4

Default Objects and Patch Grids

Learning Objectives

After completing this chapter, you will be able to:

- *Use the Mirror tool*
- *Use the Align tool*
- *Create AEC extended objects*
- *Create doors*
- *Create windows*
- *Create patch grids*

INTRODUCTION

In this chapter, you will learn to create the default objects and patch grids in Autodesk 3ds Max. Also, you will learn to use the **Mirror** and **Align** tools while modeling the objects with the help of various primitives and default objects.

MIRROR TOOL

Menu bar: Tools > Mirror
Main Toolbar: Mirror

The **Mirror** tool is used to mirror or clone the selected object about the center of the current coordinate system. You can also move the object while mirroring its orientation. To mirror an object, select it and invoke the **Mirror** tool from the **Main Toolbar**; the **Mirror: Screen Coordinates** dialog box will be displayed, as shown in Figure 4-1. Set the parameters in this dialog box and choose the **OK** button to mirror the objects. The two areas in this dialog box are discussed next.

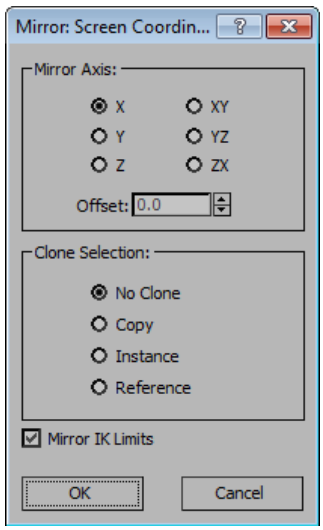

***Figure 4-1** The **Mirror: Screen Coordinates** dialog box*

Mirror Axis Area

Select the **X**, **Y**, **Z**, **XY**, **YZ**, or **ZX** radio button in the **Mirror Axis** area to define the direction of the object while mirroring. The value in the **Offset** spinner defines the distance of the mirrored object from the original one.

Clone Selection Area

The **Clone Selection** area is used to define the type of clone created by the **Mirror** tool. By default, the **No Clone** radio button is selected in this area. As a result, the selected object is mirrored but not retained. Select the **Copy** radio button to retain the selected object after mirroring. You can also change the position of the copied object by entering the required value in the **Offset** spinner in the **Mirror Axis** area. Select the **Instance** radio button to mirror the selected object as an instance. Select the **Reference** radio button to mirror the selected object as reference of the selected object.

An instance is a type of clone in which the changes are reflected when they are made in the original object. Also, if you make any change in the instanced object, then it will transfer to the original object.

A reference object is similar to an instance object with the only difference that the changes made in the reference object are not reflected in the original object.

ALIGN TOOL

Menu bar: Tools > Align > Align
Main Toolbar: Align
Keyboard: ALT+A

The **Align** tool enables you to align the current object with the target object. To align an object using the **Align** tool, select the current object and then invoke the **Align** tool from the **Main Toolbar**; the align cursor attached to a pair of crosshairs will be displayed, as shown in Figure 4-2. Move the cursor over the target object and click on it; the **Align Selection (X)** dialog box will be displayed, as shown in Figure 4-3. Here, **X** refers to the name of the target object. You need to use the options in the **Align Selection (X)** dialog box to align the objects. Various areas and options in this dialog box are discussed next.

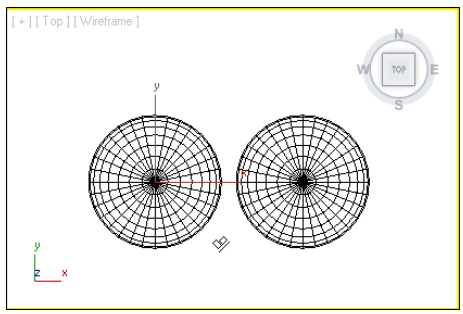

Figure 4-2 *The align cursor in the Top viewport*

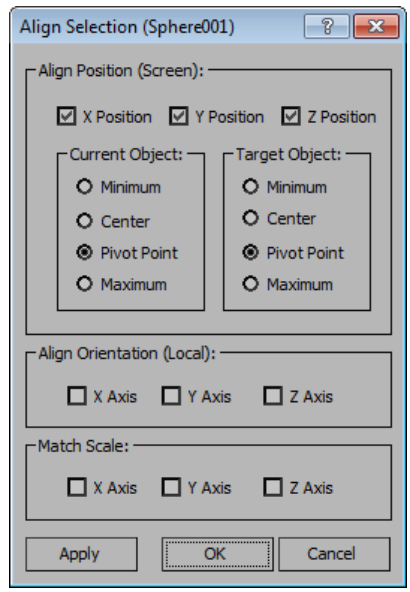

Figure 4-3 *The **Align Selection (Sphere001)** dialog box*

Align Position Area

You can select the check box(es) in this area to specify the axis along which you want to align the object. You can also select all the check boxes simultaneously. By default, all the check boxes are selected.

Current Object/Target Object Area

The **Minimum**, **Center**, **Pivot Point**, or **Maximum** radio button in the **Current Object** and **Target Object** areas can be selected to specify different points on the current and target objects to be used for alignment.

Note

*You should try different combinations of axes in the **Align Position** area. Also, try using different options in the **Current Object** and **Target Object** areas to notice the difference.*

AEC EXTENDED PRIMITIVES

In Autodesk 3ds Max, there are some default objects such as trees, railings, walls, and so on. These objects can be used to make a scene more realistic and are known as AEC extended objects. All AEC extended objects can be created dynamically using the mouse or by entering the parameters in the **Keyboard Entry** rollout.

To create an AEC extended object, you need to choose **Create > Geometry** in the **Command Panel**; the **Standard Primitives** option will be displayed by default in the drop-down list. Select the **AEC Extended** option from the drop-down list and activate the viewport in which you want to create the objects. Next, invoke the corresponding tool from the **Object Type** rollout. In this section, you will learn to create and modify the AEC extended objects using various tools available in the **Object Type** rollout.

Creating a Foliage

Menu:	Create > AEC Objects > Foliage
Command Panel:	Create > Geometry > AEC Extended > Object Type rollout > Foliage

To create a foliage or a tree, activate the viewport in which you want to create it. Then, invoke the **Foliage** tool from the **Object Type** rollout; the **Name and Color**, **Keyboard Entry**, **Favorite Plants**, and **Parameters** rollouts will be displayed, as shown in Figure 4-4.

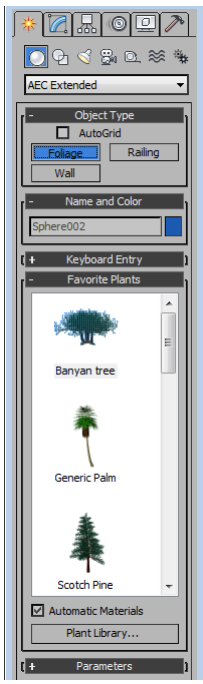

Figure 4-4 *Various rollouts to create a tree*

In the **Favorite Plants** rollout, select one of the trees, and then double-click on it; the selected tree will be displayed in the viewports. One of the sample trees is shown in Figure 4-5. Alternatively, you can create a tree by dragging it from the **Favorite Plants** rollout to the desired location in the viewport. Also, you can select one of the trees from the **Favorite Plants** rollout and then click in the viewport at the desired location to place it. You need to invoke the **Zoom Extents All** tool to view the entire tree in the viewports.

Various rollouts used to create and modify the tree are discussed next.

Note

*The options in the **Name and Color** rollout are the same for all AEC extended objects.*

*The **Keyboard Entry** rollout is used to create various objects by entering the parameters using the keyboard. The method of creating these objects is the same as discussed earlier in Chapter 2. However, the railing object cannot be created using the keyboard, therefore, it does not have the **Keyboard Entry** rollout.*

Favorite Plants Rollout

The **Favorite Plants** rollout has a palette consisting of a list of default trees to create them in the viewport. By default, the **Automatic Materials** check box is selected. It is used to assign the default material to the trees. If you clear this check box and create a tree, then the tree created will not show any material. Also, the default color will be displayed in it. Choose the **Plant Library** button below the **Automatic Materials** check box; the **Configure Palette** dialog box will be displayed. This dialog box is used to give information such as **Name**, **Scientific Name**, **Type**, **Description**, and **Faces** about all the default trees in the **Favorite Plants** rollout. You can also use this dialog box to remove or add a particular plant from the palette in the **Favorite Plants** rollout. To do so, select the name of a plant from the **Configure Palette** dialog box and choose the **Remove from Palette** button; the **no** option will be displayed in the **Fav.** row, and the selected plant will not be displayed in the **Favorite Plants** rollout. Similarly, to display a plant in the **Favorite Plants** rollout, select the name of the plant from the **Configure Palette** dialog box, and then choose the **Add to Palette** button; the **no** option will be replaced by the **yes** option in the **Fav.** row. Next, choose the **OK** button to save the changes.

Note

*To modify the default material of the trees, you need to use the **Material Editor** tool, which will be discussed in detail in the later chapters.*

Parameters Rollout

The options in this rollout are used to modify the tree created using the **Foliage** tool. To do so, select the tree and choose the **Modify** tab in the **Command Panel**; the **Parameters** rollout will be displayed, as shown in Figure 4-6. Enter a new value in the **Height** spinner to modify the height of the tree. The value in the **Density** spinner varies from 0.0 to 1.0 and is used to set the amount of leaves and flowers in the tree. The value in the **Pruning** spinner varies from 0.0 to 1.0 and is used to remove the branches of the tree based on the value entered in this spinner, refer to Figures 4-7 and 4-8.

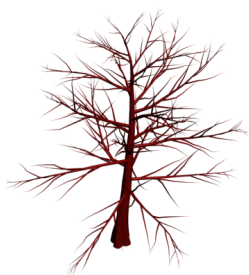

Figure 4-5 *A tree created using the **Foliage** tool*

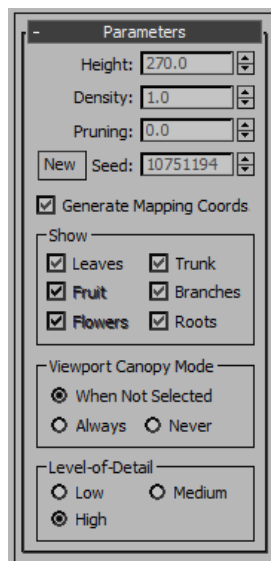

Figure 4-6 *The **Parameters** rollout*

Figure 4-7 *A tree with the* ***0*** *value in the* ***Pruning*** *spinner*

Figure 4-8 *A tree with the* ***0.5*** *value in the* ***Pruning*** *spinner*

Choose the **New** button to view the variation in the placement of leaves, branches, and the angle of trunk of the selected plant. When you choose the **New** button the value in the **Seed** spinner changes accordingly, showing the possible variation in the selected tree. The other areas in the **Parameters** rollout are discussed next.

Show Area

The options in this area are used to display leaves, trunk, fruits, branches, flowers, and roots. Select the check boxes to display the corresponding parts of a tree.

Note

In the ***Show*** *area, some options will not be available for some trees. For example, if you select a tree that does not have flowers, the* ***Flowers*** *check box will not be available.*

Viewport Canopy Mode Area

The options in this area are used to display the plant in the canopy mode in the viewports. The canopy of a plant is a type of covering area which covers the outermost parts of the tree such as leaves, branches, and trunk. Select the **When Not Selected** radio button to display the tree in the canopy mode in the viewport, if the tree is not selected. Select the **Always** radio button to display the tree always in the canopy mode, whether it is selected or not. Select the **Never** radio button to display the tree in a simple mode.

Level-of-Detail Area

This area is used to define how a tree will be displayed at the time of rendering. Select the **Low** radio button to display the lowest detail of a tree. It renders the tree in the canopy mode, as shown in Figure 4-9. Select the **Medium** radio button to render the tree with less number of faces in the branches and trunk, as shown in Figure 4-10. By default, the **High** radio button is selected. It is used to render the tree with all its faces in the branches and trunk. It will provide the highest detail of a tree, as shown in Figure 4-11.

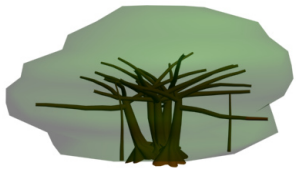

Figure 4-9 *The tree with low level of detail at rendering*

Figure 4-10 *The tree with medium level of detail at rendering*

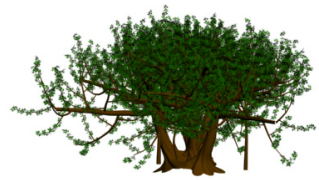

Figure 4-11 *The tree with high level of detail at rendering*

Creating a Railing

Menu bar:	Create > AEC Objects > Railing
Command Panel:	Create > Geometry > AEC Extended > Object Type rollout > Railing

To create a railing, activate the viewport in which you want to create it. Then, invoke the **Railing** tool from the **Object Type** rollout; the **Name and Color**, **Railing**, **Posts**, and **Fencing** rollouts will be displayed, as shown in Figure 4-12. Now, press and hold the left mouse button on the left side of the viewport and then drag the cursor to the right side to specify the length of the railing. Release the left mouse button to set the length. Now, move the cursor up to specify the height of the railing and click on the screen; the railing will be created in the viewports, as shown in Figure 4-13. You may need to use the **Zoom Extents All** tool from the **Main Toolbar** to view the entire railing.

Various rollouts used to modify the railing are discussed next.

Railing Rollout

The **Pick Railing Path** button is used to create railing paths using the splines. You can create the splines using the tools placed in **Create > Shapes** in the **Command Panel**. You will learn more about these tools in the later chapters. To create a railing according to the railing path or the spline, first create a spline and a railing in the viewport. Next, select the railing and choose the **Modify** tab in the **Command Panel**. Then, choose the **Pick Railing Path** button in the **Railing** rollout and move the cursor over the spline in the viewport; the pick cursor will be displayed and it will prompt you to pick the spline to create a railing according to the spline as path. Next, click on the spline; a railing will be created. Now, set a value in the **Segments** spinner to specify the number of segments in the railing. Select the **Respect Corners** check box to put the corners in the railing to match the corners of the railing path. The **Segments** spinner and the **Respect Corners** check box will be activated only if you create a railing using the railing path. The value in the **Length** spinner specifies the length of the railing. The areas in the **Railing** rollout are discussed next.

Top Rail Area

The top rail is the topmost part of the railing, refer to Figure 4-13, and the options in this area are used to modify the top rail. The **Profile** drop-down list is used to define the cross-section shape of the top rail. Select the **Round** or the **Square** option from the drop-down list to make the top rail round or square, respectively. Select the **none**

option to remove the top rail from the railing. The values entered in the **Depth**, **Width**, and **Height** spinners specify the depth, width, and height of the top rail, respectively, refer to Figure 4-14.

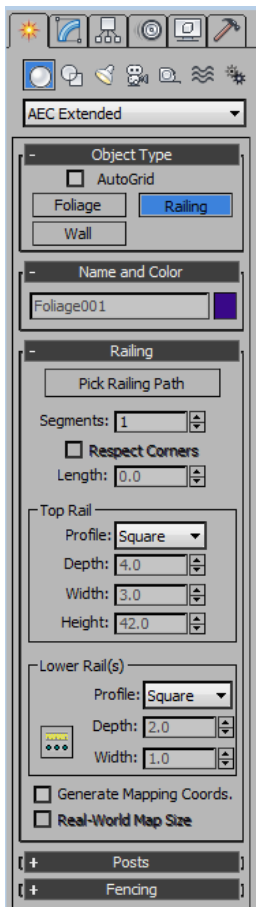

Figure 4-12 *Partial view of various rollouts to create a railing*

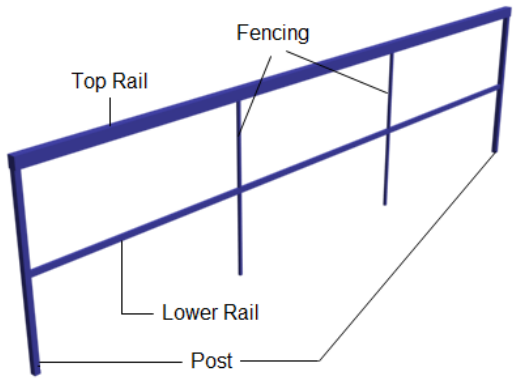

Figure 4-13 *The railing with different parts labeled*

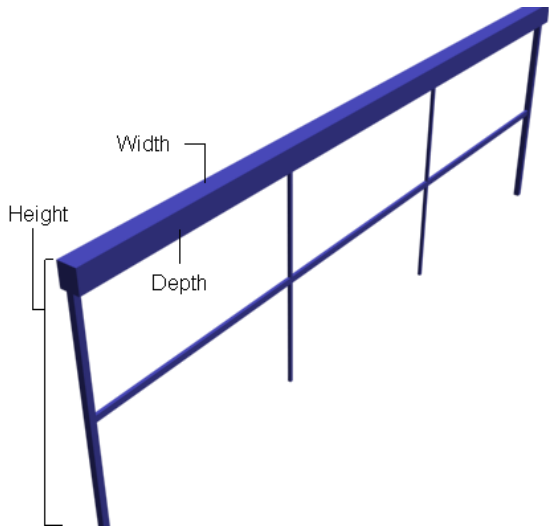

Figure 4-14 *The railing with different dimensions*

Lower Rail(s) Area

The lower rail is placed below the top railing, refer to Figure 4-13, and the options in this area are used to modify the lower rail of the railing. The **Profile** drop-down list is used to define the shape of the cross-section of the lower rail. The value in the **Depth** spinner specifies the depth of the rail, whereas the value in the **Width** spinner specifies the width of the lower rail. Choose the **Lower Rail Spacing** button on the left side of the **Lower Rail(s)** area; the **Lower Rail Spacing** dialog box will be displayed, as shown in Figure 4-15. In this dialog box, select the **Count** check box, if it is not already selected. The value in the spinner on the right of this check box specifies the number of lower rails in the railing. Choose the **Close** button to close the dialog box.

Posts Rollout

The posts are the left and right supports of the railing, refer to Figure 4-13, and the options in this rollout are used to modify them. Most of the options in this rollout are the same as those discussed in the **Lower Rail(s)** area of the **Railing** rollout, except the **Extension** spinner. The value in the **Extension** spinner is used to extend the posts of the railing from the bottom of the top rail, as shown in Figure 4-16.

