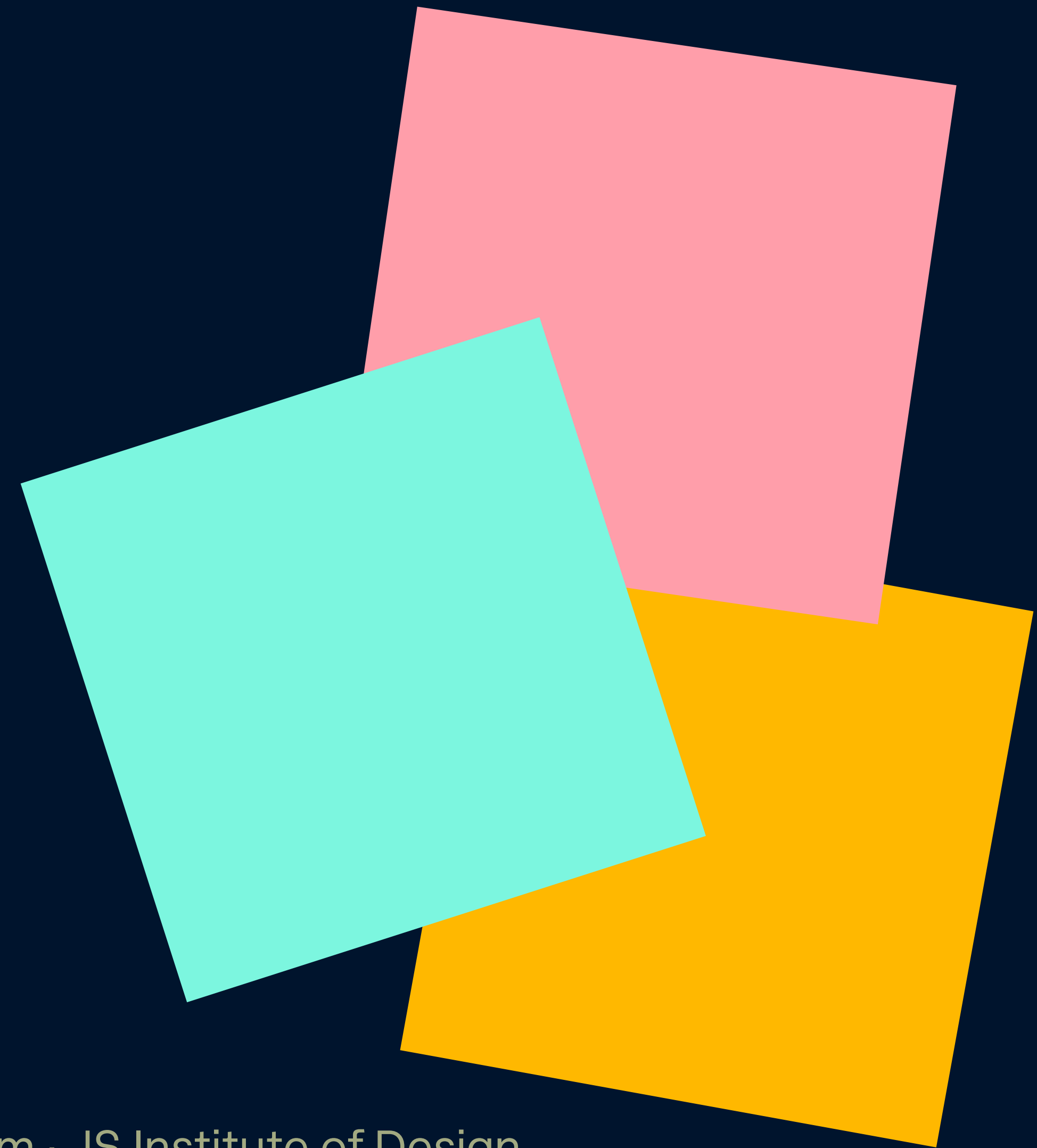


Lecture 5

Ergonomics - Physical and Cognitive

Mental Models

26 September 2025 · Gyan Lakhwani · gyanlakhwani@gmail.com · JS Institute of Design



RECAP

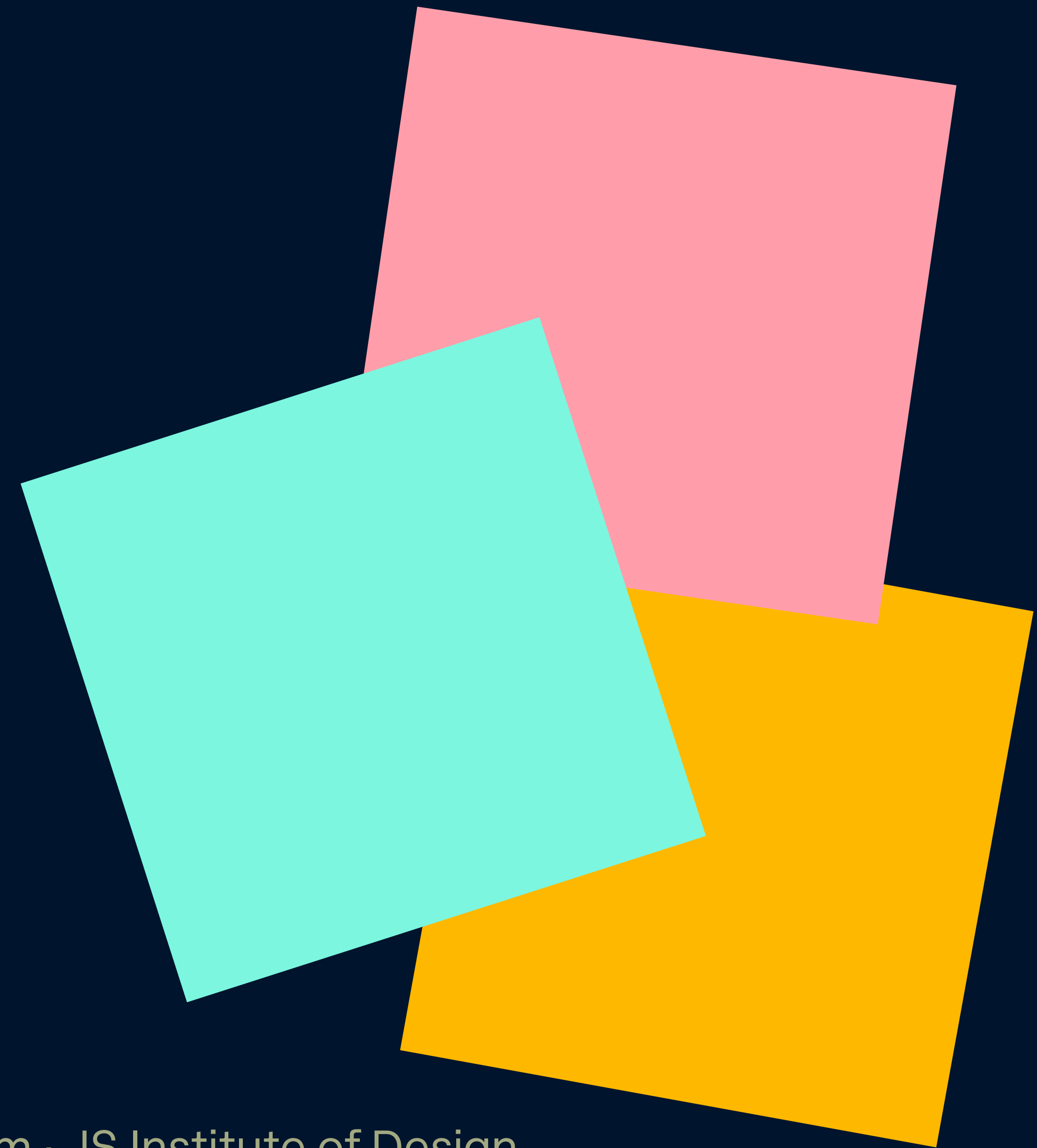
Last Friday

Lecture 4

Ergonomics - Physical and Cognitive

Attention

19 September 2025 · Gyan Lakhwani · gyanlakhwani@gmail.com · JS Institute of Design



Have you ever been told
PAY ATTENTION
TO THIS!

What does that actually mean?



Attention is the cognitive
process of selecting certain
information while ignoring
other stimuli.

