

Lec 9

# Cognitive Aspects

Frameworks & Cognitive Processes

Omar Hammad

**Desert**

**مكتبة**

**Algorithm**

**Jeddah**

**User Interface**

**Falcon**

**تحليل**

**Pixel**

**Cultural Heritage**

**Clickstream**

**Riyadh**

**Heuristic Evaluation**

**شجرة**

**Neural Network**

**Dates**

**Omar Hammad**

**Sand Dunes**

**بريد إلكتروني**

**Protocol**

**Cactus**

# Cognitive Frameworks

# Digital Behavior

- Online shopping funnel
- Apps quitting
- Multitasking in VR
- ....

# Cognitive Frameworks

**Mental  
Models**

**Gulfs of  
Execution and  
Evaluation**

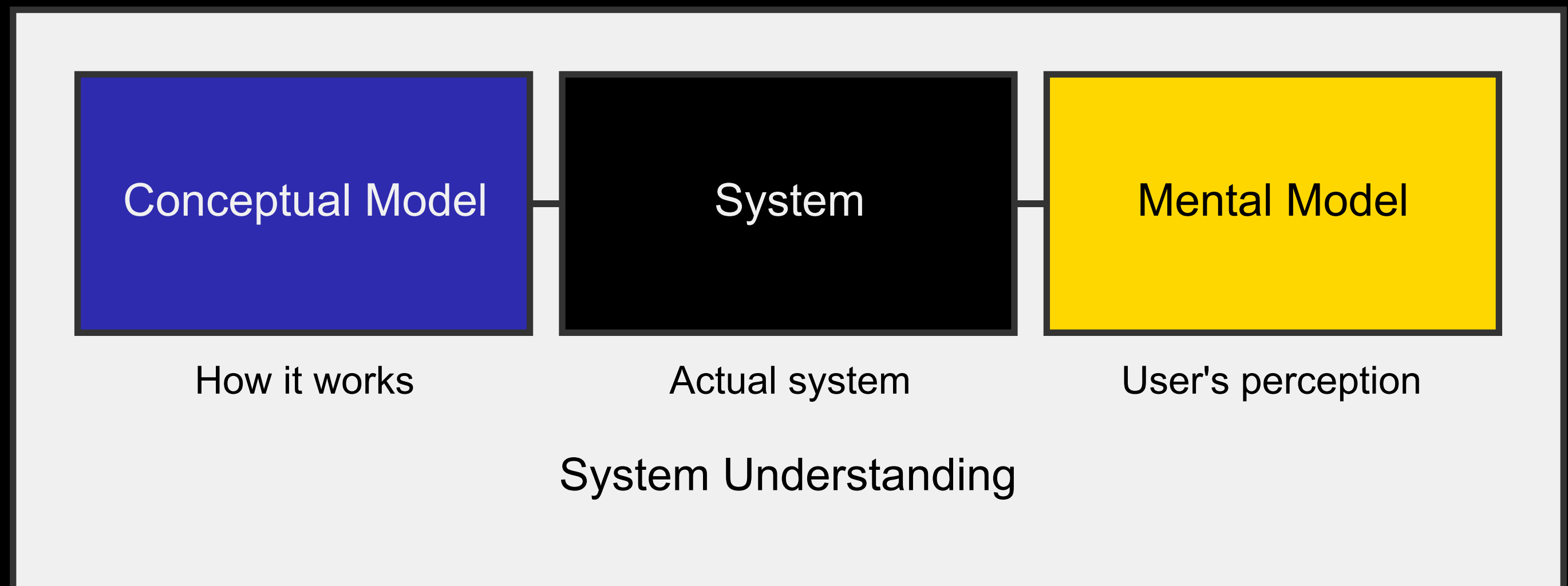
