

## Today

✓ Distributed System Basics

✓ Lamport's clock

✓ Efficient Communication Software

Therkath + Levy { \* Application interface to the Kernel  
\* Inside the Kernel

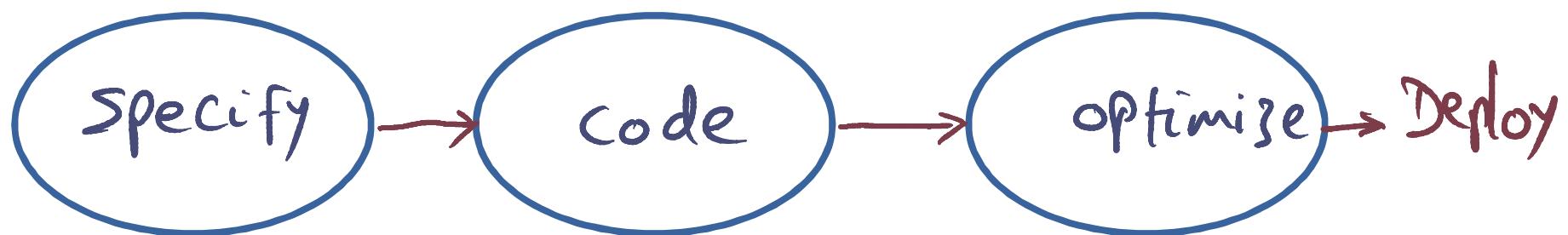
wetherall { \* End-to-End QoS via Active Networks

⇒ Synthesizing Network Protocol Stacks

Next week Spring Kernel ( Distr. Objects )  
Lesson 6

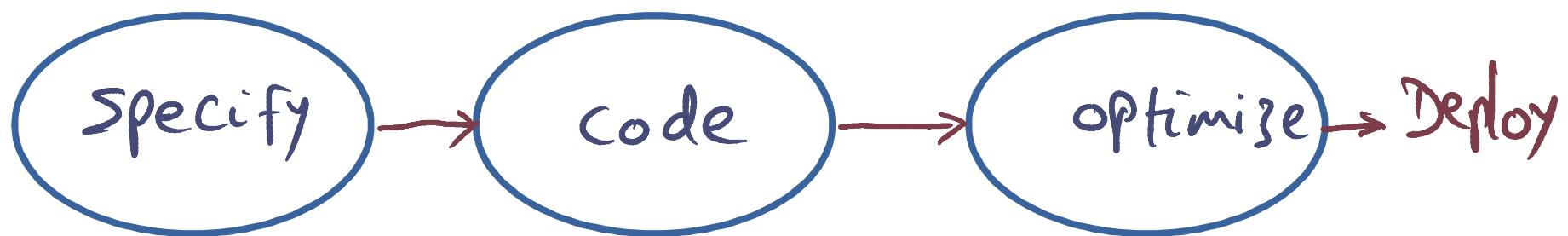
## Ensemble - Big Picture

Design Cycle



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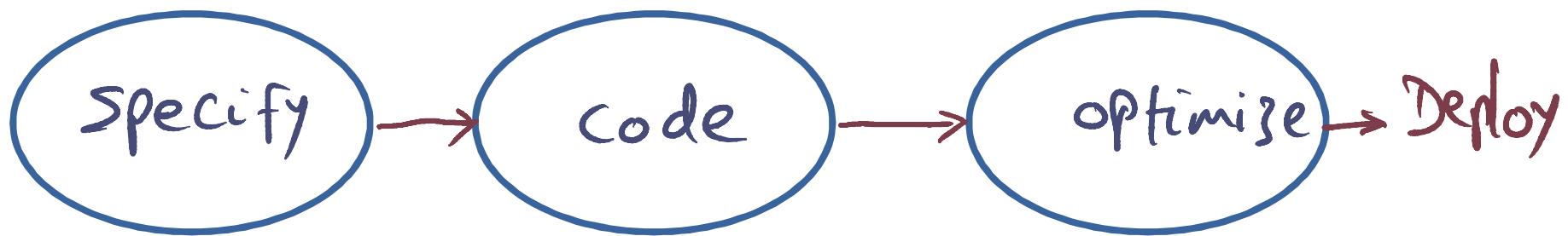


