



Google
Developers



Advanced Design for Engineers

Cognitive Hacking

Alex Faaborg, Christian Robertson
Designers



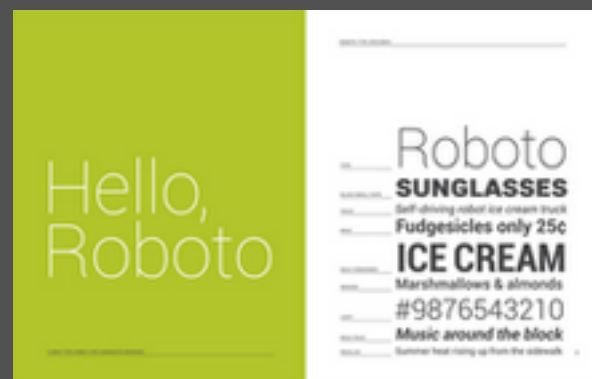
FORM

+

FUNCTION

Christian Robertson

Alex Faaborg



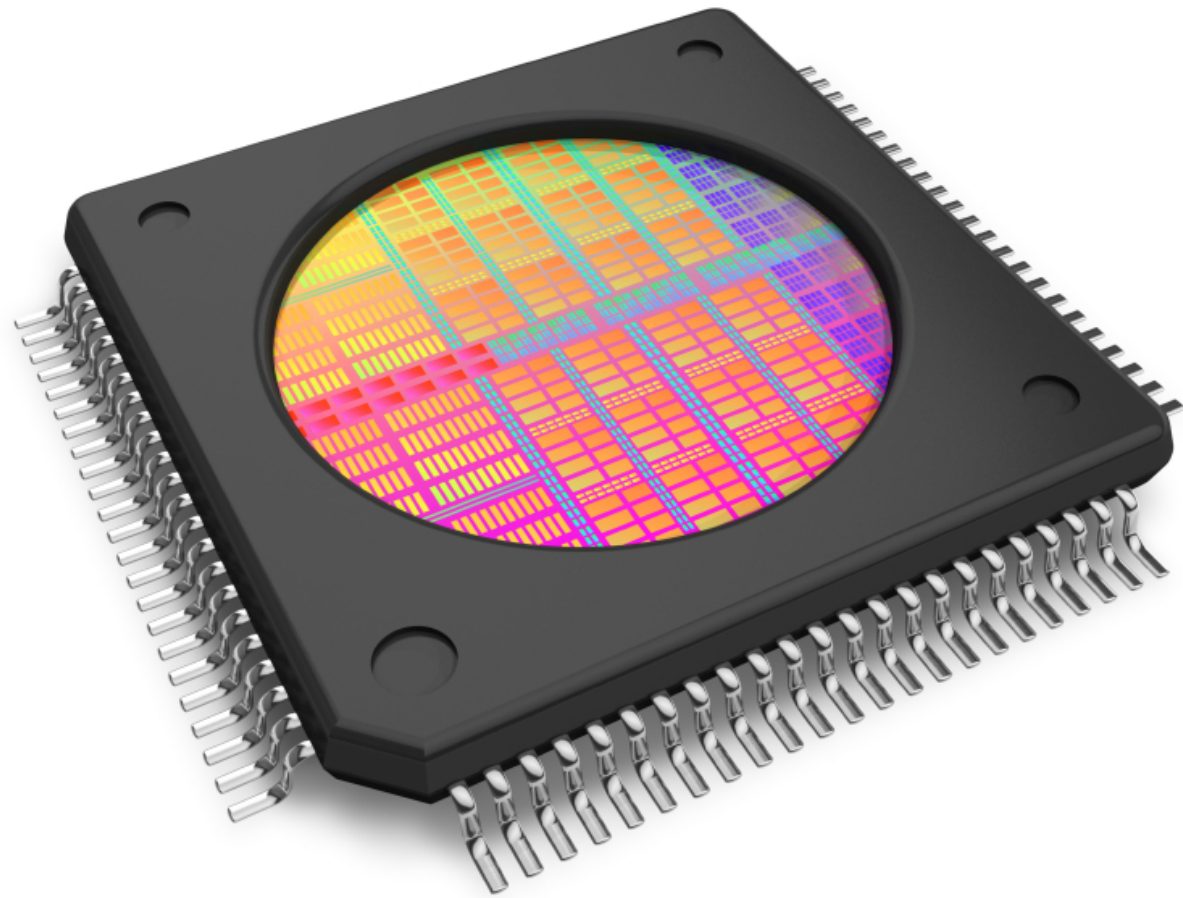


Interactive Design

Alex Faaborg

RESPECT DESIGN

Two information processing machines



parallel processing

base 2

know exactly how it works



massively parallel processing

action potential

still figuring it out

3 aspects of a great interface:

self **DESCRIBING**

prevent **ERRORS**

make users **FAST**

self DESCRIBING

Mental Model

**== a simulation of reality,
inside of your mind**

**How many instances of
this talk are there?**

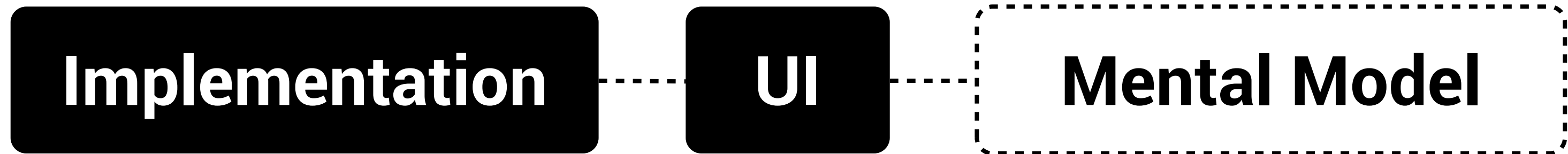


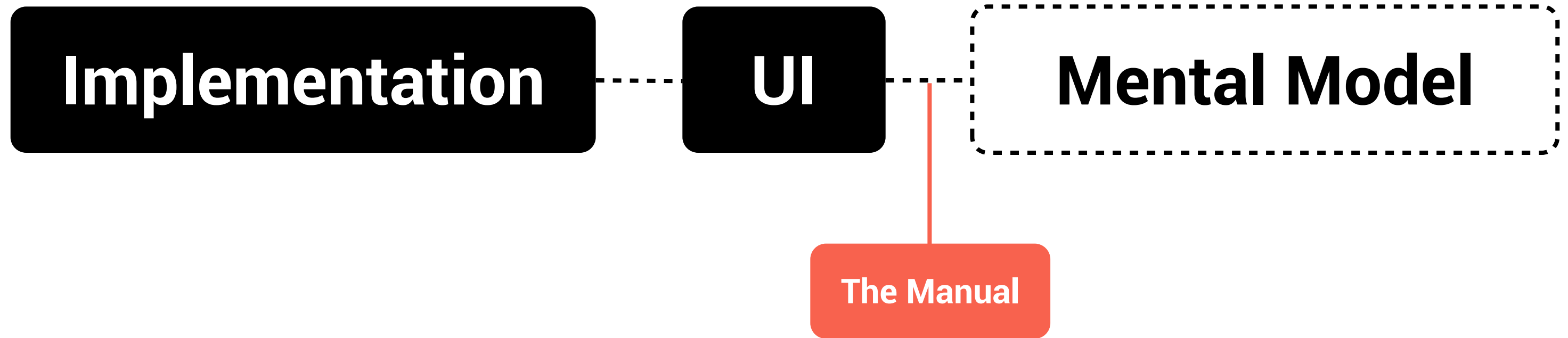
REALITY



REALITY

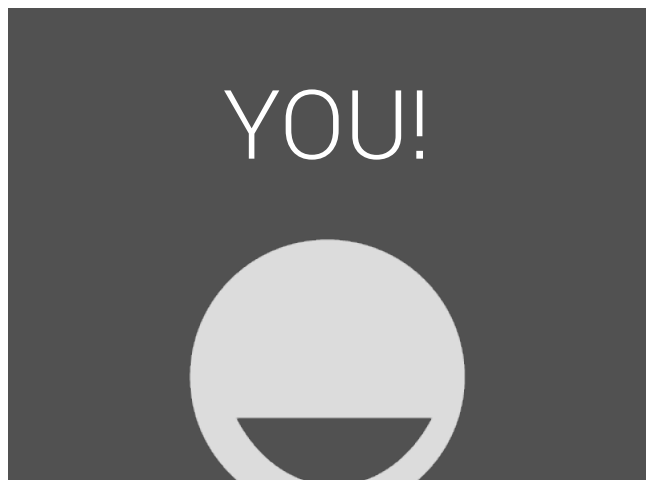
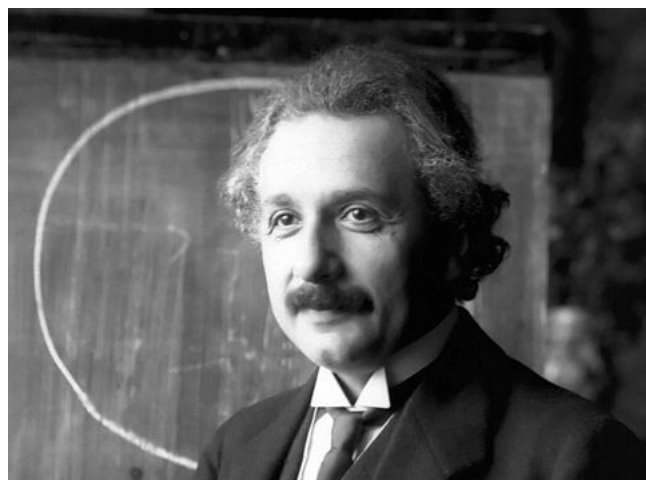
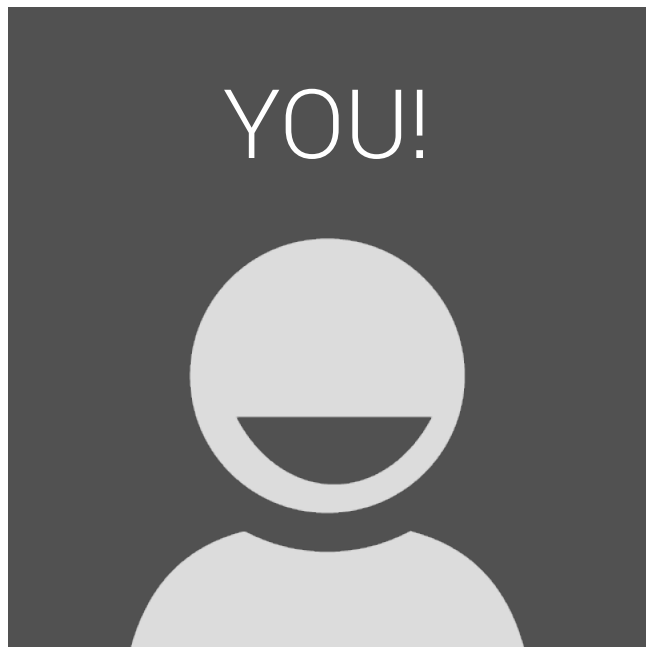
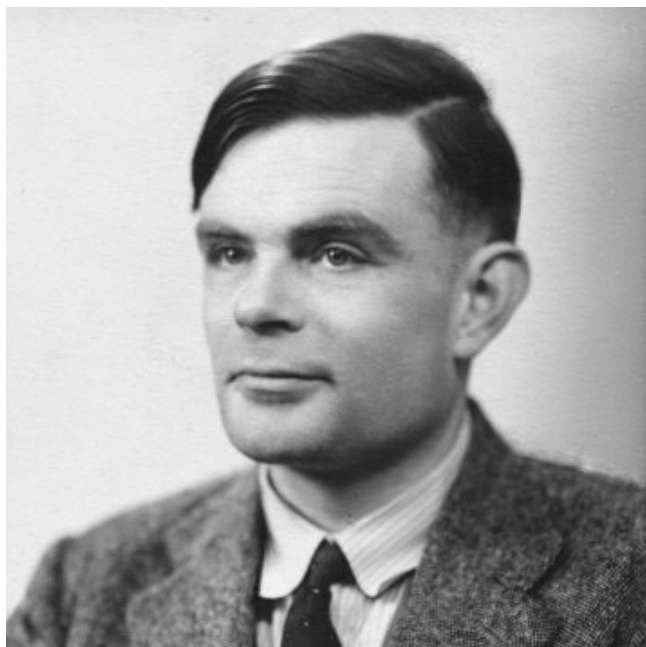
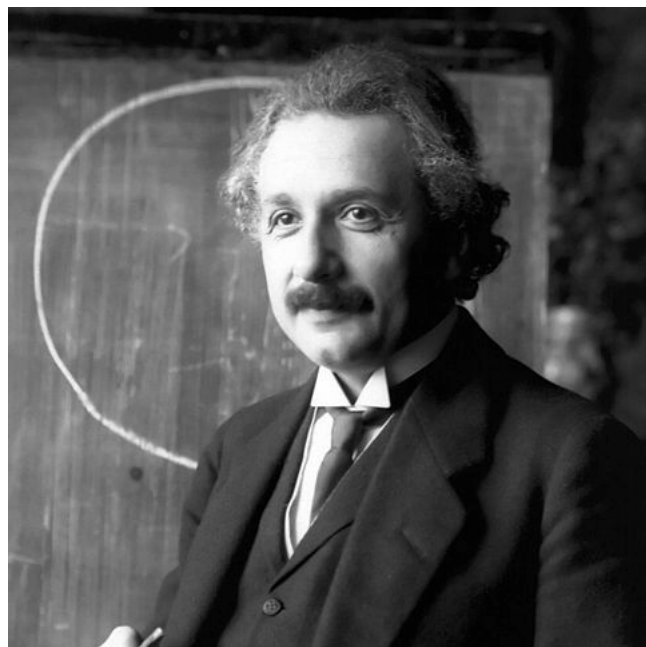
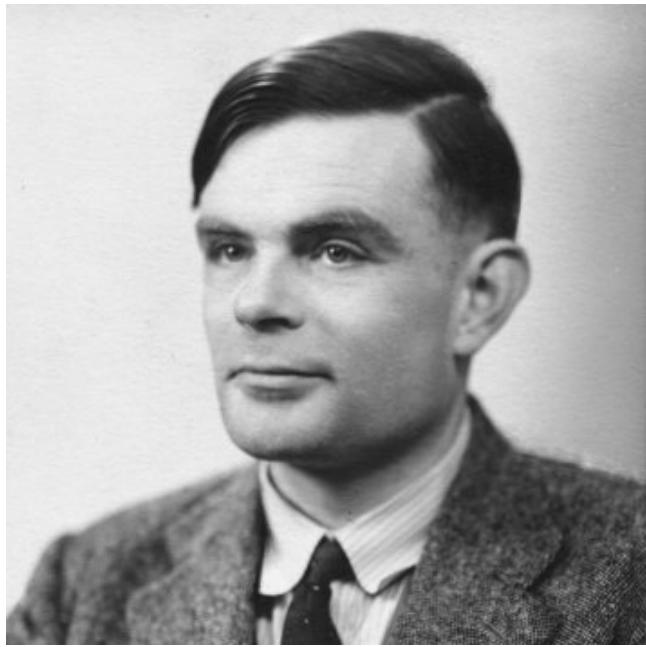
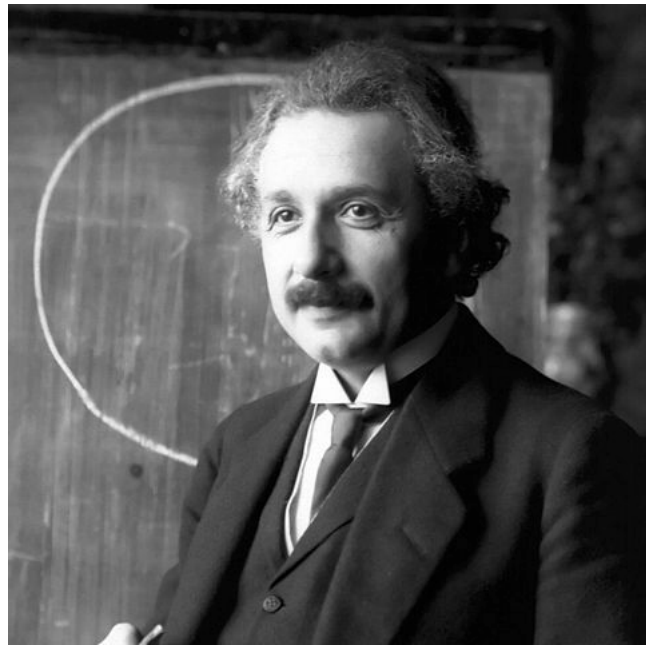






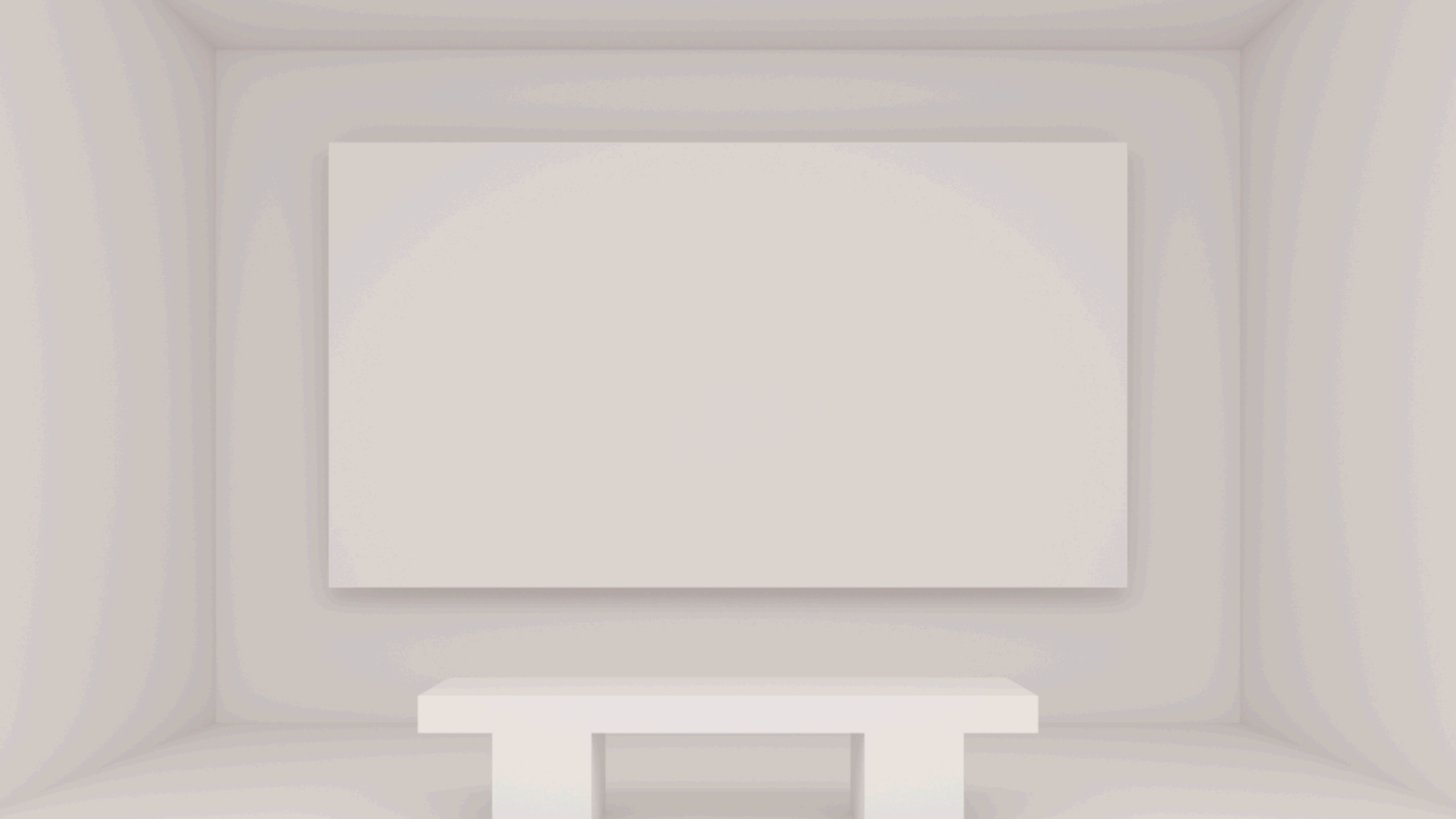
RTFM!

