

Designing and Implementing a Dynamic Camera System

Phil Wilkins

Objectives

- Flexible
- Designer driven
- Smooth
- Not require player intervention
- No collision

Overview

- Zoning
- Dynamics
- Blending
- Rails
- Fields

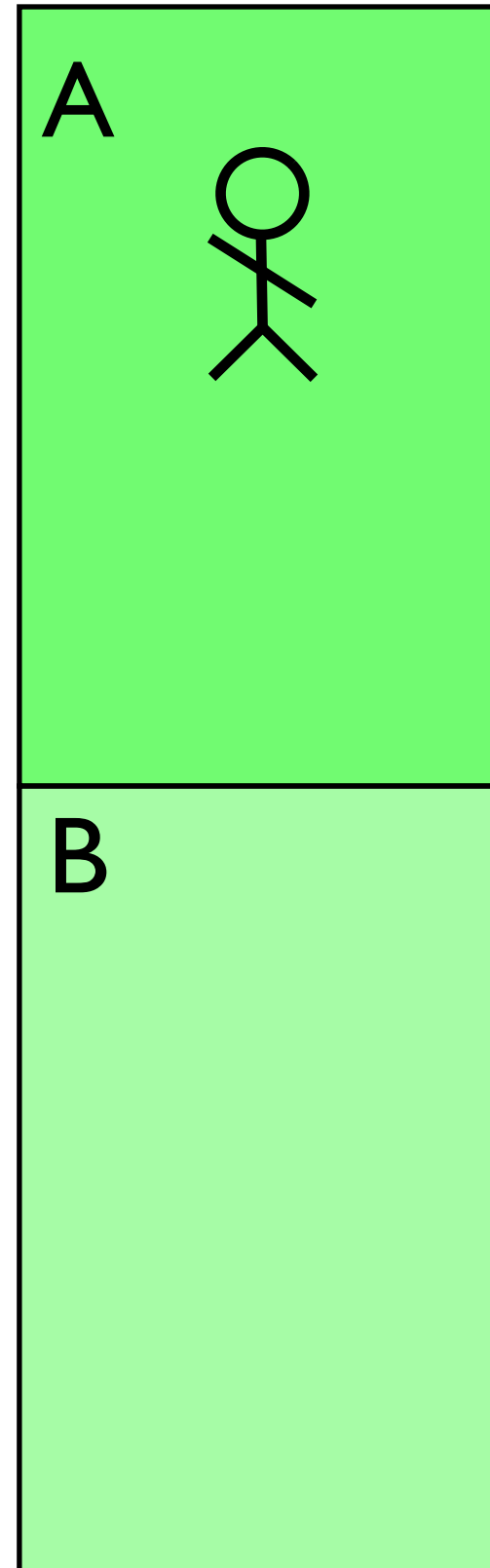
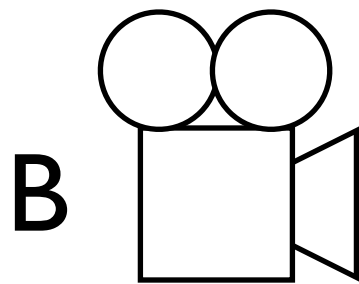
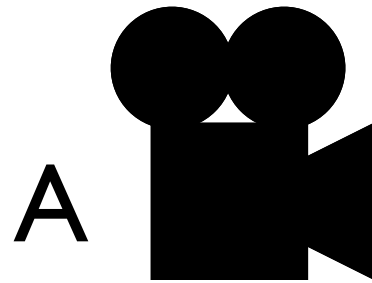
Overview

- Zoning
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- Rails
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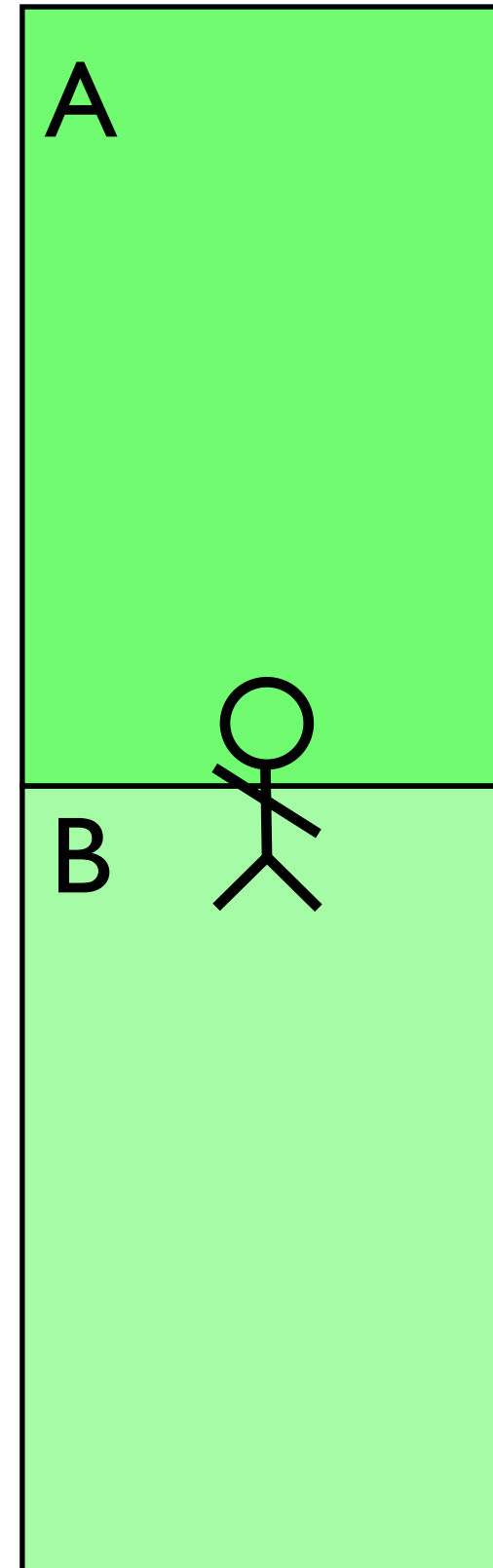
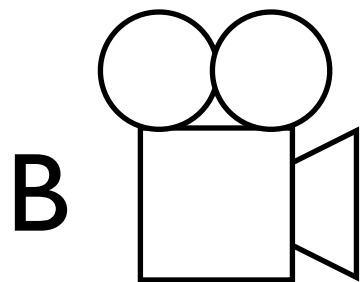
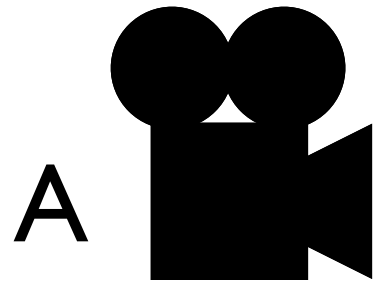
Zoning : Objectives

- Stationary Cameras
- Chosen by Player Position
- Alone in the Dark

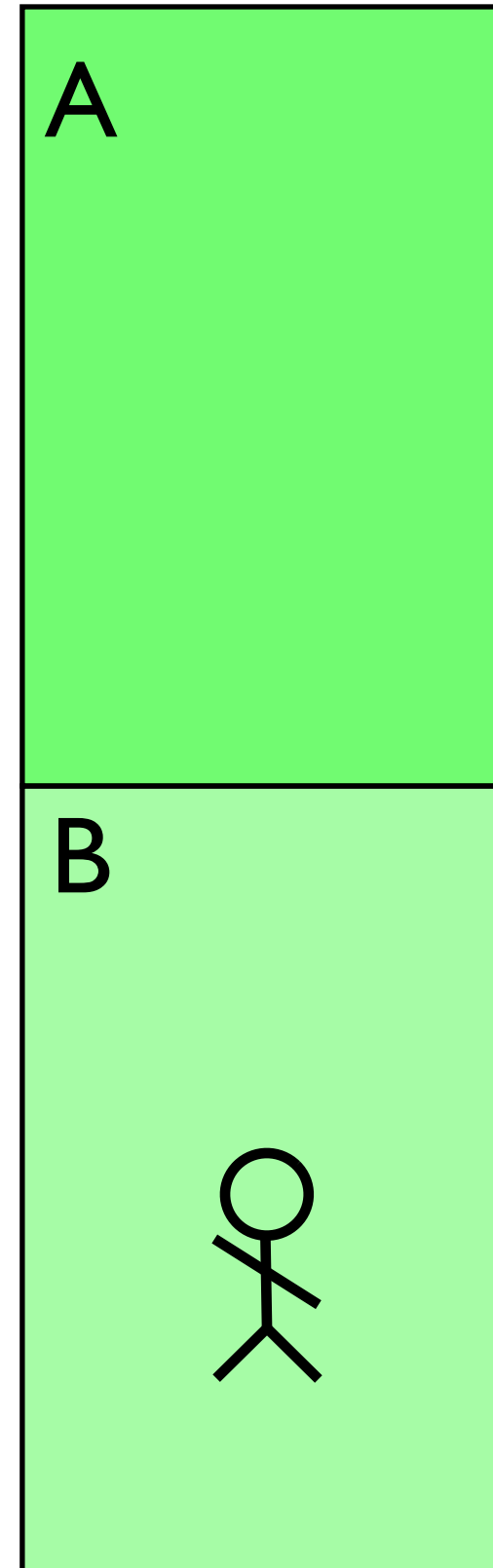
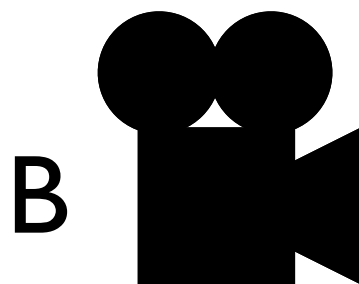
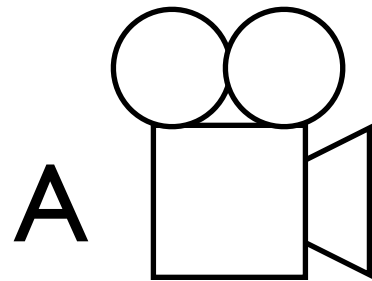
Zoning : Design



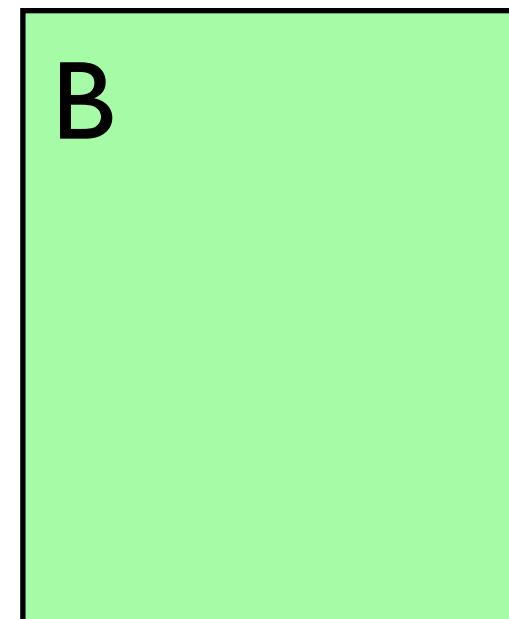
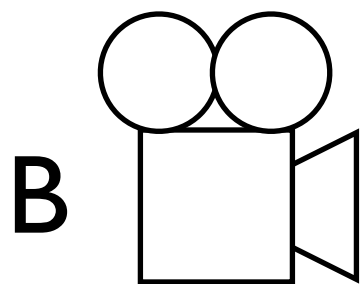
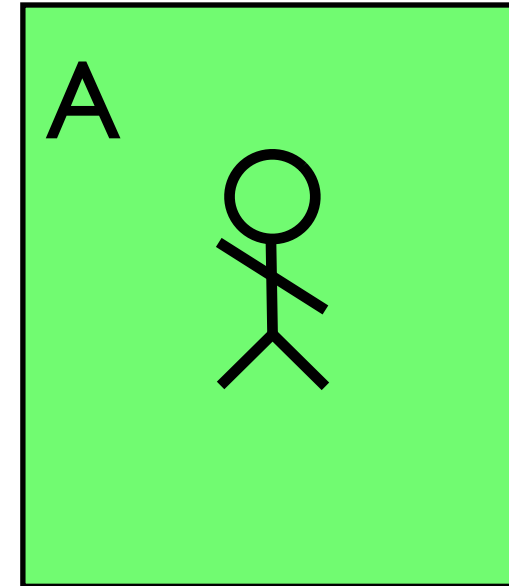
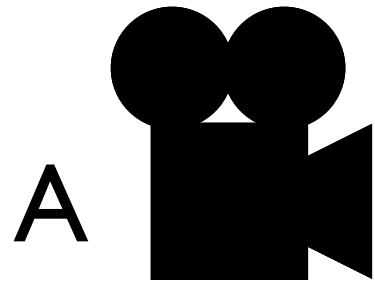
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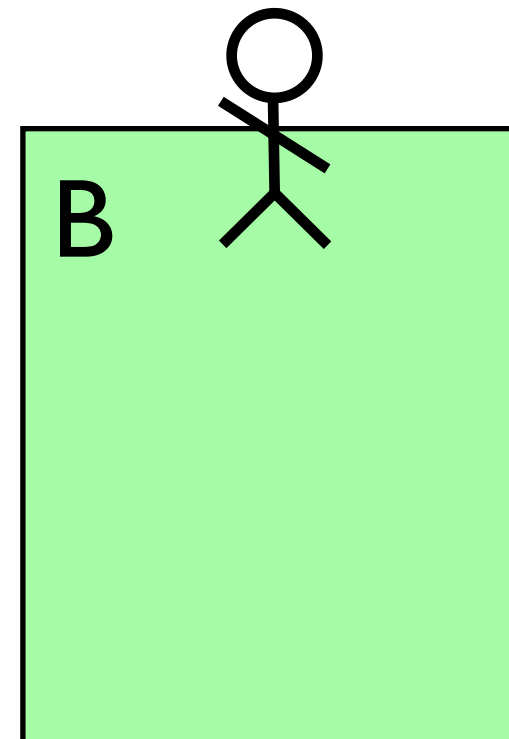
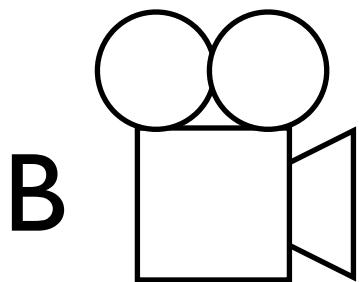
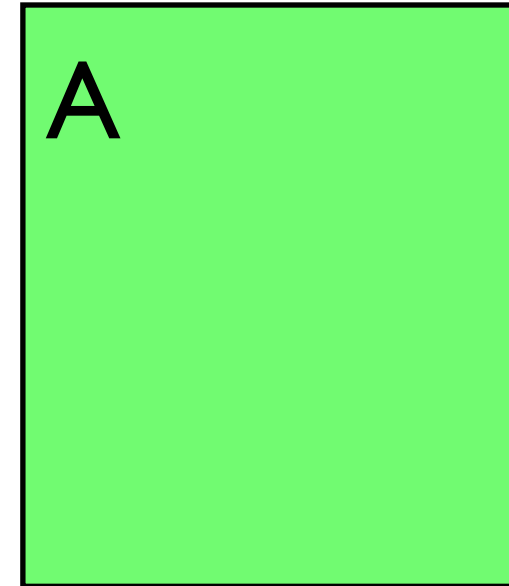
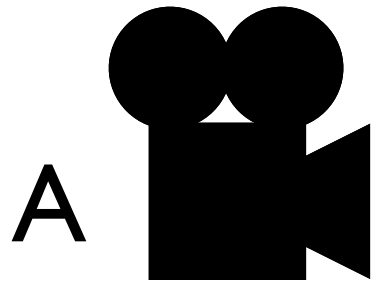
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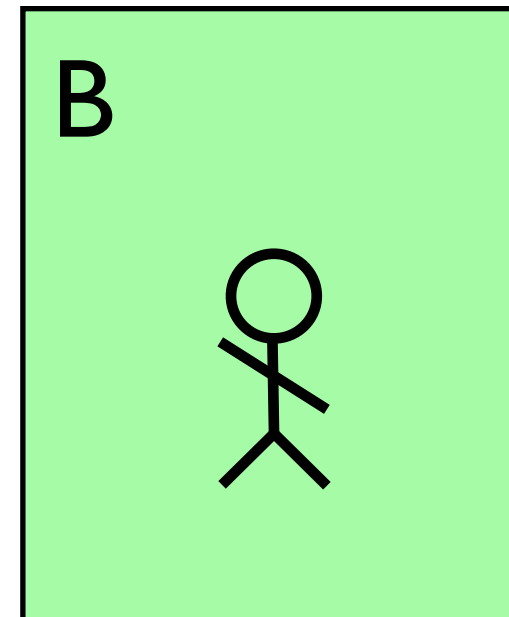
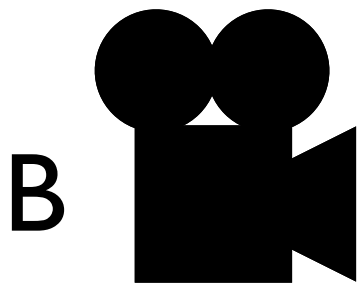
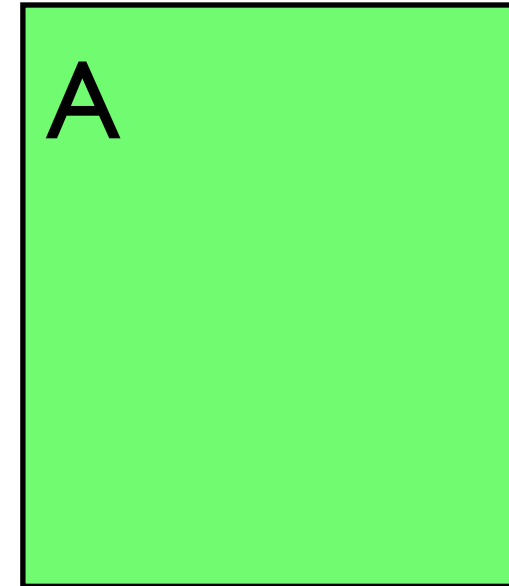
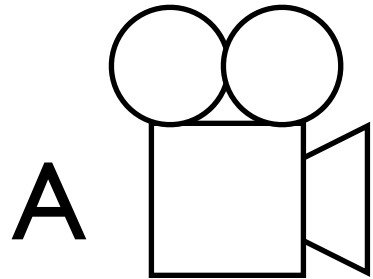
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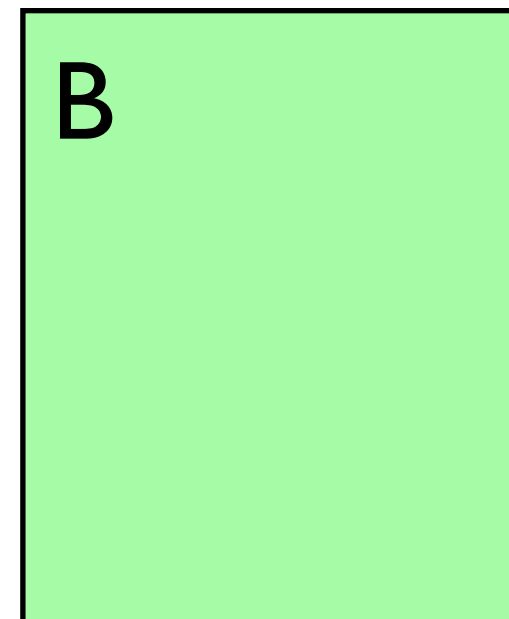
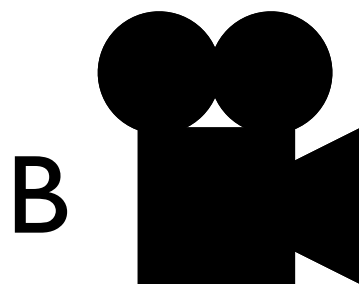
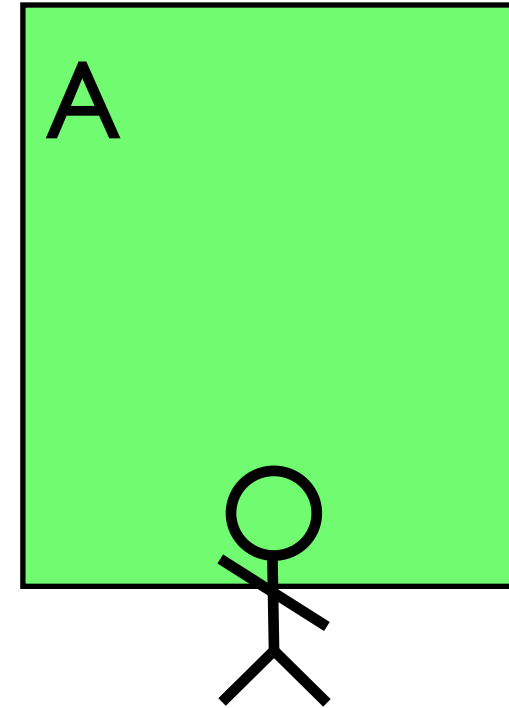
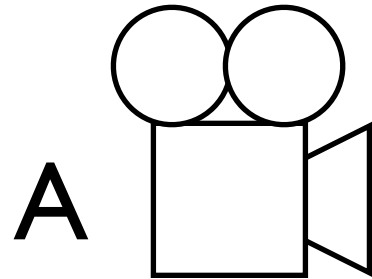
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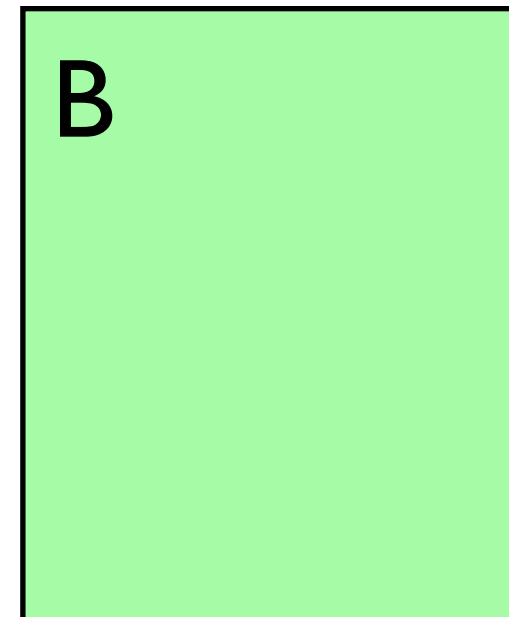
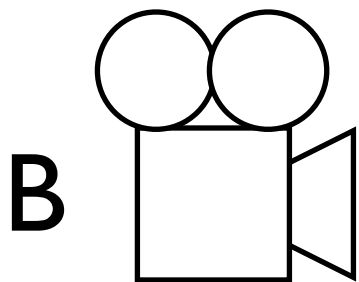
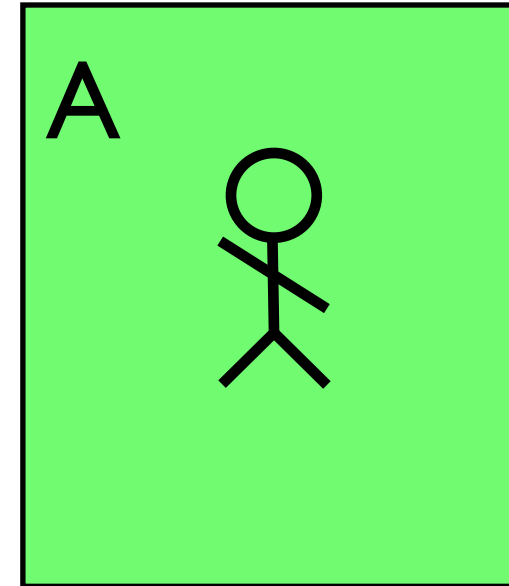
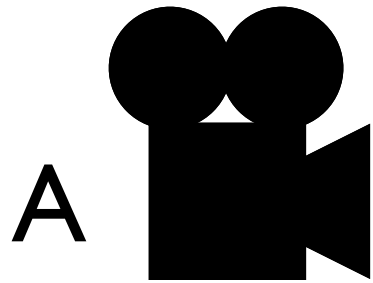
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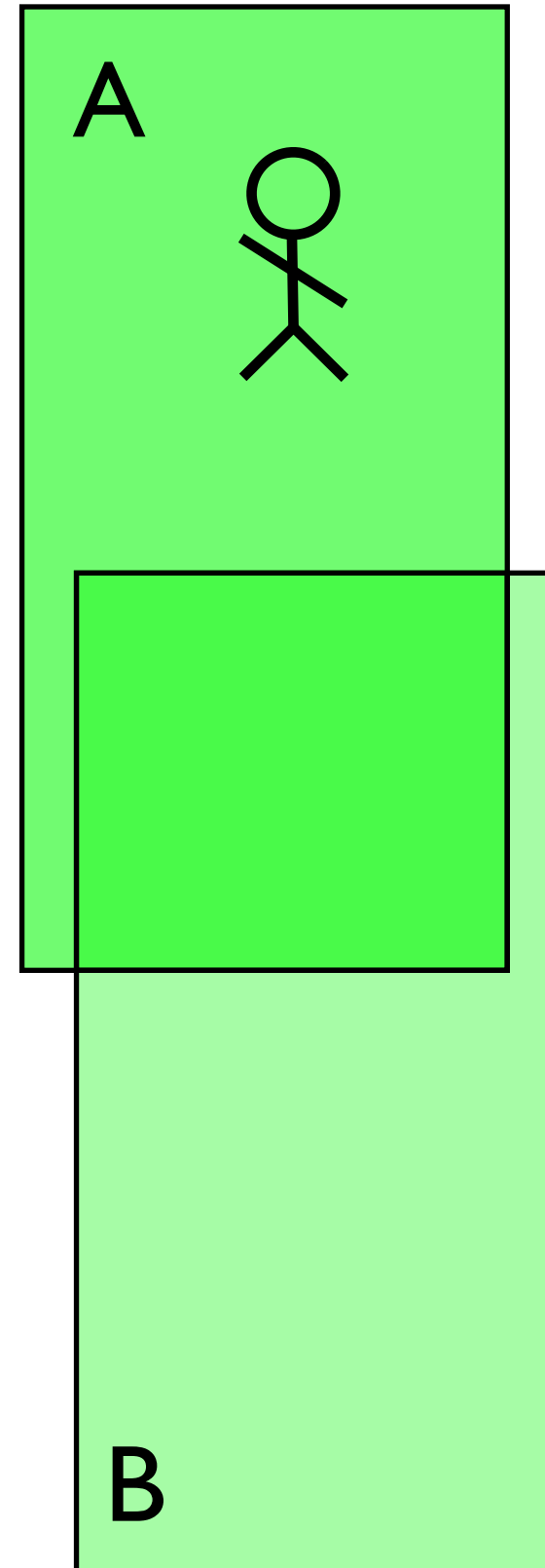
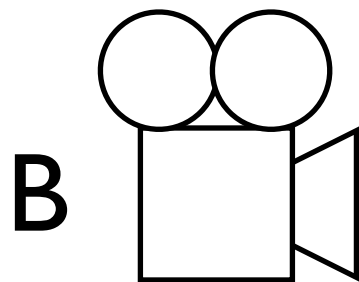
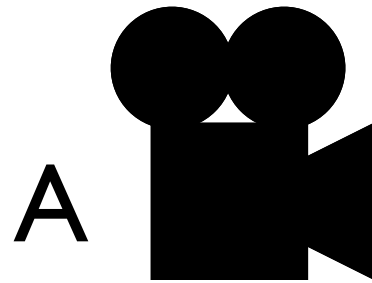
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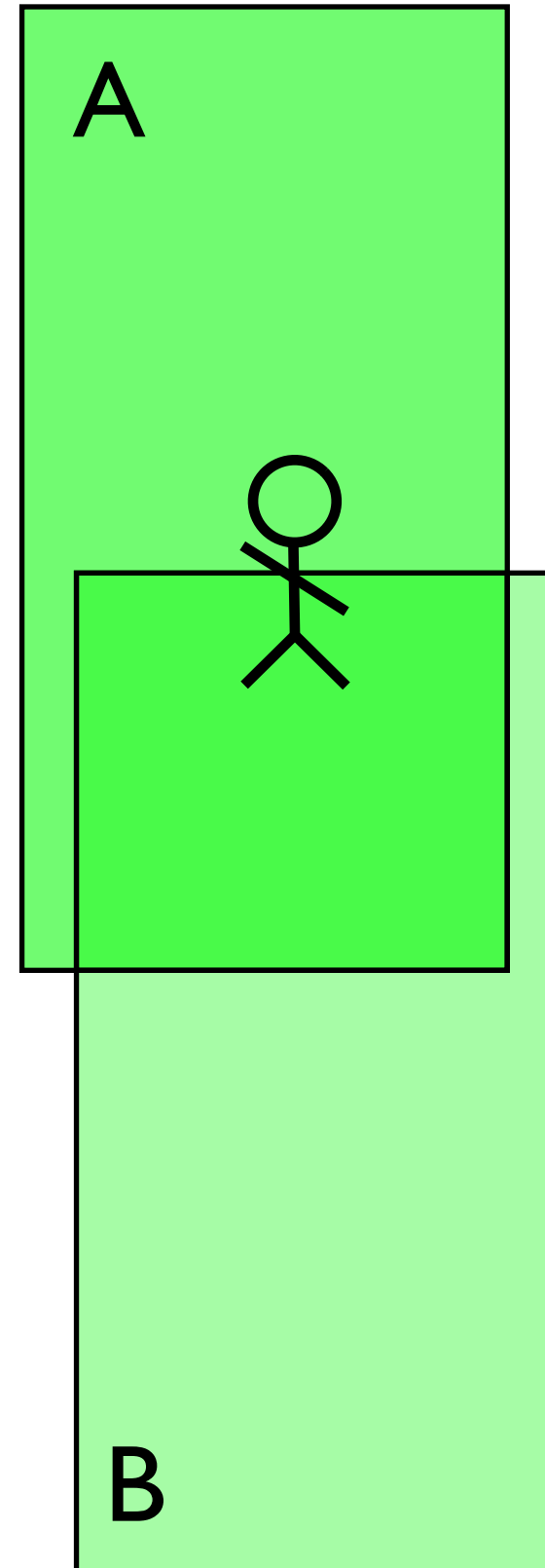
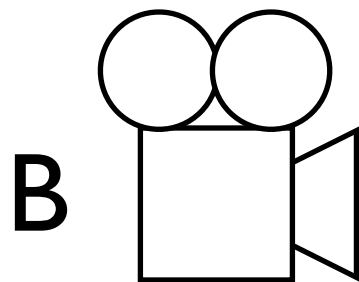
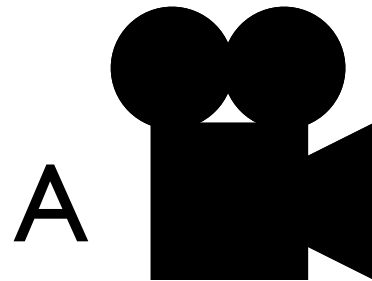
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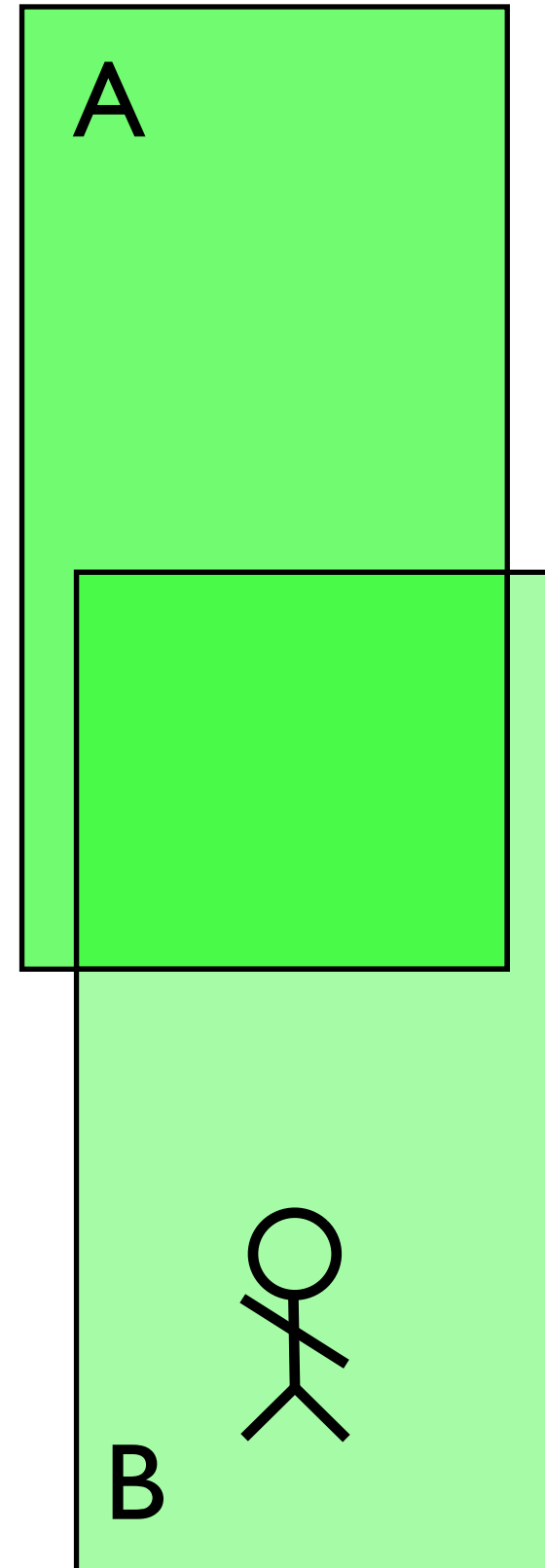
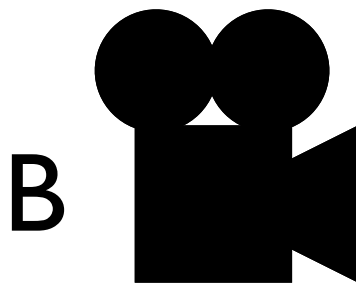
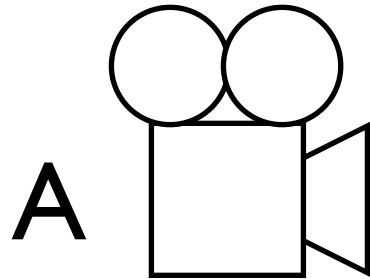
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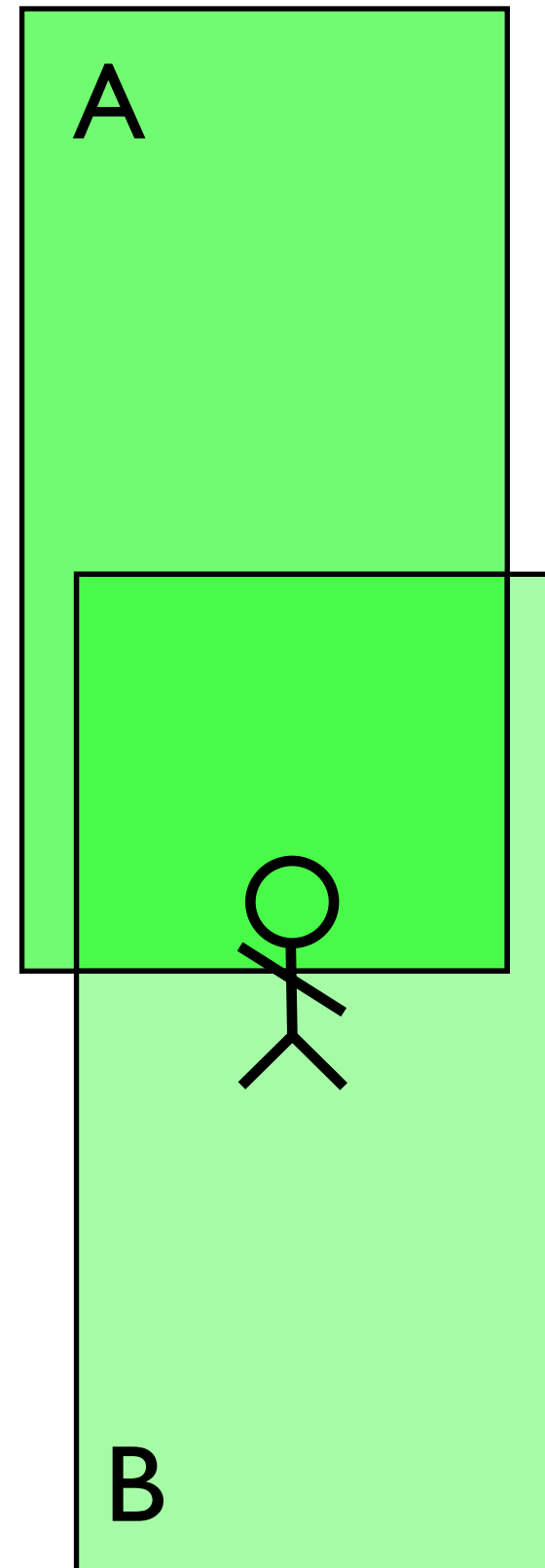
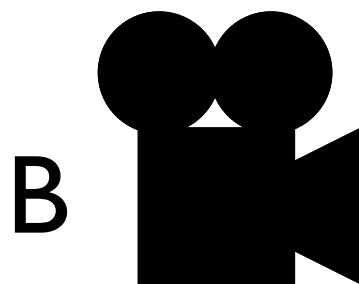
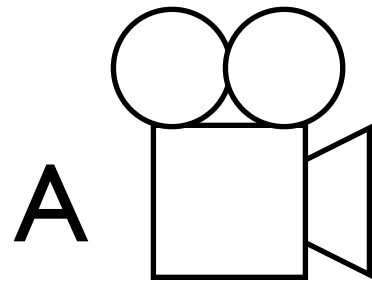
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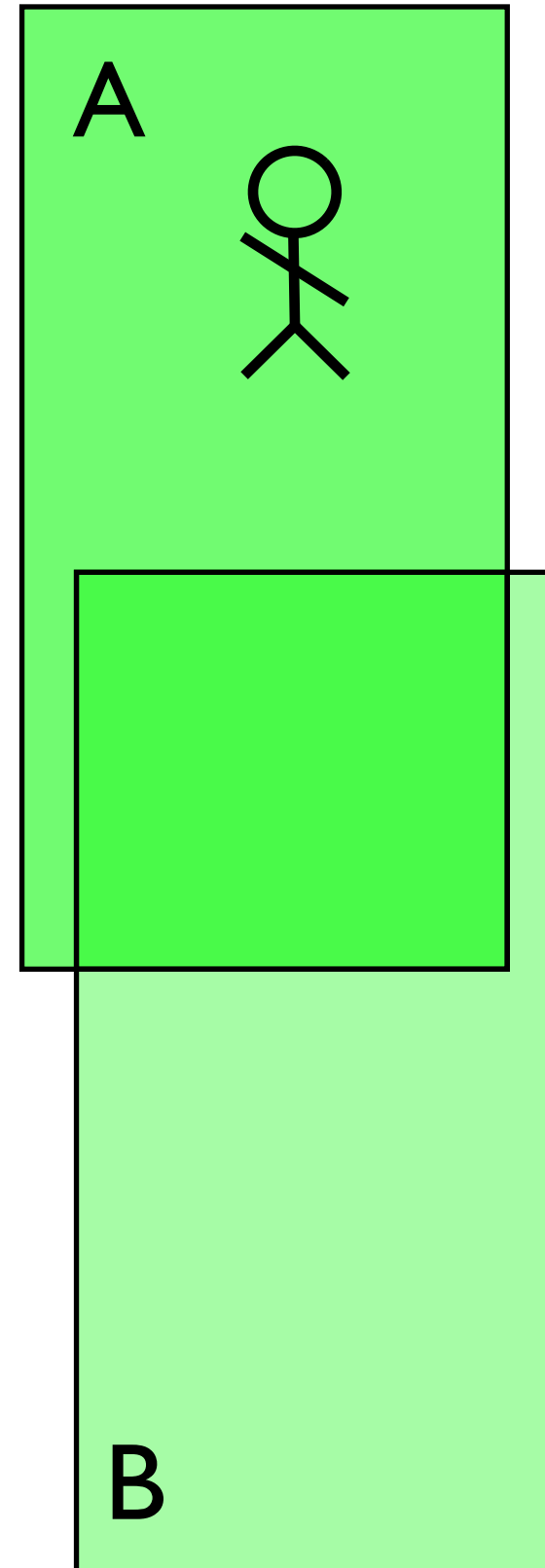
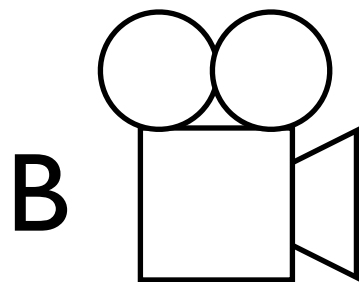
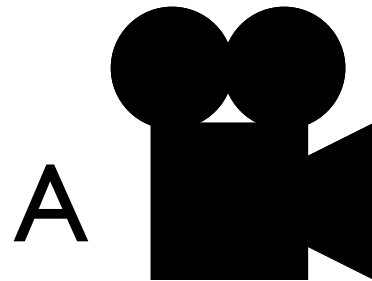
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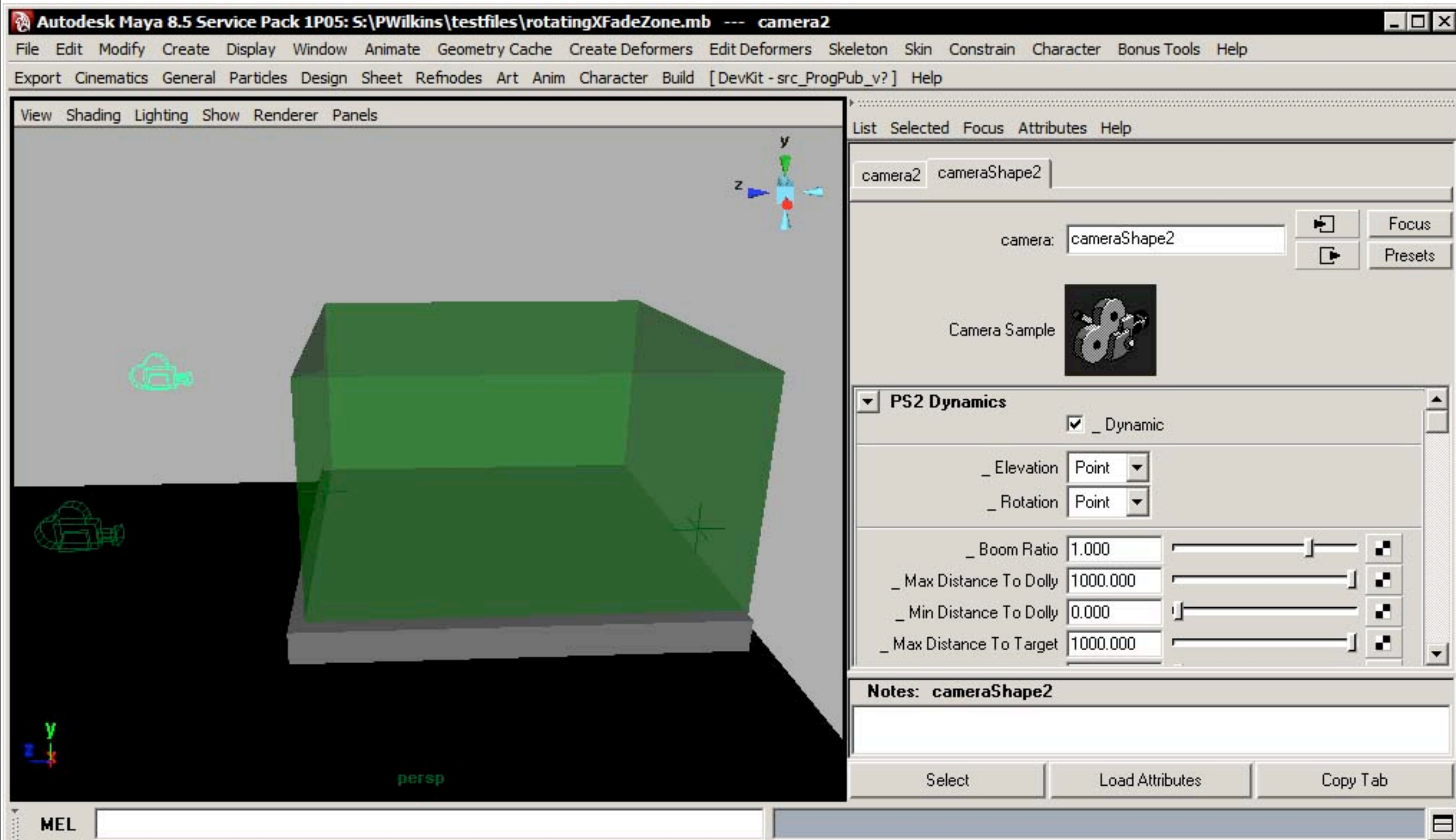
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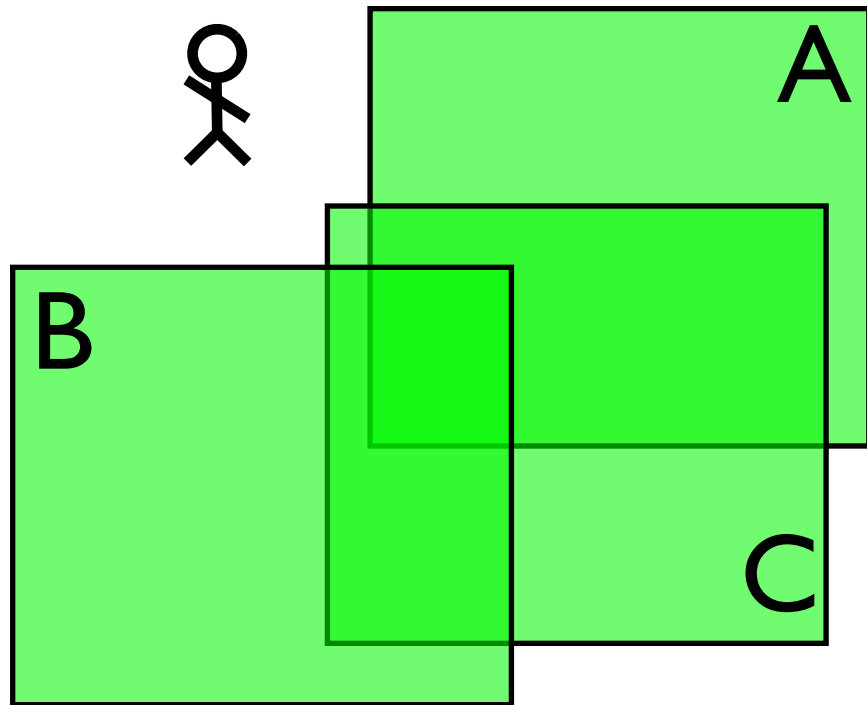
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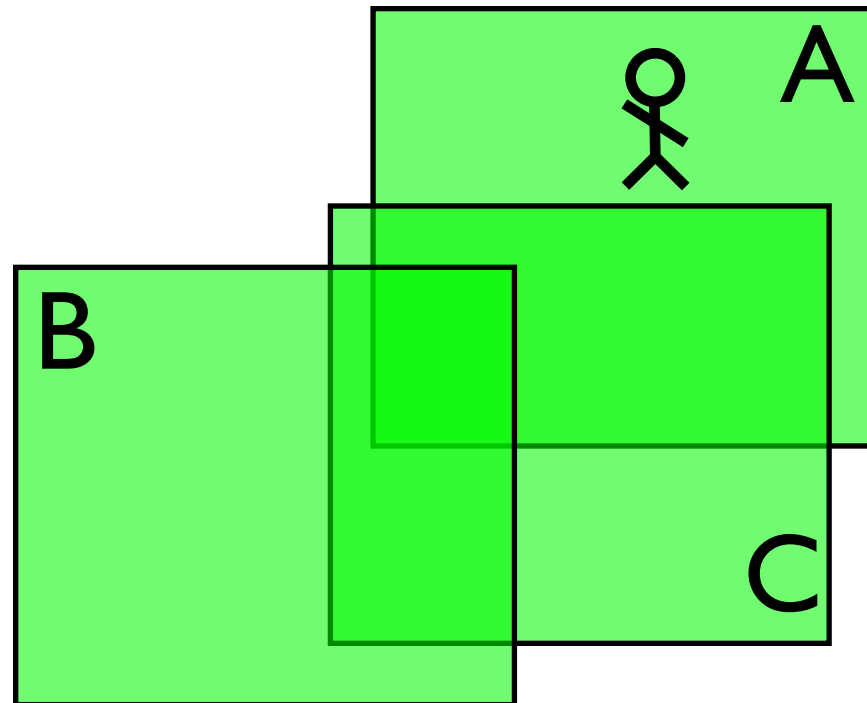
Zoning : Implementation



Zoning : Implementation

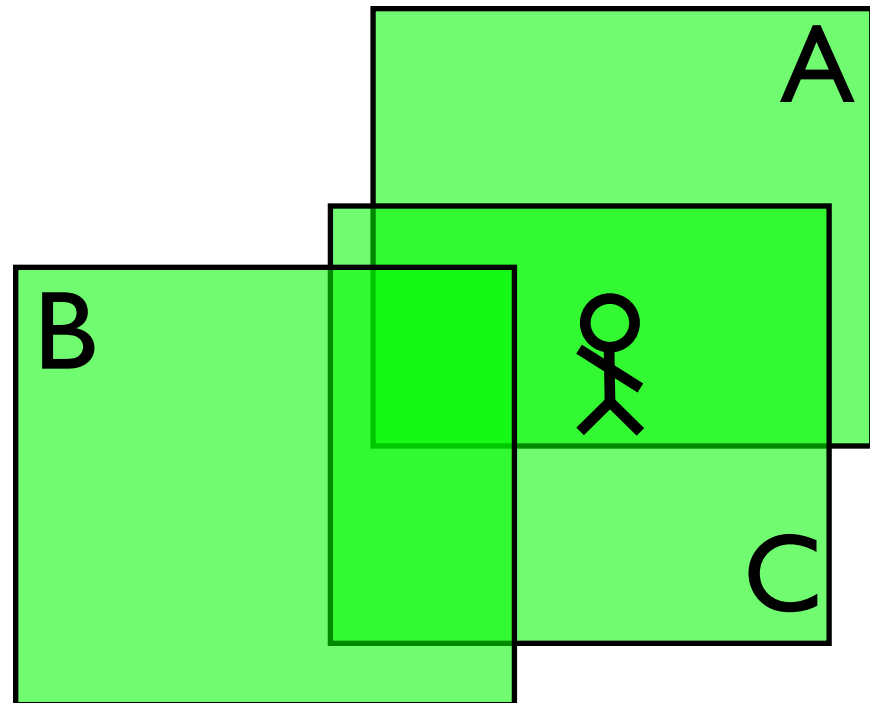


Zoning : Implementation



Camera A

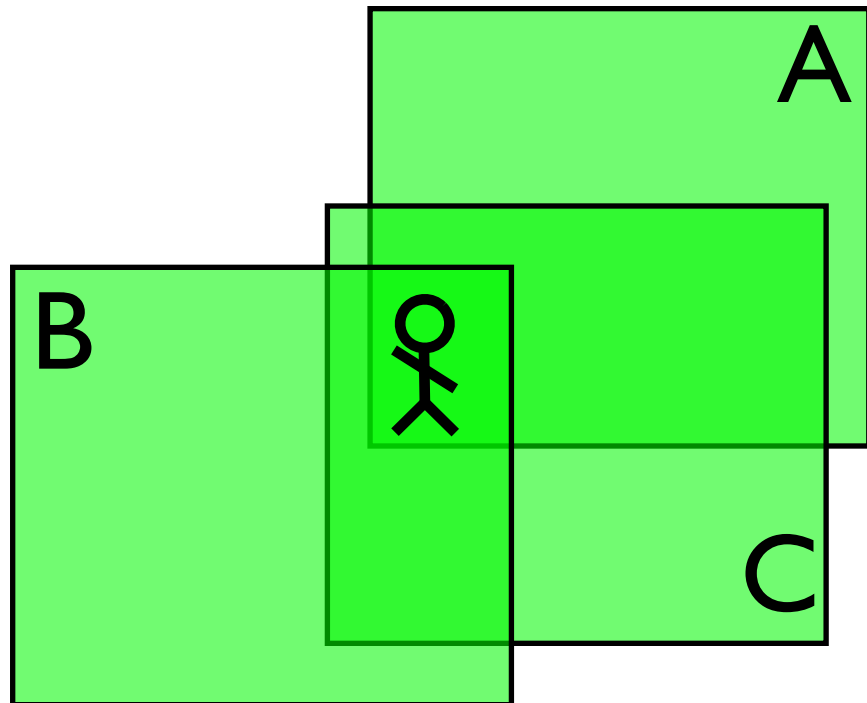
Zoning : Implementation



Camera A

Camera C

Zoning : Implementation

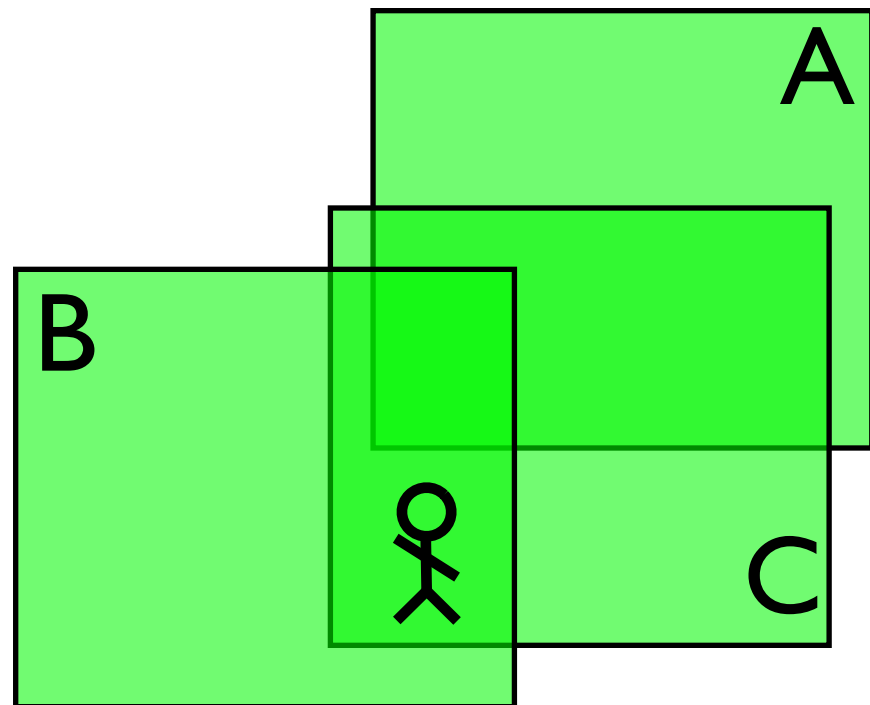


Camera A

Camera B

Camera C

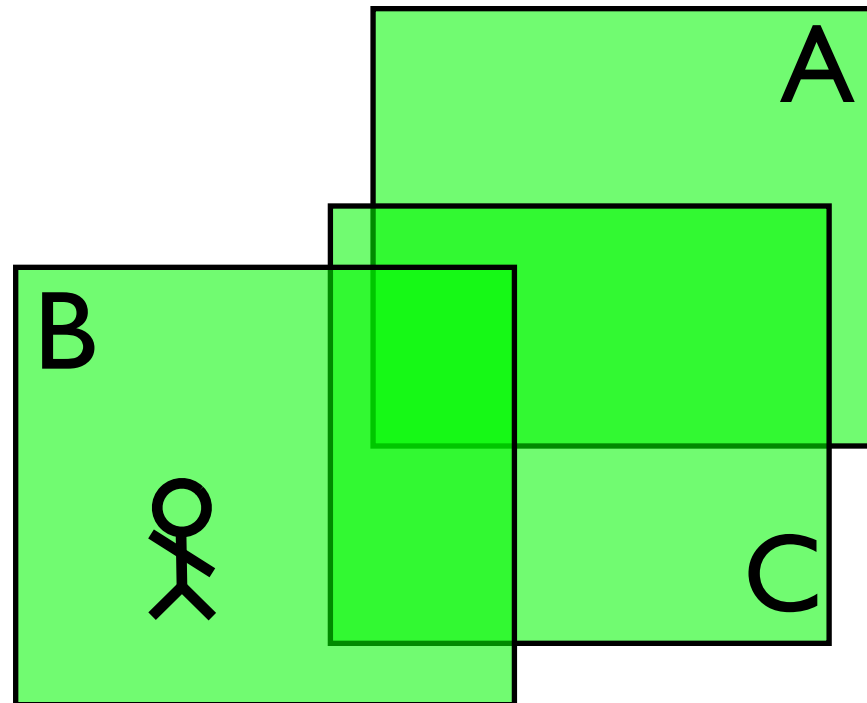
Zoning : Implementation



Camera B

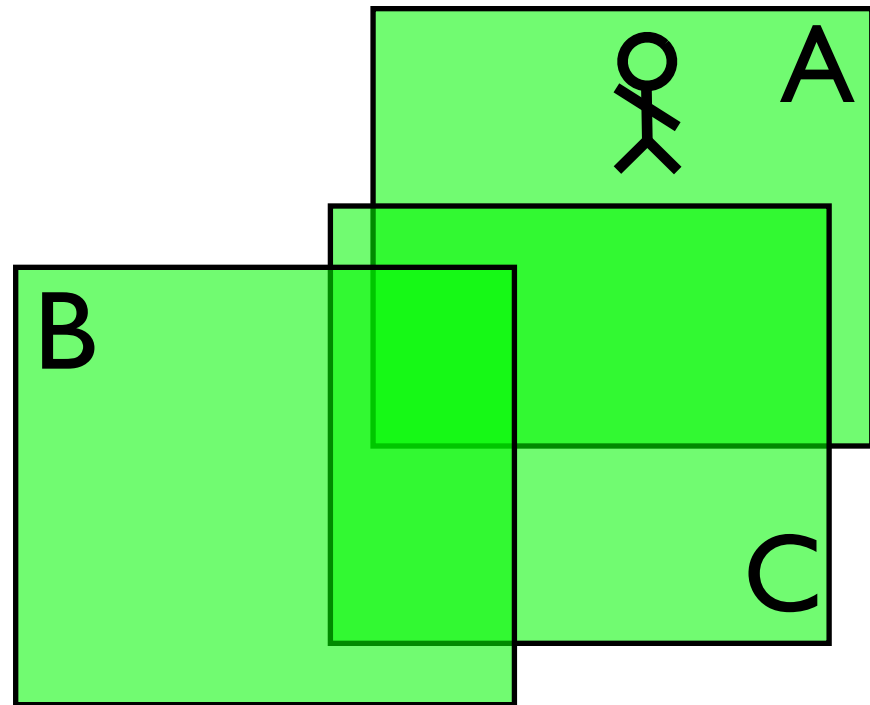
Camera C

Zoning : Implementation

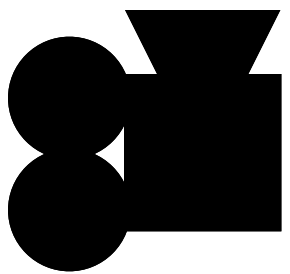


Camera B

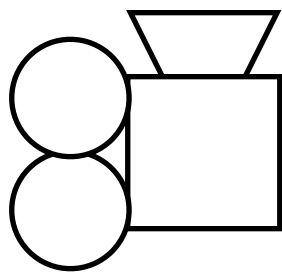
Zoning : Implementation



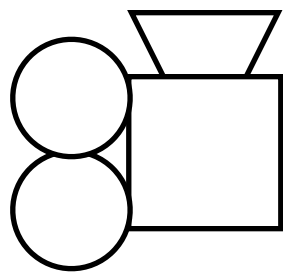
Camera A



A

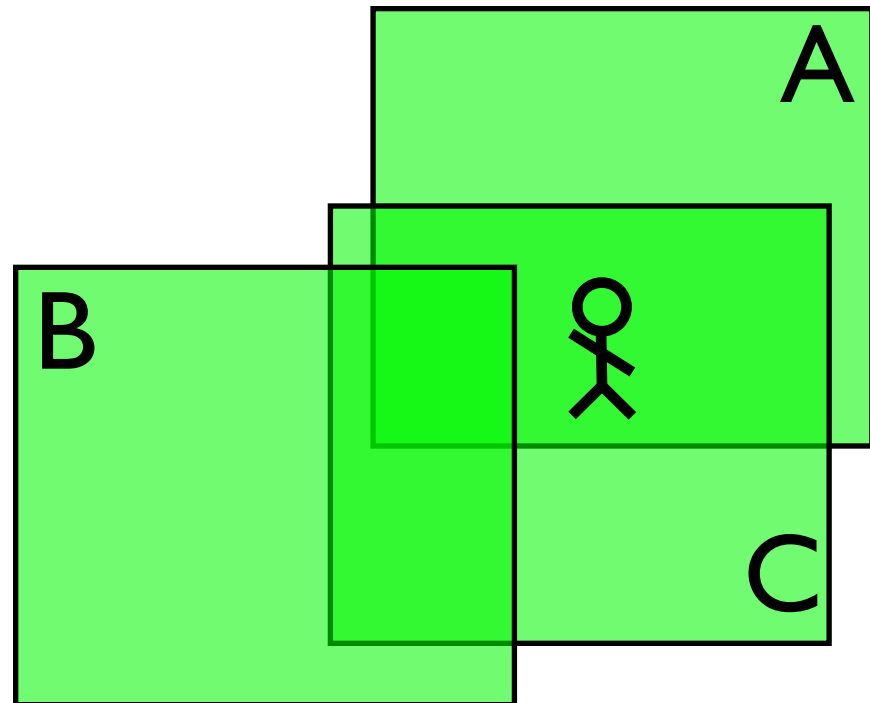


B

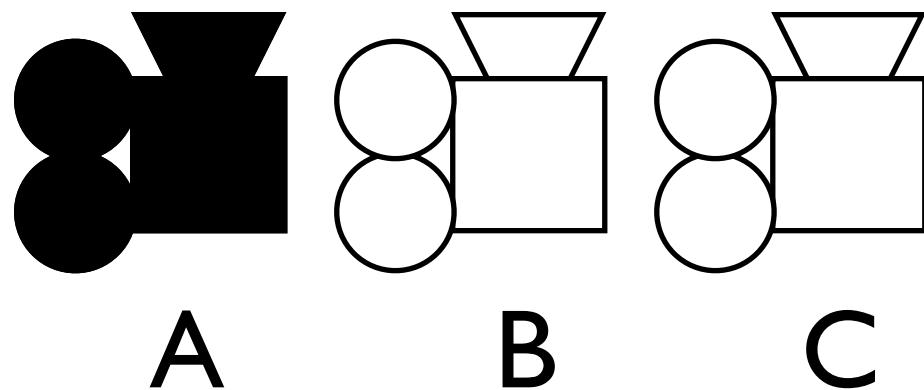


C

Zoning : Implementation

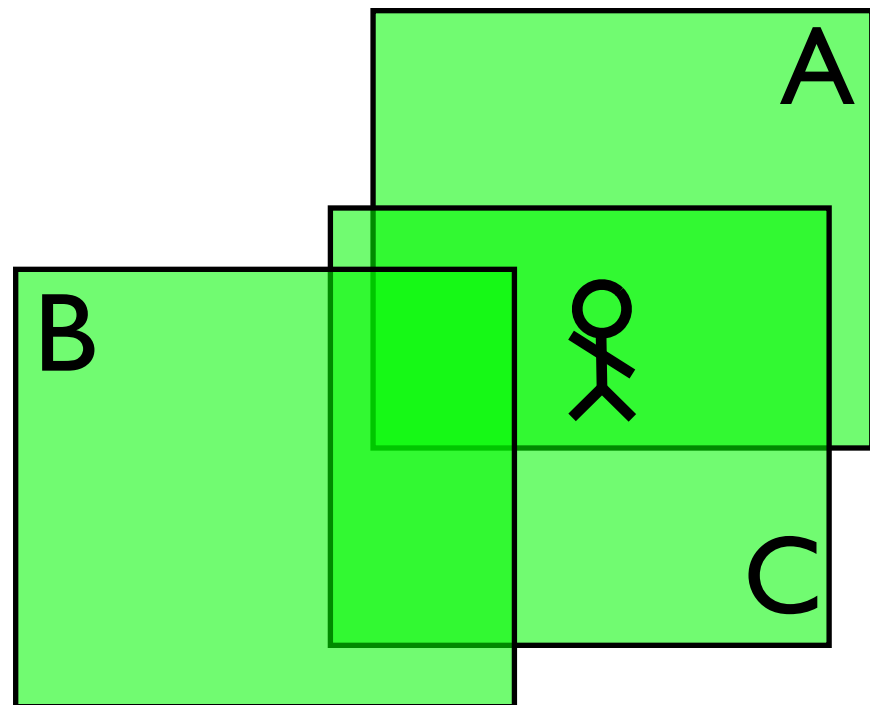


Camera A

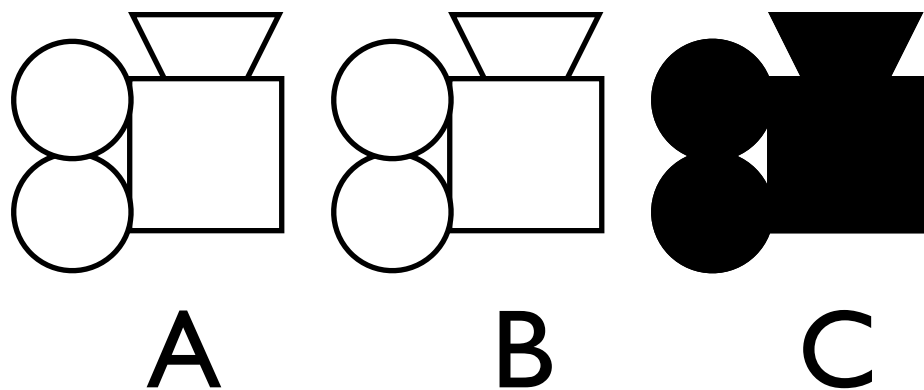


Camera C

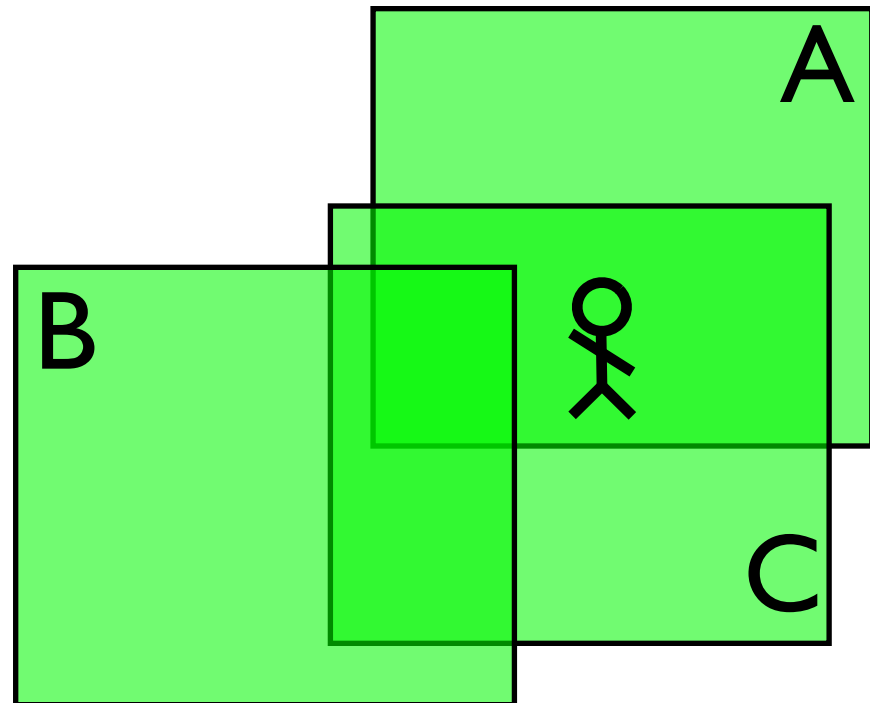
Zoning : Implementation



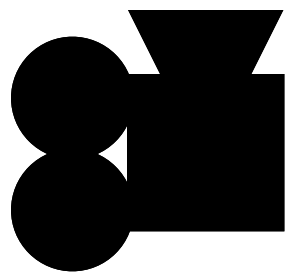
Camera A



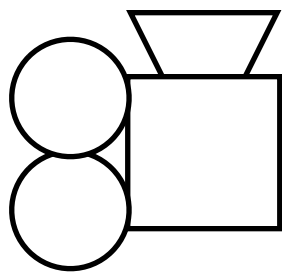
Zoning : Implementation



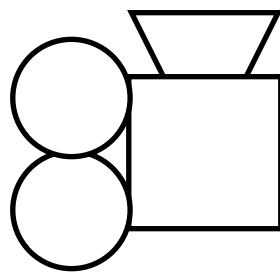
Camera A



A



B



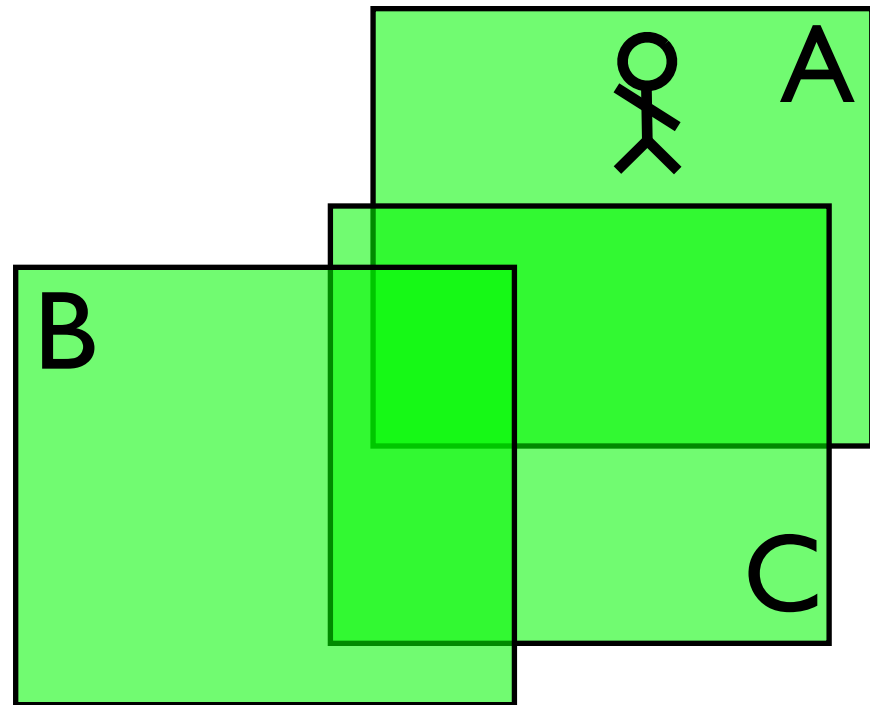
C

Camera C

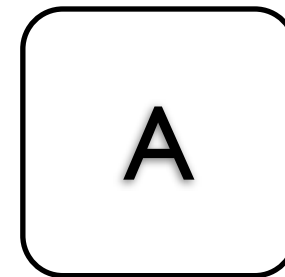
Zoning : Implementation

- Submission List
 - List of all cameras that were submitted last frame.
 - Used to distinguish newly submitted cameras from old ones
 - New cameras inserted at top
 - Effectively sorted by age