TOA

- C-like syntax
- composition operator

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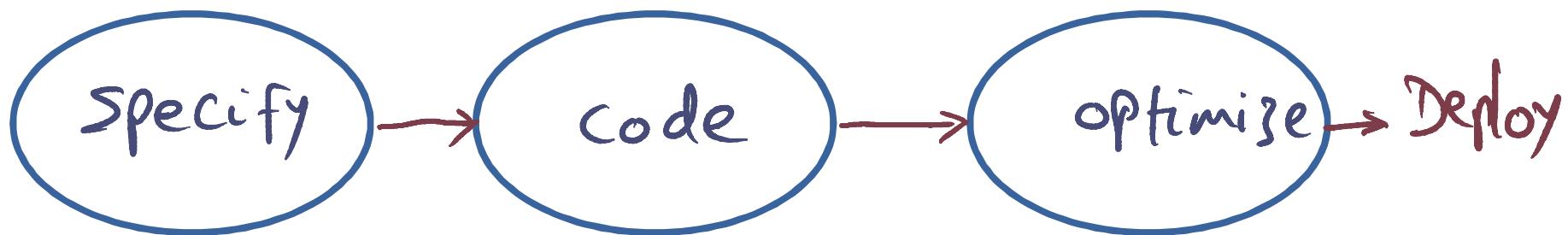


IOA

- C-like syntax
  - composition operator
- Ocaml
- object oriented
  - efficient code
  - similar to C
  - nice complement to IOA

