



Faculty of Design

2014

From systems to software

Sheiner, Tim

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THE DIGITAL MACHINE

Converting Systems to Software

Tim Sheiner

RSD3.Oslo.16.Oct.



THIS WORK BY

Thanks!

My Students

in the Interaction Design Program at California College of Arts who gave me a good reason to organize my thoughts

Jut

who supported my teaching and sponsored my trip to RSD3

Hugh Dubberly

my systems thinking mentor

**"SOFTWARE IS
EATING THE
WORLD"**

Marc Andreessen

wsj.com, 2011

116 The Lt-Commander
Murch K.L. King

Band
Copyright 1934 45769 250

1st Edition
12/26/30 500 3280
10/6/39 500 4050

3rd Edition
revised April 48 500
Sept 64 500
Jan 1970 500

2500

~~1500~~

Printed by Oth. Zimmerman Co, Cincinnati, Ohio
Plates at " " 48 00

The Big Case. 117
Band Jalop K.L. King

Copyright 1934 45766 1/5/35 300

1st Edition
12/26/30 500 4250

2nd Ed. 1942 250
3rd Ed. 1946 500
4th Ed. 1950 500
5th Ed. 1953 500
6th Ed. 1961 500
7th Ed. Nov. 1968 500

3250

~~4250~~

Printed by Rayner, Dalheim Co, Chicago, Ill
Plates at " " " " 48 00

Fully Digested

Microsoft Excel - BudgetForecastsXDemoA												
File Edit View Insert Format Tools Data Window Help												
Type a question for help												
Verdana 8 B I U												
B	C	D	E	F	G	H	I	J	K	L	M	N
Happy Valley Farm												
iv./Department		Status	1	Enter 1 for completed status.								
Cut Flowers												
Happy Valley Farm		Start Date	Completed >	Complete								
		Jun-06										
Unit Sales			Jun-06	Jul-06	Aug-06	Sep-06	Oct-06	Nov-06	Dec-06	Jan-07	Feb-07	Mar-07
Products	Direct Unit Cost	Totals	1	2	3	4	5	6	7	8	9	10
lowers-Export	\$0.27	169,000	0	5,000	6,500	7,500	10,000	20,000	20,000	20,000	20,000	20,000
lowers-Local	\$0.43	93,200	0	200	3,500	5,500	4,000	8,000	12,000	12,000	12,000	12,000
lowers-Eldoret	\$0.81	151,540	0	40	1,500	5,000	10,000	15,000	20,000	20,000	20,000	20,000
evenue 4	\$0.00	0	0	0	0	0	0	0	0	0	0	0
evenues 5	\$0.00	0	0	0	0	0	0	0	0	0	0	0
total Units		413,740	0	5,240	11,500	18,000	24,000	43,000	52,000	52,000	52,000	52,000
ales	Unit Prices											
lowers-Export	\$2.25	\$380,250	\$0	\$11,250	\$14,625	\$16,875	\$22,500	\$45,000	\$45,000	\$45,000	\$45,000	\$45,000
lowers-Local	\$2.95	\$274,940	\$0	\$590	\$10,325	\$16,225	\$11,800	\$23,600	\$35,400	\$35,400	\$35,400	\$35,400
lowers-Eldoret	\$3.45	\$522,813	\$0	\$138	\$5,175	\$17,250	\$34,500	\$51,750	\$69,000	\$69,000	\$69,000	\$69,000
evenue 4	\$0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
evenues 5	\$0.00	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
total Sales		\$1,178,003	\$0	\$11,978	\$30,125	\$50,350	\$68,800	\$120,350	\$149,400	\$149,400	\$149,400	\$149,400
irect Cost of Sales		\$208,453	\$0	\$1,468	\$4,475	\$8,440	\$12,520	\$20,990	\$26,760	\$26,760	\$26,760	\$26,760
ross Margin		\$969,550	\$0	\$10,510	\$25,650	\$41,910	\$56,280	\$99,360	\$122,640	\$122,640	\$122,640	\$122,640
ross Margin %		82.3%	0.0%	87.7%	85.1%	83.2%	81.8%	82.6%	82.1%	82.1%	82.1%	82.1%
perating Expenses		\$558,977	\$24,700	\$27,363	\$31,415	\$35,923	\$40,036	\$51,526	\$58,002	\$58,002	\$58,002	\$58,002
perating Profit/Loss		-\$753,566	-\$24,700	-\$16,853	-\$5,765	\$5,987	\$16,244	\$47,834	\$64,638	\$64,638	\$64,638	\$64,638
anagement Charges		\$60,624	\$0	\$1	\$2	\$3	\$4	\$5	\$6	\$7	\$8	\$8
rofit/Loss		\$410,507	-\$24,700	-\$16,854	-\$5,767	\$5,984	\$16,240	\$47,829	\$64,632	\$64,631	\$64,630	\$64,630
perating Margin %		34.85%	0.00%	-140.77%	-19.14%	11.88%	23.61%	39.74%	43.26%	43.26%	43.26%	43.26%
			Jun-06	Jul-06	Aug-06	Sep-06	Oct-06	Nov-06	Dec-06	Jan-07	Feb-07	Mar-07
variable Costs Budget	22.29%	Totals										
Variable Costs	Variable %	\$262,575	\$0	\$2,663	\$6,715	\$11,223	\$15,336	\$26,826	\$33,302	\$33,302	\$33,302	\$33,302
License / Welcome / Capacities / Introduction / Excel / Set Up / Year One / Years 2-3 / Years 4-10 /												



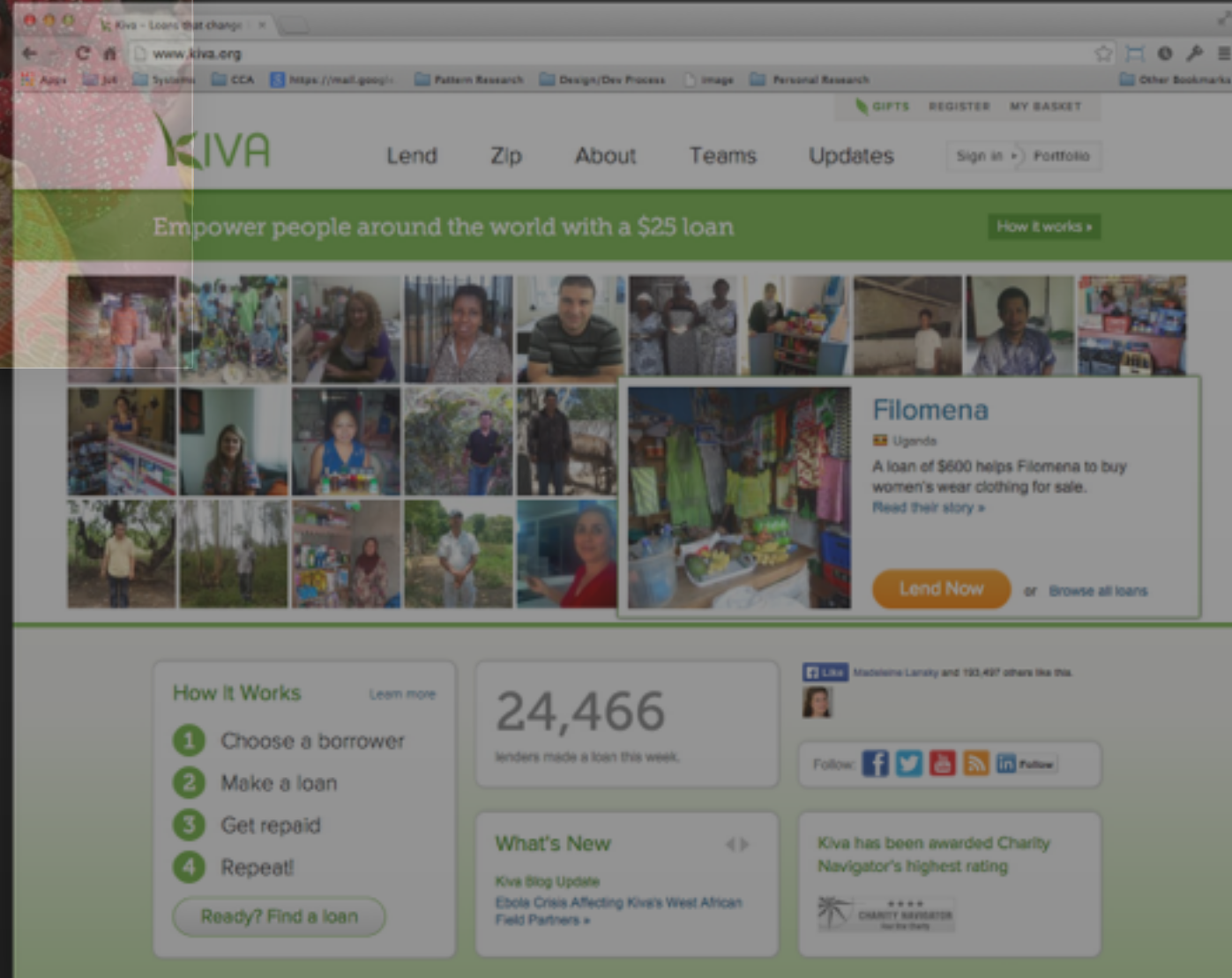
The New Fast Food



Invent a New Cuisine



Invent a New Cuisine



HOW?

Analyze The Purposeful Activity¹

116	The Lt. Commander March	K.L. King	117	The Big Cage.	Galay	K.L. King
Band			Band			
Copyright 1934	417669	250	Copyright 1934	41766 41755	300	
1st Edition			1st Edition			
12/16/34	500	3280	12/16/34	500	41750	
10/16/39	500	4050	2nd Ed. 1942	250		
3rd Edition			3rd Ed. 1946	500		
1st Ed. 1948	500		4th Ed. 1950	500		
2nd Ed. 1950	500		5th Ed. 1955	500		
3rd Ed. 1961	500		6th Ed. 1961	500		
Jan 1970	500		7th Ed. Nov. 1968	500		
	2500					
Printed by Otho Zimmerman Co., Cincinnati, Ohio			Printed by Otho Zimmerman Co., Cincinnati, Ohio			
Plates at		4800	Plates at		4800	



