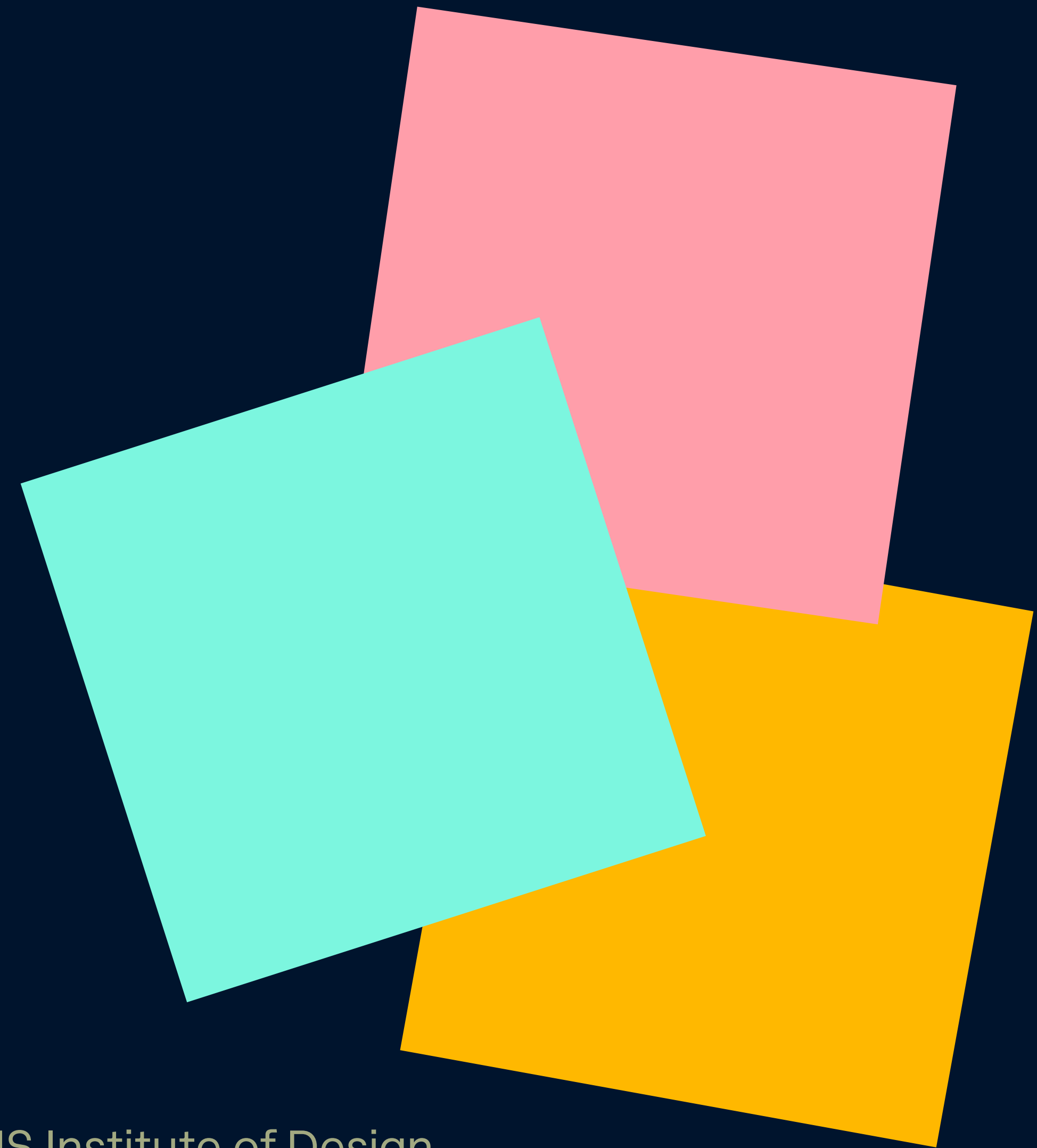


Lecture 8

Ergonomics - Physical and Cognitive

Error Prevention

3 October 2025 · Gyan Lakhwani · gyanlakhwani@gmail.com · JS Institute of Design



RECAP

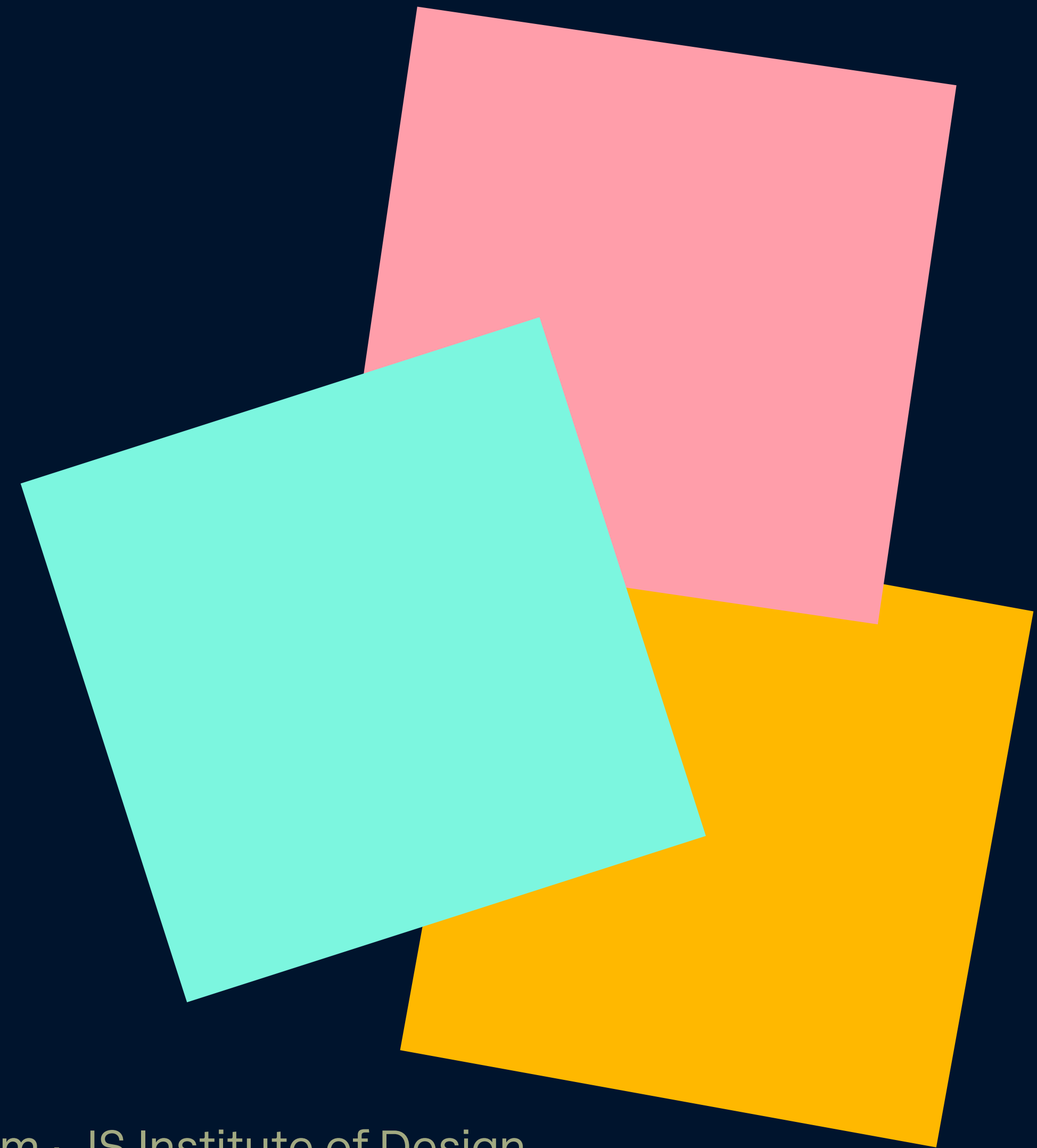
Last Tuesday

Lecture 7

Ergonomics - Physical and Cognitive

