Chapter 2

Introduction to Autodesk 3ds Max 2012

Learning Objectives

After completing this chapter, you will be able to:

- *Start a new scene in Autodesk 3ds Max 2012*
- *Understand the Autodesk 3ds Max screen components*
- *Understand various selection techniques*
- *Understand time slider and animation controls*
- *Use controls for creating or modifying the objects*
- *Use hotkeys in Autodesk 3ds Max*
- *Customize hotkeys*
- *Customize the colors of elements*

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INTRODUCTION

Welcome to the world of Autodesk 3ds Max, an advanced application that is used to create still or animated 3D models and objects. With the help of this application, you can create realistic scenes by modifying objects, applying maps and materials to have the reference, assigning environment, adding lights and cameras, and so on. Before working with Autodesk 3ds Max, you should have the basic knowledge of various tools and commands available in this software. In this chapter, you will learn the basic features of Autodesk 3ds Max.

GETTING STARTED WITH Autodesk 3ds Max 2012

First, you need to install Autodesk 3ds Max 2012 on your system. On installing the software, the **Autodesk 3ds Max 2012** shortcut icon will automatically be created on the desktop. Double-click on this icon to start Autodesk 3ds Max. Alternatively, you can start Autodesk 3ds Max from the **Start** menu. To do so, choose **Start > All Programs > Autodesk > Autodesk 3ds Max 2012 > Autodesk 3ds Max 2012**, as shown in Figure 2-1. On doing so, the system will prepare to start Autodesk 3ds Max 2012 by loading all required files.

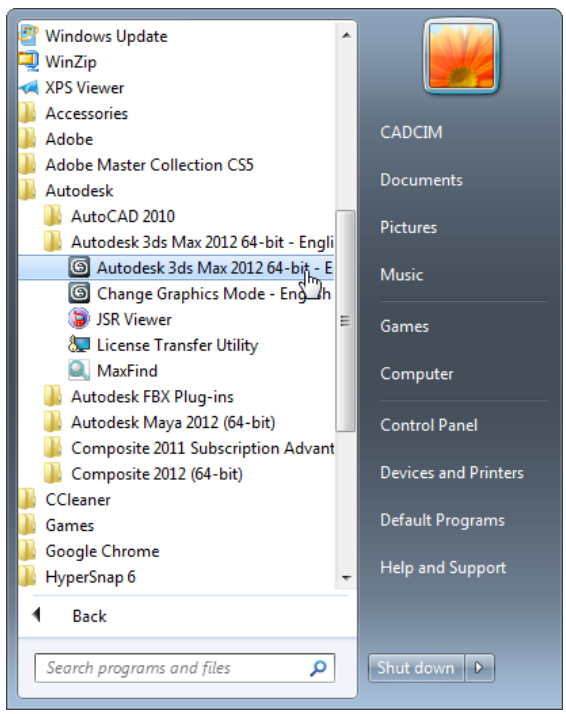

Figure 2-1 *Starting Autodesk 3ds Max 2012 using the* ***Start*** *menu*

If you are running Autodesk 3ds Max for the first time, the **Autodesk Customer Involvement Program** dialog box will be displayed, as shown in Figure 2-2, and you will be prompted to join the Customer Involvement Program (CIP). Select the **Yes, I would like to participate in CIP** radio button and then choose the **OK** button to join the CIP. Else, select the **No, thanks** radio button. On joining the CIP, Autodesk will gather product feature usage and system information every day from your system to analyze trends and patterns. This

entire information helps Autodesk to improve its product. You can also invoke the **Autodesk Customer Involvement Program** dialog box by choosing **Help > Customer Involvement Program** from the menu bar.

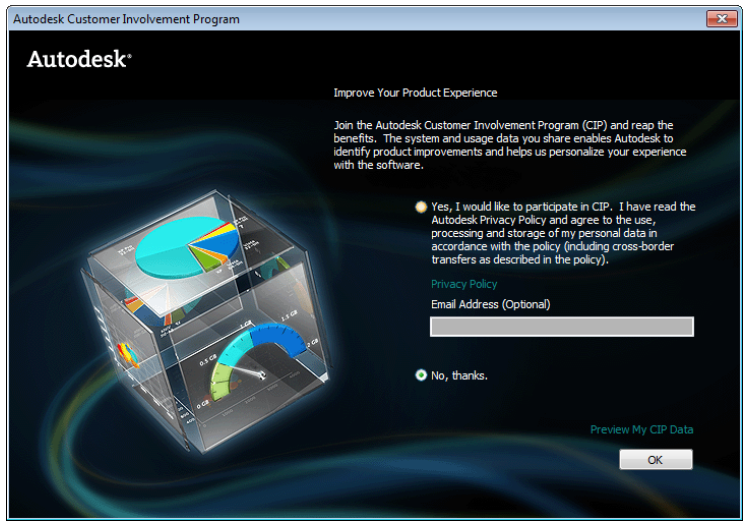

Figure 2-2 *The* ***Autodesk Customer Involvement Program*** *dialog box*

After all required files are loaded, the 3ds Max interface will be displayed along with the **Welcome to 3ds Max** dialog box, as shown in Figure 2-3. The **Welcome to 3ds Max** dialog box will display the video tutorials that help you to learn the basic working environment of the software. To start a tutorial, choose one of the buttons available on the left in this dialog box; the corresponding tutorial will be displayed in a separate window on the screen. Also, you can create a new file, open an existing file or a recently created file using this dialog box. Choose the **Close** button in the **Welcome to 3ds Max** dialog box to close it.

STARTING A NEW SCENE IN Autodesk 3ds Max

To start a new scene in Autodesk 3ds Max, choose the **Application** button at the top left corner of the interface; the **Application** menu will be displayed. Next, choose **New > New All** from the **Application** menu; a new scene will be displayed in the 3ds Max interface. The new scene will clear all contents of the current scene. Alternatively, press the CTRL+N keys; the **New Scene** dialog box will be displayed, as shown in Figure 2-4. By default, the **New All** radio button is selected in this dialog box. It is used to clear all the contents in the current scene and open a new scene. Choose the **OK** button; a new scene will be displayed.

You can also reuse the objects from the current scene in the new file. To do so, select the **Keep Objects** radio button in the **New Scene** dialog box. However, on selecting this radio button, all the animation keys and links between the objects will be cleared. To keep the objects and the links between them, select the **Keep Objects and Hierarchy** radio button. However, in this case, the animation keys will be deleted. Before starting a new scene in Autodesk 3ds Max, it

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is recommended that you reset Autodesk 3ds Max and start afresh. By doing so, you will be able to reset all the settings for the new scene. To reset Autodesk 3ds Max, choose **Reset** from the **Application** menu; the **3ds Max** message box will be displayed, as shown in Figure 2-5. Choose the **Yes** button; the Autodesk 3ds Max will be reset.

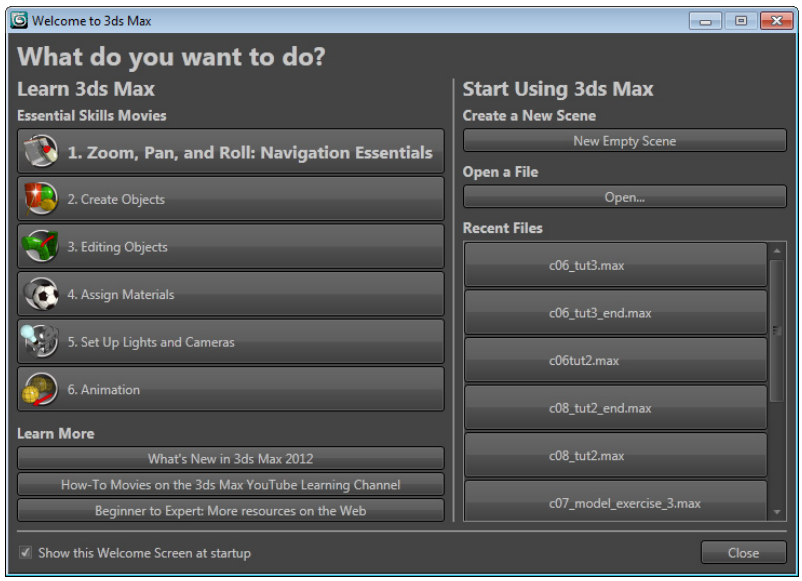

Figure 2-3 *The* ***Welcome to 3ds Max*** *dialog box*

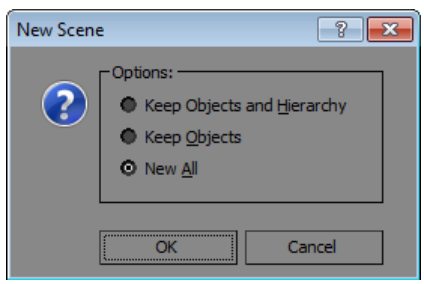

Figure 2-4 *The* ***New Scene*** *dialog box*

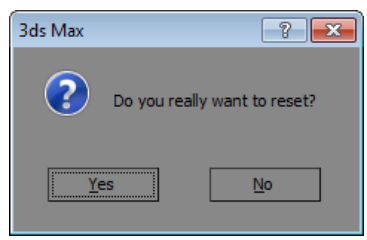

Figure 2-5 *The* ***3ds Max*** *message box*

Autodesk 3ds Max 2012 SCREEN COMPONENTS

The 3ds Max interface screen consists of different components, as shown in Figure 2-6. These components are discussed next.

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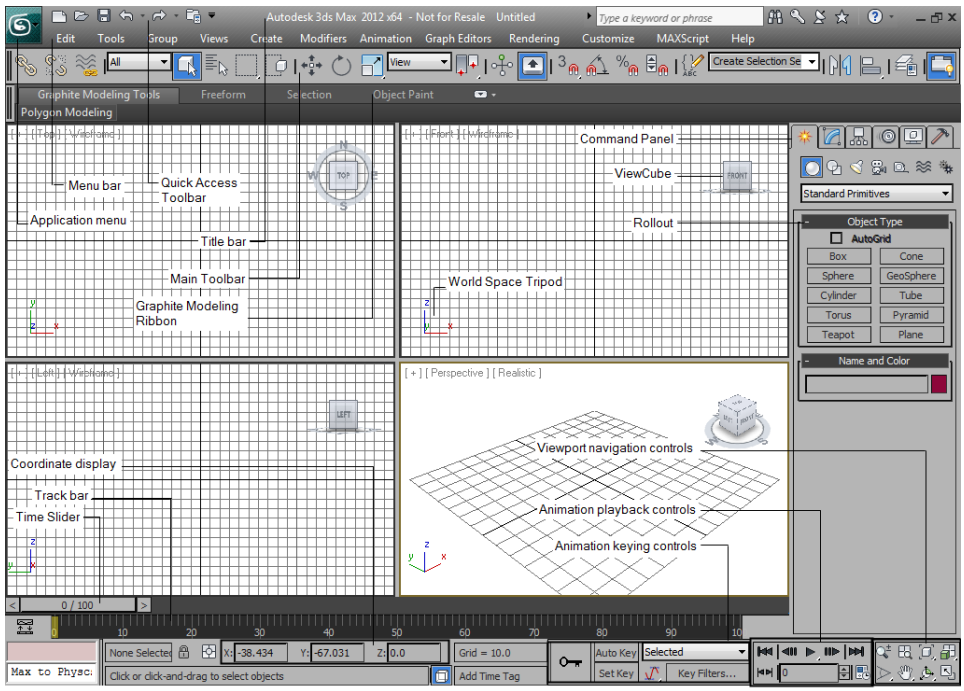

Figure 2-6 *Different screen components of Autodesk 3ds Max interface*

Menu Bar

The menu bar, as shown in Figure 2-6 is located just below the title bar and contains various drop-down. Some of the pull-down menus are standard window menus such as **Edit** and **Help**, and others are 3ds Max pull-down menus such as **Create**, **Modifiers**, **Animation**, **Graph Editors**, **Rendering**, **Customize**, and so on. The title of each pull-down menu indicates the purpose of commands in the menu. When you choose one of the menu titles, Autodesk 3ds Max displays the corresponding pull-down menu. Each menu consists of a collection of commands. In a pull-down menu, the dots after a command indicate that a dialog box will be displayed on choosing that command. An arrow next to a command indicates that a cascading menu will be displayed on placing the cursor on that command. For some of the commands in the pull-down menus, the keyboard shortcuts are available on their right side, as shown in Figure 2-7.

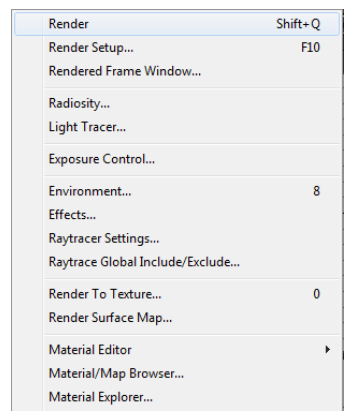

Figure 2-7 *The keyboard shortcuts for some commands*

Application Menu

The **Application** menu is used to manage the files created in 3ds Max. To display this menu, choose the **Application** button on the top left of the 3ds Max screen, as shown in Figure 2-8. The menu comprises of the most commonly used file management options. In 3ds Max 2012, the **Send to** option is added which provides interoperability with Autodesk applications such

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as Softimage, MotionBuilder, and Mudbox. When you choose **Send to** from the **Application** menu, a cascading menu is displayed. It consists of options: **Send to Softimage**, **Send to MotionBuilder**, and **Send to Mudbox**. Choose the desired option from the cascading menu; a submenu will be displayed with the options **Send as New Scene**, **Update Current Scene**, **Add to Current Scene**, and **Select Previously Sent Objects**. You can choose the option from this menu as per your requirement.