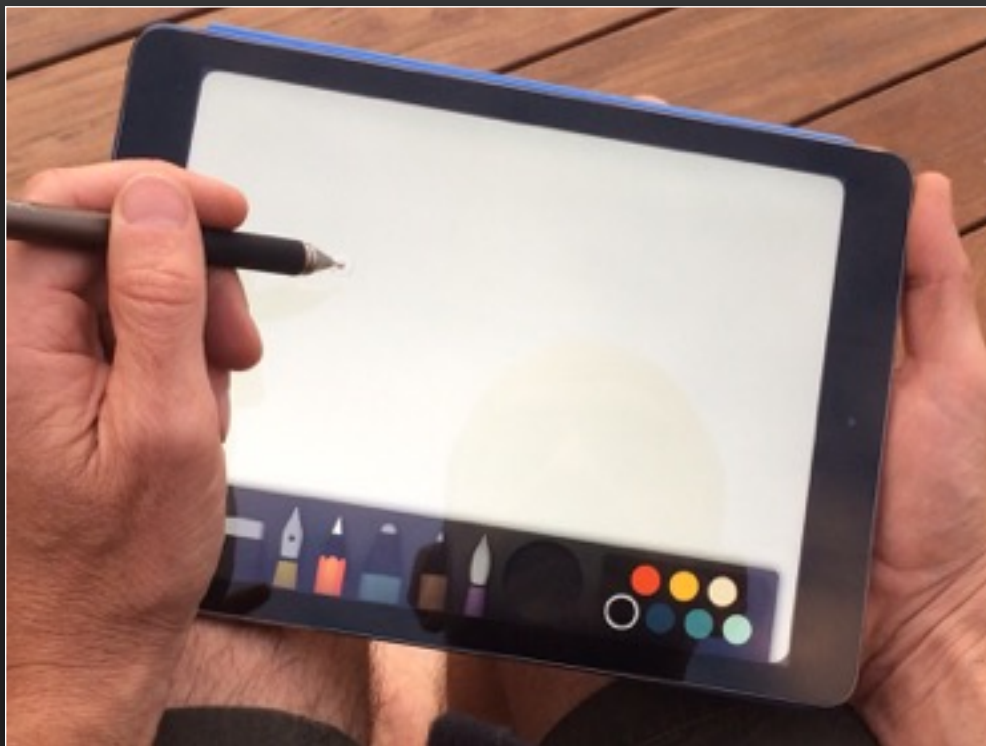
¹Checkland, Learning for Action

Describe it as a Transformation

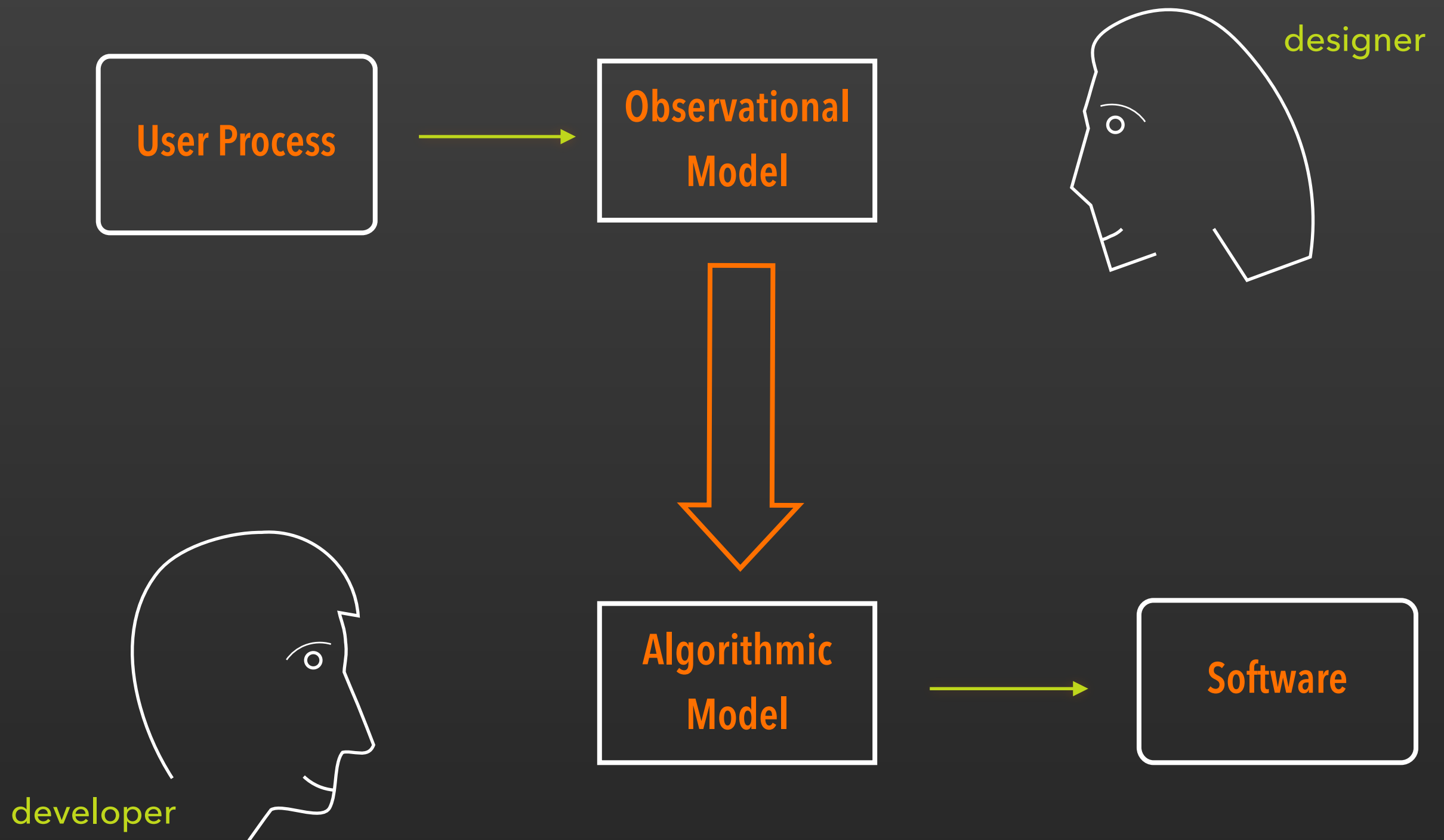


$$\frac{d}{dt} (\text{system})$$

Convert the Transform to Algorithms



$$\frac{d}{dt} (\text{system})$$



User Process



Observational
Model

designer

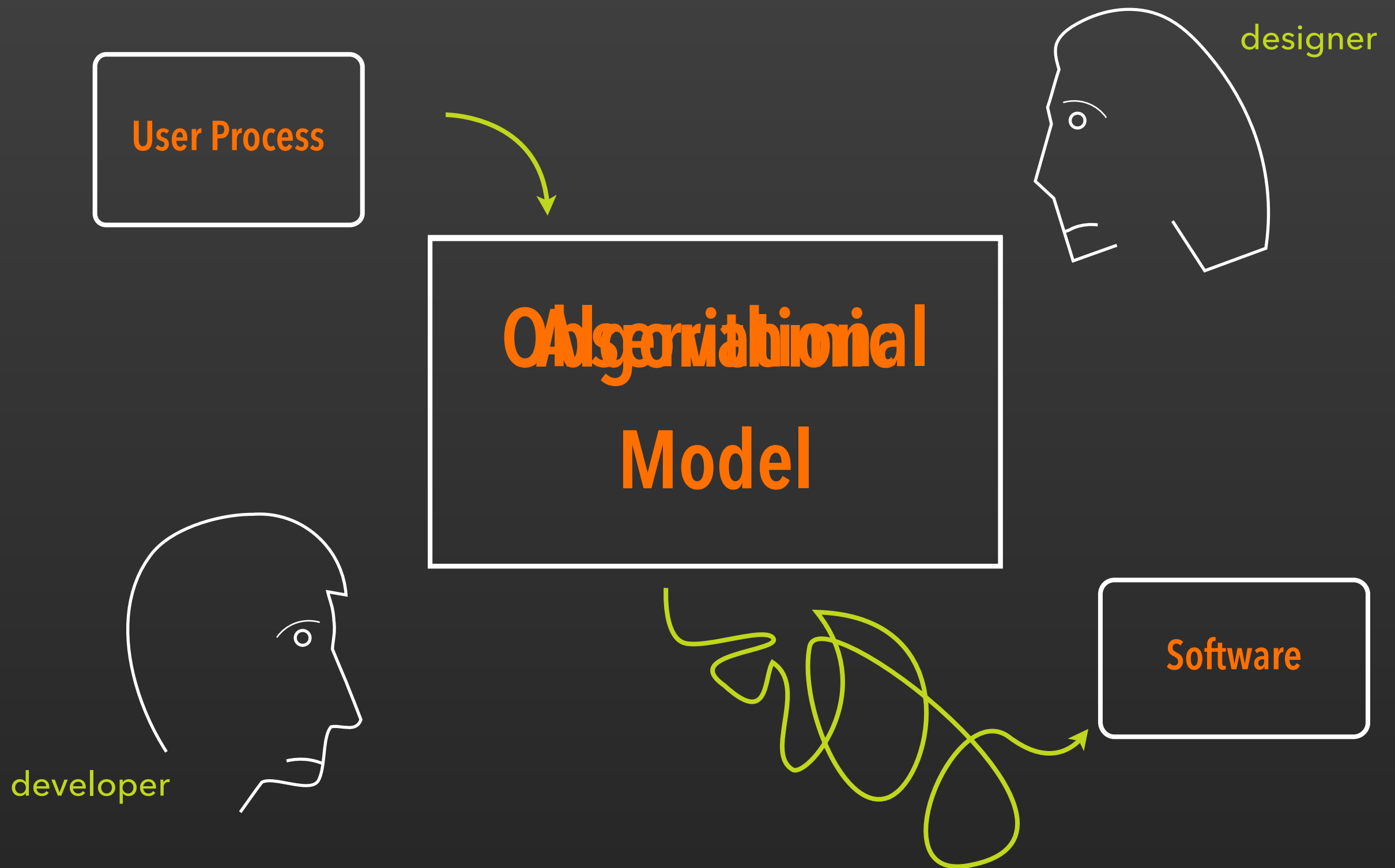


developer



Software



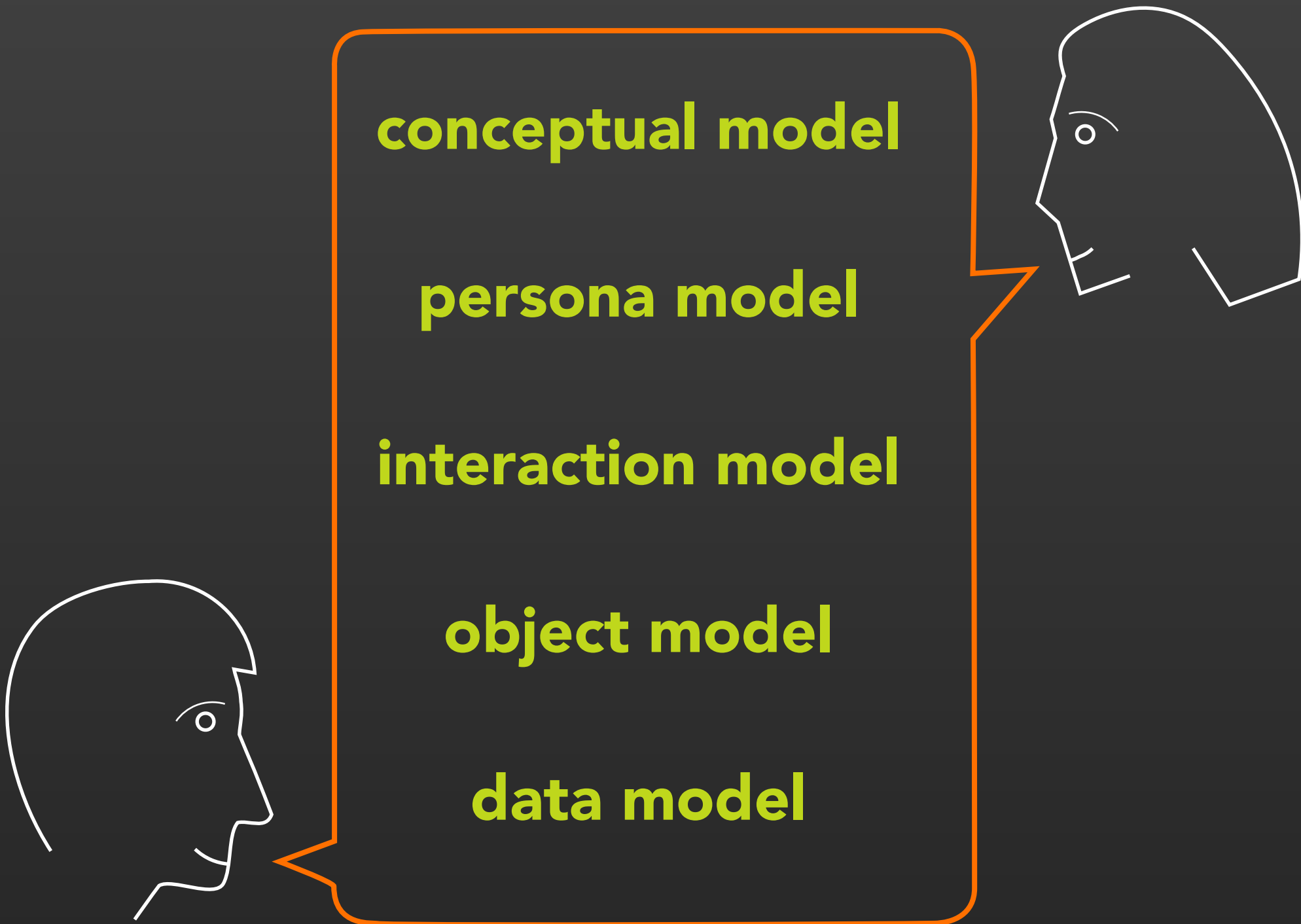


**Algorithmic
Model**

**Observational
Model**

Digital Machine







conceptual model
what is the value?

