CSE440: Introduction to HCI

Methods for Design, Prototyping and Evaluating User Interaction

Lecture 04:
Design of Everyday Things

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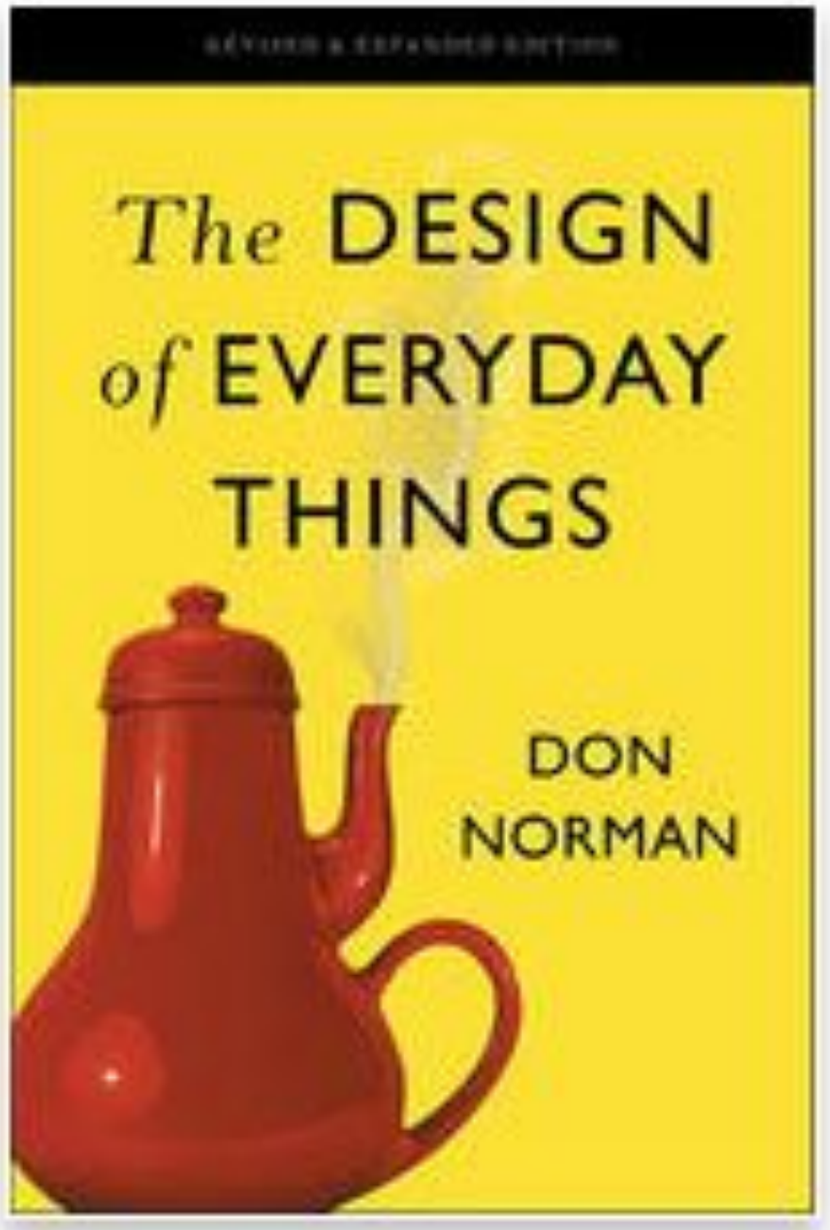
DESIGN
USE
BUILD

PAUL G. ALLEN SCHOOL
OF COMPUTER SCIENCE & ENGINEERING

What we will do today

It is never a user's fault!



[99% Invisible Post](). (Just read and listen everything there!) =)


snatch
BENICIO DEL TORO DENNIS FARINA VINNIE JONES BRAD PITT RADE SHERBEDGIA JASON STATHAM
SCREEN GEMS PRESENTS IN ASSOCIATION WITH SKA FILMS
A MATTHEW VAUGHN PRODUCTION A FILM BY GUY RITCHIE "SNATCH"
PRODUCED BY MATTHEW VAUGHN
WRITTEN BY GUY RITCHIE
DIRECTED BY GUY RITCHIE
SKA FILMS
R RESTRICTED
UNDER 17 REQUIRES ACCOMPANYING PARENT OR ADULT GUARDIAN
STRONG VIOLENCE, LANGUAGE, SOME NUDITY
SOUNDTRACK ON TVT SOUNDTRAX
SCREEN GEMS
sony.com/snatch
coming soon

What is Interaction?

Two-Way

One-way is reaction

Communicative

Information is sent

Receptive

Information is received

Effective

There are changes as a result

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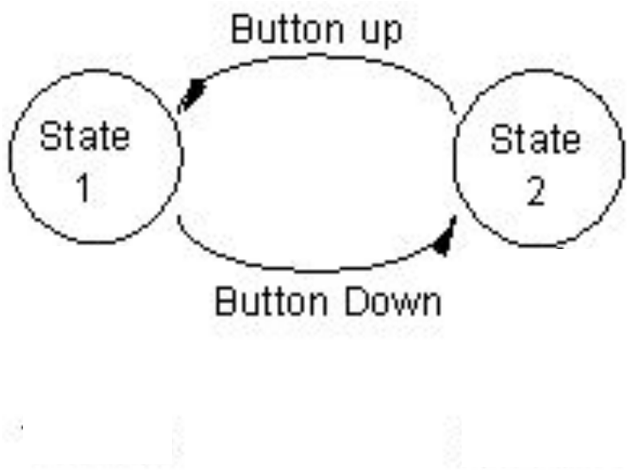
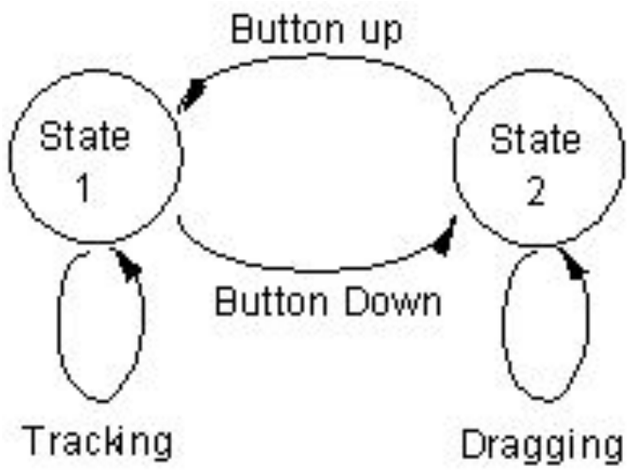
Buxton’s 3-State Model



Buxton's 3-State Model



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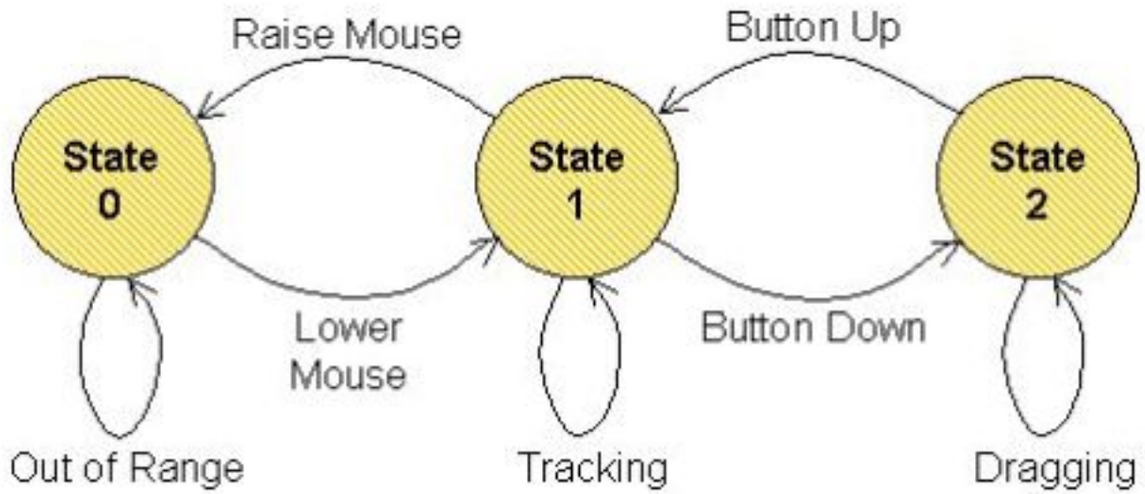
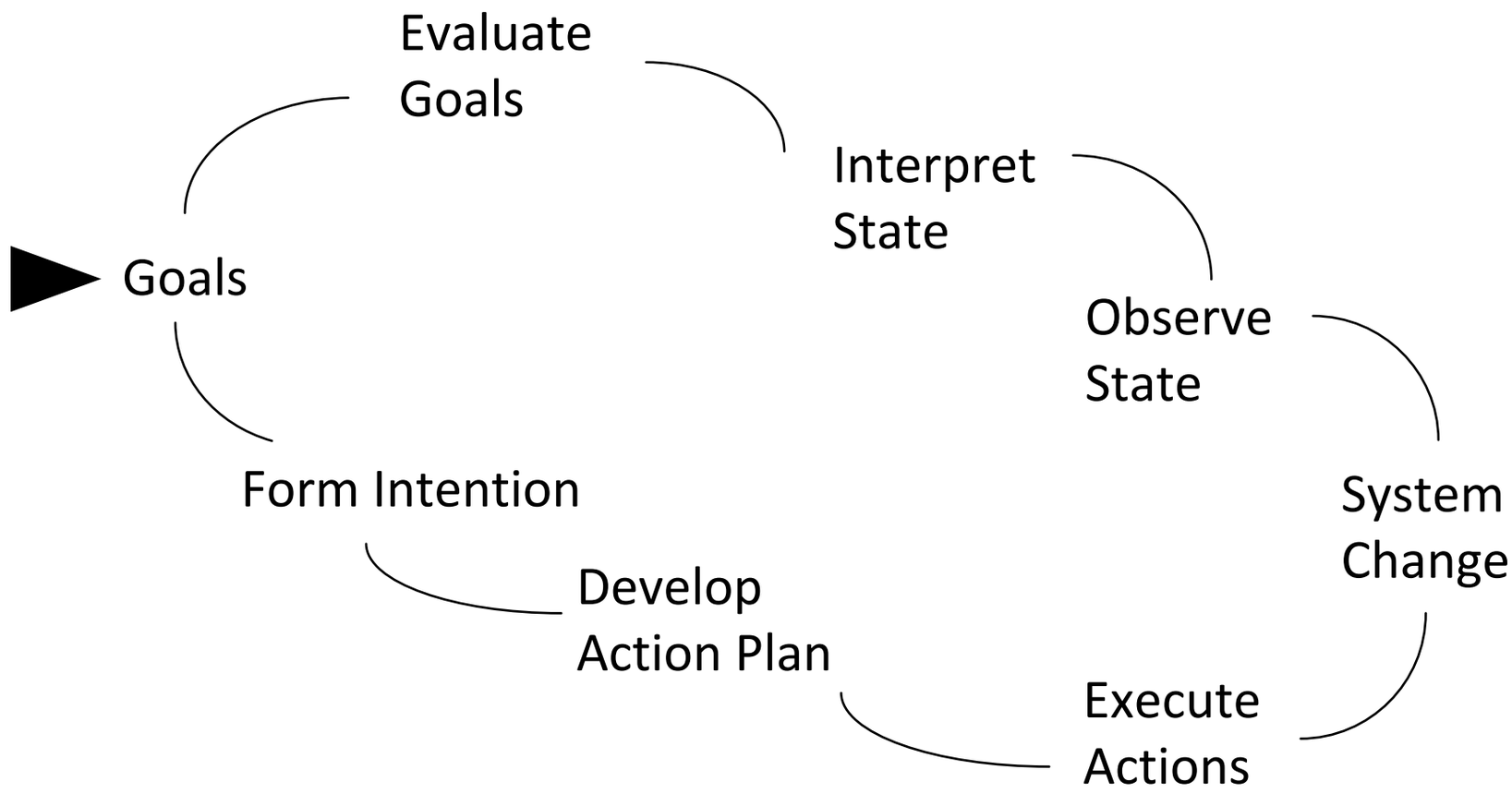