The **Recent Documents** area on the right of the menu provides a complete information about the files that were previously saved in 3ds Max. You can change the size of the icons of the recent documents. To do so, choose the **Icon or Image Display** button from the **Application** menu, refer to Figure 2-8; a drop-down list will be displayed, as shown in Figure 2-9. Select the icon size from the drop-down list to change the size of the icons of the recent documents.

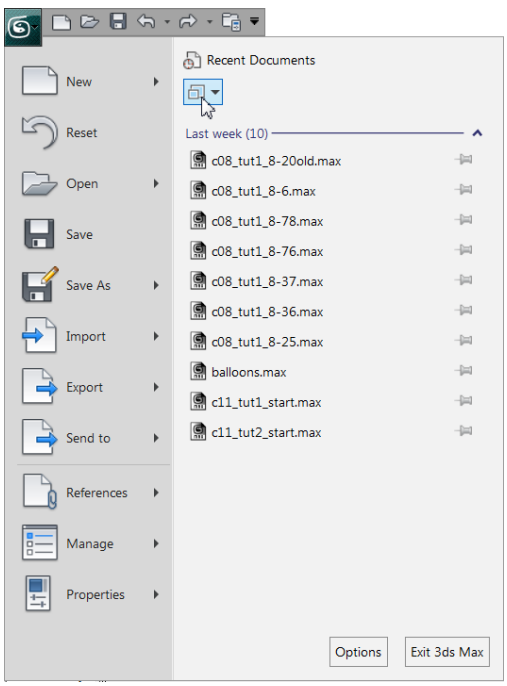

Figure 2-8 *Choosing the* ***Icon or Image Display*** *button from the* ***Application menu***

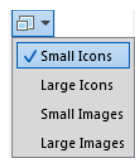

Figure 2-9 *The icon or image display drop-down list*

You can also use the keyboard shortcuts to work with the **Application** menu. To do so, press ALT+F; the **Application** menu will be displayed with all shortcuts, as shown in Figure 2-10. Next, press the shortcut key based on your requirement; the corresponding command will be executed. However, if you click again on the **Application** menu after pressing the ALT+F keys, the **Application** menu will not display the shortcuts. You can repeat the process to view the shortcuts again.

Quick Access Toolbar

The **Quick Access Toolbar** comprises of the most commonly used file management buttons,

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as shown in Figure 2-11. These buttons are also available in the **Application** menu. Apart from the commonly used buttons, the **Quick Access Toolbar** contains the **Redo Scene Operation** and **Undo Scene Operation** buttons.

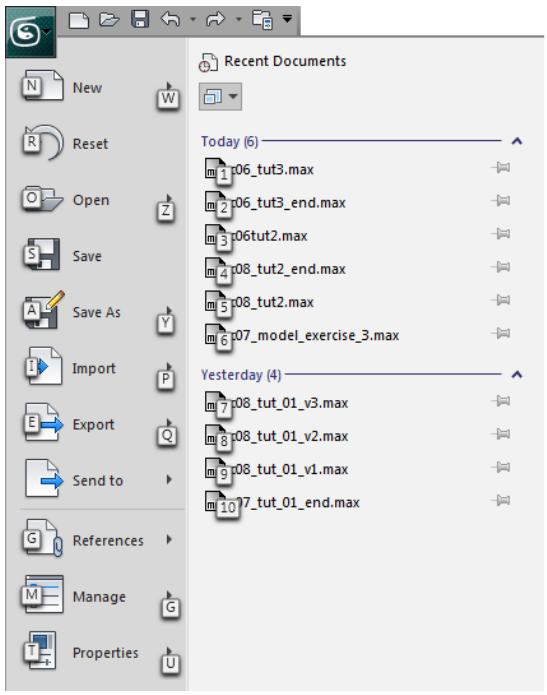

Figure 2-10 *The* ***Application*** *menu with the keyboard shortcuts*

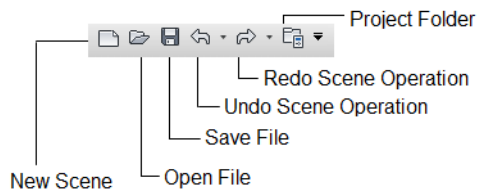

Figure 2-11 *The* ***Quick Access Toolbar***

Toolbars

In Autodesk 3ds Max, there are various commands available in toolbars as buttons or tools. By default, only the **Main Toolbar** will be displayed on Autodesk 3ds Max screen. However, you can display other toolbars such as **Snaps**, **Axis Constraints**, **Extras**, **MassFX Toolbar**, and so on in the 3ds Max screen. Also, you can move, resize, and undock them based on your requirements. To display these toolbars, right-click in the blank area on the **Main Toolbar**; a shortcut menu will be displayed with the names of all the toolbars, as shown in Figure 2-12. Next, choose the name of the required toolbar; the chosen toolbar will be displayed on the screen. Also, you can hide any of the displayed toolbars by choosing its name from the shortcut menu. The **Main Toolbar** provides quick access to many tools and dialog boxes such as **Select and Link**, **Unlink Selection**, **Select Object**, **Material Editor**, and so on. This toolbar is docked just below the menu bar. You will learn more about the tools available in various toolbars in the later chapters.

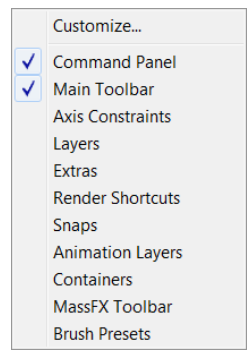

Figure 2-12 *Displaying the shortcut menu with the names of all the toolbars*

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Command Panel

By default, the **Command Panel** is docked on the right of the 3ds Max screen. There are six tabs in the **Command Panel** namely: **Create**, **Modify**, **Hierarchy**, **Motion**, **Display**, and **Utilities**, as shown in Figure 2-13. Most of the 3ds Max modeling and animation tools are placed in these tabs. The tools in the **Command Panel** are used to create, modify, and animate the objects. Each tab has several rollouts to create or modify the objects. You can collapse or expand these rollouts. The six tabs in the **Command Panel** are discussed next:

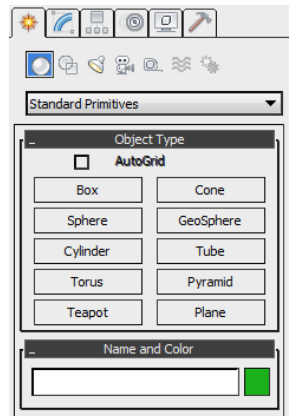

Figure 2-13** The **Command Panel



The **Create** tab is chosen by default. The tools in the **Create** tab are used to create objects, cameras, lights, and so on.



The **Modify** tab is used to modify the selected objects in the viewport by modifying the parameters, applying various modifiers, and editing the editable objects such as editable mesh or editable poly.



The **Hierarchy** tab is used to control the links in the hierarchy, joints, and inverse kinematics.



The **Motion** tab is used to control the animation controllers.



The **Display** tab is used to hide and unhide the objects in the viewport.



The **Utilities** tab is used to access various utility programs.



Note

*You can undock the **Command Panel** and **Main Toolbar** and place them anywhere on the screen. To do so, move the cursor on top of the **Main Toolbar** to relocate it; the cursor will change into an arrow with two overlapping rectangles. Now, press and hold the left mouse button and drag the **Main Toolbar** to the desired location. Double-click on the **Main Toolbar** to dock it back to its default position.*



Viewports

When you start Autodesk 3ds Max, you are provided with a default interface. This interface consists of four equally sized viewports surrounded by tools and controls, refer to Figure 2-6. These viewports are labeled as Top, Front, Left, and Perspective. The viewports in Autodesk 3ds Max are used to create 3D scenes. Also, they enable you to view a scene from different angles. When you create an object in the viewport, the Top, Front, and Left viewports will display the top, front, and left orthographic views of the object, respectively. You can modify the size of the viewports by dragging the intersection of the viewports. To restore the original size, right-click on the intersection of the dividing lines; a shortcut menu will be displayed, as

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shown in Figure 2-14. Choose the **Reset Layout** option from the shortcut menu; the default size of the viewports will be displayed.

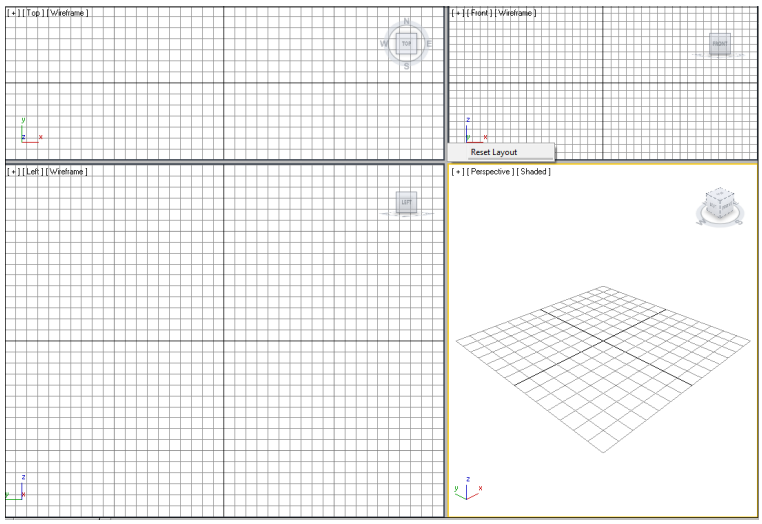

Figure 2-14 *The* ***Reset Layout*** *option displayed*

Among the four viewports, one will be highlighted in yellow border, indicating that it is the active viewport. Note that only one viewport can be activated at a time. To activate another viewport, you need to click on it. You can also activate a viewport by right-clicking on it. On doing so, the selection state of the objects will be maintained.

On the bottom left corner of each viewport, there is a world-space tripod, as shown in Figure 2-15. The world-space tripod has three axes, X, Y, and Z, which are displayed in red, green, and blue colors, respectively. The tripod always refers to the world coordinate system, regardless of the local coordinate system. The ViewCube is placed on the top right corner of the viewport, as shown in Figure 2-15. The ViewCube provides visual feedback of the current orientation of the viewport.

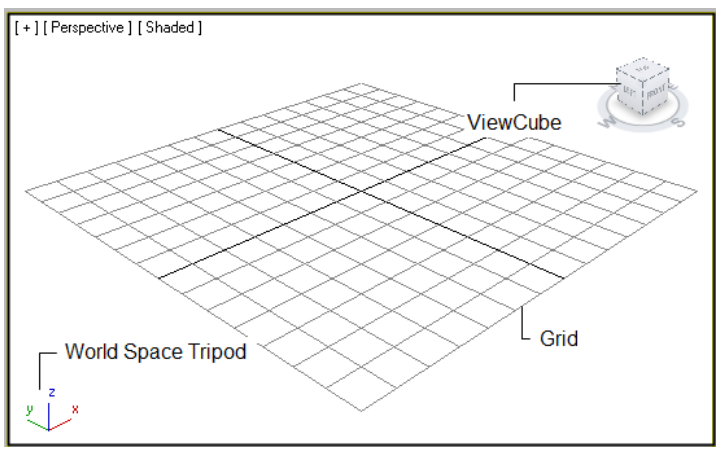

Figure 2-15 *The world space tripod and grids in the Perspective viewport*

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Note

The ViewCube will not be visible in the viewport for camera, light, or activeshade.

It is important to note that the local coordinate system defines the local position of an object in a scene. Whereas, the world coordinate system uses fixed axes to define the position of all objects in the world space.

Each viewport has a grid placed in it, refer to Figure 2-15. It is like a graph paper in which all the lines intersect each other at right angles. You can modify the spacing in the grids. The grids in all viewports act as an aid to visualize the spacing and distance while creating objects. Also, they provide a construction plane to create and align the objects. You can also use the grids as a reference system while using the snap controls to align the objects. To hide the grid in the viewport, press the G key.

On the top left corner of each viewport, there are three viewport labels: General viewport label, Point of view (POV) viewport label, and Shading viewport label, as shown in Figure 2-16. When you click on any of the viewport labels, the corresponding shortcut menu will be displayed, as shown in Figure 2-17. The options in these shortcut menus are used to modify various aspects of the active viewport. You can activate or disable the active viewport by using the options in the General viewport label menu. Choose the **Configure Viewports** option from this menu; the **Viewport Configuration** dialog box will be displayed. Various commands in this dialog box can be used to configure the viewports. You already know that four equally sized viewports are displayed on the screen. However, you can change the viewport configuration based on your requirement. To change the basic configuration of the viewports, choose the **Layout** tab in the **Viewport Configuration** dialog box, as shown in Figure 2-18. In the **Layout** tab, you can specify the division method of the viewports. There are 14 types of configurations displayed on the top in the dialog box. Select the required configuration and then choose the **OK** button; the viewports will be displayed according to the configuration that you have selected in the **Viewport Configuration** dialog box.

