

# Perception

The process of integrating,  
organizing, and interpreting  
sensory information

# Perceptual Processing

- ◆ Bottom-up processing—emphasizes the importance of sensory receptors in detecting the basic features of a stimulus. Moves from part to whole. Also called data-driven processing.
- ◆ Top-down processing—emphasizes importance of observer's cognitive processes in arriving at meaningful perceptions. Moves from whole to part. Also called conceptually driven processing.

# Perceptual Organization

- ◆ Some of the best examples of perceptual organization were provided by the Gestalt psychologists
- ◆ Gestalt psychologists hypothesized that “the whole is greater than the sum of the parts”
- ◆ They were interested in showing the global nature of our perceptions

# Figure and Ground

Gestalt Psychologists also thought that an important part of our perception was the organization of a scene in to its:

Figure—the object of interest

Ground —the background





# Gestalt Grouping Principles

- ◆ Gestalt theorists argued that our perceptual systems automatically organized sensory input based on certain rules
- ◆ Proximity
- ◆ Similarity
- ◆ Closure
- ◆ Good Continuation
- ◆ Common Movement
- ◆ Good Form



# Depth Perception


- ◆ One of our more important perceptual abilities involves seeing in three-dimensions
- ◆ Depth perception is difficult because we only have access to two-dimensional images
- ◆ How do we see a 3-D world using only the 2-D retinal images?



# Depth Perception Cues

- ◆ Cue—stimulus characteristics that influence our perceptions
- ◆ We are able to see in 3-D because the visual system can utilize depth cues that appear in the retinal images

# Types of Depth Cues

- ◆ Depth cues are usually divided into categories, we will consider two types of depth cues:
  - ◆ Monocular—depth cues that appear in the image in either the left or right eye
  - ◆ Binocular—depth cues that involve comparing the left and right eye images
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# Monocular Depth Cues

- ◆ Relative image size
- ◆ Linear perspective
- ◆ Texture gradient
- ◆ Overlap
- ◆ Aerial perspective
- ◆ Motion parallax