**Information  
Processing**

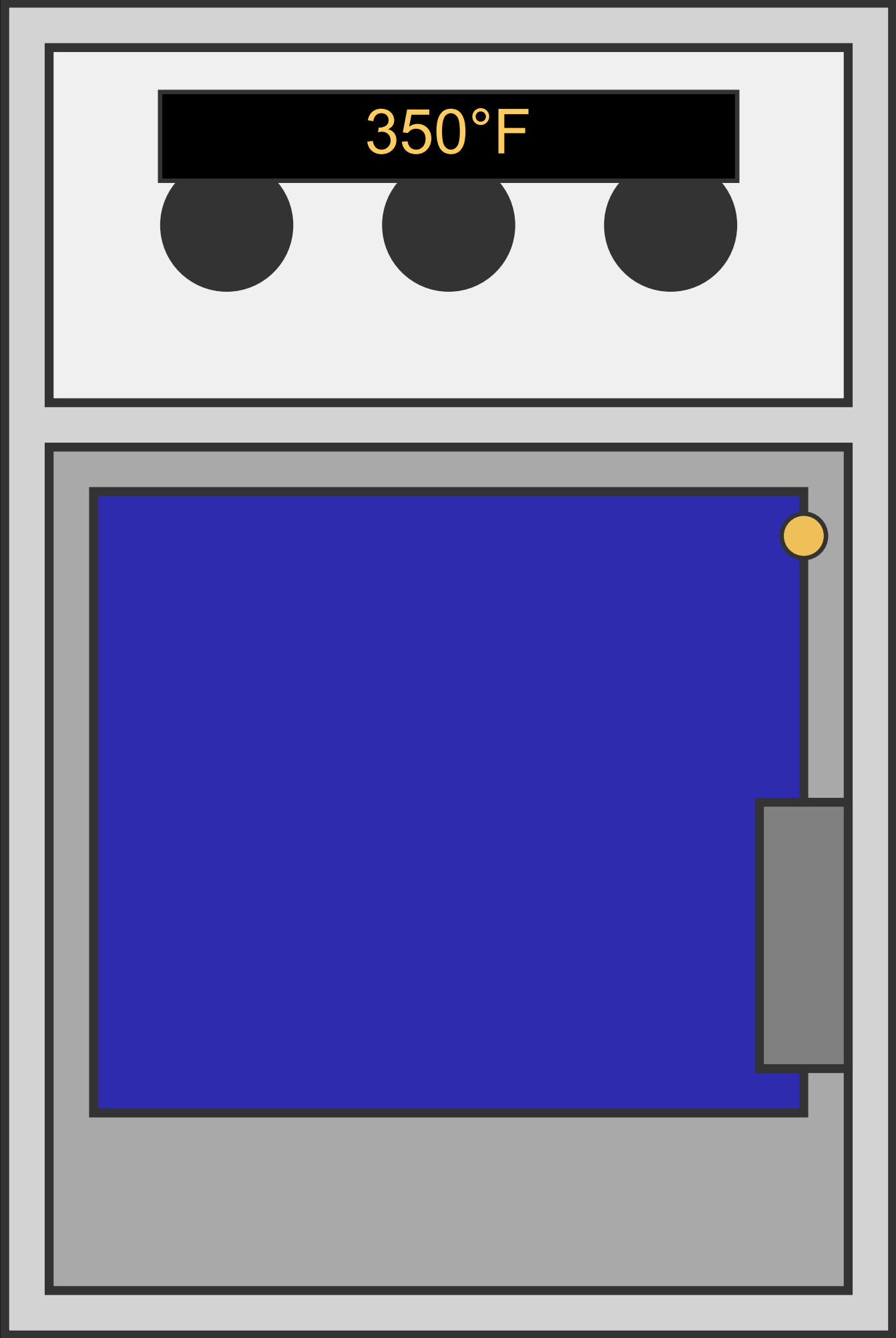
**Distributed  
Cognition**

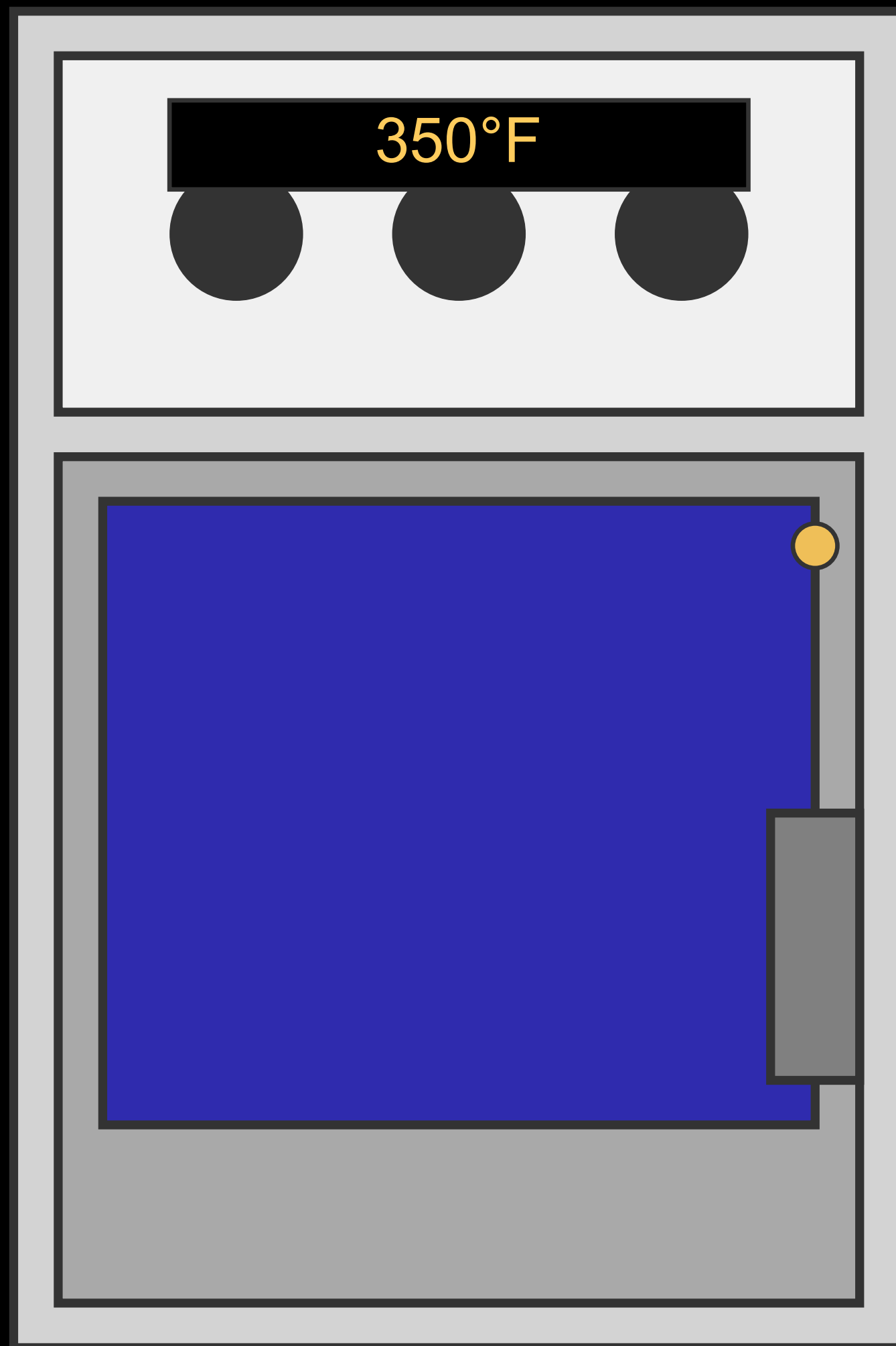
**External  
Cognition**

**Embodied  
Interaction**

# Mental Models







## Confused with “More is More”

- Fire oven > More heat
- Open Faucet > More water
- Food > Growth
- ...