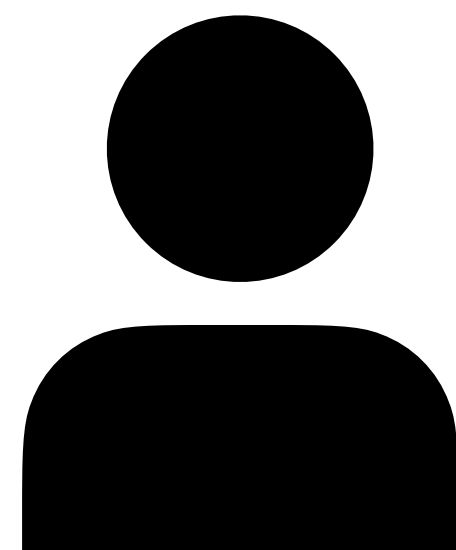
Feedback Mechanisms

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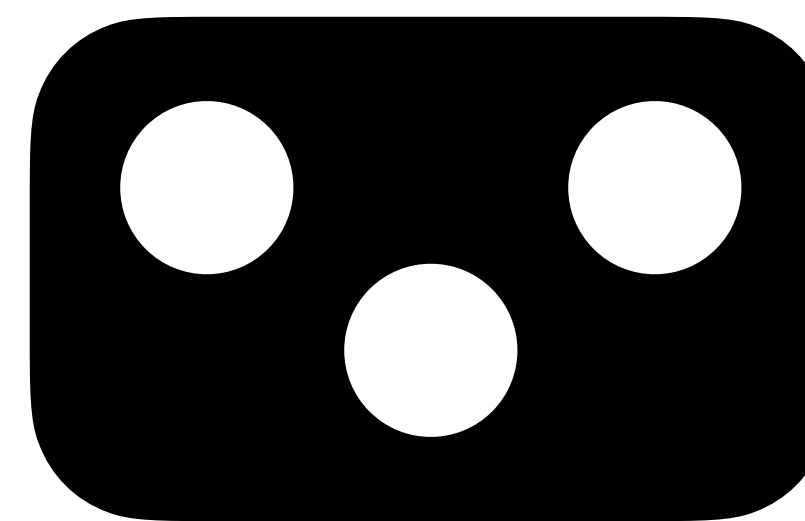