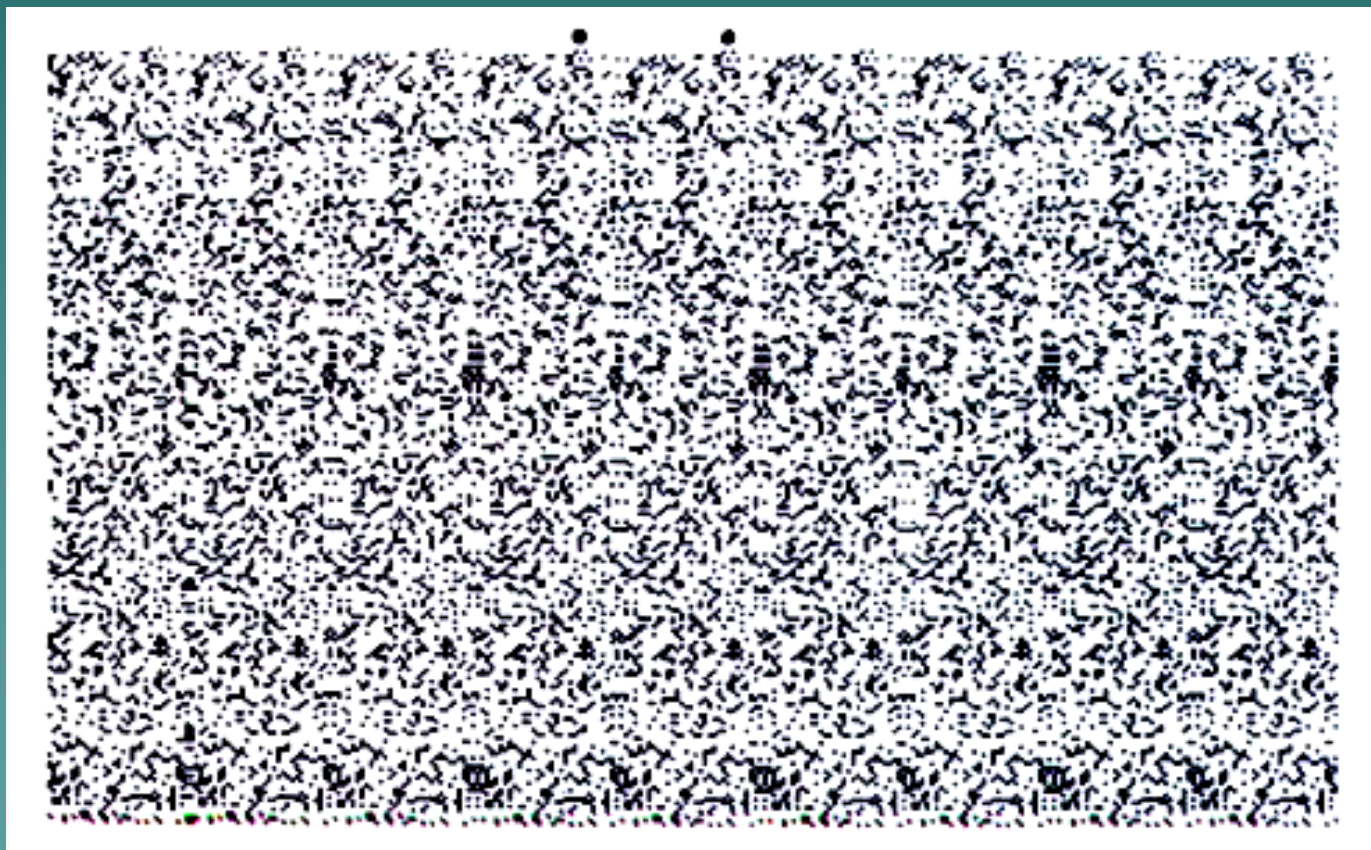
# Binocular Depth Cues

- ◆ Our best depth perception occurs if we look through both eyes
- ◆ This is because our right and left eyes see a slightly different view of the world this is called binocular disparity
- ◆ Convergence is the degree to which your eye muscles must rotate to see an object.

# Stereogram

- ◆ Another way to create the illusion of depth through binocular with a stereogram
- ◆ A stereogram is formed by superimposing two repeating patterns
- ◆ The two patterns are slightly offset; when viewed properly, this offset is seen as a binocular disparity

# Stereogram



# Perception of Motion

- ◆ Process that is not very well understood
- ◆ Usually assume that the figure is moving and the ground is stationary
- ◆ Stroboscopic motion--perception of motion caused by carefully timed flashing lights



# Phi Phenomenon

Apparent motion

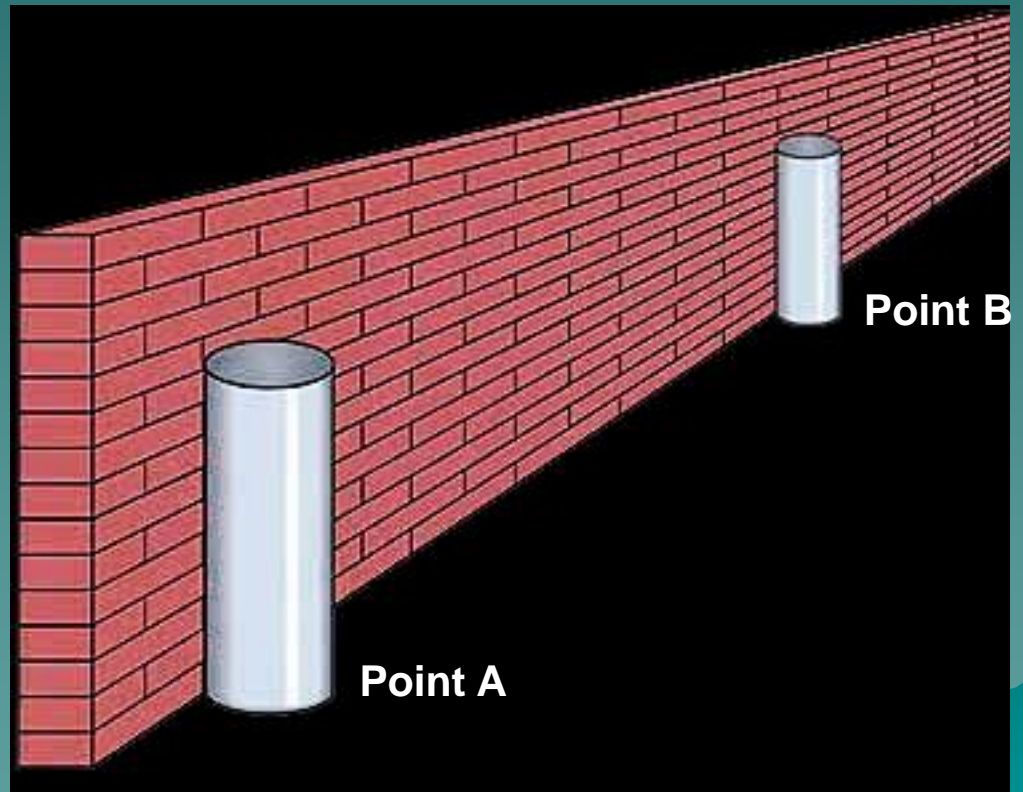


# Perceptual Constancy

- ◆ When viewing conditions change, the retinal image changes even if the objects being viewed remain constant
- ◆ Example: as a person walks away from you, their retinal image decreases in size
- ◆ Important function of the perceptual system is to represent constancy in our environment even when the retinal image varies

