

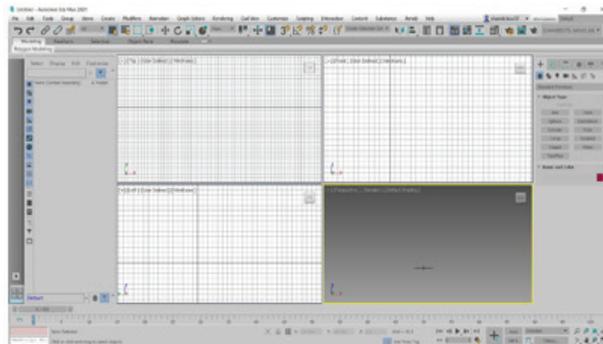


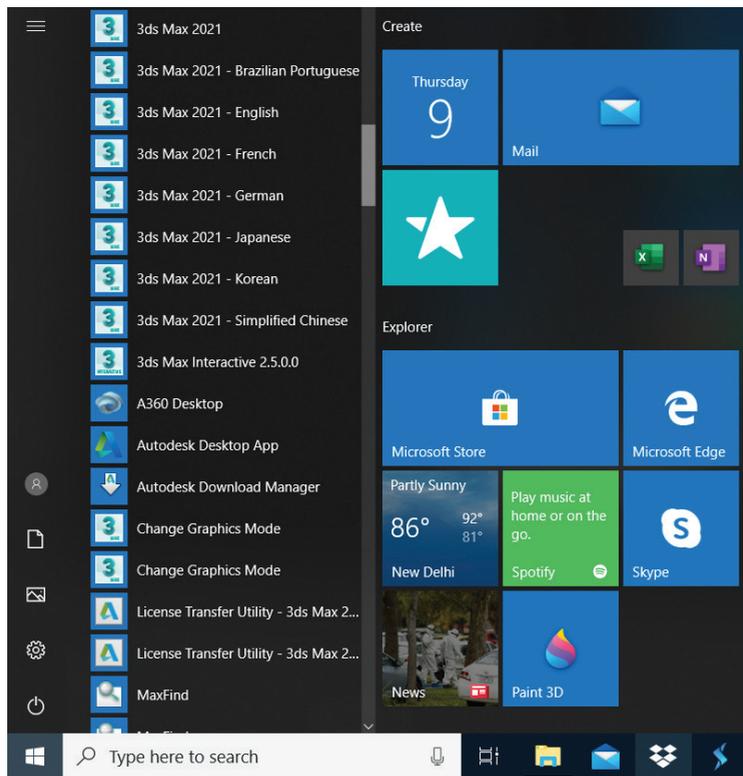
# Introduction to Autodesk 3ds Max 2021

## Learning Objectives

**After completing this chapter, you will be able to:**

- Understand the Autodesk 3ds Max interface components
- Use controls for creating or modifying objects
- Use and customize hotkeys in Autodesk 3ds Max
- Customize the colors of the scene elements





*Figure 1-1 Starting Autodesk 3ds Max 2021 from the taskbar*



*Figure 1-2 The Welcome Screen*

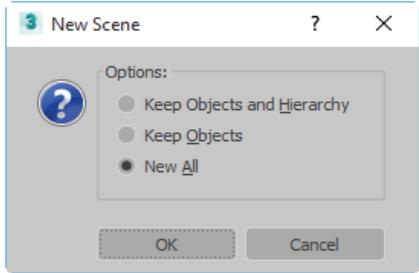


Figure 1-3 The New Scene dialog box

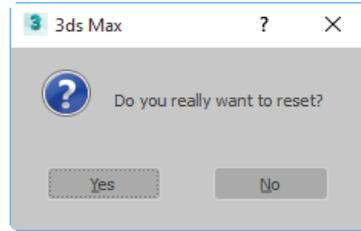


Figure 1-4 The 3ds Max message box

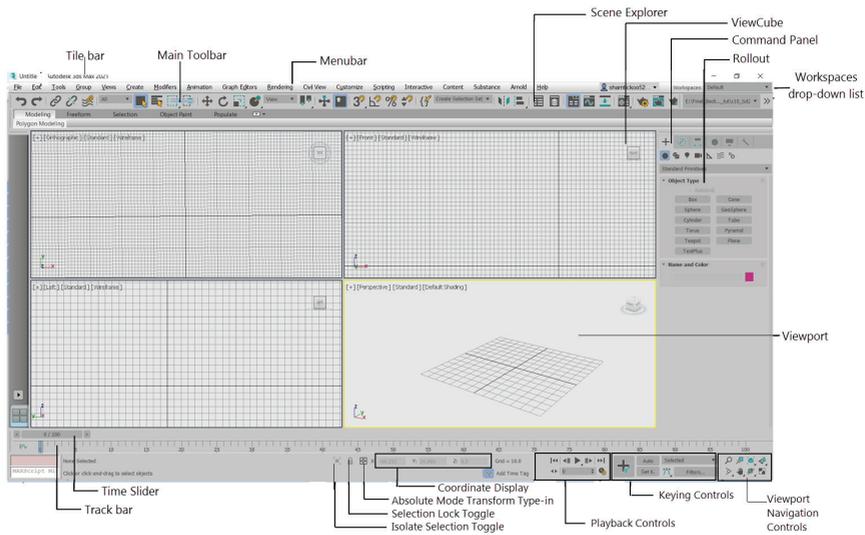


Figure 1-5 Different screen components of Autodesk 3ds Max interface

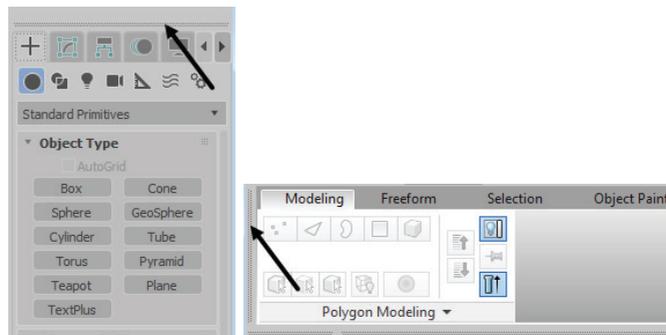
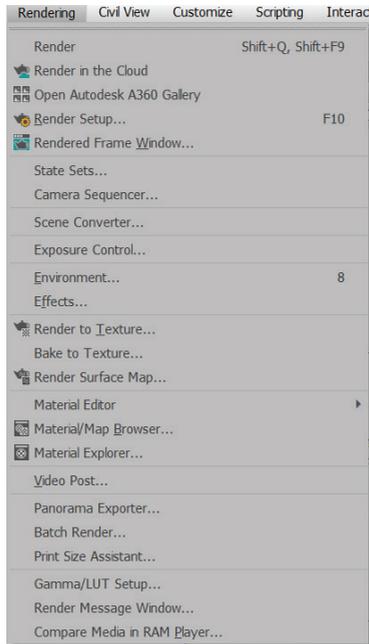
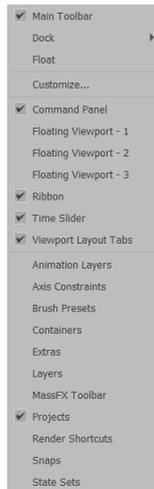


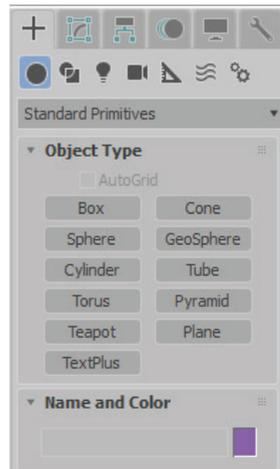
Figure 1-6 The handles marked with arrows



*Figure 1-7* The keyboard shortcuts in the **Rendering** pull-down menu



*Figure 1-8* The shortcut menu displayed to view the hidden toolbars



*Figure 1-9* The **Command Panel**

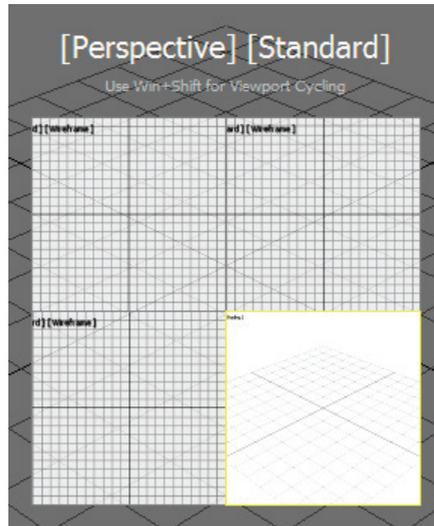


Figure 1-10 Selecting a viewport to make it active

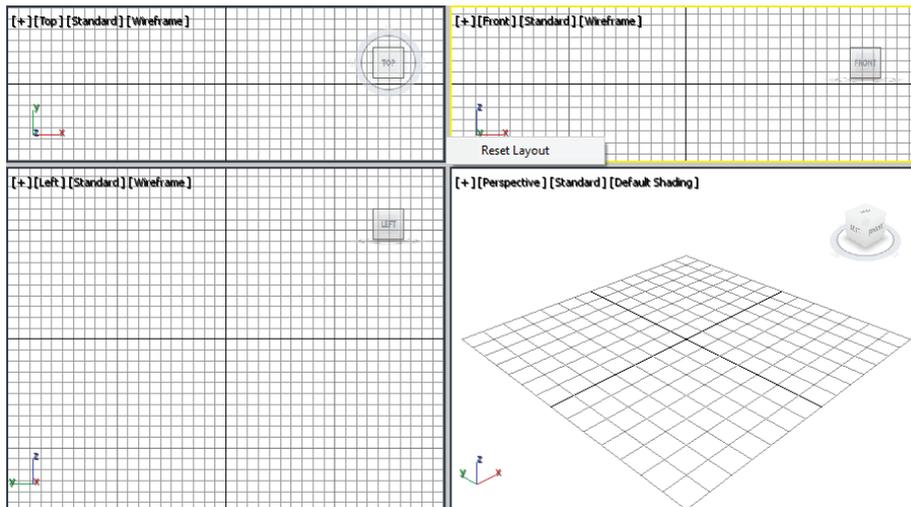


Figure 1-11 The Reset Layout option in the shortcut menu

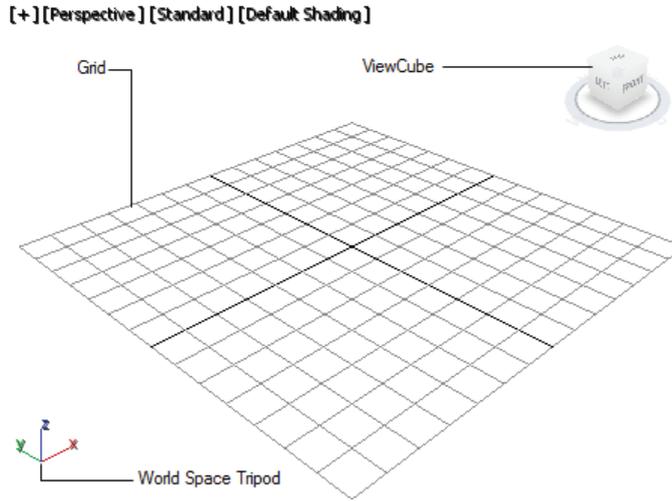


Figure 1-12 The world space tripod, grid, and ViewCube in the Perspective viewport

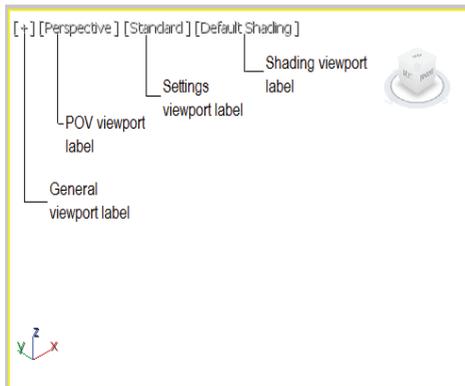


Figure 1-13 The viewport labels in the Front viewport

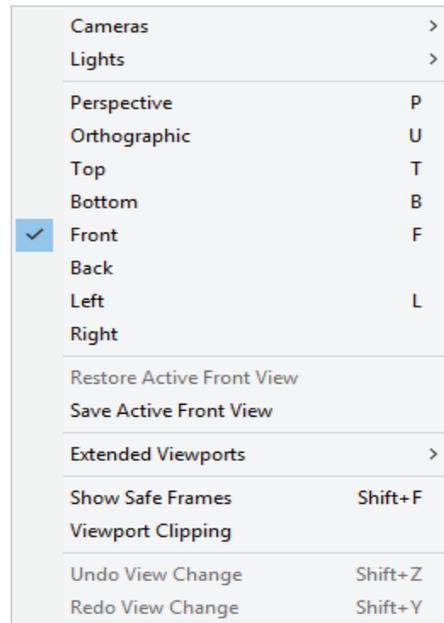


Figure 1-14 The flyout displayed on clicking the POV viewport label

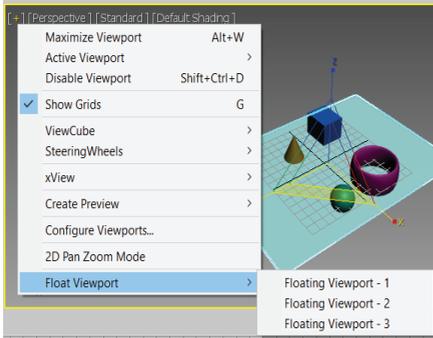


Figure 1-14 (a) The cascading menu displayed on choosing the **Float Viewport** option

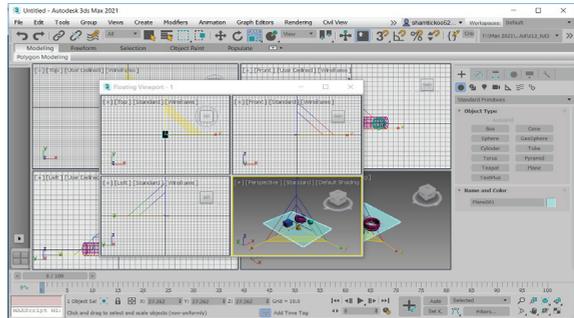


Figure 1-14 (b) The Floating viewport

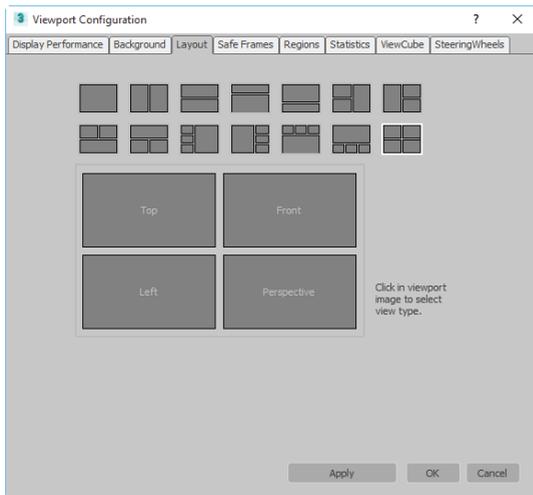


Figure 1-15 The **Layout** tab of the **Viewport Configuration** dialog box

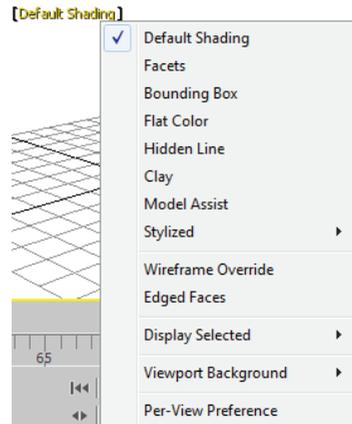


Figure 1-16 The flyout displayed on clicking the **Shading** viewport label



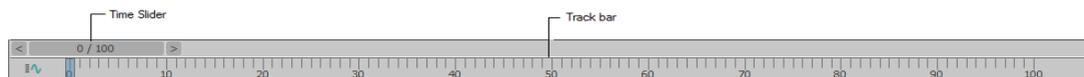
Figure 1-17 The viewport navigation controls



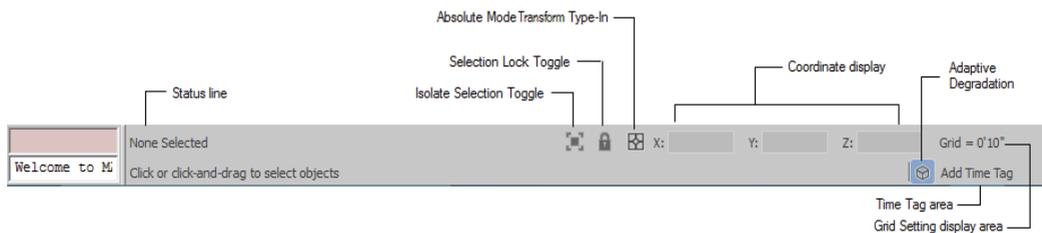
**Figure 1-18** The animation playback controls



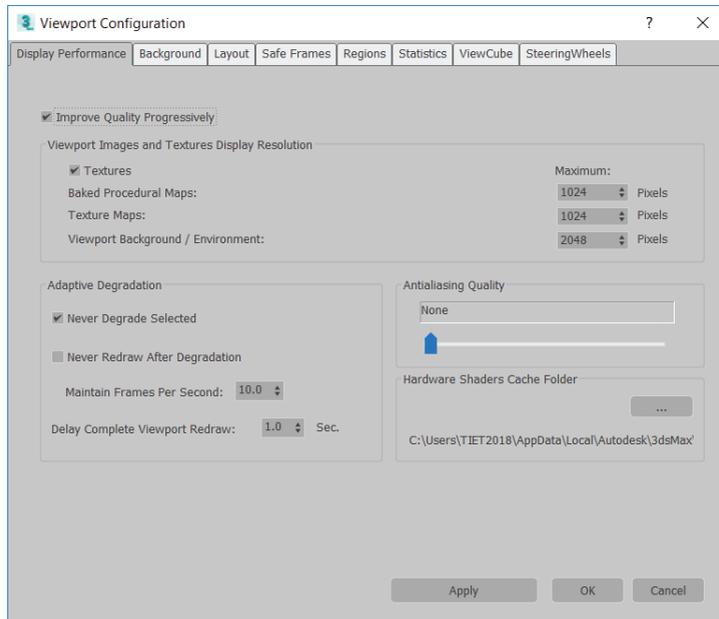
**Figure 1-19** The animation keying controls



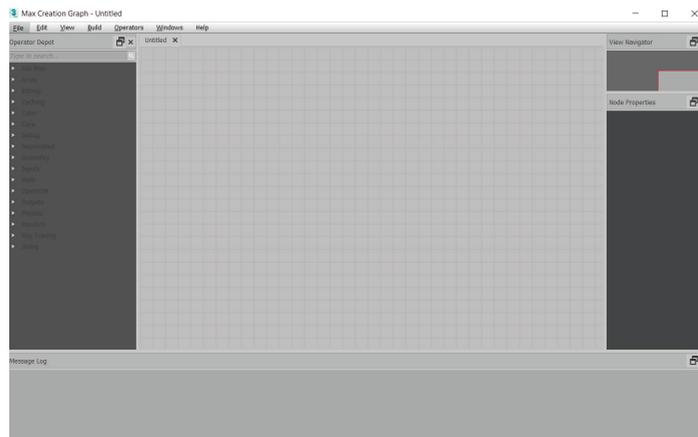
**Figure 1-20** The track bar and the time slider



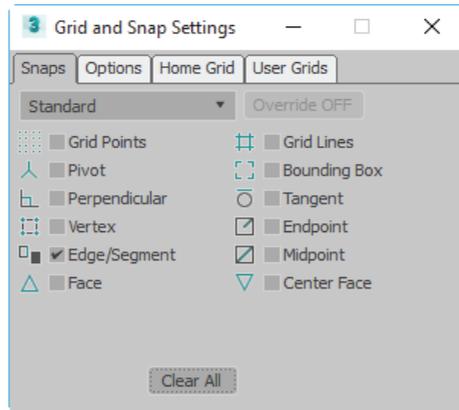
**Figure 1-21** The status bar



*Figure 1-22 The Viewport Configuration dialog box*



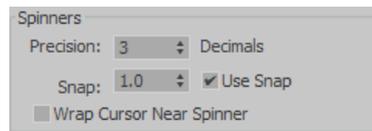
*Figure 1-23 The Max Creation Graph - Untitled window*



*Figure 1-24 The Grid and Snap Settings dialog box*



*Figure 1-25 The Snaps Toggle flyout*



*Figure 1-26 The Spinners area in the Preference Settings dialog box*

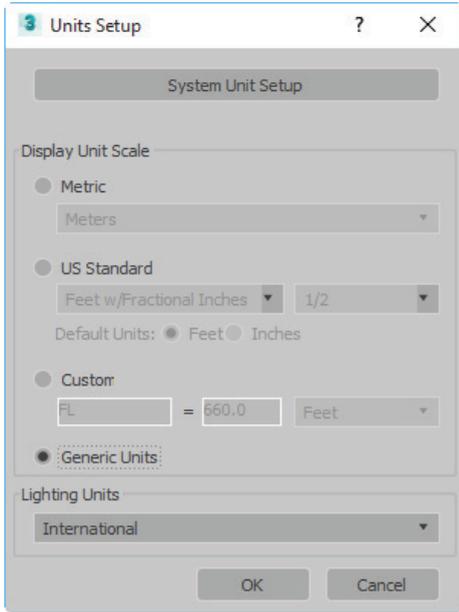


Figure 1-27 The Units Setup dialog box

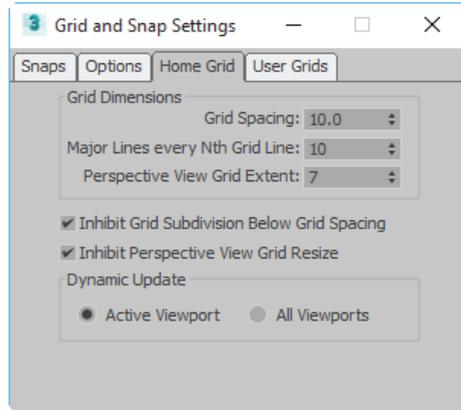


Figure 1-28 The Home Grid tab chosen in the Grid and Snap Settings dialog box

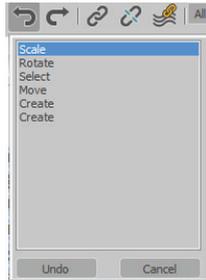


Figure 1-29 The list of actions displayed

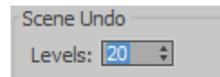


Figure 1-30 The Scene Undo area in the Preference Settings dialog box



Figure 1-31 The About to Fetch. OK? dialog box

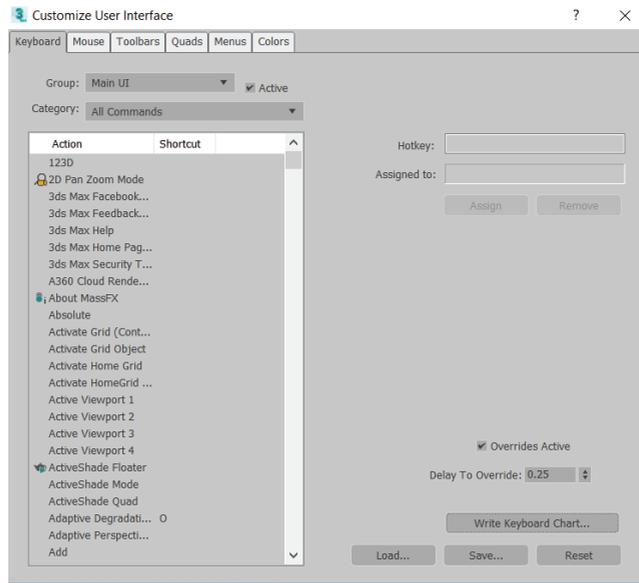
H	Invokes the <b>Select From Scene</b> dialog box
S	Invokes the <b>Snaps Toggle</b> tool
A	Invokes the <b>Angle Snap Toggle</b> tool
CTRL+SHIFT+P	Invokes the <b>Percent Snap Toggle</b> tool
M	Invokes the <b>Material Editor</b> dialog box
SHIFT+Q	Invokes the <b>Render Production</b> tool

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

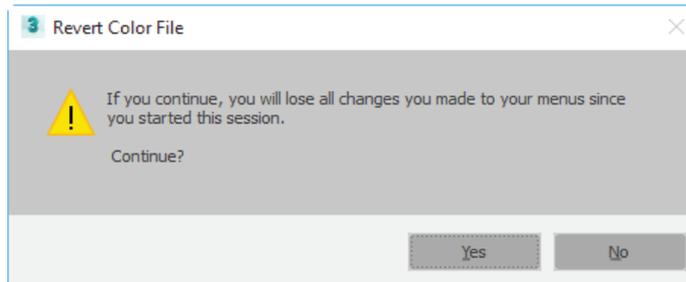
The following hot keys are used to change the POV viewport labels:

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

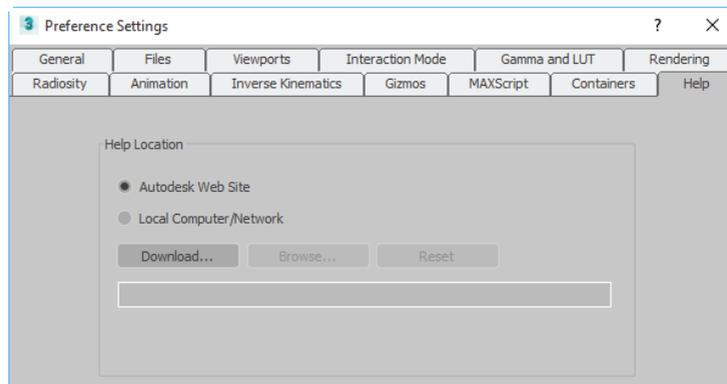
N	Invokes the <b>Auto Key</b> tool
Home	Go to start frame
End	Go to end frame
/ (backslash)	Plays animation
ESC	Stop the animation
, (comma)	Go to previous frame
. (period)	Go to next frame



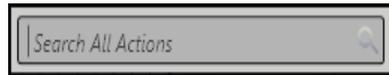
*Figure 1-32 The Customize User Interface dialog box*



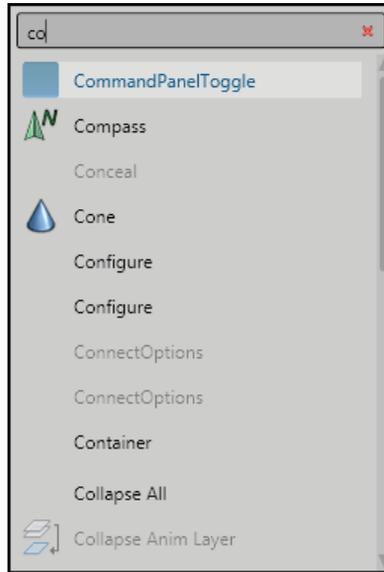
*Figure 1-33 The Revert Color File message box*



*Figure 1-34 The Help tab chosen in the Preference Settings dialog box*



**Figure 1-35** The search field



**Figure 1-36** List of commands displayed on entering first few characters

# Chapter 2

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## Primitive Objects-I

### Learning Objectives

**After completing this chapter, you will be able to:**

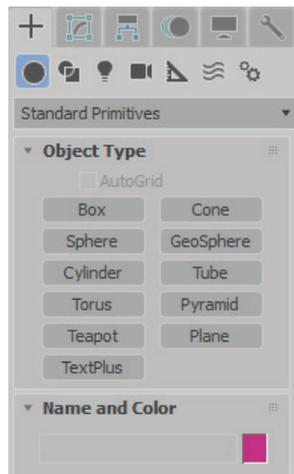
- *Create primitive objects*
- *Modify primitive objects*
- *Use the Mirror and Align tools*



## Tutorial 1



*Figure 2-1 The model of a temple*



*Figure 2-2 The tools and rollouts in the Command Panel*

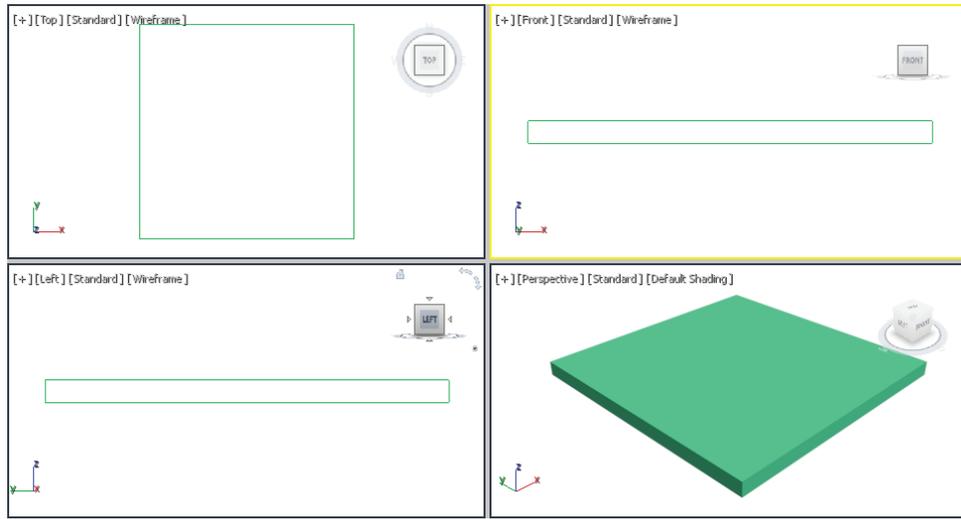


Figure 2-3 Bottom zoomed to its extents

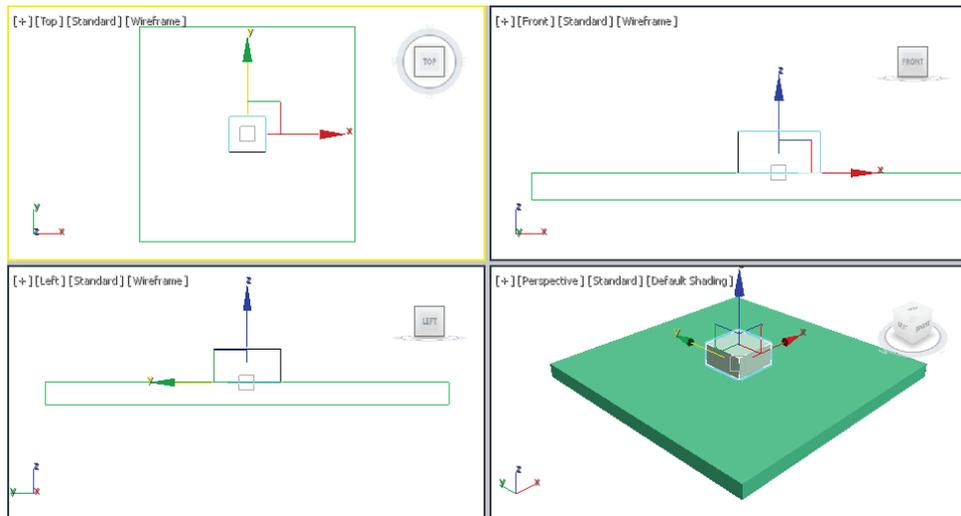
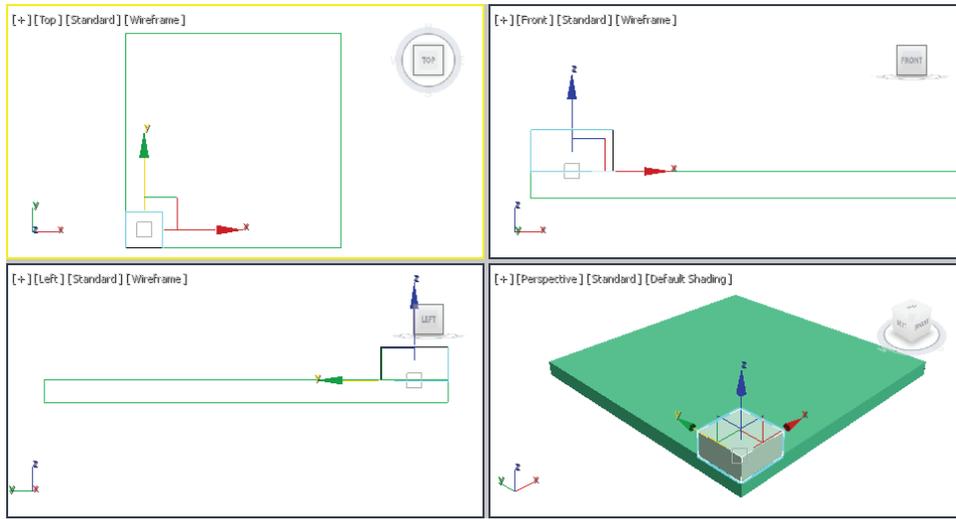
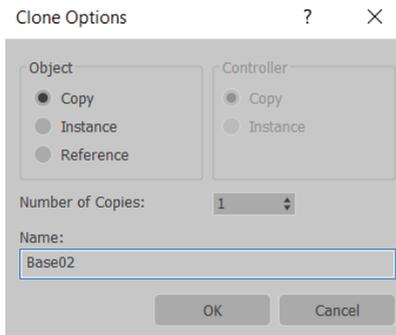