Norman's Execution-Evaluation Cycle

1. Establish the goal
   - Increase light in the room
2. Form the intention
   - To turn on the lamp
3. Specify the action sequence
   - Walk to the lamp, reach for the knob, twist the knob
4. Execute the action sequence
   - [walk, reach, twist]
5. Perceive the system state
   - [hear "click" sound, see light from lamp]
6. Interpret the system state
   - The knob rotated. The lamp is emitting light. The lamp seems to work
7. Evaluate the system state with respect to the goals and intentions
   - The lamp did indeed increase the light in the room [goal satisfied]

[REPEAT!]

Norman's Execution-Evaluation Cycle



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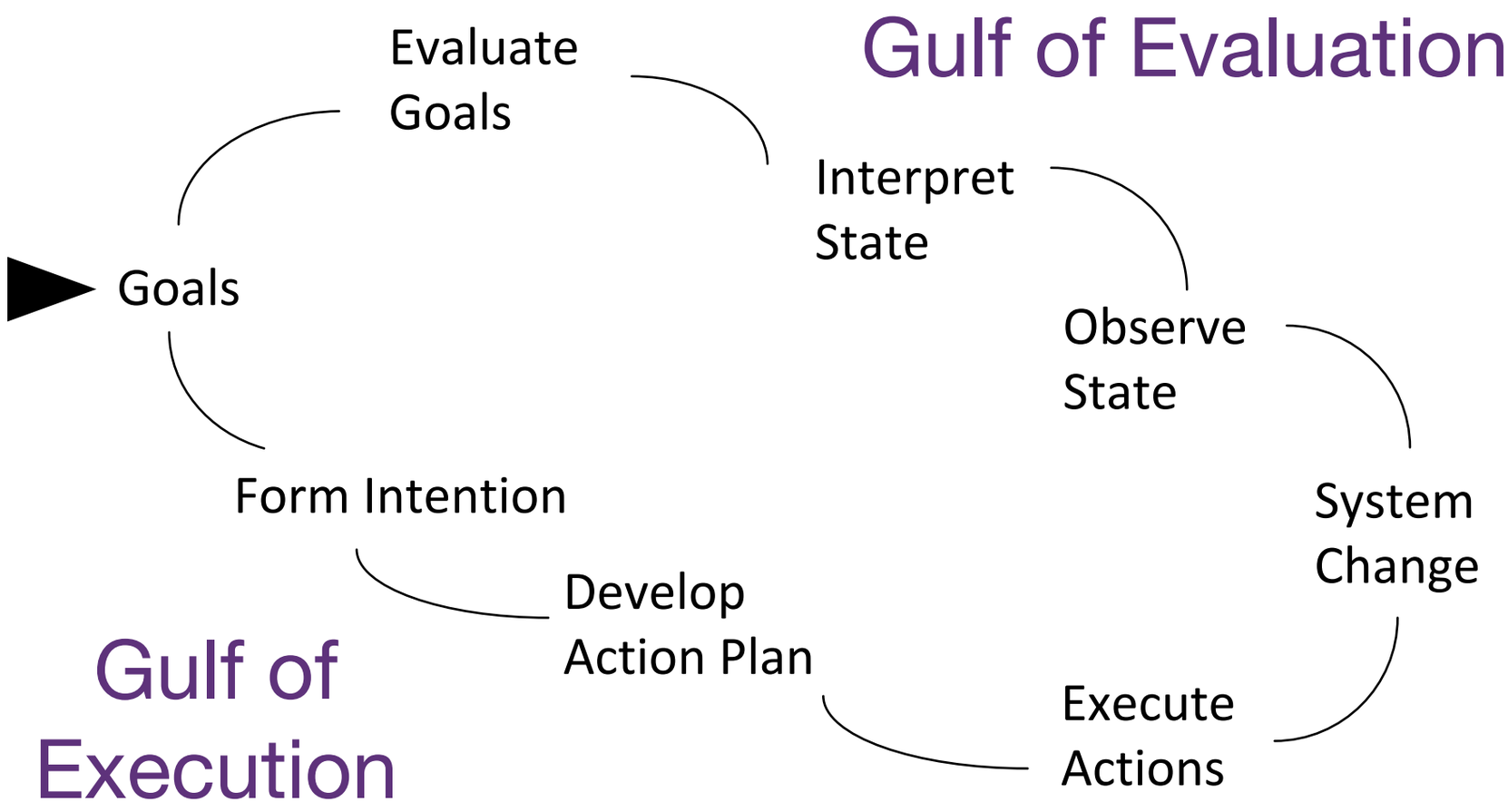
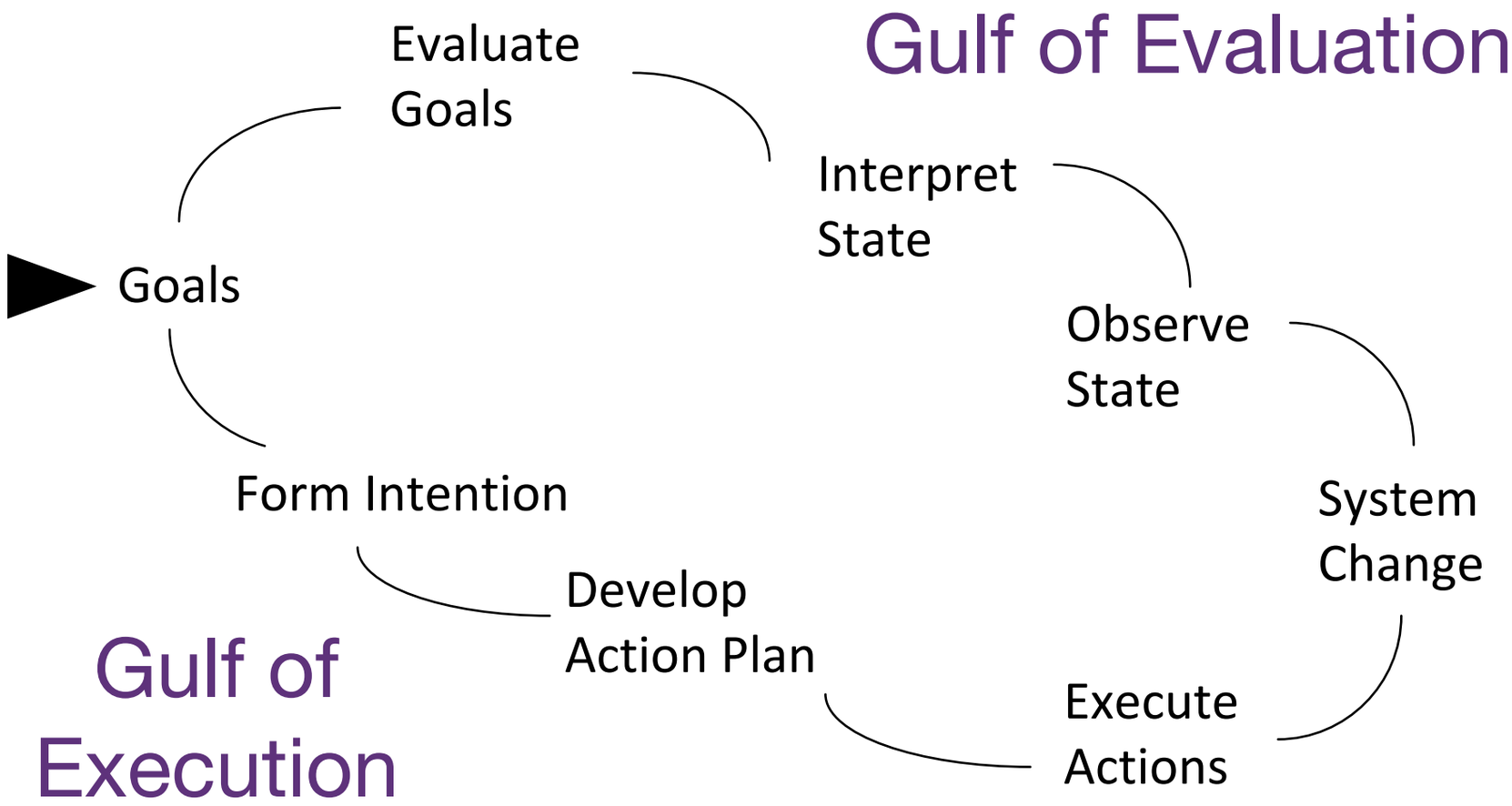