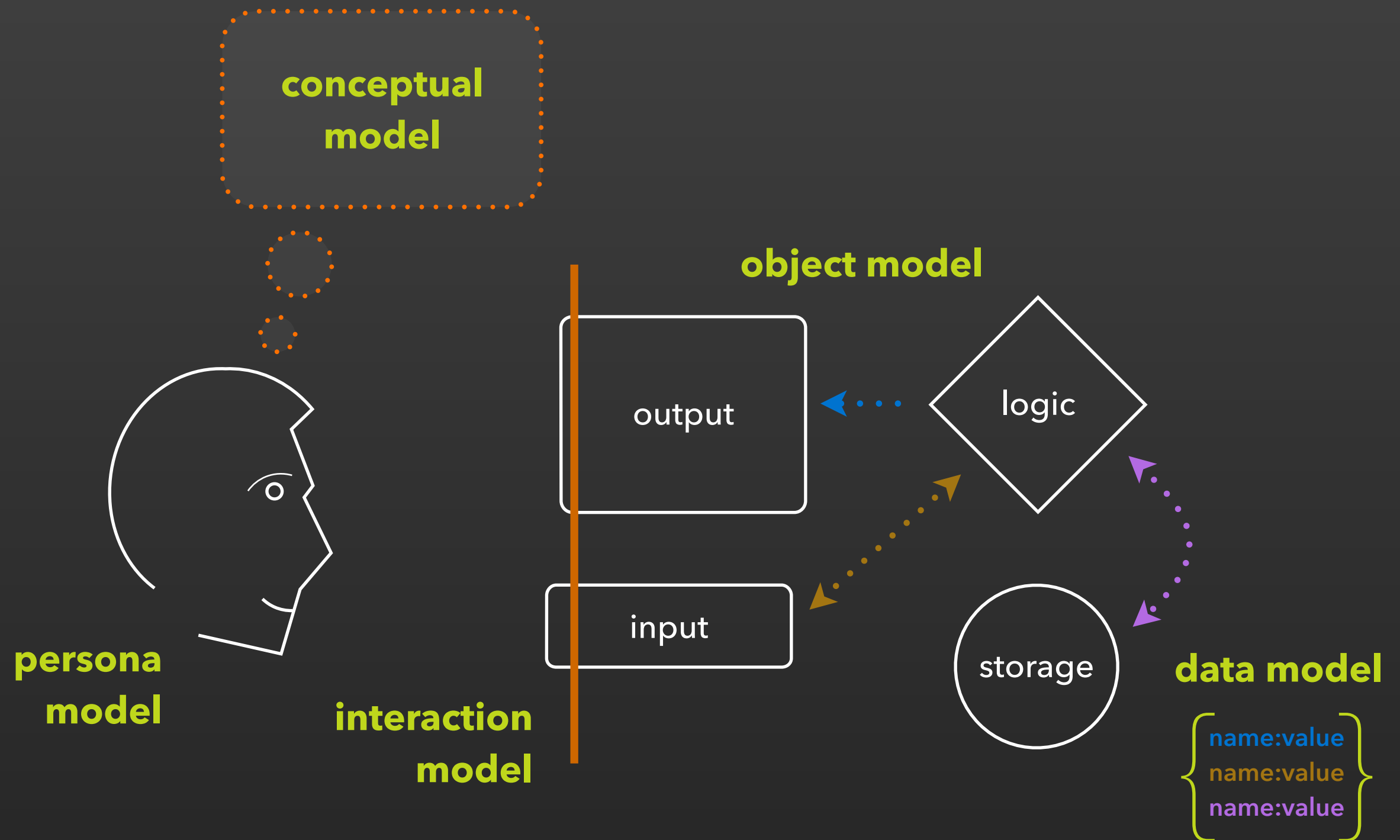
persona model
who is it for?

interaction model
how do I use it?

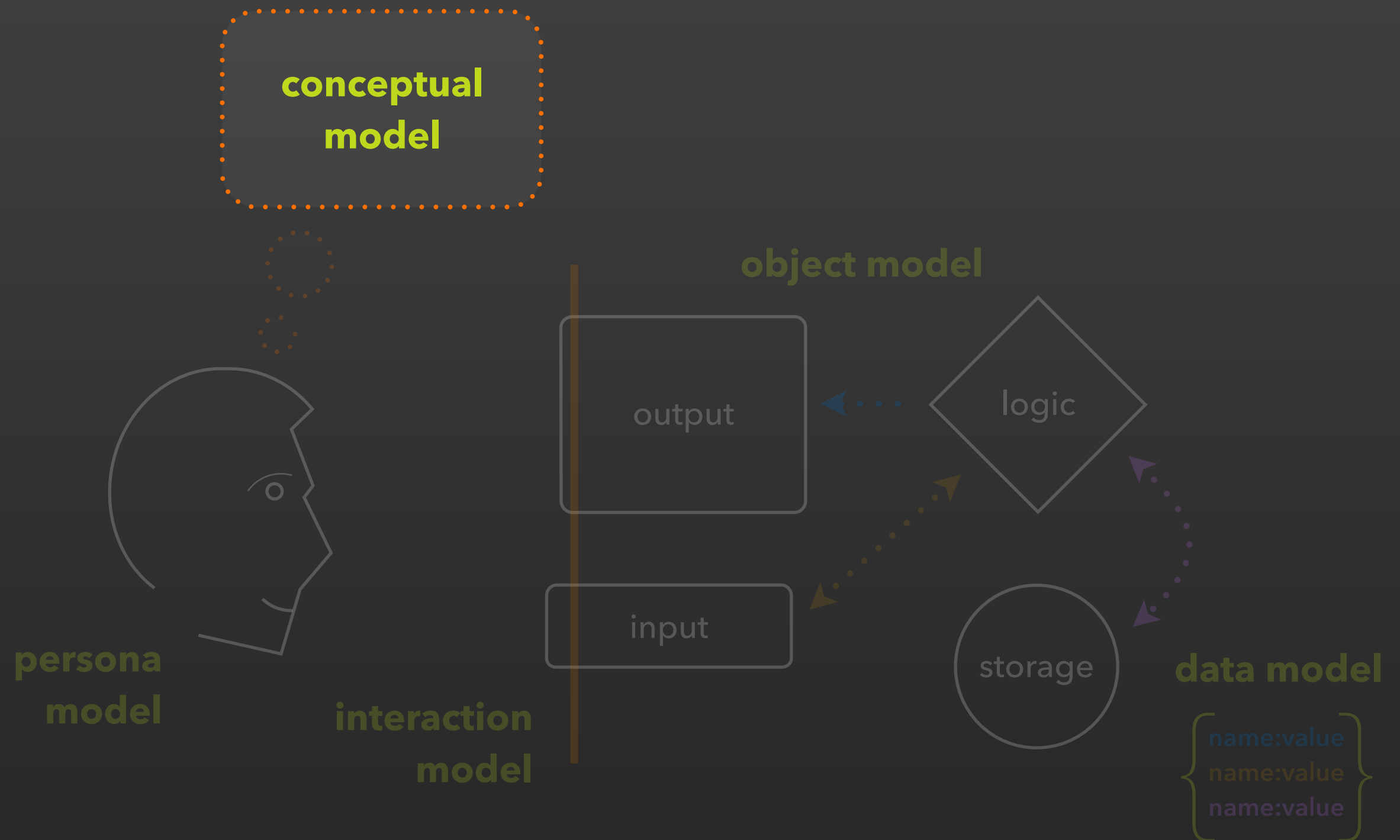
object model
what is the structure?

data model
how is state managed?





THE MODELS



Conceptual Model

is a positioning statement

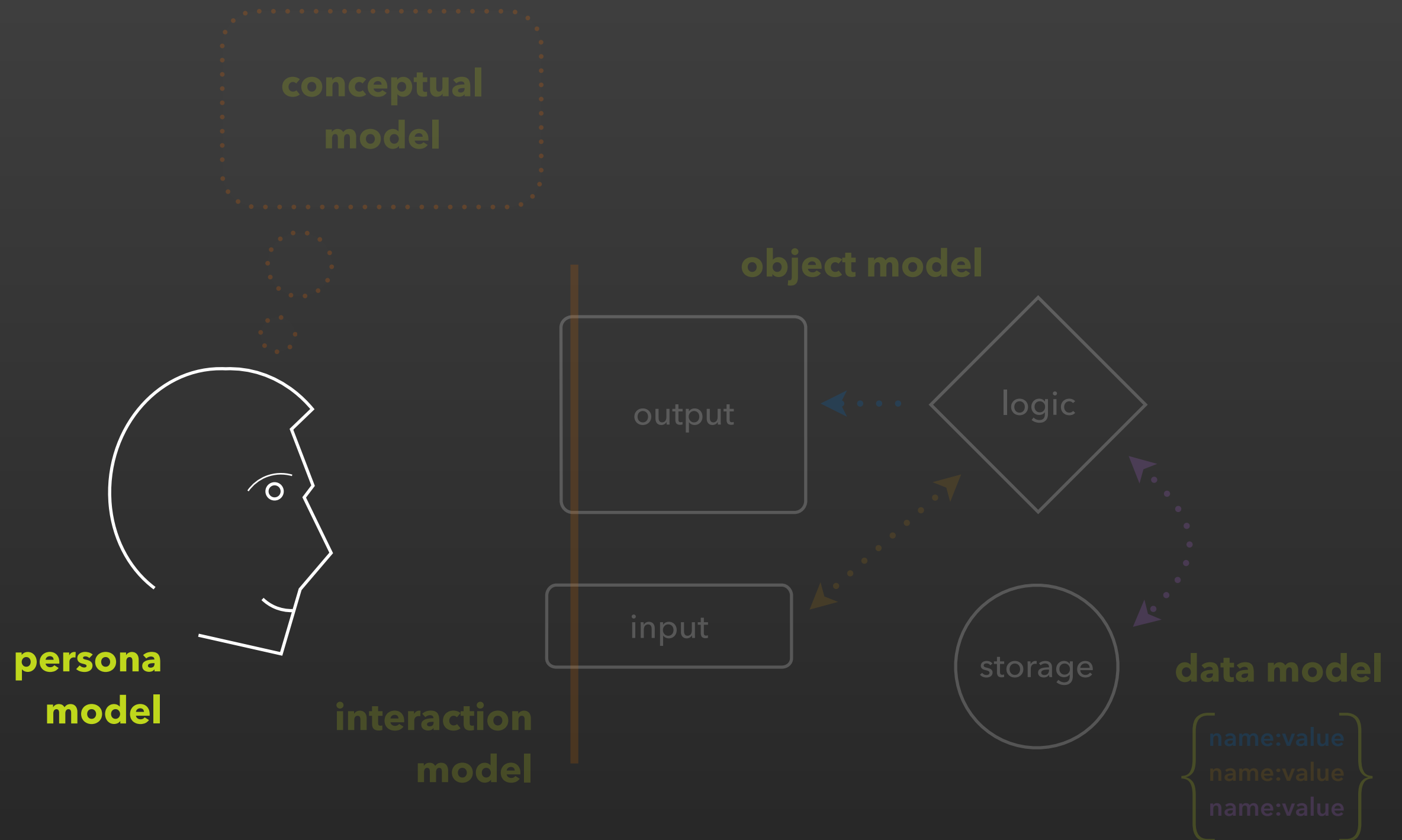
For target customers

Who have a particular need

This product is a category of solution

That provides a key benefit

Unlike the competition



Persona Model

Design Personas



THE TECHNICIAN

Kyle Ratcliffe

Born and educated in Britain, Kyle trained in computer science before taking his first job as an operations technician with Barclays bank. Following an impetuous move across the Atlantic, Kyle has landed at DropBox as a member of the ops team.



Challenges

- Lots of context switching between monitoring tools
- Moving from a perspective of worrying about machines to worrying about the delivered experience
- Understanding if a problem is in the application or the infrastructure
- Being overwhelmed by continually increasing data sources and volume

Needs

Kyle's primary concern is system stability so he wants a system that tells him about change: has it happened, and if so, where and how much?

Kyle needs to trust that he will only hear from his system when there is a problem or, preferably, when a problem might be starting.

