Chapter 1

Getting to Know VIZ

Welcome to *Mastering Autodesk VIZ 4*. Formerly known as 3D Studio VIZ, Autodesk VIZ 4 steps from the shadows of its sister product, 3ds max, to give architects and other design professionals an indispensable design tool. Although 3D Studio VIZ was a great rendering tool, VIZ 4 gives designers an even better way to see their designs under various natural and artificial lighting conditions.

This chapter introduces some of VIZ 4's special features and then gets you started working with the VIZ 4 interface.

- Introducing VIZ 4 Features
- Getting Started
- Touring the Interface
- Working with Objects
- Getting the View You Want

Introducing VIZ 4 Features

With new features like global illumination technology and real-world lighting, VIZ 4 isn't just a program to create pretty pictures of your designs. It now allows you to make better design decisions by providing the most accurate rendition of the effects of light in and on a design. And as experienced designers know, lighting can have a dramatic effect on the way a space is perceived.

New! VIZ 4 takes a major departure from 3D Studio VIZ by offering *radiosity rendering*. Radiosity rendering is a method of rendering whereby the interaction of light and materials is accurately simulated in the computer. This means that a light source's intensity, color, and direction can be reproduced within the framework of a 3D computer model. If a surface has a color, the light from a source reflects that color as it bounces around in a space. The net result is an image that, in many cases, cannot be distinguished from an actual photograph.

With radiosity rendering, VIZ 4 becomes more than just a rendering tool. You can now create accurate study models of a design by inserting light-fixture specifications. By simulating the way light works in the real world, radiosity rendering takes much of the guesswork out of lighting design.

With VIZ 4, you won't need to wait until a project is built to see if your lighting design works the way you intended. Natural outdoor lighting has also been improved to give you a realistic representation of your design. In addition, VIZ 4 gives you greater control over your renderings by offering a perspective "straightening" tool to reduce the exaggerated foreshortening of wide-angle views.

VIZ 4 is also a faster program, especially when you're using realistic material modeling, known as Ray Traced materials, as shown in Figure 1.1. Ray Traced materials are especially useful for reflective and refractive materials such as glass and water.

FIGURE 1.1
A sample of a 3D model using a Ray Traced material

If your computer is connected to a computer network, you can borrow processor time from the other computers to reduce the time it takes to render a single image. As with earlier versions of VIZ, you can also take advantage of multiprocessor systems to improve speed.

Autodesk VIZ 4 is also designed to take advantage of the Internet. With its Asset Browser and an Internet connection, you can quickly acquire 3D models and props that are available on the Web. File sharing across the Internet is also integrated into VIZ through its file system and file-sharing capabilities. If you're an AutoCAD user, you'll find that linking to your AutoCAD designs has been improved.

Finally, VIZ 4 offers a set of improvements based on user feedback. The interface has been simplified to help make model creation easier.

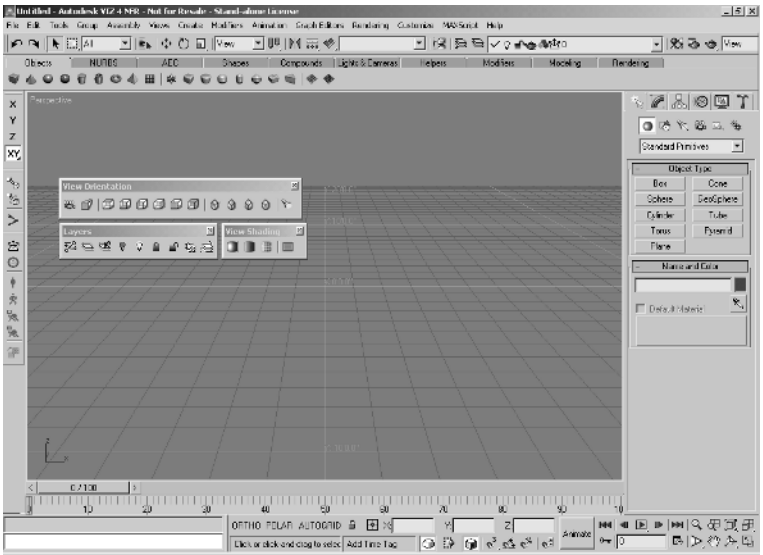
Getting Started

Although many of VIZ's components are typical for a Windows program, quite a few are unique. To begin exploring the VIZ 4 interface, start the program by doing one of the following:

- Double-click the Autodesk VIZ 4 icon on the Desktop.
- Choose Start ➢ Programs ➢ Autodesk VIZ 4 ➢ Autodesk VIZ 4.

You'll see a variety of components in the VIZ window (see Figure 1.2)—some that are familiar and others that are not.

FIGURE 1.2
The standard Autodesk VIZ 4 window



At the top, you see a typical menu bar and toolbar. Below the toolbar is something called a Tab panel, which offers custom tools and macros geared toward specific tasks. In the center, you see the viewport area, which currently shows a perspective view. At the lower right corner of the screen, you see the viewport navigation tools for adjusting your views in the main viewport. You also see the time controls for creating animations, the prompt line and status bar, and something called the MaxScript Mini Listener (for creating macros). On the right side, you see the Command Panel, which contains nearly all the tools you'll use to create and edit objects in VIZ. Let's take a closer look at each of these components.

Touring the Interface

VIZ offers a wealth of tools, and their sheer number can be overwhelming. To get a basic understanding of the VIZ window, let's look at each of the window components individually, starting with the menu bar.

The Main Menu Bar

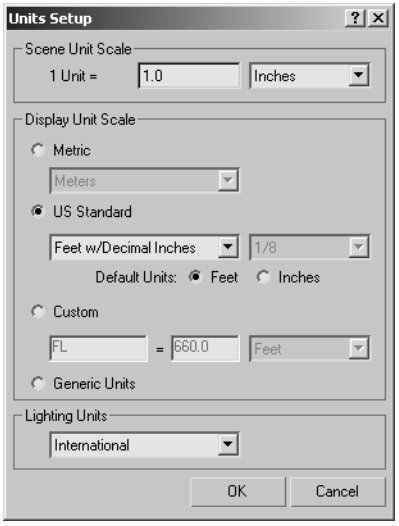
At the top of the screen is the main menu bar. Here, you find the typical Windows commands for file maintenance, as well as commands specifically for Autodesk VIZ 4.

The options in the menu bar are organized in the same way as they are in most other Windows applications. Clicking an option issues a command, and you're expected to take some action. An option that's followed by three periods, called an ellipsis, opens a dialog box, usually to allow you to make

changes to settings related to the option. An option with a right-pointing arrow displays more options in what is called a *cascading menu.*

Try out the menu bar by taking a look at the Units Setup dialog box.

1. Choose Customize ➢ Units Setup. The Units Setup dialog box displays.



2. Make sure that Inches is selected for the Scene Unit Scale setting. Also make sure the US Standard radio button is selected, that Feet w/Decimal Inches is selected below it, and that the Feet radio button is selected for Default Units.
3. Click OK to close the dialog box.

By checking the Units Setup dialog box, you ensure that in future exercises, you'll be working with the same units that are discussed in this book. Now let's continue with a look at the Tab panel.

NOTE *The main toolbar and the Tab panel discussed in the next sections may be located in a different order—that is, the Tab panel may be positioned above the main toolbar.*

The Tab Panel

Below (or above) the menu bar are the main toolbar and the Tab panel, as shown in Figure 1.3.

FIGURE 1.3
The Tab panel and the main toolbar

The Tab panel offers a quick way to access commonly used tools and macros. Some of the tabs contain options that duplicate the main toolbar, and other tabs offer custom macros for building architectural or mechanical components. When you click a tab, a set of tools related to that tab displays in the space just below the tabs, much like the tabs of a typical Windows dialog box. For example, if you click the Shapes tab, you see a set of tools. As you might guess, clicking the icon for one of these tools lets you draw the object indicated by the tool icon.

If you place your cursor on a Tab panel tool icon for a second, you see a tool tip appear. A tool tip gives you a quick reminder of what the tool is used for.

The Tab panel also offers a way to organize your VIZ window when you have a lot of toolbars on the screen. Any toolbar can be turned into a tab on the Tab panel for easy access. Here's a little exercise to show you how it works:

1. Right-click the Rendering tab at the far right of the Tab panel. You see a pop-up menu displaying a list of tab options.
2. Click the Convert to Toolbar option in the menu. The Rendering tab becomes a toolbar.

3. Right-click the Rendering toolbar. A different pop-up menu displays. Notice that you have a Dock option at the top. This allows you to dock the toolbar at the VIZ window border.
4. Click the Move to Tab Panel option on the menu. The Rendering toolbar returns to its location on the Tab panel.

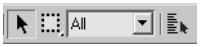
NOTE *Autodesk VIZ 4 is something of a chameleon. It can change its appearance, depending on the focus of your modeling needs. If your VIZ 4 window doesn't look the way it does in the figures in this book, choose Customize ➢ Revert to Startup Layout. You'll see a warning message telling you that any UI (user interface) changes you have made will be lost. Click OK to set up your VIZ windows to match the interface you see in this book.*

The Main Toolbar

Just above the menu bar is the main toolbar. The tools on this toolbar offer tool tips to help you remember their purpose.

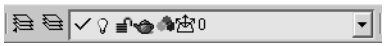
To the far left of the toolbar are the Undo and Redo options.

Next is a set of tools for selecting objects. These selection tools let you select objects by clicking them or by selecting them by name. You can also set the method for selecting objects by using a selection window, which provides a way of indicating a selection by placing a rectangle, circle, or other border around the objects.



To the right of the selection tools are the transform tools. This set of tools lets you move, rotate, scale, and mirror objects. You can also set the center of the transform using the Pivot options, change the spacing between objects, and align objects to one another.

To the right of the transform tools are the layer tools. These tools allow you to organize your drawing by separating objects into layers. If you are an AutoCAD user, these tools are already familiar to you.



The next group of tools to the right of the layer tools are the materials and rendering tools. The materials tools give you control over the appearance of objects. With these tools, you can create color, texture, opacity, and other material characteristics, and then apply these characteristics to objects in your model.

The rendering tools give you control over the output of your Autodesk VIZ 4 model. Unlike output from most applications, output from VIZ 4 is most likely to be image or multimedia files. The rendering tools let you set the type and size of output, from single, large format stills to video-ready animations.

TIP *If you're working with a screen resolution of 1024×768 or less, you won't see all the tools on the main toolbar. Some of the tools are off the screen to the far right. To access these tools, place the cursor on the toolbar so that a hand icon appears, and then click and drag the toolbar to the right. The hidden tools will emerge. You can also click the Rendering tab to expose all the rendering tools.*

Docked and Floating Toolbars

In addition to the main toolbar, you see a column of toolbars to the left of the VIZ 4 window and three "floating" toolbars sitting on top of the perspective view (see Figure 1.2). Let's take a quick look at these other toolbars.

At the far left of the screen is a set of toolbars stacked vertically along the border of the window. Toolbars that are positioned here are said to be in the "docked" position. The top toolbar is the Constraints toolbar, which offers options for controlling the way objects are moved or copied. (This toolbar is shown horizontally here to conserve space.)

Below the Constraints toolbar is the Inverse Kinematics, or IK, toolbar, which contains options for linking objects in your model. The IK tools are especially helpful in creating models of machinery, where objects must be linked together.

Below the IK toolbar is the Radiosity toolbar, which contains options for setting up and applying the radiosity features to your model.

There are three more toolbars that are floating over the Perspective viewport. As with most toolbars, you can move these floating toolbars to the side or hide them altogether to gain better access to objects in the main viewport.

The top floating toolbar is the View Orientation toolbar. It offers options for controlling the display of your model. Here, you can select from a set of standard isometric views as well as orthographic projections, including top, front, left side, and right side views. In addition, you can select a camera view and a view as seen from a light. You'll learn more about cameras and lights in Chapter 6.

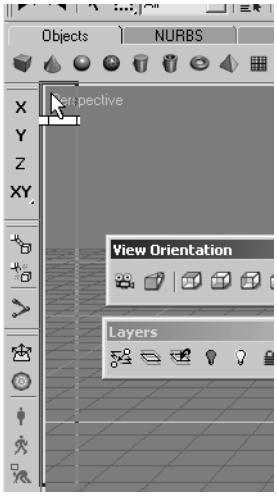
Below and to the left of the View Orientation toolbar is the Layers toolbar. Layers are like overlays that help you organize the objects in your model. If you are an AutoCAD or Photoshop user, you should have an idea of how layers work. You'll learn more about layers in Chapter 5.

Finally, below and to the right of the View Orientation toolbar is the View Shading toolbar. This toolbar gives you control over the way objects are shaded in the main viewport that's showing your model. You can view your model as a solid form or as a simple outline called a *wireframe view*.