Norman's Execution-Evaluation Cycle

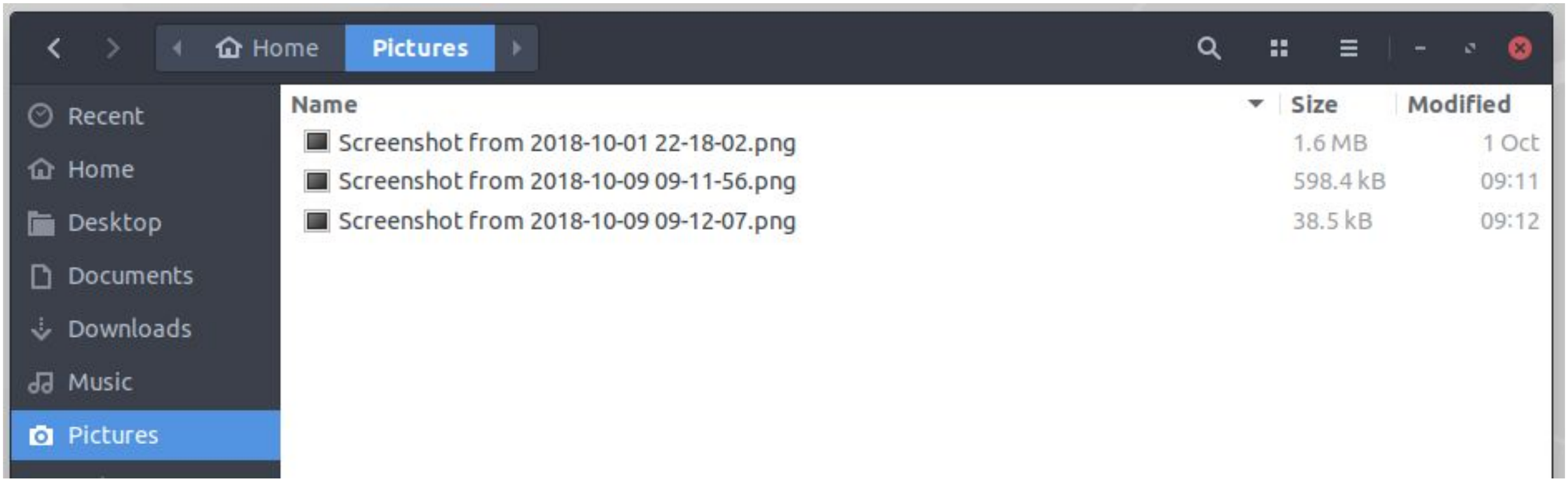


What factors can extend the Gulfs in the example of increasing light in the room?

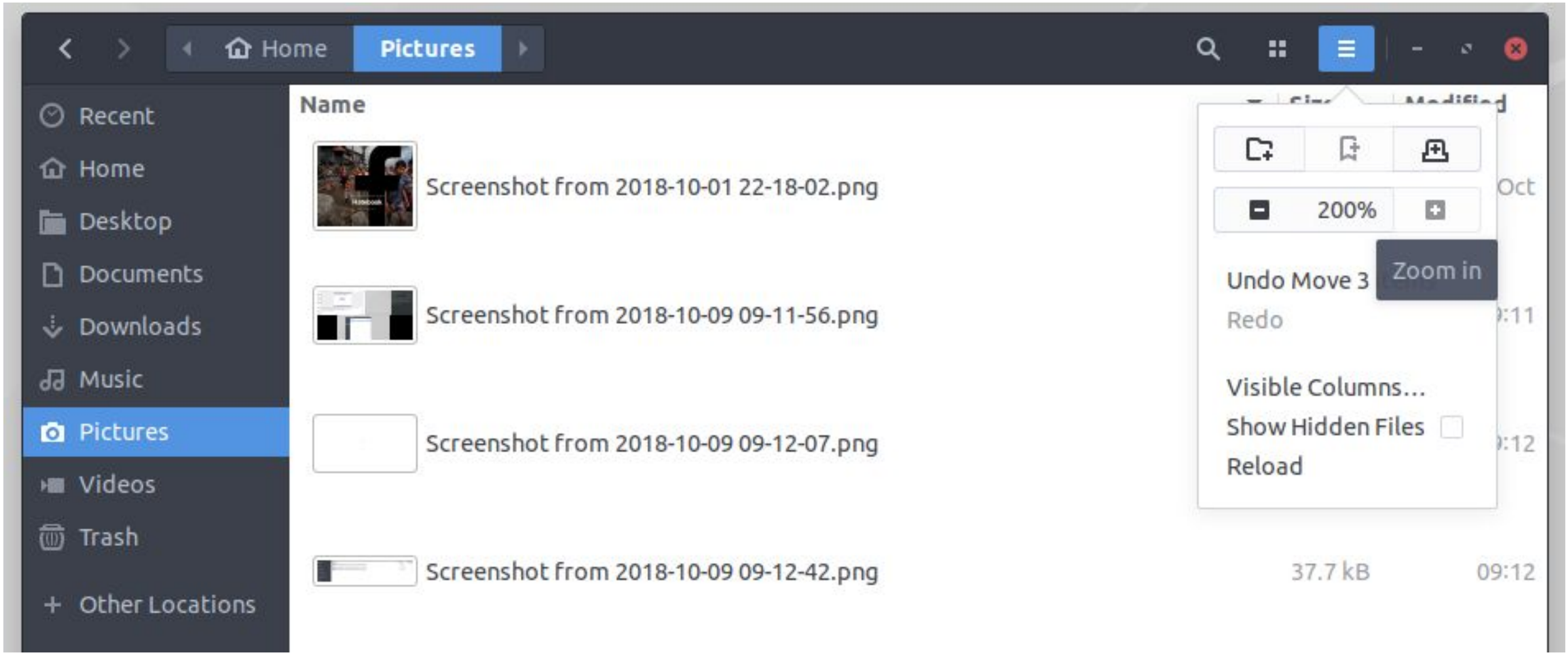
Gulf of Execution: An Example

https://www.coursera.org/learn/ui-design/lecture/JTDiI/the-gulf-of-execution-and-the-gulf-of-evaluation