When there is trouble Kyle's particular challenges are

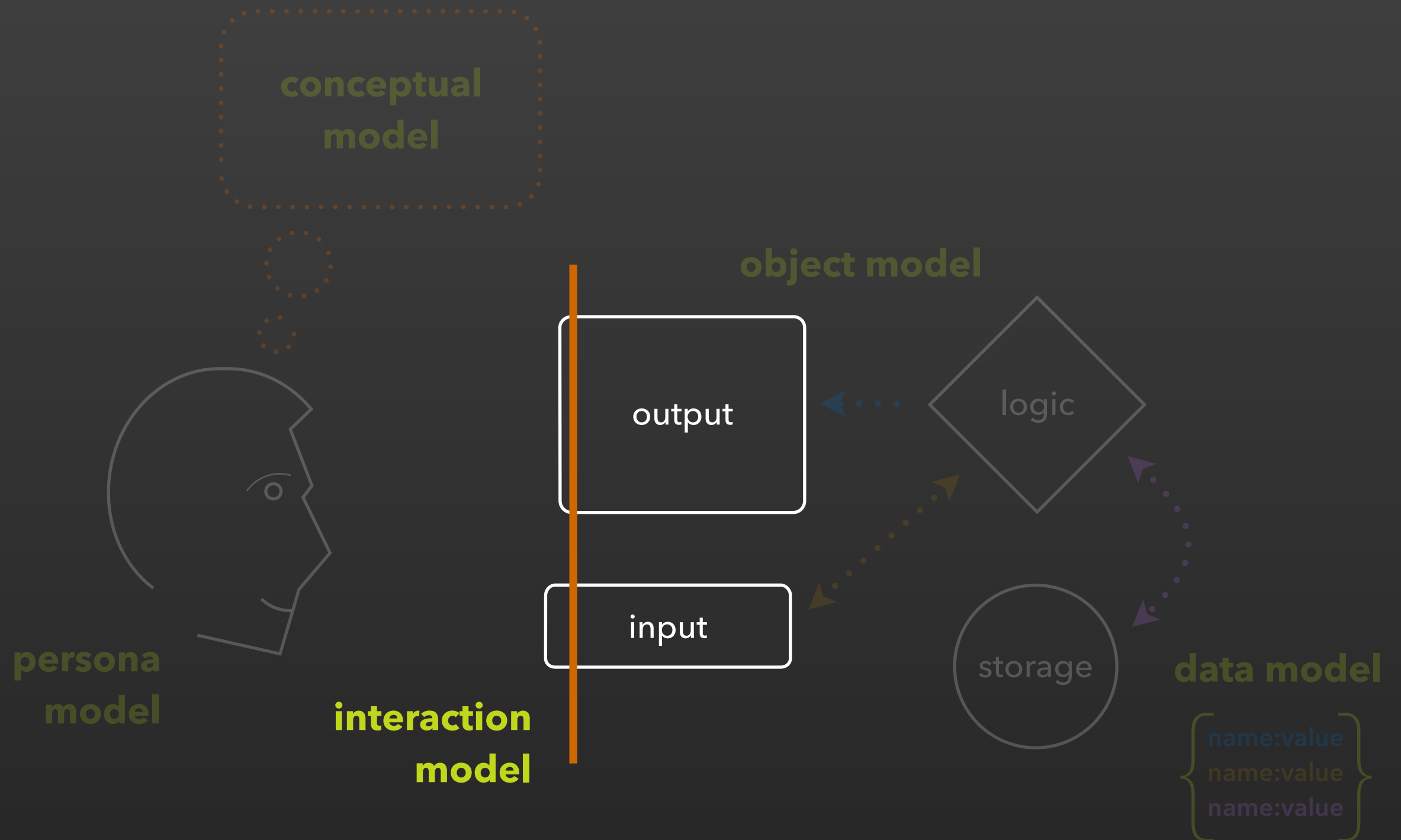
- visualizing trends across his system
- seeing log events as measurable metrics

Kyle's Favorite Tool: Chef



Likes

- he can create a logical recipe that describes



Scenario 1:

Interaction Model

First thing in the morning, Kyle checks out hacker news and reads an article about a new data analytics tool called Jut.

Being curious, he clicks on the link to Jut's homepage and ends up on Jut.io

Upon arriving at Jut, Kyle immediately sees a visualization of real time and historical data of [traffic for hacker news]. Also within view is a code editor window pre-loaded with code in a language that he is told is Juttle.

Kyle also sees a short description of what exactly the code is doing along with challenge for changes he can try to make to the code and see how it effects the visualization.

Kyle sees a series of other scenarios that he can explore. As he clicks through each scenario, he can see how short segments of Juttle code allow him to analyze data in a way that is more effective and more efficient than he can with other applications.

Kyle begins to make edits in the editor window and is provided with code hints to help him better understand what methods and functions are available to him in Juttle.

Kyle follows the directions given in this first scenario and makes the suggested changes. Afterward, he sees the visualization immediately react to the changes he made.

After completing the recommended changes, Kyle clicks the 'submit' code button and is congratulated for taking his first step for correctly completing the challenge.

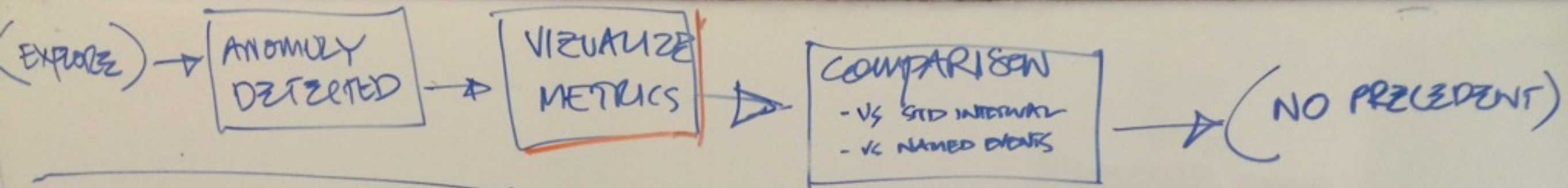
Kyle is then given an explanation of how juttle is designed with dev-ops engineers in mind along some suggestions for other ways he can make more advanced changes to his code in this scenario. He decides to pass on these suggestions and move on to the next scenario.

Kyle finishes a couple more scenarios and, on the last one, is given the option to import his own live <twitter feed>. After loading his data in, he makes some changes to the Juttle code that allow him to visualize it in a unique way. He decides he wants to share this visualization in a blog post about the advent of dev-ops and its effects on traditional operations.

Kyle copies a link to the visualization he's just made along with the data that he's uploaded and embeds the link in his blog.

Kyle sees how Jut could be useful for a couple future projects at work and decides to sign up for the beta while copying a few co-workers on the sign-up to loop them into the conversation and make sure they all know when Jut is ready for use.