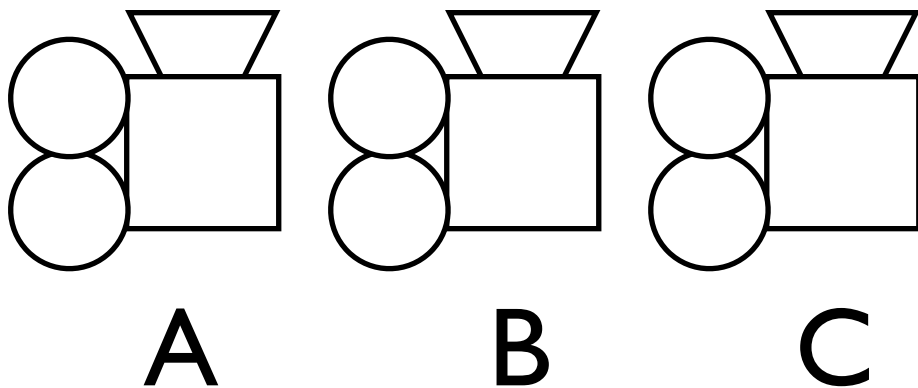
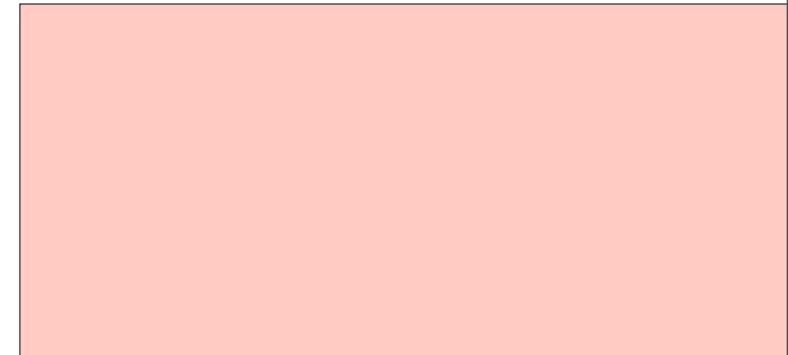
Zoning : Implementation



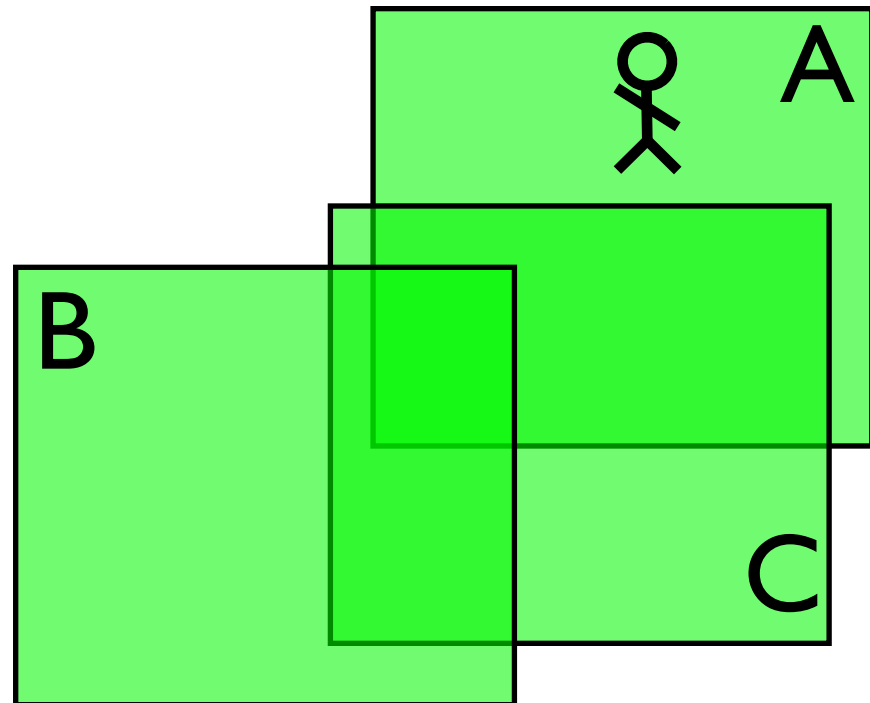
Query
Result



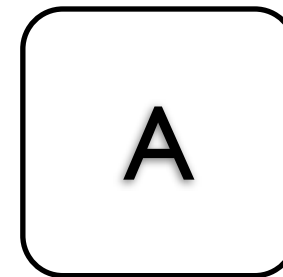
Submission
List



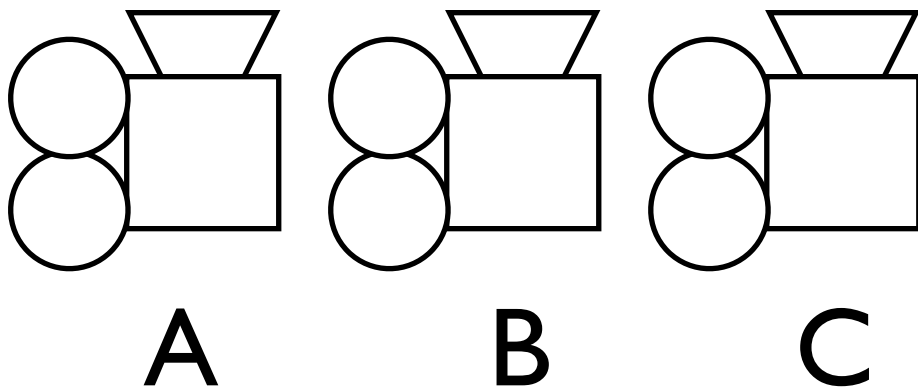
Zoning : Implementation



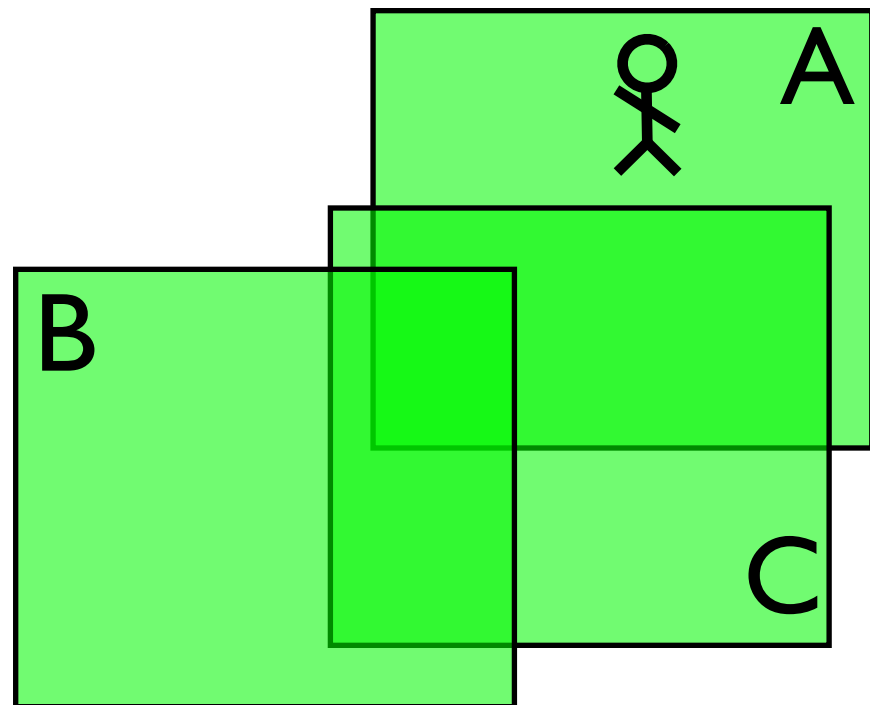
Query
Result



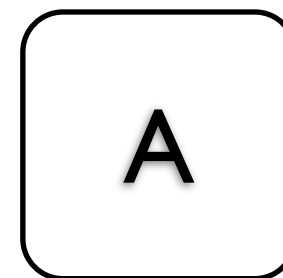
Submission
List



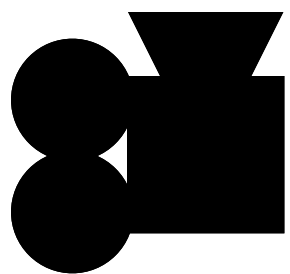
Zoning : Implementation



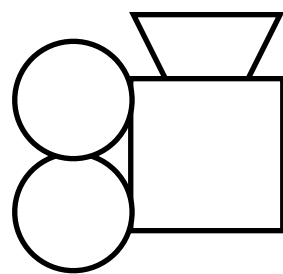
Query
Result



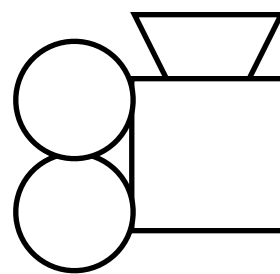
Submission
List



A

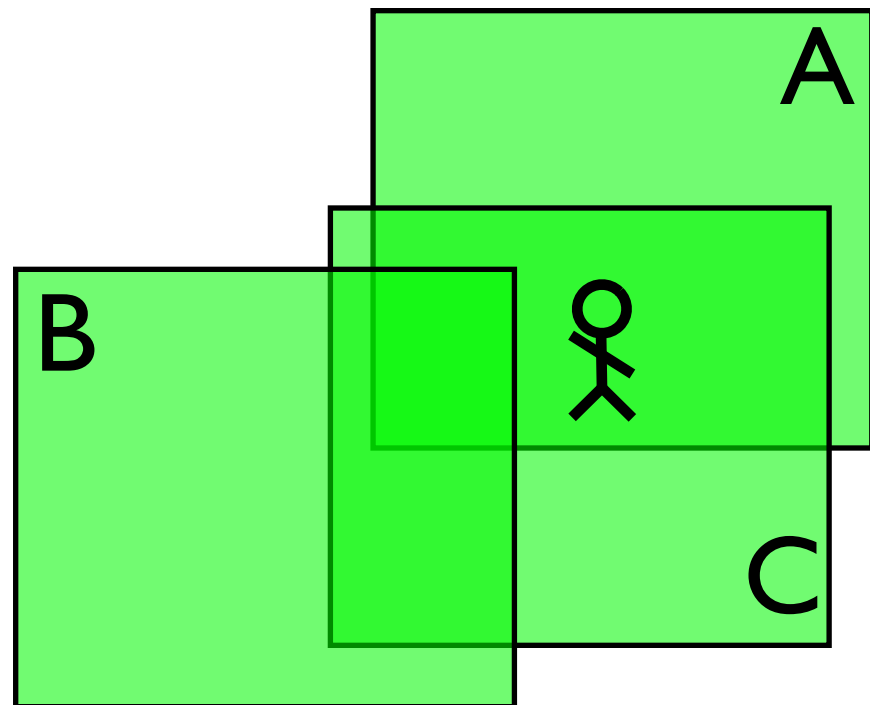


B

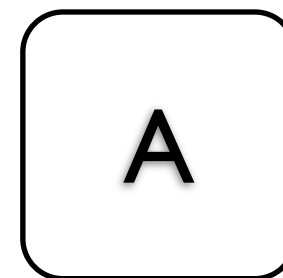


C

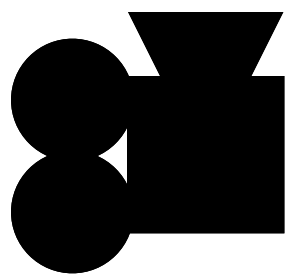
Zoning : Implementation



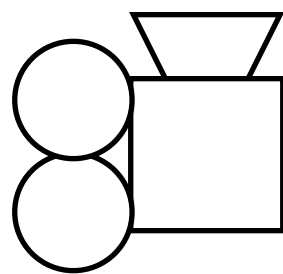
Query
Result



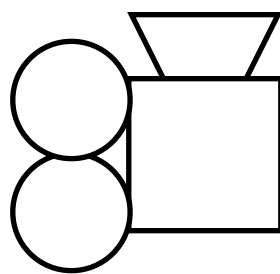
Submission
List



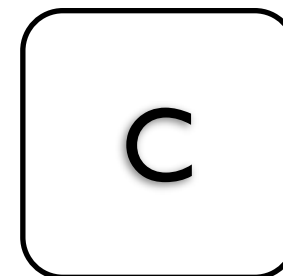
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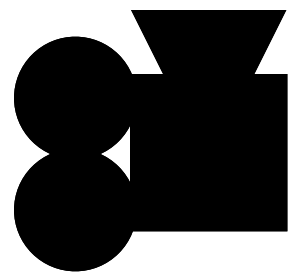
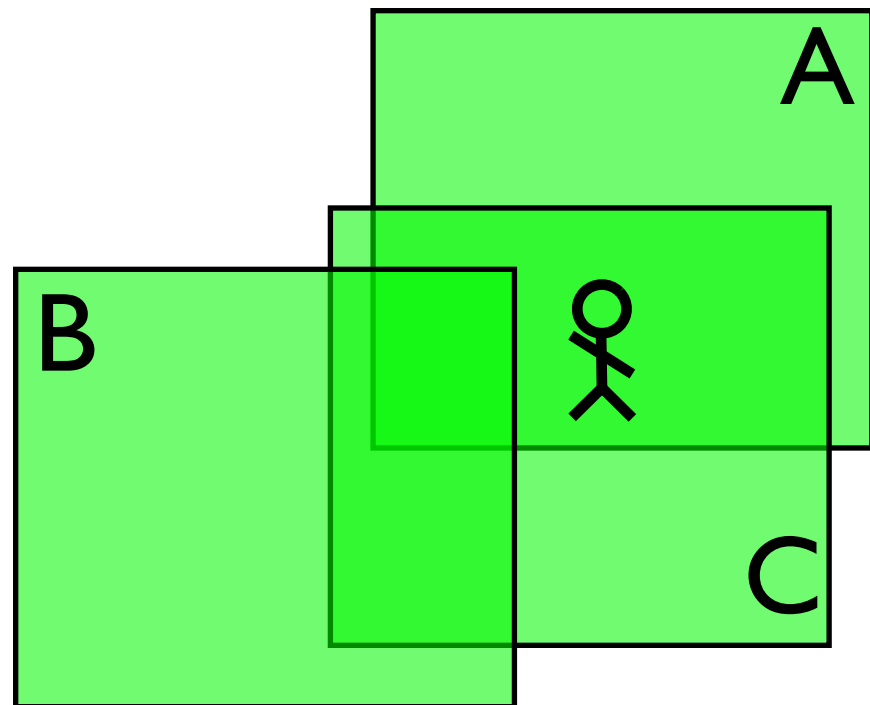
B



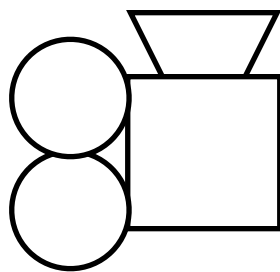
C



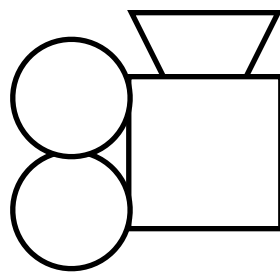
Zoning : Implementation



A

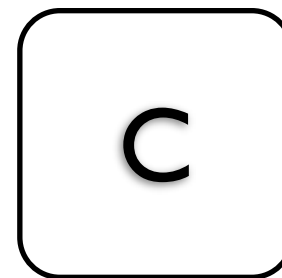
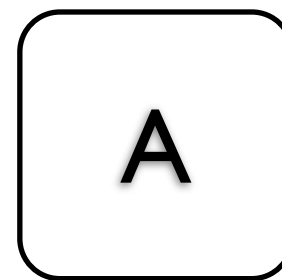


B

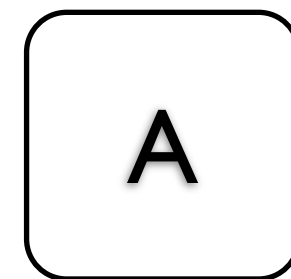
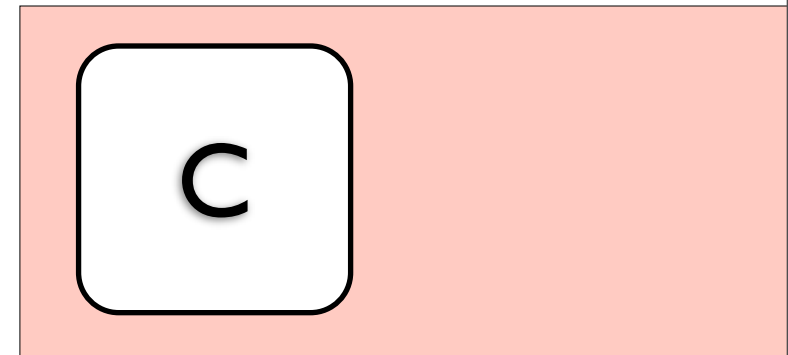


C

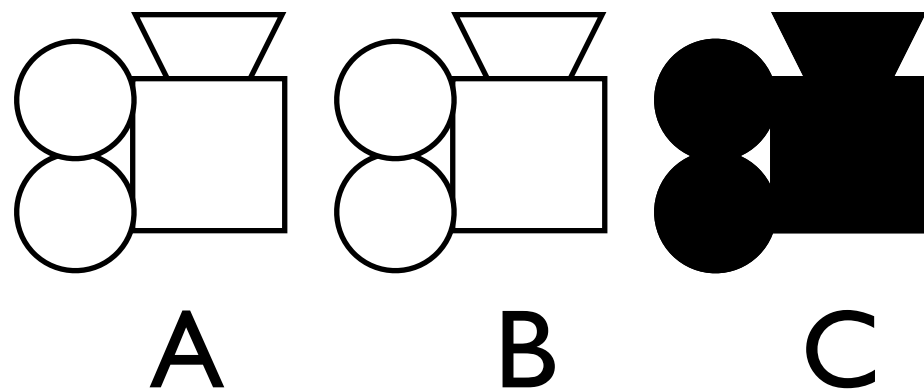
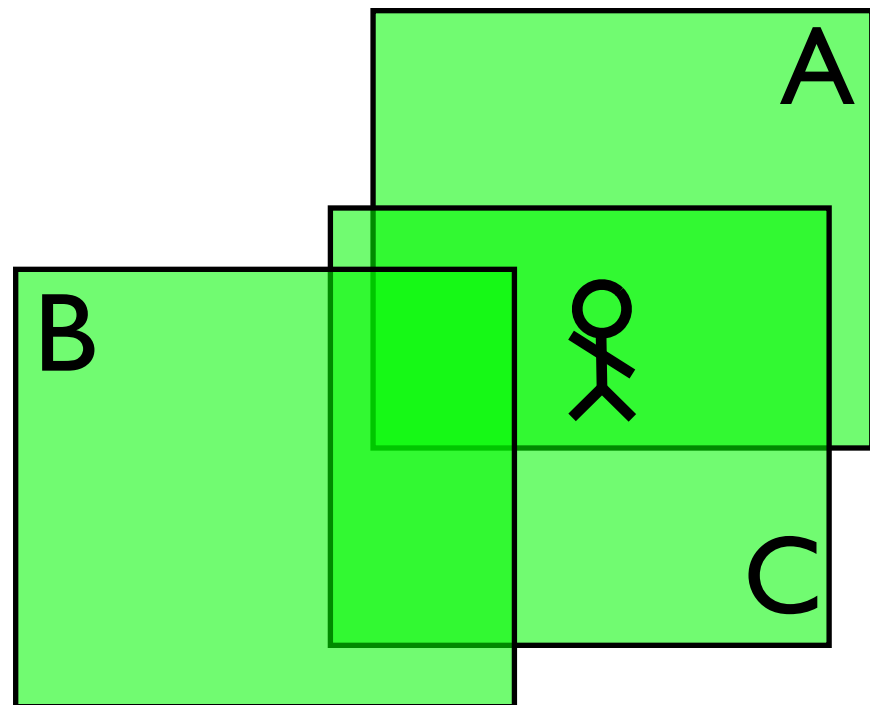
Query
Result



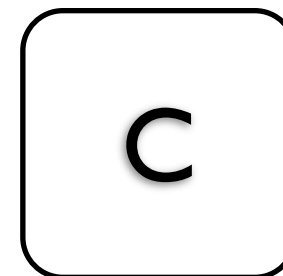
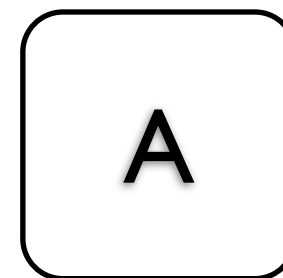
Submission
List



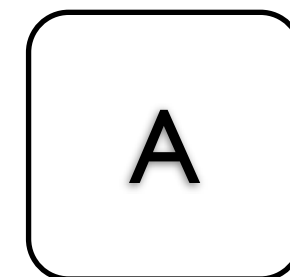
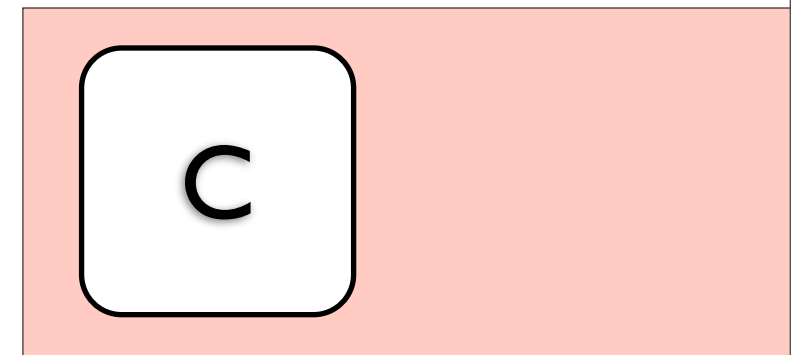
Zoning : Implementation



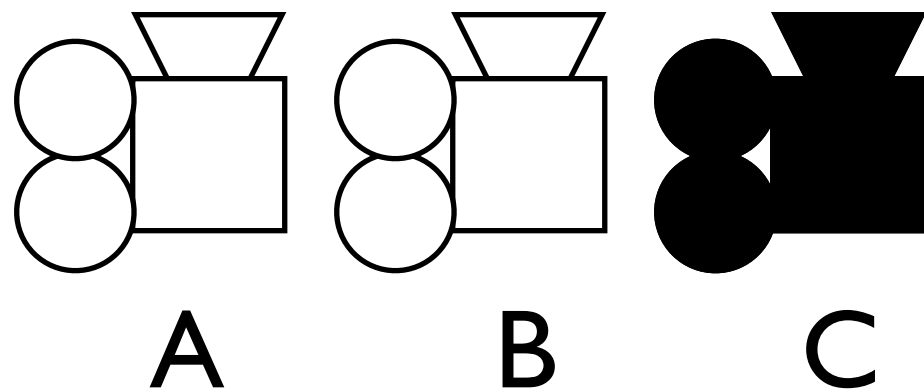
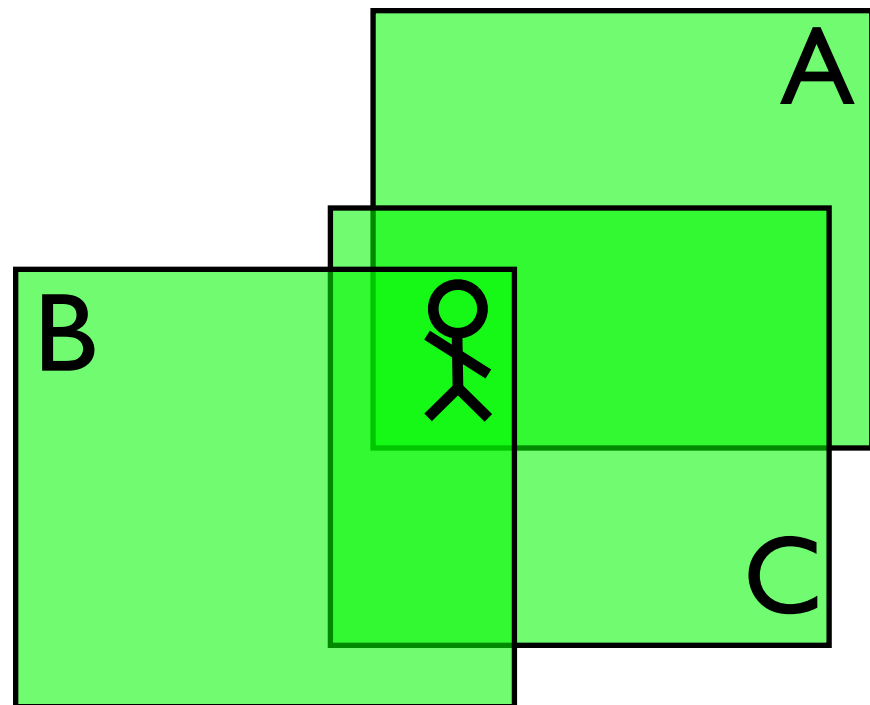
Query
Result



Submission
List



Zoning : Implementation



Query
Result

A

B

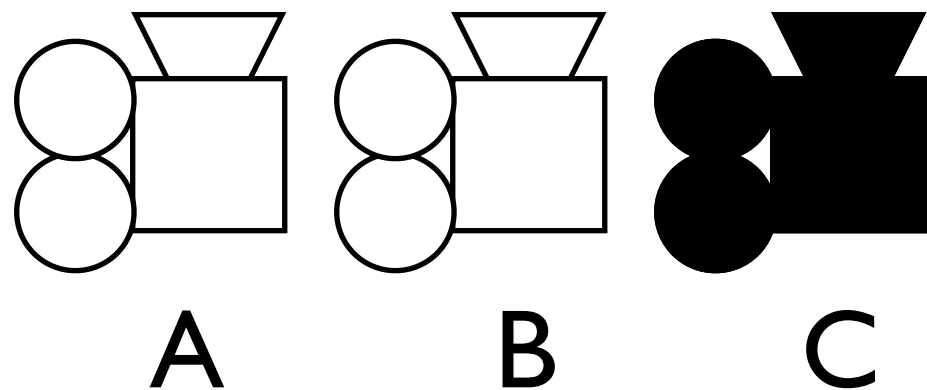
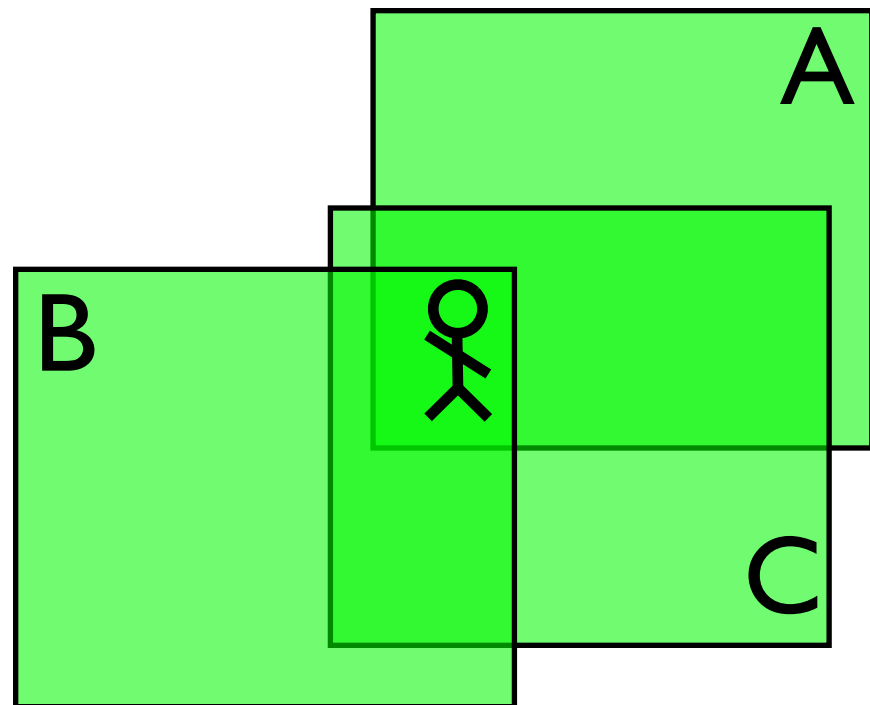
C

Submission
List

C

A

Zoning : Implementation



Query
Result

A

B

C

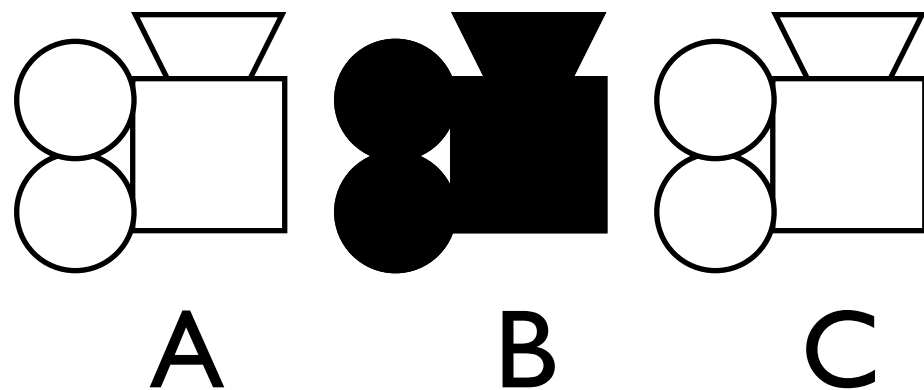
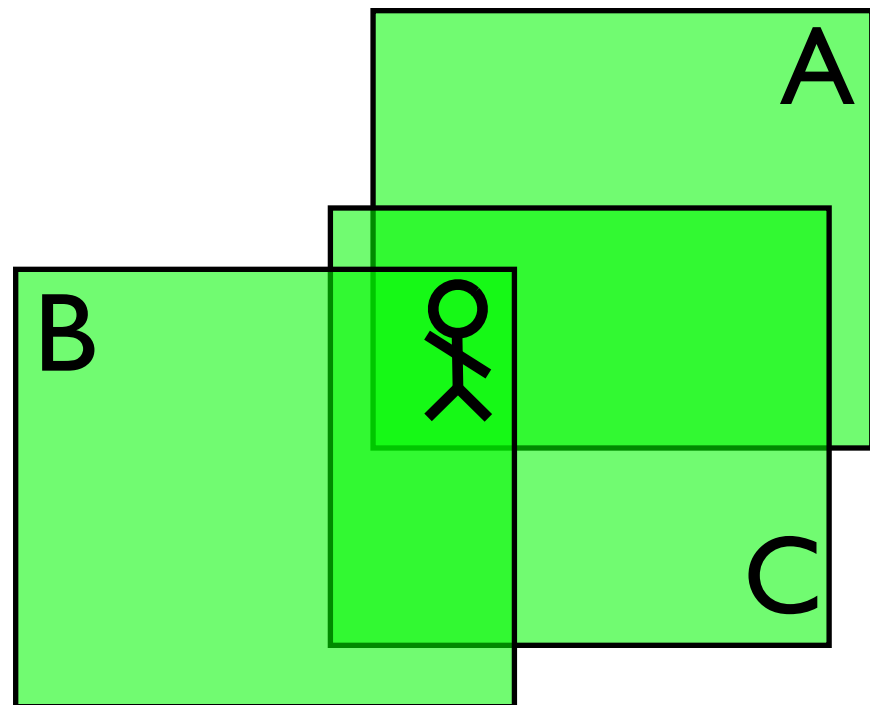
Submission
List

B

C

A

Zoning : Implementation



Query
Result

A

B

C

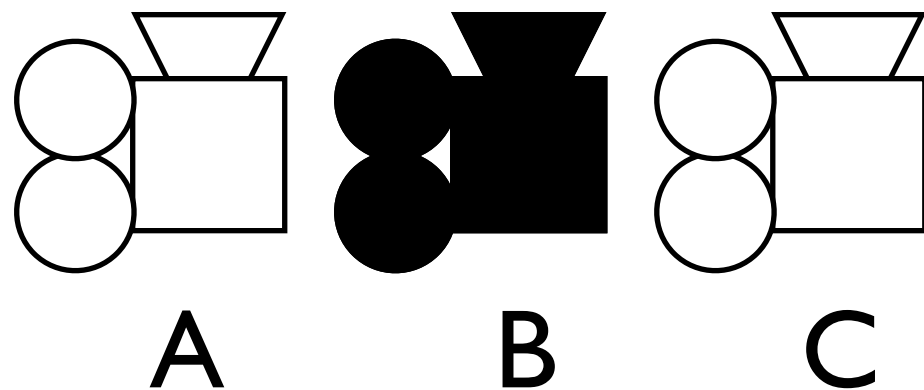
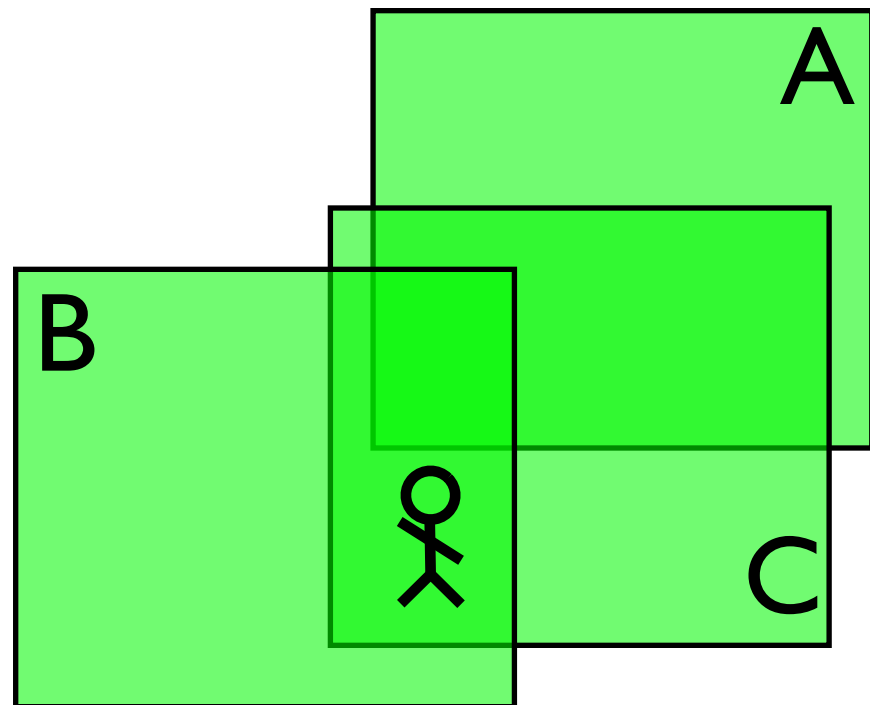
Submission
List

B

C

A

Zoning : Implementation



Query
Result

Submission
List

B

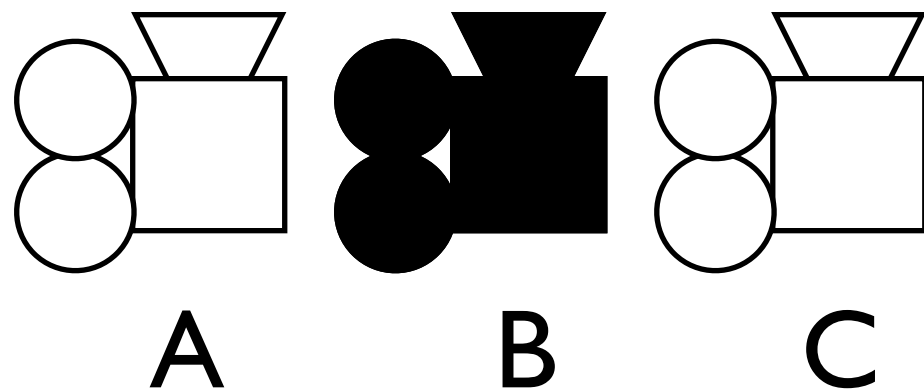
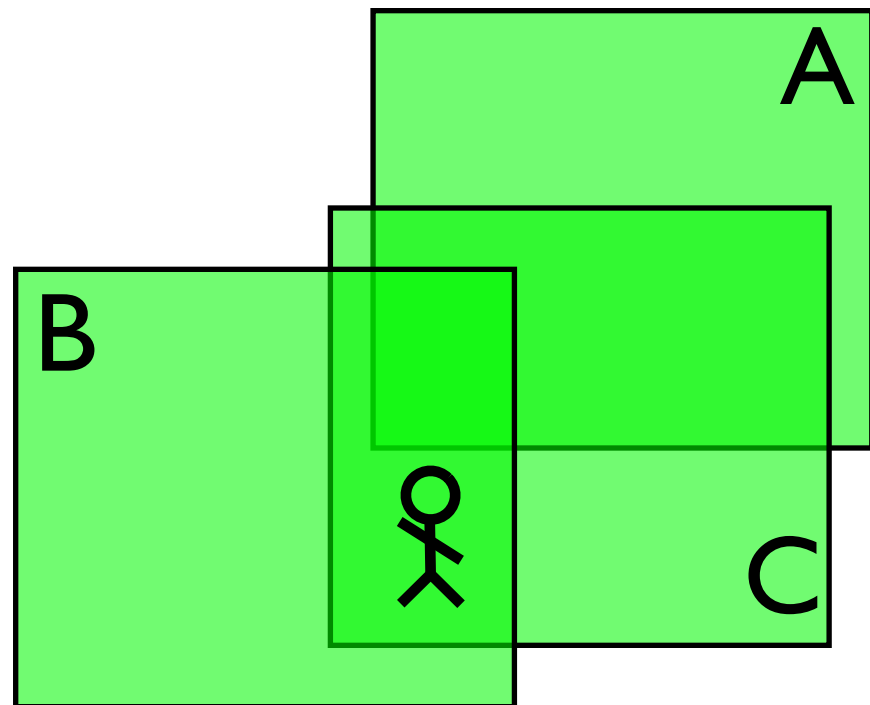
C

B

C

A

Zoning : Implementation



Query
Result

Submission
List

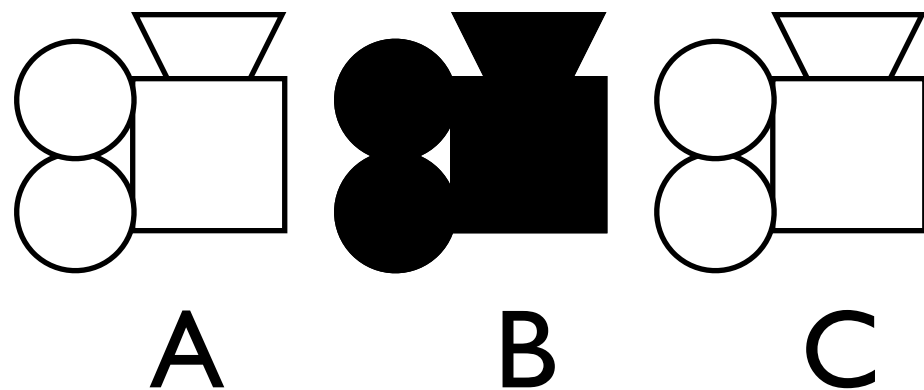
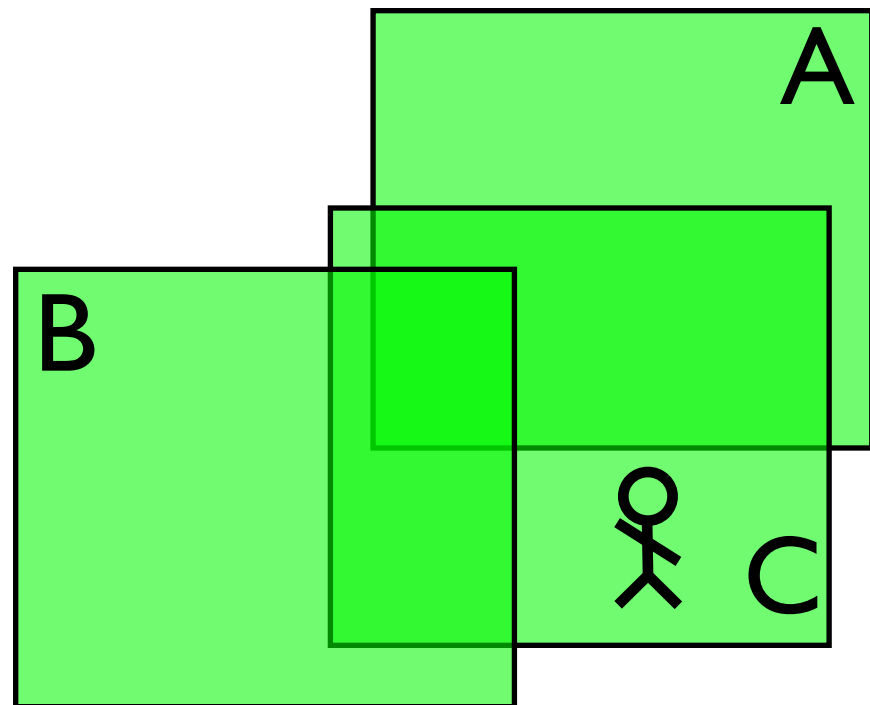
B

C

B

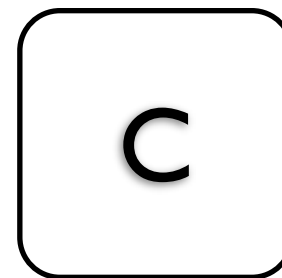
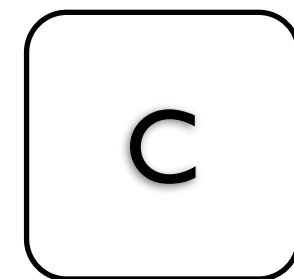
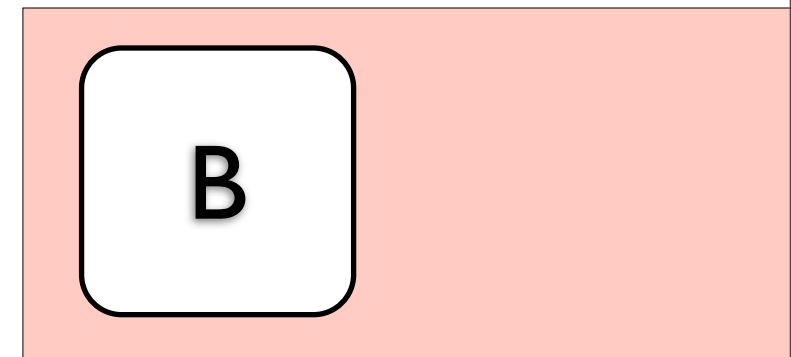
C

Zoning : Implementation

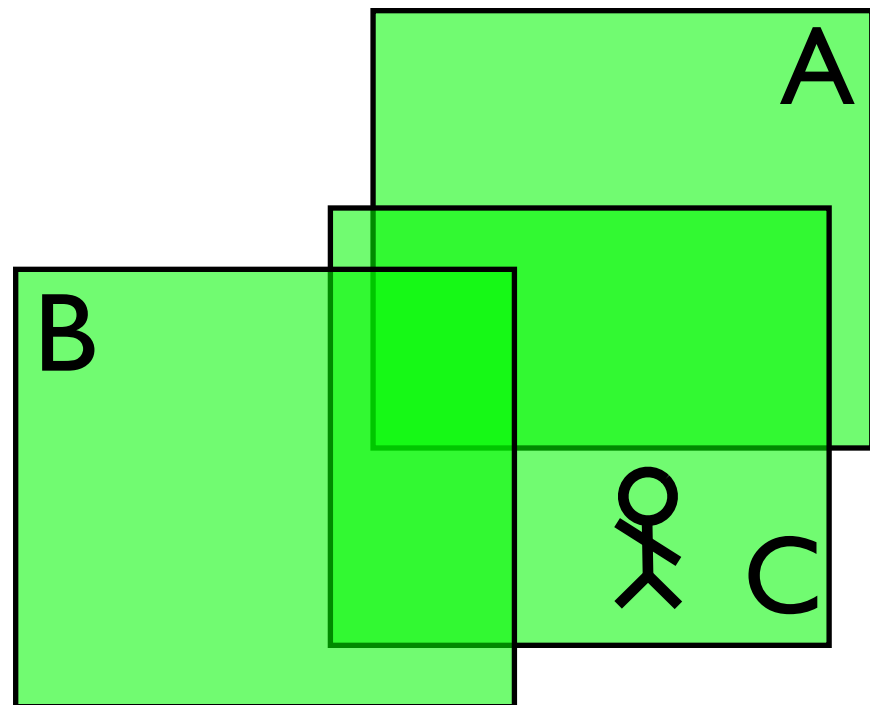


Query
Result

Submission
List

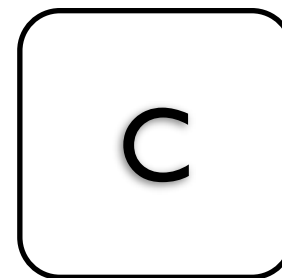
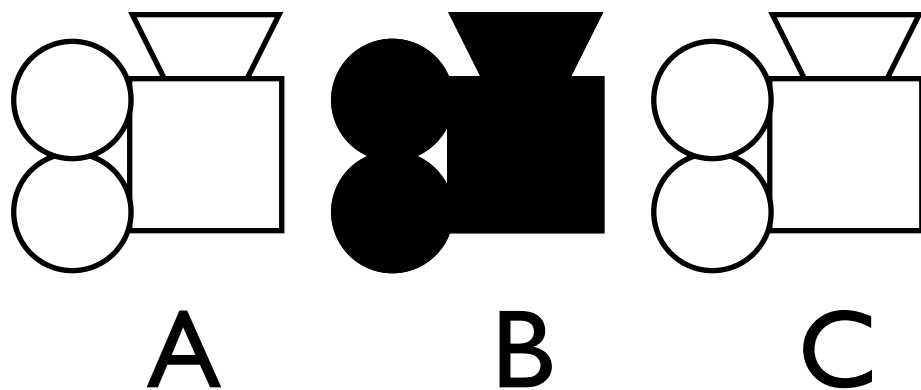
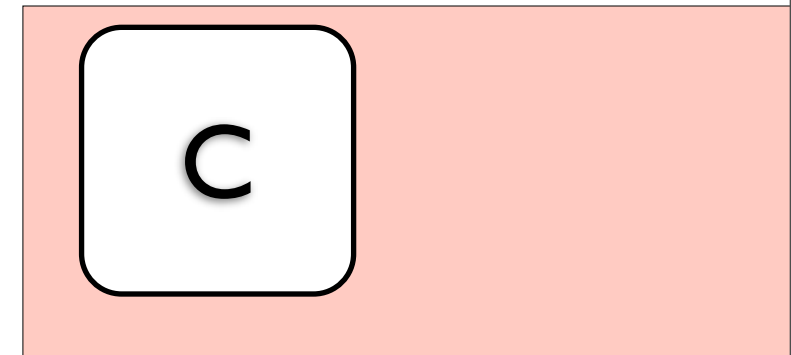


Zoning : Implementation

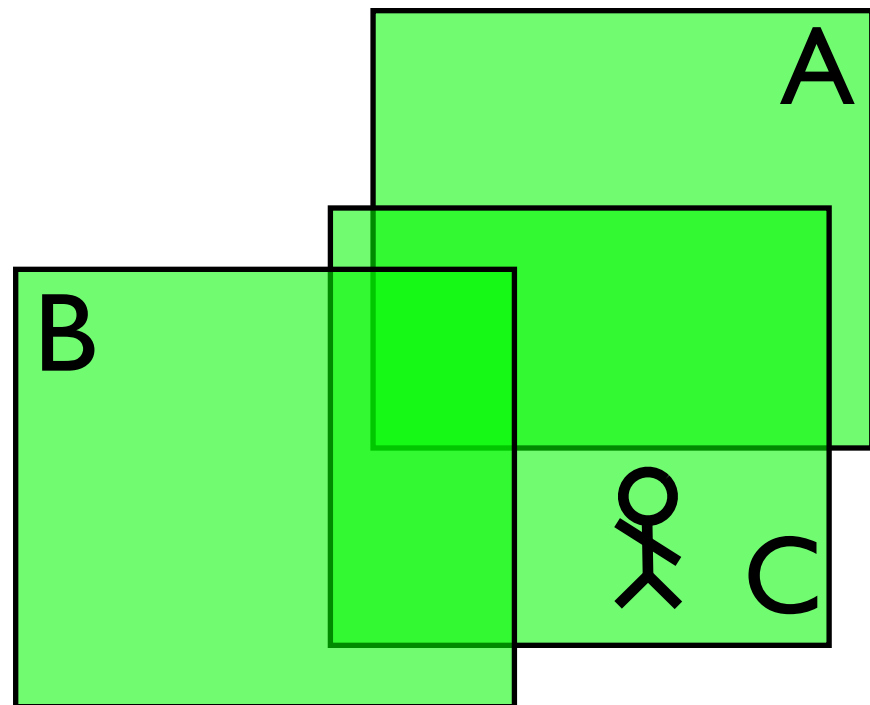


Query
Result

Submission
List

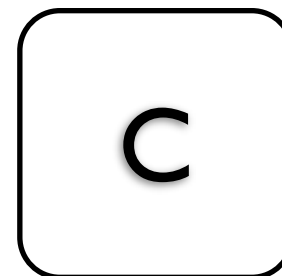
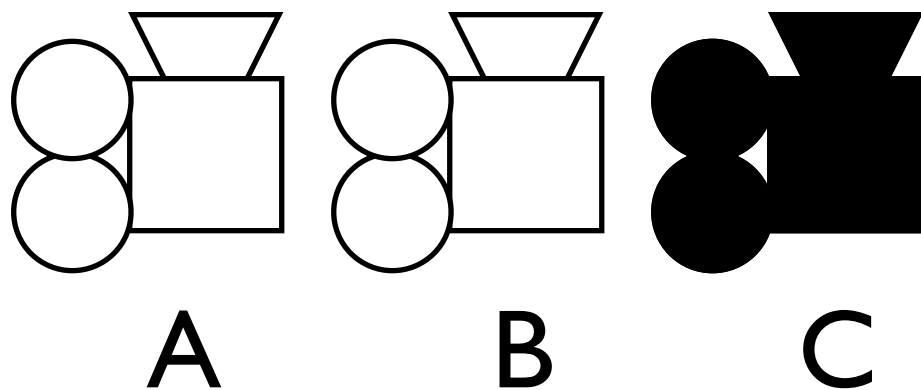
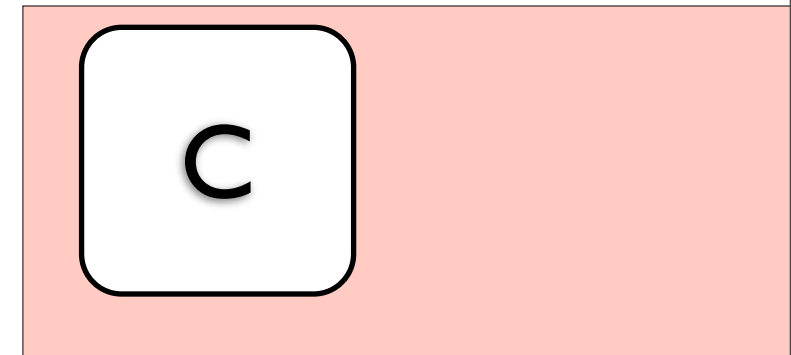


Zoning : Implementation



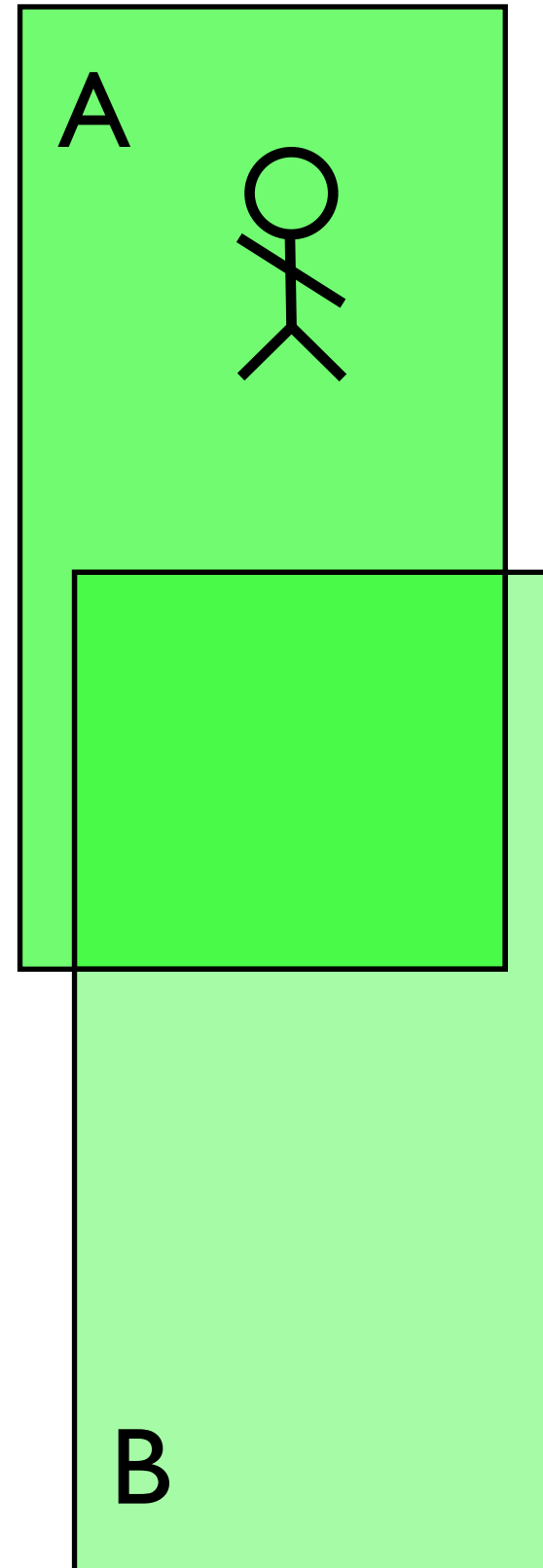
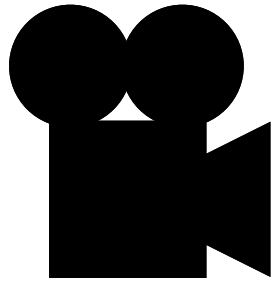
Query
Result

Submission
List

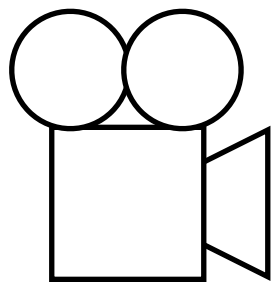


Zoning : Implementation

Camera A
Priority 1

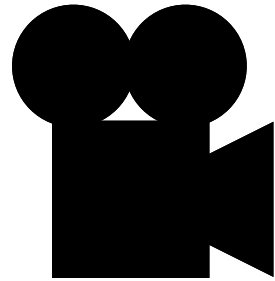


Camera B
Priority 2

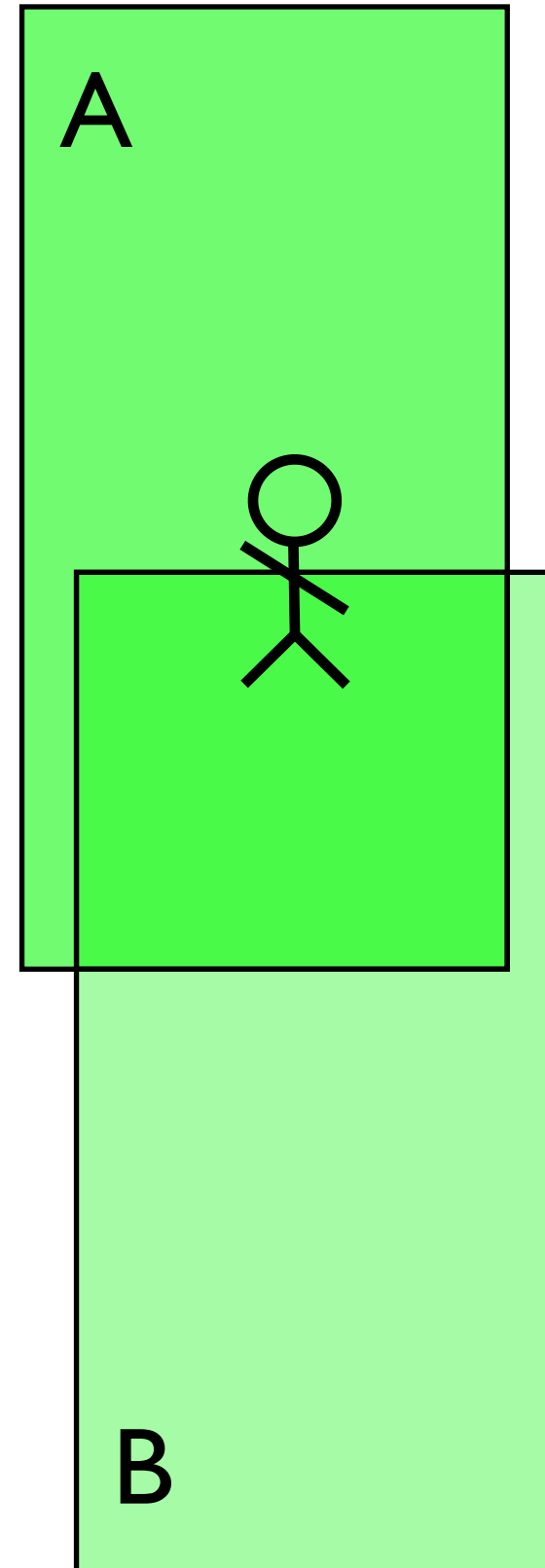
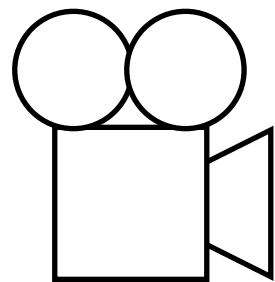


Zoning : Implementation

Camera A
Priority 1

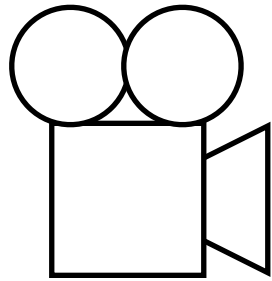


Camera B
Priority 2

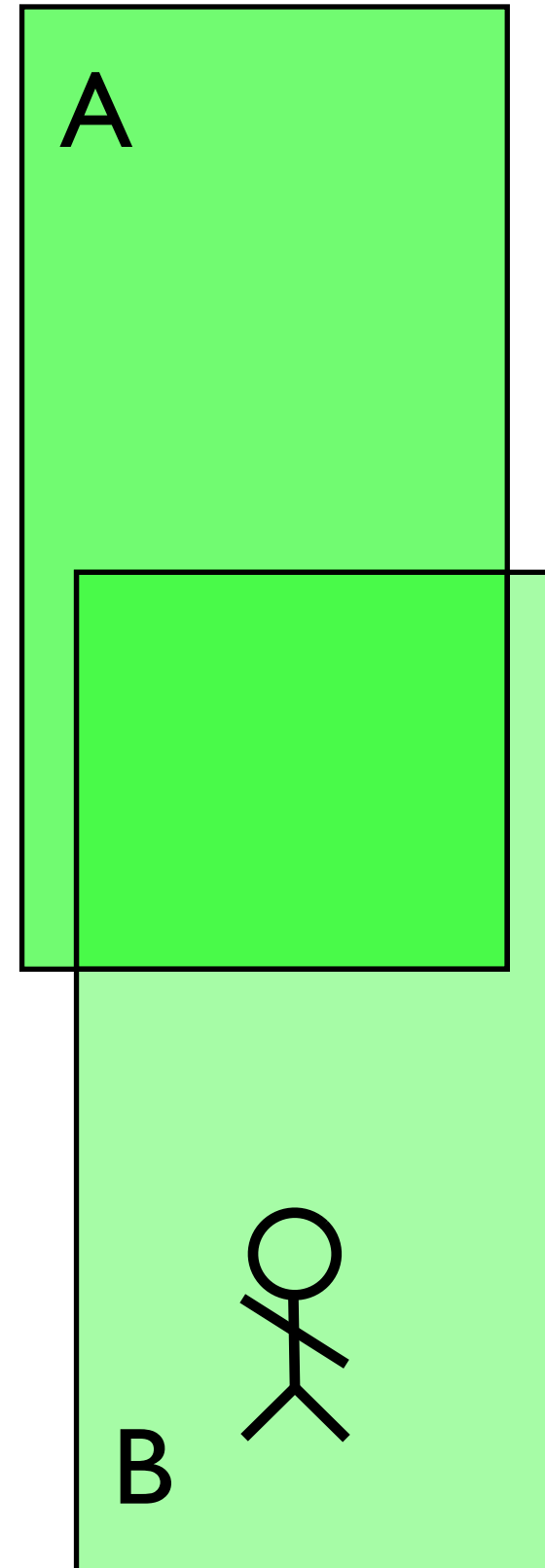
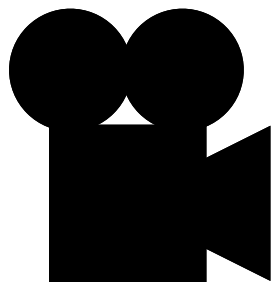


Zoning : Implementation

Camera A
Priority 1

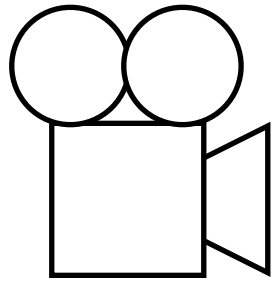


Camera B
Priority 2

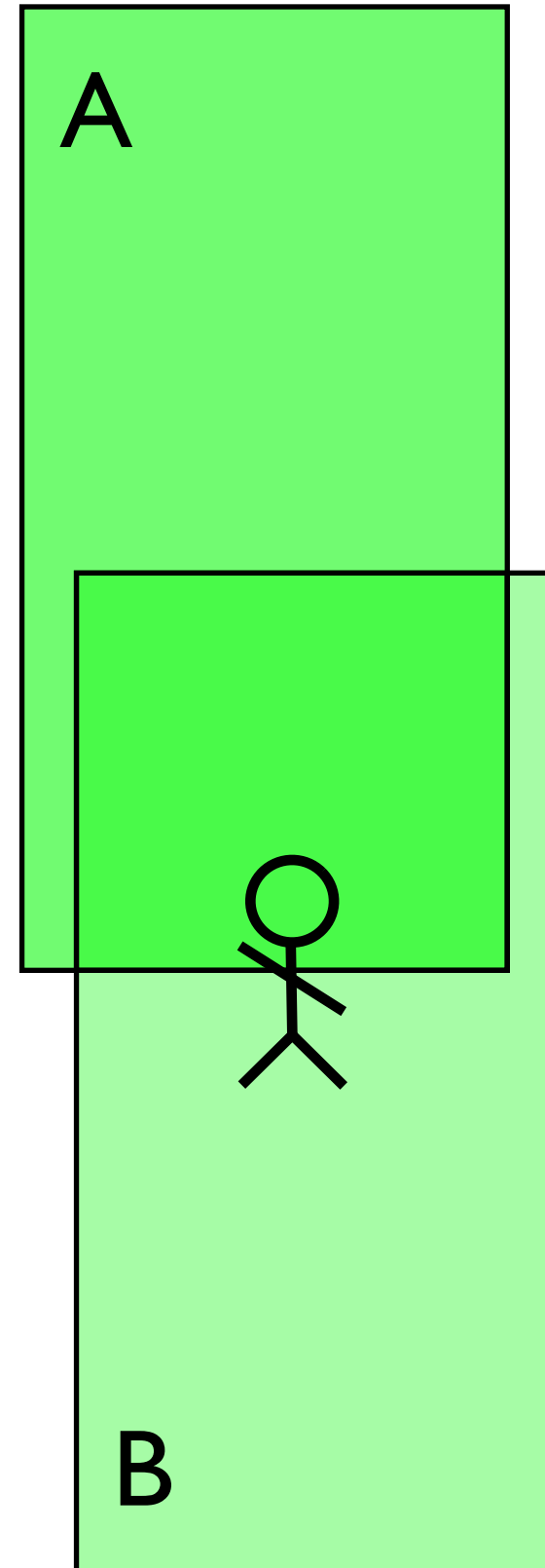
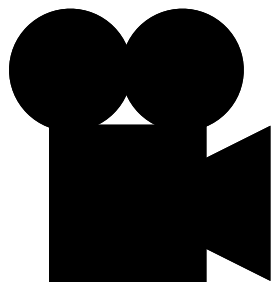


Zoning : Implementation

Camera A
Priority 1

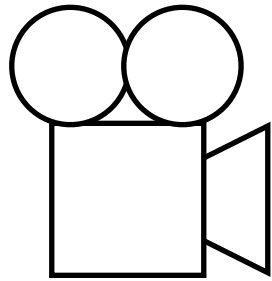


Camera B
Priority 2

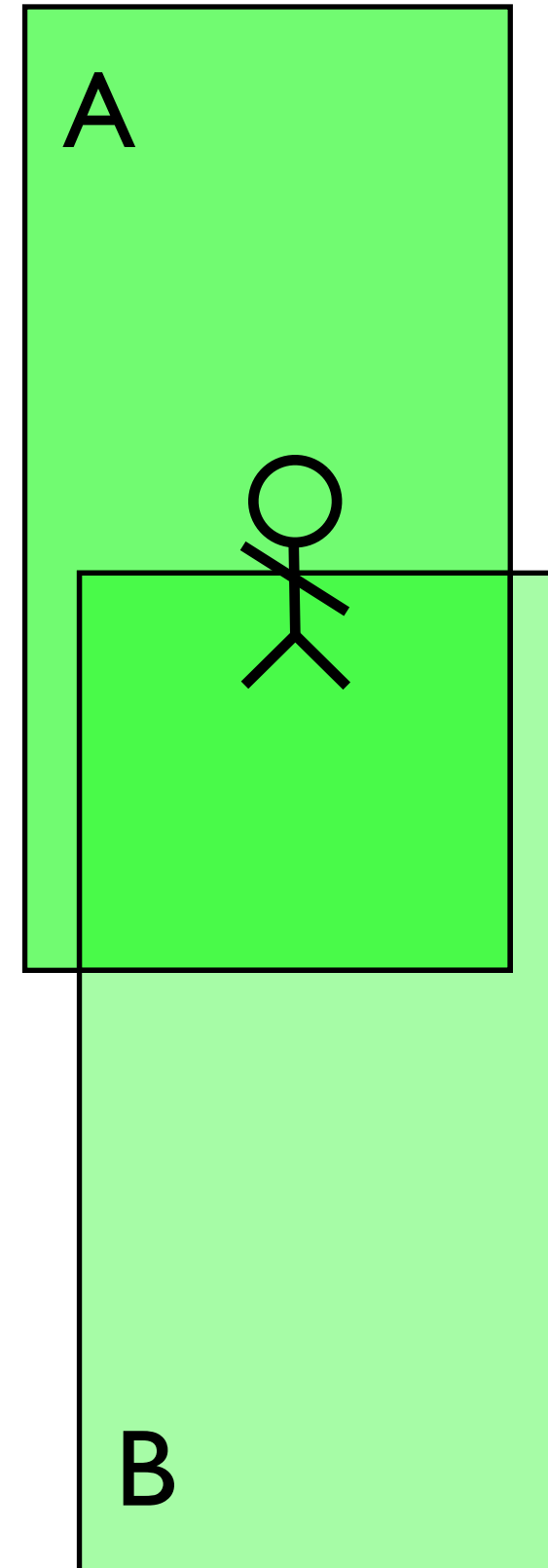
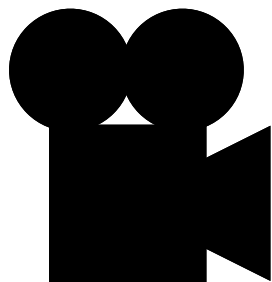


Zoning : Implementation

Camera A
Priority 1

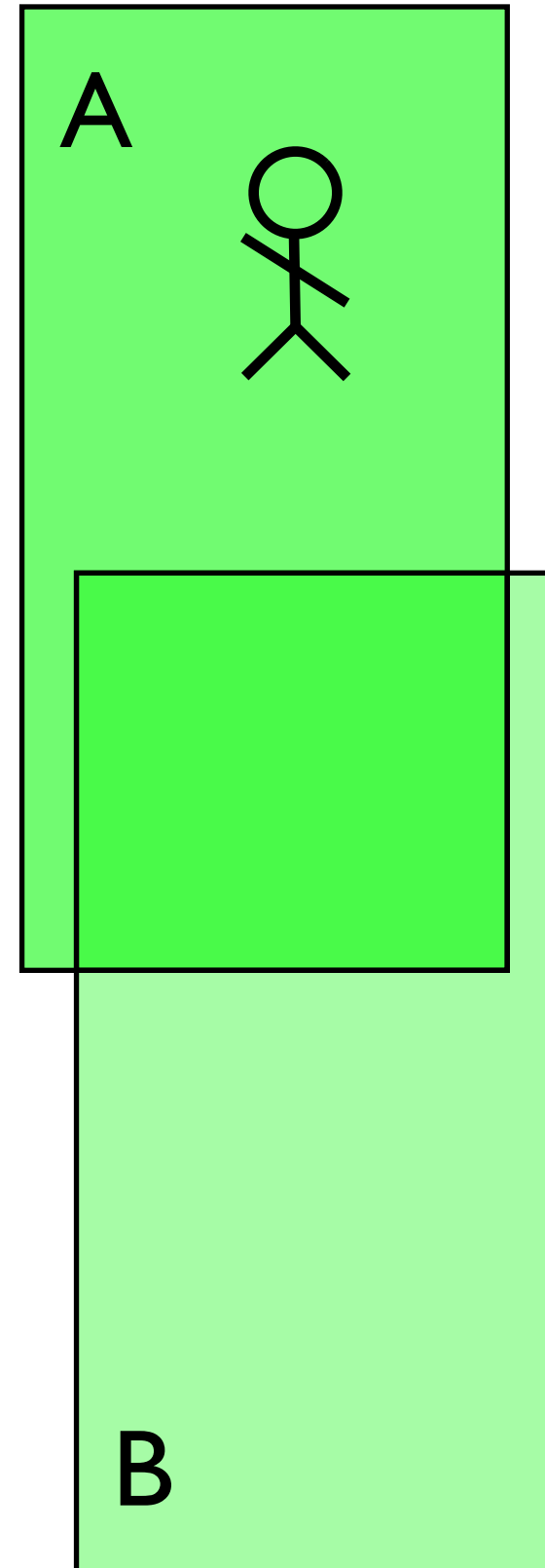
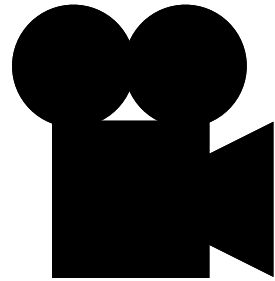