Gulf of Evaluation: An Example

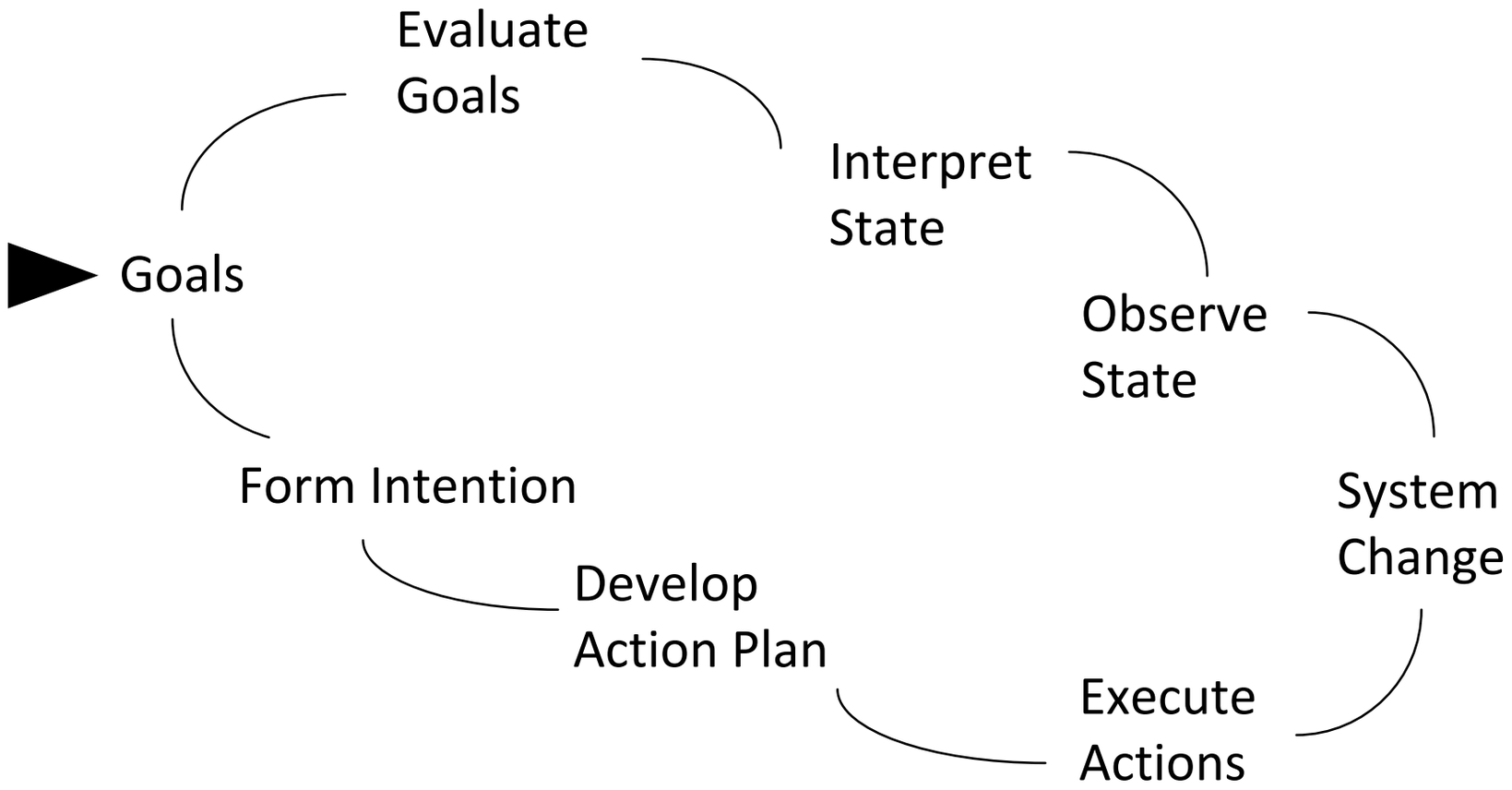


Gulf of Evaluation: An Example



Bridging the Gulfs

Ask yourself: How easily can the user…



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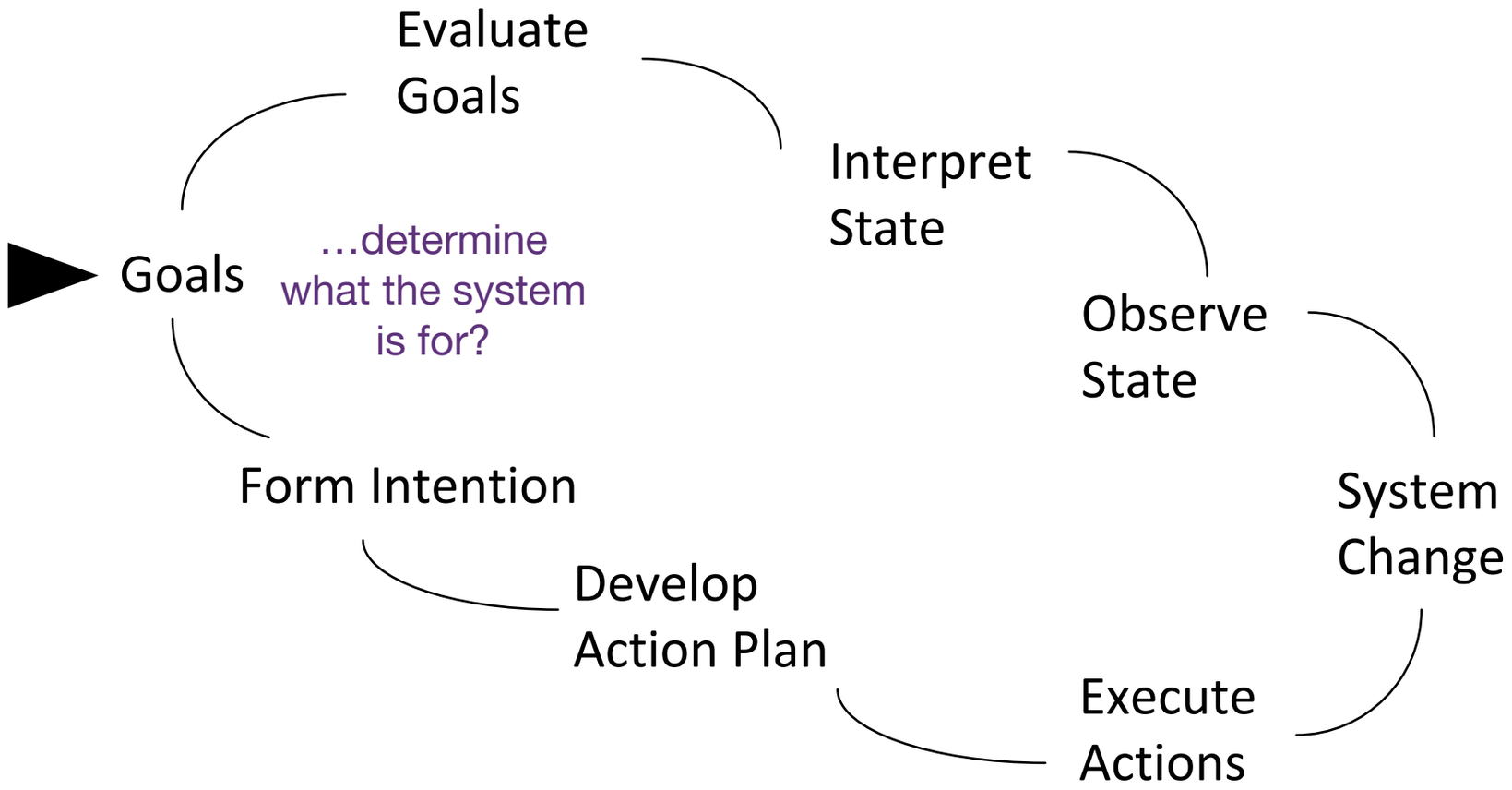

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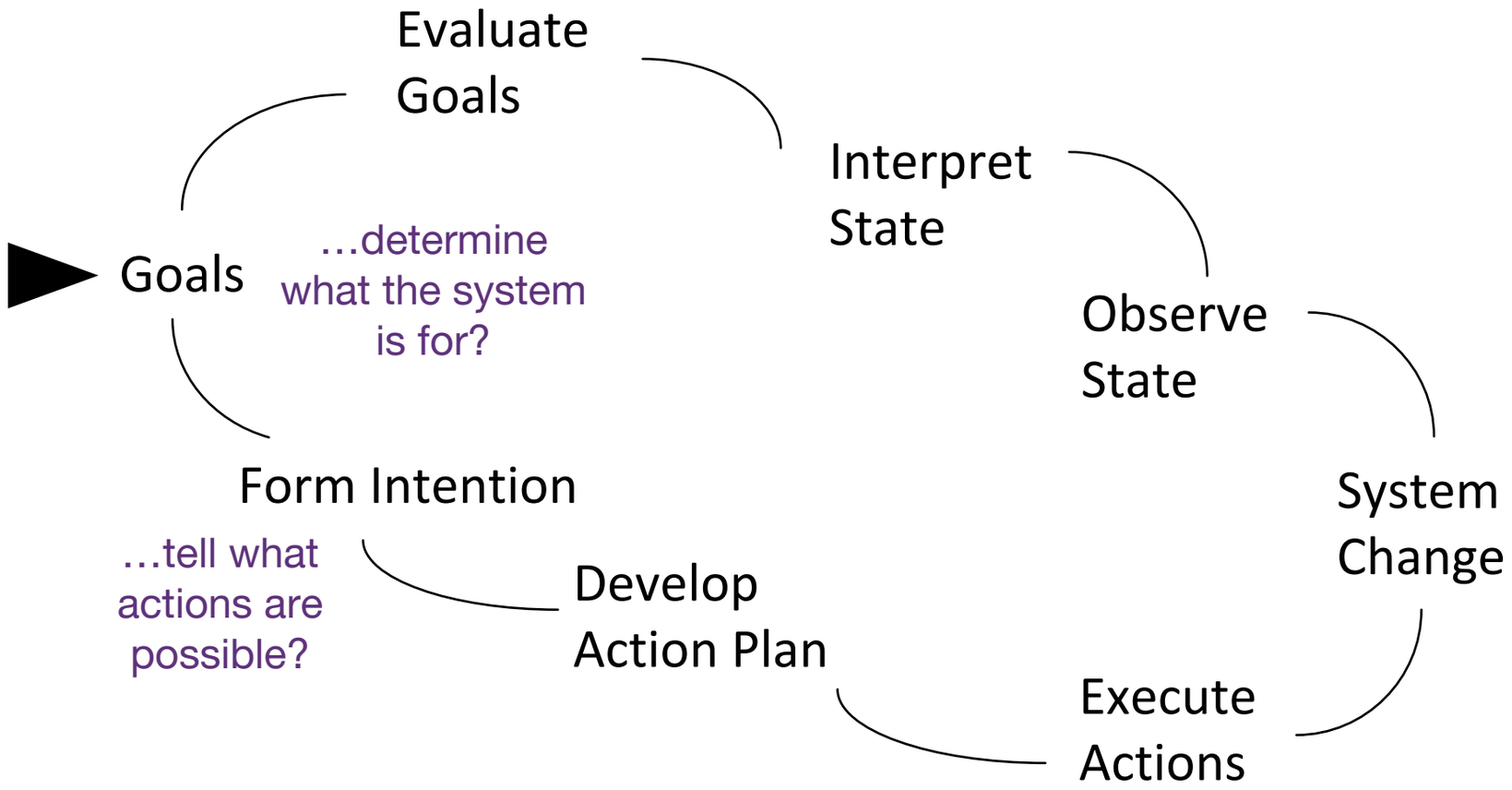