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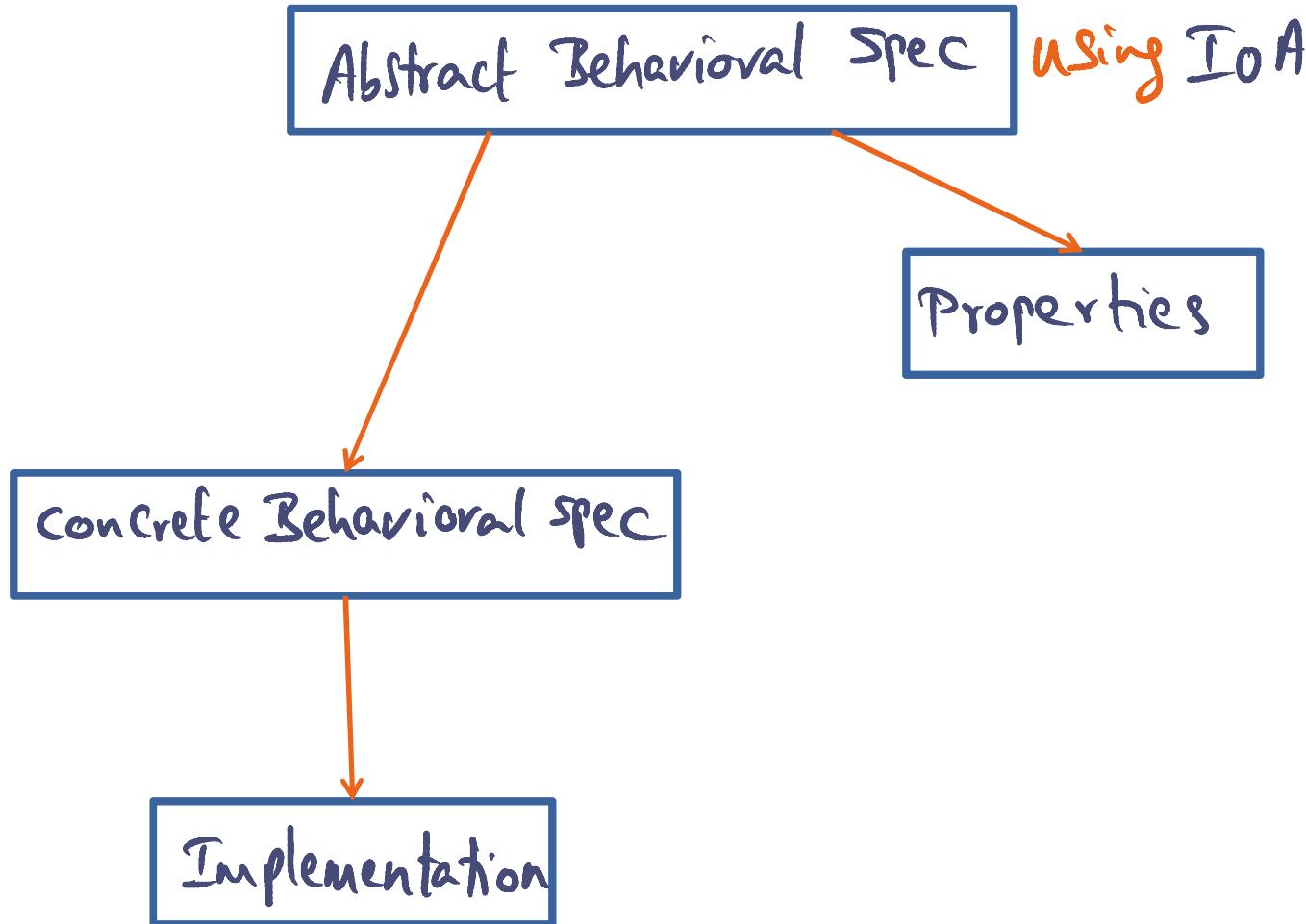
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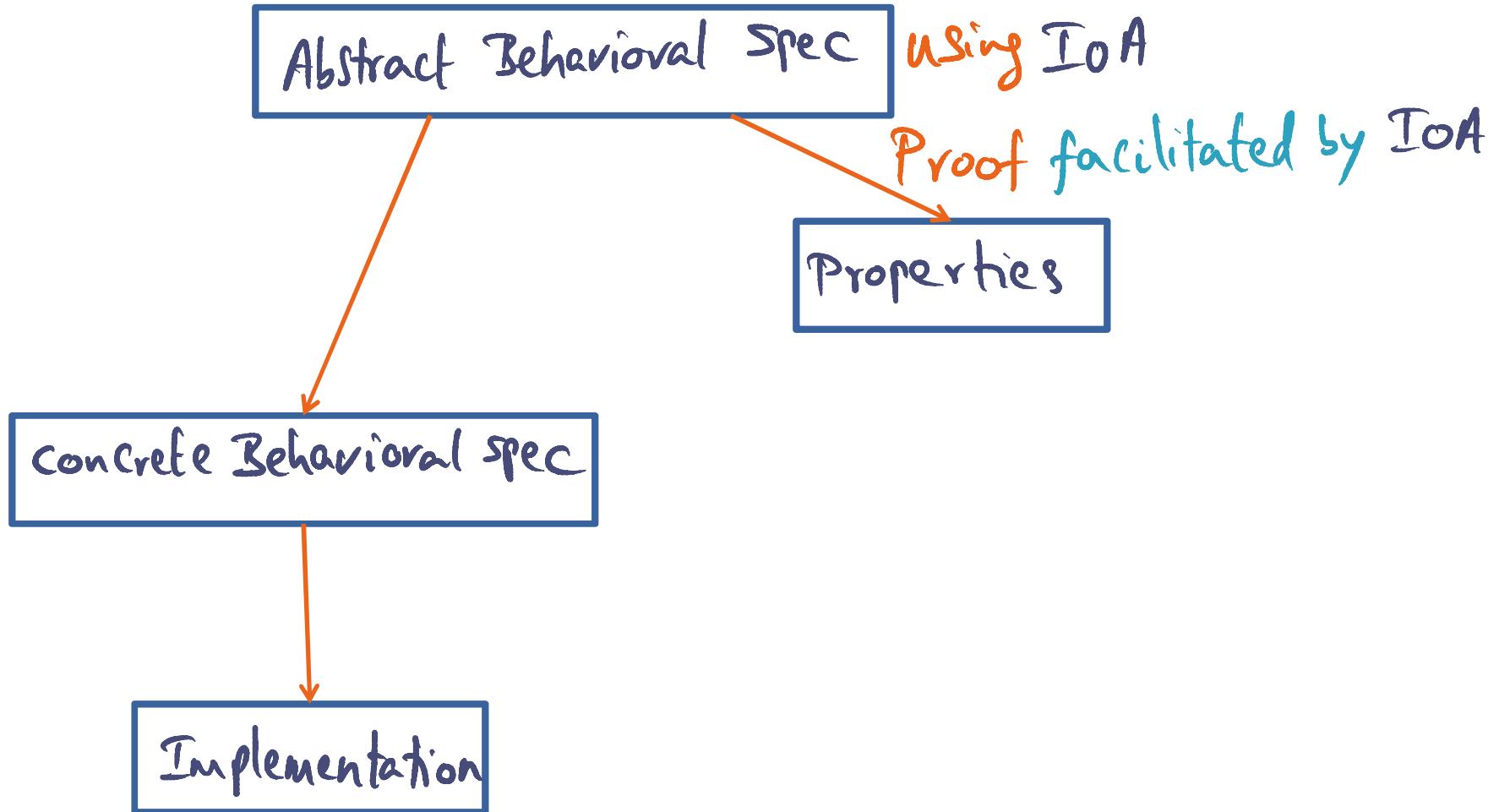
Nuprl