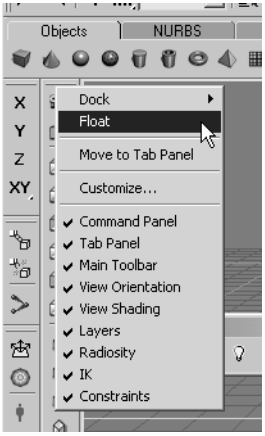
Earlier, you saw how you can move a toolbar into the Tab panel. You can also change a toolbar's location from a docked position along the border of the VIZ 4 window to a floating position, or from a floating position to a docked position. You can try the following exercise to see how to change the location of toolbars:

1. Click and drag the title bar of the View Orientation toolbar so that the toolbar is just to the right of the Constraints toolbar, which is to the left of the VIZ window (see Figure 1.4) The View Orientation toolbar appears as a vertical outline.

FIGURE 1.4
Moving the View Orientation toolbar next to the Constraints toolbar



2. When the outline is in the position shown in Figure 1.4, release the mouse button. The View Orientation toolbar is now in a docked position.
3. Right-click the horizontal line at the top of the View Orientation toolbar to open the short-cut menu.



4. Select Float from the shortcut menu. The View Orientation toolbar returns to its floating position.
5. Close the View Orientation, Layers, and View Shading toolbars by clicking the Close button in the upper right corner of each toolbar.

In this brief exercise, you moved the View Orientation toolbar from a floating position to a docked position and back again. Then you closed the toolbars entirely. To bring back one of these toolbars, you can right-click the blank portion of the toolbar and select the toolbar's name from the shortcut menu. For now, keep the floating toolbars closed.

Toolbar Flyouts

You may have noticed that some of the tools in the main toolbar show a small arrow in the lower right corner of the tool icon.

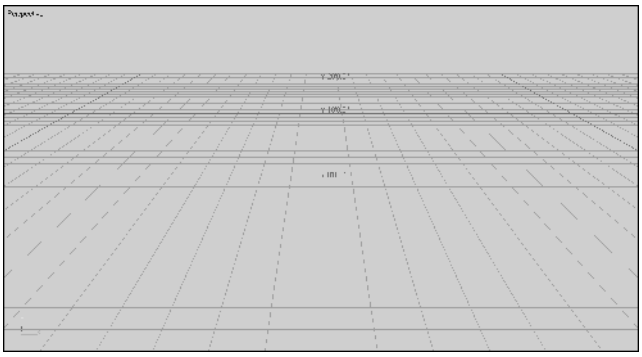
That arrow indicates that the tool is one of several offered in a *flyout*. A flyout is like a graphical version of options in a menu bar. If you click and hold a tool that's part of a flyout, you see a set of other tools appear. For example, if you click and hold the Select and Uniform Scale tool, two additional tools appear.

Once you select an option from a flyout, it becomes the default button that you see in the toolbar.

The Viewport

At the center of the window is the *viewport* (see Figure 1.5). This is where you'll be doing most of your modeling work. In a blank file, the viewport shows a grid that you can use as a reference for orientation and size. The grid is labeled with distances in the current, default unit setting. The labels also indicate the X and Y axes.

FIGURE 1.5
A typical Perspective viewport in the opening screen



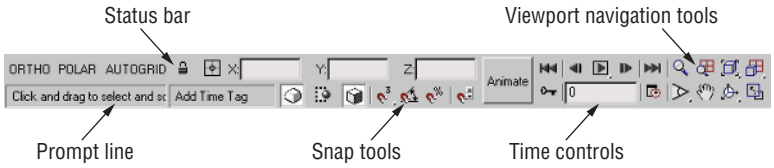
If you look in the lower left corner of the viewport, you see the world axis that indicates the orientation of the X, Y, and Z axes. The world axis helps you get your bearings when looking at other types of views.

Currently, the viewport shows the perspective view, as indicated by the label in the upper left corner. You can also tell that it's a perspective view by the way the grid converges in the distance. As you'll see toward the end of this chapter, you can configure and view your model in a variety of ways, depending on your needs.

Tools for Working with the Viewport

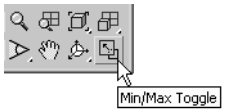
At the bottom of the window, there are several other options that are grouped into four sections: the status bar, the prompt line, the time controls, the snap tools, and the viewport navigation tools (see Figure 1.6). Most of these tools affect the viewport, either by modifying the display of the viewport directly or by affecting the way you interact with objects within the viewport.

FIGURE 1.6
The bottom sections of the Autodesk VIZ 4 window



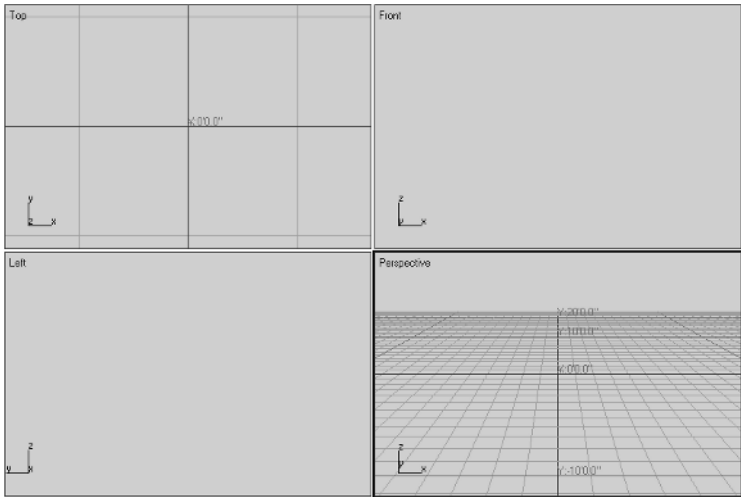
The viewport navigation tools give you control over the main graphic display in the center of the window. With these tools, you can zoom and pan over the display, as well as alter the viewpoint of your model. You can also switch between multiple views and a single view. Try the following:

1. Click the Min/Max Toggle button in the far lower right corner of the window. This is a tool you'll be using often.



The graphic display changes to display four separate viewports. Each viewport shows a different type of view, as shown in Figure 1.7. Notice that the viewports are labeled in their upper left corners.

FIGURE 1.7
Four viewports, showing the top, left, front, and perspective views



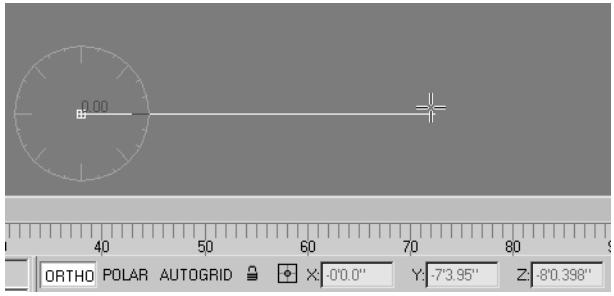
2. Click the upper left viewport, labeled Top. Notice that the border of the Top viewport becomes highlighted.
3. Click the Min/Max Toggle tool again. Now the Top viewport fills the graphic area. Notice how you can quickly expand the view of a viewport to see more detail.
4. Click the Min/Max Toggle tool again. Then click in the Perspective viewport.
5. Click the Min/Max Toggle tool to restore your original window setup.

You've just seen how you can expand the graphic area into multiple viewports showing the top, front, left, and perspective views. Several other views and viewport arrangements are available, as you'll see later in this chapter.

TIP You can set the current, active viewport to display a top, front, or right side view by pressing the T, F, or R key. You can also type L for the left view and B for the bottom view. Pressing P will display the perspective view, and pressing U will display a user-defined view. While you're using the display tools, pressing K will take you back to a previous view. If you have added a camera, you can press C to select from a list of camera views.

To the left of the viewport navigation tools are time control tools. These tools give you control over the animation functions of VIZ. Here, you can set your creations in motion by selecting the length of time for your animation, as well as setting the precise location of objects within that time frame.

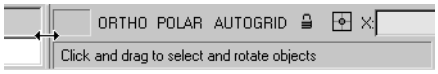
To the left of the time control tools are the snap tools and the prompt line. Here, you find tools to aid you in general drafting and model construction. For example, the Ortho tool helps to keep any lines at right angles as you draw them. With the Ortho or Polar tool, VIZ displays a compass that shows the angle to which your cursor is pointing when you're creating or editing objects.



TIP If you are used to AutoCAD, some of these options are familiar. For example, the Polar and Ortho tools perform similar functions in VIZ 4 and AutoCAD.

Just to the right of these drafting aids is the coordinate readout. This area displays the location of your cursor in X, Y, and Z coordinates. It also displays other types of data, depending on your current activity. For example, if you're rotating an object, the coordinate readout displays the rotation angle of the object being rotated.

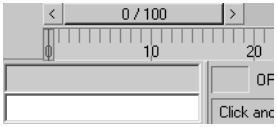
In addition to the drafting aids and coordinate readout, there is a Grid panel, which may lie hidden to the right if your display is set to low resolution. To find it, place the cursor on the vertical bar just to the left of the prompt line until you see a double-pointed arrow.



When you see the arrow, click and drag to the left. The Grid panel will be revealed to the right of the coordinate readout.

You can display a grid in the current, active viewport by clicking this panel. Right-click the panel to open a dialog box that lets you set the grid spacing and other grid parameters.

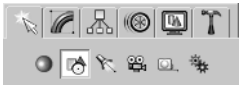
Finally, to the far left at the bottom of the VIZ window is the MaxScript Mini Listener. MaxScript is a language that allows you to create custom *macros* in Autodesk VIZ 4. A macro is like a prerecorded series of instructions. The MaxScript Mini Listener serves two functions: the pink area displays your activity when the MaxScript MacroRecord function is turned on, and the white area provides a space where you can enter commands through the keyboard.



Getting to Know the Command Panel

You'll be using the Command Panel for most of your work in VIZ. If you're an experienced AutoCAD user, you might think of the Command Panel as the equivalent of the AutoCAD command line; it's a single entry point for nearly all of the program's functions. The Command Panel offers nearly all the tools for creating and editing in VIZ.

Across the top of the Command Panel, you see a set of six tabs, each displaying an icon.



From left to right, the tabs are Create, Modify, Hierarchy, Motion, Display, and Utilities. If you place the cursor on a tab, you'll see a tool tip displaying the name of the tab. When you click a tab, the functions relating to the tab appear in the rest of the Command Panel. Here's a brief rundown of what each tab offers:

Create Allows you to create two-dimensional and three-dimensional objects. You can also create light sources, cameras, and helper objects that are used to determine distance and relationships between objects. Light sources, cameras, and helpers are objects that don't appear when your view is rendered.

Modify Gives you control over the dimension and shape of your objects. You find tools to extrude, twist, and bend your objects. You can also control methods for applying material definitions to objects (called *mapping coordinates*) in this tab.

Hierarchy Offers a set of tools aimed primarily at animation. The options in this tab let you build relationships between objects to simulate joint movement or to constrain motion of one object in relation to another. It also offers a way to control the location of an object's pivot point.

Motion Another tab that gives you control over animation. Here, you can control the actual motion of objects over time and view the trajectories of objects.

Display Lets you turn objects on or off in your model. There may be times when you don't want a particular object visible while you render your model or while you're editing a complex model full of objects. Display lets you temporarily hide objects from view.

Utilities A kind of catchall tab that provides access to special features and plug-ins. This is where you find the Camera Match utility that lets you match your model view to a photograph. You can also get access to the MaxScript customization features in this tab.

TIP *You can move the Command Panel just like any toolbar, or close the panel entirely by clicking the Close button (the one with the X, in the upper right corner of the window). To bring the Command Panel back, right-click the blank area of any toolbar and then select Command Panel from the shortcut menu. (You can also right-click the Command Panel's title bar to dock the panel on the left side of the screen.)*

Understanding VIZ's Tools

There are a few ways of working in VIZ that are a bit unusual for a Windows program. In this section, you'll explore the Create tab of the Command Panel as a way to understand some of VIZ's quirks. There aren't many, but understanding them now will make it easier for you to learn how to use the program.

Getting to Know Scrolling Panels and Rollouts

Autodesk VIZ 4 has a rich set of creation and editing tools—so many, in fact, that VIZ's programmers had to come up with a way to get to them easily without making the program too arcane. Two of these tools help you navigate its interface: the *scrolling panel* and the *rollout*. A scrolling panel is an area that can be scrolled up or down using a hand cursor. A rollout is a set of tools that can be opened or closed, much like a drawer in a dresser. Let's start by looking at how a scrolling panel works:

1. Click the Create tab of the Command Panel. Notice the row of icons just below the title of the tab. These icons are buttons, or tools, that offer different types of objects.

2. Place the cursor over the tool that looks like a movie camera. Notice that a tool tip displays, offering the name of the tool.
3. Click the Camera tool. You see the options change below the tools.

4. Click the Target button. A set of additional options appears. Although it may not be obvious, these options extend beyond the bottom of the Command Panel.

5. Move your cursor down to a blank spot in the Command Panel. The cursor changes to a hand.
6. Click and drag upward with your mouse. Notice that the options in the Command Panel scroll upward, following the motion of your mouse. This is an example of a scrolling panel. This scrolling action exposes the rest of the options in the lower portion of the Command Panel. Release the mouse button at any time, once you've seen how this scrolling action works.
7. Place the cursor on a blank area again, so that the hand cursor displays. Then click and drag downward to view the Target and Free buttons under the Object Type bar.