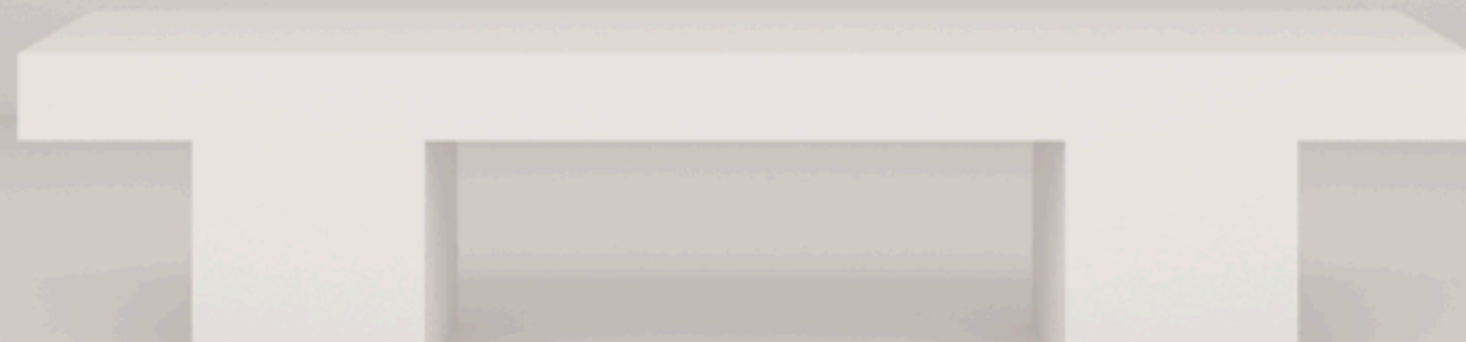
“Stupid Users”

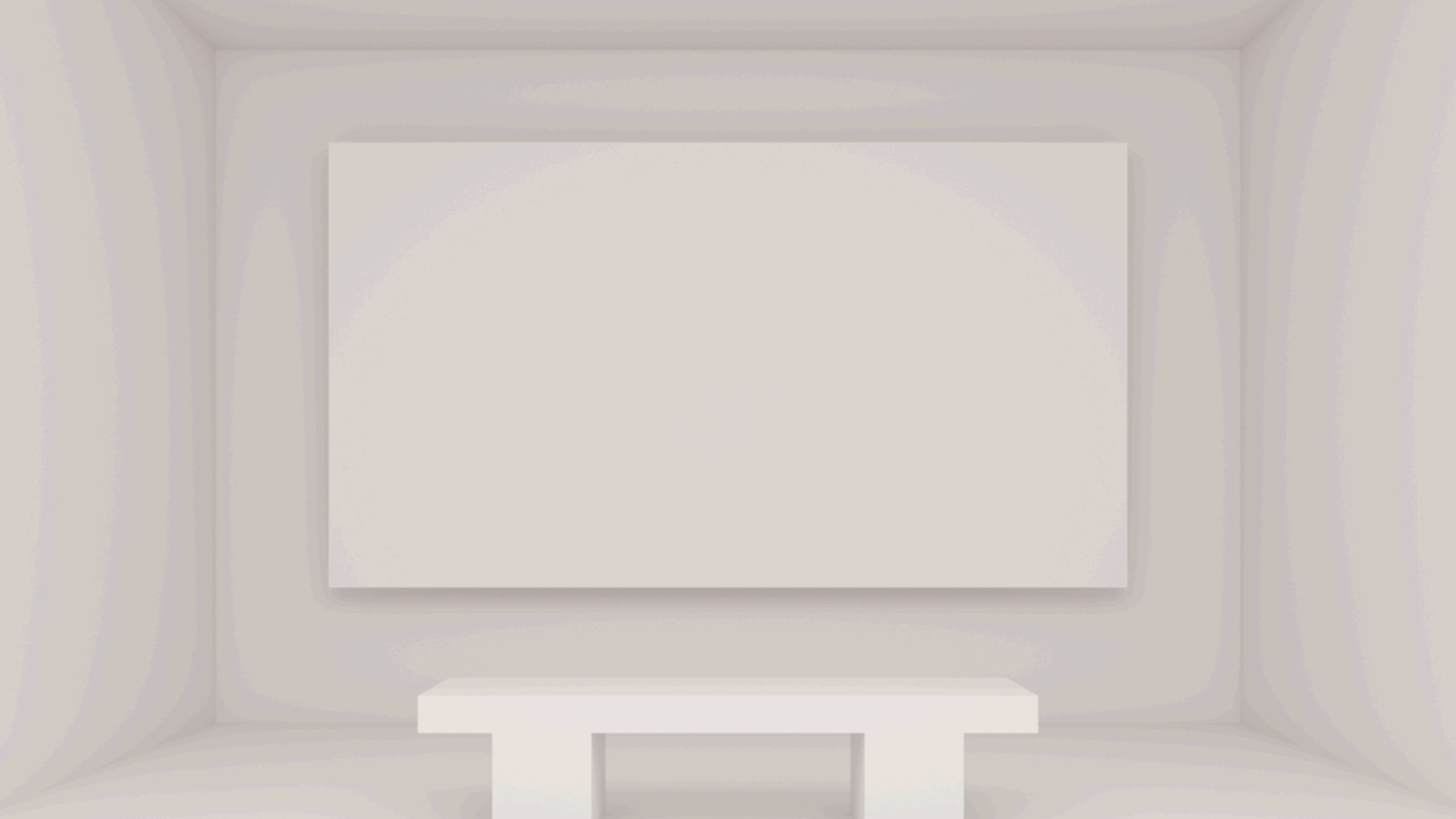


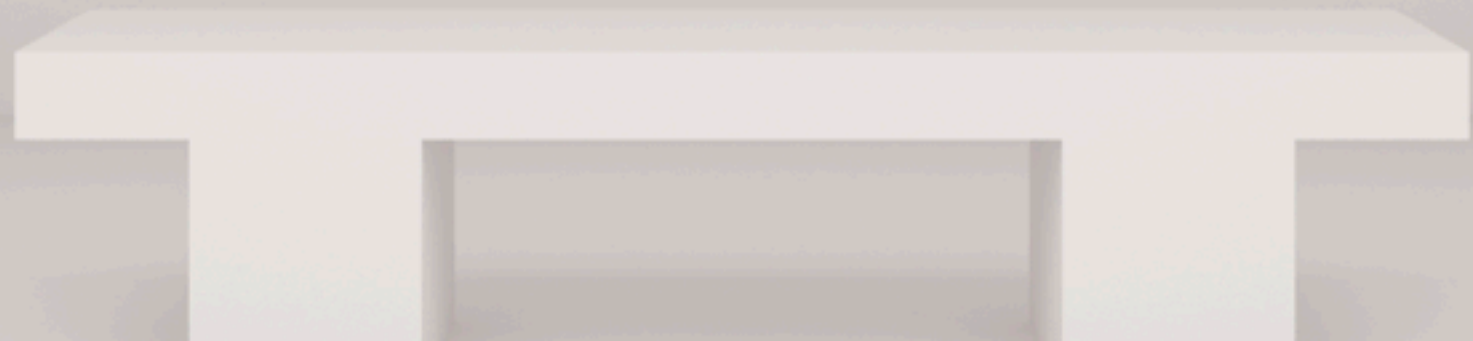


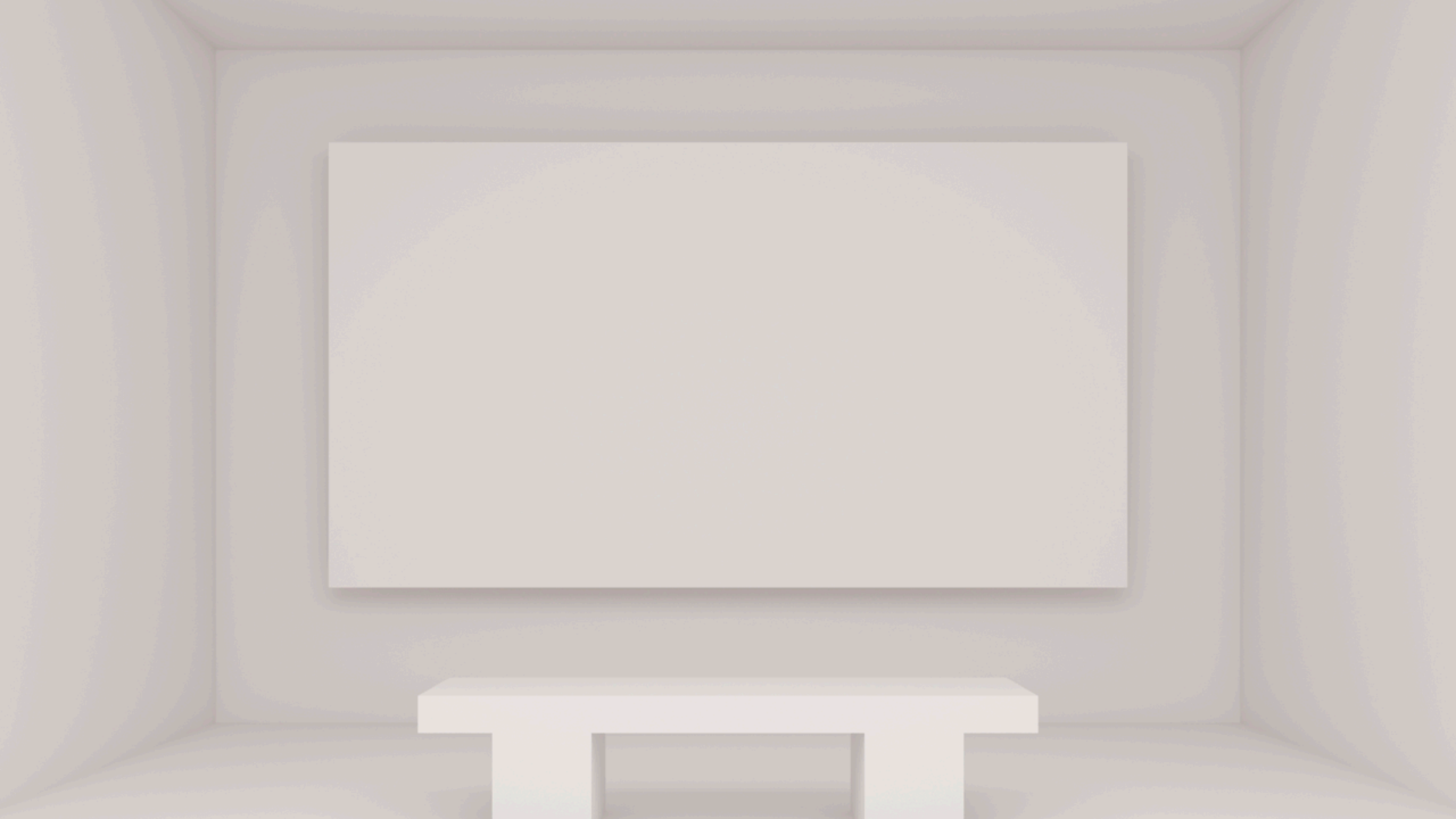




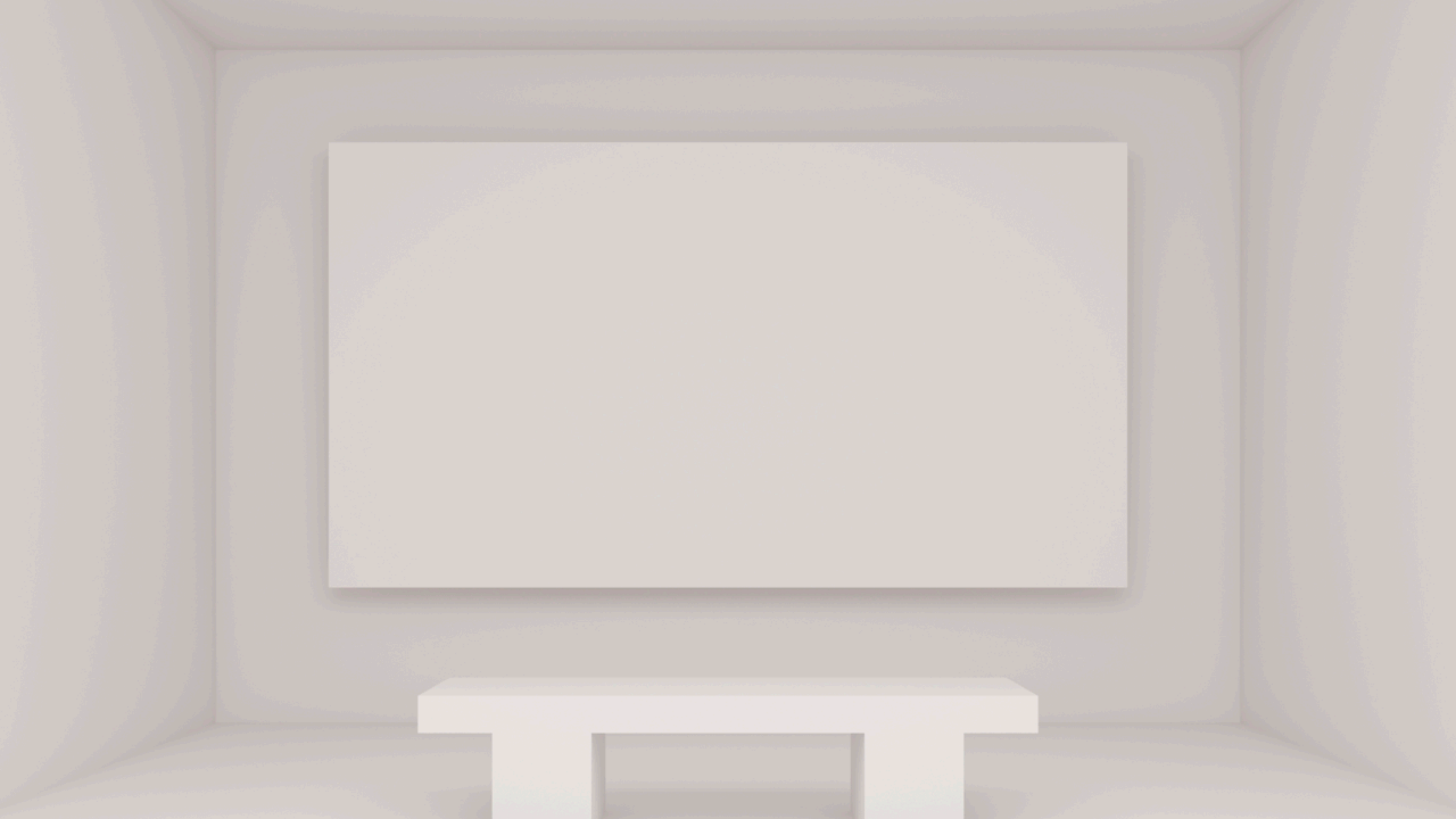


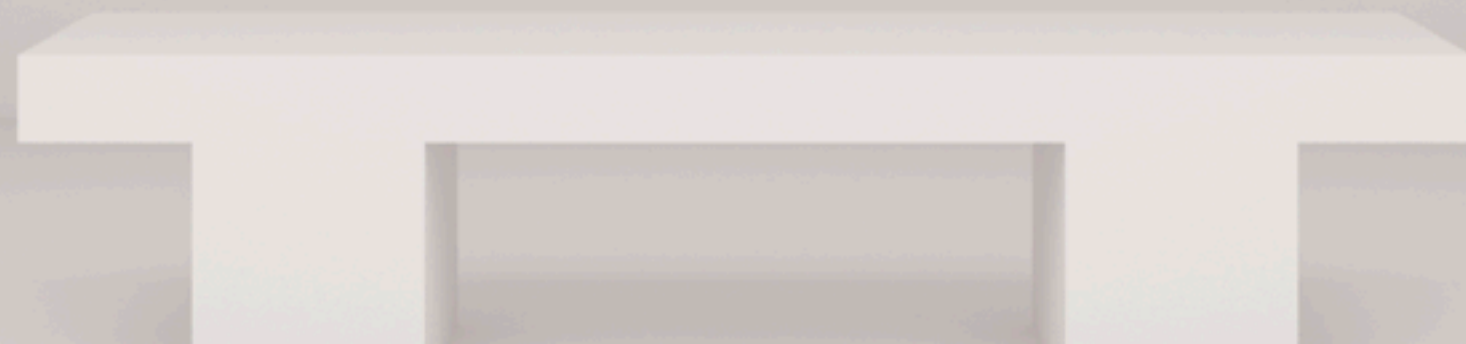
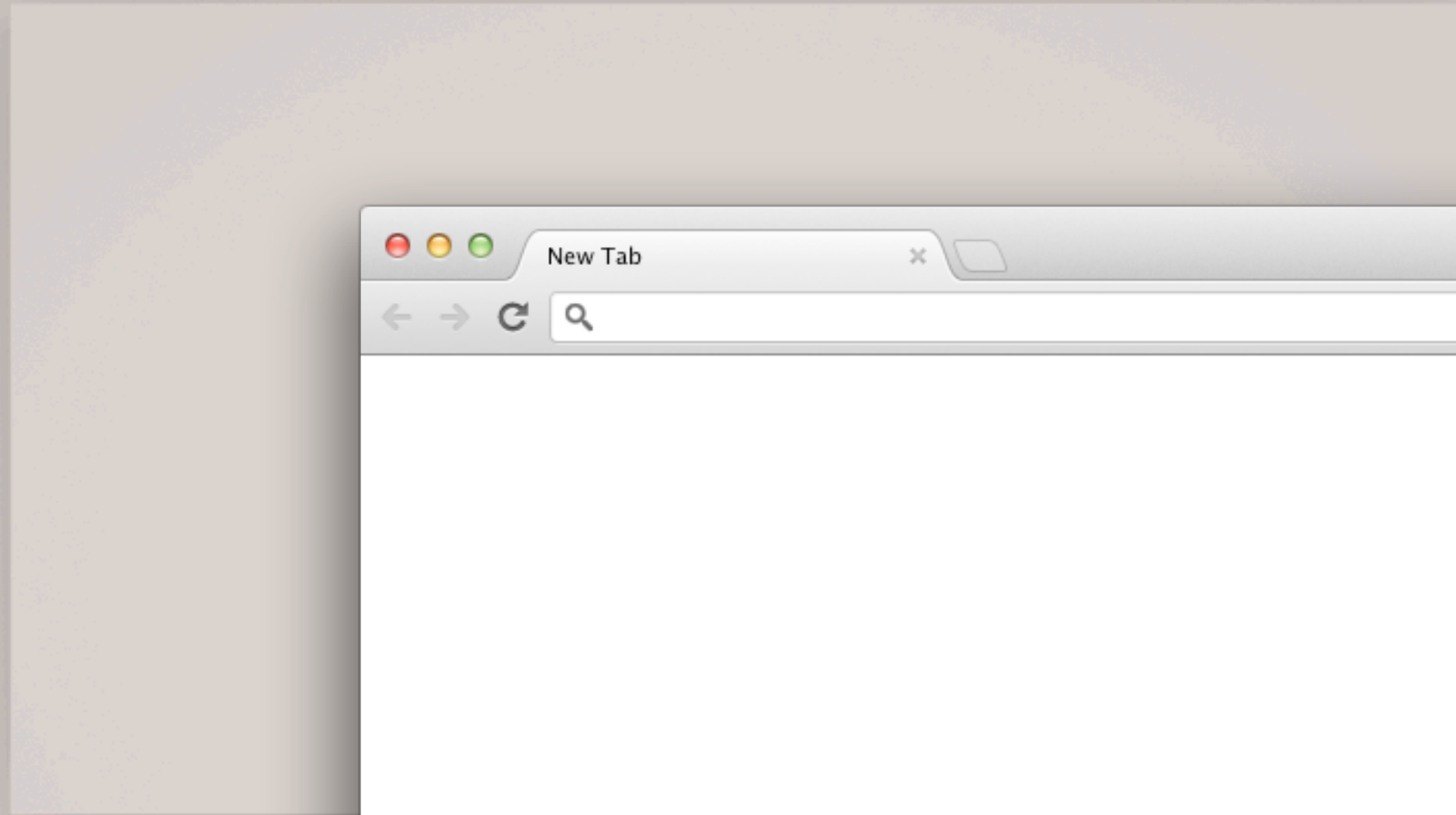