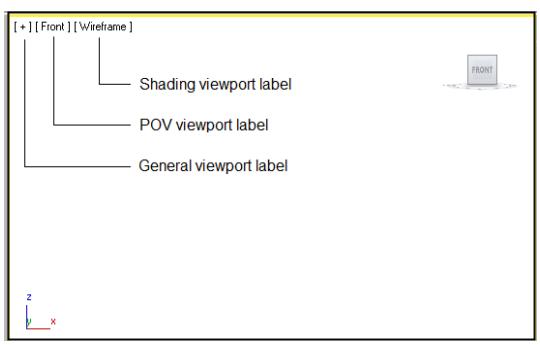

Figure 2-16 *The viewport labels in the Front viewport*

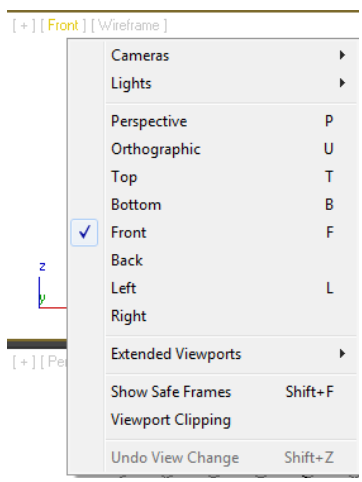

Figure 2-17 *The shortcut menu displayed on clicking the POV viewport label*

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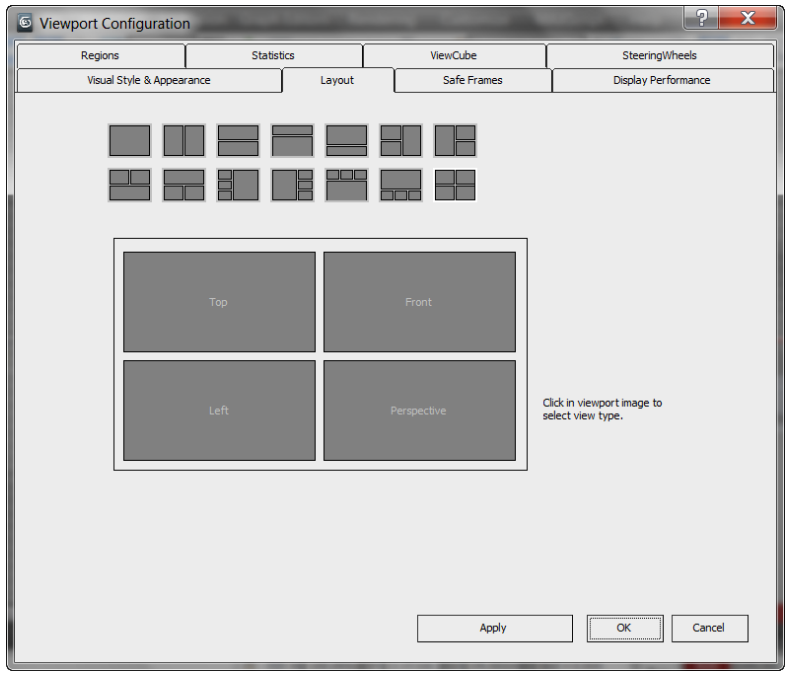

Figure 2-18 *The* ***Layout*** *tab of the* ***Viewport Configuration*** *dialog box*

Note

The viewport configuration specifies how the viewports will be arranged on the screen.

You can change the default viewport to any other viewport type available, such as Bottom, Right, and so on, by using the options in the POV viewport label menu. To do so, click on the POV viewport label; a shortcut menu will be displayed. Choose the name of the viewport that you want to display.

You can also use the Shading viewport label menu for defining the type of shadings displayed in the viewport. The different shading types are: **Realistic**, **Shaded**, **Consistent Colors, Wireframe**, **Edged Faces**, **Bounding box**, **Hidden Line**, and so on. However, some of these shading types are available in the cascading menu of the **Stylized** option, refer to Figure 2-19. These shading types are **Graphite**, **Color Pencil**, **Ink**, and so on. You can choose any option to change the shading.

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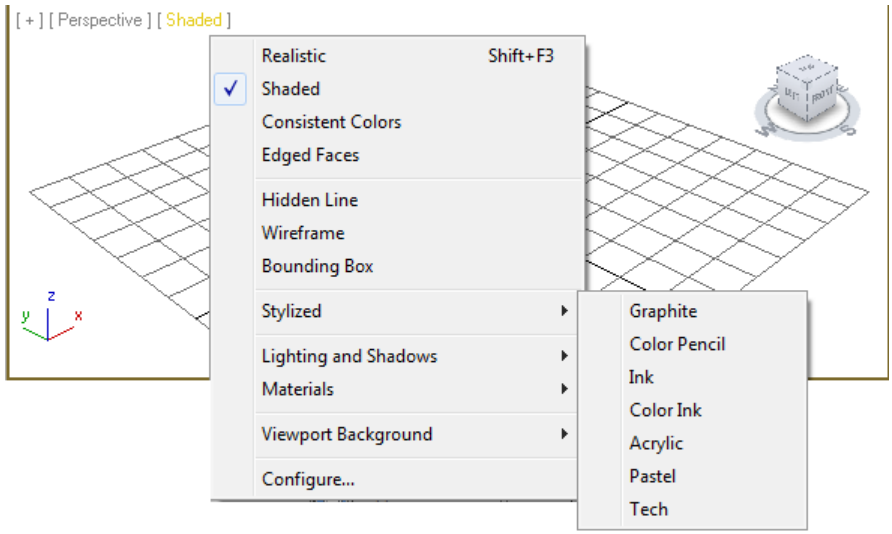

Figure 2-19 *Displaying the different shading types available in the* ***Stylized*** *cascading menu*

Status Bar

There are various tools in the status bar that provide information of the scene and the active command, as shown in Figure 2-20. The prompt line, which is located at the bottom of the screen, displays information of the active command or tool. On top of the status bar, a text box known as the status line is available. This status line displays the number of currently selected objects (current selection set). The **Selection Lock Toggle** tool on the right side of the status bar is used to lock the selection set. The **coordinate display/transform type-in** area displays the X, Y, and Z coordinates of the cursor or the currently selected object. The **coordinate display/transform type-in** area can also be used to enter transform values while moving, scaling, or rotating the selected object(s).

The grid setting display area is placed on the right of the coordinate display area. It displays the size of the grid. The time tag area located below the grid setting display area, is used to assign the text labels at any point of time during the animation. Click on the time tag area; the **Add Tag** and **Edit Tag** options will be displayed. Use these options to add or edit the text labels at any point of time during the animation.

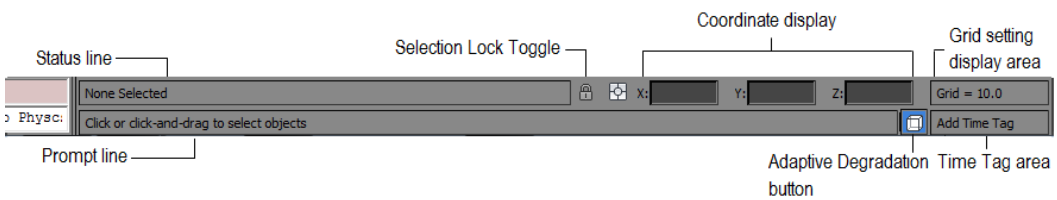

Figure 2-20 *The status bar*

Viewport Navigation Controls

There are various tools available at the bottom right corner of the Autodesk 3ds Max screen. These tools are known as viewport navigation controls and they are used to control the display and navigation of the viewport. The tools displayed in the viewport navigation controls depend on the viewport selected. For example, if the Camera viewport is selected, its corresponding tools will be displayed in the viewport navigation control.

Note that some of the tools mentioned below are available in a flyout which will be displayed when you click on the arrow located on the lower right corner of the tool icon. The viewport navigation tools are discussed next.

Zoom Tool



The **Zoom** tool is used to increase or decrease the view size of the active viewport. You can zoom in a view by pressing the left mouse button and dragging the cursor up. Similarly, you can zoom out by pressing the left mouse button and then dragging the cursor down.

Zoom All



The function of the **Zoom All** tool is the same as the **Zoom** tool with the only difference that this tool zooms the display in all four viewports simultaneously.

Zoom Extents



The **Zoom Extents** tool is used to view all objects in the active viewport.

Zoom Extents Selected



The **Zoom Extents Selected** tool is used to view all selected objects in the active viewport.

Zoom Extents All



The function of the **Zoom Extents All** tool is the same as the **Zoom Extents** tool with the only difference that this tool is used to view all objects in all viewports.

Zoom Extents All Selected



The function of the **Zoom Extents All Selected** tool is the same as the **Zoom Extents Selected** tool with the only difference that this tool is used to view all selected objects in all viewports.

Zoom Region



The **Zoom Region** tool is used to define the area to be magnified and view this area in the current viewport. The area to be magnified is specified by a rectangle created by dragging the cursor.

Field-of-View



The **Field-of-View** tool is available only in the Perspective and Camera viewports. It is used to change the field of view of the scene in these viewports. The greater

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the **Field-of-View** of a camera, the better will be the visibility of scene, and vice-versa.

Pan View



The **Pan View** tool is used to pan the scene in the viewport. This tool enables you to display the contents that are outside the display area of the viewport, without changing the current viewport.

Walk Through



The **Walk Through** tool is available in Perspective and Camera viewports only. It allows you to navigate through these viewports. On invoking this tool, the cursor changes into a circle with a dot at its center. Press and hold the left mouse button to navigate in the active viewport. Alternatively, invoke this tool and then press the arrow keys to navigate through the viewport. On pressing the arrow key, the cursor shows a directional arrow indicating the navigation direction.

Orbit



The **Orbit** tool is used to rotate the viewport around its view center. Rotating the view enables you to see the three-dimensional (3D) view of the objects in the Perspective viewport. You can rotate the Top, Front, and Left viewports as well. But in such cases, the respective viewport becomes the Orthographic viewport.

Orbit Selected



The function of the **Orbit Selected** tool is the same as the **Orbit** tool with the only difference that it is used to rotate the viewport about the center of the current selection.

Orbit SubObject



The function of the **Orbit SubObject** tool is the same as the **Orbit** tool with the only difference that it is used to rotate the viewport about the center of the current sub-object selection.

Maximize Viewport Toggle



The **Maximize Viewport Toggle** tool is used to maximize the active viewport so that you can view only active viewport in place of all four viewports.

Selection Techniques

In Autodesk 3ds Max, you can select objects using various tools such as **Select Object**, **Select by Name**, **Select and Move**, and so on. These tools are discussed next.

Select Object Tool

Quad Menu: Select
Main Toolbar: Select Object
Keyboard: Q



The **Select Object** tool is used to select one or more objects in the viewport. To select an object, choose this tool and place the cursor over the object; the cursor will convert into a selection cursor. Next, press the left mouse button; the objects will be selected.

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To select more than one object at a time, hold the CTRL key and click on the objects that you want to add to the selection. To remove an object from the selection set, hold the ALT key and click on the object that you want to remove from the selection.

Select by Name Tool

Menu bar: Edit > Select By > Name
Main Toolbar: Select by Name
Keyboard: H



The **Select by Name** tool is used to select an object by its name from the list of objects present in the **Select From Scene** dialog box. When you invoke the **Select by Name** tool from the **Main Toolbar**, the **Select From Scene** dialog box will be displayed, showing the list of the components/objects in the scene, as shown in Figure 2-21. Now, select a component from the list and then choose the **OK** button to select the component in the scene. Alternatively, you can double-click on the object name in the list to select it. You can also select more than one object by holding the CTRL key. The buttons at the top of the dialog box are used to filter the objects in the list.

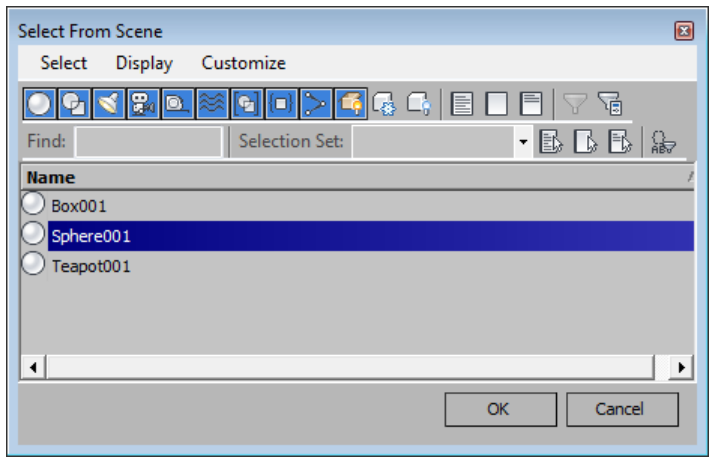

Figure 2-21 *The* ***Select From Scene*** *dialog box*

Select and Move Tool

Quad Menu: Move
Main Toolbar: Select and Move
Keyboard: W



The **Select and Move** tool is used to select and move objects in the viewport. You can move an object by selecting it and then dragging the mouse along the X, Y, or Z axis. You can also move an object in the XY, YZ, or ZX plane. To move an object along one of the axes, invoke **Select and Move** tool and then select the object; all axes will be displayed. Move the cursor over the axis along which you want to move the object, press the left mouse button, and then drag the cursor. Similarly, to move the object in one of the planes, place the cursor over that plane displayed between the two axes; the plane will be highlighted in yellow. Next, press the left mouse button and drag the cursor.

