

## THE ILLUSION OF REALITY

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## THE ILLUSION

- “Virtual reality works because reality is virtual”  
– Lawrence Stark, UC Berkeley



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## THE ILLUSION

- We experience a high-resolution spatial and temporal continuum when we look around the 3D environment we are in.
- This is an **illusion!**

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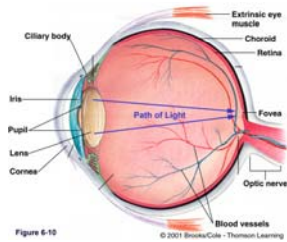
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## THE ILLUSION

- The retinal image of the visual field is in focus only in a very small area: The **fovea**.



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## THE ILLUSION

- We need to sample the visual field, with **saccades** and **fixations** (~3 per sec.) to construct an image.

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scanpaths and what we see

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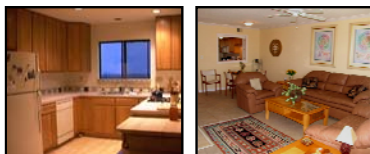
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## THE ILLUSION

- Sampled information is relatively sparse when you walk into a room. You see the typical things and think you have seen the whole room.



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## THE ILLUSION

- You can change the way that you see by changing perceptual filters.
- For example: "I want to see squares"...

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"I want to see squares"

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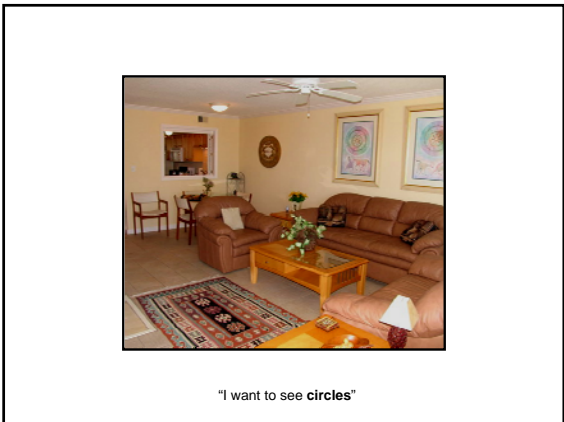
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### THE ILLUSION

- **Fixating** ~90 % of the time.
- **Checking and rechecking** points of interest, as if gathering support for what we think we are seeing.
- It is hard to overcome strong **presuppositions**, such as what a room looks like...

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... or what a **vase** looks like



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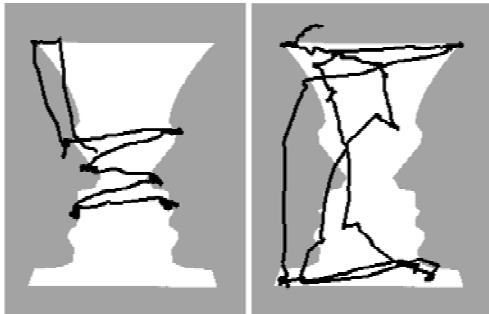
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(a) Scanpath for two faces

(b) Scanpath for vase

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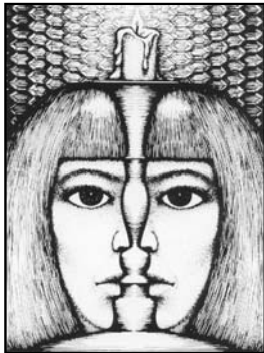
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**THE ILLUSION**

- We see what is in **our mind's eye**, and use sampled visual information to verify this.
- The **scanpath** is driven by our **mental model**. Change the model and the scanpath changes.

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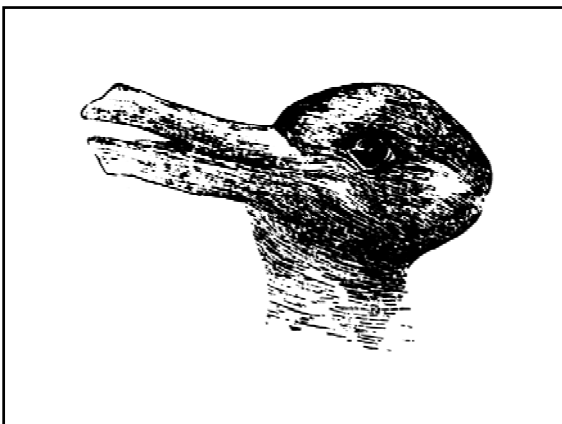
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## THE ILLUSION

- Our model can even make us see things that we **don't have any sensory data** for!