**Other confusions with  
interfaces ..**

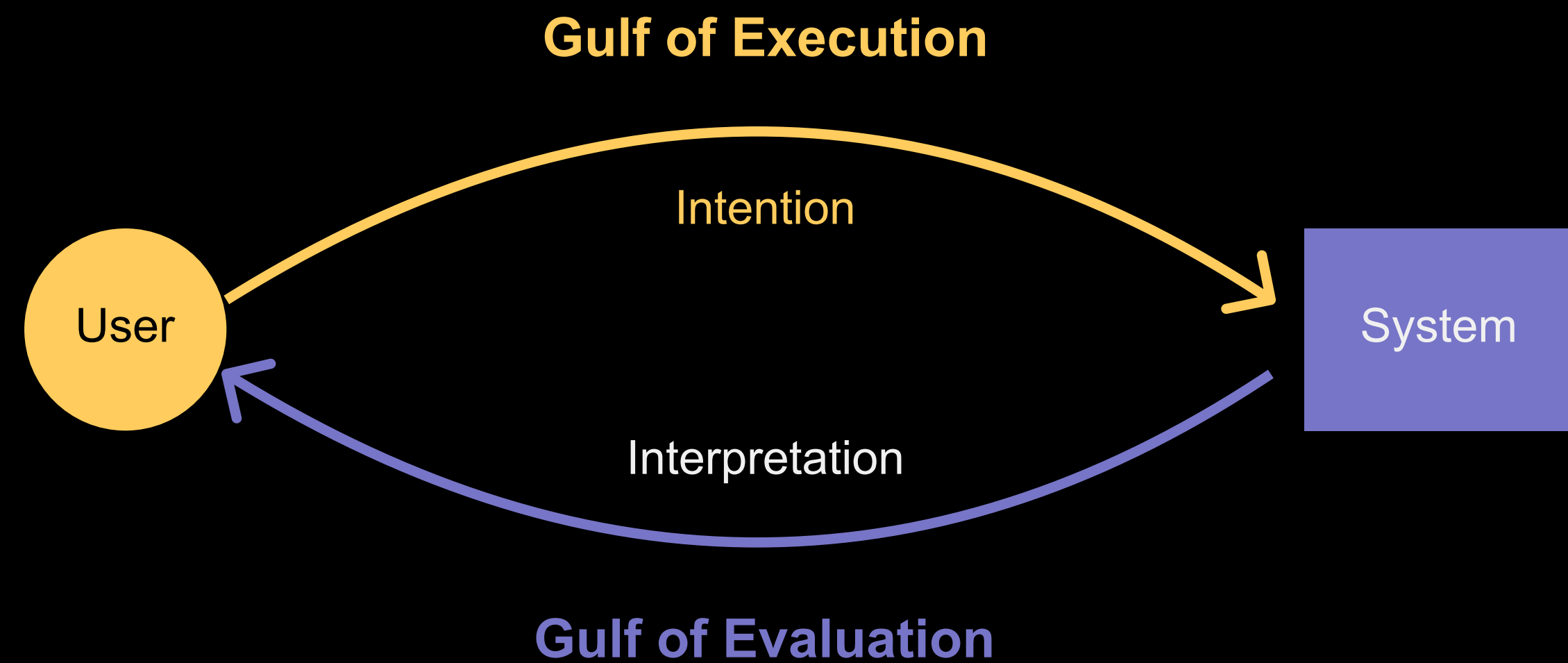
- ...

initially building on familiar patterns to ensure  
comprehension while gradually introducing new  
elements and components



- What information is sent between the mobile and the card reader?
- how does the reader works?
- maximum amount to pay?
- what happens when stolen?