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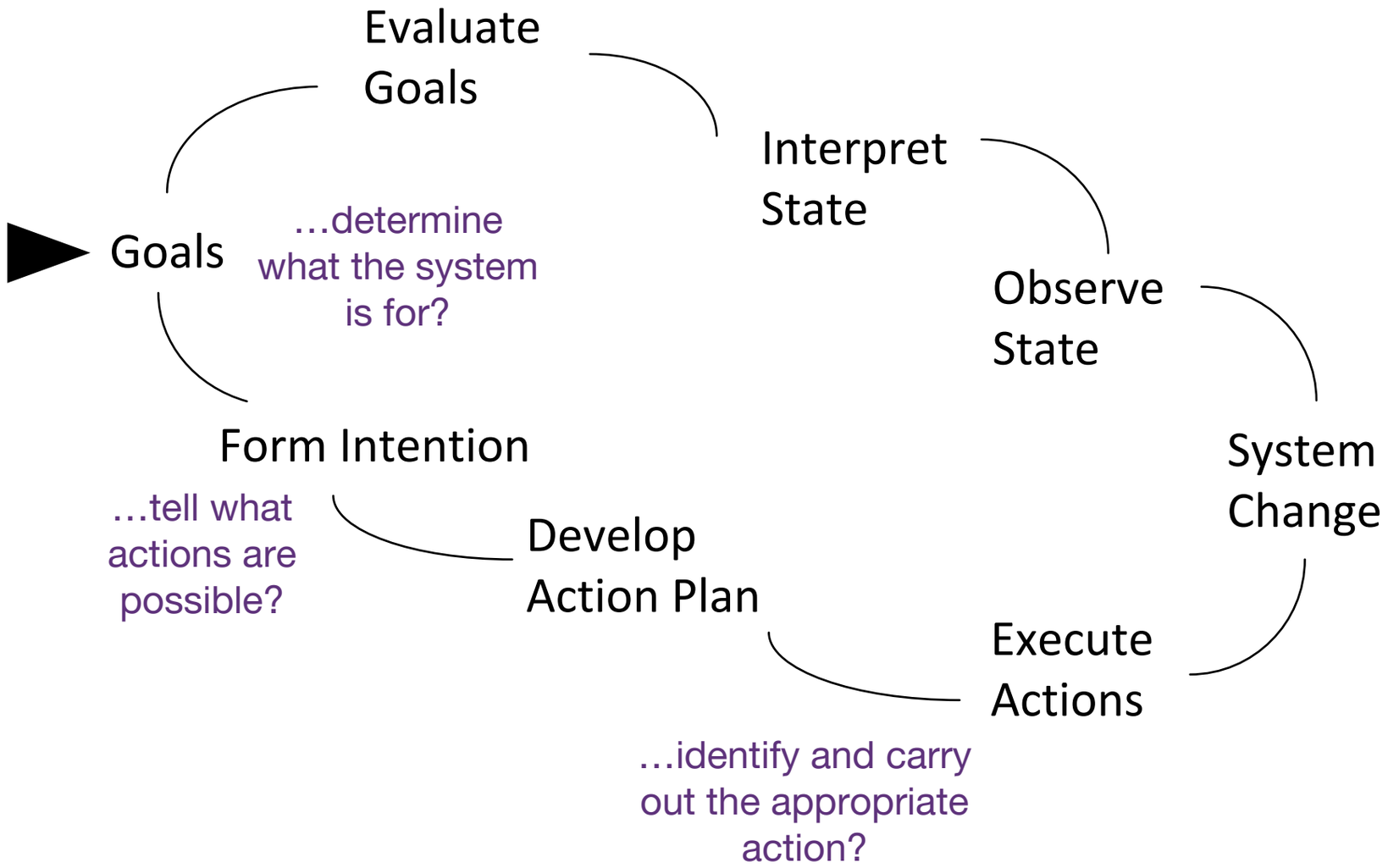

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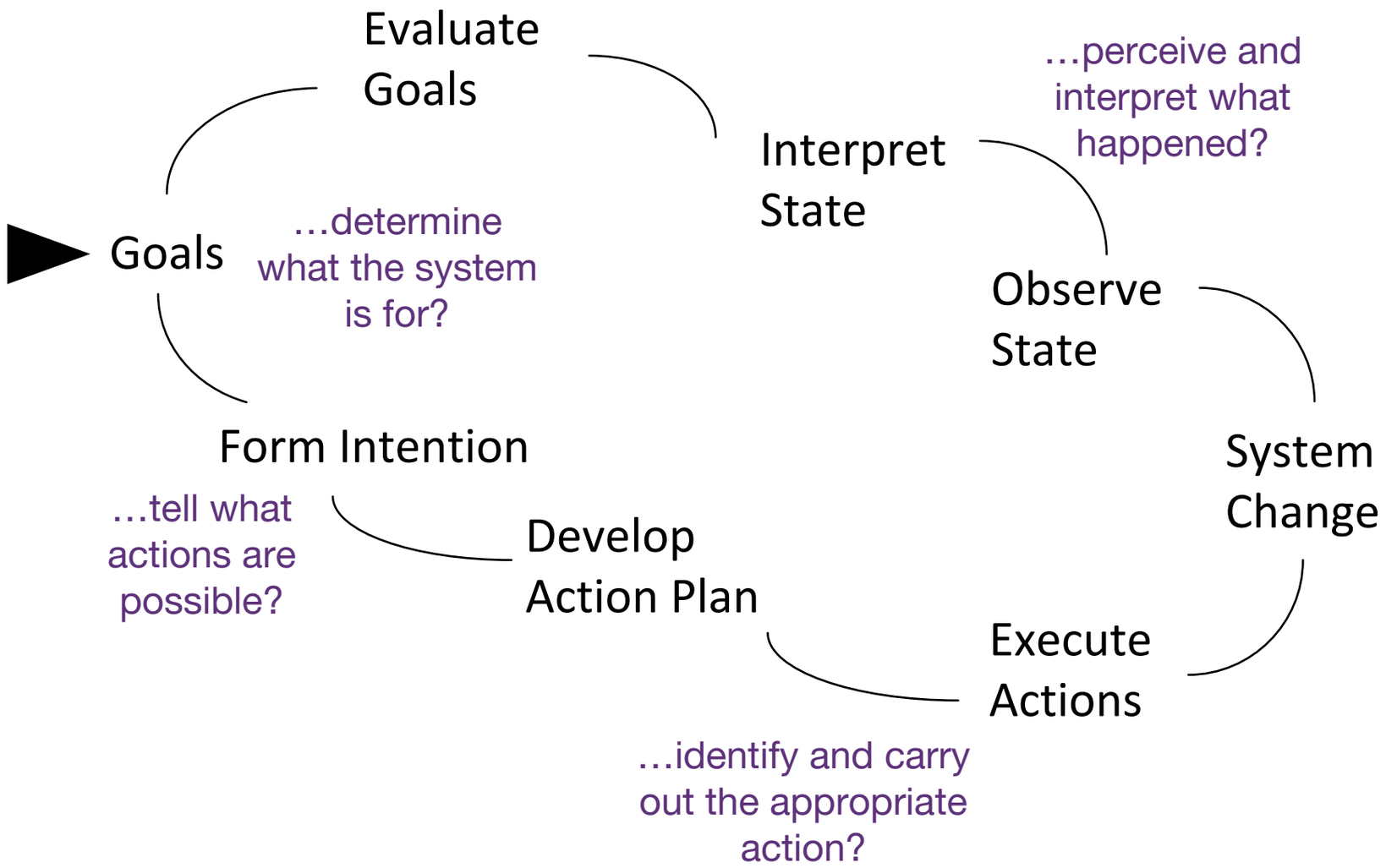
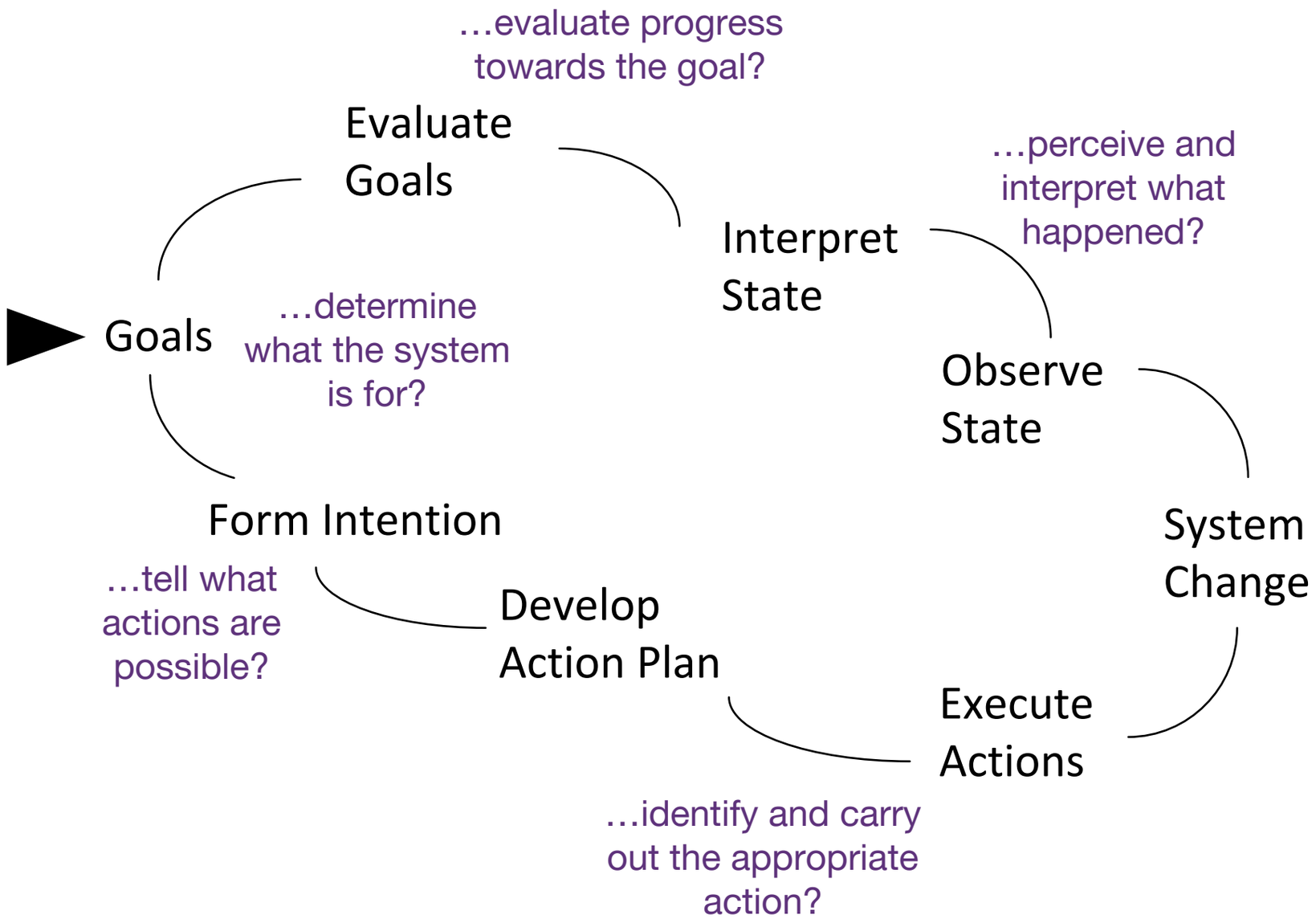
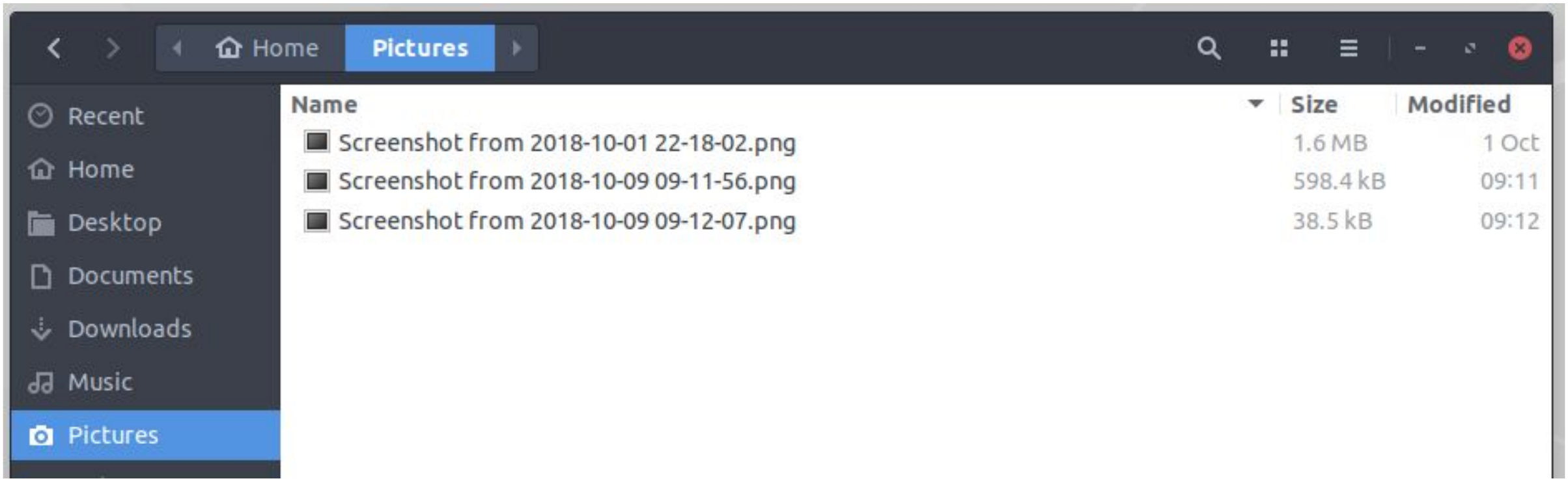