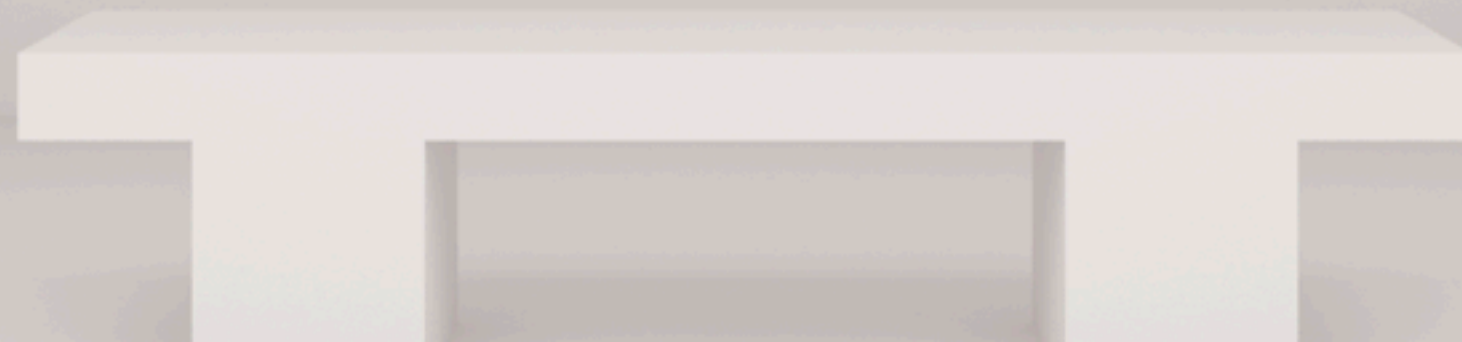
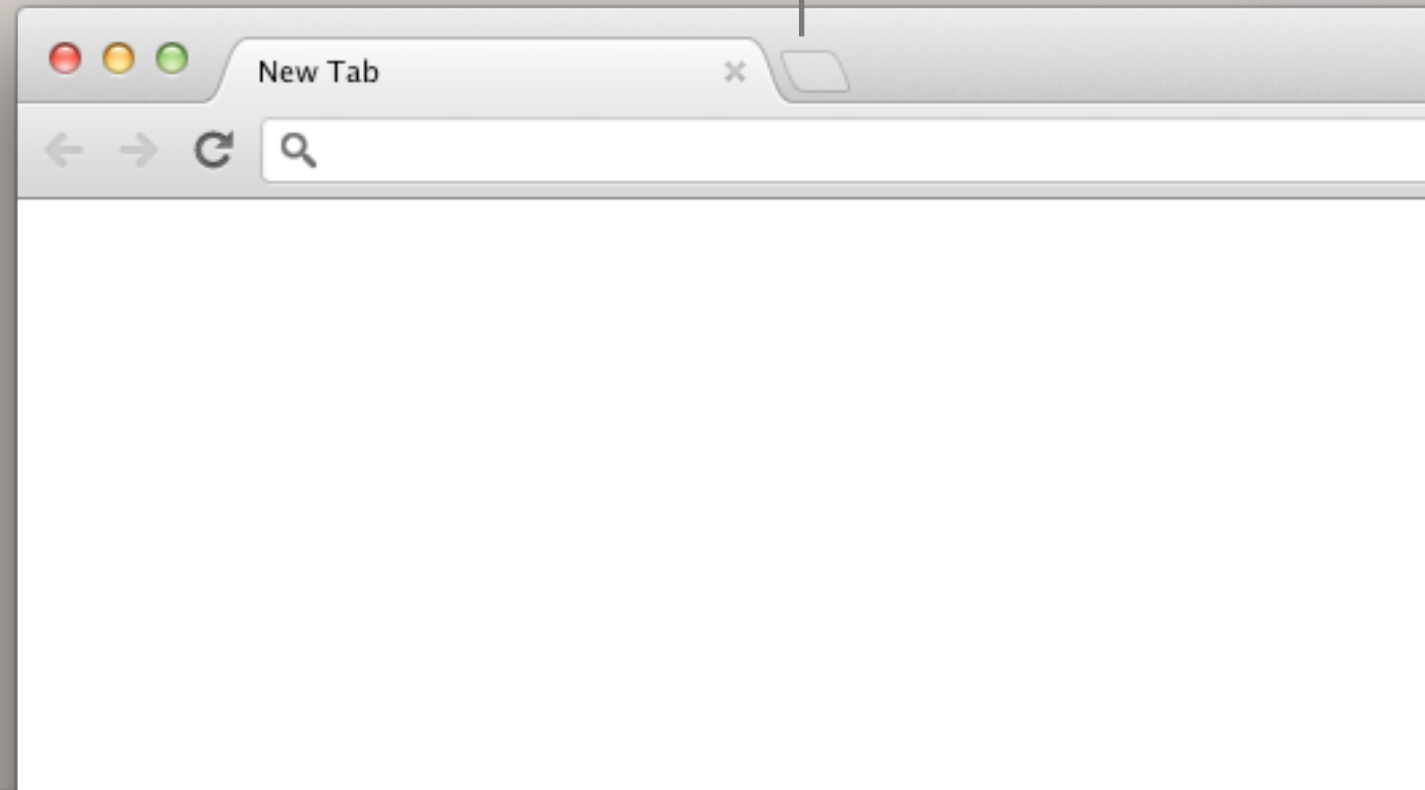


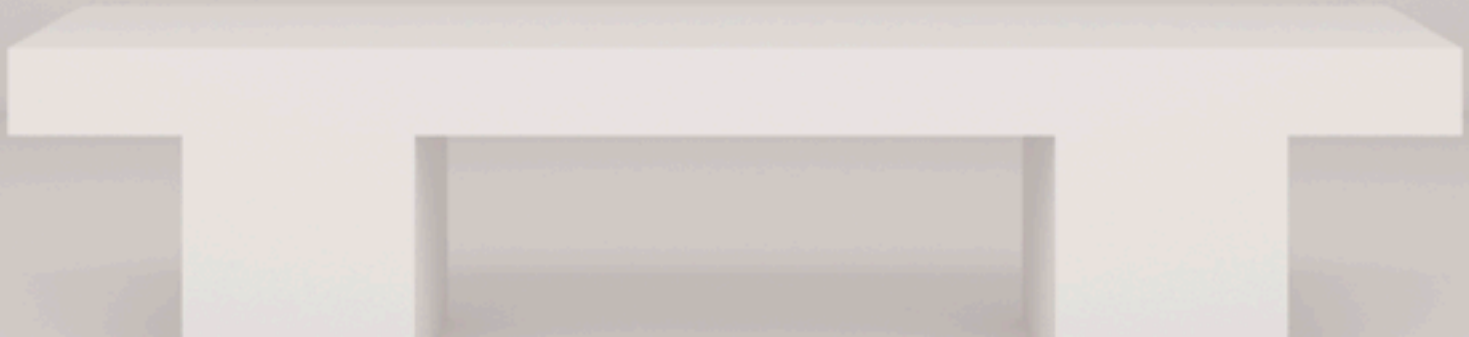
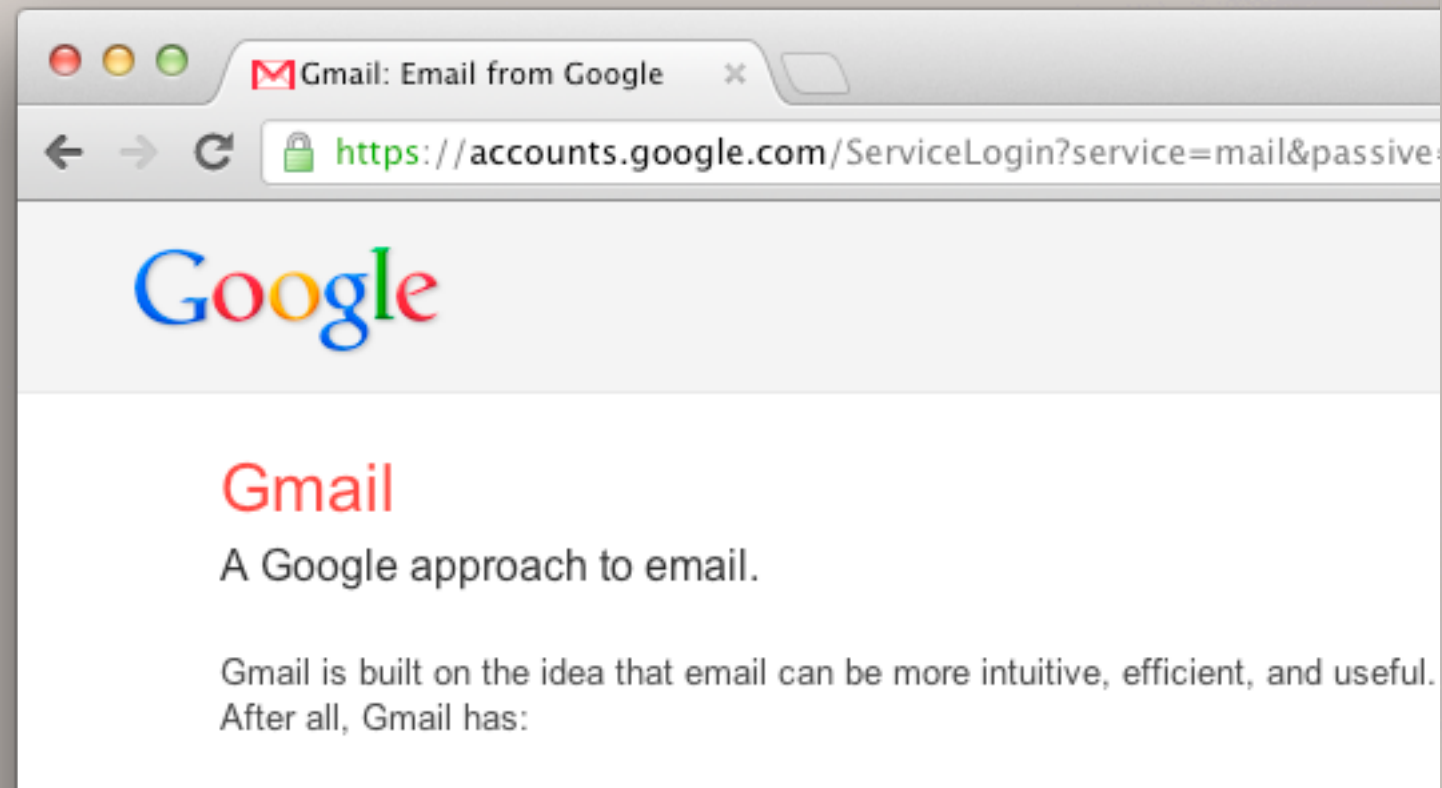




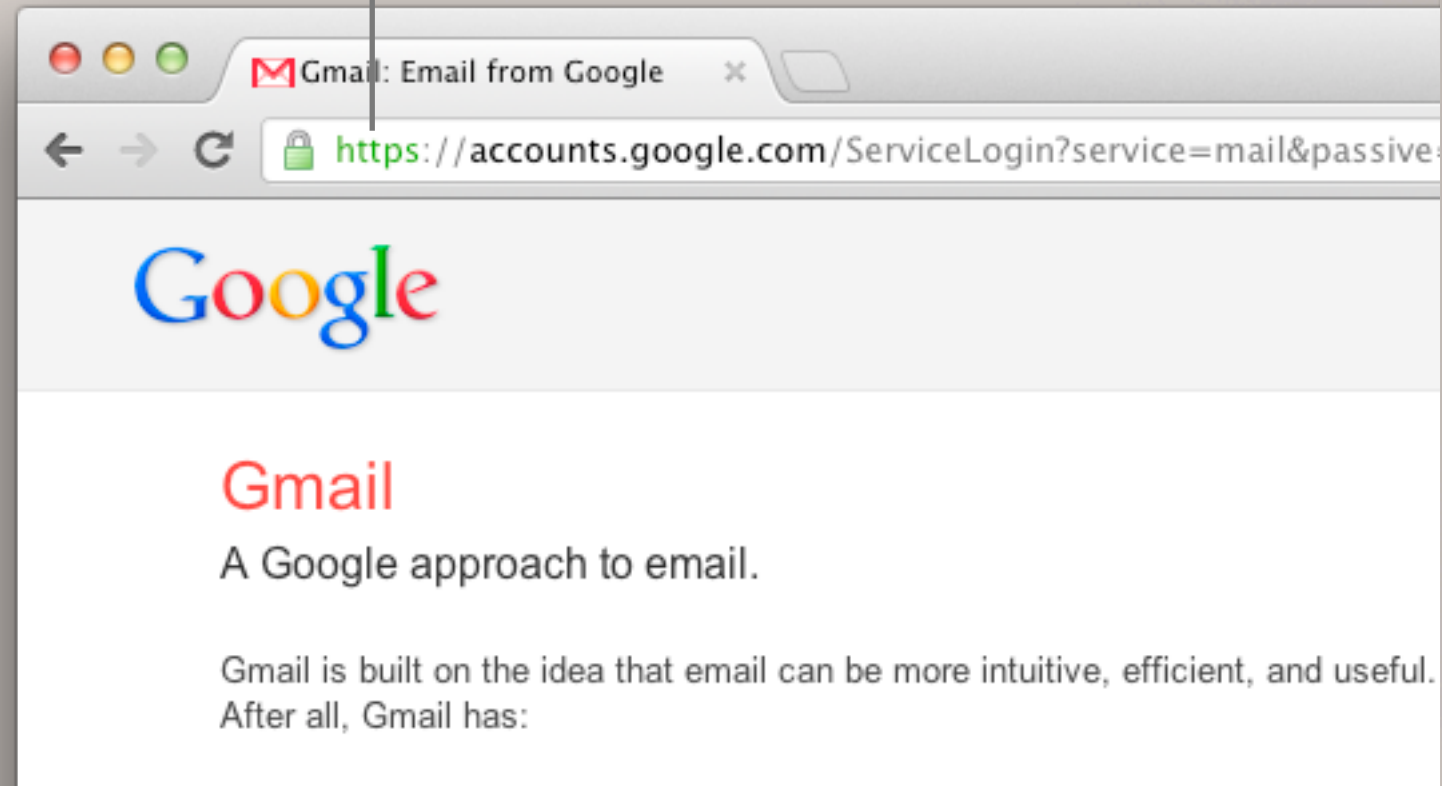


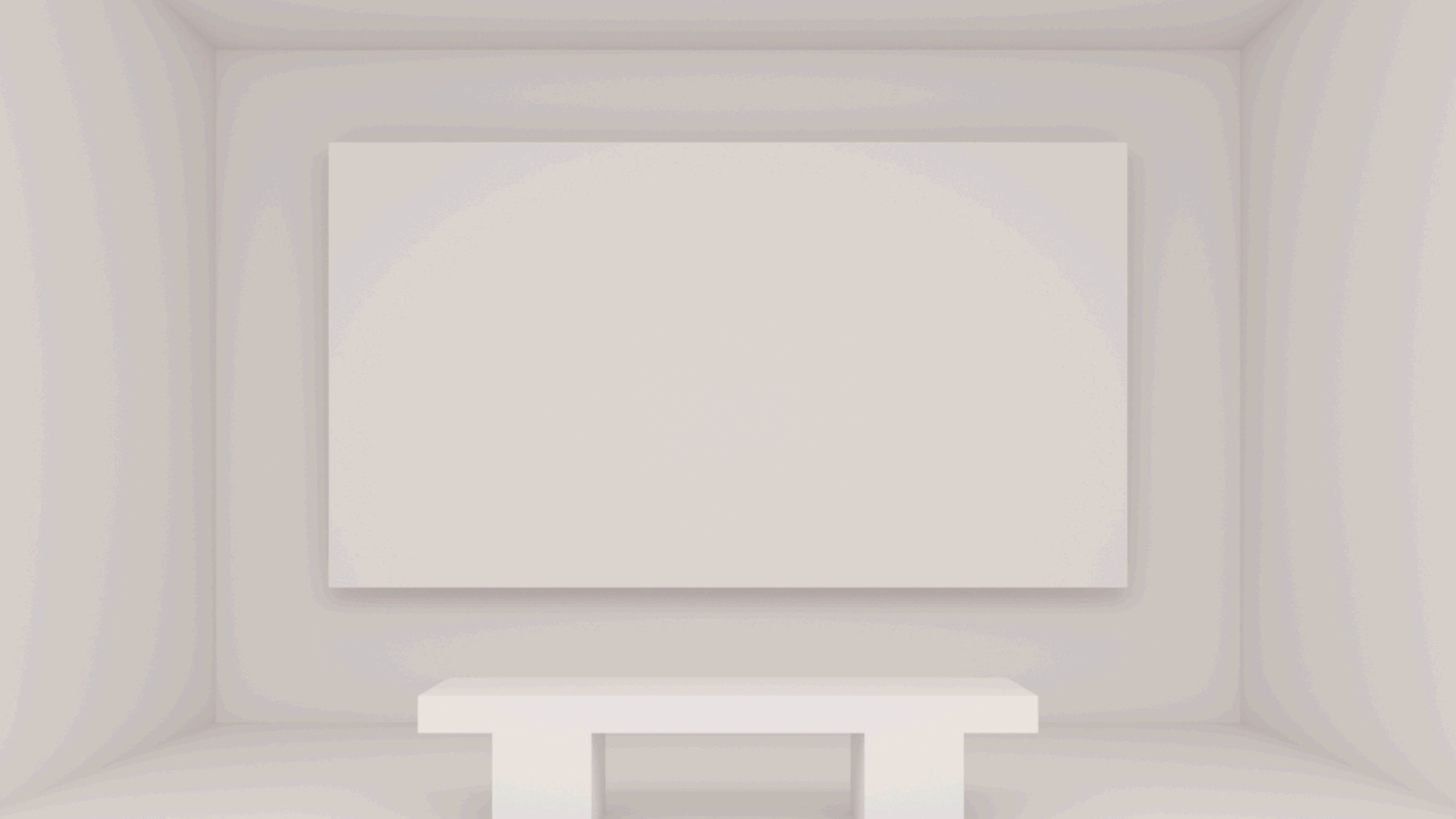
What does this button do?