- optimization of  
Ocaml code
- output verified to be  
functionally equivalent

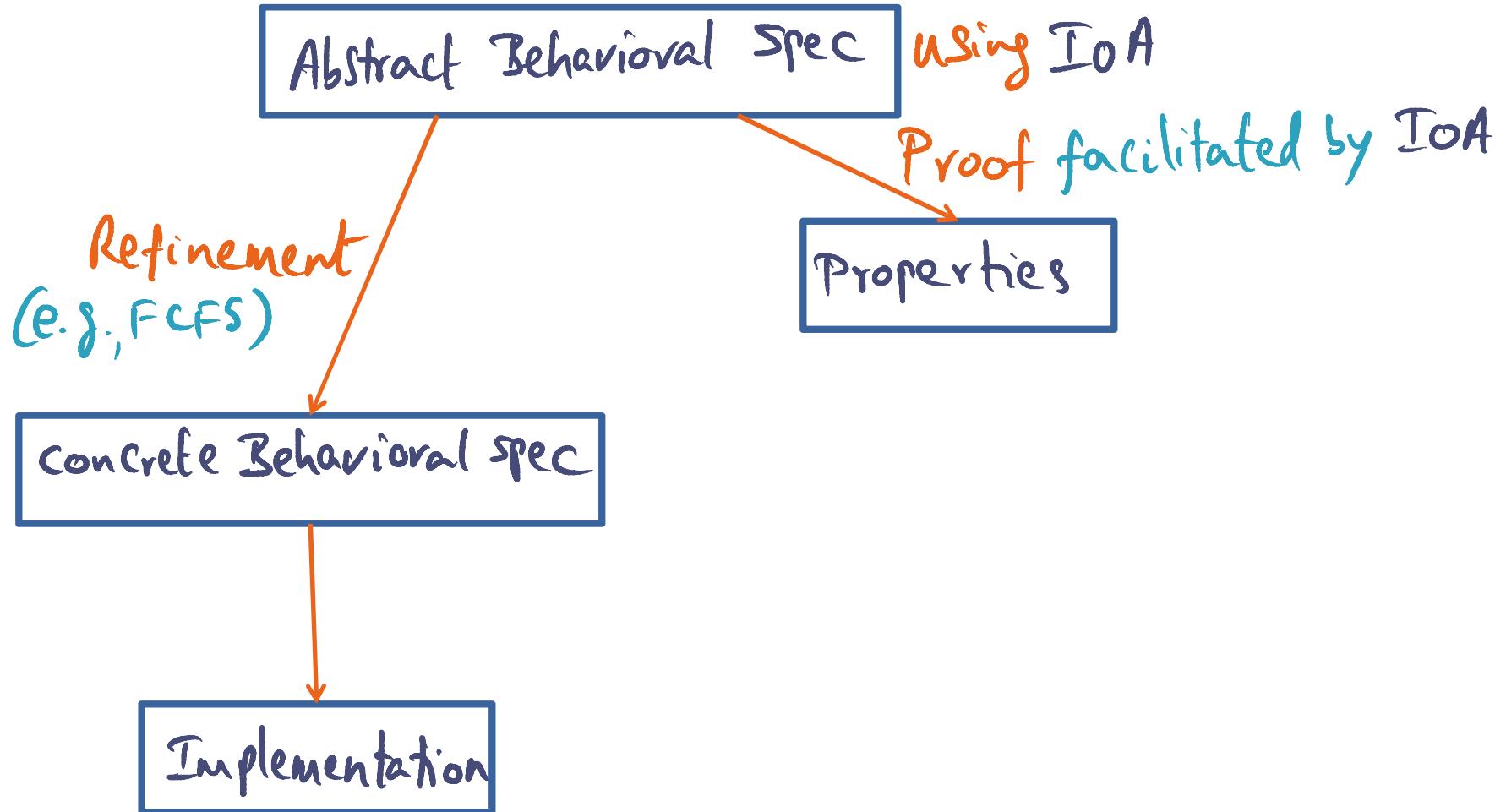
# Digging Deeper – From Spec to Implementation