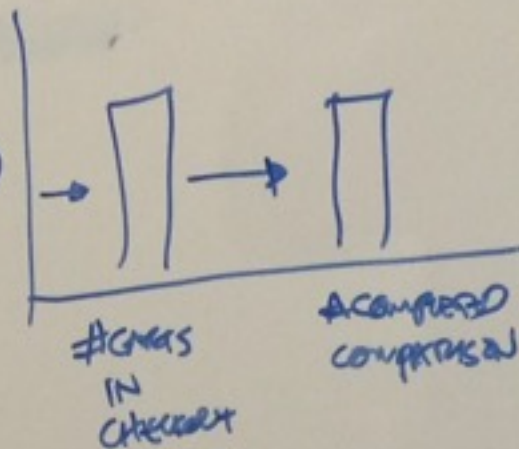
is a story about change



- PROBLEM
- CONFIRM TRUE PROBLEM
- LOOK FOR ERRORS
- FIND BAD MACHINE
- REPAIR PROBLEM IS CHECK IN

- STOPPING FILLED
- CAN'T CHECKOUT

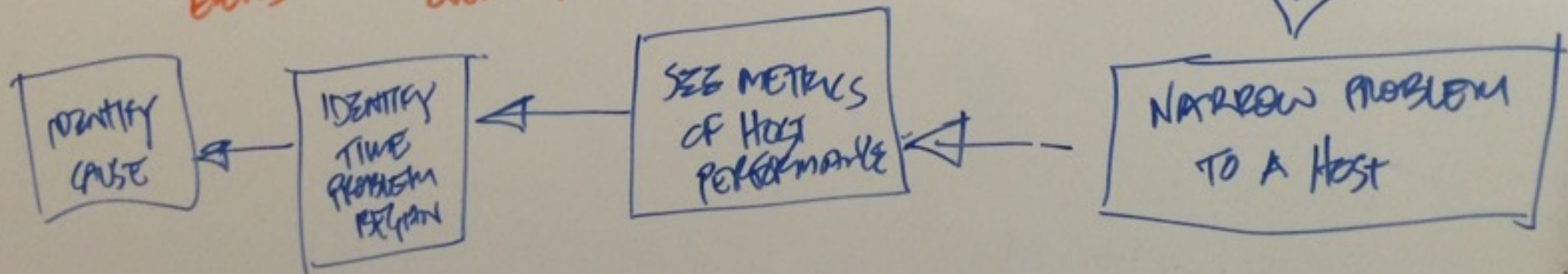
BROKEN STEP

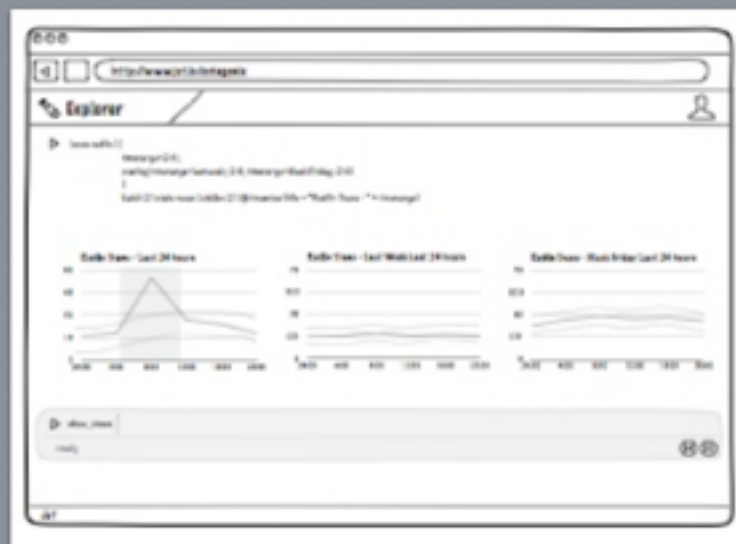


SEARCH FOR ERRORS
IN LOGS

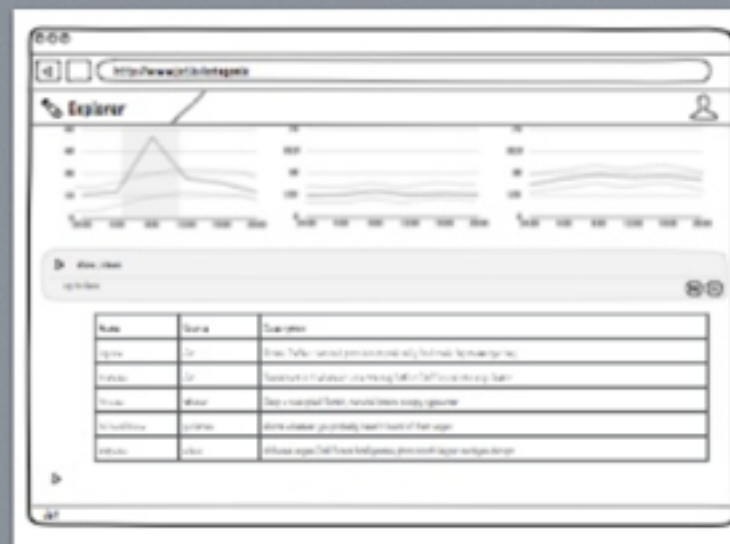
ABANDON EVENTS