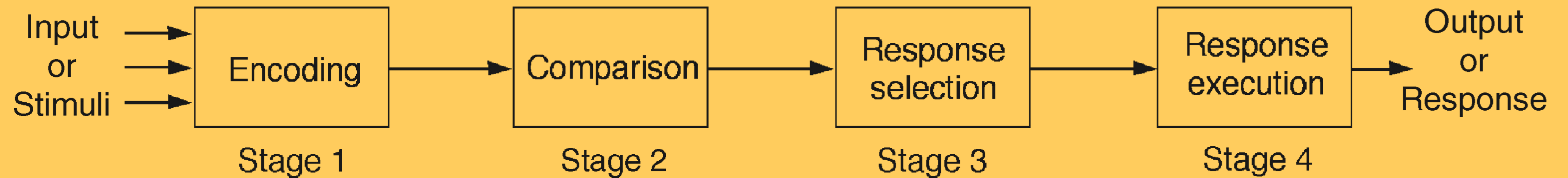
# Gulf of Execution/ Evaluation



**Examples of  
confusion that  
happens in intention/  
interpretation ..**

- Banking app .. Transfer ..
- ...

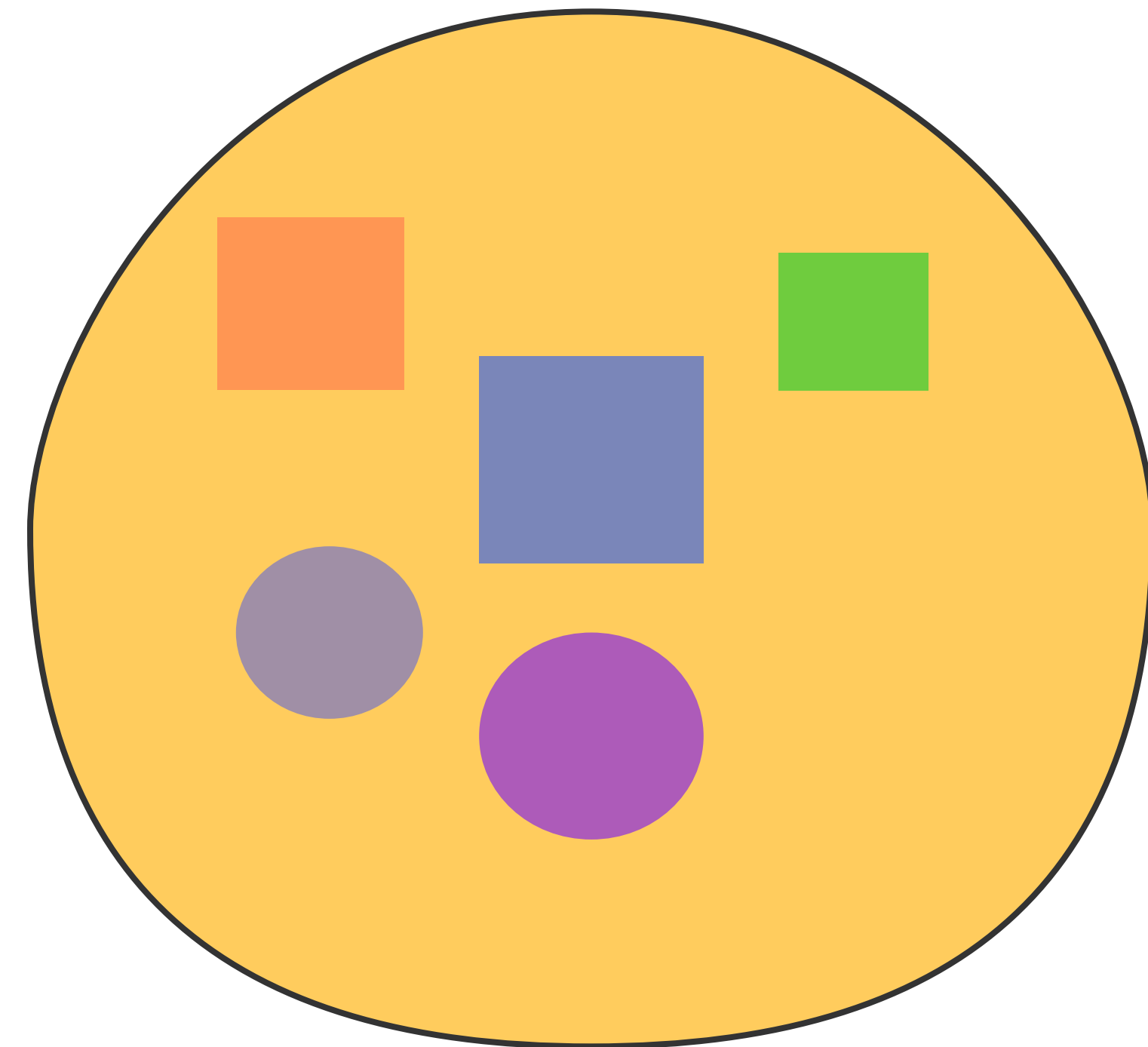
# Information Processing



# Cognitive Load

The mental effort required to learn something new or perform a task, with the assumption that mental capacity is limited.

Cognitive Load Illustration



Tasks and Memory Items

**Back to:**  
**Cognitive Aspects**



# Perception

Acquiring information through the five senses

To present information in a way that can be readily perceived in the manner it was intended

# **Design considerations to make perception easier**

- **Contrast**
- **White space**
- **Grouping**
- **.. what else?**

**Today's date is**

**18/09/2024**

**What is the time?**

**18/09/2024**

**18/09/2024**

# Why White space is important

- Improves Readability: White space around text and between elements improves readability by giving the eyes a rest and preventing information overload.
- Enhances Focus: It helps direct attention to the most important elements by removing distractions and creating a clear hierarchy.
- Creates Balance and Harmony: Proper use of white space gives a sense of balance, harmony, and elegance to a design.
- Increases Comprehension: Well-spaced content improves comprehension and retention as it makes the content easier to follow and understand.
- Facilitates Scannability: In digital interfaces, white space makes it easier for users to scan content quickly, improving user experience.
- Promotes Visual Hierarchy: It helps create a visual hierarchy by separating different sections and guiding the user's eye to specific points of interest.