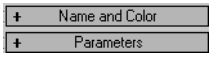
In this exercise, you see that the entire set of options can be changed by clicking a single tool. You can also see that the set of tools can extend beyond the bottom of the Command Panel. The hand cursor can be used to scroll the options upward or downward. This allows VIZ to offer a wide variety of options within the limited space of your display.

The main toolbar also acts like a scrolling panel whenever a portion of the toolbar extends beyond the screen area. For example, if your screen resolution is 1024×768, a portion of the Rendering toolbar isn't visible to the right of the screen. If you place the cursor on a blank area of the Rendering toolbar, it turns into a hand cursor. You can then click and drag to the left to display the additional tools.

When you clicked the Target button in step 4 of the preceding exercise, a set of options appeared under a button labeled Parameters. There are two other buttons, labeled Object Type and Name and Color. Notice the minus sign to the far left of these buttons. These buttons are called *rollouts.* They let you open and close a set of options to get them out of the way. Try the following:

1. Click the rollout labeled Parameters. The options below the Parameters rollout disappear. Also notice that the minus sign to the left of the rollout changes to a plus sign. This indicates that the rollout is in its closed state and that you can open it by clicking the rollout.

2. Click the rollout labeled Name and Color. It, too, closes and displays a plus sign to the left.



3. Click the Parameters and Name and Color rollouts again to display the options.

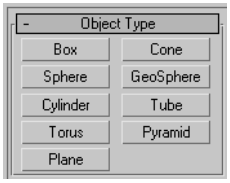
In this and later chapters, you'll explore the rollouts that appear in the Command Panel and throughout the program.

Creating Objects and Setting Their Parameters

By now, you've seen most of VIZ's interface and how it functions. There are a few more tools and methods that you will want to know about before you really delve into using VIZ. In the following exercises, you'll get a chance to create a simple object, and in the process, you'll be introduced to a few new tools.

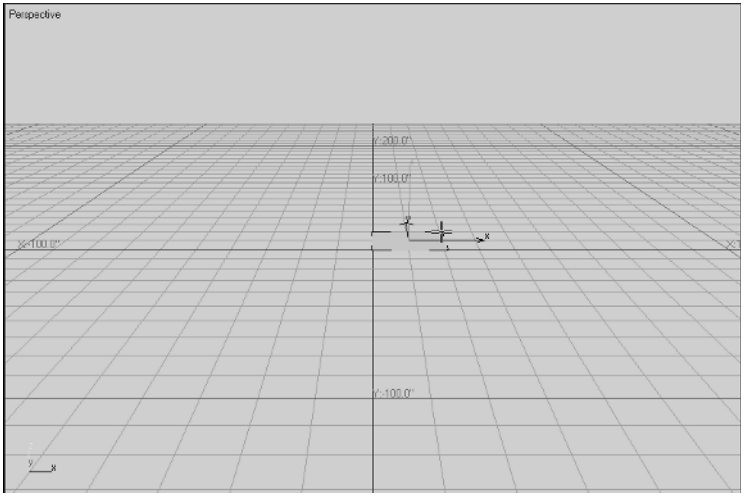
1. In the Create tab of the Command Panel, click the Geometry tool at the top of the panel.

You see the Object Type rollout with a set of object types.



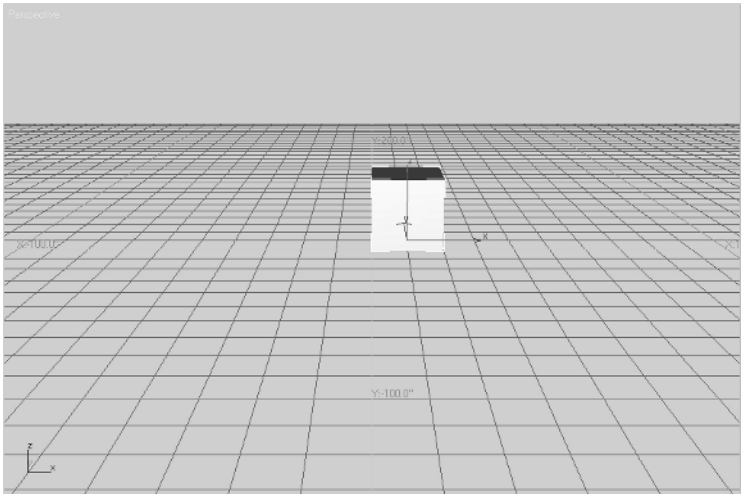
2. Click the Box button. Additional rollouts appear in the Command Panel. These include Creation Method, Keyboard Entry, and Parameters. Notice that a message displays in the prompt line that says, "Click and drag to begin creation process." Also, the cursor in the graphic area displays as a cross, telling you that you're in object creation mode.
3. Place the cursor at the center of the graphic area at coordinates 0,0 and click and drag diagonally to the upper right corner of the screen—don't release the mouse button just yet. As you move the mouse, a rectangle follows your cursor. Notice that the values in the Length and Width input boxes in the Parameters rollout change as you move the mouse.
4. Place the cursor so that the rectangle looks similar to the one shown in Figure 1.8, and then release the mouse button. (You don't need to match the rectangle in the figure exactly.) Now, as you move the cursor, the rectangle changes in height. Notice that the Height parameter in the Parameters rollout also follows the change in height.

FIGURE 1.8
The rectangle so far



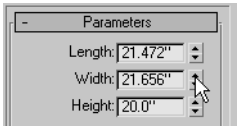
5. Adjust the height so that the Height parameter shows about 20 and click your mouse. The box is now fixed at the height you selected. It should look similar to Figure 1.9.

FIGURE 1.9
The finished box



You've just created your first object in VIZ, and in the process, you've seen how the dimensions of an object are reflected in the Parameters rollout. Once you've created an object, you can continue to modify its parameters, as the following exercise demonstrates.

1. In the Parameters rollout, locate the Width input box and click the upward-pointing arrow to the right of the box several times. Arrows like this one are called *spinners,* and they allow you to graphically adjust the value of the input box they are associated with. Notice that the box in the perspective view begins to widen as the value in Width input box increases.

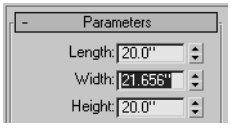


2. Click and hold down the left mouse button while pointing to the upward arrow of the Width spinner. Notice that the box continues to grow in width as you hold down the mouse button.
3. Right-click the spinner arrow. The box shrinks in width to 0. Right-clicking the spinner changes the spinner value to its default, which is 0 in this case.
4. Click and drag the mouse upward from the Width spinner. The box gradually grows in width. Click and drag downward, and the width shrinks back down.
5. Click and drag the Width spinner upward until the cursor reaches the top of the screen. Then continue moving the mouse upward. Notice that the cursor reappears at the bottom of the screen. This *circular* action of the spinner lets you scroll continuously without being limited by the screen area.

TIP While adjusting a spinner, you can immediately undo any changes you make by right-clicking the mouse while still holding the left mouse button. This allows you to quickly experiment with spinner settings while you work.

You've just seen how you can change the parameters of an object by using the spinner. Now let's take a look at the old-fashioned way of entering values into input boxes.

1. Click the Length input box in the Parameters rollout and type **20**↵. Notice how the box's length changes.
2. Press the Tab key. Notice that the Width value is now highlighted.



3. Type **20**↵ for the width and press Tab again. The Height value is highlighted.
4. Enter **20**↵ again. The box is now a cube 20 units square.

NOTE You can also create a cube directly by selecting the Cube check box in the Creation Method rollout.

If there is a series of related input boxes—such as the Length, Width, and Height boxes in the previous exercise—the Tab key lets you advance from one value to the next. You'll find that numeric input boxes and spinners are quite common throughout Autodesk VIZ 4.

TIP If you hold down the Ctrl key while you move a spinner, the rate of change in the spinner value increases. The Alt key has the opposite effect, decreasing the rate of change. The higher the numeric value in the spinner, the faster the rate of change, and vice versa.

Working with Objects

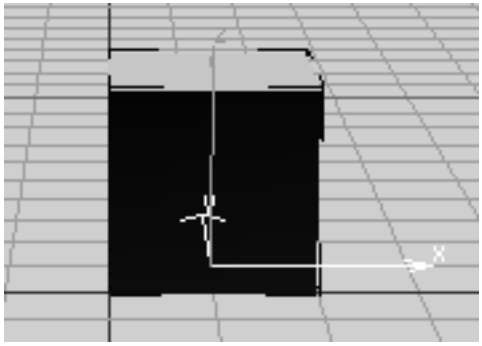
Now that you've seen the main elements of the VIZ interface, let's take a look at how you interact with objects in the viewport. You'll start by looking at a way to move the cube you've just created. Then you'll learn how you can view your cube from different angles.

Selecting and Moving Objects

VIZ's basic editing tools are simple and straightforward, although it may take a little explaining for you to grasp the finer points. As with most graphics programs, you use a selection tool to select objects. This tool is typically shown on the toolbar as an upward-pointing arrow that looks like the standard Windows cursor.

1. Click the Select Object tool in the main toolbar.

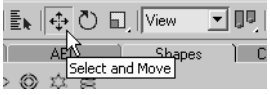
2. Click in a blank area of the viewport. This clears any selections that may currently be active.
3. Move the cursor over the cube. Notice that the cursor turns into a plus sign. This tells you that the cursor has found a selectable object.
4. Click the cube. A graphic displays, showing the X, Y, and Z orientation of the cube in relation to the viewport. Also notice that marks like 3D *corner marks* appear at the corners of the cube. These are called *selection brackets,* and they are indicators that show you graphically the objects that are selected.



With the cube selected, you can go to the Modify tab of the Command Panel and edit its properties. Or you can use any number of other editing tools to affect the cube.

Let's continue by looking at one of the more basic editing tools you'll use—the Select and Move tool.

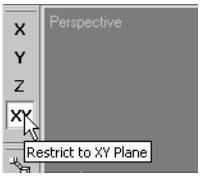
1. Click the Select and Move tool. Notice that the graphics indicating the box selection change and new ones appear.



2. Place the cursor on the cube. It changes into the Select and Move icon.
3. Place the cursor on the blue arrow, representing the Z axis. Notice that the Z axis label is highlighted and the X axis label turns red. When you move the cursor away from the Z axis, the X axis is highlighted again and the Z axis returns to blue.

   The highlighting shows you which axis is currently active. The X axis is the default constraint direction. If you look at the Constraints toolbar to the left of the VIZ window, you'll see that the X tool is selected. As you've seen in this step, you can select an axis to constrain just by placing your cursor on the axis coordinate arrow.
4. Click and drag the box to the right. The cube now moves in the X axis. When you click and drag the X arrow, movement is constrained along the X axis.

5. Click and drag the blue Z coordinate arrow upward. Now, movement is constrained in the Z axis. As you may guess, clicking and dragging the green Y coordinate arrow constrains movement in the Y axis.
6. Click the Restrict to XY Plane tool in the Constraints toolbar.



7. Click and drag the cube slowly in a circular motion, taking care not to click a coordinate arrow. (You still must have the cursor over the cube.) If you click an object in a location other than the coordinate arrows, but still on the object, you can freely move the object in the X-Y plane. Notice that the coordinate location of the object is displayed in the status line just below the drafting tools.

Constraining Motion

The tools in the Constraints toolbar constrain the motion of an object in the X, Y, or Z axis. For example, to constrain motion in the X axis, click the Select and Move tool, and then click the X tool in the Constraints toolbar. The selected object's motion is constrained to the X axis. Prior to Autodesk VIZ 4, this was the only method available to constrain motion.

Another important function that the Constraints toolbar offers is the selection of the default *free motion* plane. In step 7 of the preceding exercise, you were able to move the cube freely in the X-Y plane, but you were constrained to that plane. The Constraints toolbar lets you select the default plane to which you are constrained. The Restrict to XY Plane tool is a flyout offering three options: XY, YZ, and ZX. You can select the plane in which you want to constrain motion by selecting one of these three options. The XY option is fine for nearly all of your work; every now and then, though, you'll want to use one of the other options, so it's good to be aware of this tool.

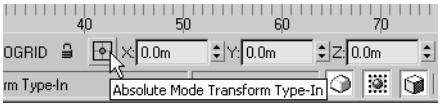
Finally, a tool that is related to the transform tools is the Selection Lock Toggle tool.

This tool helps to prevent the accidental loss of a selection due to a mouse click. It also allows you to use the transform tools without actually placing the cursor on the selected objects. You can turn this tool on by clicking it or by pressing the spacebar while in a selection mode.

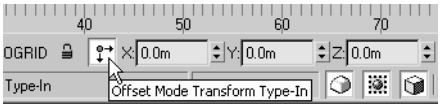
As you see, moving an object in VIZ is fairly straightforward. But what if you want to move an object a specific distance or to a known position? The following exercise demonstrates how this is done.

New!

1. With the cube still selected and the Select and Move tool still active, click the Absolute/Offset Mode Transform Type-In button at the bottom of the VIZ window.



