

Intro to Programming

Making the Computer Do Stuff

Making the Computer Do Stuff



Program

Making the Computer Do Stuff



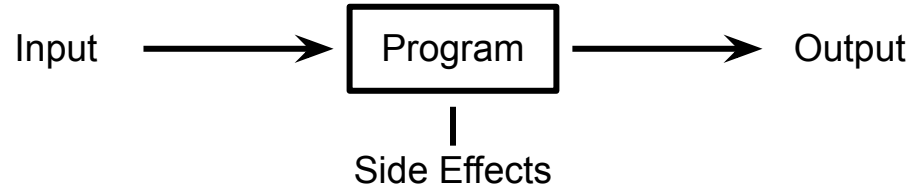
Program



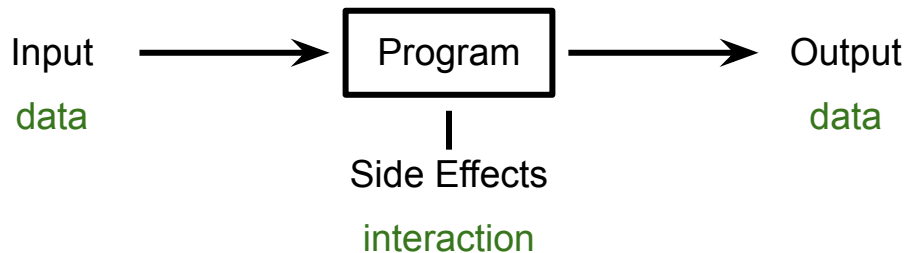
Making the Computer Do Stuff



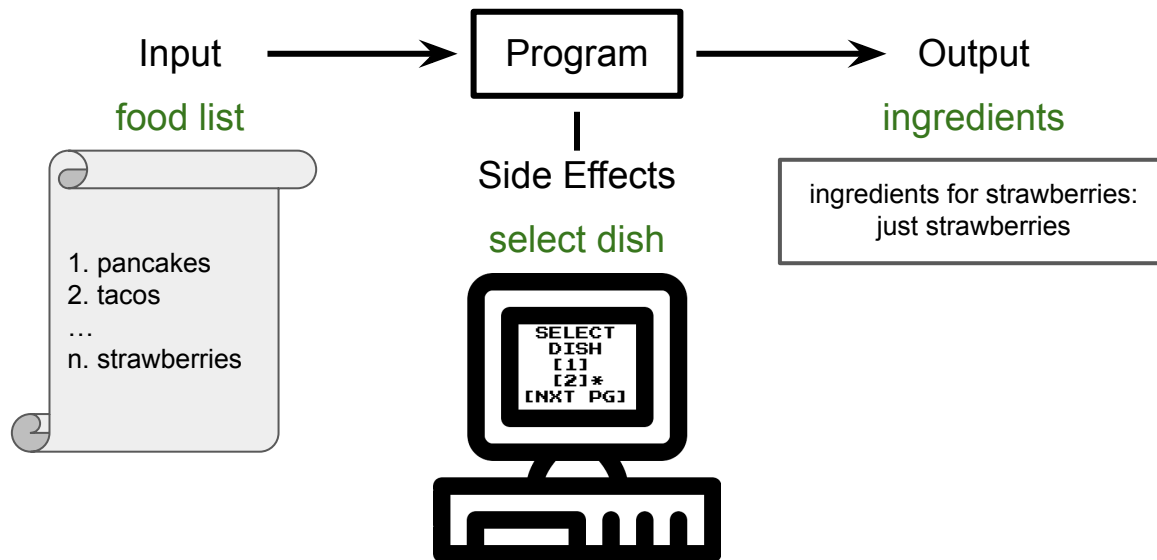
Making the Computer Do Stuff



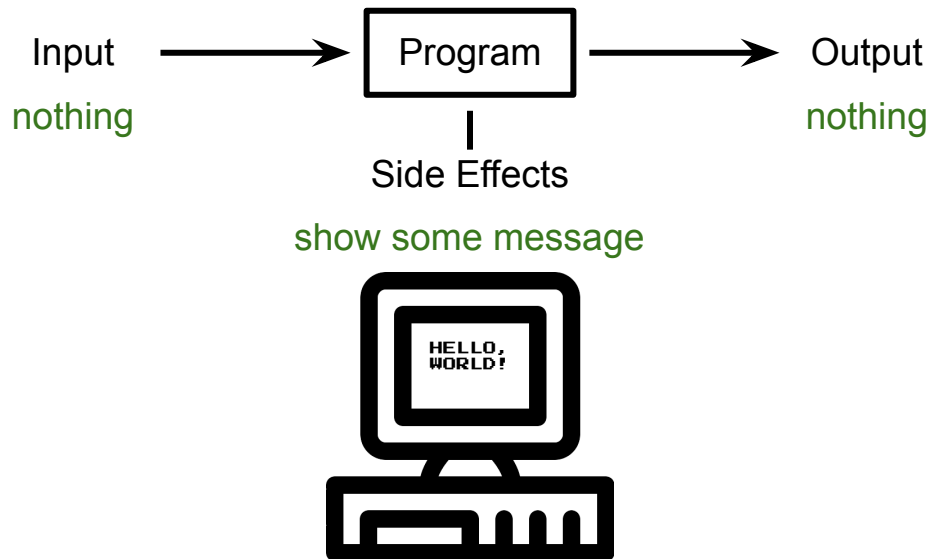
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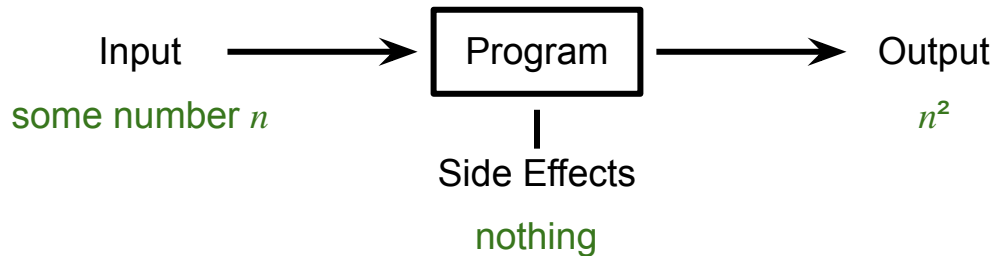
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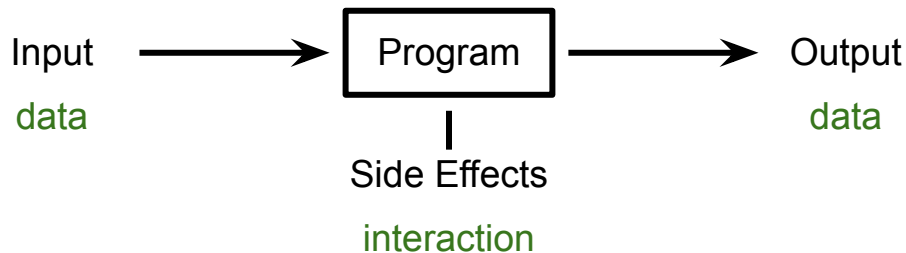
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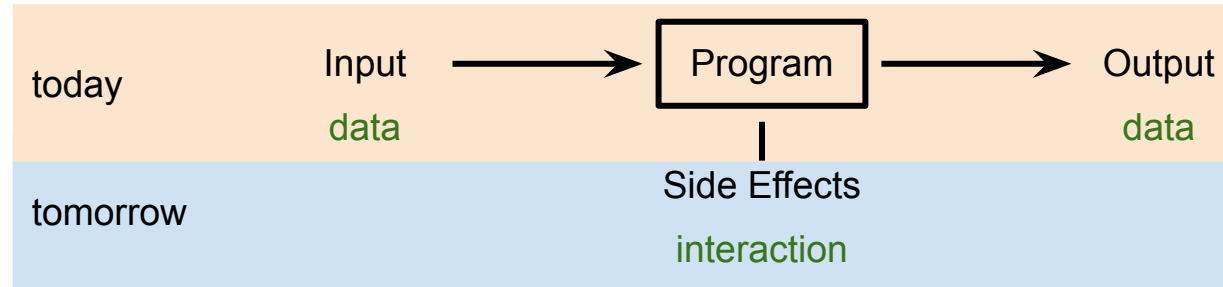
Making the Computer Do Stuff



Making the Computer Do Stuff



Making the Computer Do Stuff



Computers are Dumb

What is Programming?

- code: sequence of structured instructions