WHAT IS

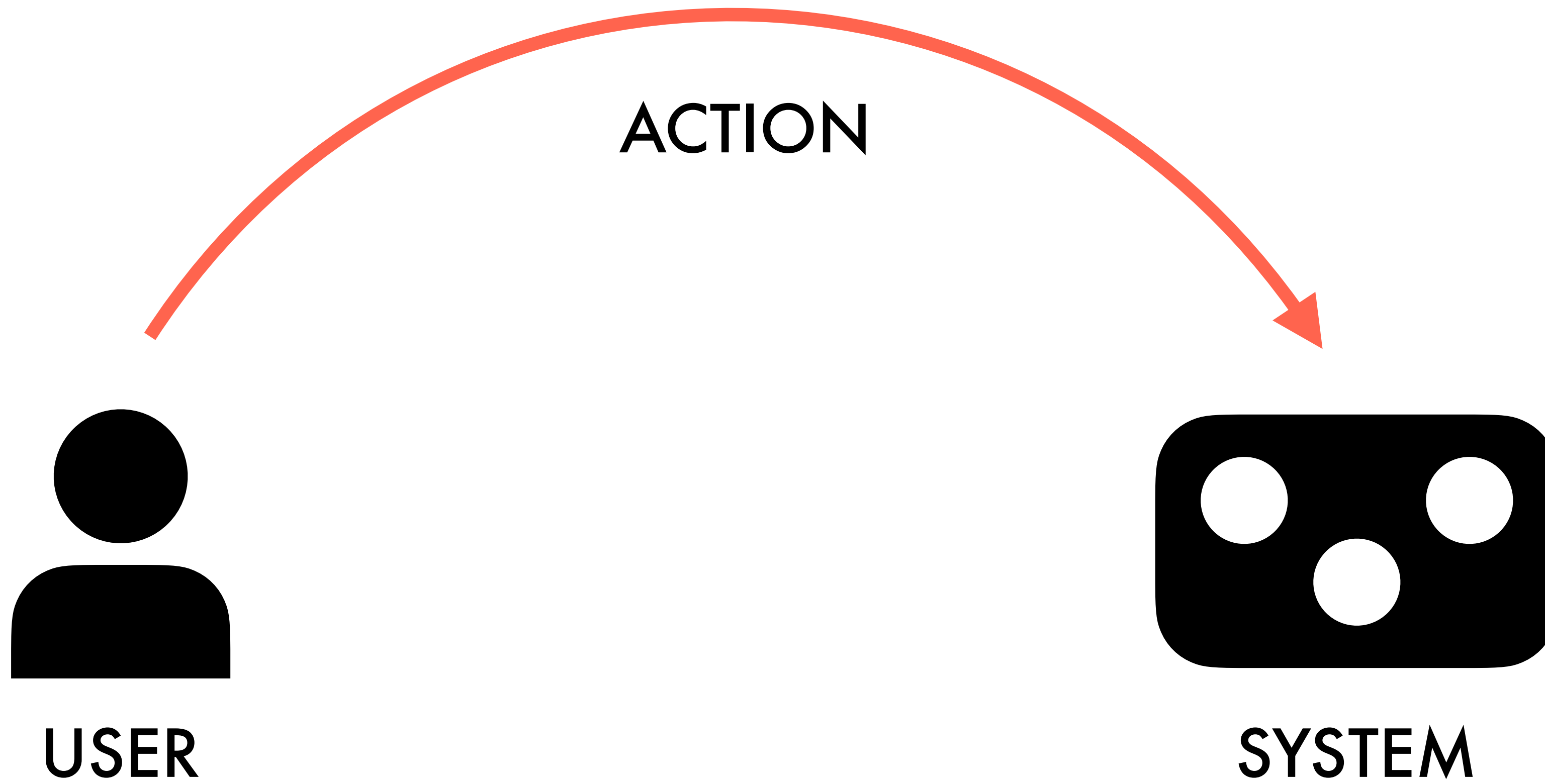
FEEDBACK?