OVERLAY GRAPHS





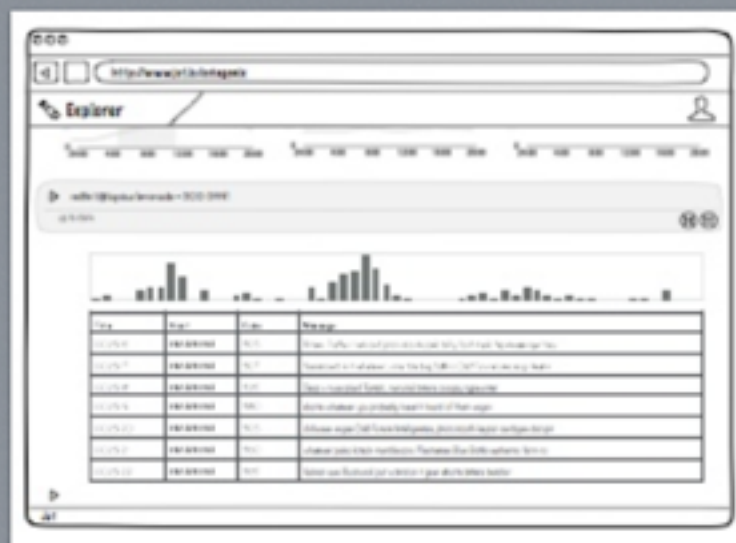
13



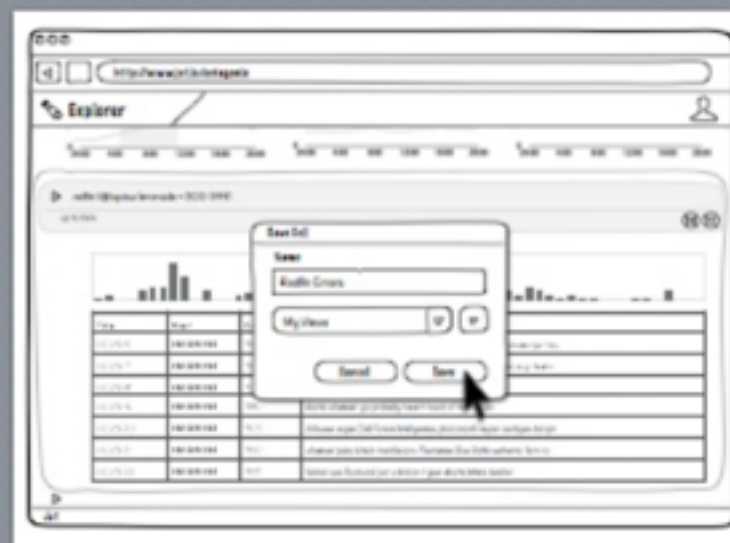
14



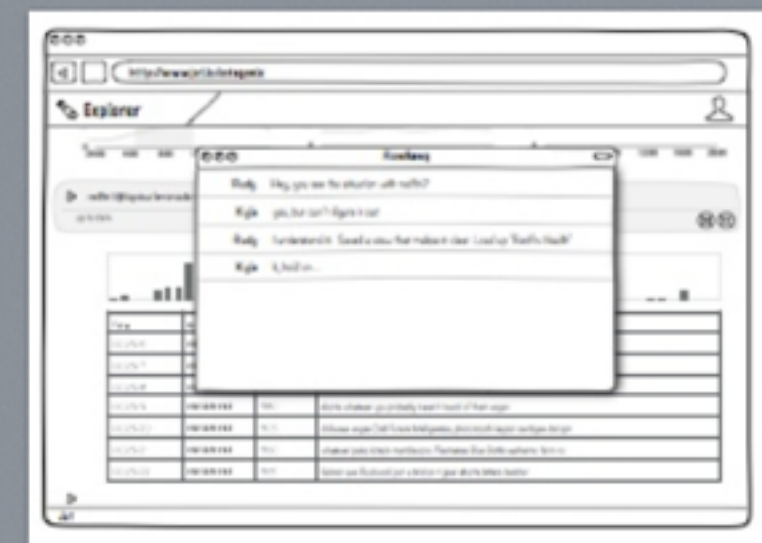
15



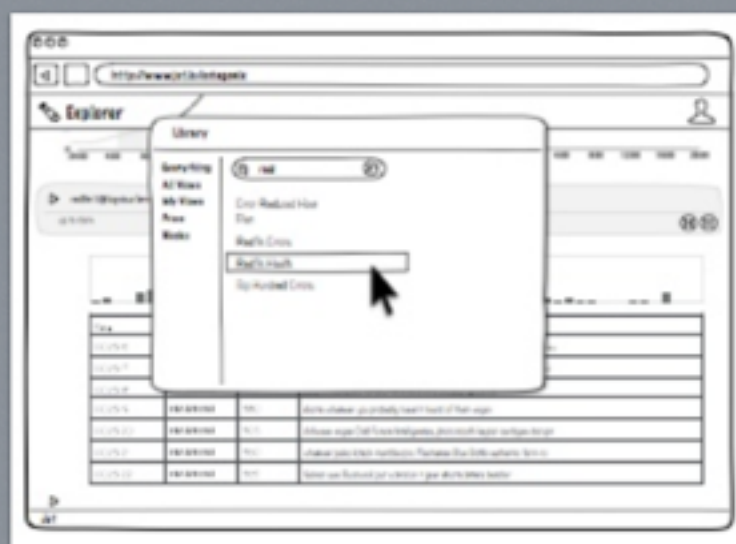
16



17



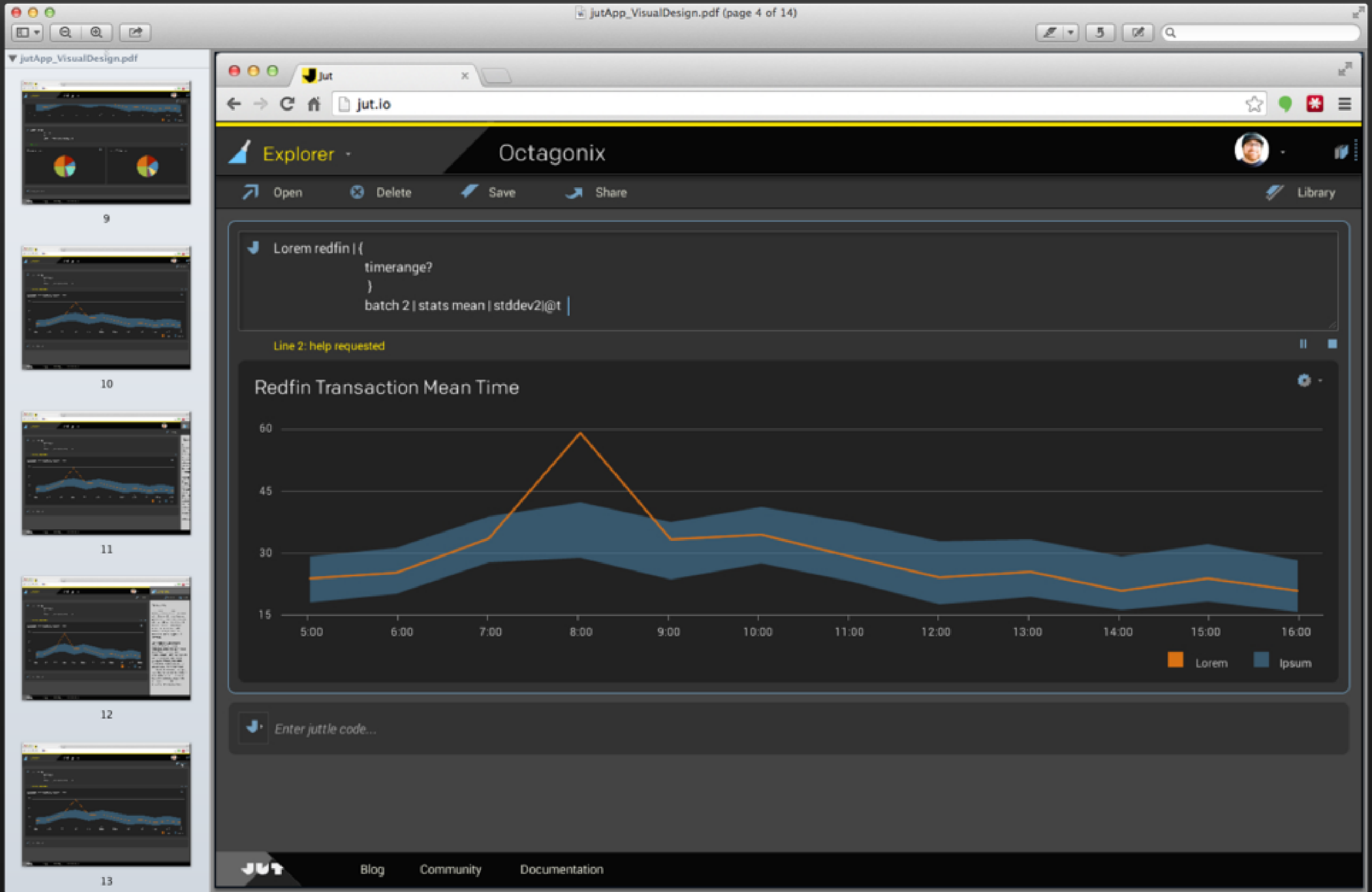
18

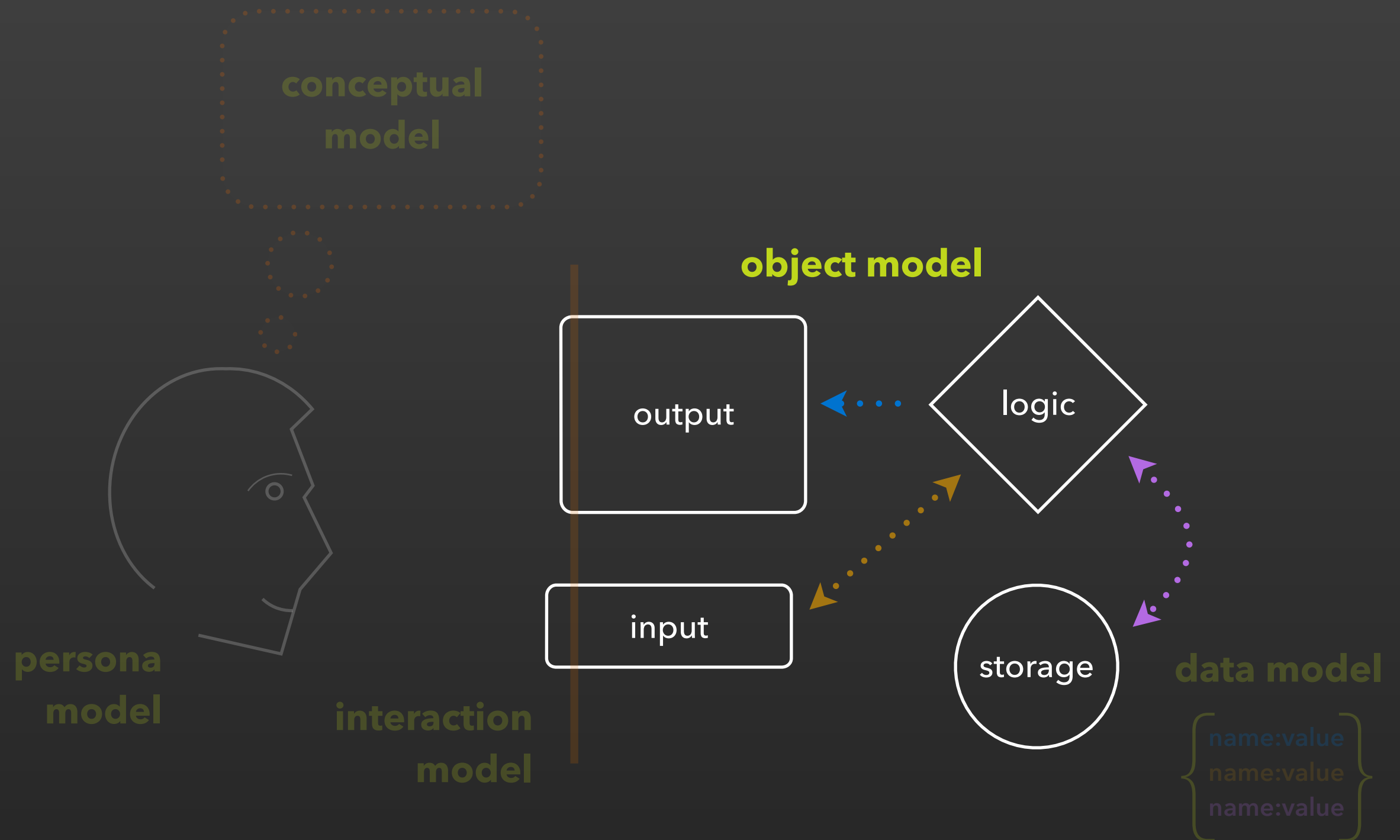


19



20















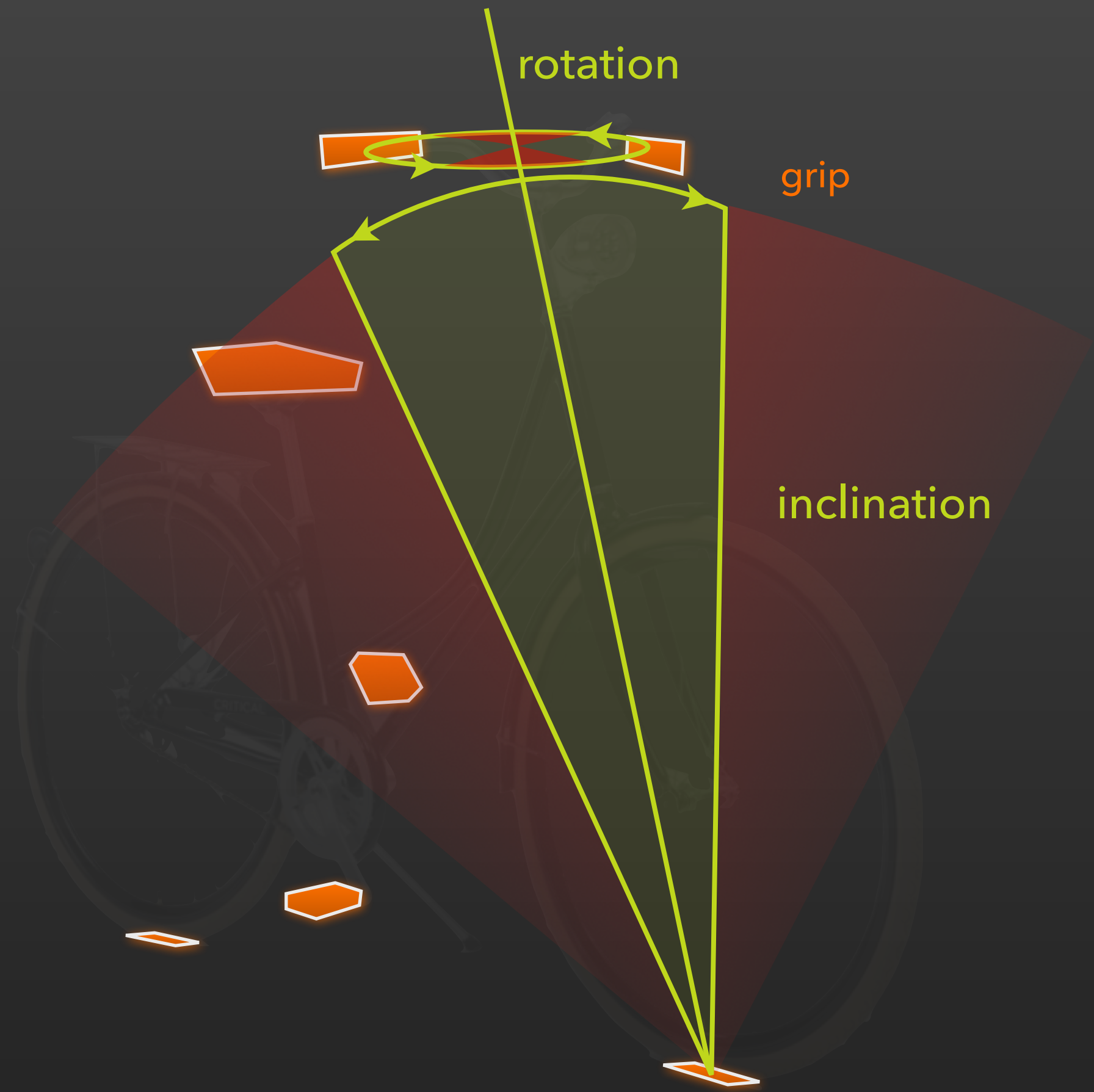
grip