Make Cheese Sandwich

Unwrap bread

Grab slice of bread

Drop slice of bread on workspace

Grab knife

Get butter

Spread butter on slice of bread

Grab cheese

Drop cheese on buttered slice

What is Programming?

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- rules of the real world → modeling

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- use of *primitives*
- syntax: `Drop X on Y` ✓

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What is Programming?

- code: sequence of structured instructions
- rules of the real world → modeling
- step-by-step instructions
- use of *primitives*
- syntax: `Drop X on Y` ✓
- semantics: `Drop workspace on butter` ×

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Problem Solving

What are Problems?

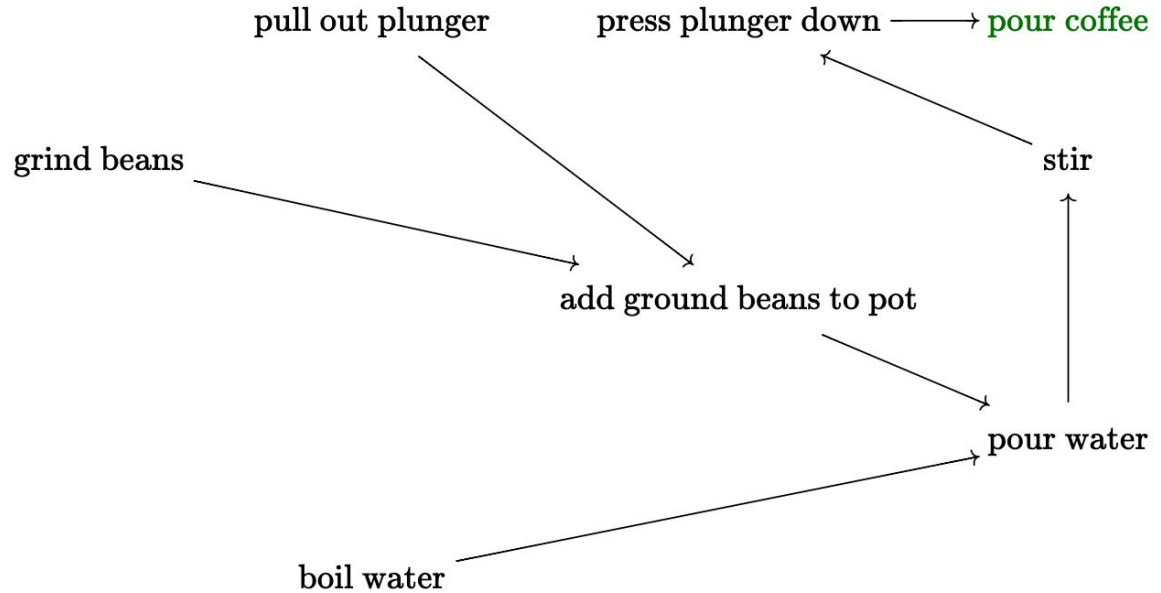
What are Problems?