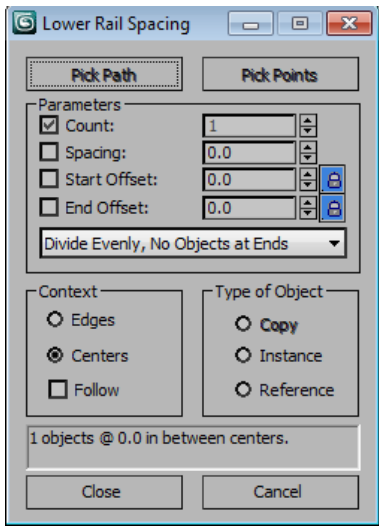

***Figure 4-15** The **Lower Rail Spacing** dialog box*

Fencing Rollout

The fencing is placed in between the posts of the railing, refer to Figure 4-13, and the options in this rollout are used to modify it. The options in the **Type** drop-down list define the type of fencing in the railing. If you select the **(none)** option in the **Type** drop-down list, the fence will not be displayed and the options in the **Picket** and **Solid Fill** areas will become inactive. If you select the **Pickets** option in the **Type** drop-down list, then the pickets will be displayed in between the posts, as shown in Figure 4-17. Also, the **Picket** area will be activated in this rollout. If you select the **Solid Fill** option in the **Type** drop-down list, then the solid box type shape will be displayed in between the posts, as shown in Figure 4-18. Also, the **Solid Fill** area will be activated. The areas in the **Fencing** rollout are discussed next.

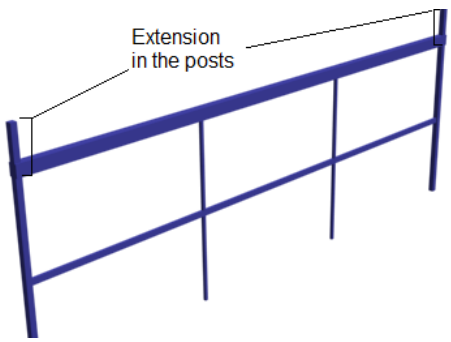

***Figure 4-16** The railing with the extension in the posts*

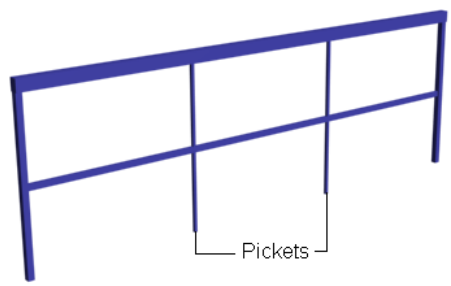

***Figure 4-17** The railing with the **Picket** type of fencing*

Picket Area

You need to select the **Pickets** option from the **Type** drop-down list to activate this area. The **Profile**, **Depth**, **Width**, and **Extension** options in this area are the same as those discussed in the **Posts** rollout. The value in the **Bottom Offset** spinner is used to set the height of the picket from the bottom of the railing, refer to Figure 4-19.

Solid Fill Area

Select the **Solid Fill** option from the **Type** drop-down list to activate this area. The value in the **Thickness** spinner is used to set the thickness of the solid fill. The value in the

Top Offset spinner is used to set the distance of the solid fill from the bottom of the top railing. The value in the **Bottom Offset** spinner is used to set the distance of the solid fill from the bottom of the railing. The value in the **Left Offset** spinner is used to set the distance of the solid fill from the left post. The value in the **Right Offset** spinner is used to set the distance of the solid fill from the right post, refer to Figure 4-20.

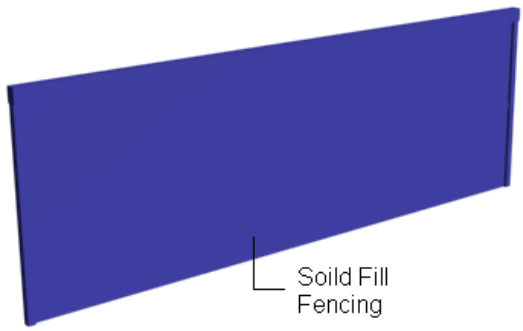

Figure 4-18 *The railing with the* ***Solid Fill*** *type of fencing*

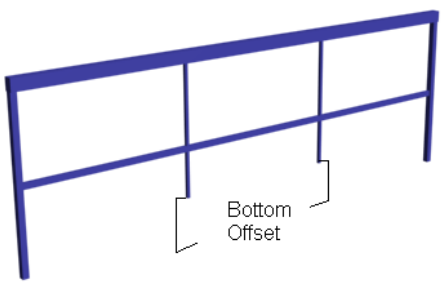

Figure 4-19 *The* ***Bottom Offset*** *in the* ***Picket*** *fencing*

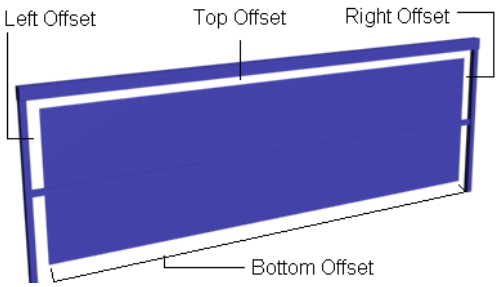

Figure 4-20 *Various offsets in the* ***Solid Fill*** *fencing*

Creating a Wall

Menu bar:	Create > AEC Objects > Wall
Command Panel:	Create > Geometry > AEC Extended > Object Type rollout > Wall

To create a wall, activate the Top viewport and then invoke the **Wall** tool from the **Object Type** rollout; the **Name and Color**, **Keyboard Entry**, and **Parameters** rollouts will be displayed, as shown in Figure 4-21. Now, in the **Parameters** rollout, set the width and height by entering values in the **Width** and **Height** spinners, respectively. Next, click on the left of the Top viewport to create the starting point of the wall. Drag the cursor to the right to define the length of the wall and then click on the screen. Now, right-click to exit the command; a wall segment will be created, as shown in Figure 4-22. If you want to create another segment of the wall in continuation, then you need to repeat the same procedure as followed for the first segment

without right-clicking. Next, to create a closed wall, click on the starting point of the first wall segment; the **Weld Point?** dialog box will be displayed, as shown in Figure 4-23. Choose the **Yes** button in this dialog box; a closed wall will be displayed, as shown in Figure 4-24. Next, right-click to exit the command.

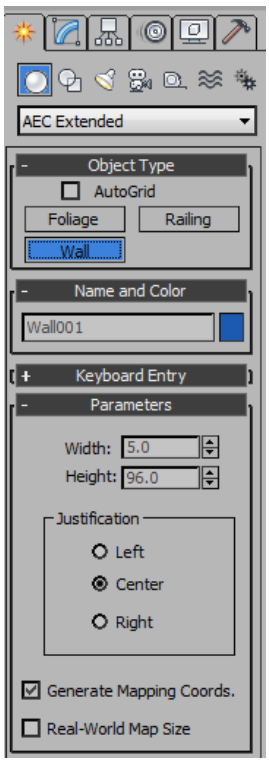

Figure 4-21 *Various rollouts to create a wall*

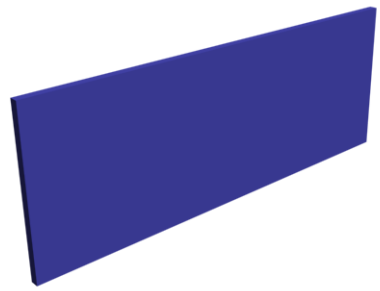

Figure 4-22 *A wall segment*

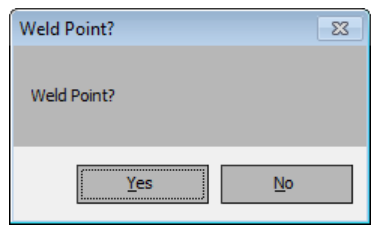

Figure 4-23 *The* ***Weld Point?*** *dialog box*

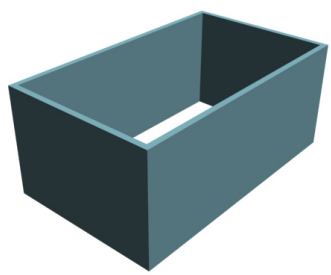

Figure 4-24 *A closed wall*

Various rollouts used to modify the wall are discussed next.

Keyboard Entry Rollout

This rollout is used to create a wall by entering the parameters in the **Keyboard Entry** rollout. To do so, expand the **Keyboard Entry** rollout. Enter the values in the **X**, **Y**, and **Z** spinners to specify the position of the starting point of the wall segment in the viewport along the axes of the home grid or a grid object. Now, choose the **Add Point** button to add a point. Repeat the same procedure to create another segment. Next, choose the **Close** button to create a closed wall. Choose the **Finish** button to end the creation of the wall. When you choose the **Pick Spline** button, you will be prompted to select a spline in the viewport to create a wall along with the spline as a path. You can create a spline using the tools given in **Create > Shapes > Splines** in the **Command Panel**. You will learn about these tools in the later chapters.

Parameters Rollout

In this rollout, enter the values in the **Width** and **Height** spinners to define the width and height of the wall, respectively. The **Justification** area in the **Parameters** rollout is discussed next.

Justification Area

The options in this area are used to align the wall at its baseline. The baseline is the line between the front and back sides of a wall and it is equal to the thickness of the wall. By default, the **Center** radio button is selected in this area and is used to align the wall at the center of its baseline. Select the **Left** radio button to align the wall at the left edge of its baseline. Select the **Right** radio button to align the wall at the right edge of its baseline.

Edit Object Rollout

Select the wall and choose the **Modify** tab in the **Command Panel**; the **Edit Object** rollout will be displayed, as shown in Figure 4-25. Choose the **Attach** button; it will become active and you will be prompted to select another wall in the viewport to attach it with the selected wall. When you select another wall, it will automatically take the same material as that of the selected wall. Choose the **Attach Multiple** button; the **Attach Multiple** dialog box will be displayed, containing the list of all walls in the viewport. Select the multiple walls that you want to attach from the list by holding the CTRL key and then choose the **Attach** button; multiple walls will be attached to the selected wall.

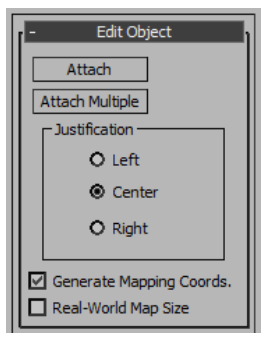

***Figure 4-25** The **Edit Object** rollout*

CREATING DOORS

In Autodesk 3ds Max, there are three tools to create the default doors. These tools are **Pivot**, **Sliding**, and **BiFold**. You can use these doors while creating houses, offices, rooms, and so on. To invoke the tools for creating doors, choose **Create > Geometry** in the **Command Panel**; the **Standard Primitives** option will be displayed in the drop-down list. Select the **Doors** option from the drop-down list and activate the viewport in which you want to create the doors. Next, invoke the corresponding tool from the **Object Type** rollout. In this section, you will learn to create and modify different types of doors using various tools available in the **Object Type** rollout.

Creating a Pivot Door

Menu bar:	Create > AEC Objects > Pivot Door
Command Panel:	Create > Geometry > Doors > Object Type rollout > Pivot

The pivot door is jointed or hinged only on one side and the door swings on this side. To create the pivot door, invoke the **Pivot** tool from the **Object Type** rollout; the **Name and Color**, **Creation Method**, **Parameters**, and **Leaf Parameters** rollouts will be displayed, as shown in Figure 4-26.

Activate the Top viewport and press and hold the left mouse button on the left of the viewport. Now, drag the cursor to the right of the viewport and release the left mouse button to define the width. Next, move the cursor up or down to define the depth of the door and click on the screen to set the depth. Now, again move the cursor up or down to define the height of the door. Click on the screen; the pivot door will be created in all viewports, refer to Figure 4-27.

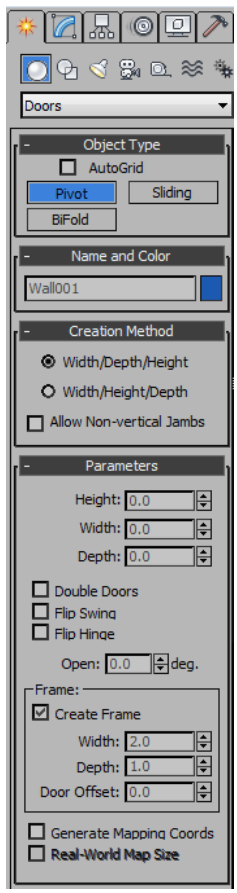

Figure 4-26 *Partial view of various rollouts to create a pivot door*

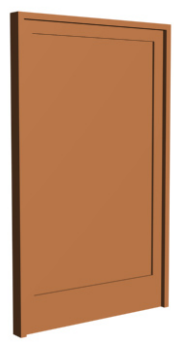

Figure 4-27 *A pivot door*

Various rollouts used to create and modify the pivot door are discussed next.

Creation Method Rollout

The options in this rollout are used to creating the pivot door dynamically. You can create the pivot door using any of the two methods discussed next.

Width/Depth/Height

To create the door using this method, make sure the **Width/Depth/Height** radio button is selected. Now, first you need to define the width and depth of the door, and then you need to move the cursor to define the height, as discussed earlier while creating the pivot door dynamically.

Width/Height/Depth

To create the door using this method, you need to select the **Width/Height/Depth** radio button. Now, first you need to specify the width and height of the door, and move the cursor to specify the depth. To do so, press and hold the left mouse button on the left side of the viewport, drag the cursor to the right of the viewport to specify the width of the pivot door, and release the left mouse button. Next, move the cursor up to define the height of the door and click on the screen to set the height. Next, move the cursor up or down to specify the depth of the door. Click on the screen; the pivot door will be created in all viewports.

Parameters Rollout

The options in this rollout are used to modify the pivot door. Select the pivot door and choose the **Modify** tab in the **Command Panel**; the **Parameters** and **Leaf Parameters** rollouts will be displayed. Enter the new values in the **Height**, **Width**, and **Depth** spinners to modify the height, width, and depth of the pivot door, respectively. Select the **Double Doors** check box to create two pivot doors, one on the left and other on the right, as shown in Figure 4-28. Select the **Flip Swing** check box to change the direction of swing of the door. Select the **Flip Hinge** check box to change the placement of the joint or the hinge of the pivot door on the opposite side. When you select the **Double Doors** check box, the **Flip Hinge** check box becomes inactive. The value in the **Open** spinner is used to specify the amount in degree to which the door will open, refer to Figure 4-29. The **Frame** area in the **Parameters** rollout is discussed next.

Frame Area

The options in this area are used to modify the frame of the pivot door. By default, the **Create Frame** check box is selected. If you clear the **Create Frame** check box, then the other options in this area will become inactive. Also, the frame will not be displayed in the door. Enter the values in the **Width** and **Depth** spinners to specify the width and depth of the frame of the pivot door. The value in the **Door Offset** spinner specifies the location of the door in reference to the frame.

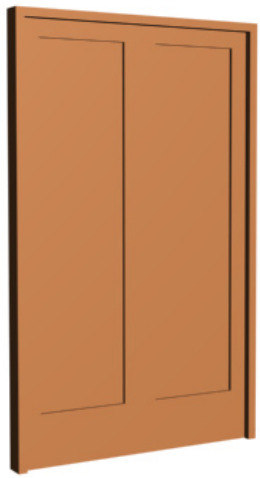

Figure 4-28 A double pivot door

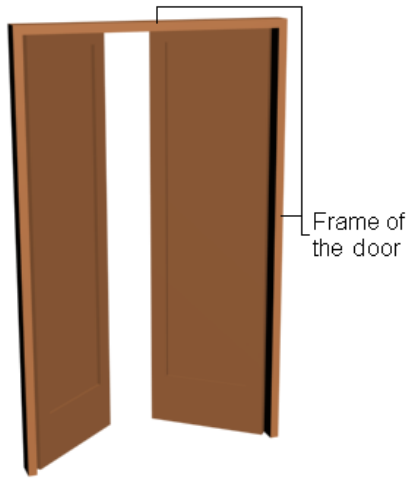

Figure 4-29 An opened double door

Leaf Parameters Rollout

This rollout is used to modify the leaf of a door. Set a new value in the **Thickness** spinner to modify the thickness of the leaf of the door. Enter a new value in the **Stiles/Top Rail** spinner to modify the frame of the door leaf on the top, left, and right side, as shown in Figure 4-30. Set a value in the **Bottom Rail** spinner to modify the frame at the bottom of the door leaf. The value in the **# Panels Horiz** spinner specifies the horizontal panels on the leaf of the door. The value in the **# Panels Vert** spinner specifies the vertical panels on the leaf of the door, refer to Figure 4-30. The value in the **Muntin** spinner is used to specify the width of the gap between the panels of the door leaf. The **Panels** area in the **Leaf Parameters** rollout is discussed next.

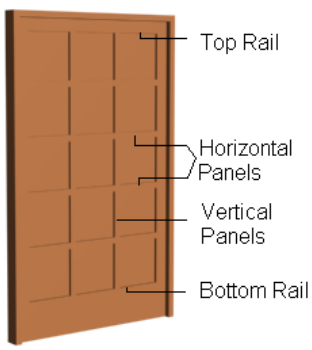

Figure 4-30 A door with the glass panels

Panels Area

The options in this area are used to modify the panels on the door leaf. The three radio buttons in this area are discussed next.

None

Select the **None** radio button; the panels will not be displayed in the door leaf.

Glass

Select the **Glass** radio button to create the glass panels, refer to Figure 4-30. Also, the **Thickness** spinner will be activated. It is used to set the thickness of the glass panel.

Beveled

Select the **Beveled** radio button to create the beveled panels, as shown in Figure 4-31. When you select the **Beveled** radio button, the options under this radio button will be activated. The **Bevel Angle** spinner is used to define the angle between the outer surface of the door and the panel surface. The **Thickness 1** spinner is used to define the outer thickness of the panel. The **Thickness 2** spinner is used to define the thickness of the starting point of the bevel. The **Middle Thick** spinner is used to define the inner thickness of the panel. The **Width 1** spinner is used to define the width of the starting point of the bevel and the **Width 2** spinner is used to define the inner width of the panel.