What does https stand for?









What does this app do?

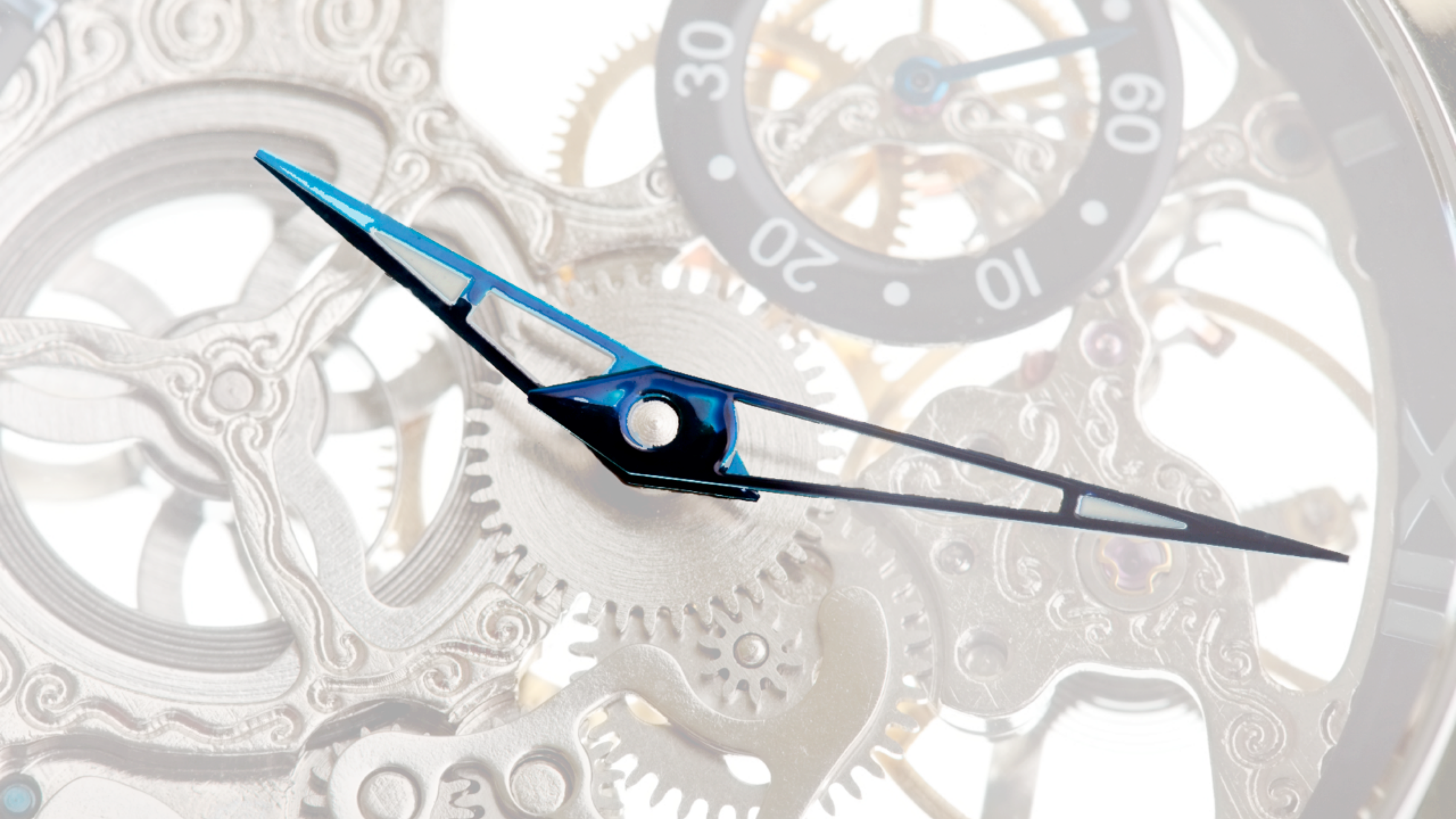
**Success has to do with
access to information,
not intelligence**

**What if you don't have a
testing facility?**

...short term amnesia

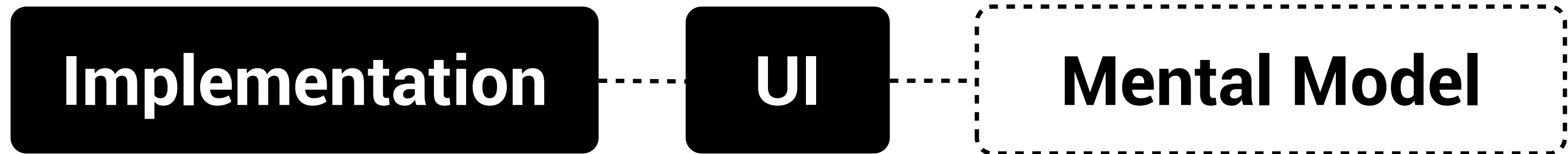


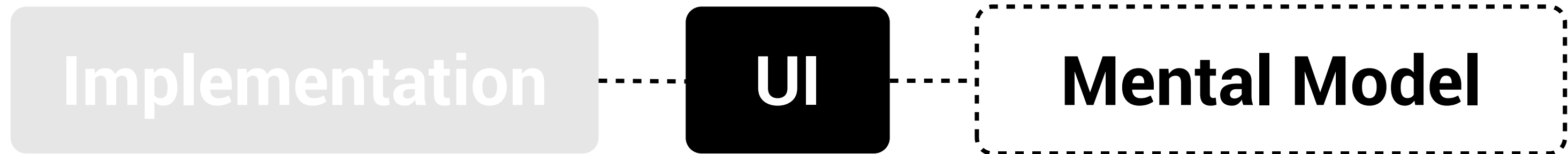




A close-up photograph of a watch movement, showing various gears and components. A prominent blue hand is positioned over the number 17 on the dial. The background is a light, faded image of the watch's internal mechanism.

ten seventeen





self DESCRIBING ?

5 ways

1/5

CONSISTENCY

**(works great, kind of
cheating)**

2/4

AFFORDANCES









Normal

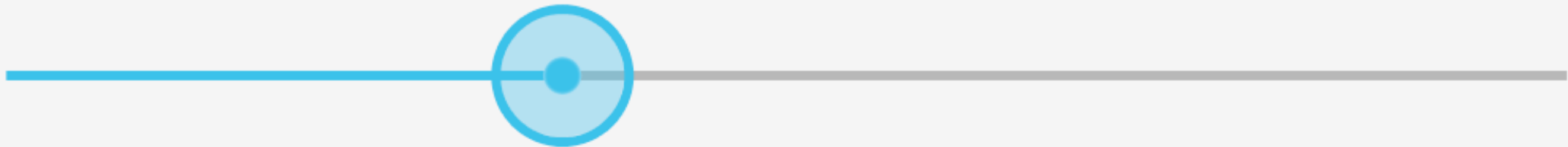


text insertion point



OFF

ON



2/5

AFFORDANCES

**== implied physics from
visual appearance**

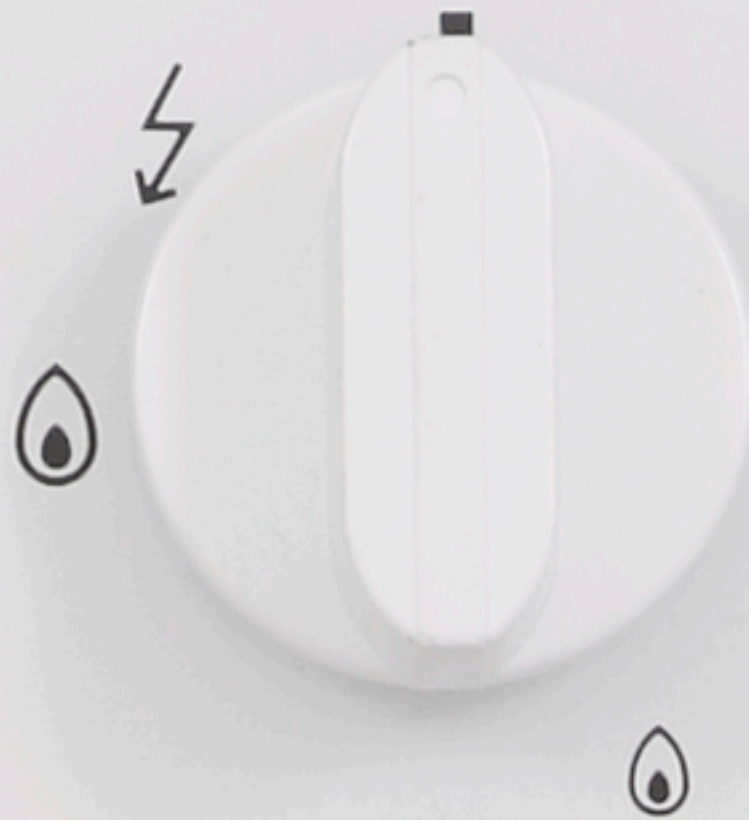
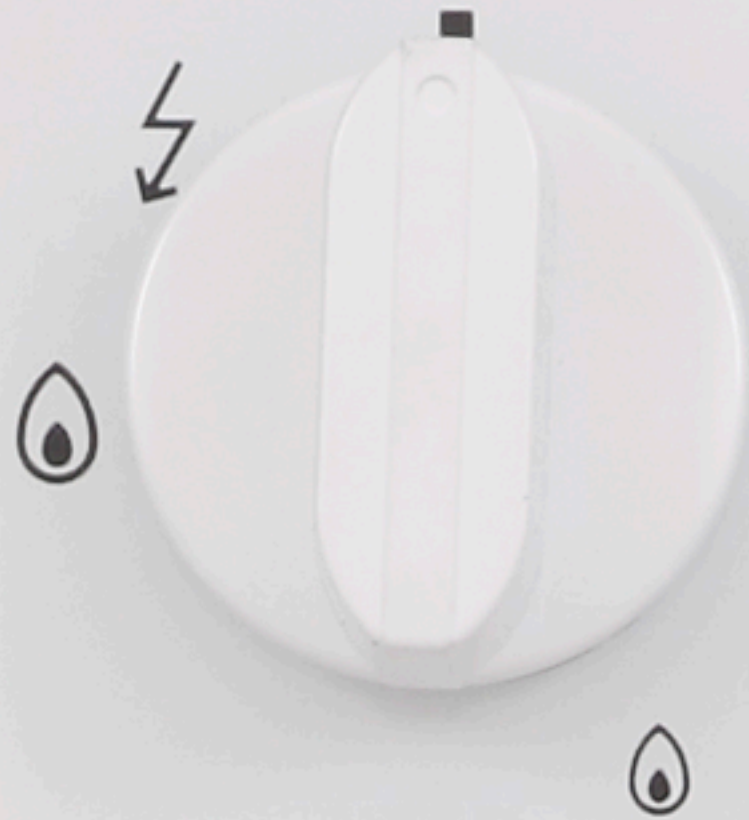
3/5

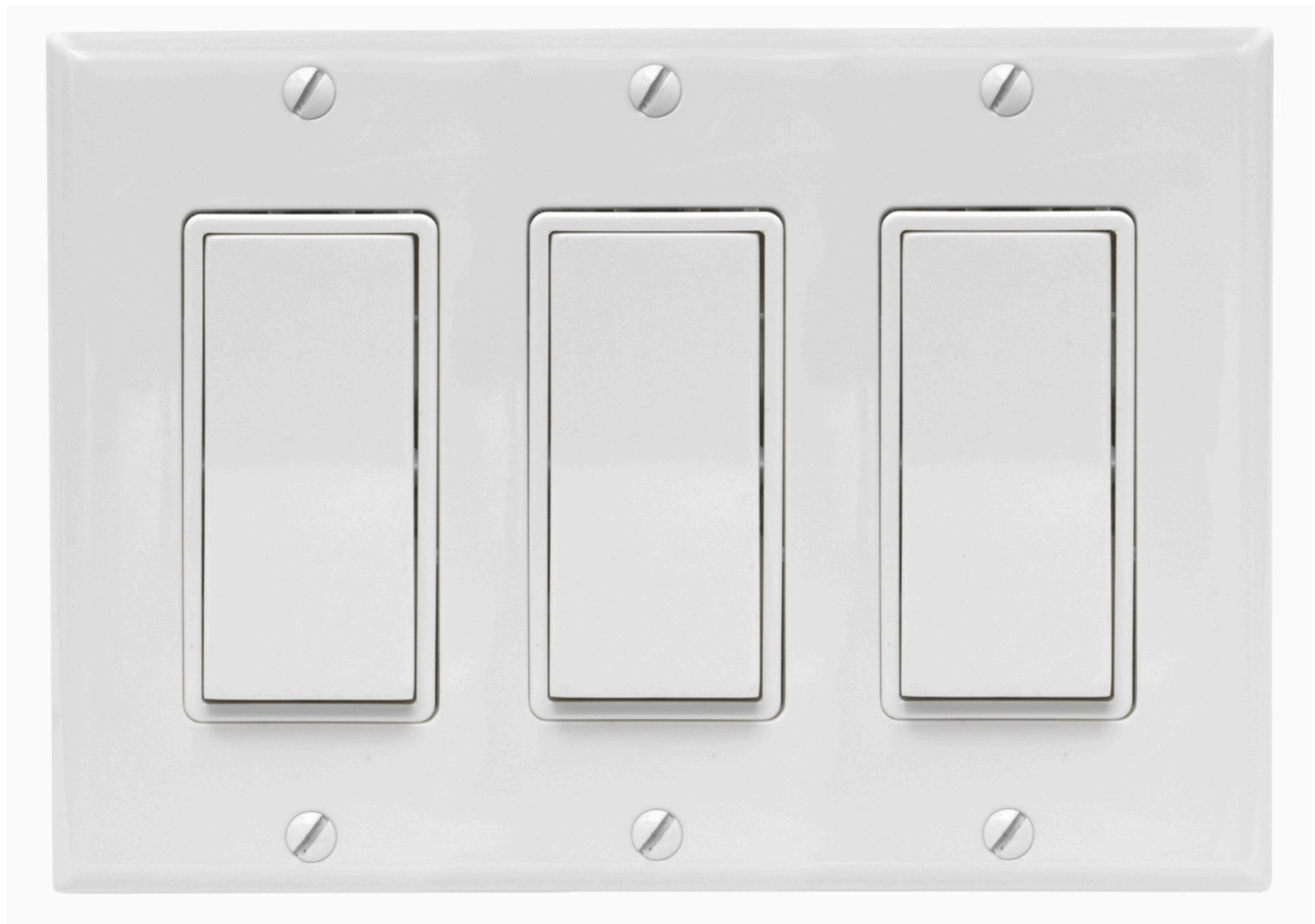
NATURAL MAPPING



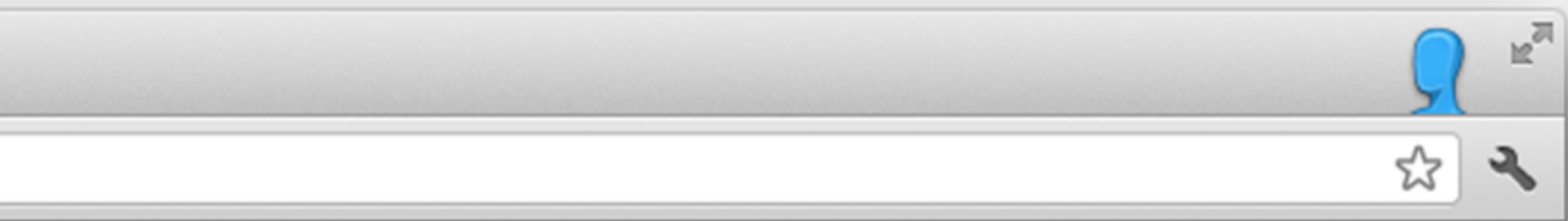


**Writing the manual
directly on your product
is cheating**









3/5

NATURAL MAPPING

**== correctly abstracted
layout**

4/5

DIRECT MANIPULATION

Google

Gmail

Inbox 10

about the dog in your office... - Honey badger

abe, me 2 Oct 18

Bugdroid Halloween costume? - I want to dress like Bugdroid for Halloween! Any idea

Mike Cleron Oct 18

Cool new browser features - Hi Hugo, Have you tried out some of the new browser

Mike, Randall 2 Oct 4

Re: Super Bowl plans? - I'll bring the booze!

Anand Agarawala Feb 13

People

Harry Page

Matias Duarte

Michael Slinger

Mike Cleron



Camera

Gallery





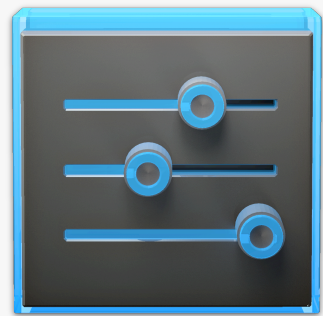
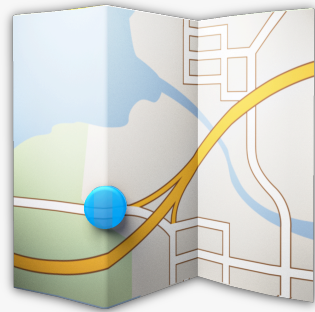
4/5