→ tasks

(1/3) French Press Coffee

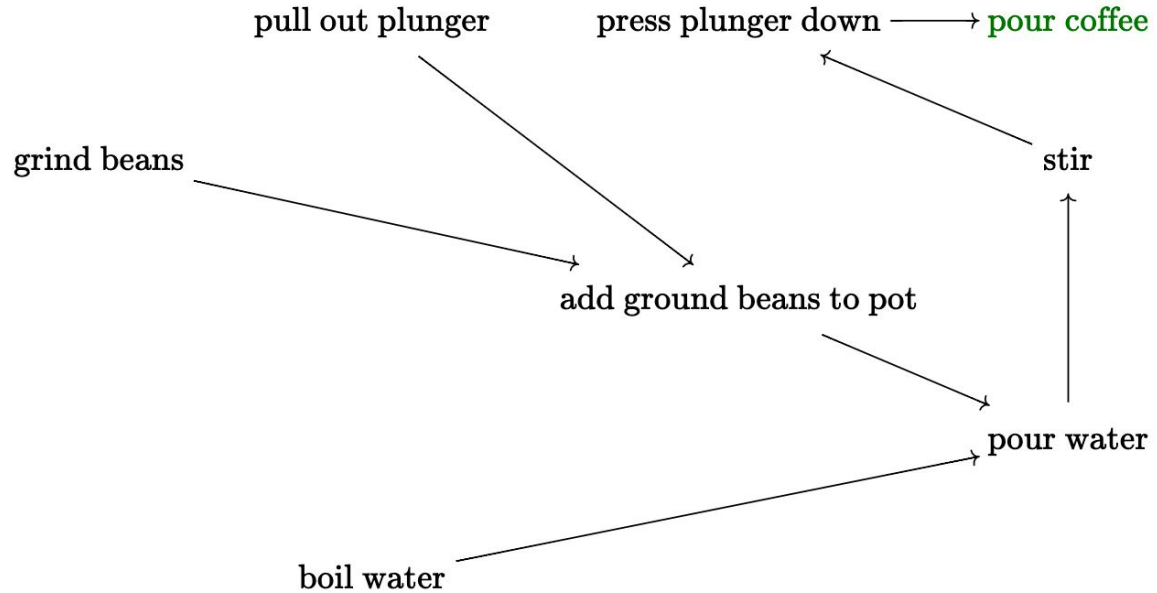


French Press Coffee



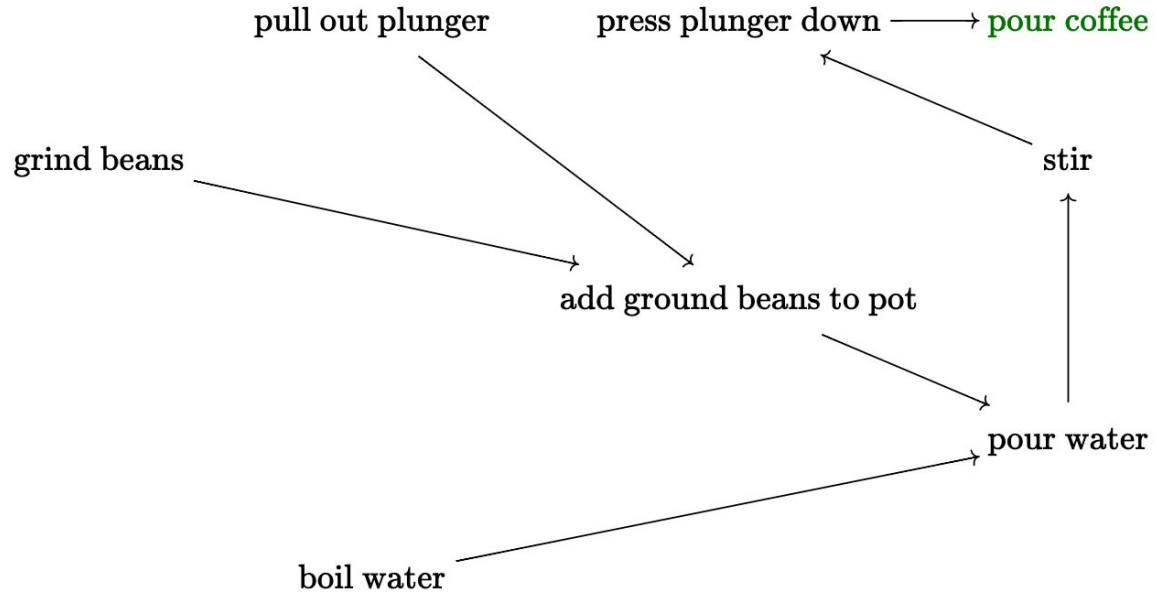
French Press Coffee

- splitting into subproblems:
order of operations
- dependencies



French Press Coffee

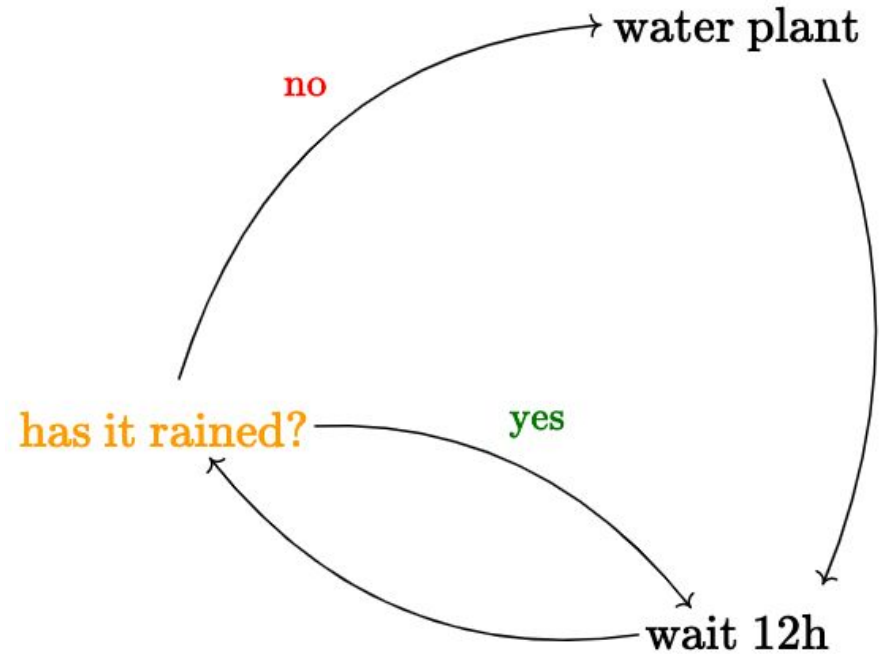
- splitting into subproblems:
order of operations
- dependencies
- solve problems
independently