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Select and Rotate Tool

Quad Menu: Rotate
Main Toolbar: Select and Rotate
Keyboard: E



The **Select and Rotate** tool is used to rotate an objects in the viewport along the X, Y, or Z axis. To rotate the object along one of the axes, invoke the **Select and Rotate** tool, and then select the object; a rotate gizmo will be displayed along the X, Y, and Z axes. Next, move the cursor over the axis along which you want to rotate the object. Now, press the left mouse button, and then drag the cursor. When you rotate the object, a transparent slice will be displayed, showing you the visual representation of the direction and the degree of rotation, as shown in Figure 2-22. Also, you can view the degree of rotation in the X, Y, and Z axes in the coordinates displayed at the bottom of the screen.

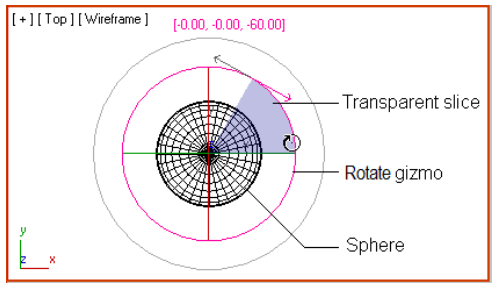

Figure 2-22 *The circular gizmo in the Top viewport while rotating the object*

Select and Scale Tools

Quad Menu: Scale
Main Toolbar: Select and Scale
Keyboard: R

There are three types of tools that are used to scale an object. These tools are available in the **Select and Scale** flyout and are discussed next.

Select and Uniform Scale



The **Select and Uniform Scale** tool is used to scale the objects proportionally along the three axes. To scale an object uniformly along all the three axes, invoke the **Select and Uniform Scale** tool from the **Main Toolbar** and select the object; the scale gizmo will be displayed, as shown in Figure 2-23. Move the cursor to the center of the gizmo and make sure its central portion is highlighted, refer to Figure 2-23. Next, drag the cursor up or down to scale the selected object. You can also perform non-uniform scaling using this tool. For example, to scale the object along Z-axis, move the cursor over the Z-axis, as shown in Figure 2-24, and then drag the cursor. Similarly, you can perform non-uniform scaling along the XY, YZ, or ZX plane. For example, to scale the object along YZ plane move the cursor over the YZ plane, as shown in Figure 2-25. Next, drag that particular plane.

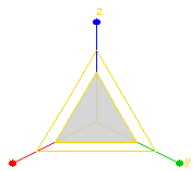

Figure 2-23 *The scale gizmo for uniform scaling*

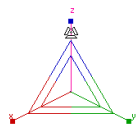

Figure 2-24 *Selecting the Z-axis for non-uniform scaling*

Select and Non-uniform Scale



The **Select and Non-uniform Scale** tool is used to scale an object non-uniformly along a particular axis or plane. To scale an object, invoke the **Select and Non-uniform Scale** tool from the **Select and Scale** flyout, and then select the object. Move the cursor over the axis along which you want to scale the object and drag the cursor to modify the shape of the object. Similarly, you can perform the non-uniform scaling along the XY, YZ, or ZX plane. You can also perform uniform scaling in the same manner, as described in the **Select and Uniform Scale** tool.

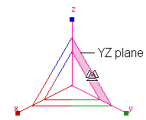

Figure 2-25 *Selecting the YZ plane for non-uniform scaling*

Select and Squash



The **Select and Squash** tool is used to select and squash the object along the selected axis. To squash an object along one of the axes, invoke the **Select and Squash** tool and select the object. Move the cursor over the axis along which you want to squash it. Next, drag the cursor. Similarly, you can squash the selected object along the XY, YZ, or ZX plane. To do so, move the cursor over the plane and drag the cursor to squash the object along that plane.



Note

By default, the color of the X,Y, and Z axes of the transform gizmos is red, green, and blue, respectively. When you move the cursor over any of these axes, the axis gets activated and turns yellow. You can see the colors of these axes at the bottom left corner of each viewport or while selecting an object using the ***Select and Move****,* ***Select and Rotate****, or* ***Select and Scale*** *tool. Figures 2-26, 2-27, and 2-28 show the move gizmo, the rotate gizmo, and the scale gizmo, respectively.*

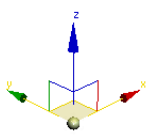

Figure 2-26 *The move gizmo*

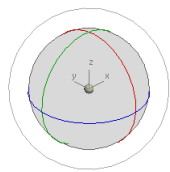

Figure 2-27 *The rotate gizmo*

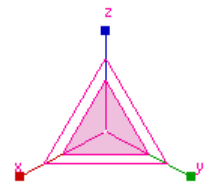

Figure 2-28 *The scale gizmo*

Axis Constraints Toolbar

The buttons in the **Axis Constraints** toolbar are used to specify the axis or plane along which the transformation would take place. The **Axis Constraints** toolbar is not displayed by default on the interface. To display it, right-click in the blank area on the **Main Toolbar**; a shortcut menu will be displayed. Choose **Axis Constraints** from the shortcut menu; the **Axis Constraints** toolbar will be displayed on the screen, as shown in Figure 2-29. Now, choose one of the buttons available in the **Axis Constraints** toolbar to perform the transformation along the selected axis. You can also use the F5, F6, and F7 function keys to invoke the **X**, **Y**, and **Z** constraints, respectively. To toggle between the **XY**, **YZ**, and **XZ** axes, you can use the F8 function key.

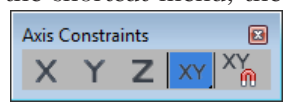

Figure 2-29 *The* ***Axis Constraints*** *toolbar*

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Time Slider and Animation Playback Controls

Autodesk 3ds Max provides various options to animate an object that you create in it. To do so, you need to be familiar with the animation playback controls and the time slider. These controls enable you to play, pause, and stop an animation. They are available at the lower right corner of the Autodesk 3ds Max screen and are discussed briefly.

Time Slider

The time slider displays the current frame and the total number of frames in the current time segment, refer to Figure 2-30. You can view the animation at each frame by dragging the time slider. The time segment is the total range of frames that you can access using the time slider. By default, it ranges from 0 to 100. You can set the range using the **Time Configuration** dialog box, about which you will learn in the later chapters.

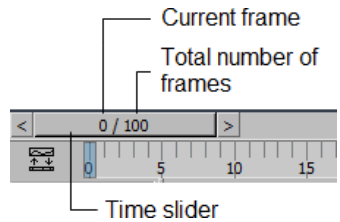

Figure 2-30 *The time slider*

Playback Controls

The tools in the animation playback controls are displayed on the left side of the viewport navigation controls, as shown in Figure 2-31. These tools are used to control the animation in the active viewport only. Also, you can set the total number of frames, animation length, and other settings of the animation using these tools.



The **Play Animation** button is used to play or start the animation in the active viewport. When you click on this button, it turns into a stop button.



The **Stop animation** button is used to stop the animation.



The **Go to Start** button is used to set the time slider at the first frame of the active time segment.



The **Go to End** button is used to set the time slider at the last frame of the active time segment.



The **Previous Frame** button is used to move the time slider to the previous frame in the reverse direction. You can view the current frame on the time slider when it moves from one frame to another.



The **Next Frame** button is used to move the time slider to the next frame one frame at a time in the forward direction.

Time Controls

In Autodesk 3ds Max, different types of tools are available at the bottom of the screen to control animation and its time settings, refer to Figure 2-31. You have already learned about the time slider and the animation playback controls in the previous section. The other controls are discussed next.

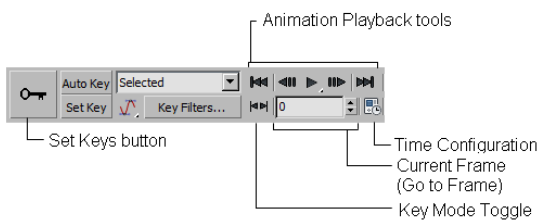

Figure 2-31 *The time control tools*

Toggle Auto Key Mode

The **Toggle Auto Key Mode** button that is labeled as **Auto Key** is chosen to turn on and off the auto key animation mode. When you choose the **Toggle Auto Key Mode** button, it turns red. Also, the background of the time slider and the border of the active viewport turns red, indicating that you are in the animation mode. Now, if you make any changes in the object, the changes will be keyframed in the time slider.



To animate using the **Toggle Auto Key Mode** button, first you need to make sure that the object to be animated is selected in the viewport. Choose the **Go to Start** button to set the time slider to the first frame. Next, choose the **Toggle Auto Key Mode** button to turn on the auto key animation mode; the **Toggle Auto Key Mode** button will turn red. Now, drag the time slider to a frame other than 0 and animate the selected object by modifying its parameters or by transforming it; a keyframe will be created on that frame and at frame 0 on the track bar below the time slider. Again, move the time slider to another frame and change the parameters. You can continue this process until you get all the keyframes in a sequential order for your animation. Next, choose the **Toggle Auto Key Mode** button again to turn it off. Choose the **Play Animation** button to view the animation of the selected object in the current viewport.

Toggle Set Key Mode

The **Toggle Set Key Mode** button that is labeled as **Set Key** is chosen to turn on and off the set key animation mode. In this mode, you need to set keys for the animation of the selected object by choosing the **Set Keys** button on the left side of the **Toggle Set Key Mode** button.



To perform the animation using the **Toggle Set Key Mode** button, select the object in the viewport in which you want to create the animation. Choose the **Go to Start** button to set the time slider to the first frame. Next, choose the **Toggle Set Key Mode** button to turn on the set key animation mode; the button will turn red. Choose the **Set Keys** button; it will flash red color and a keyframe will be set for the current position of the selected object. Now, drag the time slider to set a frame other than 0 and animate the selected object. Again, choose the **Set Keys** button; it will flash red color and another keyframe will be set on the track bar on the changed position. You can continue this process until you get all the keyframes in a sequential order for your animation. Then, choose the **Toggle Set Key Mode** button to turn it off. Also, choose the **Play Animation** button to view the animation of the selected object in the current viewport.



Note

*When you choose the **Toggle Set Key Mode** button and transform an object, the keyframe will be set only if you choose the **Set keys** button.*

Current Frame (Go To Frame)

The **Current Frame (Go To Frame)** spinner shows the current frame number at which the time slider is positioned. While animating your scene, if you want to go to another frame, you can enter the frame number directly in the **Current Frame (Go To Frame)** spinner. As you drag the time slider, the value in the **Current Frame (Go To Frame)** spinner gets changed automatically according to its position.

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Key Mode Toggle

By default, the **Key Mode Toggle** button is not activated. If activated, it allows you to jump between the keyframes directly. To understand the function of this button, you need to select the animated object in the viewport. Next, choose the **Key Mode Toggle** button; it will turn blue and the **Previous Frame** and **Next Frame** buttons in the animation playback controls will be replaced with the **Previous Key** and **Next Key** buttons, refer to Figures 2-32 and 2-33. Choose the **Previous Key** or **Next Key** button to move the time slider from one keyframe to the other.

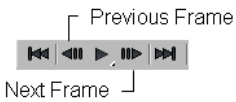

Figure 2-32 *Animation playback controls before choosing the* ***Key Mode Toggle*** *button*

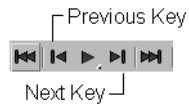

Figure 2-33 *Animation playback controls after choosing the* ***Key Mode Toggle*** *button*

Time Configuration

The **Time Configuration** button is used to set the length of an animation by defining the number of frames in the track bar. It is also used to set the frame rate, time display, and so on. To set these parameters, choose the **Time Configuration** button; the **Time Configuration** dialog box will be displayed, as shown in Figure 2-34. You need to use the options in this dialog box to set the animation length, frame rate, and time display. The options in this dialog box are discussed next.

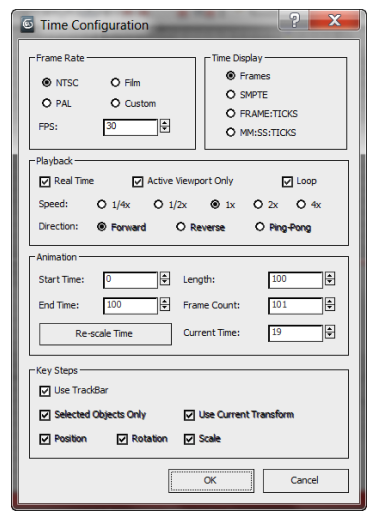

Figure 2-34 *The* ***Time Configuration*** *dialog box*

Frame Rate Area

The radio buttons in this area are used to set a particular frame rate for the animation in frames per second. By default, the **NTSC** radio button is selected. The **FPS** spinner is used to manually set the frame rate of the animation.