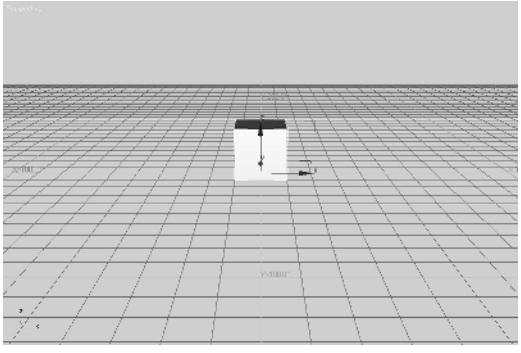
The tool changes to show that the Offset mode is active.



When the Absolute/Offset Mode Transform Type-In button is in the "up," or Absolute, mode, you can enter the specific coordinate where you want to move your object. When it's in the "down," or Offset, mode, you can enter a relative distance from the object's current location.

2. Click in the X input box in the coordinate readout and type **10**↵. The cube moves 10 units to the right.
3. Click and drag the Z axis coordinate readout spinner upward. The cube moves vertically.

4. Click the Absolute/Offset Mode Type-In button to switch to Absolute mode. Then click in the Z coordinate readout input box and enter **1**↵. The cube moves so that its base is exactly at 1 for the Z coordinate.
5. Right-click the X coordinate readout spinner. Remember that right-clicking a spinner converts the value associated with the spinner to its default, which is 0 in this case. Notice that the cube moves to 0 for the X coordinate.
6. Right-click the spinners for the Y and Z coordinates in the coordinate readout. The cube moves to the center of the screen at the origin (coordinates 0,0,0).



Just as with the spinners in the Command Panel, the spinners in the coordinate readout let you set values by clicking and dragging. You can also return to the default values by right-clicking the spinners. The spinners in the coordinate readout appear when you turn on the Select and Move, Select and Rotate, or Select and Scale tools from the main toolbar.

TIP *If you are used to earlier versions of VIZ, you can still use the Transform Type-In dialog box that appears when you right-click the Select and Move, Rotate, and Scale tools.*

Rotating and Scaling Objects

Besides the Move tool, the transform tools also include the Rotate and Scale tools. Try the following set of exercises to see how these tools work.

TIP *You can also activate the Move, Rotate, and Scale tools by right-clicking an object and selecting Move, Rotate, or Uniform Scale from the shortcut menu.*

1. With the cube selected, click the Select and Rotate tool in the main toolbar.

2. Click and drag the X axis arrow upward. The cube rotates about the X axis.

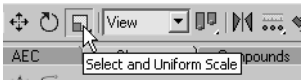
   Make sure the Absolute/Offset Mode Transform Type-In button is in the Absolute mode and look at the coordinate readout. Notice that the X value is not zero, because you rotated it in step 2.

3. Right-click the X spinner in the coordinate readout to set the X value rotation back to zero. Notice that the cube snaps back to its original orientation.

The Select and Rotate tool's methods are the same as those for the Select and Move tool. You can rotate an object graphically by clicking and dragging the object, or, with an object selected, you can enter an exact rotation value in the coordinate readout. When the Absolute/Offset Transform Type-In button is in the Absolute mode, you can control the orientation in relation to the object's original orientation when it was created. In the Offset mode, you can control the orientation relative to the object's current orientation.

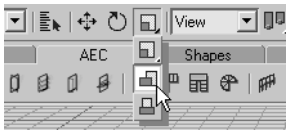
Now try out the Scale tool:

1. With the cube selected, click the Select and Uniform Scale tool in the main toolbar.

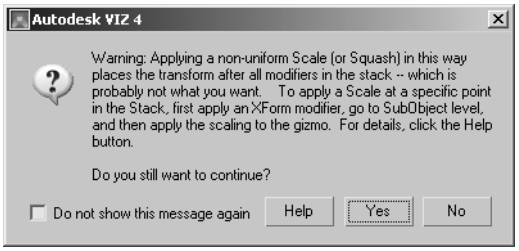


2. Click and drag the cube upward. The cube grows uniformly in size.

3. Click and hold the Select and Uniform Scale tool. Then select the middle tool, which is the Select and Non-uniform Scale tool.



4. You'll see a warning message telling you that it's not a good idea to use the Select and Scale transform tool in this way.



Go ahead and click Yes, indicating that you would like to continue. Because you are exploring the use of these tools, you don't need to worry about the warning for now.

Now, take a look at the coordinate readout. The values you see are percentages of scale. When the Absolute/Offset Transform Type-In button is in the Absolute (up) position, the values are percentages of the original size of the object. When it's in the Offset position, the values are the scale in relation to the current size.

1. With the Absolute/Offset Transform Type-In tool in the Absolute position, click and drag the Z spinner upward. Notice that the box grows in the Z axis.
2. Right-click the Y axis spinner. The cube distorts to a 0 value in the Y axis.
3. Click in the X value input box and enter **100**↵. The cube's X value is restored to its original size.
4. Press the Tab key to move to the Y value input box and enter **100**↵.
5. Press Tab again to move to the Z input box and enter **100**↵. The cube is now restored to its original size.

The Select and Scale tool works in a slightly different way from the other two transform tools. For one thing, a zero value in the coordinate readout doesn't return the selected object to its original shape. This is because the values in the coordinate readout represent percentages.

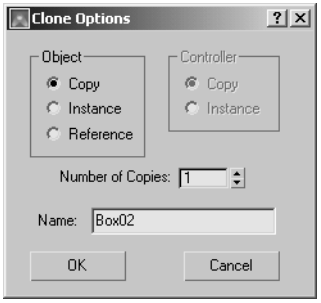
Also, clicking and dragging the X, Y, or Z transform gizmo on the object doesn't affect the scale of the object in the individual axes, unless you select the Select and Non-uniform Scale tool from the Select and Scale flyout. Using the Select and Scale tool, the object is uniformly scaled in all directions.

As you saw earlier, the Select and Uniform Scale tool in the main toolbar is one of three tools in a flyout. The other two tools—the Select and Non-uniform Scale tool and Select and Squash tool—let you alter the scale nonuniformly by dragging.

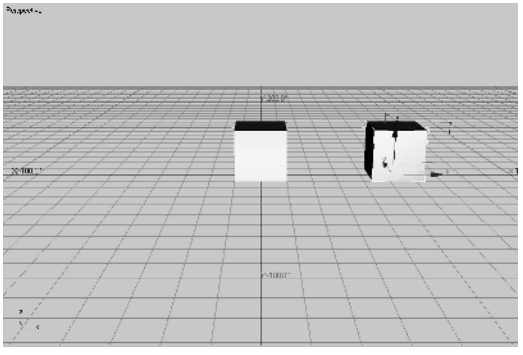
Copying an Object

You've covered just about all the ways of moving, rotating, and scaling an object in the Perspective viewport. If you want to copy an object, you use the same methods you would use to move, rotate, or scale objects—with the addition of holding down the Shift key. Try the following steps to see how copying, or cloning as it's called in VIZ, works. (Copying is one of the forms of a more general function called *cloning*.)

1. Make sure that the Select and Move tool is active and that the cube is selected.
2. While holding down the Shift key, drag the cube to the right. A second cube appears.
3. Release the mouse button. The Clone Options dialog box displays. This dialog box lets you control the type of copy you're making, as well as the name of the new object.



4. In the Object group of the Clone Options dialog box, make sure Copy is selected.
5. Click OK. The new cube is now added to your model.



TIP There may be times when you want to make a copy of an object in exactly the same location as the original object. To accomplish this, first select the object you wish to copy, and then select Edit ➢ Clone from the menu bar. You see the Clone Options dialog box that you saw in the preceding exercise. Set your options and click OK. Note that the new copy doesn't appear at first, because it occupies the same space as the original. (You can accomplish the same thing by Shift+clicking an object with the Select and Move tool.)

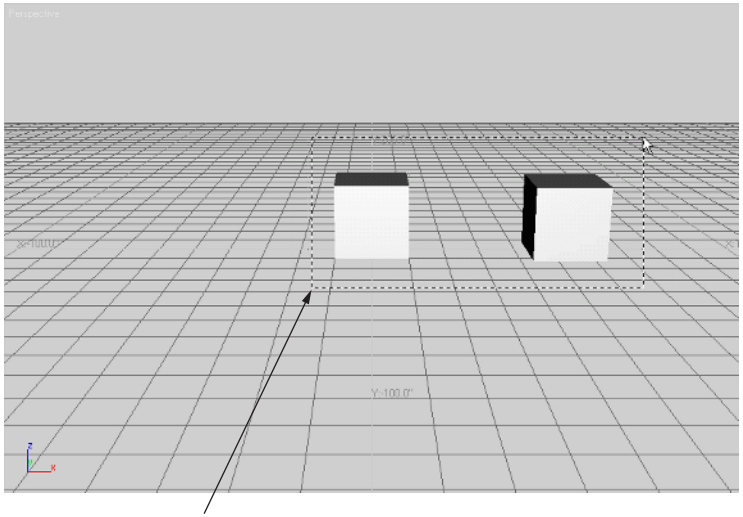
In step 4, you selected the Copy option in the Clone Options dialog box. This option creates a distinct copy of the original object. The other two options, Instance and Reference, create copies that are linked to the original, so that changes in one object affect the other. You'll learn more about these options in Chapter 2.

Selecting Multiple Objects

You've now learned how to select, move, and copy a single object, but what do you do if you want to move or copy several objects at once? You can select multiple objects, or *selection sets* as they are called in VIZ, using two methods. The first is one that is also employed in other graphics programs.

1. Click the Select Object tool on the main toolbar.
2. Click a blank area of the viewport to clear any selections you may already have.
3. Click and hold your mouse at a point below and to the left of the original cube. Then drag to the right and upward. Notice that a dotted rectangle follows your cursor, as shown in Figure 1.10.
4. Continue to drag the cursor up and to the right until it encloses both cubes. Then release the mouse button. Both cubes are selected.

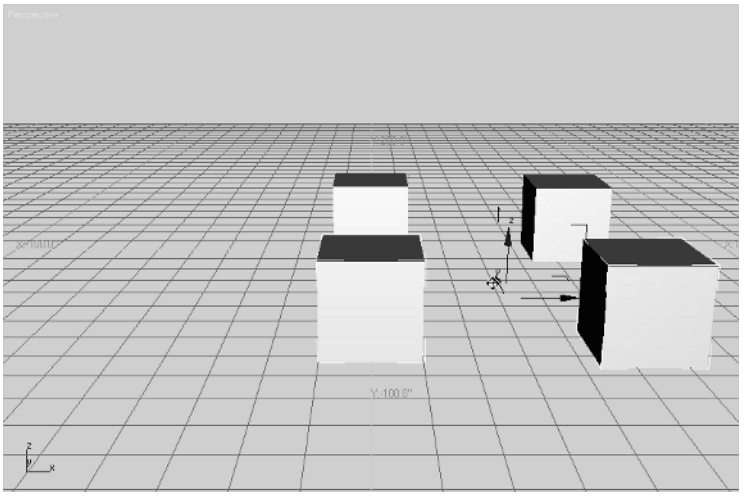
FIGURE 1.10
Placing the selection rectangle around the cubes



Notice that both cubes show their bounding boxes, and a transform gizmo appears between the two cubes, showing you that the two objects are selected. There are a couple of other ways you can select objects, which you'll learn about in a moment, but first, let's use the current selection to make a few more copies of the cube.

1. Click the Select and Move tool in the main toolbar.
2. Shift+click and drag the Y axis arrow downward so that copies of the two cubes appear in the location shown in Figure 1.11. (You don't need to be exact about the placement of the copies.)
3. When you have the copies in place, release the mouse button.
4. In the Clone Options dialog box, make sure Copy is selected in the Object group and click OK.

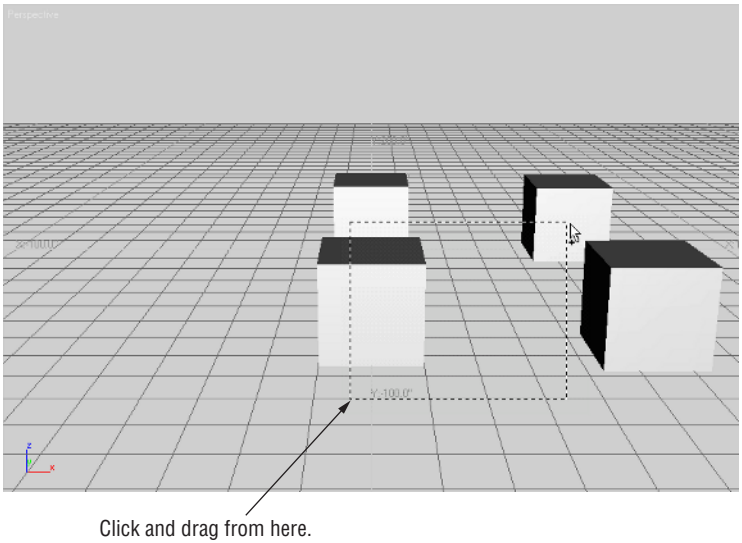
FIGURE 1.11
Place the copies just below the middle of the cube in the center foreground.



