xkcd.com/

algorithms
in three easy parts

- giving instructions
  - sequence, parameters
  - conditionals, iteration, recursion
- needles in haystacks
  - hard to find; easy to recognise
- some things are impossible
  - “I never tell the truth”

sequence

- separate four eggs

- beat the whites

- ...

parametrisation

- separate three eggs

- beat the whites

- ...

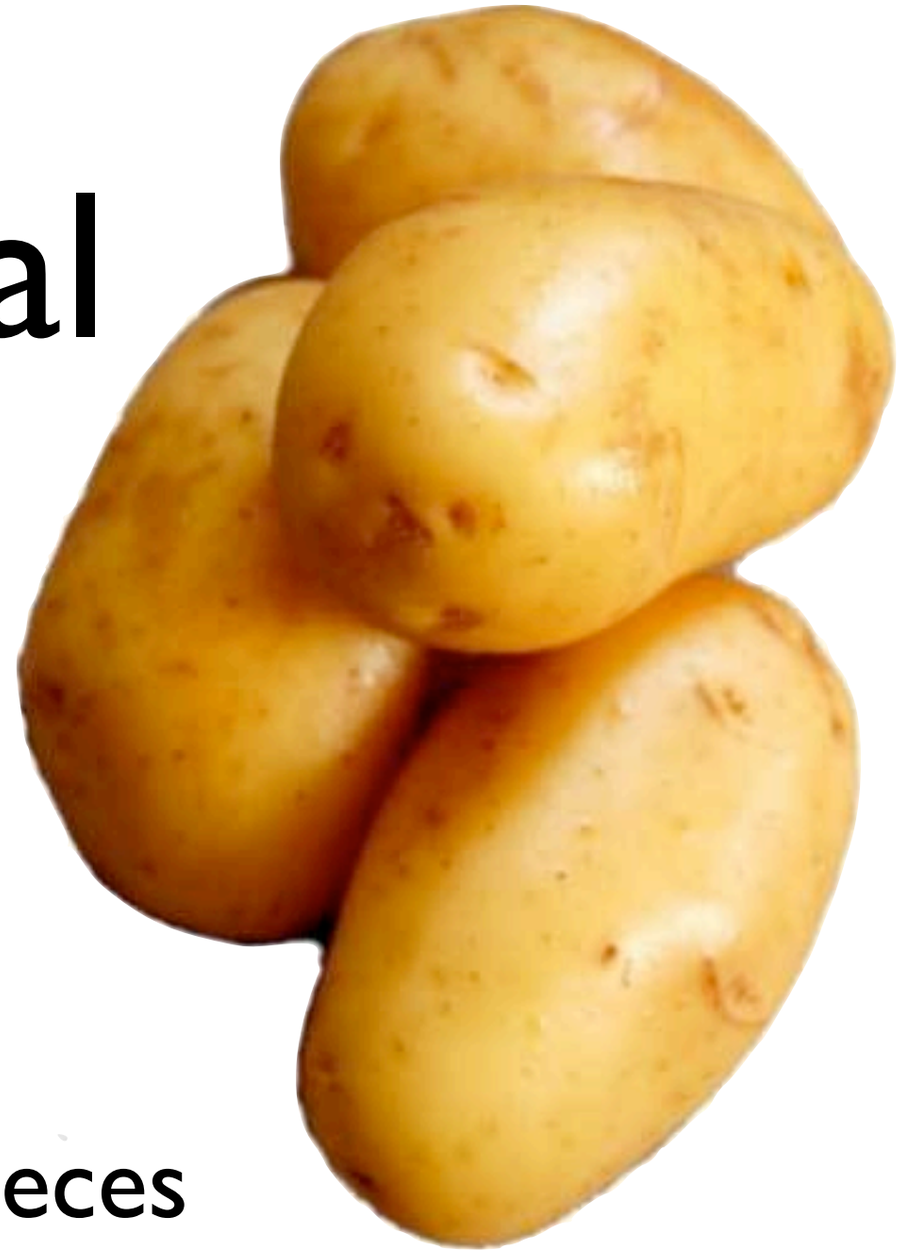
parametrisation

- separate n eggs

- beat the whites

- ...