Figure 2-4 Bottom and Base01 displayed in viewports



*Figure 2-5 Alignment of Base01 to the lower-left corner of Bottom*



*Figure 2-6 The Clone Options dialog box*

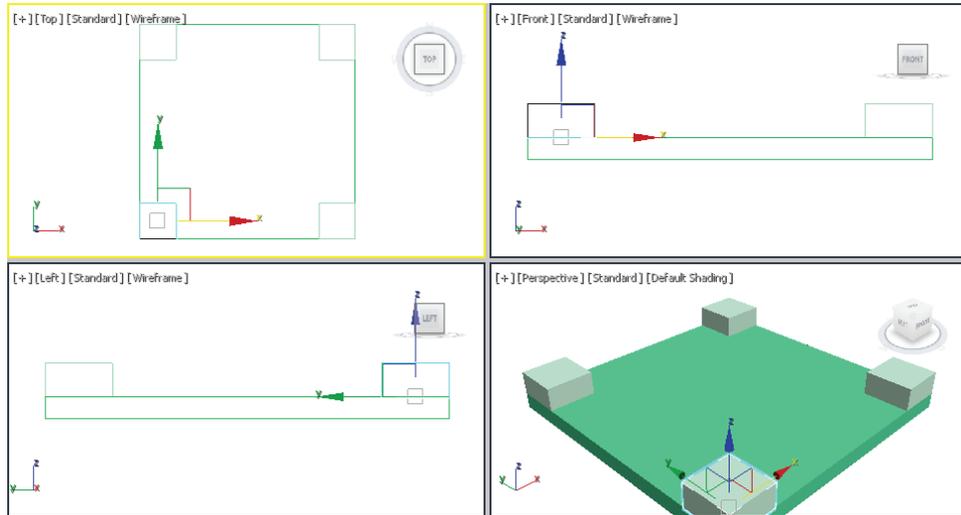


Figure 2-7 Four bases of the temple

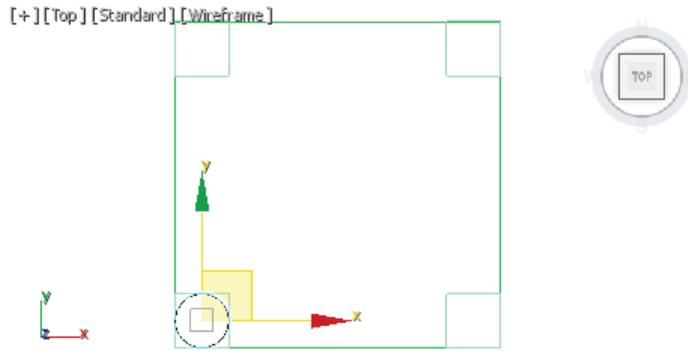
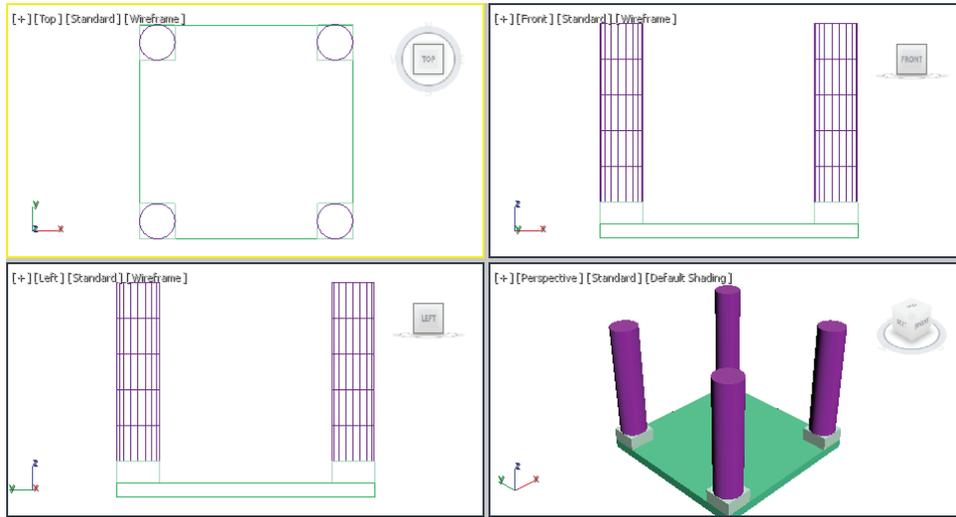
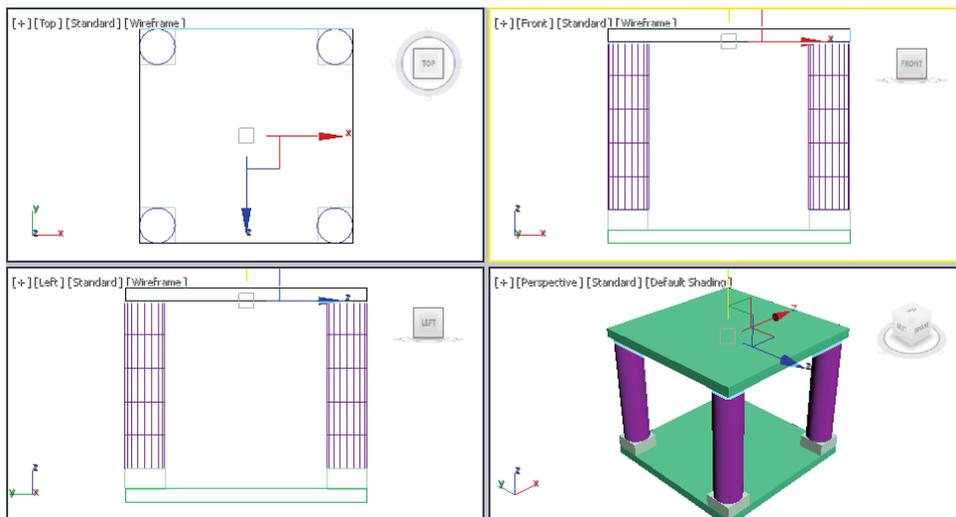


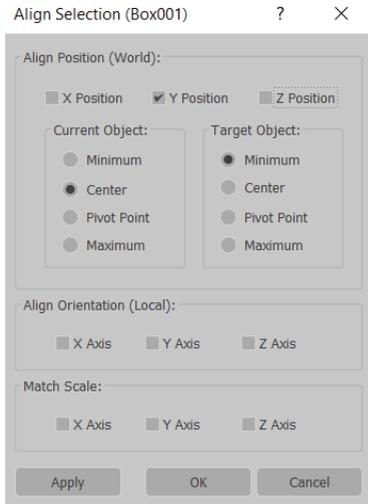
Figure 2-8 Aligning Pillar01 to Base01 in the Top viewport



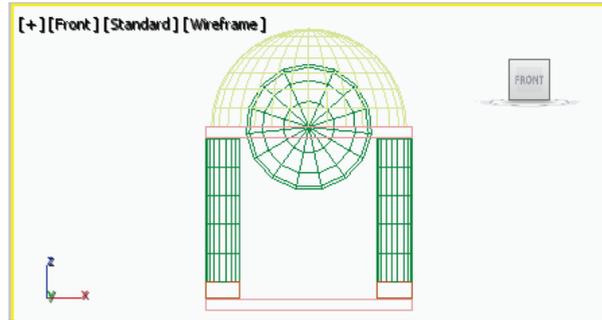
*Figure 2-9 The pillars created for the temple*



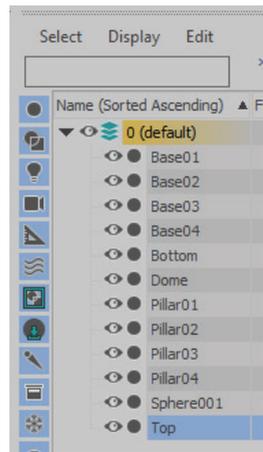
*Figure 2-10 Bottom copied to create top of temple*



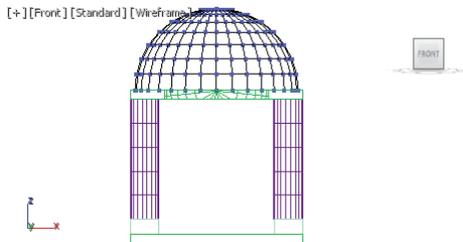
**Figure 2-11** The Align Selection (Dome) dialog box



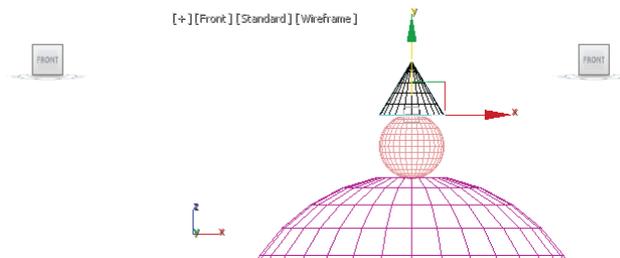
**Figure 2-12** Alignment of Sphere001 with Dome



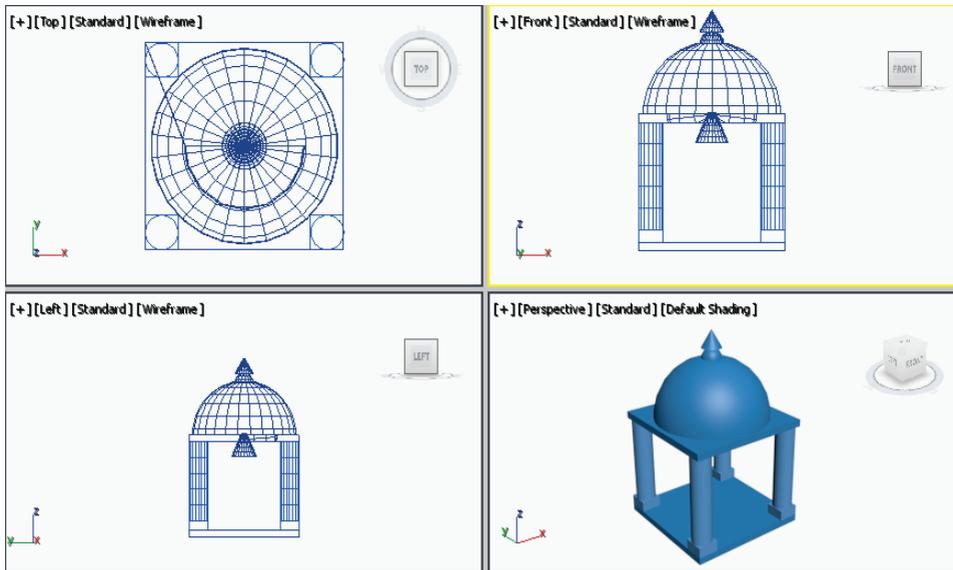
**Figure 2-13** Selecting Top from the Scene Explorer



**Figure 2-14** Vertices of the Dome displayed



**Figure 2-15** The details added to the top of Dome



*Figure 2-16 Adjustment of Bell at the center of Dome*



*Figure 2-17 The rendered image*



Figure 2-18 The table and benches

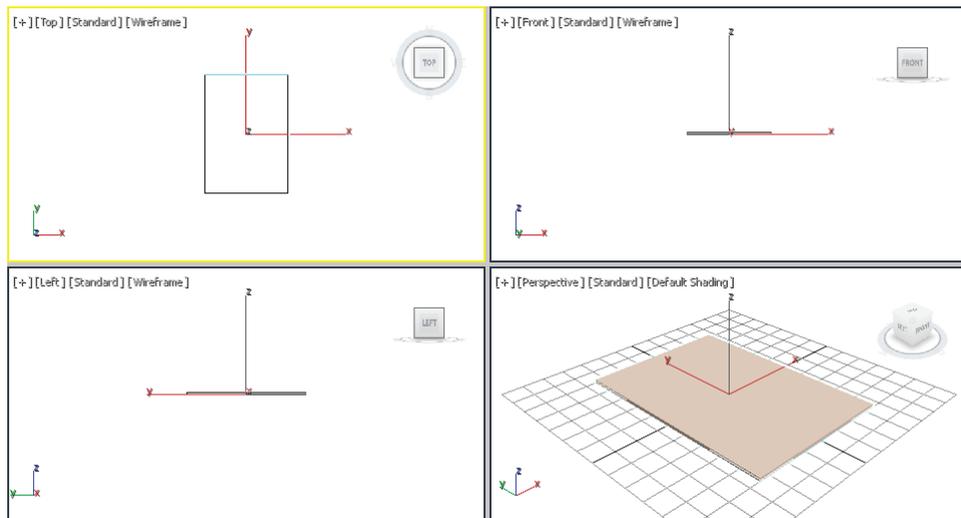


Figure 2-19 The box created in all viewports

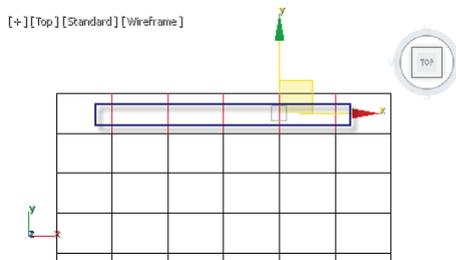


Figure 2-20 Five vertical edges selected

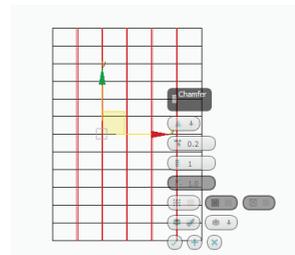
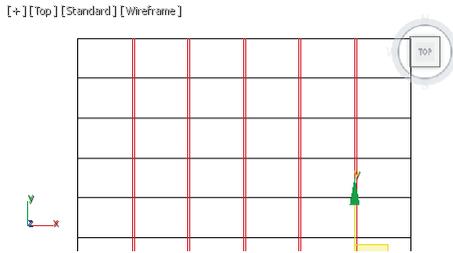
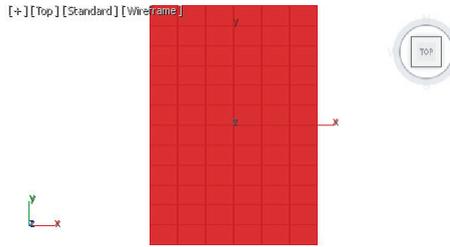


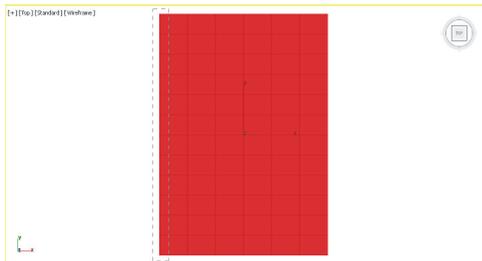
Figure 2-21 Setting the value in the Chamfer-Amount spinner



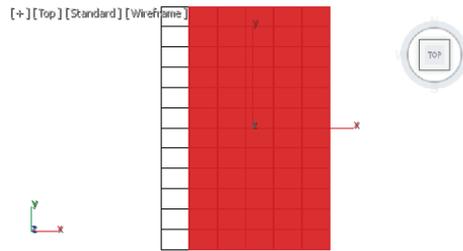
**Figure 2-22** The edges chamfered



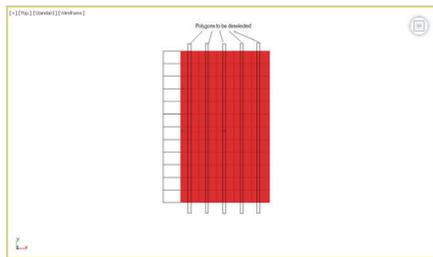
**Figure 2-23** The polygons selected



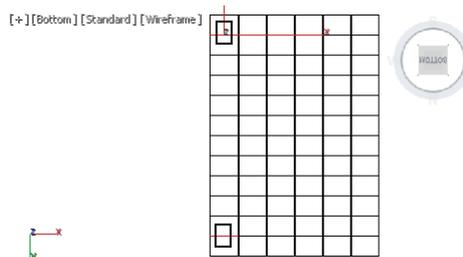
**Figure 2-24** Drawing a cross window around the polygons



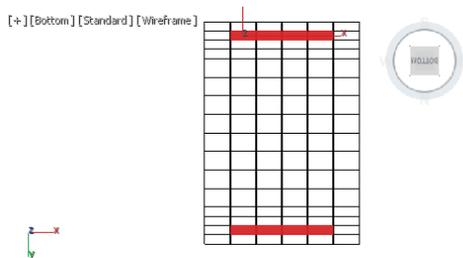
**Figure 2-25** The polygons deselected



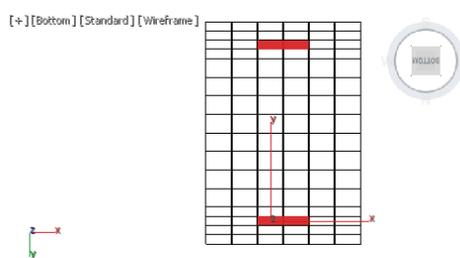
**Figure 2-26** The polygons to be deselected



**Figure 2-27** Two horizontal edges selected in the Bottom viewport



**Figure 2-28** The polygons selected in the Bottom viewport



**Figure 2-29** The polygons selected

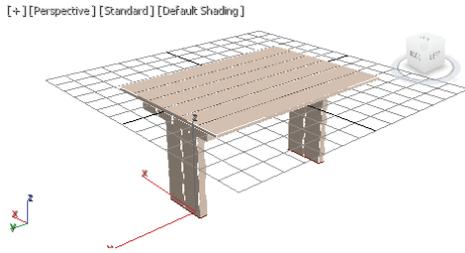


Figure 2-30 The polygons extruded

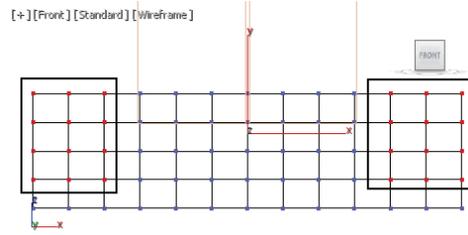


Figure 2-31 The vertices to be selected

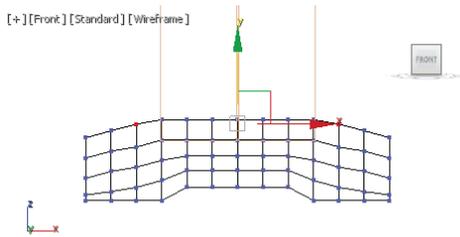


Figure 2-32 The shape of base1

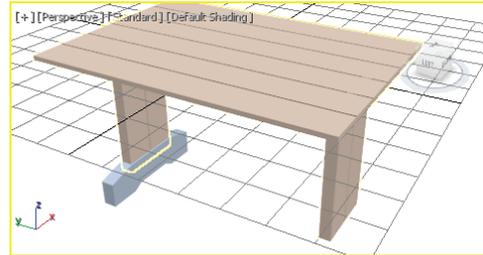


Figure 2-33 The base1 object aligned in all viewpoints

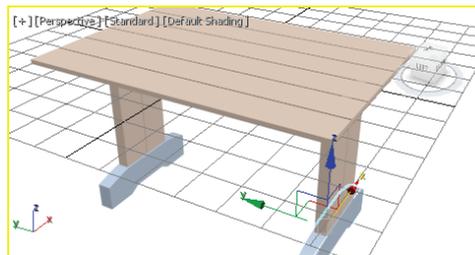


Figure 2-34 The base2 object aligned in all viewpoints

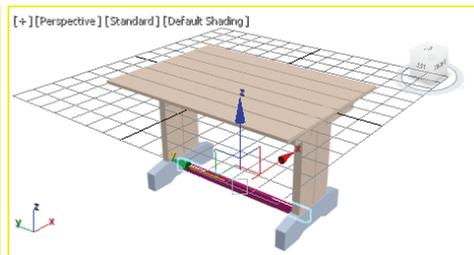
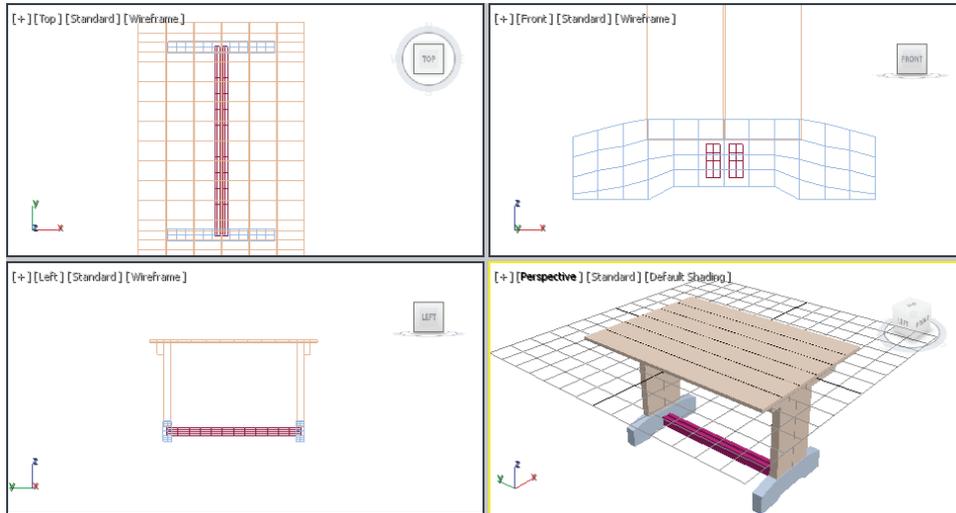
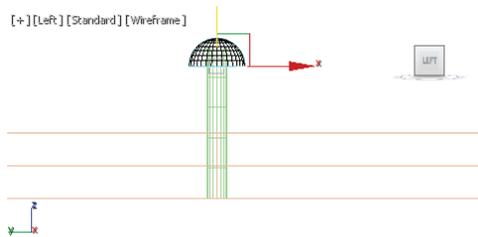


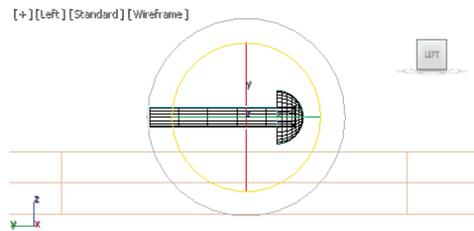
Figure 2-35 The footrest1 object aligned in all viewpoints



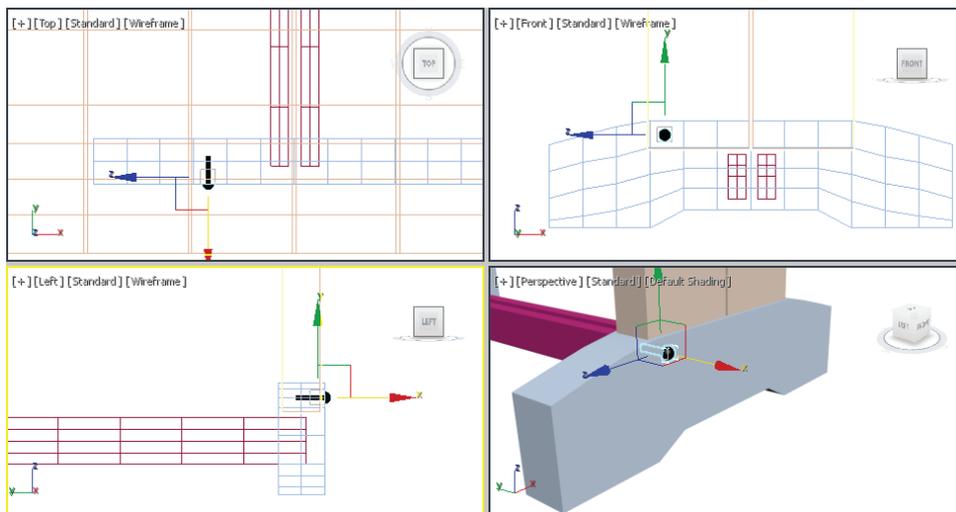
*Figure 2-36 The copy of footrest1 object aligned in all viewports*



*Figure 2-37 The cap and body objects aligned in all viewports*



*Figure 2-38 The rivet001 object rotated*



*Figure 2-39 The rivet001 object aligned in all viewports*

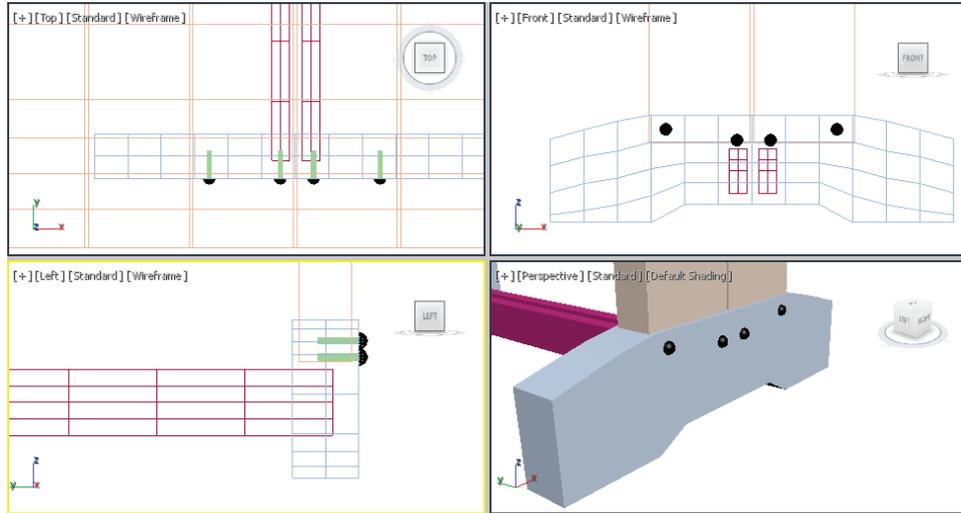


Figure 2-40 The copies of rivet001 aligned in all viewports

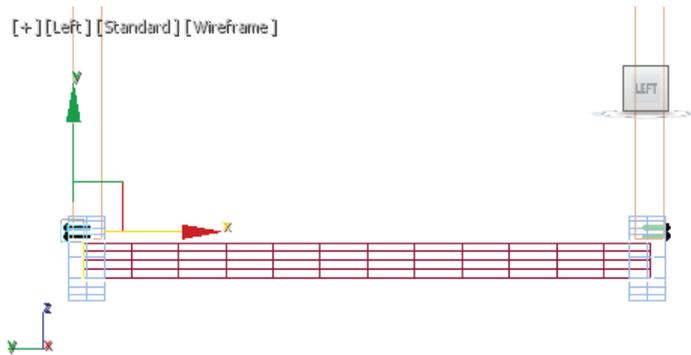


Figure 2-41 The copy of rivets created

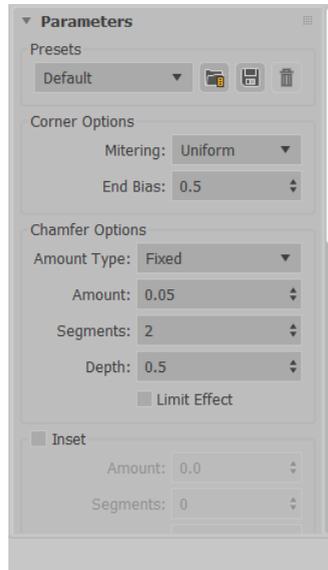


Figure 2-42 The Parameters rollout

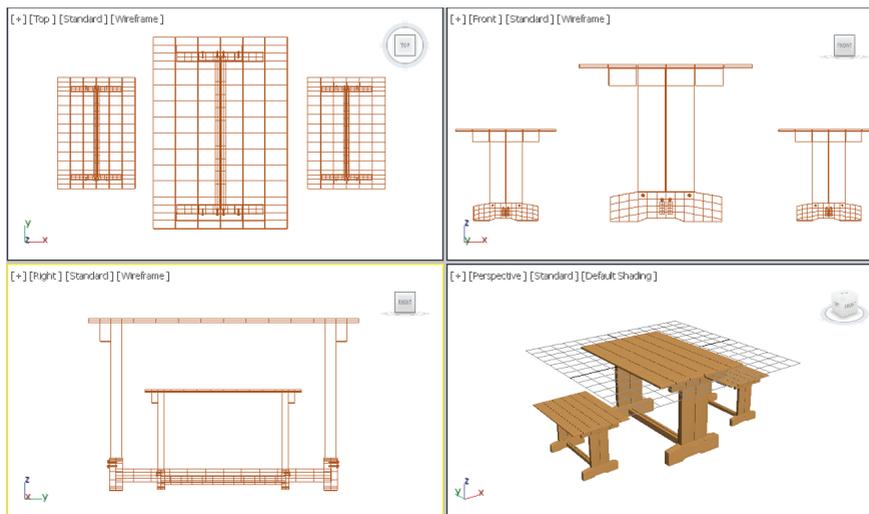


Figure 2-43 The table and benches aligned



*Figure 2-44 The rendered image*

## Exercise 1



*Figure 2-45 The model of chairs and center table*

# Chapter 3

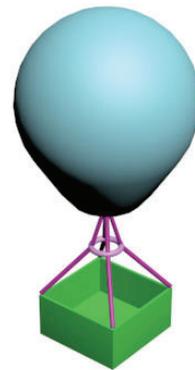
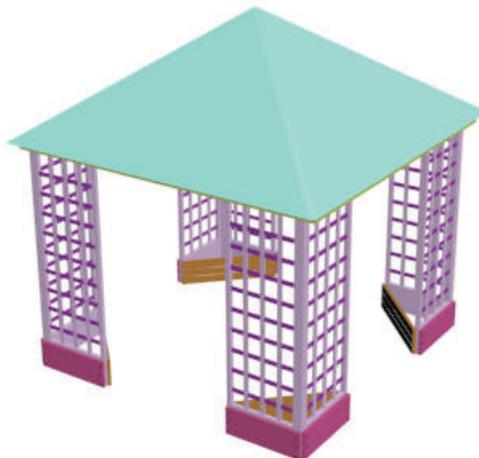
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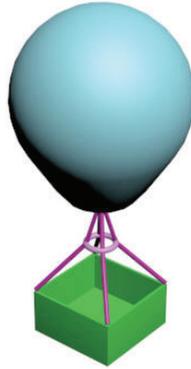
## Primitive Objects-II

### Learning Objectives

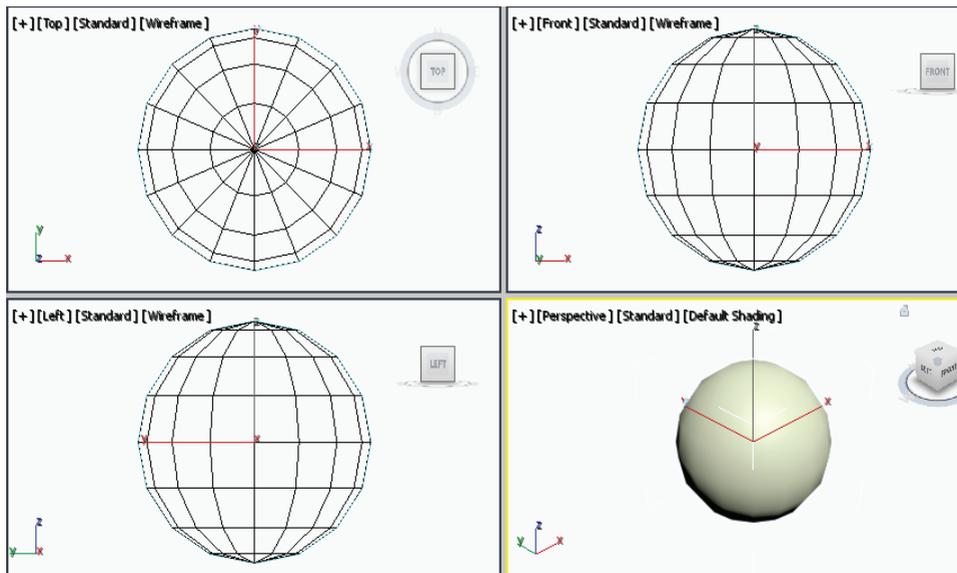
**After completing this chapter, you will be able to:**

- *Create primitive objects*
- *Modify primitive objects*
- *Use the Boolean and Array tools*

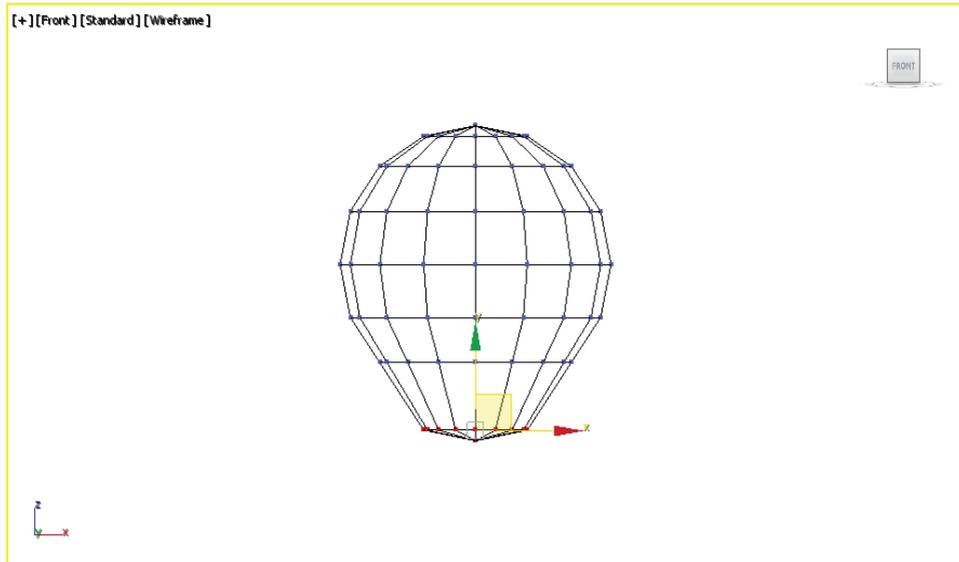


**Tutorial 1**

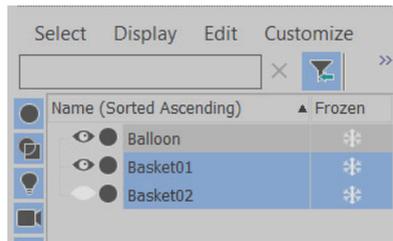
*Figure 3-1 The model of hot air balloon*



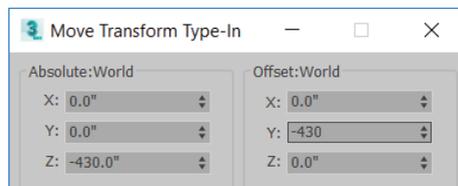
*Figure 3-2 The sphere created and zoomed in all four viewports*