Let's Bridge the Gulfs...

… of finding the right Screenshot in my computer!



How did you bridge the gap?



Design principles help us answer these questions

Affordances
Constraints
Feedback
Consistency
Metaphors
Mappings
Visibility

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Affordances

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Affordances

Perceived Action Possibilities

What does this chair afford?

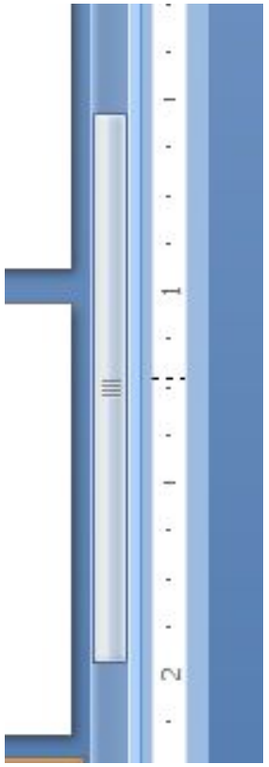
Affordances

Affordances

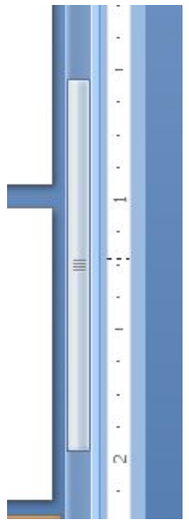
Affordances

Technology affordances are often based in affordances from the physical world

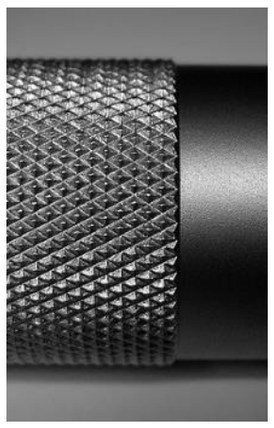
Affordances



Affordances



“Real-world” example: Knurling



Affordances

"In general, when the apparent affordances of an artifact matches its intended use, the artifact is easy to operate. When apparent affordances suggest different actions than those for which the object is designed, errors are common."

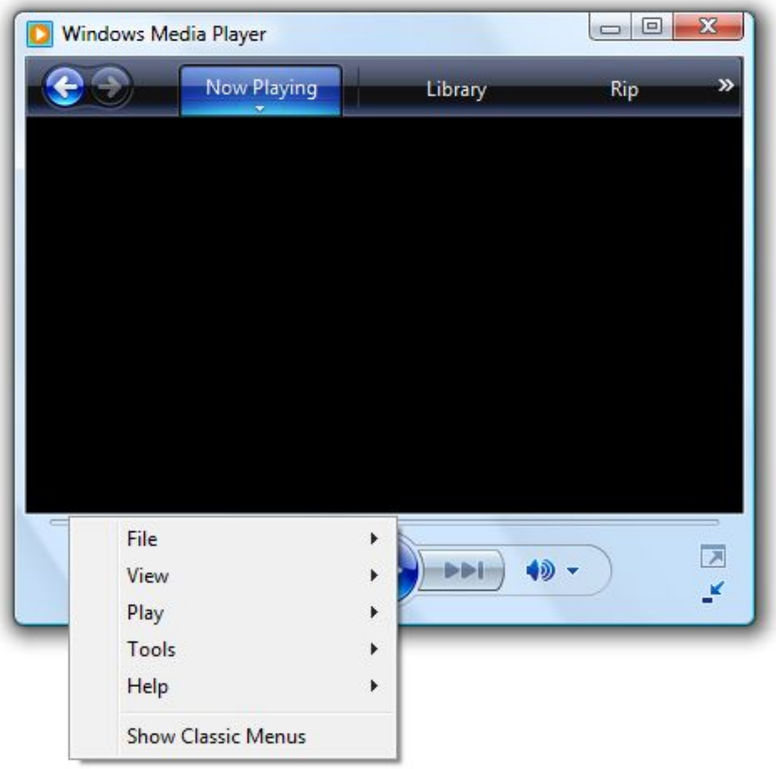
Gaver

False affordances

False affordances

Hidden affordances

When there is no perceptual information suggesting an actual intended use



Hidden affordances

Logos linking to home is a convention, but not afforded by the page

Clarification on Convention

"Designers sometimes will say that when they put an icon, cursor, or other target on the screen, they have added an 'affordance' to the system. This is a misuse of the concept. … It is wrong to claim that the design of a graphical object on the screen 'affords clicking.' … Yes, the object provides a target and it helps the user know where to click and maybe even what to expect in return, but those aren't affordances, those are conventions, and feedback, and the like. … Don't confuse affordances with conventions." **Norman**

Affordances vs Signifiers

Affordances are the possible interactions **between people and the environment**. (It is not a property of the "thing"!)

Perceived affordances often act as signifiers, but they can be ambiguous.

Signifiers signal things, in particular what actions are possible and how they should be done. Signifiers must be perceivable, else they fail to function.