The four cubes help to demonstrate some of the other selection methods available to you. First, let's look at another property of the selection window.

1. Click the Select Object tool.
2. Click a blank spot in the viewport to clear your selection set.
3. Click and drag the cursor from the point indicated in Figure 1.12.

FIGURE 1.12
Selecting points for a crossing window



4. Drag the rectangle up and to the right so that it encompasses just a portion of the cube in the back right corner, as shown in Figure 1.12. Then release the mouse button. Three of the four cubes are selected.

Notice that you didn't need to enclose the cubes completely to select them. In the current selection mode, you only need to have the selection window cross over the desired objects. This is known as a *crossing window.* If you're an AutoCAD user, this type of window should be familiar to you.

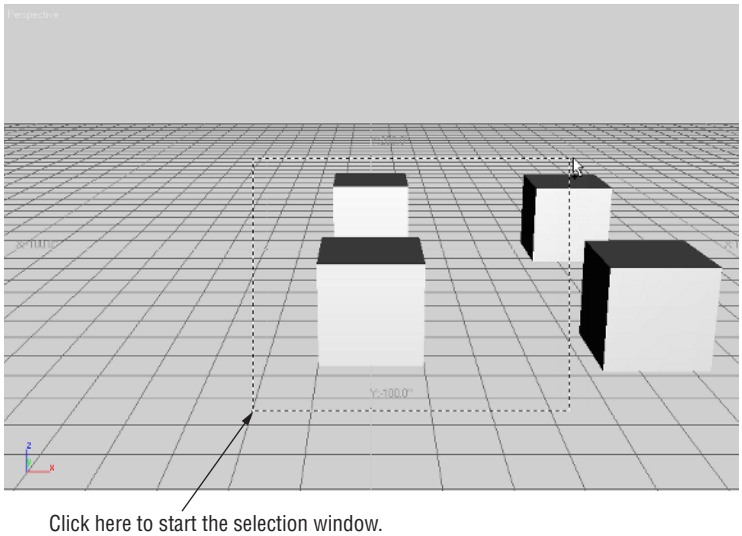
You can change the way the selection window works by using the Crossing/Window Selection tool. The following exercise demonstrates this.

1. Click a blank area in the drawing in order to clear your selection set.
2. Click the Crossing Selection tool at the bottom of the window.

Notice that the icon changes to one showing a sphere that's completely within a dotted rectangle. This tells you that you are now in Window Selection mode.

3. Click a point below and to the left of the cube in the center foreground, as shown in Figure 1.13.

FIGURE 1.13
Placing a selection window



4. Drag the rectangle up and to the right until it includes part of the cube in the back right corner, as shown in Figure 1.13. Then release the mouse button. Notice that the only objects selected are the two cubes on the left.

When you use Window Selection mode, only objects that are completely within the selected window are selected. Unlike with the crossing window, objects that are partially inside the selected window are left out of the selection.

You can use the Ctrl key in conjunction with a window or crossing selection to continue to add more objects to your selection set. You can also remove objects from your selection set by using the Ctrl key with a window or crossing selection. Let's see how adding and subtracting from selections works:

1. Ctrl+click a point above and to the left of the cube in the upper right of the viewport, as shown in Figure 1.14.
2. Drag the window down and to the right so that it completely encloses the two cubes to the right. Then release the mouse button. Now all four cubes are selected.
3. Hold down the Ctrl key and then place a window around the cube in the upper right of the screen, as shown in Figure 1.15. Now all cubes except the upper right one are selected.

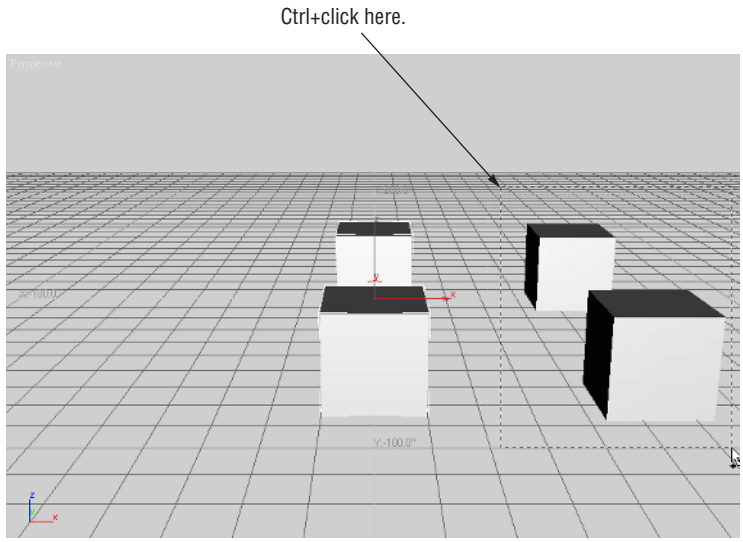


FIGURE 1.14
Adding objects to your selection set using the Ctrl key and a window

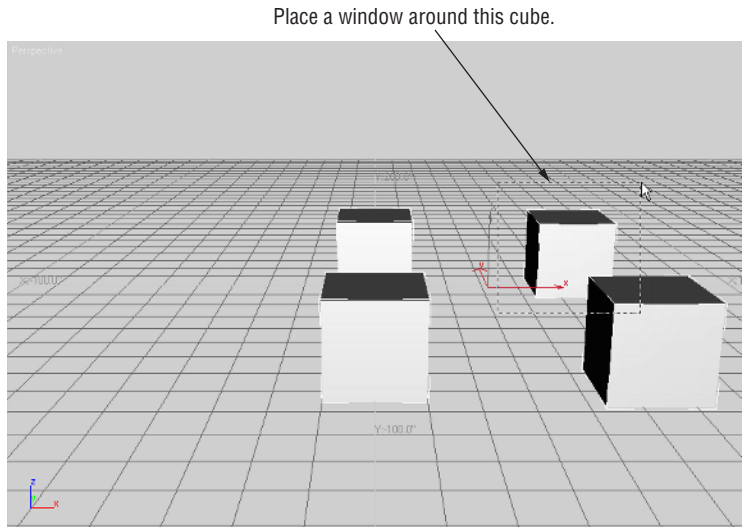


FIGURE 1.15
Removing an object using the Ctrl key and a window

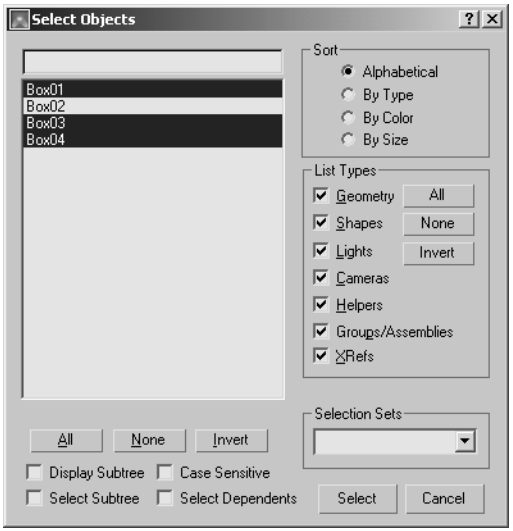
TIP *When you have several objects that are close to each other, and you want to select only certain objects within the group, you can Ctrl+click single objects to add or remove them from the selection set.*

Right now, you have only a few objects in your model, but as your model develops, you'll find that selecting objects in a crowded model becomes more of a challenge. Knowing about the different selection modes you've just used will go a long way toward making your work easier.

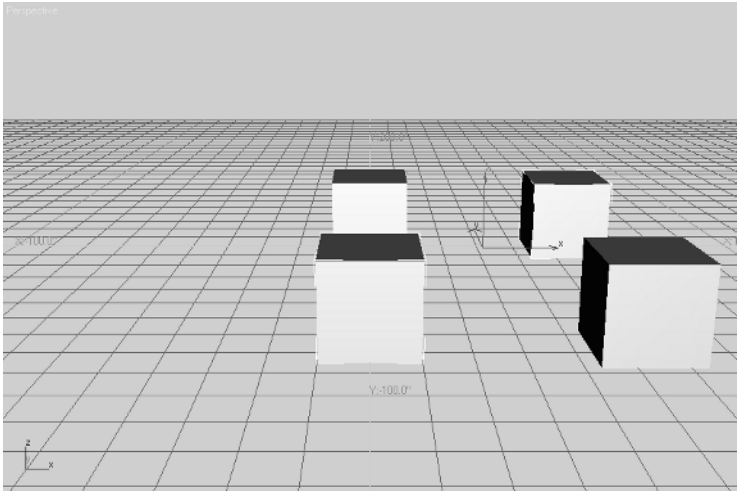
There is one more selection method that will be an invaluable tool as your model becomes more complex. You can select objects by their names, using the Select Objects dialog box. The following is a quick exercise that will introduce you to this important tool.

1. Click the Select by Name tool in the main toolbar.

The Select Objects dialog box displays. Notice that it contains a list showing the names of the objects in your drawing. Right now, the list shows the default names given to the objects by VIZ. You can always change the name of an object in the Command Panel. (You can rename an object on every tab except Utilities.)



2. Click the None button near the bottom of the dialog box. This clears the selection set.
3. Click Box02 and then Ctrl+click Box04 in the list of object names. This list lets you select multiple names as you would in a typical Windows list box. You can Shift+click to select a group of adjacent names or Ctrl+click to select a group of individual names.
4. Click the Select button. The two boxes are selected.



The preceding exercise showed you how to select objects based on their names, but it also indirectly showed you the importance of the names of objects. Giving objects meaningful names helps you locate and select them more easily, especially in a crowded model.

NOTE *VIZ is a parametric, object-oriented program (unlike AutoCAD), because every object has its own name. Each object has its own parameters that can be accessed from the Modify tab.*

Whenever you create an object in Autodesk VIZ 4, you have the opportunity to give the new object a name. If you don't indicate a new name, VIZ provides a name for you. If the new object is a copy of an existing one, the new name that VIZ provides is the name of the original object, with a number appended to its name. If you don't give an object a meaningful name when you create the object, it's easy enough to change it later. Just select the object, and then enter a new name in the object name input box at the top of the Modify tab or in the Name and Color rollout of the Create tab.

Naming Selection Sets

Suppose you've gone through a lot of effort selecting a set of objects, and you know you will want to select the same set of objects again at a later time. VIZ offers the Selection toolbar, which lets you name a selection set for later recall. Here's how it works:

1. Make sure two of the cubes are selected. It doesn't really matter which two, because you're just practicing using the Selection toolbar.

2. Click inside the Selection input box that's just to the right of the Align tool in the main toolbar.

3. Type the name **Sample**↵. You've just given the current selection set a name. (You can enter a selection set name up to 15 characters long.)
4. Click in a blank area of the viewport to clear the current selection set.
5. In the main toolbar, click the downward-pointing arrow to the right of the Selection input box. Select Sample. The two boxes you selected earlier are now the current selection set.

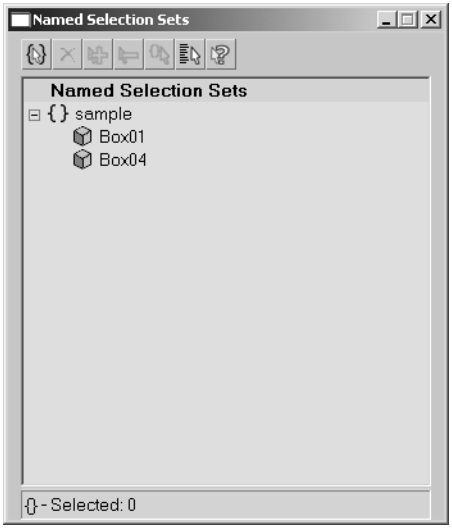
In these early stages of learning VIZ, the concept of named selection sets may seem simple, but it's one tool you'll likely use quite a bit as you expand your skills.

TIP The Edit option in the menu bar offers some additional selection commands, such as Select All, Select None, and Select Invert. You can also use the Edit ➢ Select By cascading menu to select objects by color, name, or layer.

Editing Named Selection Sets

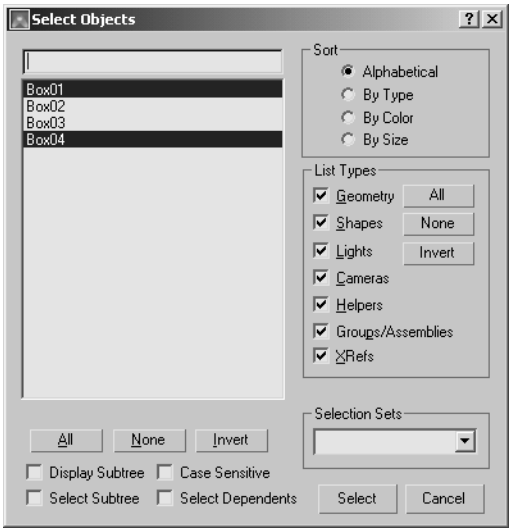
New! Named selection sets are not fixed in stone. You can add to or subtract from them, or you can delete them entirely through the Named Selection Sets dialog box.