*Figure 3-3 The shape of the sphere changes into balloon shape*



*Figure 3-4 Selecting Basket01 and Basket02 from the Scene Explorer*



*Figure 3-5 The Move Transform Type-In dialog box*

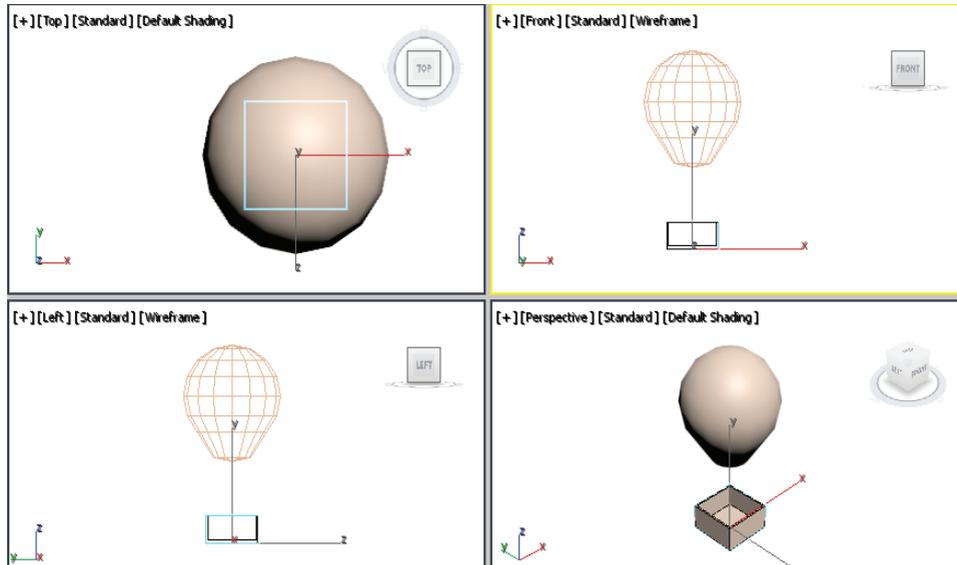


Figure 3-6 Basket01 after performing the **Boolean** operation

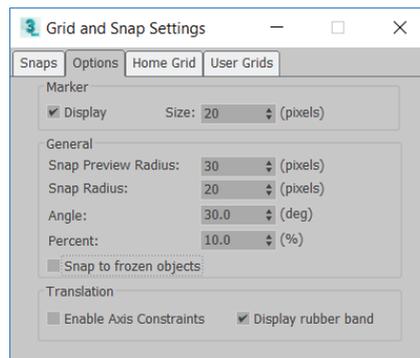


Figure 3-7 The **Grid and Snap Settings** dialog box

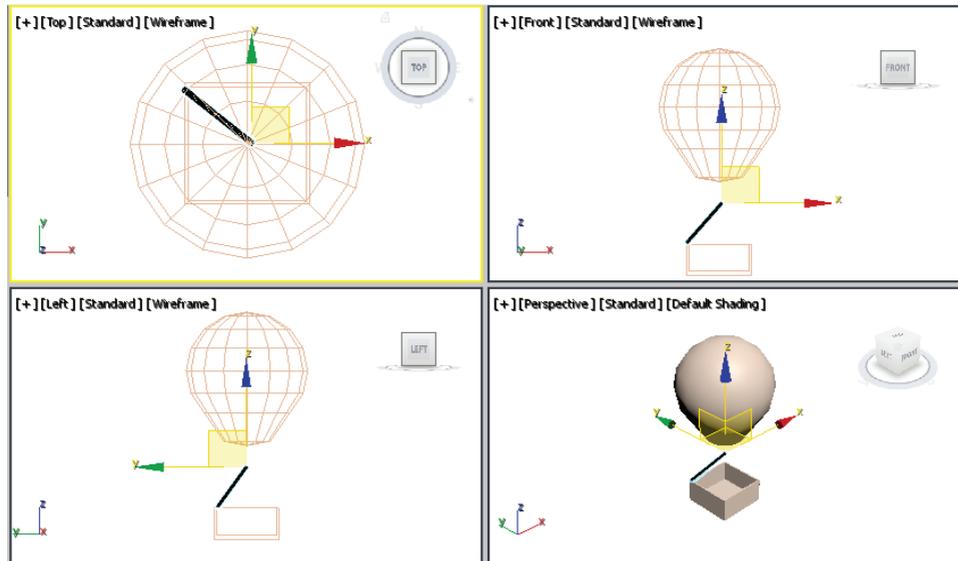


Figure 3-8 Rope01 in all viewports

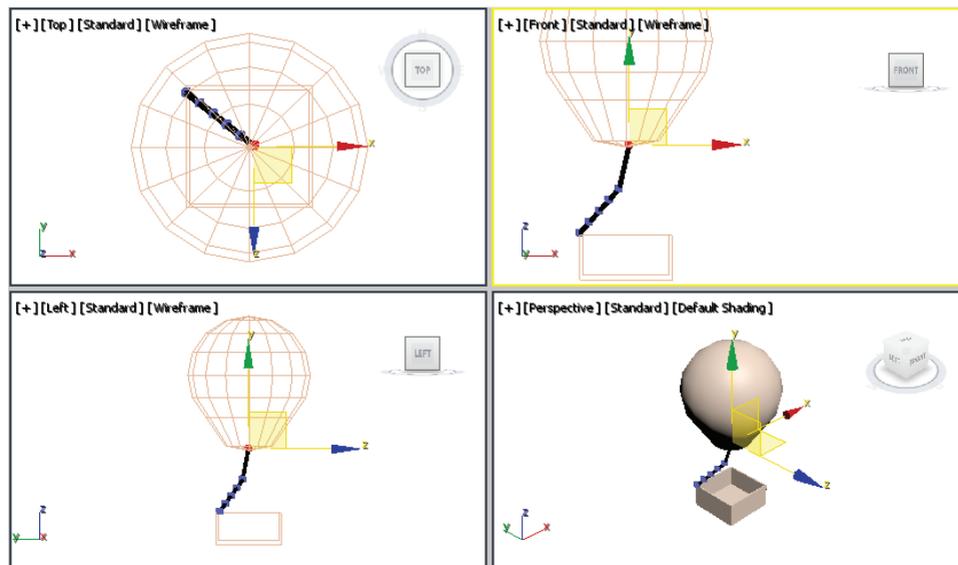
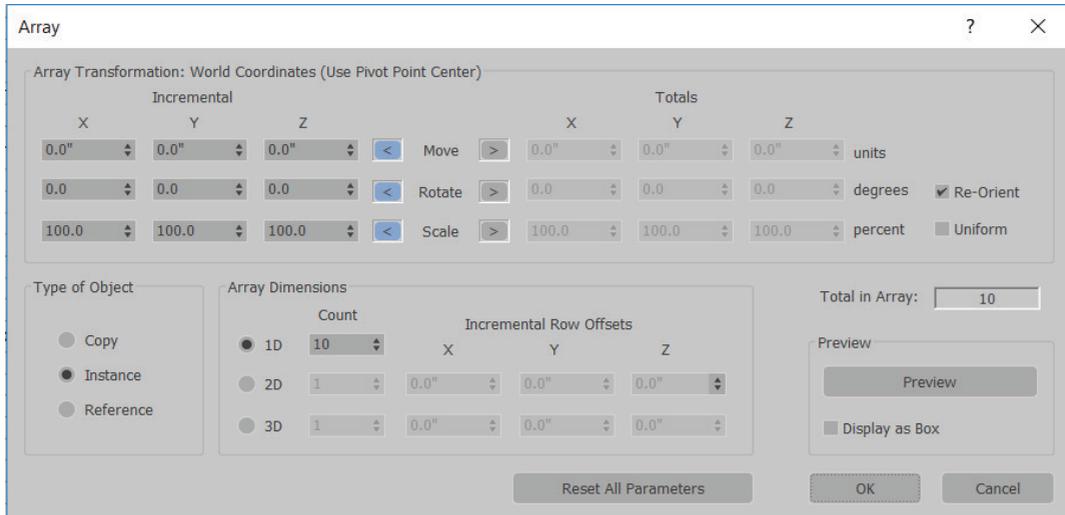
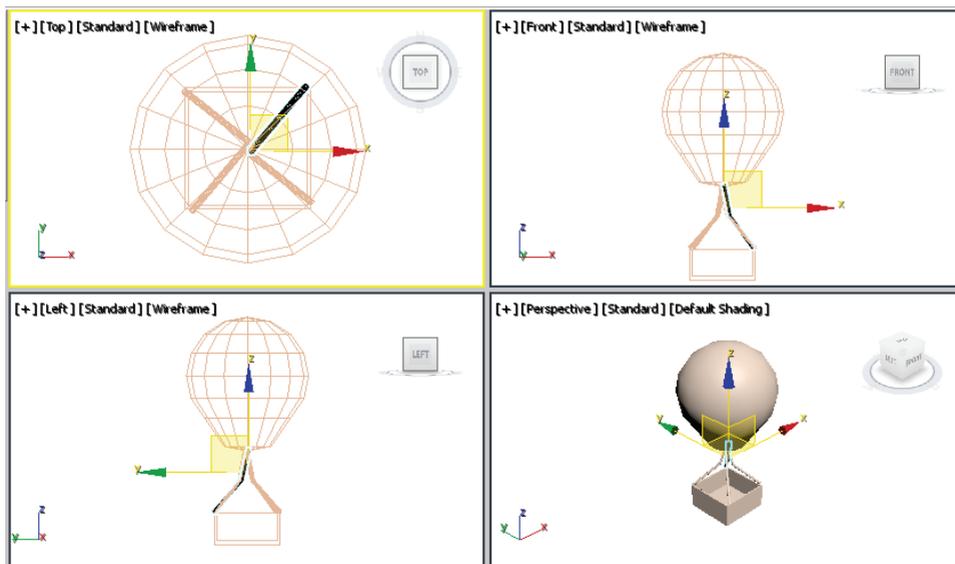


Figure 3-9 The end vertices of the Rope01 moved to touch the bottom of the balloon



*Figure 3-10 The Array dialog box*



*Figure 3-11 The four ropes placed at the four corners of basket*

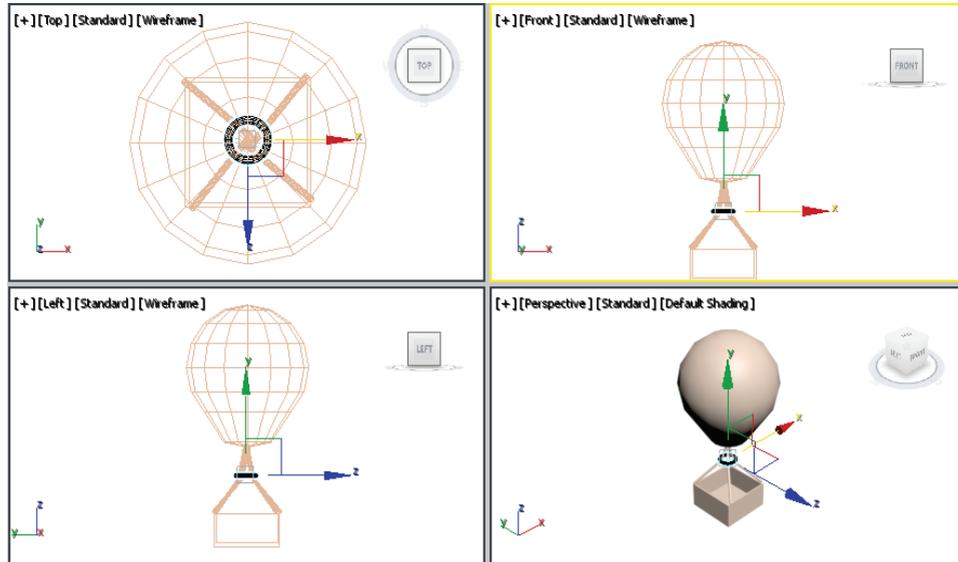


Figure 3-12 Alignment of collar with the ropes

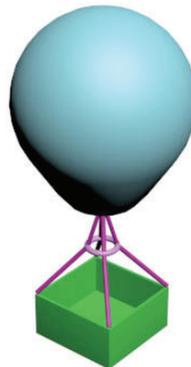


Figure 3-13 The rendered image of the hot air balloon

**Tutorial 2**

Figure 3-14 The model of a shed

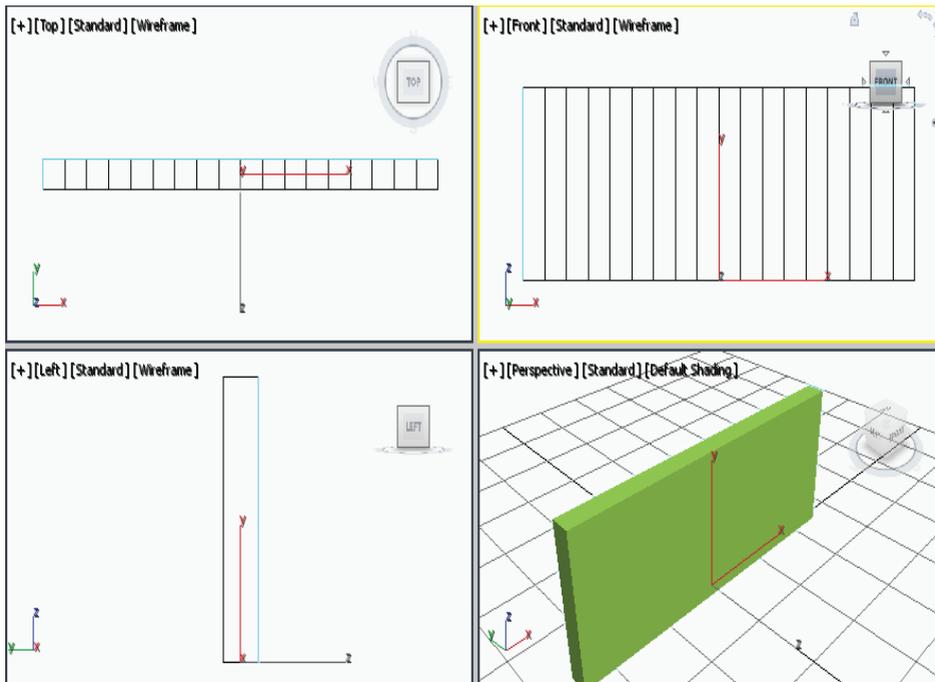


Figure 3-15 The side 1 displayed in all viewports

[+][Front][Standard][Wireframe]

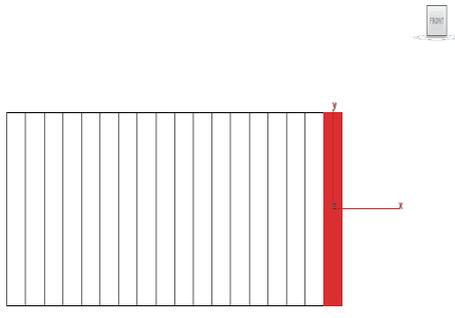


Figure 3-16 The polygon selected

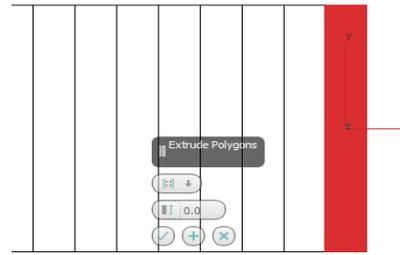


Figure 3-17 The Extrude Polygons caddy control

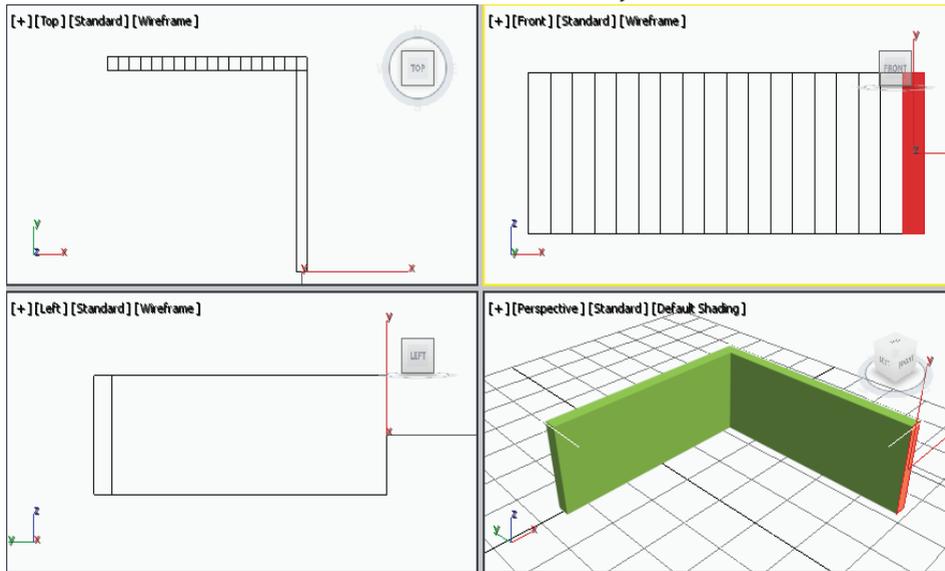
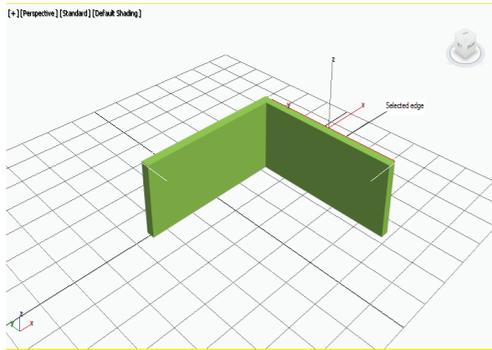
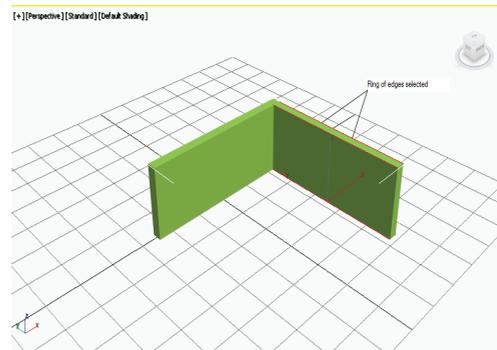


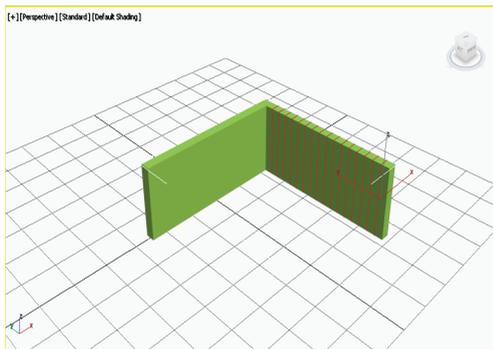
Figure 3-18 The selected polygon extruded



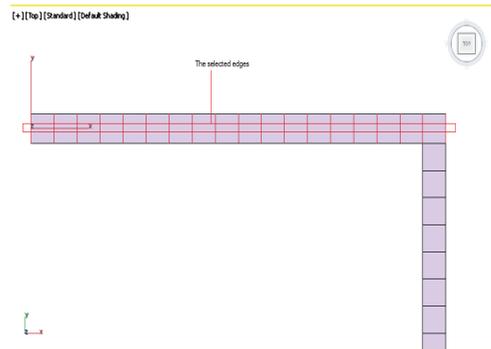
*Figure 3-19 The edge selected*



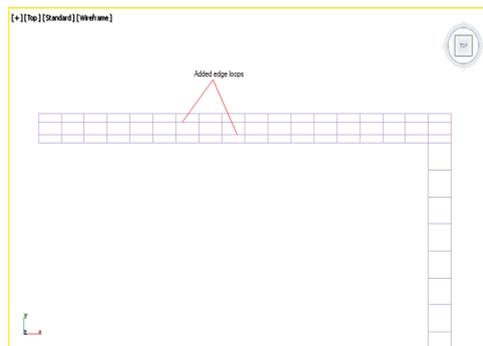
*Figure 3-20 The ring of edges selected*