- Boosts Aesthetic Appeal: White space adds sophistication and cleanliness to a design, making it visually more attractive.
- Encourages Interaction: In interactive design, white space can help users focus on clickable elements like buttons, improving interaction rates.
- Prevents Overcrowding: It ensures that a design doesn't look too busy or cluttered, reducing cognitive load and user frustration.
- Builds Brand Perception: A well-spaced, clean design communicates professionalism, quality, and credibility, which can positively affect how users perceive a brand.

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# **Design Implications of Perception**

• .....

# **Design Implications of Perception**

- Icons should enable users to distinguish their meaning readily
- Bordering and spacing are effective visual ways of grouping information
- Sounds should be audible and distinguishable
- Research proper color contrast techniques when designing an interface:
  - Yellow on black or blue is fine
  - Yellow on green or white is a no-no
- Haptic feedback should be used judiciously



# Memory

Recalling various kinds of knowledge that allow people to act appropriately

**What do you remember  
from the list of words?**

# **What do we know about memory?**

- Our brains filter information
- Affected by attention
- Context plays a big role in recall
- Recognition is much easier
- Interesting finding: we forget what we photograph (Henkel, 2014)
- We have a short term & long term memory
- ....

# Read & Present

## Mental Processes

- Learning
- Reading, Speaking & Listening
- Problem-Solving, Planning, Reasoning, and Decision-Making

## Mental Frameworks

- Distributed cognition
- External cognition
- Embedded interaction

## **Reducing cognitive load examples**

- Google maps ..
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