1. Open the Named Selection Sets dialog box by choosing Edit ➢ Edit Named Selection. You see a list of objects included in the Sample selection set.



2. Click Sample in the list. Then click the Select Objects by Name button in the Named Selection Sets toolbar.

The Select Objects dialog box displays.



3. Select one of the names in the list that doesn't already appear in the Named Selection Sets dialog box, and then click the Select button. The name you selected now appears in the list in the Named Selection Sets dialog box.
4. Close the dialog box.
5. Select Sample from the Selection toolbar's drop-down list to refresh the selection. Now you see that three of the cubes are selected.

There are several other tools in the Named Selection Sets dialog box. These tools let you add or delete objects from the list. You can also create new named selection sets using the Create New Set tool at the far left of the Named Selection Sets toolbar.

You've now seen most of the selection tools you'll need to get started with VIZ. There are a few other selection tools you'll learn about as you work with VIZ, and you'll also get a chance to apply the tools you've already learned as you start to build and edit 3D models in later chapters.

In the next section, you'll learn about the tools that enable you to view your model from different angles, and how these different views can aid you in creating and editing your model.

Getting the View You Want

So far in this chapter, you've done all of your work without making any modifications to the *point of view* of your model. Now let's take a look at ways you can control your view. Understanding the viewport controls is essential for manipulating objects in your model, so take some time to become familiar with all the tools discussed in this section.

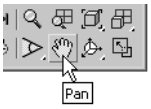
Understanding the Perspective Viewing Tools

If you look at the viewport tools in the lower right corner of the VIZ window, you'll see some tools that are common among most graphics programs. These include the magnifying glass and the hand. Other tools in this area may be a bit more mysterious. In this section, you'll learn how these tools let you get around in your model.

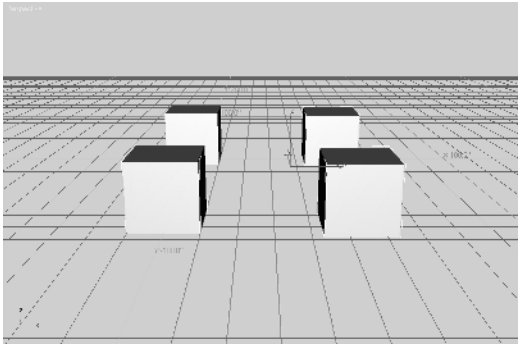
Panning and Zooming Your View

Let's start by looking at the tool with the hand icon, known as the Pan tool. Like similar tools in other programs, the Pan tool displaces your view up or down, or to the left or right. But in VIZ's Perspective viewport, you're also changing your point of view. Do the following to see what this means.

1. Click the Pan tool.



2. Click and drag the viewport to the left and upward until the cubes are roughly centered in the viewport.



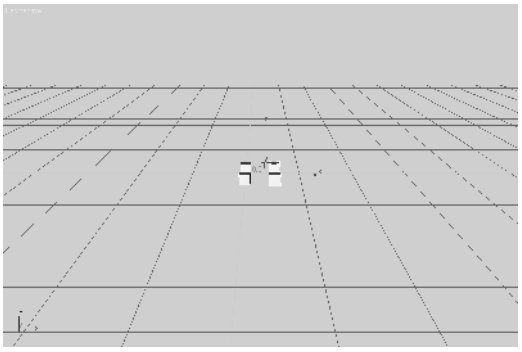
3. Click and drag the viewport in a circular fashion. Notice that your view of the model appears to change as if you were moving sideways while looking at the cubes.

Next, try the Zoom tool.

1. Click the Zoom tool.

2. Click and drag the Zoom tool upward from the center of the viewport. Notice how you appear to get closer to the cubes.
3. Click and drag the cursor downward in the viewport. Now you appear to be moving away from the cubes.
4. Continue to click and drag downward until your view looks similar to the one shown in Figure 1.16.

FIGURE 1.16
Zooming out to view a larger area



Again, as with other graphics programs, the Zoom tool enlarges or reduces your view. In VIZ's Perspective viewport, the Zoom tool has the effect of moving you closer to or farther away from the objects in your model.

You may have also noticed that, as you moved farther away, the grid became denser. Then, at a certain point, the grid changed to a wider interval. VIZ does this so that the grid doesn't overwhelm the view when it becomes too dense.

Now, suppose you don't like the last view change you made and you want to go back to the previous view. Try the following steps to return to the previous view.

1. Choose View ➢ Undo View Change. You return to the previous view. (Alternatively, press Shift+Z.)
2. Choose View ➢ Undo View Change or press Shift+Z again. Your view returns to the view prior to the last view.
3. Choose View ➢ Undo View Change a third time. You return to the view you had before you panned your view.

The View ➢ Undo View Change command lets you step back to a previous view in case the last view change you made is one you don't like. View ➢ Undo View Change undoes any view change, regardless of which viewport tool you used last.

WARNING *Don't confuse View ➢ Undo View Change with the Edit ➢ Undo command. Edit ➢ Undo undoes creation and editing operations but not view changes.*

Saving a View You Like

If you happen to get a view that you know you want to go back to later, you can save the view with the View ➢ Save Active command from the menu bar. Use it in the next exercise to save a view that you'll return to later in this chapter. And, as you'll see in Chapter 6, you can also create a camera object and align it to a view.

1. Click the Zoom Extents tool to set up your view for the next exercise. Zoom Extents causes the viewport to display the entire model.

2. Save this view by choosing View ➢ Save Active Perspective View.

The Zoom Extents tool repositions your view so that the entire model just fits within the viewport, filling the viewport as much as possible. If you're an AutoCAD user, you're familiar with this tool, because its counterpart in AutoCAD performs the same function.

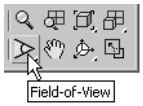
TIP *You can restore the default perspective view (the one you see when you open a new file) in a blank file by clicking the Zoom Extents tool or by choosing File ➢ Reset to reset the design.*

Changing Your Viewing Angle

There are two other tools that are specifically designed for viewing 3D objects: Field-of-View and Arc Rotate Selected. The Field-of-View tool changes your field of view. The Arc Rotate Selected tool lets you rotate your view around a selected object.

The Field-of-View tool appears to do the same thing as the Zoom tool, but as you'll see in the following exercise, there is a significant difference between the Zoom and Field-of-View tools.

1. Save the current view by choosing View ➢ Save Active Perspective View. This lets you return to the current view later.
2. Click the Field-of-View tool.



3. Place the cursor in the viewport and click and drag downward until your view looks similar to Figure 1.17.

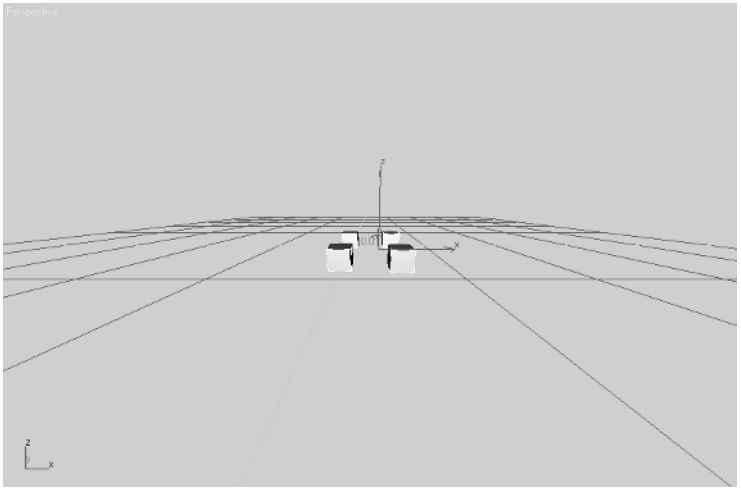
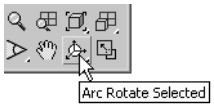


FIGURE 1.17
View of perspective after increasing the field of view

In one sense, it appears as though you've zoomed out from the cubes, but if you compare this view to the zoomed-out view in the previous exercise, you notice a difference. When you use the Zoom tool in the Perspective viewport, your view changes as though you were physically moving closer or farther away from the cubes. As the name implies, the Field-of-View tool widens or narrows your field of view, much as a zoom lens on a camera does. You're not actually changing the distance from the object; instead, you're changing the area that your viewport displays. The Field-of-View tool has the potential of distorting your view, just as a super-wide-angle fish-eye lens or a super-telephoto lens tends to distort a photograph. Until you find yourself in a situation where you really need to change the field of view, you may want to refrain from using the Field-of-View tool.

Now let's take a look at the Arc Rotate Selected tool.

1. Return to the view you had before you used the Field-of-View tool by selecting View ➢ Undo View Change.
2. Click the Select Object tool. Click in a blank space in the viewport to clear any selections that may be active. In the next exercise, you'll see why this is significant.
3. Click the Arc Rotate Selected tool.



You see a yellow circle with squares at each of the four cardinal points on the circle. If you place the cursor inside the circle, the cursor looks like two overlapping ellipses.

4. Place the cursor on the square at the far left of the circle. Notice that the cursor changes shape to what looks like a horizontal ellipse.
5. With the cursor on the square, slowly click and drag the cursor to the right. Notice how the view rotates.
6. Place the cursor on the square at the top of the circle. Now the cursor changes to a vertically oriented ellipse.
7. With the cursor on the square, click and drag the cursor downward. The view now rotates in that direction.

The squares on the yellow circle are like handles that you can grab and turn to change your view orientation. The left and right squares constrain the rotation to the horizontal plane, and the top and bottom squares constrain the rotation to the vertical plane. If you prefer, you can adjust the view freely without constraint in the vertical or horizontal direction by clicking and dragging the cursor anywhere within the circle. You can also rotate the view by clicking and dragging anywhere outside the circle. The following exercise demonstrates these features. Pay attention to the shape of the cursor in each step.

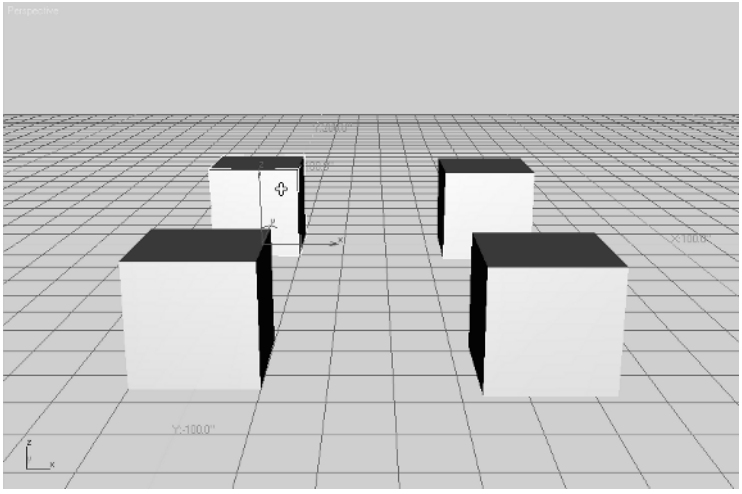
1. Place the cursor anywhere within the circle. Then slowly click and drag in a small, circular motion. Notice how the view changes as if your point of view were rotating around the group of cubes.
2. Place the cursor anywhere outside the circle. Then slowly click and drag in an up-and-down motion. Now the view rotates around the circle as if you were tilting your head from side to side.

You may have noticed that the cursor changes, depending on whether you're inside or outside the circle. This gives you further cues regarding the way the Arc Rotate tool affects your view.

You've been introduced to nearly all of the viewport tools. There's one more feature of the Arc Rotate Selected tool that you'll want to know about before you move on. The Arc Rotate Selected tool uses the center of the viewport as the center about which it rotates when no object is selected. But the Arc Rotate Selected tool works in a slightly different way when objects are selected. Try the following exercise to see how this variation works.

1. Choose View ➢ Restore Active Perspective View to restore the view you saved earlier.

2. Click the Select Object tool from the main toolbar.
3. Click the cube in the left side in the back row.



4. Click the Arc Rotate Selected tool again.
5. Slowly click and drag the cursor within the circle. Notice how the view appears to be fixed at the center of the selected cube.
6. Slowly click and drag the cursor in a vertical motion outside the circle. The view appears to rotate around the selected cube.
7. Return to the saved view by choosing View ➢ Restore Active Perspective View.

If you click and hold the Arc Rotate Selected tool, you'll see two other Arc Rotate tools in the Arc Rotate flyout. The tool at the top, called simply the Arc Rotate tool, rotates the view about the view center, regardless of whether an object is selected. You've already seen how the second tool, the Arc Rotate Selected tool, works. The tool at the bottom of the Arc Rotate flyout is the Arc Rotate Sub-Object tool. This tool rotates a view about a sub-object-level selection. You'll learn about sub-object-level editing in Chapter 4.

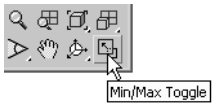
By being able to select an object or set of objects as the center of rotation for your view, you are better able to set up your views for rendering or editing. The combination of the Zoom, Pan, and Arc Rotate tools allows you to obtain just about any view you may need as you work within VIZ's Perspective viewport. But you aren't limited to a perspective view of your model. In fact, there are many situations where the perspective view is not ideal, especially when editing your model. In the next section, you'll look at other viewport types that give you greater flexibility in creating and editing objects in your model.