(2/3) Keeping a Plant Alive

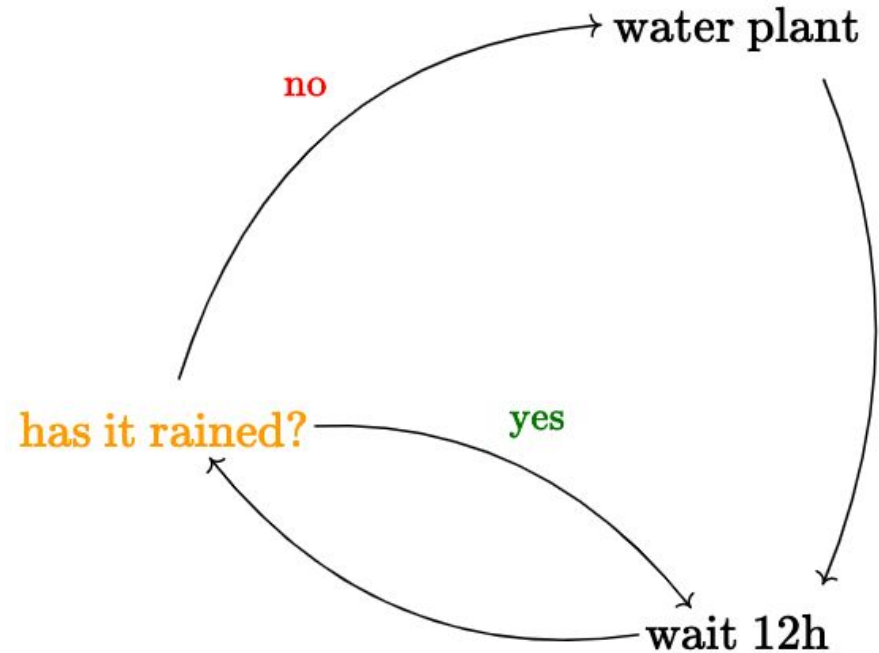


Keeping a Plant Alive



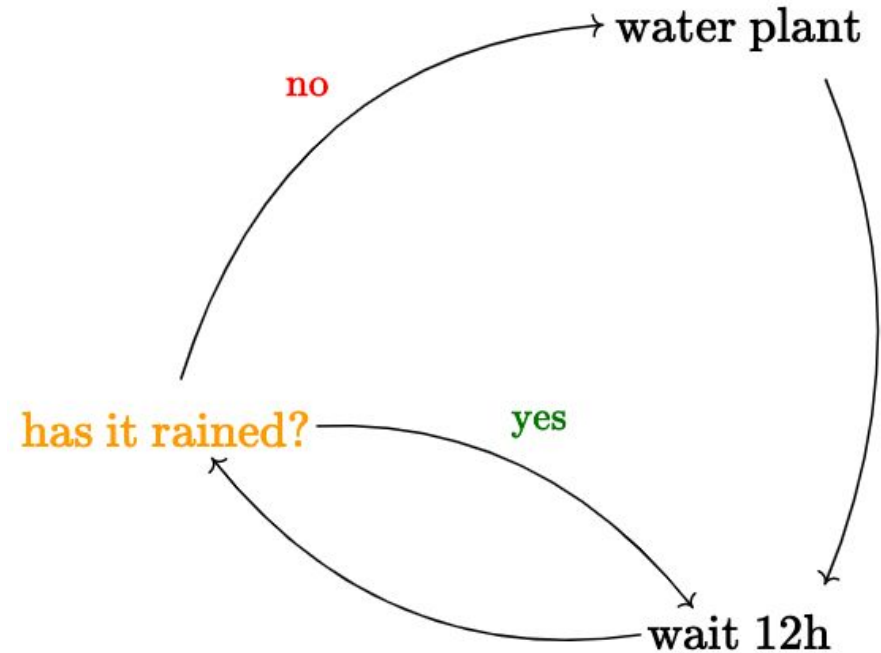
Keeping a Plant Alive

- sequence of discrete steps
- model decisions (“flow control”)



Keeping a Plant Alive

- sequence of discrete steps
- model decisions (“flow control”)
- think of all cases



(3/3) Month of Birth

Input:

- List of people's names and their months of birth
- My month of birth

Output:

- List of the names of all people with same month of birth as me

Month of Birth

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- List of people's names and their months of birth
- My month of birth

Output:

- List of the names of all people with same month of birth as me

Subproblem:

- (1) Given a single person, check whether we share month of birth

Month of Birth

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- List of people's names and their months of birth
- My month of birth

Output:

- List of the names of all people with same month of birth as me

Subproblem:

- (1) Given a single person, check whether we share month of birth

Program:

Run solution for (1) for every person in the list

summary:

- find mental models
- practice

The Process of Programming

Problem

A diagram illustrating the decomposition of a problem into subproblems. On the left, a large light blue square is labeled "Problem". To its right, three smaller light blue rectangles are stacked vertically, labeled "Subproblem A", "Subproblem B", and "Subproblem C" from top to bottom. This visualizes the concept of breaking a complex problem into smaller, more manageable parts.

Problem

Subproblem A

Subproblem B

Subproblem C

The diagram illustrates a process of problem decomposition. On the left, a light blue rectangle labeled 'Problem' is connected by three horizontal lines to three stacked light blue rectangles labeled 'Subproblem A', 'Subproblem B', and 'Subproblem C'. These subproblems are then grouped together by a large, light green cloud-like shape labeled 'Abstract Problem Solving'.