Time Display Area

The radio buttons in this area are used to display the method of time in the time slider. By default, **Frames** radio button is selected.

Playback Area

The **Playckback** area is used to set the playback speed of the animation. By default, the **Real Time** check box is selected in this area. You can select one of the radio buttons such as **1/4x** or **1/2x**, and so on in the **Speed** group to define the speed of the playback animation. If you clear the **Real Time** check box, then the **Speed** group will be deactivated and the **Direction** group will be activated. The radio buttons in the **Direction** group are used to define the direction of the playback animation. The **Active Viewport Only** check box is selected by default and is used to play the animation only in the active viewport. If you clear this check box, then the animation will be played simultaneously in all the viewports. The **Loop** check box is also selected by default and is used to repeatedly play the animation repeatedly.

Animation Area

The options in this area are used to set the length of animation. The default values in the spinners of this area specify the number of frames for the animation. Set the values in the **Start Time** and **End Time** spinners to specify the current time segment in the time slider. The current time segment is the total range of frames that you can access using the time slider. Set the value in the **Length** spinner to specify the total number of frames in the current time segment or the length of the animation. The value in the **Frame Count** spinner specifies the number of frames that will be rendered. The value in the **Current Time** spinner specifies the current frame number at which the time slider is positioned. Choose the **Re-scale Time** button; the **Re-scale Time** dialog box will be displayed. You can specify the options in this dialog box to change the existing time segment to a new time segment.

Track Bar

The track bar lies between the time slider and the status bar, refer to Figure 2-35. It displays a timeline along with the frame numbers.

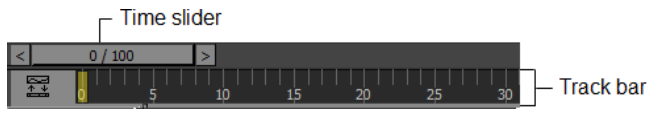

Figure 2-35 *Partial view of the track bar and the time slider*

Track View

Menu bar:	Graph Editors > Track View - Curve Editor
	Graph Editors > Track View - Dope Sheet
Main Toolbar:	Curve Editor (Open)



The track view is used to view and edit the animation keys in the scene. The track view uses two different modes, **Curve Editor** and **Dope Sheet**. In the **Track View - Curve Editor** window, as shown in Figure 2-36 the animation is displayed as the function curves on a graph. In the **Track View - Dope Sheet** window, the animation is displayed as a spreadsheet of keys, as shown in Figure 2-37.

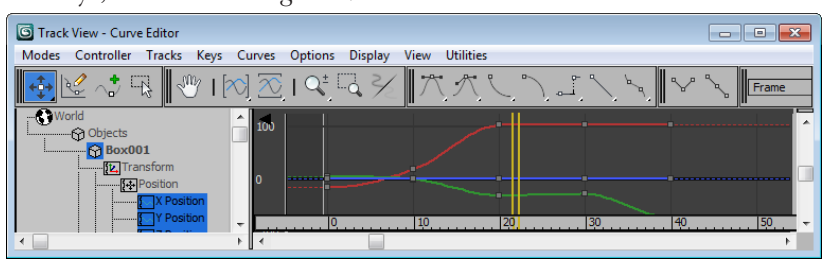

Figure 2-36 *The **Track View - Curve Editor** window*

To edit the animation of an object using **Curve Editor**, select the animated object and invoke the **Curve Editor (Open)** tool from the **Main Toolbar**; the **Track View - Curve Editor** dialog box will be displayed, refer to Figure 2-37. The pull-down menus on the top of this dialog box are used to choose different options to edit the animation. The hierarchy on the left side of

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this dialog box displays all the objects of the scene. To view the sub-options in this tree, you need to click on the plus sign(+). The edit window on the right of the hierarchy tree is used to edit the animation of the objects using the tangent handles available on the keys found on the curves.

To edit the animation of an object using **Track View - Dope Sheet** window, select the animated object and choose **Graph Editors > Track View - Dope Sheet** from the menu bar; the **Track View - Dope Sheet** window will be displayed, refer to Figure 2-37. In this window, you can view all the keys in a spreadsheet form. You need to select the keys and edit them according to the animation.

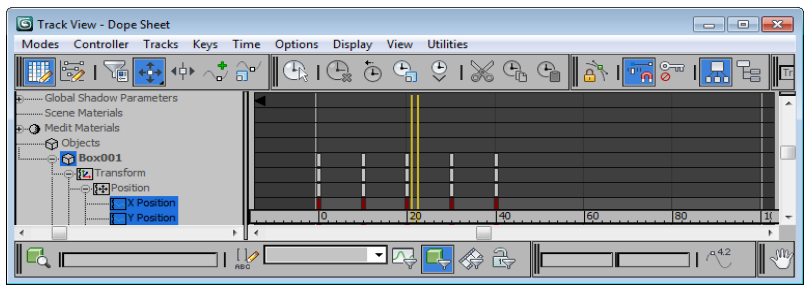

***Figure 2-37** The **Track View - Dope Sheet** window*

Tip: *You can also invoke **Track View - Curve Editor** in place of the track bar. To do so, choose the **Open Mini Curve Editor** button on the left side of the track bar.*

Rendering an Animation

Menu bar:	Rendering > Render Setup
Main Toolbar:	Render Setup
Keyboard:	F10

Rendering is a process of generating a photorealistic scene. It shows the lighting effects, materials applied, background, and other settings that are set for the scene.

To render the animated scene, invoke the **Render Setup** tool; the **Render Setup: Default Scanline Renderer** dialog box will be displayed, as shown in Figure 2-38. The **Common** tab is chosen by default in this dialog box. In the **Common** tab, set the parameters in the different rollouts and make sure that the **Production** radio button is selected on the bottom of this dialog box. Also, in the **View** drop-down list, select the viewport that you want to render. Next, choose the **Render** button; the **Perspective, frame 0, Display Gamma:2.2, RGBA Color 16 Bits/Channel (1:1)** dialog box and the **Rendering** dialog box will be invoked, displaying the rendering process, as shown in Figure 2-39. Various rollouts in the **Common** tab of the **Render Setup: Default Scanline Renderer** dialog box are discussed next.

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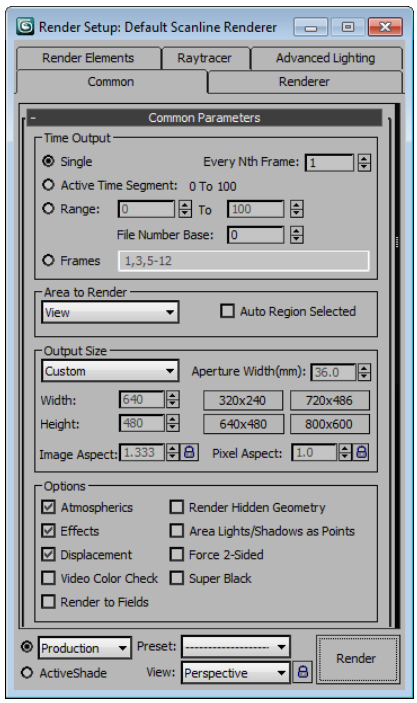

Figure 2-38 *The* ***Render Setup: Default Scanline Renderer*** *dialog box*

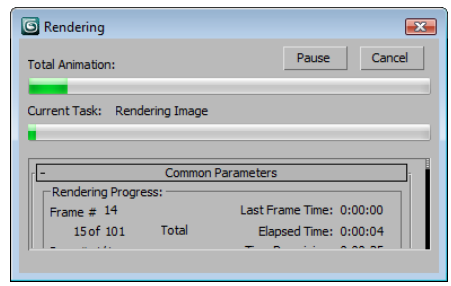

Figure 2-39 *The* ***Rendering*** *dialog box*

Common Parameters Rollout

There are different types of renderers to render a scene in Autodesk 3ds Max such as **mental ray Renderer**, **VUE File Renderer**, and so on. The options in this rollout are used to set the common parameters for all types of renderers. The commonly used areas in this rollout are discussed next.

Time Output Area

This area is used to set the number of frames that you want to render. By default, the **Single** radio button is selected that enables you to render only a single frame. To render the animation, you need to select the **Active Time Segment** or **Range** radio button. This radio button renders all the frames in the current time segment. Select the **Range** radio button to specify a range of frames for rendering. To do so, enter the start and end frame numbers in the spinners given on the right of this radio button. The **Frames** radio button allows you to render the frame numbers or frame range of your choice. To do so, select this radio button and enter the required frame number or range in the text box given on the right of this radio button.

Output Size Area

This area is used to define the size of the rendered image. Choose one of the default buttons such as, **320x240**, **640x480**, **720x486**, or **800x600** to define the size of the output window; the corresponding values will be displayed in the **Width** and **Height** spinners. You can also set the values manually in the **Width** and **Height** spinners to define the size. You can also select the standard resolution formats from the **Custom** drop-down list.

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Options Area

The check boxes in this area are selected to include the render effects in the final output such as atmospheres, lighting effects, and so on.

Advanced Lighting Area

The check boxes in this area are selected to use options for advanced lighting or computing render effects.

Bitmap Performance and Memory Options Area

This area is used to decide whether Autodesk 3ds Max will use the full resolutions maps or the proxies of the maps at rendering. To assign the render settings, you need to choose the **Setup** button in this area; the **Global Settings and Defaults for Bitmap Proxies** dialog box will be displayed. The **Global Settings and Defaults for Bitmap Proxies** dialog box is used to set create and proxy versions of the bitmaps used in materials.

Render Output Area

This area is used to specify a file where the rendered animation can be saved. To do so, choose the **Files** button; the **Render Output File** dialog box will be displayed. Enter the name of the file in the **File name** text box and then select AVI file (.avi) from the **Save as type** drop-down list. Next, choose the **Save** button; the **AVI File Compression Setup** dialog box will be displayed. Use the default settings and choose the **OK** button; the **Save File** check box will get selected and the path of the file will be displayed just below the **Files** button in the **Render Output** area.

Assign Renderer Rollout

This rollout is used to set renderer for the scene. The **Production** option is used to assign a renderer for the graphics. The **Material Editor** option is used to assign a renderer for the sample slots in the **Material Editor** dialog box. The **ActiveShade** option is used to assign a renderer for the lighting effects in the scene, as shown in Figure 2-40.

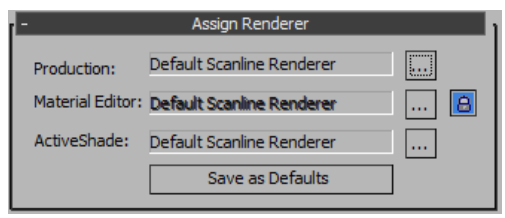

Figure 2-40 *The* ***Assign Renderer*** *rollout*

To assign a renderer, choose the **Choose Renderer** button on the right of the options given in **Assign Renderer** rollout; the **Choose Renderer** dialog box will be displayed, as shown in Figure 2-41. Select a renderer and choose the **OK** button; the name of the selected renderer will be displayed in the text box on the right of the selected option. Choose the **Save as Defaults** button in the **Assign Renderer** rollout to save the settings as default for further use.

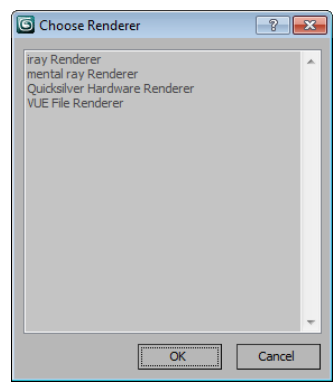

Figure 2-41 *The* ***Choose Renderer*** *dialog box*



Note

If you install any additional renderer plug-ins in Autodesk 3ds Max, the renderer types will be added in the ***Choose Renderer*** *dialog box.*

Previewing an Animation

If a scene has a large number of objects, lights, and special effects, it may take a long to render the final animation. To check the accuracy of animation, Autodesk 3ds Max allows you to preview the animation in low resolution. Note that in the preview rendering, only the diffuse color maps are displayed. Therefore, it takes lesser time to render. You can have a look at your animation before the final rendering.

To create a preview animation, choose **Tools > Views - Grab Viewport > Create Animated Sequence File** from the menu bar; the **Make Preview** dialog box will be displayed, as shown in Figure 2-42. Alternatively, choose **Create Preview > Create Animated Sequence File** from the General viewport label to invoke the **Make Preview** dialog box. Set the parameters for different options in this dialog box and select the scene that you want to render from the **Render Viewport** drop-down list which is located at the bottom of the dialog box. Next, choose the **Create** button; the **Video Compression** dialog box will be displayed. The **Video Compression** dialog box will be only displayed if you choose the **Microsoft Video 1** button. Use the default settings and choose the **OK** button; the rendering of the preview will start. Once the preview has been created, it will automatically start in the Windows Media Player.