Figure 4-31 *A door with the beveled panels*

Creating a Sliding Door

Menu:	Create > AEC Objects > Sliding Door
Command Panel:	Create > Geometry > Doors > Object Type rollout > Sliding

A sliding door has two door components, one is fixed, whereas the other slides or moves over the fixed component to open. To create a sliding door, invoke the **Sliding** tool from the **Object Type** rollout; the **Name and Color**, **Creation Method**, **Parameters**, and **Leaf Parameters** rollouts will be displayed.

Now, to create the sliding door, follow the same procedure as you did for the pivot door; a sliding door will be created, as shown in Figure 4-32.

The options in the **Name and Color**, **Creation Method**, **Parameters**, and **Leaf Parameters** rollouts are the same as discussed in the pivot door. However, some options in the **Parameters** rollout are different and these are discussed next.

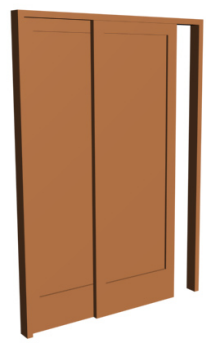

Figure 4-32 *A sliding door*

Select the **Flip Front Back** check box to choose the component that you want to place in the front. Select the **Flip Side** check box to change the fixed component to the sliding component.

Creating a BiFold Door

Menu:	Create > AEC Objects > BiFold Door
Command Panel:	Create > Geometry > Doors > Object Type rollout > BiFold

The bifold door has two door components and two joints in it. To create the bifold door, invoke the **BiFold** tool from the **Object Type** rollout; the **Name and Color**, **Creation Method**, **Parameters**, and **Leaf Parameters** rollouts will be displayed in the **Command Panel**. Now, create a bifold door dynamically using the same method as discussed for creating the pivot door; a bifold door will be created, as shown in Figure 4-33.

The options in the **Name and Color**, **Creation Method**, **Parameters**, and **Leaf Parameters** rollouts are the same as those discussed in the pivot door.

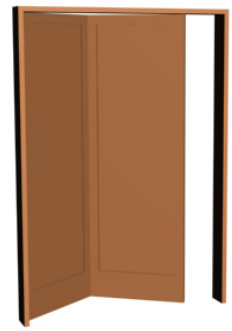

Figure 4-33 *A bifold door*

CREATING WINDOWS

In Autodesk 3ds Max, there are six tools to create different types of default windows such as **Awning**, **Casement**, and so on. You can use these windows at various places for architectural designs.

To invoke these tools for creating the windows, choose **Create > Geometry** in the **Command Panel**; the **Standard Primitives** option will be displayed in the drop-down list. Now, select the **Windows** option from this drop-down list; various tools will be displayed in the **Object Type** rollout. In this section, you will learn to create various types of windows using these tools.

Creating an Awning Window

Menu:	Create > AEC Objects > Awning Window
Command Panel:	Create > Geometry > Windows > Object Type rollout > Awning

An awning window has one or more cases that are jointed at its top. To create an awning window, invoke the **Awning** tool from the **Object Type** rollout; the **Name and Color**, **Creation Method**, and **Parameters** rollouts will be displayed, as shown in Figure 4-34.

Activate the Top viewport and press and hold the left mouse button on the left side of the viewport, drag the cursor to the right side to specify the width of the window, and release the left mouse button. Next, move the cursor up or down to define the depth of the window and click on the screen. Now, move the cursor up or down to specify the height of the window. Click on the screen; the awning window will be created in all viewports, refer to Figure 4-35. The options in the **Name and Color** and **Creation Method** rollouts are the same for all windows as those discussed in the pivot door.

Parameters Rollout

The options in this rollout are used to modify the awning window. To do so, select the awning window and choose the **Modify** tab in the **Command Panel**; the **Parameters** rollout will be displayed. Enter new values in the **Height**, **Width**, and **Depth** spinners to modify the height, width, and depth of the awning window, respectively. The areas in the **Parameters** rollout are used to modify the window. These areas are discussed next.

Frame

The options in this area are used to modify the frame of the window, refer to Figure 4-35. Enter a value in the **Horiz. Width** spinner to set the width of the horizontal (top and bottom) frames of the window. Enter a value in the **Vert. Width** spinner to set the width of the vertical (left and right) frames of the window. Similarly, enter a value in the **Thickness** spinner to set the overall thickness of the frame of the window.

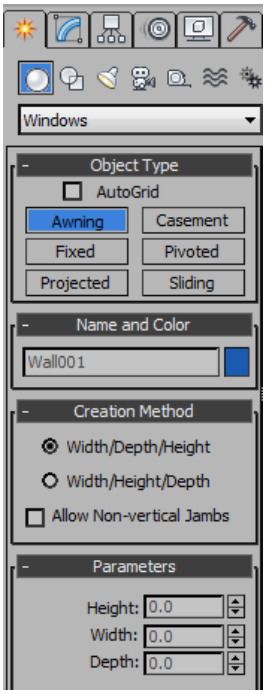

Figure 4-34 *Partial view of various rollouts to create an awning window*

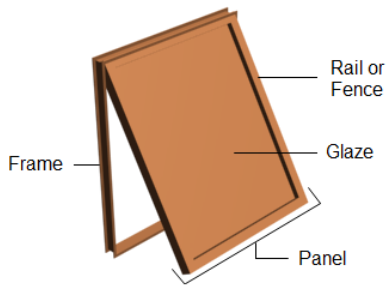

Figure 4-35 *An awning window*

Glazing

The **Thickness** spinner in this area is used to set the thickness of the glaze or the glass of the window, refer to Figure 4-35.

Rails and Panels

This area is used to modify the panel of the window. Enter a value in the **Width** spinner to set the width of the fence in the panel. Enter a value in the **Panel Count** spinner to set the number of panels in the window, as shown in Figure 4-36.

Figure 4-36 *An awning window with two panels*

Open Window

The **Open** spinner in this area is used to open the window. Its value will be in percentage.

Creating a Casement Window

Menu bar:	Create > AEC Objects > Casement Window
Command Panel:	Create > Geometry > Windows > Object Type rollout > Casement

A casement window has one or more cases that are jointed on the sides. To create the casement window, invoke the **Casement** tool from the **Object Type** rollout; the **Name and Color**, **Creation Method**, and **Parameters** rollouts will be displayed. Create a casement window dynamically

using the same method as discussed for creating the awning window. A casement window is shown in Figure 4-37.

Parameters Rollout

The options in this rollout are the same as those discussed in the **Awning** tool, except the **Casement** and **Open Window** areas. These areas are discussed next.

Casements Area

This area is used to modify the panel of the window. Enter a value in the **Panel Width** spinner to set the width of the fence in the panel. By default, the **One** radio button is selected to create one panel in the window. If you want to create two panels in the window, as shown in Figure 4-38, you need to select the **Two** radio button.

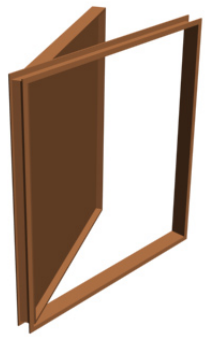

Figure 4-37 *A casement window*

Figure 4-38 *A casement window with two panels*

Open Window Area

The **Open** spinner in this area is used to open the window. Its value will be in percentage. Select the **Flip Swing** check box to swap the swinging of the panel of the window.

Creating a Fixed Window

Menu bar:	Create > AEC Objects > Fixed Window
Command Panel:	Create > Geometry > Windows > Object Type rollout > Fixed

A fixed window cannot be opened. To create a fixed window, activate the viewport and invoke the **Fixed** tool from the **Object Type** rollout; the **Name and Color**, **Creation Method**, and **Parameters** rollouts will be displayed.

Now, activate the Top viewport and follow the same method as discussed for creating the awning window; a fixed window will be created, as shown in Figure 4-39.

Parameters Rollout

The options in this rollout are the same as those discussed in the **Awning** tool, except the **Rails and Panels** area. This area is discussed next.

Rails and Panels Area

This area is used to modify the panel of the window. Enter a value in the **Width** spinner to set the width of the fence in the panel. Set a value in the **#Panels Horiz** spinner to define the number of horizontal divisions in the panel. Similarly, set a value in the **#Panels Vert** spinner to define the number of vertical divisions in the panel, as shown in Figure 4-40.

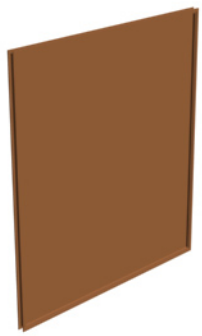

Figure 4-39 *A fixed window*

Figure 4-40 *A fixed window with horizontal and vertical divisions*

Creating a Pivoted Window

Menu bar:	Create > AEC Objects > Pivoted Window
Command Panel:	Create > Geometry > Windows > Object Type rollout > Pivoted

A pivoted window has only one panel that is jointed in the middle of the frame. When you open this window, it will swing around the horizontal axis. To create a pivoted window, activate the viewport and invoke the **Pivoted** tool from the **Object Type** rollout; the **Name and Color**, **Creation Method**, and **Parameters** rollouts will be displayed. Now, follow the same method as discussed while creating the awning window; a pivoted window will be created, as shown in Figure 4-41.

Parameters Rollout

Most of the options in this rollout are the same as discussed in the **Awning** tool, except the **Rails** and **Pivots** areas. These areas are discussed next.

Rails Area

This area is used to modify the panel of the window. Enter a value in the **Width** spinner to set the width of the fence in the panel.

Pivots Area

When you open the window, by default it rotates about the horizontal axis. To rotate the window about the vertical axis, select the **Vertical Rotation** check box; it will be rotated, as shown in Figure 4-42.

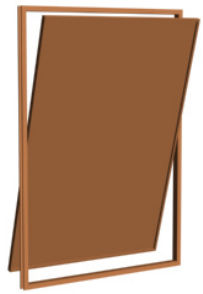

Figure 4-41 *A pivoted window rotated around the horizontal axis*

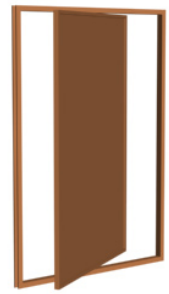

Figure 4-42 *A pivoted window rotated around the vertical axis*

Creating a Projected Window

Menu bar:	Create > AEC Objects > Projected Window
Command Panel:	Create > Geometry > Windows > Object Type rollout > Projected

A projected window has three panels in which the top one remains still, and the other two swing in the opposite direction. To create a projected window, activate the viewport and invoke the **Projected** tool from the **Object Type** rollout; the **Name and Color**, **Creation Method**, and **Parameters** rollouts will be displayed. Now, follow the same method as discussed while creating the awning window; a projected window will be created, as shown in Figure 4-43.

Figure 4-43 *A projected window*

Parameters Rollout

Most of the options in this rollout are the same as discussed in the **Awning** tool, except the **Rails and Panels** area. This area is discussed next.

Rails and Panels Area

This area is used to modify the panel of the window. Set the value in the **Width** spinner to specify the width of the fence in the panel. Set the value in the **Middle Height** spinner to define the height of the middle panel relative to the frame of the window. Similarly, set the value in the **Bottom Height** spinner to define the height of the bottom panel relative to the frame of the window.

Creating a Sliding Window

Menu bar:	Create > AEC Objects > Sliding Window
Command Panel:	Create > Geometry > Windows > Object Type rollout > Sliding

A sliding window has two panels in which one remains still and the other one slides to open. To create a sliding window, activate the viewport and invoke the **Sliding** tool from the **Object Type** rollout; the **Name and Color**, **Creation Method**, and **Parameters** rollouts will be displayed.

Now, create a sliding window dynamically using the same method as discussed while creating the awning window; a sliding window will be created, as shown in Figure 4-44.

Parameters Rollout

Most of the options in this rollout are the same as those discussed in the **Awning** tool, except the **Rails and Panels** and **Open Window** areas. These areas are discussed next.

Rails and Panels

This area is used to modify the panel of the window. Set the value in the **Rail Width** spinner to set the width of the fence in the panel. Set the value in the **#Panels Horiz** spinner to define the number of horizontal divisions in the panel. Set the value in the **#Panels Vert** spinner to define the number of vertical divisions in the panel. Select the **Chamfered Profile** check box to chamfer the fence between the panels, as shown in Figure 4-45.

Open Window

The **Open** spinner in this area is used to open the window and its value will be in percentage. By default, the **Hung** check box is selected. As a result, the panel slides in the vertical direction. Clear the **Hung** check box to slide the panel in the horizontal direction, refer to Figure 4-46.

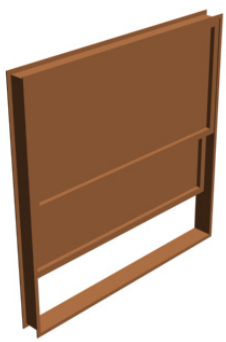

Figure 4-44 *The sliding window*

Figure 4-45 *The sliding window with two horizontal and vertical chamfered divisions*

Figure 4-46 *The sliding window with the horizontal sliding*

CREATING STAIRS

In Autodesk 3ds Max, there are four tools to create different types of default stairs such as **LType Stair**, **Spiral Stair**, and so on. To invoke these tools, choose **Create > Geometry** in the **Command Panel**; the **Standard Primitives** option will be displayed in the drop-down list. Now, select the **Stairs** options from the drop-down list; various tools will be displayed in the **Object Type** rollout. In this section, you will learn to create various types of stairs using these tools.

Creating L-type Stairs

Menu bar:	Create > AEC Objects > L-Type Stair
Command Panel:	Create > Geometry > Stairs > Object Type rollout > LTypeStair

The L-type stairs have two stairways that are jointed at right angles to each other. To create the L-type stairs, invoke the **LType Stair** tool from the **Object Type** rollout; the **Name and Color**, **Parameters**, **Carriage**, **Railings**, and **Stringers** rollouts will be displayed, as shown in Figure 4-47.

Now, activate the Top viewport. Press and hold the left mouse button on the left side of the viewport, drag the cursor to the right side of the viewport to specify the length of the first stairway of the stair, and then release the left mouse button. Next, move the cursor up or down at right angle to define the length of the second stairway of the stair and then click on the screen. Now, move the cursor up to specify the overall height of the stair and then click on the screen; the L-type stairs will be created in all viewports, as shown in Figure 4-48.

Various rollouts used to create and modify the L-type stairs are discussed next.

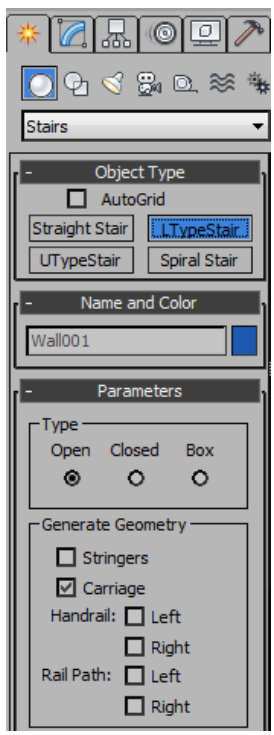

Figure 4-47 *Partial view of various rollouts to create L-type stairs*

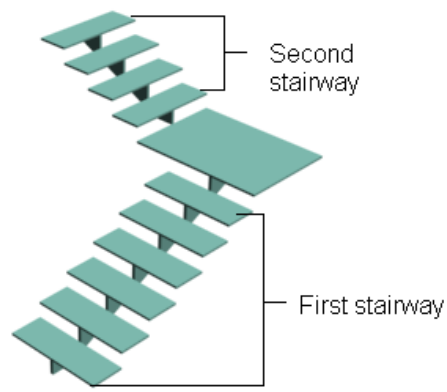

Figure 4-48 *The L-type open stairs*

Parameters Rollout

The options in this rollout are used to modify the L-type stairs. To do so, select the L-type stairs and choose the **Modify** tab in the **Command Panel**; the **Parameters**, **Carriage**, **Railings**, and

Stringers rollouts will be displayed. The **Parameters** rollout has a number of areas to modify the stairs. These are discussed next.

Type Area

The options in this area are used to define the type of stairs. By default, the **Open** radio button is selected, and therefore the stairs with open steps are created, as shown in Figure 4-48. Select the **Closed** radio button to create the stairs with closed steps, as shown in Figure 4-49. Select the **Box** radio button to create a support for the steps of the stairs, as shown in Figure 4-50.

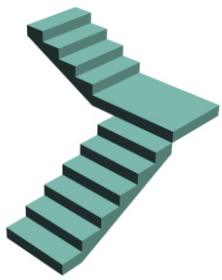

Figure 4-49 *The L-type closed stairs*

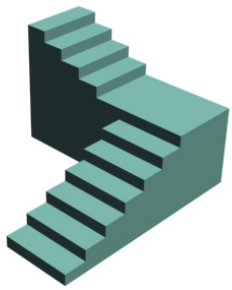

Figure 4-50 *The L-type box stairs*

Generate Geometry Area

The options in this area are used to modify the stairs by incorporating the geometry shapes. Select the **Stringers** check box to create the left and right support for the steps of the stairs. Select the **Carriage** check box to create support for the steps of the stairs. Select the **Left** and **Right** check boxes in the **Handrail** group to create the left and right handrails, as shown in Figure 4-51. On selecting the **Left** and **Right** check boxes in the **Rail Path** group, a path will be created on the left and right of the stairs, as shown in Figure 4-52. By using these paths, you can insert the default railings for stairs. To do so, invoke the **Railing** tool from **Create > Geometry > AEC Extended > Object Type** rollout. In the **Railing** rollout, choose the **Pick Railing Path** button and move the cursor over the path that is created while selecting the **Left** and **Right** check boxes in the **Rail Path** of the stairs; the cursor will get changed and prompts you to select the path. Select one of the rail paths in the viewport; the default railing will be displayed. Next, modify the default railings as discussed earlier in the **Railing** tool.

Layout Area

The options in this area are used to modify the dimensions of the stairs. Enter a value in the **Length 1** spinner to set the length of the first stairway. Similarly, enter a value in the **Length 2** spinner to set the length of the second stairway. The value in the **Width** spinner is used to set the width of the overall steps in the stairs. Enter a value in the **Angle** spinner to set the angle between the second stairway and the landing of the stairs. Enter

a value in the **Offset** spinner to set the distance from the second stairway to the landing of the stairs.