DIRECT MANIPULATION

**== no abstraction, you act on
the objects themselves**

5/5

METAPHOR





Button



5/5

METAPHOR

== abstract consistency

self DESCRIBING

prevent ERRORS

1/3

MODE ERRORS

2/3

DATA LOSS

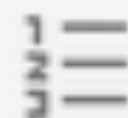


Format Tools Table Help

All changes saved

Normal text | Arial

Every change you make is automatically saved.
Last edit was seconds ago





Calendar
Last synced 6/19/2012 11:59 PM

Contacts
Last synced 6/20/2012 2:59 PM

Currents
Last synced 6/20/2012 2:20 PM

Drive
Last synced 6/20/2012 3:03 PM

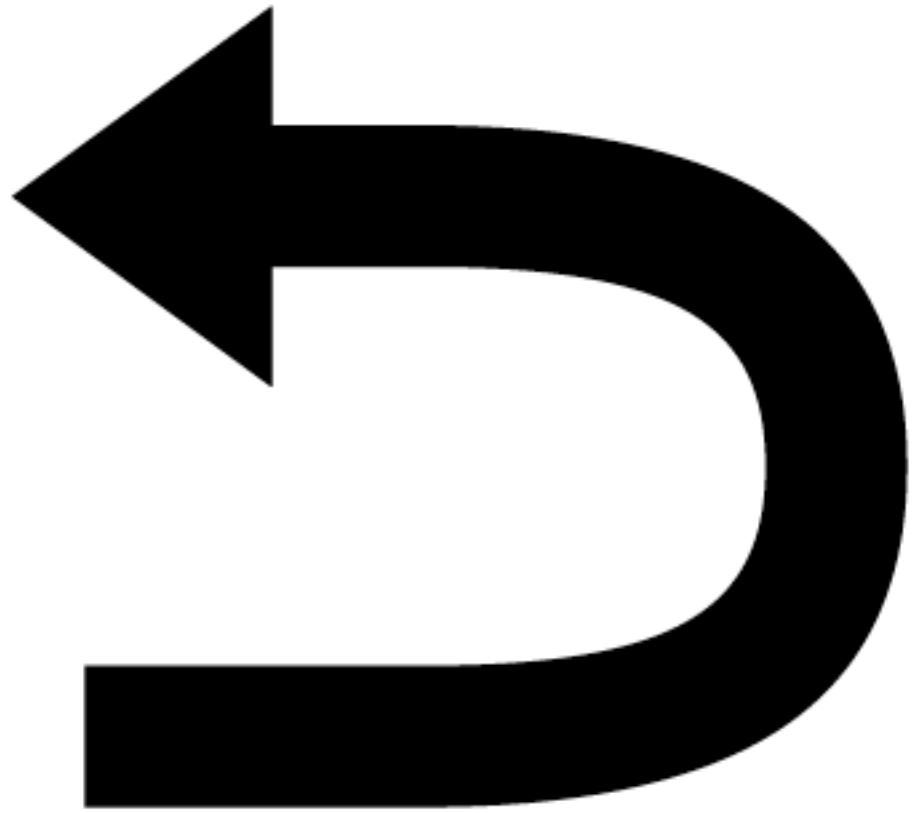
Gmail
Last synced 6/20/2012 3:00 PM

Google Photos
Last synced 6/19/2012 11:58 PM

Google Play Books
Last synced 5/17/2012 3:49 PM

3/3

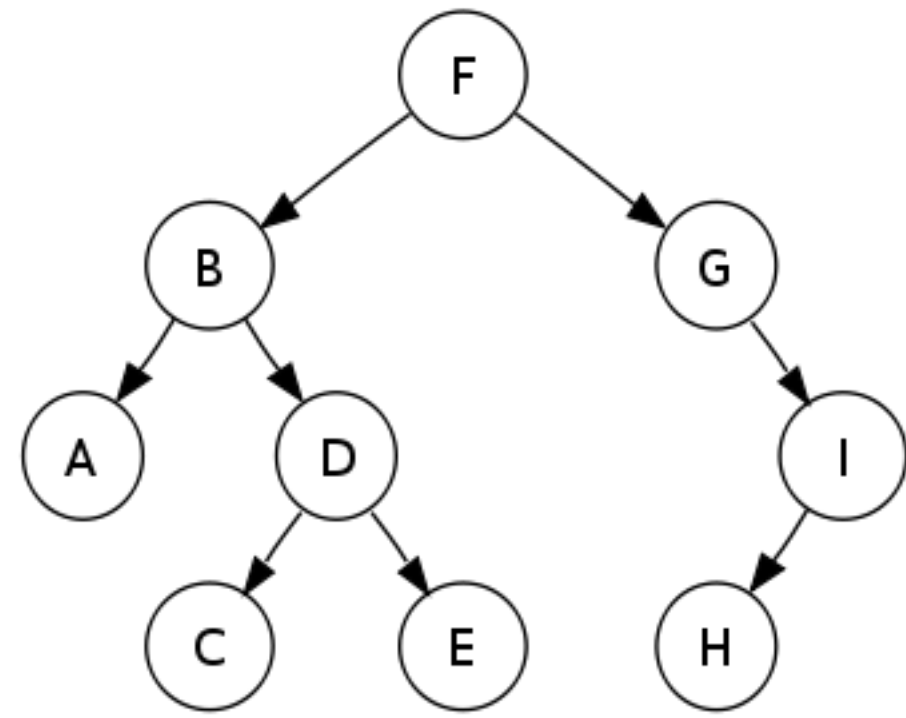
MINOR DATA LOSS

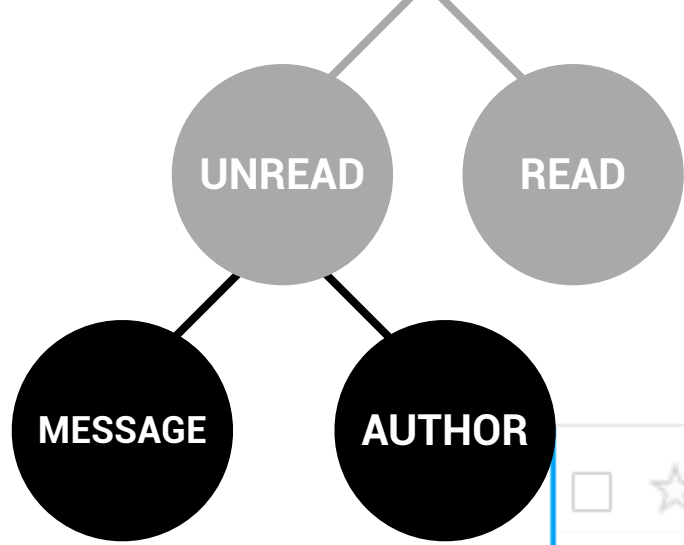


prevent ERRORS

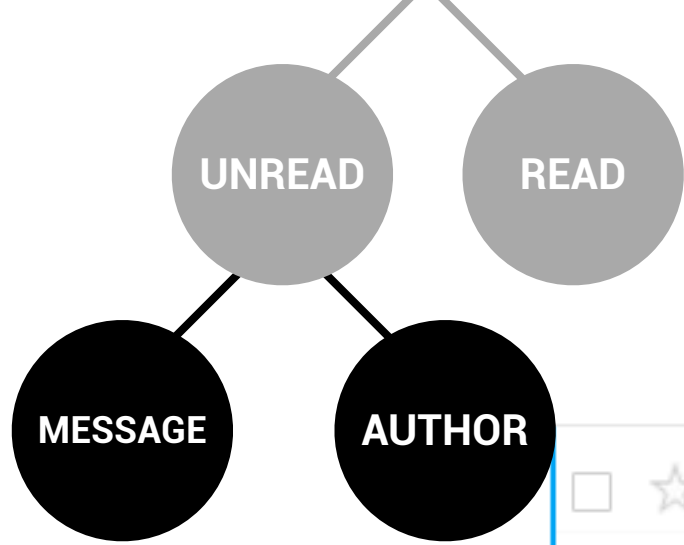
make users FAST

VISUAL HIERARCHY

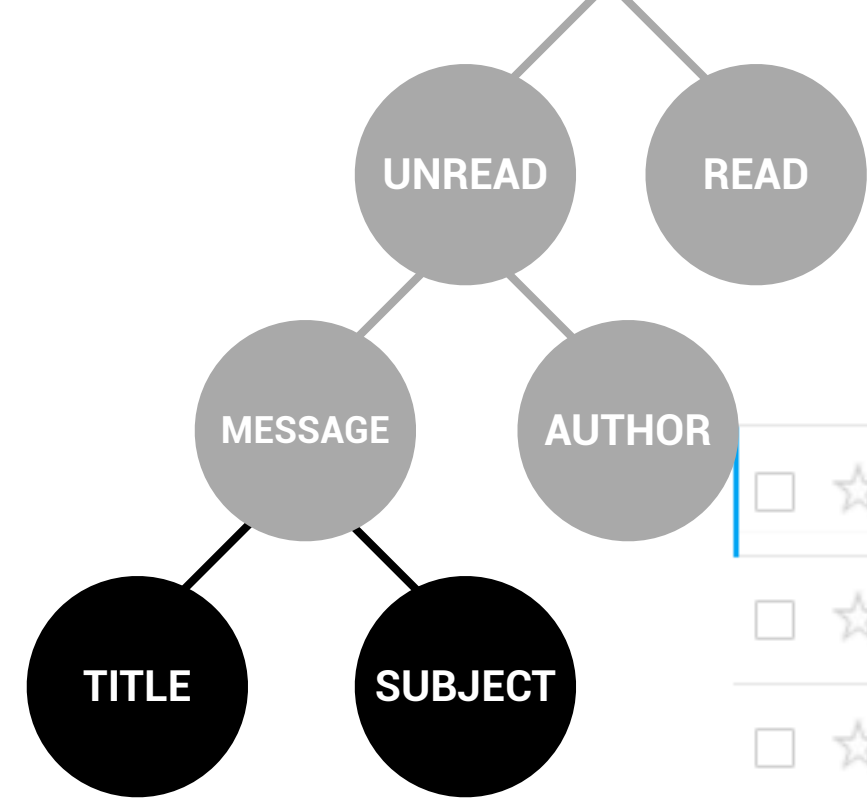




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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Theresa Horrel
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Faye Liberman
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Ruth Sullivan
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Janet Stevens
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Maggie Bartram
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	James Garcia
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Ruth Patton
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Josie Salsbury
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Glenda Figueroa
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Andre Greenwood
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Robert Bradley



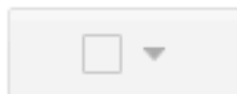
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Theresa Horrel	Duis aute irure dolor
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Ruth Sullivan	Sed do eiusmod tempor incididunt
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Janet Stevens	Ut enim ad minim veniam, ASAP
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Ruth Patton	Excepteur sint occaecat
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Josie Salsbury	Sunt in culpa qui officia deserunt
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Glenda Figueroa	Ad minim veniam
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Andre Greenwood	Nostrud exercitation ullamco
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Robert Bradley	Tempor incididunt



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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Theresa Horrel	Duis aute irure dolor - Consectetur adipisicing elit, sed do eiusmod tempor incididunt ut
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Faye Liberman	Consectetur adipisicing elit - Quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Ruth Sullivan	Sed do eiusmod tempor incididunt - Duis aute irure dolor in reprehenderit in voluptate velit
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Maggie Bartram	Duis aute irure dolor in reprehenderit in voluptate - Email body contents go here
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	James Garcia	Cupidatat non proident - Exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Ruth Patton	Excepteur sint occaecat - occaecat cupidatat non proident, sunt in culpa qui officia deserunt
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Glenda Figueroa	Ad minim veniam - Quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea com
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Gmail ▾



More ▾

COMPOSE

Inbox (1,114)

Starred

Important

Sent Mail

Drafts (1)

All Mail

▶ Circles

! Reciepts

All Family

Archive Spam

Notes

Travel

More ▾



Guy Helt

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Theresa Horrel

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Glenda Figueroa

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Andre Greenwood

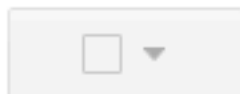
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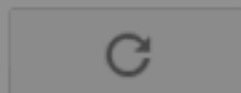


Robert Bradley

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Maggie Bartram

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Robert Bradley

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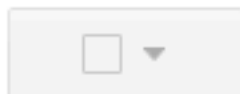
More

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Guy Helt	Lorem ipsum dolor sit amet - Excepteur sint occaecat cupidatat non proident, sunt in culpa
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Theresa Horrel	Duis aute irure dolor - Consectetur adipisicing elit, sed do eiusmod tempor incididunt ut
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Faye Liberman	Consectetur adipisicing elit - Quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Ruth Sullivan	Sed do eiusmod tempor incididunt - Duis aute irure dolor in reprehenderit in voluptate velit
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Janet Stevens	Ut enim ad minim veniam, ASAP - Ut enim ad minim veniam, quis nostrud
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	James Garcia	Cupidatat non proident - Exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat
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note: entirely fictional data



Gmail ▾



More ▾

COMPOSE

Inbox (1,114)

Starred

Important

Sent Mail

Drafts (1)

All Mail

▶ Circles

! Reciepts

All Family

Archive Spam

Notes

Travel

More ▾



Guy Helt

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Theresa Horrel

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Ruth Sullivan

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Janet Stevens

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Maggie Bartram

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James Garcia

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Ruth Patton

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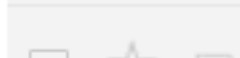
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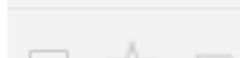
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note: entirely fictional data

Label settings

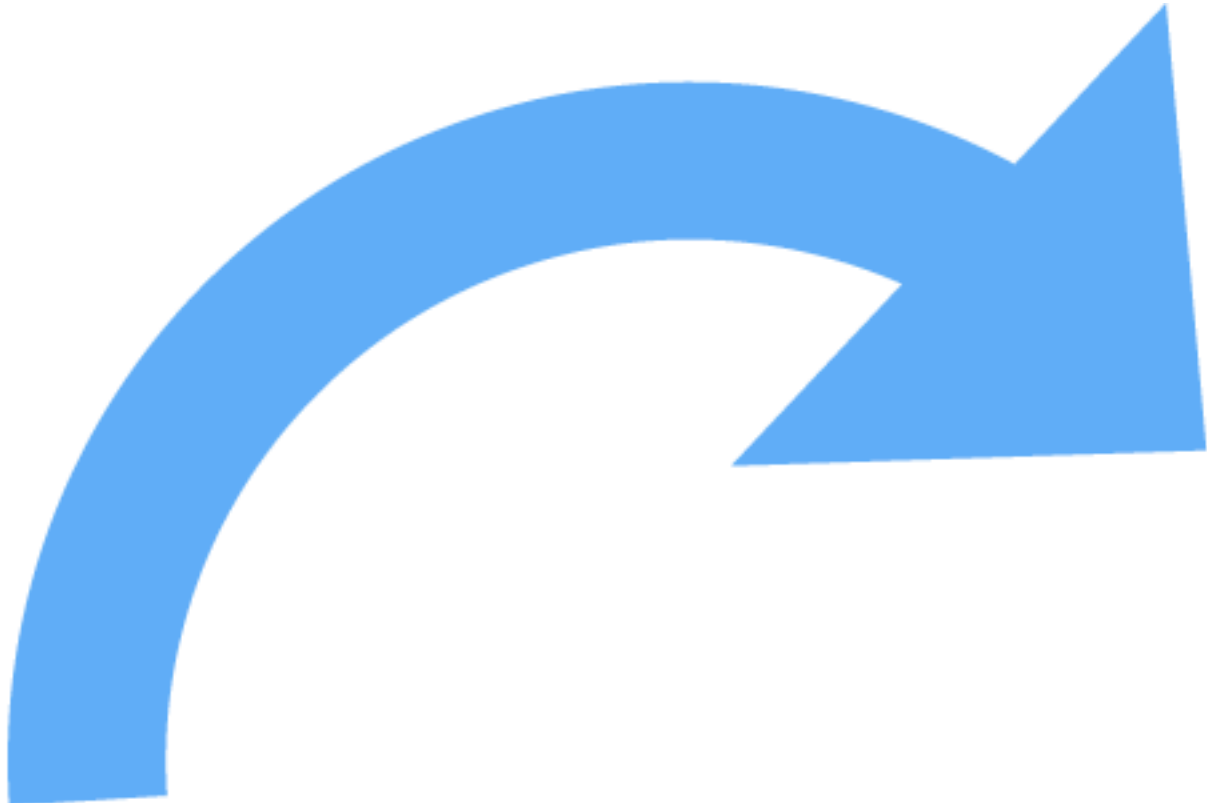
Settings

Help

Send feedback



**visual
hierarchy**



**usage
metrics**



FITTS' LAW

== solve for **time** given
target size and **distance**

$$\text{TIME} = \text{DEVICE LAG} + \text{DEVICE SPEED} \cdot \text{LOG}_2 \left(1 + \frac{\text{DISTANCE}}{\text{TARGET WIDTH}} \right)$$

HICK'S LAW

== solve for **time** given **number of choices** and **probability**

$$\text{TIME} = \frac{\text{HUMAN PROCESSING SPEED}}{\text{LOG}_2 \left(\text{NUMBER OF EQUALLY PROBABLE CHOICES} + 1 \right)}$$

TIME =

$$\text{HUMAN PROCESSING SPEED} \sum_i^N \text{PROBABILITY OF } i \cdot \text{LOG}_2 \left(\frac{1}{\text{PROBABILITY OF } i} + 1 \right)$$

COGNITIVE MODELING

== predicting performance
assuming **highly trained users**



build great interfaces

self **DESCRIBING**

user's mental model:
they simulate the UI in
their head

CONSISTENCY

AFFORDANCES

NATURAL MAPPING

DIRECT MANIPULATION

METAPHOR

prevent **ERRORS**

MODE

DATA LOSS

make users **FAST**

VISUAL HIERARCHY

FITTS' LAW

HICK'S LAW

cognitive modeling:
algorithms to simulate
user efficiency



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Visual Design

Christian Robertson

PEOPLE ARE SMART

THEY JUST DON'T CARE

HOW HARD IS IT?