Camera B
Priority 2

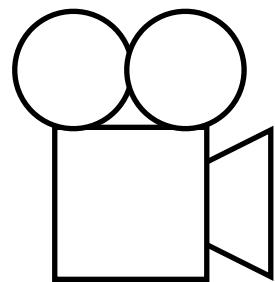


Zoning : Implementation

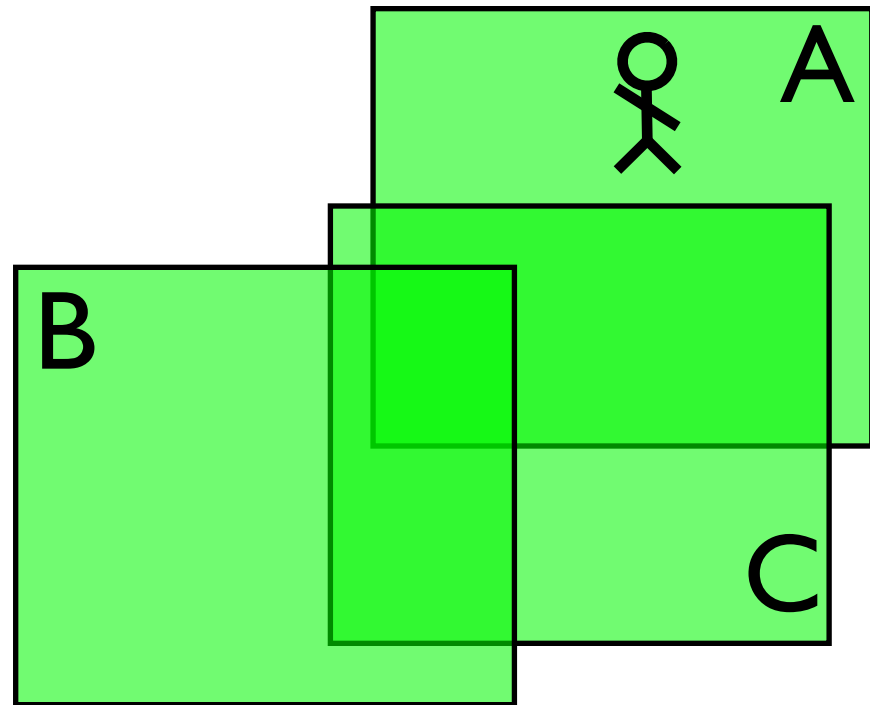
Camera A
Priority 1



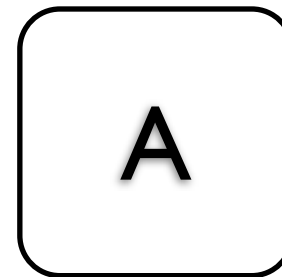
Camera B
Priority 2



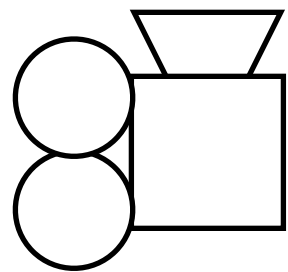
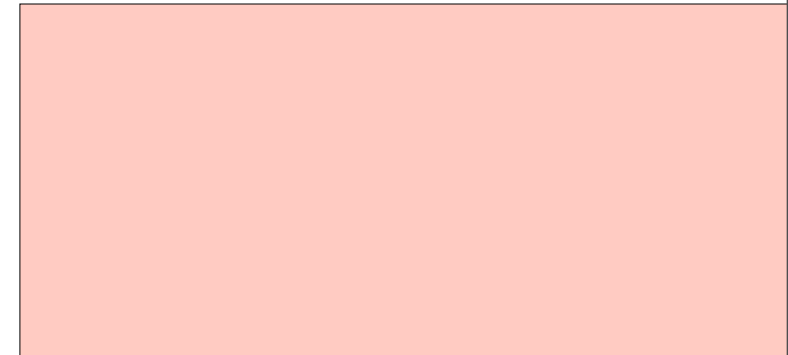
Zoning : Implementation



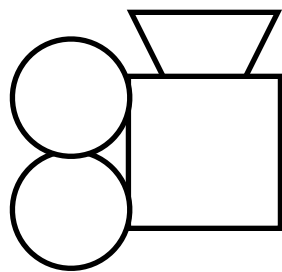
Query
Result



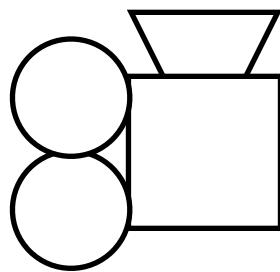
Submission
List



A



B



C

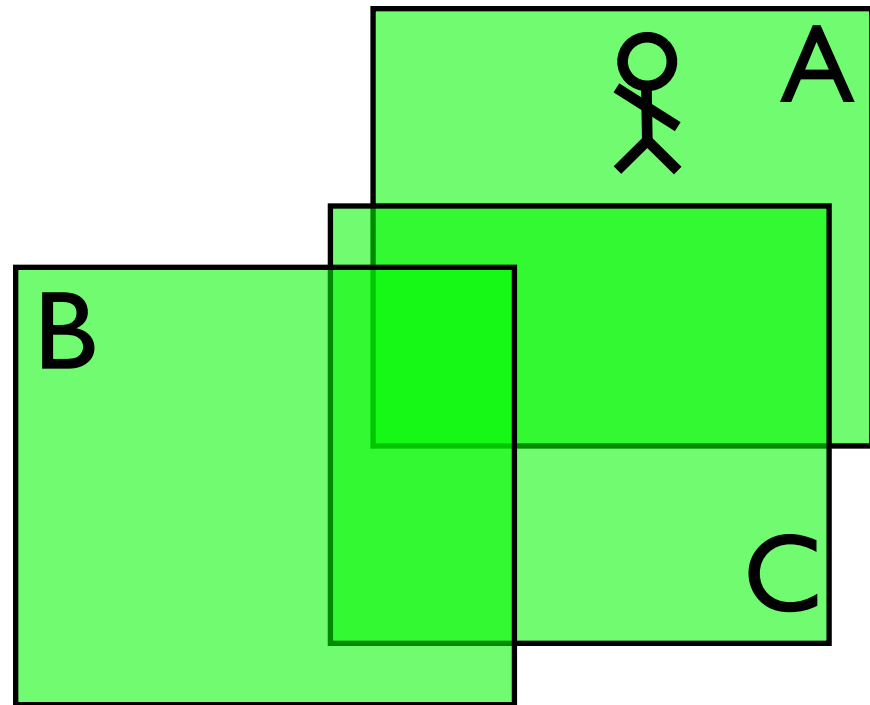
Priority

2

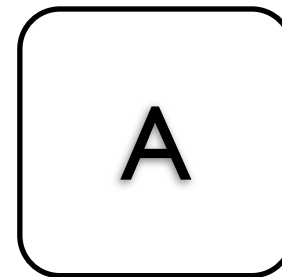
2

1

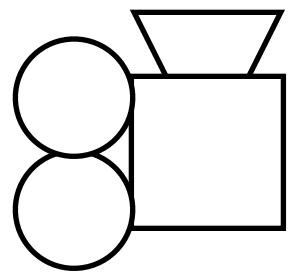
Zoning : Implementation



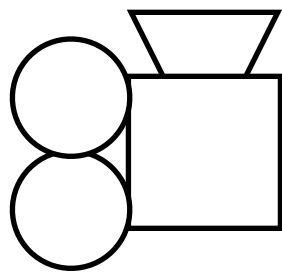
Query
Result



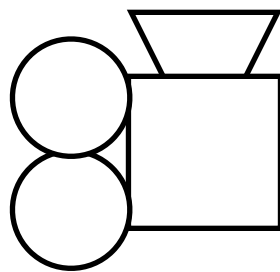
Submission
List



A



B



C

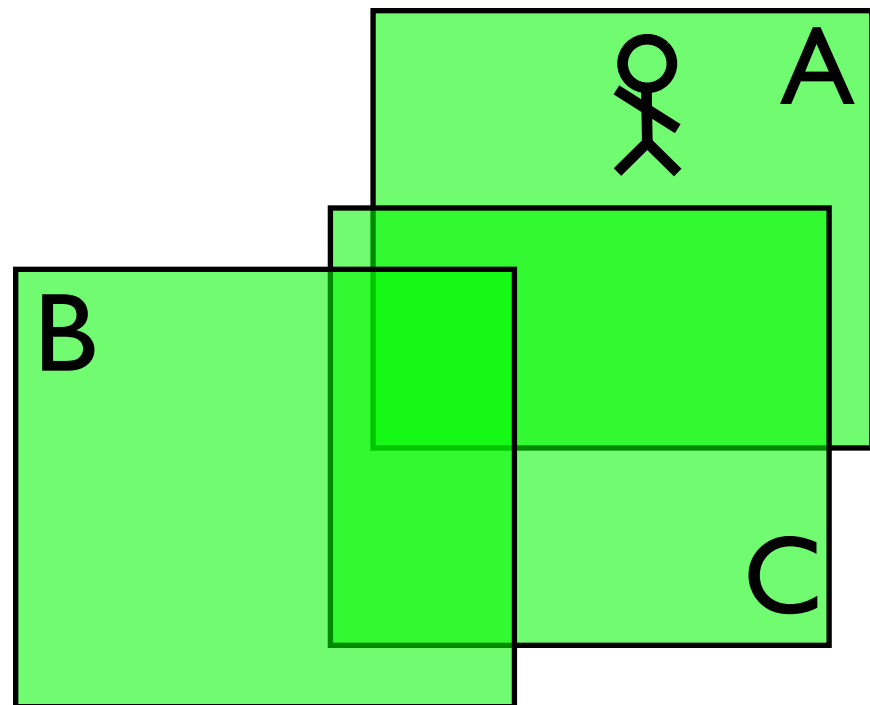
Priority

2

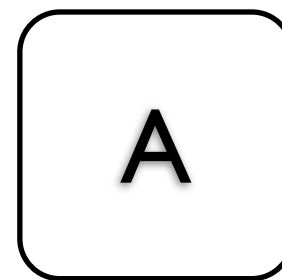
2

1

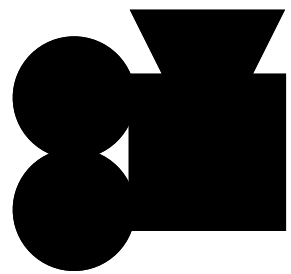
Zoning : Implementation



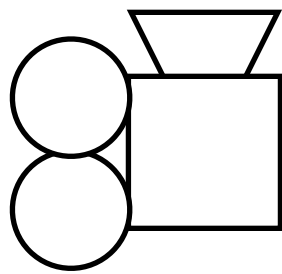
Query
Result



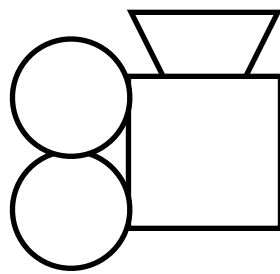
Submission
List



A



B



C

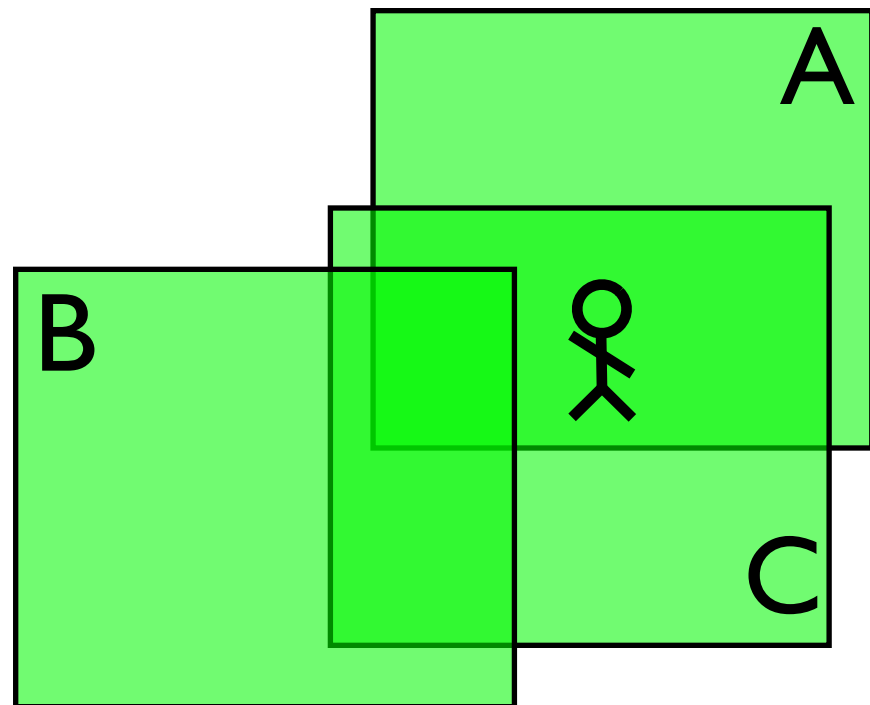
Priority

2

2

1

Zoning : Implementation

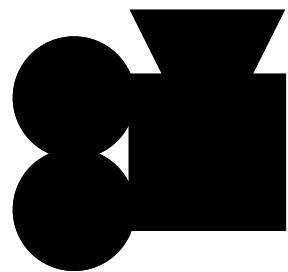


Query
Result

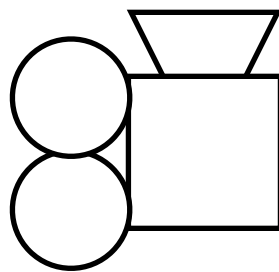
A

Submission
List

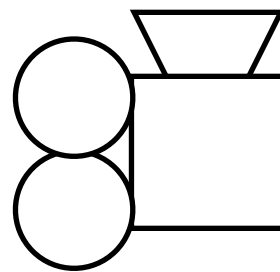
A



A



B



C

C

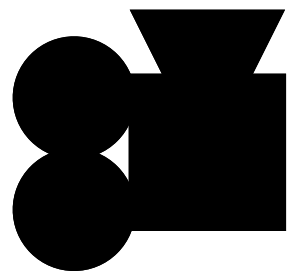
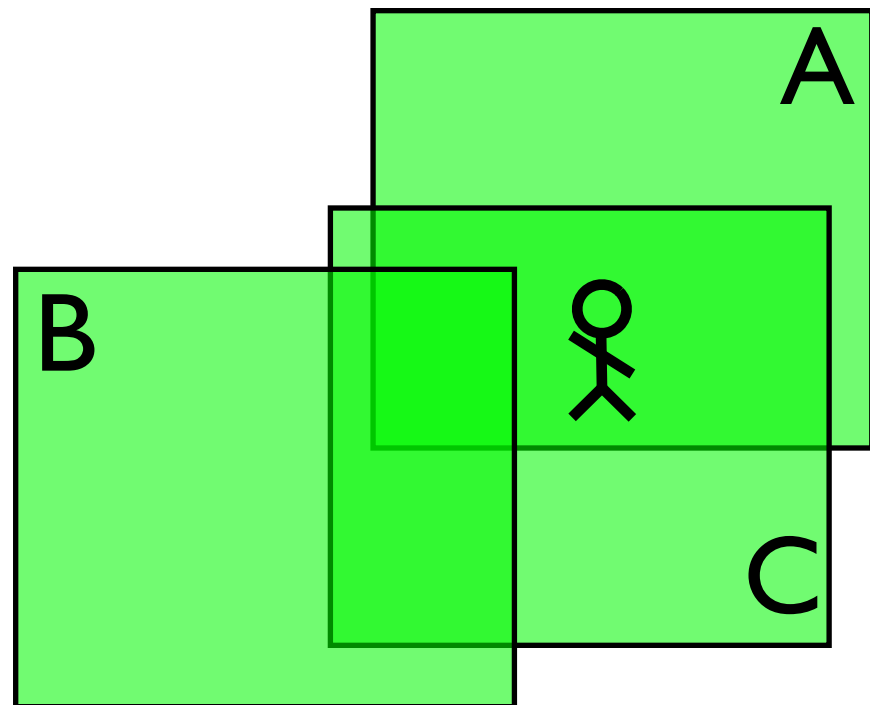
Priority

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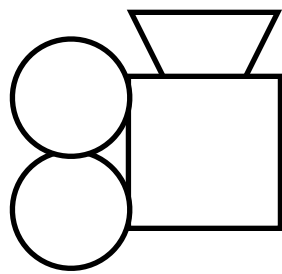
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1

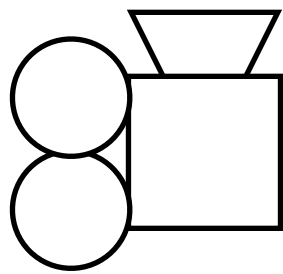
Zoning : Implementation



A

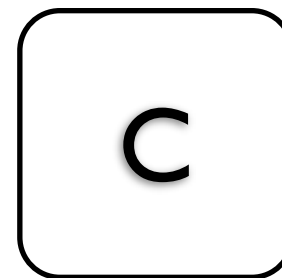
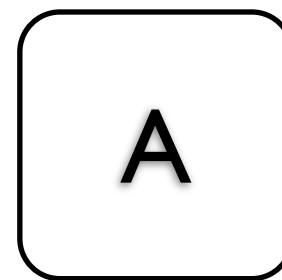


B

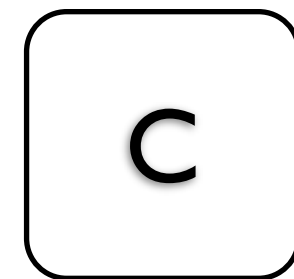


C

Query
Result



Submission
List



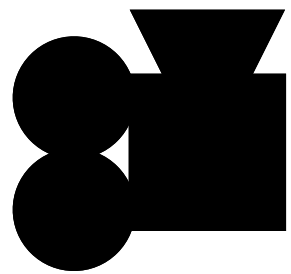
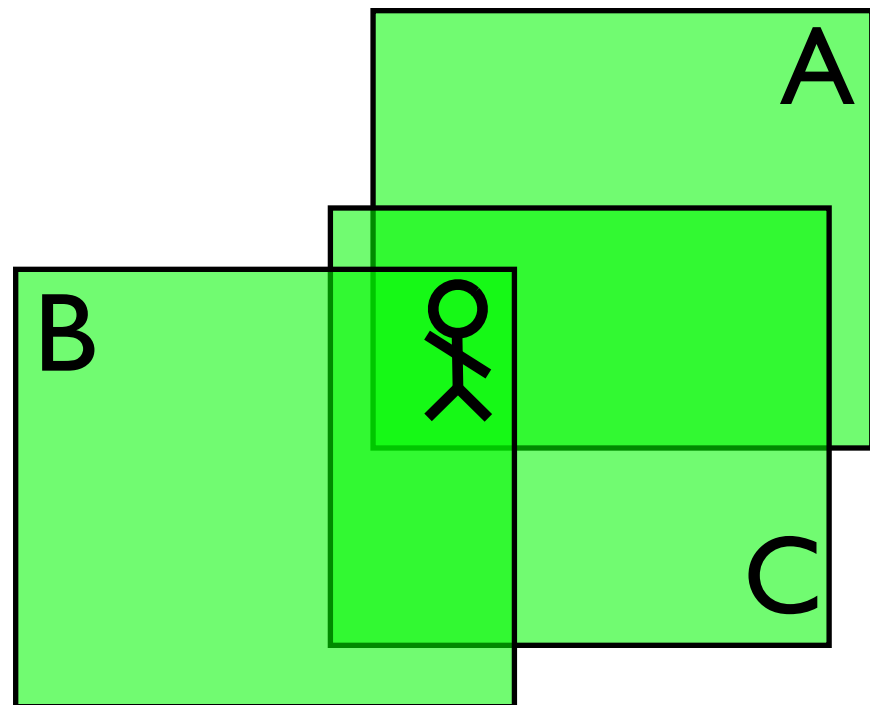
Priority

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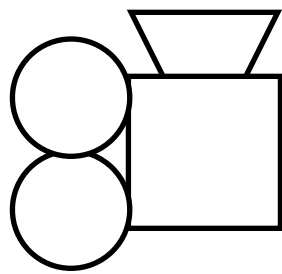
2

1

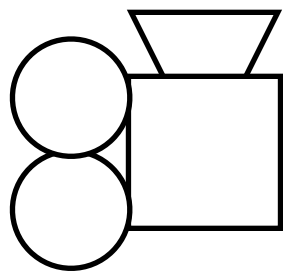
Zoning : Implementation



A



B



C

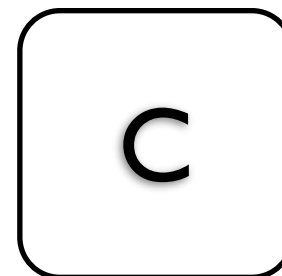
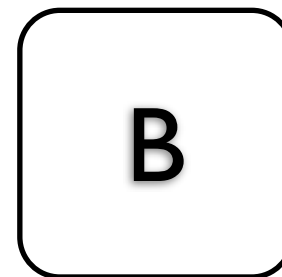
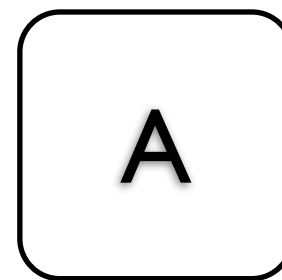
Priority

2

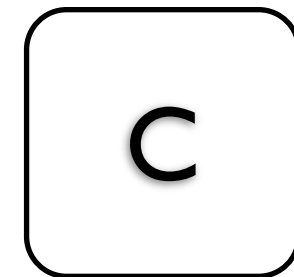
2

1

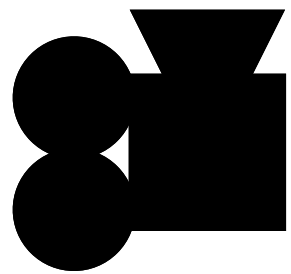
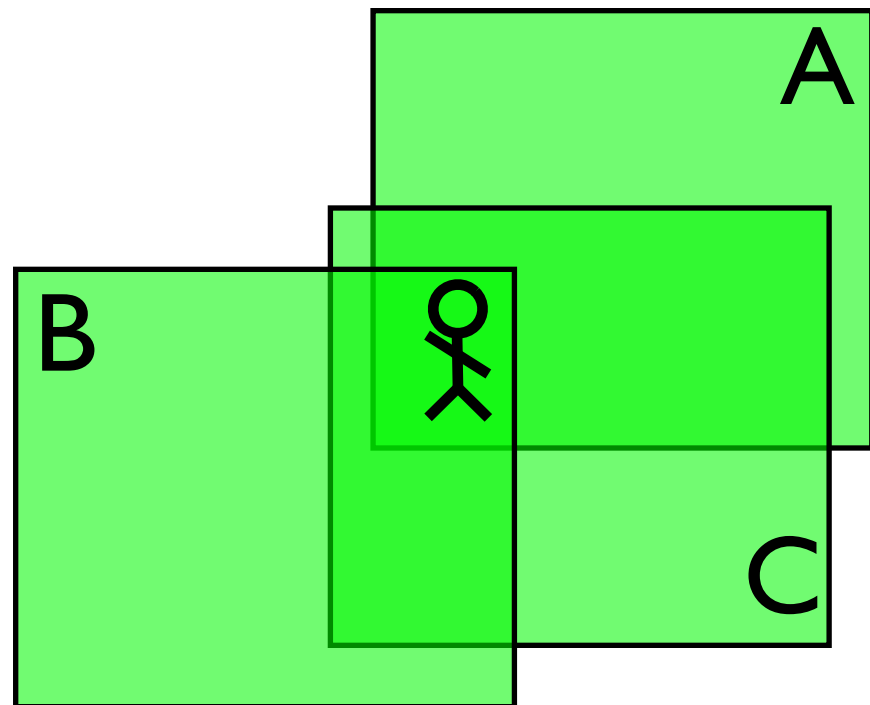
Query
Result



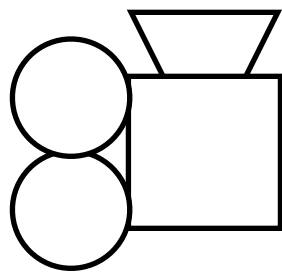
Submission
List



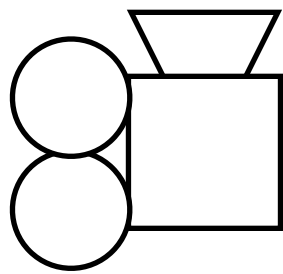
Zoning : Implementation



A



B



C

Priority

2

2

1

Query
Result

A

B

C

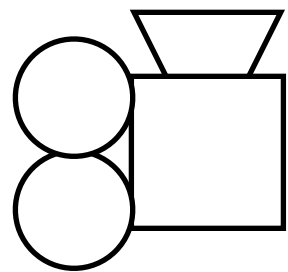
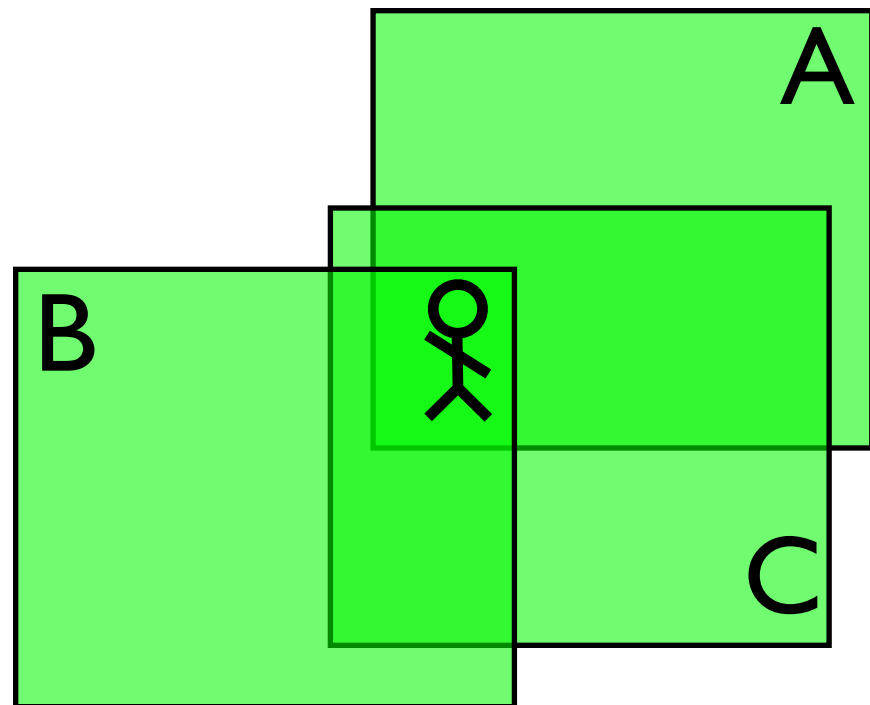
Submission
List

B

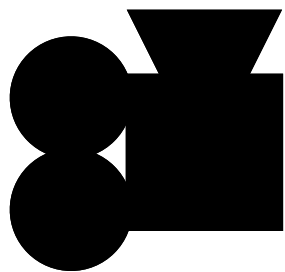
A

C

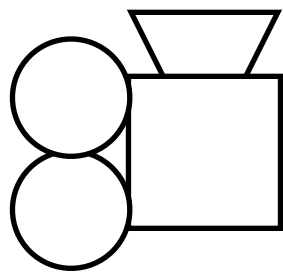
Zoning : Implementation



A



B



C

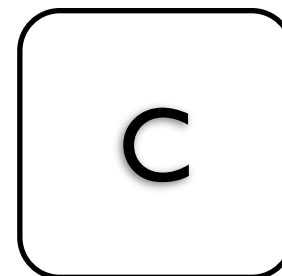
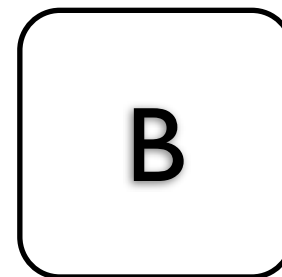
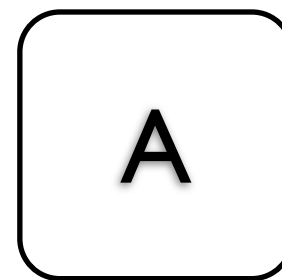
Priority

2

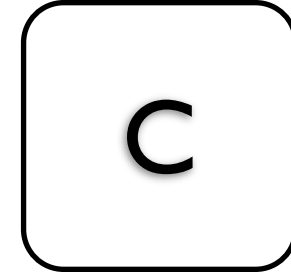
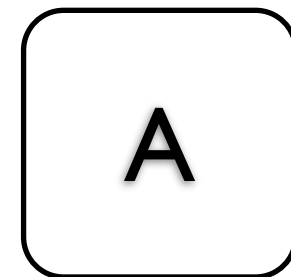
2

1

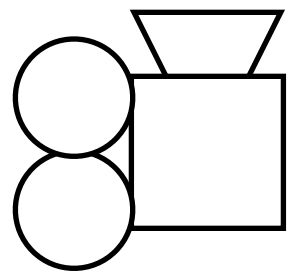
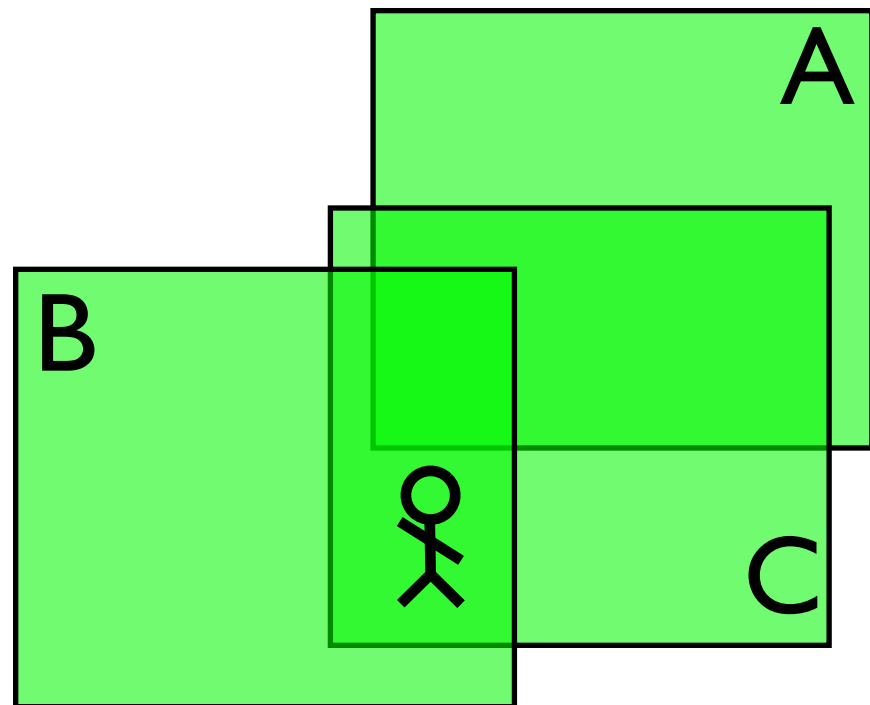
Query
Result



Submission
List

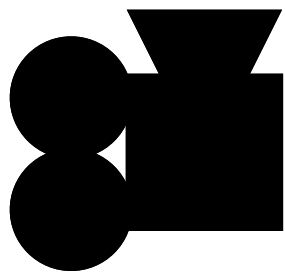


Zoning : Implementation



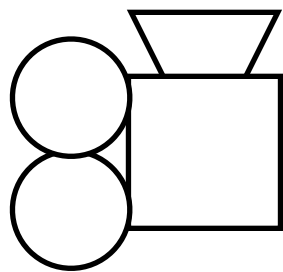
A

2



B

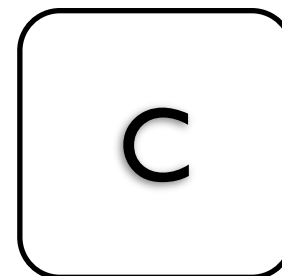
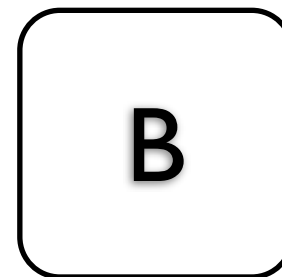
2



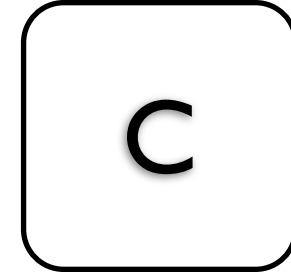
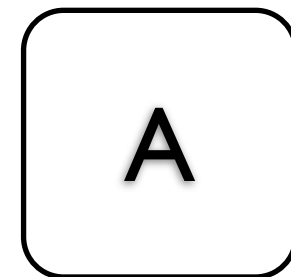
C

1

Query
Result

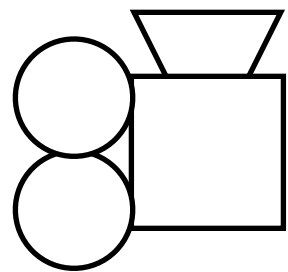
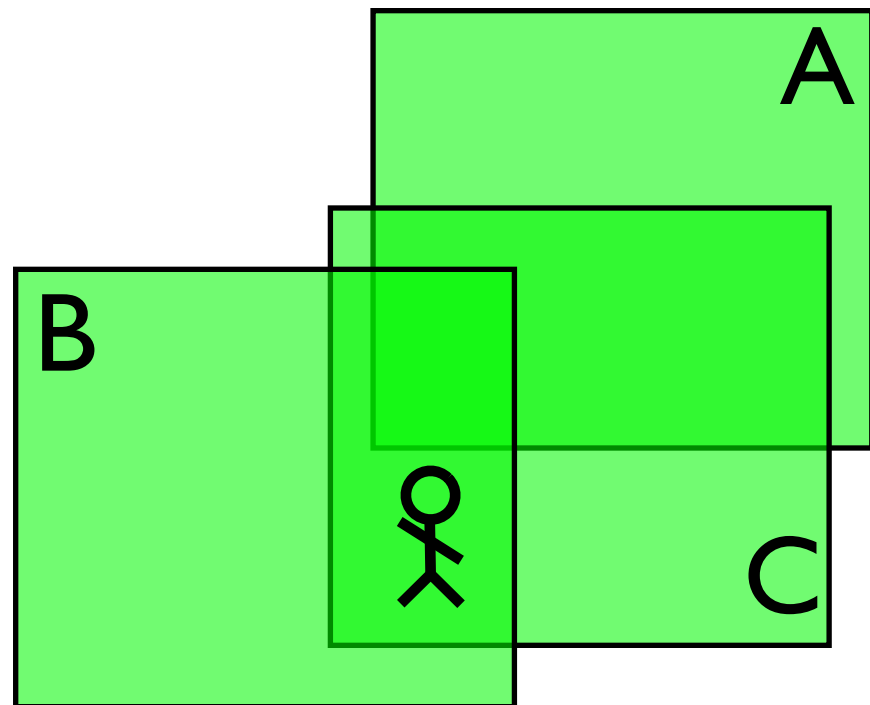


Submission
List

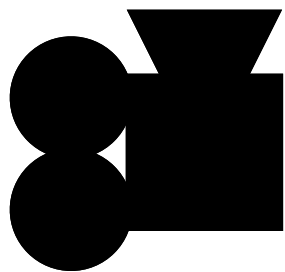


Priority

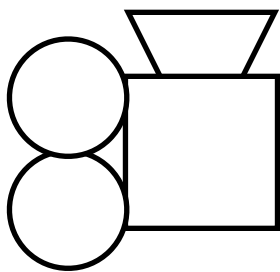
Zoning : Implementation



A



B



C

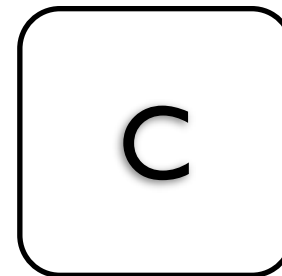
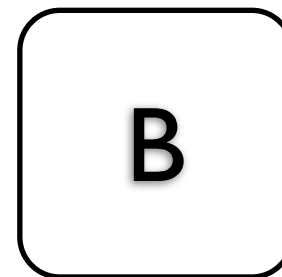
Priority

2

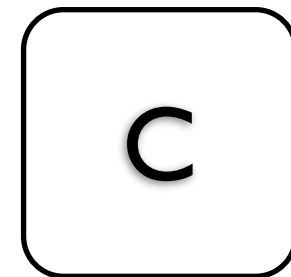
2

1

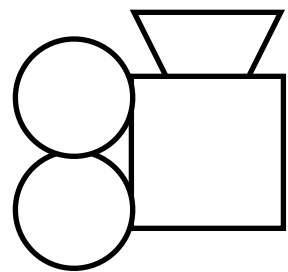
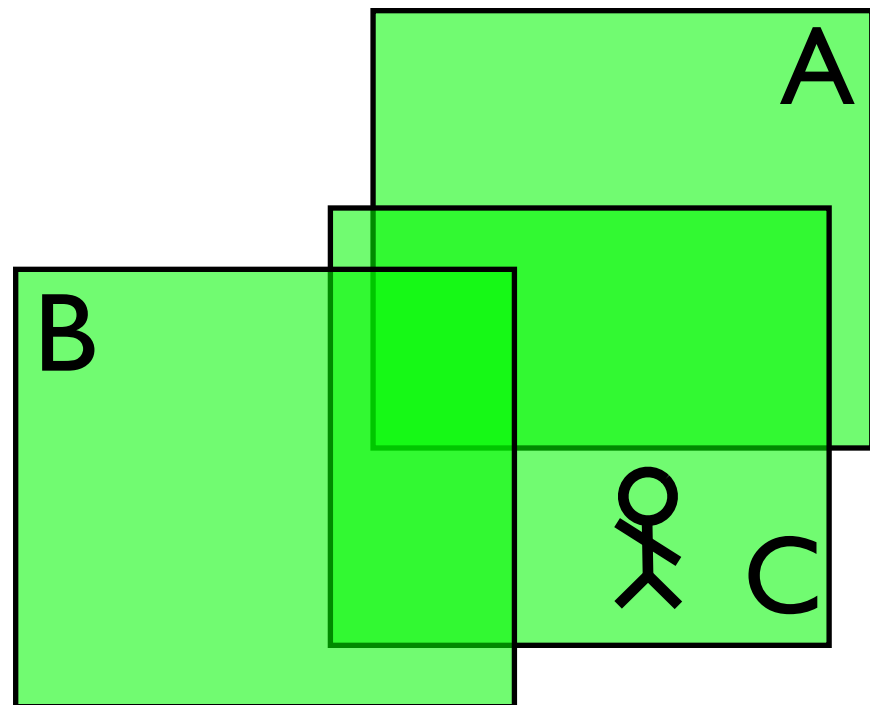
Query
Result



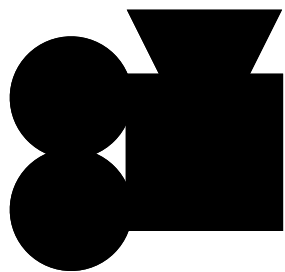
Submission
List



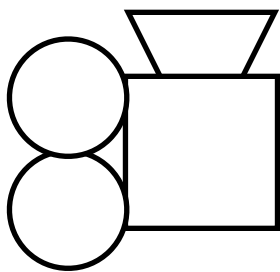
Zoning : Implementation



A



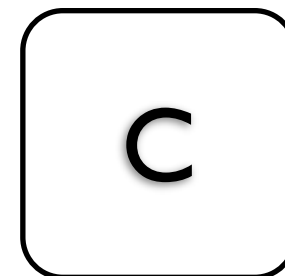
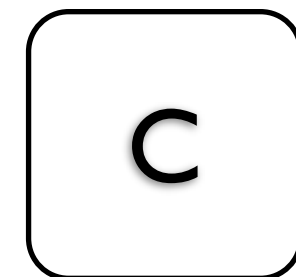
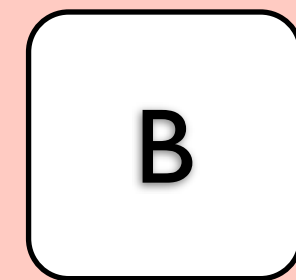
B



C

Query
Result

Submission
List



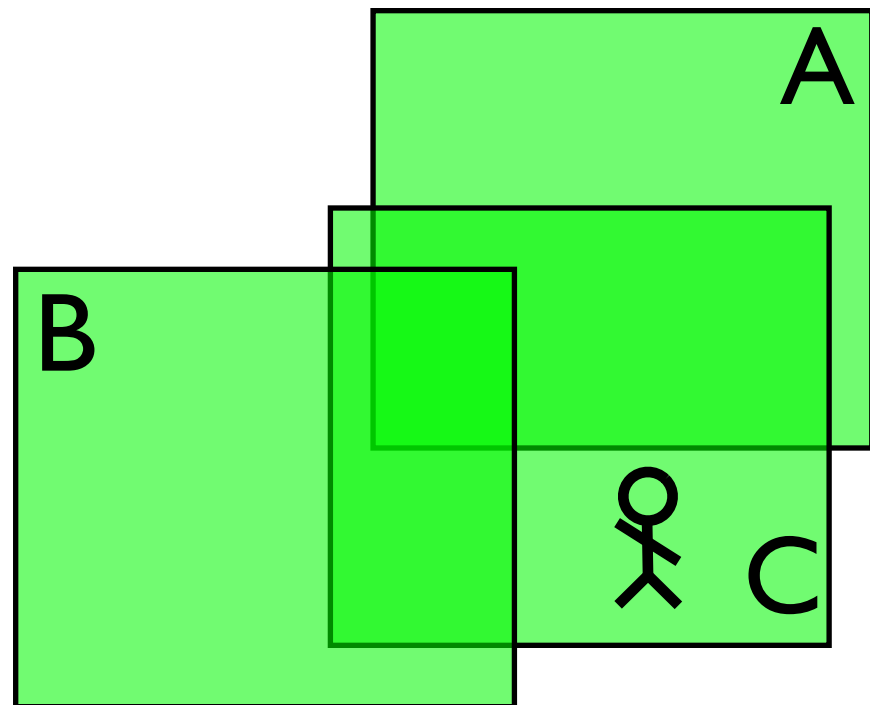
Priority

2

2

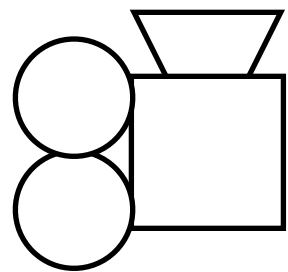
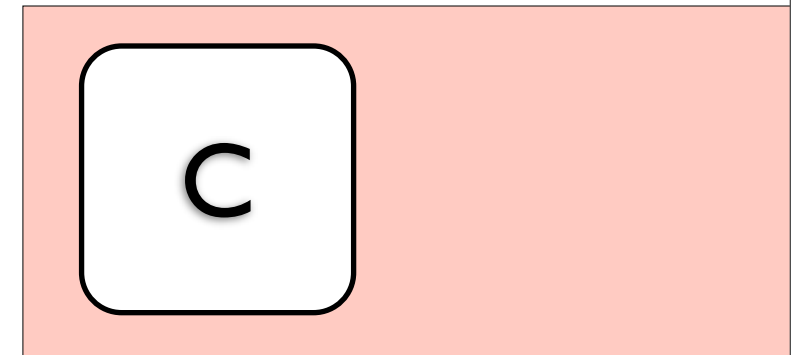
1

Zoning : Implementation

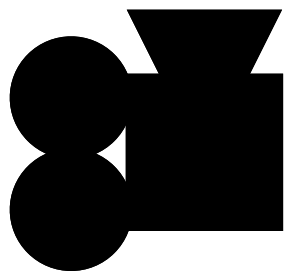


Query
Result

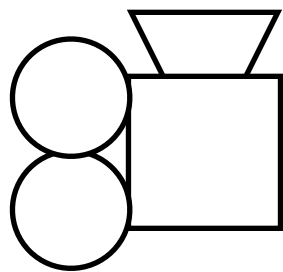
Submission
List



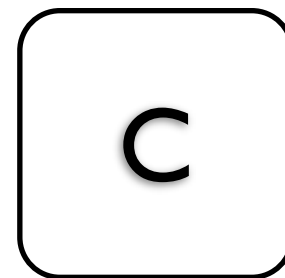
A



B



C



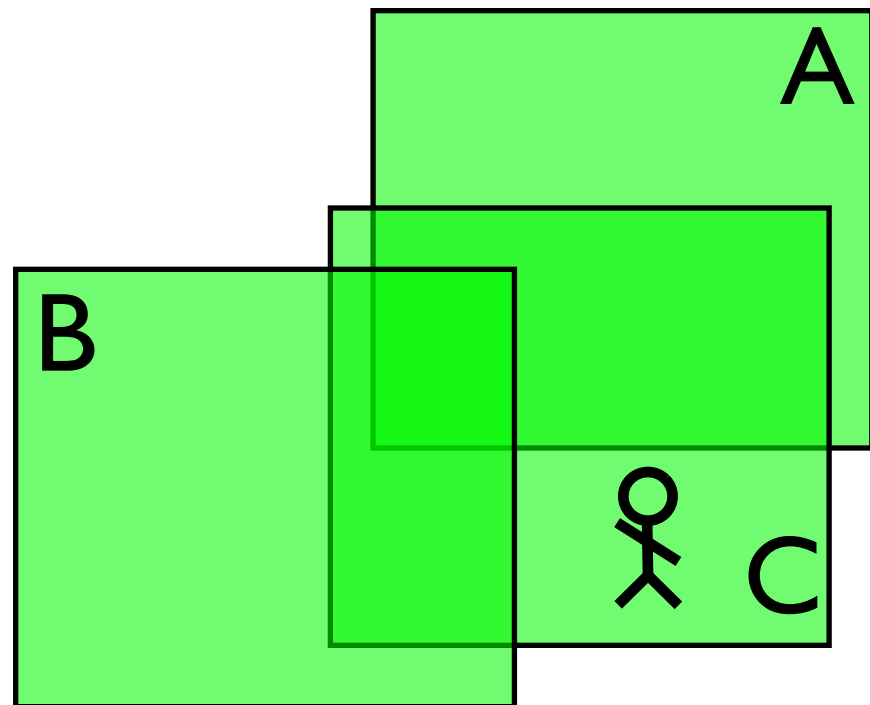
Priority

2

2

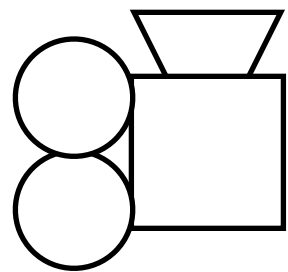
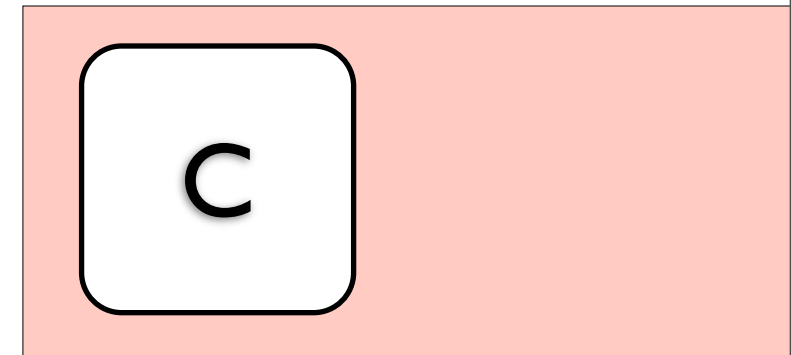
1

Zoning : Implementation

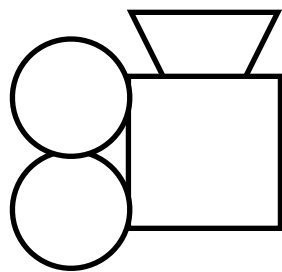


Query
Result

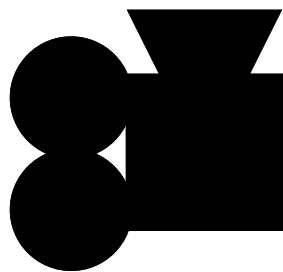
Submission
List



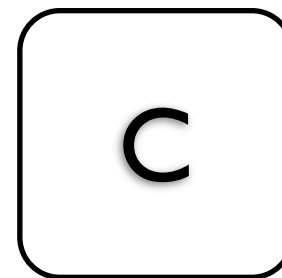
A



B



C



Priority

2

2

1

Zoning Implementation

- Submission List
 - Insert and delete entries to match query results
 - Unless query result was empty
 - Sorted by priority
 - Then by age
 - Top entry is active camera