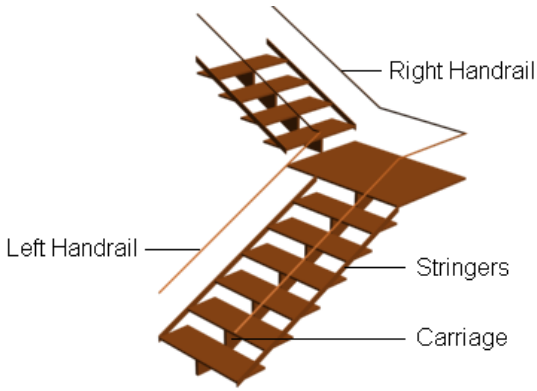

Figure 4-51 *The L-Type stairs with handrails, carriage, and stringers*

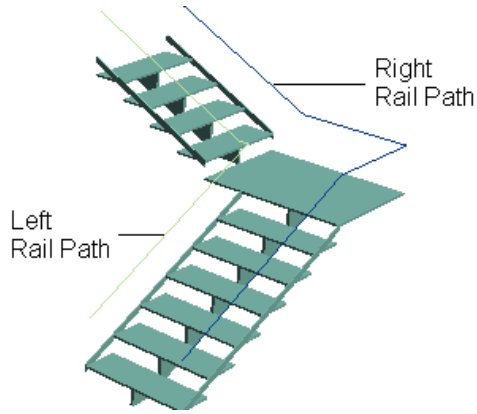

Figure 4-52 *The L-Type stairs with rail paths*

Rise Area

There are three spinners in this area. These spinners are controlled by choosing the buttons available on their left side. When you choose one of the buttons, the spinner on the right side of that button becomes inactive. You can modify only two spinners at a time. Enter a value in the **Overall** spinner to define the height of stairways. The **Riser Ht** spinner is used to set the height of the risers in the stairs. The **Riser Ct** spinner is used to set the number of risers in the stairs. The riser is the gap between the steps in a stairways.

Steps Area

Enter a value in the **Thickness** spinner to modify the thickness of the steps of the stairs. This spinner is activated only if the **Open** radio button is selected in the **Type** area. Select the check box on the left side of the **Depth** spinner; the **Depth** spinner will become active. Set a value in the **Depth** spinner to modify the depth of the steps of the stairs.

Carriage Rollout

To activate the options in this rollout, make sure the **Carriage** check box in the **Generate Geometry** area of the **Parameters** rollout is selected. In the **Parameters** area of the **Carriage** rollout, enter a value in the **Depth** spinner to set the depth of the carriage. Enter a value in the **Width** spinner to set the width of the carriage. Choose the **Carriage Spacing** button just below the **Width** spinner; the **Carriage Spacing** dialog box will be displayed. Select the **Count** check box, if it is not already selected. The value in the spinner on the right side of the **Count** check box specifies the number of carriages in the stairs. Set the required value and then choose the **Close** button to close the dialog box. The **Spring from Floor** check box in this rollout is used to control the starting point of the carriage from the floor.

Railings Rollout

To activate the options in this rollout, you need to select one of the **Handrail** check boxes in the **Generate Geometry** area of the **Parameters** rollout. Enter a value in the **Height** spinner to set the height of the railing from the steps of the stairs. The **Offset** spinner is used to set the offset of the railing from the ends of the steps. The value in the **Segments** spinner is used to set the number of segments in the railing. More the number of segments, smoother will be the railing. The value in the **Radius** spinner is used to set the radius of the railing.

Stringers Rollout

To activate the options in this rollout, you need to select the **Stringers** check box in the **Generate Geometry** area of the **Parameters** rollout. Enter a value in the **Depth** spinner to set the distance of the stringers from the floor. The value in the **Width** spinner is used to set the width of the stringers. The **Offset** spinner is used to set the distance of the stringers from the steps. The **Spring from Floor** check box is used to control the starting point of the stringers from the floor.

Creating Spiral Stairs

Menu bar:	Create > AEC Objects > Spiral Stair
Command Panel:	Create > Geometry > Stairs > Object Type rollout > Spiral Stair

The spiral stairs have a spiral shaped staircase. To create the spiral stairs, invoke the **Spiral Stair** tool from the **Object Type** rollout; the **Name and Color**, **Parameters**, **Carriage**, **Railings**, **Stringers**, and **Center Pole** rollouts will be displayed. To create the spiral stairs dynamically, activate the Top viewport. Next, click on a point in the viewport to specify the center of the spiral stair, hold the left mouse button, and drag downward to specify the radius and width. Release the left mouse button and move the cursor up or down to specify the overall rise in the height. Then, click on the screen; the spiral stairs will be created in all viewports. Different types of spiral stairs are shown in Figures 4-53, 4-54, and 4-55.

Figure 4-53 *The spiral stairs*

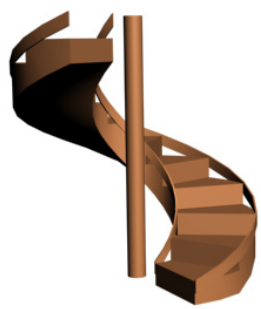

Figure 4-54 *The closed spiral stairs*

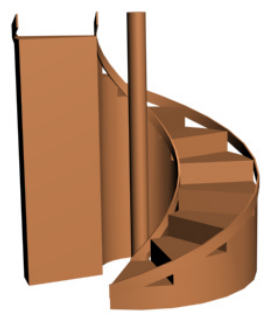

Figure 4-55 *The spiral box stairs*

Note

*The options in the **Carriage**, **Railings**, and **Stringers** rollouts are the same for the **Spiral**, **Straight**, and **UType** stairs as discussed in the L-type stairs.*

Parameters Rollout

In this rollout, the **Type**, **Rise**, and **Steps** areas are the same as discussed in the **LType Stair** tool. But, the **Generate Geometry** and **Layout** areas are different and these areas are discussed next.

Generate Geometry

The options in this area are used to modify the stairs by incorporating the geometry shapes. Select the **Stringers** check box to create the left and right supports for the steps of the stairs. Select the **Carriage** check box, if it is not already selected, to create support for the steps of the stairs. Select the **Center Pole** check box to create a pole at the center of the stairs, refer to Figure 4-53. Select the **Inside** and **Outside** check boxes in the **Handrail** area to create the handrails on both sides. The **Inside** and **Outside** check boxes in the **Rail Path** area are used to create a path on the left and right sides of the stairs.

Layout

The options in this area are used to modify the dimensions of the stairs. Select the **CCW** radio button, if it is not already selected, to rotate the stairs in the counterclockwise direction. Select the **CW** radio button to rotate the stairs in the clockwise direction. Enter a value in the **Radius** spinner to set the radius of the spiral stairs. Enter a value in the **Revs** spinner to set the number of revolutions of the stairs. The value in the **Width** spinner is used to set the width of the spiral stairs.

Center Pole Rollout

To activate the options in this rollout, you need to select the **Center Pole** check box in the **Generate Geometry** area of the **Parameters** rollout. In the **Parameters** area of the **Center Pole** rollout, set a value in the **Radius** spinner to set the radius of the center pole. Set the value in the **Segments** spinner to set the number of segments of the center pole. Select the check box on the left side of the **Height** spinner to activate it and set the value in this spinner to define the height of the pole.

Creating Straight Stairs

Menu bar:	Create > AEC Objects > Straight Stair
Command Panel:	Create > Geometry > Stairs > Object Type rollout > Straight Stair

The straight stairs have only one stairway. To create the straight stairs, activate the Top viewport and invoke the **Straight Stair** tool from the **Object Type** rollout; the **Name and Color**, **Parameters**, **Carriage**, **Railings**, and **Stringers** rollouts will be displayed.

Now, press and hold the left mouse button on the left side of the viewport, drag the cursor to the right side of the viewport to specify the length of the stairs, and release the left mouse button. Next, move the cursor up or down to define the width of the stairs and click on the screen to set the width. Next, move the cursor up or down to specify the height of the stairs. Click on the screen; the straight stairs will be created in all viewports, as shown in Figure 4-56. You can also create the closed and box straight stairs in the same way as described in the L-type stairs, refer to Figures 4-57 and 4-58.

Parameters Rollout

In this rollout, all areas are same as discussed in the **LType Stair** tool, except the **Layout** area and this area is discussed next.

Figure 4-56 *The straight stairs*

Figure 4-57 *The straight closed stairs*

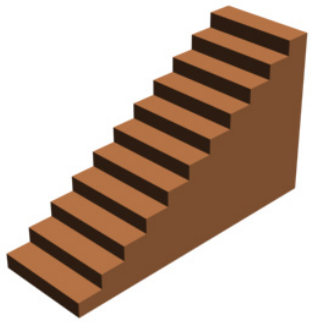

Figure 4-58 *The straight box stairs*

Layout Area

The options in this area are used to modify the dimensions of the stairs. The value in the **Length** spinner is used to set the length and the value in the **Width** spinner is used to set the width of the stairs.

Creating U-Type Stairs

Menu bar:	Create > AEC Objects > U-Type Stair
Command Panel:	Create > Geometry > Stairs > Object Type rollout > UTypeStair

The U-type stairs have two stairways parallel to each other in U shape. To create the U-type stairs, activate the Top viewport and invoke the **UType Stair** tool from the **Object Type** rollout; the **Name and Color**, **Parameters**, **Carriage**, **Railings**, and **Stringers** rollouts will be displayed.

Next, press and hold the left mouse button on the left side of the viewport, drag the cursor to the right side to specify the length of the stairs, and release the left mouse button. Now, move the cursor up to define the width of the stairs and the distance between the two stairways. Click on the screen to set the width. Next, move the cursor up or down to specify the rise of the stairs. Click on the screen; the U-type stairs will be created in all viewports. Different U-type stairs are shown in Figures 4-59, 4-60, and 4-61.

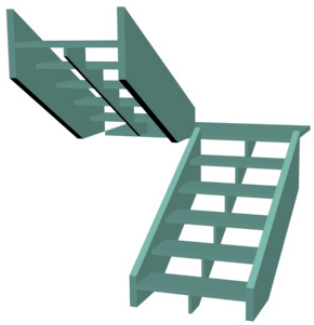

Figure 4-59 *The U-type stairs*

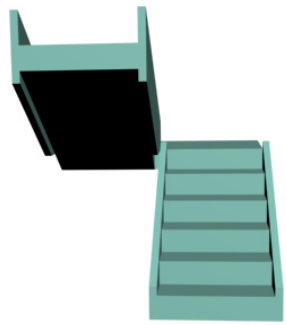

Figure 4-60 *The U-type closed stairs*

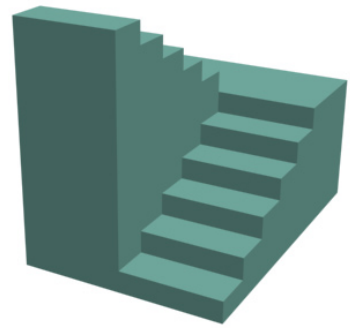

Figure 4-61 *The U-type box stairs*

CREATING PATCH GRIDS

The patch grids are 2D objects that are used to create 3D surfaces. To invoke the tools for creating the 3D surfaces, choose **Create > Geometry** in the **Command Panel**; the **Standard Primitives** option will be displayed in the drop-down list. Now, select the **Patch Grids** option from the drop-down list; the **Quad Patch** and **Tri Patch** tools will be displayed in the **Object Type** rollout. In this section, you will learn to create the path grids using these tools.

Creating a Quad Patch

Menu bar:	Create > Patch Grids > Quad Patch
Command Panel:	Create > Geometry > Patch Grids > Object Type rollout > Quad Patch

You can create a quad patch using the **Quad Patch** tool. It has 36 visible rectangular faces. Each rectangular face is divided into two triangular faces, therefore, in all it has 72 triangular faces. To create a quad patch, activate the Top viewport and invoke the **Quad Patch** tool from the **Object Type** rollout; the **Name and Color**, **Keyboard Entry**, and **Parameters** rollouts will be displayed, as shown in Figure 4-62.

Creating the Quad Patch Dynamically

To create the quad patch dynamically, press and hold the left mouse button on the upper left side of the Top viewport and drag the cursor to the lower right side of the viewport to specify the length and width of the patch. Release the left mouse button; the quad patch will be created in all viewports, refer to Figures 4-63 and 4-64.

Note

*The **Keyboard Entry** rollout is used to create the quad patch and tri patch by entering the parameters using the keyboard. The method of creating these patch grids using this rollout is the same as discussed earlier.*

To view the faces in the quad patch or the tri patch, you need to convert them into editable mesh about which you will learn in the later chapters.

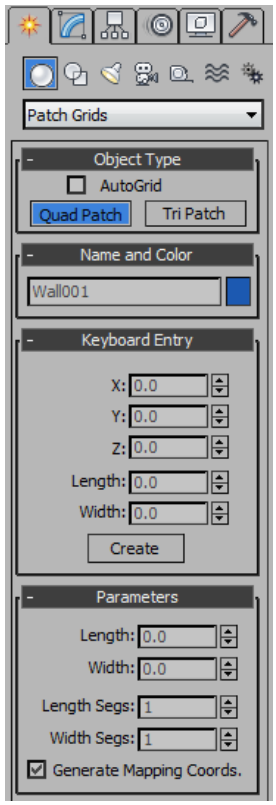

Figure 4-62 *Various rollouts to create a quad patch*

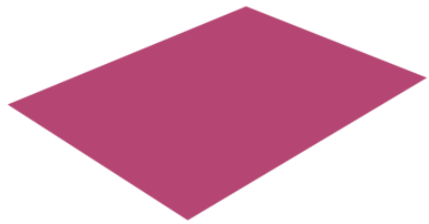

Figure 4-63 *The quad patch*

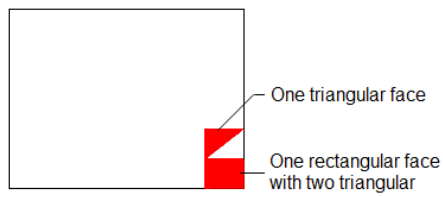

Figure 4-64 *The quad patch with rectangular and triangular faces in the Top viewport*

The **Parameters** rollout is used to modify the quad patch is discussed next.

Parameters Rollout

This rollout is used to modify the quad patch. To do so, select the quad patch and choose the **Modify** tab in the **Command Panel**; the **Parameters** rollout will be displayed. Set the new values in the **Length** and **Width** spinners to modify the length and width. Similarly, enter a value in the **Length Segs** spinner to specify the number of segments along the length of the patch. And, enter a value in the **Width Segs** spinner to specify the number of segments along the width of the patch.

Note

*The value 1 in the **Length Segs** and **Width Segs** spinners specifies 36 rectangular faces in a quad patch. If you increase the number of segments, then the number of faces will also be increased accordingly.*

Creating a Tri Patch

Menu bar:	Create > Patch Grids > Tri Patch
Command Panel:	Create > Geometry > Patch Grids > Object Type rollout > Tri Patch

The object created using the **Tri Patch** tool is very similar to the object created using the **Quad Patch** tool. It also has 72 visible triangular faces. To create a tri patch, activate the Top viewport and invoke the **Tri Patch** tool from the **Object Type** rollout; the **Name and Color**, **Keyboard Entry**, and **Parameters** rollouts will be displayed, as shown in Figure 4-65.

Next, press and hold the left mouse button on the upper left side of the viewport, drag the cursor to the lower right side of the viewport to specify the length and width of the patch, and release the left mouse button; the tri patch will be created in all viewports, refer to Figures 4-66 and 4-67.

The **Parameters** rollout is used to modify the tri patch is discussed next.

Parameters Rollout

This rollout is used to modify the tri patch. To do so, select the tri patch and choose the **Modify** tab in the **Command Panel**; the **Parameters** rollout will be displayed. Set the new values in the **Length** and **Width** spinners to modify the length and width of the tri patch, respectively.

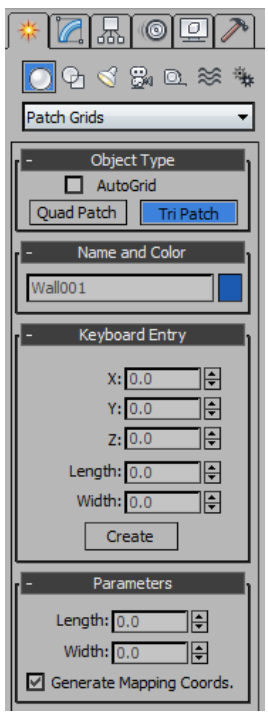

Figure 4-65 *Various rollouts to create a tri patch*

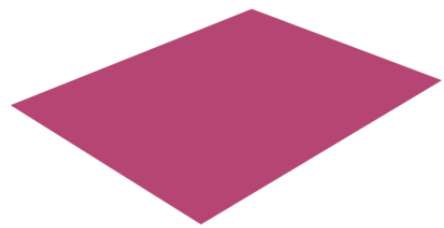

Figure 4-66 *The tri patch*

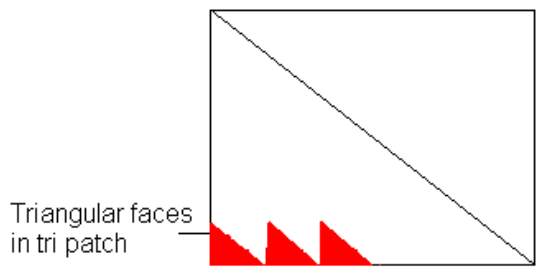

Figure 4-67 *The tri patch with triangular faces in the Top viewport*

Note

You cannot increase the number of segments in a tri patch.

Tutorial 1

In this tutorial, you will create a nature scene, as shown in Figure 4-68, using the AEC extended objects and the standard primitives. **(Expected time: 15 min)**

The following steps are required to complete this tutorial:

a. Set the project folder.
b. Create the floor.
c. Create railings.
d. Create trees.
e. Change the background color at rendering.
f. Render the scene for the final output.
g. Save the file.

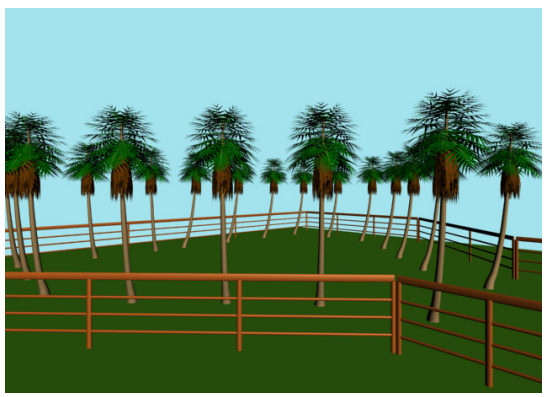

Figure 4-68 *Model for Tutorial 1*

Setting the Project Folder

Before starting a new file, it is recommended that you set the project folder.