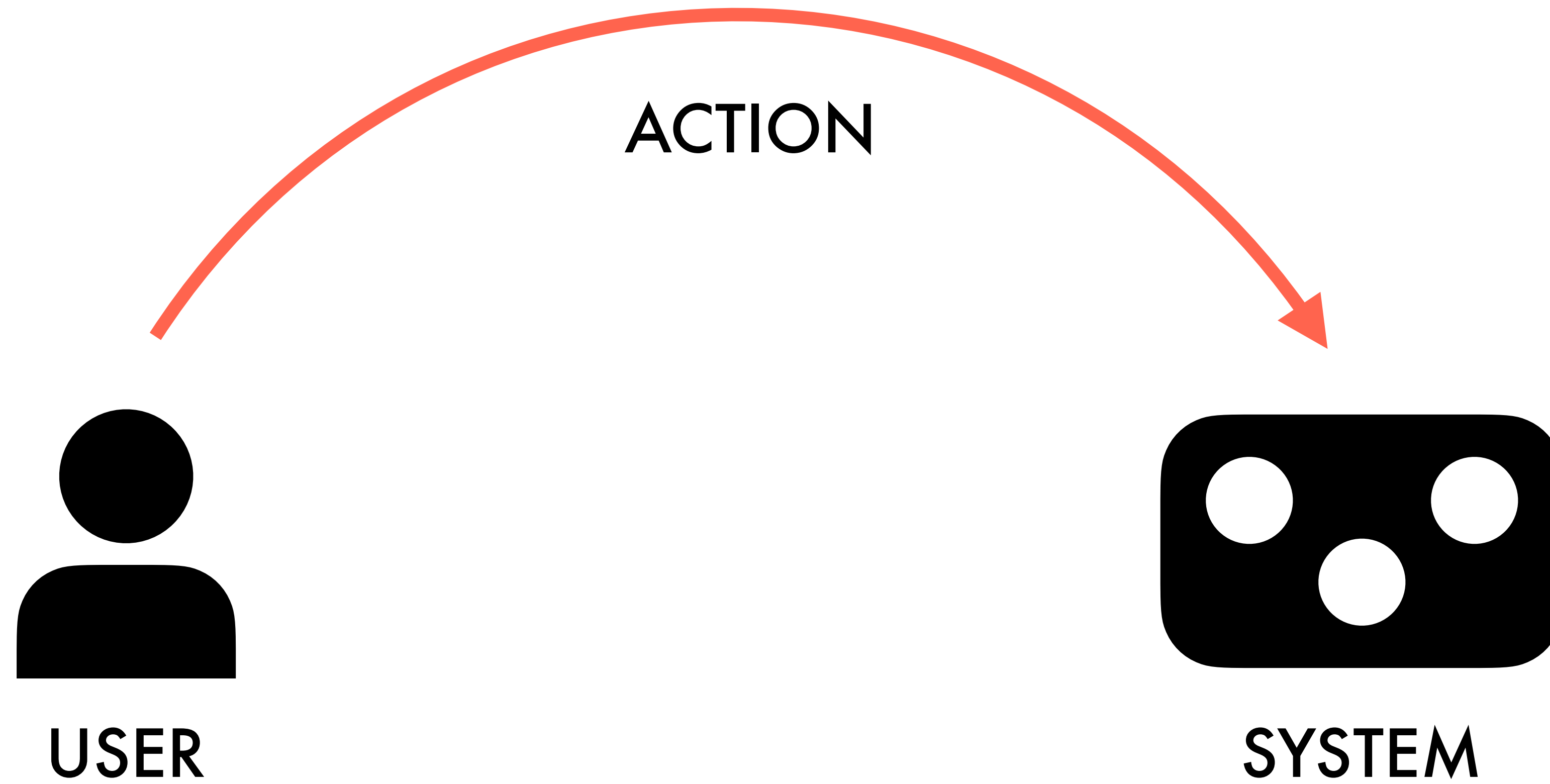


USER

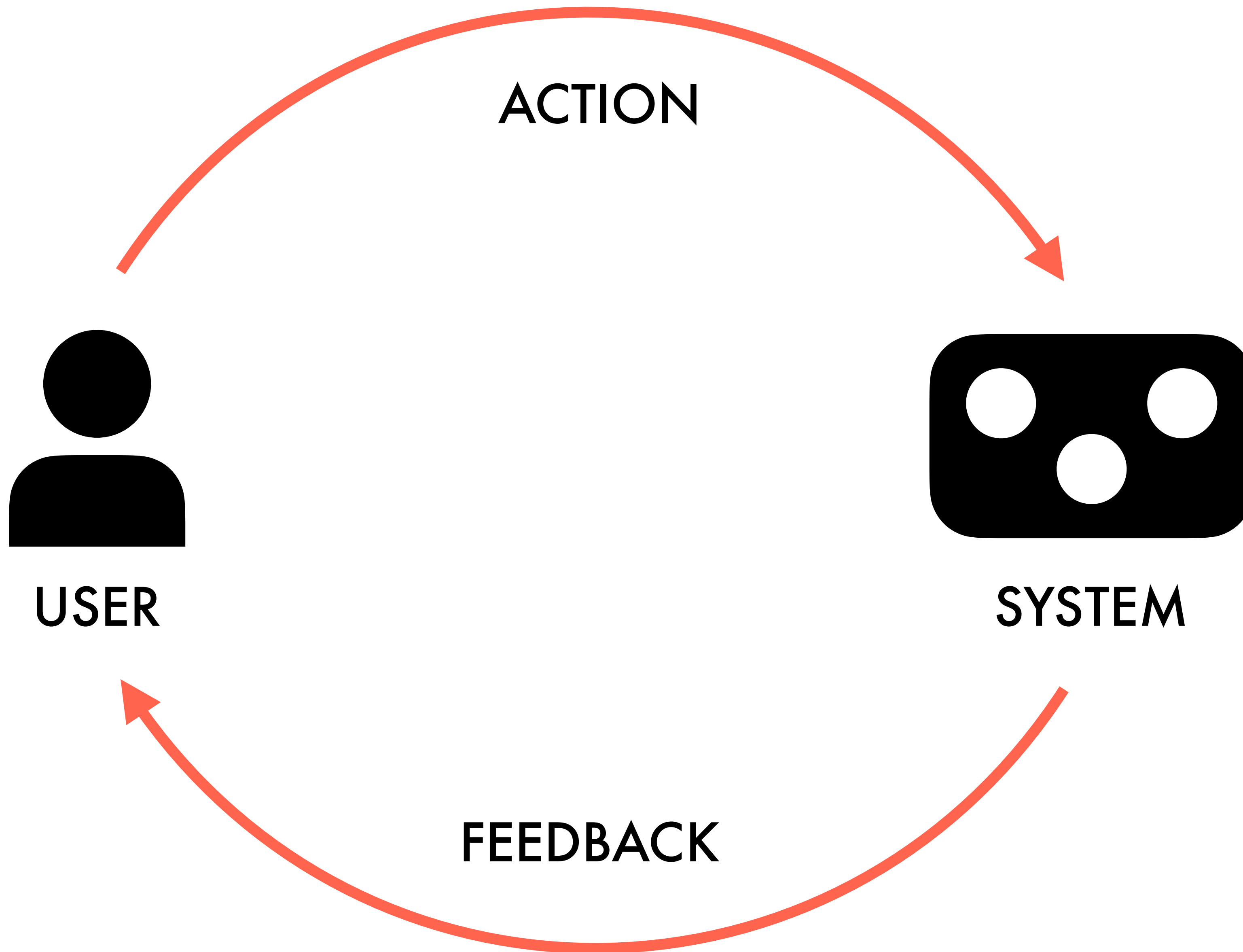


