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/

WHENEVER I LEARN A NEW SKILL I CONCOCT ELABORATE FANTASY SCENARIOS WHERE IT LETS ME SAVE THE DAY.

OH NO! THE KILLER MUST HAVE FOLLOWED HER ON VACATION!

BUT TO FIND THEM WE'D HAVE TO SEARCH THROUGH 200 MB OF EMAILS LOOKING FOR SOMETHING FORMATTED LIKE AN ADDRESS!

IT'S HOPELESS!

EVERYBODY STAND BACK.

I KNOW REGULAR EXPRESSIONS.

BOOM!
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
- ...

Saturday, 3 December 2011
parametrisation

- separate three eggs
- beat the whites
- ...

Saturday, 3 December 2011
parametrisation

- separate $n$ eggs
- beat the whites
- ...

Saturday, 3 December 2011
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
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
maze generator
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
Leci 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*
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.