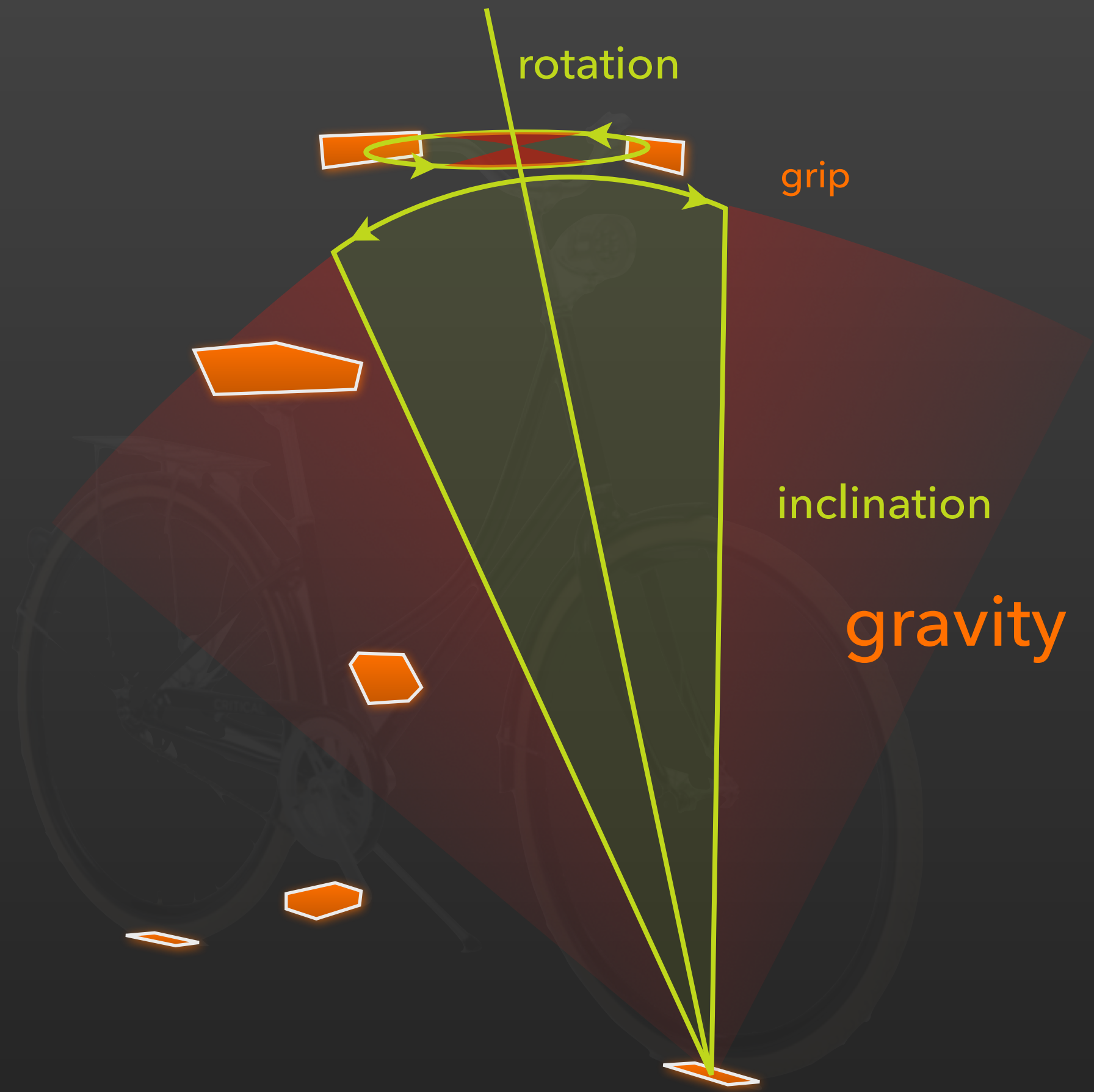
rotation

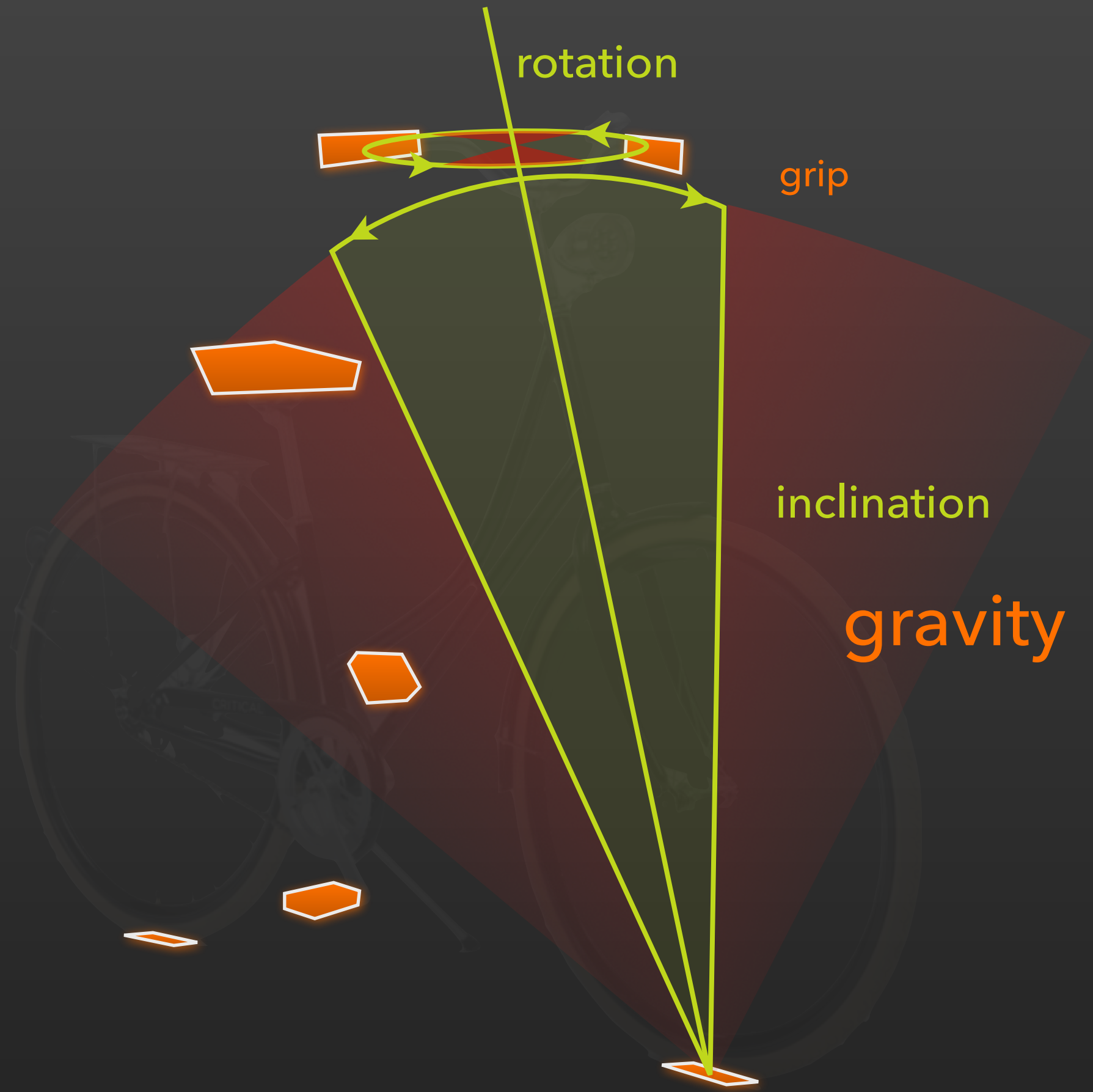
grip



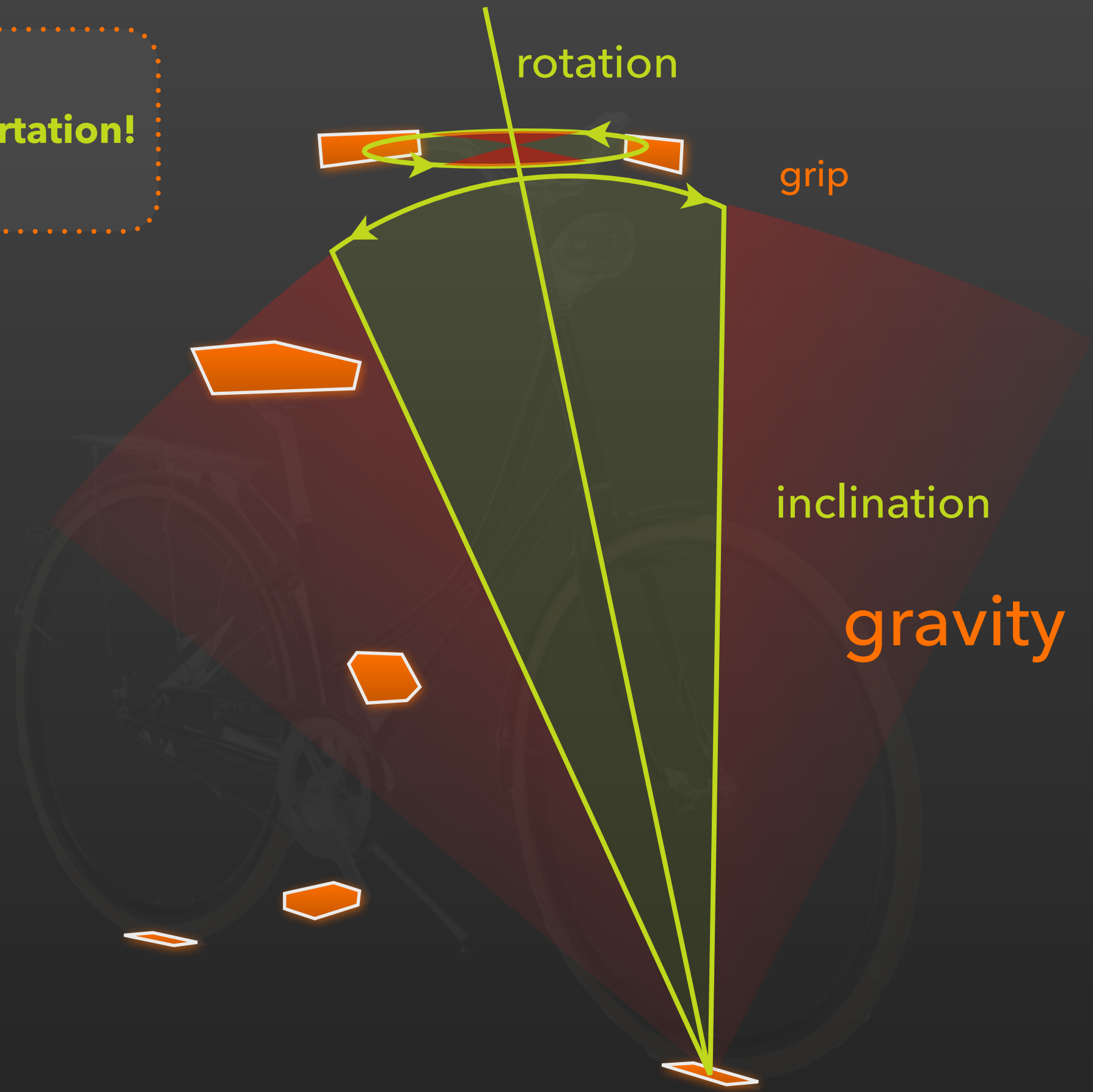




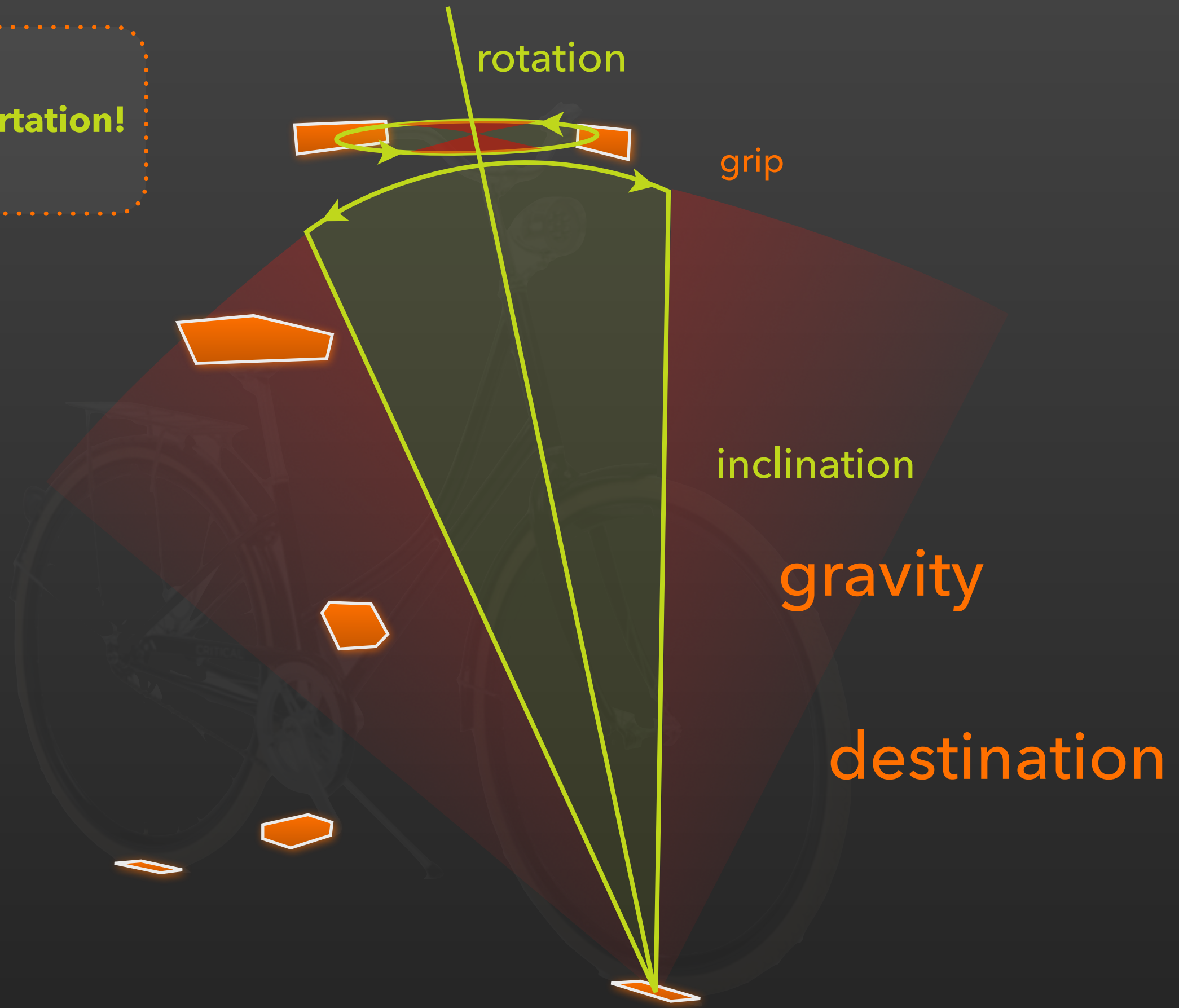




transportation!



transportation!



transportation!



rotation

grip

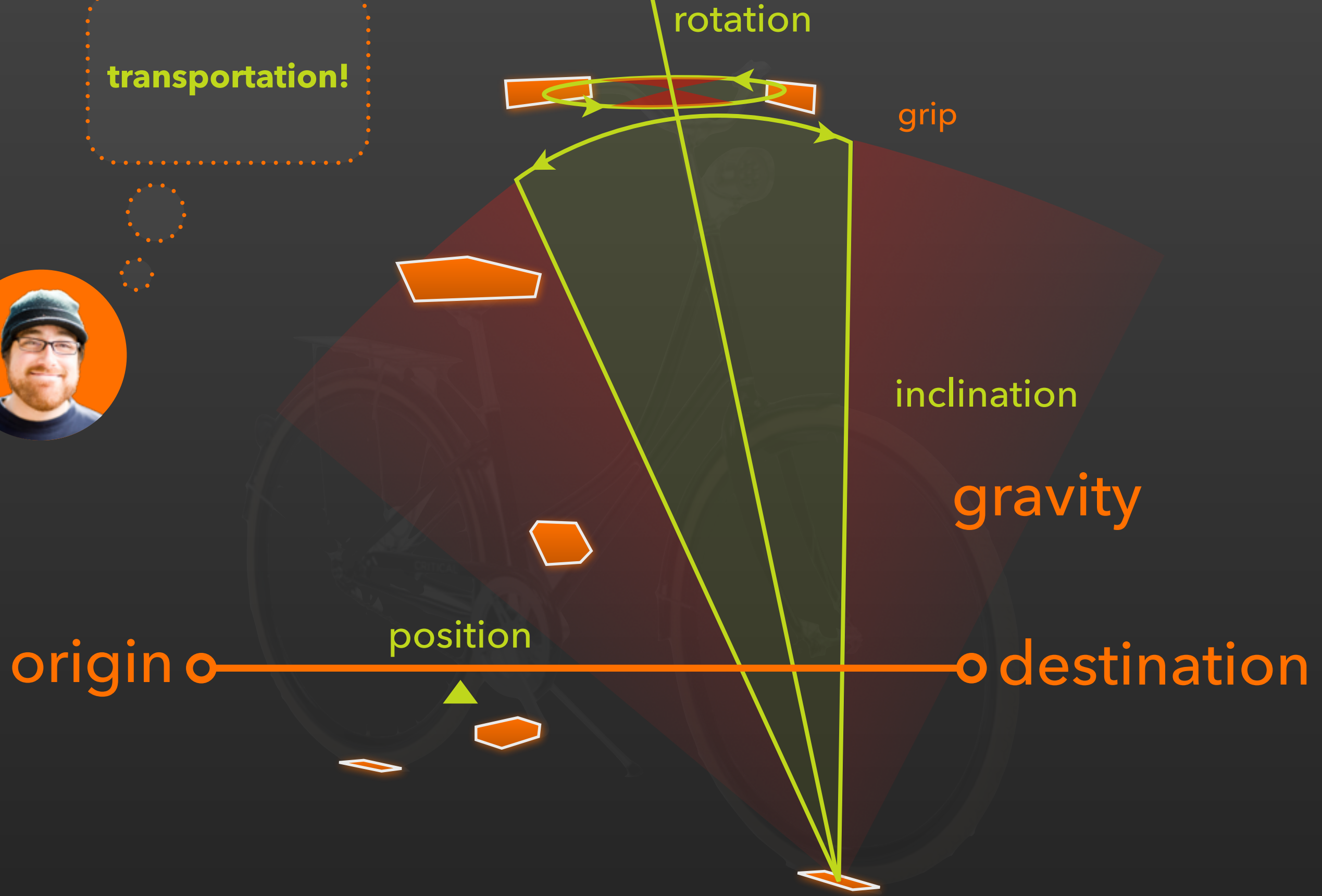
inclination

gravity

origin o

o destination

transportation!



transportation!