*Figure 3-21 The edge loops added*



*Figure 3-22 The vertical edges selected*



*Figure 3-23 Two edge loops added*

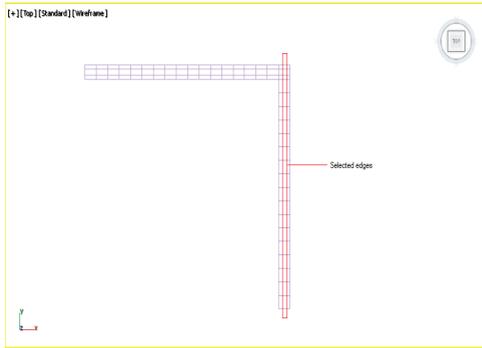


Figure 3-24 The horizontal edges selected

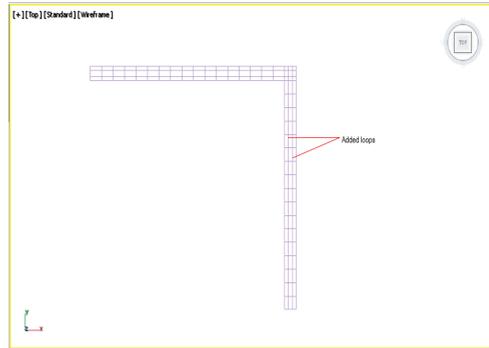


Figure 3-25 Two edge loops added

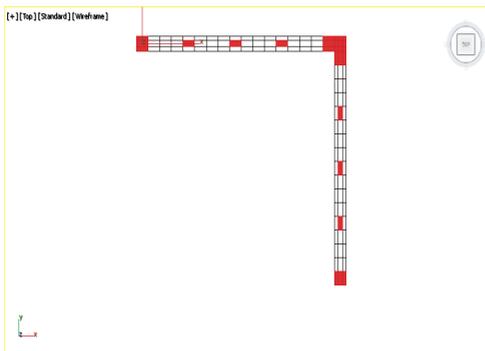


Figure 3-26 The polygons selected

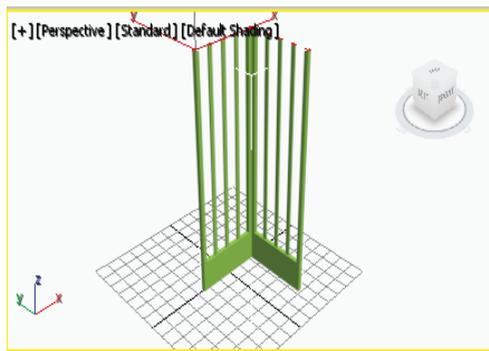


Figure 3-27 The selected polygons extruded

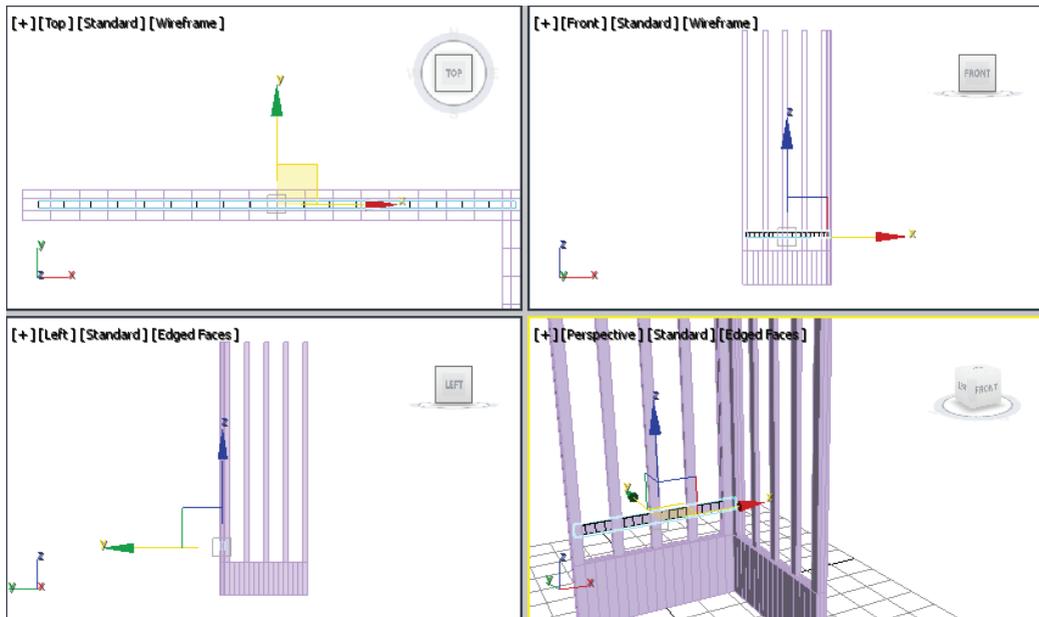


Figure 3-28 The hozt strip1 aligned

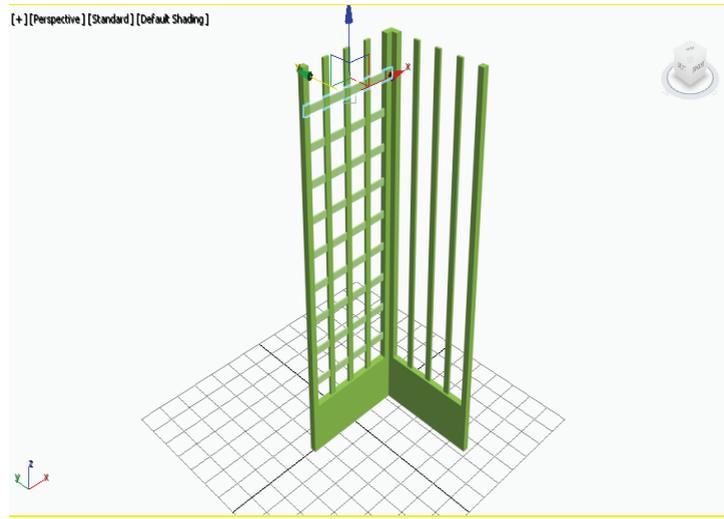


Figure 3-29 The copies of hozt strip1 created

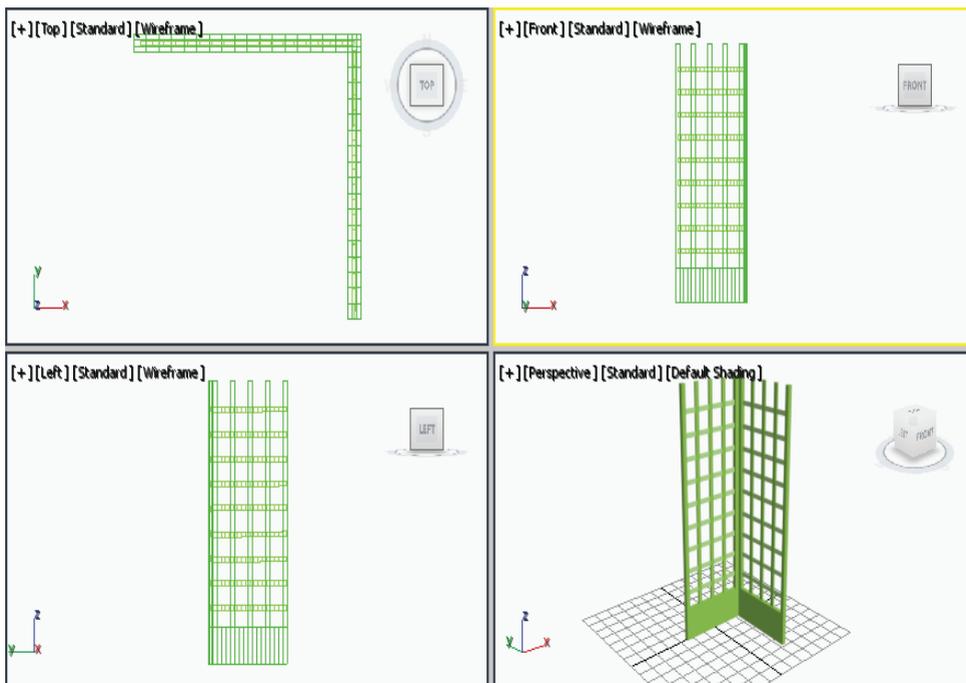


Figure 3-30 The copies of the horizontal strips created

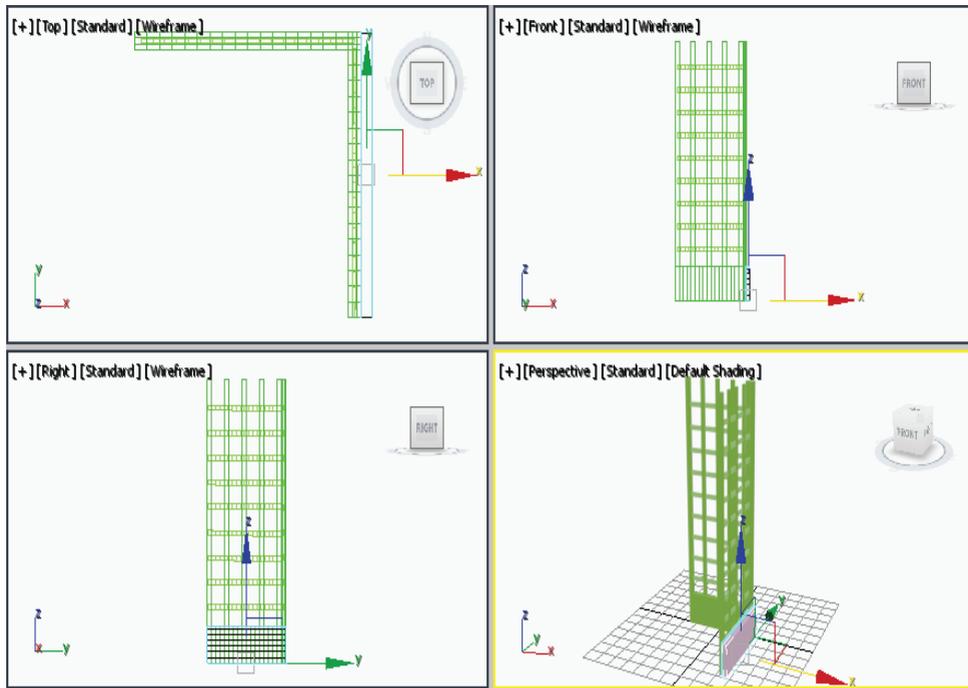


Figure 3-31 The support1 aligned in all viewports

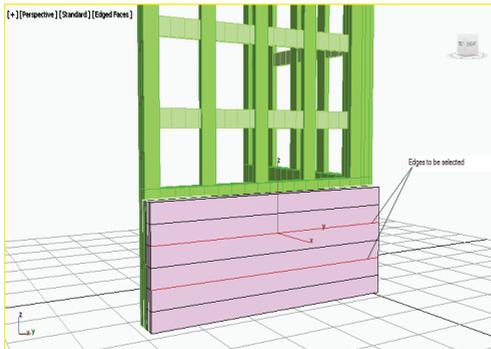


Figure 3-32 Two edges selected

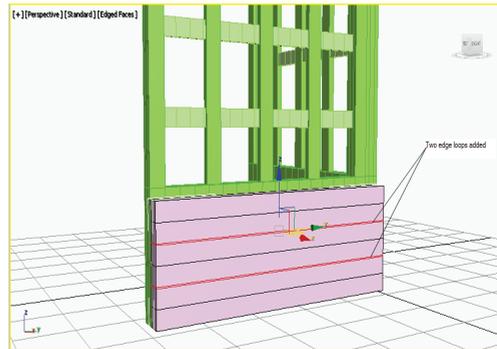


Figure 3-33 Two edge loops added

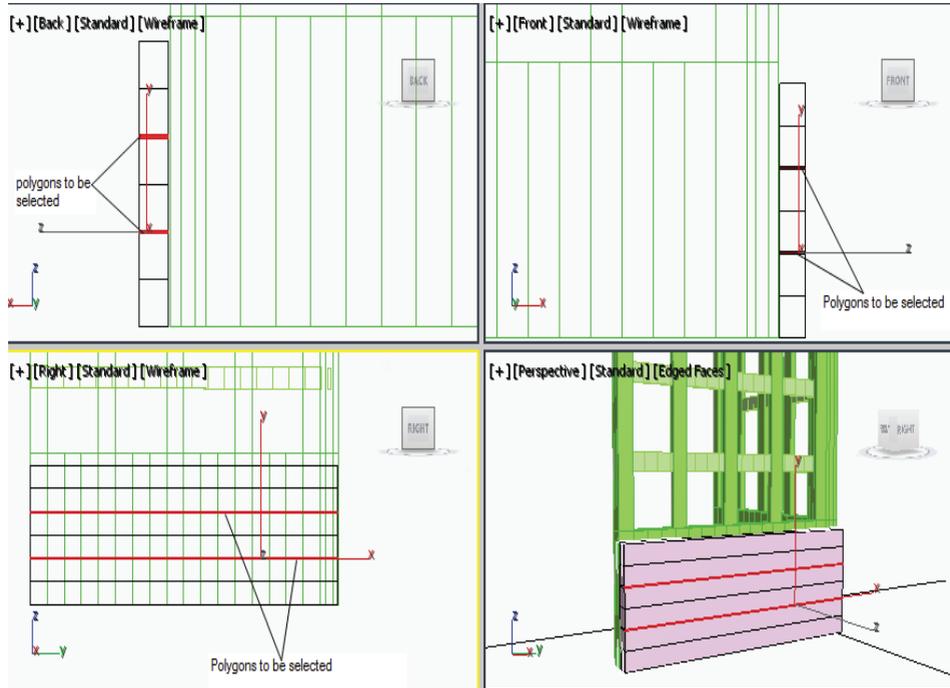


Figure 3-34 The selected polygons

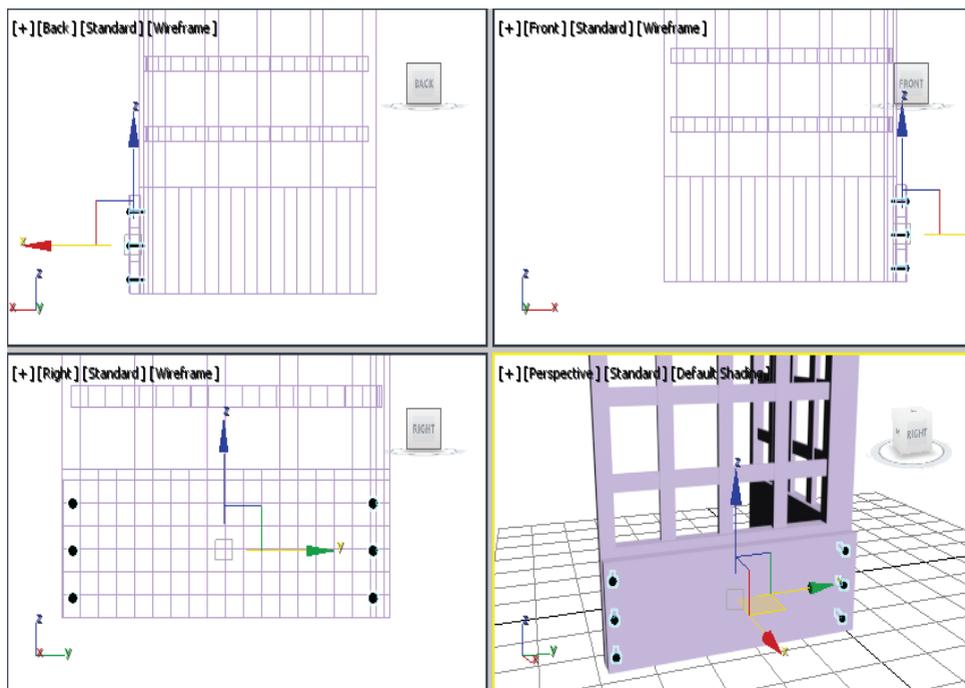


Figure 3-35 The rivets aligned

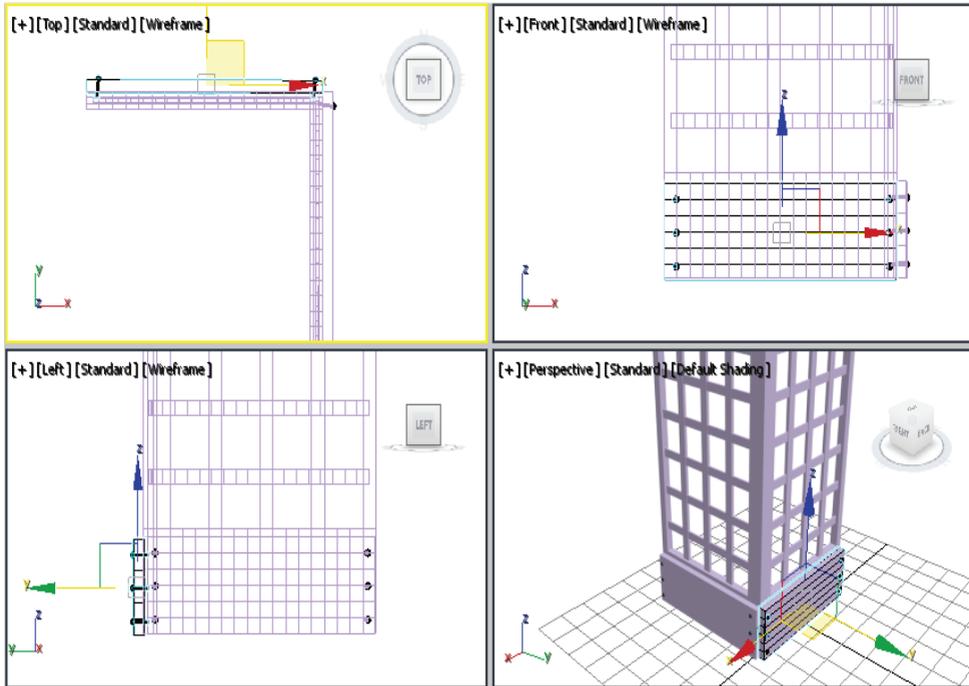


Figure 3-36 The support02 aligned

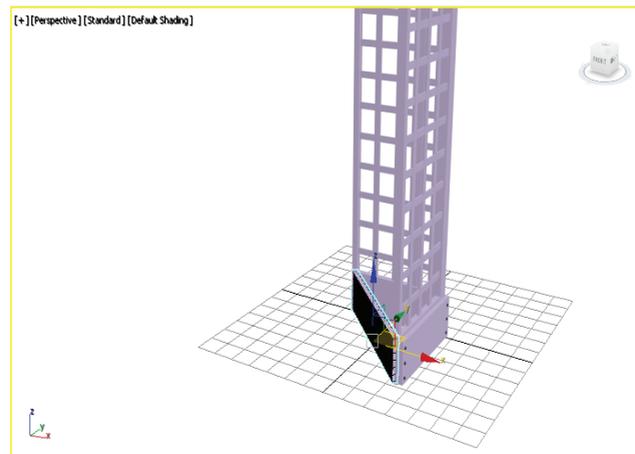


Figure 3-37 The support03 aligned

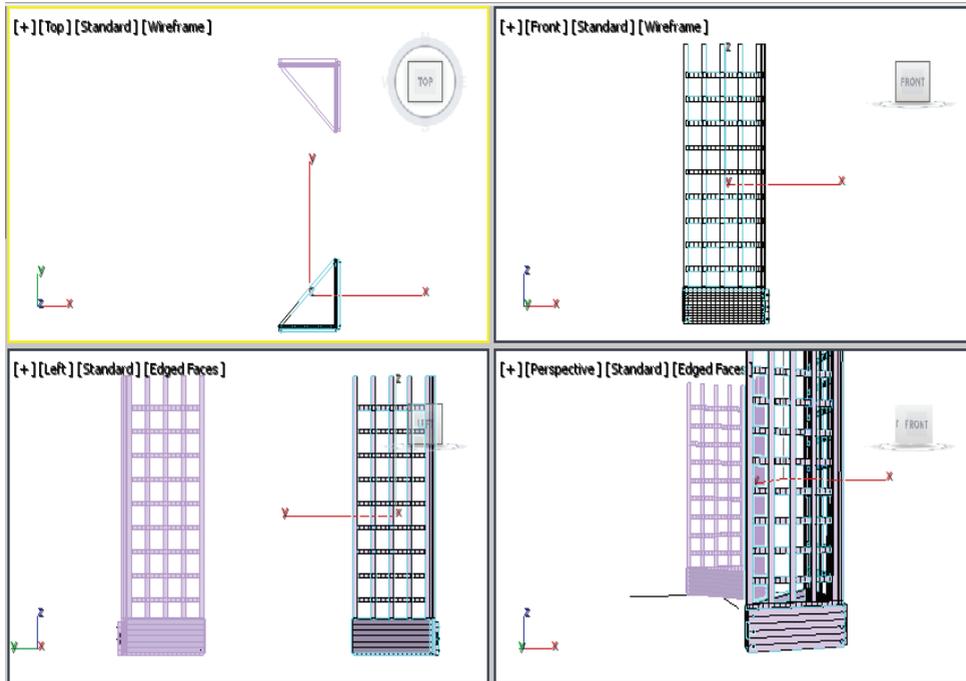


Figure 3-38 The SIDE002 created and positioned

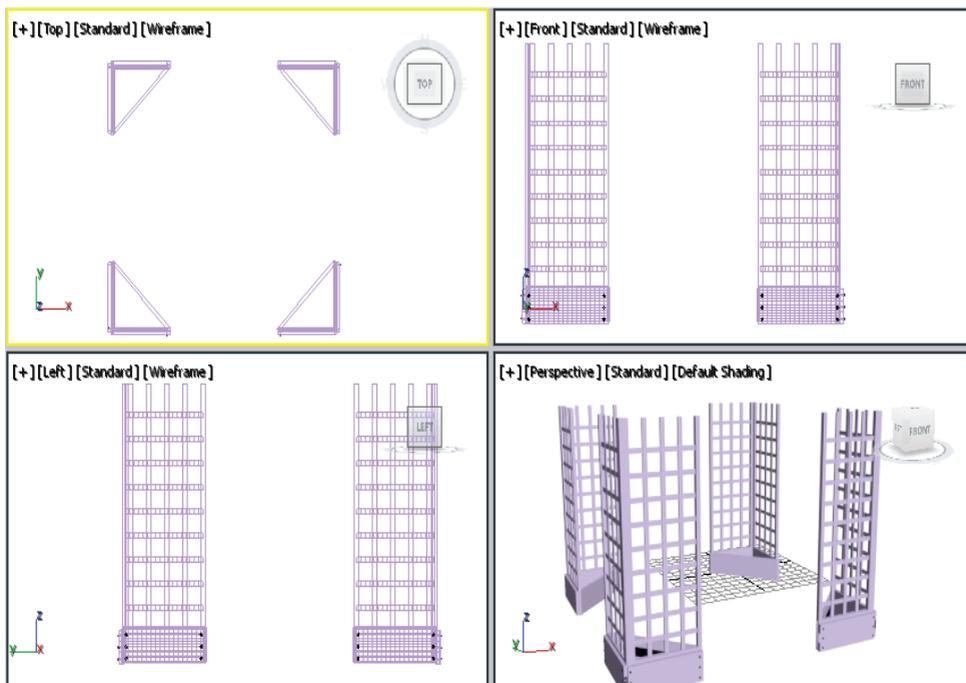


Figure 3-39 The SIDE003 and SIDE004 positioned

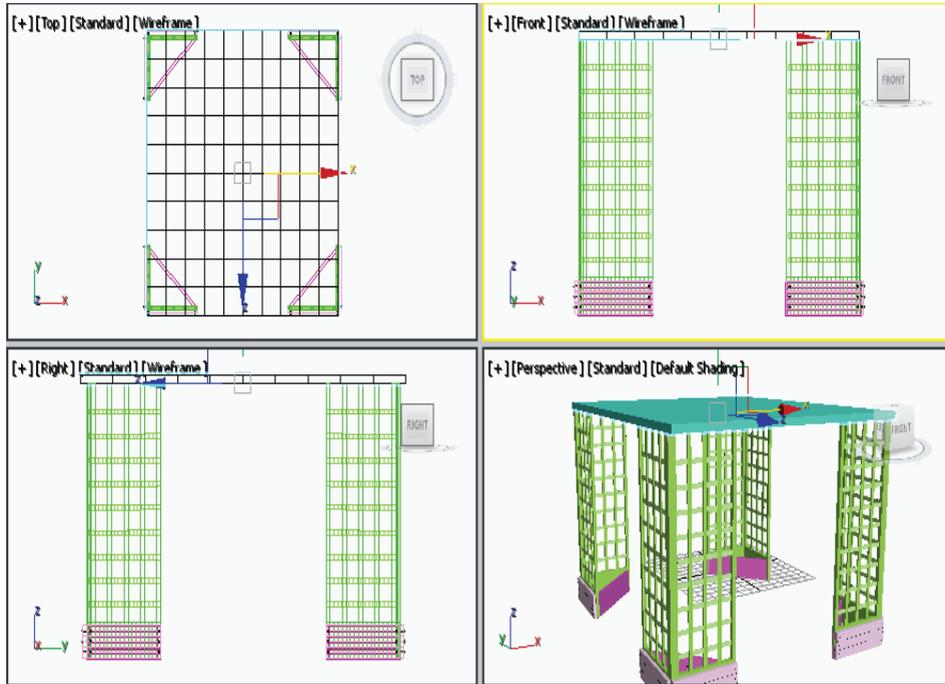


Figure 3-40 Top 1 aligned in all viewports

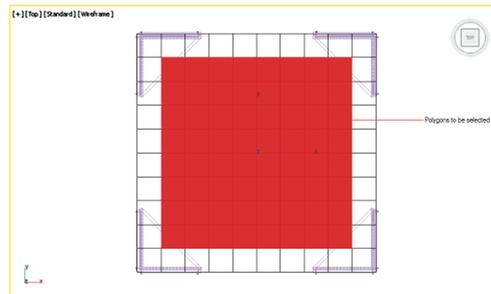


Figure 3-41 The polygons selected

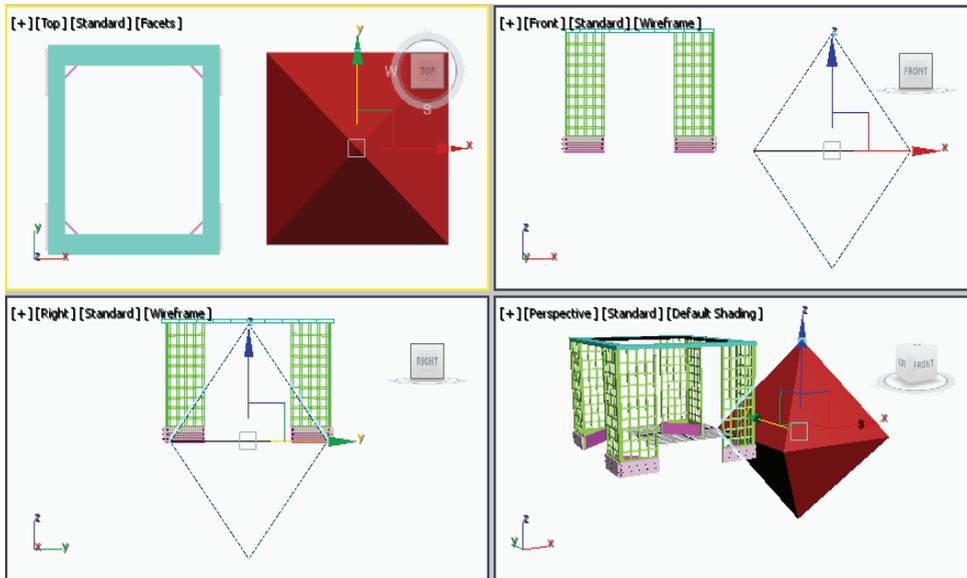


Figure 3-42 Hedra001 created

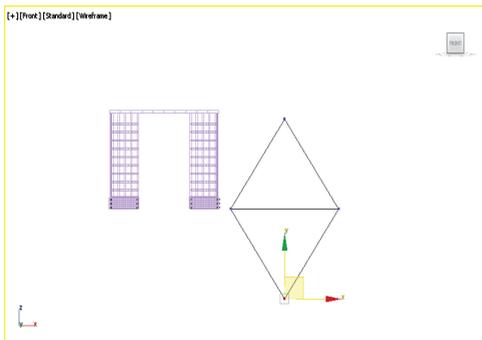


Figure 3-43 The selected vertex

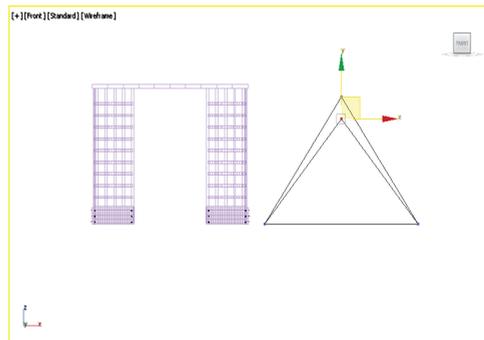


Figure 3-44 The vertex moved

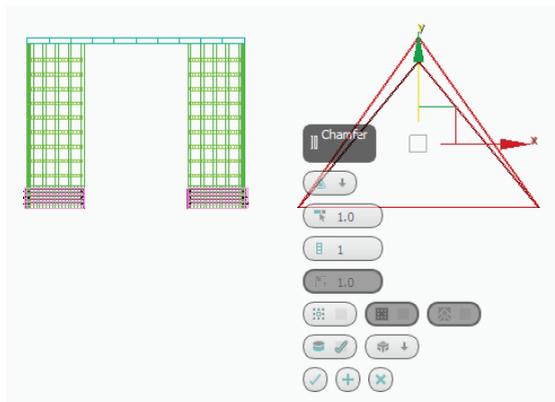


Figure 3-45 The Chamfer caddy control

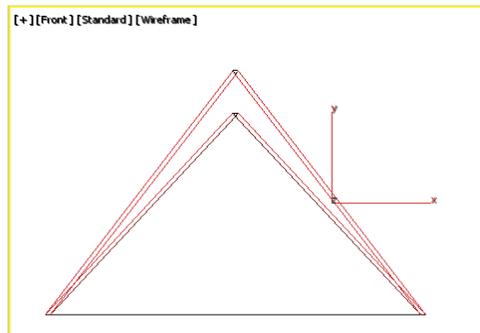


Figure 3-46 All edges chamfered

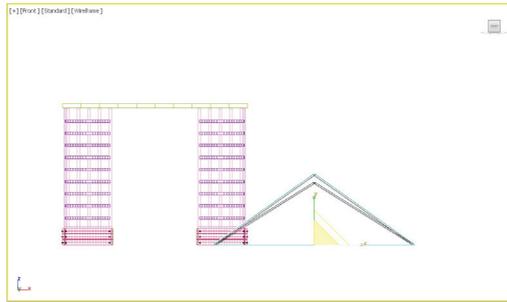


Figure 3-47 The Top 2 scaled

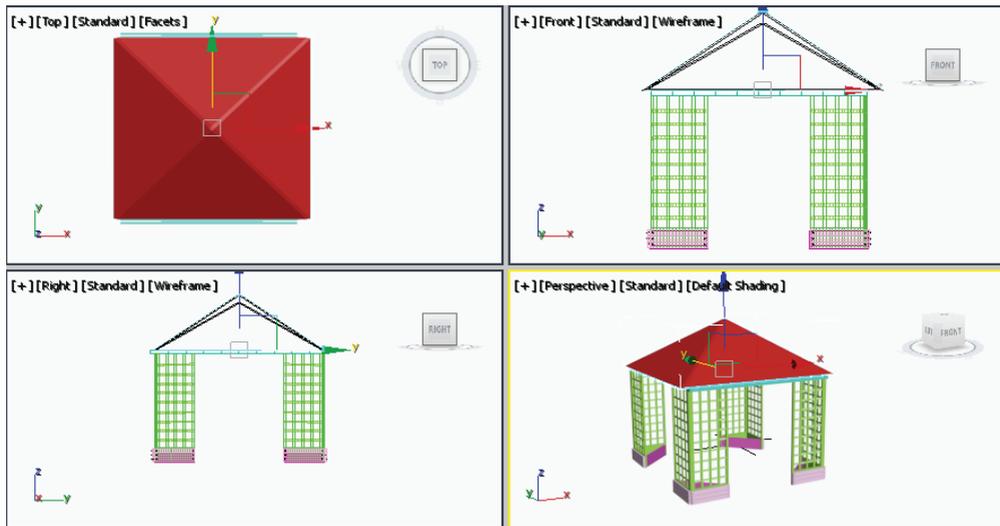


Figure 3-48 The Top 2 aligned in all viewports

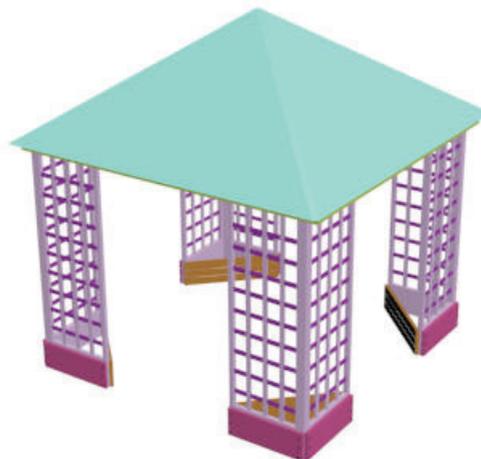


Figure 3-49 The rendered image of a shed

**Exercise 1**

*Figure 3-50 The scene of an umbrella and a table*

# Chapter 4

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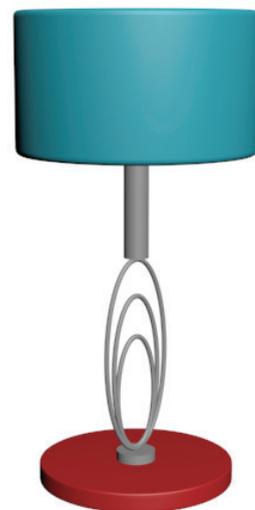
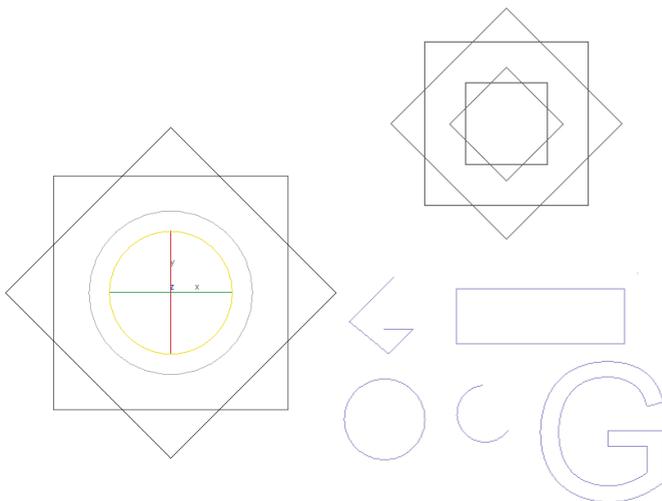
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## Working with Splines-I

### Learning Objectives

**After completing this chapter, you will be able to:**

- *Create 2D shapes*
- *Modify splines*
- *Change bezier splines*
- *Work with transform centers*



# Tutorial 1

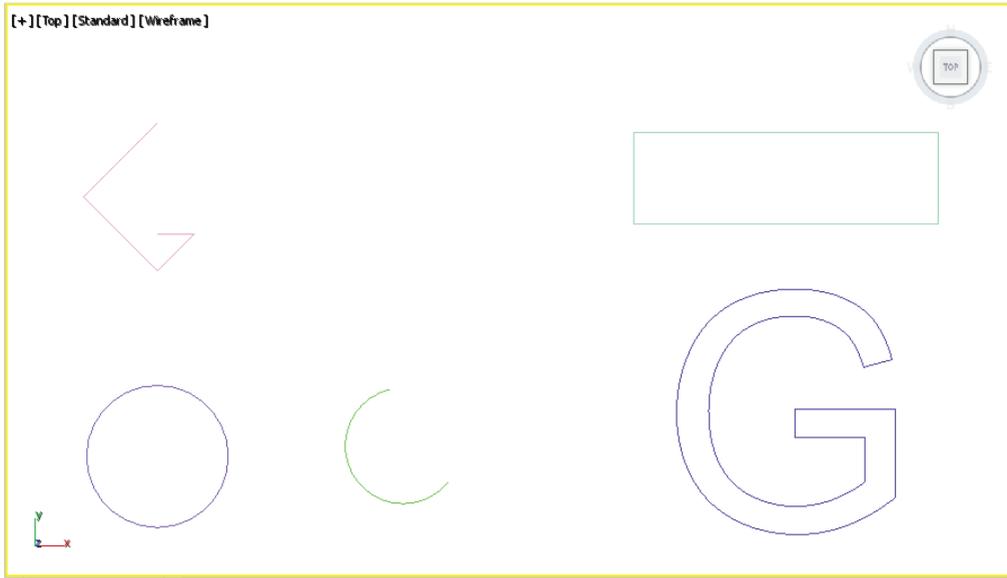


Figure 4-1 Different spline shapes created in the Top viewport

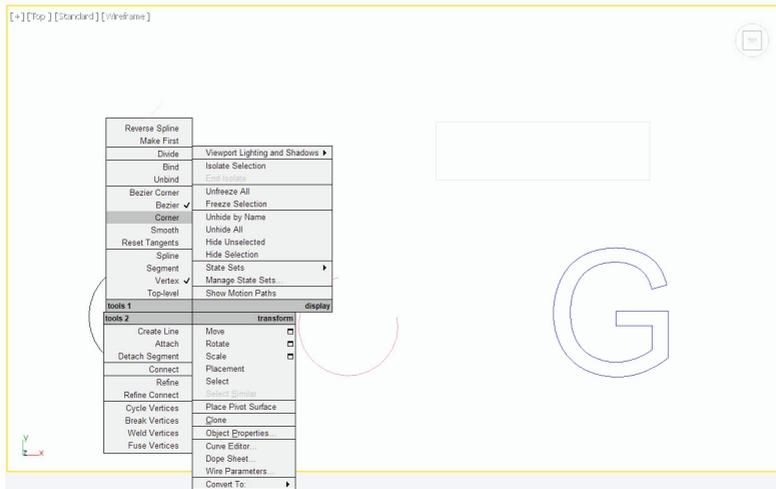


Figure 4-2 Choosing **Corner** from the upper-left quadrant of the quad menu

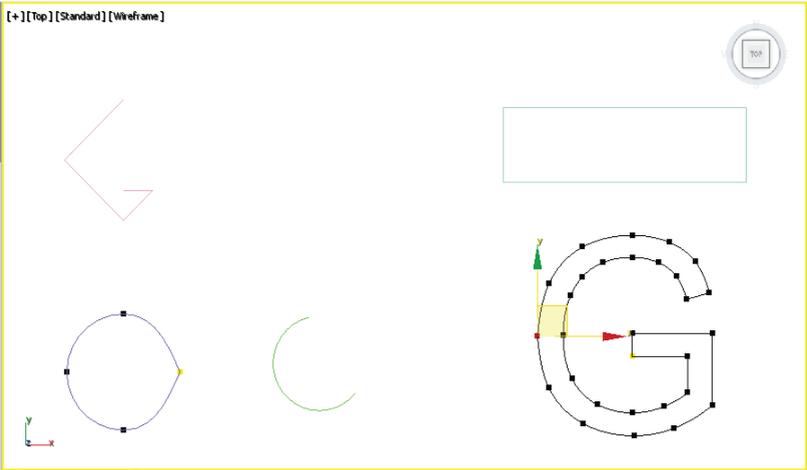


Figure 4-3 The curved vertices changed to corner

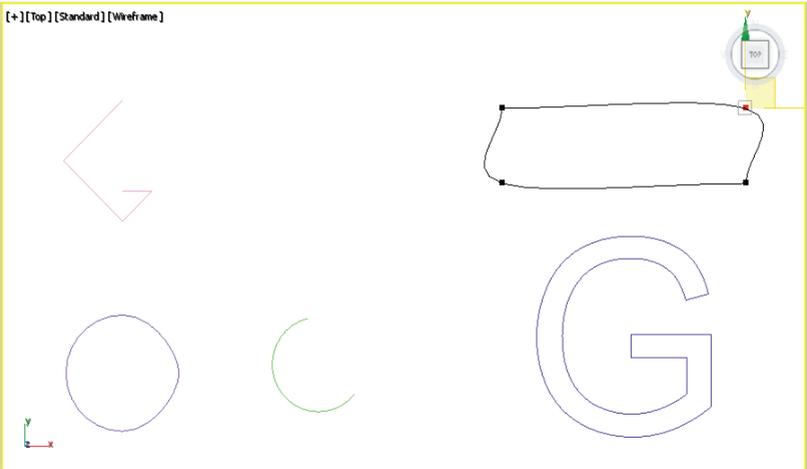
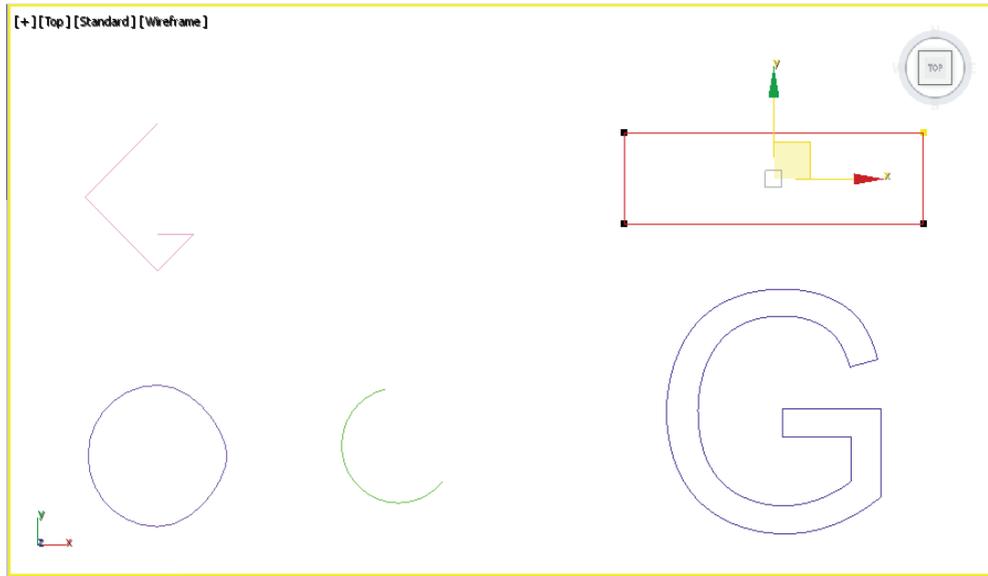
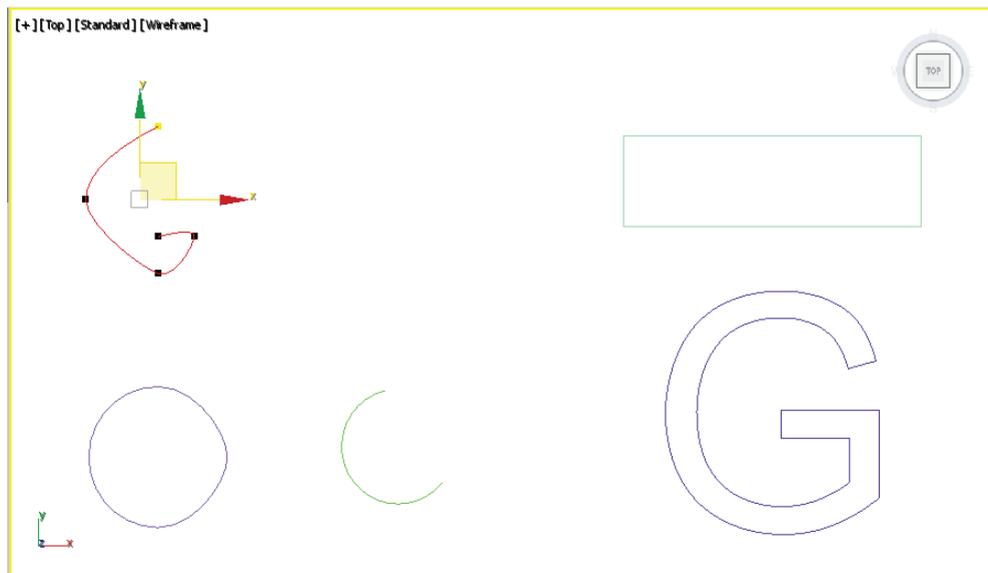


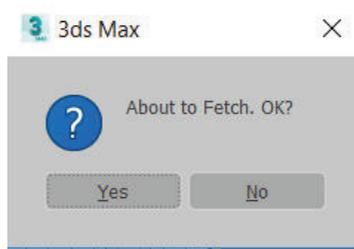
Figure 4-4 Two corners of the rectangle changed to smooth curves



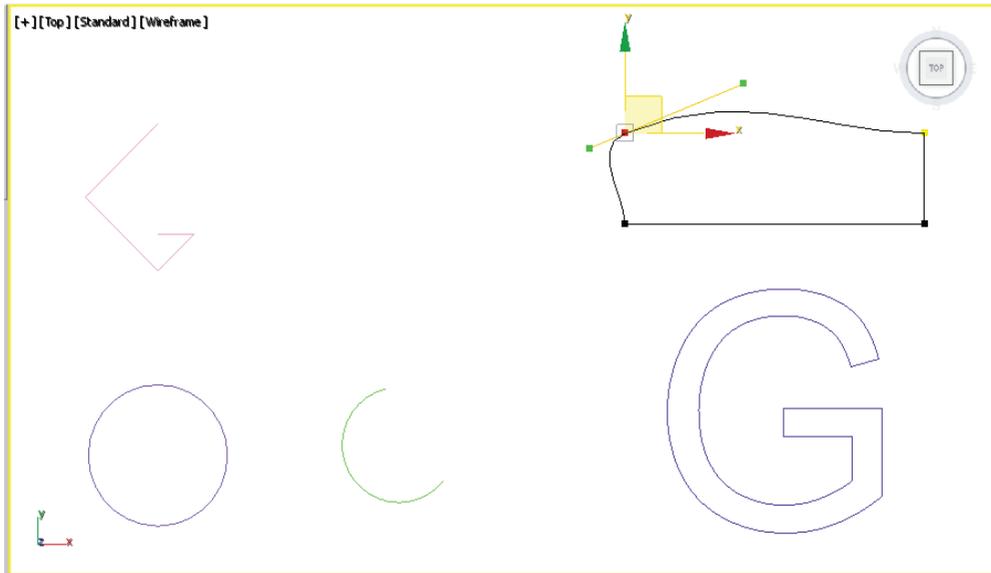
*Figure 4-5 The rectangle restored to its original shape*