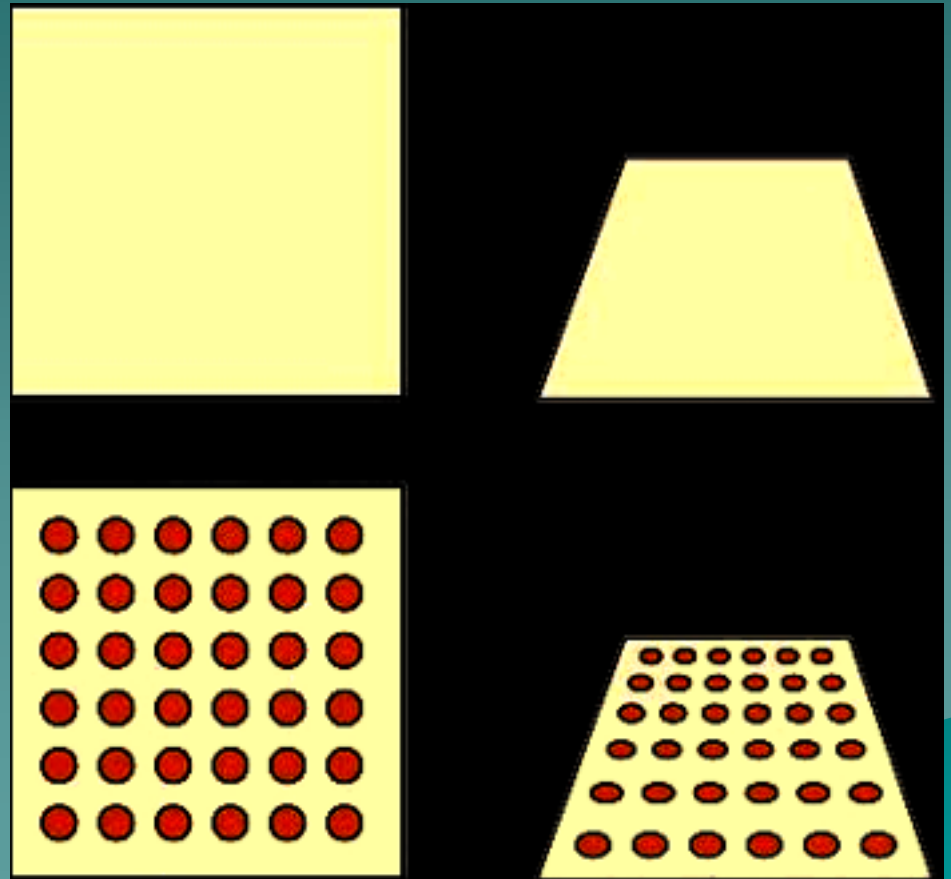
# Size Constancy

- ◆ Cylinders at positions A and B are the same size even though their image sizes differ
- ◆ The depth cues such as linear perspective and texture help the visual system judge the size accurately