Using Multiple Viewports

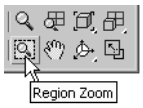
So far, you've done all your work in the Perspective viewport, but this isn't the only view you have available. You saw earlier how you can divide the VIZ window so that it displays four equal viewports, each representing a different view. Let's go back to that viewport arrangement to explore the

uses of some of VIZ's display tools. The first item you'll look at is the way that the Field-of-View tool changes when your active viewport changes.

1. Click the Min/Max Toggle tool in the set of viewport navigation controls. VIZ's window changes to display four viewports.



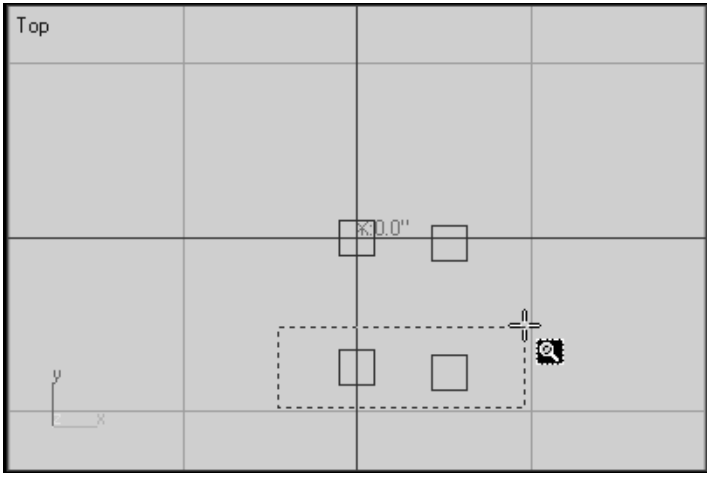
2. Click anywhere in the viewport labeled Top in the upper left corner of the display. Notice that the Field-of-View tool changes to a magnifying glass with a rectangle. This is the Region Zoom tool.



   Also notice that the Top viewport now shows a thick border around it, indicating that it is the current, active viewport.

3. Click the Region Zoom tool.
4. Click and drag the cursor on a point below and to the left of the cubes, as shown in Figure 1.18. As you drag the cursor, you see a rectangle appear. Don't release the cursor just yet.

FIGURE 1.18
Selecting a view to enlarge with the Region Zoom tool



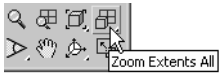
5. Position the rectangle above and to the right of the bottom row of cubes, as shown in Figure 1.18, and then release the mouse button. The view enlarges to the region you just indicated with the Region Zoom tool.

The Region Zoom tool acts like the magnifying tools in many other graphics programs. Also, the Zoom and Pan tools perform the same functions in orthogonal views in VIZ as they do in other programs, allowing you to zoom in and pan over the view.

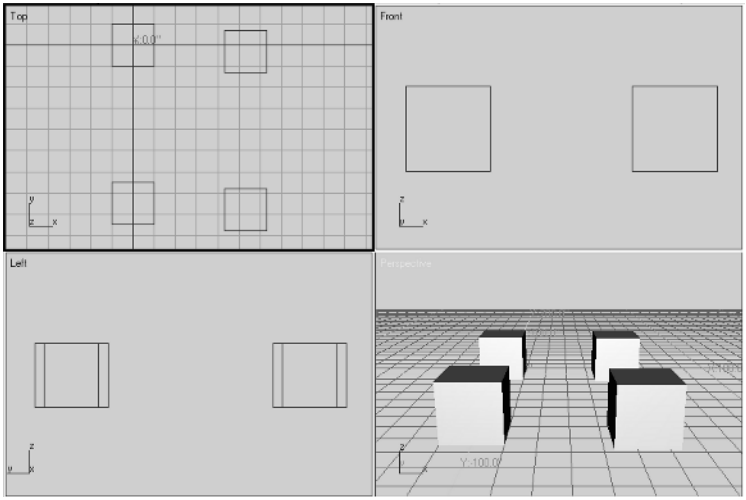
You may have noticed two other tools in the viewport navigation controls that haven't been discussed yet: the Zoom All and Zoom Extents All tools. Now that you have multiple viewports displayed, you can try out these two tools.

1. Click the Zoom All tool.

2. In any viewport, click and drag the cursor upward. Notice that the view in all of the viewports is enlarged to take in as much of the four cubes as can be displayed.
3. Click and drag the cursor downward, and the views expand to show more of the model area.
4. Click the Zoom Extents All tool.



All of the viewports change to show enlarged views of the cubes.



Although not as frequently used as the other viewport navigation tools, the Zoom All tool and the Zoom Extents All tool can be helpful when you need to adjust the overall view of your model in multiple viewports.

You should be aware that the Arc Rotate Selected tool you used in the Perspective viewport also works in the other viewports. Try it out on the Top viewport in the next exercise.

1. Click the Arc Rotate Selected tool.
2. Click and drag the cursor from the center of the Top viewport upward and to the right, so it shows a view similar to Figure 1.19.

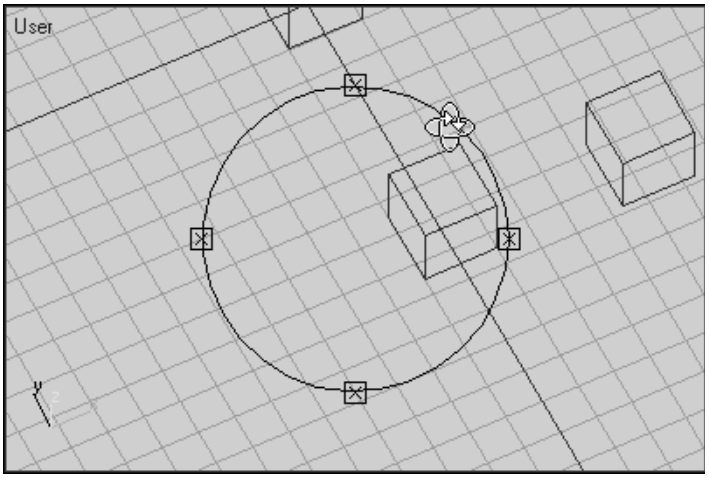


FIGURE 1.19
Top view after using Arc Rotate Selected

The view changes to a type of 3D view known as an *axonometric projection.* Also notice that the label in the upper left corner of the viewport now reads User. This indicates that the view is a custom view based on your changes.

3. Click the Zoom Extents tool to center the view in the viewport.

NOTE *An axonometric view is one in which all parallel edges of an object are shown parallel as opposed to convergent as in a perspective view. The familiar isometric view is a type of axonometric view. User viewports can contain any type of axonometric view. Unlike Perspective viewports, you can apply region zooms to User viewports, making them ideal for many types of editing functions.*

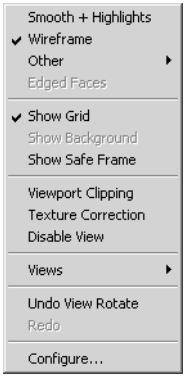
The 3D view in the upper left corner of the display differs in many ways from the perspective view. But, as you'll see in the next section, it's different only because a few of the settings for that viewport are different from those of the Perspective viewport.

Changing the Viewport Display and Configuration

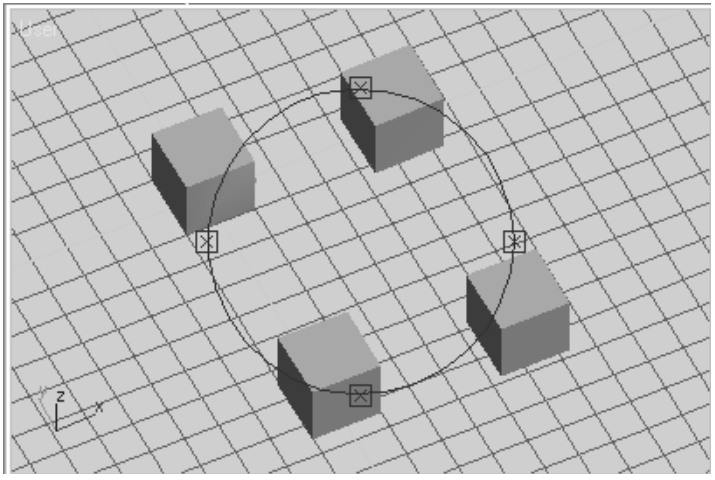
If you compare the User viewport with the Perspective viewport, you notice two things that are different. First, as mentioned in the previous exercise, the User viewport shows a 3D orthographic projection. The second difference is that the User viewport isn't shaded; the cubes are displayed as simple line outlines called a *wireframe view.* These display characteristics can be modified for each viewport.

In the following exercise, you'll see how you can alter viewport settings to obtain specific view characteristics such as shading and perspective.

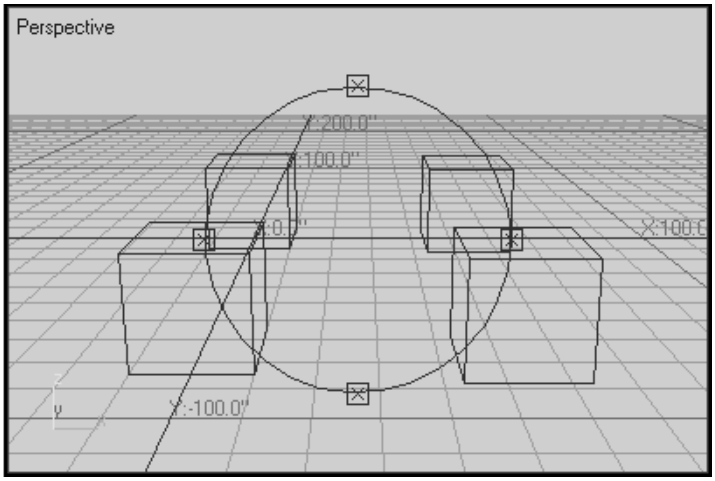
1. Right-click the User label in the upper right corner of the User viewport. A pop-up menu displays.



2. Select Smooth + Highlights from the menu. The cubes now appear shaded, just as they do in the Perspective viewport.

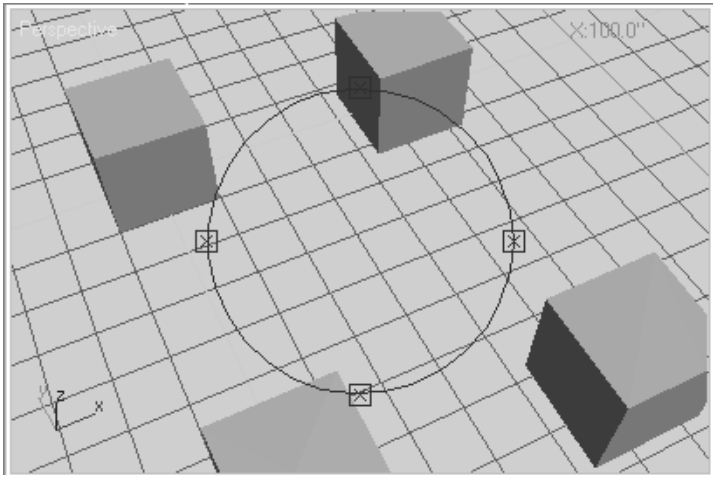


3. Right-click the Perspective viewport label. Then select Wireframe from the pop-up menu. The perspective view changes to a wireframe representation.



Notice that the pop-up menu is the same for both the User and Perspective viewports. This menu gives you control over the display characteristics of the viewport. Try out a few other options in the Viewport pop-up menu.

1. Right-click the User label, and then select Views ➢ Perspective. The user view changes to a perspective view. Notice that the label changes to read Perspective, so that you now have two Perspective viewports.



2. Right-click the Perspective label of the upper left viewport, and then select Views ➢ Top. The view now changes back to the original top view. Notice that the cubes are still shaded.

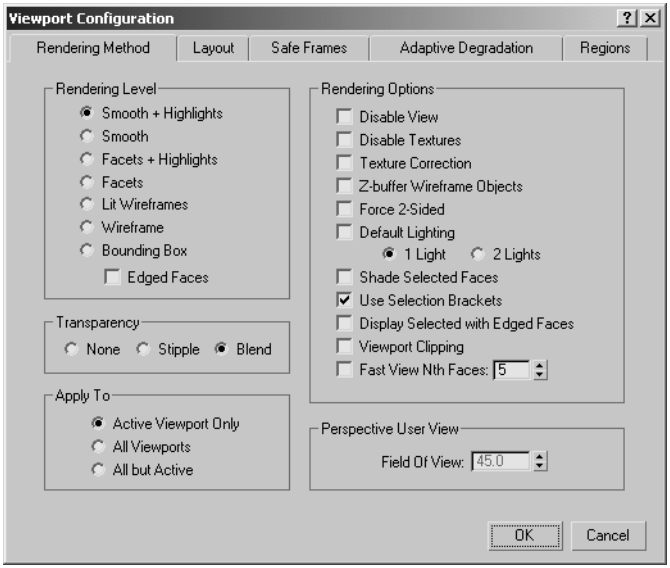
3. Right-click the Top label and select Wireframe. The view returns to its original state.