Norman

Design principles

Affordances

Constraints

Feedback

Consistency

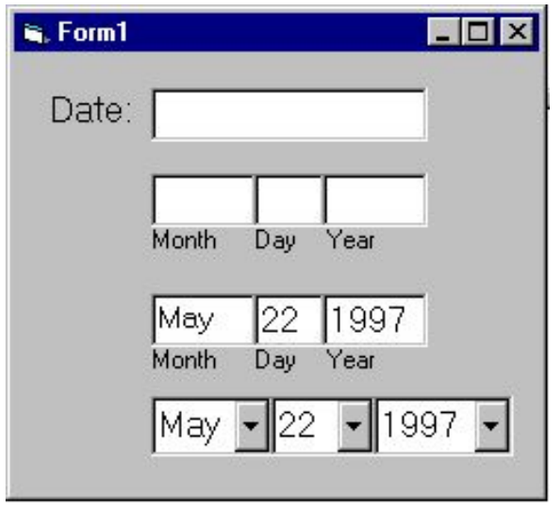
Metaphors

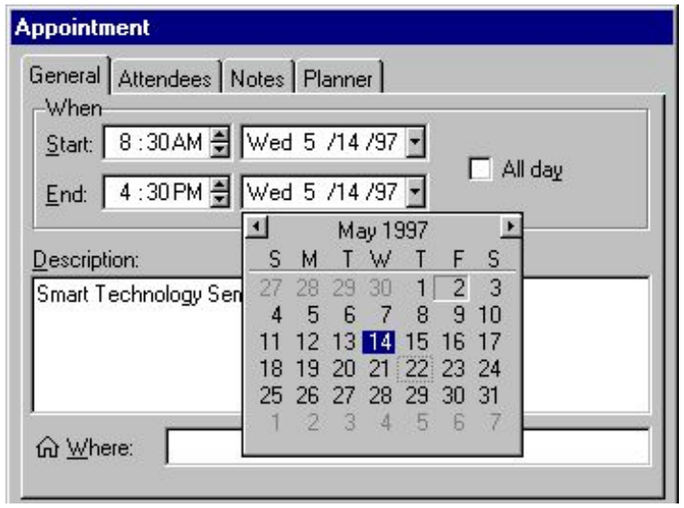
Mappings

Visibility

Constraints

Prevent some actions while allowing others





Prevent errors before they can happen

Disruptive error messages are a last resort

Constraints

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Feedback

https://www.videoblocks.com/video/loading-bar-scribble-animation-doodle-cartoon-4k-b03byrauliz20iitl

Feedback

All actions have to be confirmed

Must be immediate

Must be informative

Preferably non-distracting and unobtrusive

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Consistency

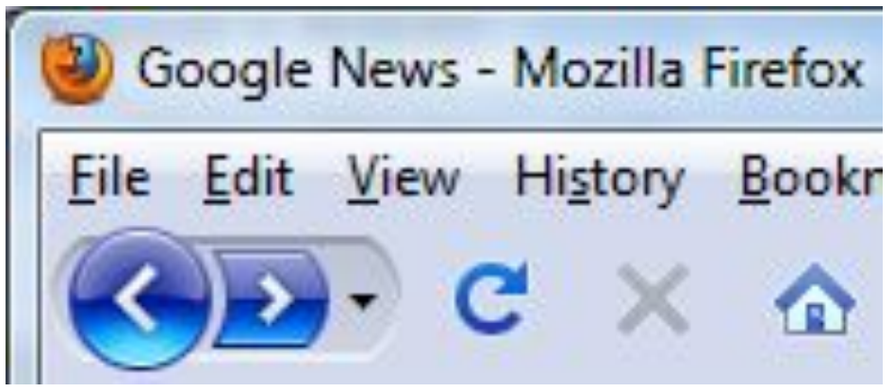
Interfaces should be consistent in meaningful ways

- Ubiquitous use of same keys for cut/copy/ paste

Types of consistency

- Internal (i.e., within itself)
  - e.g., same terminology and layout throughout
- External (i.e., with other applications)
  - e.g., common widget appearance
  - e.g., design patterns common across applications

Is consistency always better?



Design principles

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Metaphors

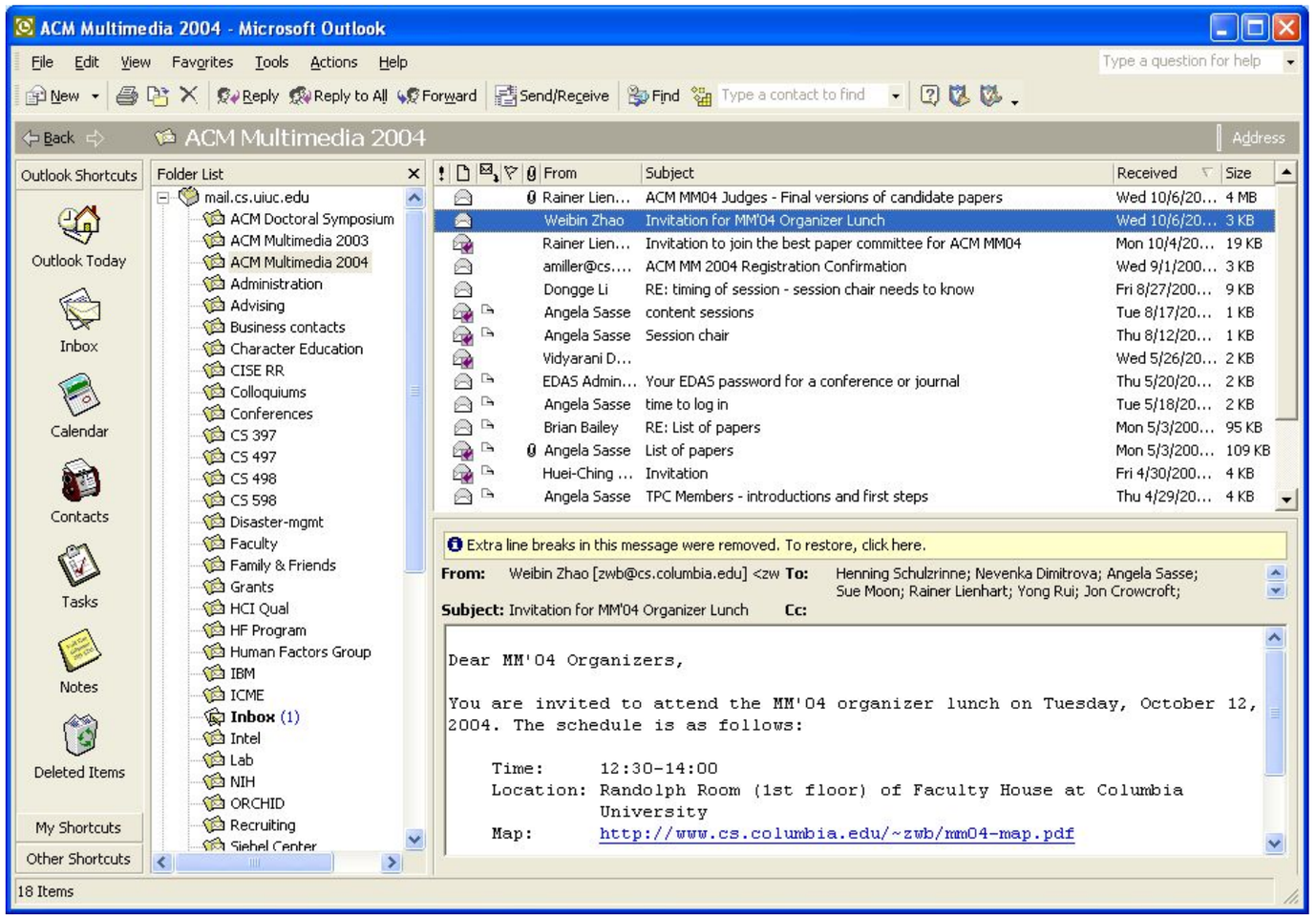
Suggest an existing mental model

- “horseless carriages”, “wireless”

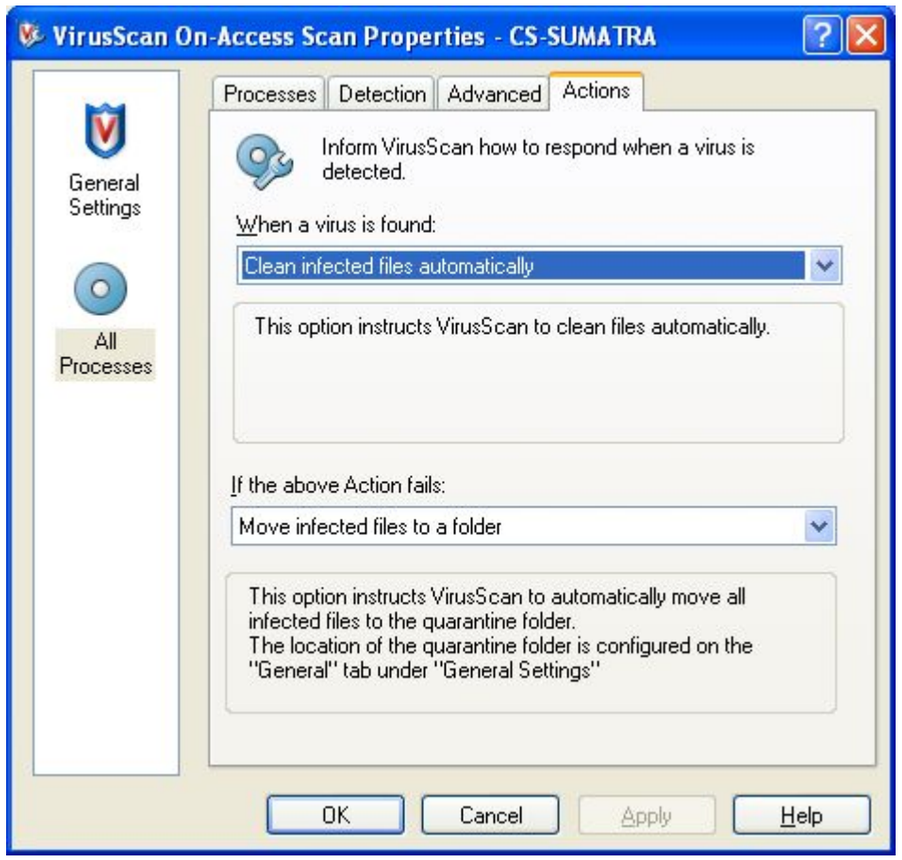
Desktop metaphor

- Not an attempt to simulate a real desktop
- Leverages knowledge of files, folders, trash
- Explains why some windows seem hidden