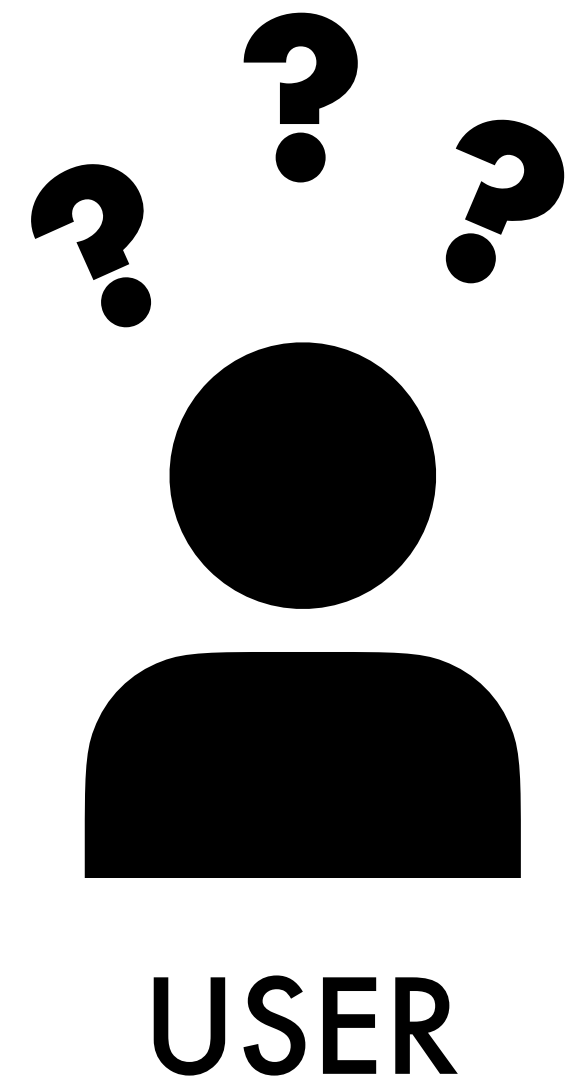
SYSTEM





How do I know if the action was successful?