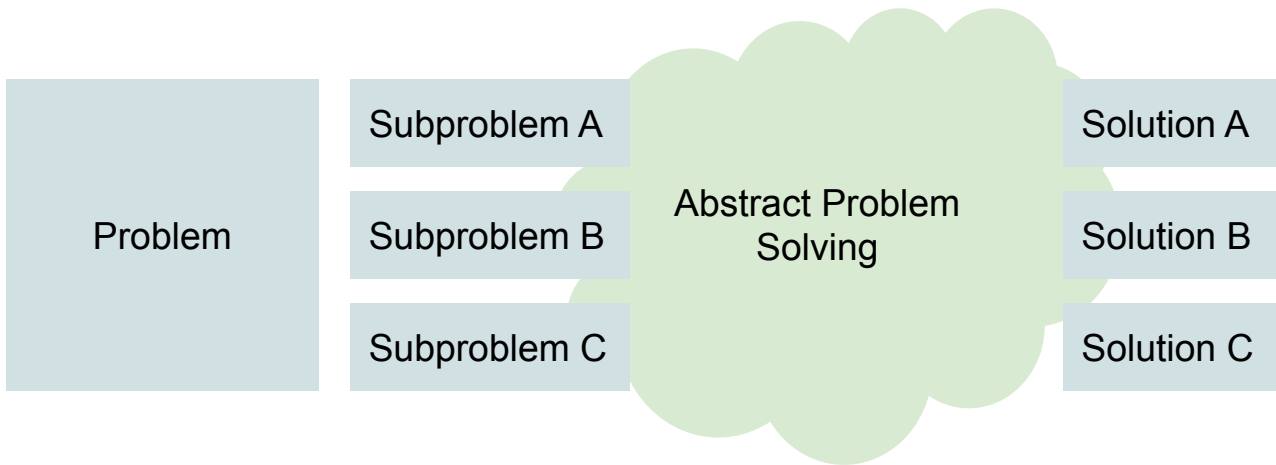
Problem

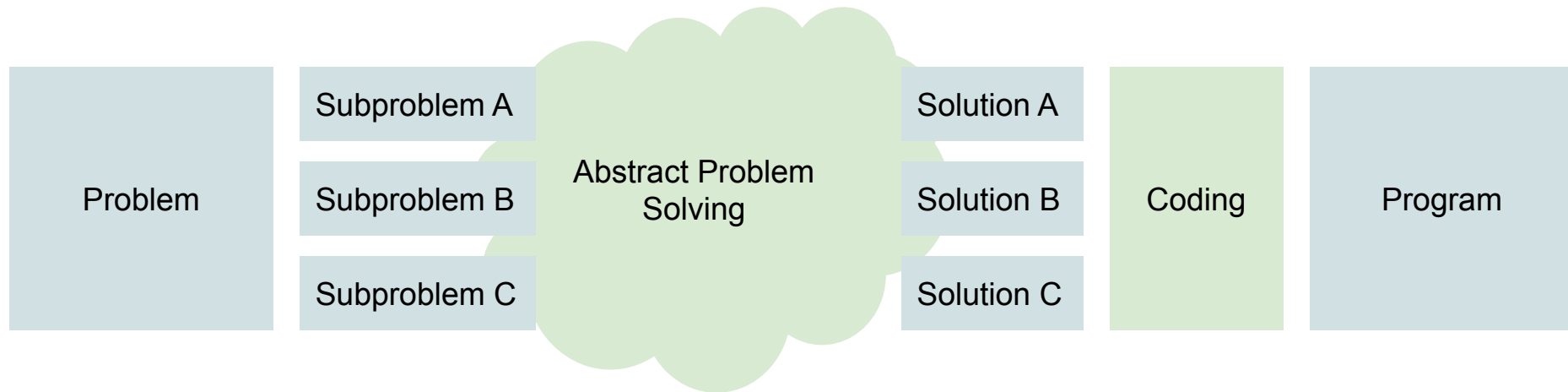
Subproblem A

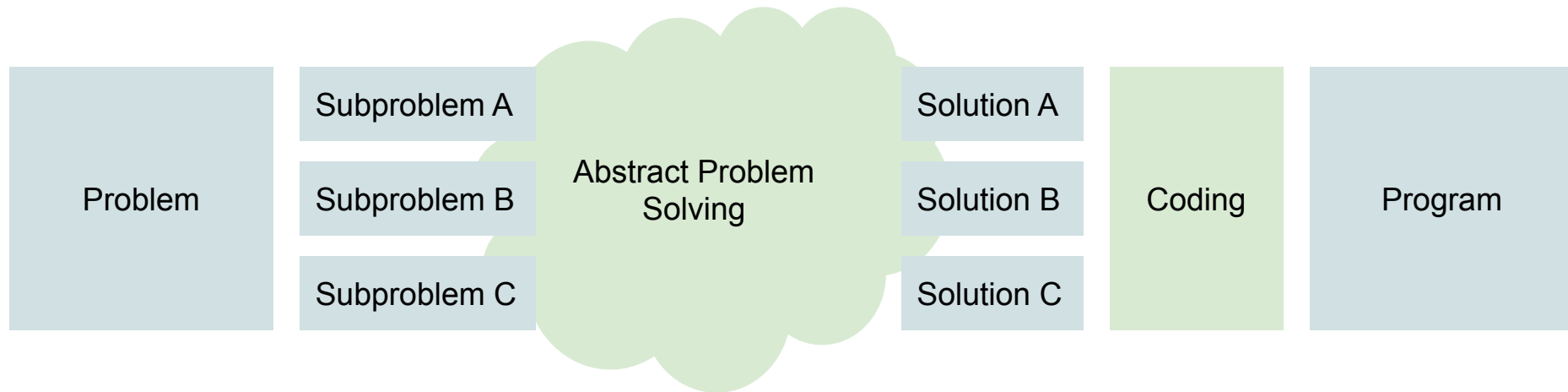