Now all the viewports show wireframe views of the cubes. Wireframe views are often better for many types of editing operations. Wireframes also redraw faster when your model is very large and full of complex geometry. Another type of view, called *bounding box,* is even faster than wireframe views, but bounding box views reduce the representation of objects to rectangular boxes.

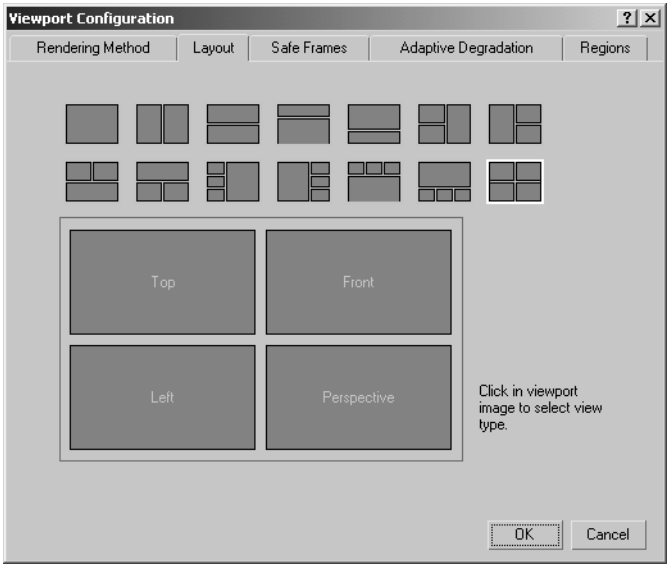
There's also another way to control viewport shading. Remember the floating View Shading toolbar that you saw earlier in this chapter? It offers the same shading controls found in the Viewport pop-up menu that you've just been working with. If you prefer to use a toolbar to select view options, you can restore the View Shading toolbar to the screen by right-clicking a blank spot on any toolbar and selecting View Shading.

Besides changing the way the viewport displays your model, wireframe view also gives you control over the layout of the viewports themselves. The following exercise shows you the variety of layouts you can create in VIZ.

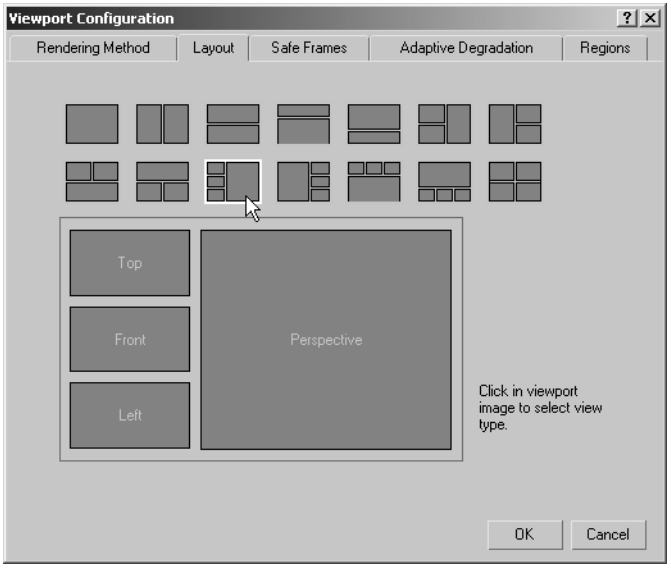
1. Choose Customize ➢ Viewport Configuration. The Viewport Configuration dialog box displays.



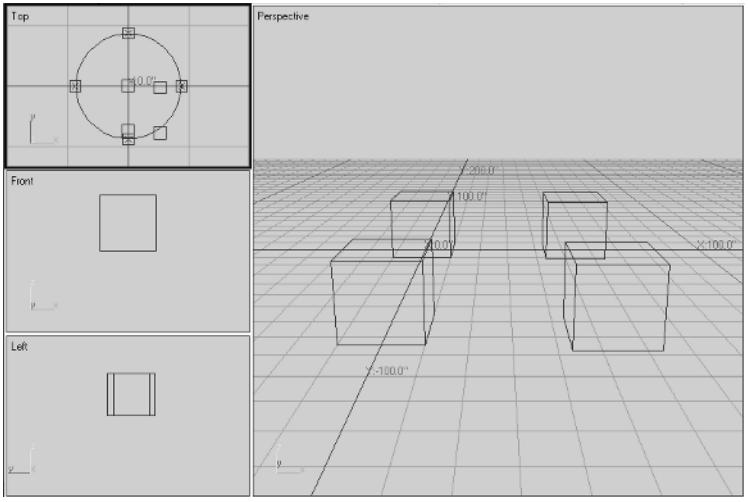
2. Click the Layout tab. You see the current viewport layout. Above it is a set of predefined layouts.



3. Click the layout that looks like three small rectangles stacked on the left side with one large rectangle on the right.



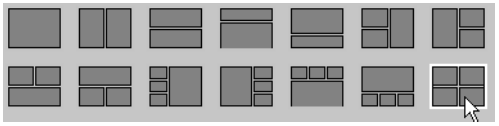
4. Click OK. The viewports change to the selected layout.



Users of previous versions of VIZ may find this layout comfortable. It has been the default layout for a few of the 3ds max and 3D Studio VIZ versions.

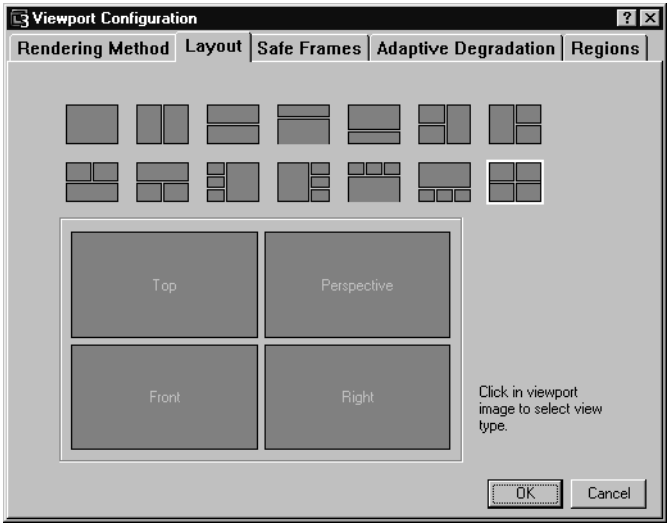
You aren't limited to the canned layouts either. You may decide that you want the layout to reflect a more traditional mechanical drawing layout, with a top, front, and right side view. Here's how you can set up such a viewport arrangement:

1. Choose Customize ➢ Viewport Configuration.
2. With the Layout tab selected, click the layout showing four equal viewports, which is the rightmost layout in the bottom row of layout options.

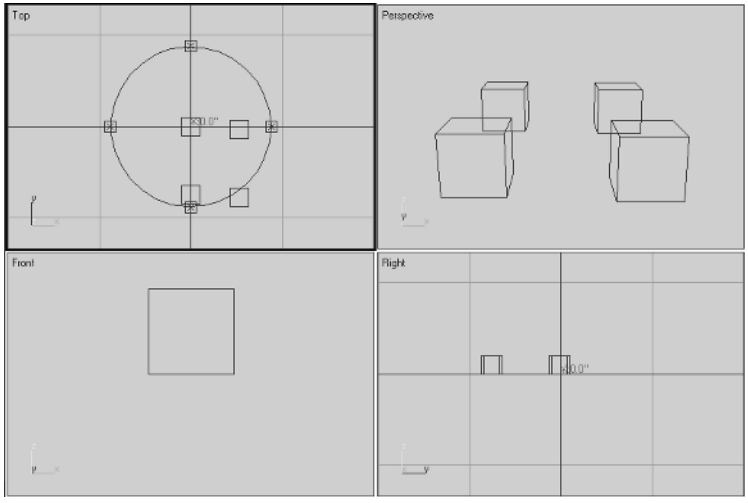


3. Click the sample viewport labeled Front in the upper right corner of the large sample layout and select Perspective in the pop-up menu.
4. Click the sample Perspective viewport in the lower right corner and select Right from the pop-up menu.
5. Click the sample left viewport in the lower left corner and select Front from the pop-up menu. The sample layout should now look like Figure 1.20.

FIGURE 1.20
The four-viewport layout with modifications



6. Click OK. Now you have a layout that shows the top, front, and right views, plus a perspective view, arranged in a more traditional manner.

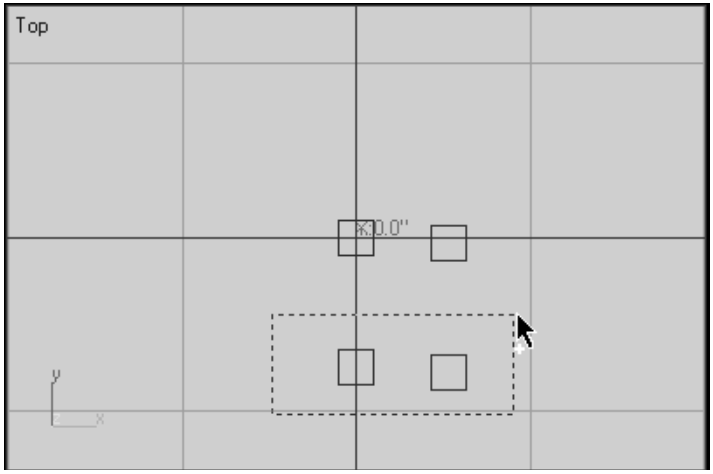


New! *TIP When VIZ displays multiple viewports, you can resize those viewports on the fly by clicking and dragging the viewport borders. Place the cursor on the border and, when you see a double-headed arrow, click and drag to change the viewport size.*

As you can see from what you've learned so far, Autodesk VIZ 4 provides a wide array of display options, but most of the time, you'll stick with one viewport layout that you are comfortable with. For the purposes of this book, you'll use the default layout that shows the four equal-size viewports.

Before you conclude your tour of the VIZ interface, let's see how the Move tool acts in the non-Perspective viewports. The following exercise will give you a feel for the ways that you can use multiple viewports.

1. Click the Select and Move tool.
2. In the Top viewport, click and drag the cursor from a point below and to the left of the bottom row of cubes.
3. Drag the selection rectangle above and to the right of the two cubes in the lower row, so that they are enclosed in the rectangle. The two cubes are selected.

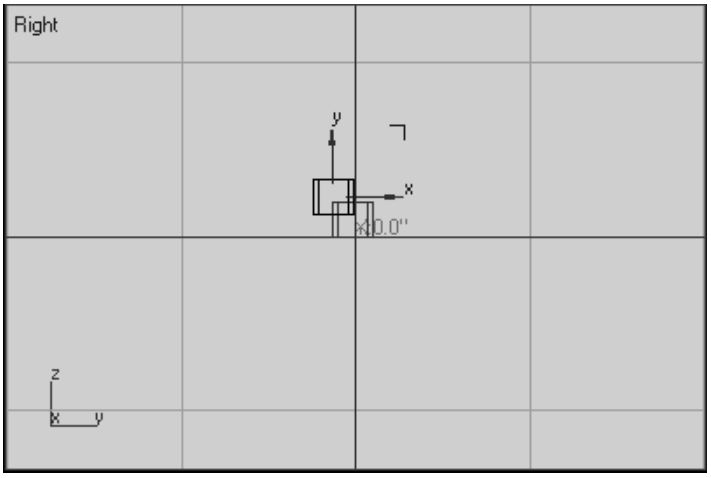


4. Right-click in the Right viewport.

TIP *By right-clicking in a viewport, you can make it active without disrupting any selections you may have active at the time.*

5. In the Right viewport, click and drag the green Y arrow upward. Notice how the cubes move in the front and perspective views as you do this.
6. Position the cubes so they are higher by about one-half the height of a cube.

7. Click and drag the red X axis of the cubes to the right of the screen, so they merge with the cube to the right, as shown here.



8. You can save this file or discard it. You won't need it anymore.

In this exercise, you've seen a number of methods in action. First, the Select and Move tool can be used to select objects as well as move them. This can help you move objects quickly by reducing the number of clicks. But be careful, or you might select and move the wrong object when you're in a hurry.

You also saw how you can right-click in a viewport to make it active. Had you simply clicked in the Right viewport in step 4, you would have lost the selection set you created in step 3.

Finally, you saw how objects in VIZ don't conform to one of the basic rules of physics. In VIZ, more than one object *can* occupy the same space at the same time. This characteristic can be useful in a number of ways as you build models in Autodesk VIZ 4.

Summary

In this introduction to Autodesk VIZ 4, you've learned how to use the many different tools available in VIZ. You saw how some tools work in familiar ways, while others, like the spinners and rollouts, are a slight departure from other typical Windows programs. You were also introduced to some of the basic object-creation and editing methods in VIZ. These basic methods are the foundation on which you will build your skills in this program.

You've covered a lot of ground in this first chapter. Don't worry if you can't remember everything. You'll be exposed to many of these tools frequently as you work through the following chapters. In the next chapter, you'll take a closer look at how objects are created and edited.