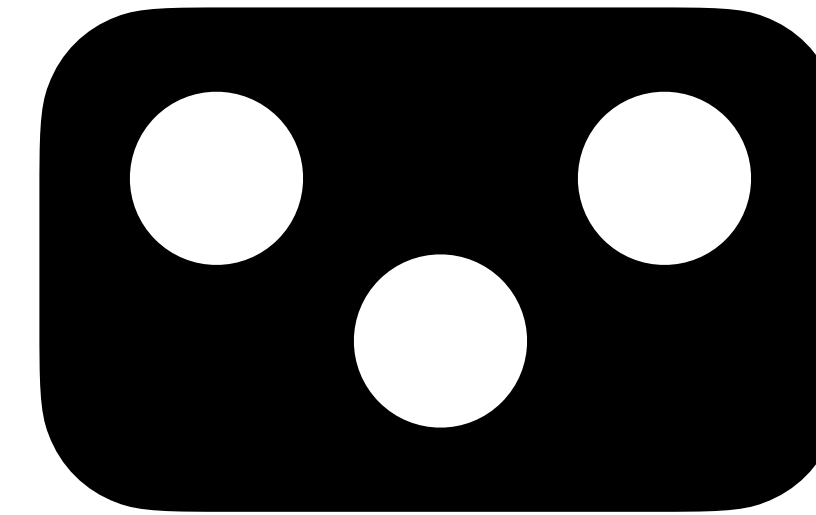




Was my input registered?
Is the system functioning
correctly?

WITHOUT FEEDBACK

I heard you!
Here's what's
happening now.



SYSTEM

WITH FEEDBACK

WHAT IS

FEED *FORWARD?*

Signifiers

Cues or signals that communicate where and how an action should be performed.

- A chair's flat seat surface invites you to sit on it
- A blinking cursor in a text box signals you can type.
- An underline on a hyperlink indicates that you can click it

Affordances

The action possibilities of an object — what the object allows you to do.

- A chair affords sitting.
- A button affords pressing.
- A text field affords typing.

Affordances + Signifiers

Together

- **Affordance:** What can be done.
- **Signifier:** How you know what can be done.

FEEDFORWARD

Information provided *before*
an action to guide it.

A handle that visually affords
pulling, or a button label that tells
you what it does.

Reduces the chance of error
(by guiding correct action).

FEEDBACK

Information provided *after*
an action.

Clicking a button → it lights up or
makes a sound.

Reduces uncertainty after the action
(by confirming the outcome).

DISCUSSION

**What do you do if
something goes wrong?**

DISCUSSION

What do you tell a friend when they make a mistake?