1. Set the project folder with the name *c04_tut1* in the *3dsmax* folder as discussed in Tutorial 1 of Chapter 2.

Creating the Floor

Start Autodesk 3ds Max and reset it as discussed in the earlier chapters; a new screen with default settings is displayed. Next, you need to use the **Plane** tool from **Standard Primitives** to create the floor of the scene.

1. Activate the Top viewport. Choose **Create > Geometry** in the **Command Panel**; the **Standard Primitives** option is displayed in the drop-down list. Invoke the **Plane** tool from the **Object Type** rollout.

2. In the **Keyboard Entry** rollout, set the values as given below:

   Length: **1485.0** Width: **1605.15**

3. Choose the **Create** button in the **Keyboard Entry** rollout; a plane is displayed in all viewports. Now, invoke the **Zoom Extents All** tool or press the Z key to display the entire plane in the viewports.

4. In the **Name and Color** rollout, enter **floor** and press ENTER; the plane is named as *floor*.

5. Use the color swatch to modify the color of the *floor* to green.

6. Activate the Perspective viewport and set the view using the **Zoom** and **Orbit** tools, as shown in Figure 4-69.

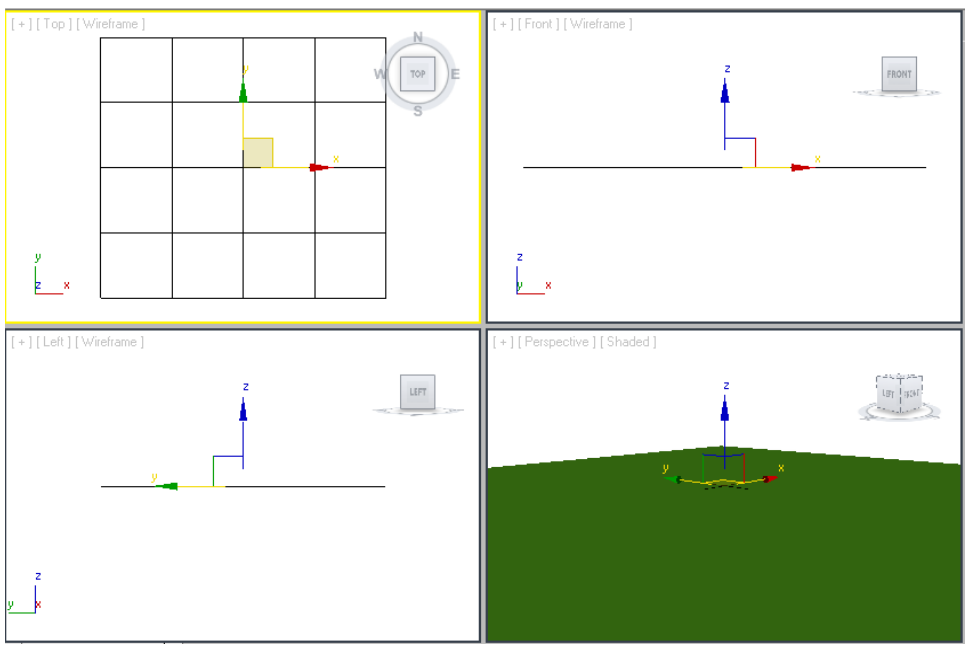

Figure 4-69 *The floor after using the* ***Zoom*** *and* ***Orbit*** *tools*

Creating Railings

You need to use the **Railing** tool from **AEC Extended** to create railings around the *floor*.

1. Choose **Create > Geometry** in the **Command Panel**; a drop-down list is displayed below the **Geometry** button. Select the **AEC Extended** option from the drop-down list and then invoke the **Railing** tool from the **Object Type** rollout.

2. Activate the Top viewport and invoke the **Maximize Viewport Toggle** tool or press the ALT+W keys to maximize the Top viewport.

3. Move the cursor to the upper left corner of the *floor*, press and hold the left mouse button, and drag the cursor to the upper right corner of the *floor* to specify the length of the railing. Release the left mouse button to set the length, and then move the cursor up to specify the height of the railing. Click on the screen; a railing is created. Next, invoke the **Maximize Viewport Toggle** tool; the railing is displayed in all viewports.

4. In the **Name and Color** rollout, enter **railing01** and press ENTER.

5. Use the color swatch to modify the color of the *railing01* and enter the values given below:

   Red: **177** Green: **88** Blue: **26**

6. Make sure the *railing01* is still selected. Choose the **Modify** tab in the **Command Panel**; the **Railing**, **Posts**, and **Fencing** rollouts are displayed.

7. In the **Railing** rollout, set the values as given below:

   Length: **1400.0**

   Top Rail area
   Profile: **Round** Depth: **10.0**
   Width: **3.0** Height: **100.0**

   Lower Rail(s) area
   Profile: **Round** Depth: **4.0**
   Width: **3.0**

8. Choose the **Lower Rail Spacing** button in the **Lower Rail(s)** area; the **Lower Rail Spacing** dialog box is displayed. Make sure the **Count** check box is selected. Next, set the value **3** in the spinner on the right side of the **Count** check box and choose the **Close** button; the railing is displayed in all viewports, as shown in Figure 4-70.

9. In the **Posts** rollout, set the values as given below:

   Profile: **Round** Depth: **7.0**
   Width: **5.0** Extension: **2.0**

10. Choose the **Post Spacing** button in the **Post** rollout; the **Post Spacing** dialog box is displayed. Make sure the **Count** check box is selected. Then, set the value **4** in the spinner on the right side of the **Count** check box and choose the **Close** button.

11. In the **Fencing** rollout, select **(none)** from the **Type** drop-down list.

Note

*If you want to add fencing in the railing, then select the type of fencing from the **Type** drop-down list and set the parameters in the respective area.*

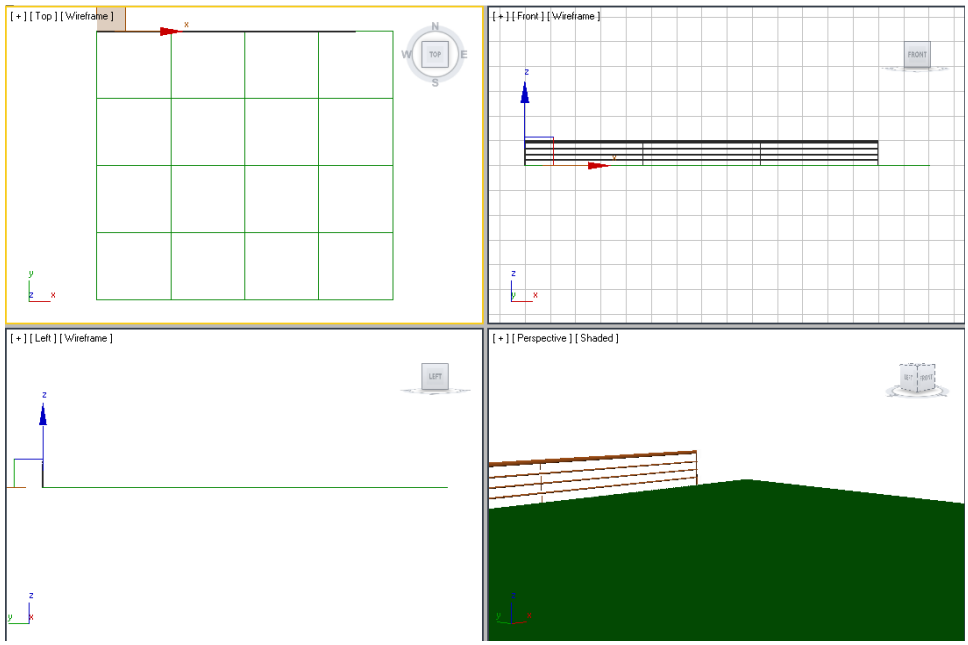

Figure 4-70 *The railing01 displayed in all viewports*

12. Make sure the *railing01* is selected in the Top viewport. Now, invoke the **Select and Move** tool from the **Main Toolbar** and align the railing manually, as shown in Figure 4-71.

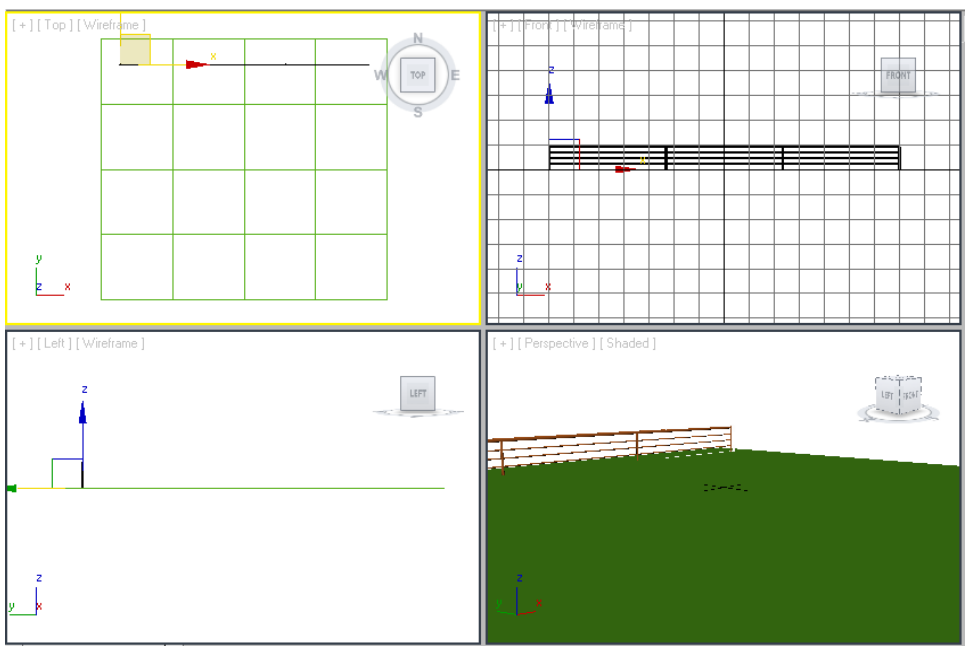

Figure 4-71 *The railing01 in all viewports after aligning it in the Top viewport*

Next, you need to create one more railing.

13. Activate the Top viewport and invoke the **Railing** tool. Create one more railing at the right angle of the *railing01* using the same method as discussed for creating the *railing01*, refer to Figure 4-72.

Note

*When you create another railing, all dimensions of the railing01, except the **Length** and **Height**, will be taken automatically.*

14. In the **Name and Color** rollout, enter **railing02** and press ENTER.

15. Assign the same color to the *railing02* as was assigned to the *railing01*.

16. Make sure the *railing02* is selected. Next, choose the **Modify** tab in the **Command Panel**; the **Railing**, **Post**, and **Fencing** rollouts are displayed.

17. In the **Railing** rollout, set the values as given next:

Length: **600.0**

Top Rail area
Height: **100.0**

18. Invoke the **Select and Move** and **Select and Rotate** tools and align the *railing02* in all viewports, as shown in Figure 4-72.

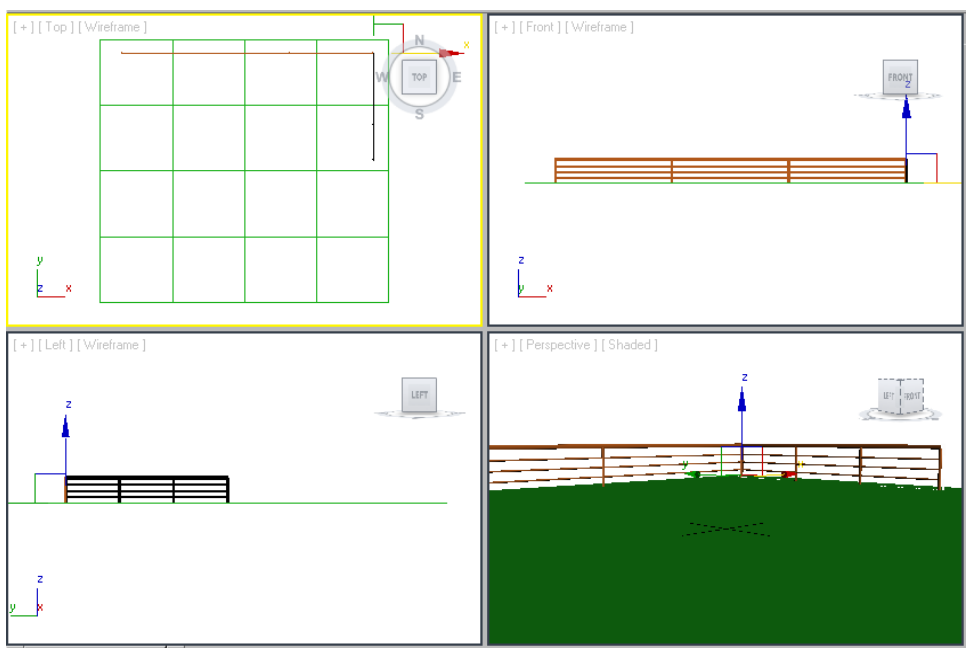

Figure 4-72 *The railing02 in all viewports after alignment*

Next, you need to create another railing.

19. Invoke the **Railing** tool and activate the Top viewport. Create another railing starting from the endpoint of *railing02* using the same method as discussed earlier.

20. In the **Name and Color** rollout, enter **railing03** and press ENTER; the railing is named as *railing03*.

21. Assign the same color to the *railing03* as was assigned to the *railing01*.

22. Make sure the *railing03* is selected. Choose the **Modify** tab in the **Command Panel**; the **Railing**, **Posts**, and **Fencing** rollouts are displayed.

23. In the **Railing** rollout, set the values as given below:

    Length: **600.0**
    Top Rail area
    Height: **100.0**

24. Invoke the **Select and Move** tool and make sure the *railing03* is aligned in all viewports, as shown in Figure 4-73.

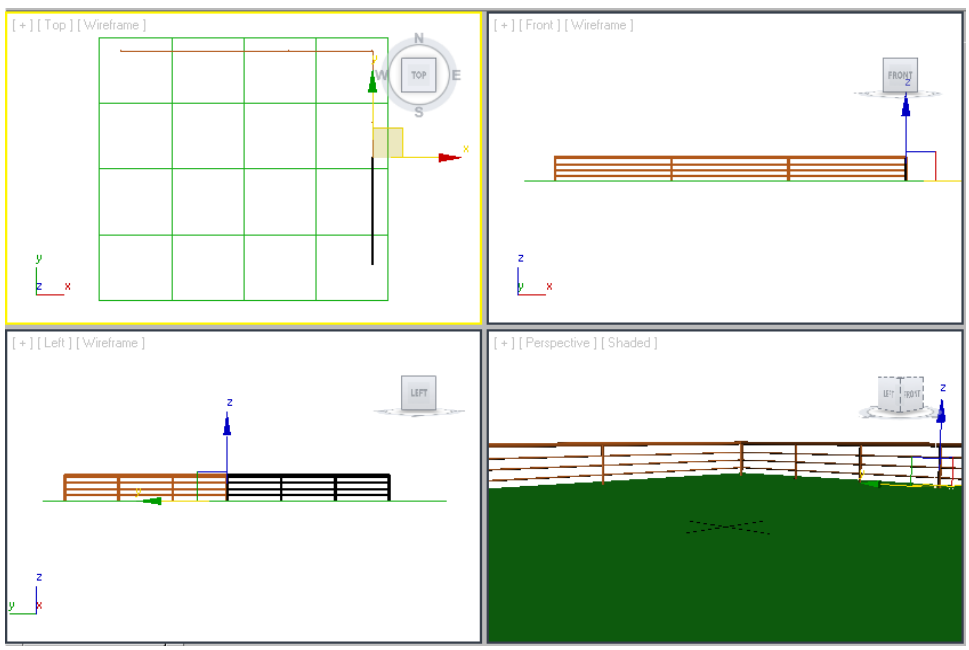

Figure 4-73 *The railing03 starting from the endpoint of railing02 after alignment*

25. Activate the Top viewport and select the *railing03*. Invoke the **Select and Rotate** tool, move the cursor over the Z-axis and rotate it to -45 degrees in the clockwise direction, as shown in Figure 4-74.

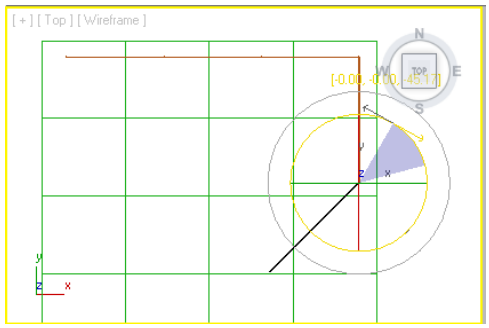

Figure 4-74 *The railing03 rotated in the Top viewport*

Note

While rotating the railing03, invoke the ***Angle Snap Toggle*** *tool from the* ***Main Toolbar*** *to measure the angle of rotation in increments.*

Now, you need to create the fourth railing.

26. Activate the Top viewport and create another railing starting from the endpoint of *railing03*.

27. In the **Name and Color** rollout, enter **railing04** and press ENTER.

28. Assign the same color to the *railing04* as was assigned to the *railing01*.

29. Make sure the *railing04* is selected. Choose the **Modify** tab in the **Command Panel**; the **Railing**, **Post**, and **Fencing** rollouts are displayed.

30. In the **Railing** rollout, set the values as given below:

    Length: **310.0**

    Top Rail area
    Height: **100.0**

31. Make sure the *railing04* is aligned in all viewports, as shown in Figure 4-75.

32. Next, invoke the **Select By Name** tool; the **Select From Scene** dialog box is displayed. Now, select the *railing02*, *railing03*, and *railing04* and choose the **OK** button; the railings are selected in the viewports.

33. Invoke the **Mirror** tool from the **Main Toolbar**; the **Mirror: Screen Coordinates** dialog box is displayed. In the **Mirror Axis** area of this dialog box, select the **X** radio button. In the **Offset** spinner, set the value **-990**. In the **Clone Selection** area, select the **Copy** radio button and choose the **OK** button; one copy of all railings created earlier is displayed and they are automatically named as *railing005*, *railing006*, and *railing007*, refer to Figure 4-76.