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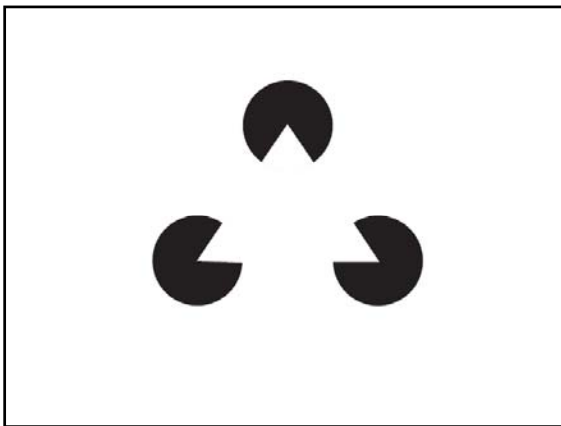
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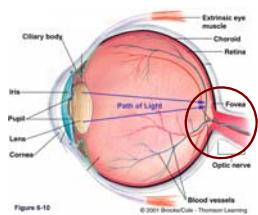
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## THE ILLUSION

- That's a good thing, because we are actually **missing some data...**



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## THE ILLUSION

- Can you find your blind spot?

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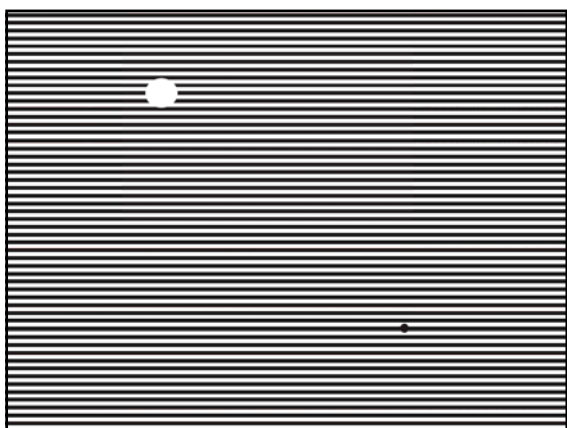
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## THE ILLUSION

- Information is integrated across neighboring areas.
- It's **image processing!**



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THE ILLUSION  
OF 3D WORLDS

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3D WORLDS

- How do we perceive immersion in a 3D environment?

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3D WORLDS

- How do we perceive immersion in a 3D environment?
  - Physiological cues
  - Stereoscopic cues
  - Static cues
  - Motion cues

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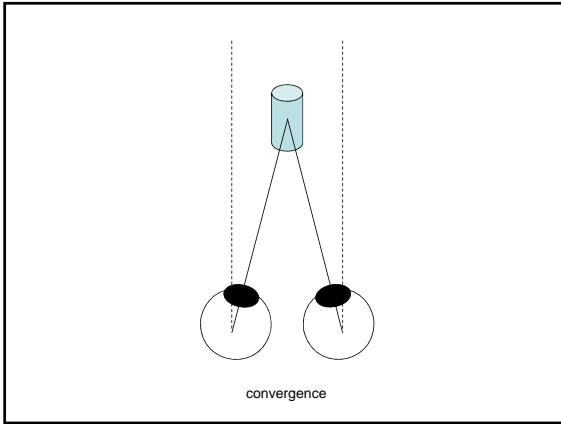
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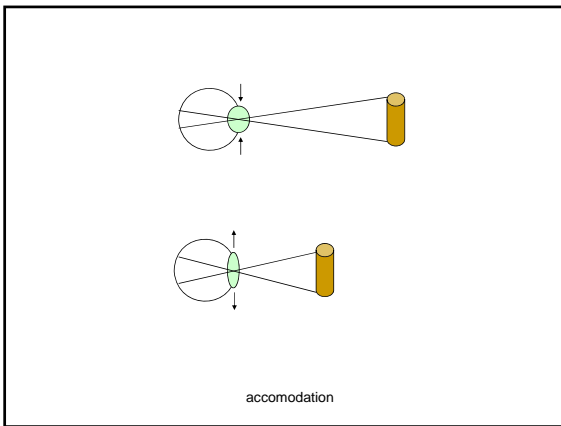
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**3 D WORLDS**

- How do we perceive immersion in a 3D environment?
  - Physiological cues
  - **Stereoscopic cues**
  - Static cues
  - Motion cues