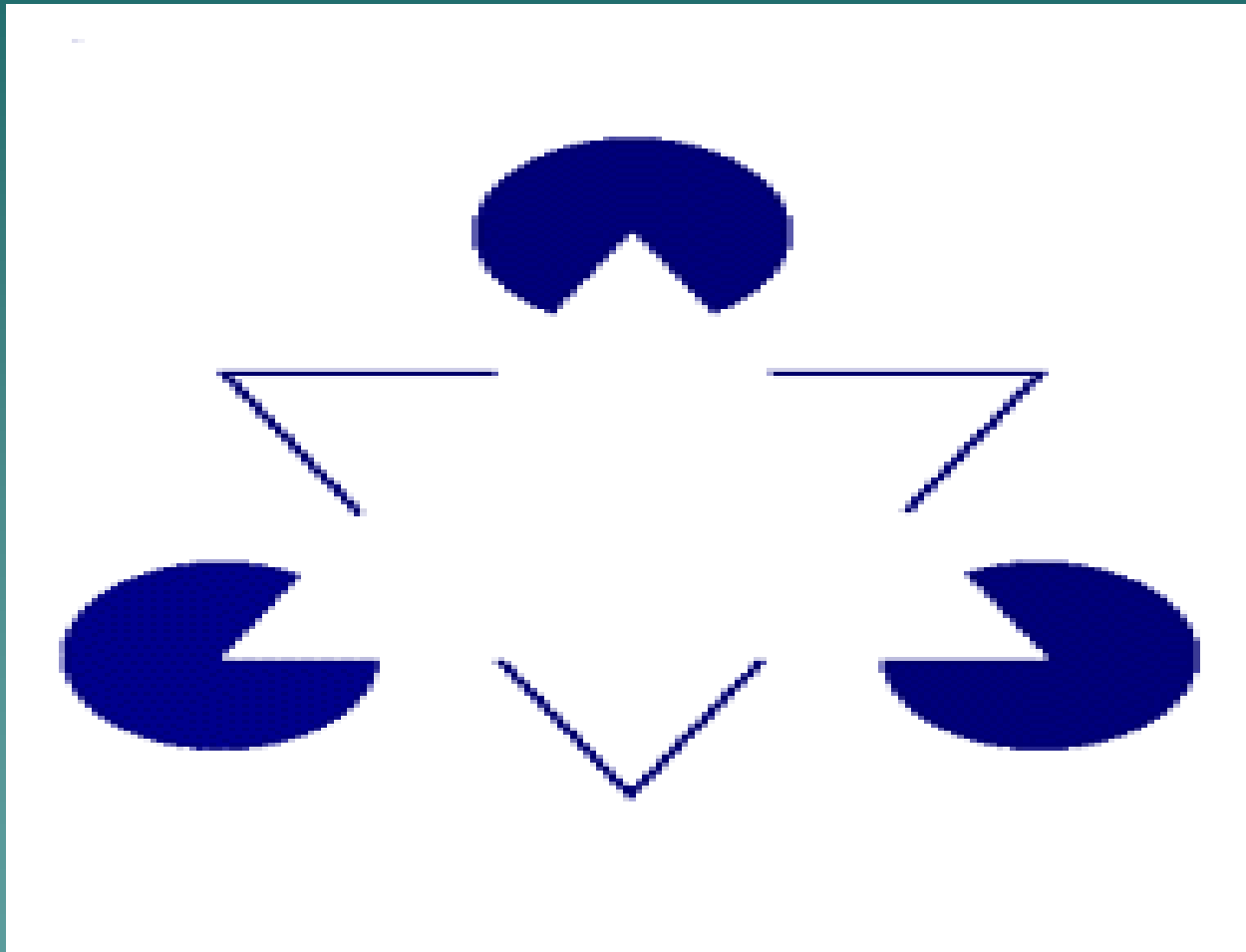


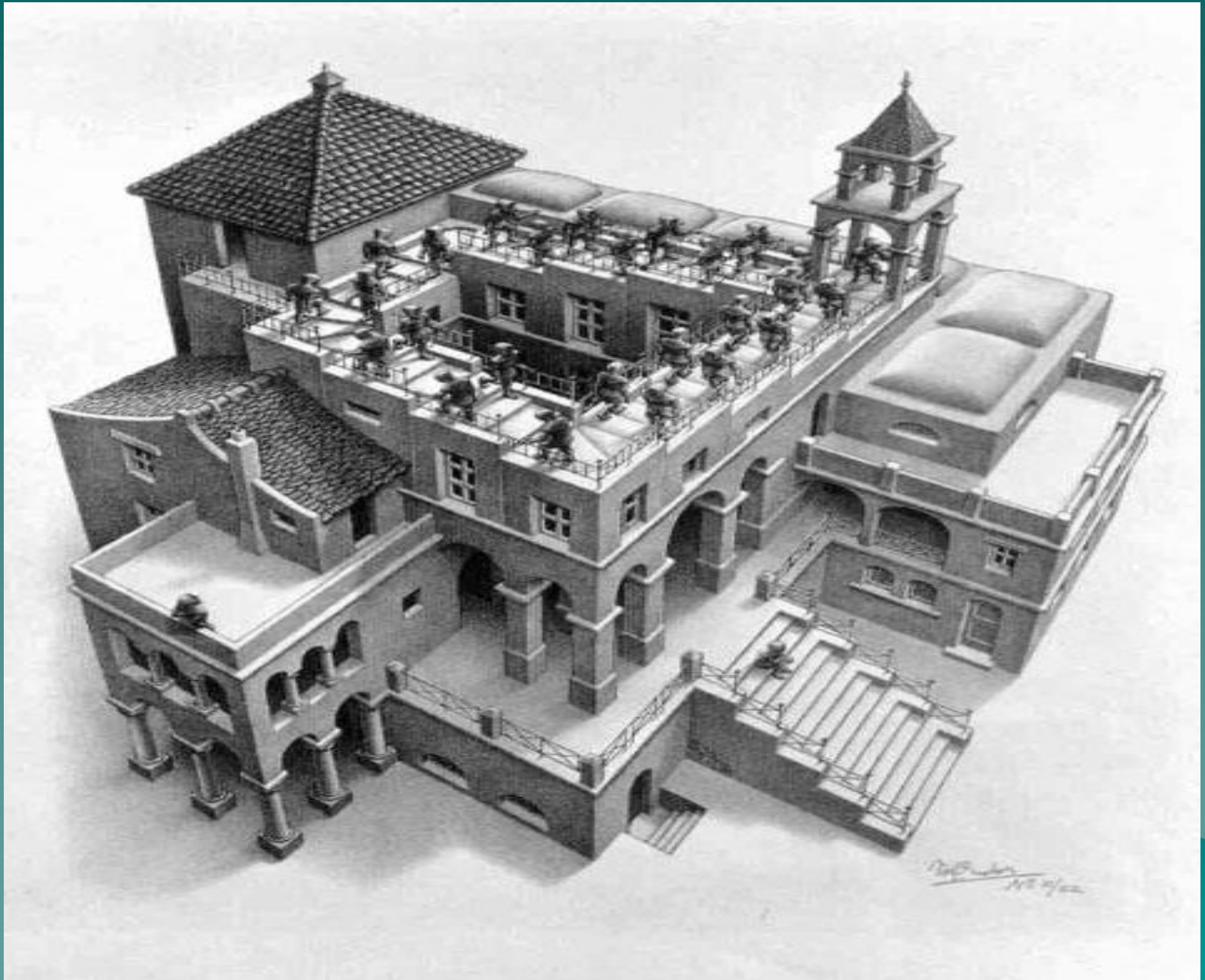
# Shape Constancy

- ◆ It is hard to tell if the figure on the upper right is a trapezoid or a square slanted backward
- ◆ If we add texture, the texture gradient helps us see that it is actually a square