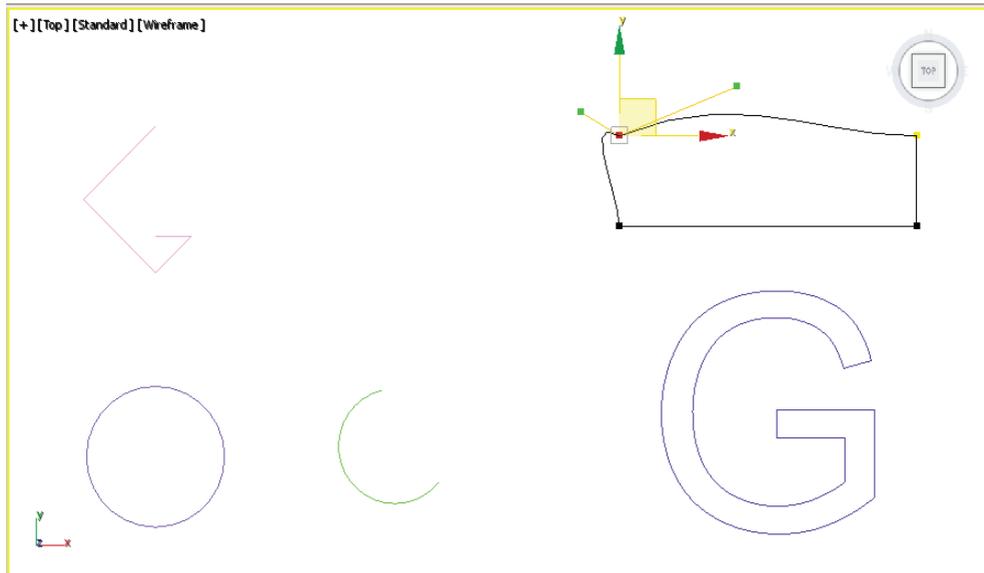
*Figure 4-6 The curved line spline*



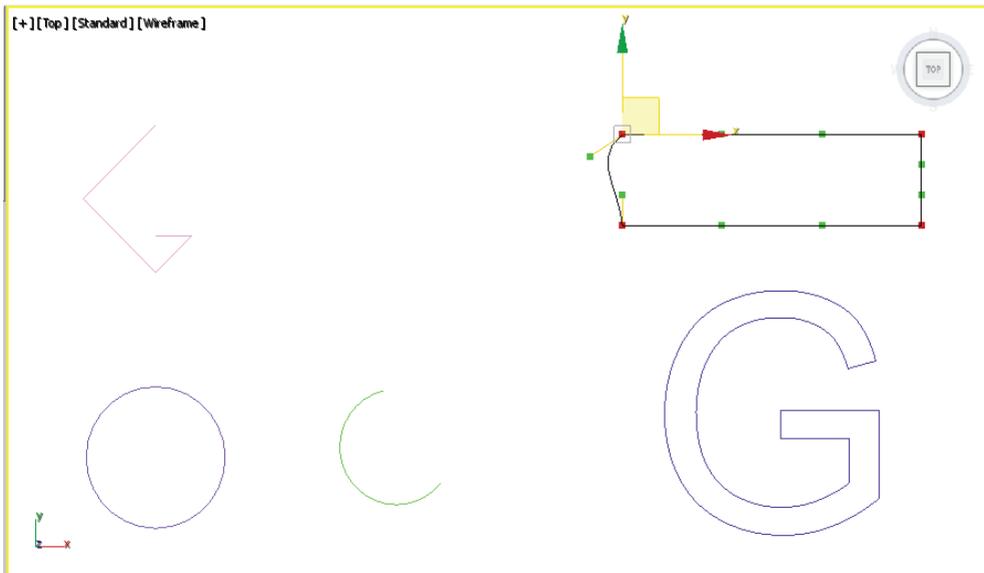
*Figure 4-7 The About to Fetch. OK? message box*



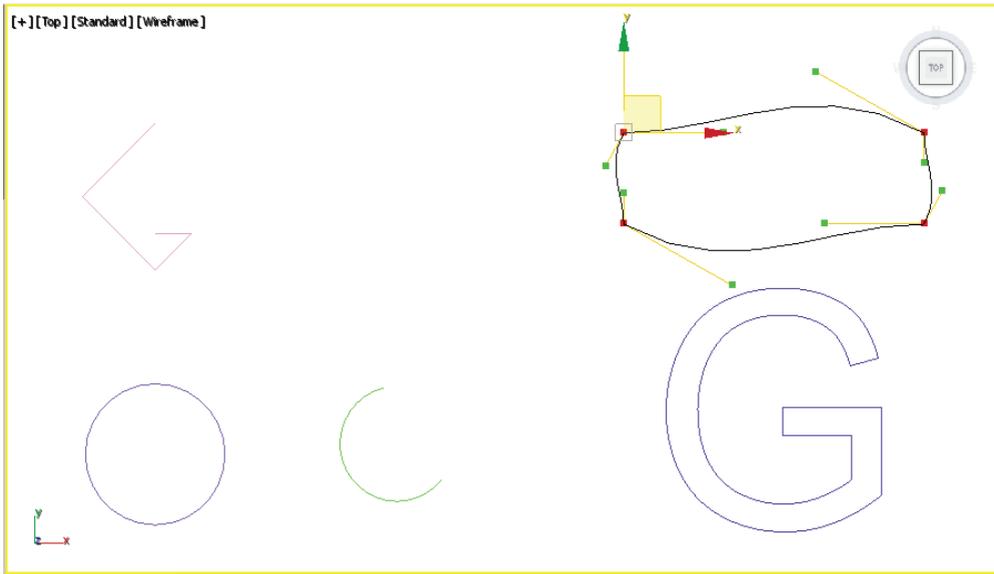
*Figure 4-8 Shape of the rectangle after dragging one of the handles*



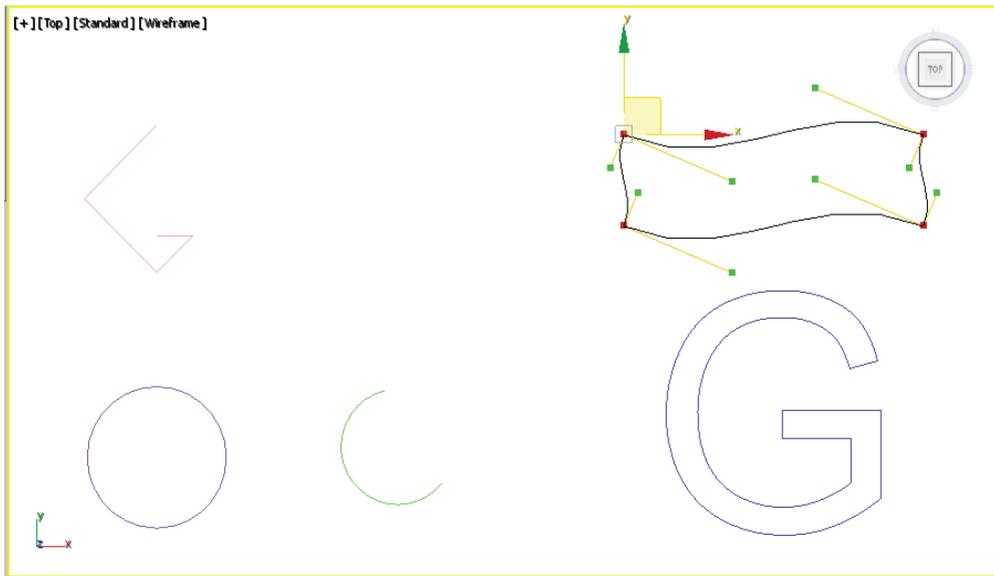
*Figure 4-9 Curved line segments of the spline*



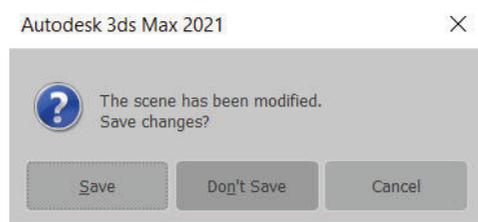
*Figure 4-10 Adjusting the bezier handles*



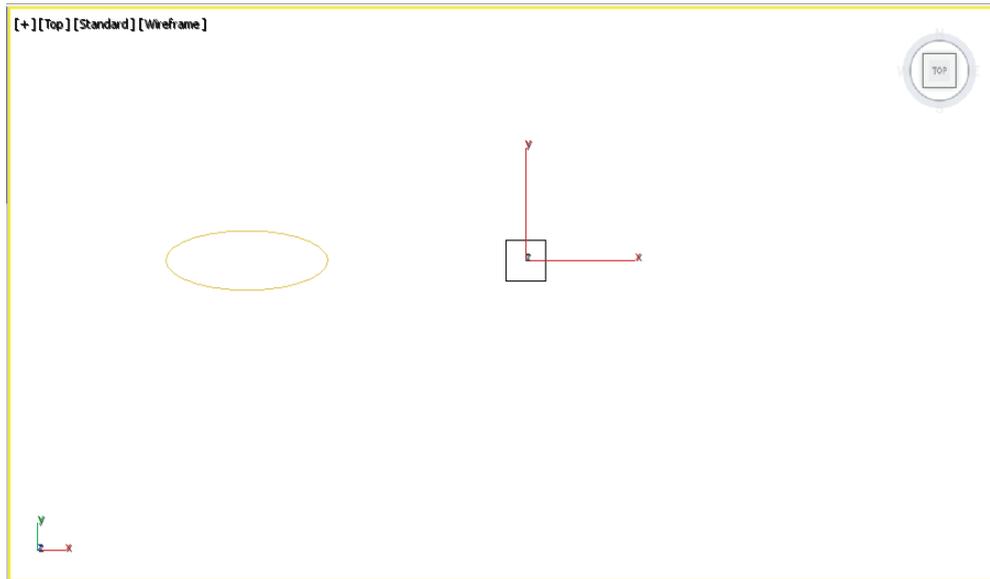
*Figure 4-11 All similar bezier handles affected by the **Lock Handles** check box and the **Alike** radio button*



*Figure 4-12 All bezier handles affected on selecting the **All** radio button*



*Figure 4-13 The Autodesk 3ds Max 2021 message box*



*Figure 4-14 The ellipse and square created in the Top viewport*

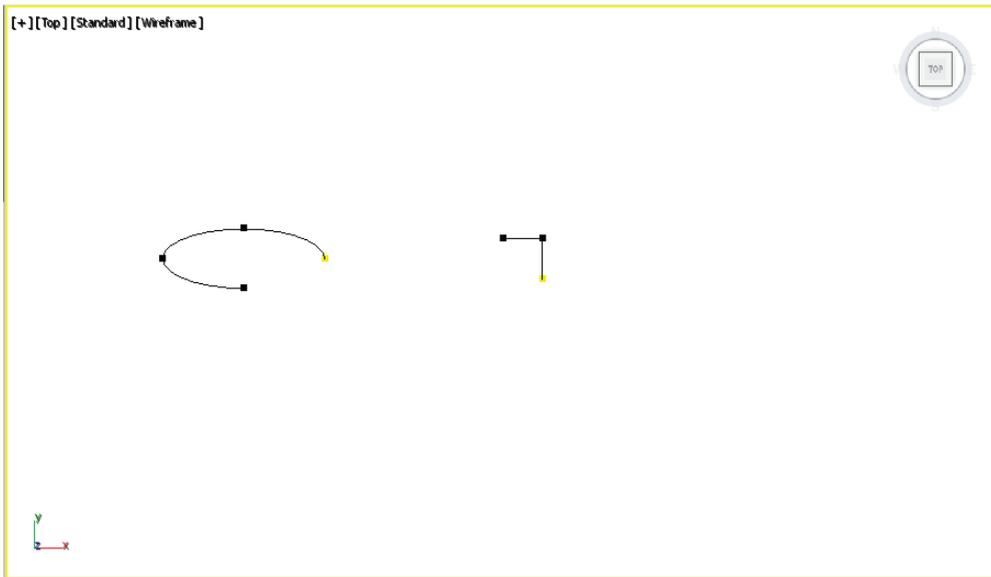


Figure 4-15 Selected segments deleted from the shapes

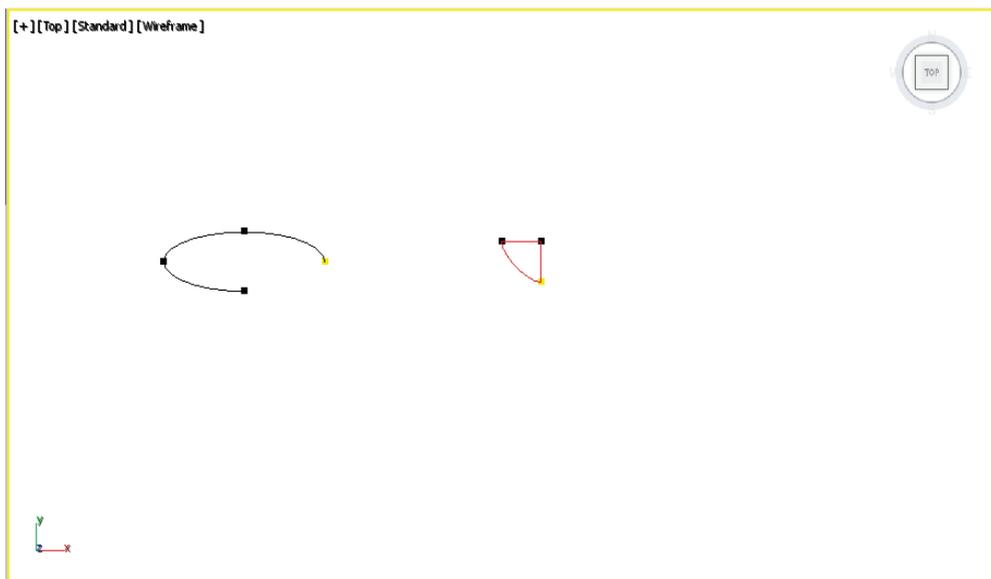
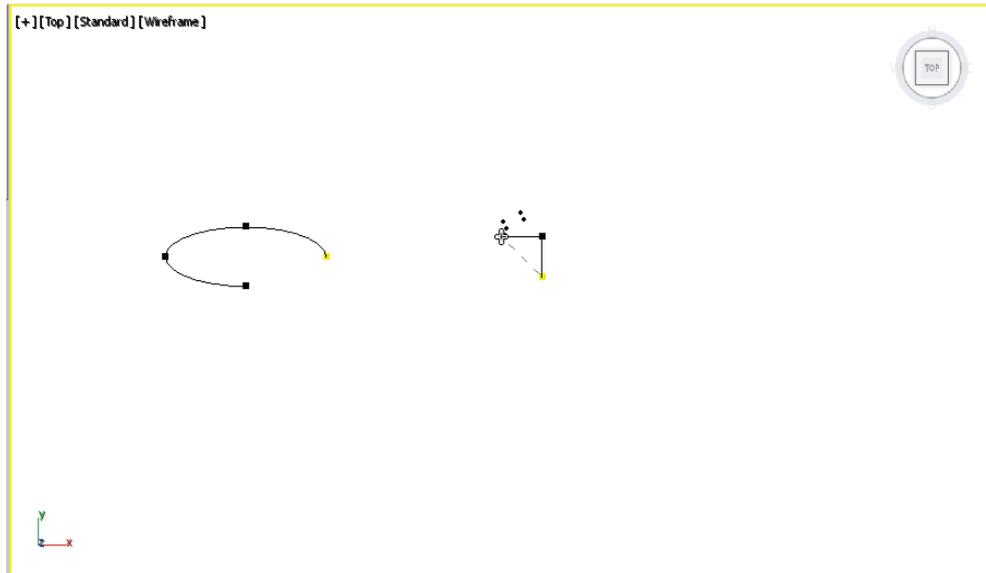
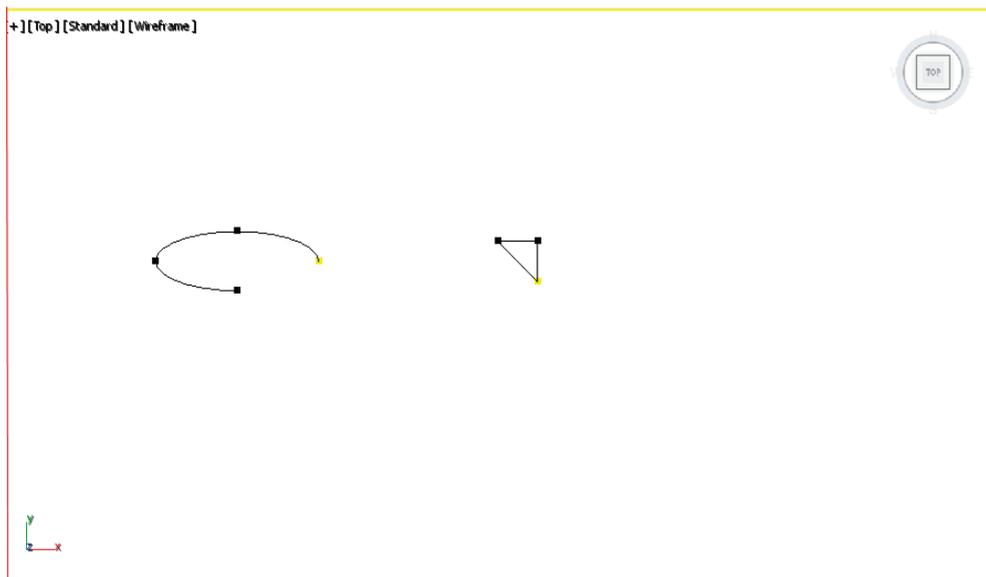


Figure 4-16 The closed spline



*Figure 4-17 A dashed line attached to the end vertices*



*Figure 4-18 The two vertices joined by a straight segment*

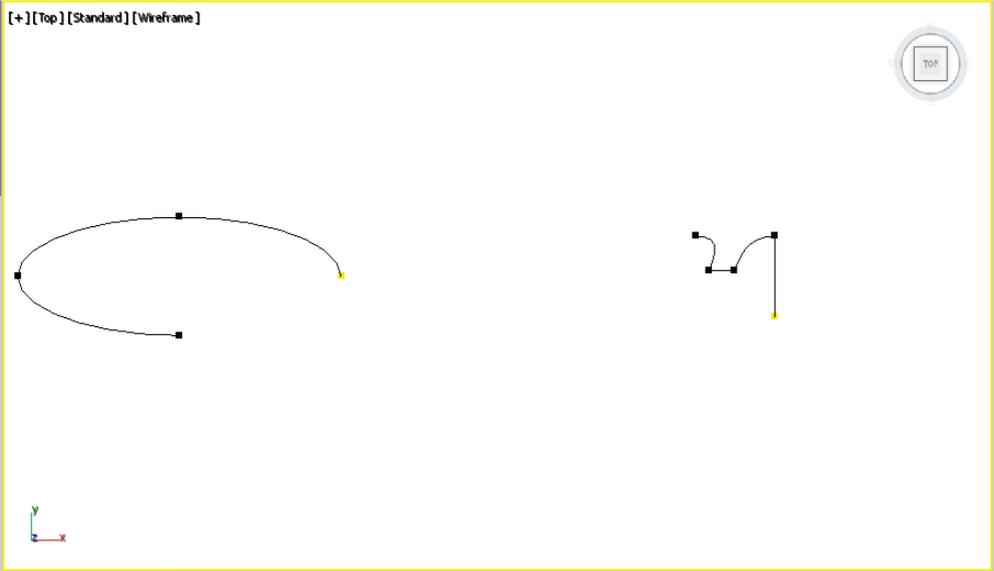


Figure 4-19 New vertices added to the segment

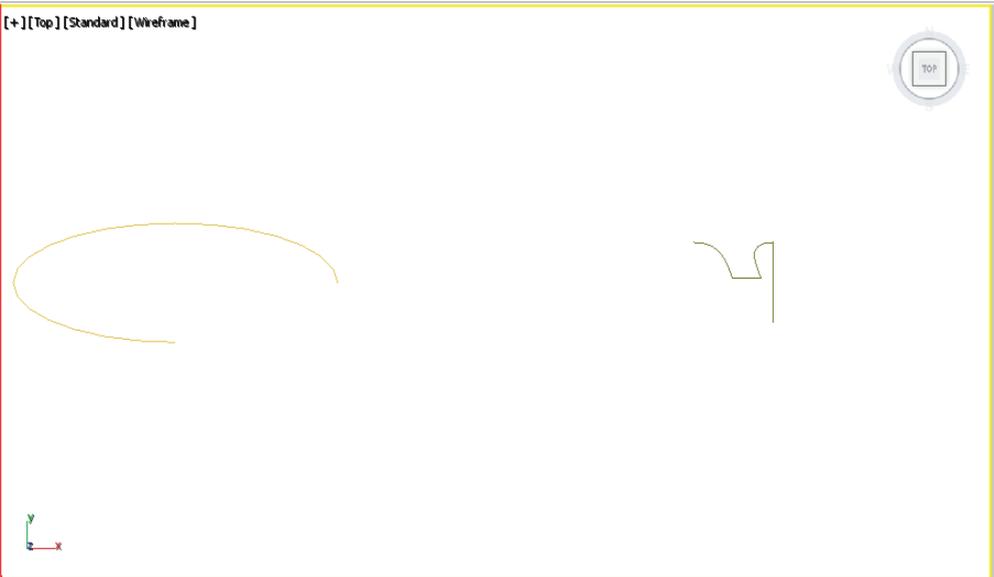
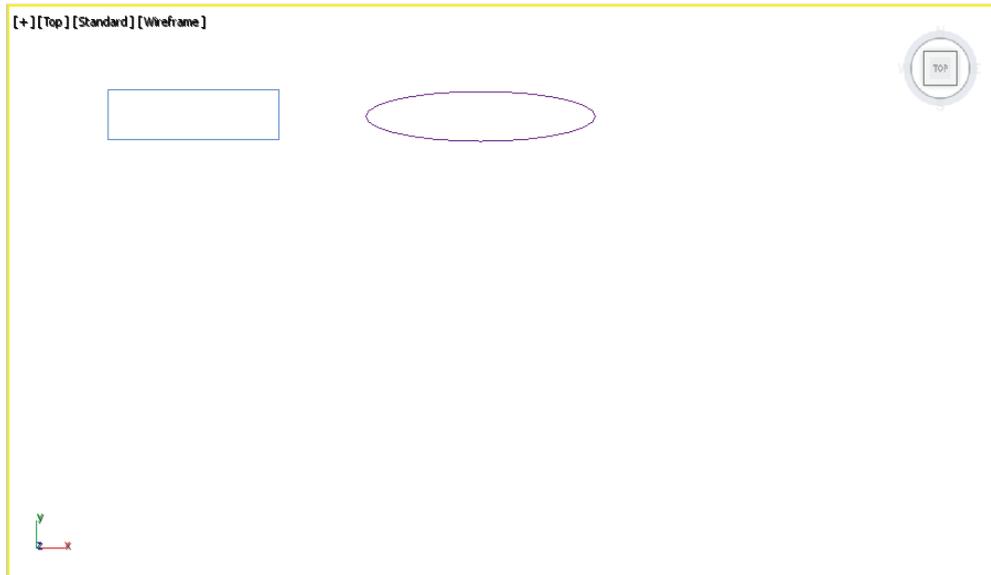
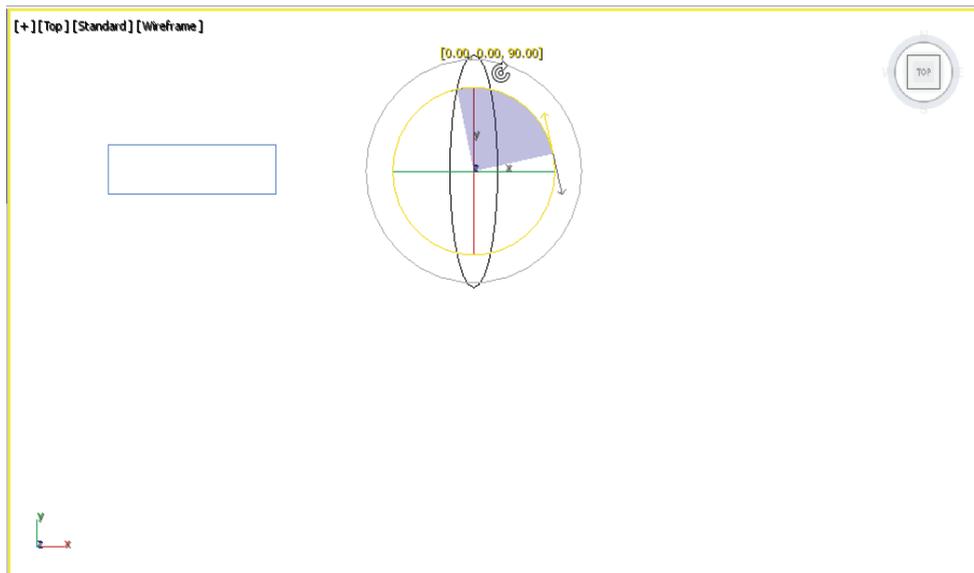


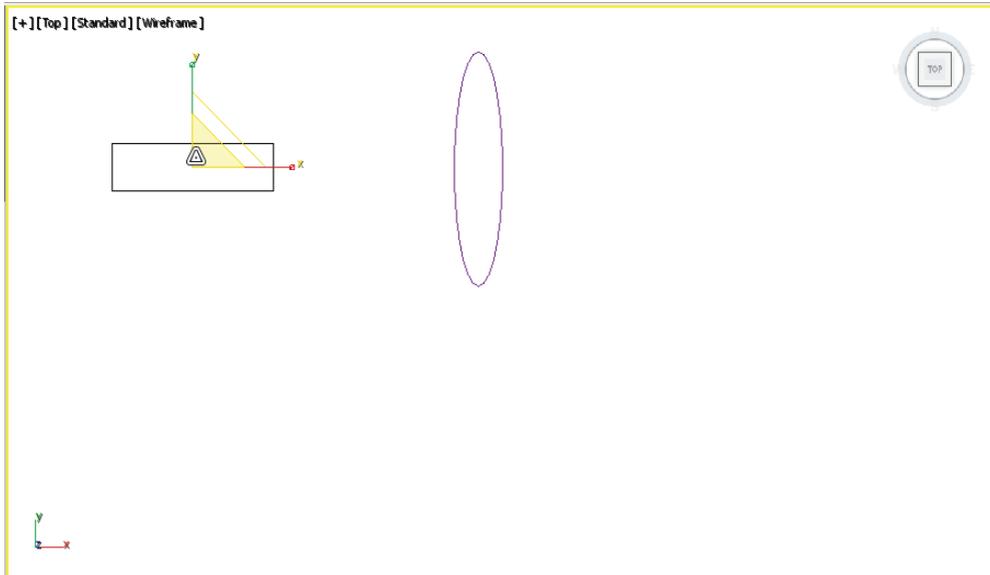
Figure 4-20 The resulting shape created after changing the direction of the spline



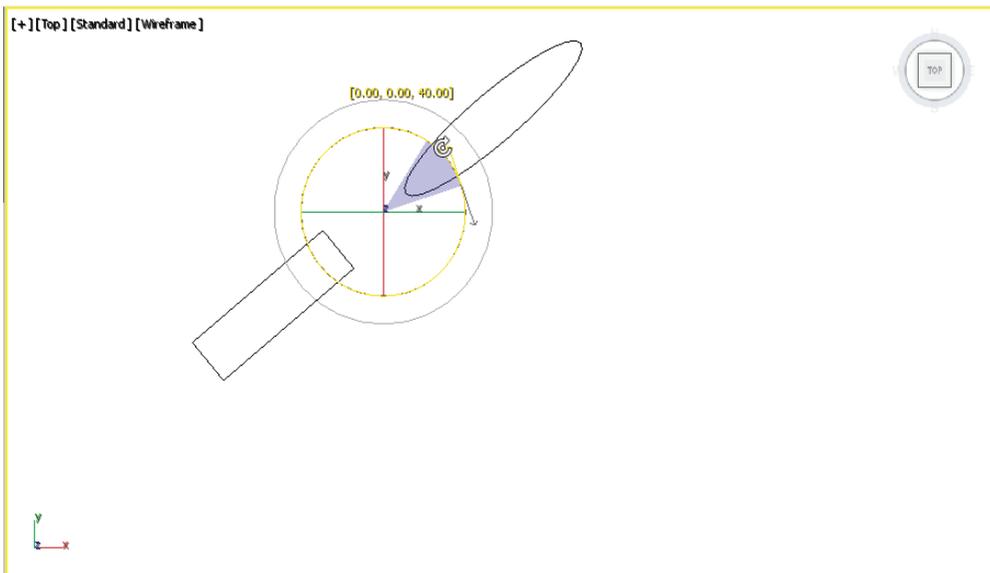
*Figure 4-21 A rectangle and an ellipse created*



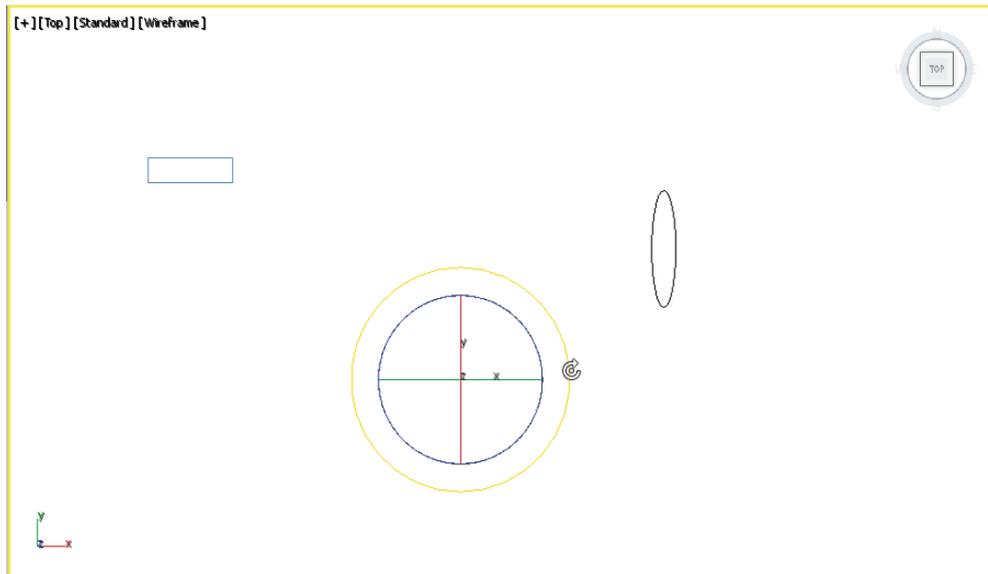
*Figure 4-22 The ellipse rotated to 90 degrees*



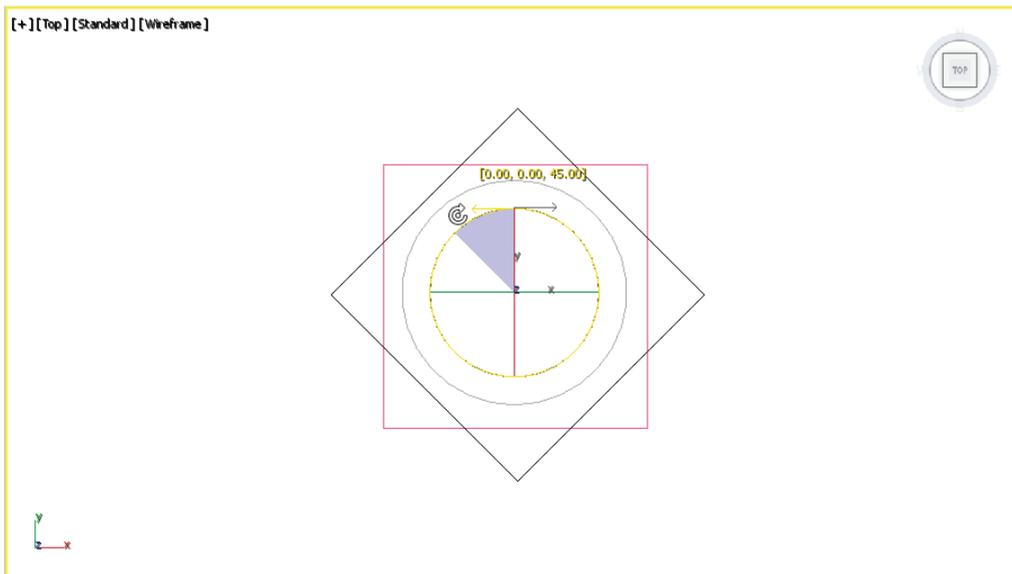
*Figure 4-23 The rectangle scaled to its pivot point*



*Figure 4-24 Both objects rotated around the center of their combined center point*



*Figure 4-25* The rotated ellipse after selecting **World** from the **Reference Coordinate System** drop-down list



*Figure 4-26* Rotating the square at an angle of 45 degrees

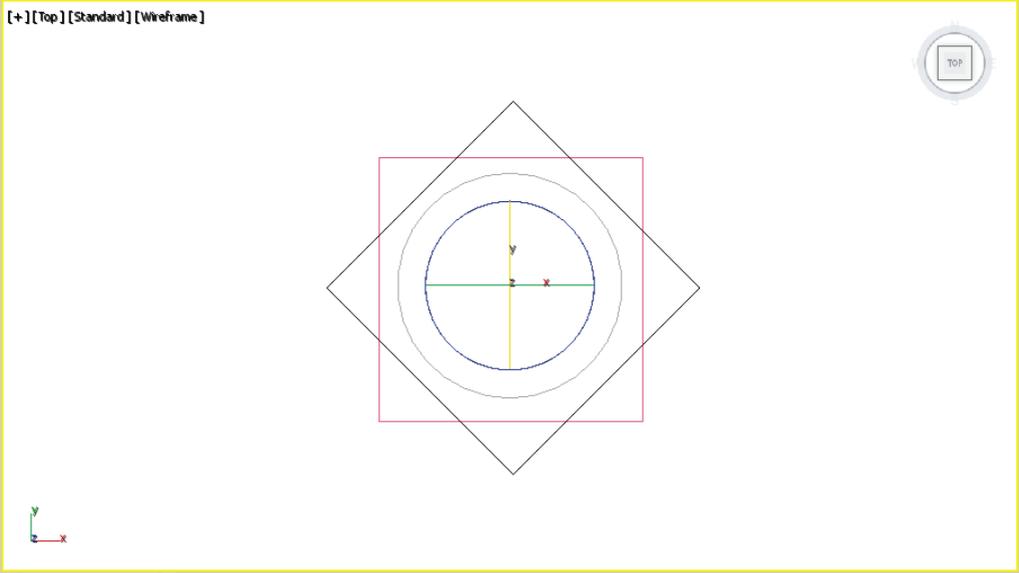


Figure 4-27 A copy of the square created by rotating it at 45 degrees

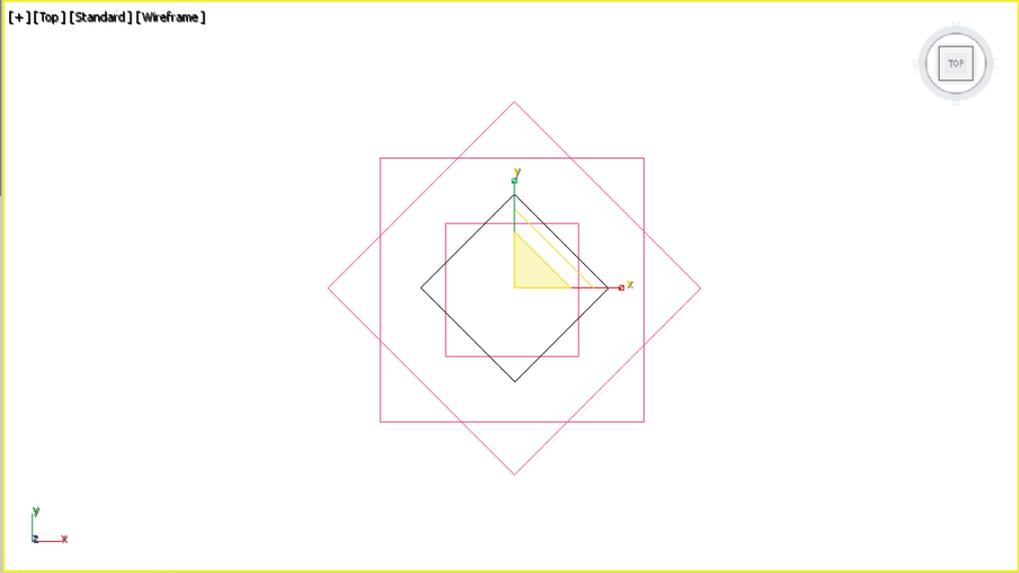
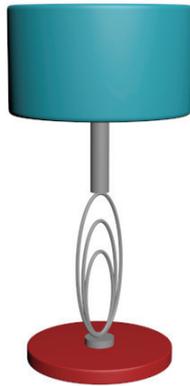
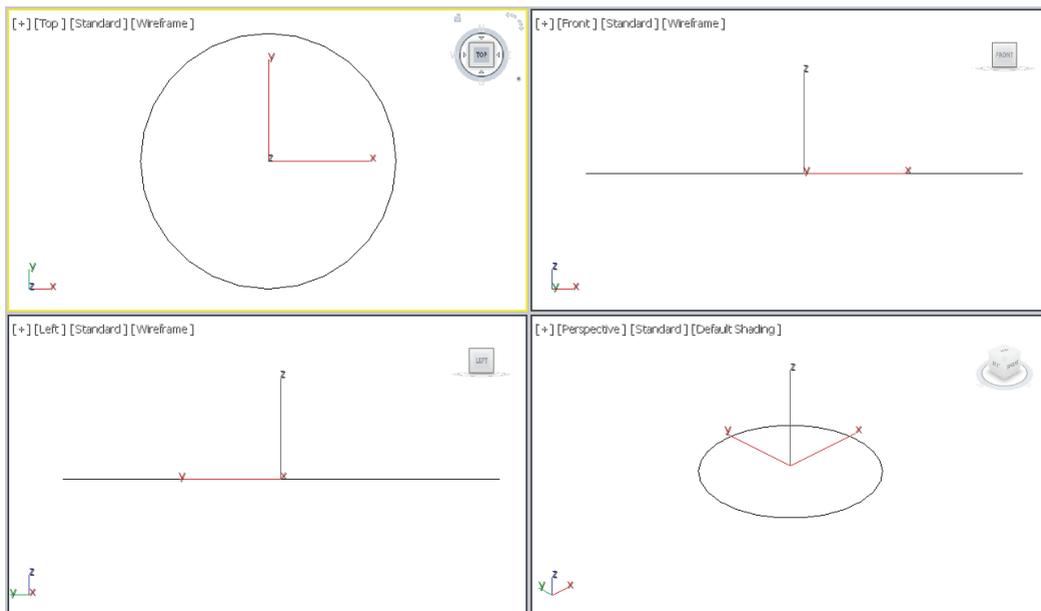