Attention is the cognitive
process of **selecting certain**
information while ignoring
other stimuli.



You can guide attention
with an understanding of
design principles

Selective Attention

People focus
only on what
seems relevant

Divided Attention

Splitting
between tasks
reduces
effectiveness

Sustained Attention

Ability to
maintain focus
over time

Selective Attention

People focus
only on what
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Ability to
maintain focus
over time

How is

ATTENTION

Relevant for designers?

- Interfaces should guide attention to what matters (through hierarchy, contrast, motion, placement).
- Reduce noise and distractions that steal attention (cluttered dashboards, irrelevant notifications).
- Respect limits of multitasking (e.g., driving while using navigation UI).

CLASS EXERCISE

ATTENTION ECONOMY

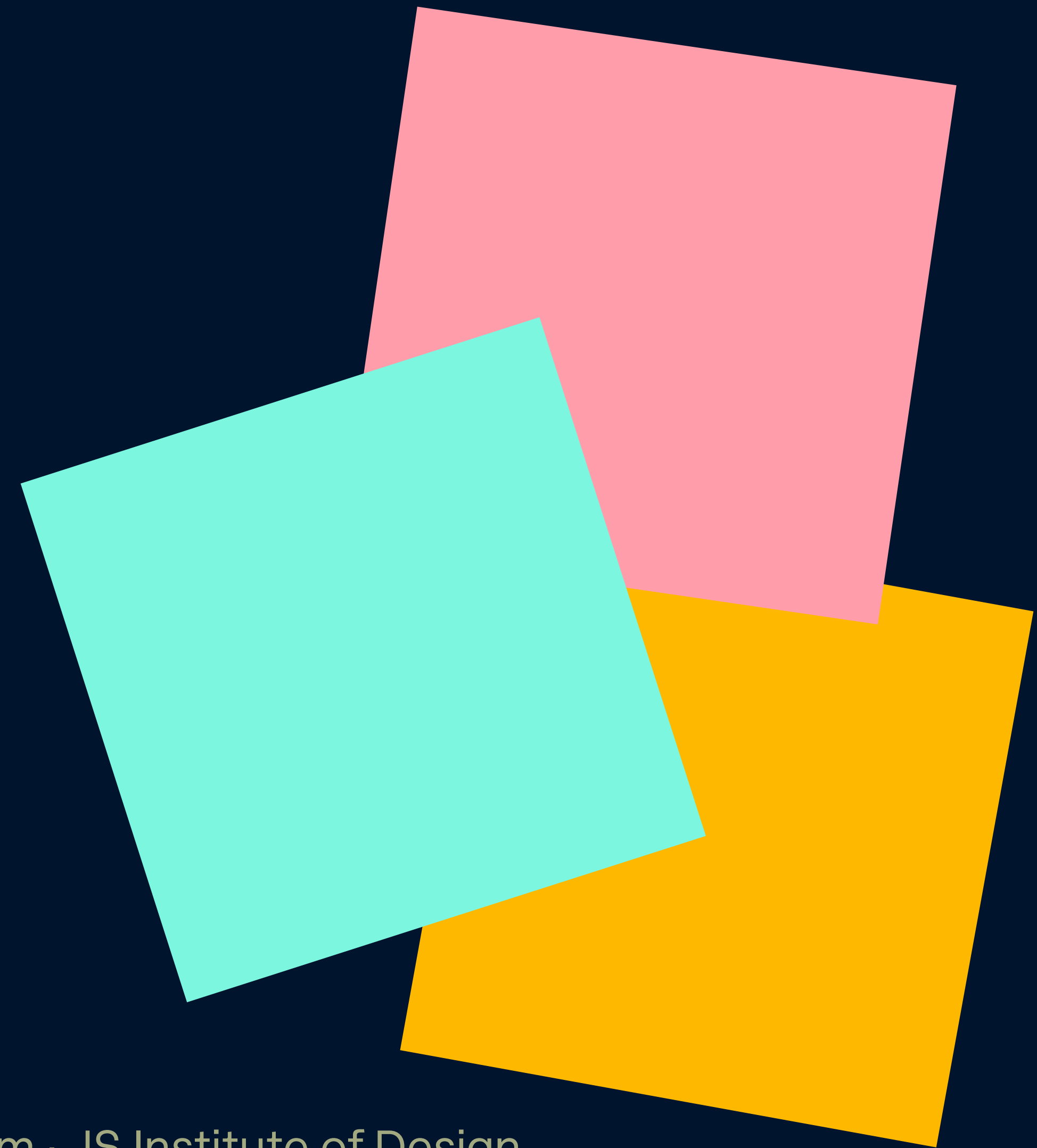
- Find an app/website you use regularly. Everyone should pick a different one.
- Analyse it using what we discussed about attention today.
- What is the app drawing your attention to?
- What is prominent? What is hidden away?
- What do you think were the tradeoffs to arrive at this design?
- If you had to change one thing to draw more or less attention, what would it be?