DISCUSSION

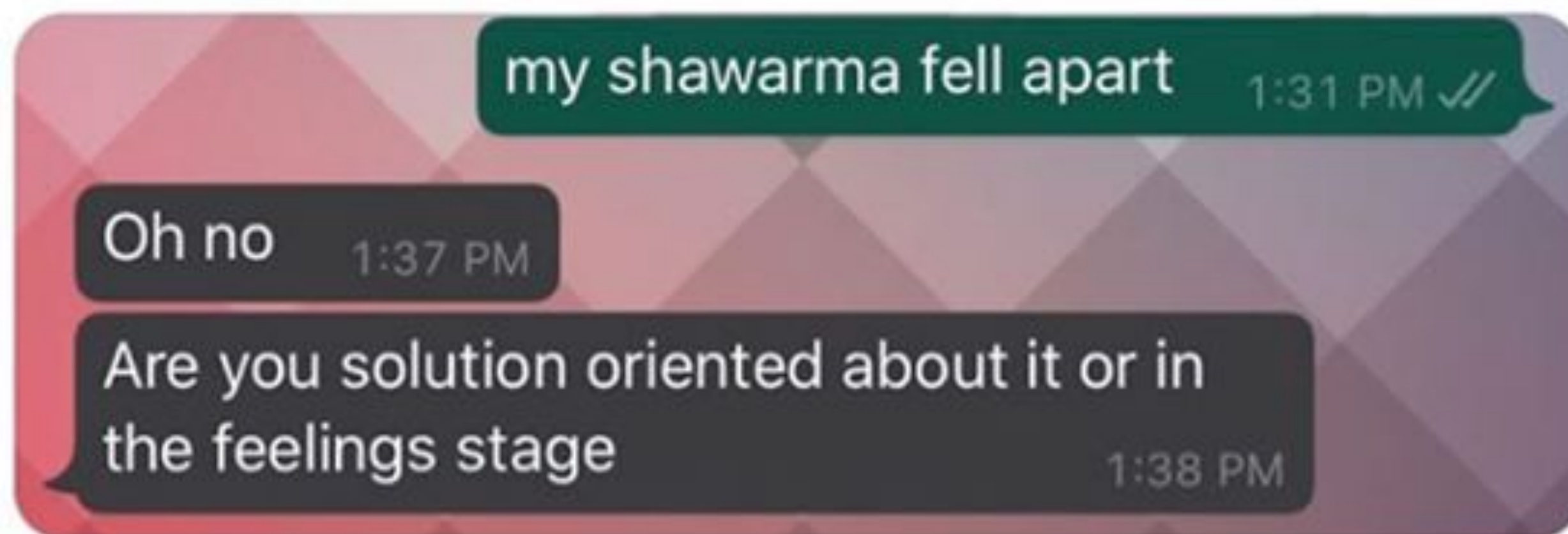
**When is it useful to
assign blame?
When is it not?**



cassie cao
@thecassiecao



my boyfriend trying to be supportive



**Have
you used
an ATM?**



**Have you ever
left your card
in an ATM?**



**What could help
people avoid
leaving their
cards in the ATM?**



Have you ever done this?



Apoorv Shankar <apoorv@invbrain.in>

to me ▼

I forgot to attach the files. Sending u in a few moments.



Apoorv Shankar <apoorv@invbrain.in>

to me ▼

HERE ARE THE ATTATCHMENTS.



What will happen if I send this?

Photos attached

Gyan Lakhwani (gmail.com)

Photos attached

Hi Gyan

I am attaching some photos to print.

--

Warm regards

Gyan Lakhwani

Partner, Public Knowledge Design Studio

www.publicknowledge.co

 **Public Knowledge**
Design Studio

Send



Sending without attachments in Gmail triggers a popup

Photos attached

Gyan Lakhwani (gmail.com)

Photos attached

Hi Gyan

I am attaching some photos to print.

--

Warm regards

Gyan Lakhwani

Partner, Public Knowledge Design Studio

www.publicknowledge.co

 **Public Knowledge**
Design Studio

Send





mail.google.com says

It seems like you have forgotten to
attach a file.

You wrote "I am attaching" in your
message, but there are no files attached.
Send anyway?

Cancel

OK

 **Public Knowledge**
Design Studio

Send



AVOIDING MISTAKES WITH GOOD DESIGN

Error Prevention

**Can all
errors be
prevented?**

DISCUSSION

**What do you do if
something goes wrong?**

MURPHY'S LAW

**Anything that can go
wrong will go wrong.**

DISCUSSION

**What do you do when
something goes wrong?**

Root Cause Analysis

FIVE WHYS

Root Cause Analysis

FIVE WHYS

Go beyond surface-level symptoms and
discover the underlying cause of an issue.

You discover coolant leaking from a machine

Coolant is leaking from the machine.

WHY?

A seal was damaged.

WHY?

Metal shavings got into the coolant.

WHY?

A screen on a coolant recycling pump was broken.

WHY?

Root Cause

The screen is located in a place where it was likely to be damaged by dropped parts.



Action: Redesign machine, or add guard to cover the screen and prevent damage. If the seal was merely replaced, it would have soon needed repair again as the damage repeated itself.