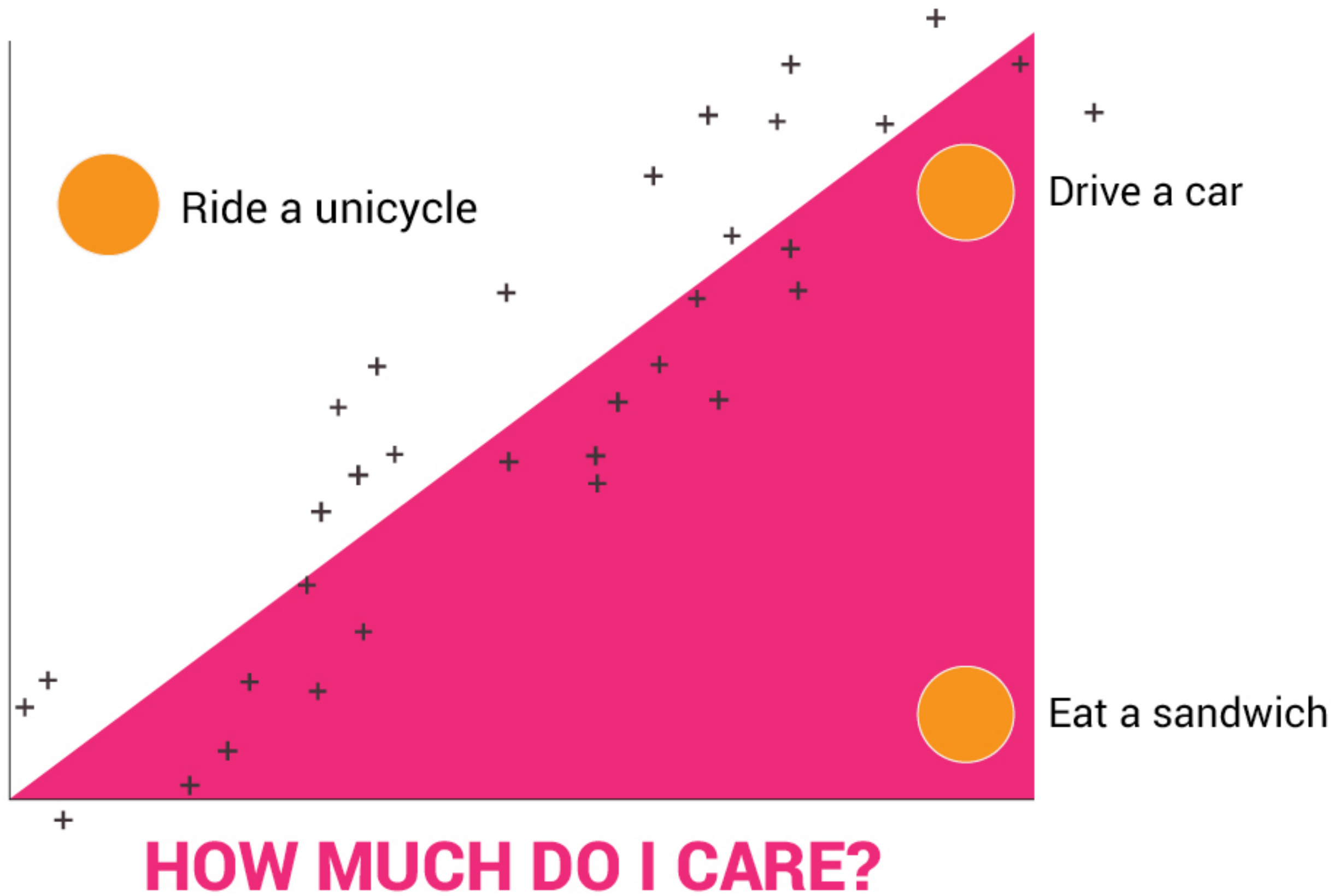


Won't Use

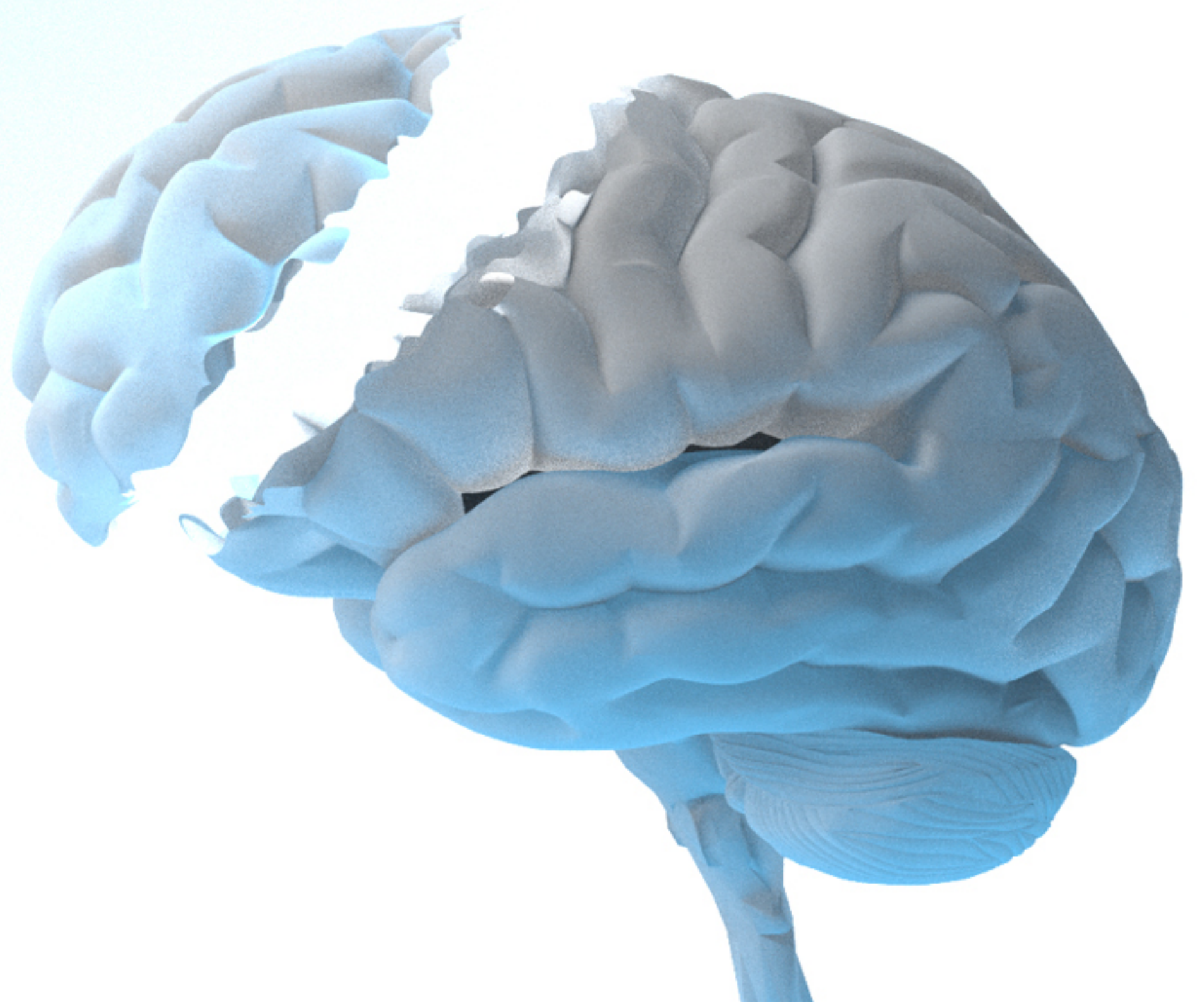
Will Use

HOW MUCH DO I CARE?

HOW HARD IS IT?



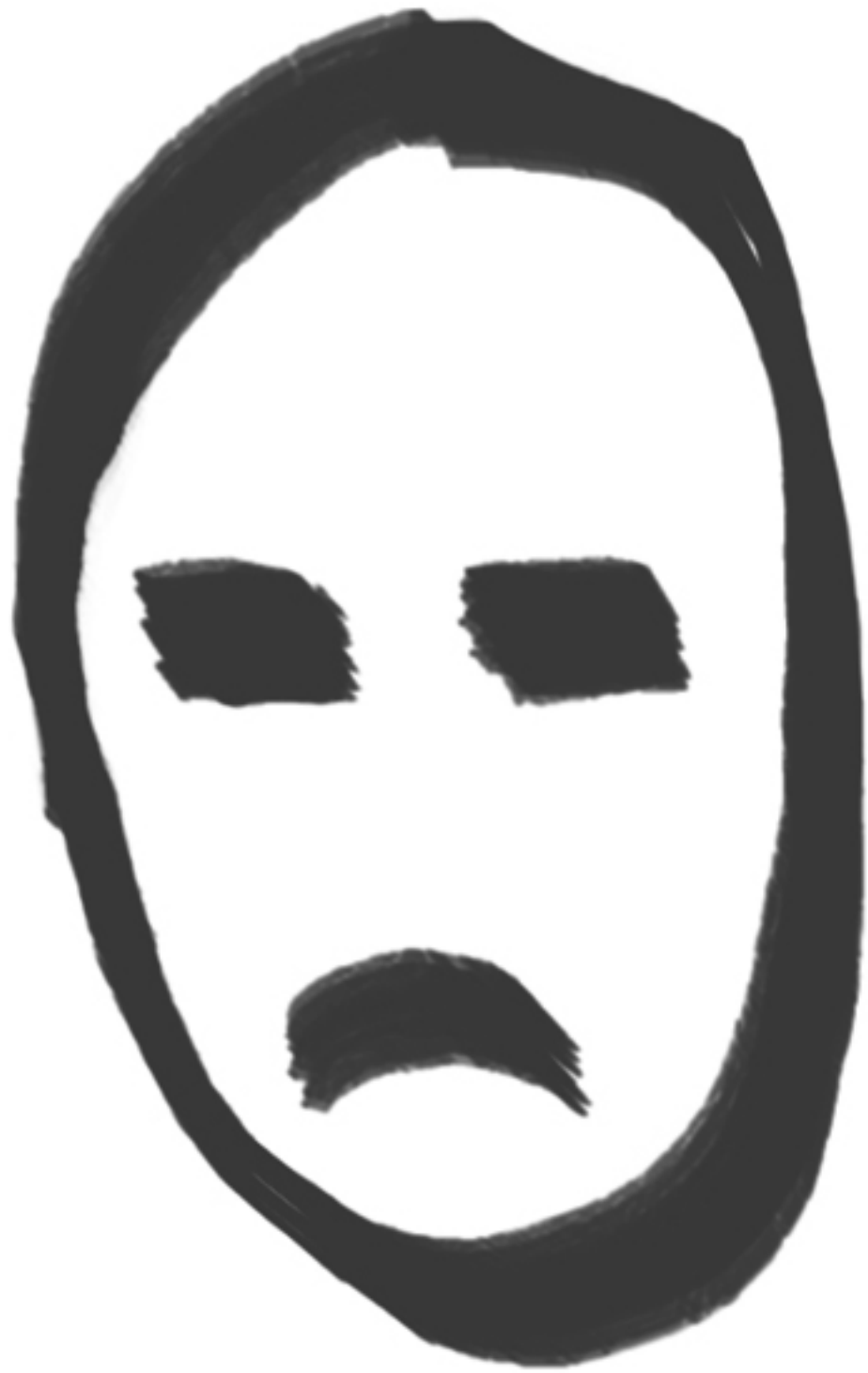
LET'S GET
SUBLIMINAL











**SOMETIMES THE BEST
DESIGN IS INVISIBLE**



INVISIBLE ORDER
(GESTALT)

A

Tapas. Seafood

Roasted Chile Relleno – Roasted poblano chile, three cheese filling with piquillo pepper and goat cheese sauce 10

Queso Fundido – Oaxacan cheese and smoked mushroom fondue, grilled poblano chiles, warm corn tortillas. 11

Hummus – House made hummus, oven roasted Roma tomatoes, EVOO with grilled olive bread 8.5

Wild Mushroom Empanadas (3) – With manchego cheese and truffle oil

Potato Gratin – Layered potatoes, poblano chiles, spices, parmesan crust

Eggplant Tian – Layered grilled eggplant, piquillo peppers, Manchego cheese, smoked tomato-paprika sauce 9

Brazilian Shrimp & Rice Croquettes - Green rice, rock shrimp, cilantro, green onions, jalapeno pepper, dende oil, jicama and green apple salad

Octopus – Warm salad of marinated octopus, potato, mint, Moroccan carrots, olives, cherry tomatoes, and lemon-chive olive oil dressing

Ahi Tuna Escabeche – Grilled fresh tuna loin, vegetable escabeche, capers and tuna aioli 12

Fried Calamari – Corn masa crusted with a side of chipotle chile aioli

Roasted Sea Scallops – Fresh sea scallops roasted with shiitake mushrooms, black pepper-soy butter sauce 10

Crab & Shrimp Tostaditos – Crisp tortillas topped with fresh crab, shrimp, chipotle aioli, guacamole and crema 9.5

Sizzling Shrimp – “Mojo de Ajo”, EVOO, garlic, chile arbol, fresh lime

Crisp Fried Rock Shrimp – Spiced fresh rock shrimp, sweet ‘n’ sour chile sauce, marinated jicama 8

Pescado Marbella - Delicate white fish baked in brown butter with preserved lemon, capers, serrano ham, and gremolata 11.5

Serrano ham, marinated shrimp, eggplant piquillo tapenade, stuffed dates, octopus salad Galicia,

Spanish tortilla, marinated carrots and Spanish tuna escabeche, mussels vinaigrette, anchovy tapenade, chicken liver mousse, Spanish deviled egg, Spanish chorizo, Manchego cheese & quince

Mussels– Steamed with saffron, white wine, roasted fennel, garlic, chorizo, and a tomato sauce

B

Tapas

Seafood

Roasted Chile Relleno – Roasted poblano chile, three cheese filling with piquillo pepper and goat cheese sauce 8.5

Queso Fundido – Oaxacan cheese and smoked mushroom fondue, grilled poblano chiles, warm corn tortillas. 9

Hummus – House made hummus, oven roasted Roma tomatoes, EVOO with grilled olive bread 8.5

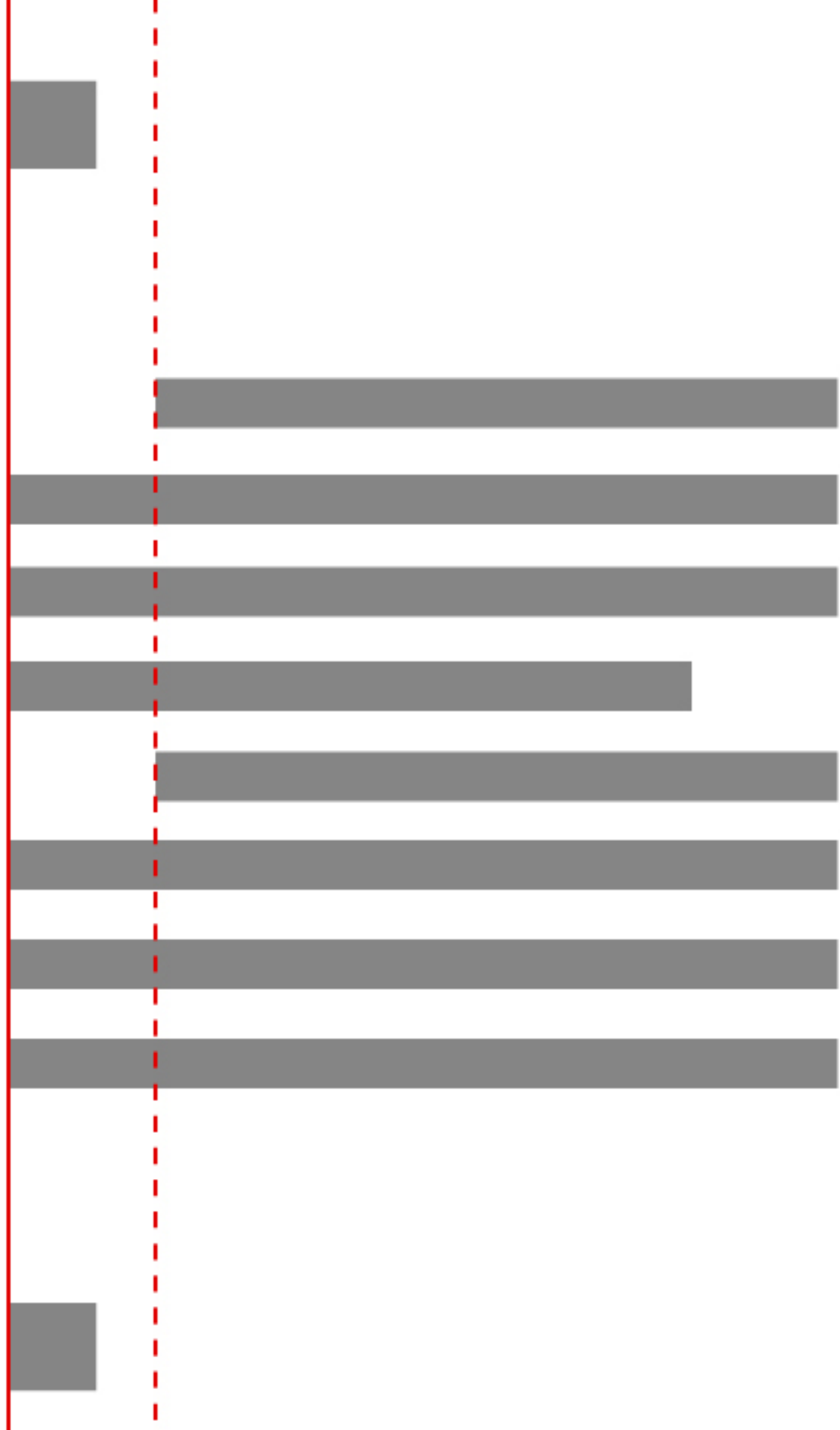
Wild Mushroom Empanadas (3) – With manchego cheese and truffle oil 11

Potato Gratin – Layered potatoes, poblano chiles, spices, parmesan crust 7

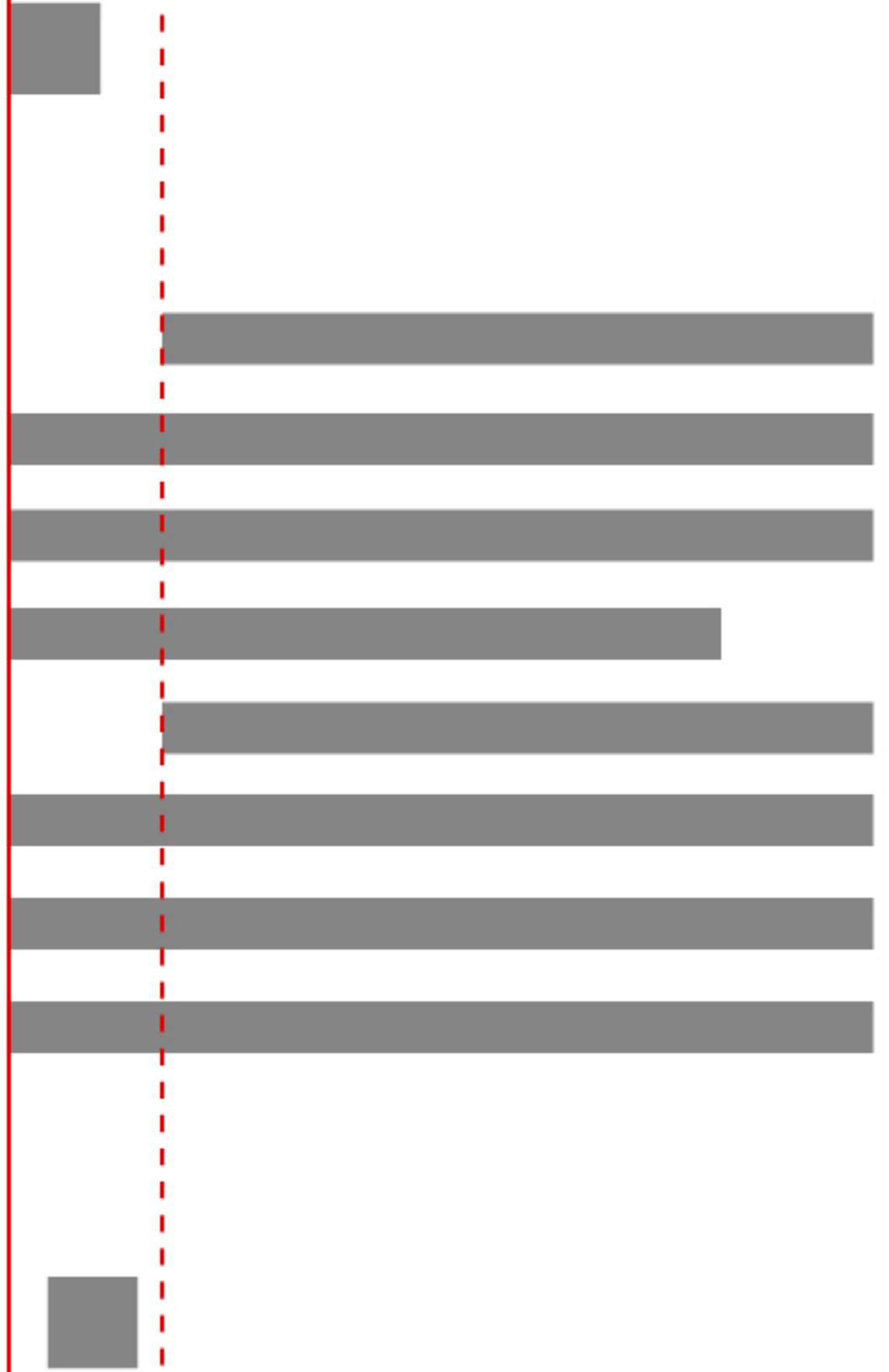
Eggplant Tian – Layered grilled eggplant, piquillo peppers, Manchego cheese, smoked tomato-paprika sauce 9

Brazilian Shrimp & Rice Croquettes - Green rice, rock shrimp, cilantro, green onions, jalapeno pepper, dende oil, jicama and green apple salad 9.5