Overview

- Zoning
- Dynamics
- Blending
- Rails
- Fields

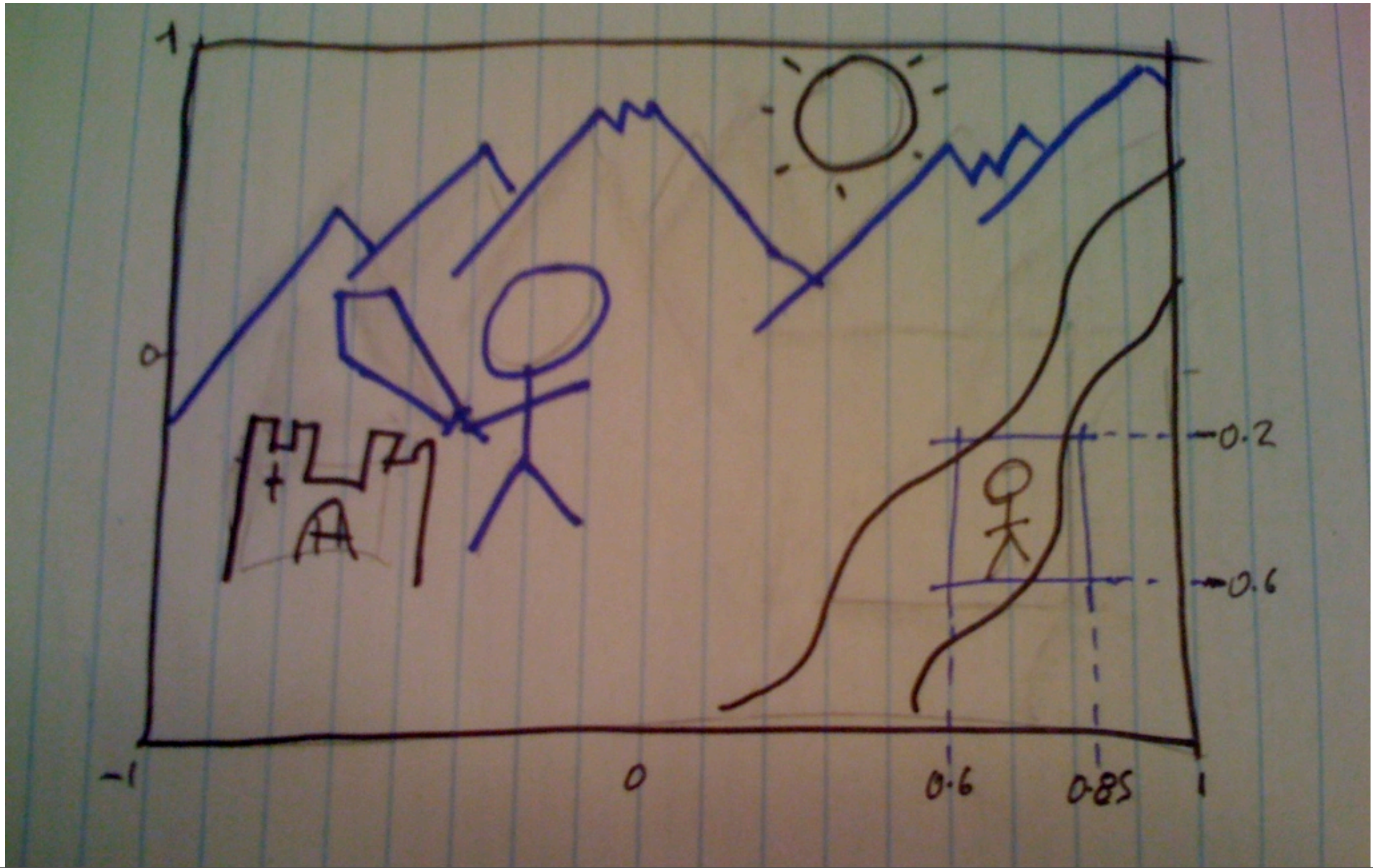
Overview

- Zoning
- **Dynamics**
- Blending
- Rails
- Fields

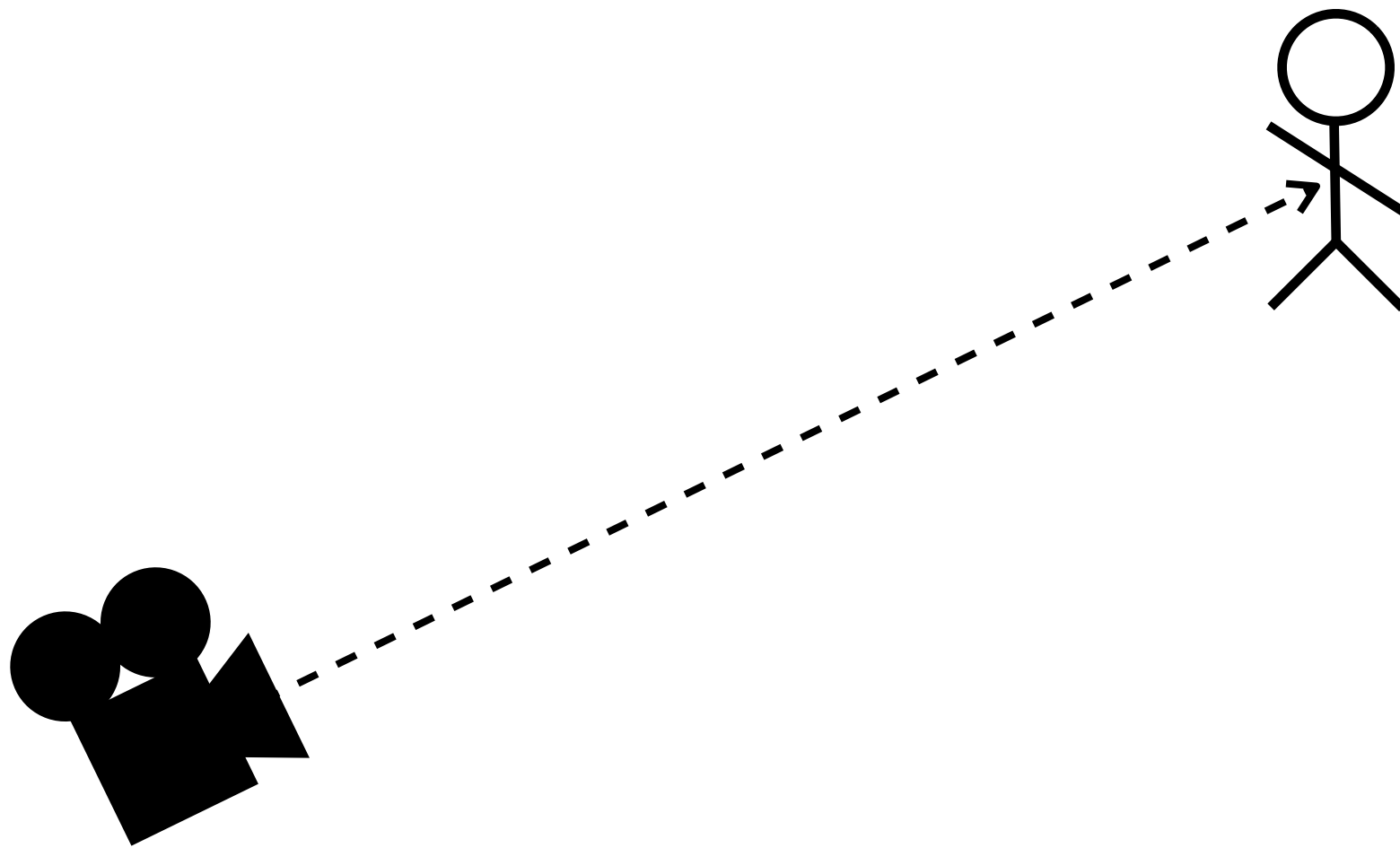
Dynamics : Objectives

- Control the display of the Player
 - Position
 - Angle
 - Size

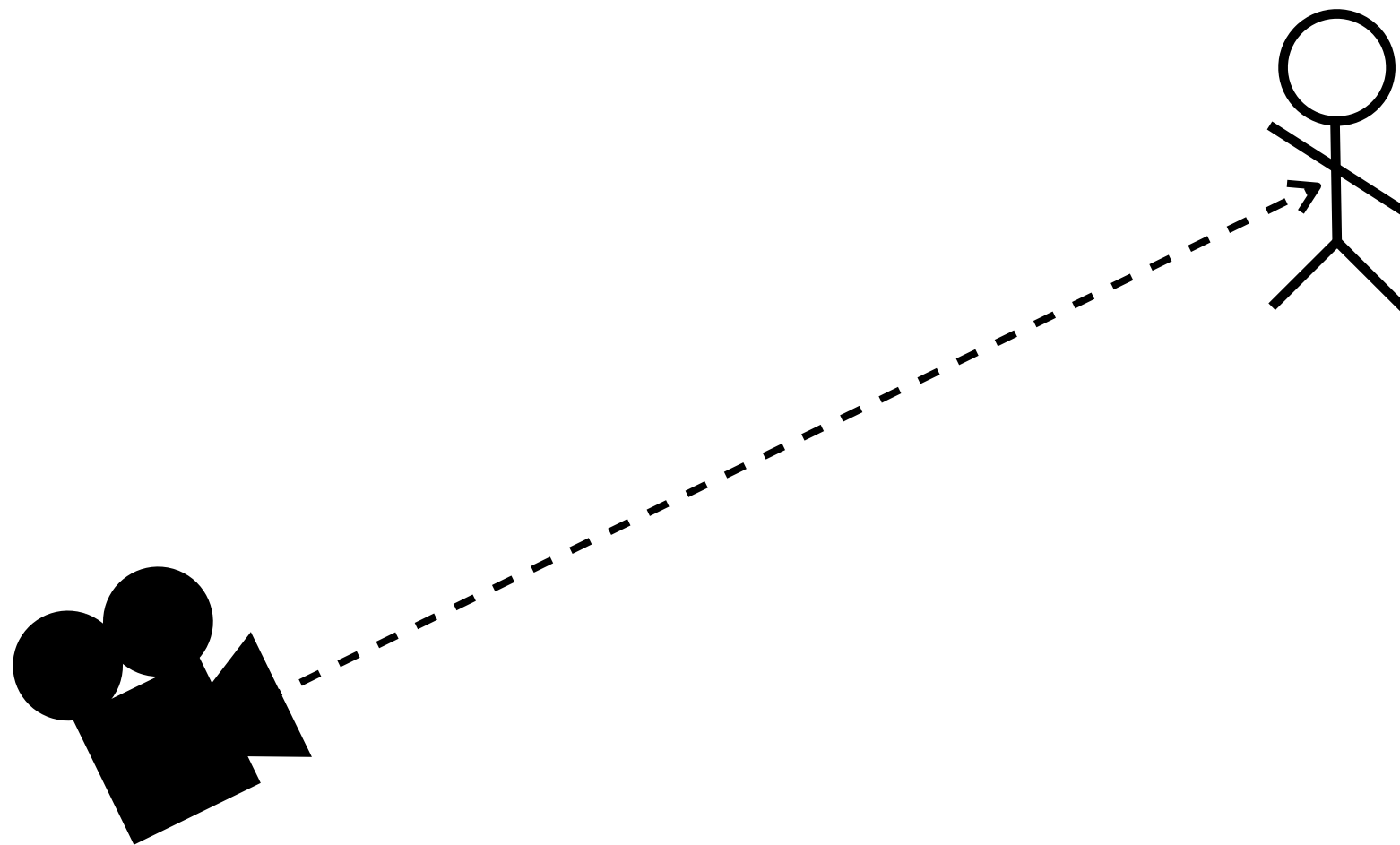
Dynamics : Design



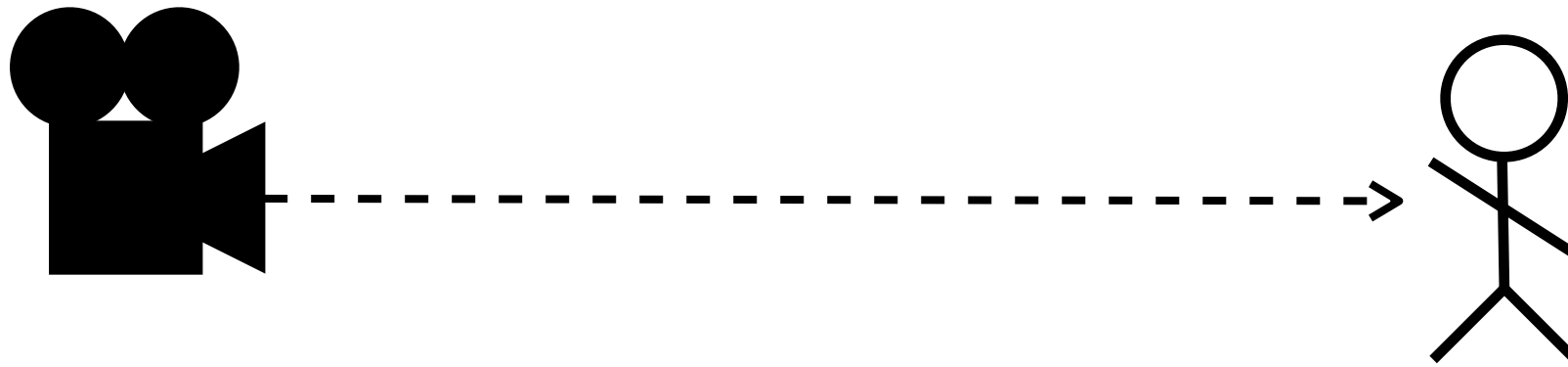
Dynamics : Design



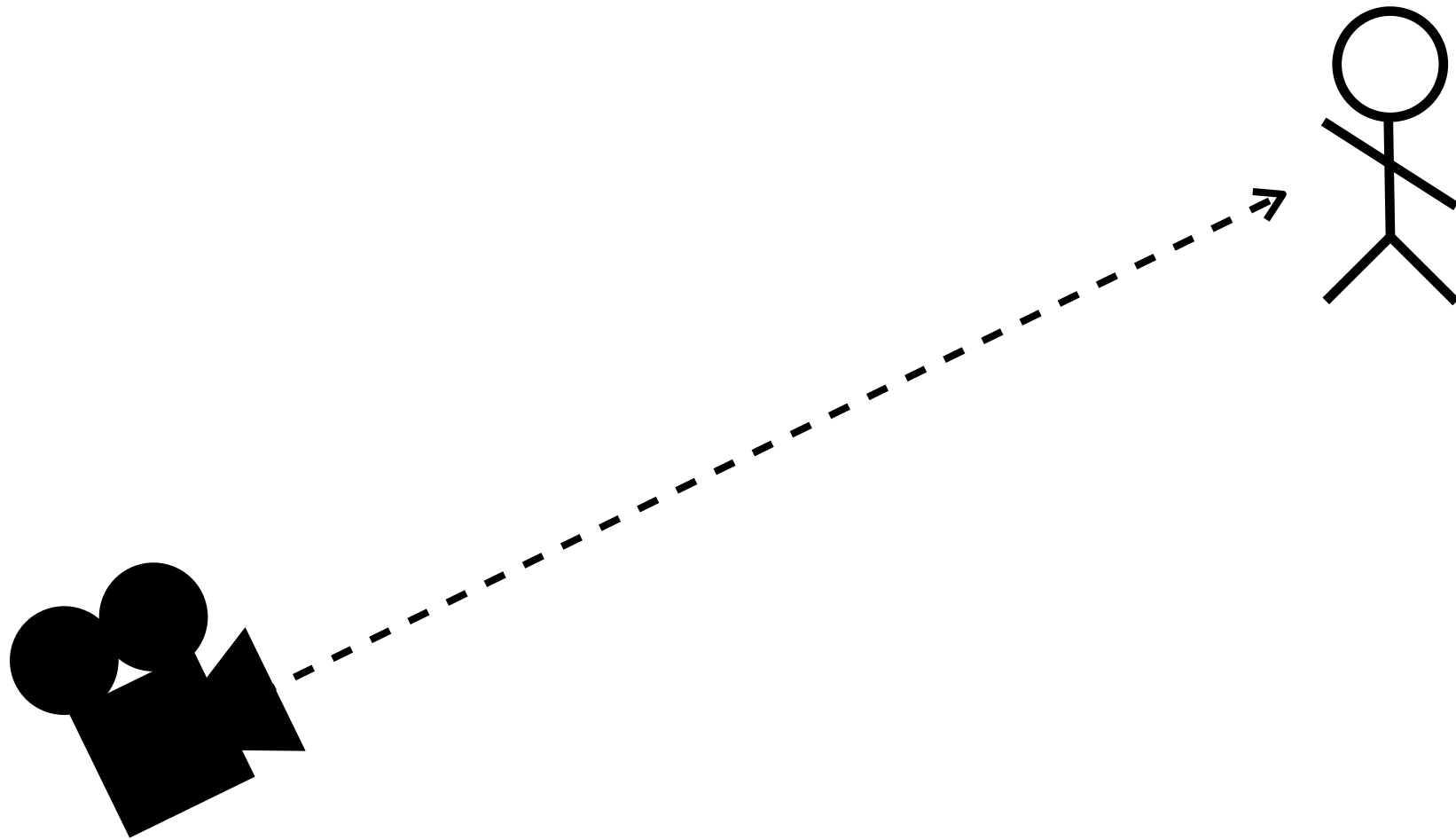
Dynamics : Design



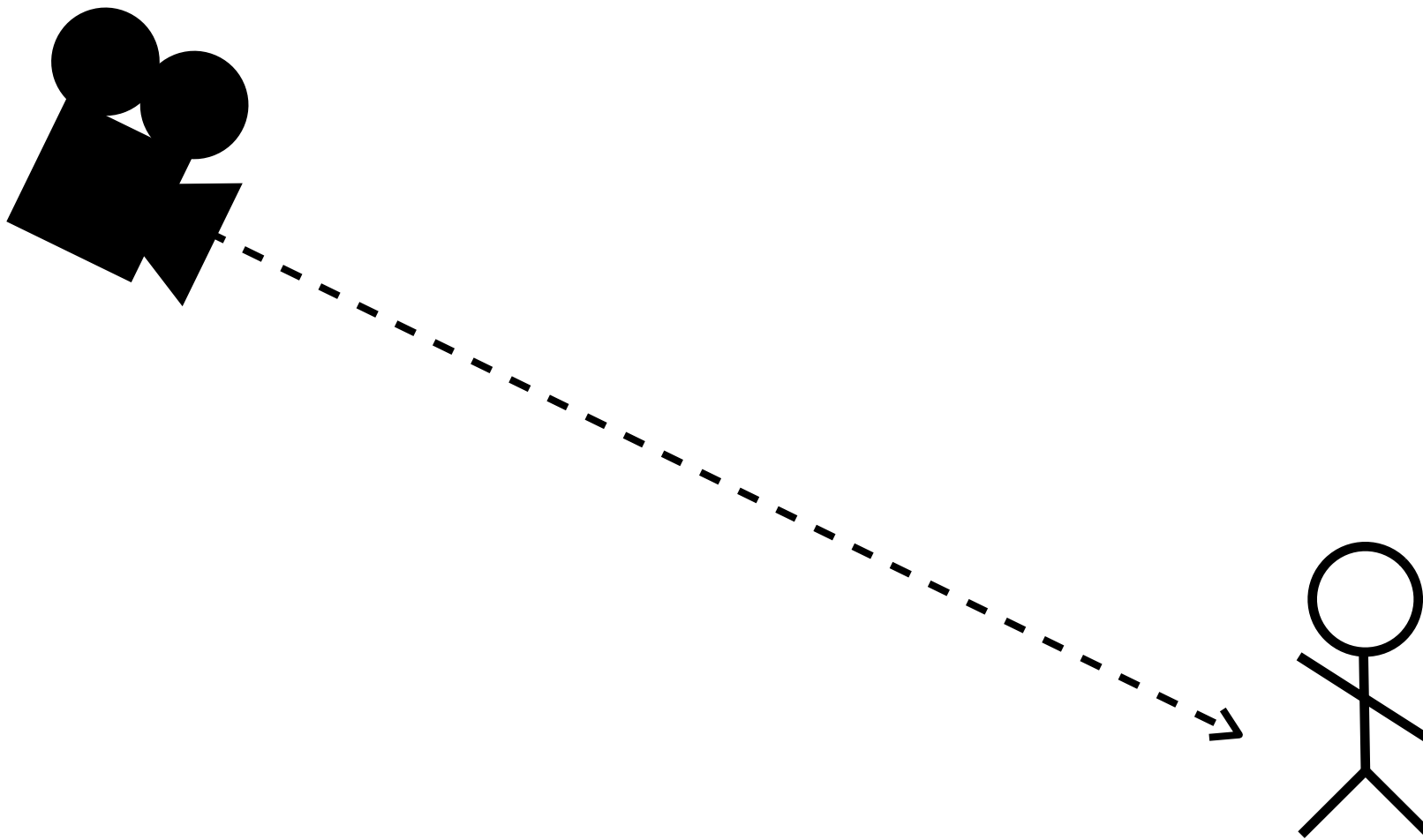
Dynamics : Design



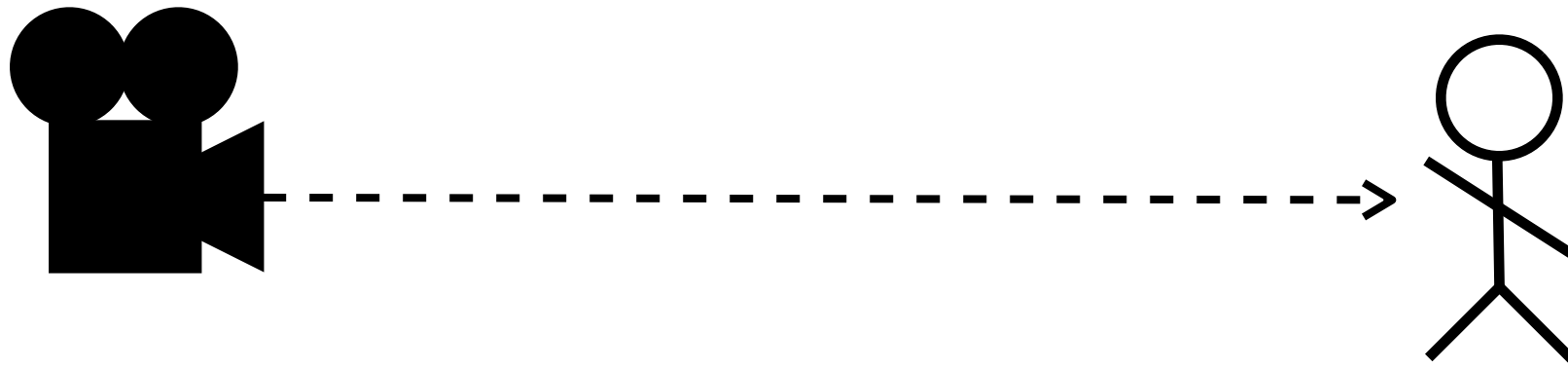
Dynamics : Design



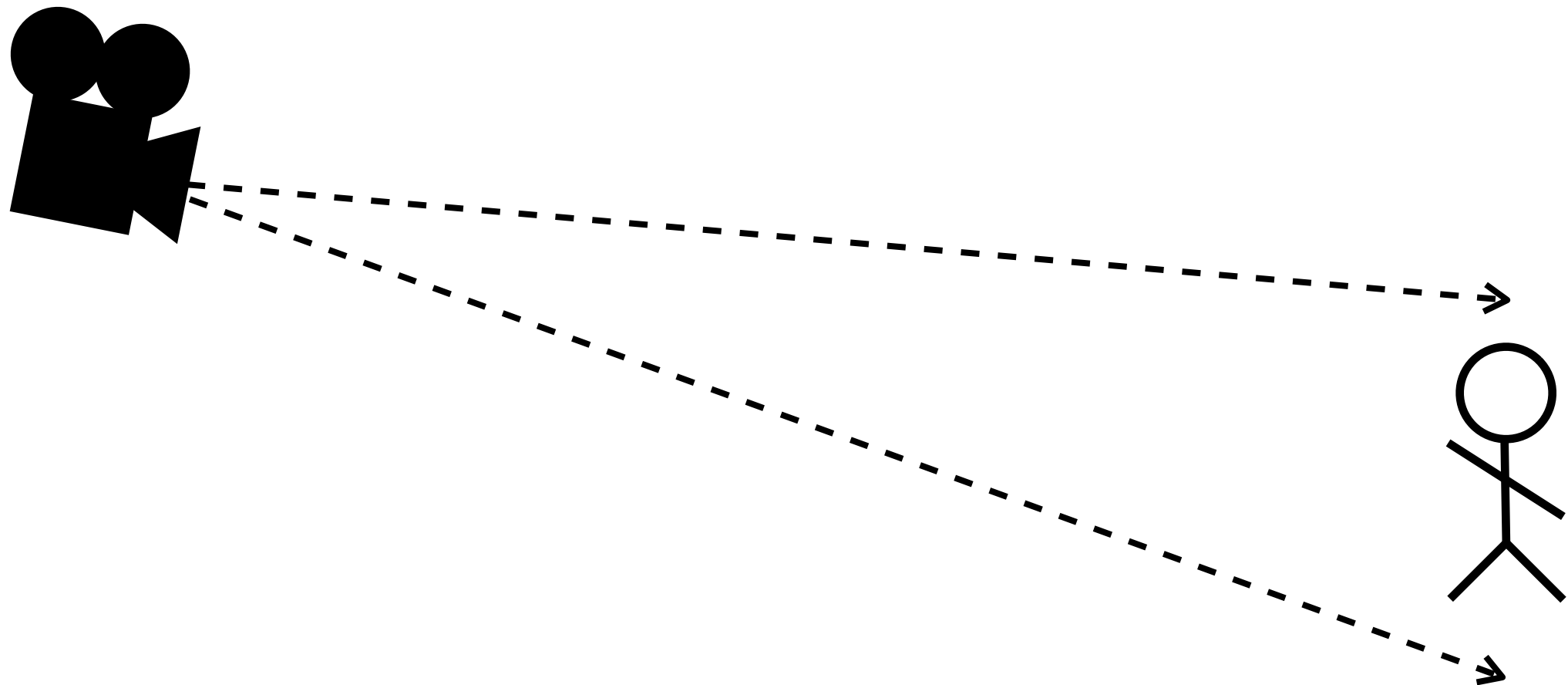
Dynamics : Design



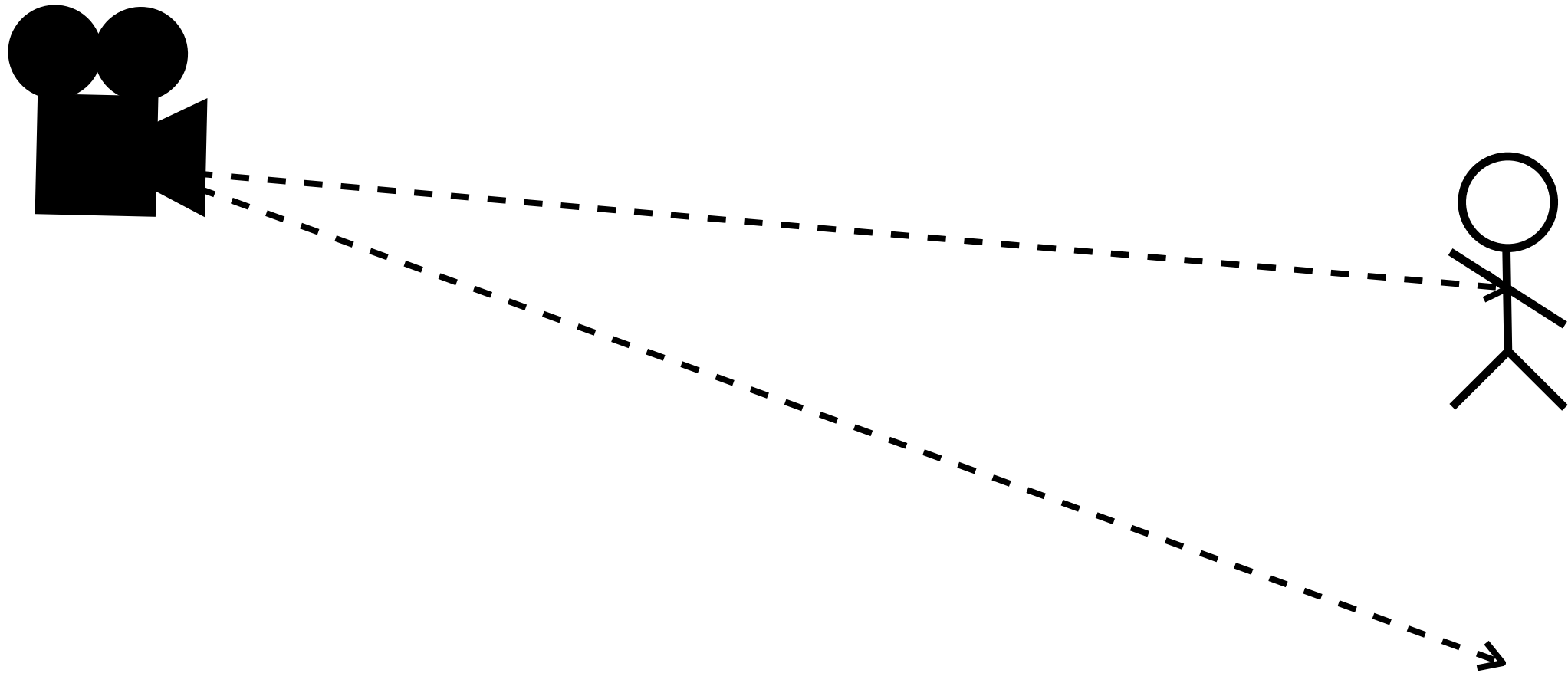
Dynamics : Design



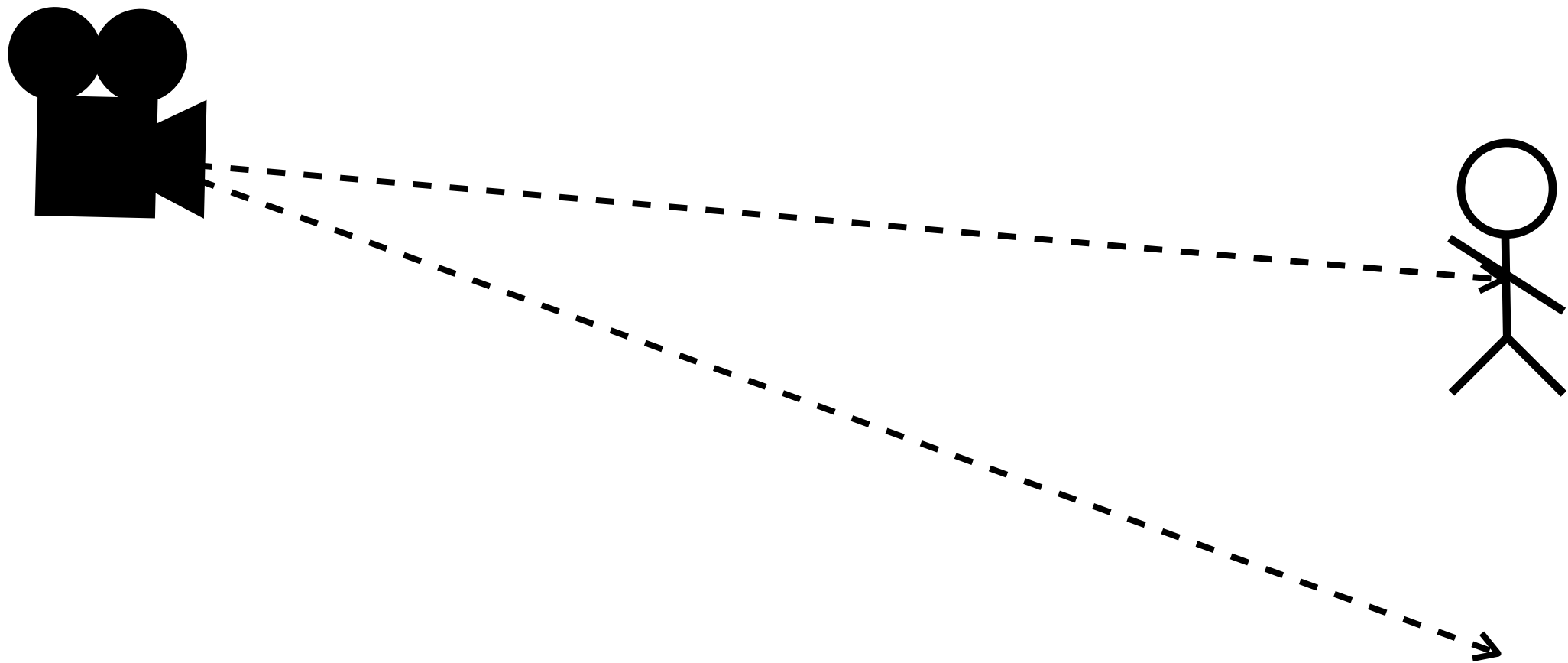
Dynamics : Design



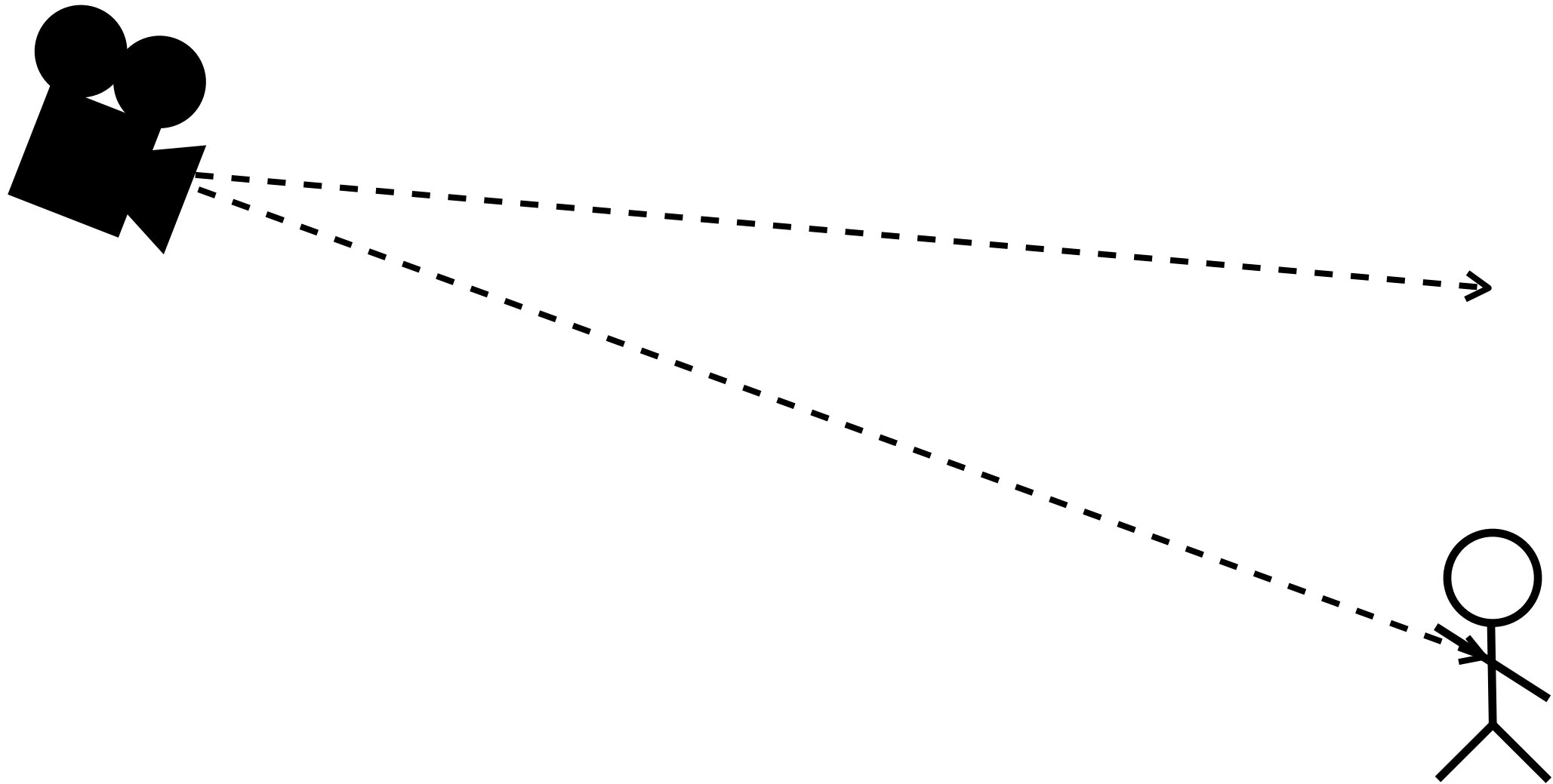
Dynamics : Design



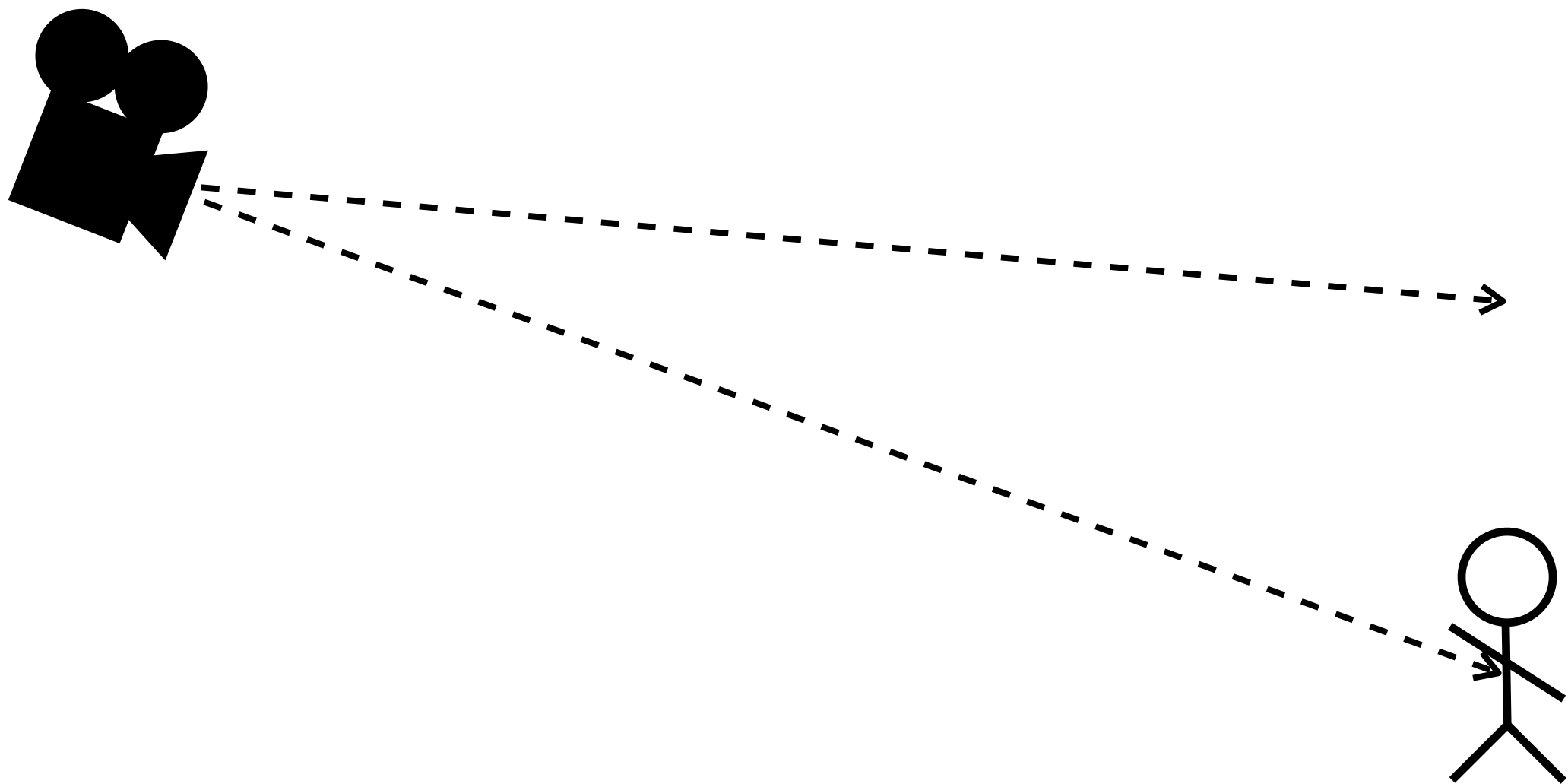
Dynamics : Design



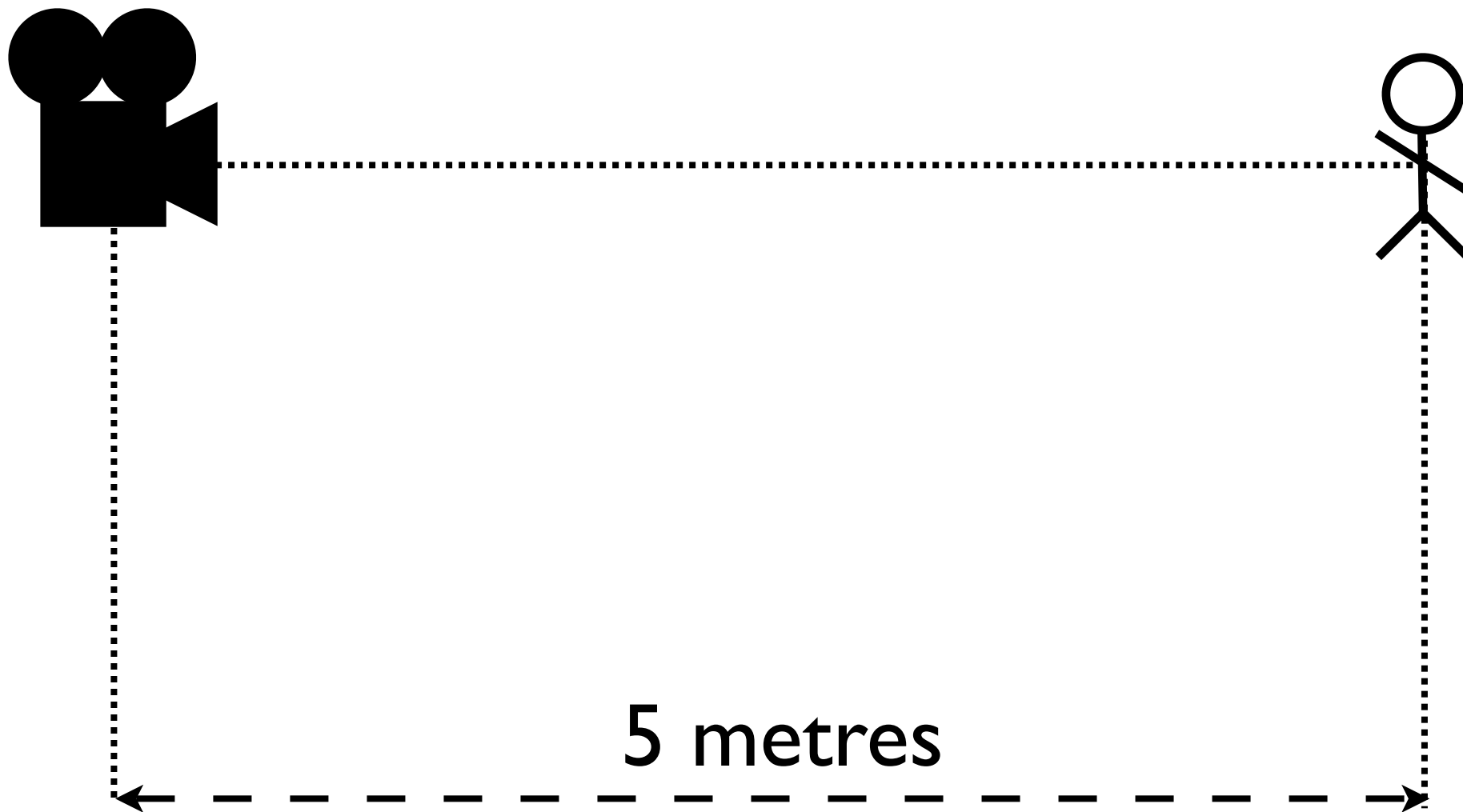
Dynamics : Design



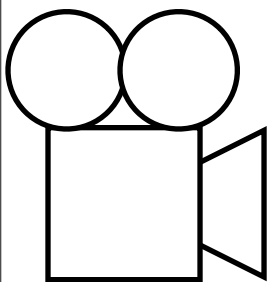
Dynamics : Design



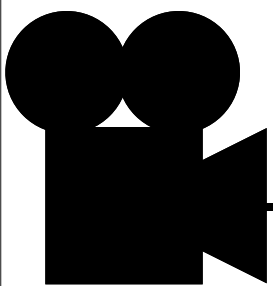
Dynamics : Design



Dynamics : Design



Dynamics : Design

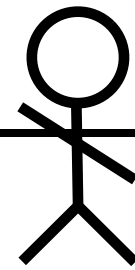


1.0

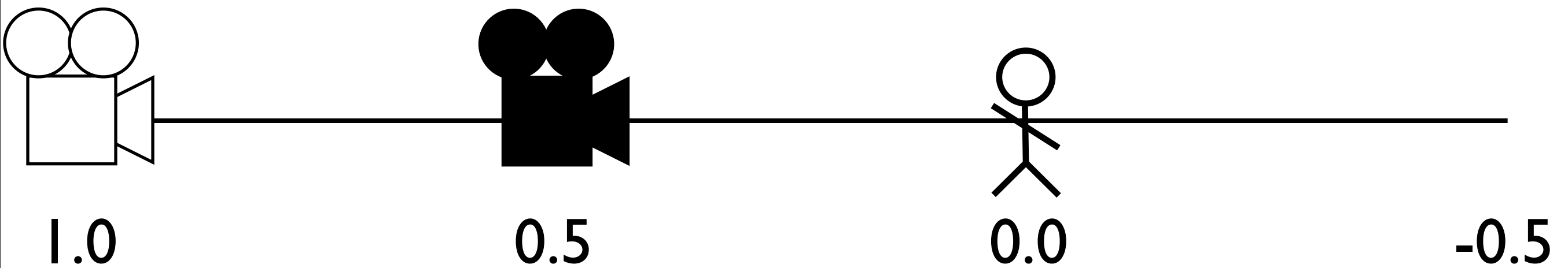
0.5

0.0

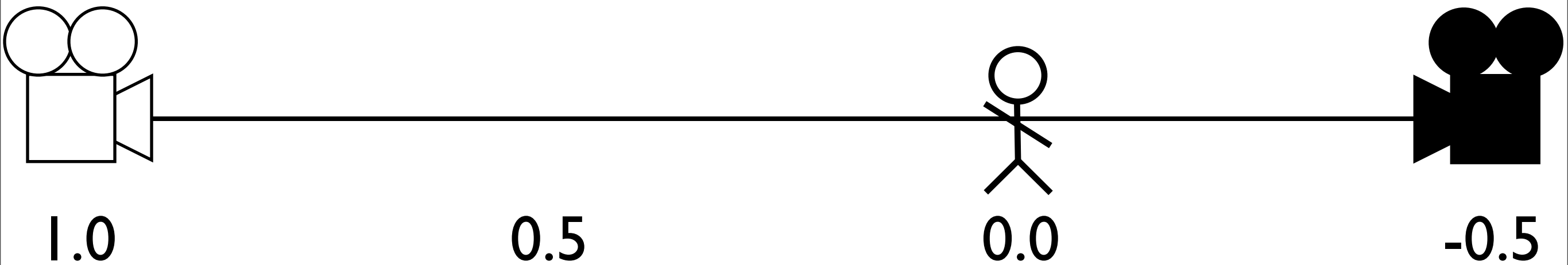
-0.5



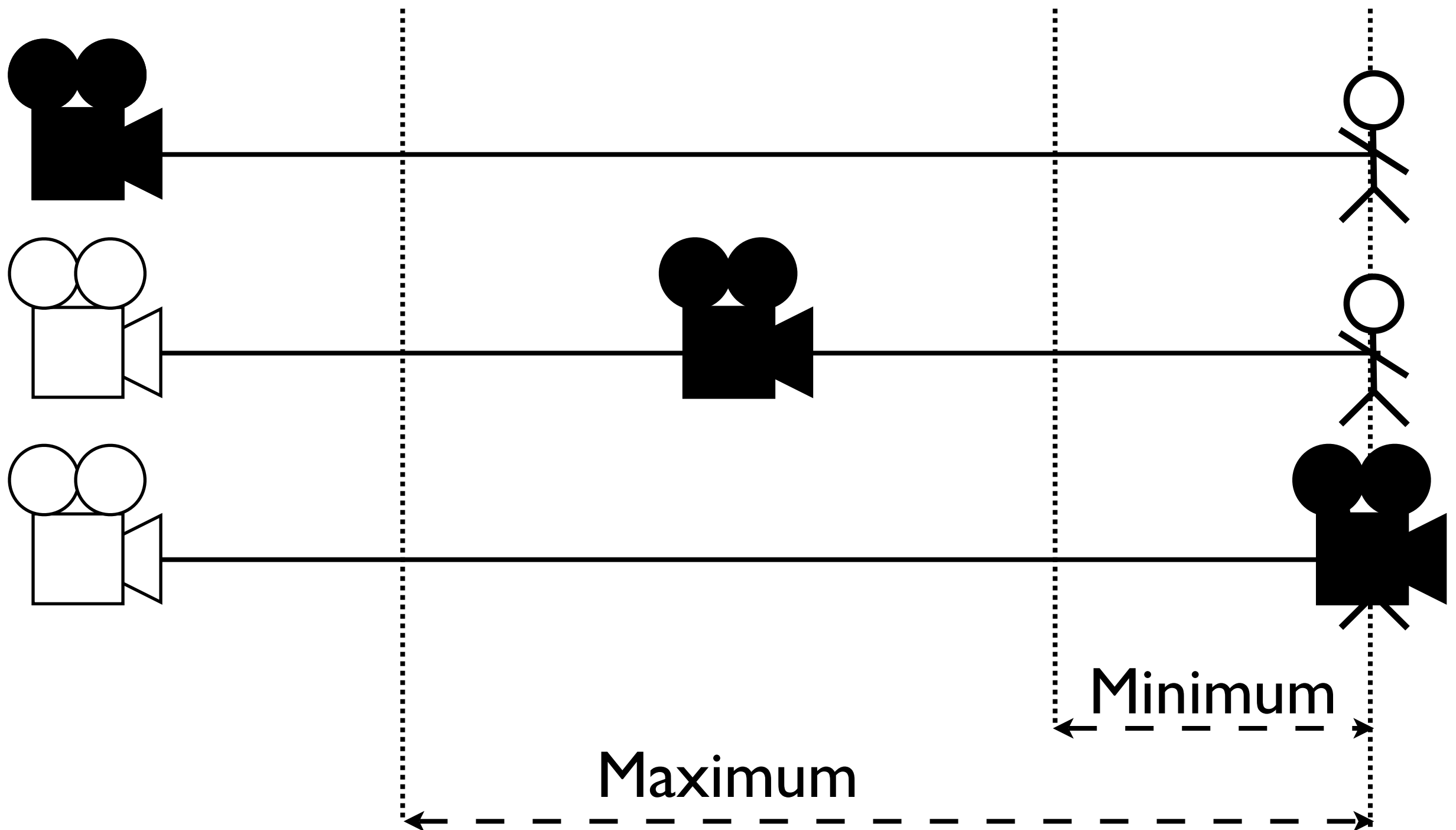
Dynamics : Design



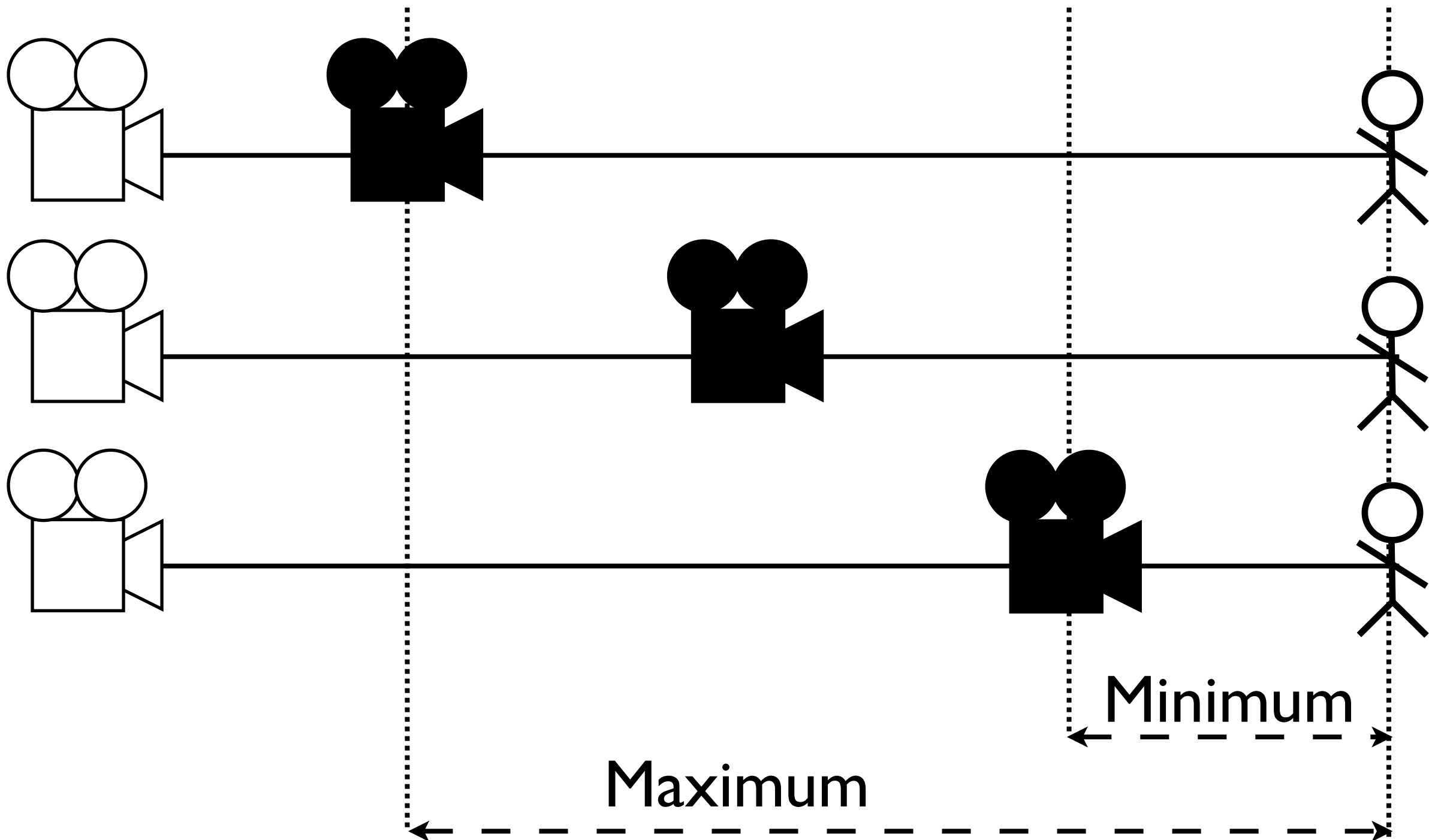
Dynamics : Design



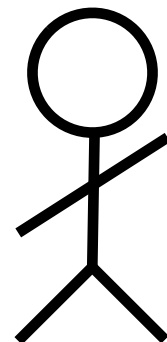
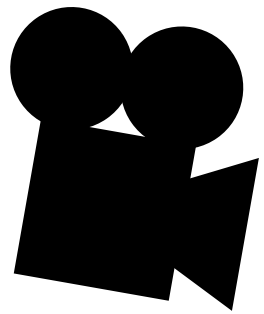
Dynamics : Design



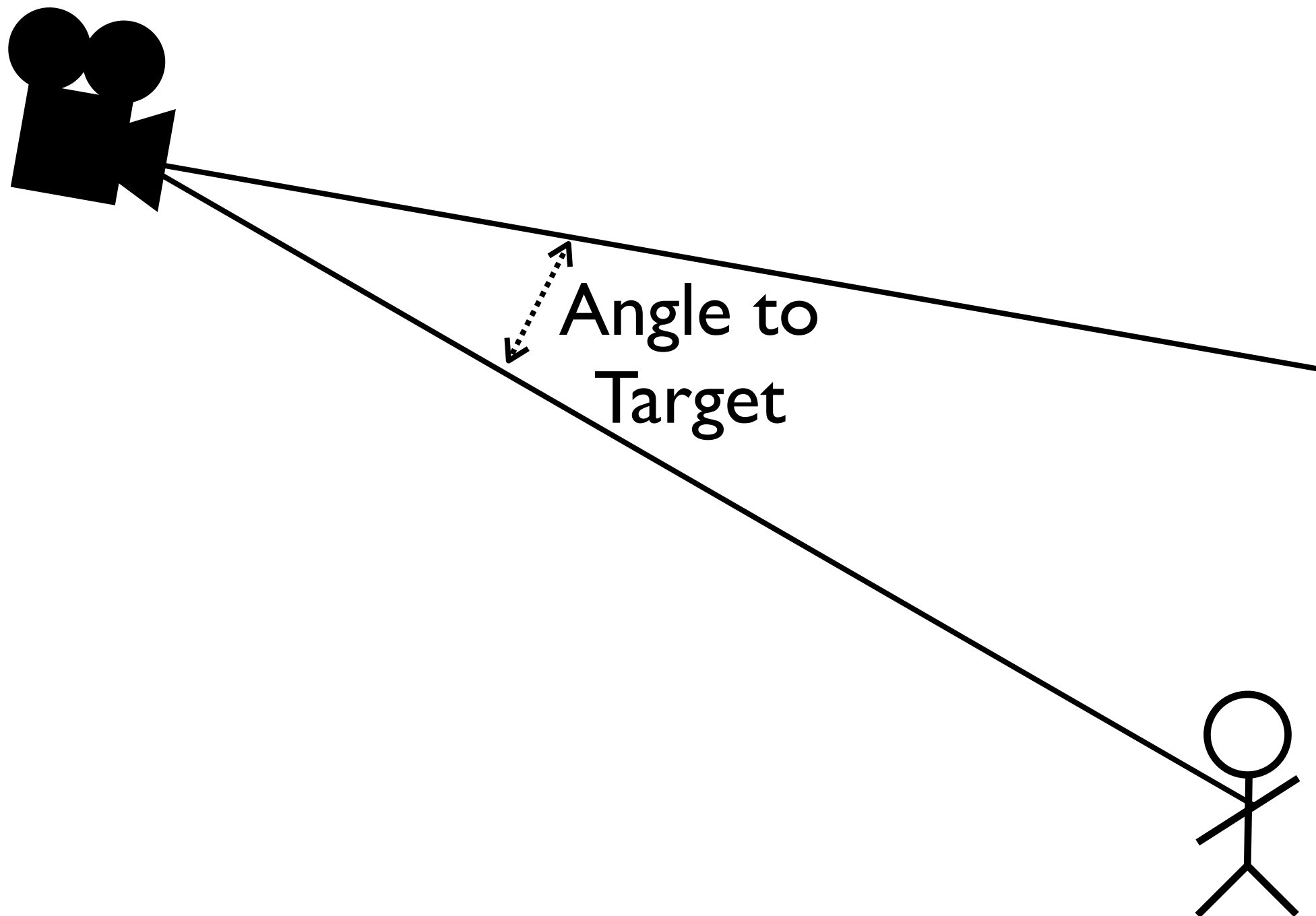
Dynamics : Design



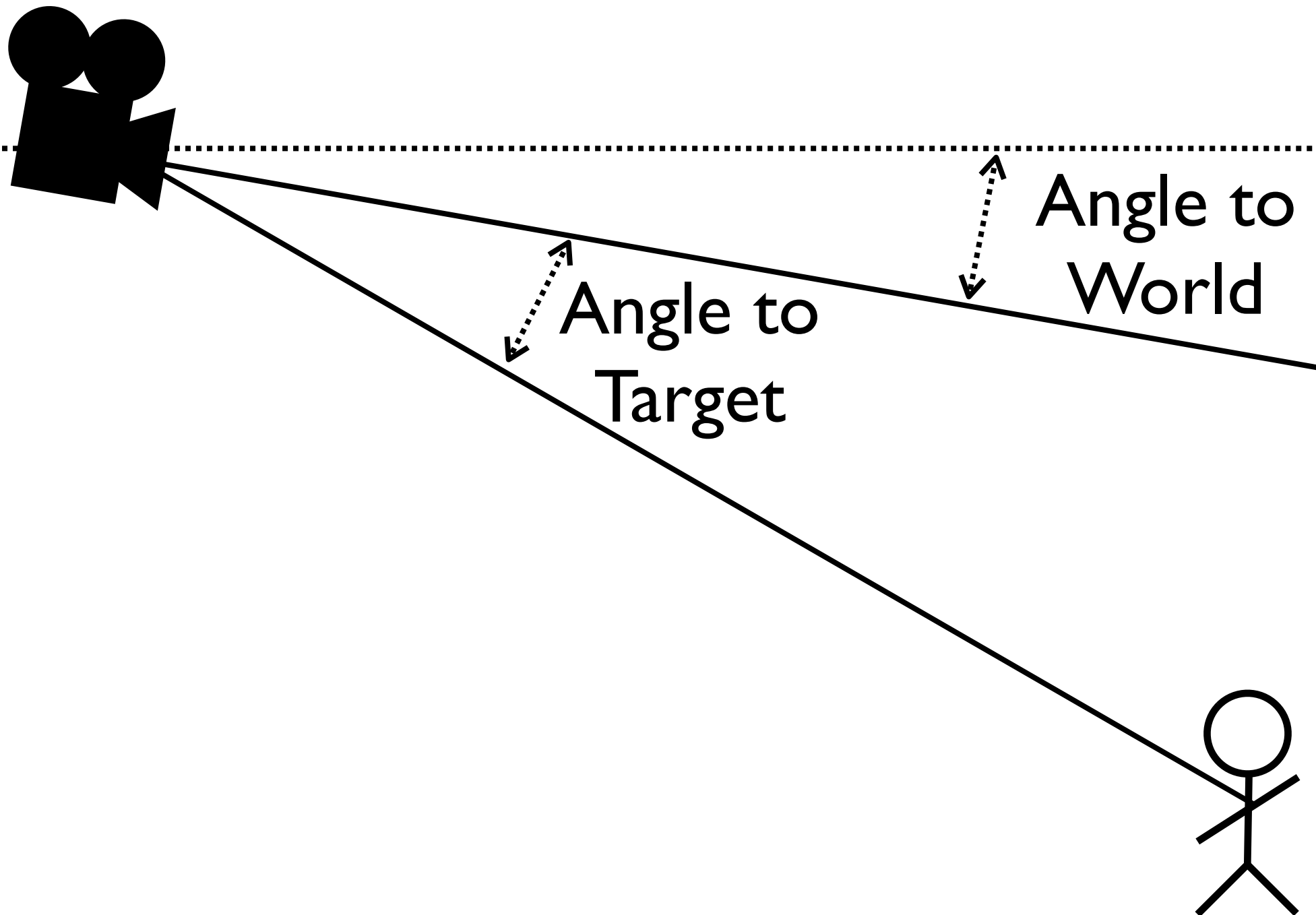
Dynamics : Implementation



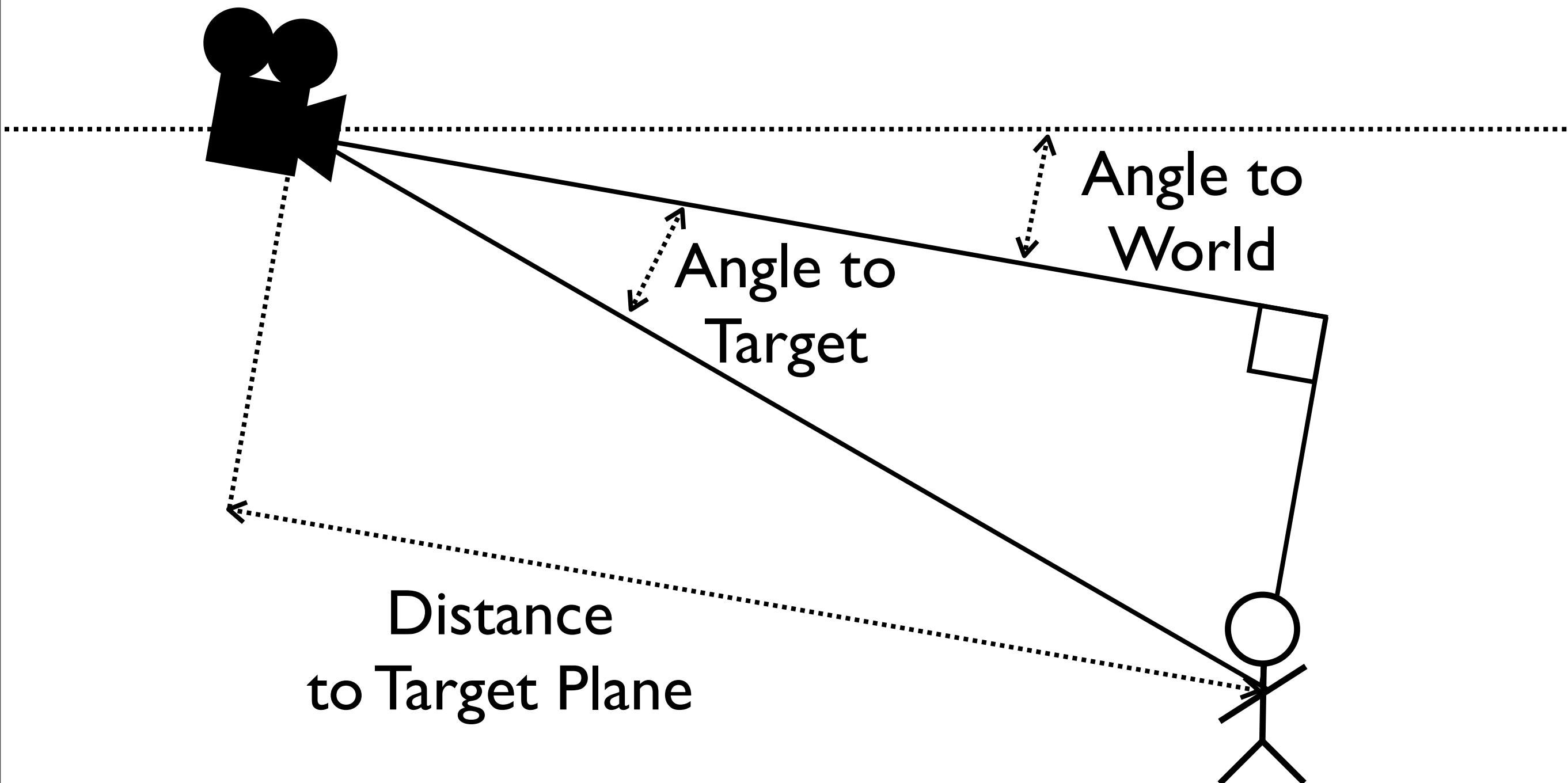
Dynamics : Implementation



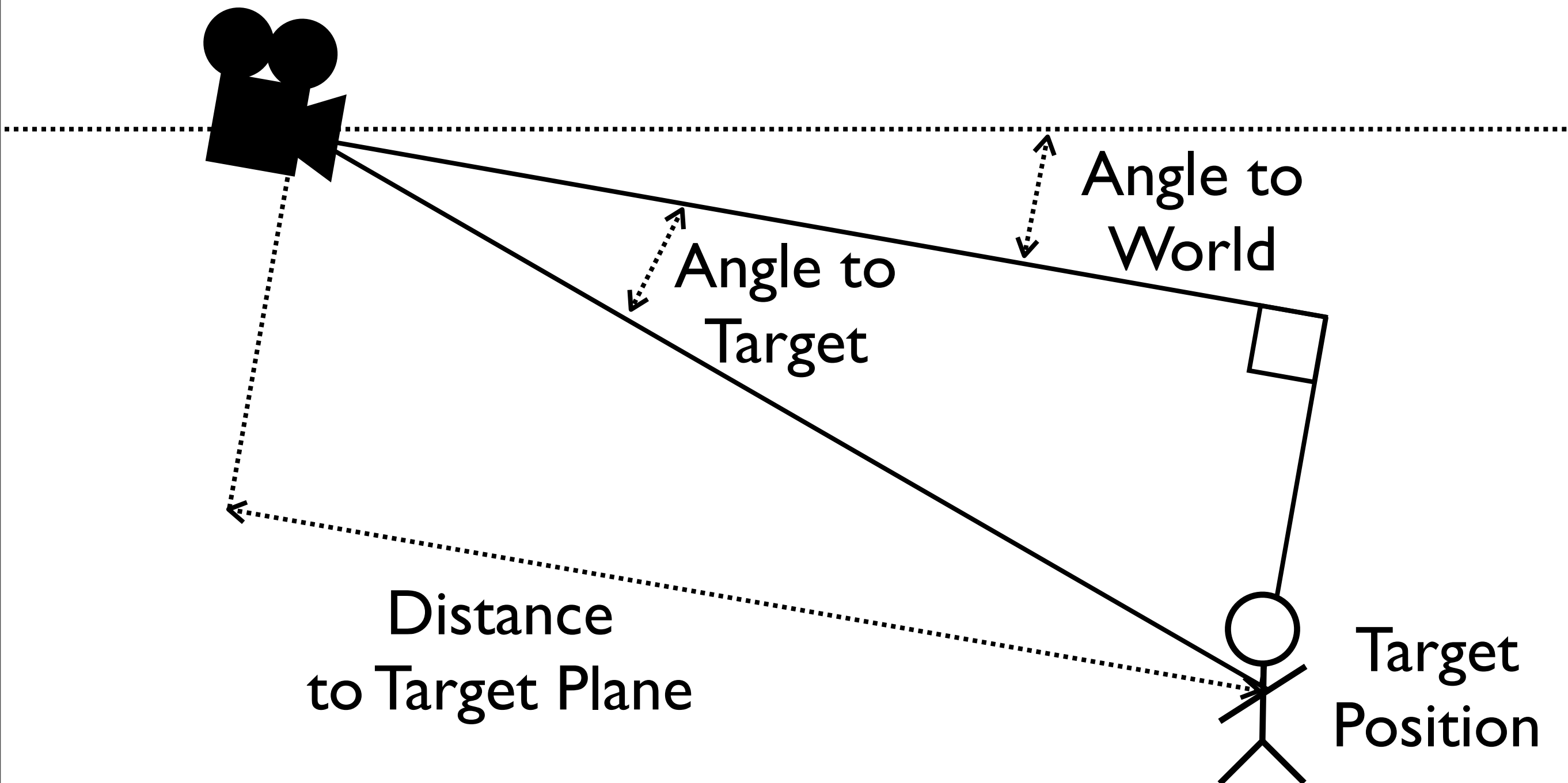
Dynamics : Implementation



Dynamics : Implementation



Dynamics : Implementation



Dynamics : Implementation

- Calculate Angle from Camera to Target
- Constrain Angle from Camera to Target
- Calculate Angle from Camera to World
- Constrain Angle from Camera to World
- Calculate Distance from Camera to Target Plane
- Constrain Distance from Camera to Target Plane

Overview

- Zoning
- **Dynamics**
- Blending
- Rails
- Fields

Overview

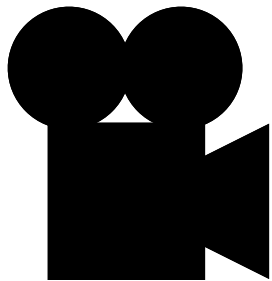
- Zoning
- Dynamics
- **Blending**
- Rails
- Fields

Blending : Overview

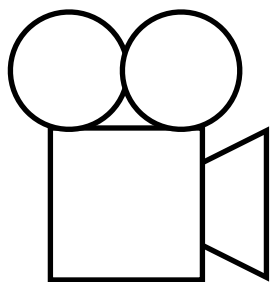
- Timers
- Ease
- Blend Space

Timers : Design

A



B



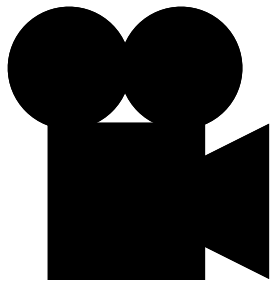
A



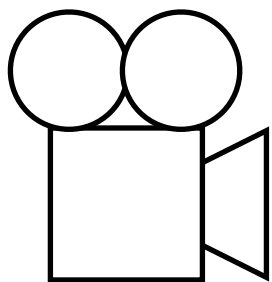
B

Timers : Design

A



B



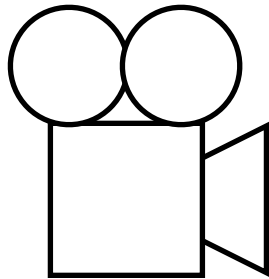
A

B

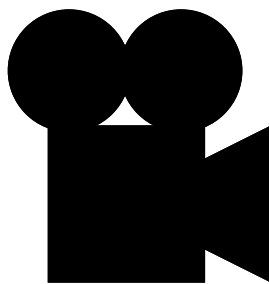


Timers : Design

A



B



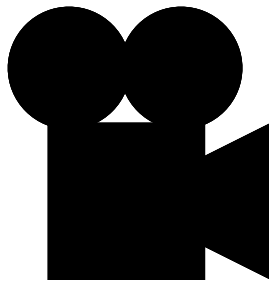
A

B

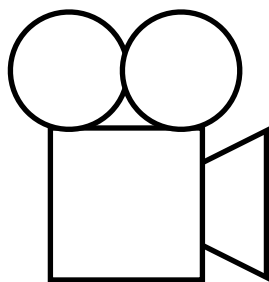


Timers : Design

A



B



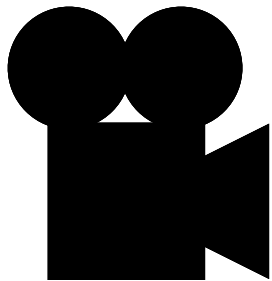
A



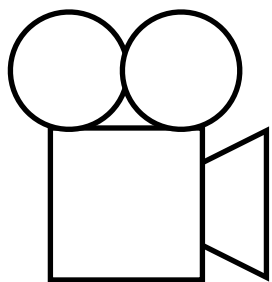
B

Timers : Design

A



B



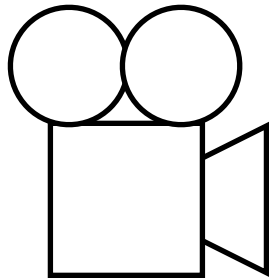
A

B

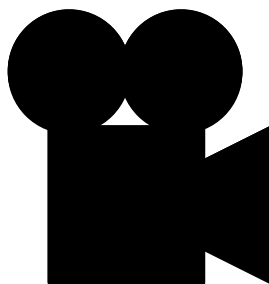


Timers : Design

A



B



A

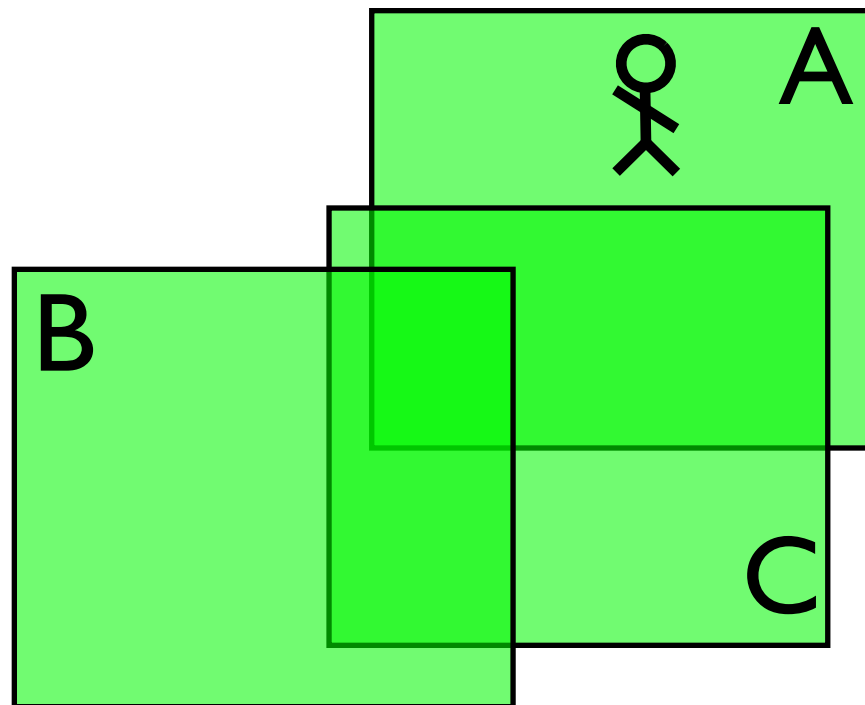
B



Timers : Implementation

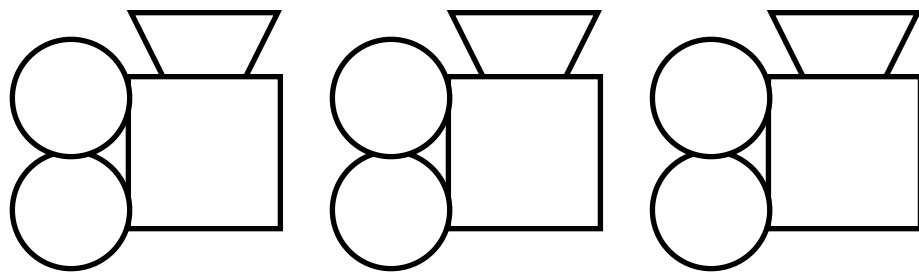
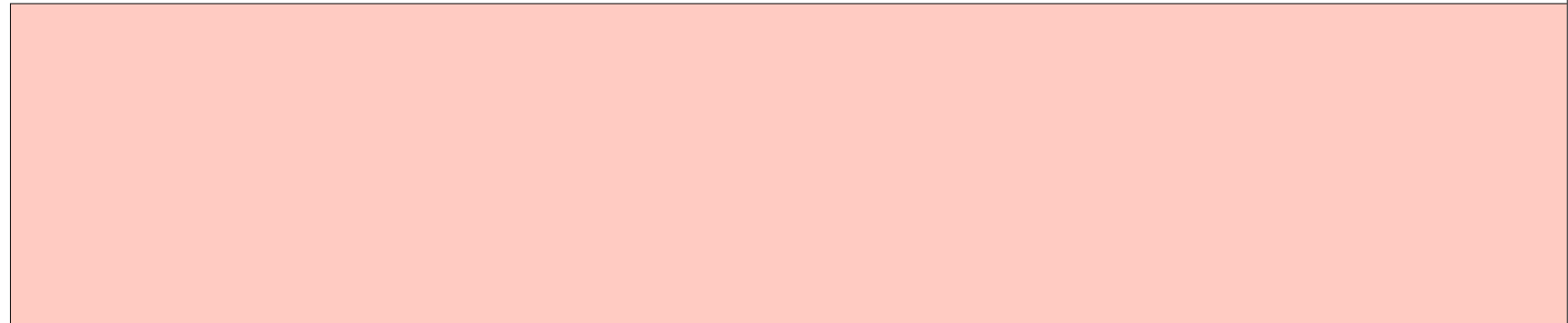
- Timer List
 - Entry is a camera fading in
 - Camera can have multiple timers in list
 - FIFO
 - New timers inserted at the top
 - When a timer completes, all timers below it are removed

Timers : Implementation



Submission
List

Timer
List

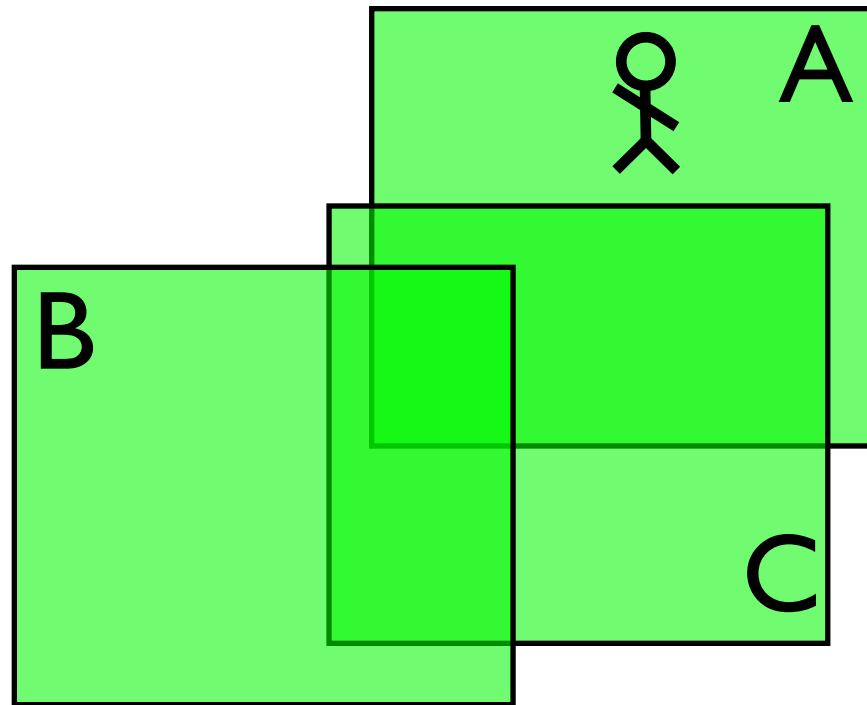


A

B

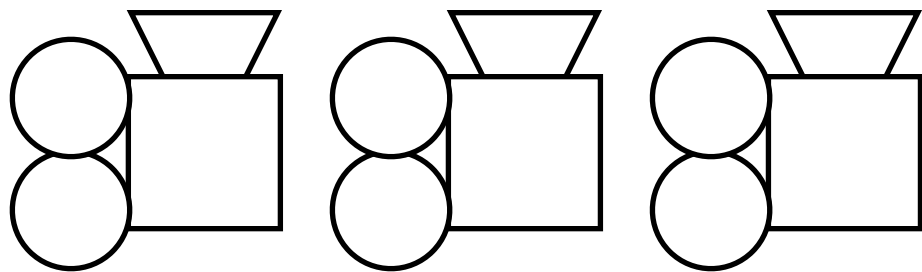
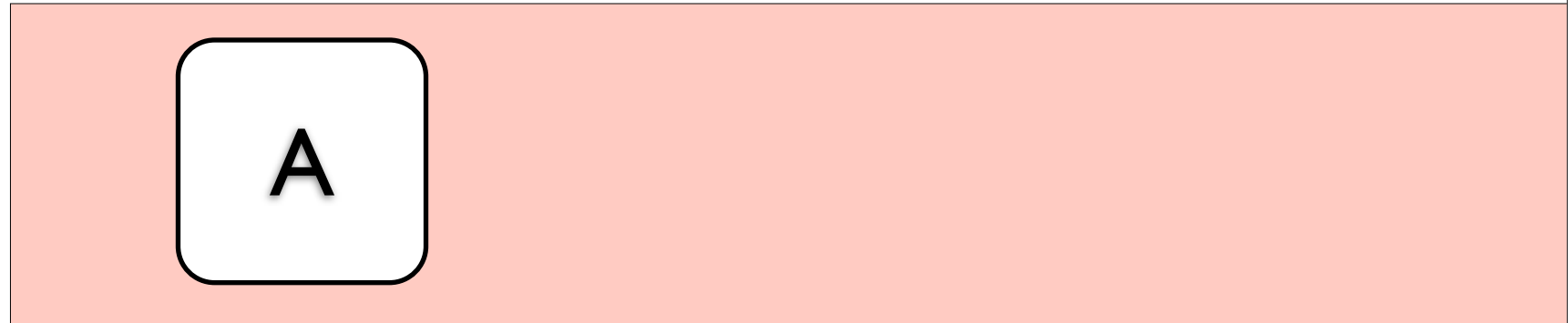
C

Timers : Implementation



Submission
List

Timer
List

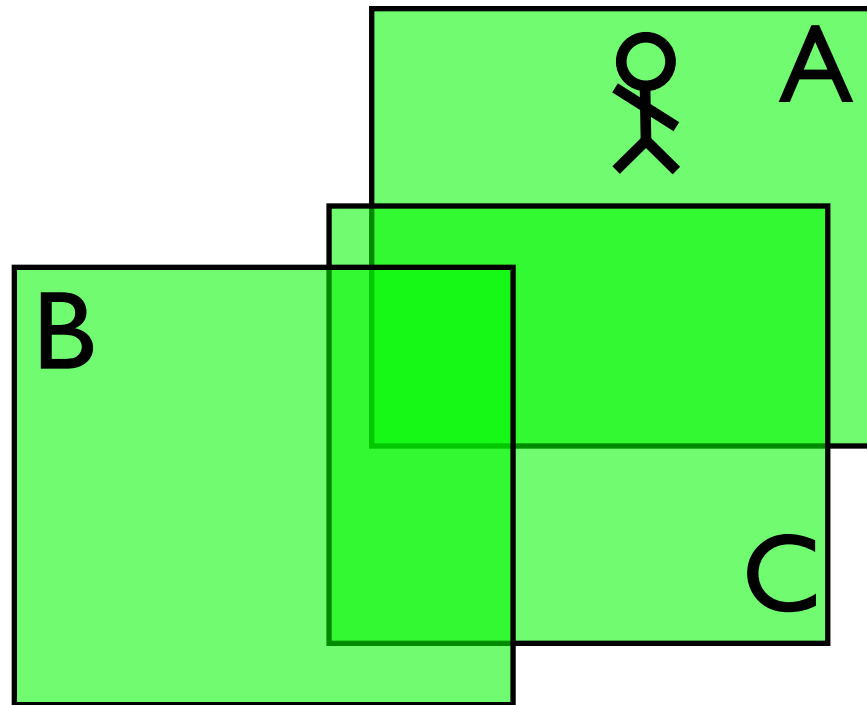


A

B

C

Timers : Implementation

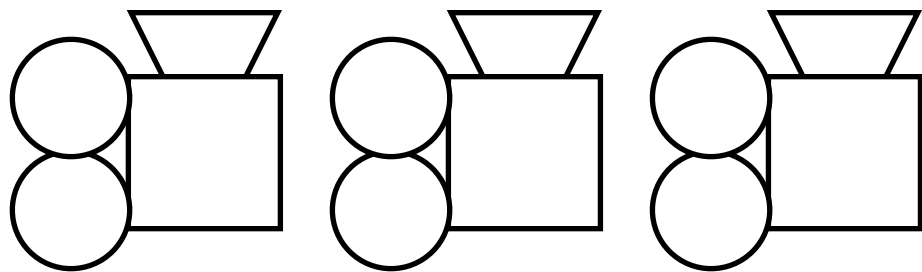


Submission
List

Timer
List

A

A I/I

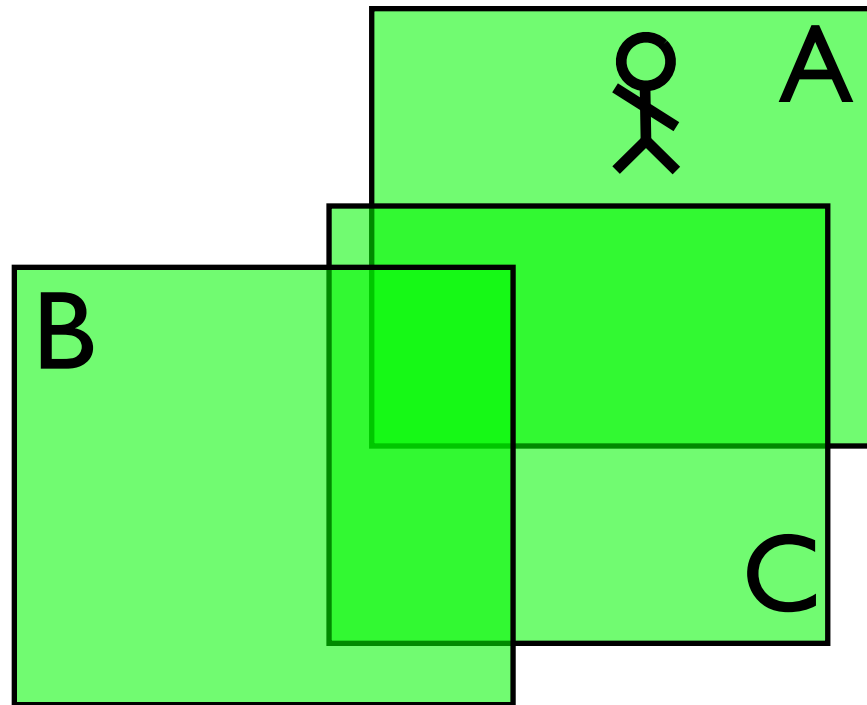


A

B

C

Timers : Implementation

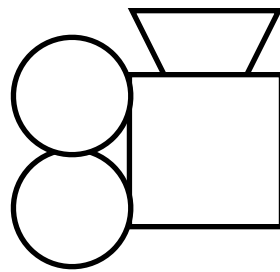
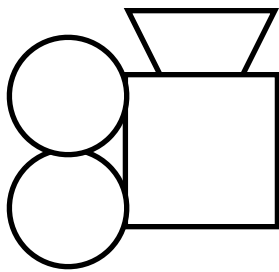
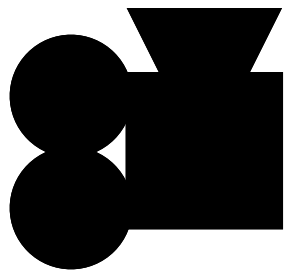


Submission
List

Timer
List

A

A I/I

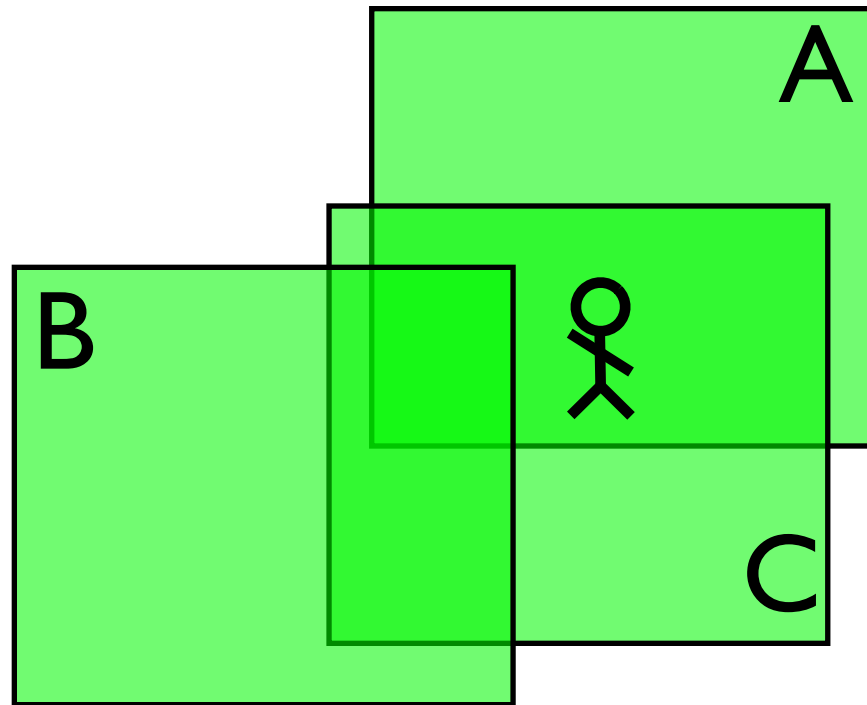


A

B

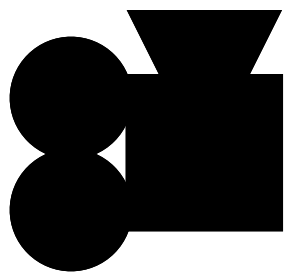
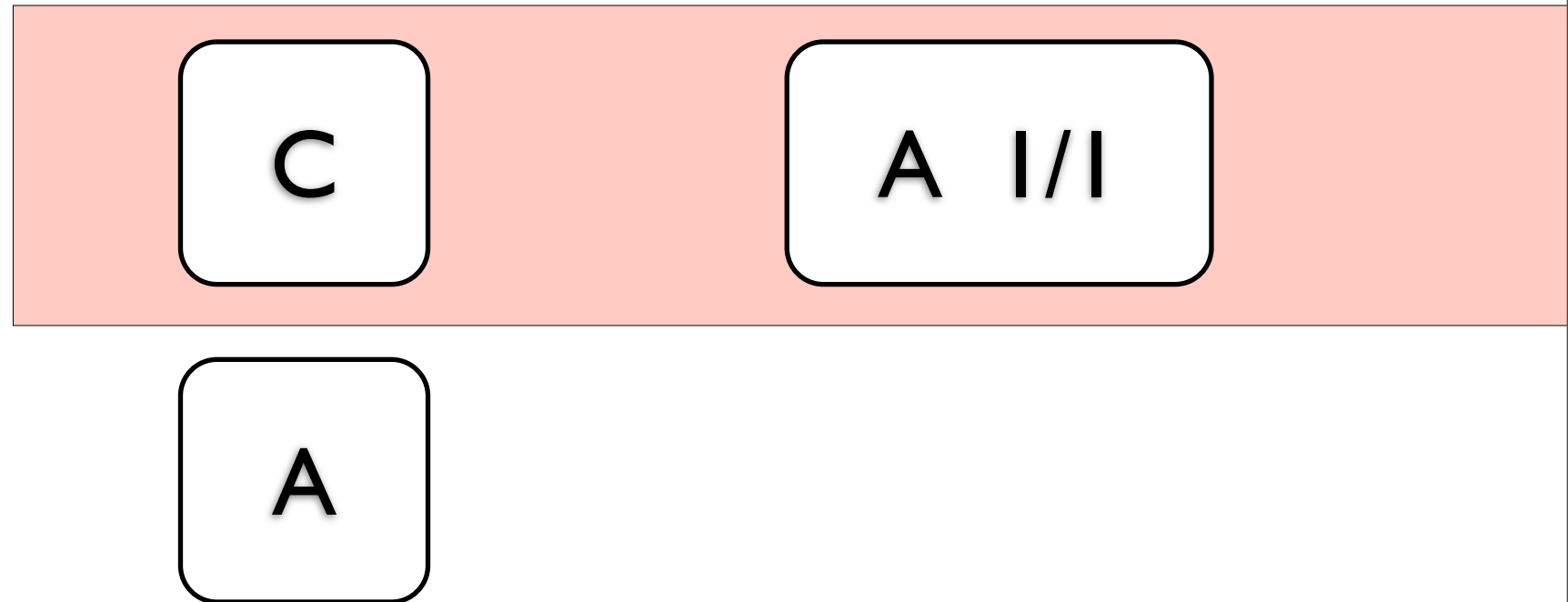
C