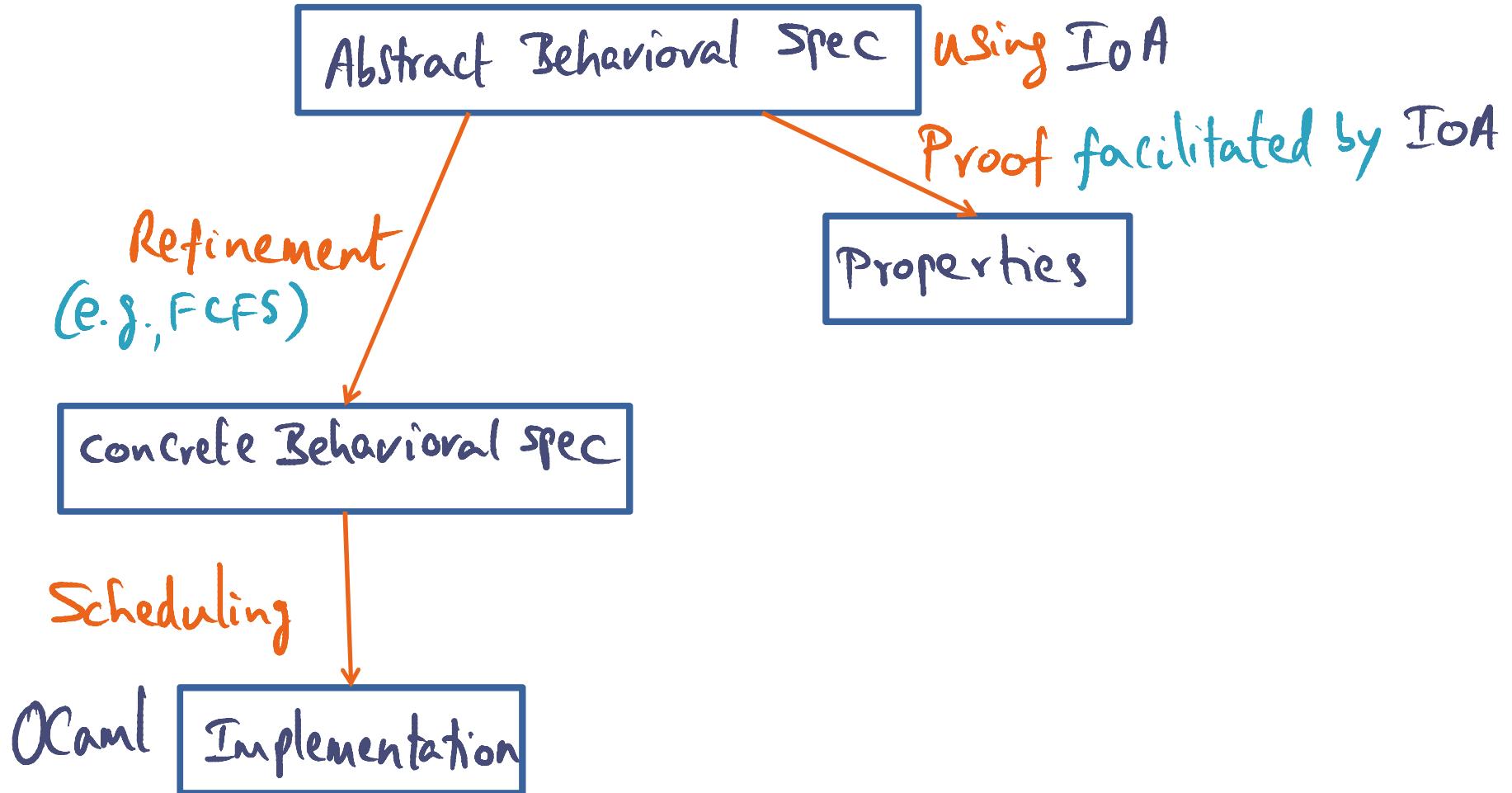
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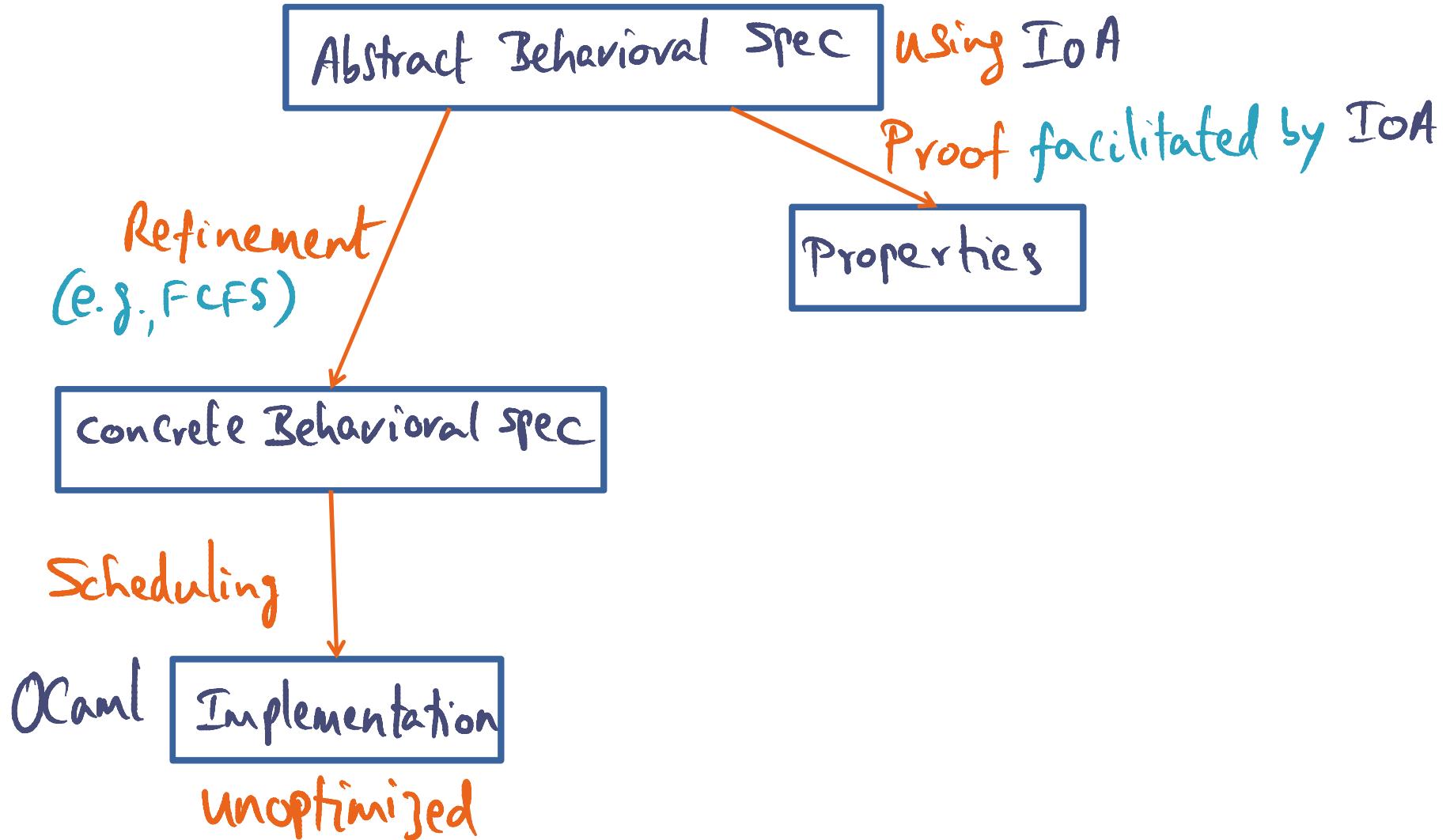