Subproblem B

Subproblem C

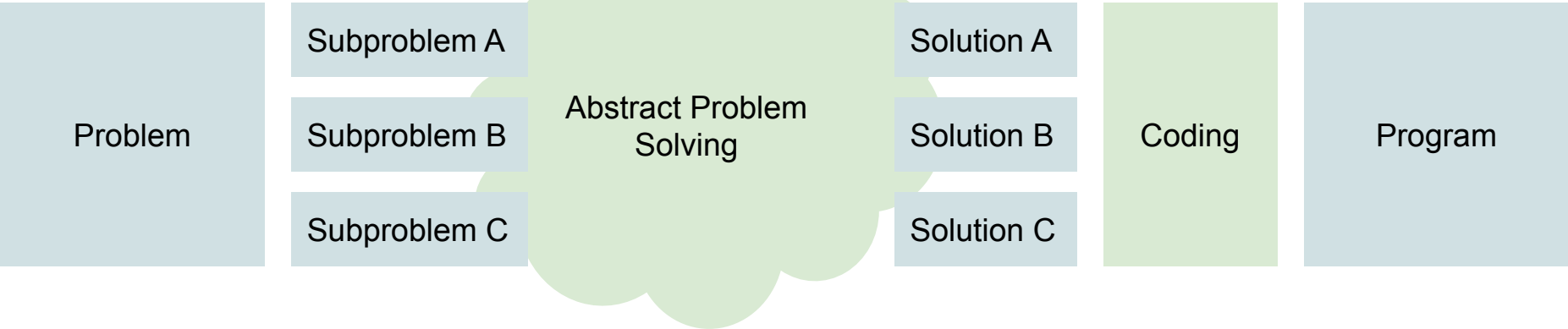
Abstract Problem
Solving



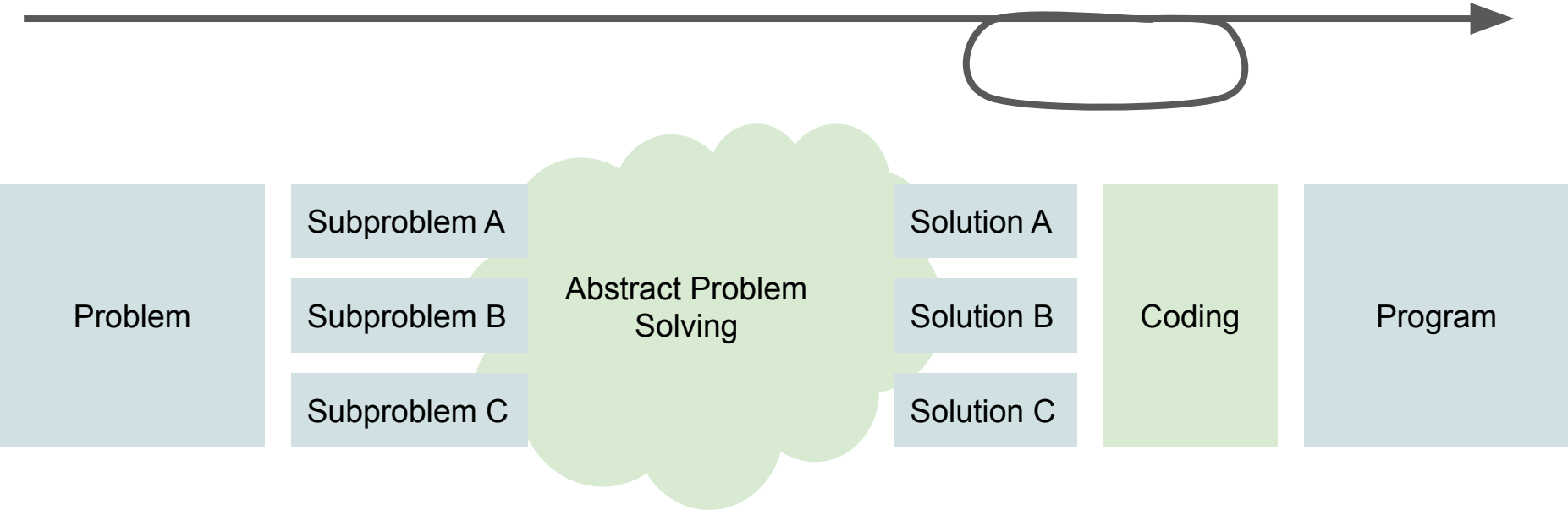