Timers : Implementation

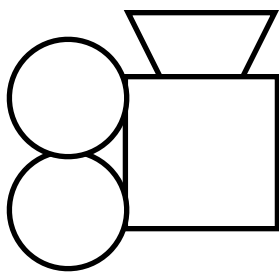


Submission
List

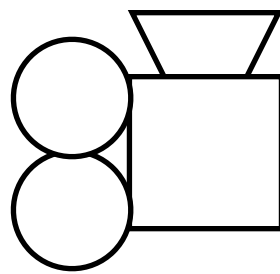
Timer
List



A

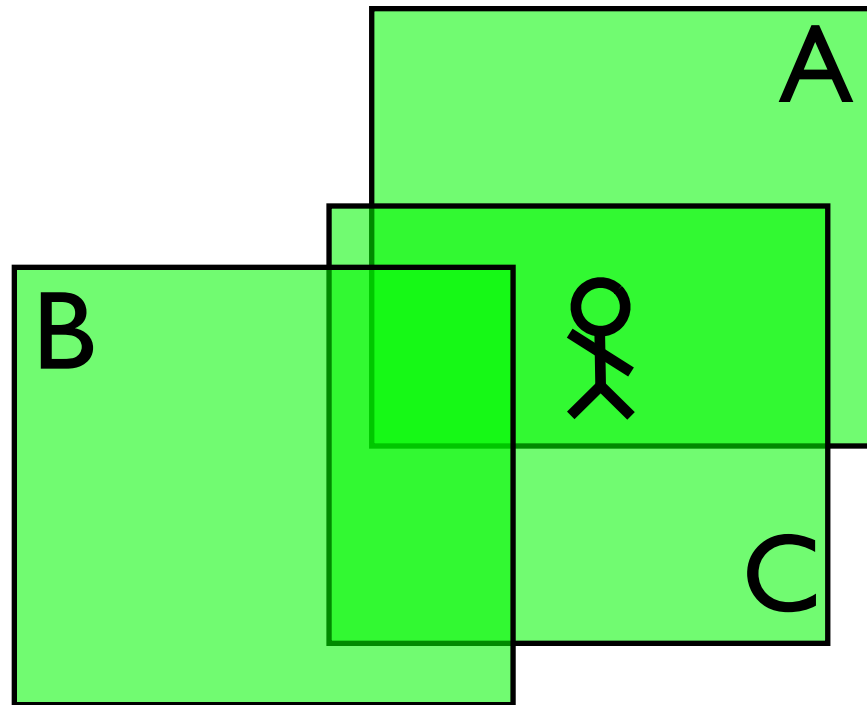


B



C

Timers : Implementation



Submission
List

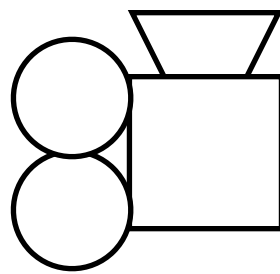
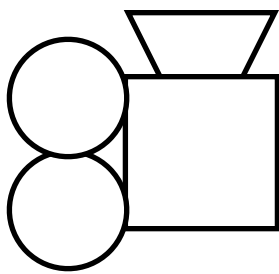
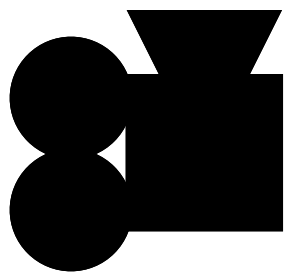
Timer
List

C

C 1/3

A

A 1/1

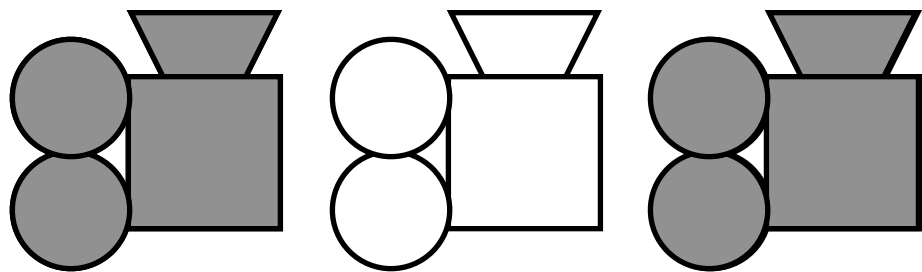
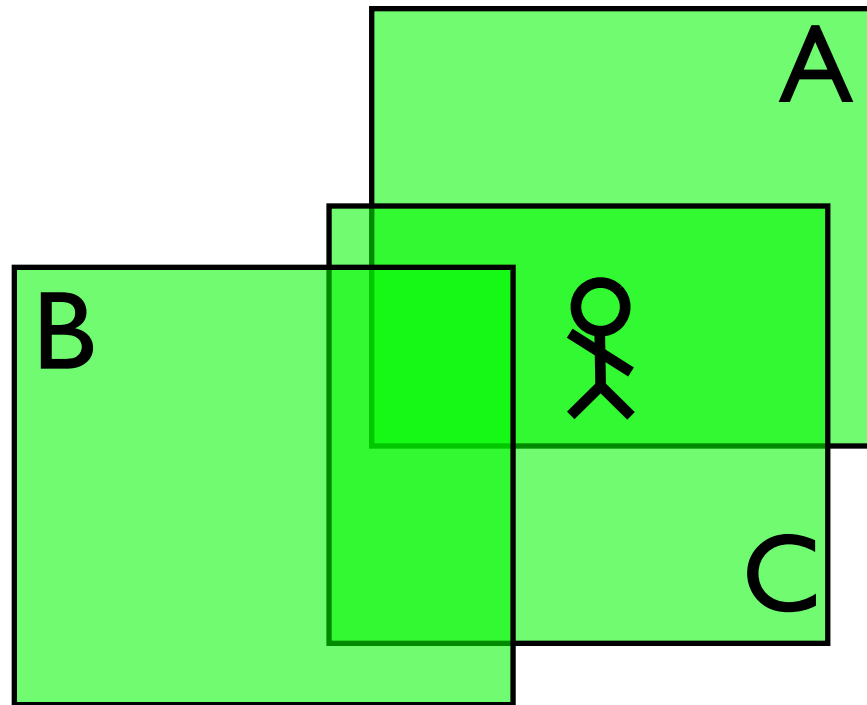


A

B

C

Timers : Implementation



A

B

C

Submission
List

Timer
List

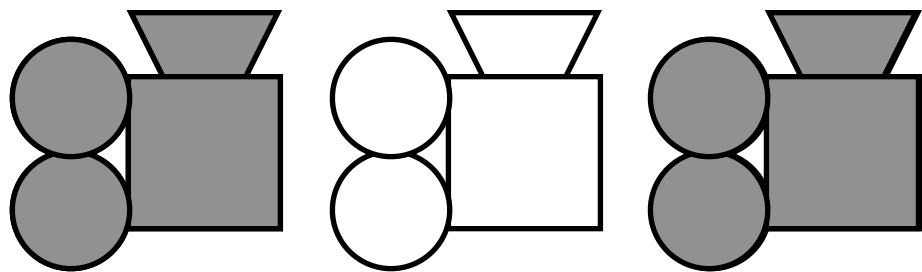
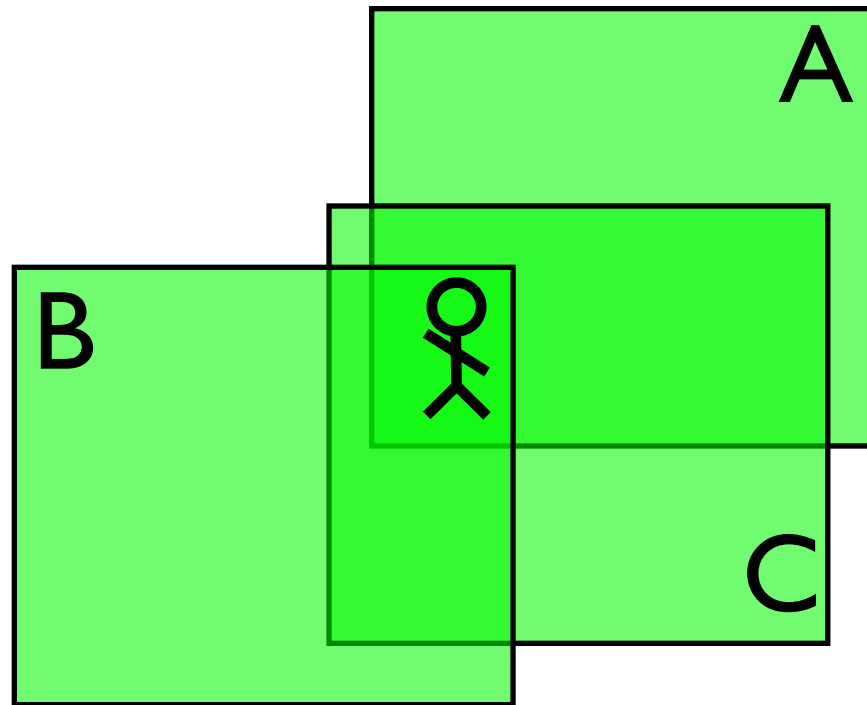
C

C 1/3

A

A 1/1

Timers : Implementation



A

B

C

Submission
List

Timer
List

B

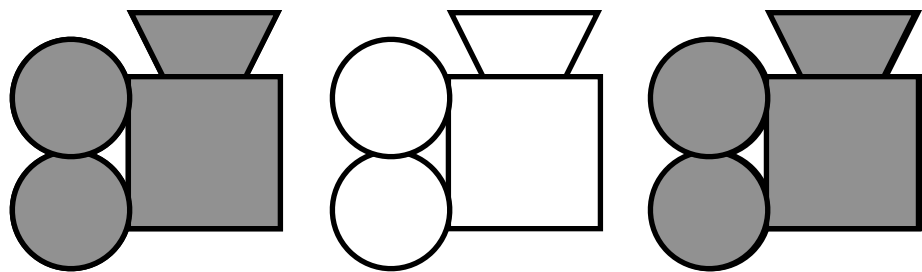
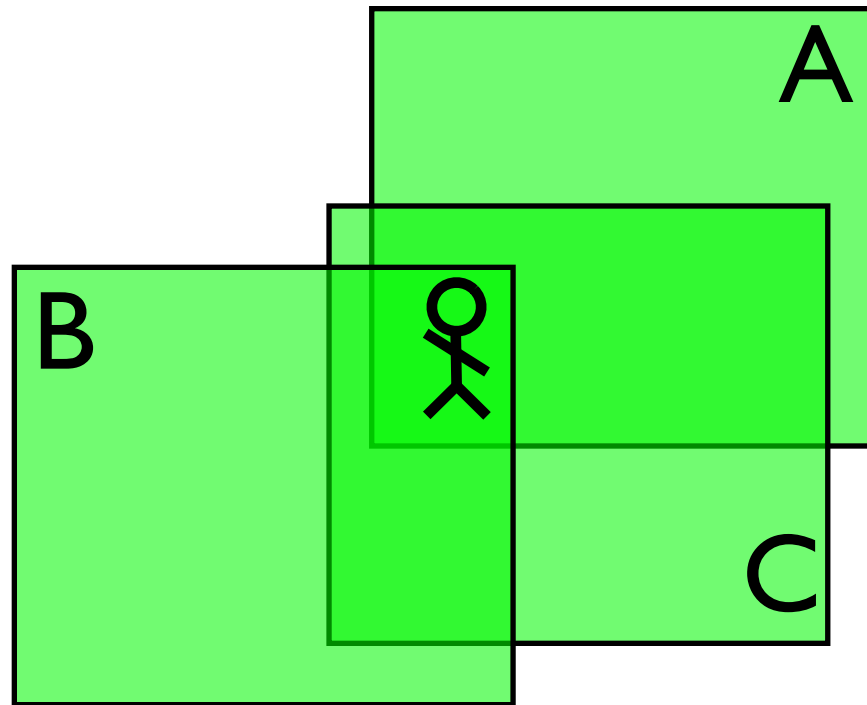
C 1/3

C

A 1/1

A

Timers : Implementation



A

B

C

Submission
List

Timer
List

B

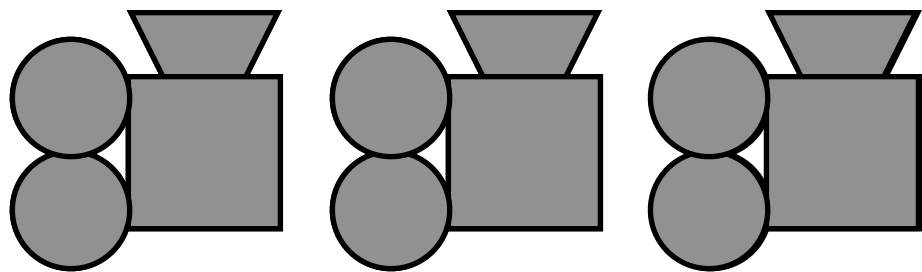
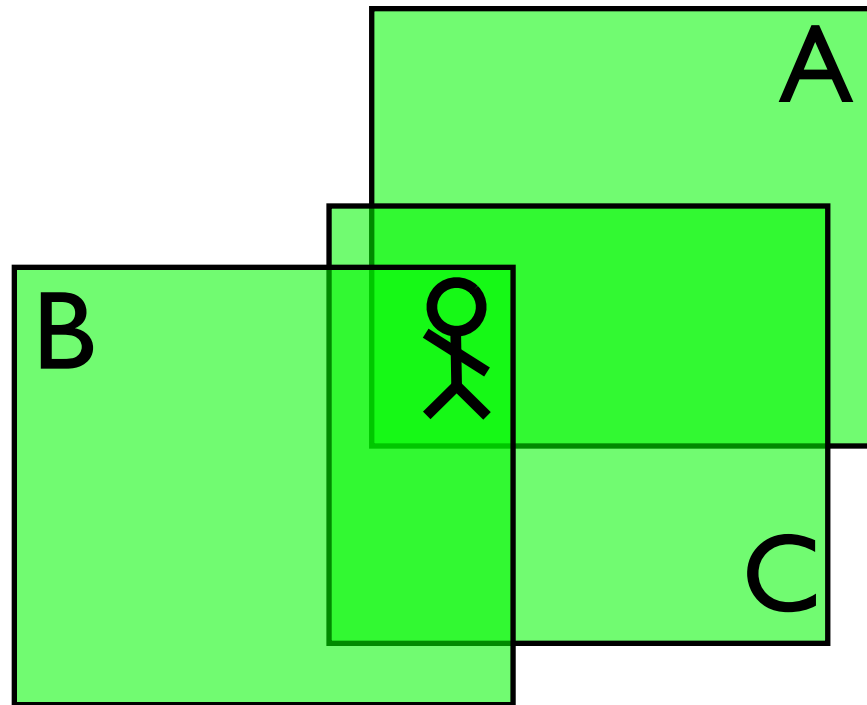
C 2/3

C

A 1/1

A

Timers : Implementation



A

B

C

Submission
List

Timer
List

B

B 1/4

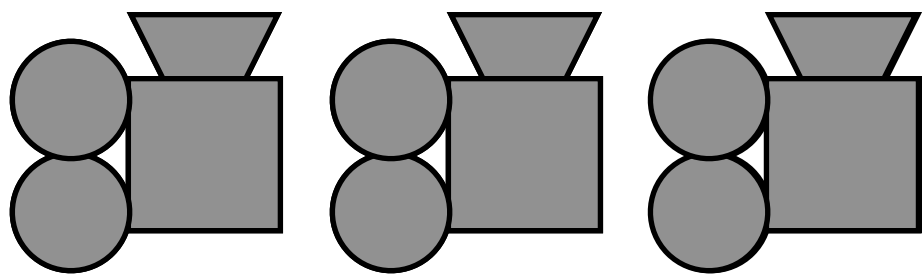
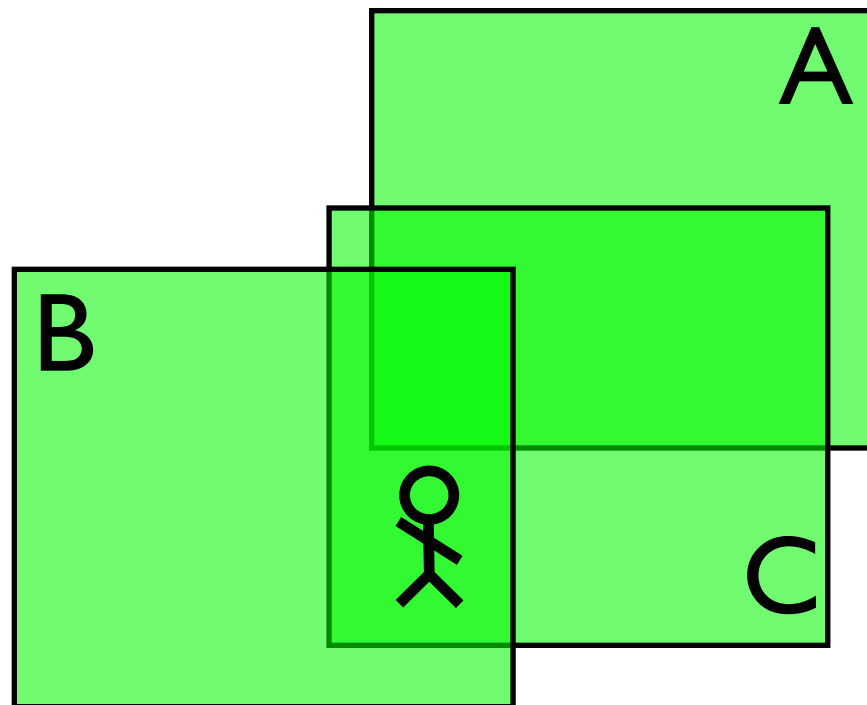
C

C 2/3

A

A 1/1

Timers : Implementation



A

B

C

Submission
List

B

C

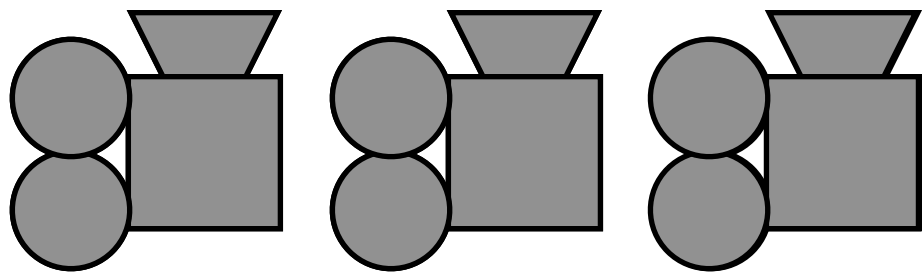
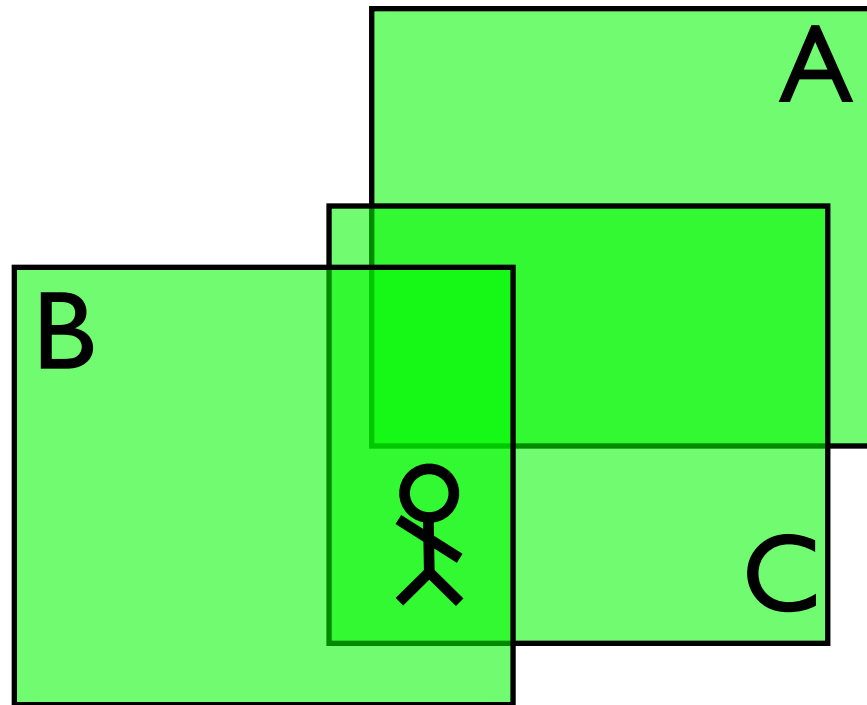
Timer
List

B 1/4

C 2/3

A 1/1

Timers : Implementation



A

B

C

Submission
List

B

C

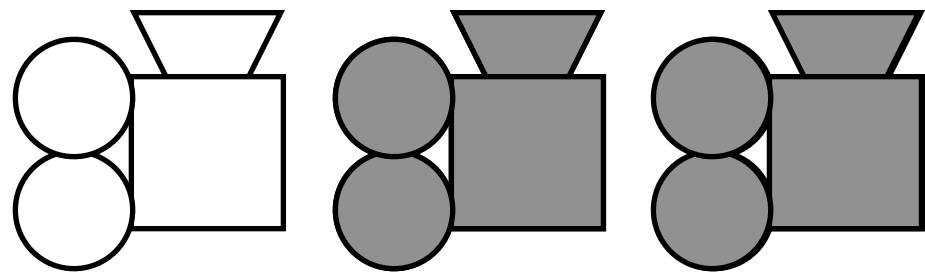
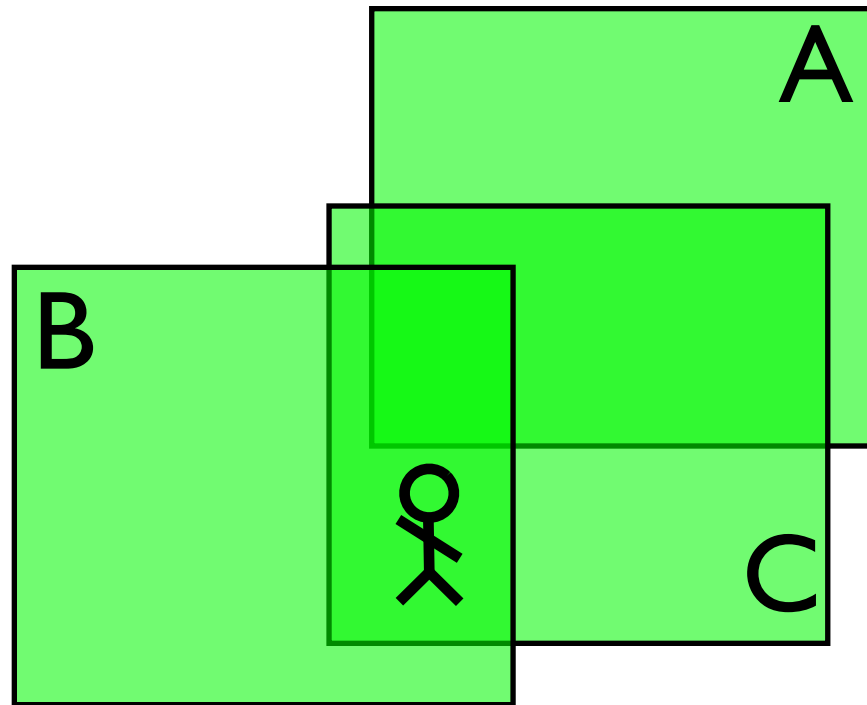
Timer
List

B 2/4

C 3/3

A 1/1

Timers : Implementation



A

B

C

Submission
List

B

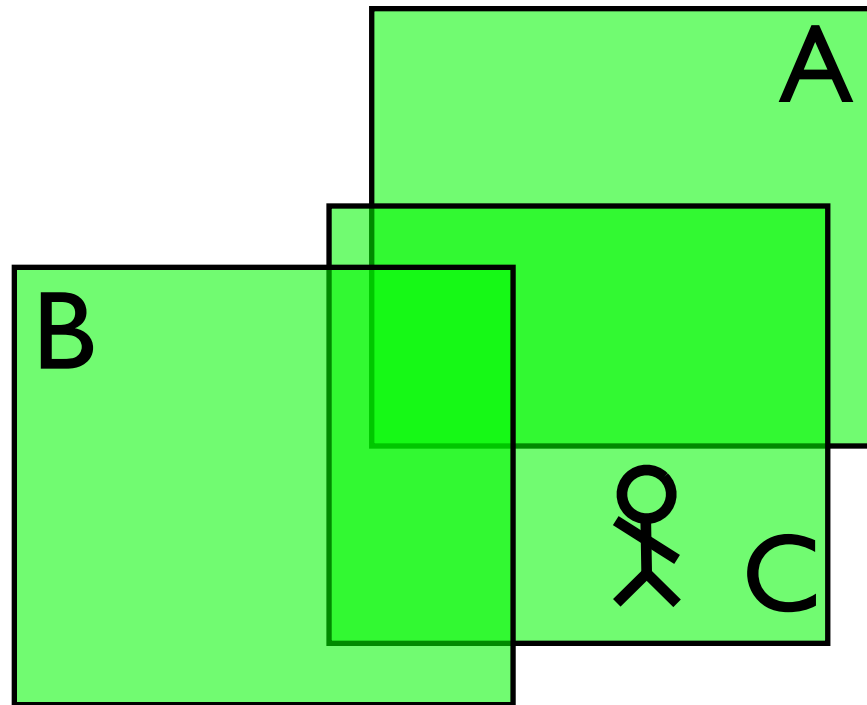
C

Timer
List

B 2/4

C 3/3

Timers : Implementation



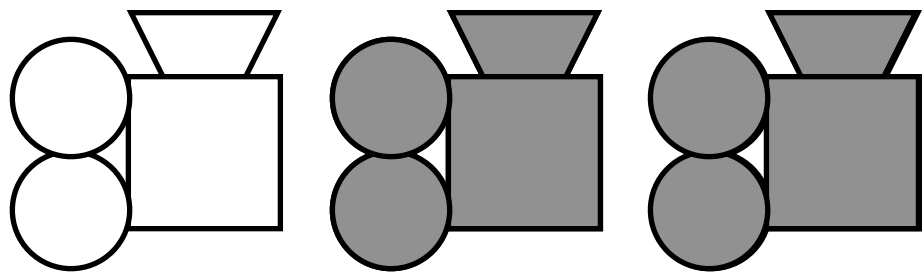
Submission
List

C

Timer
List

B 2/4

C 3/3

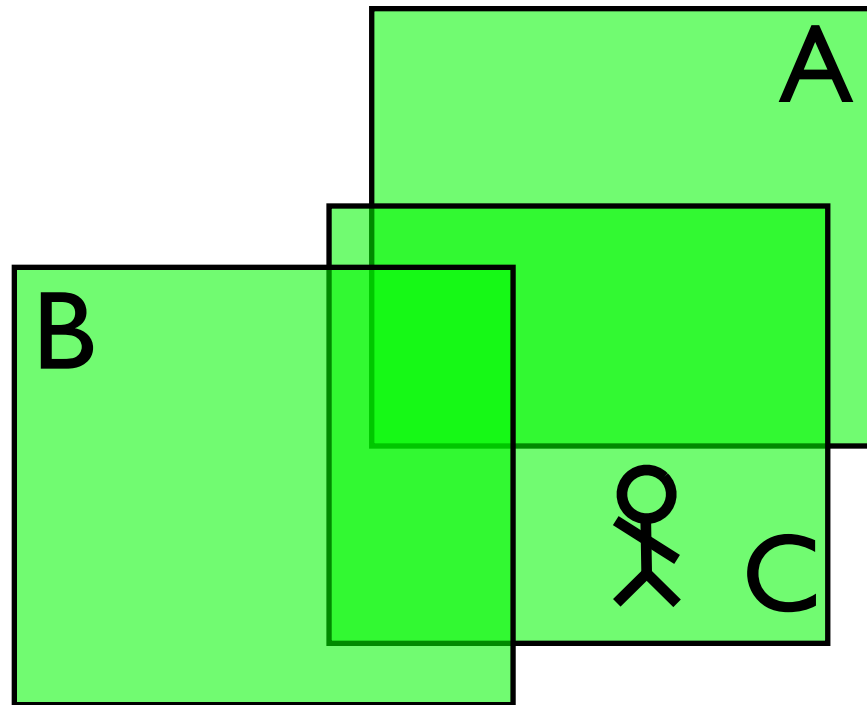


A

B

C

Timers : Implementation



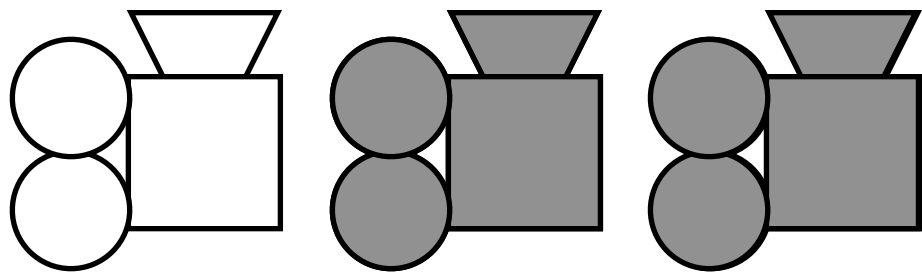
Submission
List

C

Timer
List

B 3/4

C 3/3

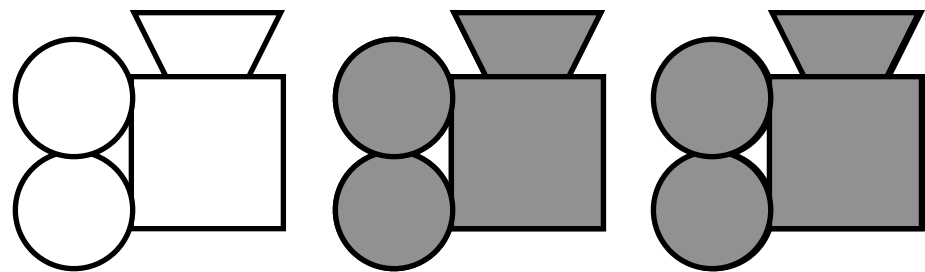
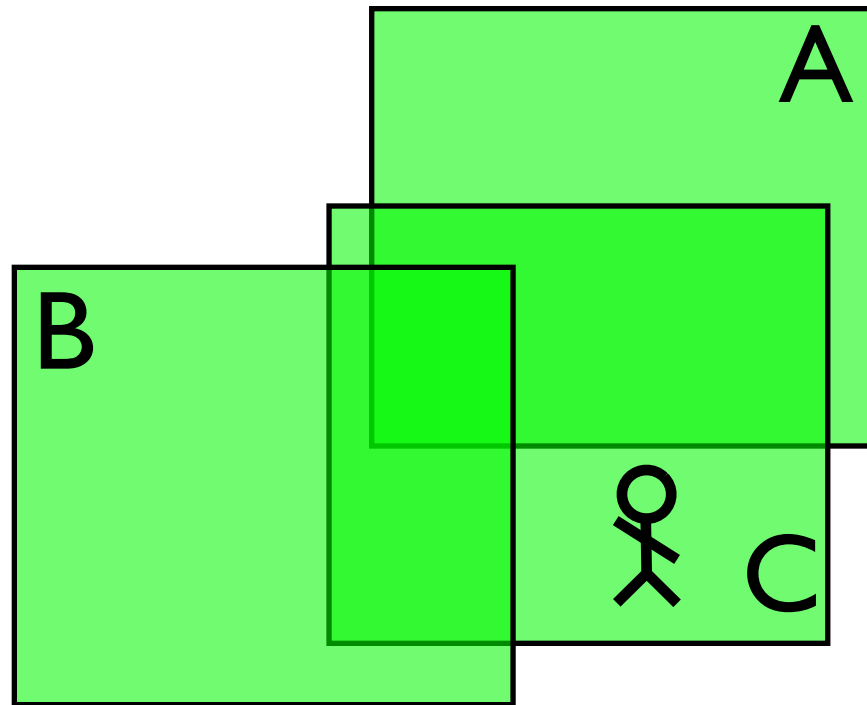


A

B

C

Timers : Implementation



A

B

C

Submission
List

C

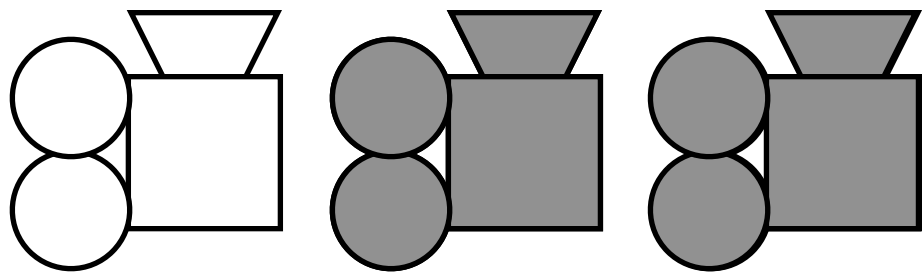
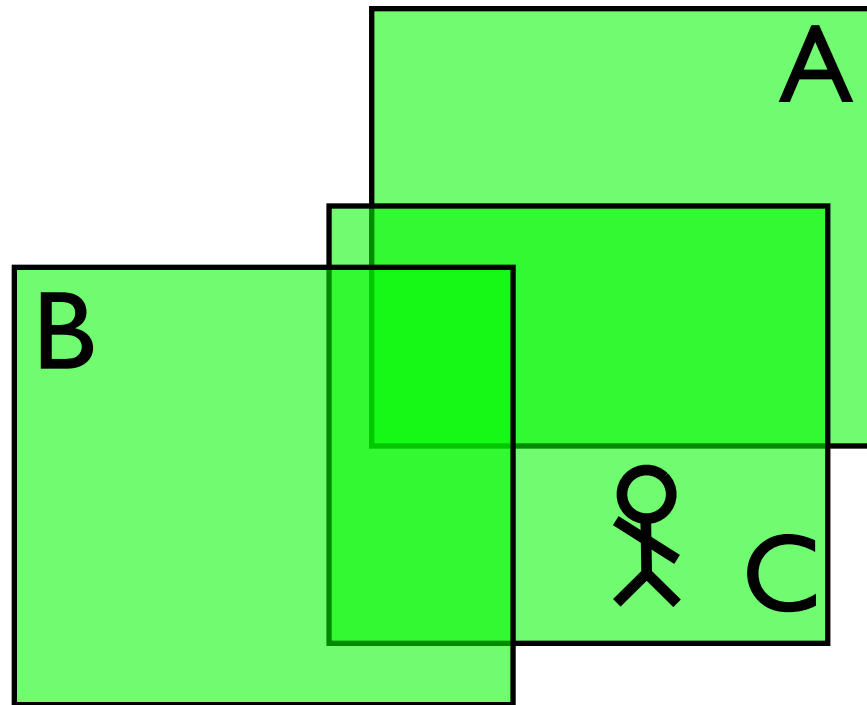
Timer
List

C 1/3

B 3/4

C 3/3

Timers : Implementation



A

B

C

Submission
List

C

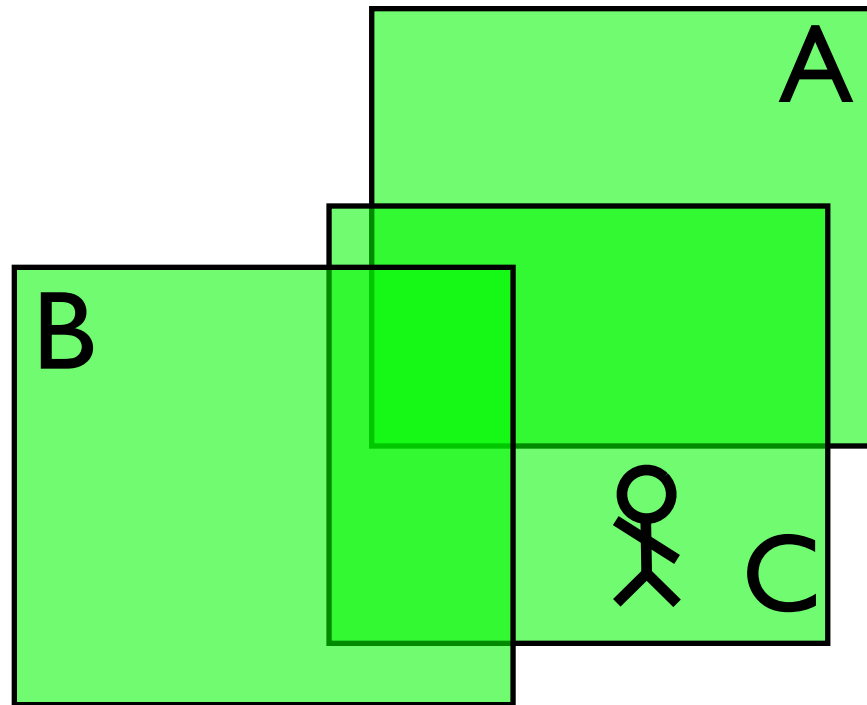
Timer
List

C 2/3

B 4/4

C 3/3

Timers : Implementation



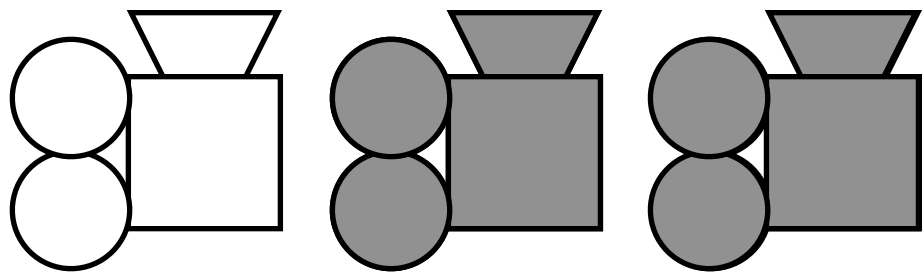
Submission
List

Timer
List

C

C 2/3

B 4/4

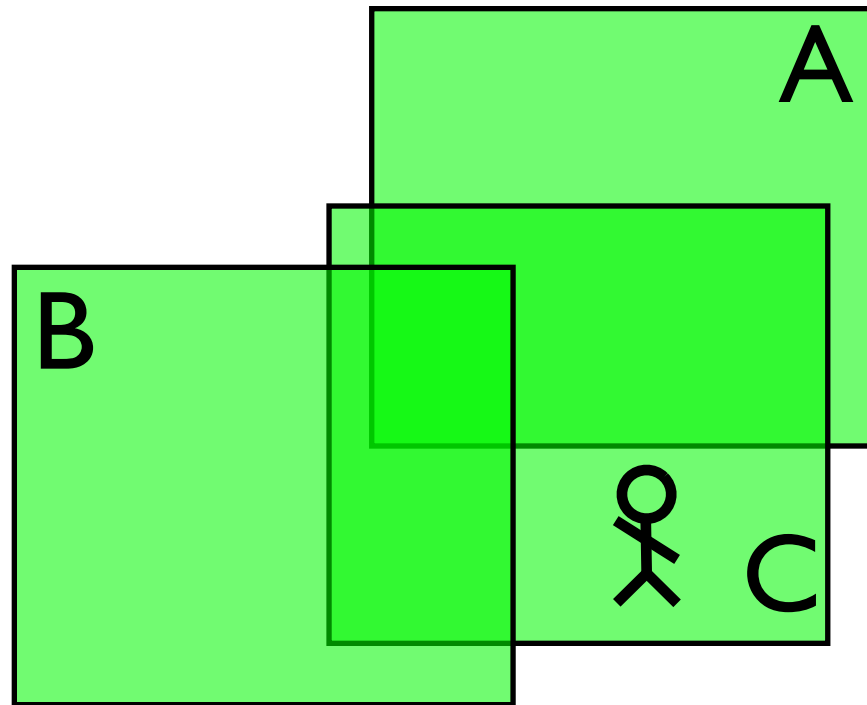


A

B

C

Timers : Implementation



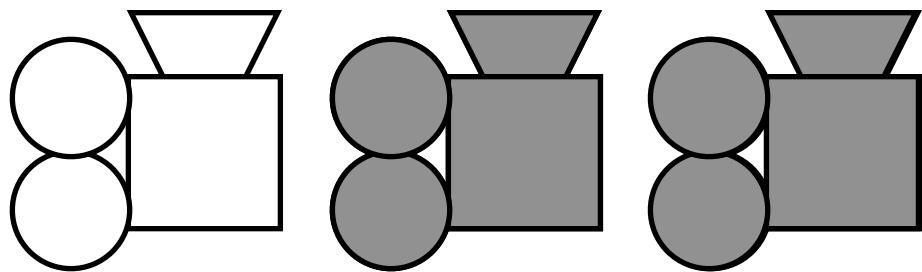
Submission
List

Timer
List

C

C 3/3

B 4/4

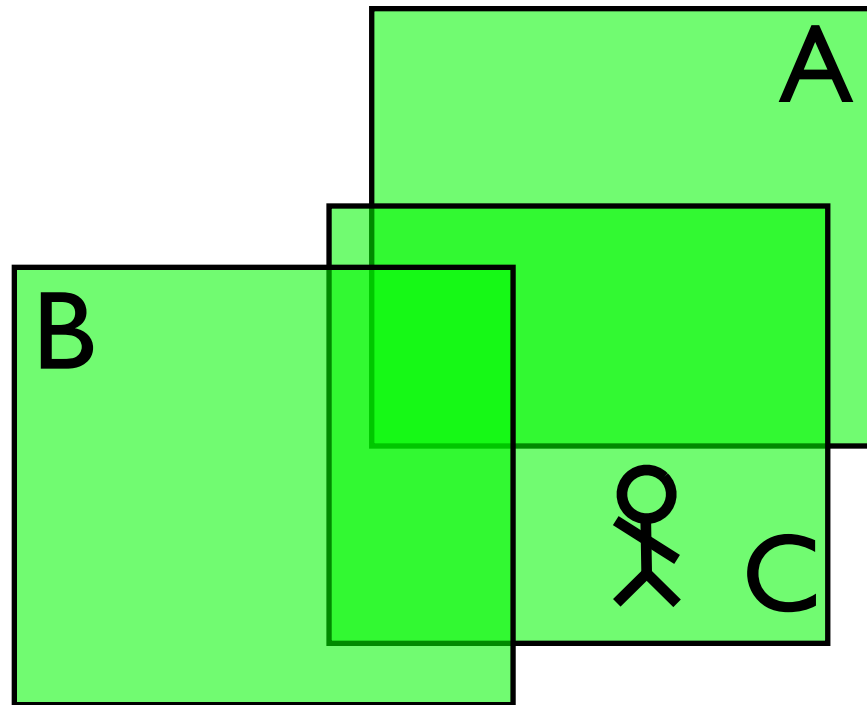


A

B

C

Timers : Implementation

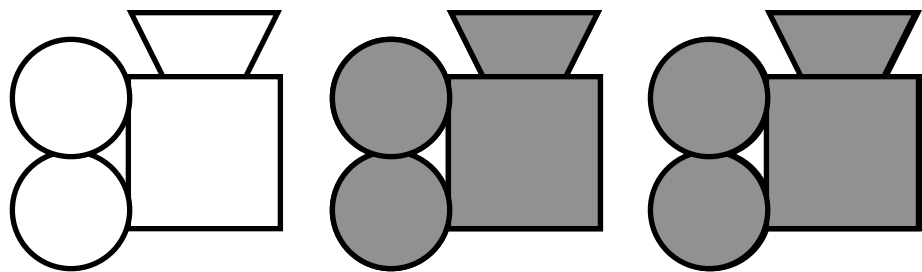


Submission
List

Timer
List

C

C 3/3

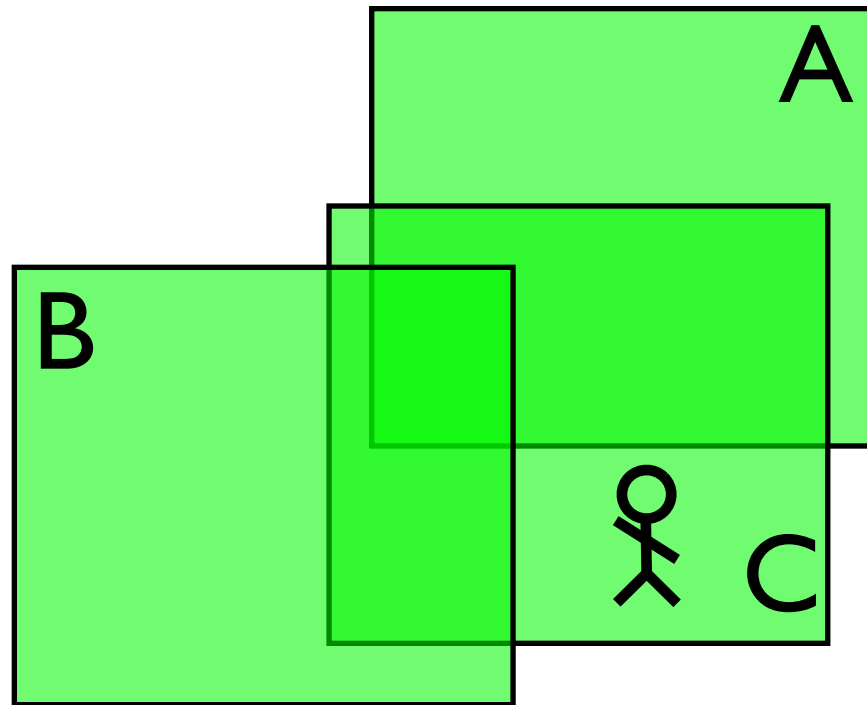


A

B

C

Timers : Implementation

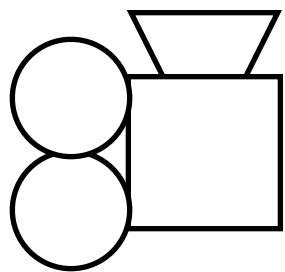


Submission
List

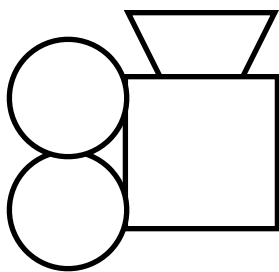
Timer
List

C

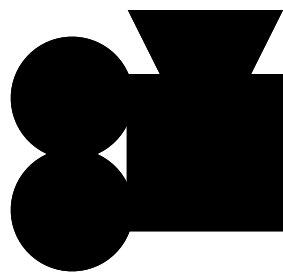
C 3/3



A



B



C

Timers : Implementation

Timer
List

C 1/3

B 3/4

C 3/3

Timers : Implementation

Timer
List

C 1/3

B 3/4

C 3/3

3/4

```
graph TD; C1["C 1/3"]; B["B 3/4"]; C3["C 3/3"]; T(("3/4")); B --> T; C3 --> T;
```

Timers : Implementation

Timer
List

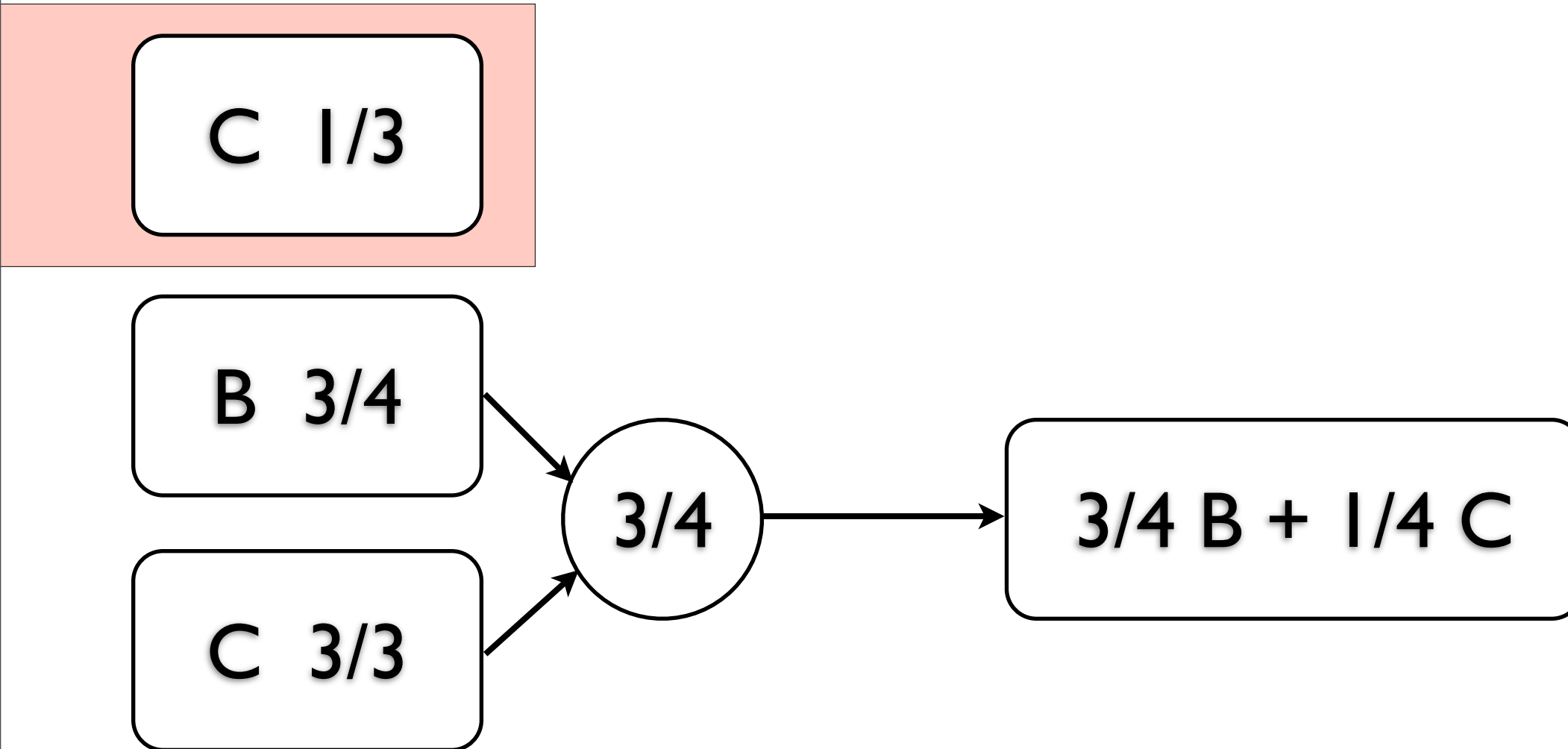
C 1/3

B 3/4

C 3/3

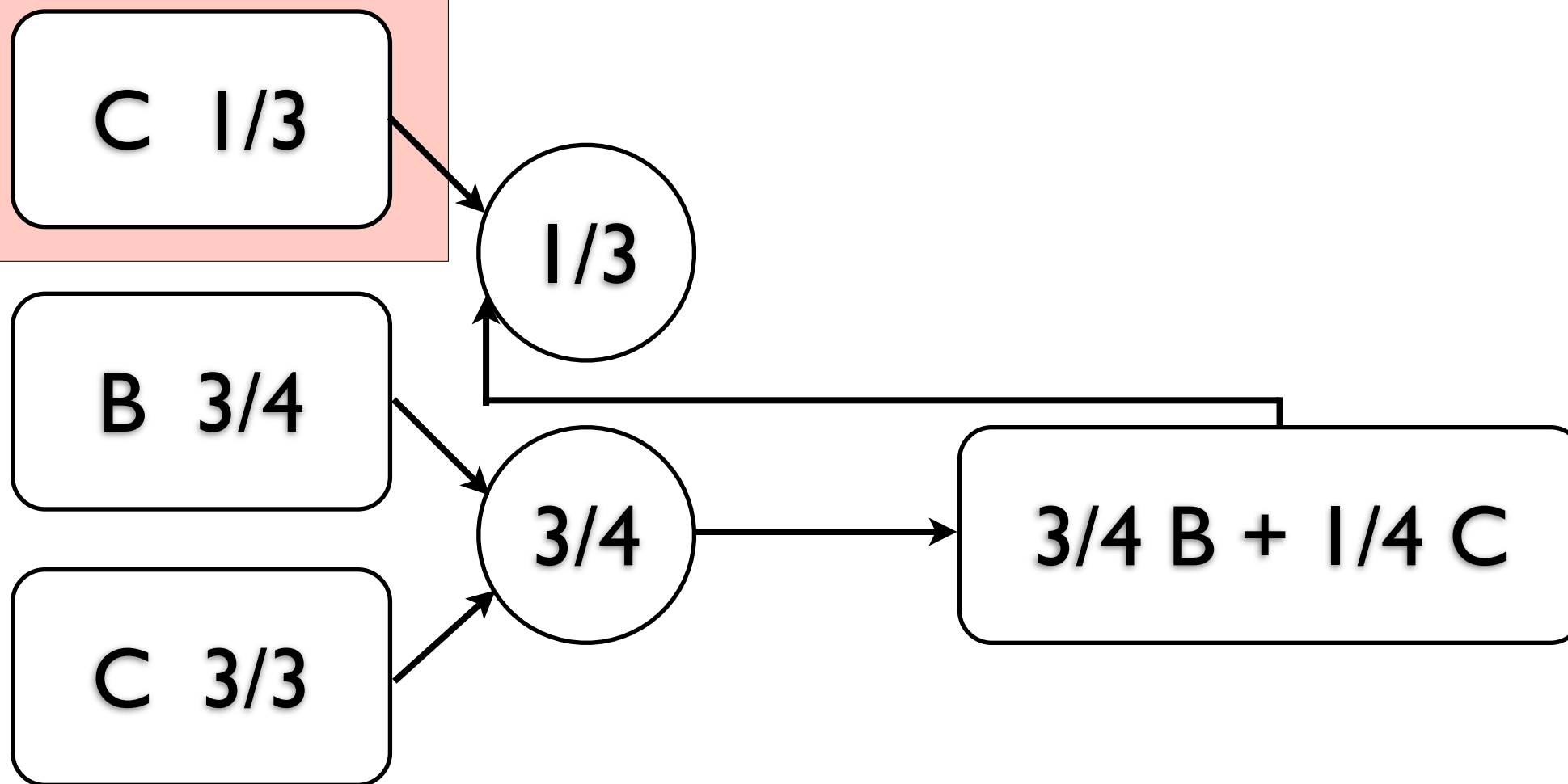
3/4

$\frac{3}{4} B + \frac{1}{4} C$



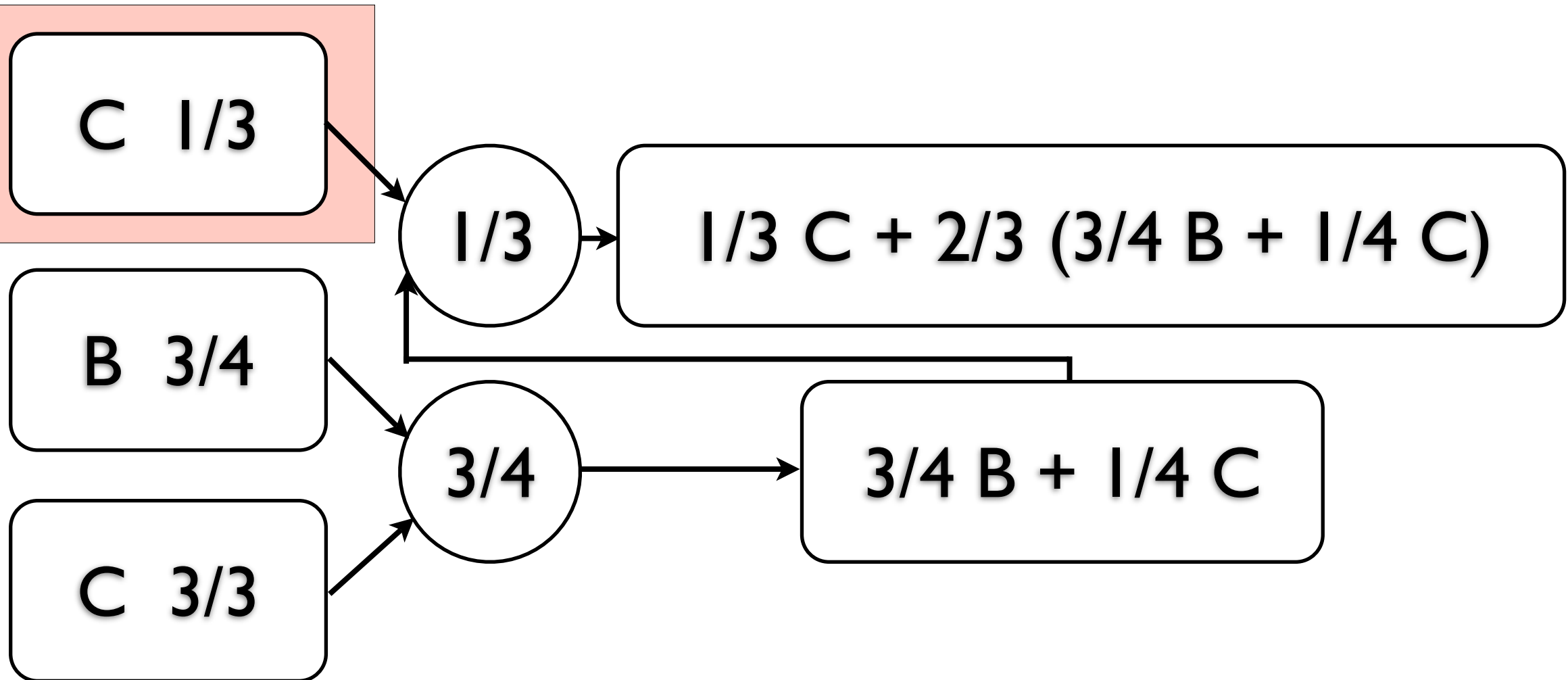
Timers : Implementation

Timer
List



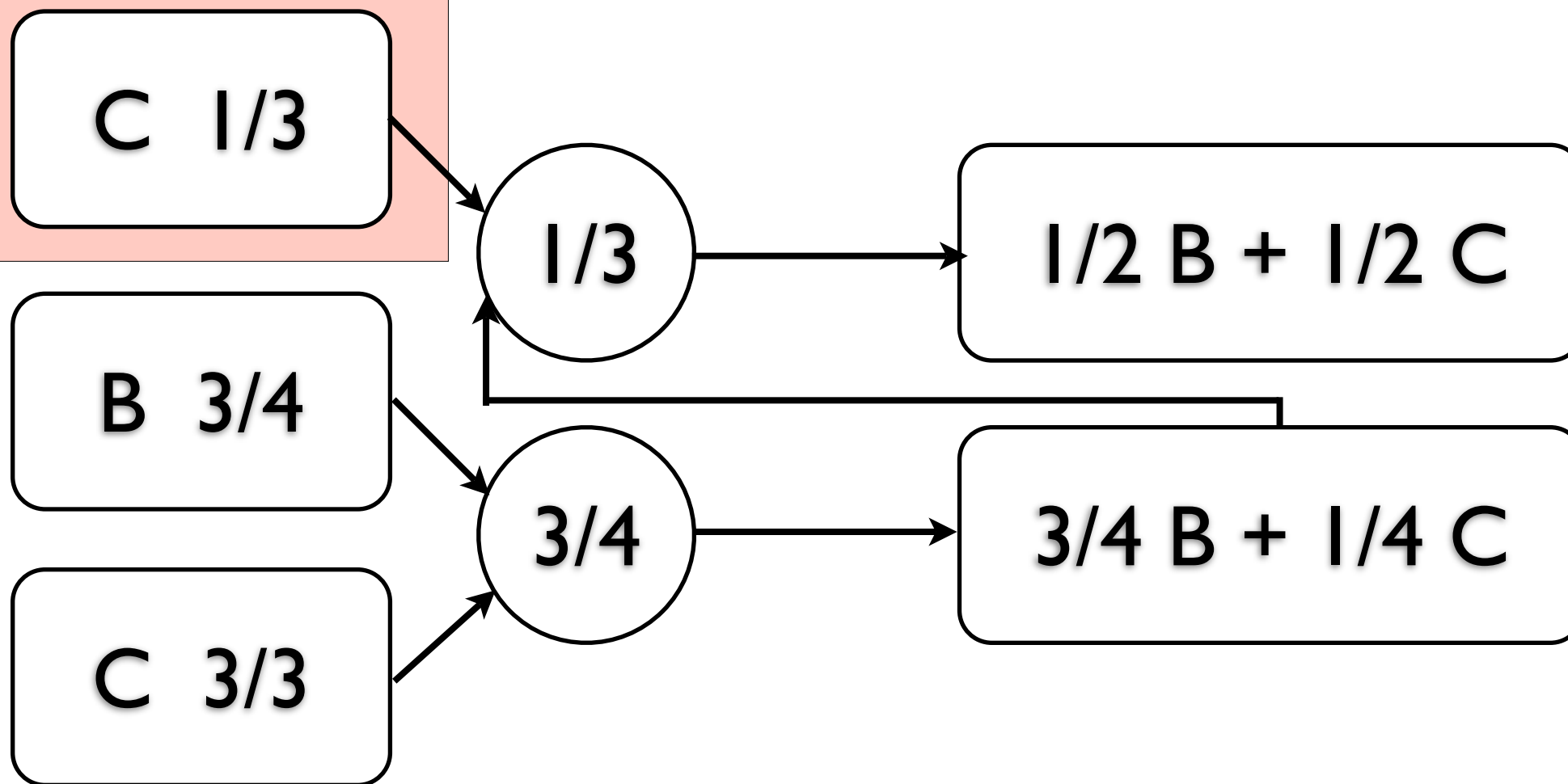
Timers : Implementation

Timer
List

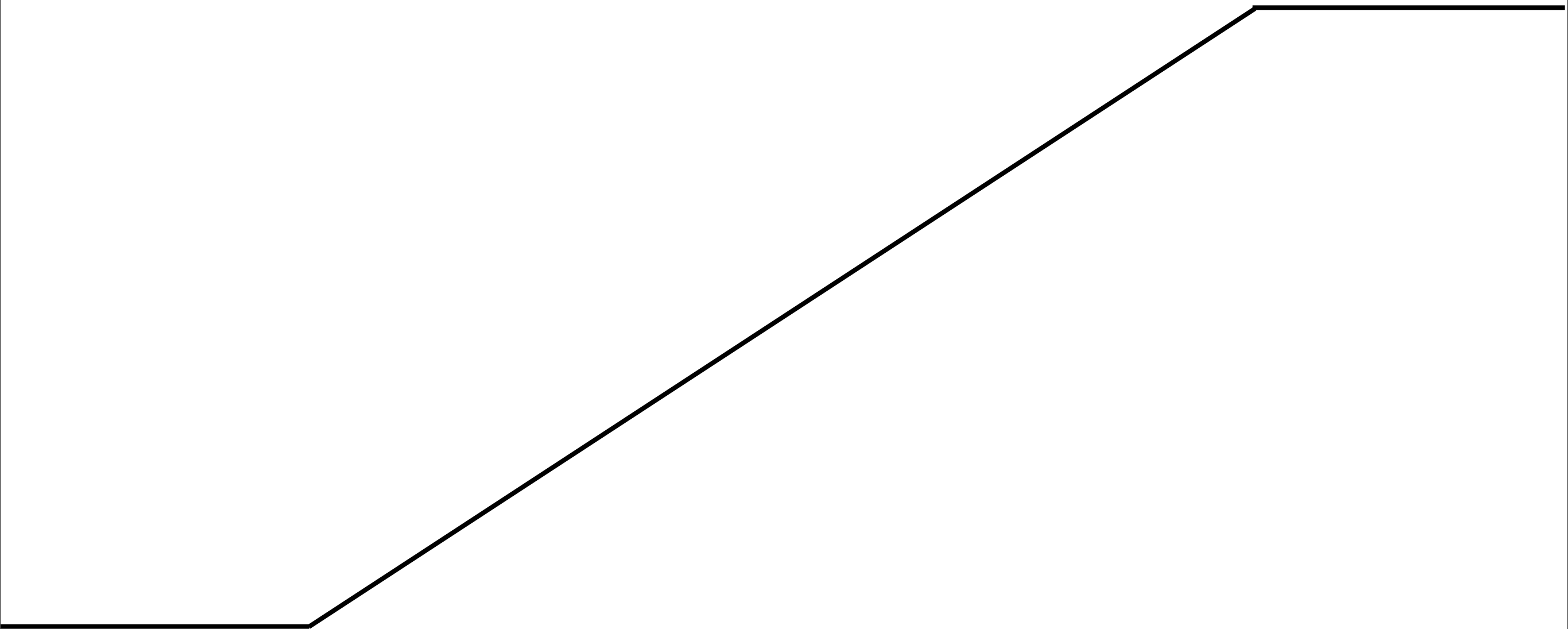


Timers : Implementation

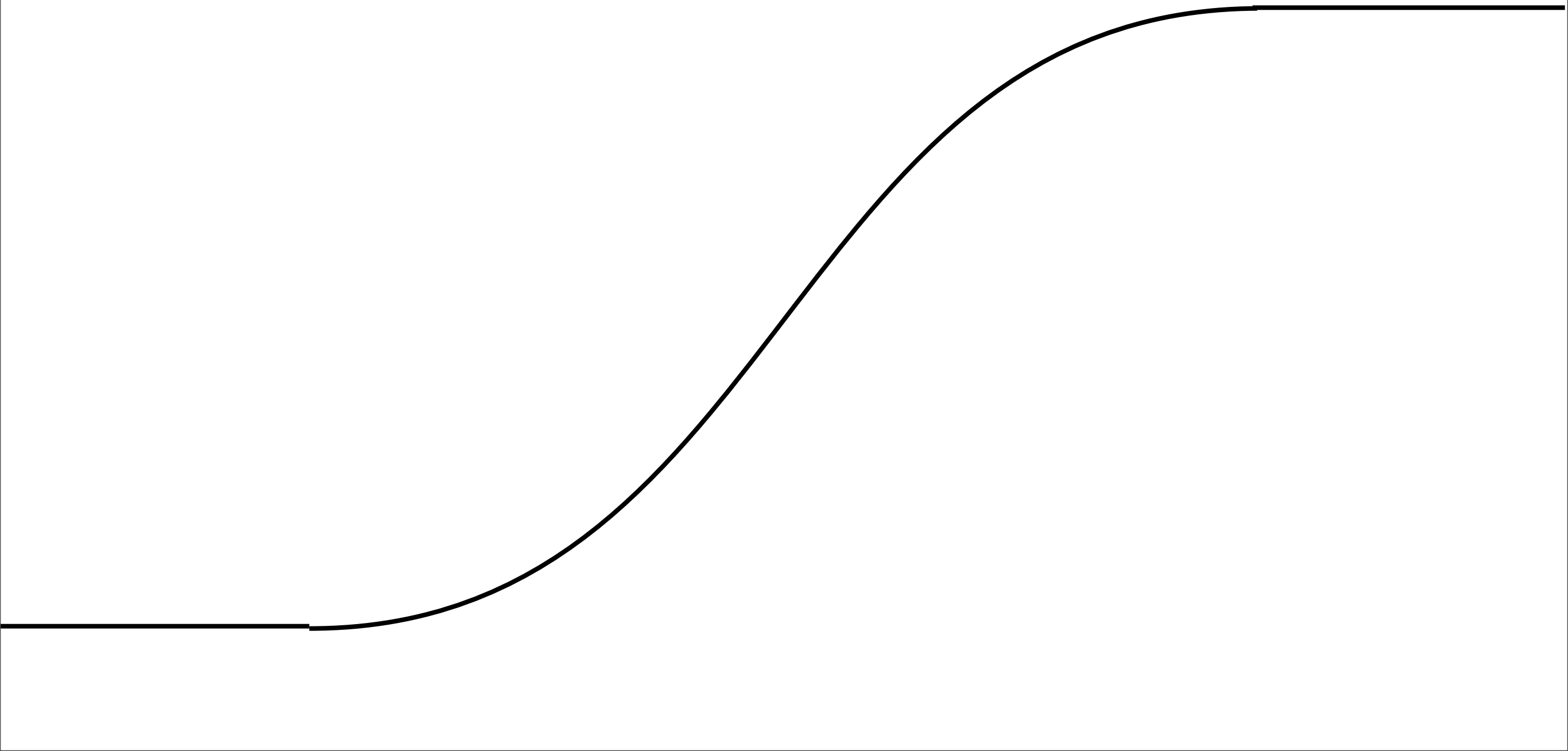
Timer
List



Ease : Design



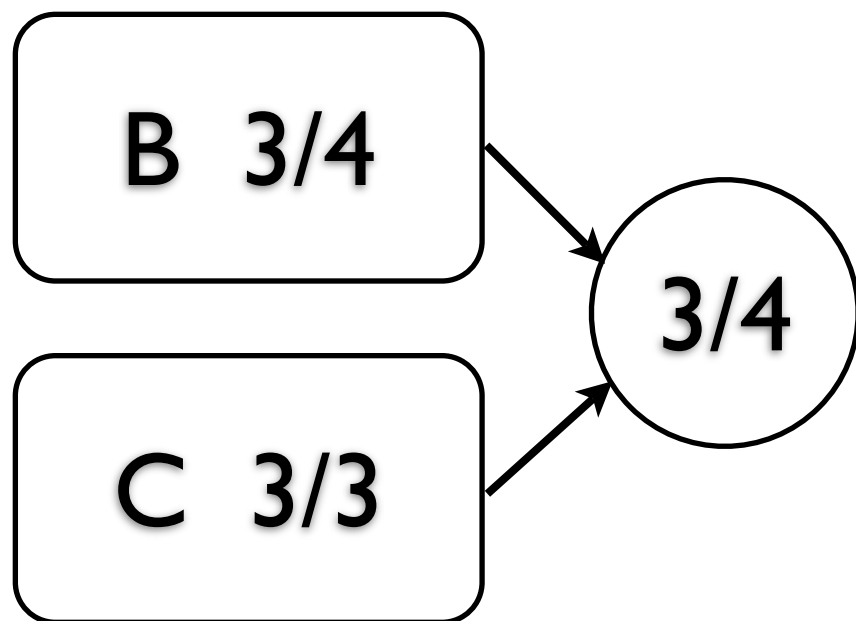
Ease : Design



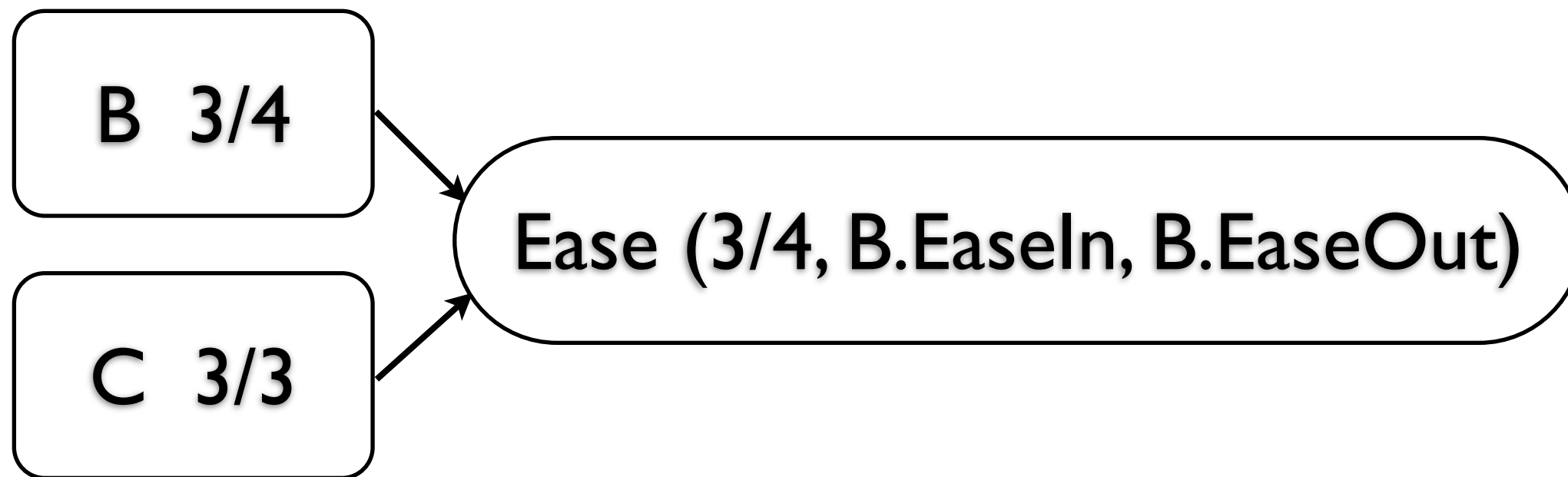
Ease : Implementation

- Hermite Spline
- Fixed endpoints at 0 & 1
- Controllable tangents
- $\text{ease} = 1 - \text{tangent}$
- Ease in and out