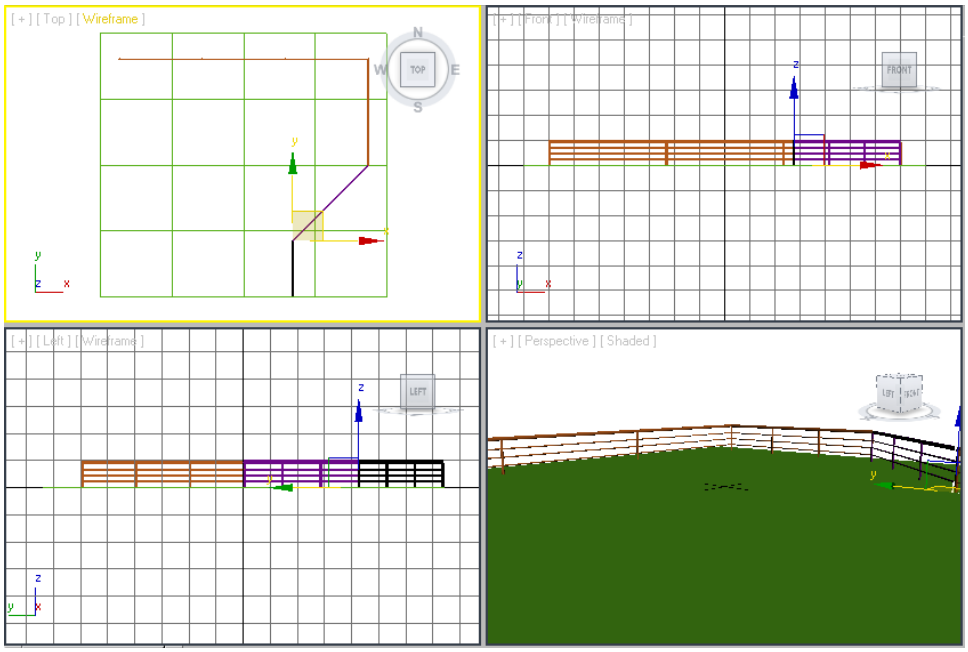

Figure 4-75 *The railing04 created from the endpoint of railing03 and aligned in all viewports*

34. Adjust the view in the Perspective viewport using the tools in the viewport navigation controls, refer to Figure 4-76.

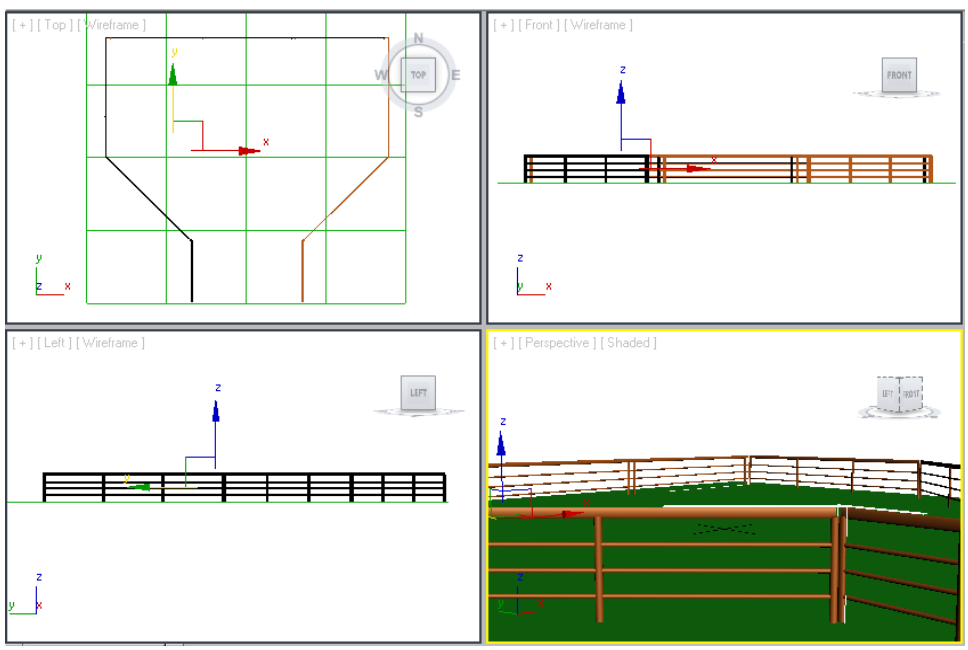

Figure 4-76 *The railings displayed in all viewports*

Creating Trees

Next, you need to use the **Foliage** tool from **AEC Extended** to create the trees.

1. Choose **Create > Geometry** in the **Command Panel**; a drop-down list is displayed below the **Geometry** button. Select the **AEC Extended** option from the drop-down list and then invoke the **Foliage** tool from the **Object Type** rollout.

2. Activate the Top viewport. In the **Favorite Plants** rollout, select the **Generic Palm** tree and double-click on it; the tree is created and displayed in all viewports.

Note

*If the **Generic Palm** tree is not displayed in the palette of the **Favorite Plants** rollout, then choose the **Plant Library** button on the bottom of the rollout; the **Configure Palette** dialog box is displayed. Select the **Generic Palm** tree and double-click on it; the **yes** option is displayed in the **Fav.** row indicating that the tree will be available in the palette. Next, choose the **OK** button.*

3. In the **Name and Color** rollout, enter **tree01** and press ENTER; the tree is named as *tree01*.

4. Make sure the *tree01* is still selected. Choose the **Modify** tab in the **Command Panel**; the **Parameters** rollout is displayed.

5. In the **Parameters** rollout, set the following parameters:

   Height: **300.0**

   Use the default values for other options.

6. In the Top viewport, invoke the **Select and Move** tool and move the *tree01* toward the *railing01* in all viewports, as shown in Figure 4-77.

7. Next, create multiple copies of the *tree01* in the Top viewport and align them using the **Select and Move** tool, as shown in Figure 4-78.

Changing the Background Color in the Final Output

1. Change the background color to light blue for the final output as discussed in Tutorial 1 of Chapter 2, using the following parameters:

   Red: **145** Green: **241** Blue: **244**

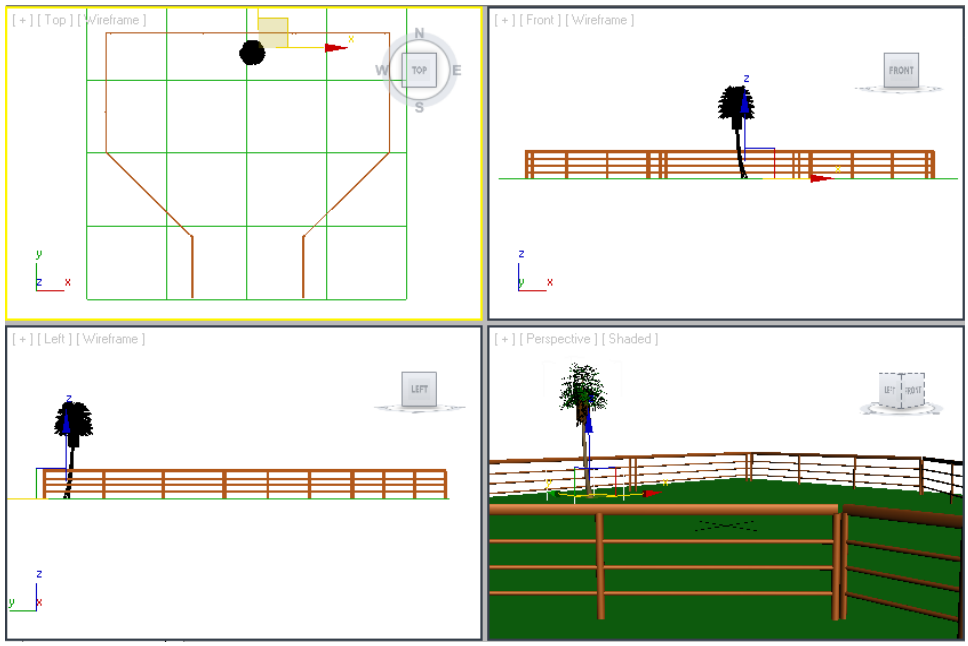

Figure 4-77 *Alignment of the tree01 in all viewports*

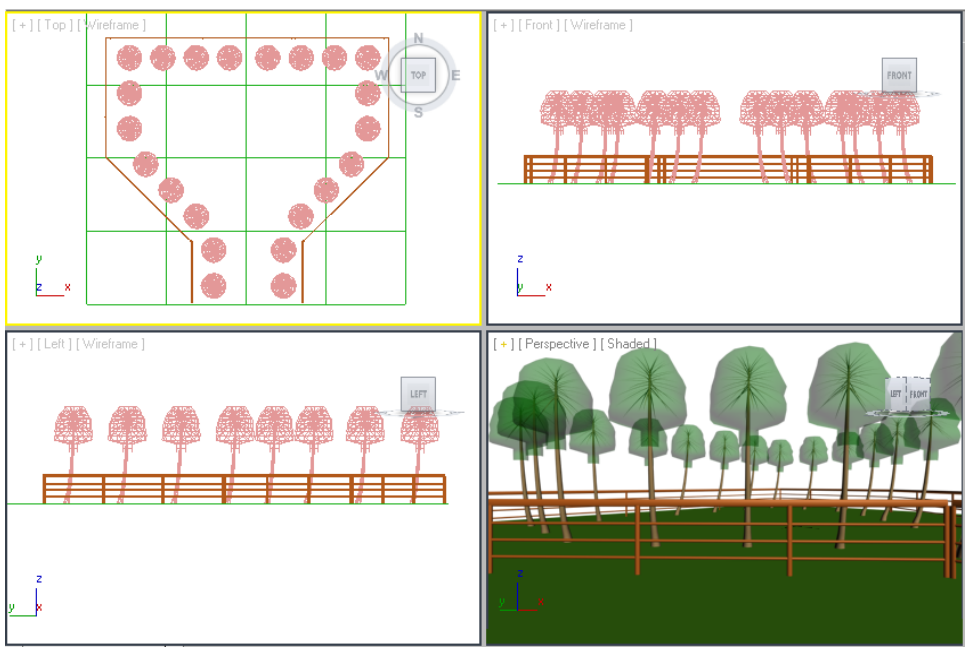

Figure 4-78 *Multiple copies of tree01 created and aligned in all viewports*

Rendering the Scene for the Final Output

1. Activate the Perspective viewport.

2. Invoke the **Render Production** tool from the **Main Toolbar**; the **Perspective, frame 0, Display Gamma:2.2, RGBA Color16 Bits/Channel (1:1)** dialog box is displayed, showing the final output of the scene at one frame, refer to Figure 4-79.

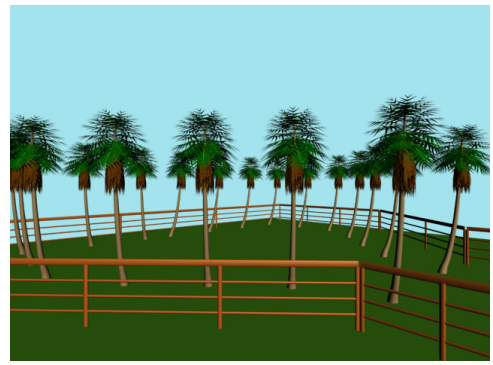

Figure 4-79 *The final output at rendering*

3. Close this window.

You can view the final rendered image of this model by downloading the file *c04_3dsmax_2012_render.zip* from *http://www.cadcim.com*. The path of the file is as follows:

Textbooks > Animation and Visual Effects > 3ds Max > Autodesk 3ds Max 2012: A Comprehensive Guide

Saving the File

1. Save the file with the name *c04tut1.max* as discussed in earlier chapters. The location of this file is given below:

\Documents\3dsmax\c04_tut1\scenes

Tutorial 2

In this tutorial, you will create a scene, as shown in Figure 4-80, using the AEC extended objects and the standard primitives. **(Expected time: 15 min)**

Figure 4-80 *Model for Tutorial 2*

The following steps are required to complete this tutorial:

a. Set the project folder.
b. Create the floor.
c. Create railings.
d. Create the room.
e. Create the window.
f. Create the door.
g. Create trees.
h. Change the background color at rendering.
i. Render the scene for the final output.
j. Save the file.

Setting the Project Folder

Before starting a new file, it is recommended that you set the project folder.

1. Set the project folder with the name *c04_tut2* in the *3dsmax* folder as discussed in Tutorial 1 of Chapter 2.

Creating the Floor

Start Autodesk 3ds Max and reset it as described earlier; a new screen with default settings is displayed. Next, you need to use the **Plane** tool from **Standard Primitives** to create the floor of the scene.

1. Activate the Top viewport and choose **Create > Geometry** in the **Command Panel**; the **Standard Primitives** option is displayed in the drop-down list. Invoke the **Plane** tool from the **Object Type** rollout.

2. In the **Keyboard Entry** rollout, set the values as given below:

   Length: **1100.0** Width: **1200.0**

3. Choose the **Create** button from the **Keyboard Entry** rollout; a plane is created in all viewports. Invoke the **Zoom Extents All** tool to display the entire plane in all viewports.

4. In the **Name and Color** rollout, enter **floor** and press ENTER; the plane is named as *floor*.

5. Modify the color of the floor by entering the values as given below:

   Red: **61** Green: **135** Blue: **6**

6. Activate the Perspective viewport and press the G key to hide grids in it. Also, set the view using the **Zoom** and **Orbit** tools, as shown in Figure 4-81.

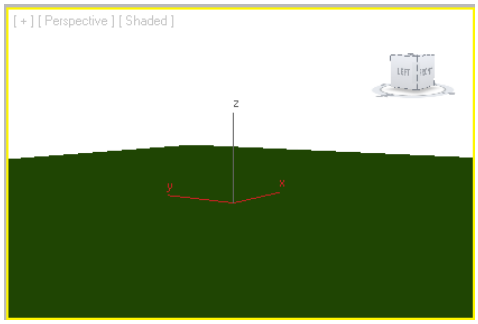

Figure 4-81 *The floor in the Perspective viewport*

Creating Railings

Next, you need to use the **Railing** tool from **AEC Extended** to create railings around the *floor*.

1. Activate the Top viewport and create a railing starting from the upper left corner of the *floor* to its upper right corner.

2. In the **Name and Color** rollout, enter **railing01** and press ENTER.

3. Use the color swatch and change the color of the *railing01* by entering the values as given below:

   Red: **177** Green: **88** Blue: **27**

4. Make sure the *railing01* is still selected. Choose the **Modify** tab in the **Command Panel**; the **Railing**, **Post**, and **Fencing** rollouts are displayed.

5. In the **Railing** rollout, set the values as given below:

   Length: **1200.0**

   Top Rail area
   Profile: **Round** Depth: **15.0**
   Width: **13.0** Height: **100.0**

   Lower Rail(s) area
   Profile: **Round** Depth: **7.0** Width: **7.0**

6. Choose the **Lower Rail Spacing** button in the **Lower Rail(s)** area; the **Lower Rail Spacing** dialog box is displayed. Select the **Count** check box and set the value **3** in the spinner on the right side of the **Count** check box and choose the **Close** button.

7. In the **Posts** rollout, set the values as follows:

   Profile: **Round** Depth: **10.0**
   Width: **5.0** Extension: **0.0**

   Choose the **Post Spacing** button in the **Post** rollout; the **Post Spacing** dialog box is displayed. Select the **Count** check box and set **5** in the spinner on the right of the **Count** check box and choose the **Close** button.

8. In the **Fencing** rollout, set the following parameter:

   Type: **(none)**

9. Invoke the **Select and Move** tool and align the *railing01* in all viewports, as shown in Figure 4-82.

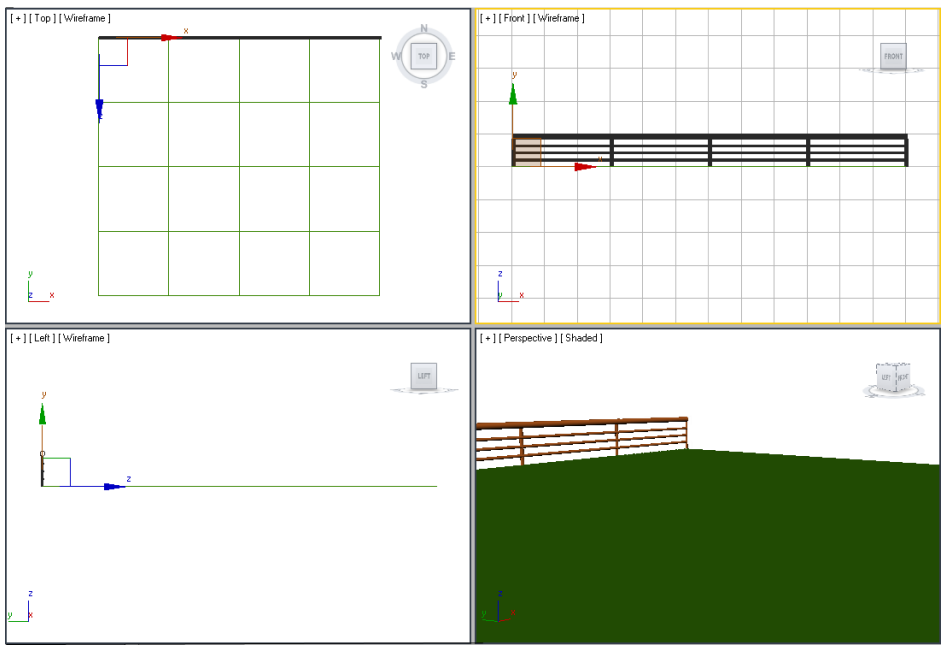

Figure 4-82 *The railing01 in all viewports after alignment*

10. Next, create the other railings to surround the *floor* using the same dimensions except for the length. Also, activate the Perspective viewport and set the view using the **Pan**, **Zoom**, and **Orbit** tools, as shown in Figure 4-83.