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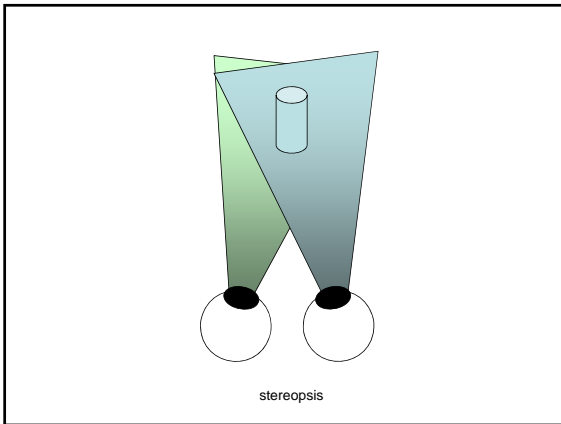
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### 3D WORLDS

- How do we perceive immersion in a 3D environment?
  - Physiological cues
  - **Stereoscopic cues**
  - Static cues
  - Motion cues

But even if we close one eye we see the world in 3D - how can that be? (also on TV etc.)

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### 3D WORLDS

- How do we perceive immersion in a 3D environment?
  - Physiological cues
  - Stereoscopic cues
  - **Static cues**
  - Motion cues

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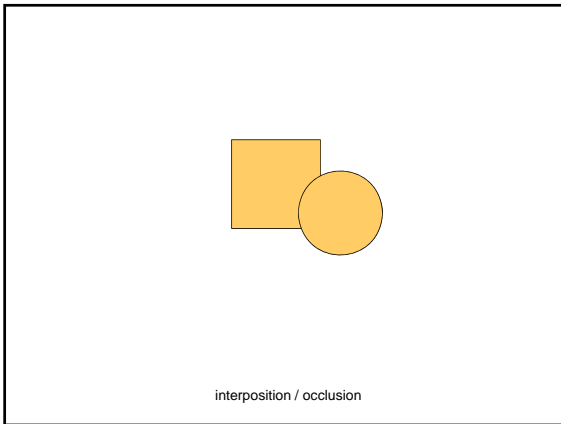
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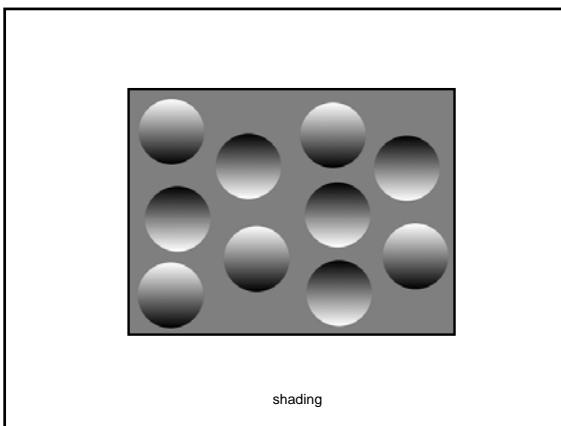
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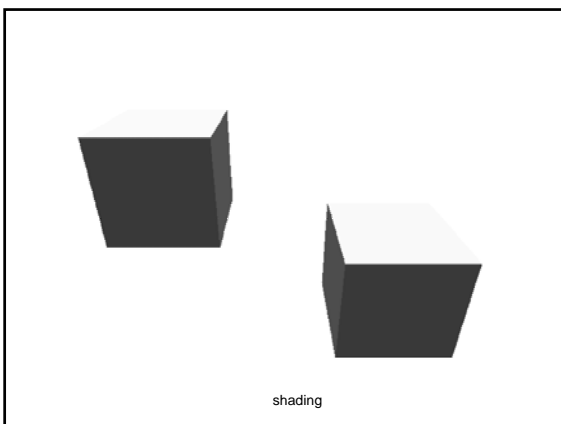
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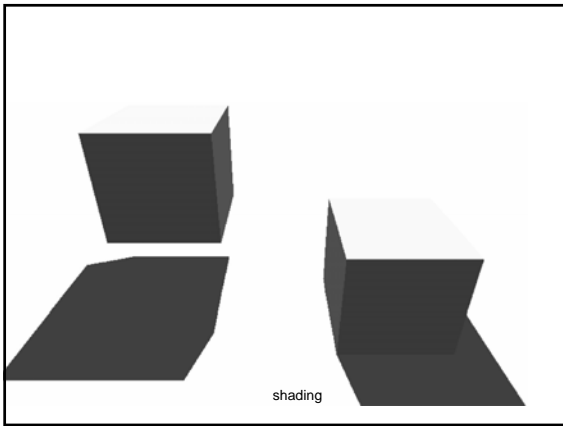
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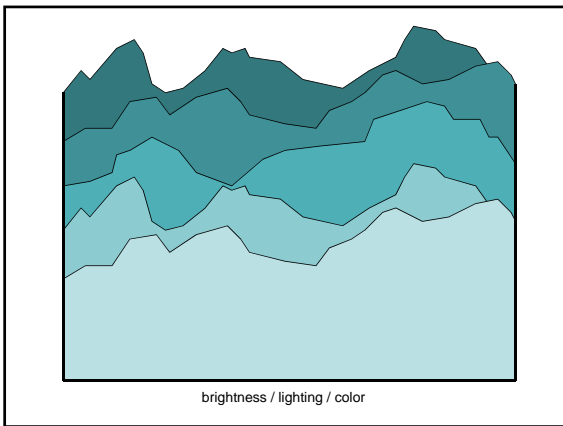