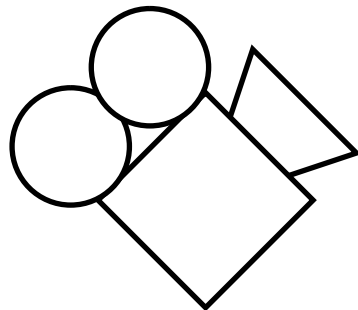
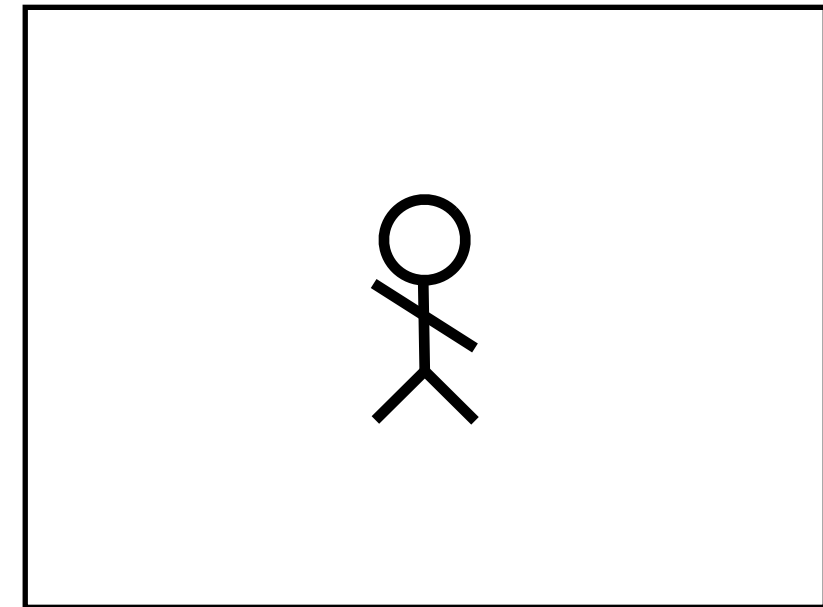
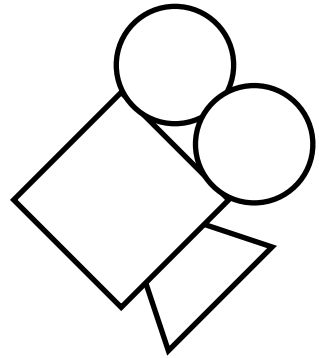
Ease : Implementation



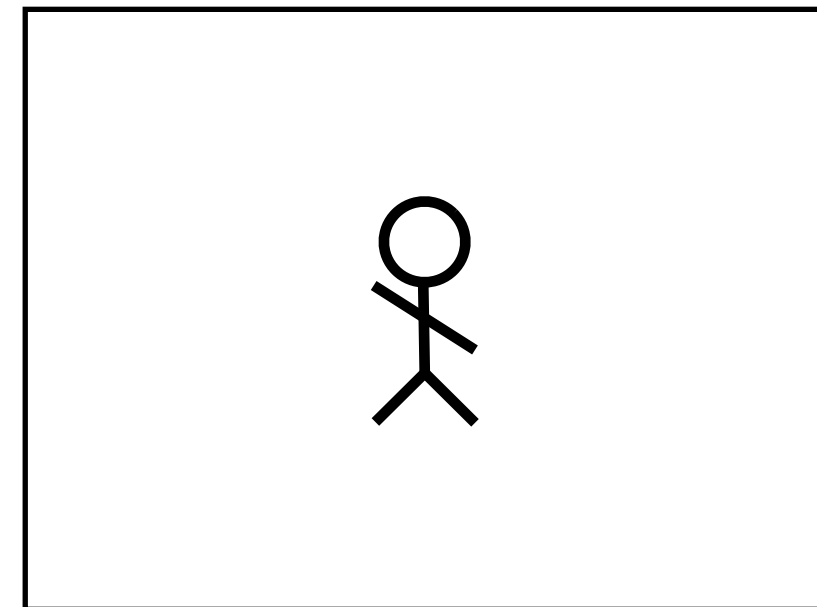
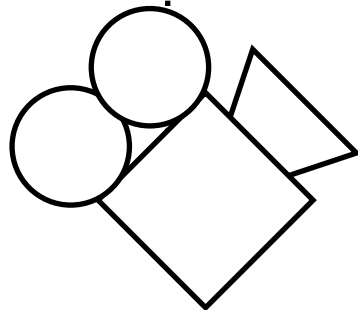
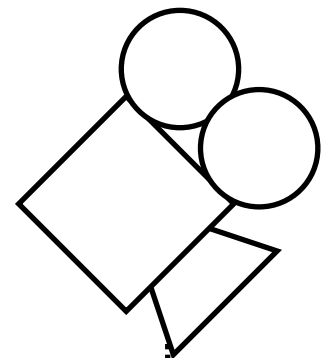
Ease : Implementation



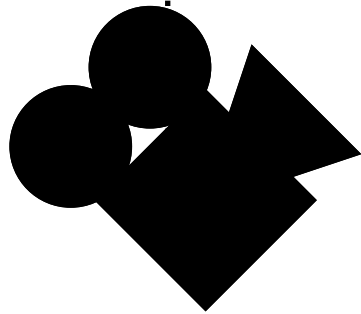
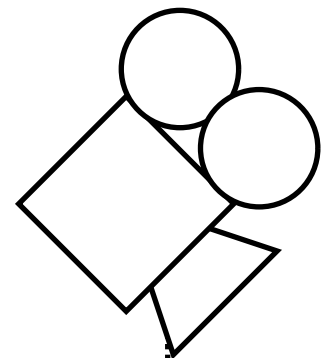
Blend Space : Design



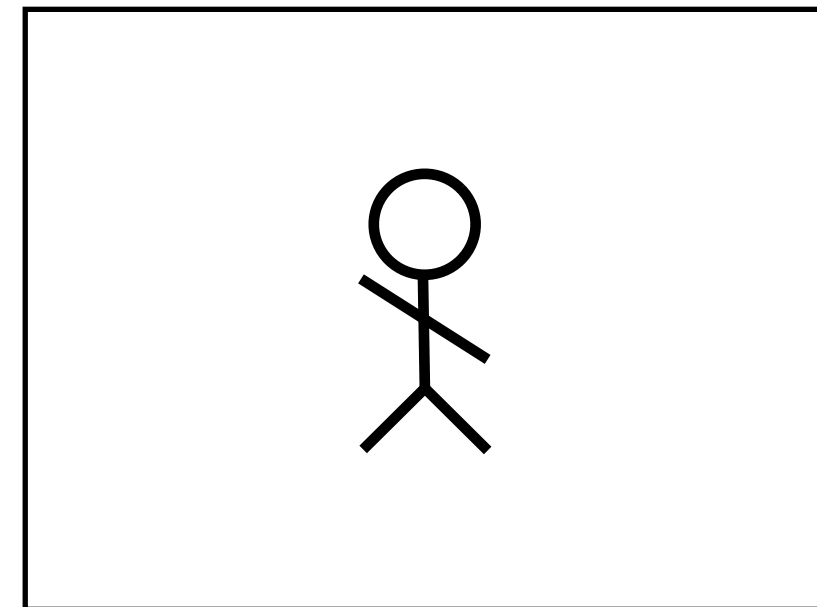
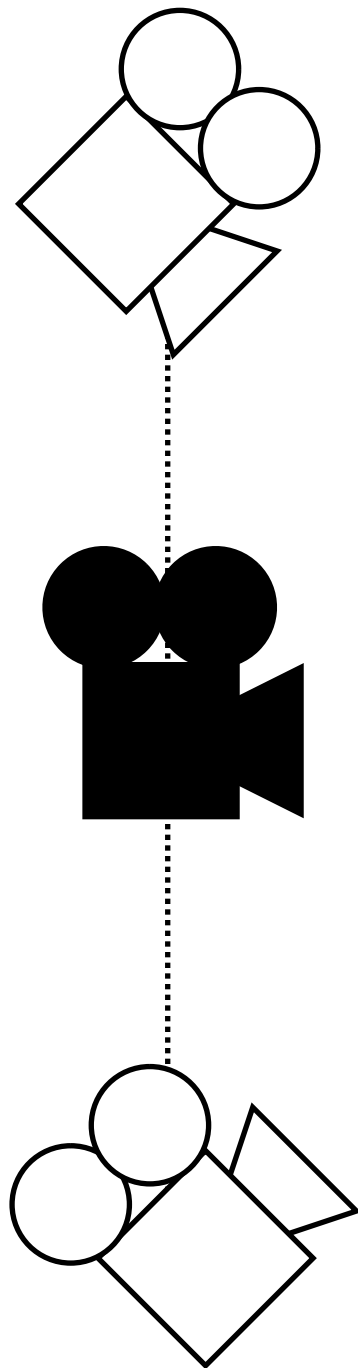
Blend Space : Design



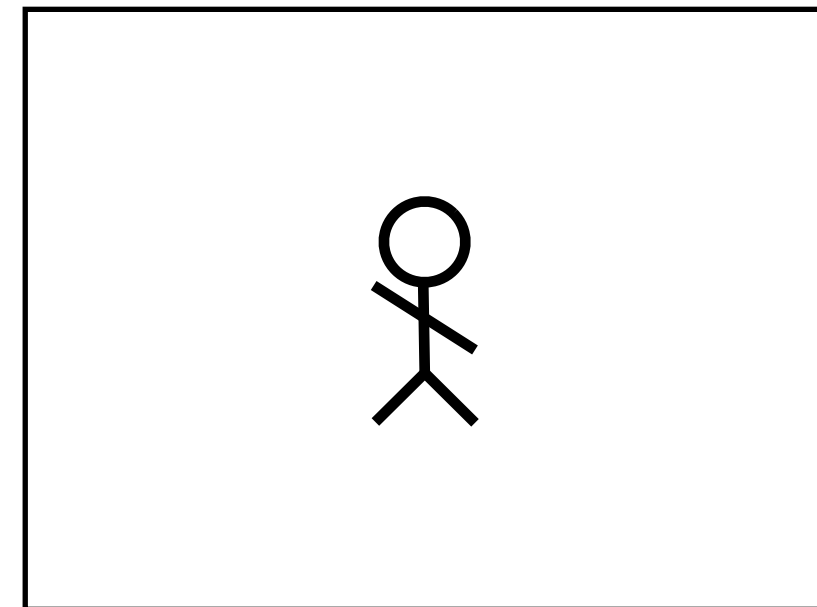
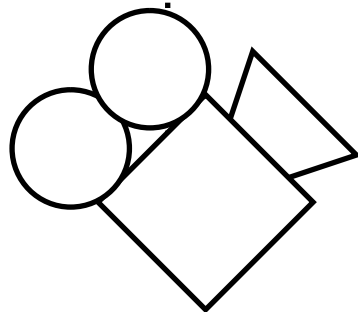
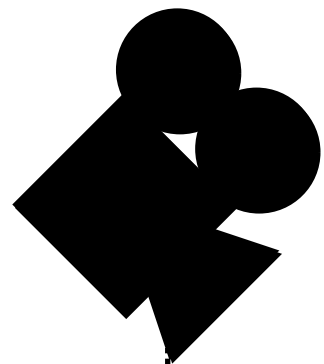
Blend Space : Design



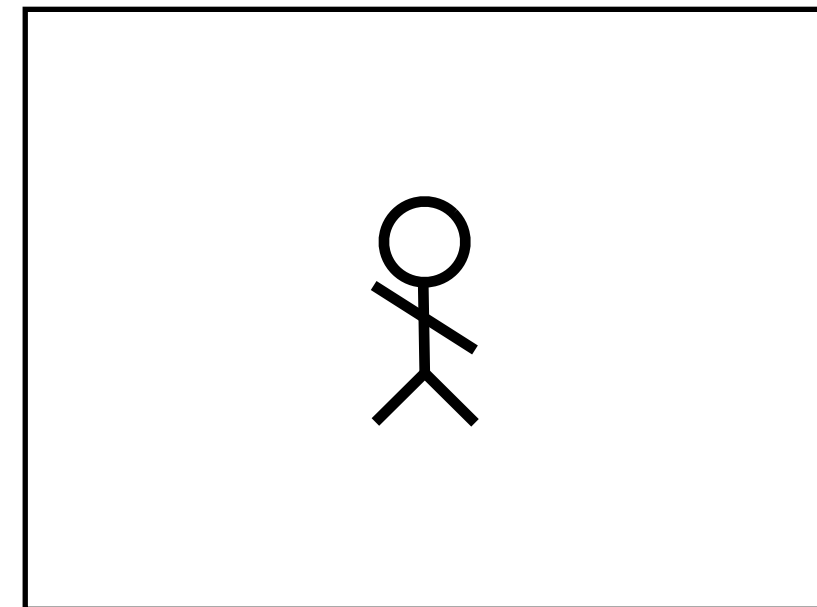
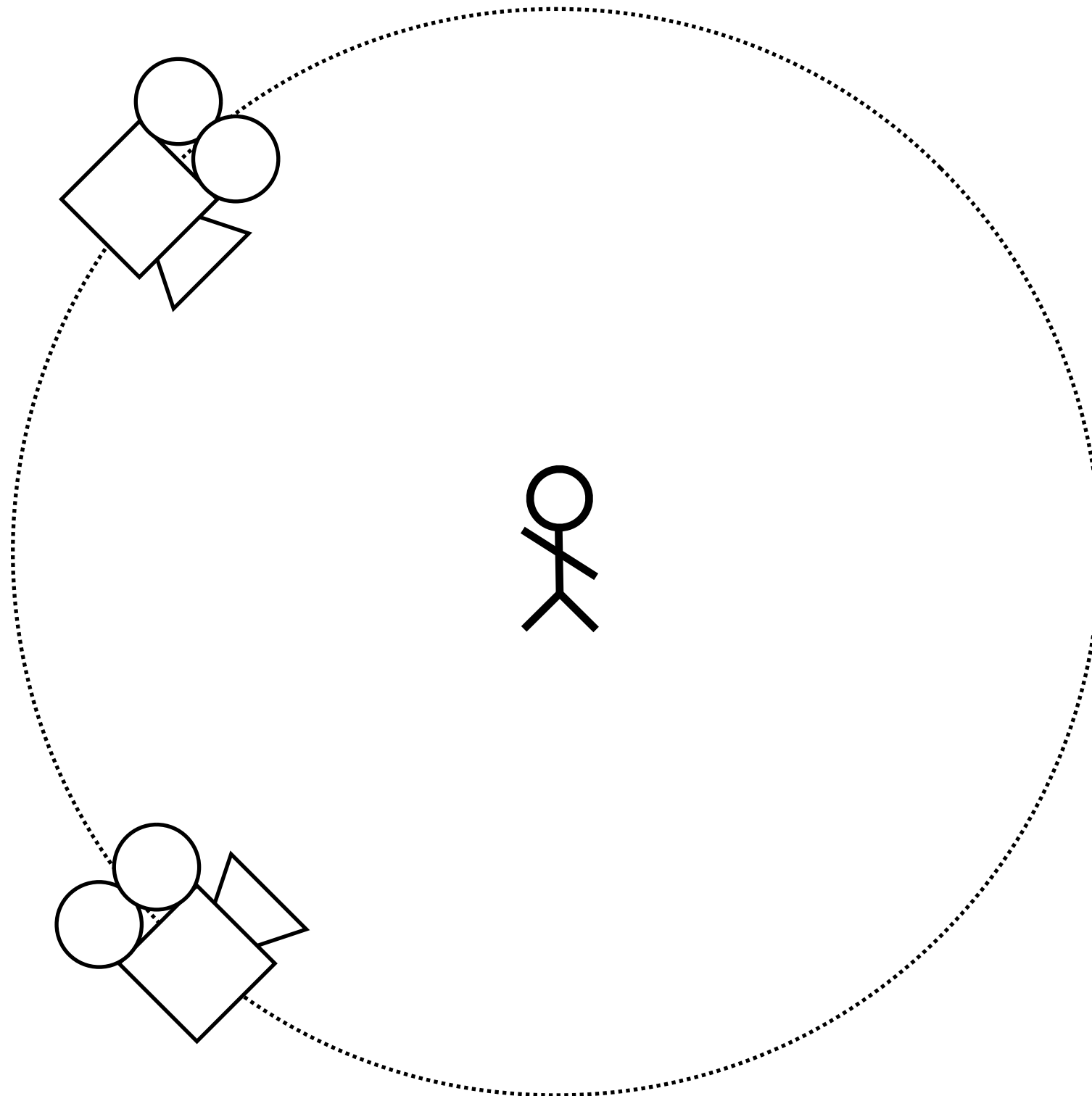
Blend Space : Design



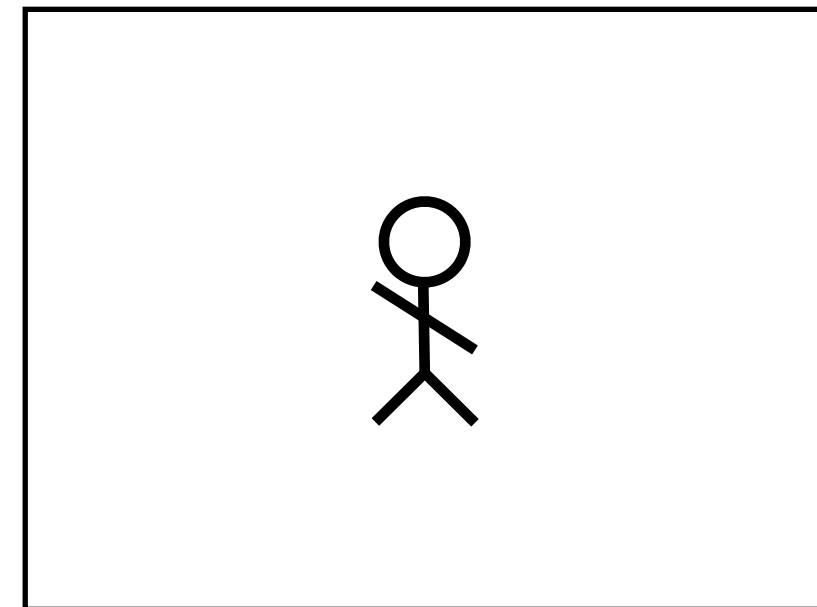
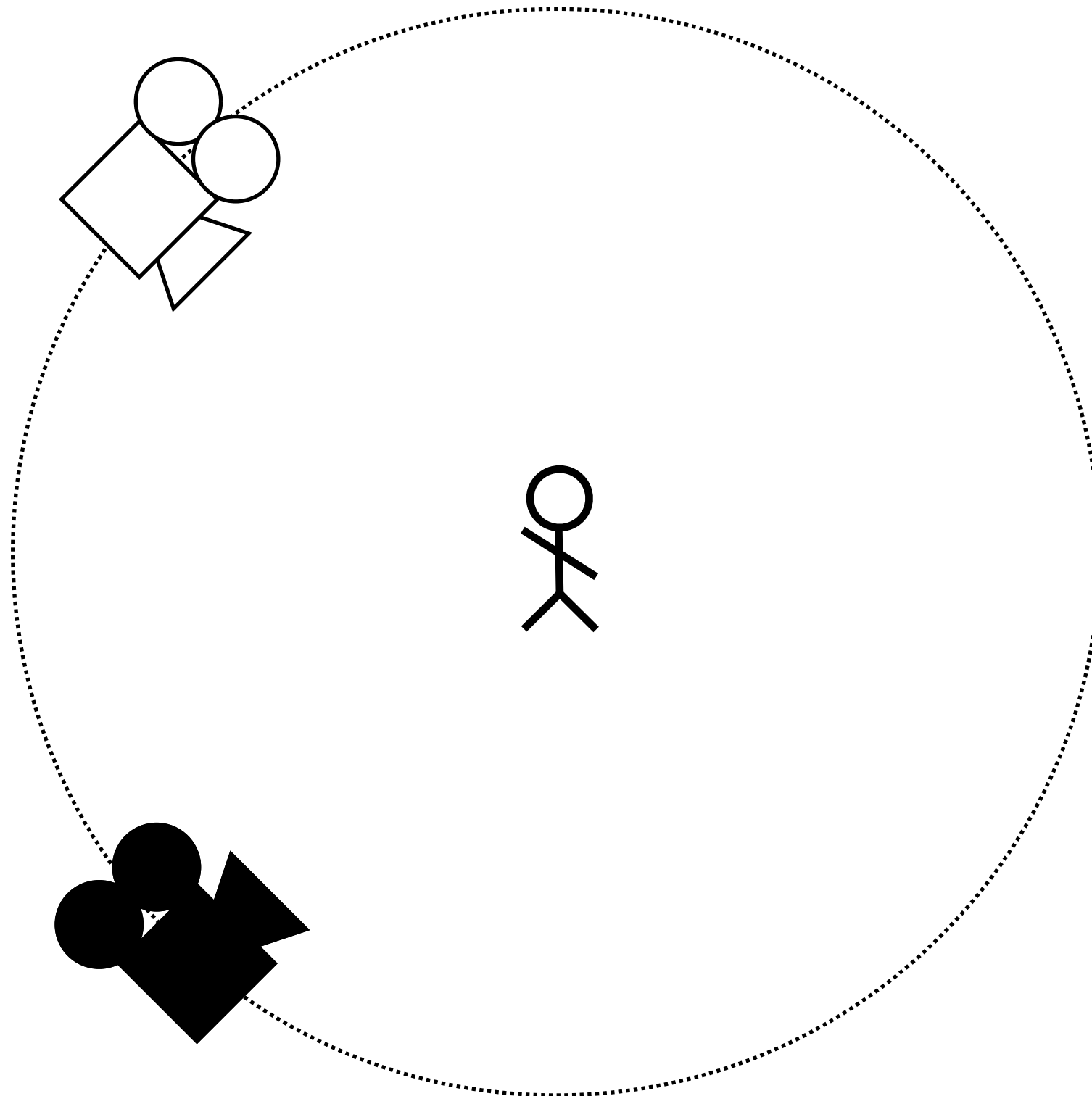
Blend Space : Design



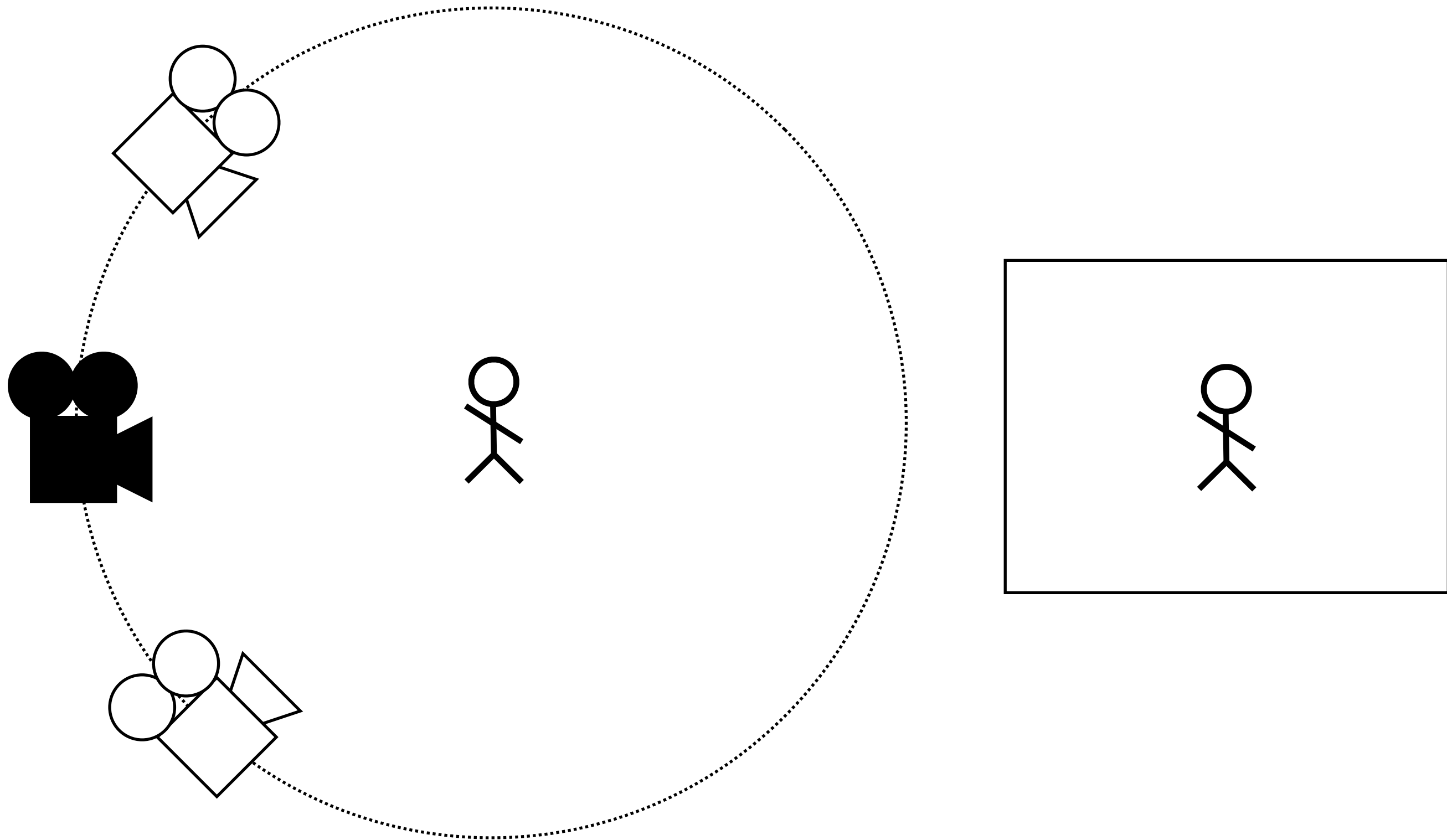
Blend Space : Design



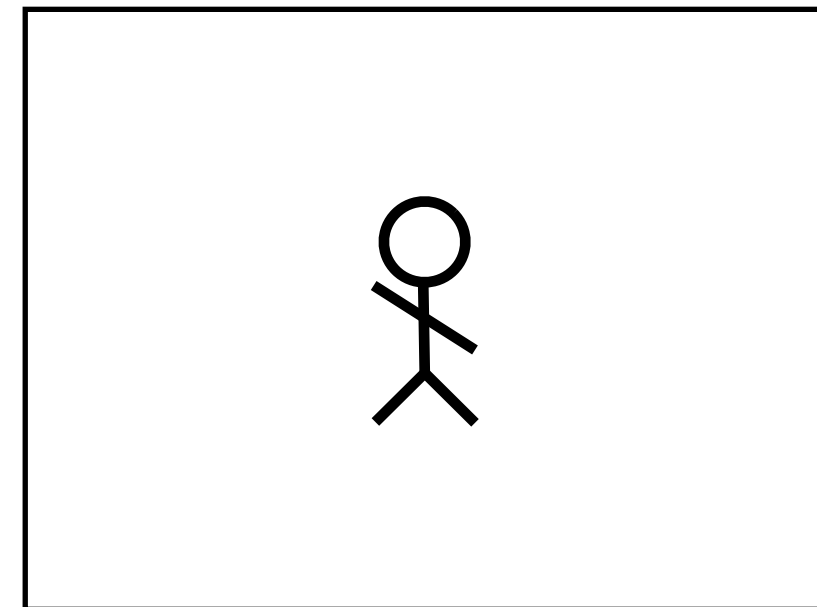
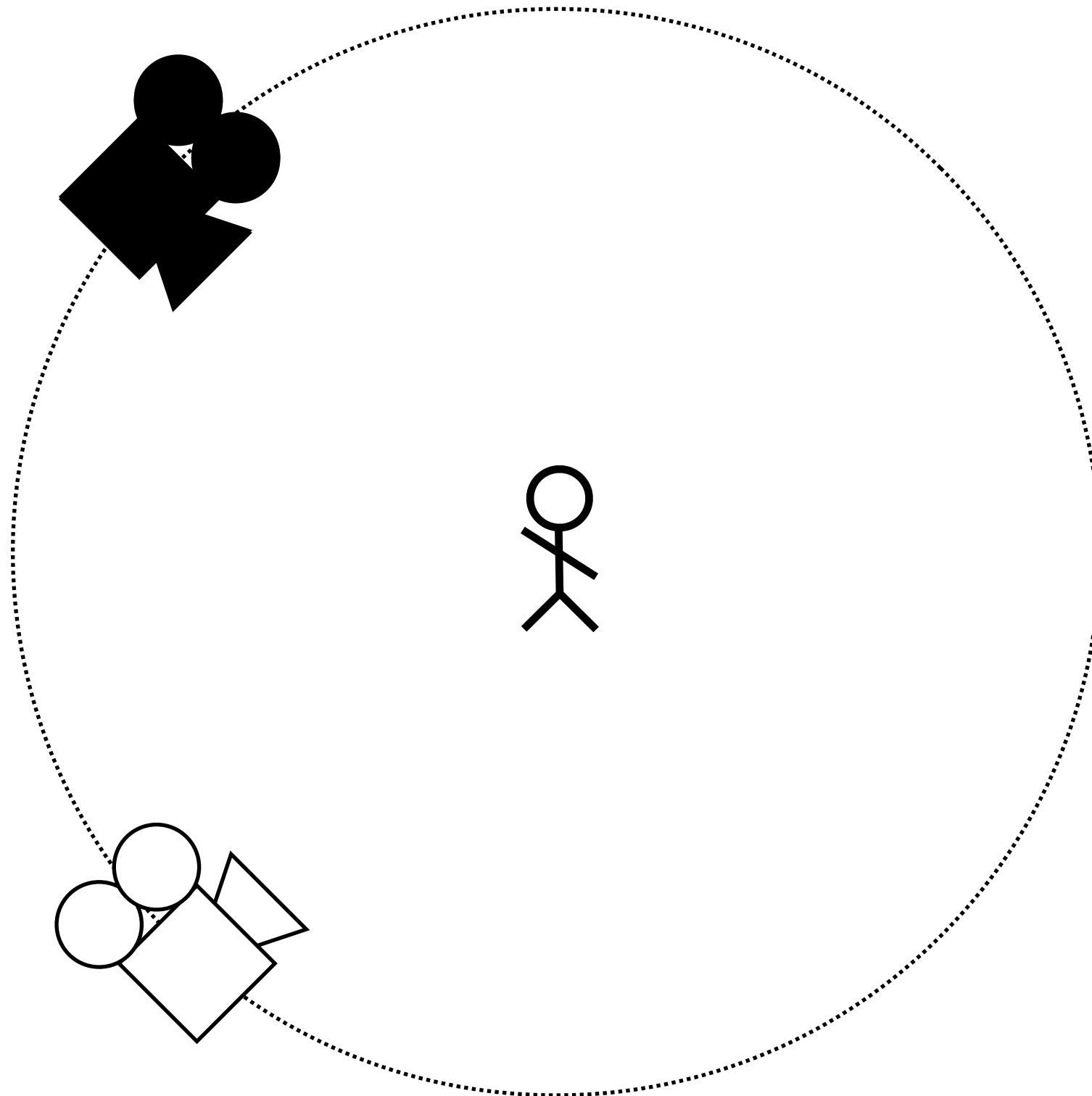
Blend Space : Design



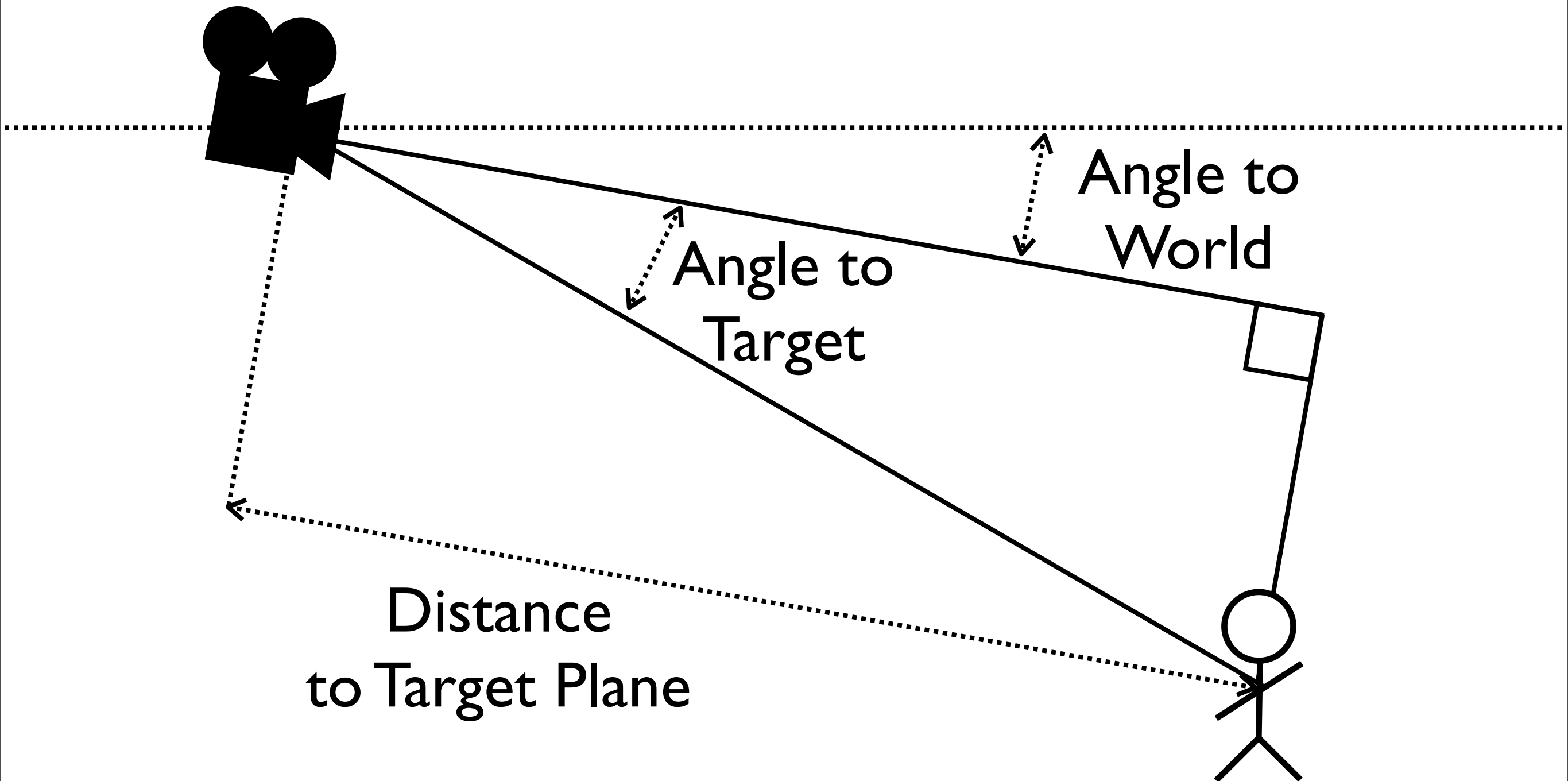
Blend Space : Design



Blend Space : Design



Blend Space : Implementation



Overview

- Zoning
- Dynamics
- **Blending**
- Rails
- Fields

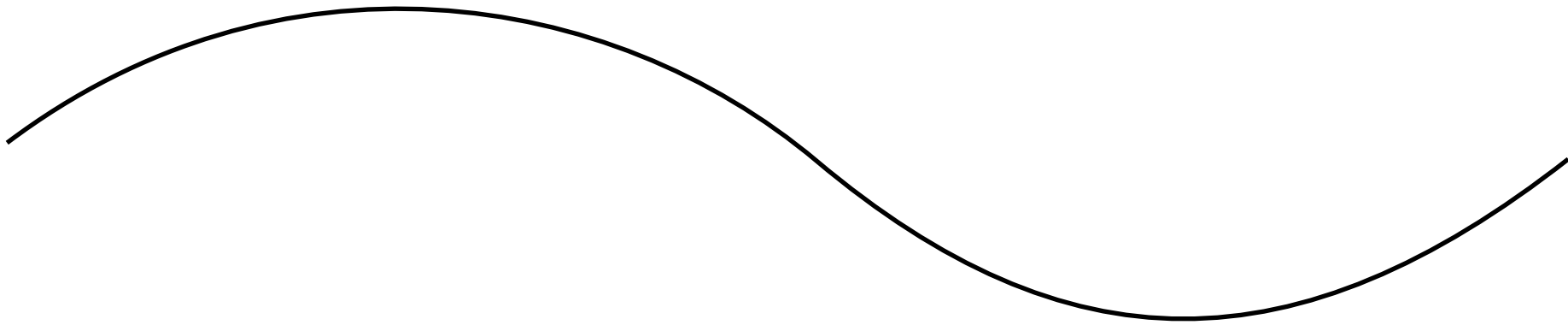
Overview

- Zoning
- Dynamics
- Blending
- **Rails**
- Fields

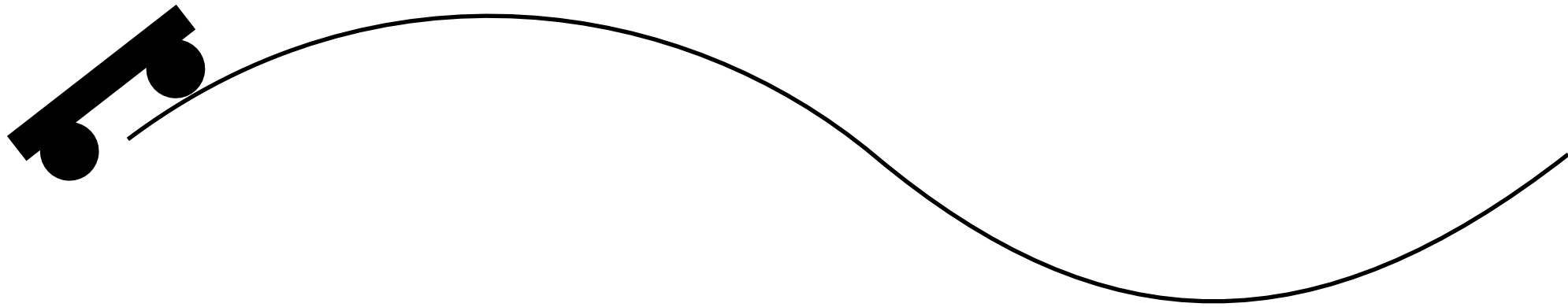
Rails : Objectives



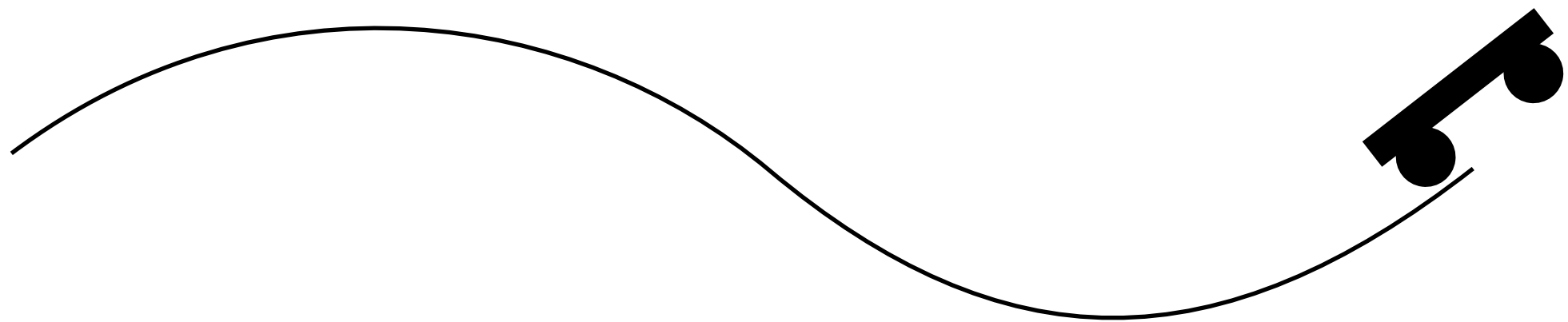
Rails : Design



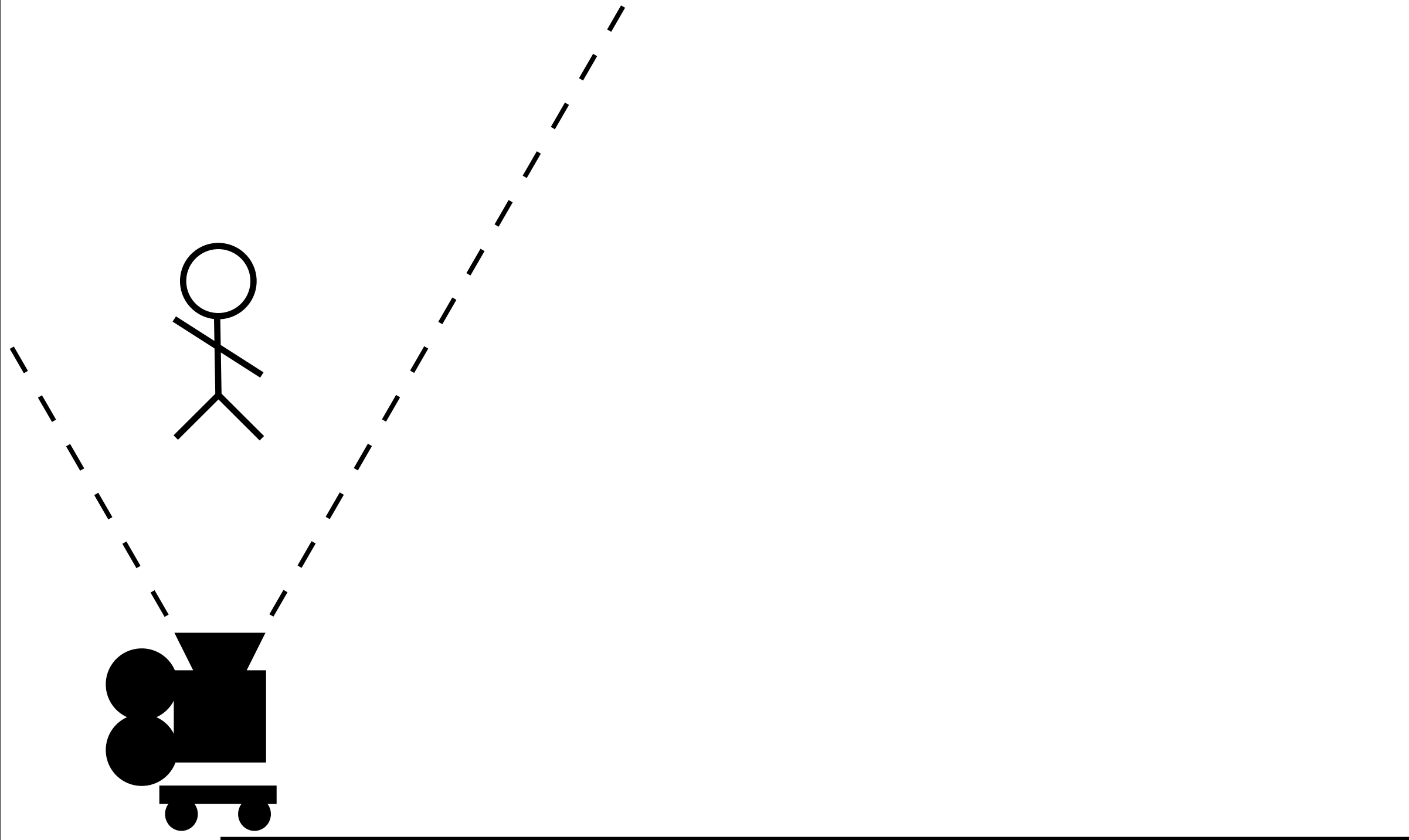
Rails : Design



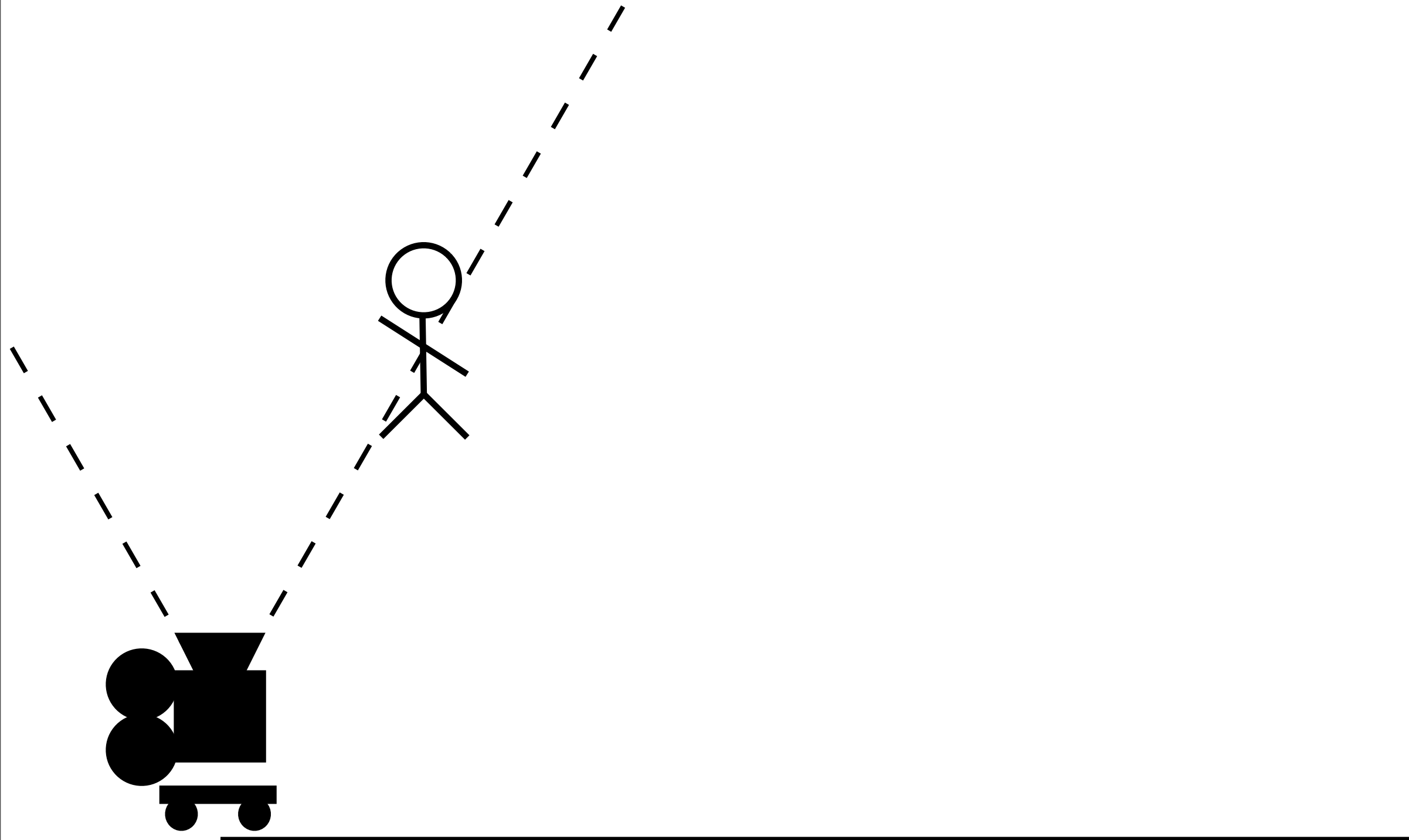
Rails : Design



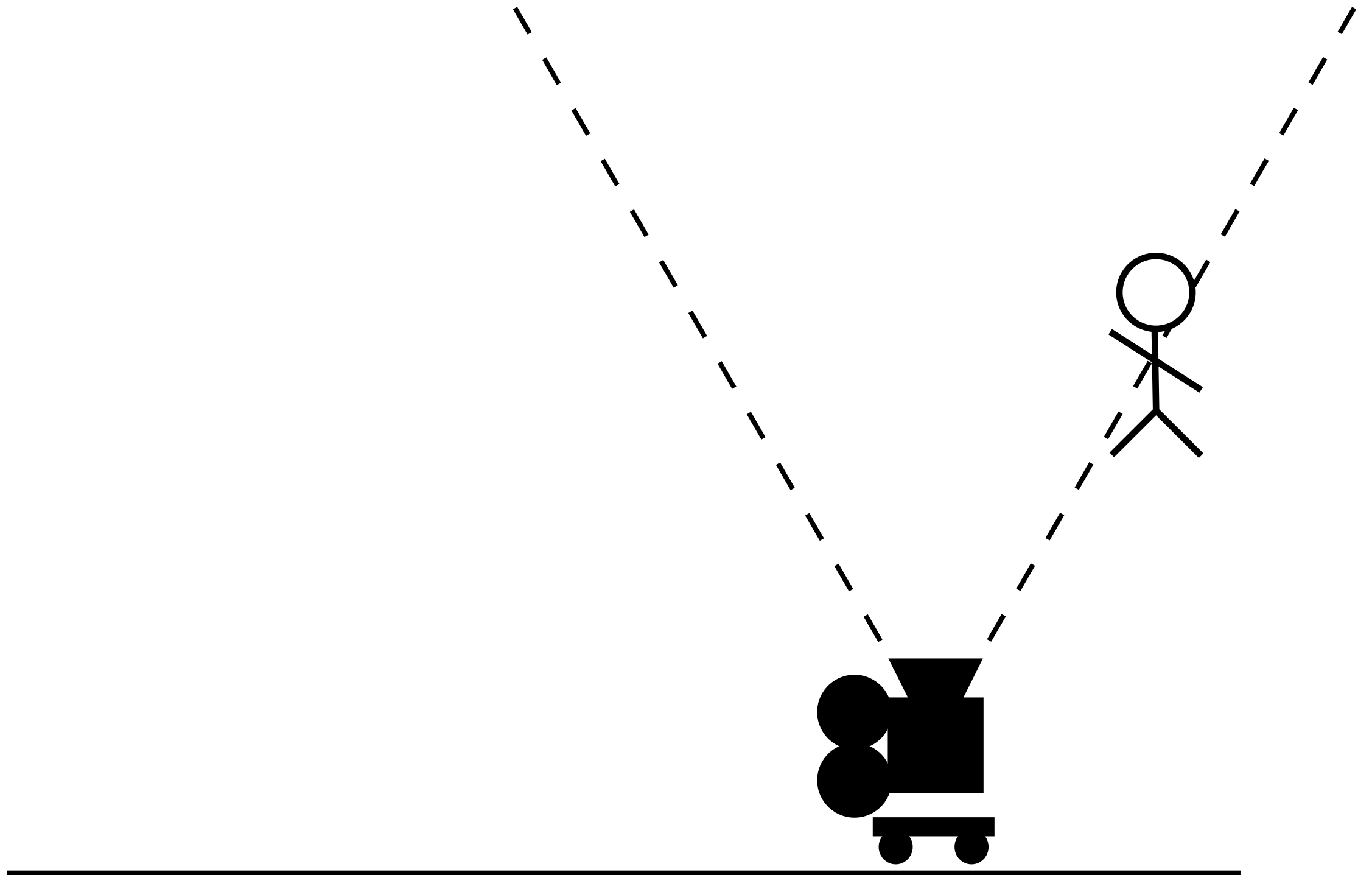
Rails : Design



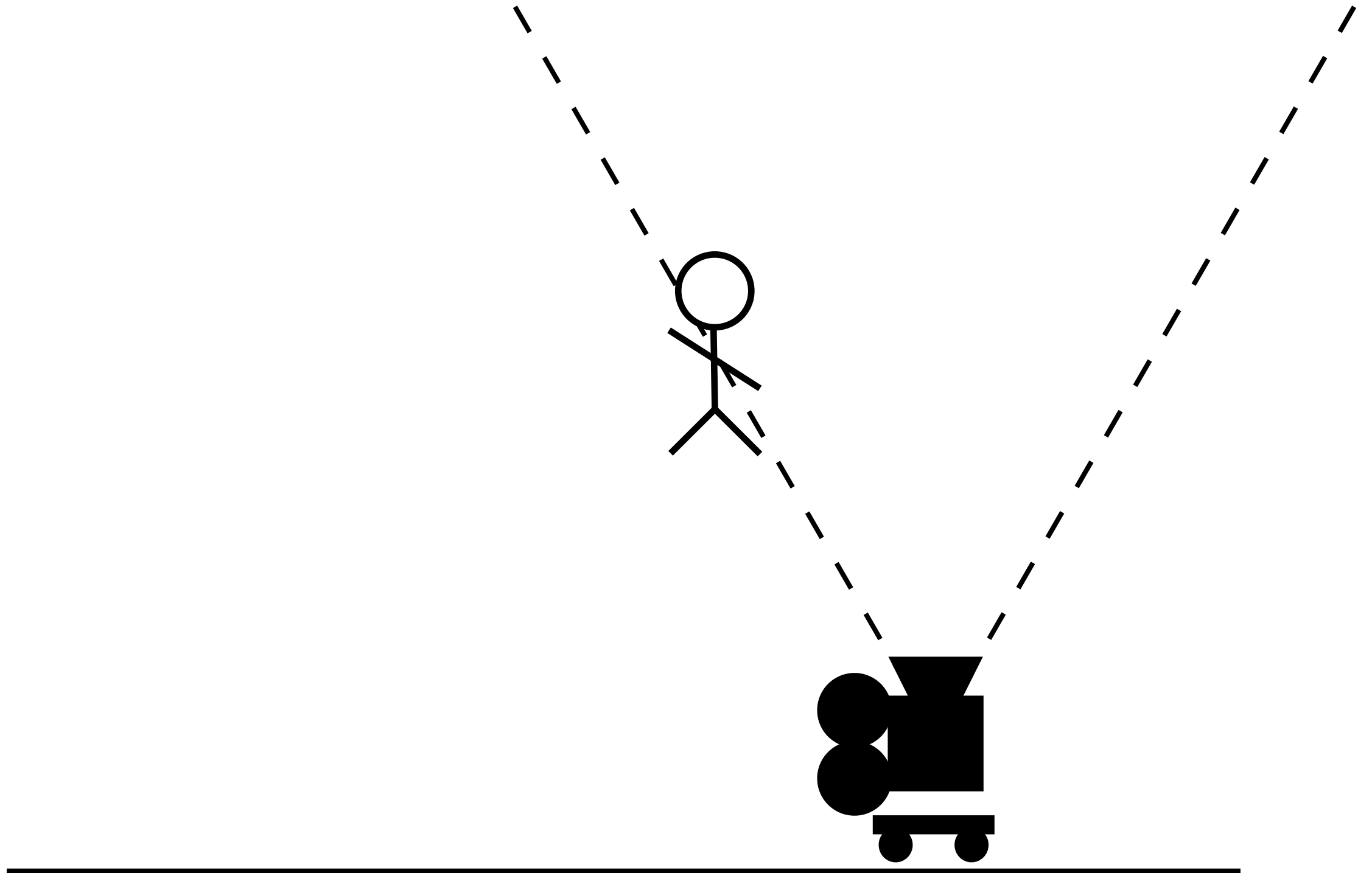
Rails : Design



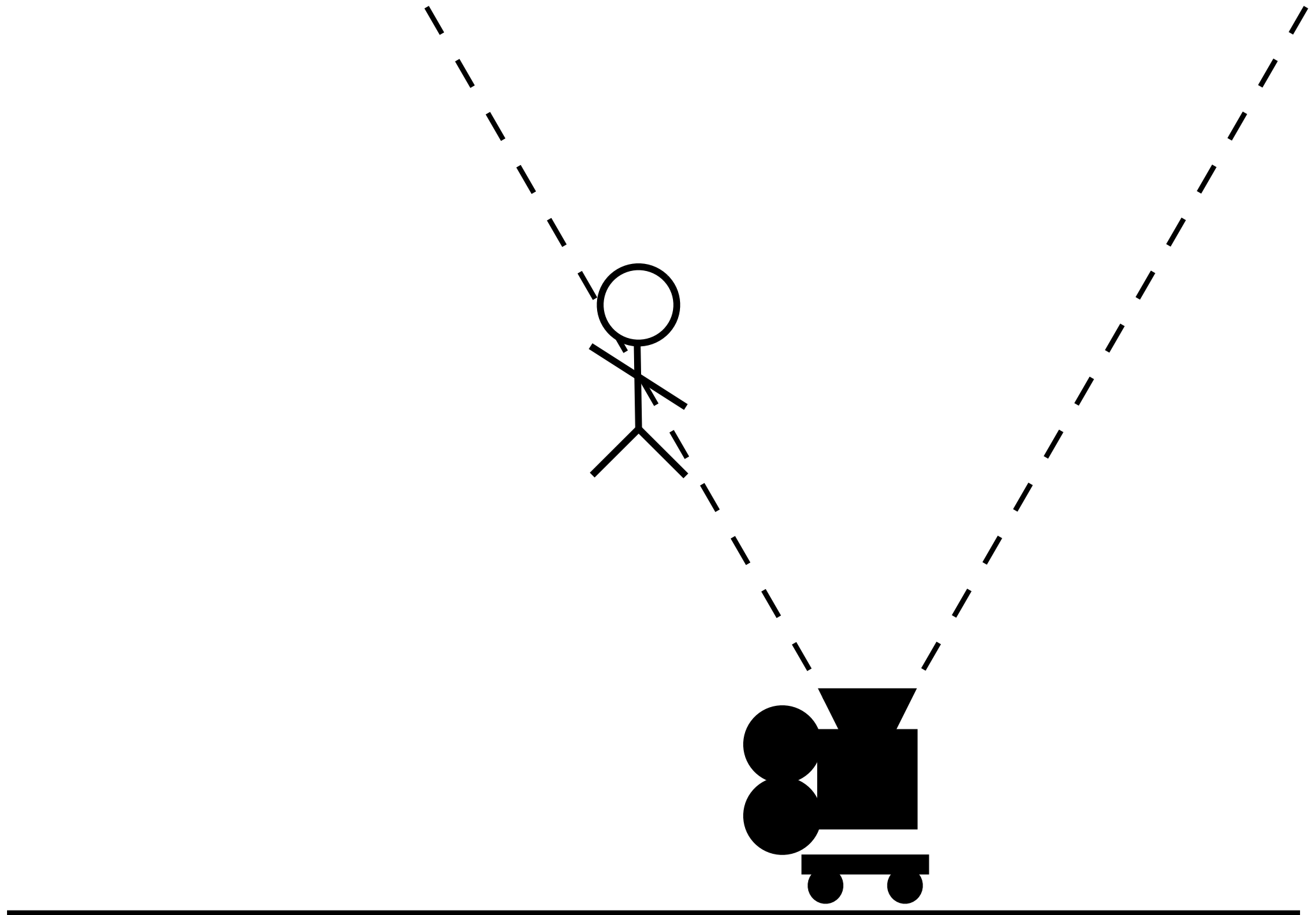
Rails : Design



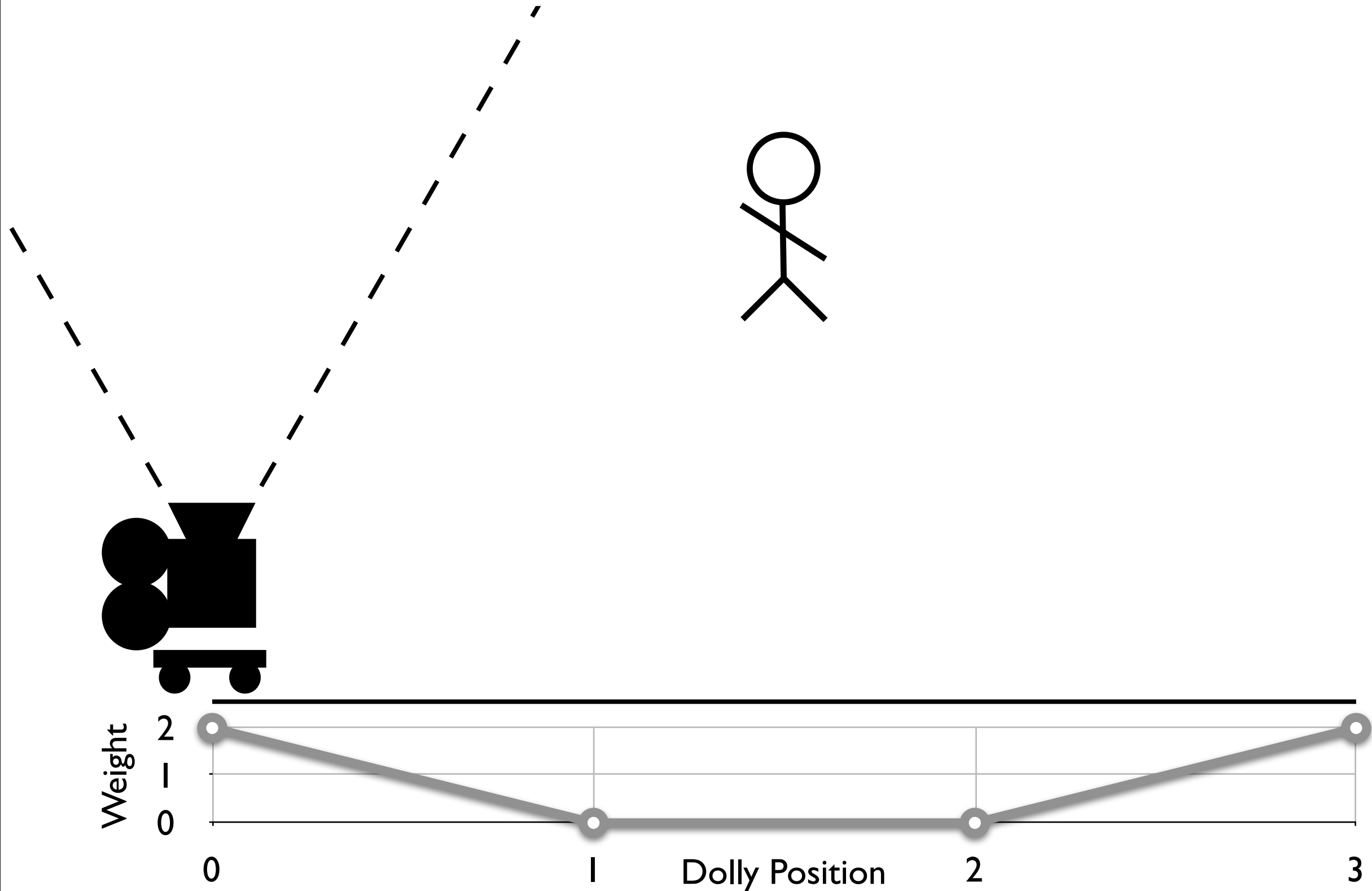
Rails : Design



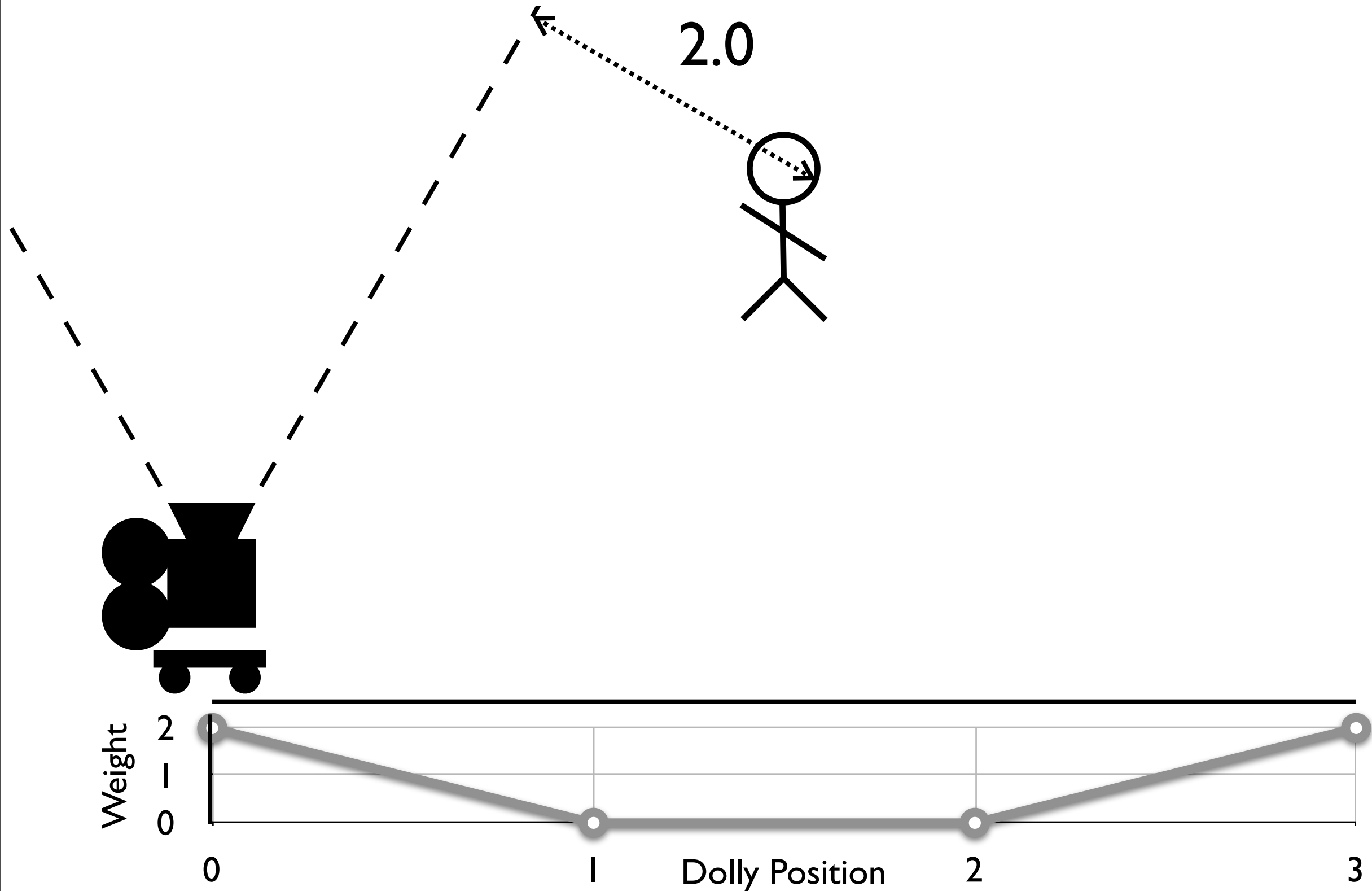
Rails : Design



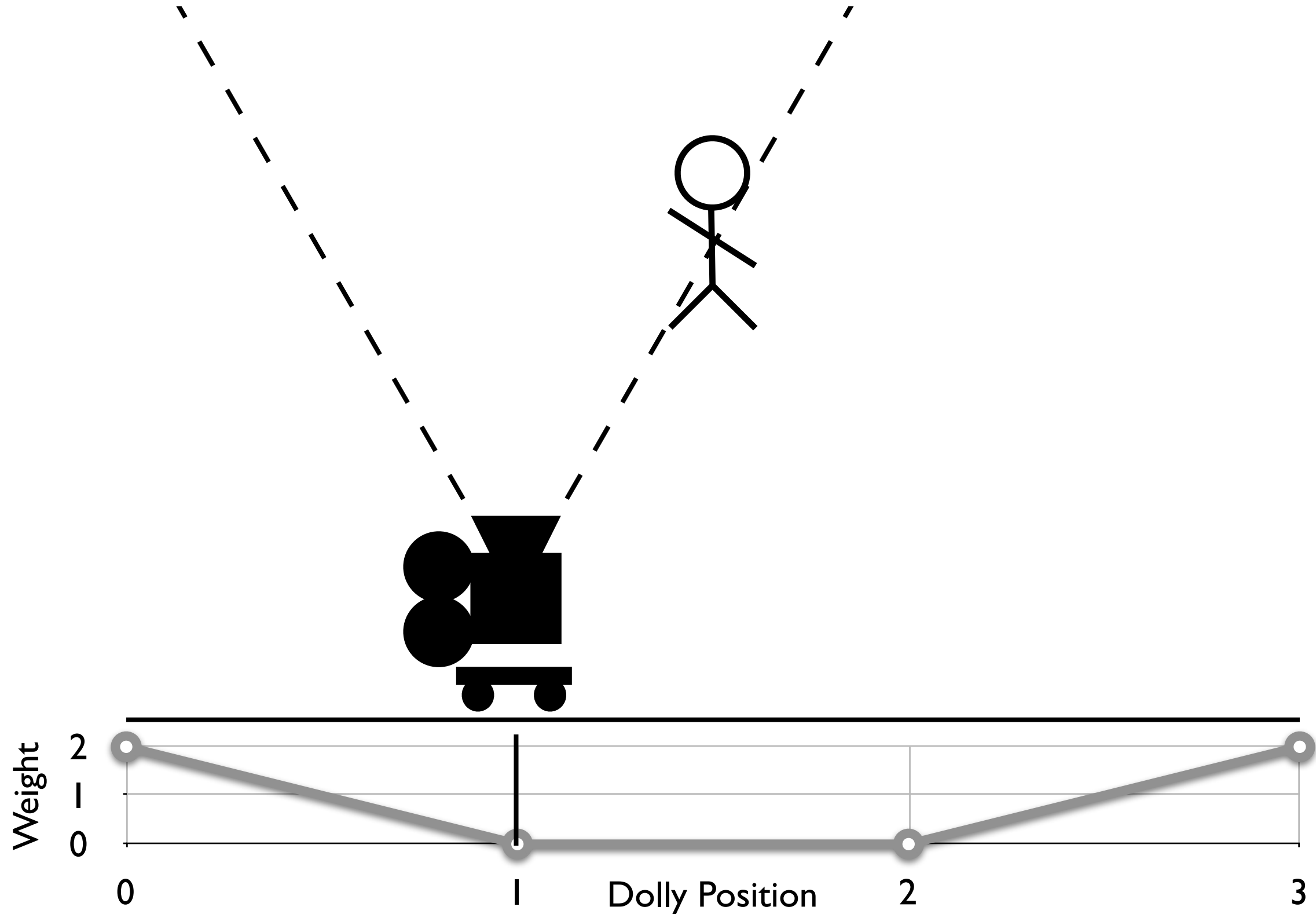
Rails : Implementation



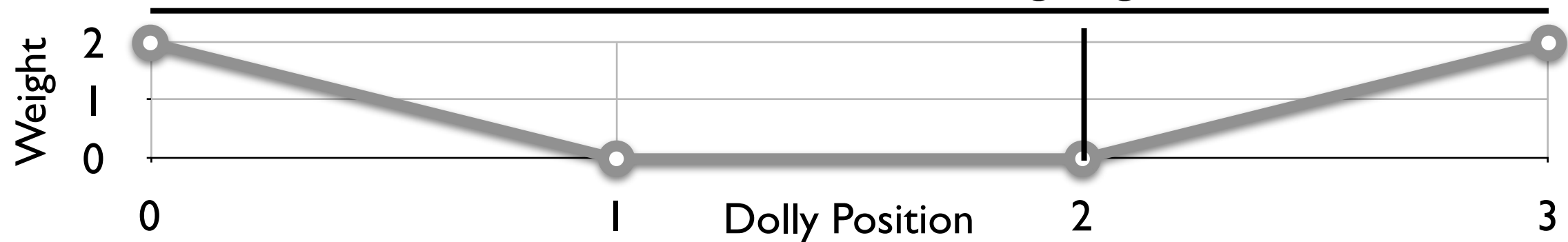
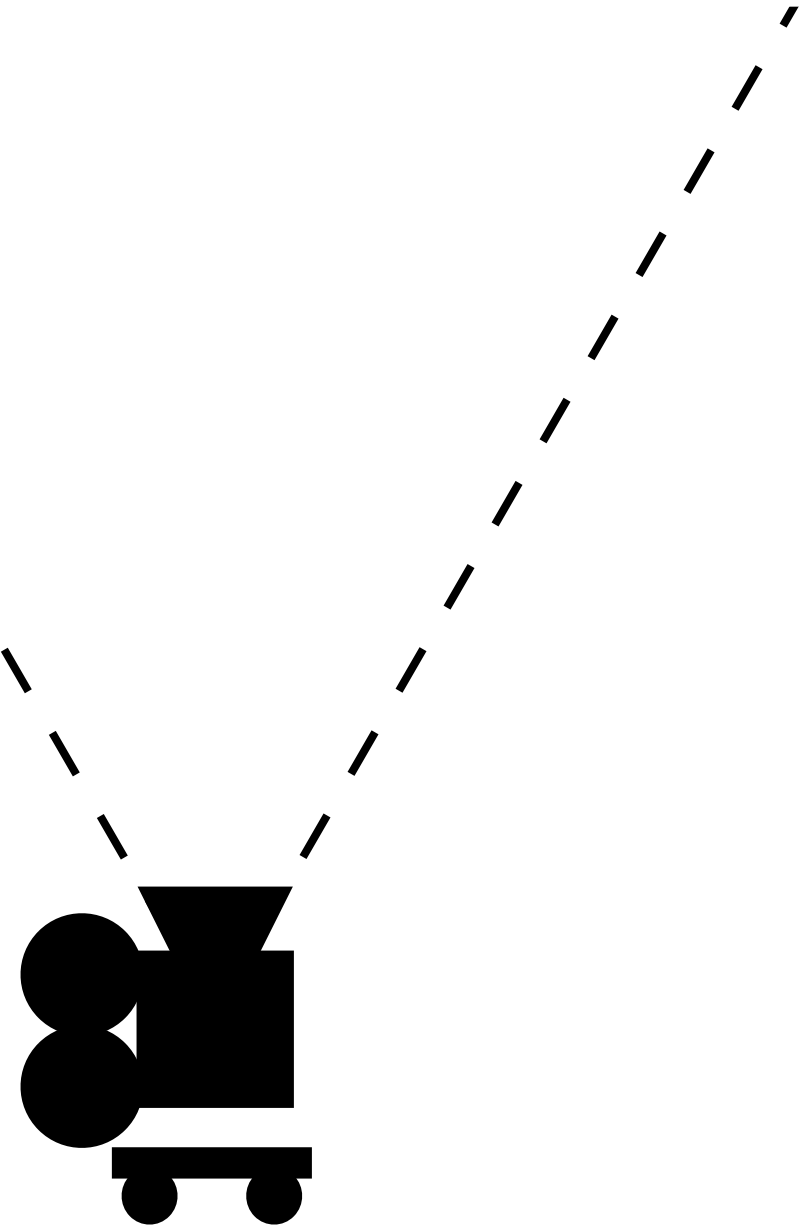
Rails : Implementation