rotation

grip

inclination

gravity

position

origin o

o destination

trip

Object Model



Object Model



details

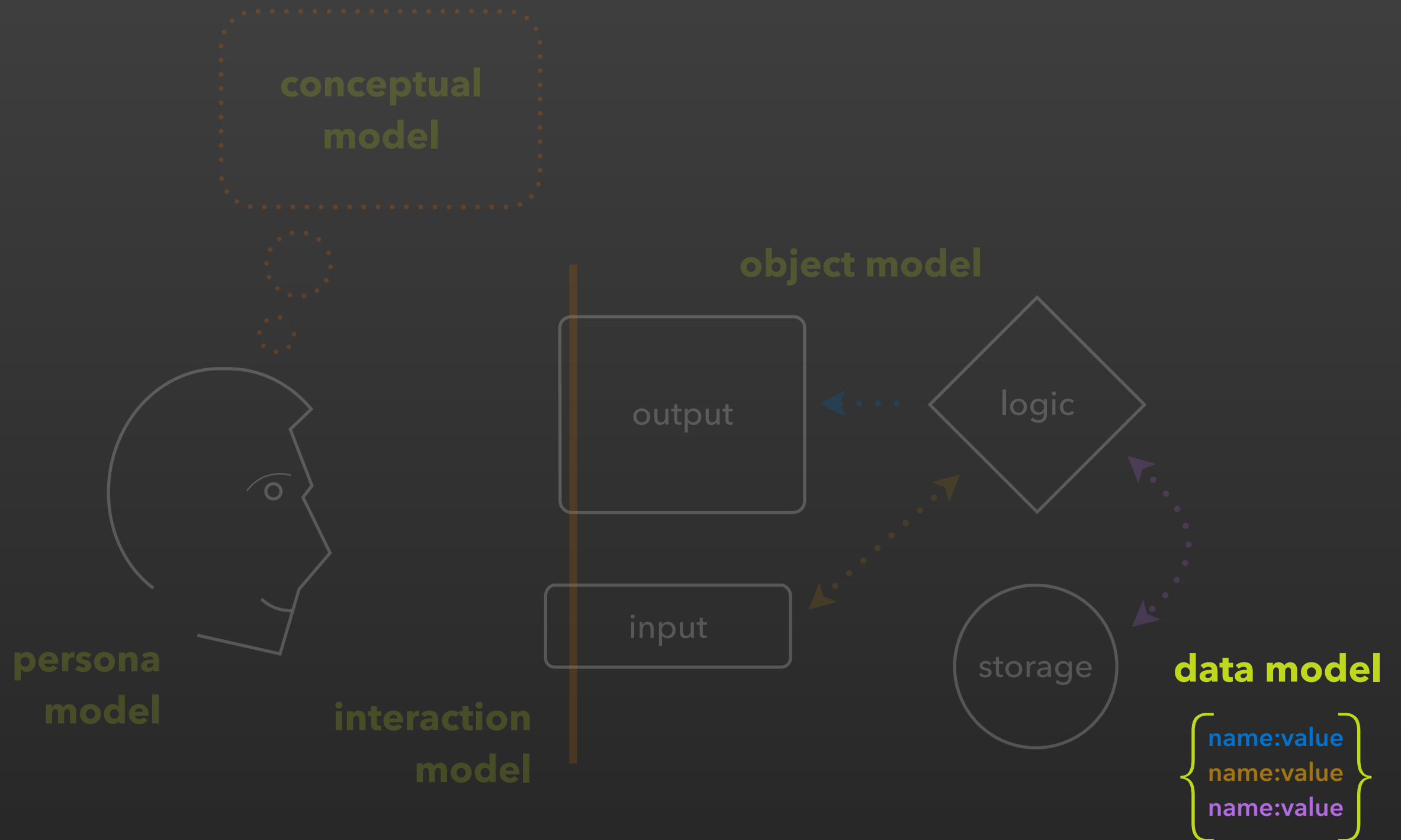
rotation

inclination

position

$\frac{d}{dt}$ (system)

?



WHAT IS DATA?

(in the software context)

name : value

lat : '59.916'

```
position : {  
  lat : '59.916', long : '10.738'  
}
```

```
position : {  
  lat : '59.916', long : '10.738'  
}
```

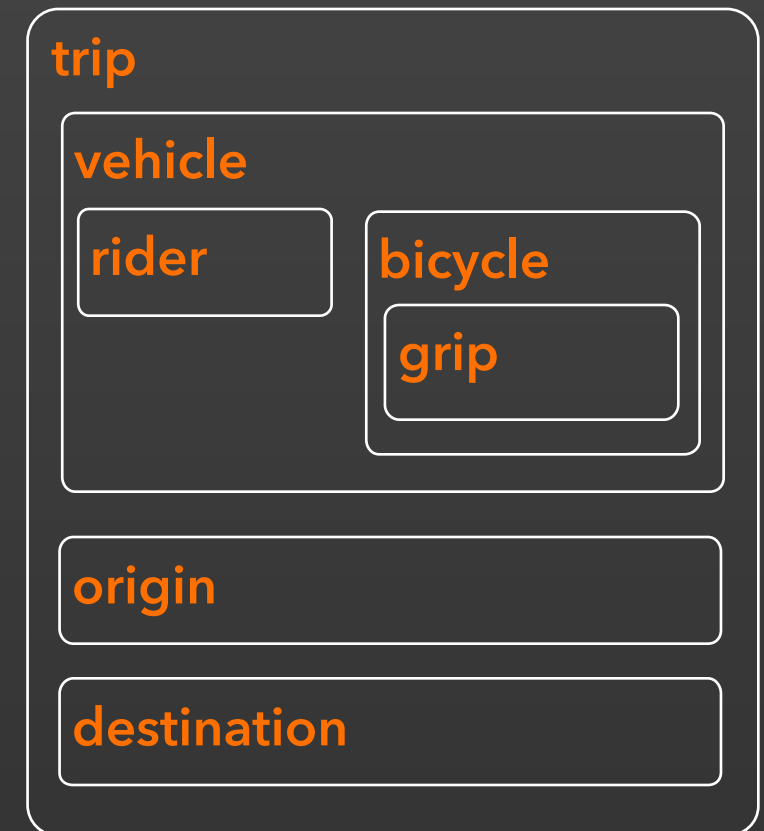
a set of **name : value**
pairs defines object
state

```
position : {  
  lat : '59.916', long : '10.738'  
}
```

```

bikeTrip = {
  vehicle : {
    rider : {
      name : 'Kyle'
    },
    bicycle : {
      grip : {
        rotation : '12', inclination : '3'
      }
    },
    position : {
      lat : '59.916', long : '10.738'
    },
  },
  origin : {
    name : 'Hotel Savoy',
    position : {
      lat : '59.916', long : '10.738'
    },
  },
  destination : {
    name : 'AHO',
    position : {
      lat : '59.925', long : '10.751'
    }
  }
}

```

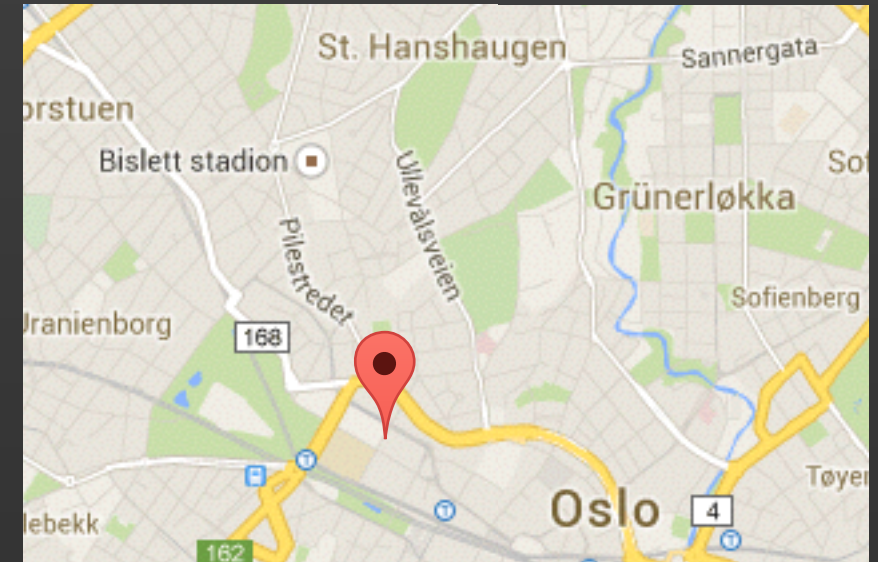


a set of **object**
states defines
system state

```
bikeTrip = {  
  position : {  
    lat : '59.916 ', long : '10.738 '  
  }  
}
```



```
bikeTrip = {  
  position : {  
    lat : '59.916', long : '10.738'  
  }  
}
```



```
bikeTrip = {  
  position : {  
    lat : '59.916', long : '10.738'  
  }  
}
```

interaction model



```
bikeTrip = {  
  position : {  
    lat : '59.925', long : '10.751'  
  }  
}
```

interaction model

$$\frac{d}{dt}(\text{system})$$



Data Model

underlies every interaction

Full Name

Username

Your Email

Your Password

Confirm Your Password

Create Account

Example Request

```
{
  name : 'Joe Doe',
  username : 'jdoe',
  email : 'joe@jut.io',
  password : 'joepass',
}
```

Example Response

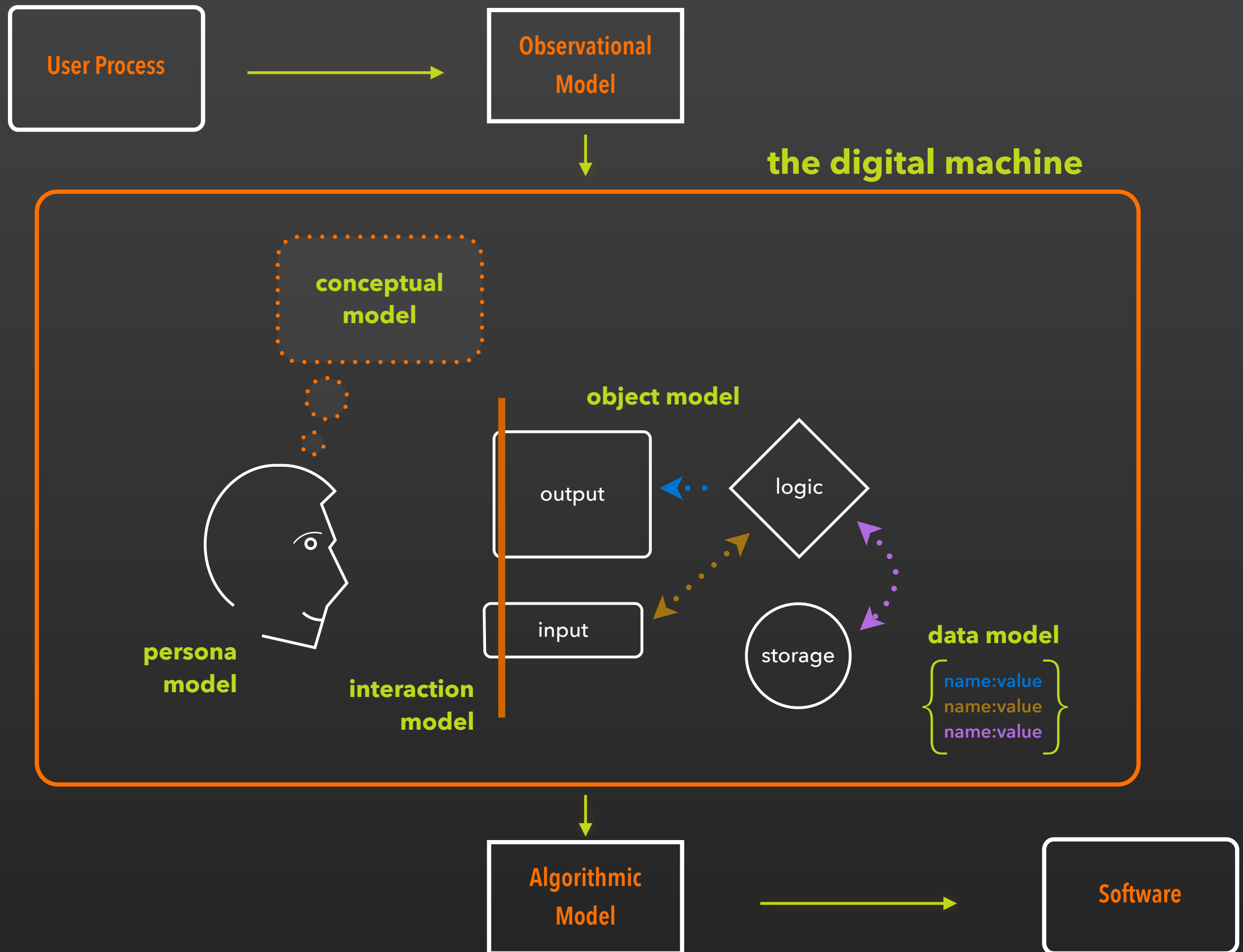
```
{
  id : 68d16a69-eeb7-41d3-b7ed-8d1bfdc02c1a
}
```

Welcome to Jut. We've carefully created and conditioned your account just for you.

Username

Password

Sign In



FIN