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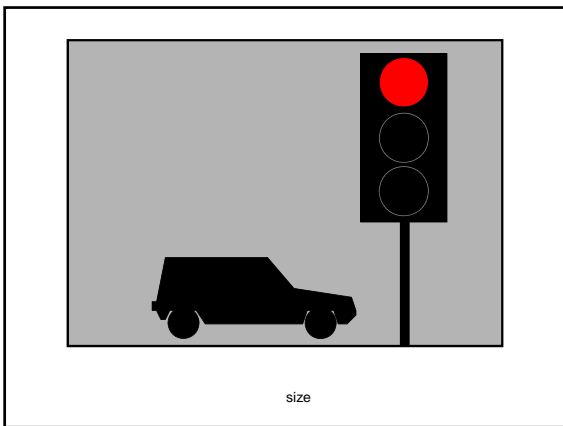
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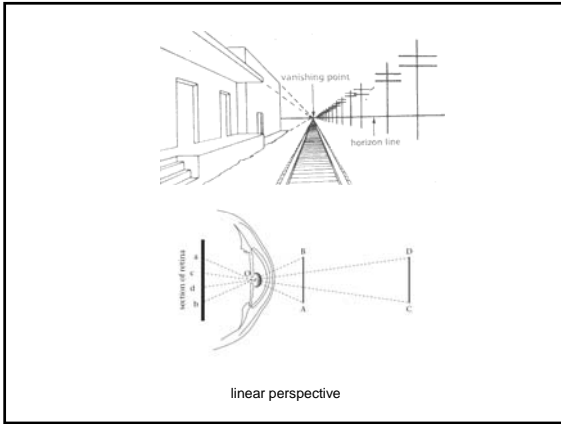
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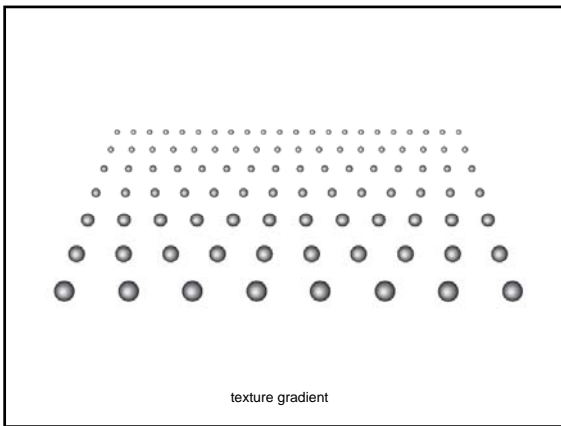
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### 3D WORLDS

- How do we perceive immersion in a 3D environment?
  - Physiological cues
  - Stereoscopic cues
  - Static cues
  - **Motion cues**

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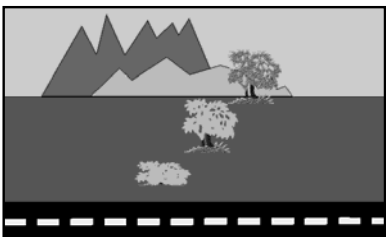
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motion parallax / head parallax

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### 3D WORLDS

- How do we perceive immersion in a 3D environment?
  - Physiological cues
  - Stereoscopic cues
  - Static cues
  - Motion cues

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### 3D WORLDS

- To sum up - Paint the 3D world into the **mind of the receiver**:
  - Build a mental model with expected behavior.
  - Address the expectations.
  - Avoid contradictions.
  - Build layers of strong consistent cues.