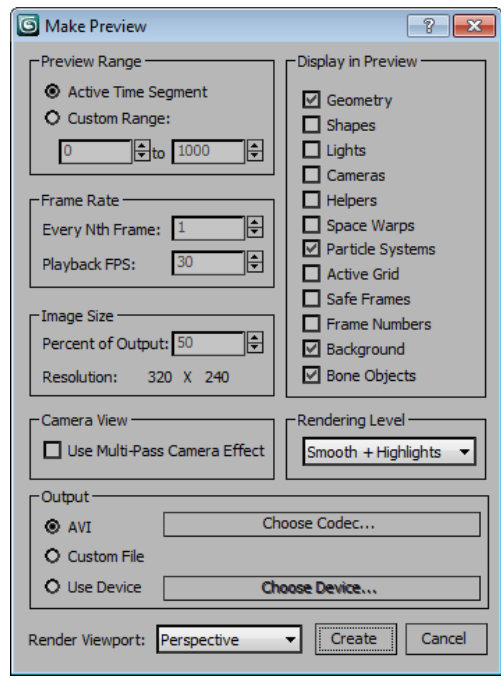

Figure 2-42 *The* ***Make Preview*** *dialog box*

To view the last preview animation, choose **Tools > Views - Grab Viewport > View Animated Sequence File** from the menu bar; the animation will start playing in the Windows Media Player. Alternatively, choose **Create Preview > View Animated Sequence File** from the General viewport label, as shown in Figure 2-43.

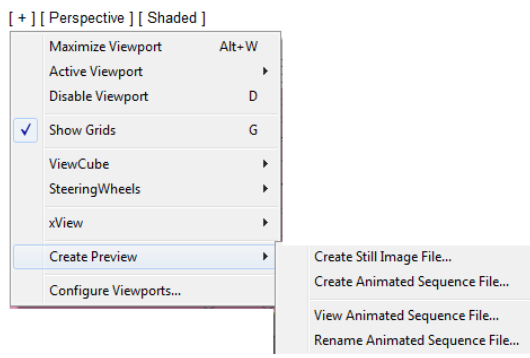

Figure 2-43 *The flyout and the cascading menu of the General viewport label*

RENDERING EFFECTS

The **Rendering effects** are special effects, assigned to a scene. These effects are visible only at rendering. To assign a rendering effect to a scene, choose **Rendering > Effects** from the menu bar; the **Environment and Effects** dialog box will be displayed, as shown in Figure 2-44. The **Effects** tab is chosen by default. In the **Effects** rollout of this tab, choose the **Add** button; the **Add Effect** dialog box will be displayed, as shown in Figure 2-45. Select any of the rendering effect from the list given in this dialog box and then choose the

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OK button; the selected rendering effect will be displayed in the **Effects** text area of the **Effects** rollout. Also, the rollouts related to the selected effect will be displayed in the **Environment and Effects** dialog box. Next, set the parameters for the selected rendering effect in these rollouts and close the dialog box. Now, render the final scene; the rendering effects will be displayed in the final rendered image.

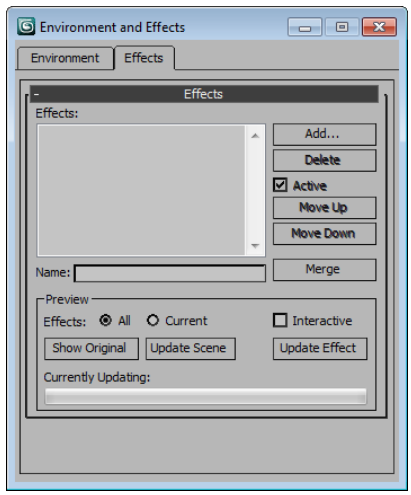

Figure 2-44 *The* ***Environment and Effects*** *dialog box*

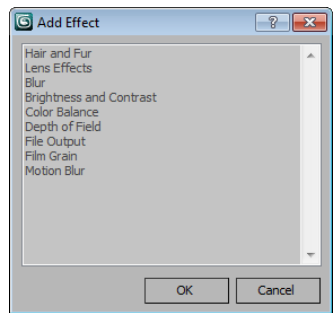

Figure 2-45 *The* ***Add Effect*** *dialog box*

UNDERSTANDING CONTROLS

In Autodesk 3ds Max, there are some special controls that can be used for creating or modifying the objects in the viewports. These controls are discussed next.

Flyout

A flyout is an icon-based menu that contains the tools having similar type of functions. Figure 2-46 shows the **Snap Toggle** flyout. The buttons having a small triangle at their lower-right corner contain a flyout. Press and hold such a button; a flyout will be displayed, refer to Figure 2-47.

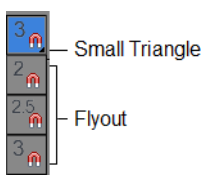

Figure 2-46 *The* ***Snap Toggle*** *flyout*

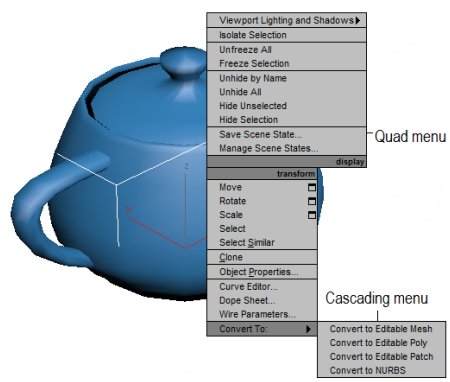

Figure 2-47 *Displaying the flyout on choosing the small triangle*

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Right-click Menus

In Autodesk 3ds Max, the right-click menus provide quick access to the commonly used commands that are related to the current selection of an object. When you right-click on an object, a quad menu is displayed, as shown in Figure 2-48. Some of the options in the quad menu have an arrow on their right side. If you move the mouse on these options, a cascading menu will be displayed. But, if you right-click in the viewport, a shortcut menu will be displayed, refer to Figure 2-48.

Snaps Settings

Snaps restrict the movement of the cursor to a specific part of an object or grid. There are four buttons available for snap settings in the **Main Toolbar**: **Snaps Toggle**, **Angle Snap Toggle**, **Percent Snap Toggle**, and **Spinner Snap Toggle**. If you right-click on the **Snaps Toggle**, **Angle Snap Toggle**, or **Percent Snap Toggle** button, the **Grid and Snap Settings** dialog box will be displayed, as shown in Figure 2-49. In the **Snaps** tab, you can select the different points in an object or grid where the cursor will snap to. You can turn the snap command on and off by pressing the S key or by selecting the **Snaps Toggle** button.

If you choose and hold the **Snaps Toggle** button, a flyout will be displayed. This flyout contains the **2D Snap**, **2.5 Snap**, and **3D Snap** tools, which can be invoked to snap the cursor.

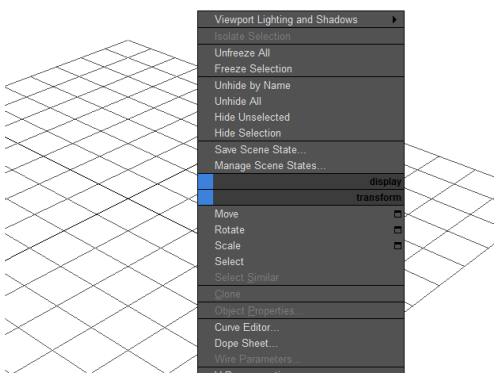

Figure 2-48 *Displaying the shortcut menu and cascading menu*

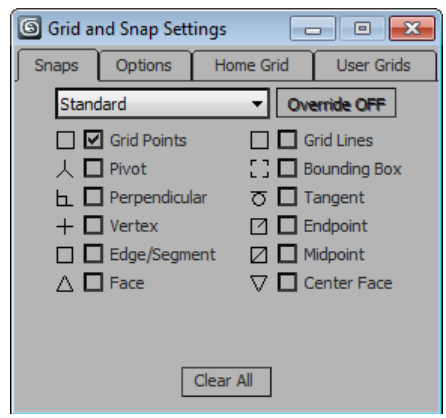

Figure 2-49 *The* ***Grid and Snap Settings*** *dialog box*

Units Setup

The units setup in Autodesk 3ds Max is used to specify the units that help in measuring the geometry in a scene. You can change the settings for units by using the **Customize** pull-down menu. To do so, choose **Customize > Units Setup** from the menu bar; the **Units Setup** dialog box will be displayed, as shown in Figure 2-50. By default, the **Generic Units** radio button is selected in this dialog box. Select any other radio button as per the requirement from the **Display Unit Scale** area of this dialog box and then choose the **OK** button; the limits in all spinners in Autodesk 3ds Max will be modified accordingly.

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Setting Grid Spacing

To set the spacing between the visible grids in the viewports, choose **Tools > Grids and Snaps > Grid and Snap Settings** from the menu bar; the **Grid and Snap Settings** dialog box will be displayed. In the **Home Grid** tab, as shown in Figure 2-51. Set the value in the **Grid Spacing** spinner to specify the size of the smallest square of the grid. The value in the spinners will be measured in the units that you specify in the units setup. Set the value in the **Major Lines every Nth Grid Line** spinner to specify the number of squares between the major lines in the grid. Set the value in the **Perspective View Grid Extent** spinner to specify the size of the home grid in the Perspective viewport. Note that the default grid displayed in the viewports on starting Autodesk 3ds Max is known as the home grid.

In the **Dynamic Update** area, the **Active Viewport** radio button is selected by default. It is used to update the settings of the active viewport as per the settings in the **Home Grid** tab. Select the **All Viewports** radio button to update all viewports simultaneously according to the new values that you have set in the spinners of the **Grid and Snap Settings** dialog box.

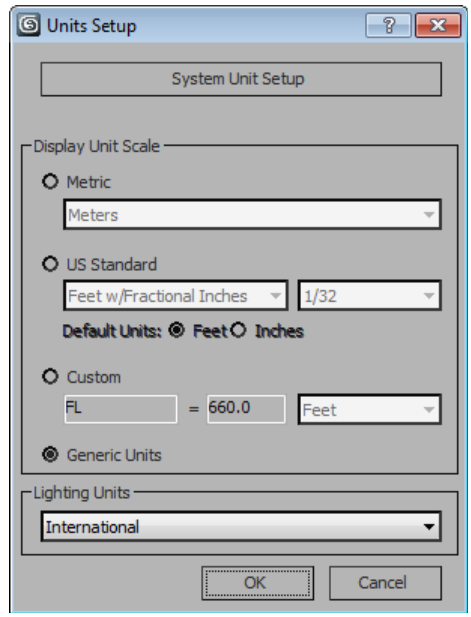

*Figure 2-50 The **Units Setup** dialog box*

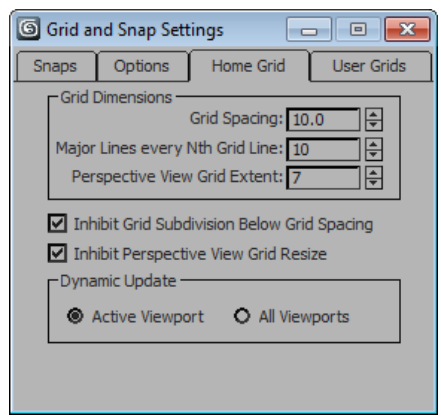

*Figure 2-51 The **Home Grid** tab chosen in the **Grid and Snap Settings** dialog box*

HOTKEYS

In Autodesk 3ds Max, you can use the keys on the keyboard to invoke some of the tools. These keys are known as the hotkeys. You can work faster and more efficiently using the hotkeys. The major hotkeys and their functions are listed next.

Main Toolbar

The hotkeys that can be used to invoke the tools from the **Main Toolbar** are given next.

H	Invokes the **Select by Name** tool
S	Invokes the tools from the **Snaps Toggle** button
A	Invokes the **Angle Snap Toggle** tool
CTRL+SHIFT+P	Invokes the **Percent Snap Toggle** tool
M	Invokes the **Material Editor** tool
SHIFT+Q	Invokes the **Quick Render** tool

Viewport Navigation Controls

The hotkeys that can be used to invoke the tools in the viewport navigation controls are given next.

ALT+CTRL+Z	Performs the action of the **Zoom Extents** tool
ALT+W	Invokes the **Maximize Viewport Toggle** tool
ALT+Z	Invokes the **Zoom** tool
CTRL+W	Invokes the **Zoom Region** tool
CTRL+P	Invokes the **Pan** tool
Scroll the middle mouse button	Zooms in or out the active viewport
CTRL+R	Invokes the **Orbit** tool
SHIFT+Z	Used to undo the **Zoom** or **Pan** command actions
ALT+ press and hold the middle mouse button and move the mouse	Performs the actions of the **Orbit** tool

The following hotkeys are used to change the POV viewport labels:

V	Invokes the viewport quad menu
T	Invokes the Top viewport
F	Invokes the Front viewport
L	Invokes the Left viewport
P	Invokes the Perspective viewport
B	Invokes the Bottom viewport
U	Invokes the Orthographic viewport

Animation Playback Controls

The hotkeys that can be used to invoke the tools in the animation playback controls are given next.