# Perceptual Completion



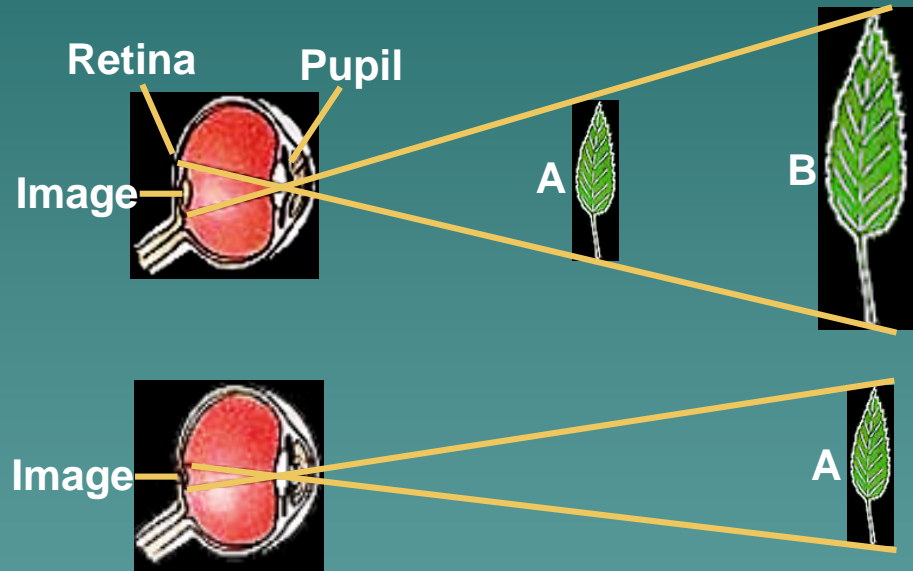


# Some Perceptual Illusions

The background is a solid teal color. In the bottom right corner, there is a silhouette of a mountain range with several peaks of varying heights, rendered in a slightly darker shade of teal.