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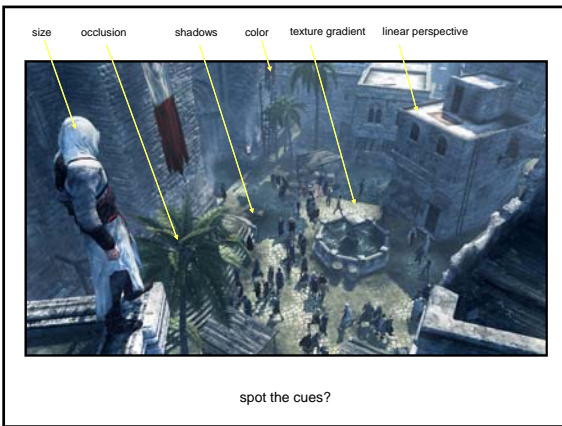
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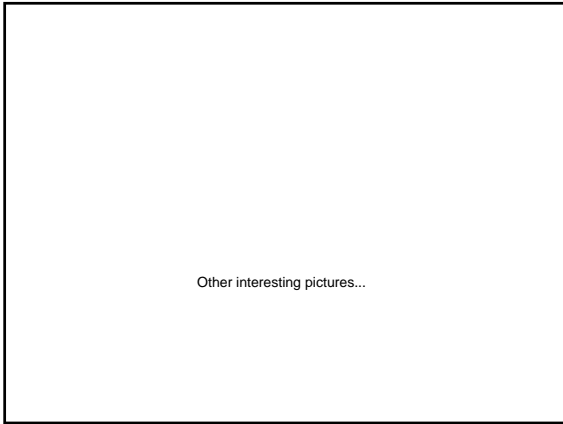
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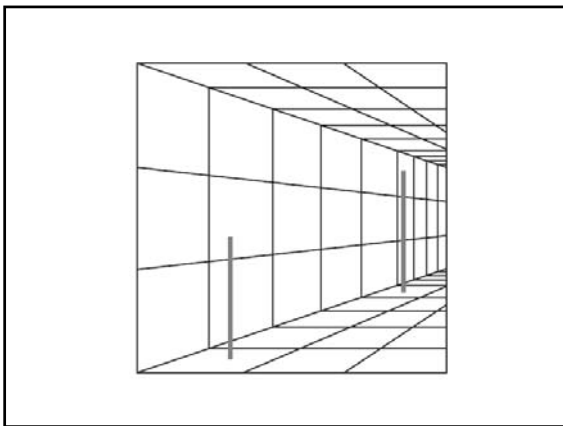
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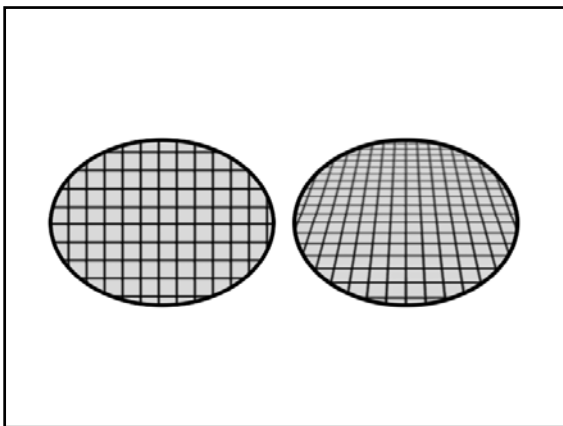
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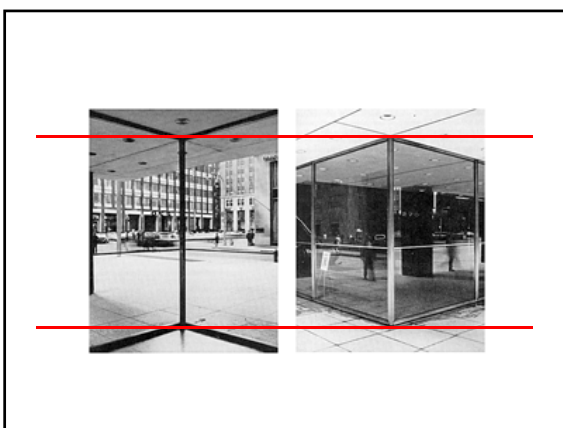
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