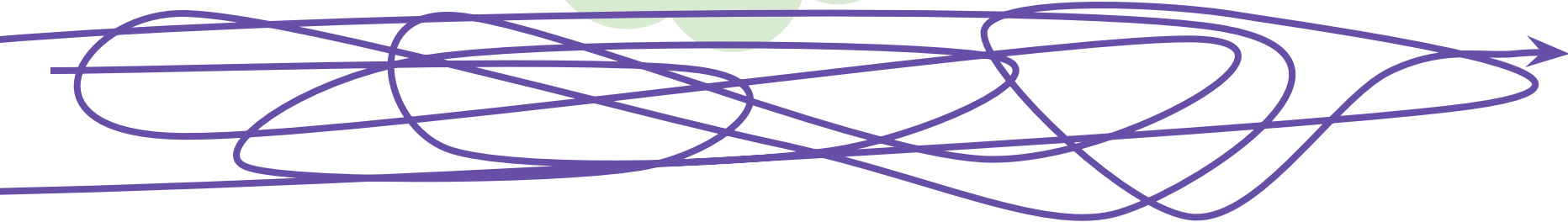
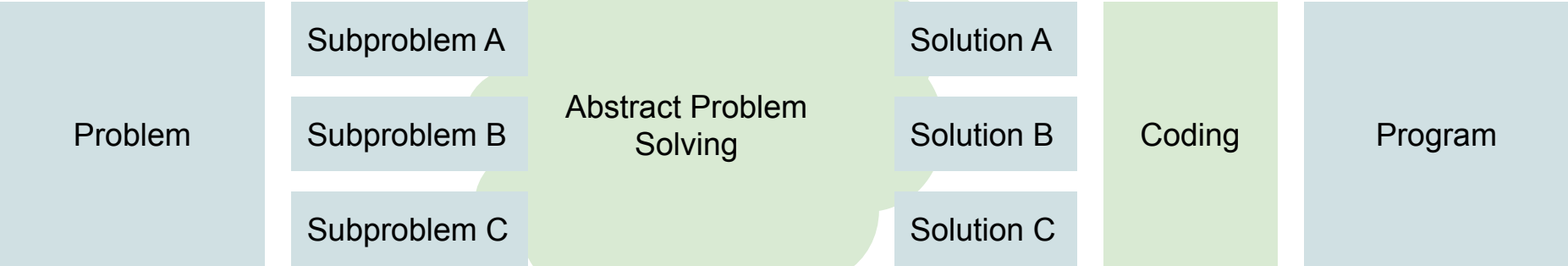
Expectation:



Expectation:



Expectation:

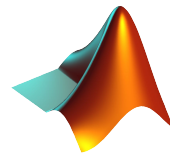


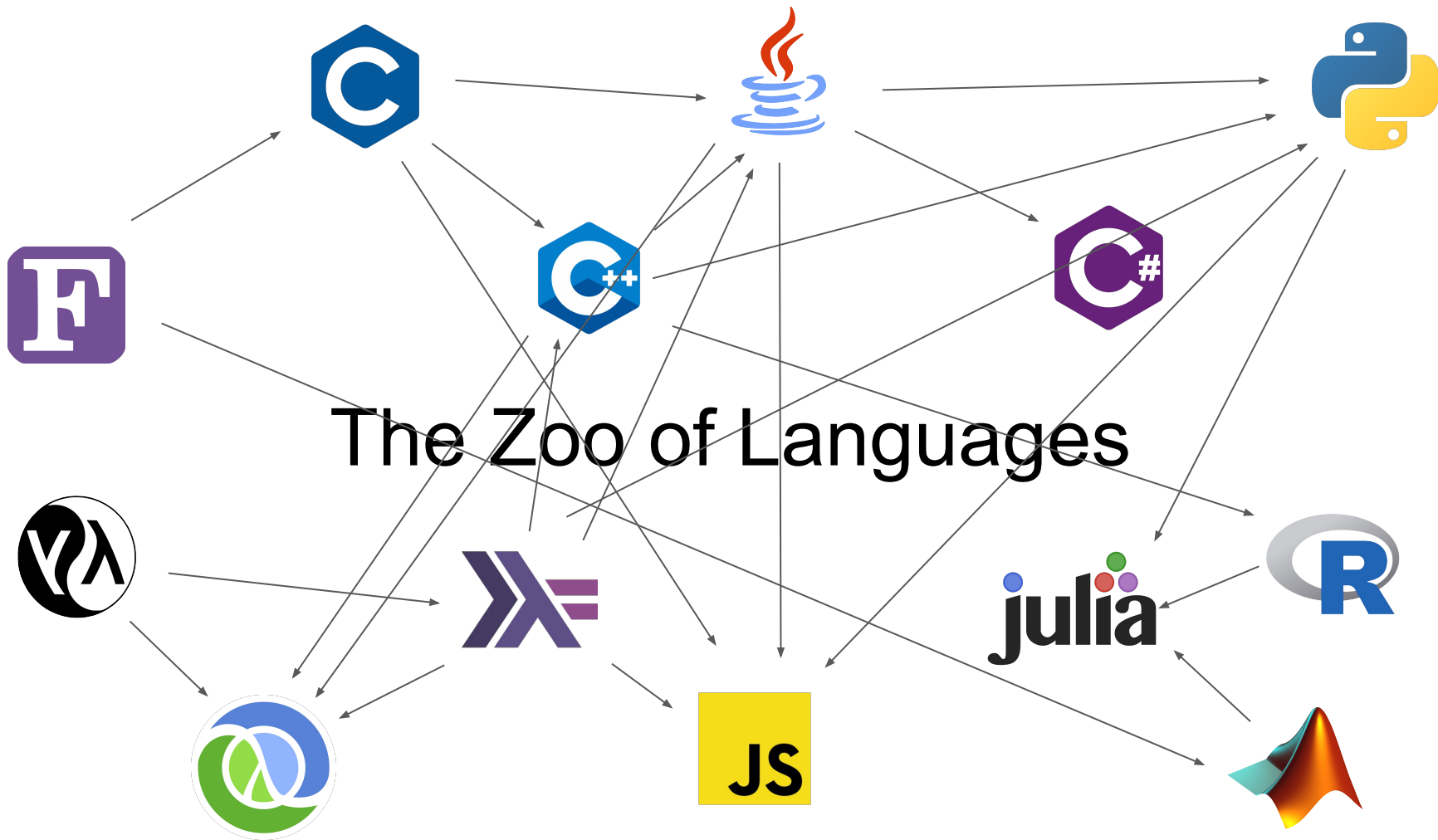
Reality

The Zoo of Languages



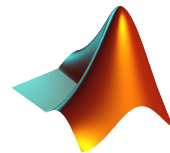
The Zoo of Languages







The Zoo of Languages





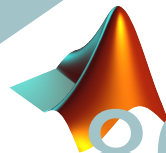
0€



The Zoo of Languages



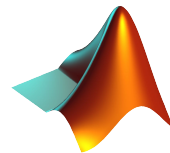
julia

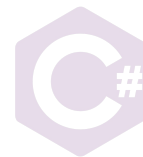


800€

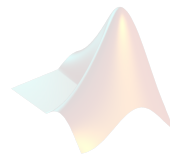


The Zoo of Languages





The Zoo of Languages



Python



object-oriented

dynamic typing

Python

duck typing



imperative

interpreted

Research



PYTORCH

packages



...

Industry

One of the most used languages among professional developers:



(StackOverflow 2020 Developer Survey, 47k respondents)

Short Break

next up: intro to python with leah

programming noun

pro·gram·ming | \ 'prō-,gra-minj , -grə- \

variants: *or less commonly* **programing**

Definition of **programming**

1 : The act of trying to stay sane while -ing.

(Merriam-Webster)