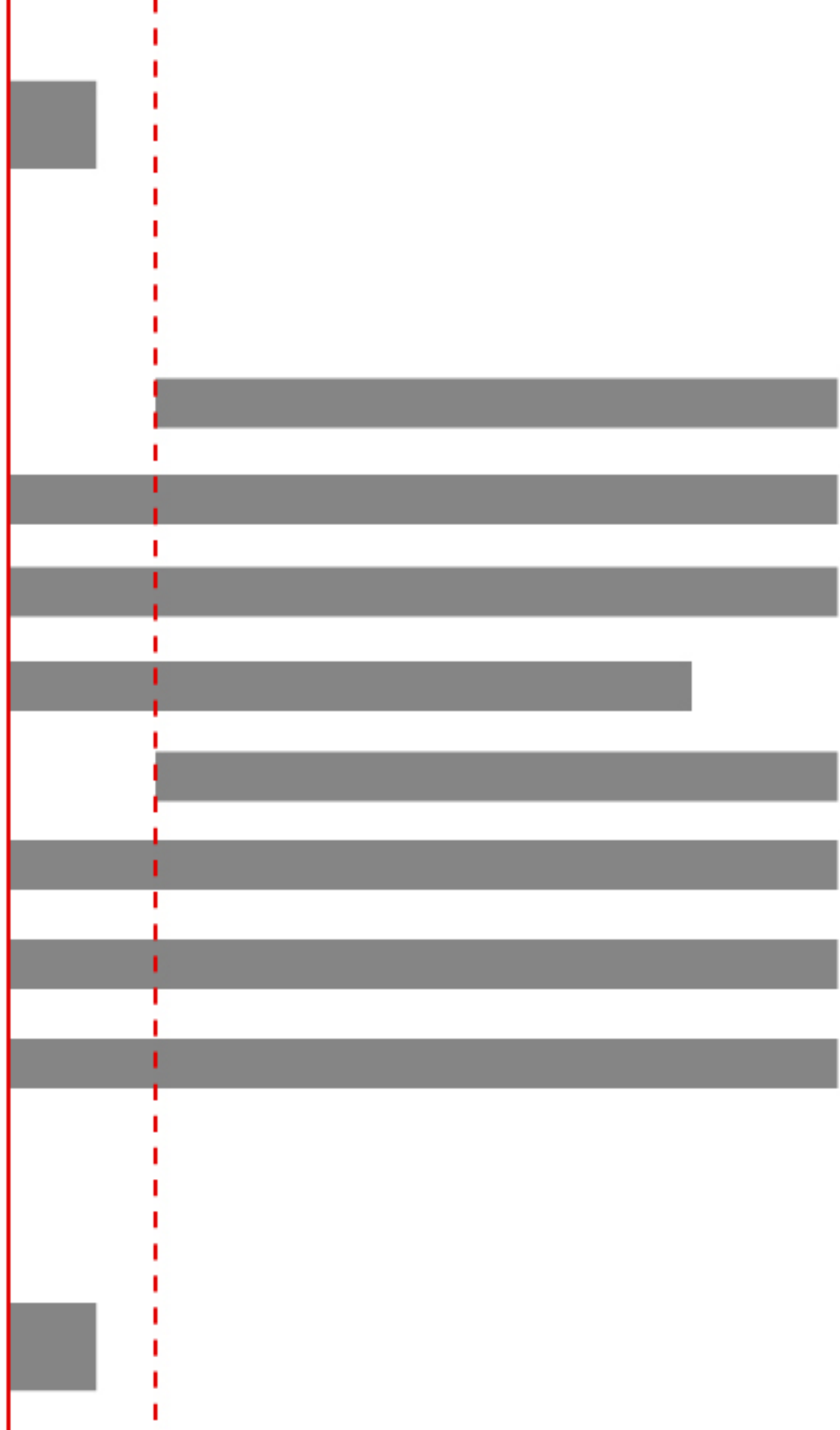
LINE STUFF UP

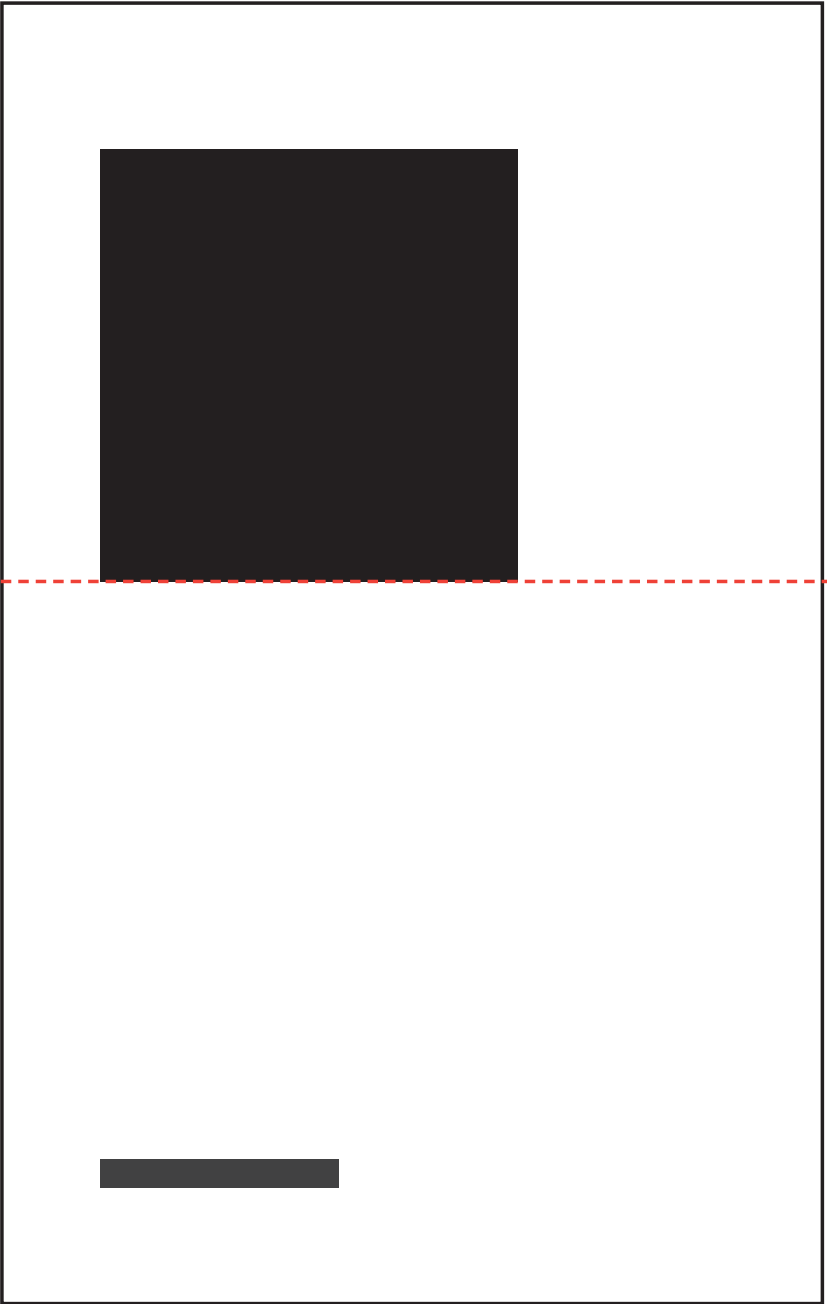
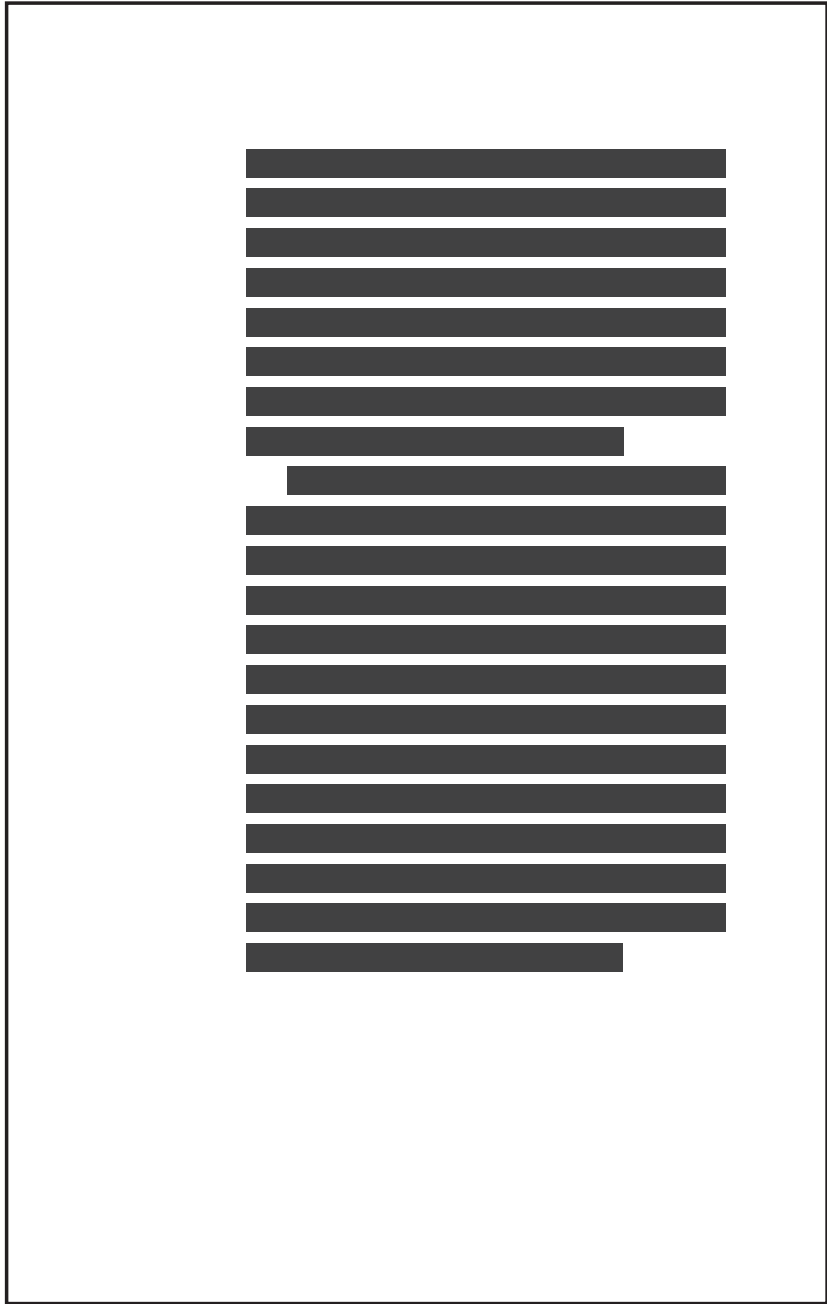
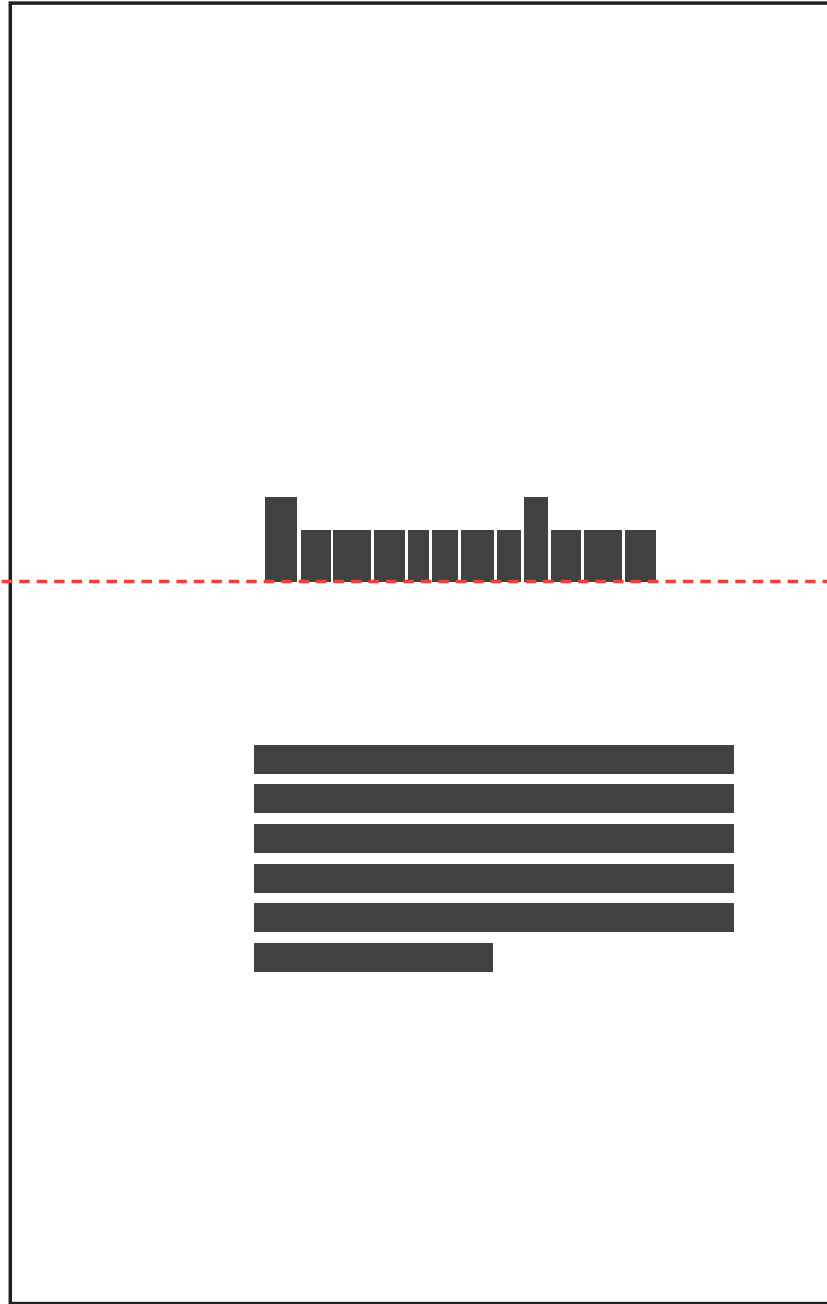