conditional



if your potatoes are large

- cut them into bite-sized pieces

iteration

- beat **until** the whites form stiff peaks

recursion: sourdough

- To make sourdough
  - take your **sourdough** out of the fridge
  - add a cup of warm water and a cup of flour to the bowl
  - leave to prove for eight hours
    - put half of the mixture in the fridge
    - use the other half to make bread

sourdough bread

- Ingredients
  - sourdough starter
  - unbleached flour
  - 2 tablespoons of olive oil or softened margarine
  - 4 teaspoons of sugar
  - 2 teaspoons of salt
- Method
  - mix all ingredients adding flour **until** you have a stiff dough
  - **repeat** twice
    - knead well
    - leave to rise
  - form into a loaf and bake

non-termination

beat the milk until it forms stiff peaks

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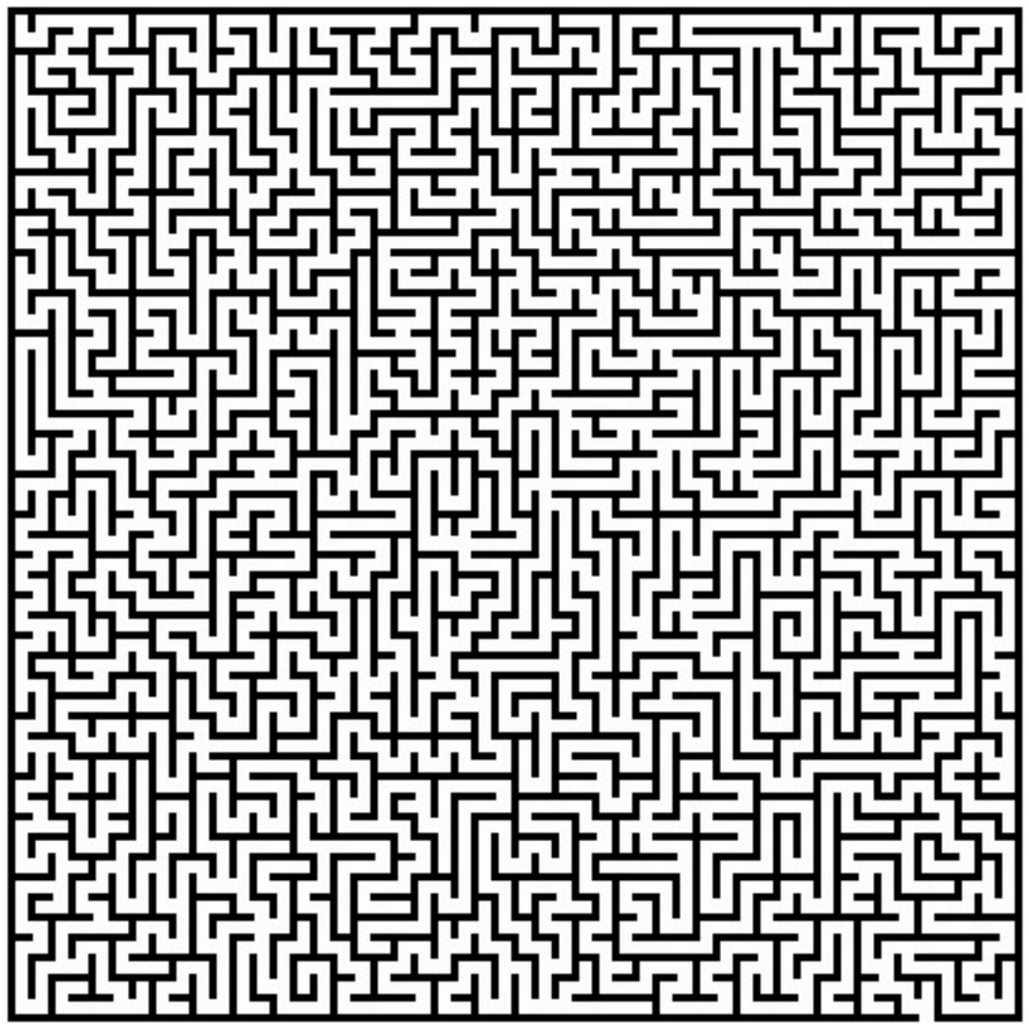
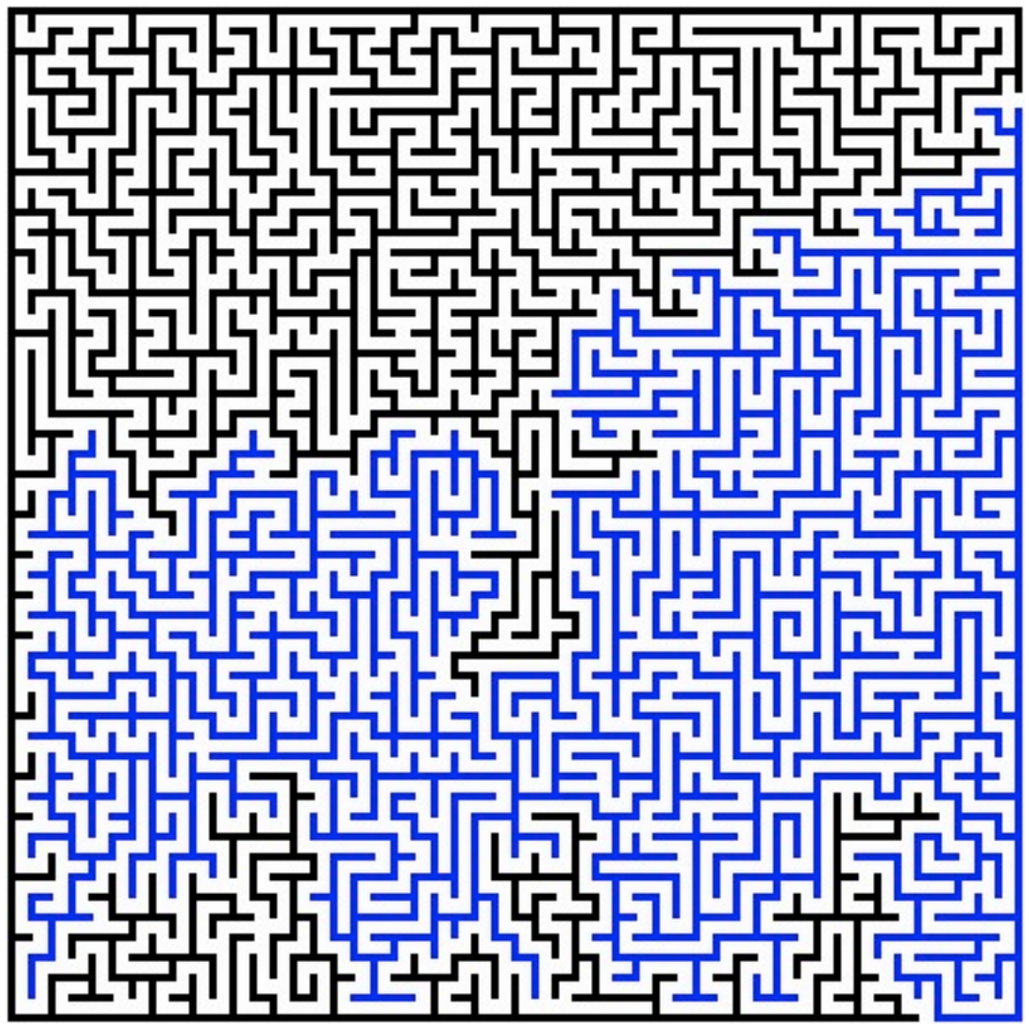
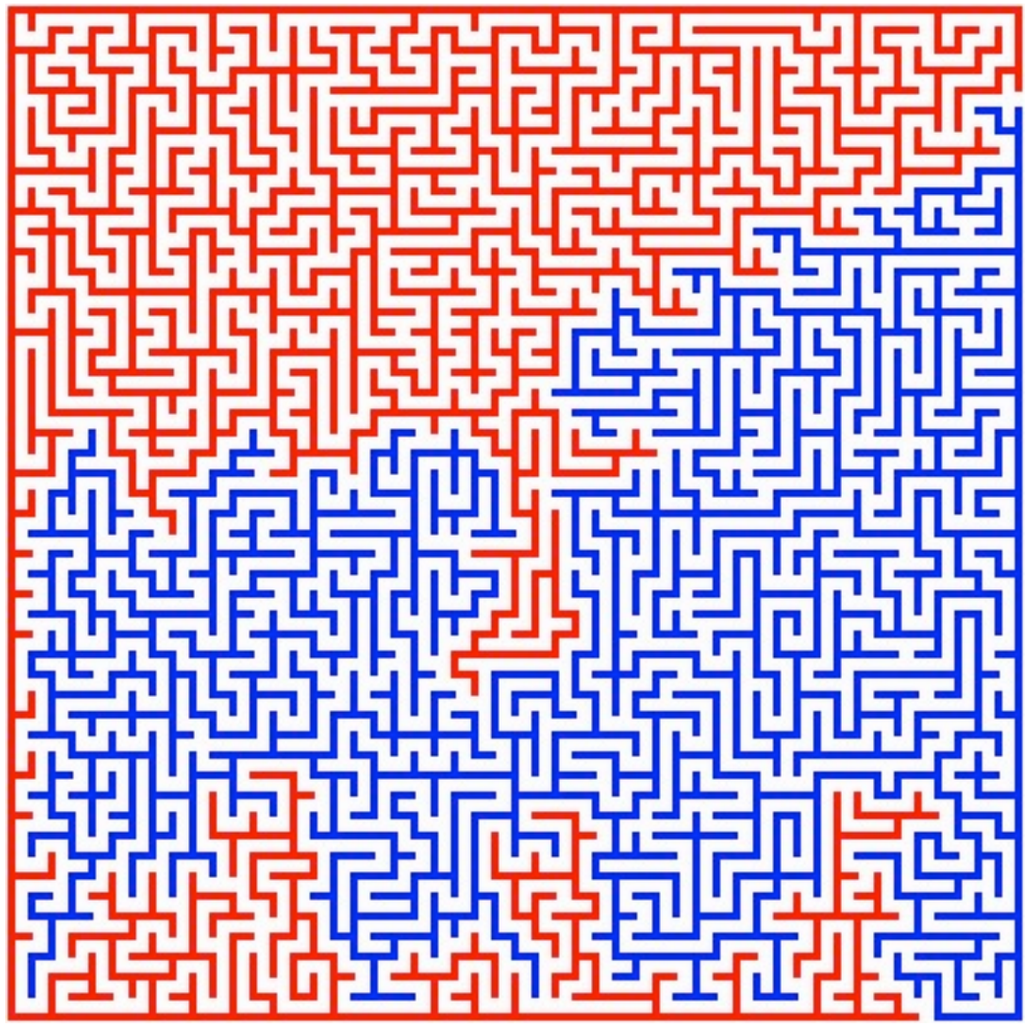
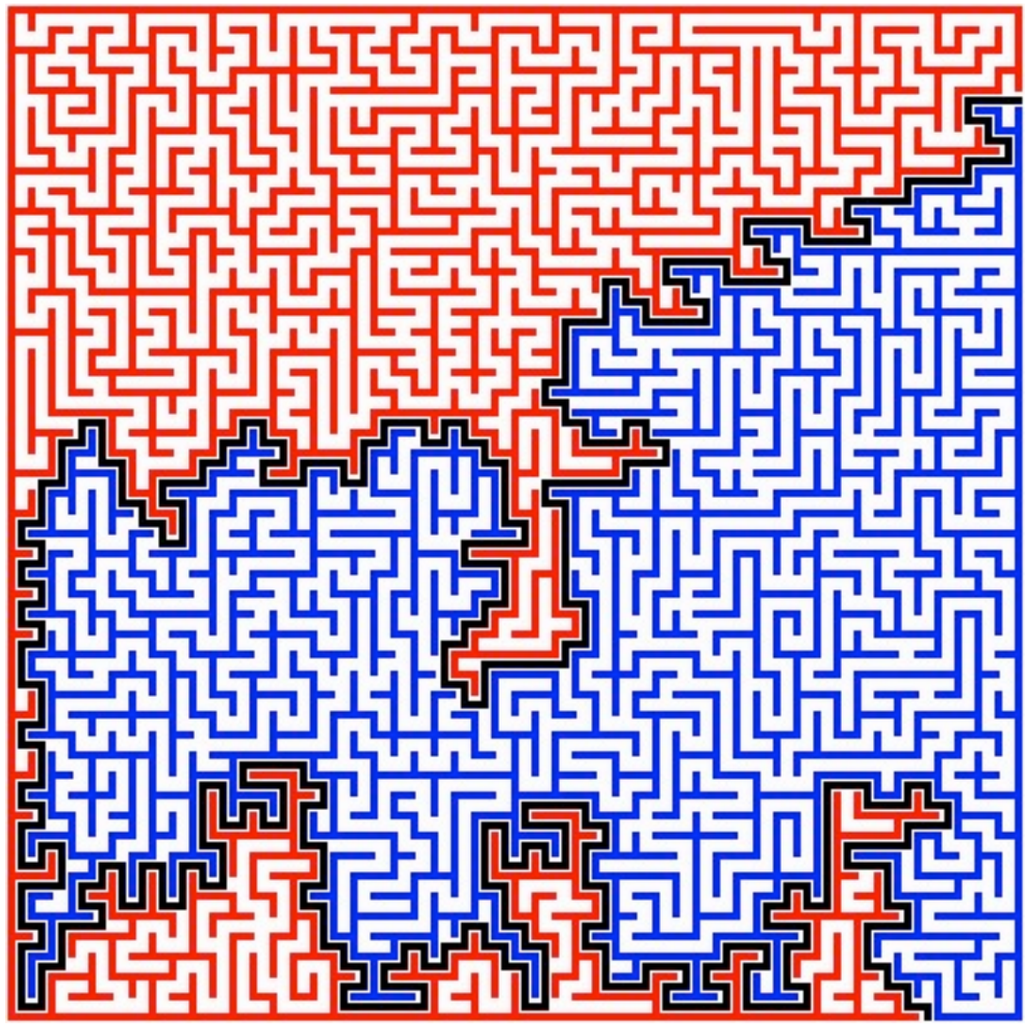
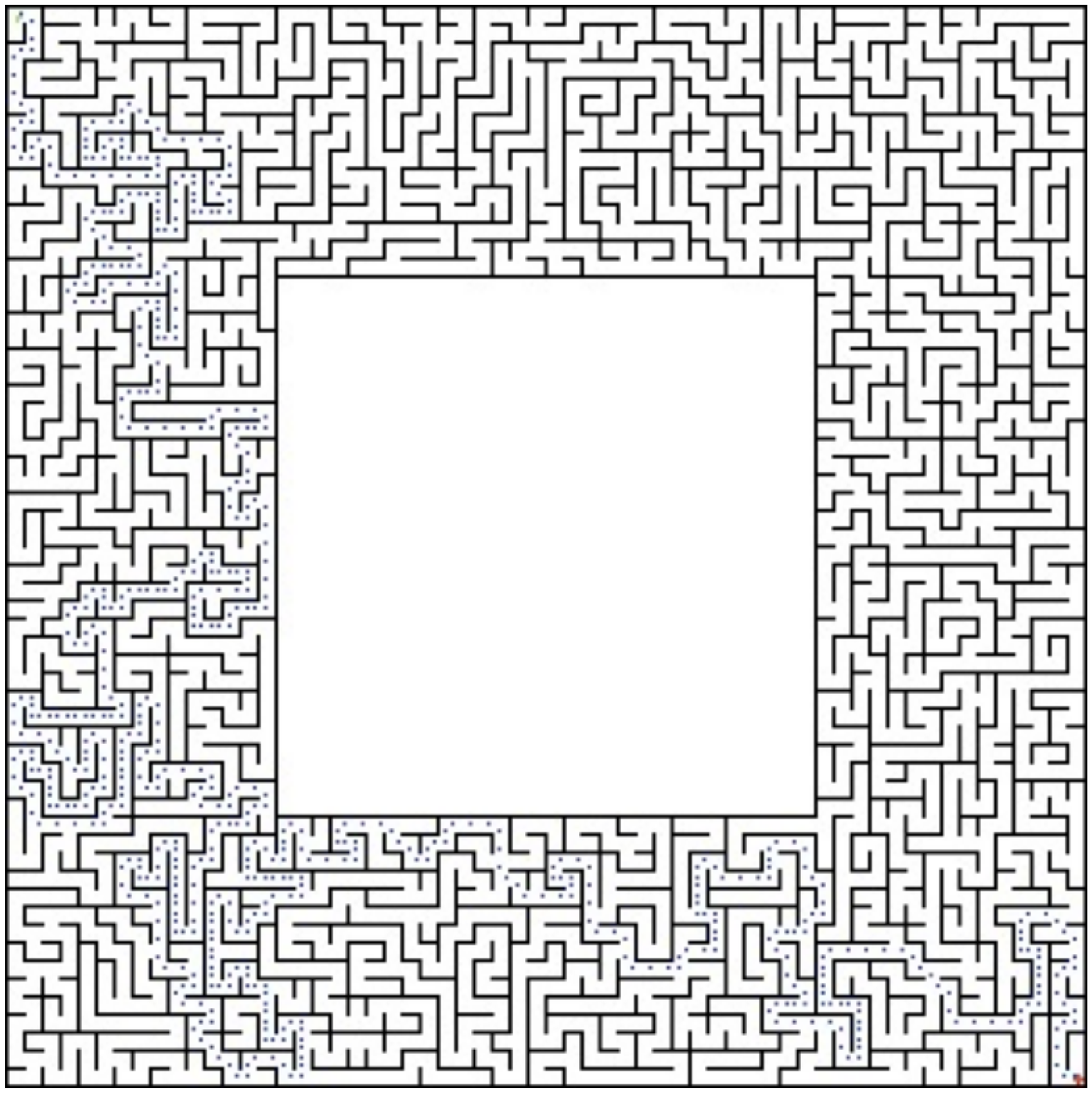