Figure 4-28 Both squares copied and scaled down to 50 percent of their original size

**Tutorial 2**

*Figure 4-29 The model of a lamp*



*Figure 4-30 The base zoomed in all viewports*

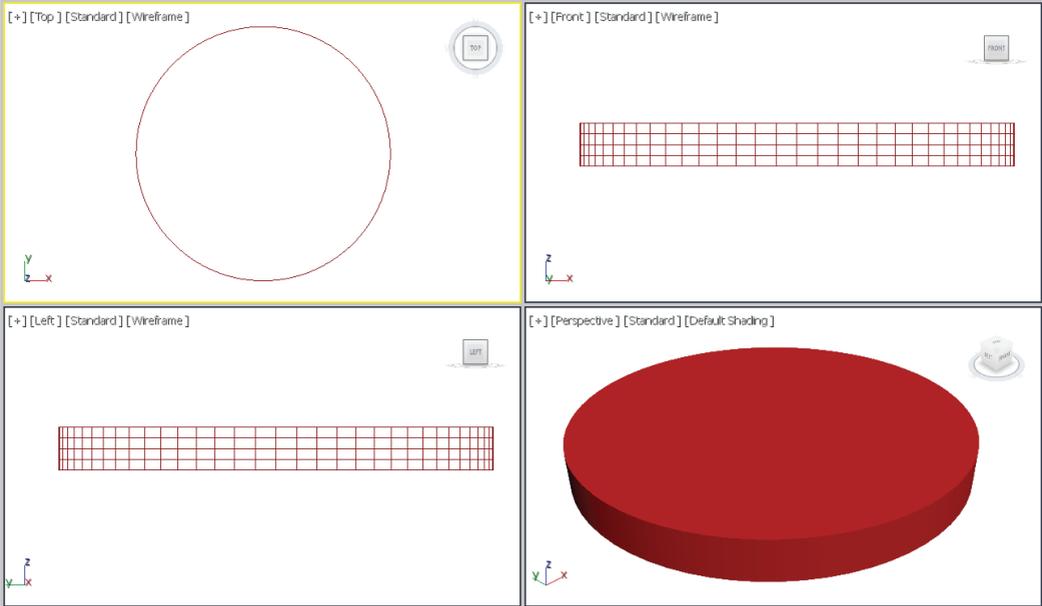


Figure 4-31 The base zoomed in all viewports

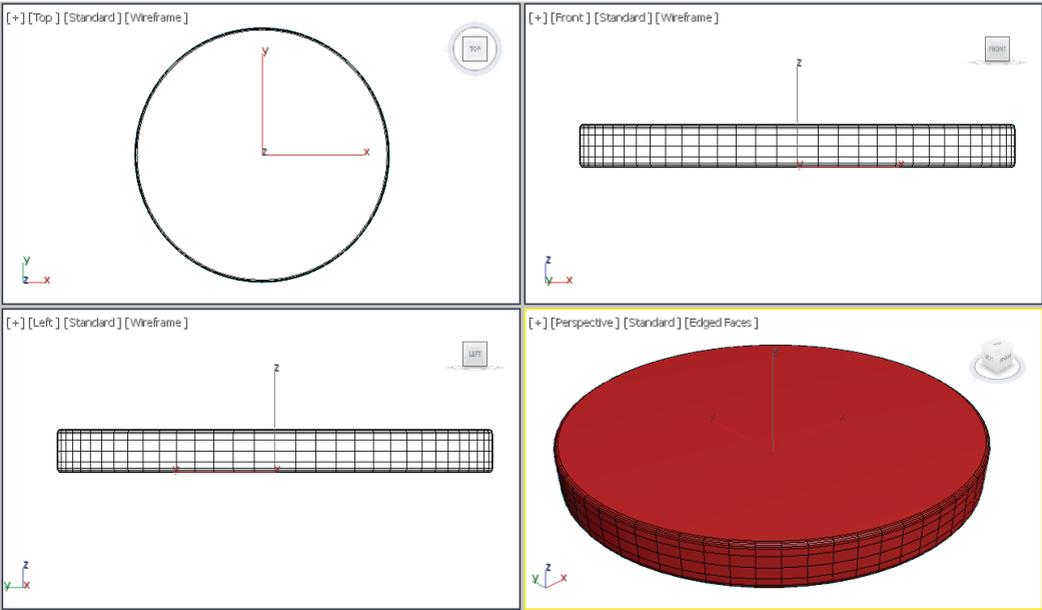


Figure 4-32 The base smoothed

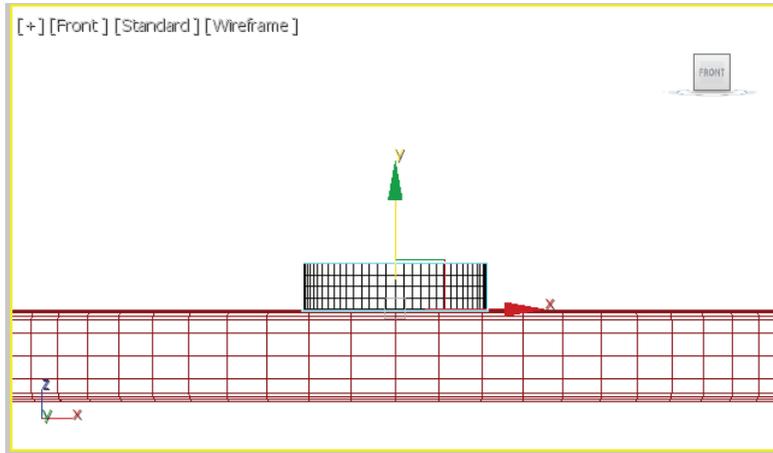


Figure 4-33 The Circle001 object moved

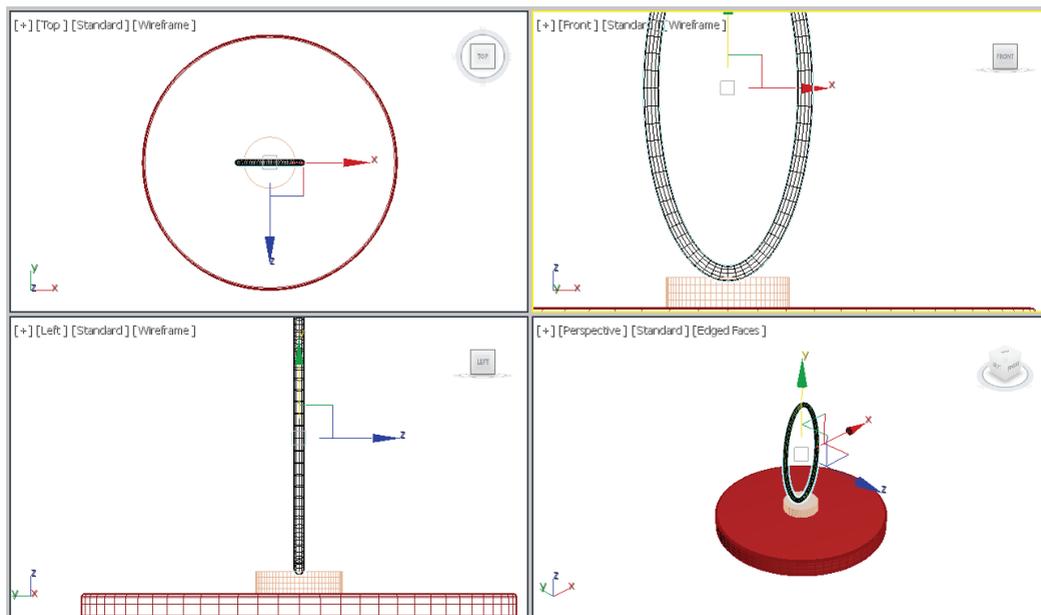


Figure 4-34 Ellipse001 aligned

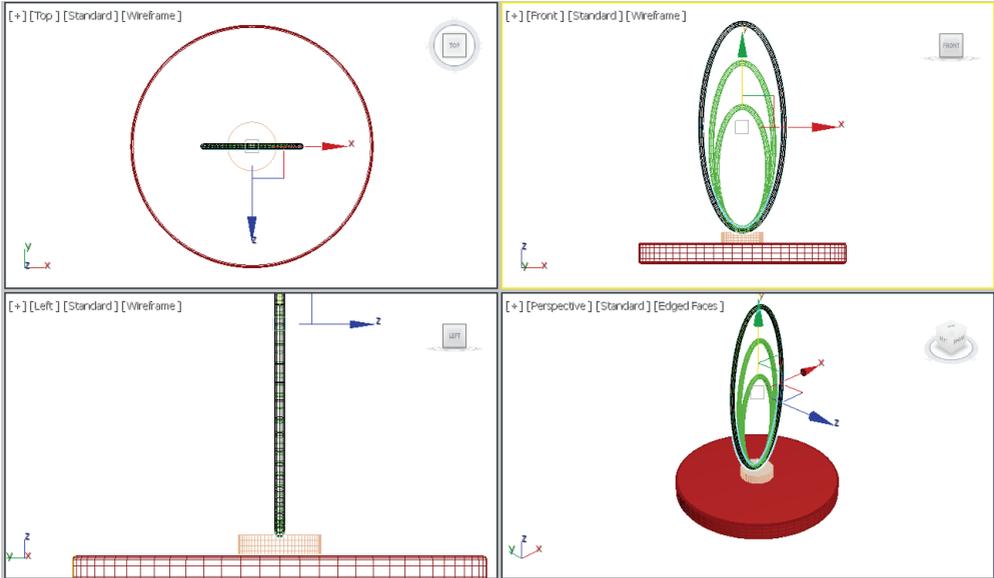


Figure 4-35 Ellipse002 and Ellipse003 aligned

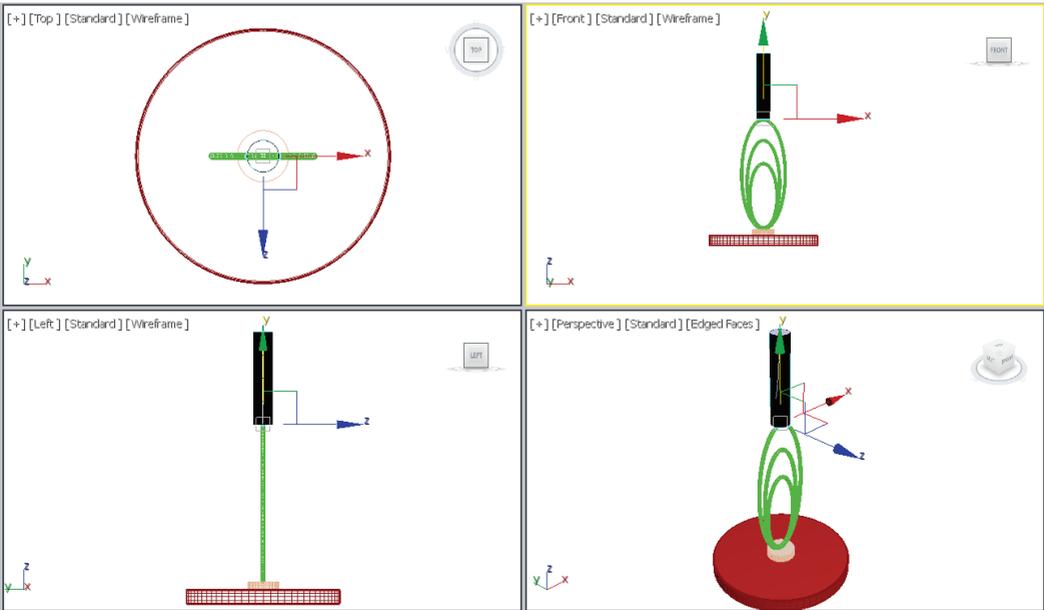


Figure 4-36 Circle002 aligned

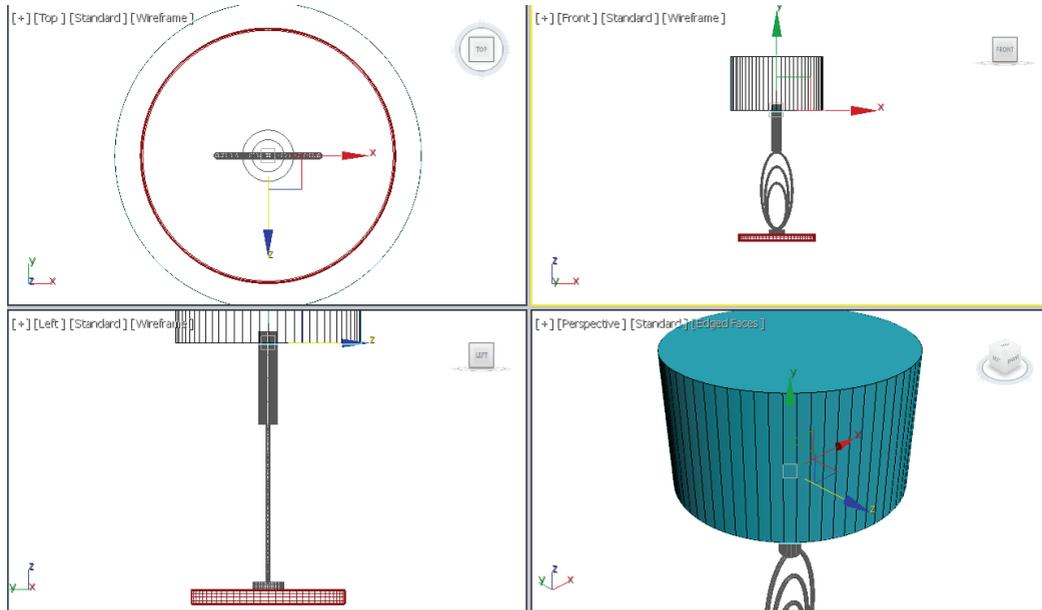


Figure 4-37 The shade object aligned

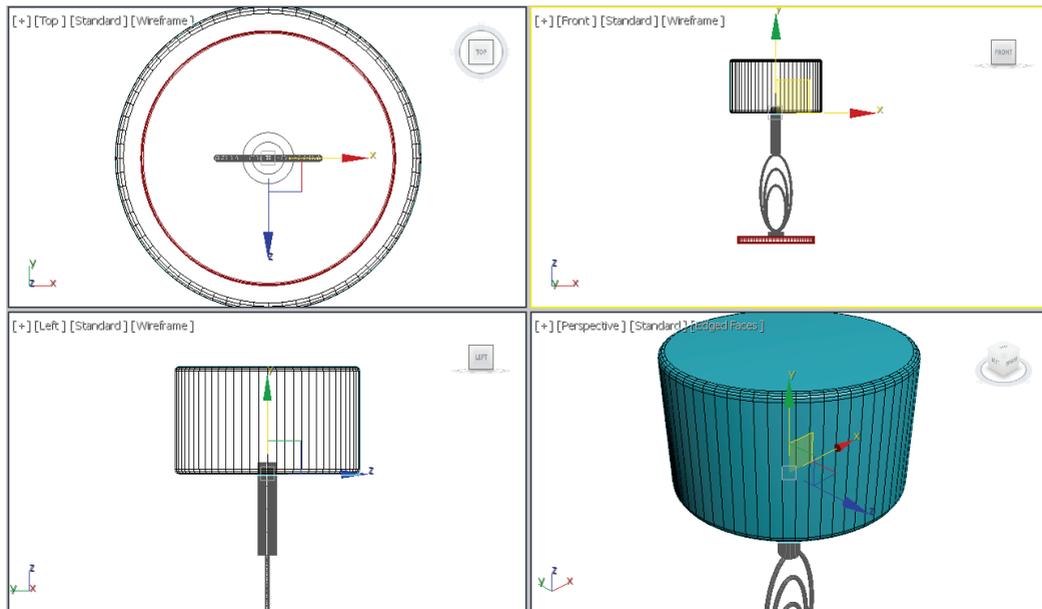


Figure 4-38 The shade object smoothed

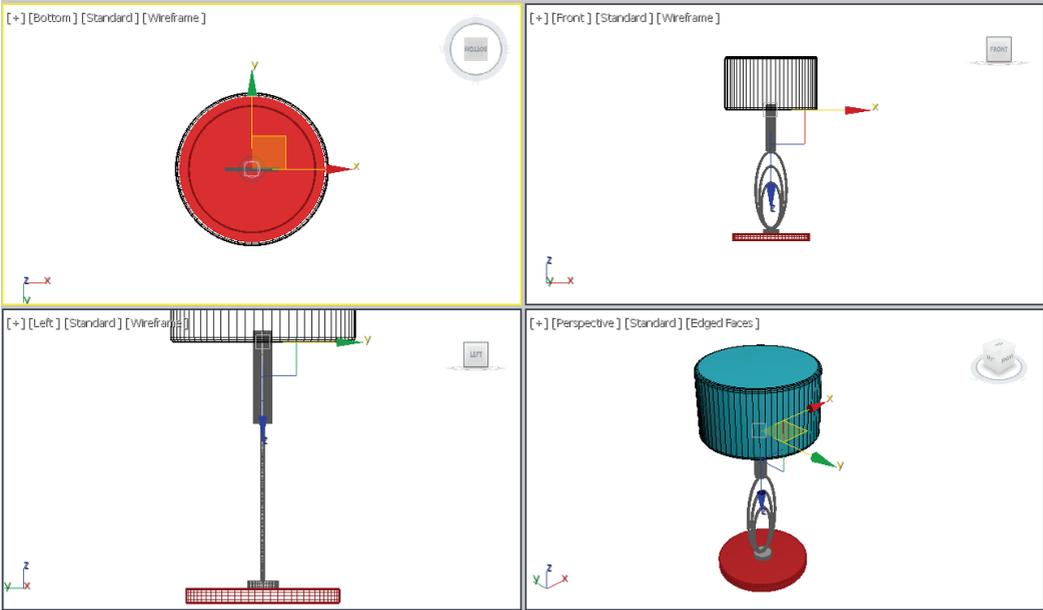


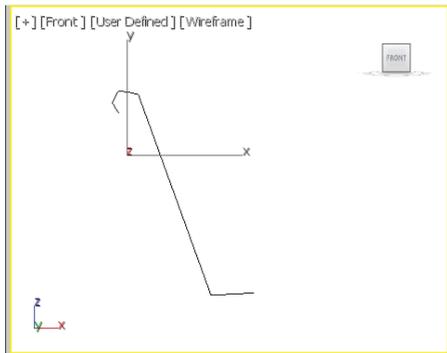
Figure 4-39 The selected polygon



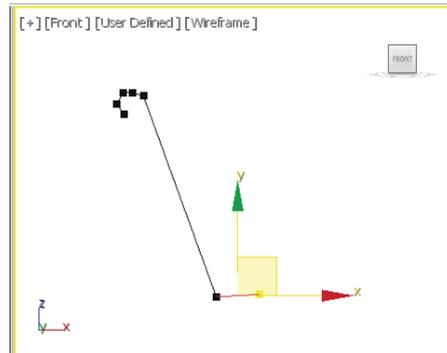
Figure 4-40 The rendered image



**Figure 4-41** The model of a vase with flower plant



**Figure 4-42** A line spline created for the vase



**Figure 4-43** The first vertex of the line spline selected in the Front viewport

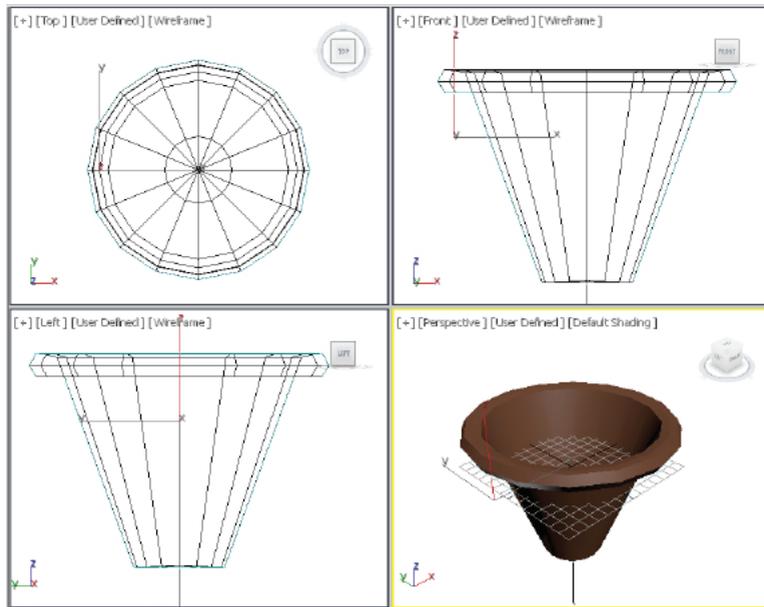


Figure 4-44 The vase geometry after applying the **Lathe** modifier

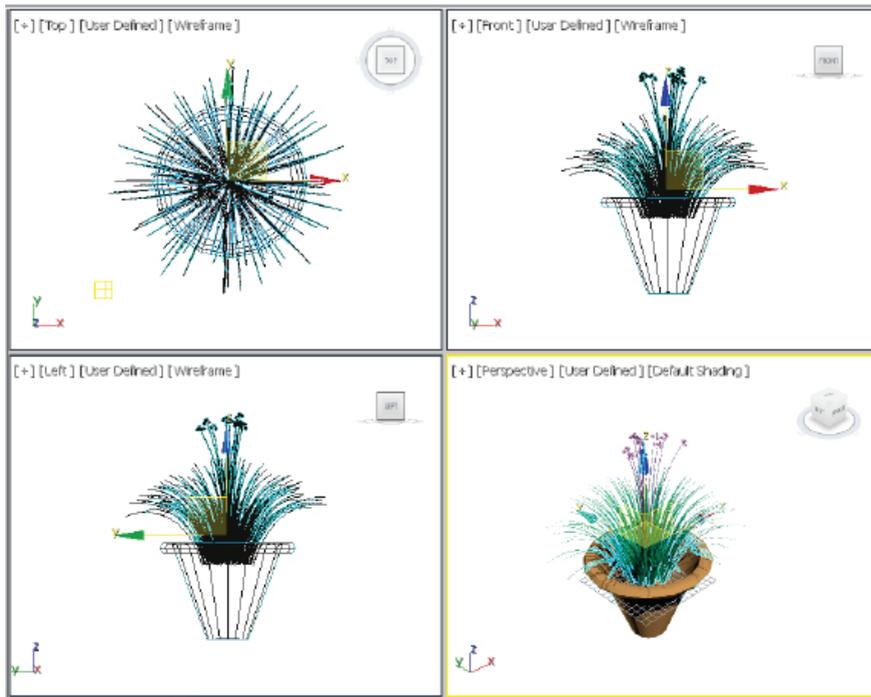
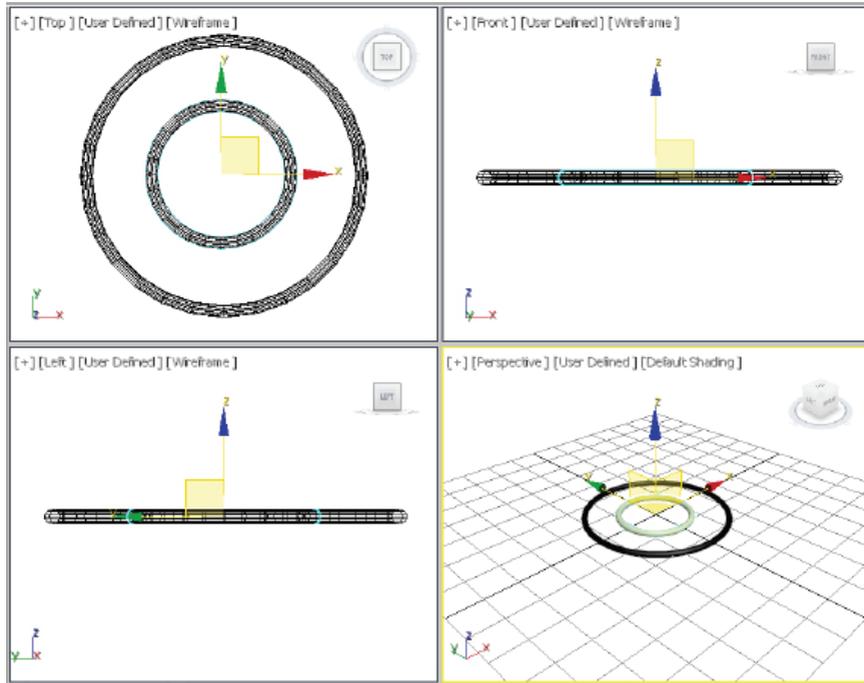
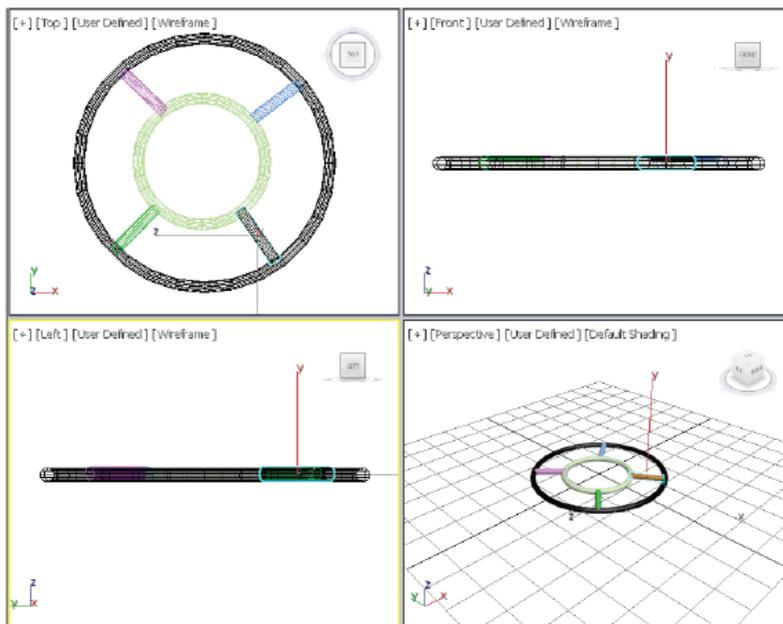


Figure 4-45 Alignment of plant with vase in viewports



*Figure 4-46 Alignment of the circles in viewports*



*Figure 4-47 The line splines created to join both the circles*



Figure 4-48 The line spline for the leg of stand

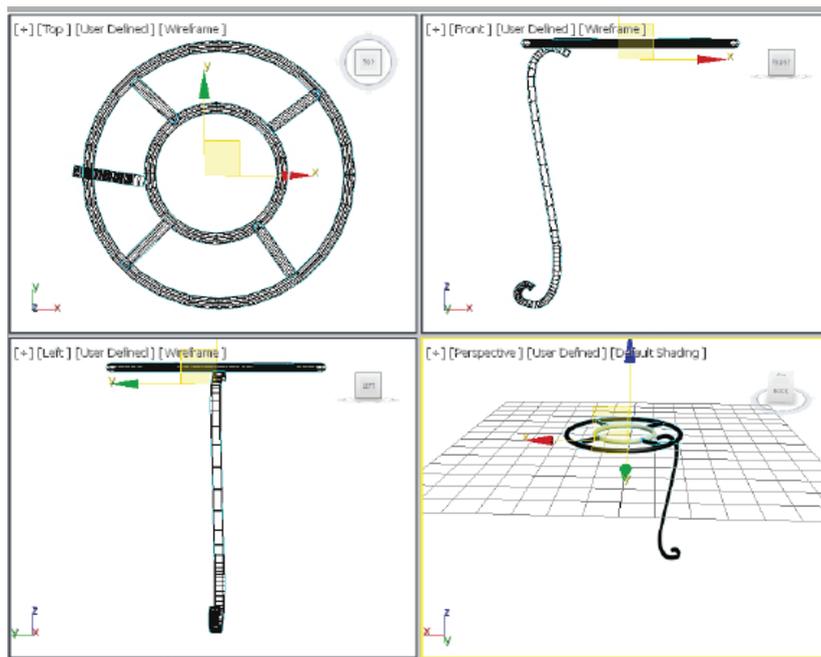


Figure 4-49 Alignment of upper portion and leg01 in viewports

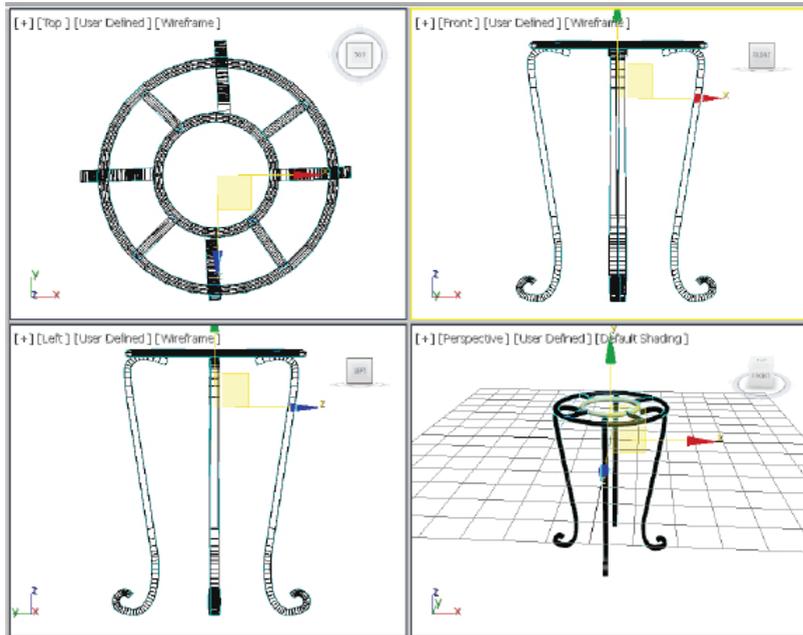


Figure 4-50 Alignment of leg01, leg002, leg003, and leg004 in viewports

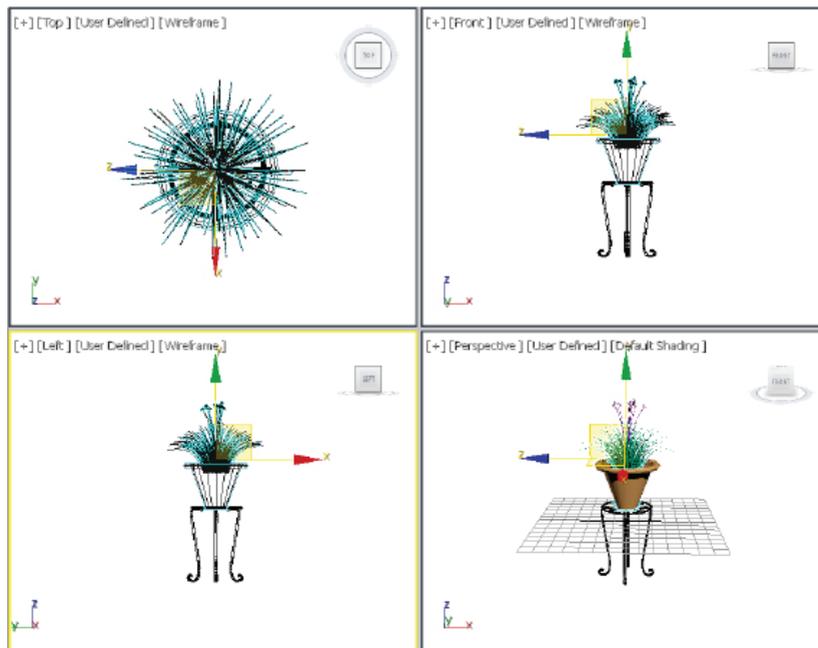


Figure 4-51 Alignment of flower vase and vase stand in viewports

## Exercise 1



*Figure 4-52 Drawing different shapes*

## Exercise 2



*Figure 4-53 The model of a street lamp*

# Chapter 5

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## Working with Splines-II

### Learning Objectives

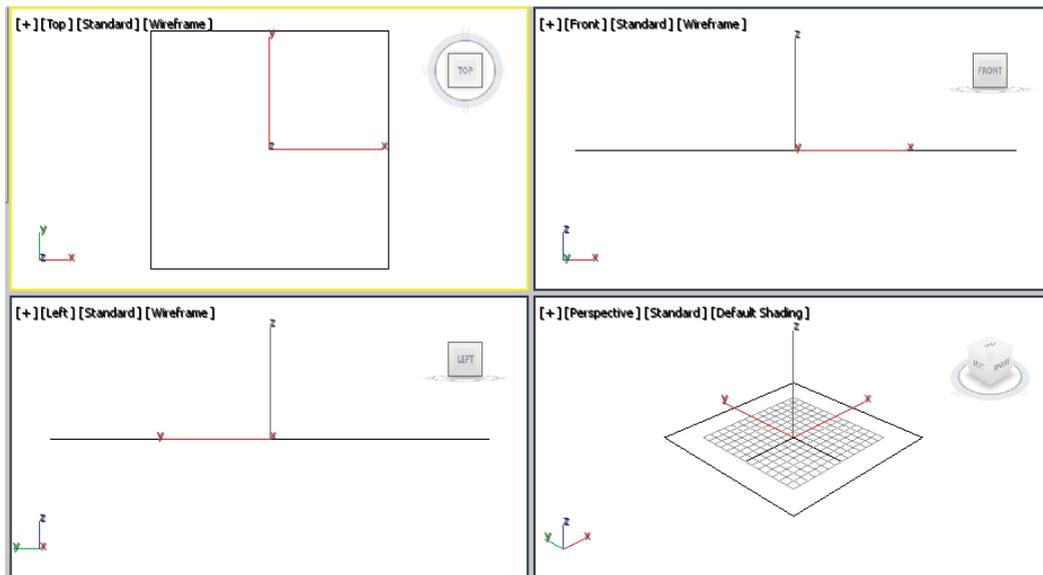
**After completing this chapter, you will be able to:**