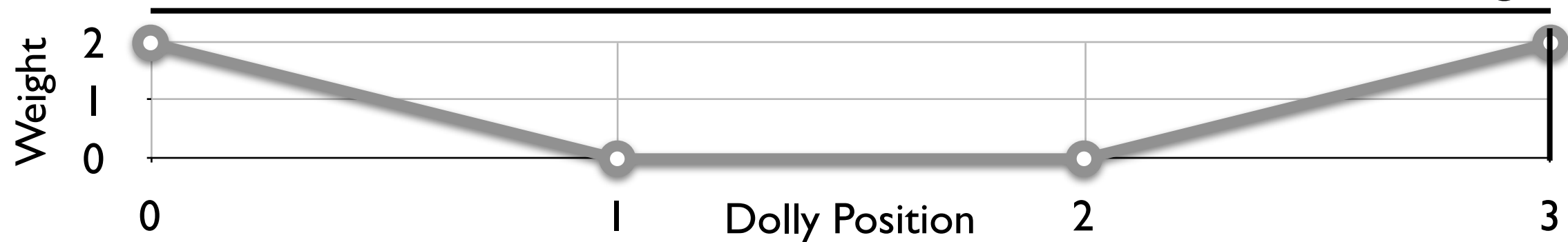
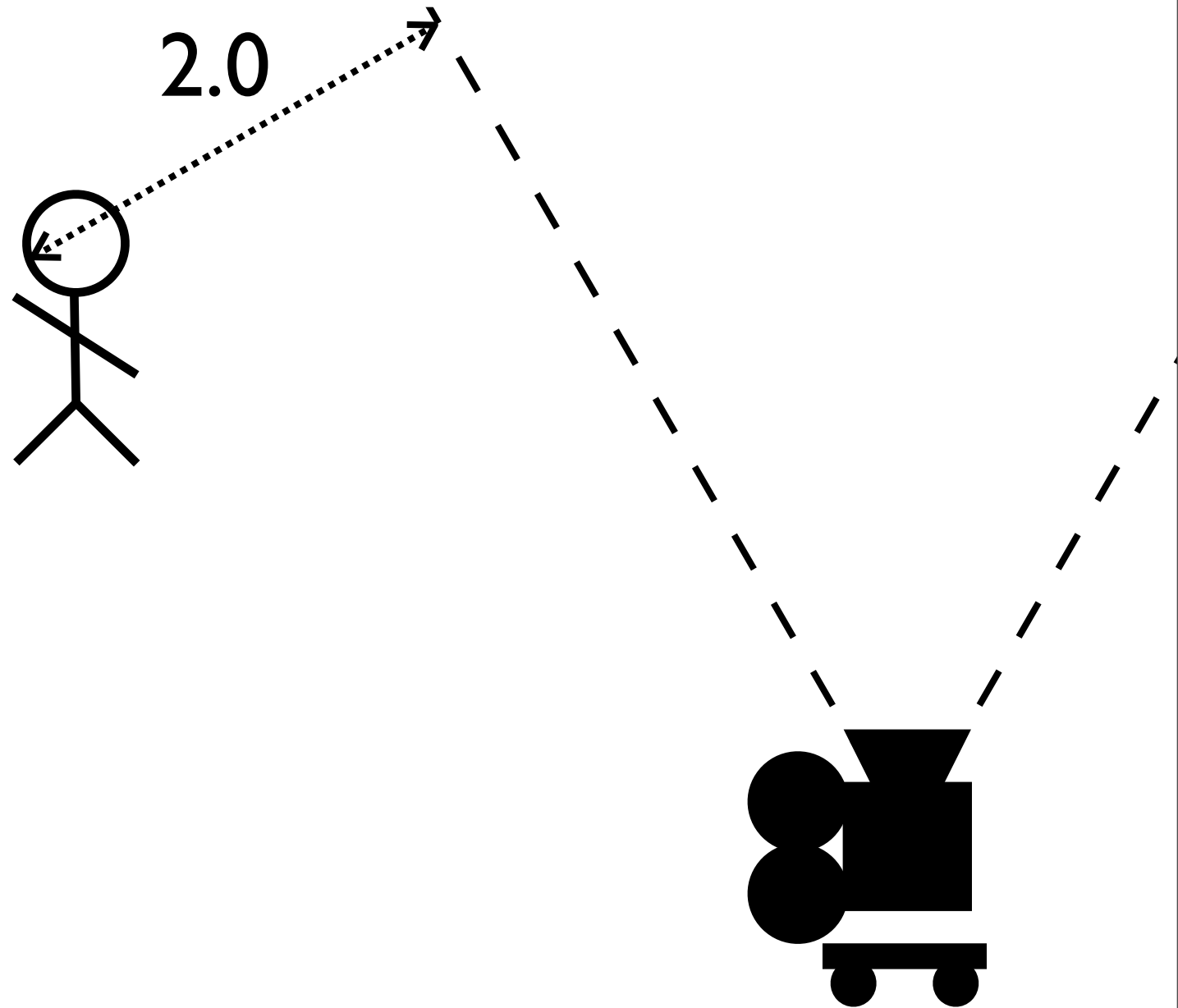
Rails : Implementation



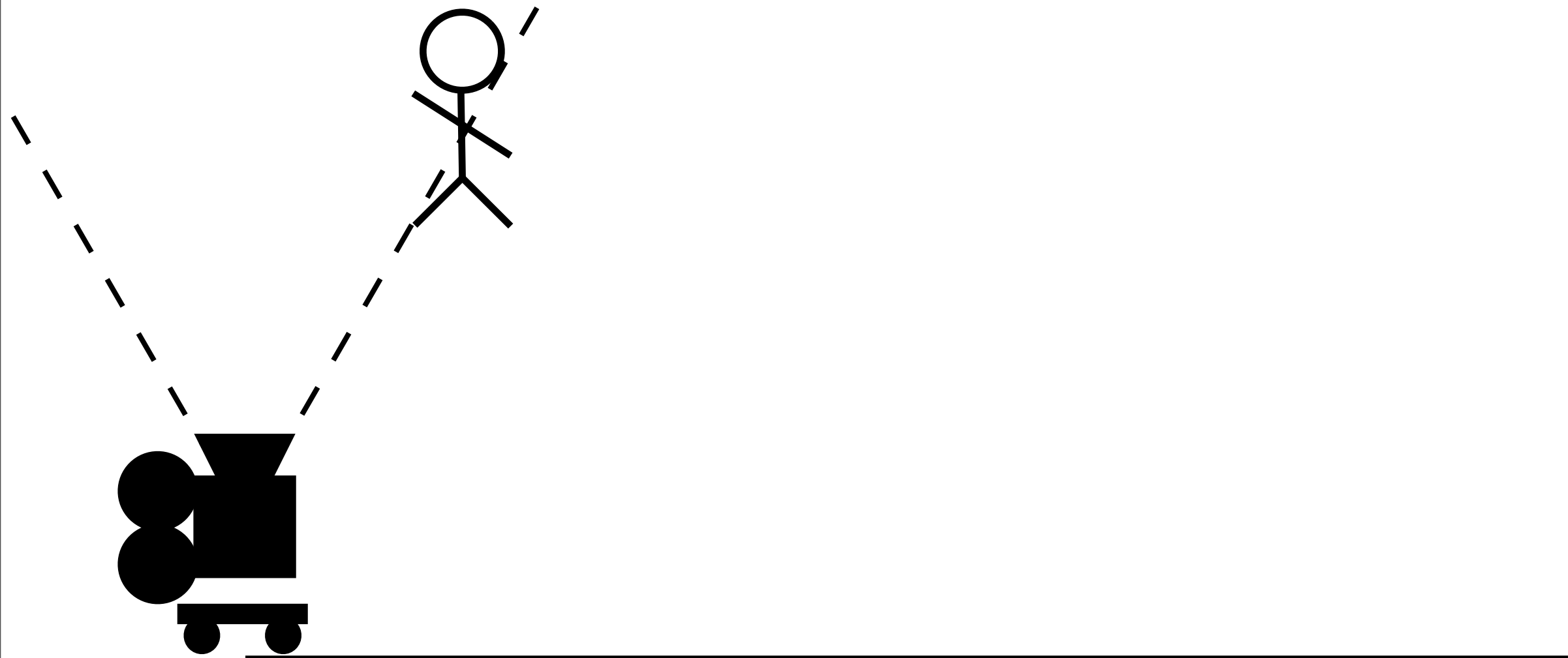
Rails : Implementation



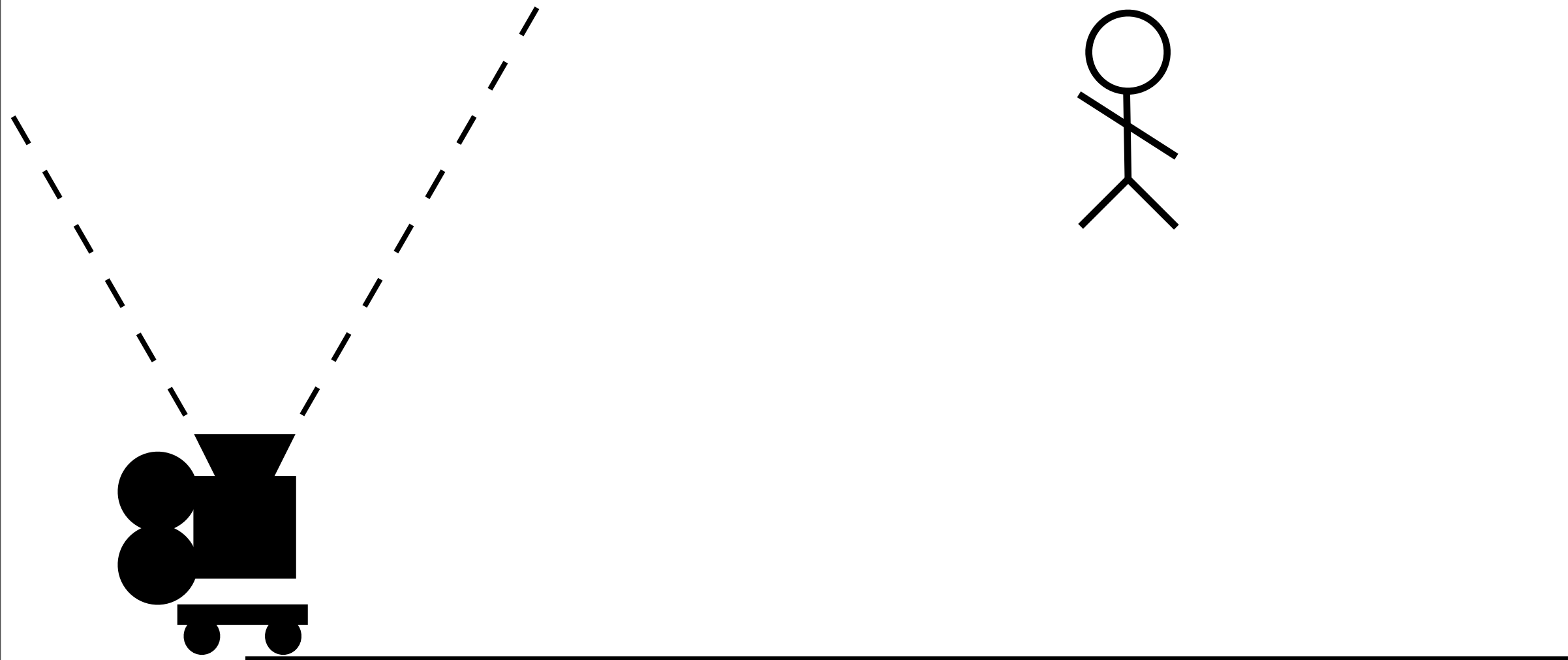
Rails : Implementation



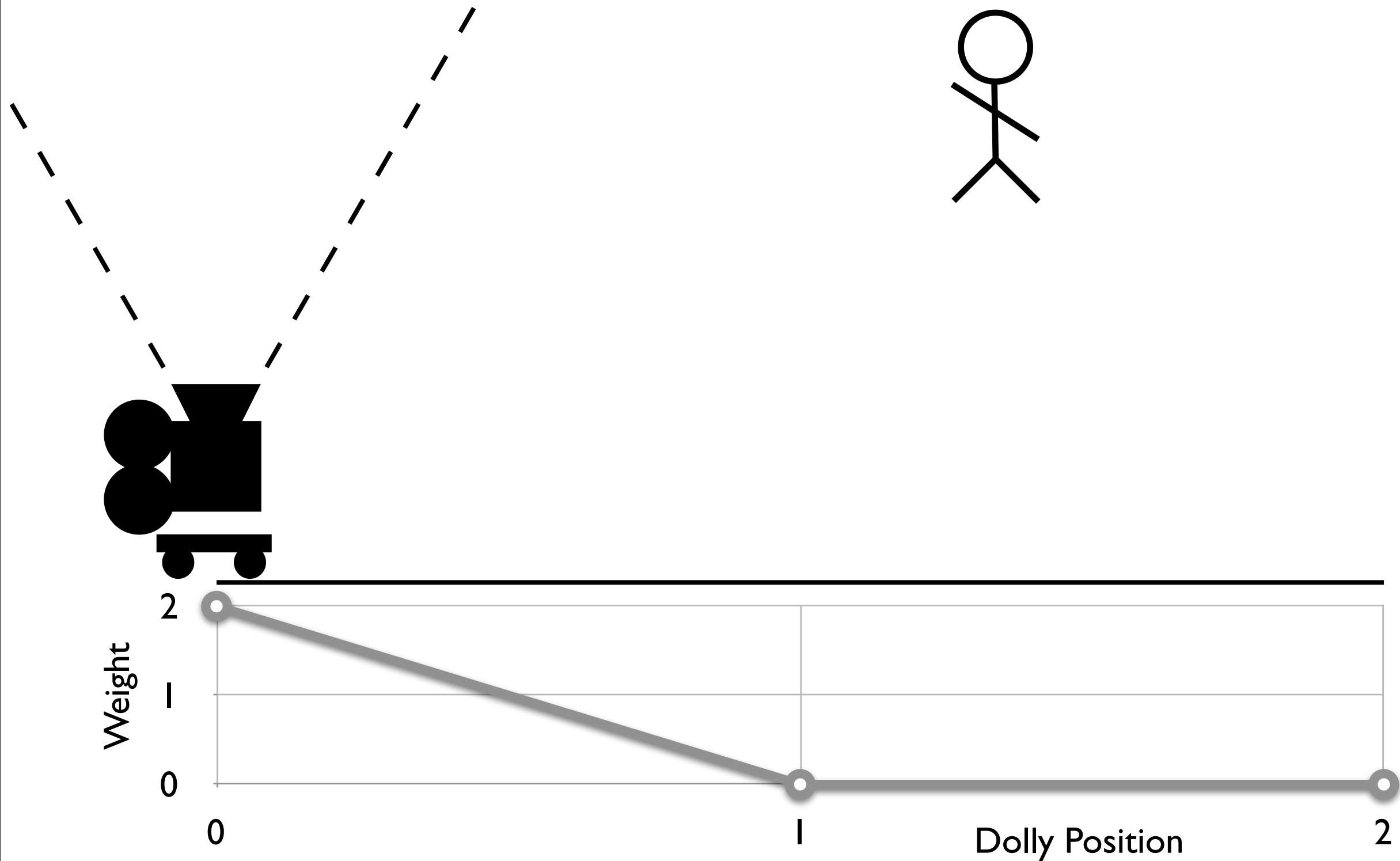
Rails : Implementation



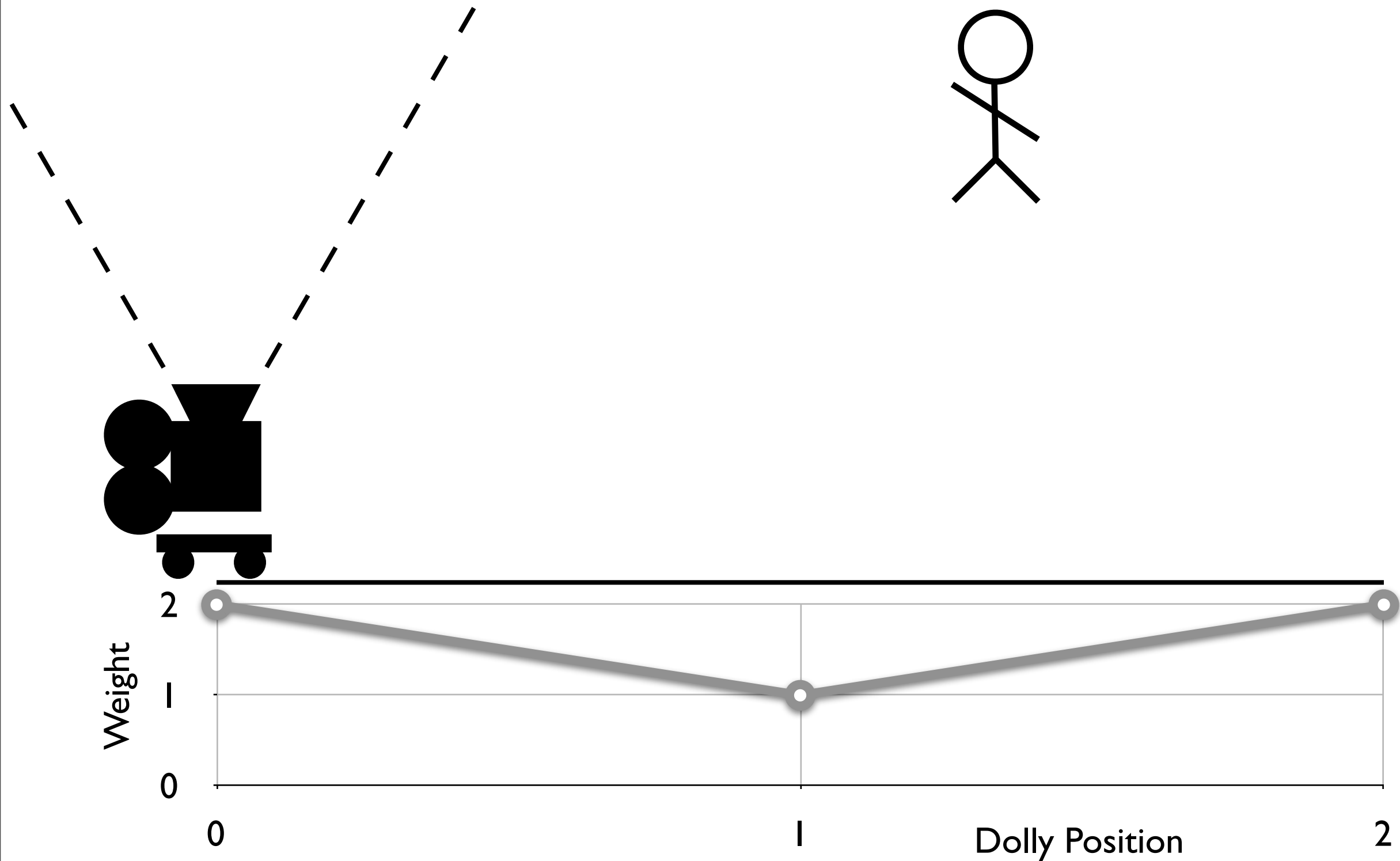
Rails : Implementation



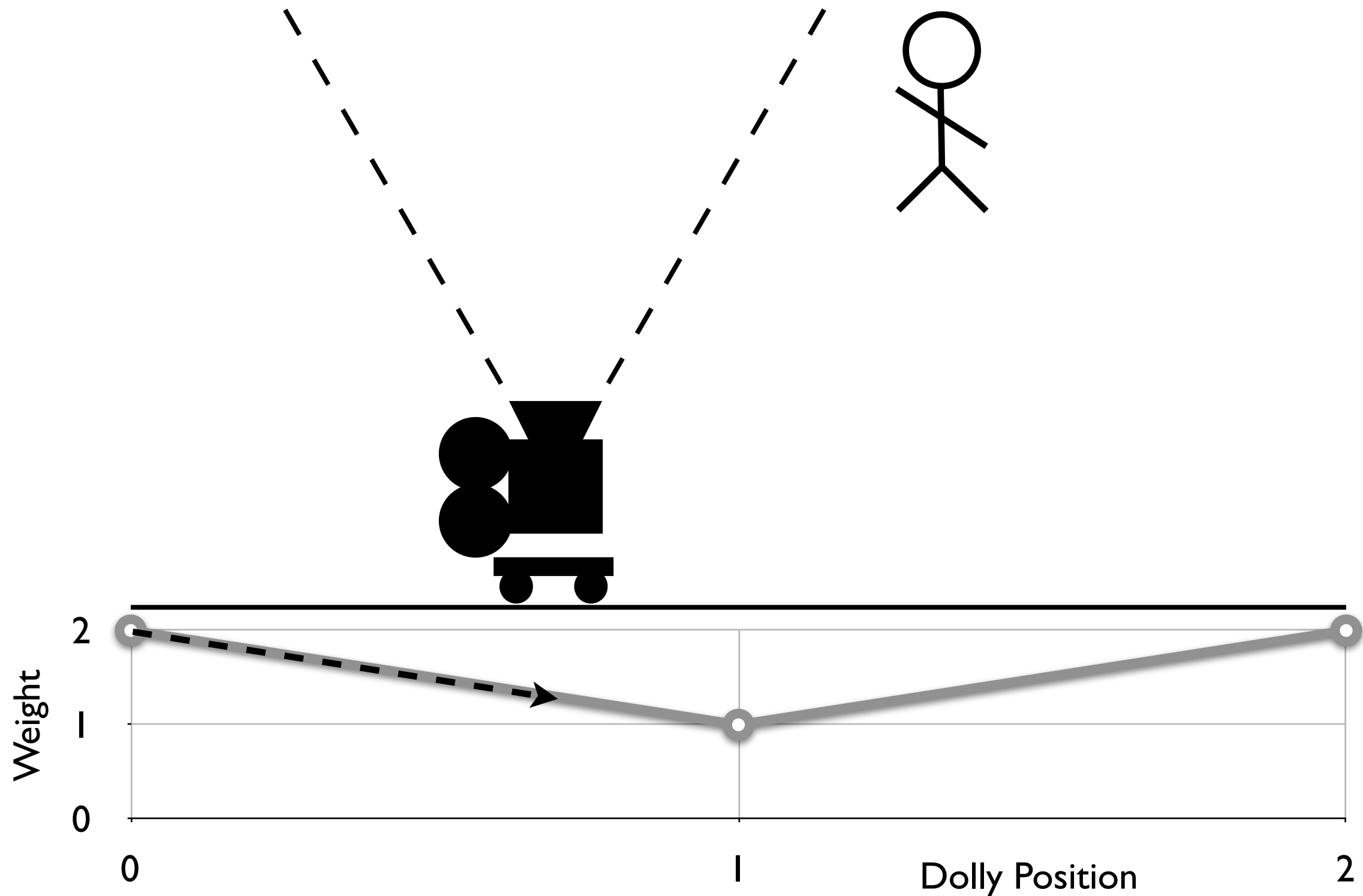
Rails : Implementation



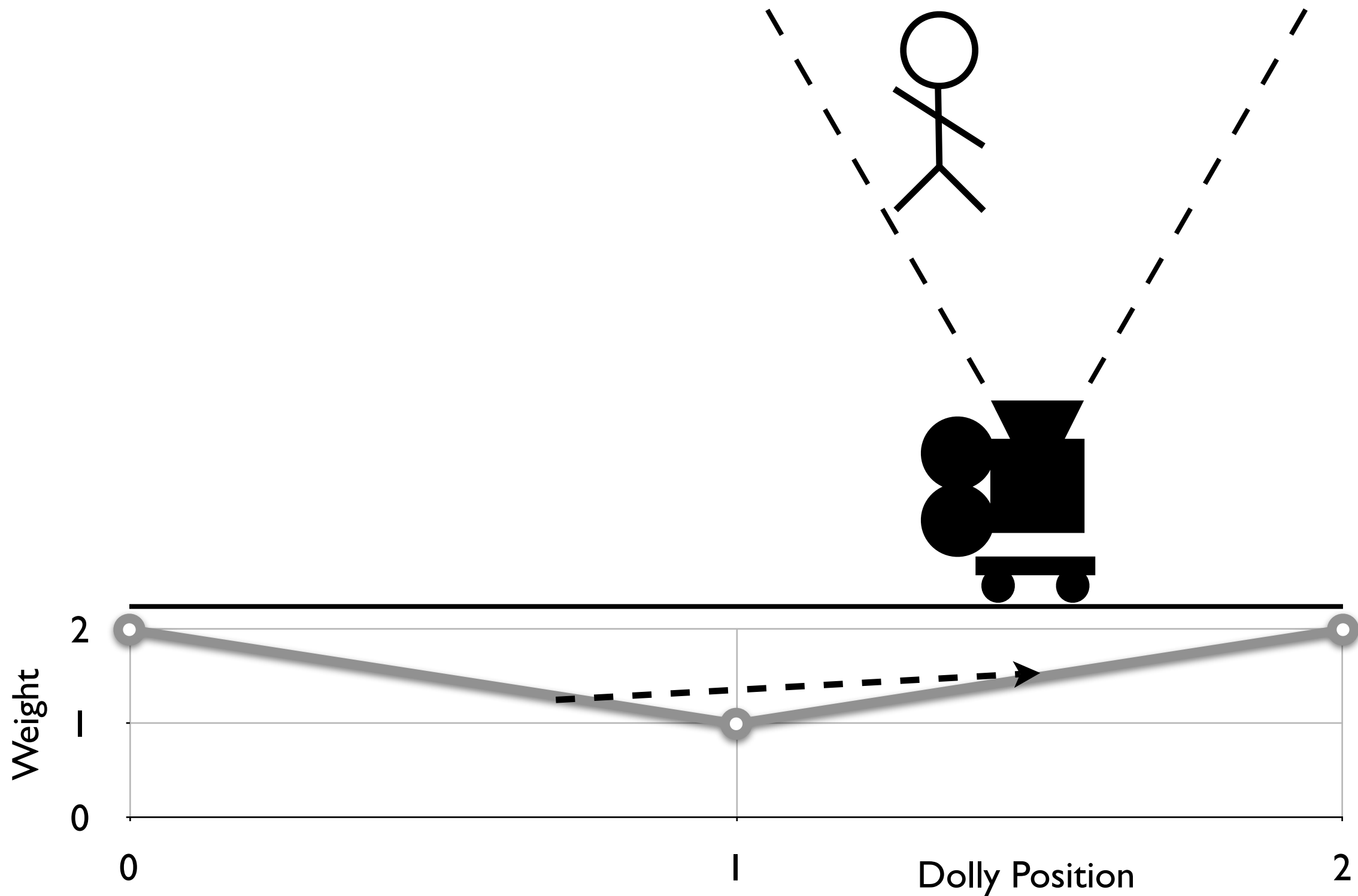
Rails : Implementation



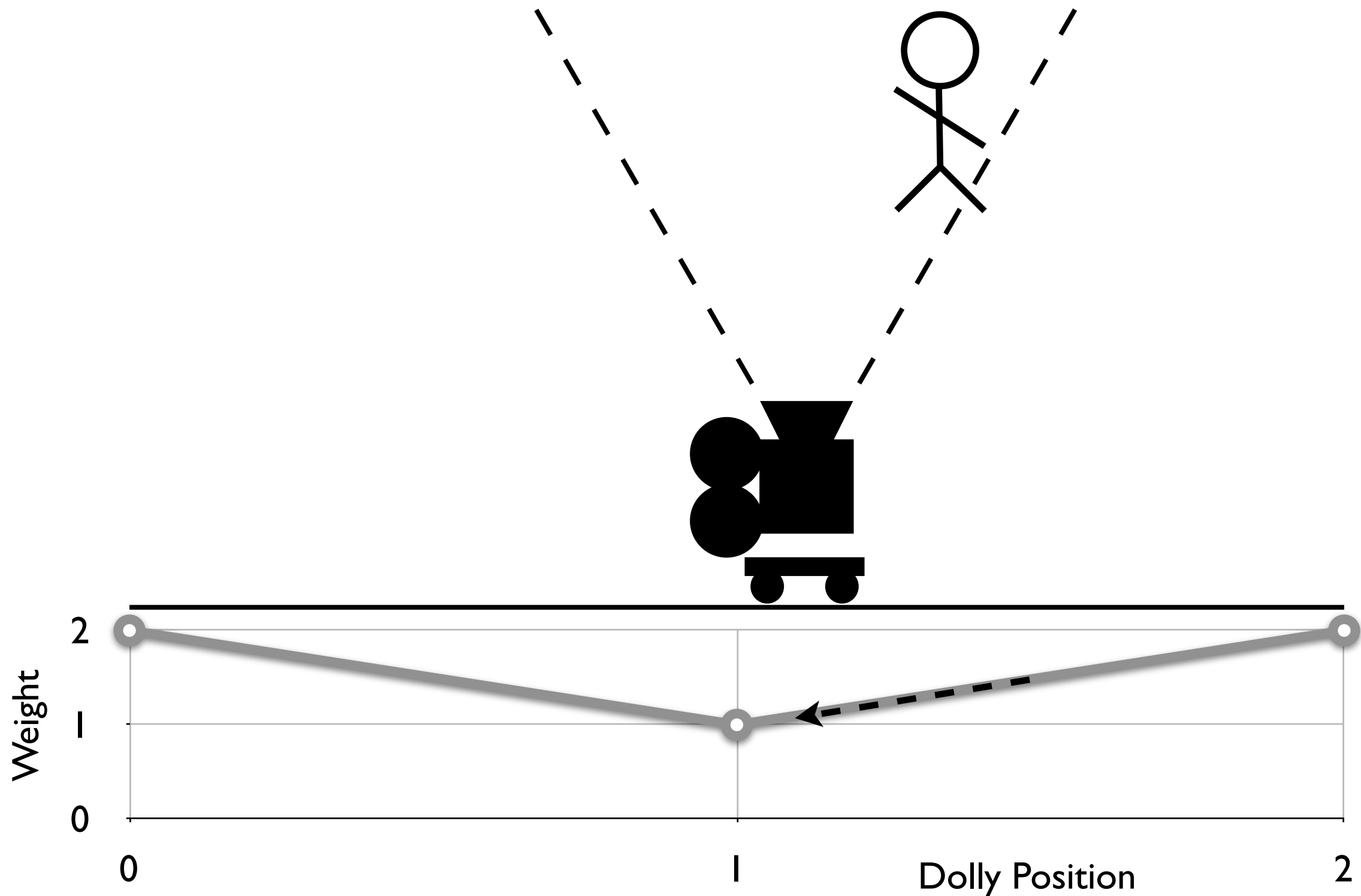
Rails : Implementation



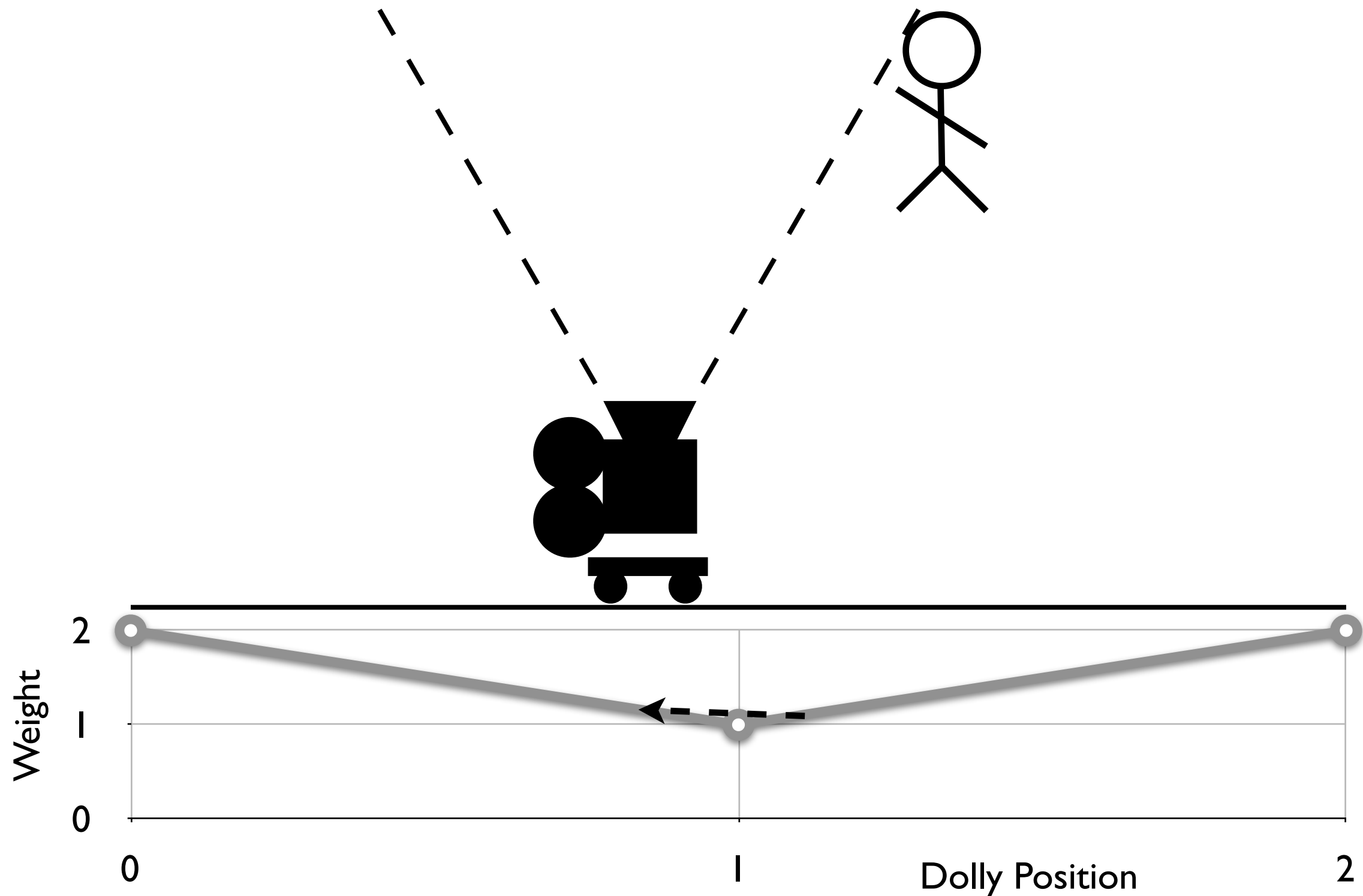
Rails : Implementation



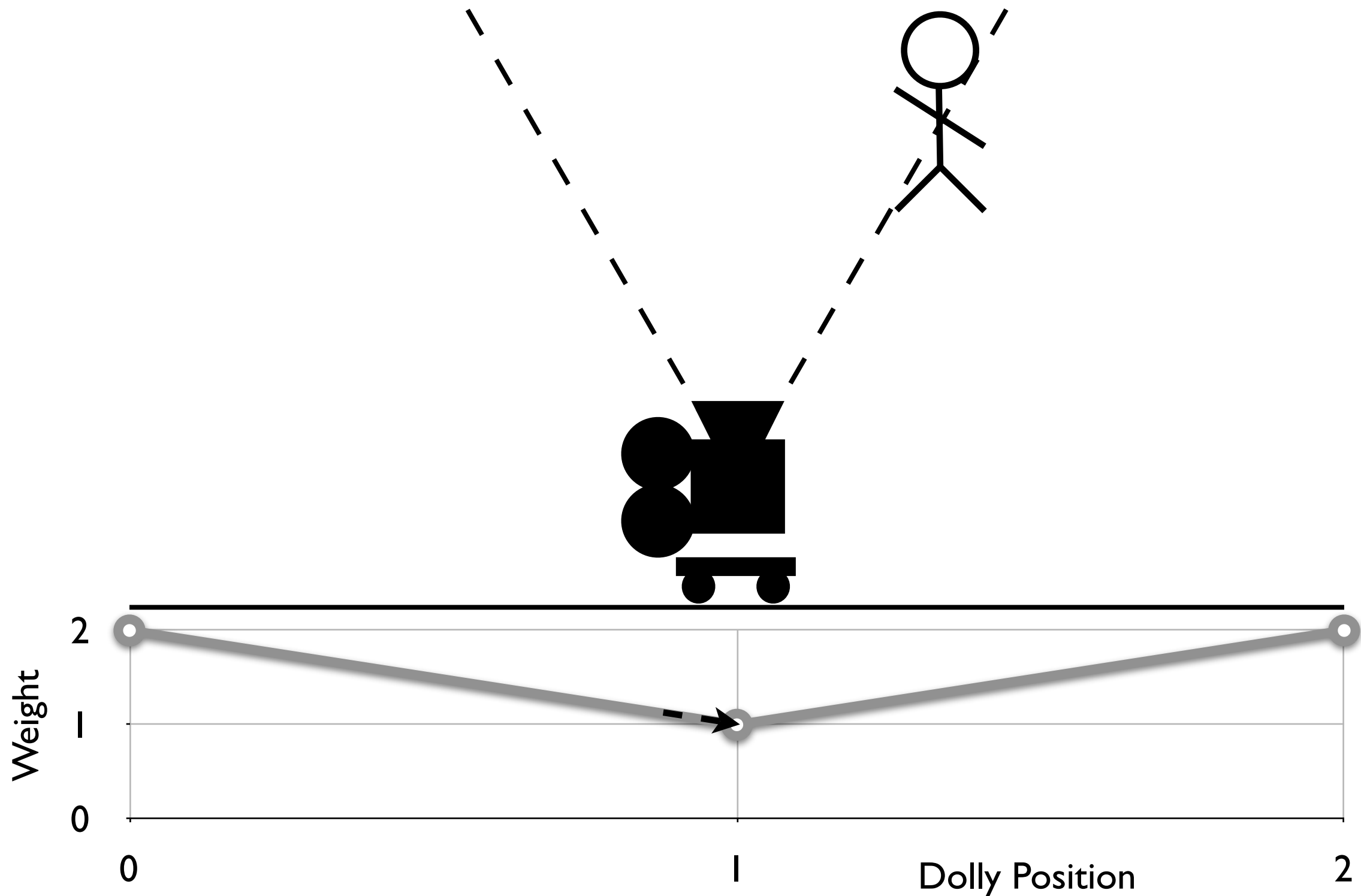
Rails : Implementation



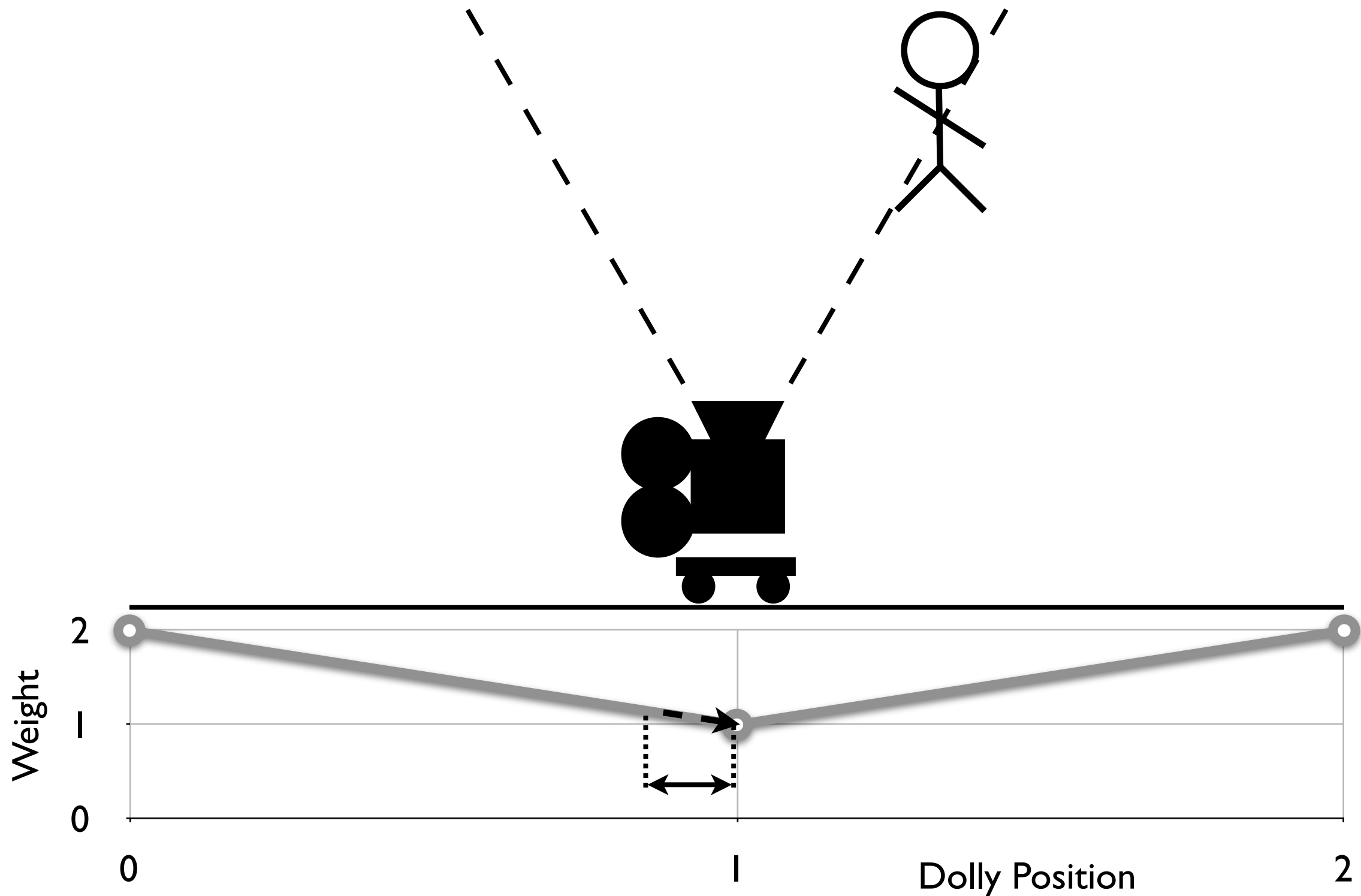
Rails : Implementation



Rails : Implementation



Rails : Implementation



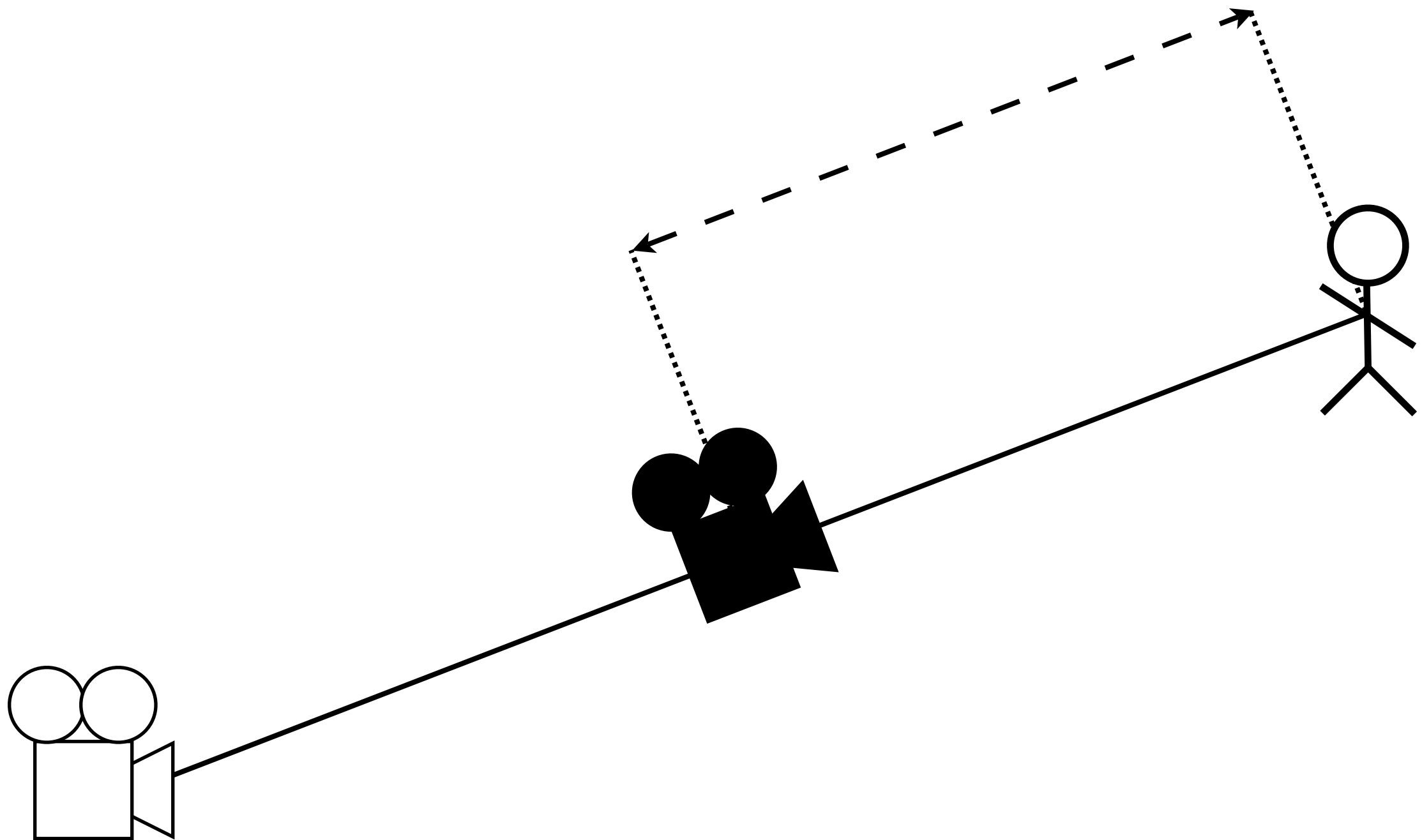
Rails : Implementation

1. Add distance from last frame to weight function
2. Guess a move based on previous frame
3. If weight decreases, keep going
4. If weight increases, slow down, turn around
5. Repeat 3 & 4 until moved less than threshold

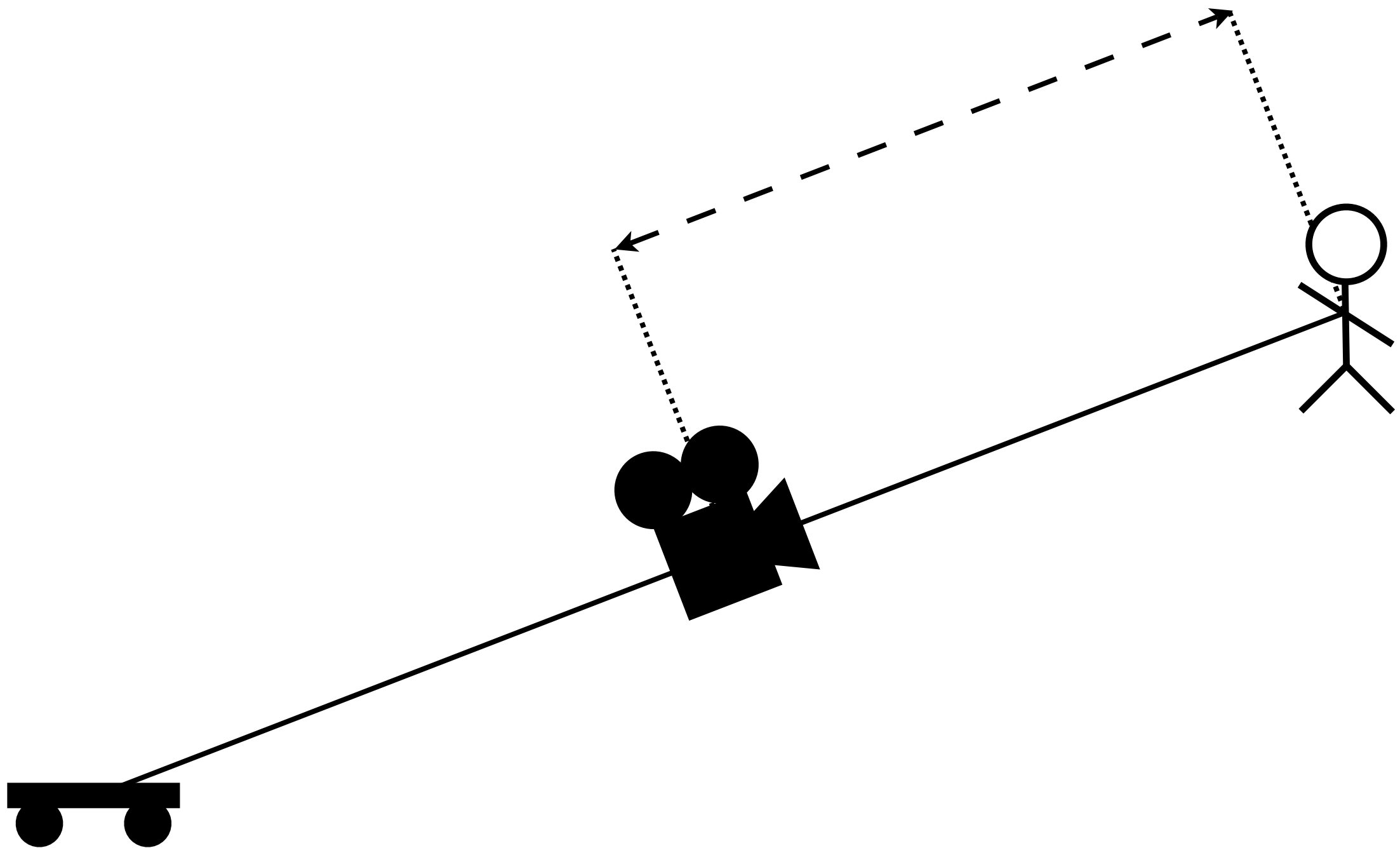
Rails : Implementation

- Additional Weights
 - Distance from Player to Dolly
 - Angle from Tangent of Rail at Dolly
 - Amount Boss obscures Player
 - Number of minor characters out of frame

Rails : Implementation



Rails : Implementation



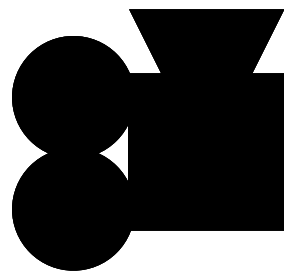
Overview

- Zoning
- Dynamics
- Blending
- **Rails**
- Fields

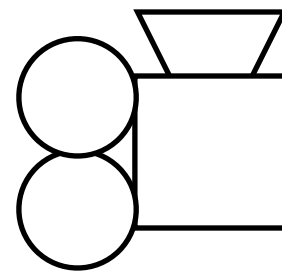
Overview

- Zoning
- Dynamics
- Blending
- Rails
- **Fields**

Fields : Design

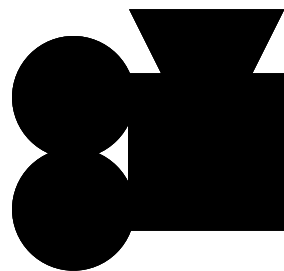


A

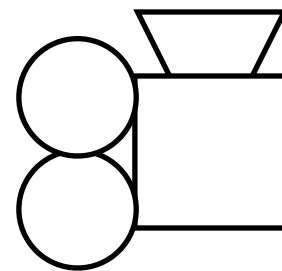


B

Fields : Design

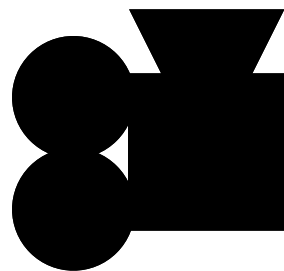
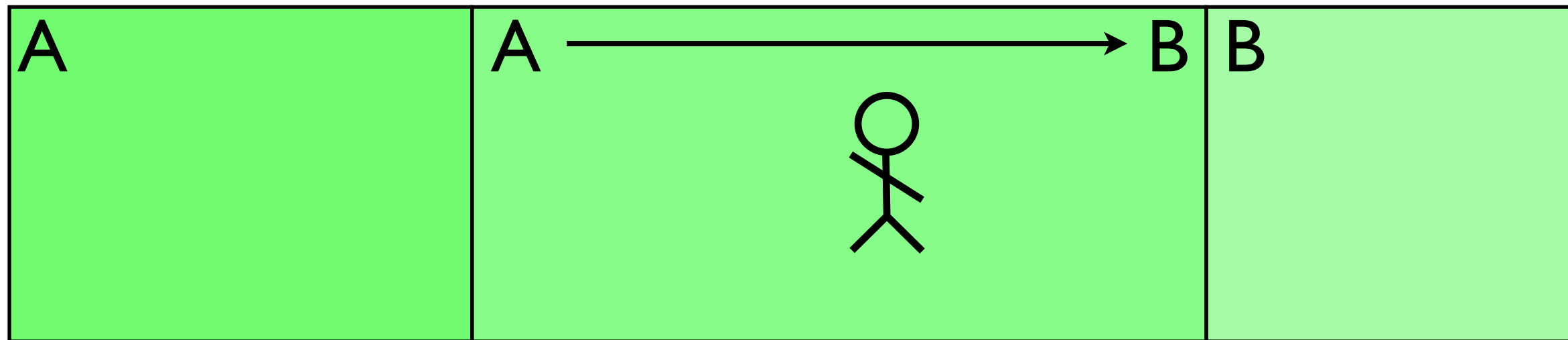


A

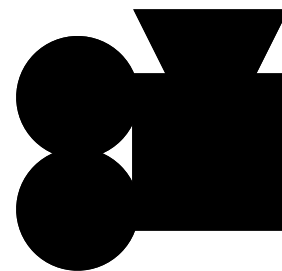
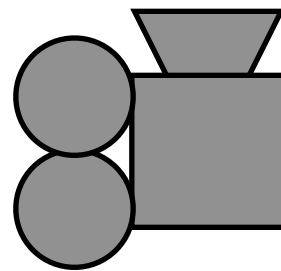


B

Fields : Design

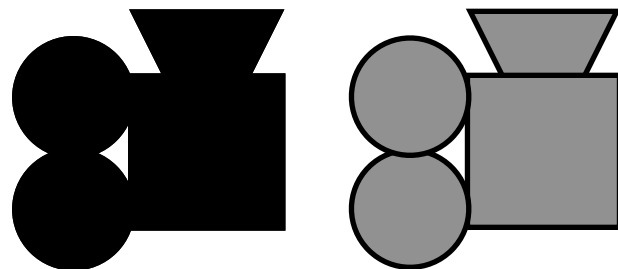
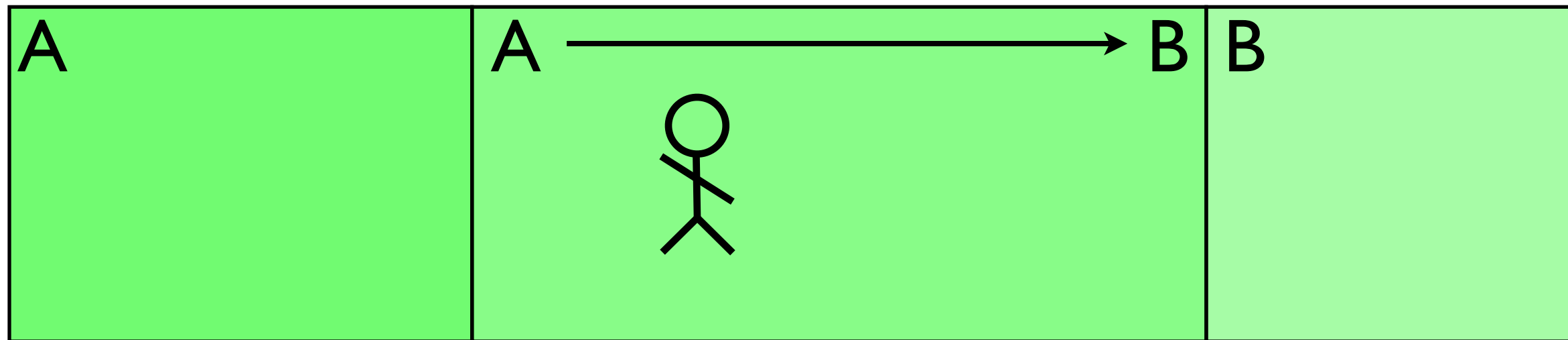


A

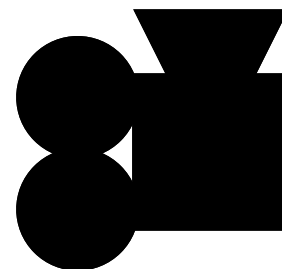


B

Fields : Design

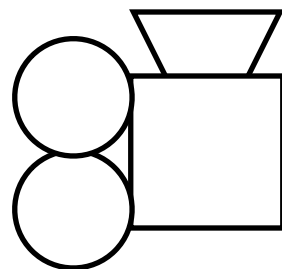


A

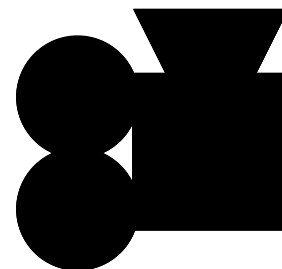


B

Fields : Design

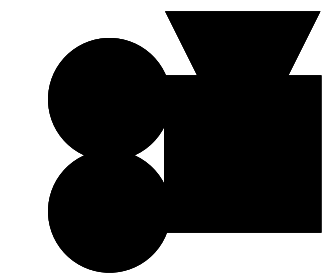
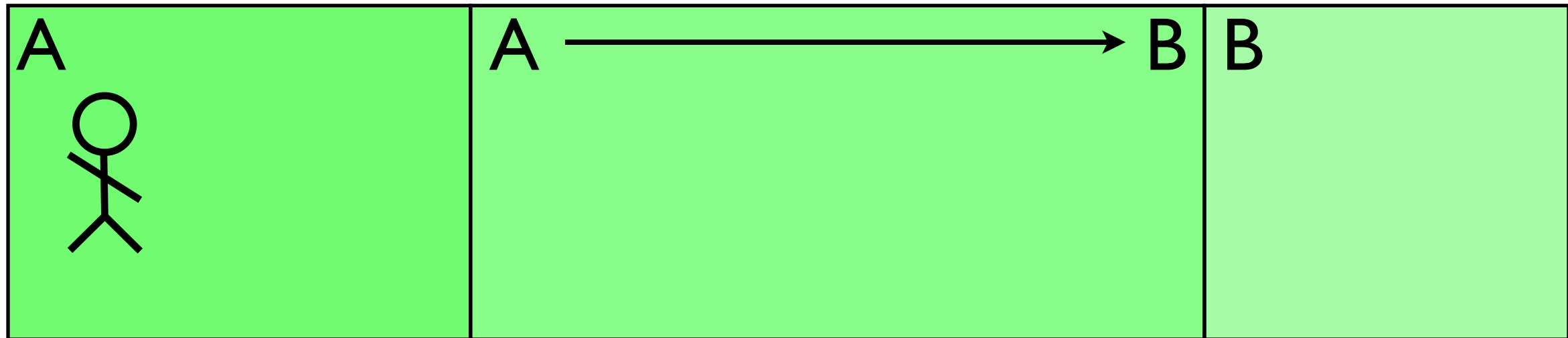


A

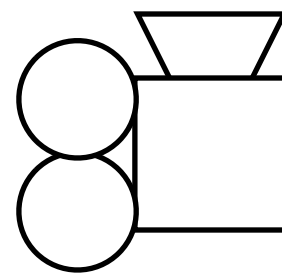


B

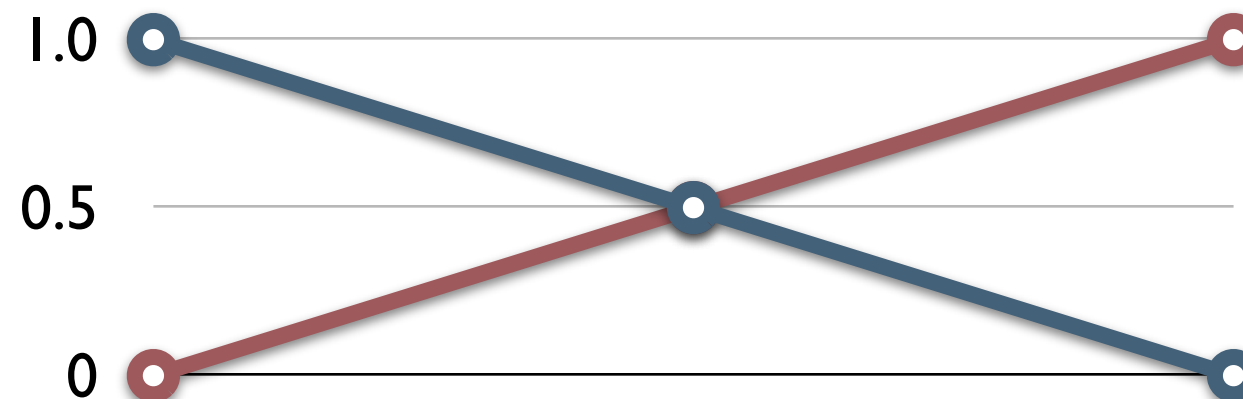
Fields : Design



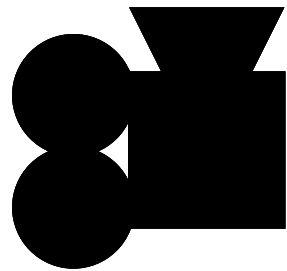
Camera A



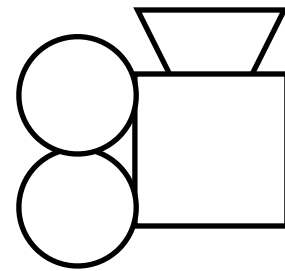
Camera B



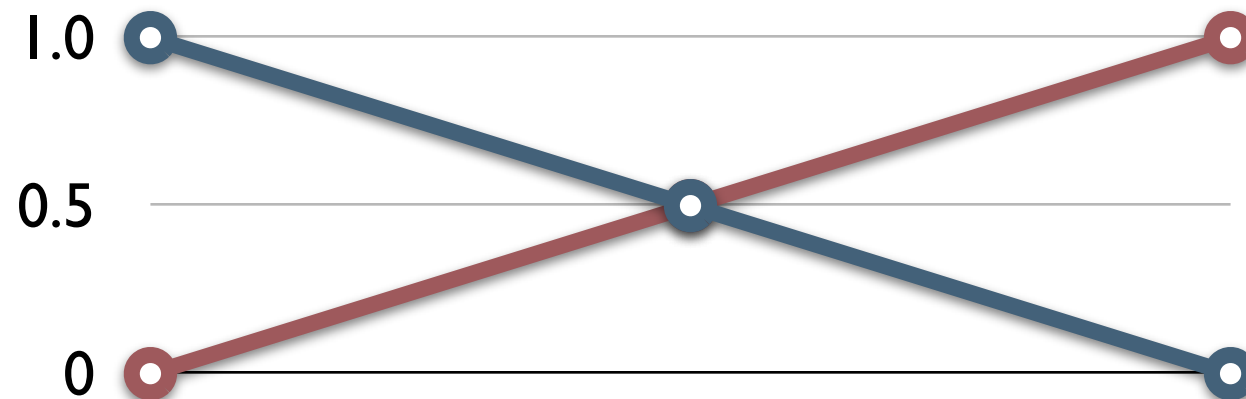
Fields : Design



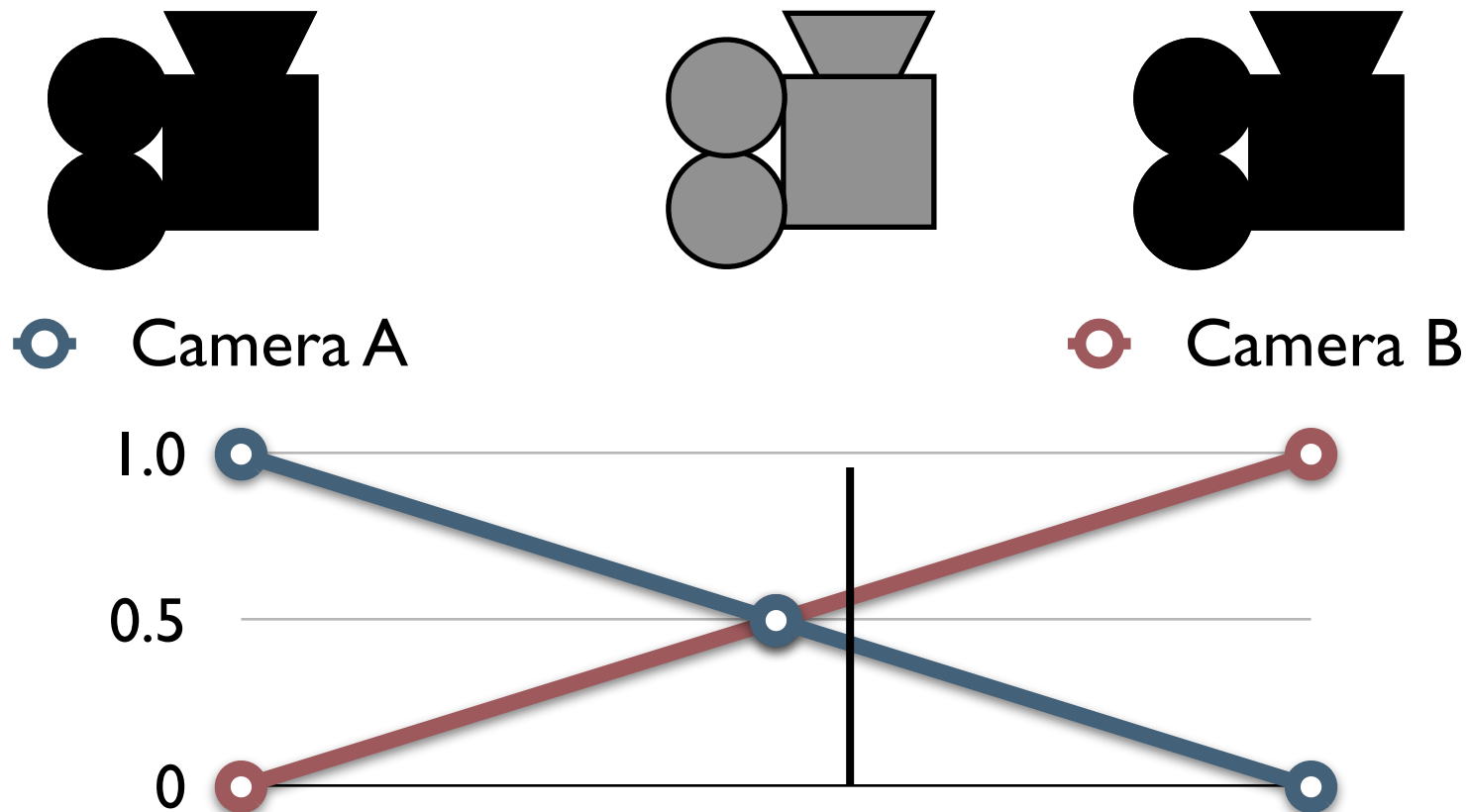
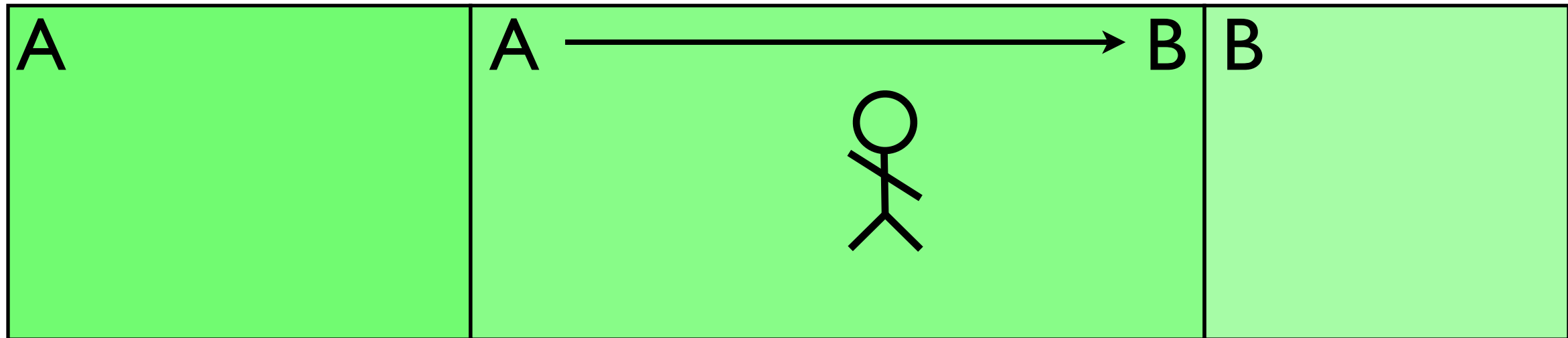
 Camera A