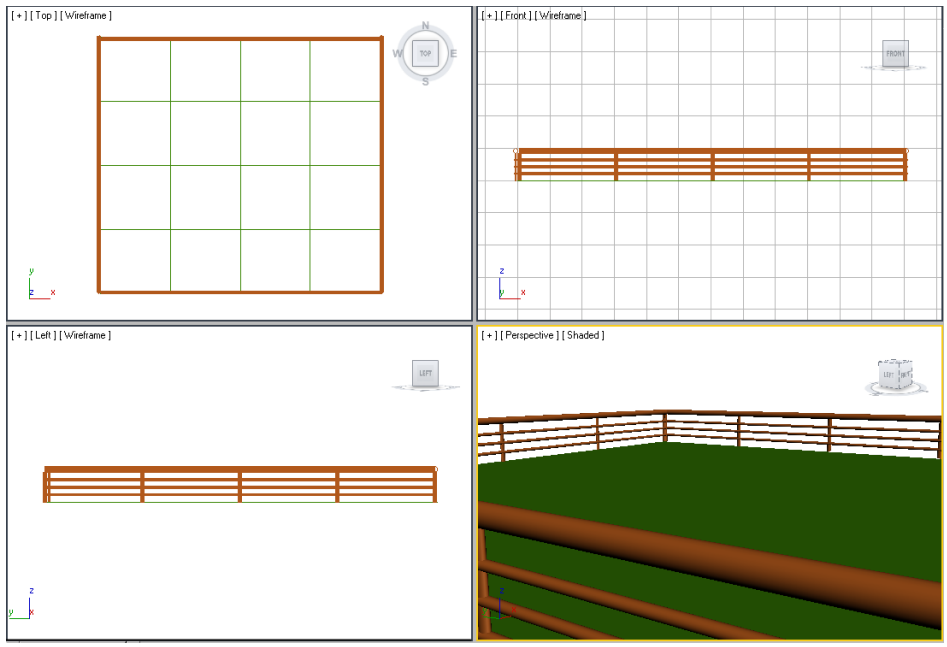

Figure 4-83 *The railings displayed in all viewports*

Creating the Room

You need to use the **Wall** tool from **AEC Extended** to create the walls of the room.

1. Activate the Top viewport. Choose **Create > Geometry** in the **Command Panel**; a drop-down list is displayed below the **Geometry** button. Select the **AEC Extended** option from the drop-down list and then invoke the **Wall** tool from the **Object Type** rollout.

2. In the **Parameters** rollout of the wall, set the values as given below:

   Width: **5.0** Height: **230.0**

3. Next, click on the upper left side of the Top viewport to specify the starting point of the wall, drag the cursor on the right side to define the length, and then click on the screen; a wall segment is created. Then, create another segment of the wall in continuation at the right angle of the first segment. Repeat the same procedure to create the wall in a rectangular shape, refer to Figure 4-84. Now, click on the starting point of the first wall segment; the **Weld Point?** message box is displayed. Choose the **Yes** button to weld the end points of the wall. Next, right-click to end the creation of the wall.

Note

You can modify the wall using the tools in the ***Select and Scale*** *flyout in the* ***Main Toolbar****.*

4. In the **Name and Color** rollout, enter **wall** and press the ENTER key.

5. Use the color swatch and change the color of the *wall* by entering the values given below:

   Red: **248** Green: **231** Blue: **120**

6. Invoke the **Select and Move** tool and align the *wall* in all viewports, as shown in Figure 4-84.

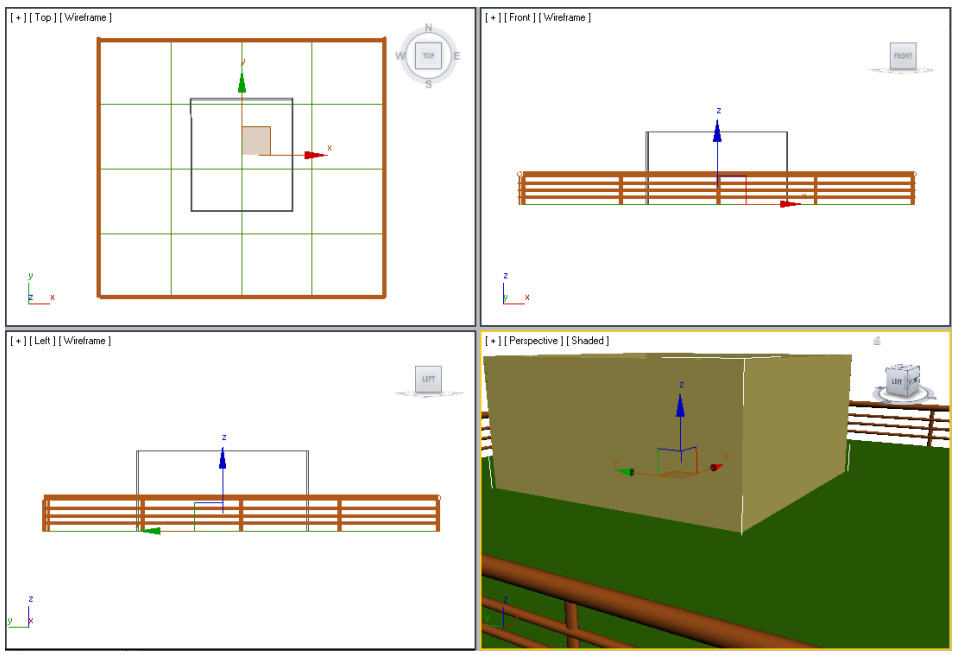

Figure 4-84 *The wall displayed in all viewports*

7. Next, select **Standard Primitives** from the drop-down list below the **Geometry** button. Invoke the **Box** tool from the **Object Type** rollout to create the roof of the *wall*.

8. Activate the Top viewport and create a box.

9. In the **Name and Color** rollout, enter **roof** and press the ENTER key.

10. Change the color of the *roof* by entering the values as given below:

    Red: **143** Green: **225** Blue: **87**

11. In the **Parameters** rollout, set the values in the **Length** and **Width** spinners to cover the upper portion of the wall, refer to Figure 4-85. Set the value **5.0** in the **Height** spinner.

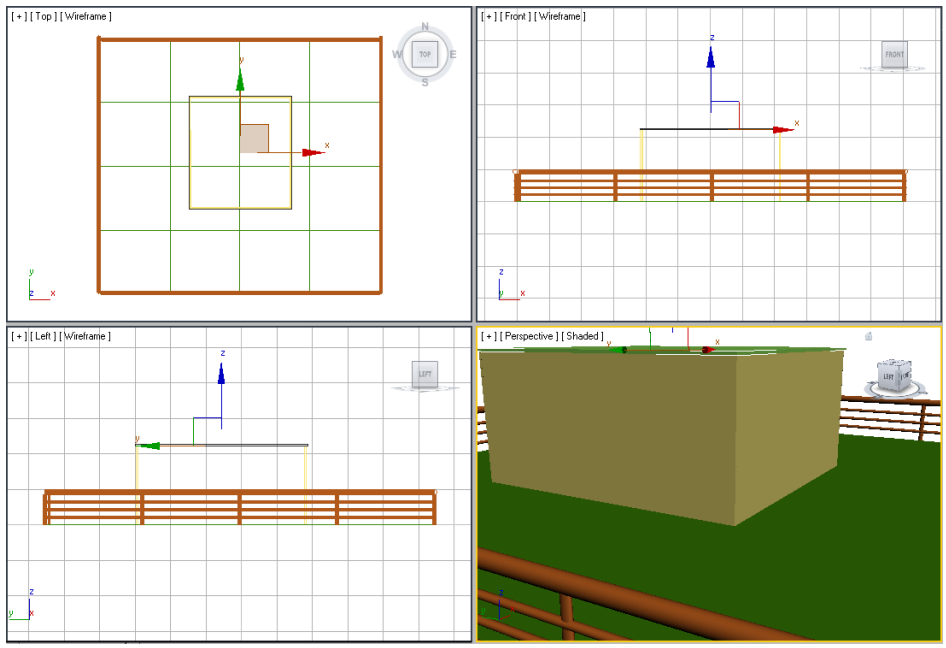

Figure 4-85 *The roof of the wall in all viewports after alignment*

12. Invoke the **Select and Move** tool and align the *roof* at the top of the wall in all viewports, refer to Figure 4-85.

13. Activate the Front viewport and make sure the *roof* is selected.

14. Invoke the **Mirror** tool from the **Main Toolbar**; the **Mirror: Screen Coordinates** dialog box is displayed. In the **Mirror Axis** area of this dialog box, select the **Y** radio button. In the **Offset** spinner, set the value **0**. In the **Clone Selection** area, select the **Copy** radio button and choose the **OK** button; the *roof001* is displayed at the top of the *roof*.

15. In the **Name and Color** rollout, modify the name as *roof fencing*.

16. Use the color swatch to change the color of the *roof fencing* by entering the values as given below:

    Red: **243** Green: **93** Blue: **47**

    Make sure the *roof fencing* is still selected.

17. Invoke the **Select and Uniform Scale** tool from the **Main Toolbar** and right-click on it; the **Scale Transform Type-In** dialog box is displayed. Now, in the **Offset: Screen** area, set the value **105** and press ENTER; the *roof fencing* is scaled, as shown in Figure 4-86. Close this dialog box.

    Next, you need to create fencing for the corners of the *wall*.

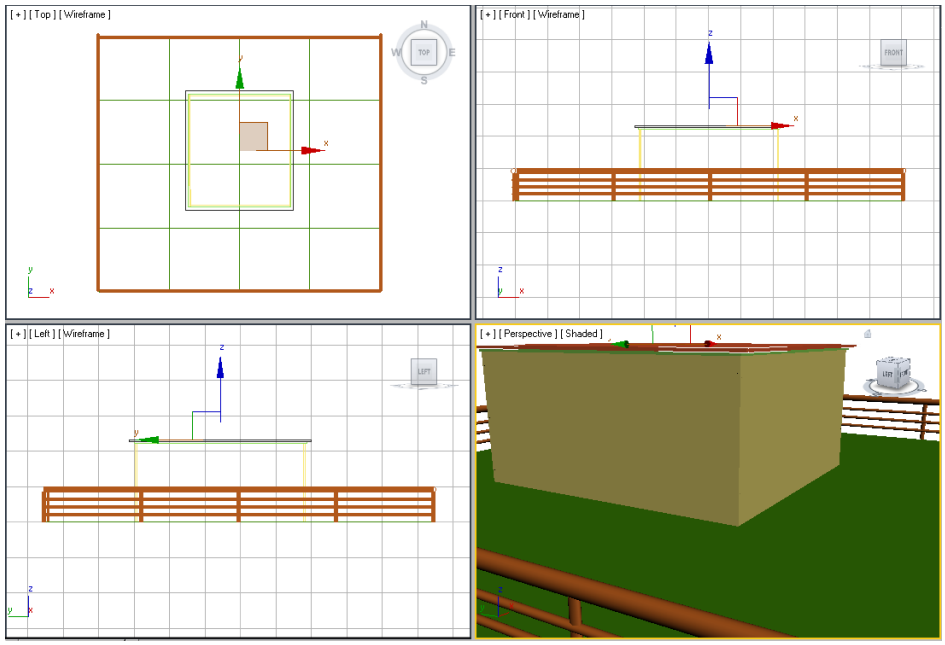

Figure 4-86 *The roof fencing after scaling in the Front viewport*

18. Activate the Top viewport and invoke the **Box** tool. In the **Keyboard Entry** rollout, set the values as given below:

X: **-300** Length: **6.0** Width: **1.0** Height: **290.207**

Note
You may need to adjust the height of the box, if you have modified the size of the wall earlier.

19. Next, choose the **Create** button; a box is displayed in all viewports.

20. In the **Name and Color** rollout, enter **fc01** and press ENTER; the box is named as *fc01*.

21. Assign the same color to the *fc01* that was assigned to the *roof fencing*.

22. Invoke the **Maximize Viewport Toggle** tool to maximize the Top viewport.

23. Invoke the **Zoom Region** tool and drag a selection box around the *roof fencing* and the lower left corner of the wall to zoom in the selected portion of the Top viewport. Next, invoke the **Select and Move** tool and align the *fc01* with the *wall*, as shown in Figure 4-87.

24. Next, make sure the *fc01* is selected in the Top viewport and invoke the **Select and Rotate** tool. Now, press and hold the SHIFT key, move the cursor over the Z-axis, and rotate it until the value in the **Z** spinner in the coordinate display becomes **90**; the copy of *fc01* gets rotated and it is automatically named as *fc002*.

25. Invoke the **Select and Move** tool and align the *fc002* with the *wall*, as shown in Figure 4-88.

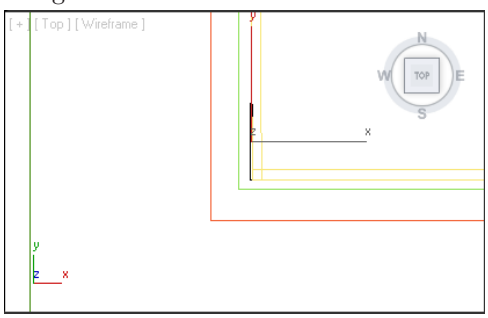

Figure 4-87 *The fc01 in the Top viewport after alignment*

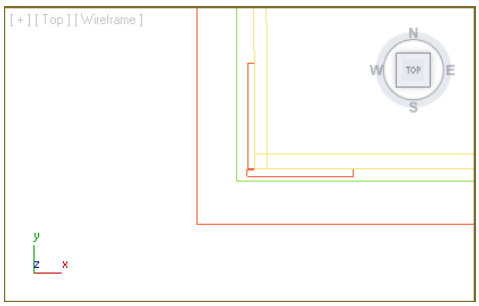

Figure 4-88 *The fc002 in the Top viewport after alignment*

26. Next, select *fc01* and *fc002* simultaneously by holding the CTRL key and group them as *fencing01*.

27. Select the *fencing01* and create three copies of it. The copies are automatically named as *fencing002*, *fencing003*, and *fencing004*. Now, align them at the corners of the *wall* using the **Select and Rotate** and **Select and Move** tools, refer to Figure 4-89. Also, you can use the **Zoom** tool to view the corners of the *wall*.

28. Next, invoke the **Maximize Viewport Toggle** tool to view the four viewports, as shown in Figure 4-89.

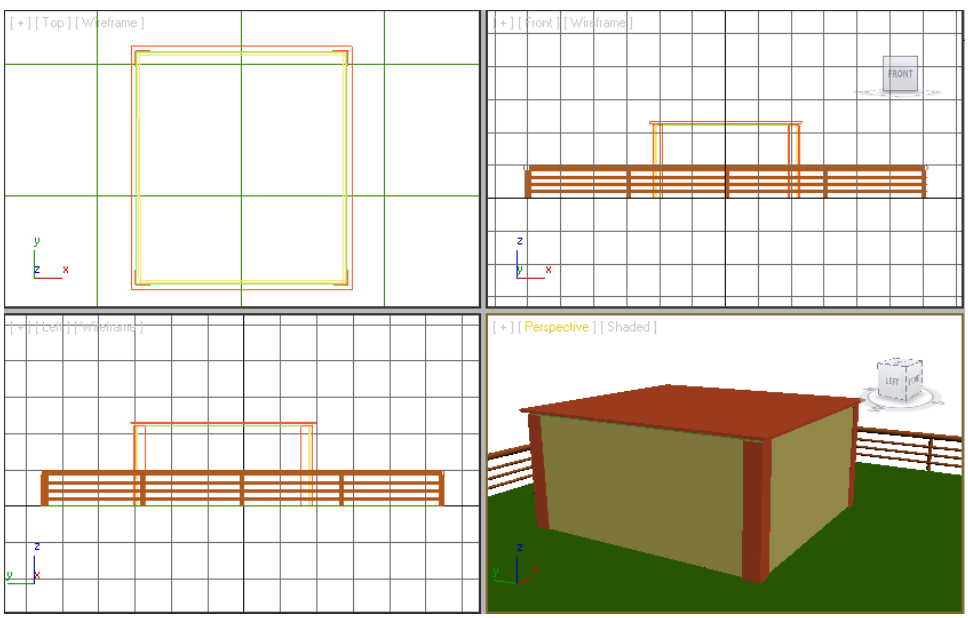

Figure 4-89 *The fencing at the four corners of the wall in all viewports*

Note

*You can also use the **Mirror** tool to create copies of fencing01.*

Creating the Window

You need to use the **Awning** tool to create a window.

1. Choose **Create > Geometry** in the **Command Panel**; a drop-down list is displayed. Select the **Windows** option from the drop-down list and then invoke the **Awning** tool from the **Object Type** rollout.

2. Activate the Top viewport. Press and hold the left mouse button on the left of the viewport, drag the cursor to the right to specify the width of the window, and then release the left mouse button. Next, move the cursor up to define the depth of the window, and then click on the screen. Now, move the cursor up to specify the height of the window and then click on the screen; an awning window is created in all viewports.

3. In the **Name and Color** rollout, enter **window** and press ENTER; the window is named as *window*.

4. Use the color swatch to change the color of the *window* by entering the following values:

   Red: **135** Green: **59** Blue: **8**

5. Make sure the *window* is still selected. Choose the **Modify** tab in the **Command Panel**; the **Parameters** rollout is displayed.

6. In the **Parameters** rollout, set the values as given below:

   Height: **148.826** Width: **106.116** Depth: **10.0**

   Frame area
   Horiz. Width: **8.94** Vert. Width: **8.94** Thickness: **0.5**

   Glazing area
   Thickness: **0.25**

   Rails and Panels area
   Width: **14.554** Panel Count: **3**

   Open Window area
   Open: **25**

   You may need to adjust the height, length, and width of the *window* according to the *wall* size in your scene.

7. Next, align the *window* on the left of the *wall* in all viewports, as shown in Figure 4-90.

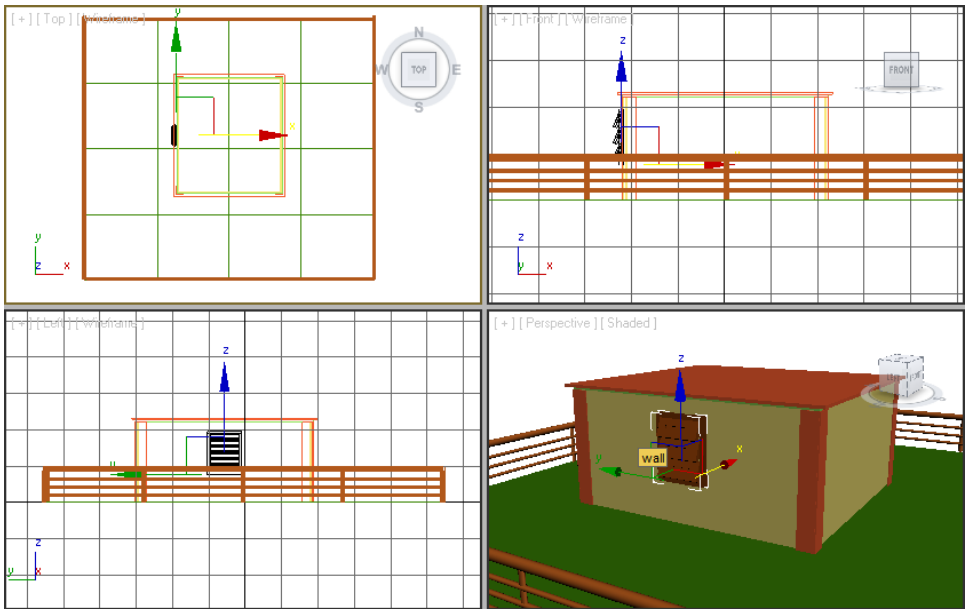

Figure 4-90 *The window in all viewports after alignment*

Creating the Foot Support

Next, you need to create a box primitive to create the foot support.