Example: Mail Metaphor

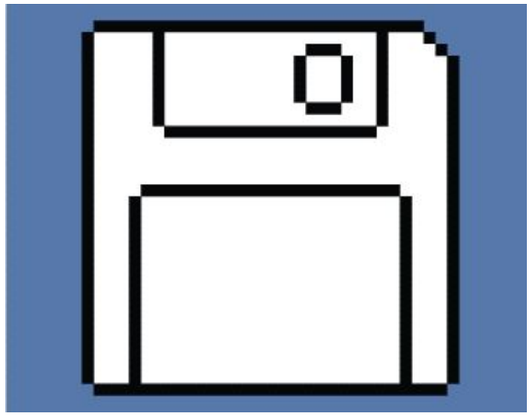


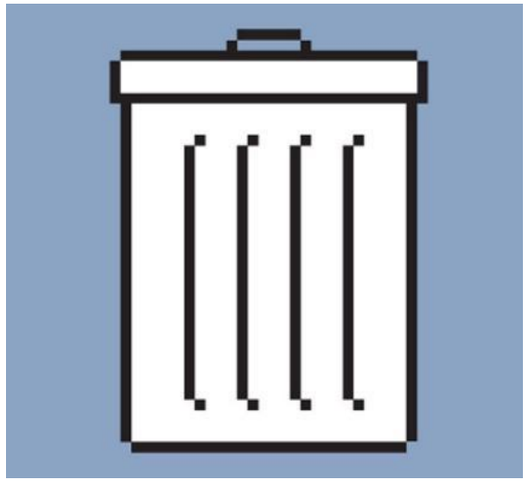
Example: Health Metaphor



Broken Metaphors

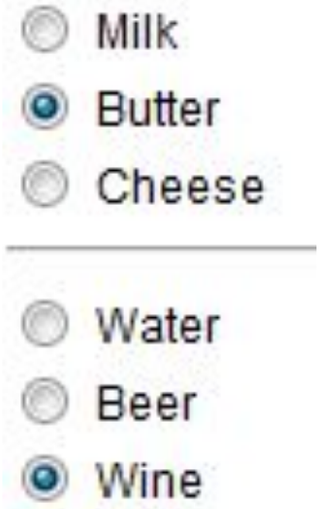
Are not consistent, do not operate in every circumstance, or do not uphold things consistent with what the metaphor would suggest





Dead Metaphors

Lost the original imagery of their meaning



Design principles

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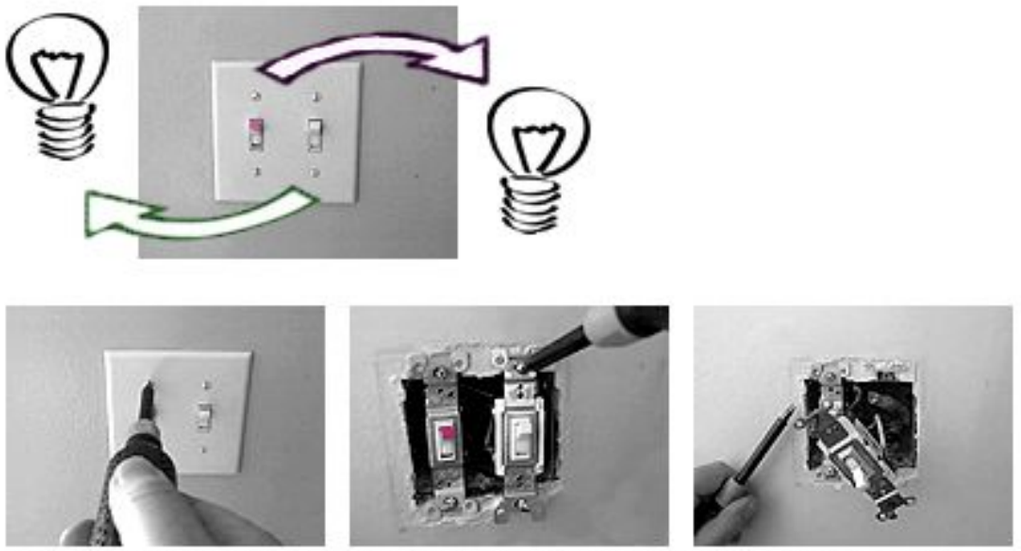
Visibility

Mappings

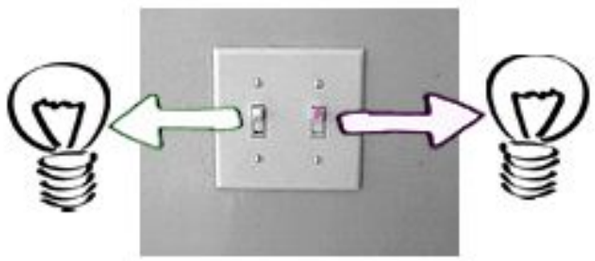
Correspondence between an interface and the corresponding action in ‘the world’

Minimize cognitive steps to transform action into effect, or perception into comprehension (i.e., execution and evaluation)

Mappings



Removing the cover plate, then removing and swapping the switches.

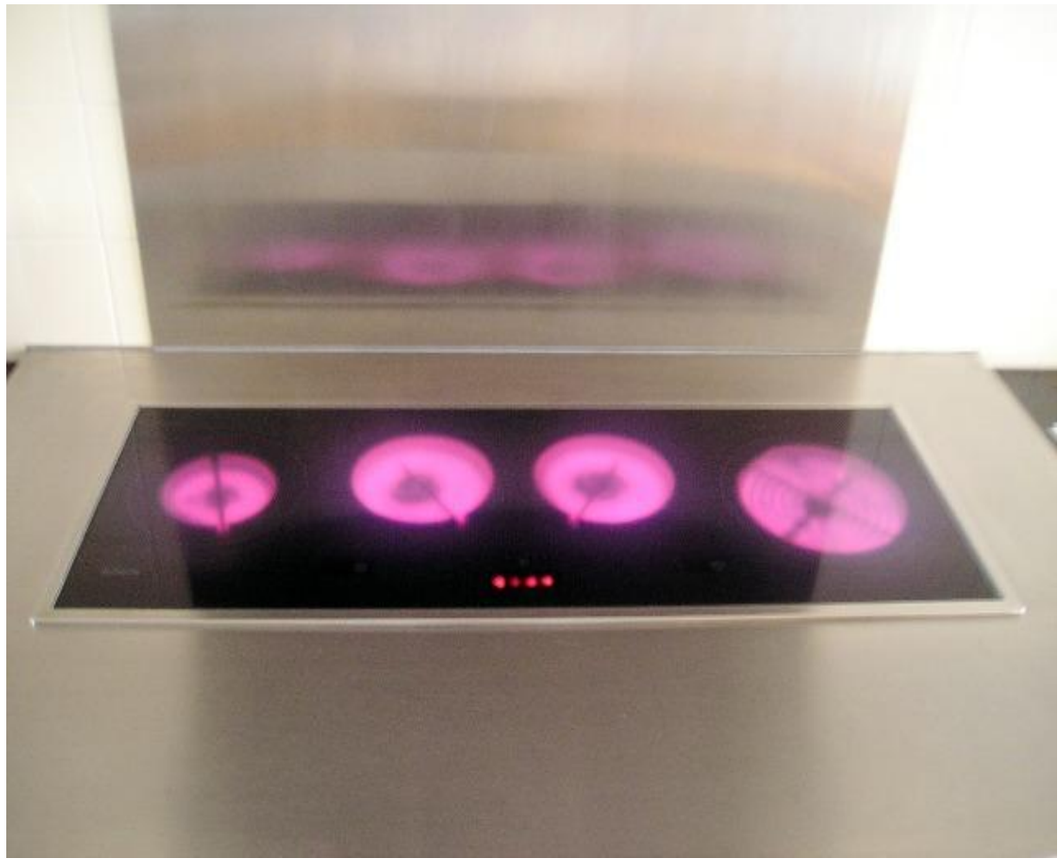


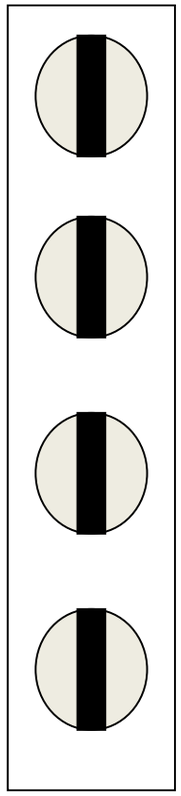
From http:/ /fivesketches.com/2009/11/natural-mapping-of-switches/

Mappings


500
500 EURO
500
200
200 EURO
200
200
100
100 EURO
100
100
10
10 EURO
10
10
50
EURO
CENT
20
EURO
CENT
10
EURO
CENT

Mappings





Mappings

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Visibility

Visibility

Visibility

Visibility

Differentiate opposing functionality

Use visual function to confirm the user's mental model of operation

Sometimes sound can be used to make things ‘visible’ (e.g. vacuum cleaner clogging up)

Just the right things have to be visible: excess is as bad as lack of visible clues

Summary

Summary: Features of Good Design

Has **affordances** (makes each operation visible)

Offers obvious **mappings** (makes the relationship between the actual action of the device and the action of the user obvious)

Provides **feedback** on the user's action

Provides a good **mental model** of the underlying behavior of the device

Provides **constraints** (to prevent errors)

Bad Design Hunt

Can you discover instances of bad design on campus?

False affordances? A lack of consistency, visibility, or mappings?

“Thanks to you, I now constantly notice how badly things are designed.” — anonymous student from the Spring 2017 offering

Ask me something!