maze generator



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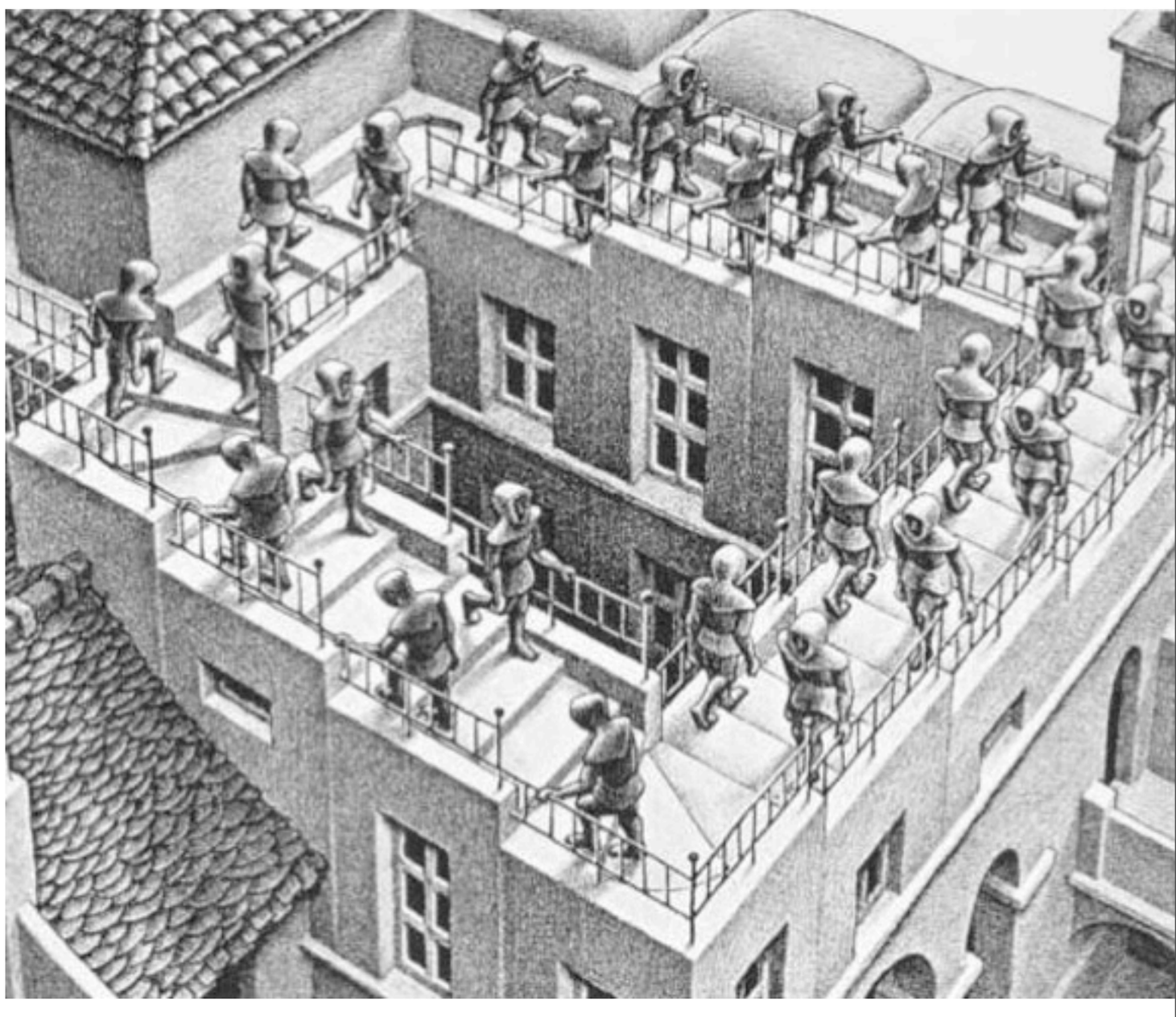
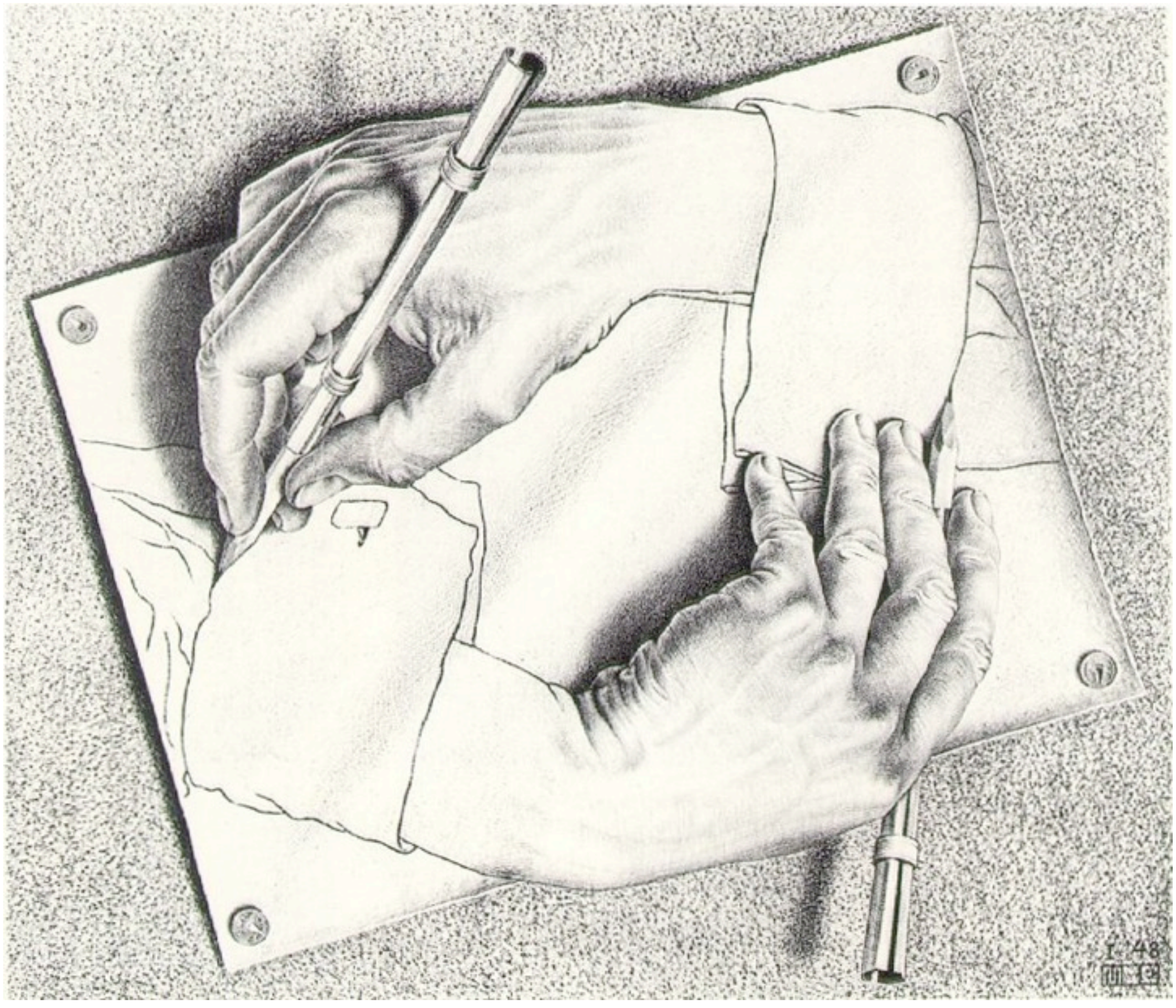
Ceci n'est pas une pipe.

circular reference

- A: statement B is true
- B: statement A is false



self reference



- A: statement A is false
- E: statement E is true

Escher, *Hands*

exercise

Albert says "Everything Caroline says is true"

Betty says "Everything I say is false"

Caroline says "Everything David says is true"

David says "Everything Caroline says is false"

Who is the only person who can be telling the truth?

This is a sample question for the Cambridge admissions test for philosophy.