1. Activate the Top viewport and create a box.
2. In the **Parameters** rollout, set the values as given below:

   Length: **157.098** Width: **135.743** Height: **10.0**

3. In the **Name and Color** rollout, enter **foot support** and press ENTER.
4. Use the color swatch to change the color of the *foot support* by entering the following values:

   Red: **241** Green: **249** Blue: **200**

5. Align the *foot support* with the front side of the *wall* in all viewports, as shown in Figure 4-91.

Creating the Door

You need to use the **Pivot** tool from **Doors** to create a door.

1. Choose **Create > Geometry** in the **Command Panel**; a drop-down list is displayed below the **Geometry** button. Select the **Doors** option from the list and invoke the **Pivot** tool from the **Object Type** rollout.

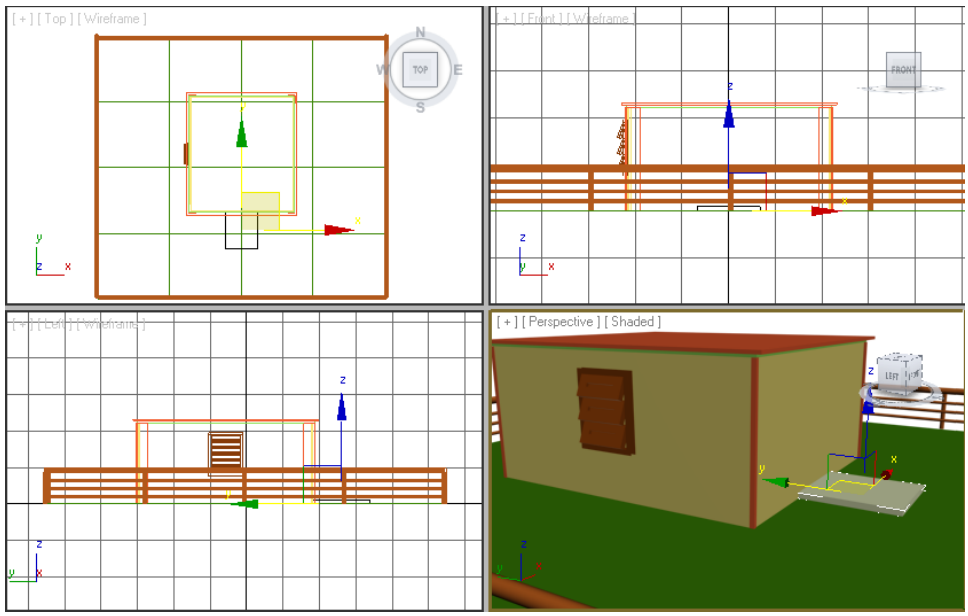

Figure 4-91 *The foot support in all viewports after the alignment*

2. Activate the Top viewport. Press and hold the left mouse button on the left of the viewport, drag the cursor to the right to specify the width of the door, and release the left mouse button. Next, move the cursor up to define the depth of the door, and then click on the screen. Next, move the cursor up again to specify the height of the door and click on the screen; the pivot door is created in all viewports.

3. In the **Name and Color** rollout, enter **door** as the name of the pivot door and assign it the same color that was assigned to the *window*.

4. Make sure the *door* is still selected. Choose the **Modify** tab in the **Command Panel**; the **Parameters** and **Leaf Parameters** rollouts are displayed.

5. In the **Parameters** rollout, set the values as given below:

   Height: **200.0** Width: **120.341** Depth: **12.0**
   Select the **Flip Swing** check box.
   Open: **30**

   Frame area
   Make sure the **Create Frame** check box is selected.
   Width: **2.0** Depth: **1.0** Door Offset: **0.0**

   You may need to set the height and width of the door according to the size of the *wall* in your scene.

6. In the **Leaf Parameters** rollout, set the values as given below:

Thickness: **2.0** Stiles/Top Rail: **10.0** Bottom Rail: **20.0**
Panels Horiz: **3** # Panels Vert: **4** Muntin: **3.265**

Panels area
Select the **Beveled** radio button and set the values as given below:

Bevel Angle: **45.0** Thickness 1: **9.46** Thickness 2: **10.0**
Middle Thick: **3.0** Width 1: **3.0** Width 2: **3.0**

7. Next, align the *door* in all viewports, as shown in Figure 4-92.

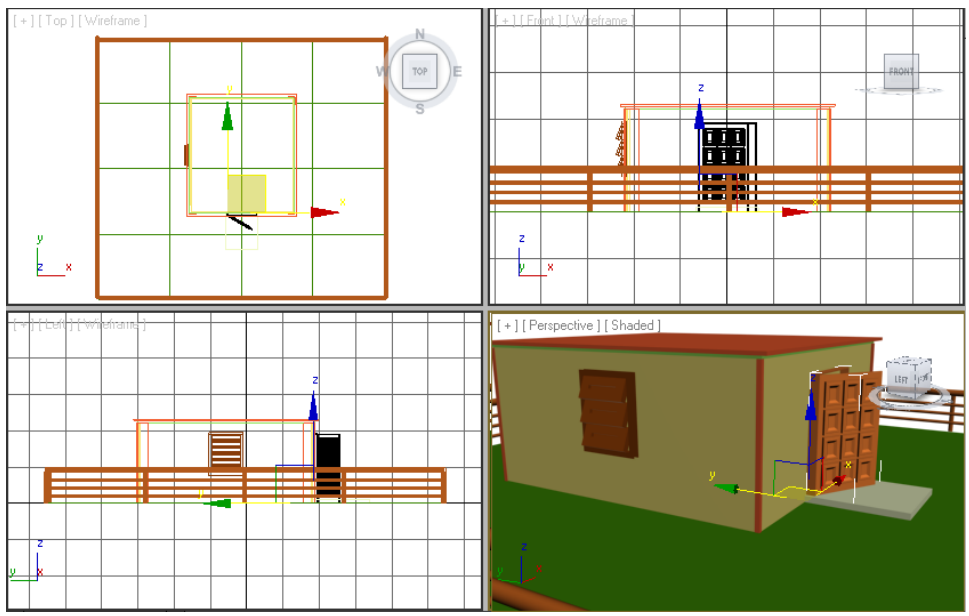

Figure 4-92 *The door in all viewports after alignment*

Note
You need to apply the boolean command on the wall to see inside the room through the window and the door. You will learn about this in the later chapters.

Creating the Trees

You need to use the **Foliage** tool from **AEC Extended** to create the trees.

1. Choose **Create > Geometry** in the **Command Panel**; a drop-down list is displayed. Select the **AEC Extended** option and invoke the **Foliage** tool from the **Object Type** rollout.

2. Activate the Top viewport. Select the **Banyan tree** from the **Favorite Plants** rollout and double-click on it; a tree is displayed in all viewports.

3. In the **Name and Color** rollout, enter **tree01** as the name of the tree.

4. Make sure the *tree01* is still selected. Choose the **Modify** tab in the **Command Panel**; the **Parameters** rollout is displayed.

5. In the **Parameters** rollout, set the values as given below:

   Height: **120.0**

   Level-of-Detail area
   Select the **Medium** radio button.

   Use the default values for other options.

6. Invoke the **Select and Move** tool and align the *tree01* in the Top viewport, as shown in Figure 4-93.

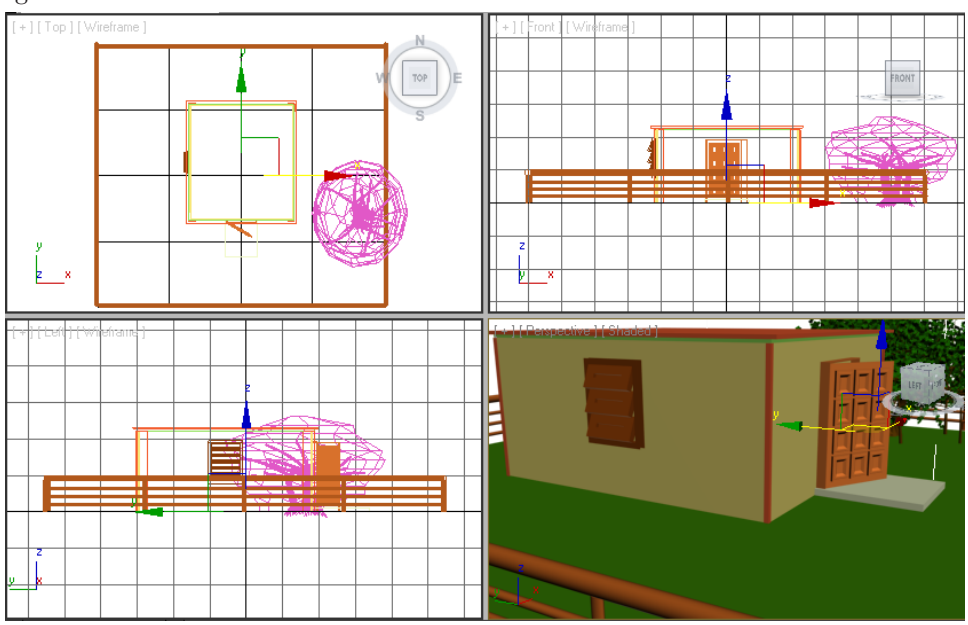

Figure 4-93 *The tree01 displayed in all viewports after alignment*

Now, you need to create another tree.

7. Activate the Top viewport. Choose the **Create** tab in the **Command Panel** and make sure the **Foliage** tool is invoked. Now, select the **American Elm** tree from the **Favorite Plants** rollout and double-click on it; the tree is displayed in all viewports.

8. In the **Name and Color** rollout, enter **tree02** as the name of the new tree created.

9. Choose the **Modify** tab in the **Command Panel**; the **Parameters** rollout is displayed.

10. In the **Parameters** rollout, set the values as given below:

    Height: **300.0**

    Use the default values for other options.

11. Invoke the **Select and Move** tool and align the *tree02* in all viewports, refer to Figure 4-94.

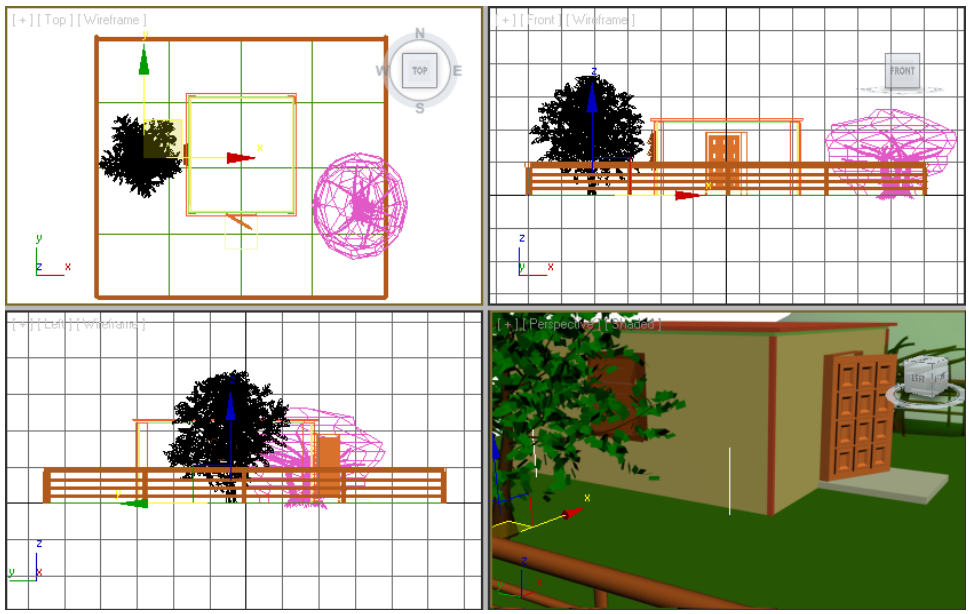

Figure 4-94 *The tree02 in all viewports after the alignment*

Changing the Background Color in the Final Output

1. Change the background color to light blue for the final output, as discussed in Tutorial 1 of Chapter 2, using the following parameters:

    Red: **145** Green: **241** Blue: **244**

Rendering the Scene for the Final Output

1. Activate the Perspective viewport.

2. Invoke the **Render Production** tool from the **Main Toolbar**; the **Perspective**, **frame 0, Display Gamma: 2.2, RGBA Color16 Bits/Channel (1:1)** window is displayed. This dialog box shows the final output of the scene at one frame, refer to Figure 4-95.

3. Close this window.

Figure 4-95 *The final output of the scene at rendering*

You can view the final rendered image of this model by downloading the file *c04_3dsmax_2012_render.zip* from *http://www.cadcim.com*. The path of the file is as follows:

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Saving the File

1. Save the file with the name *c04tut2.max* as discussed in earlier chapters. The location of this file is given below:

   \Documents\3dsmax\c04_tut2\scenes

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 a part of the **AEC Extended** objects?

   (a) **Foliage** (b) **Railing**
   (c) **Wall** (d) All of these

2. Which of the following tools is used to create doors?

   (a) **Awning** (b) **Bifold**
   (c) **Projected** (d) **Fixed**

3. Which of the following tools is used to create windows?

(a) **Pivot** (b) **Railing**
(c) **Casement** (d) **Bifold**

4. Which of the following tools is used to create stairs?

(a) **Straight Stair** (b) **UType Stair**
(c) None of these (d) Both (a) and (b)

5. To activate the **Align** tool, you need to press the _____ keys.

6. The _____ button in the **Favorite Plants** rollout of the **Foliage** tool in **AEC Extended** is used to give information about all the default trees.

7. You can increase the number of lower rails in the railing by entering the value in the _____ spinner of the _____ dialog box.

8. The **Mirror** tool is used to clone an object about the center of the current coordinate system. (T/F)

9. You can change the default material of the plants that you create using the tools given in **Create > Geometry > AEC Extended > Foliage > Favorite Plants** rollout. (T/F)

10. The **Align** tool is used to align the current object with the target object. (T/F)

Review Questions

Answer the following questions:

1. Which of the following tools is used to create patch grids?

(a) **Tri Patch** (b) **Tetra Patch**
(c) Both (a) and (b) (d) None of these

2. Which of the following tools is used to create spiral stairs?

(a) **LType Stair** (b) **Straight stair**
(c) **UType Stair** (d) None of these

3. Which of the following rollouts is used to modify the panels of the doors?

(a) **Name and Color** (b) **Parameters**
(c) **Leaf Parameters** (d) **Creation Method**

4. An instance of an object is a clone in which the changes are reflected when they are made in the original object. (T/F)

5. To invoke the **Tri Patch** tool, you need to choose **Create > Geometry > AEC Extended** from the drop-down list in the **Command Panel**. (T/F)

6. You can create default trees in the viewports by invoking the **Foliage** tool from the **AEC Extended** drop-down list. (T/F)

7. You cannot increase the number of segments in a quad patch object. (T/F)

8. The object created using the **Quad Patch** tool has_____ rectangular and _____ triangular faces.

9. When you select the stair in the viewport and choose the **Modify** tab in the **Command Panel**, the _____, _____, _____, and _____ rollouts are displayed.

10. The object created using the **Tri Patch** tool has_____ triangular faces.

Exercises

Exercise 1

Start Autodesk 3ds Max 2012 and then perform the following operations:

1. Choose **Create > Geometry** in the **Command Panel**; a drop-down list will be displayed. Select the **AEC Extended** option from the drop-down list.

2. Invoke the **Foliage** tool from the **Object Type** rollout, create different default plants given in the **Favorite Plants** rollout, and then notice the difference. Also, try to modify the plants using different options given in the **Parameters** rollout.

3. Invoke the **Railing** tool and create a railing. In the **Railing**, **Posts**, and **Fencing** rollouts, try using different options and notice the difference.

4. Choose **Create > Geometry** in the **Command Panel**; a drop-down list will be displayed. Select **Doors** from the drop-down list. Create different type of doors using the **Pivot**, **Sliding**, and **BiFold** tools in the **Object Type** rollout. Choose the **Modify** tab in the **Command Panel**, and in the **Parameters** rollout of each door, set different values in the **Open** spinner to notice the difference.

5. Choose **Create > Geometry** in the **Command Panel**; a drop-down list will be displayed. Select **Windows** from the drop-down list. Create different type of windows using the tools in the **Object Type** rollout. Choose the **Modify** tab in the **Command Panel**, and in the **Parameters** rollout of window, set different values in the **Open** spinner to notice the difference.

6. Choose **Create > Geometry** in the **Command Panel**; a drop-down list will be displayed. Select **Stairs** from the drop-down list. Create different type of stairs using the tools in the **Object Type** rollout and notice the difference in the stairs.

7. Choose **Create > Geometry** in the **Command Panel**; a drop-down list will be displayed. Select **Patch Grids** from the drop-down list. Create different patches using the **Quad Patch** and **Tri Patch** tools in the **Object Type** rollout and notice the difference.

Exercise 2

Create the model shown in Figure 4-96 using the dimensions of your choice. You can view the final rendered image of this model by downloading the file *c04_3dsmax_2012_render.zip* from *http://www.cadcim.com*. The path of the file is as follows: **(Expected time: 15 min)**

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Figure 4-96 *Model for Exercise 2*

Answers to Self-Evaluation Test

1. d, **2.** b, **3.** c, **4.** d, **5.** ALT+A, **6. Plant Library**, **7. Count**, **Lower Rail Spacing 8.** T, **9.** T, **10.** T