CHAPTER

3

Space

Space is a complex visual component. It not only defines the screen where all the other visual components are seen, but space itself has several subcomponents that must be explained. This chapter is divided into two parts. Part One defines the four subcomponents of space: deep, flat, limited, and ambiguous. Part Two discusses aspect ratio, surface divisions, and open and closed space.

PART ONE: THE PRIMARY SUBCOMPONENTS

The real world that we live in is three-dimensional, having height, width, and depth. But the physical nature of a screen is strictly two-dimensional. Movie, television, and computer screens are flat surfaces that can be measured in height and width but, practically speaking, have no depth.

The challenge is to portray our three-dimensional world on a two-dimensional screen surface and have the result appear believably three-dimensional. A viewer should watch the screen's two-dimensional pictures and accept the images as a realistic representation of our three-dimensional world.

How can a two-dimensional screen surface display pictures that appear to have three dimensions or depth? The answer is not 3D movies or holograms (although the latter is truly a three-dimensional picture). Pictures can appear three-dimensional even though they're being viewed on flat two-dimensional screen surfaces.

Deep Space

Deep space is the illusion of a three-dimensional world on a two-dimensional screen surface. It's possible to give an audience the visual experience of seeing a three-dimensional space (height, width, and depth), even though all the depth is illusory. There is never real depth because the screen upon which the picture exists is only two-dimensional.

The audience believes they see depth on a two-dimensional screen because of depth cues.

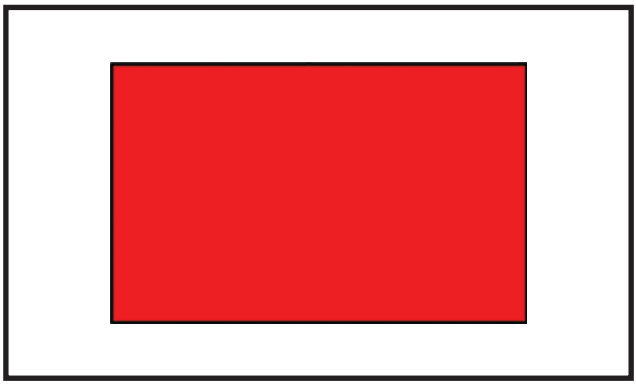
This is a picture of busy freeway that stretches far into the distance. The cars in the right lanes race away from camera, and the cars on the left come from the distance, and move quickly past the camera. This description seems correct, but it's completely wrong. The picture is being displayed on a flat two-dimensional piece of paper (or a flat screen) so there can't be any real depth. Still, we believe that the freeway extends into the depth of the picture, and that some of the cars are closer, and others are farther away. There is something about this two-dimensional picture that convinces us we're seeing depth, where there's no actual depth at all. That something is called a depth cue.

The Depth Cues

Deep space, the illusion of depth on a two-dimensional surface, is created and controlled using the depth cues. Depth cues are visual elements that create the illusion of depth.

Perspective

The most important depth cue is perspective. When creating illusory depth for a flat screen, it is essential to know how to recognize perspective in the real world.

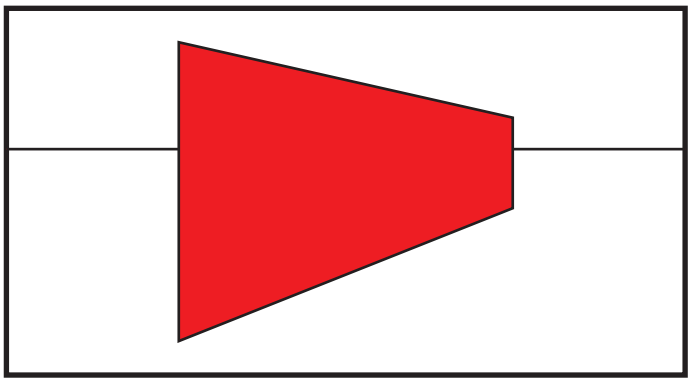


Here's the two-dimensional plane that was introduced in Chapter 1. The plane's top and bottom lines are parallel and its left and right side lines are parallel. This is a frontal plane.

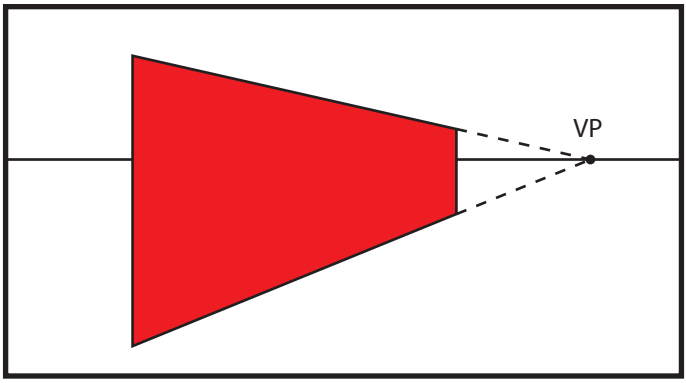
This wall is the same as the frontal plane. Visually, the frontal plane and the wall have no depth but they can be given the appearance of depth by adding perspective. For our purposes, perspective comes in three basic types: one-point, two-point, and three-point perspective.

One-Point Perspective

This is the simplest type of perspective.



Using the same wall, the viewer's position can be moved, revealing the depth cue of perspective.



The lines along the top and bottom of the plane now appear to meet or converge at a single point called a vanishing point or VP. Usually the vanishing point appears on the horizon, although it can appear anywhere. This creates a longitudinal plane, an extremely important cue to illusory depth. The longitudinal plane appears to have depth. One side of the plane looks farther away even though it exists on this flat paper surface.

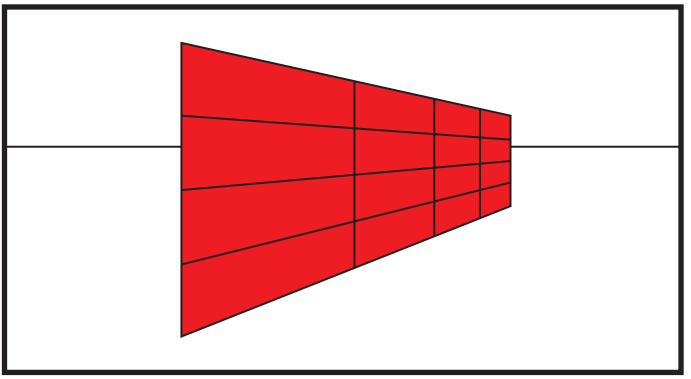
A classic example of one-point perspective occurs when standing in the middle of a railroad track. The rails appear to meet or converge at a vanishing point on the horizon. The rails never actually meet; they always remain parallel, but they appear to converge toward the vanishing point.

The rails of the train track create a longitudinal plane. This longitudinal plane would extend to the horizon, but in the diagram, the plane is shortened for clarity. We equate this convergence with distance. The more the rails converge, the farther away they seem.

Convergence occurs in the real world and in the screen world, but in the screen world it happens on a two-dimensional surface, and is a cue to illusory depth. The railroad tracks seem to go into the depth of the picture, but there is no real depth on a flat screen.

Two-Point Perspective

The next, more complex, level is two-point perspective, which uses two vanishing points. There are several ways that two-point perspective can be produced, shown here:



This longitudinal plane still has only one vanishing point. Additional lines have been added to the plane to make the convergence more obvious.