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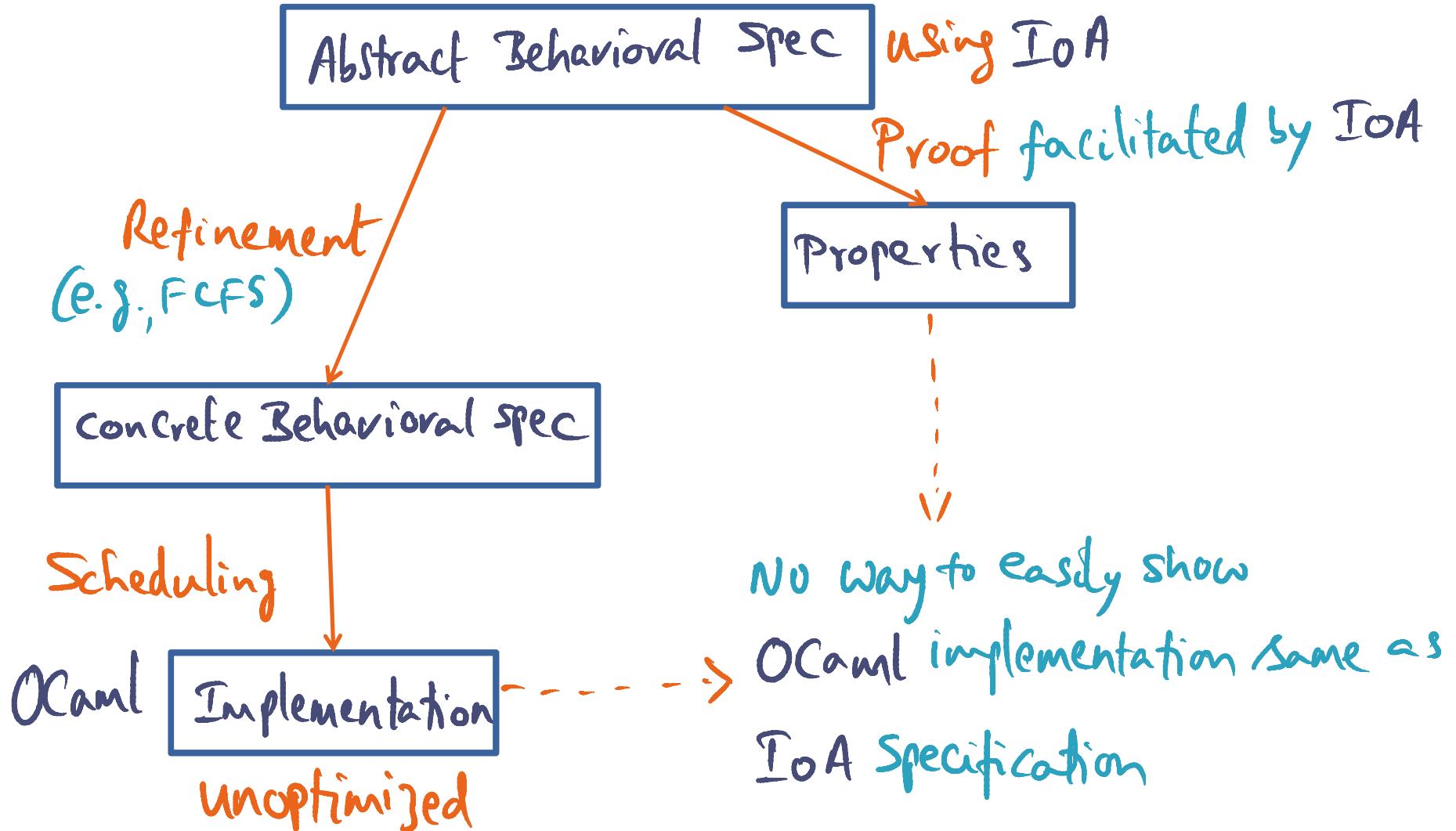
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