- *Create objects by using different shapes*
- *Create objects by revolving a shape*
- *Create objects by lofting a shape along a path*



**Tutorial 1**

*Figure 5-1 The model of a table and jug*



*Figure 5-2 The rectangle created for the table top*

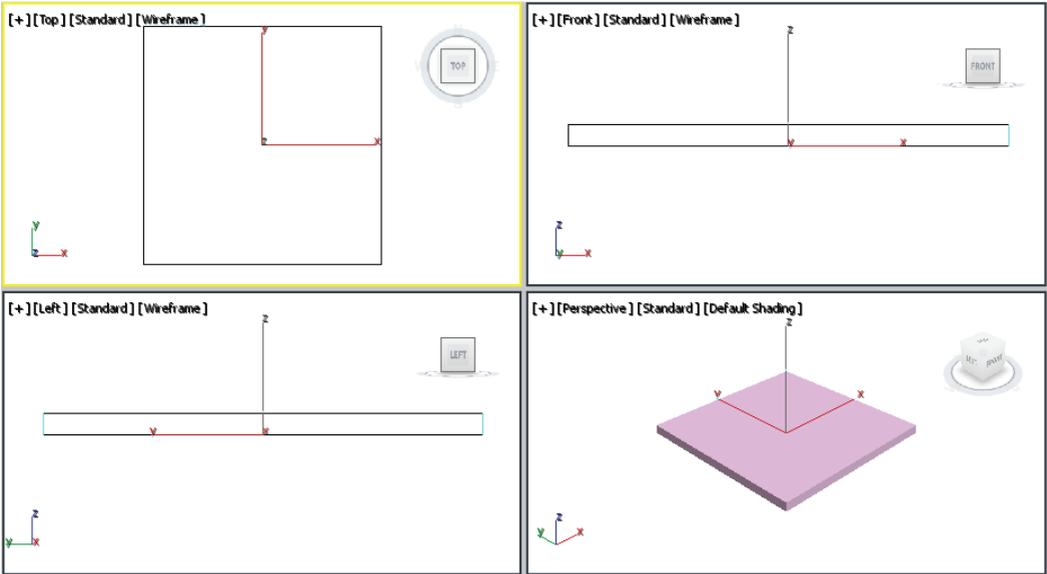


Figure 5-3 The Top extruded by 10 units

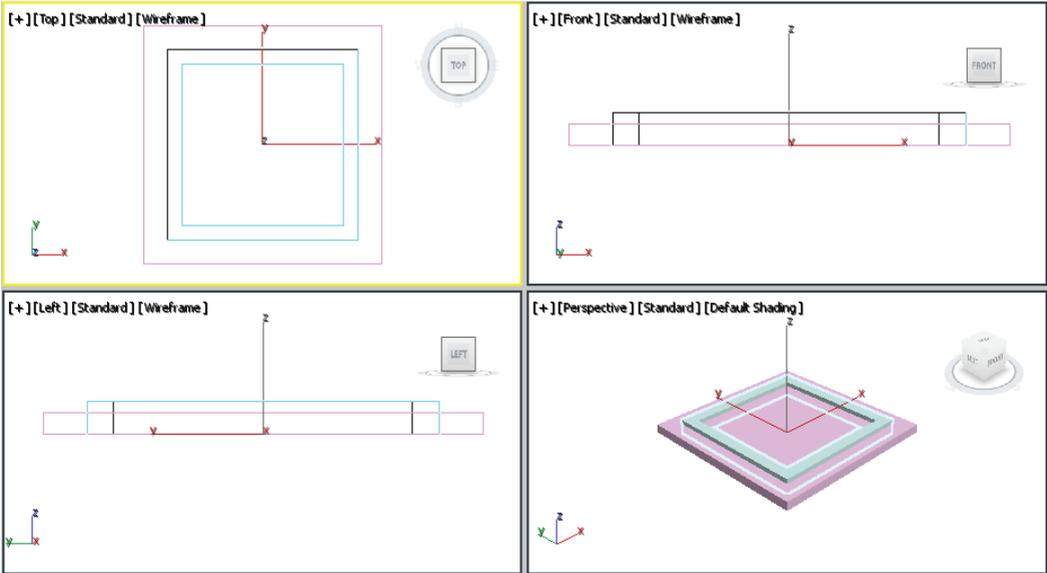
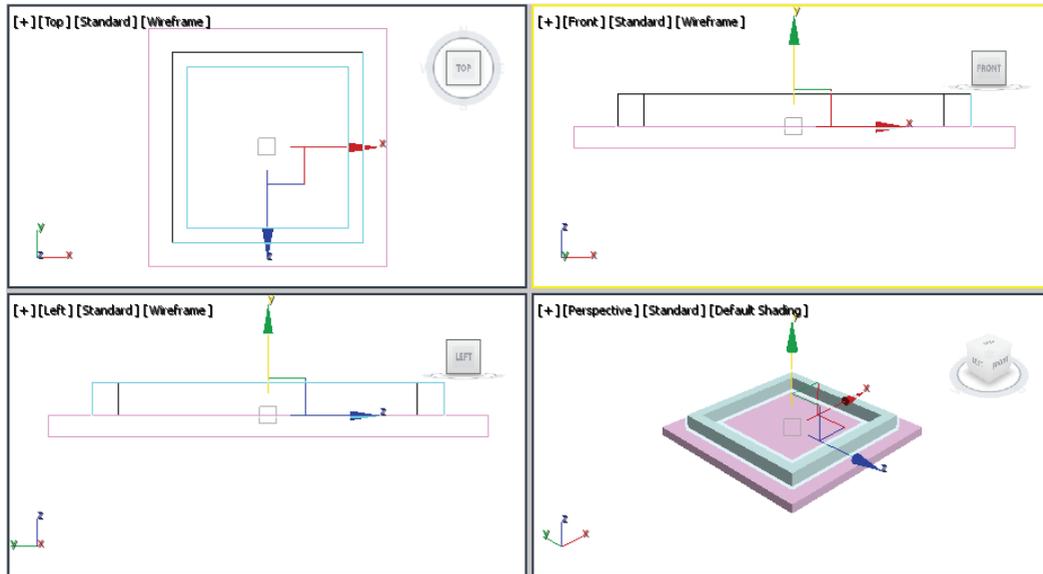
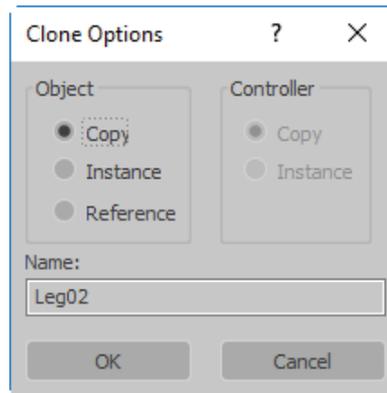


Figure 5-4 The Frame extruded by 15 units



*Figure 5-5 The Frame aligned*



*Figure 5-6 The Clone Options dialog box*

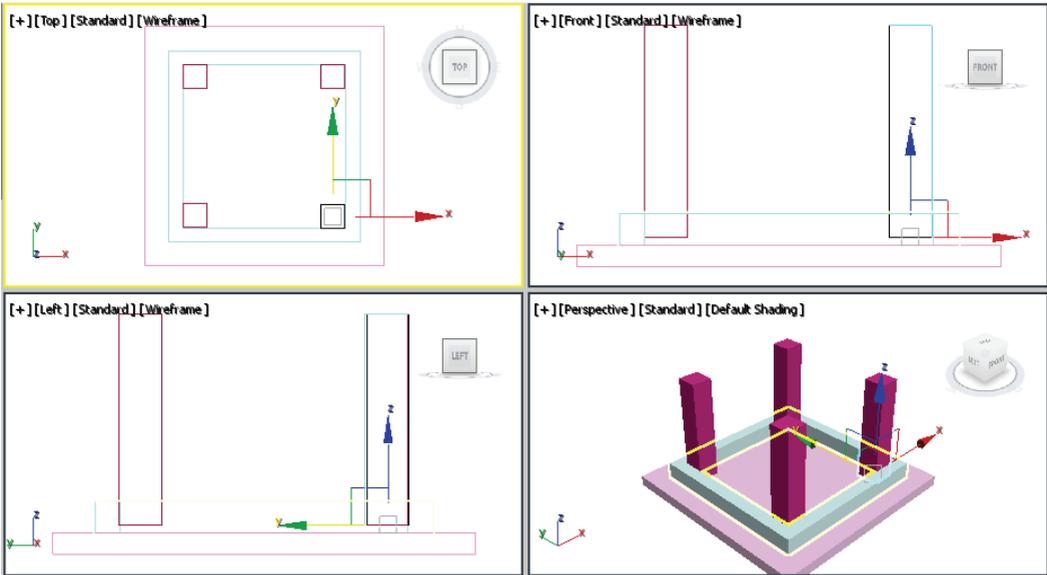


Figure 5-7 The four legs of the table created and aligned to their correct places

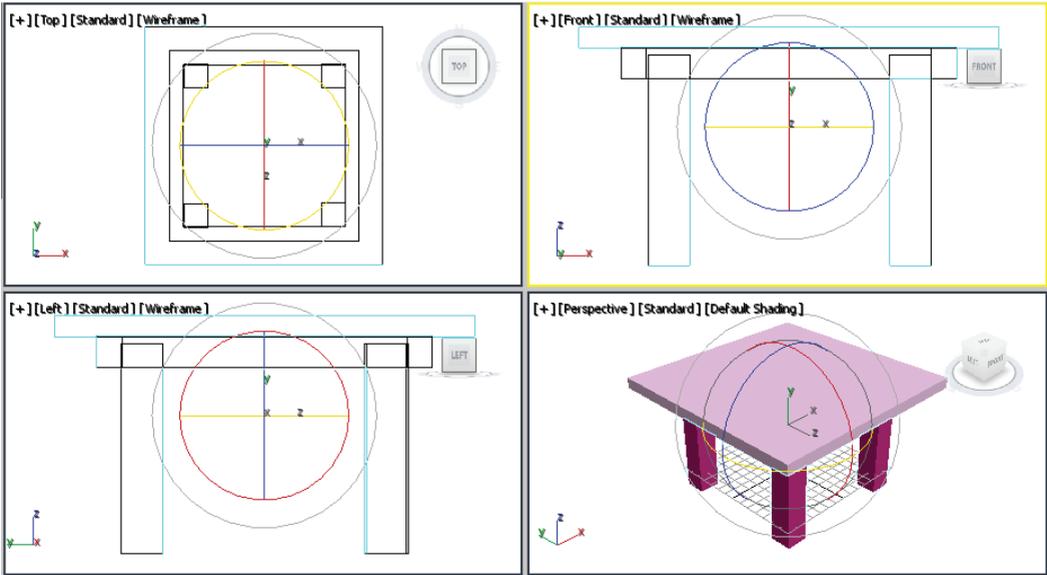
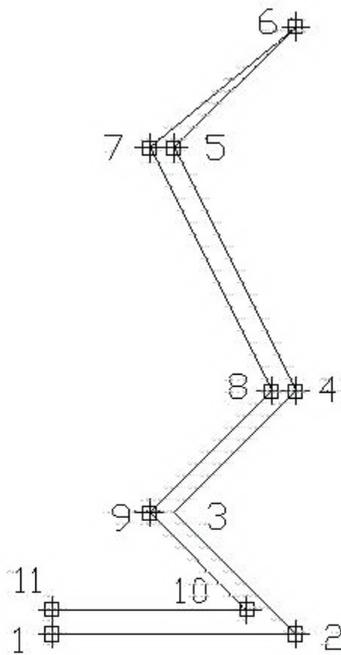


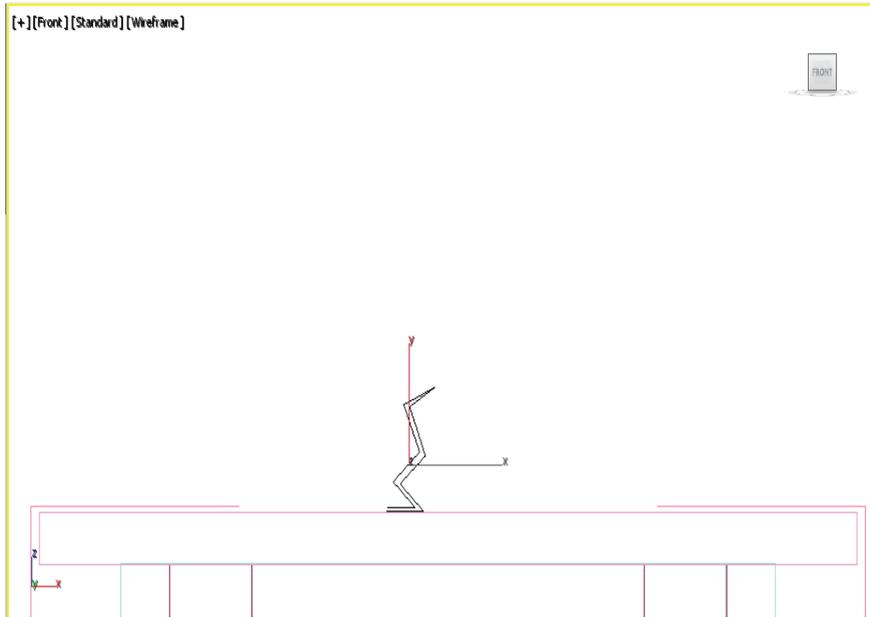
Figure 5-8 Table rotated upright to stand on its legs



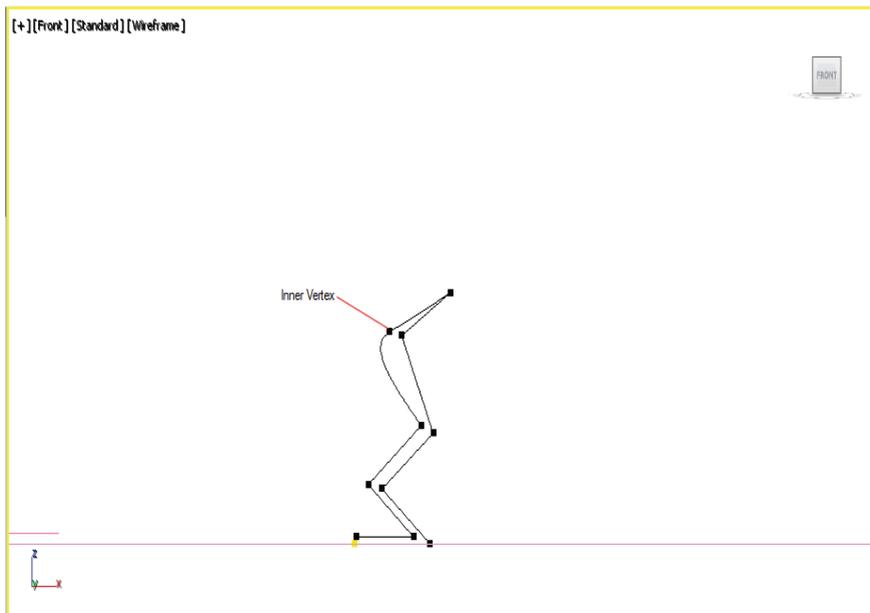
*Figure 5-9* The center of Table zoomed in the Front viewport



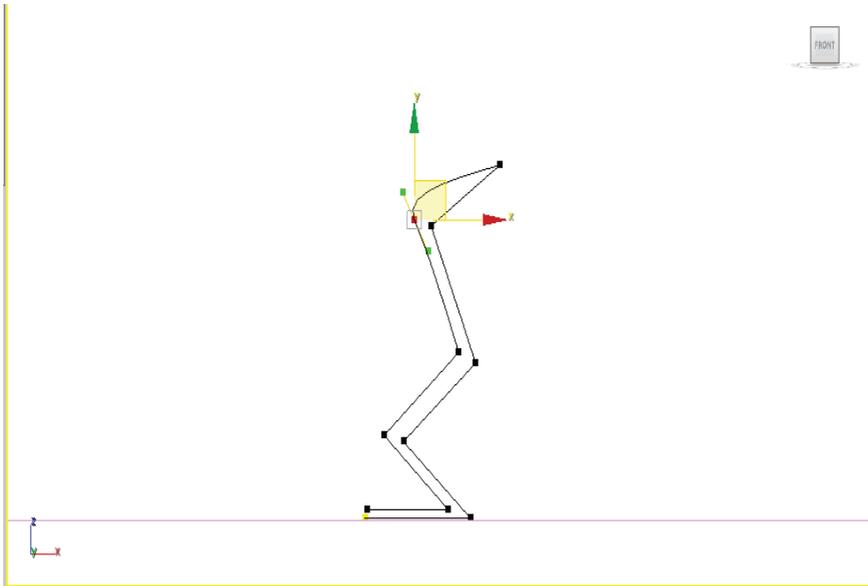
*Figure 5-10* The profile curve of the Jug



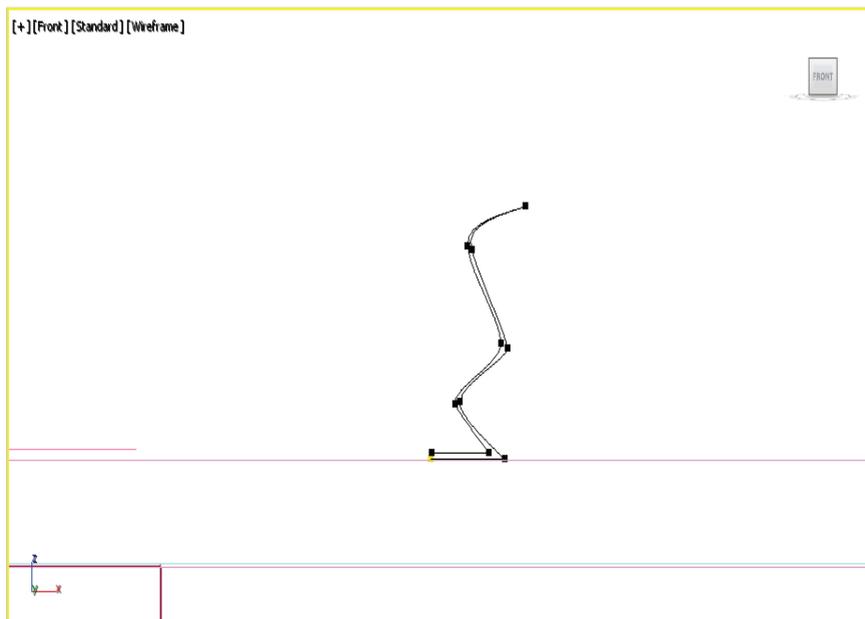
*Figure 5-11 The profile of the Jug*



*Figure 5-12 The bezier handles displayed at the vertex*



*Figure 5-13 The curve reshaped by dragging the bezier handle*



*Figure 5-14 The curve edited by moving the bezier handles of the vertices*

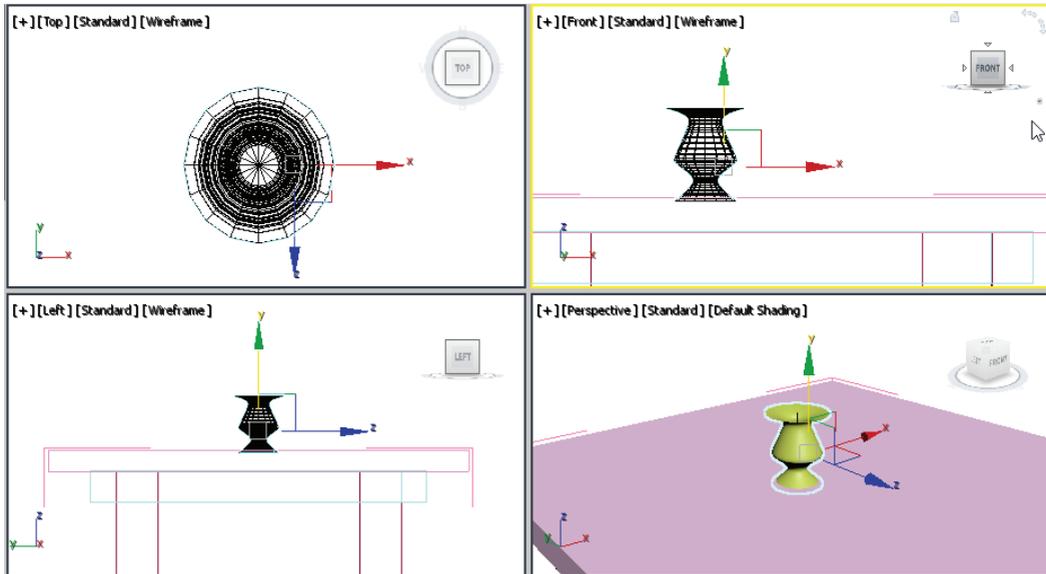


Figure 5-15 The profile rotated to form the Jug

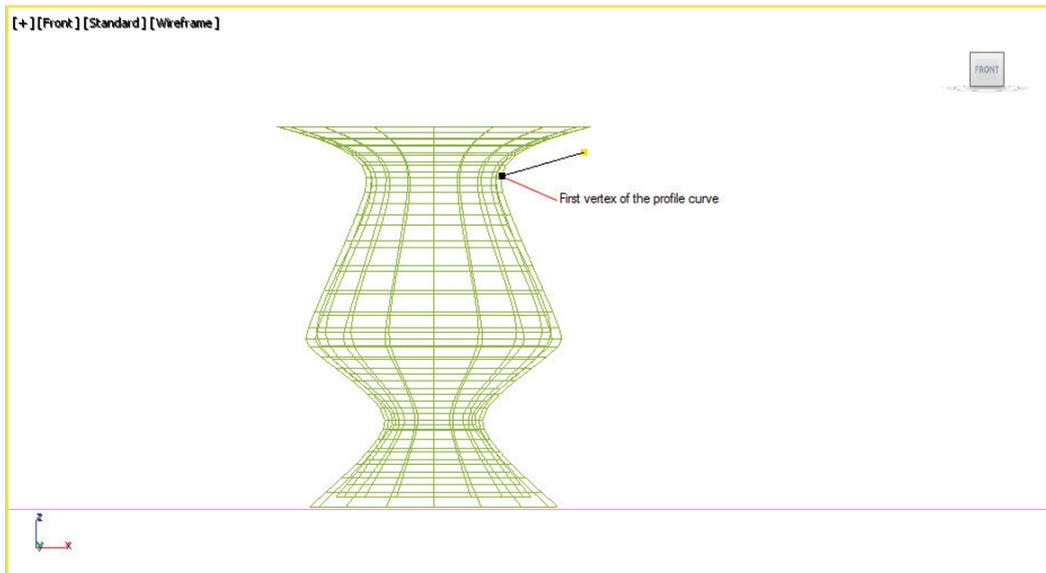
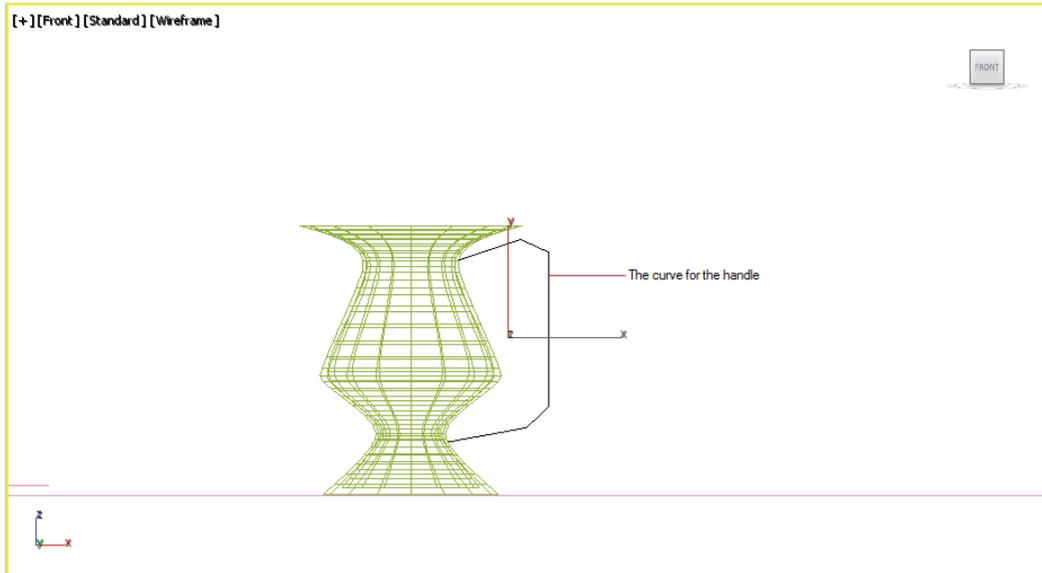
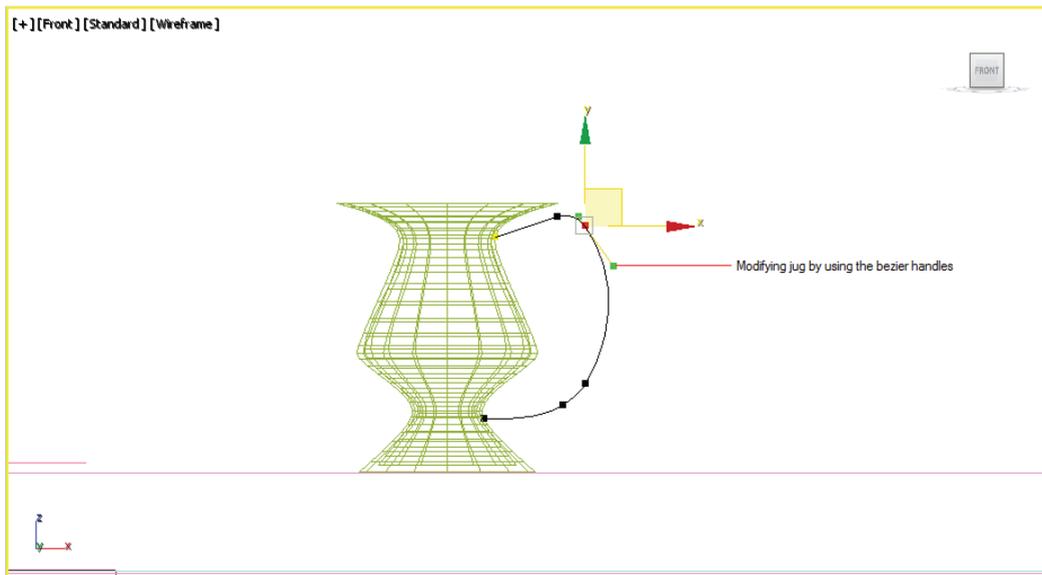


Figure 5-16 The first vertex placed within the profile



*Figure 5-17 The curve for the handle of the Jug*



*Figure 5-18 The Handle modified by moving the bezier handles*

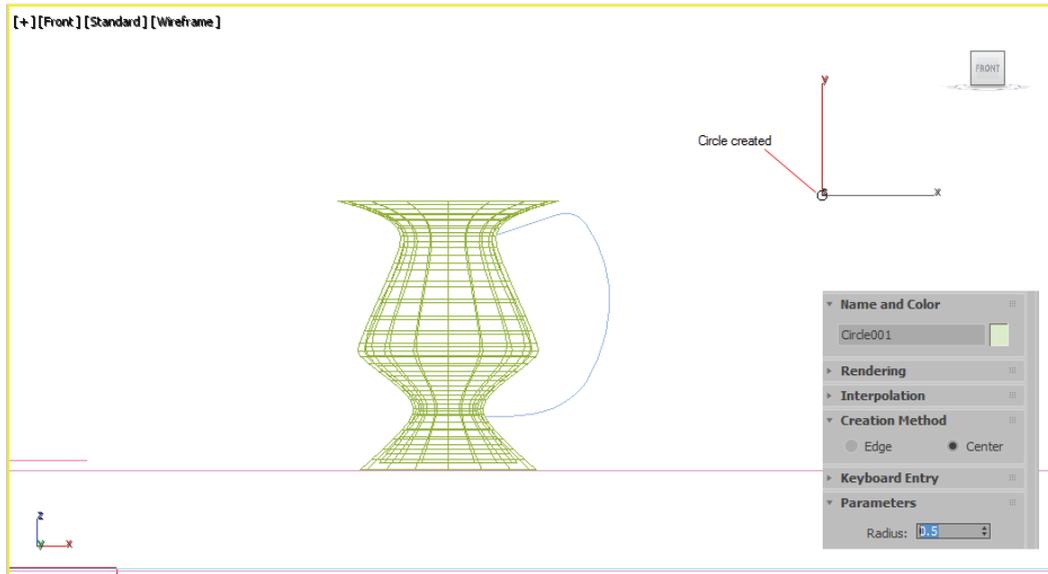


Figure 5-19 The circle created

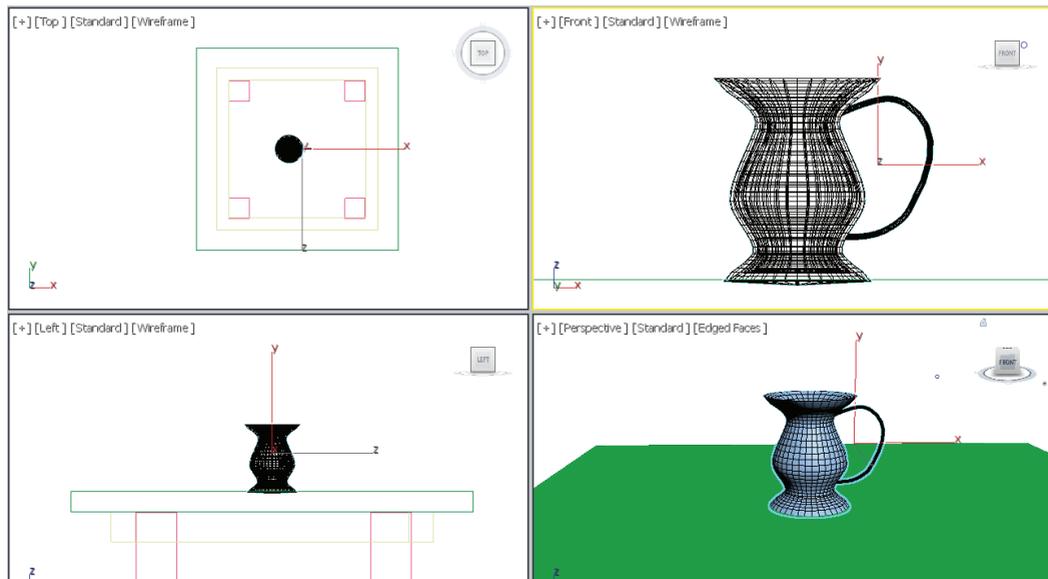


Figure 5-20 Using the boolean operation to join the Handle and Jug



*Figure 5-21 The rendered image*

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## Tutorial 2



*Figure 5-22 The model of a lamp post*

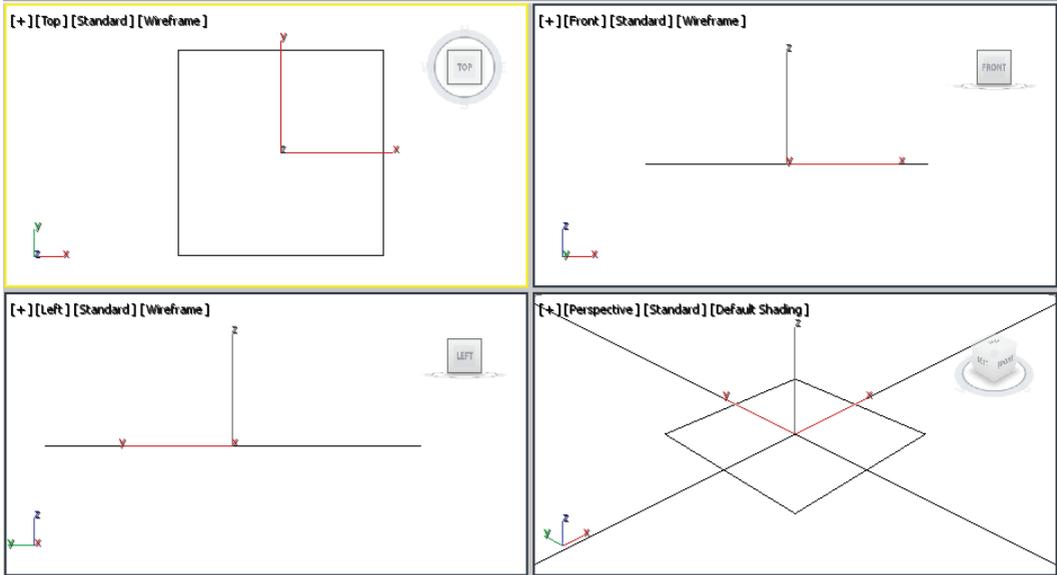


Figure 5-23 The base zoomed in all viewports

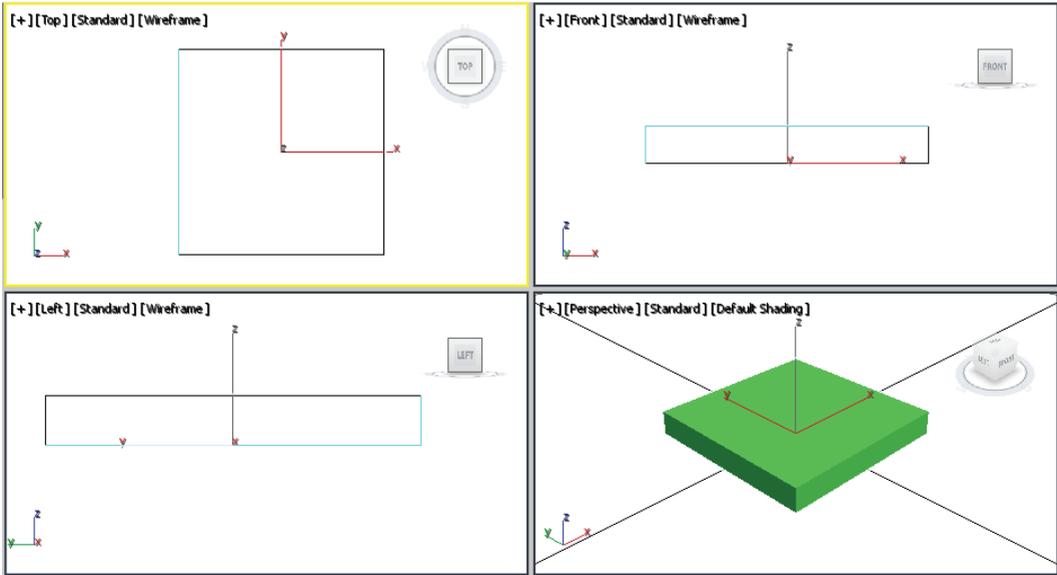
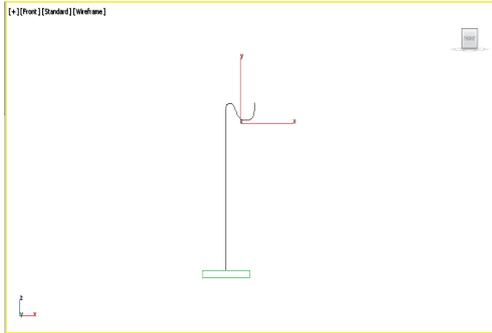
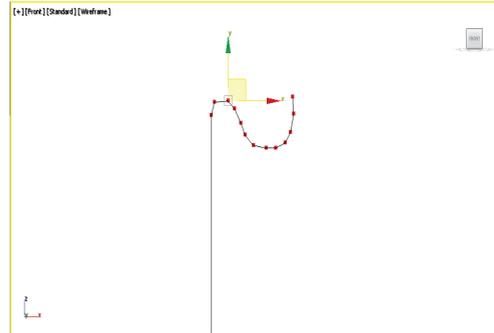