Lecture 5

Ergonomics - Physical and Cognitive

Mental Models

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CLASS EXERCISE

Read and Discuss “How to read a paper” by S. Keshav.

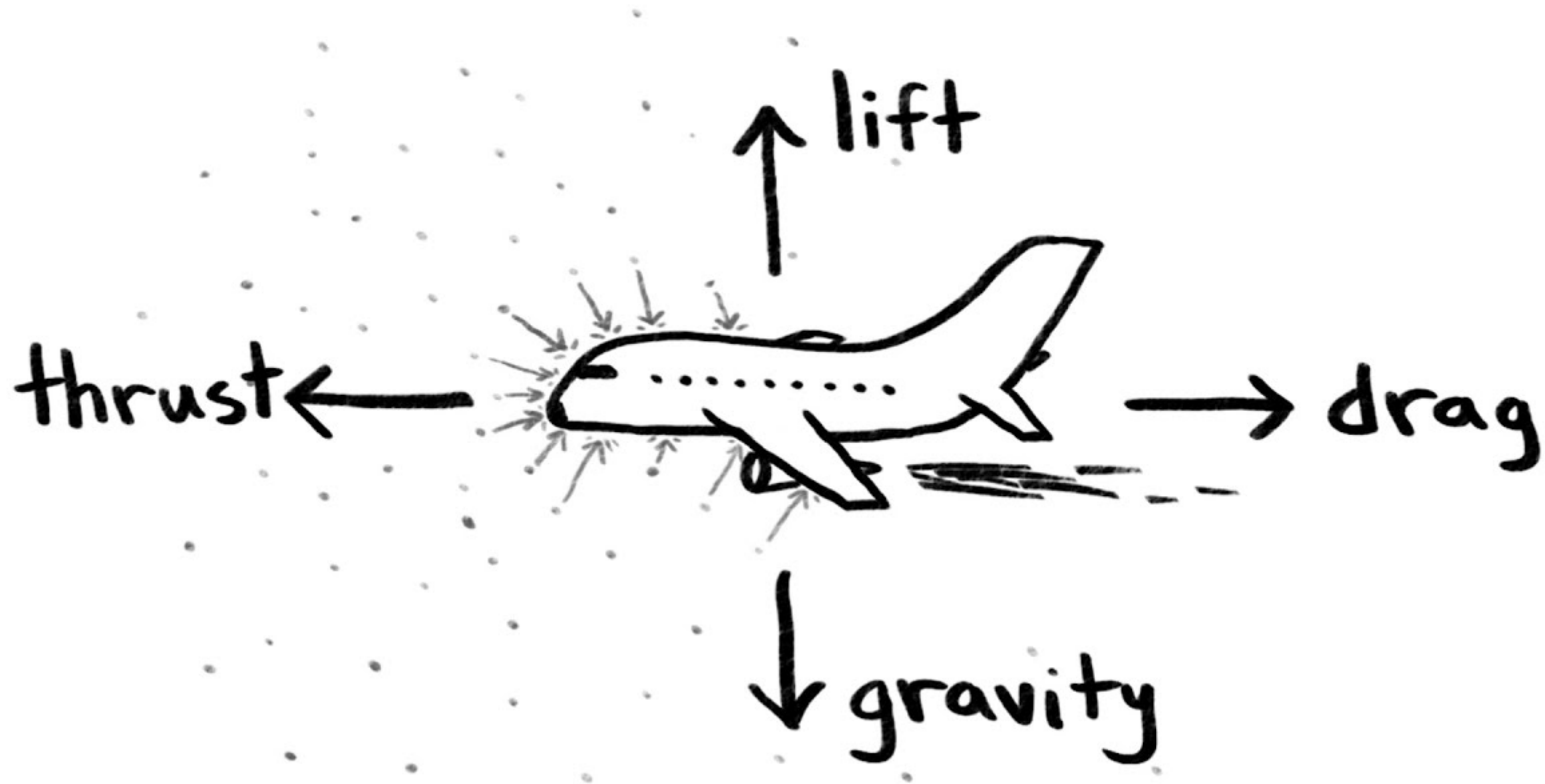
How to Read a Paper

S. Keshav

David R. Cheriton School of Computer Science, University of Waterloo
Waterloo, ON, Canada
keshav@uwaterloo.ca

How does an airplane fly?

How does an airplane fly?



How does an airplane fly?

I have no idea.

How does an airplane fly?

I have no idea.

Magic, probably.



Cognitive Ergonomics

Mental Models

Mental Models

**A simplified
explanation of how
something works.**

Mental Models



**Room is at 30°
I am feeling hot
I set the remote to 24°**

Mental Models



**I am still feeling hot
What do I do?**

Mental Models



**If I set the remote to
16° what will happen?**

Mental Models

Many people assume an AC remote works like a gas pedal, and setting the temperature to cooler will mean it cools faster.

In reality, it just sets a target. When the target is reached, the AC shuts off or goes into low power mode.

Mental Models

Did you know this?

Mental Models

Did you know this?

Have you operated an AC before?

Mental Models

Did you know this?

Have you operated an AC before?

**Did your mental model cause you any issues
in operating the AC?**

Mental Models

**Users mental models may
not perfectly match how
something really works.**

If you press the elevator button multiple times, does it make the elevator arrive faster?

QUESTIONS

- ✦ What assumption were you making?
- ✦ Where did that assumption come from? (experience, analogy, culture)
- ✦ Was it a useful shortcut or a misleading one?

**Force-quitting apps
(swiping them
away) always
makes your phone
faster and saves
battery.**

QUESTIONS

- ✦ What assumption were you making?
- ✦ Where did that assumption come from? (experience, analogy, culture)
- ✦ Was it a useful shortcut or a misleading one?

If you set your microwave to 60 seconds at medium power, what actually happens?

What about 30 seconds at high power?