# Relationship Between Perceived Size and Perceived Depth

- ◆ To perceive the size of objects accurately we must also perceive their distance accurately
- ◆ Thus, many visual illusions occur simply because a particular image lacks sufficient depth cues

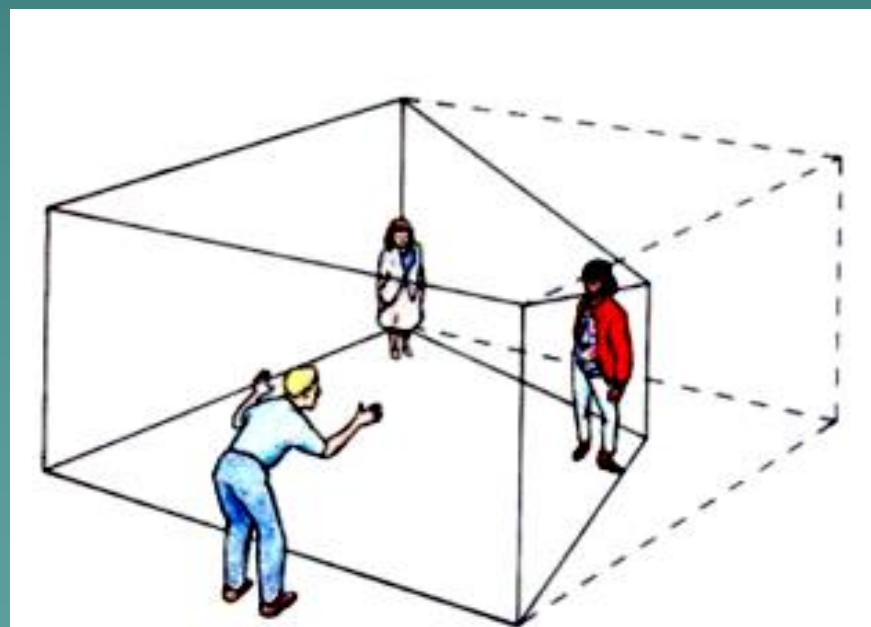


This figure shows that image size depends upon both object size and distance

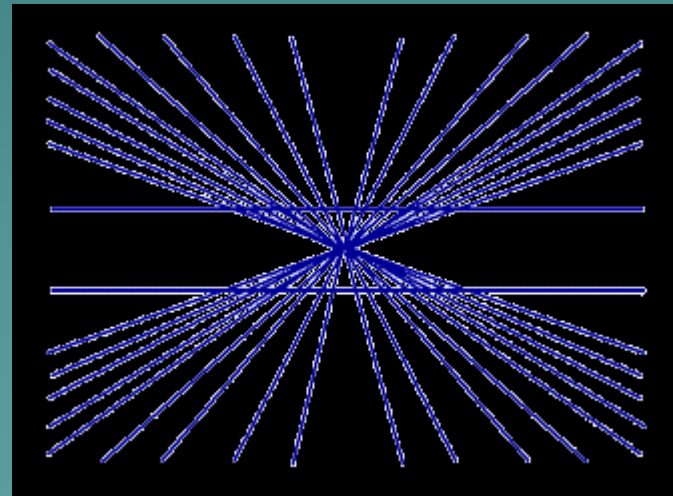
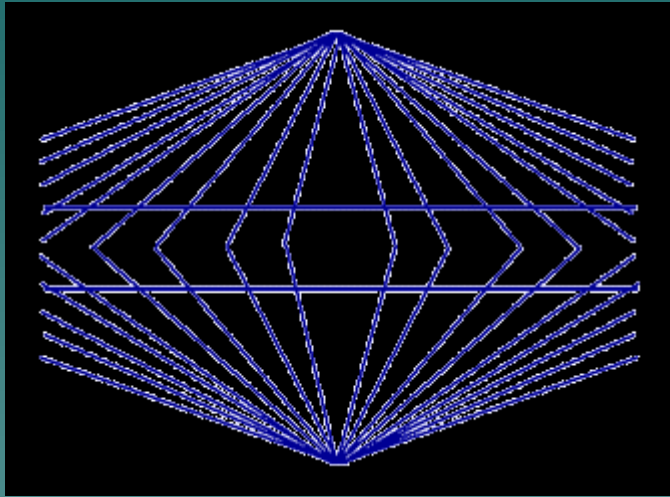


# Ames Room

- ◆ The Ames room is designed so that the monocular depth cues give the illusion that the two people are equally far away



# Müller-Lyer Illusion



# Ponzo Illusion

- ◆ Converging lines indicate that top line is farther away than bottom line