N	Invokes the **Toggle Autokey Mode** tool
Home	Invokes the **Go To Start** button
End	Invokes the **Go To End** button
/ (backslash)	Invokes the **Play Animation** button
ESC	Invokes the **Stop Animation** button
, (comma)	Invokes the **Previous Frame** button
. (period)	Invokes the **Next Frame** button

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CUSTOMIZING THE HOTKEYS

In Autodesk 3ds Max, you can create your own keyboard shortcuts. To do so, choose **Customize > Customize User Interface** from the menu bar; the **Customize User Interface** dialog box will be displayed, as shown in Figure 2-52.

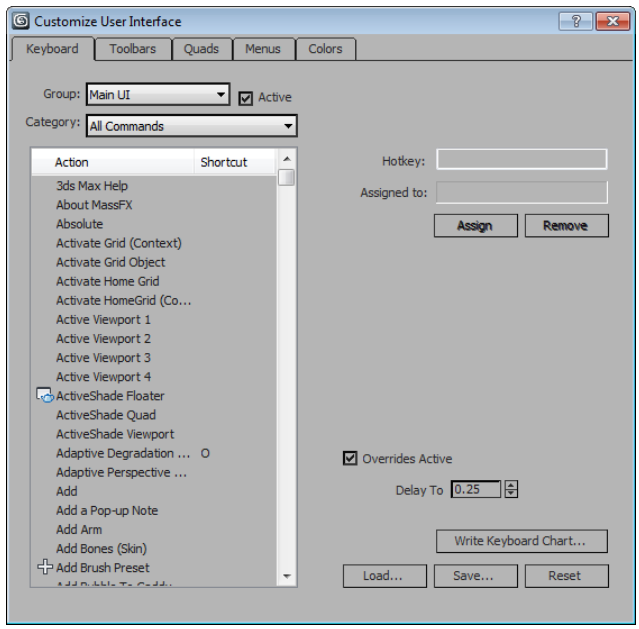

Figure 2-52 *The* ***Customize User Interface*** *dialog box*

In this dialog box, the **Keyboard** tab is chosen by default. In this tab, select a command from the **Group** and **Category** drop-down lists; the list of the categories in the selected group will be displayed just below the **Category** drop-down list. Now, select one of the actions from the list and then enter the key that you want to assign to the selected action in the **Hotkey** text box. Next, choose the **Assign** button; the key is assigned to the selected action.

CUSTOMIZING THE COLORS OF THE USER INTERFACE

Autodesk 3ds Max allows you to modify the colors of the software interface. You can modify the colors for almost every element in the interface. To modify the colors, choose **Customize > Customize User Interface** in the menu bar; the **Customize User Interface** dialog box will be displayed. Choose the **Colors** tab. Next, select the category of the interface element from the **Elements** drop-down list; the list of the corresponding elements will be displayed just below the **Elements** drop-down list. Now, select one of the elements from the list and choose the color swatch on the right of the **Elements** drop-down list; the **Color Selector** dialog box will be displayed. Select a new color and choose the **OK** button to close the **Color Selector** dialog box.

You can reset the new color to the default one. To do so, choose the **Reset** button at the bottom of the **Customize User Interface** dialog box; the **Revert Color File** message box will be displayed, as shown in Figure 2-53. Choose the **Yes** button; the default color will be displayed in the color swatch.

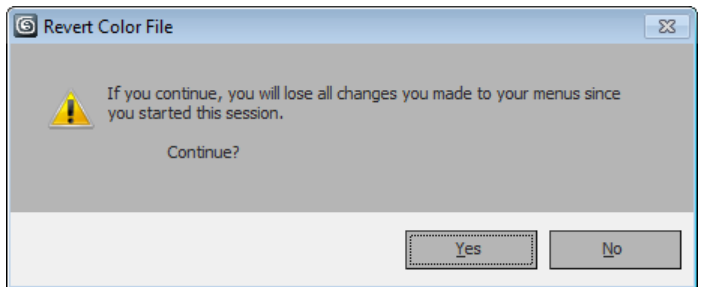

***Figure 2-53** The **Revert Color File** message box*

HELP PREFERENCES

When you choose **Help > Autodesk 3ds Max Help** from the menu bar; the 3ds Max help will be displayed from the Autodesk website. If you want to open the help from the local drive, you need to download it from *http://usa.autodesk.com/adsk/servlet/item?id=16755719&siteID=123112&linkID=10809867* and then install it. Next, restart 3ds Max. Choose **Customize > Preferences** from the menu bar; the **Preference Settings** dialog box will be displayed. Choose the **Help** tab in this dialog box, refer to Figure 2-54. Select the **Local Computer/ Network** radio button from the **Help Location** area and then choose the **OK** button to exit the dialog box. Now, you can access the help from local drive.

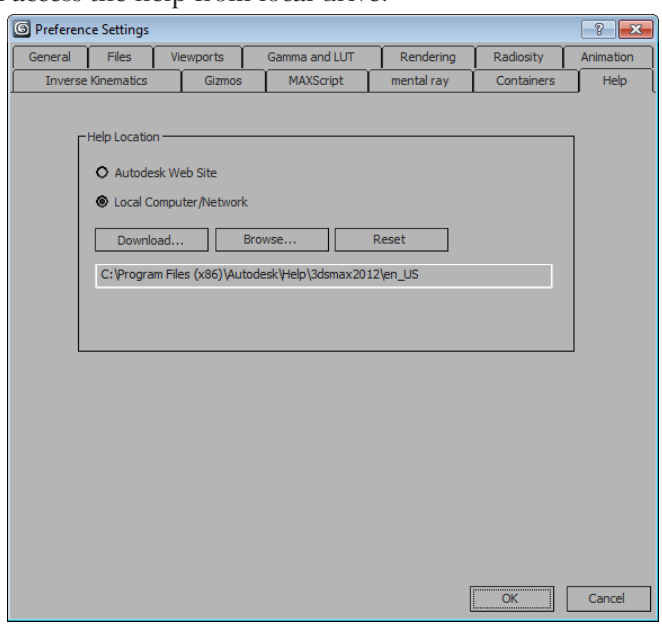

***Figure 2-54** The **Help tab** in the **Preference Settings** dialog box*

3ds MAX OVERVIEW

3ds Max deals with varied aspects of modeling, animation, rendering, and so on. These aspects are discussed next.

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Modeling

In 3ds Max, there are four types of modeling methods: NURBS, Patch Modelling, Mesh Modelling, Poly Modelling. Before modeling an object, you first need to visualize it in 3D and then you need to examine it to determine the method of modelling to be used. Your visualization and approach towards the object will guide you to judge the method of modeling that you want to use for creating the object. The various types of modelling methods are discussed next.

NURBS

The NURBS (Non-Uniform Rational Basis Splines) curves and surfaces are used to create complex 3D models. The NURBS objects use the mathematical calculations to create accurate complex 3D objects from 2D splines.

NURBS curves

The NURBS curves are similar to the shape objects and are used to create complex surfaces for creating 3D models. You can use the NURBS curves to create 3D surfaces using modifier such as **Lathe** and **Extrude**. Also, you can loft the NURBS curves to create loft objects. In Autodesk 3ds Max, there are two types of NURBS curves, Point Curve and CV Curve.

NURBS surfaces

The NURBS surfaces are the base of the NURBS model. The NURBS models can be created by modifying NURBS surfaces at advanced level. In Autodesk 3ds Max, there are two types of NURBS surfaces: Point Surface and CV Surface.

Editable Mesh

You can modify most of the objects at advanced level by converting them into editable mesh. However, the open splines such as line, arc, and so on cannot be converted into editable mesh. The editable mesh provides you the sub-object levels of an object. These sub-object levels help you to select the sub-objects of an object in the viewport. You need to move, rotate, and scale these sub-objects to modify the shape of the object.

You can convert an object into editable mesh by using one of the following methods:

1. Create an object and select it in the viewport. Next, right-click on the object; a quad menu will be displayed. Choose the **Convert To:** option; a cascading menu will be displayed, as shown in Figure 2-55. Choose **Convert to Editable Mesh**; the object will be converted into editable mesh.

2. Create an object and select it in the viewport. Choose the **Modify** tab in the **Command Panel**; the modifier stack will be displayed in the modify panel. In the modifier stack, right-click on the name of the tool; a shortcut menu will be displayed, as shown in Figure 2-56. Choose the **Editable Mesh** option from the shortcut menu; the object will be converted into editable mesh.

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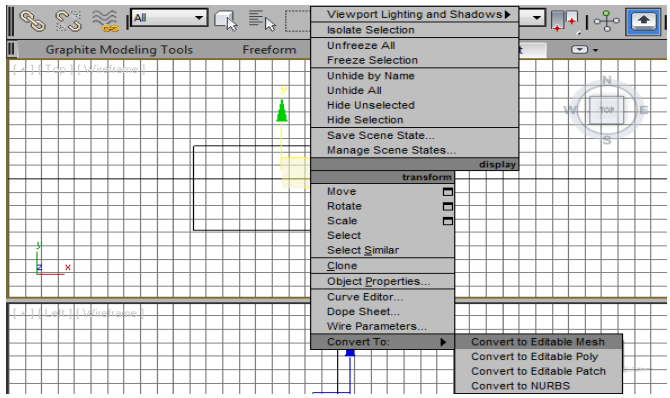

Figure 2-55 *The cascading menu after right-clicking on the object*

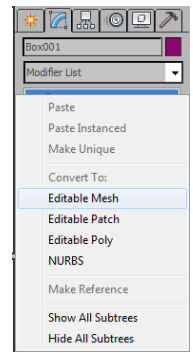

Figure 2-56 *The shortcut menu in the modifier stack*

Editable Poly

To modify an object with editable poly is similar to modifying an object with the editable mesh. The only difference is that the editable poly works with advance tools, meant for polygonal mesh editing. To work with editable poly, you need to convert the object into editable poly. To convert an object into editable poly, you need to use one of the following methods:

1. Create an object and select it in the viewport. Next, right-click on the object; a quad menu will be displayed. Choose the **Convert To**: option; a cascading menu will be displayed. Choose the **Convert to Editable Poly** option; the object will be converted into editable poly.

2. Create an object and select it in the viewport. Choose the **Modify** tab in the **Command Panel**; the modifier stack will be displayed in the modify panel. In the modifier stack, right-click on the name of the tool which you have used to create the object; a shortcut menu will be displayed. Choose the **Editable Poly** option; the object will be converted into editable poly.

3. Create an object and select it in the viewport. Next, move the cursor over the **Polygon Modeling** panel in the **Graphite Modeling Tools** tab; a flyout will be displayed, as shown in Figure 2-57. Choose the **Convert to Poly** option; the selected object will be converted into editable poly.



Note

When you convert an object into editable poly, various panels will be displayed in the ***Graphite Modeling Tools*** *tab, such as* ***Edit***, ***Geometry (All)***, ***Subdivision***, *and so on.*

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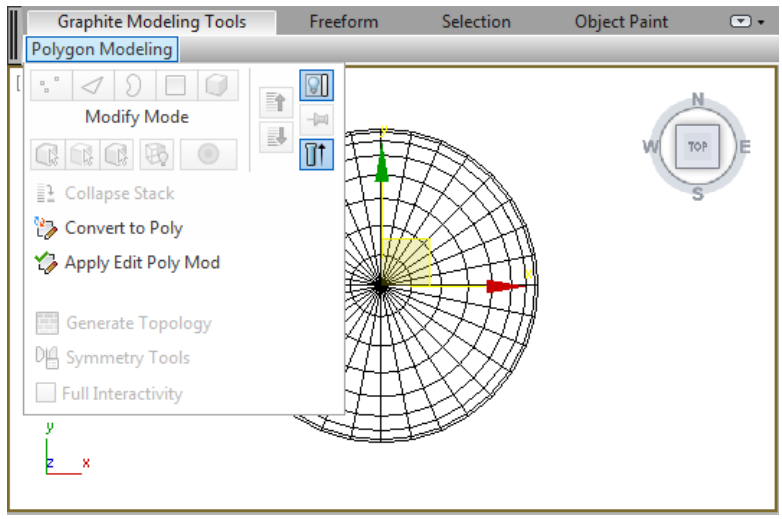

Figure 2-57 *A flyout displayed after moving the cursor over the* ***Polygon Modeling*** *panel*

Modifiers

The modifiers are used to modify or edit an object in an advance and realistic way. You can apply more than one modifier to an object. The modifiers can also be used to modify the object at sub-object levels. There are three categories of modifiers in the **Modifier List** drop-down list: **Selection Modifiers**, **WORLD-SPACE MODIFIERS**, and **OBJECT-SPACE MODIFIERS**. The most commonly used modifiers in these three categories are discussed next:

Mesh Select Modifier

The **Mesh Select** modifier is used to pass the sub-object selections of the selected object to subsequent modifiers in the modifier stack.

Displace Modifier

The **Displace** modifier is used to deform the shape of an object by displacing the vertices. You can distort the object either by using the gizmo of the modifier or by using the bitmap image.

Extrude Modifier

The **Extrude** modifier is used to convert a 2D spline into a 3D object. It provides thickness and depth to a spline.

Face Extrude Modifier

This modifier is used to extrude the selected faces along their normals. A normal is an invisible line coming straight out of the centre of the face at 90 degree angle.