QUESTIONS

- ✦ What assumption were you making?
- ✦ Where did that assumption come from? (experience, analogy, culture)
- ✦ Was it a useful shortcut or a misleading one?

Two people on the same Wi-Fi: Does one person streaming Netflix make the other person's emails load slower?

QUESTIONS

- ✦ What assumption were you making?
- ✦ Where did that assumption come from? (experience, analogy, culture)
- ✦ Was it a useful shortcut or a misleading one?

When the car fuel tank needle is on “E,” how much fuel do you actually have left?

QUESTIONS

- ✦ What assumption were you making?
- ✦ Where did that assumption come from? (experience, analogy, culture)
- ✦ Was it a useful shortcut or a misleading one?

Mental Models

**A Mental Model Is Based
on Belief, Not Facts**

Mental Models

**Every person has their own
mental models based on
background knowledge and
past experiences.**

Mental Models

Mental models can change over time — due to additional experience with your system or with other systems.

Is Keshav's 3 pass method a mental model?

- It simplifies a complex task: Reading a paper can feel overwhelming (dense text, jargon, math, long proofs). The three-pass method reduces that by giving a structured approach: skim → read deeper → dive fully.
- It guides decision-making: Instead of randomly reading, you know what to focus on at each stage. That's exactly how mental models work — they filter what's important and what to ignore.
- It transfers across contexts: While designed for research papers, the same staged reading can be applied to technical reports, product specs, policy docs, even design case studies.
- It encodes a strategy: Like other mental models (Pareto principle, Feynman technique), this one is a reusable strategy for navigating complexity.

NOTE

Keshav's 3 pass method is a procedural mental model (a recipe for action) rather than a structural one (like a mental model of how an AC works).

It can be considered under cognitive strategies that help manage attention, comprehension, and cognitive load.