LINE STUFF UP

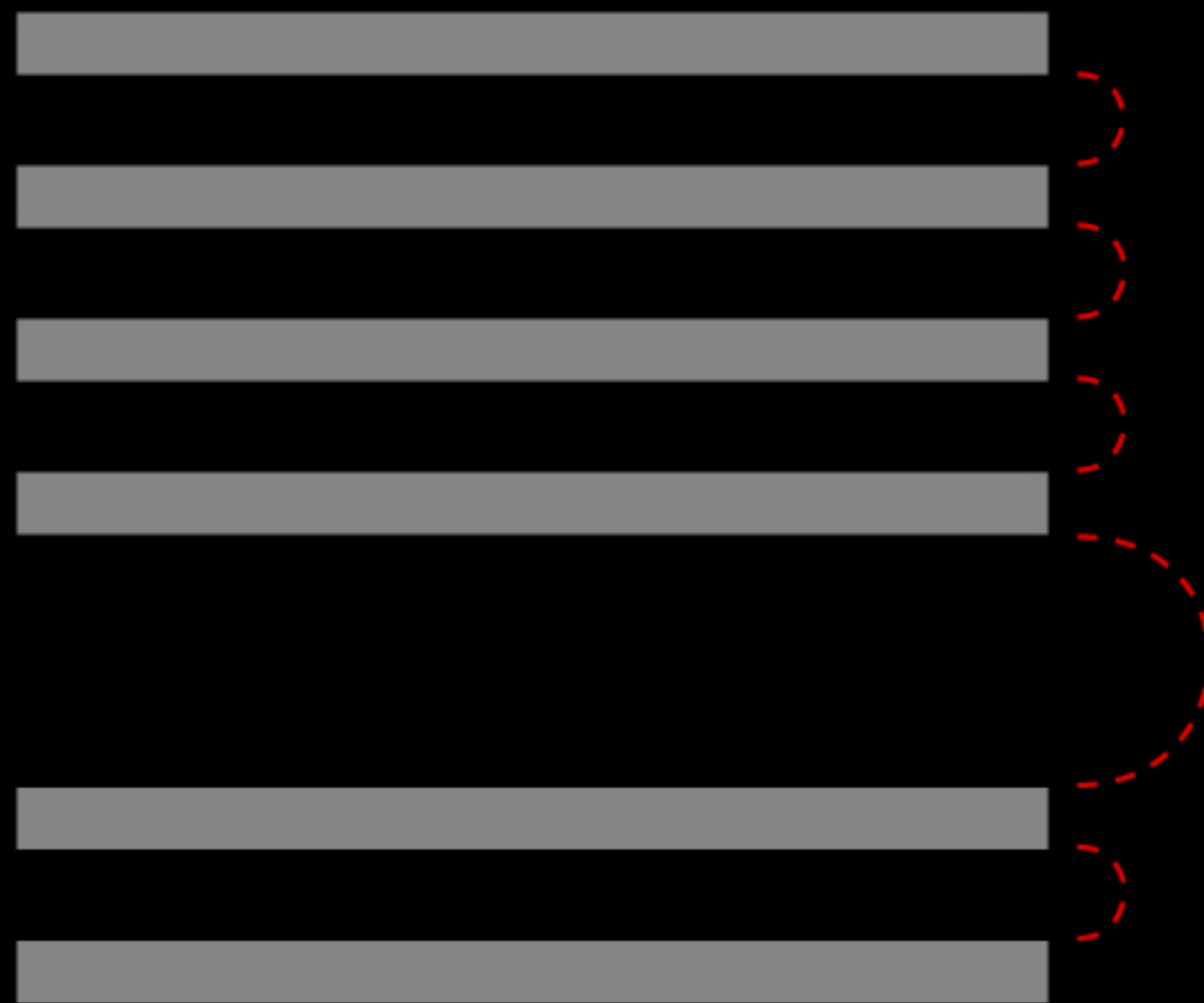


LINE STUFF UP

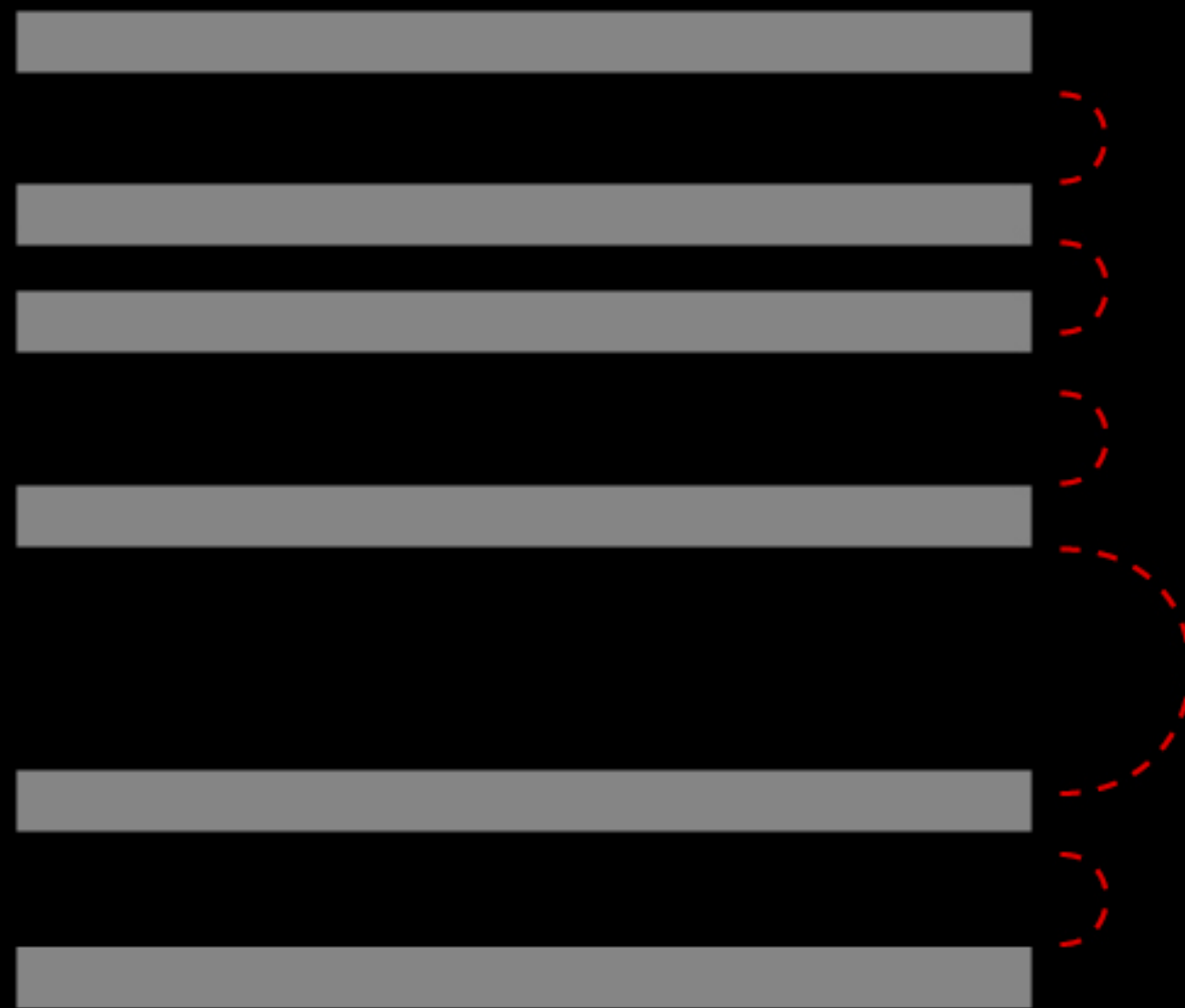




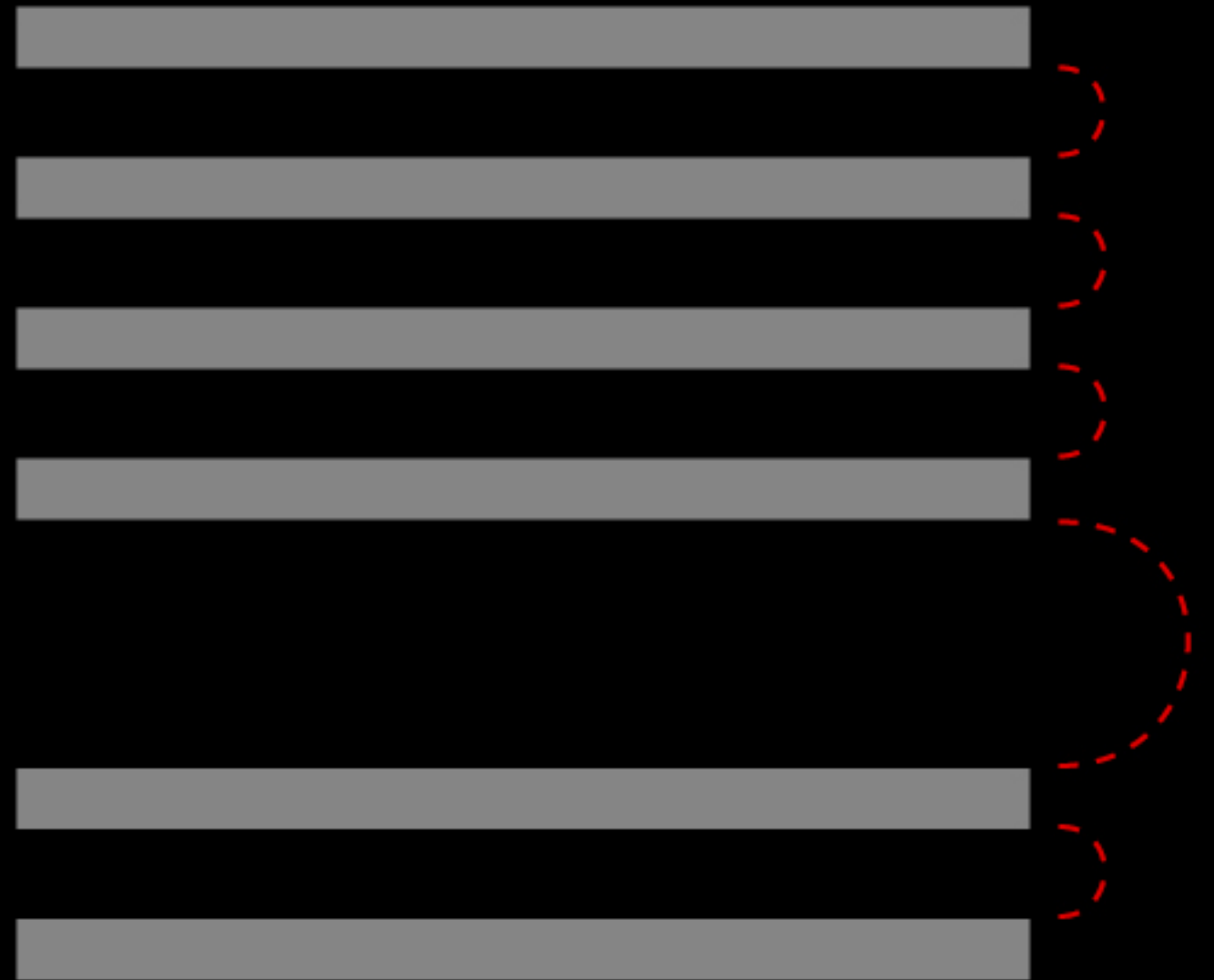
DESIGN THE SPACES



DESIGN THE SPACES

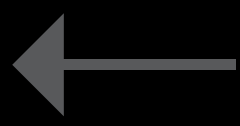
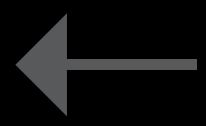


DESIGN THE SPACES



VALVE

VALVE



WHAT DOES IT MEAN?

(###) ###-####

WHAT IS THIS?

A glowing neon sign with a yellow border and the words "fresh peaches" in a cursive font. A green leaf icon is positioned above the letter 'h' in "peaches". The sign is hanging from a wire against a background of warm, out-of-focus lights.

fresh
peaches

WHICH IS FRESHER?

Fresh

PEACHES

WHICH IS FRESHER?

fresh
peaches

Fresh
PEACHES



SHOW ME THAT YOU CARE

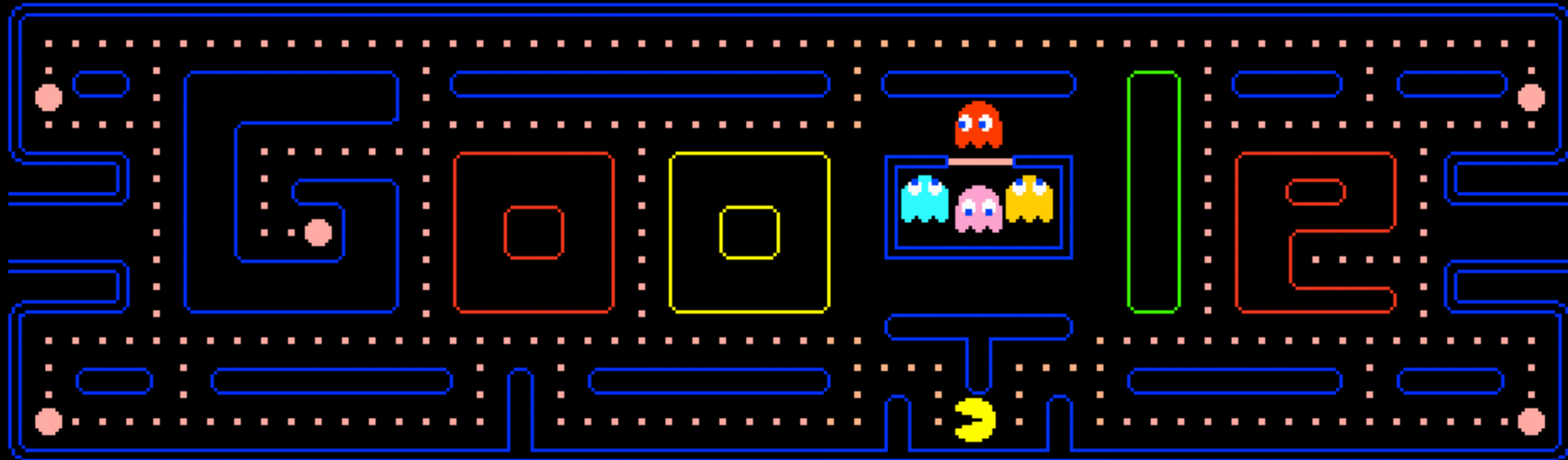


WITH USER PERCEPTION ...



SMALL DETAILS MAKE A BIG DIFFERENCE

XOXO



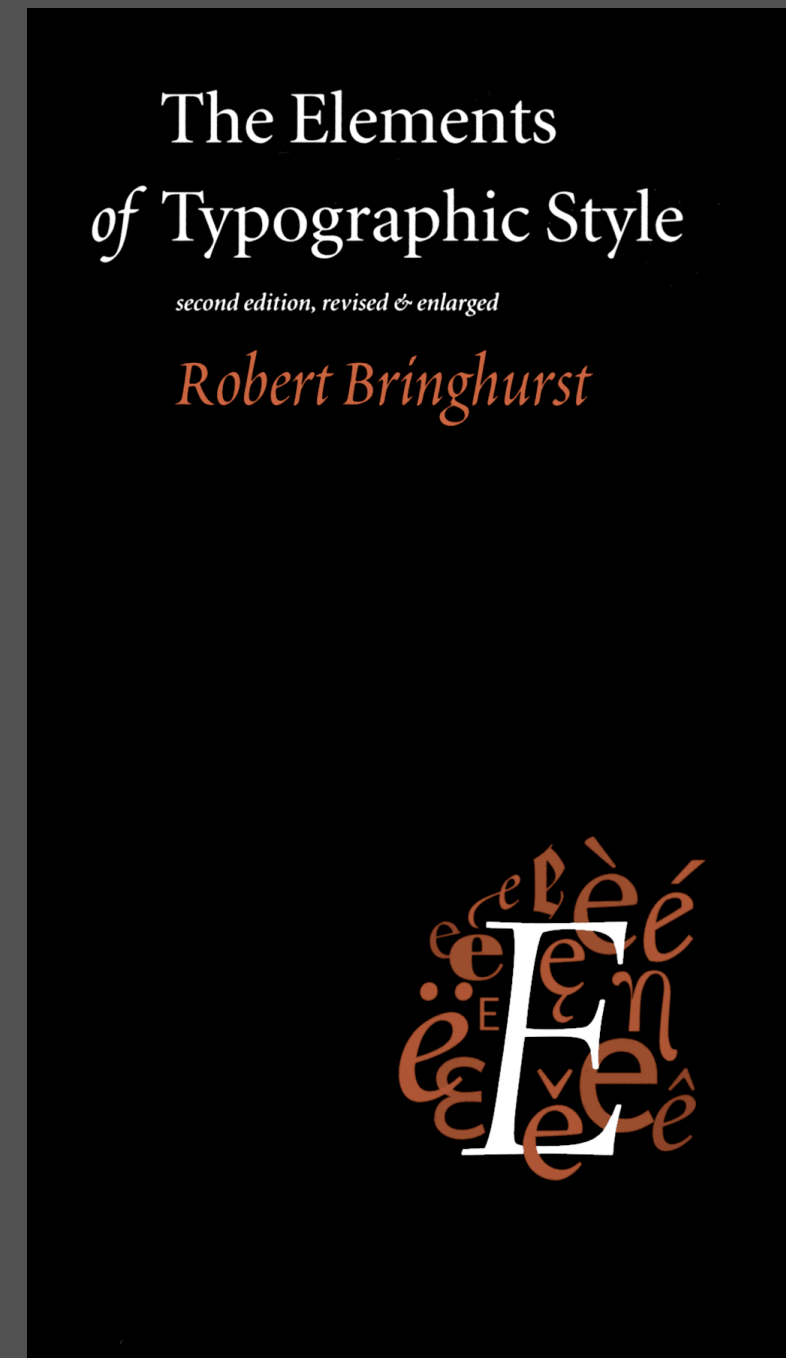
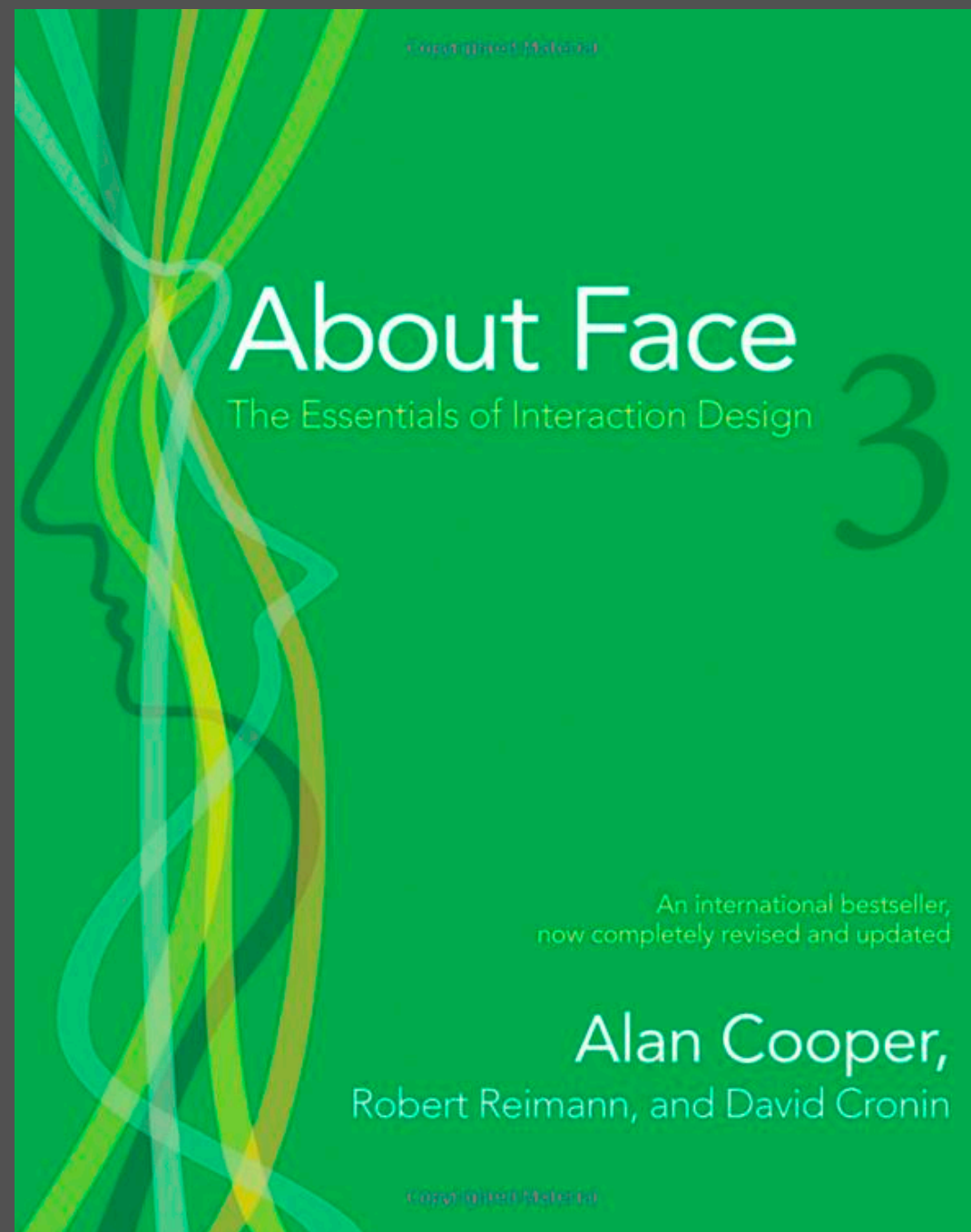
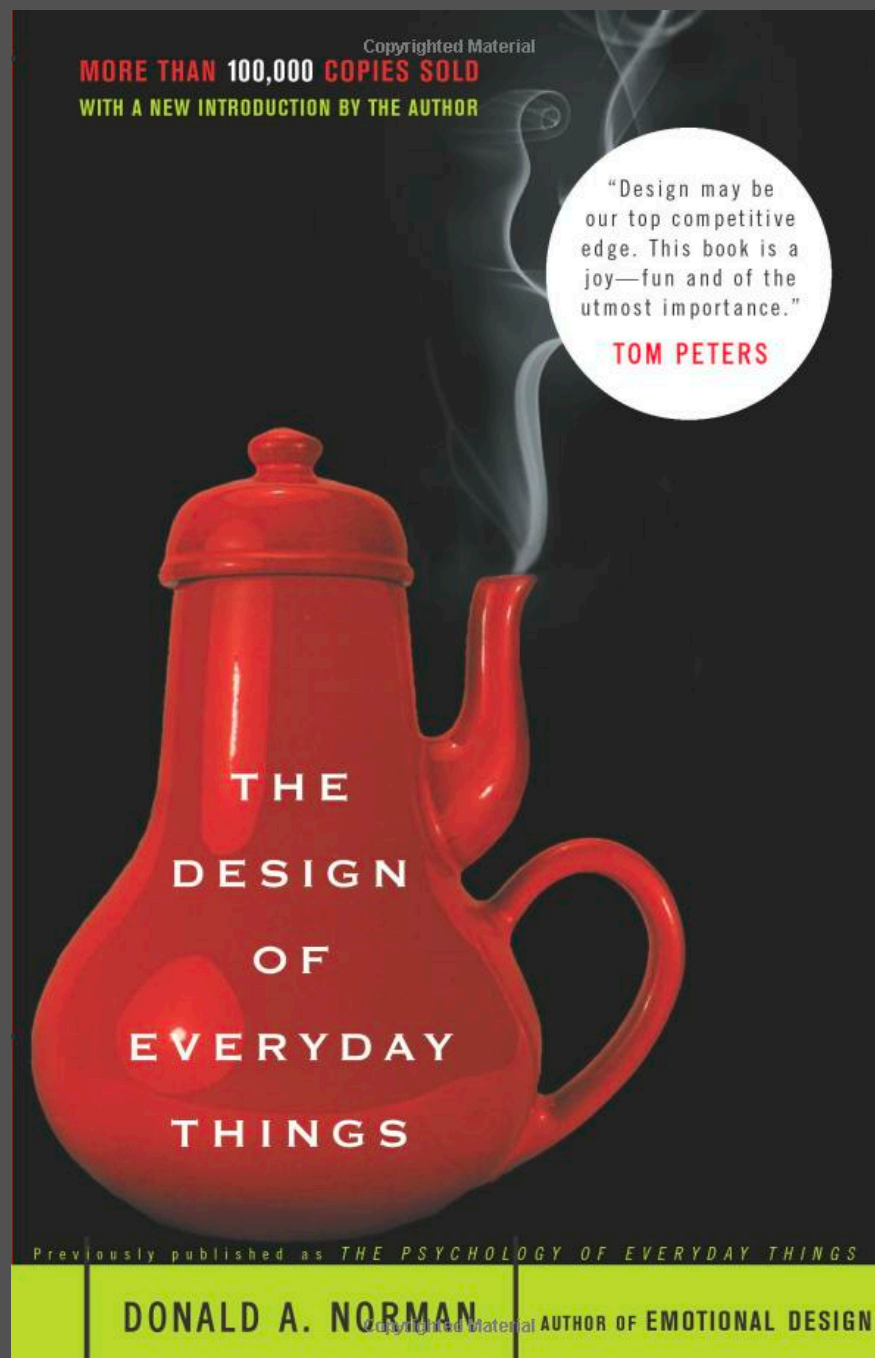
Google

Search, or say Google



46 minutes to Home





RECOMMENDED READING

A DAY OF DESIGN!

Day 3	09:00 - 10:00	10:15 - 11:15	11:30 - 12:30	13:15 - 14:15	14:30 - 15:30
Android	Ten Things Game Developers Should Know +	So You've Read The Design Guide; Now What? +	Navigation In Android +	Playing With Patterns +	Playing With Patterns +
	Android Design For Success +	Android WebView +	Measuring The End-To-End Value Of Your App +		Security And Privacy In Android Apps +

<Thank You!>

+Alex Faaborg, @faaborg

+Christian Robertson, @cr64





Google
Developers