Lattice Modifier

The **Lattice** modifier is used to convert the segments, edges, or shape of an object into wireframes or cylindrical struts.

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Material Modifier

The **Material** modifier is used to assign the material ID to the object or the sub-objects. The material ID of an object is a value given to specify the sub-material that will be applied to it from the **Multi/Sub-Object** material. You can apply different materials to the selected sub-objects by assigning different material IDs.

Noise Modifier

The **Noise** modifier is used to generate the disturbances on the surface of an object to create irregular surfaces. It can also be used to animate the water or wavy surfaces.

Twist Modifier

The **Twist** modifier is used to produce the swirling effect on an object.

Lathe Modifier

The **Lathe** modifier is a shape modifier and is used to create a 3D object by rotating a shape about an axis. The direction of the axis of revolution depends on the pivot point of the shape.

MeshSmooth Modifier

The **MeshSmooth** modifier is used to produce smoothness in 3D mesh objects.

Tessellate Modifier

The **Tessellate** modifier is used to subdivide the faces of an object. It provides smoothness at curved surfaces for rendering.

Push Modifier

The **Push** modifier is used to push an object inward or outward along the normals of its faces.

Normal Modifier

The **Normal** modifier is used to flip the normals of an object without applying an Editable Mesh Modifier.

Edit Mesh Modifier

Applying the **Edit Mesh** modifier to an object is the same as converting the object into editable mesh. The **Edit Mesh** modifier and the editable mesh object provides the same edting tools for different sub-object levels to modify the object at an advanced level. The main difference is that you can retain the object creation parameters and then use them to edit the object, even after applying the **Edit Mesh** modifier. Note that you cannot animate the sub-objects of an object after applying the **Edit Mesh** modifier.

UVW Map Modifier

The **UVW Map** modifier is used to adjust the mapping coordinates on an object. It is used to control the appearance of mapped and procedural materials on the surface of an object.

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FFD (Free-Form Deformation) Modifiers

The FFD modifiers are used to deform objects by creating a box around them. This box is made up of lattice and control points. You can deform an object using these control points and lattice. There are five different types of FFD modifiers: **FFD 2x2x2**, **FFD 3x3x3**, **FFD 4x4x4**, **FFD(box)**, and **FFD(cyl)**, refer to Figures 2-58 through 2-60.

The different types of FFD modifiers are based on the number of control points. The **FFD 2x2x2** modifier provides a lattice box with two control points on each of its edge. Similarly, **FFD 3x3x3** and **FFD 4x4x4** modifiers provide the lattice boxes with three and four control points on each of their edge, respectively. The **FFD(box)** and **FFD(cyl)** modifiers are used with the box-shaped and cylinder-shaped objects. In these modifiers, you can adjust the number of control points in the lattice box in the **Parameters** rollout.

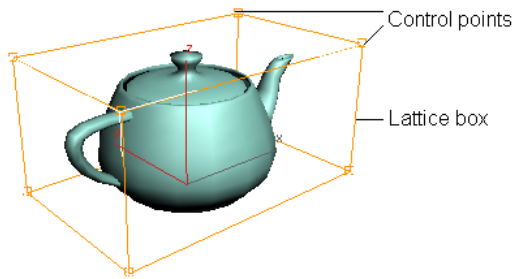

Figure 2-58 *The **FFD 2x2x2** modifier applied to the object*

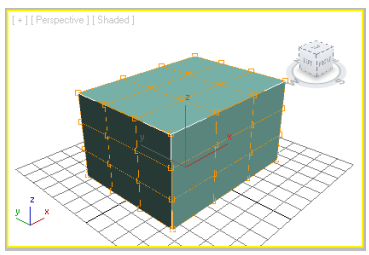

Figure 2-59 *A box object with the **FFD(box)** modifier applied*

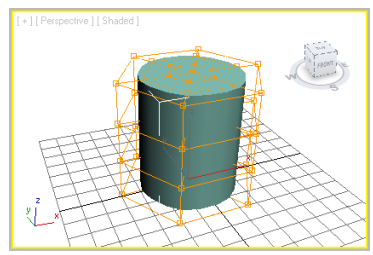

Figure 2-60 *A cylindrical object with the **FFD(cyl)** modifier applied*

Texturing

Texturing gives a realistic look to an object. In Autodesk 3ds Max, there are two types of material editors, **Slate Material Editor** and **Compact Material Editor**. The **Slate Material Editor** is mostly used to design the materials of your choice. It uses nodes and connection wires to graphically display the design of the materials created by you. The **Compact Material Editor** is more useful when you just need to apply the materials to the objects that have already been designed. To create a new material, press the M key; the **Slate Material Editor** dialog box will be displayed, as shown in Figure 2-61. Next, if you choose **Modes > Compact Material Editor** from the material editor menu bar; the **Material Editor** dialog box will be displayed, as shown in Figure 2-62. The title bar of the **Material Editor** dialog box displays the number and name of the current material, which gets changed depending on the material that you select.

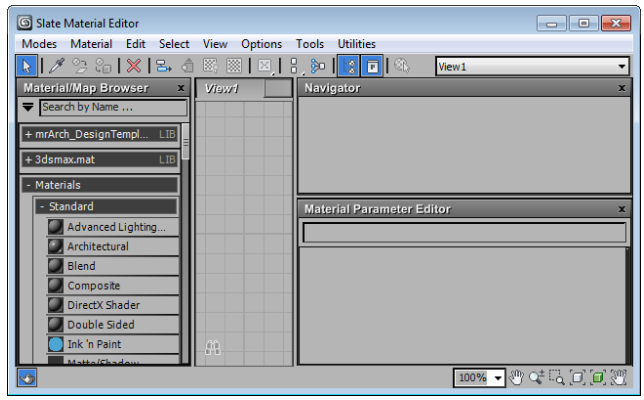

Figure 2-61 *The* ***Slate Material Editor*** *dialog box*

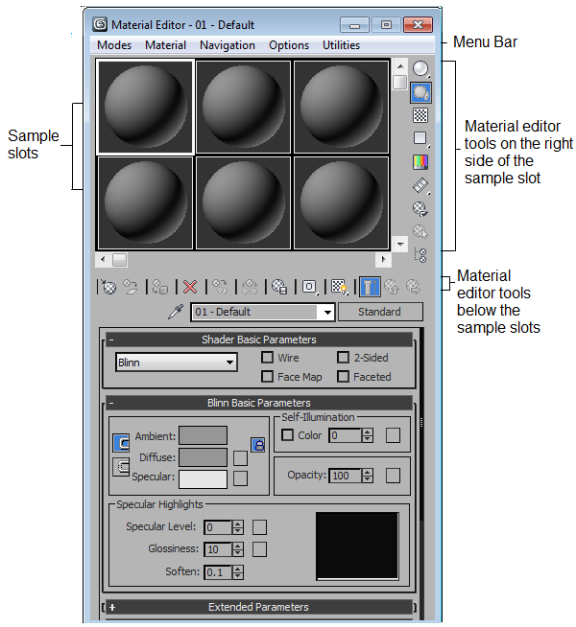

Figure 2-62 *Partial view of the* ***Material Editor*** *dialog box*

Lighting

In Autodesk 3ds Max, lights are used to illuminate the scene and make it more realistic. They are also used to create the sources of illumination such as street lights, flashlights, and so on. There are two main categories of lights: Standard and Photometric. In these categories, different types of lights are available. You need to select one or more lights based on the requirement of a scene. The Photometric lights provide more realistic lighting effects but they are more complex than the Standard lights. Also, they use the light energy values to create a realistic scene.

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Animation

Animation brings life to an object. To animate an object, you need to define different positions, rotations, and scaling of the object at different key points in the time slider. These defined points are known as keyframes. The keys between the frames consist of the information about the actions performed in an animation. When you play an animation, a series of frames are displayed quickly one after another and the object seems to be moving. In Max, there are various types of animation. These will be discussed in later chapters.

Particle Systems

In Autodesk 3ds Max, the particle systems are used to create an object that generates particles. These particles are used to simulate snow, dust, rain, and so on. You can also animate the particles in a particle system. To create a particle system, choose **Create > Geometry** in the **Command Panel**; a drop-down list will be displayed below the **Geometry** button. Select **Particle Systems** from the drop-down list; the **Object Type** rollout containing various types of tools to create the particle system will be displayed, as shown in Figure 2-63.

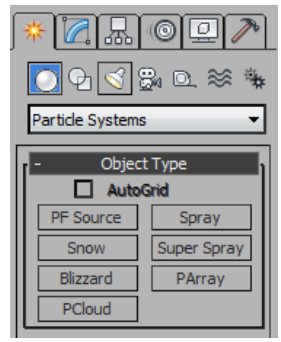

Figure 2-63 *Various tools displayed to create particle systems*

Space Warps

In Autodesk 3ds Max, the space warps objects cannot be rendered and are used to affect the motion and appearance of other objects. They can generate special effects such as blowing wind, flowing waves, and so on in the animation. There are five categories of space warps: **Forces**, **Deflectors**, **Geometric/Deformable**, **Modifier-Based**, and **Particles & Dynamics**.

Systems

In Autodesk 3ds Max, a system is an object set that consists of objects, linkages, and controllers. These systems help you to simplify the complex animations. There are four types of systems: **Bones**, **Ring array**, **Sunlight**, **Daylight**, and **Biped**. These will be discussed in later chapters.

Rigid Body Dynamics

A rigid body is an object which does not deform when it collides with another object. You can convert an object into three types of rigid bodies using the **MassFX Toolbar**. This toolbar is a new feature added in 3ds Max 2012. It consists of options for converting an object into rigid bodies, various types of constraint helpers, and simulation controls.

Constraints

Constraints are used to restrict the movement of rigid bodies in the simulation. Various types of constraints are available in the **Constraint** flyout, such as rigid constraint, slide constraint, hinge constraint, and so on. These constraints are used to make the two rigid bodies work together. A constraint links two rigid bodies together or links a single rigid body to a fixed point in global space. The constraints develop a hierarchical relationship in which the child object must be a dynamic rigid body, while the parent object can be a dynamic or a kinematic rigid body, or can be a point in the global space.

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Note

For the printing purpose, this textbook will use the white background. However, for a better understanding and a clear visualization at various places, this textbook will follow other color schemes as well. In addition, the shaded type of shading is used throughout the book in all screen captures. Moreover, at some places in figures, grids will be hidden for better understanding and visualization.

In some tutorials, you have been instructed to browse the images and max files from the CADCIM website. Therefore, before starting the tutorials, download the images and max files from http://www.cadcim.com. The path of the file is as follows:

Textbooks > Animation and Visual Effects > Character Animation > Character Animation: A Tutorial Approach (Using 3ds Max)

Self-Evaluation Test

Answer the following questions and then compare them to those given at the end of this chapter:

1. Which of the following tools is used to improve the performance of a viewport in a complex scene by temporarily decreasing the visual fidelity of some of the objects?

   (a) **Progressive Display** (b) **Snaps Toggle** flyout
   (c) **Mirror** (d) All of these

2. Which of the following tabs should be chosen to control the animation controllers?

   (a) **Motion** (b) **Display**
   (c) **Hierarchy** (d) None of these

3. Which of the following dialog boxes is used to set the spacing in the grids, displayed in the viewports?

   (a) **Customize User Interface** (b) **Grid and Snap Settings**
   (c) **Units Setup** (d) All of these

4. Which of the following combinations of keys is used to invoke the **pan** tool?

   (a) CTRL+P (b) SHIFT+Z
   (c) CTRL+A (d) CTRL+W

5. The _____ is located at the bottom of the screen and displays the information about the active command or tool.

6. The _____ dialog box displays video tutorials which help in learning the basic working environment of the software.

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7. Most of the 3ds Max modeling and animation tools can be invoked from the tabs located in the **Command Panel**. (T/F)

8. The default interface of Autodesk 3ds Max consists of three equal viewports that are surrounded by tools and commands. (T/F)

9. In Autodesk 3ds Max, you can modify the color of almost every element in the interface. (T/F)

10. The tools in the animation playback controls are used to control the display of a viewport. (T/F)

Review Questions

Answer the following questions:

1. Which of the following hotkeys is used to invoke the **Stop Animation** button?

   (a) HOME (b) END
   (c) ESC (d) N

2. The _____ provides visual feedback of the current orientation of the viewport.

3. The _____ displays the current frame and the total number of frames in the current line segment.

4. The _____ is located between the time slider and the status bar.

5. The _____ tool located on the right of the status bar is used to lock a selection set.

6. In Autodesk 3ds Max, the _____ objects cannot be rendered and are used to affect the motion and appearance of other objects.

7. _____ are used to restrict the movement of rigid bodies in simulation.

8. The _____ modifier is used to produce a swirling effect on an object.

9. Snapping restricts the movement of the cursor to a specific part of an object or grid. (T/F)

10. The options in the General viewport label menu are used for defining the type of shadings displayed in the viewport. (T/F)

Answers to Self-Evaluation Test

1. a, **2.** a, **3.** b, **4.** a, **5.** prompt line, **6. Welcome to 3ds Max**, **7.** T, **8.** F, **9.** T, **10.** F

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