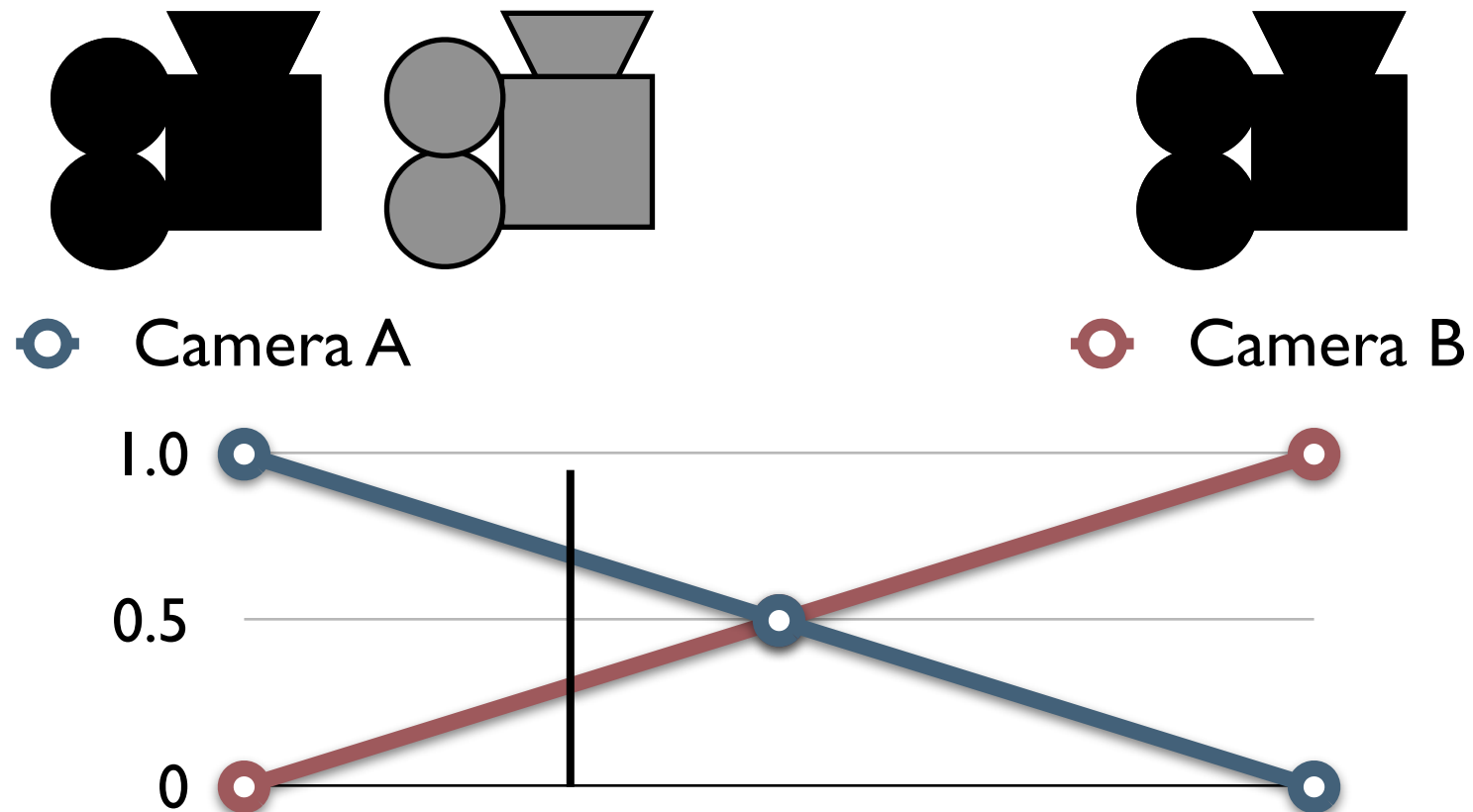
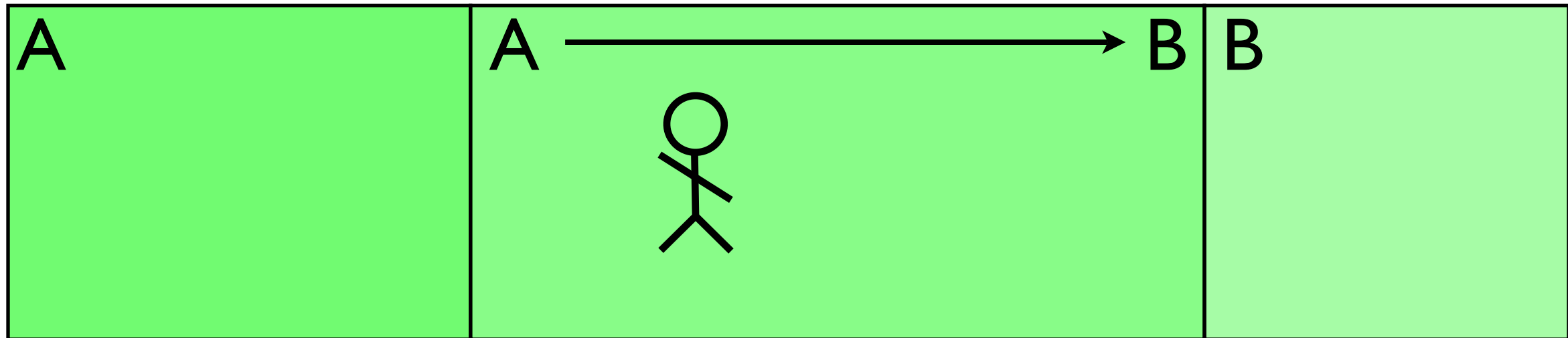
 Camera B



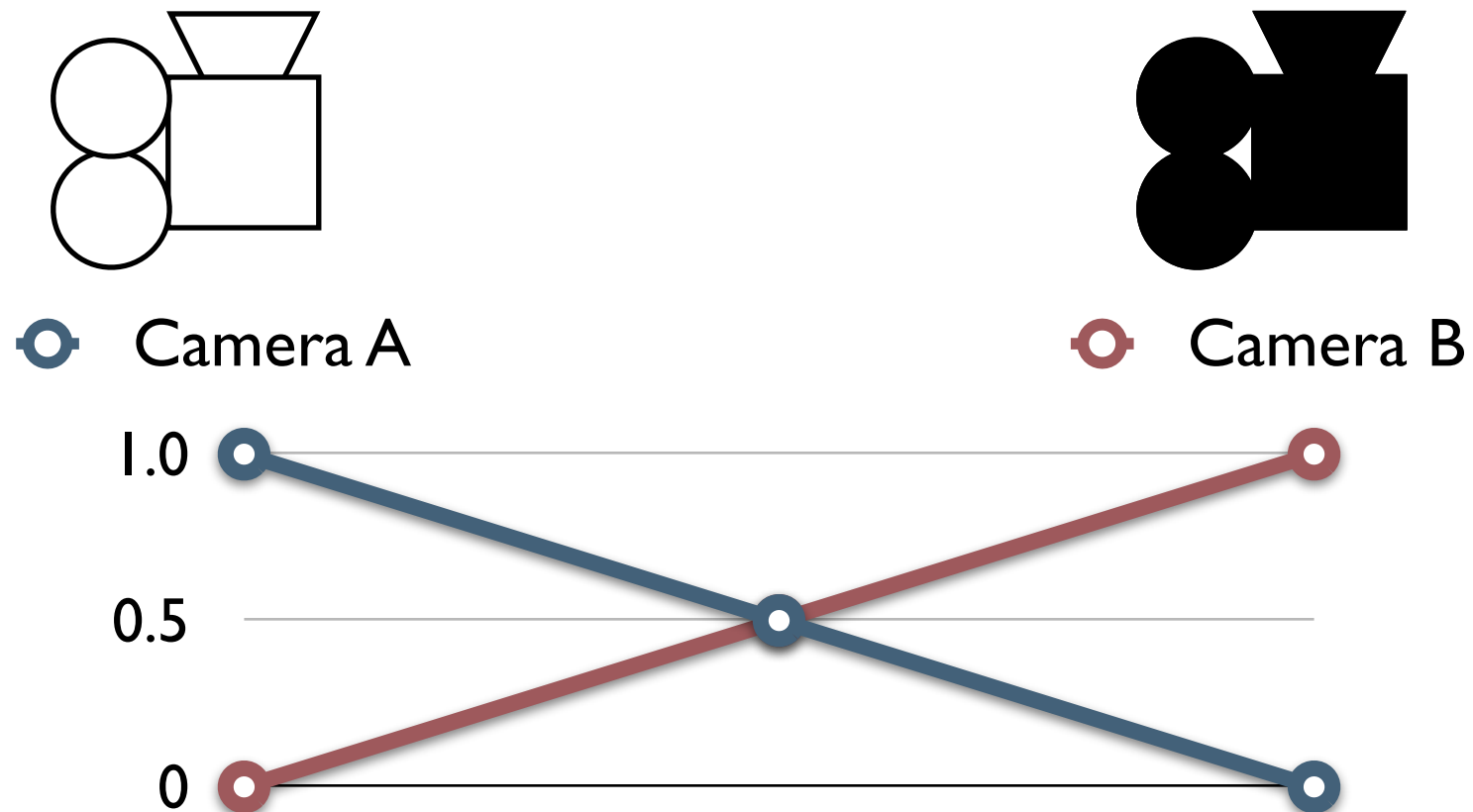
Fields : Design



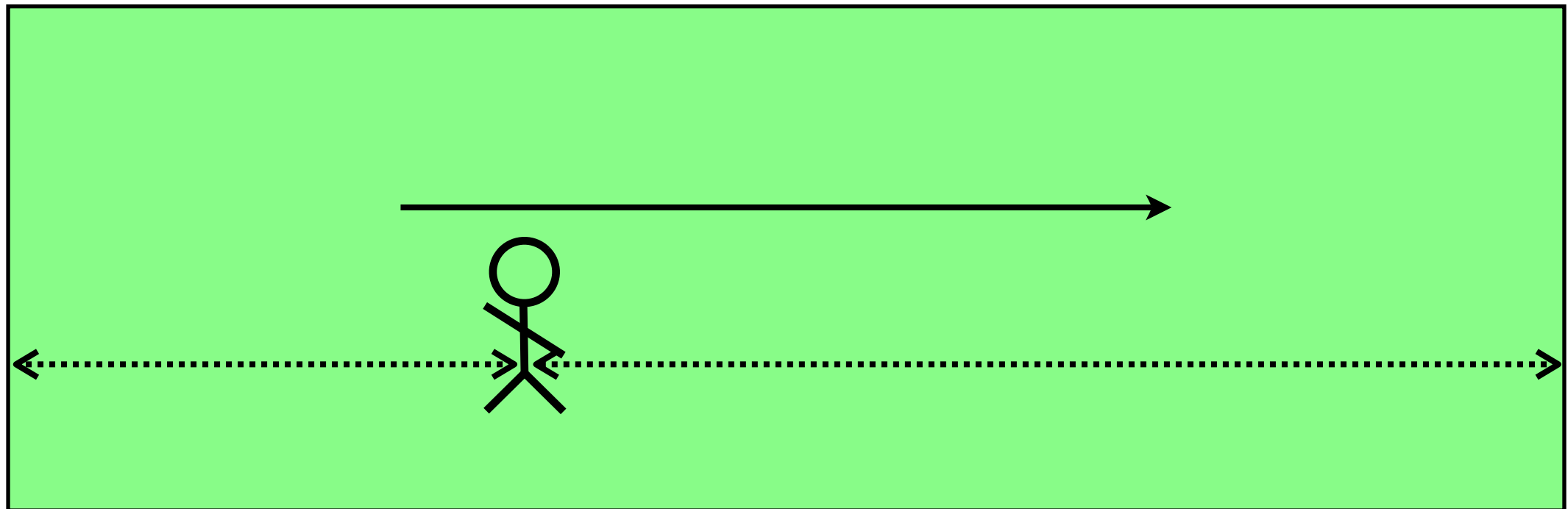
Fields : Design



Fields : Design



Fields : Implementation

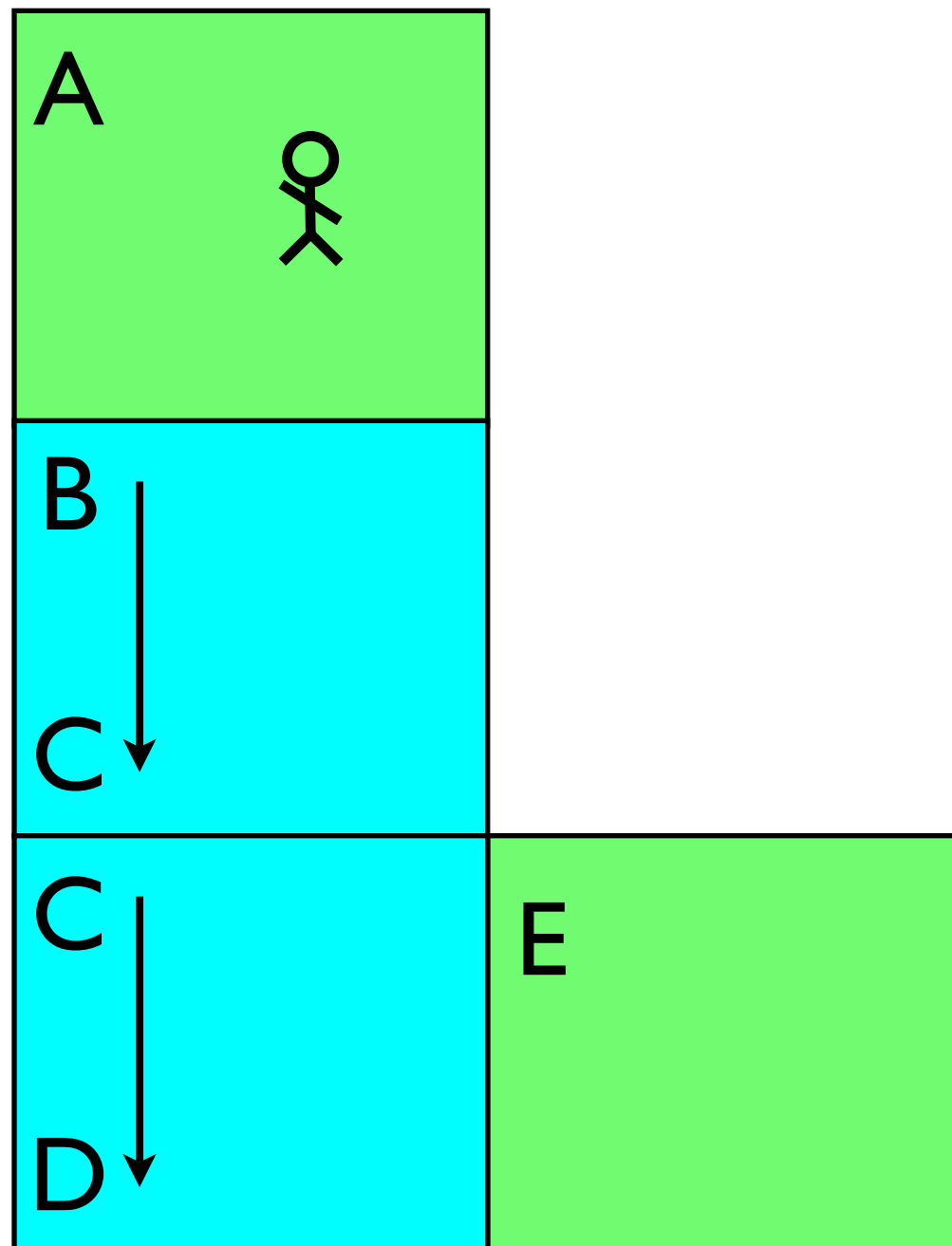


$\text{Dot}(\text{plane}, \text{position}) / \text{Dot}(\text{plane}, \text{direction})$
plane (A, B, C, D) where $Ax + By + Cz + D = 0$
position (x, y, z, l) direction $(x, y, z, 0)$

Fields : Implementation

- Field values are returned from the query and copied into Submission List
- Timer list becomes a Blend list
- Blend list tracks Timers and Field values
- Field blended cameras are flagged and only blend with other field blended cameras at the same priority level
- Field values are frozen if all members of the group drop out of the query results

Fields : Implementation



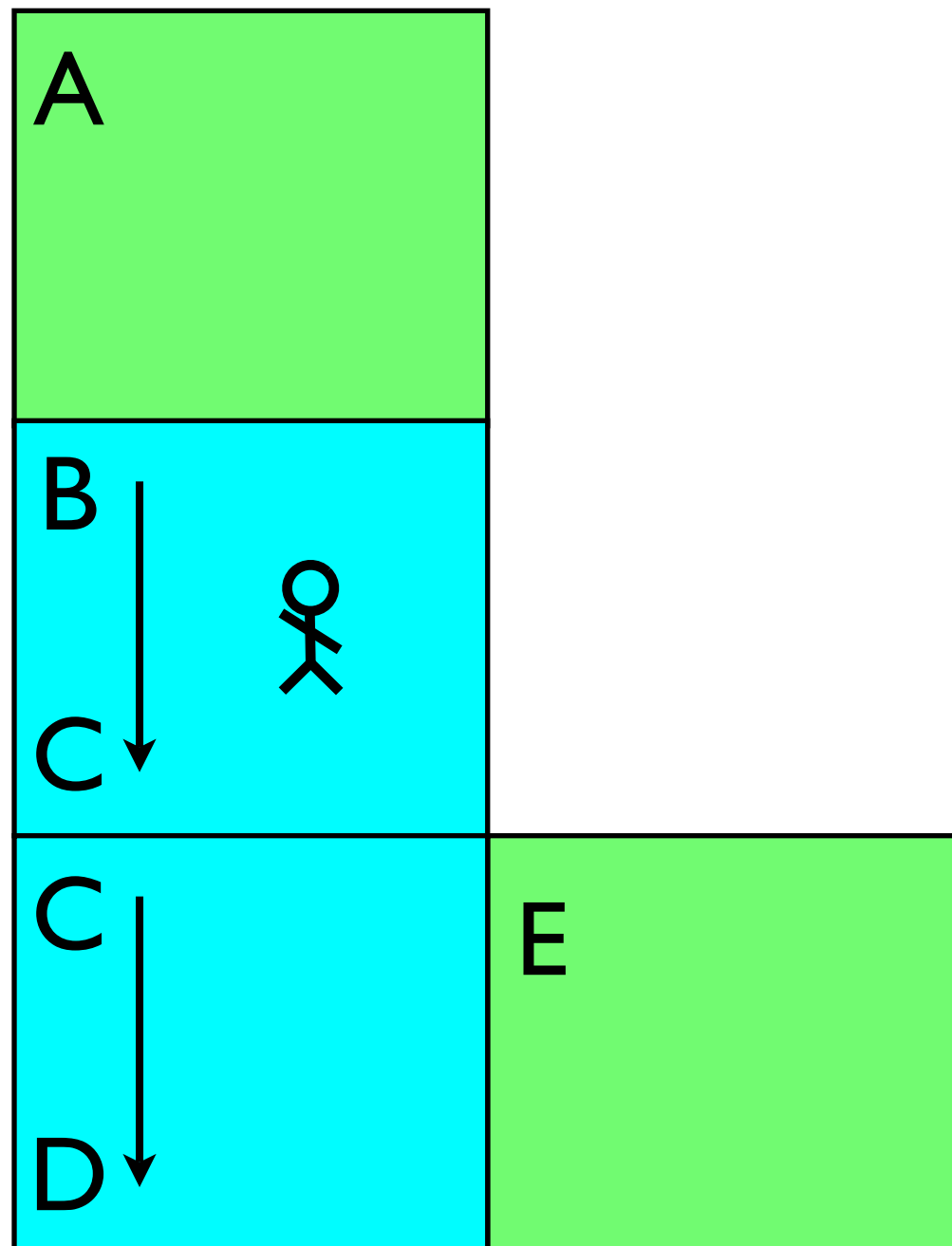
Submission
List

A f1.0

Blend
List

A f1.0 I/I

Fields : Implementation



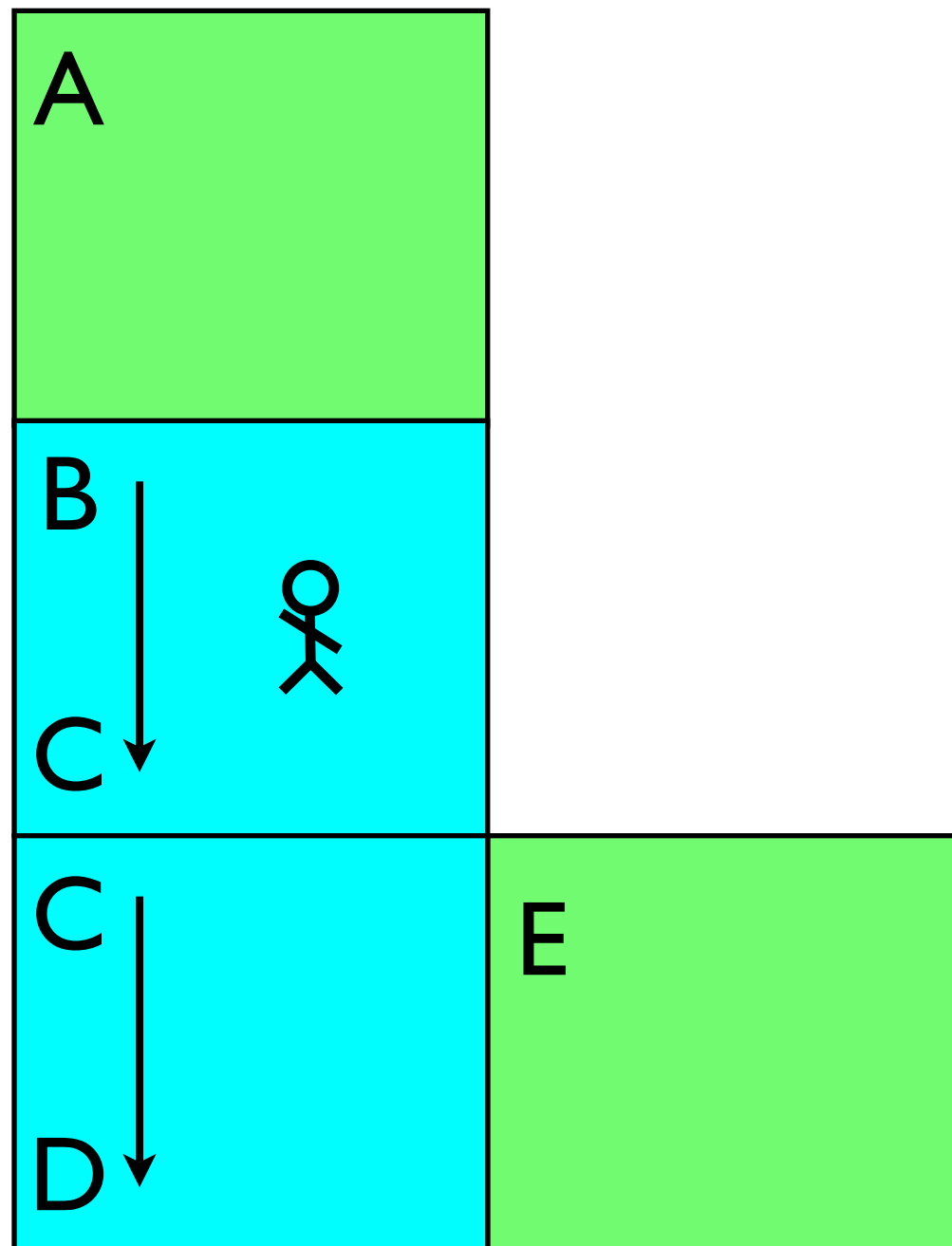
Submission
List

A f1.0

Blend
List

A f1.0 I/I

Fields : Implementation



Submission
List

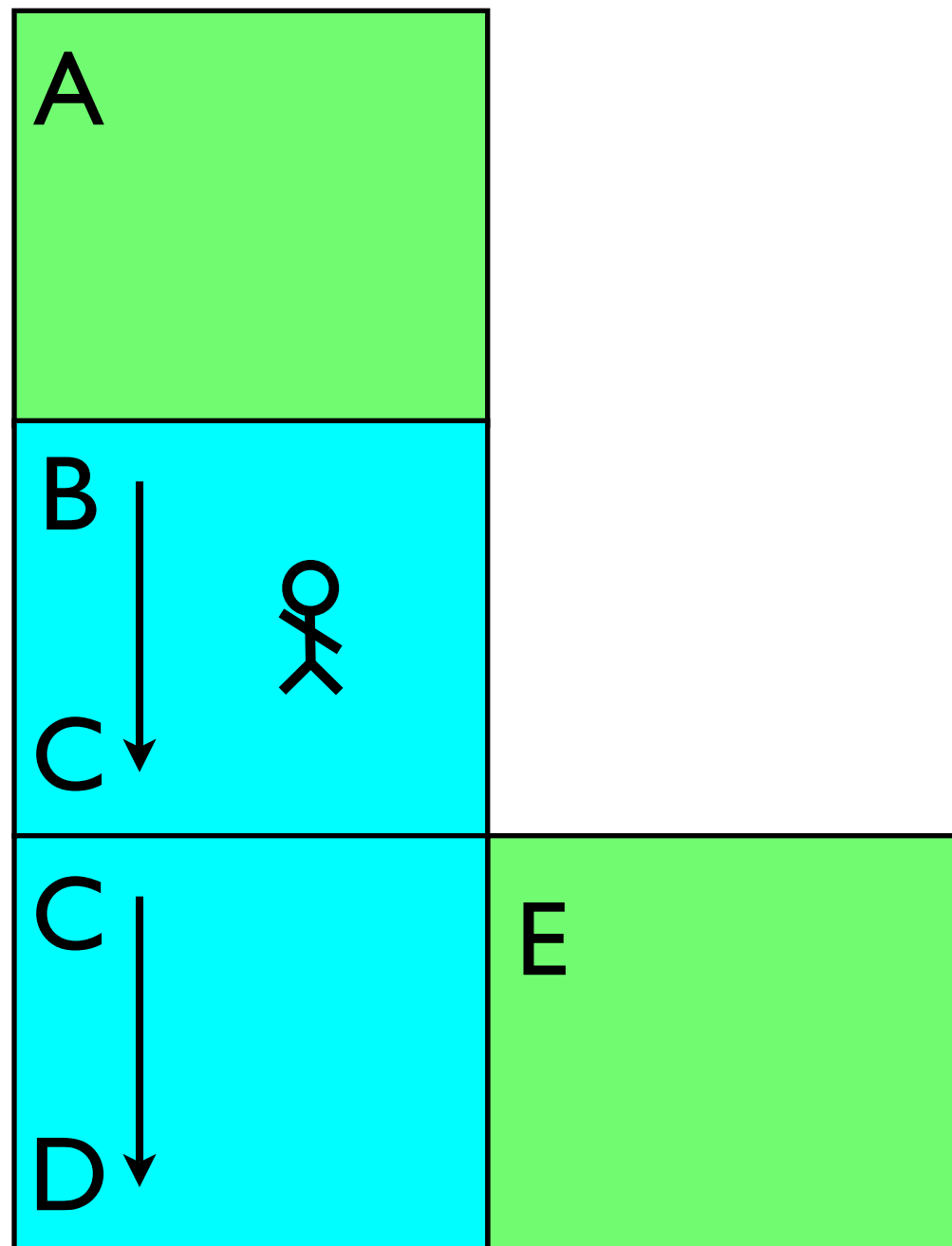
C f0.5

B f0.5

Blend
List

A f1.0 I/I

Fields : Implementation



Submission
List

C f0.5

B f0.5

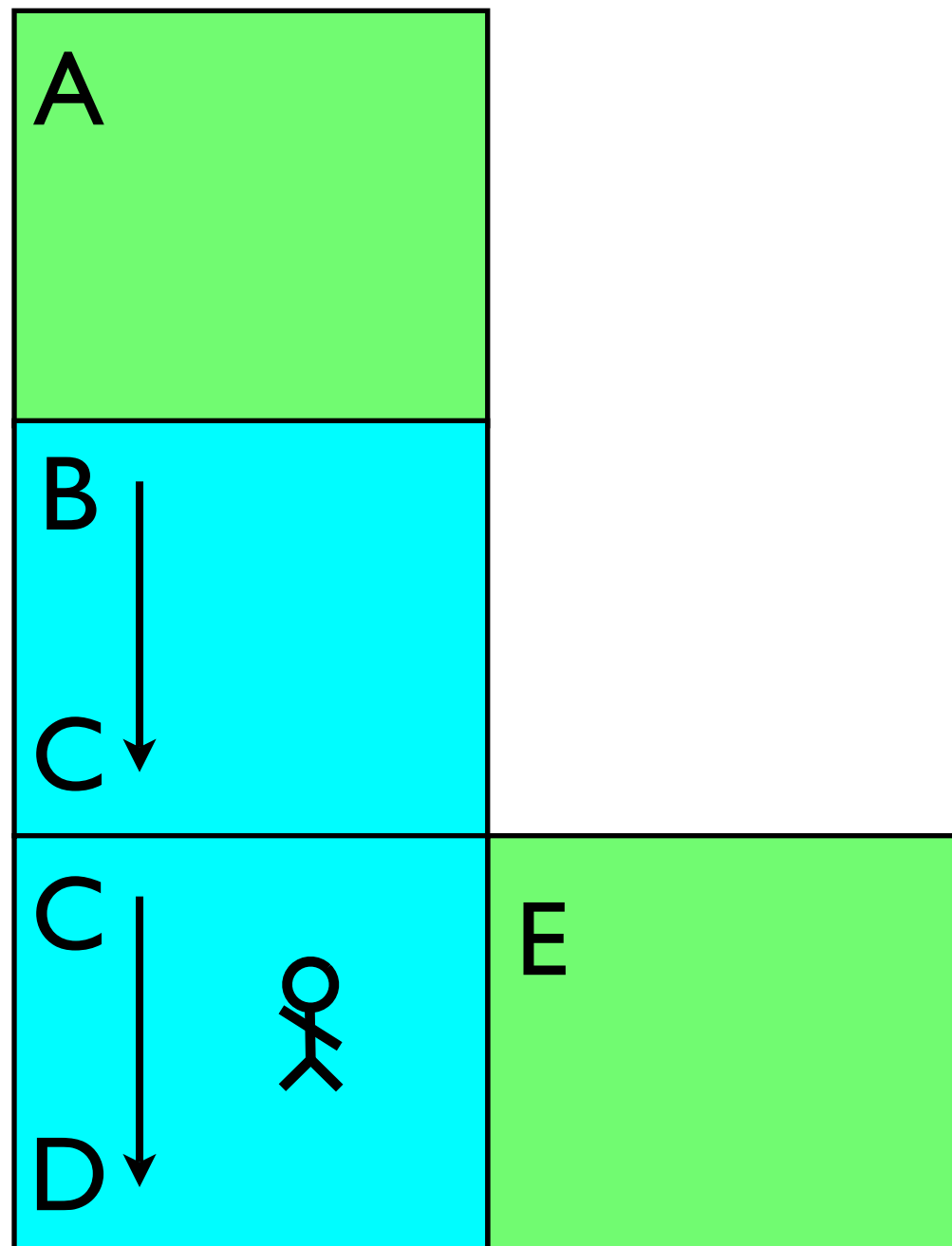
Blend
List

C f0.5 I/2

B f0.5 I/2

A f1.0 I/1

Fields : Implementation



Submission
List

C f0.5

B f0.5

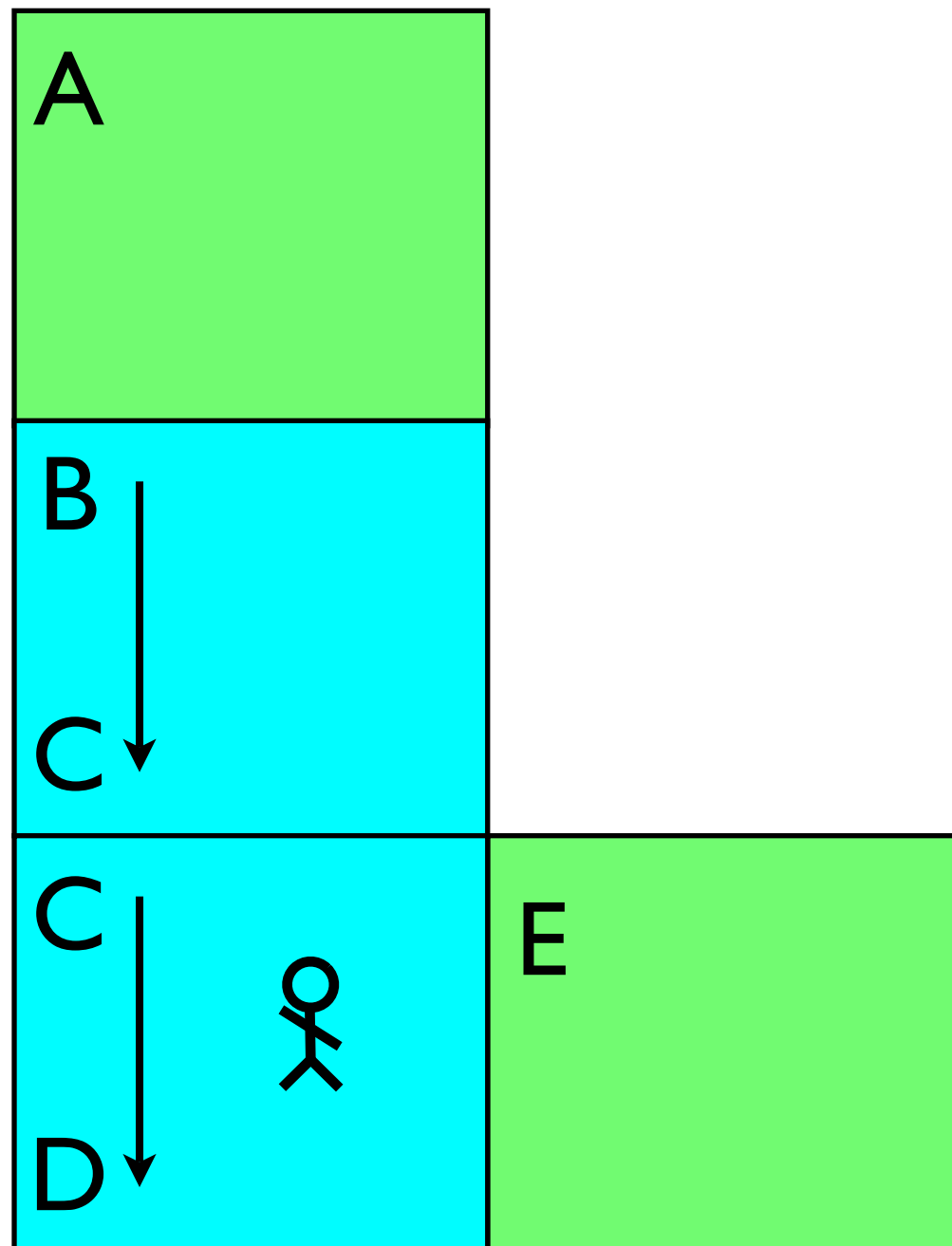
Blend
List

C f0.5 I/2

B f0.5 I/2

A f1.0 I/1

Fields : Implementation



Submission
List

D f0.5

C f0.5

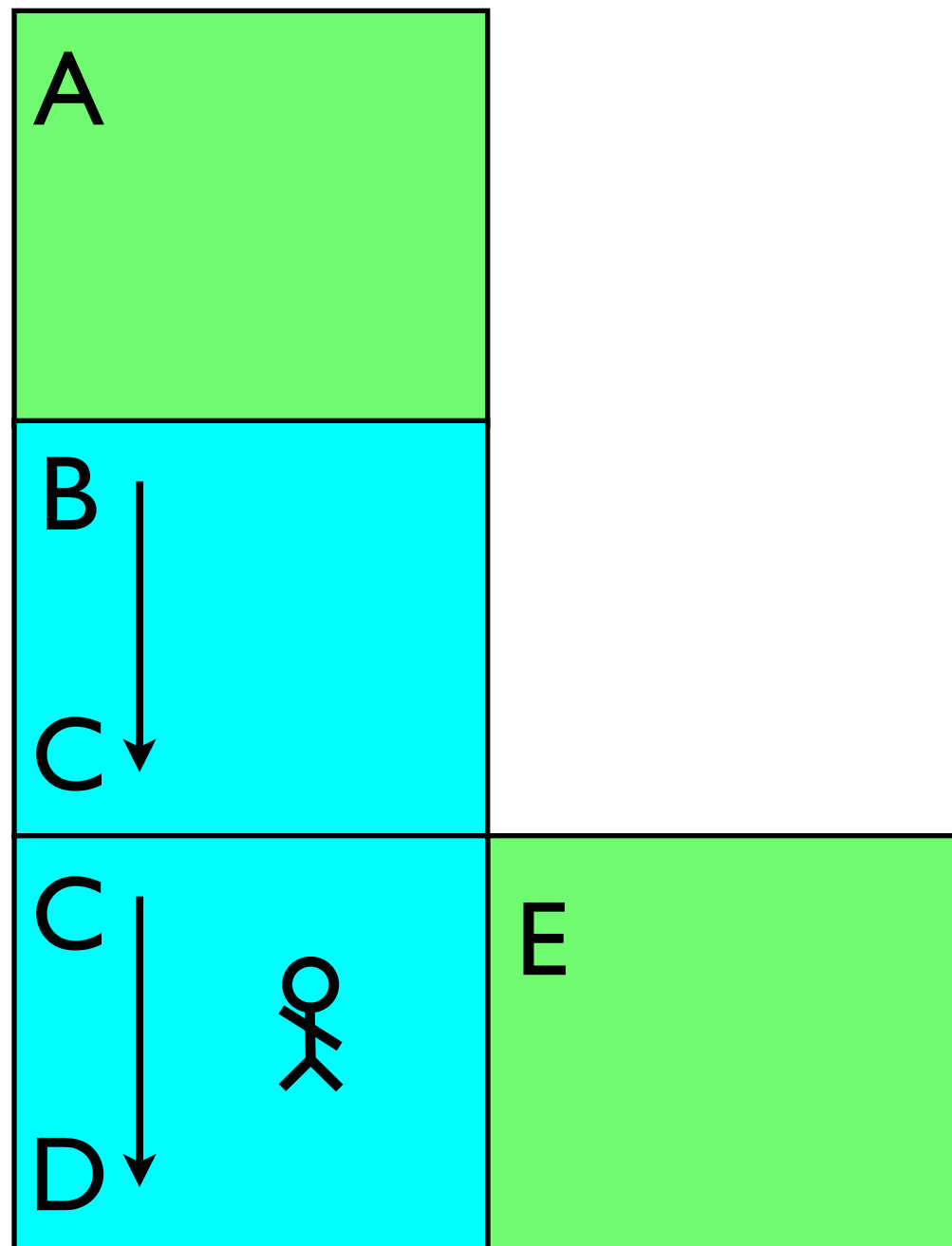
Blend
List

C f0.5 I/2

B f0.5 I/2

A f1.0 I/I

Fields : Implementation



Submission
List

D f0.5

C f0.5

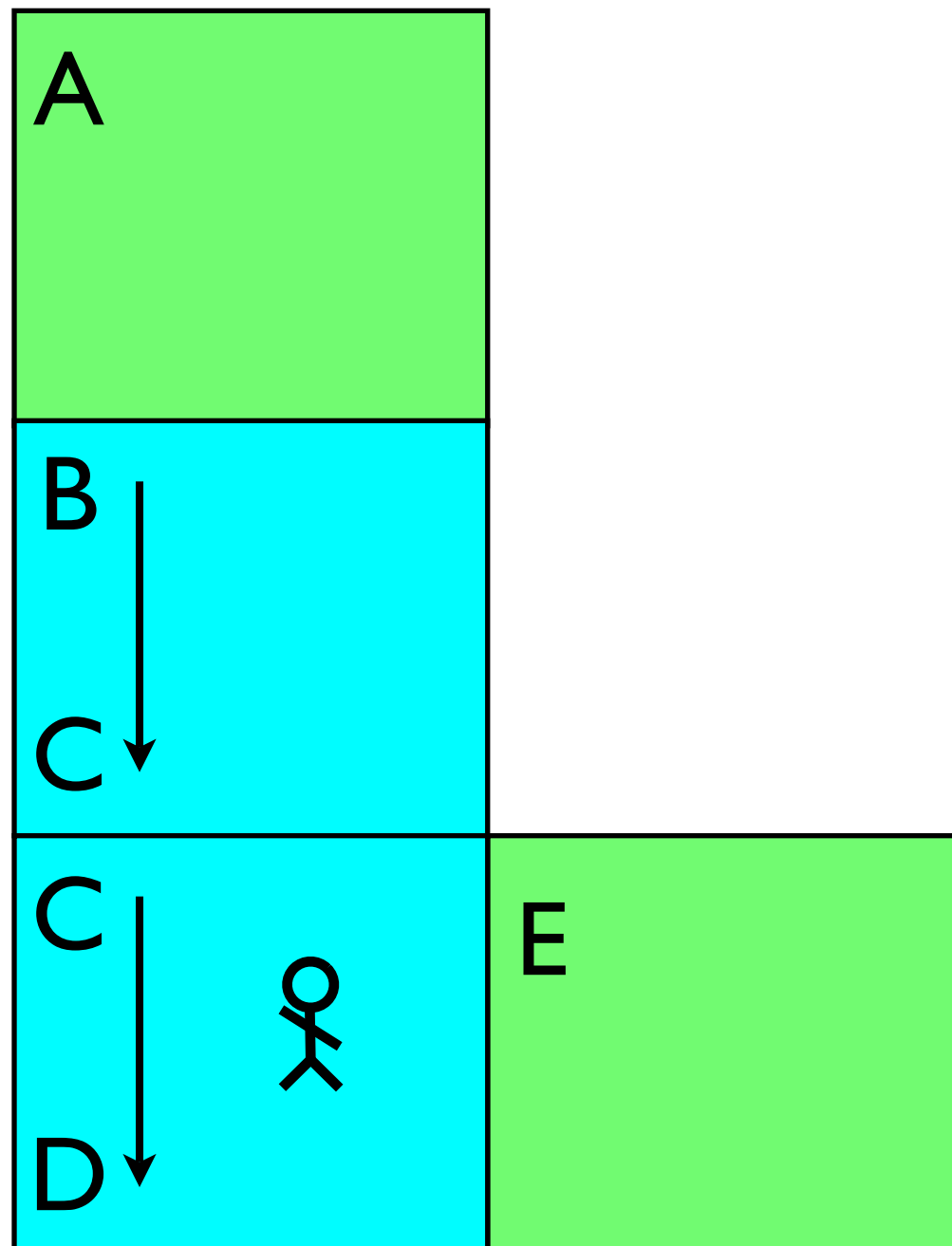
Blend
List

D f0.5 2/2

C f0.5 2/2

A f1.0 1/1

Fields : Implementation



Submission
List

Blend
List

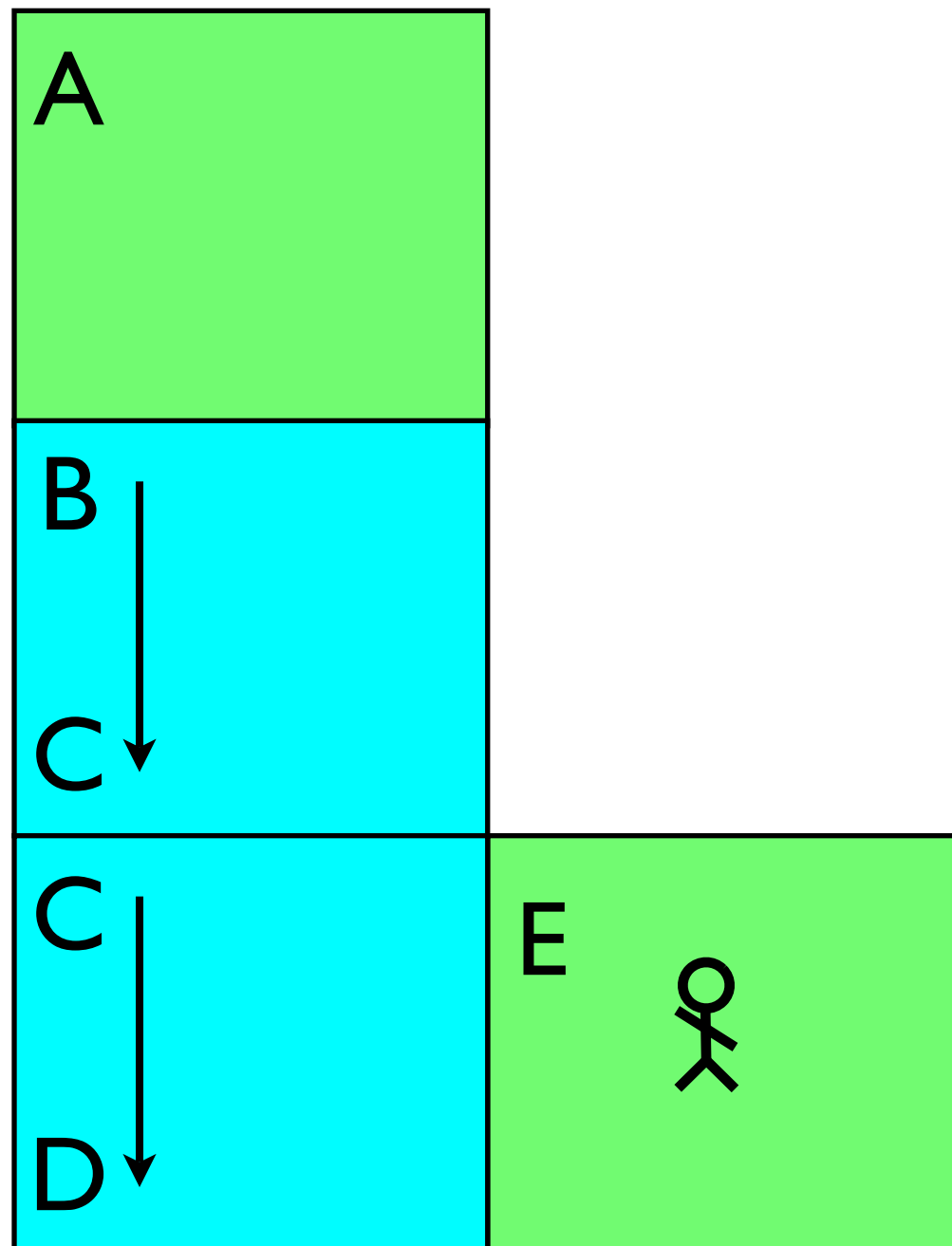
D f0.5

D f0.5 2/2

C f0.5

C f0.5 2/2

Fields : Implementation



Submission
List

D f0.5

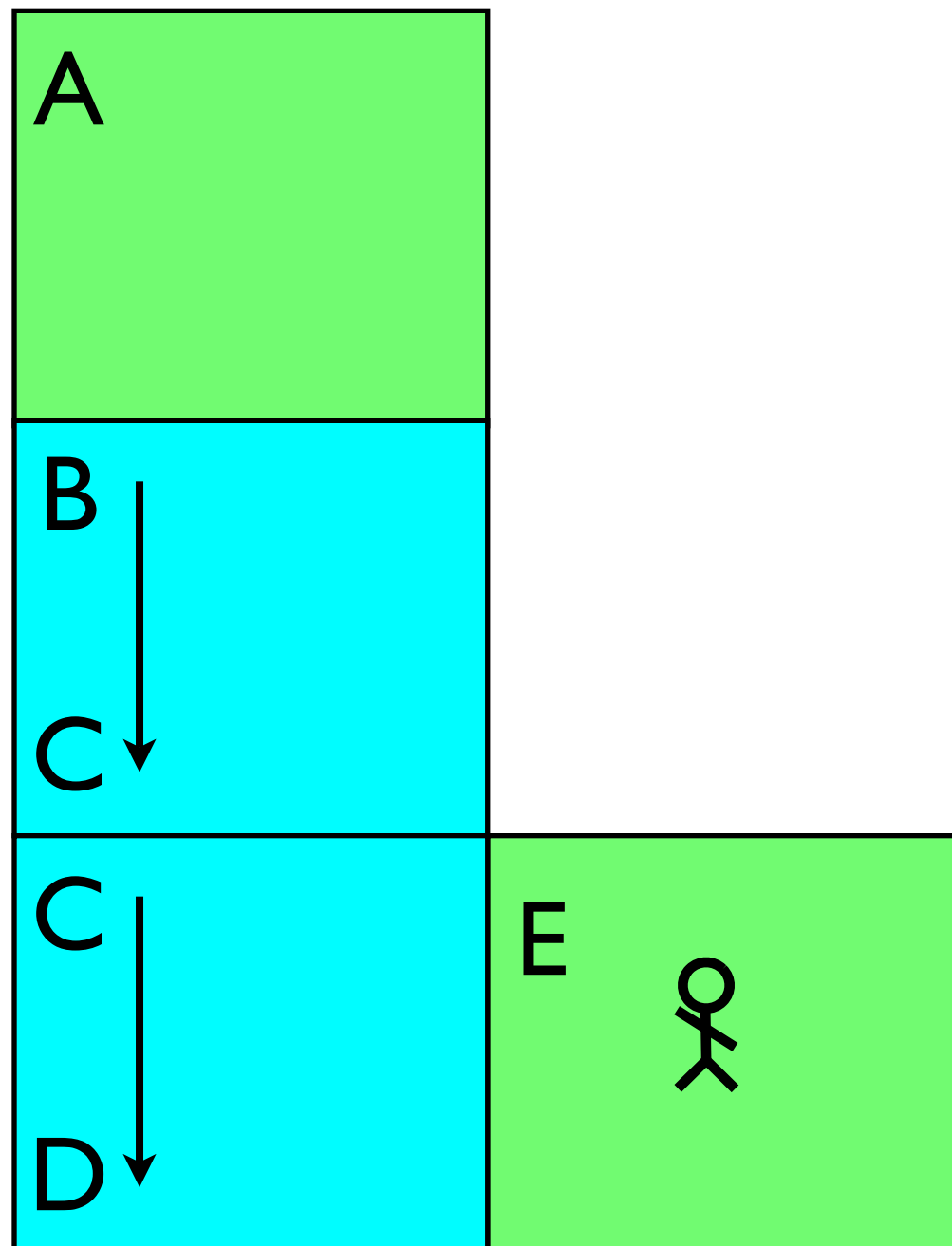
C f0.5

Blend
List

D f0.5 2/2

C f0.5 2/2

Fields : Implementation



Submission
List

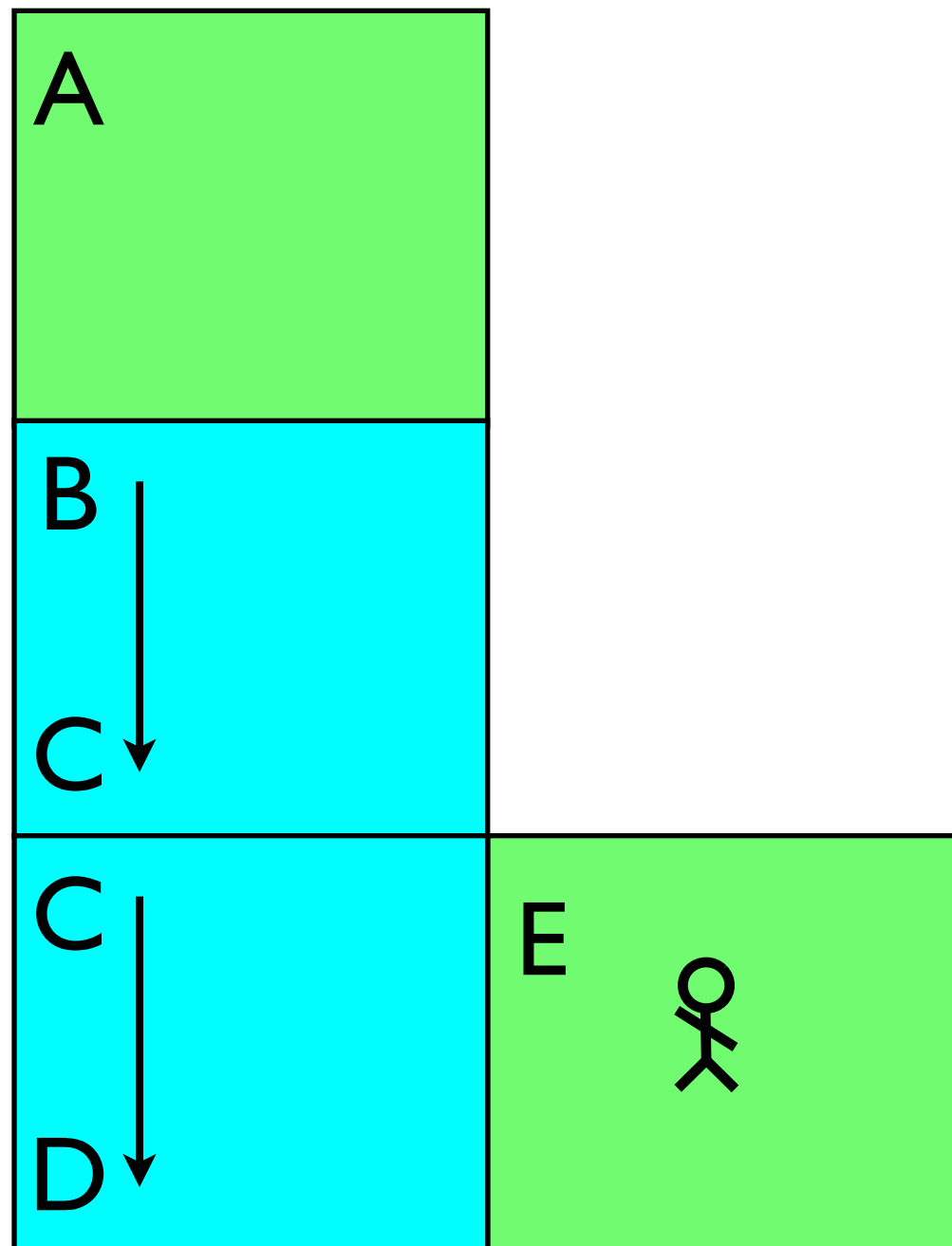
E f1.0

Blend
List

D f0.5 2/2

C f0.5 2/2

Fields : Implementation



Submission
List

E f1.0

Blend
List

E f1.0 1/2

D f0.5 2/2

C f0.5 2/2

Fields : Implementation

E f1.0 1/2

D f0.6 2/2

C f0.3 2/2

B f0.6 2/2

Fields : Implementation

E f1.0 1/2

1.0

D f0.6 2/2

0.6

C f0.3 2/2

0.8

B f0.6 2/2

0.6

Fields : Implementation

E f1.0 1/2

1.0

D f0.6 2/2

0.6

C f0.3 2/2

0.8

2.0

B f0.6 2/2

0.6

Fields : Implementation

E f1.0 1/2

1.0

D f0.6 2/2

0.3

C f0.3 2/2

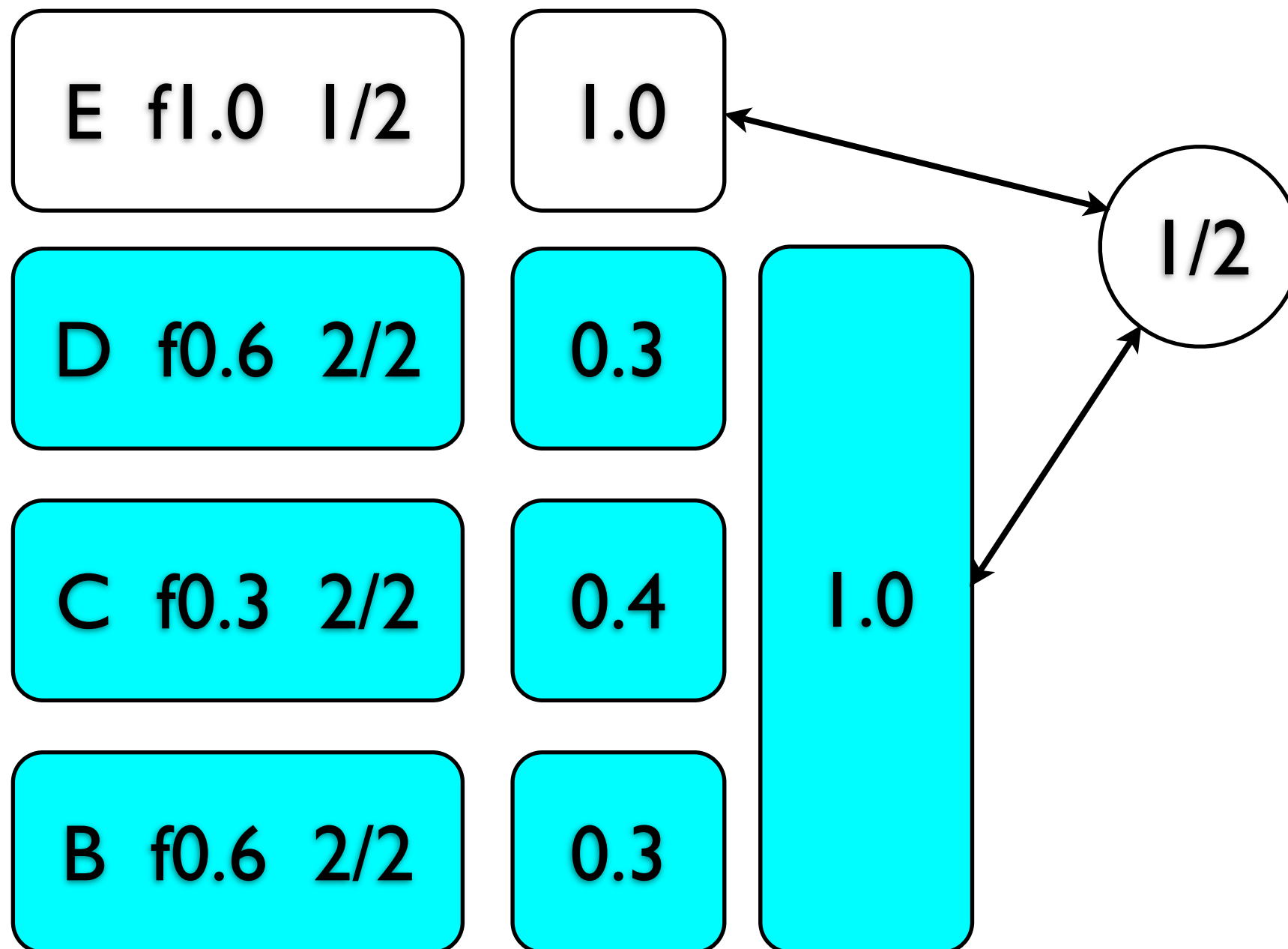
0.4

1.0

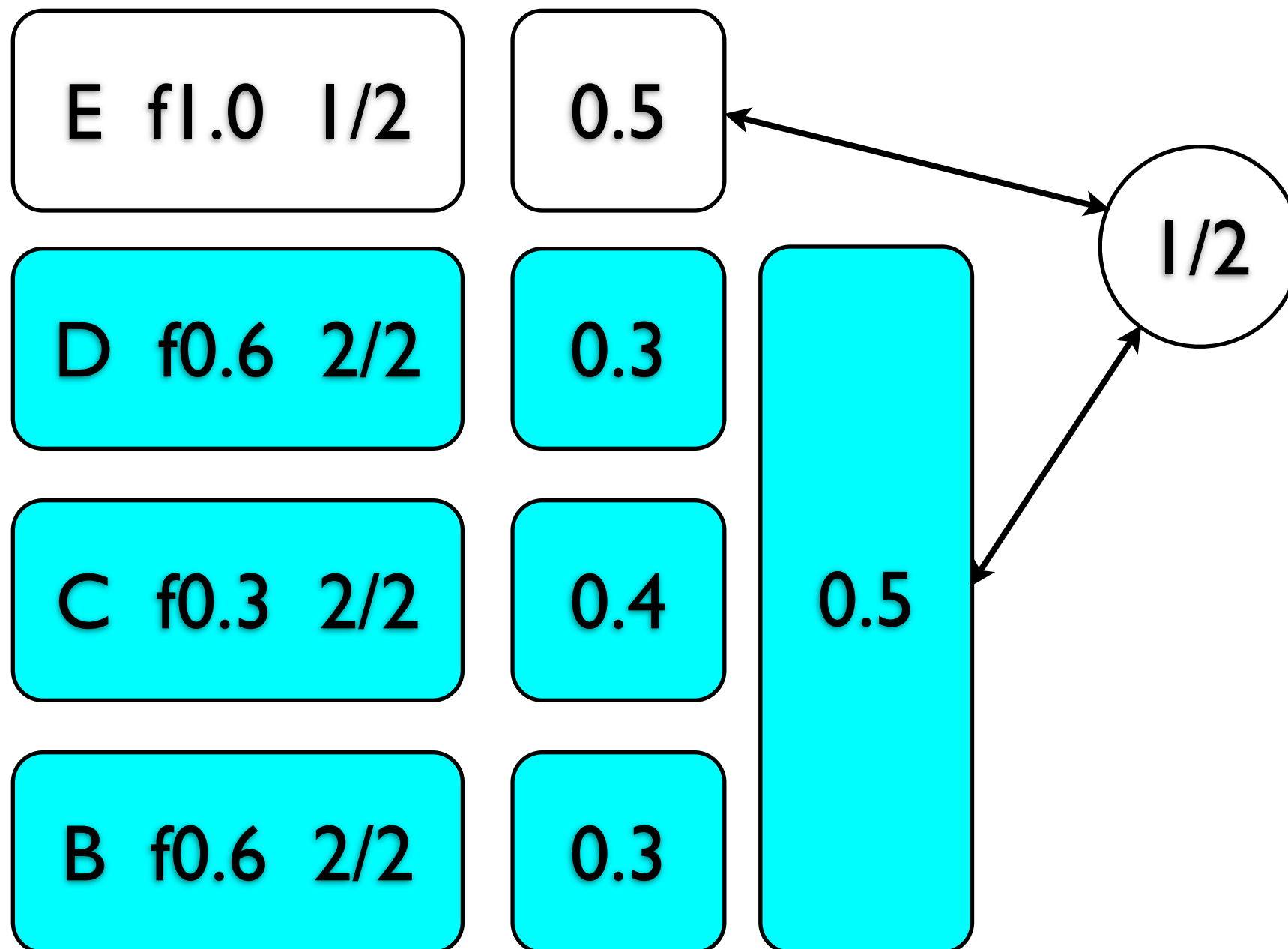
B f0.6 2/2

0.3

Fields : Implementation



Fields : Implementation



Fields : Implementation

E f1.0 1/2

0.5

D f0.6 2/2

0.15

C f0.3 2/2

0.2

B f0.6 2/2

0.15

Fields : Implementation

E f1.0 1/2

0.5

D f0.6 2/2

0.15

C f0.3 2/2

0.2

B f0.6 2/2

0.15

Fields : Implementation

E f1.0 1/2

0.5

D f0.6 2/2

0.15

C f0.3 2/2

0.2

B f0.6 2/2

0.15

0.35

$0.43B + 0.57C$

Fields : Implementation

E f1.0 1/2

0.5

D f0.6 2/2

0.15

0.35

$0.43B + 0.57C$

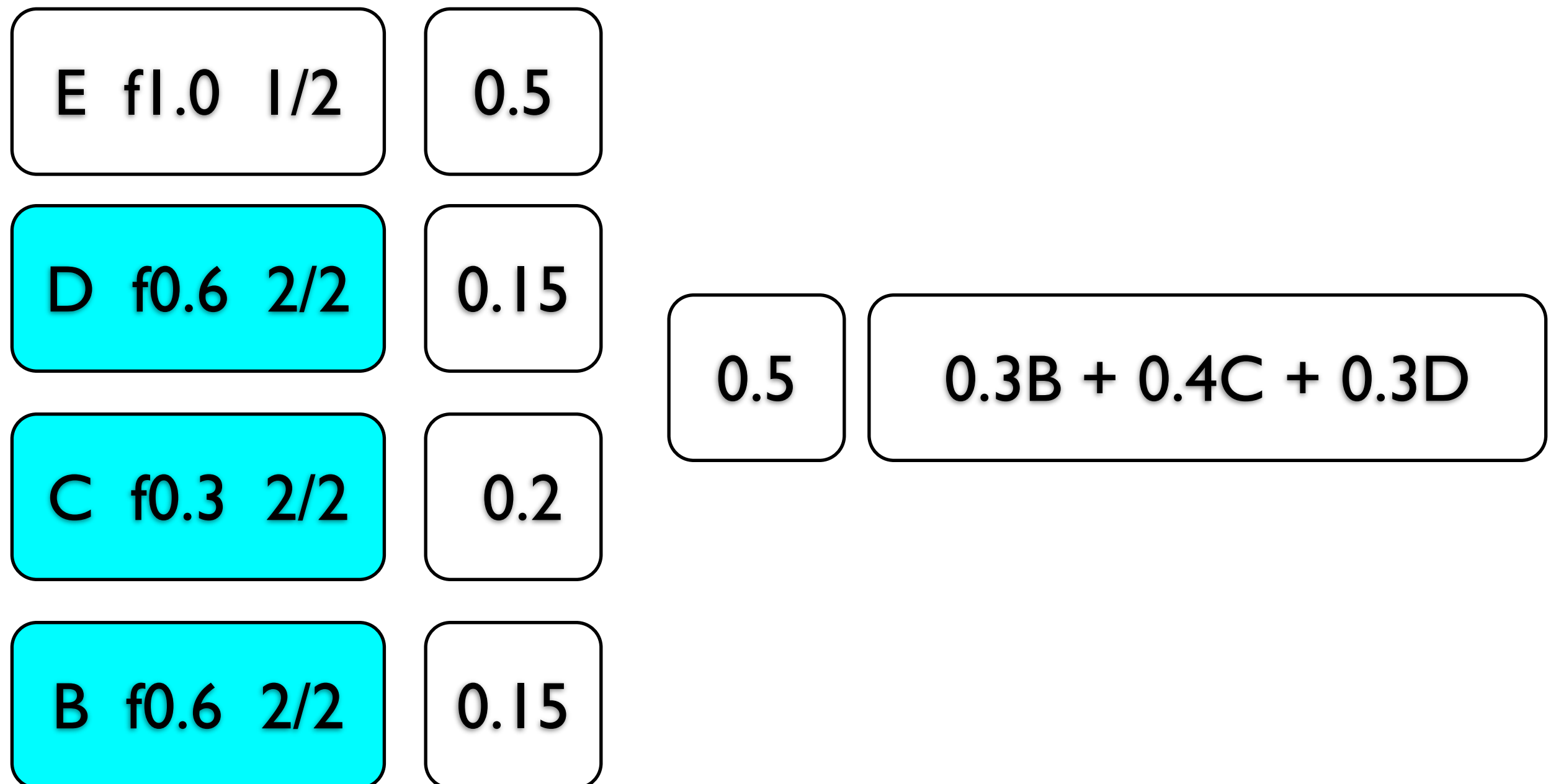
C f0.3 2/2

0.2

B f0.6 2/2

0.15

Fields : Implementation



Fields : Implementation

E f1.0 1/2

0.5

0.5

$0.3B + 0.4C + 0.3D$

D f0.6 2/2

0.15

C f0.3 2/2

0.2

B f0.6 2/2

0.15

Fields : Implementation

E f1.0 1/2

0.5

D f0.6 2/2

0.15

C f0.3 2/2

0.2

B f0.6 2/2

0.15

$$0.5A + 0.15B + 0.2C + 0.15D$$

Overview

- Zoning
- Dynamics
- Blending
- Rails
- **Fields**

Overview

- Zoning
- Dynamics
- Blending
- Rails
- Fields

Other Stuff

- Dealing with multiple targets
- Target definition, and calculation
- Dealing with static and animated cameras
- Overriding cameras at arbitrary points to focus on dynamic areas of interest
- Framing fights, using multiple targets
- Damping
- Fragility of rotational blends
- Physical post effects like shake and sway

Aspect Ratio



Aspect Ratio



Aspect Ratio



Aspect Ratio



1.0



0.5



0.0

Thank You

- Any Questions?

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