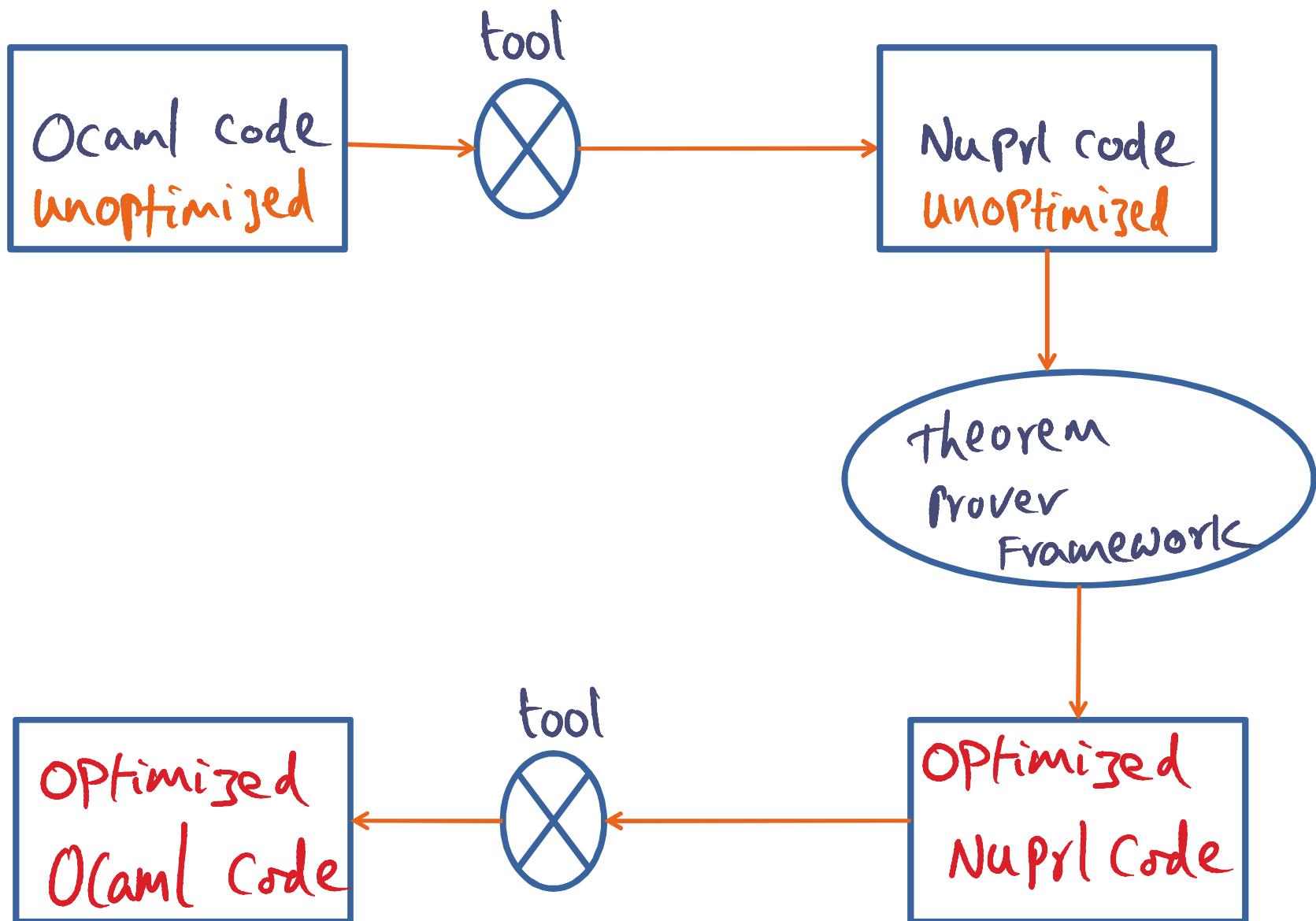
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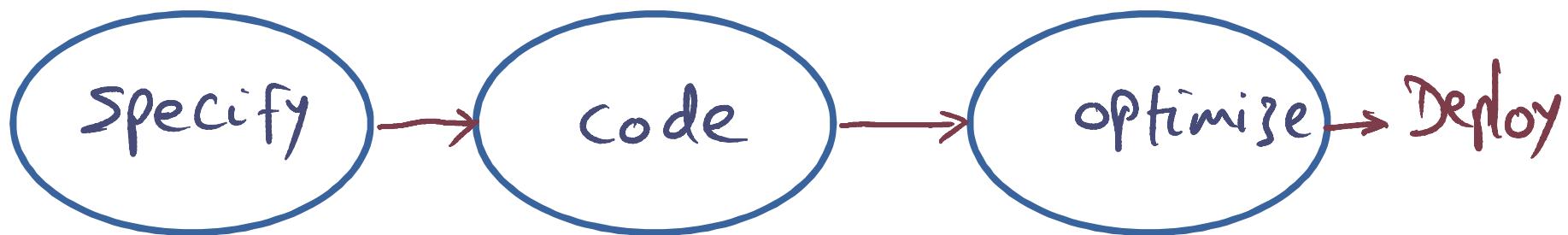


## Digging Deeper – From Implementation to optimization



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