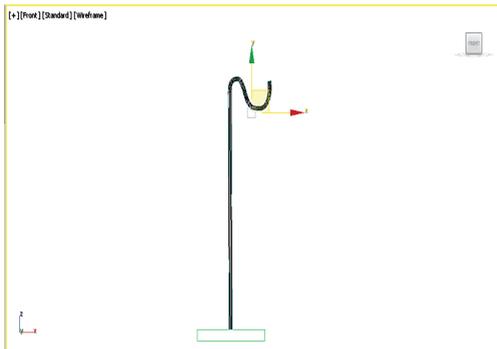
Figure 5-24 The base extruded in all viewports



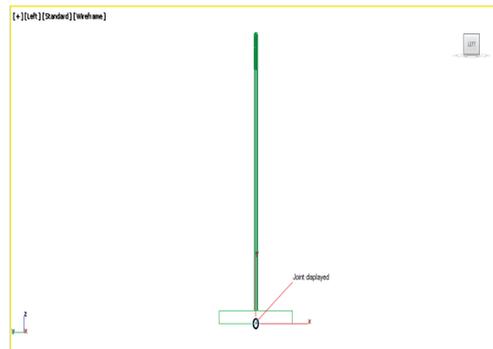
*Figure 5-25 The line created*



*Figure 5-26 The selected vertices*



*Figure 5-27 The thickness added to pillar*



*Figure 5-28 The joint displayed*

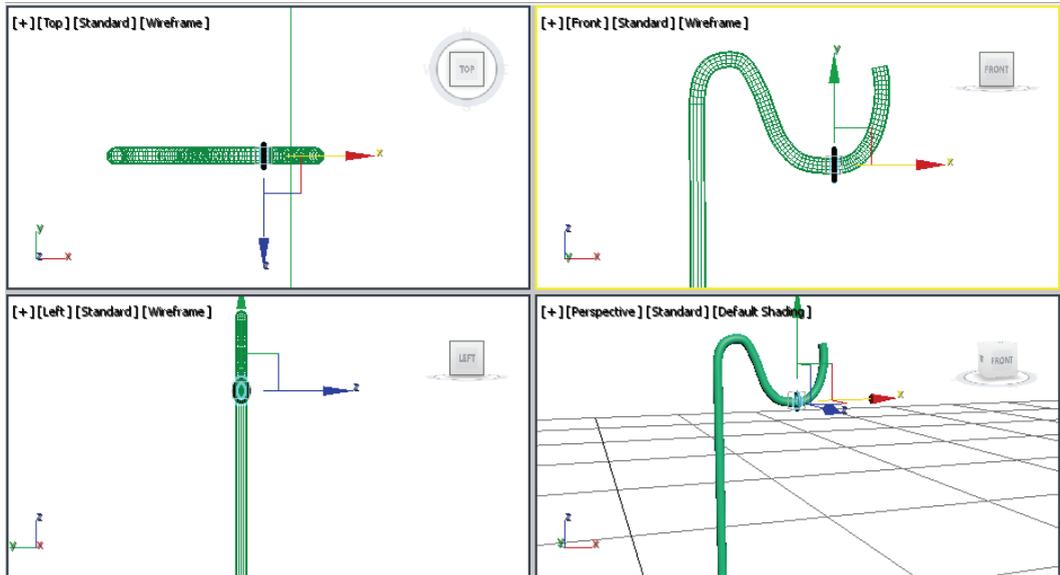


Figure 5-29 The joint aligned in all viewports

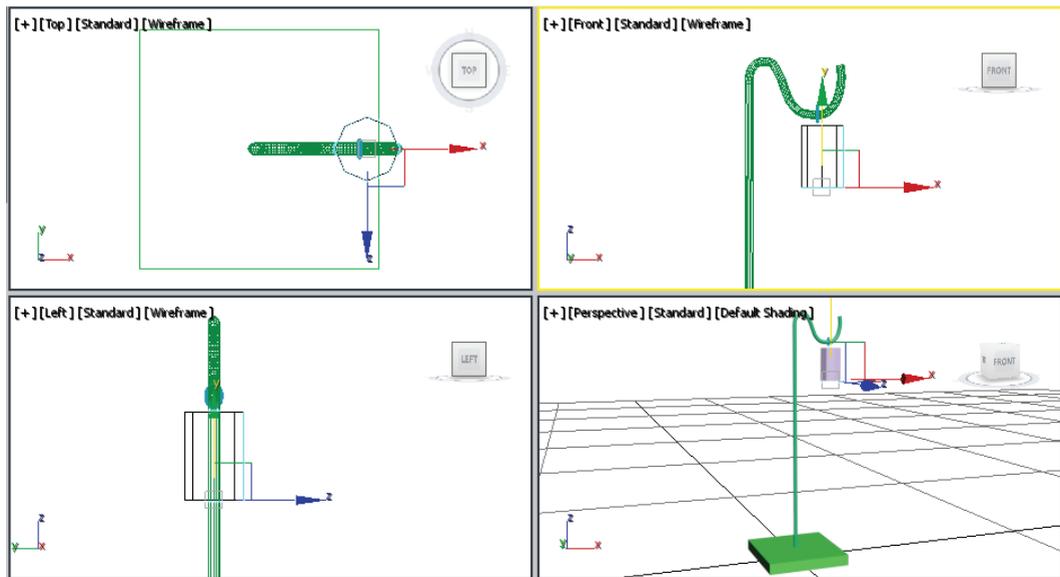
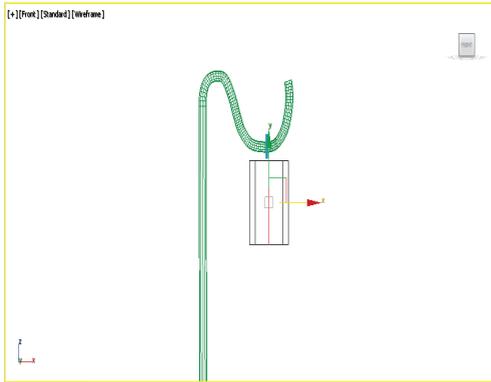
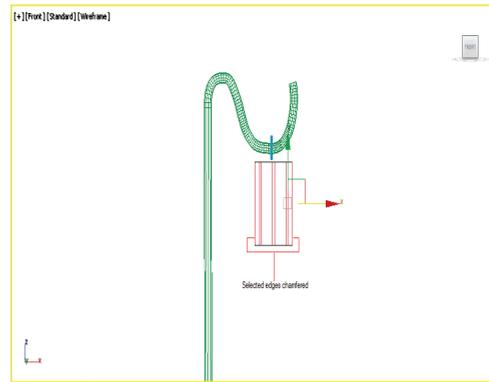


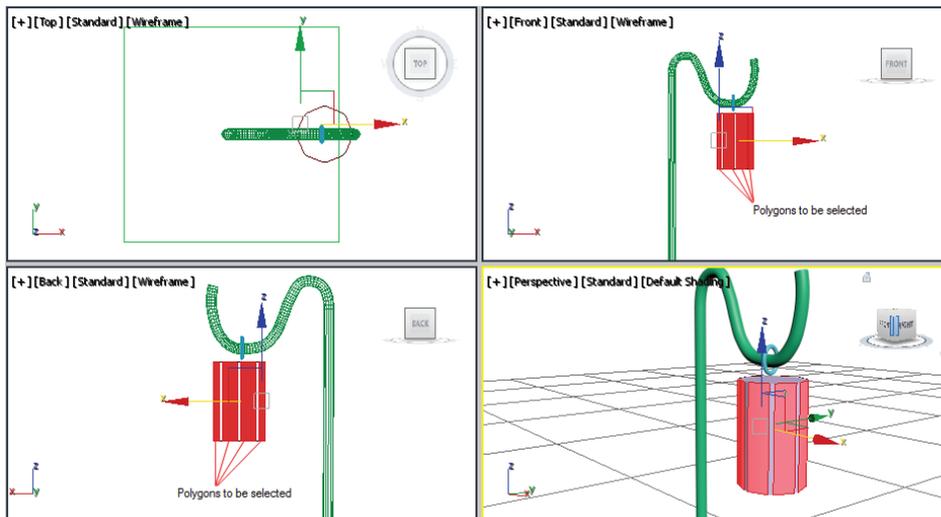
Figure 5-30 The lamp holder aligned in all viewports



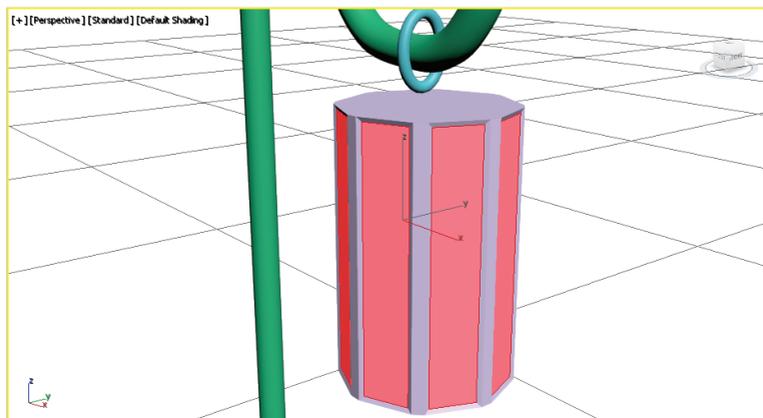
*Figure 5-31 The edge selected*



*Figure 5-32 Selected edges chamfered*



*Figure 5-33 The selected polygons between chamfered edges*



*Figure 5-34 The selected polygons beveled*

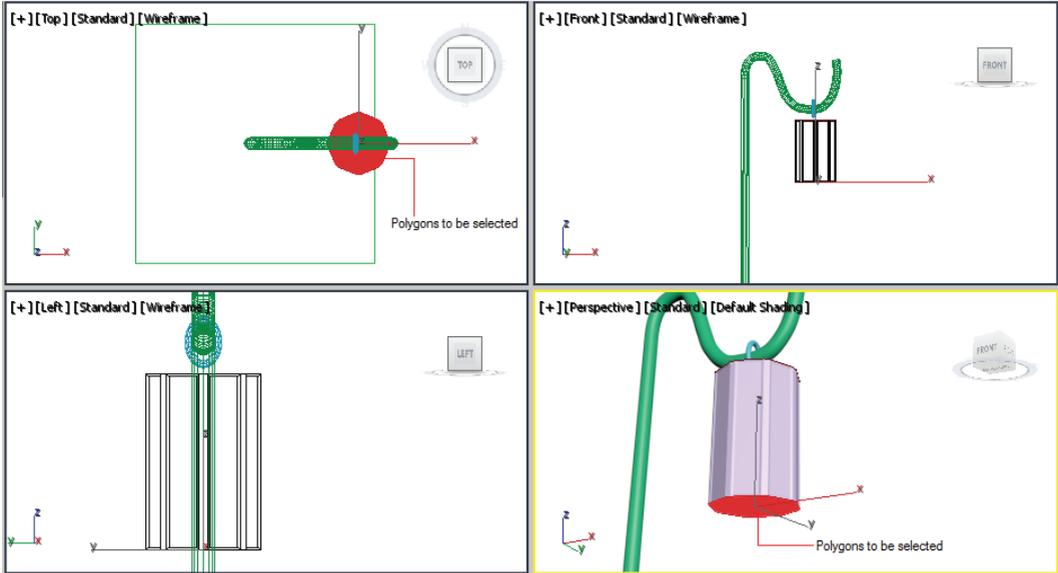


Figure 5-35 The selected polygons

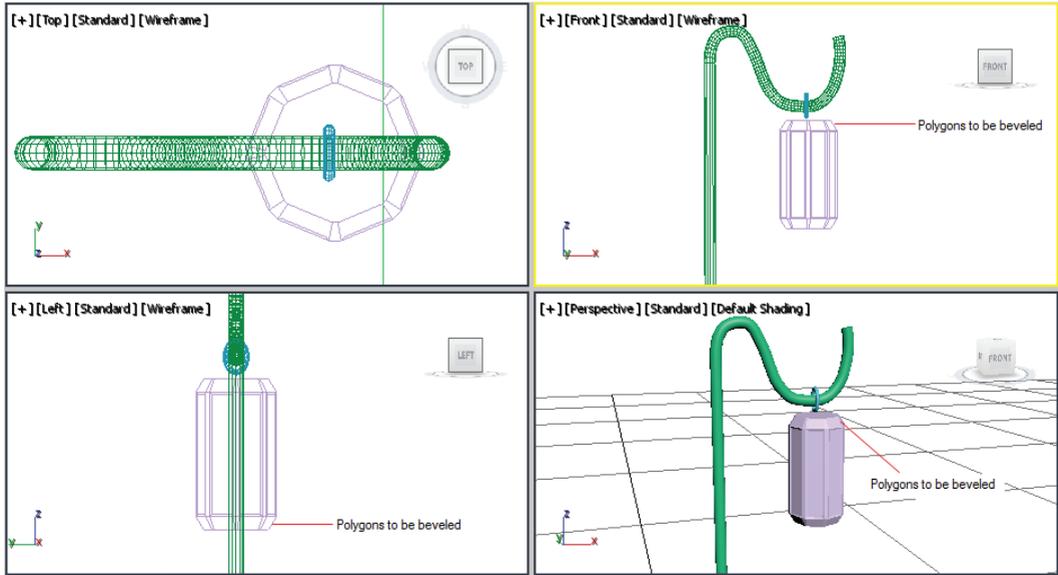
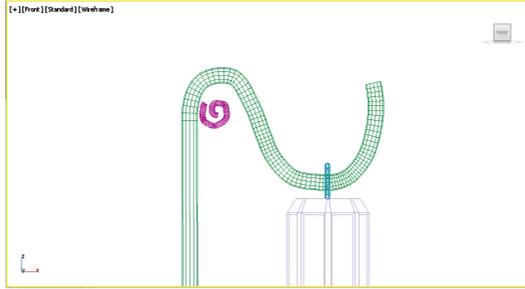
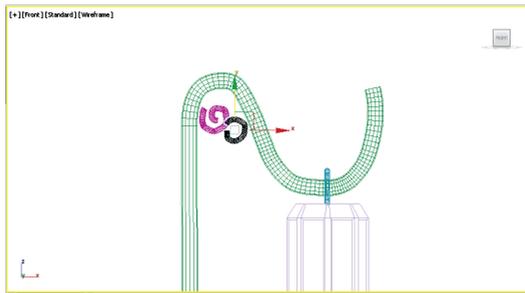


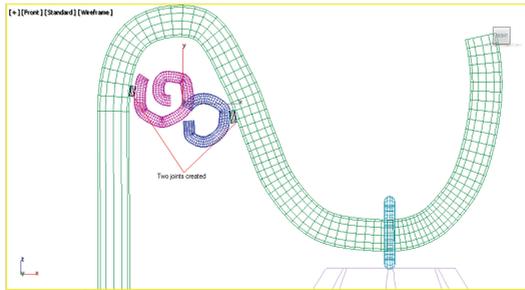
Figure 5-36 The selected polygons beveled



*Figure 5-37 The curve created*



*Figure 5-38 The second curve created*



*Figure 5-39 Two joints created*



Figure 5-40 The rendered image of a lamp post

**Exercise 1**



Figure 5-41 The cup and saucer

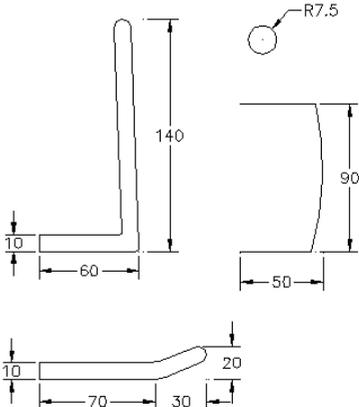


Figure 5-42 Profile curves of the cup and saucer

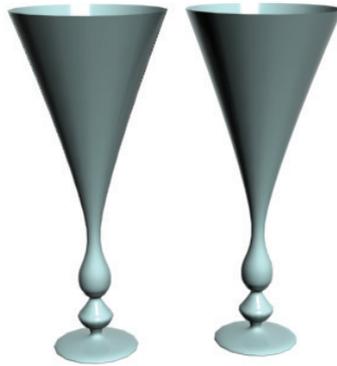
**Exercise 2**

*Figure 5-43 A pair of cocktail glasses*

**Exercise 3**

*Figure 5-44 A candle stand*

**Exercise 4**



*Figure 5-45 A pair of glasses*

**Exercise 5**



*Figure 5-46 A pair of wine glasses*

# Chapter 6

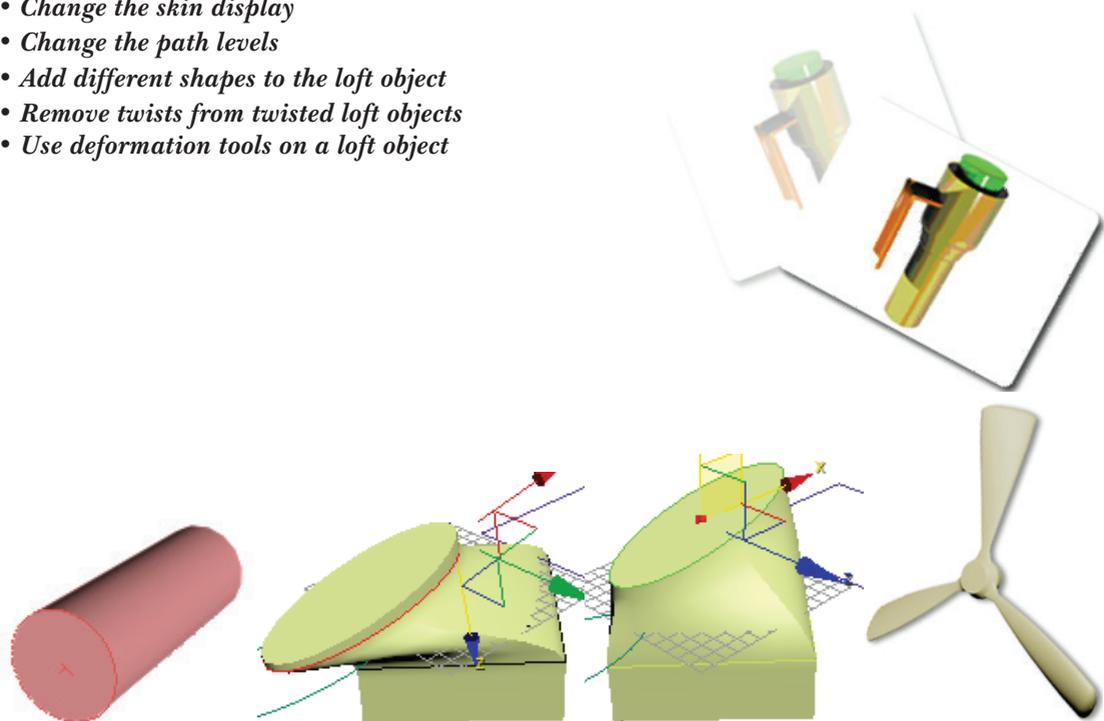
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## Lofting, Twisting, and Deforming Objects

### Learning Objectives

After completing this chapter, you will be able to:

- Loft spline objects along a path
- Change the skin display
- Change the path levels
- Add different shapes to the loft object
- Remove twists from twisted loft objects
- Use deformation tools on a loft object



## Tutorial 1

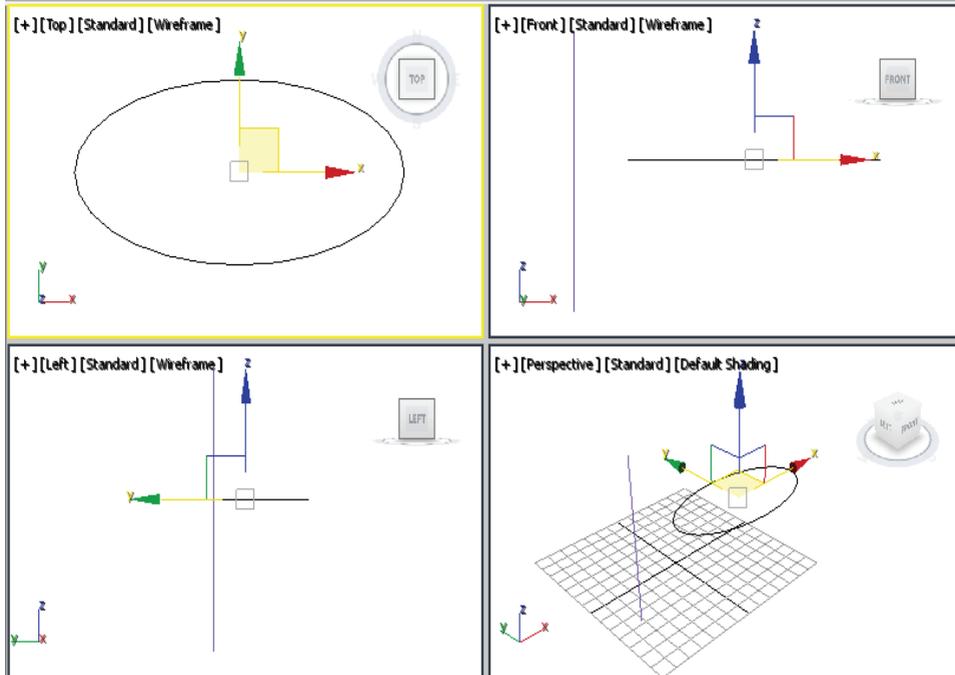


Figure 6-1 A straight line and an ellipse

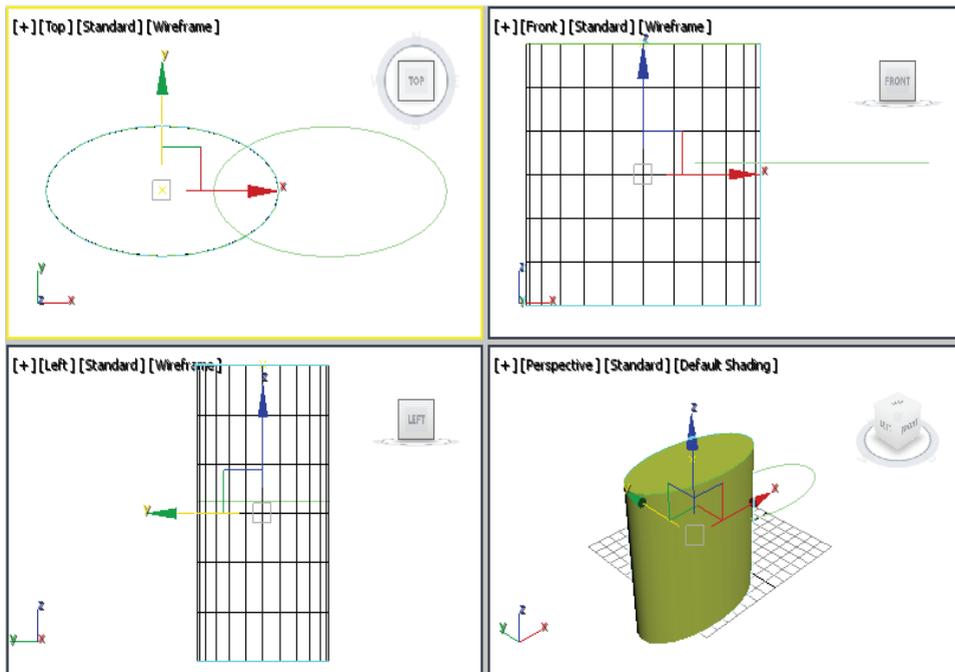


Figure 6-2 The lofted object zoomed to its extents in all viewports

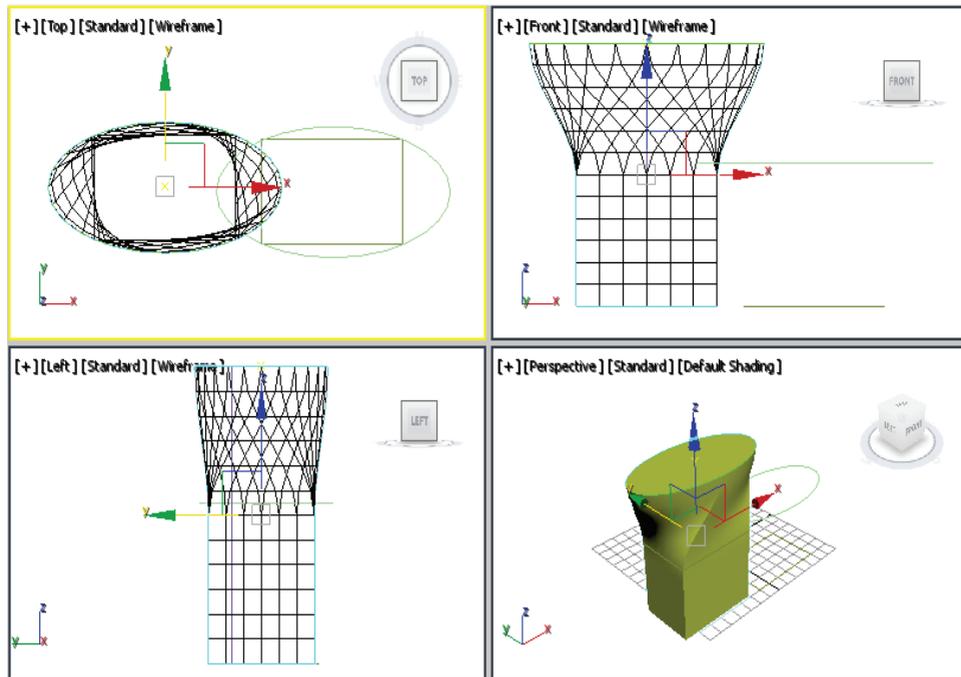


Figure 6-3 A rectangular section created in the middle of the loft

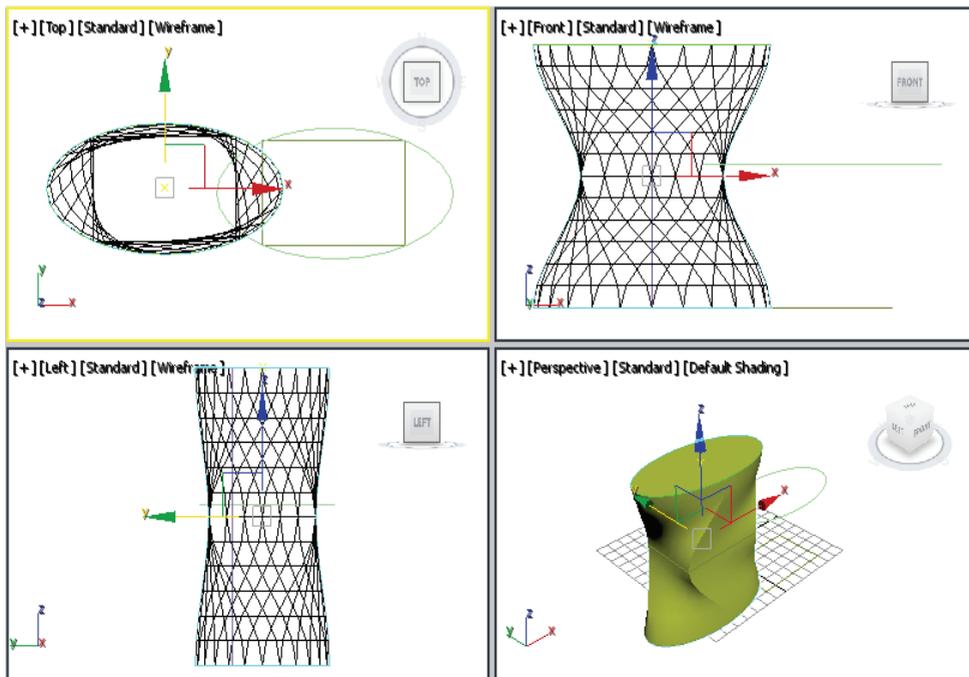


Figure 6-4 The ellipse added as a shape at the end of the path

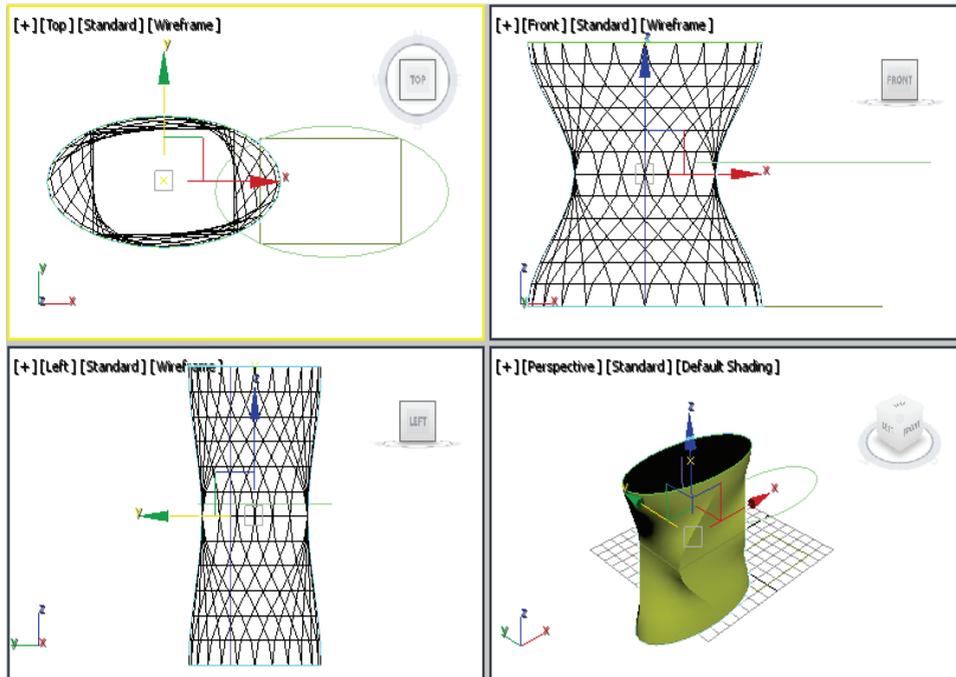


Figure 6-5 The top end of the loft object opened

## Tutorial 2

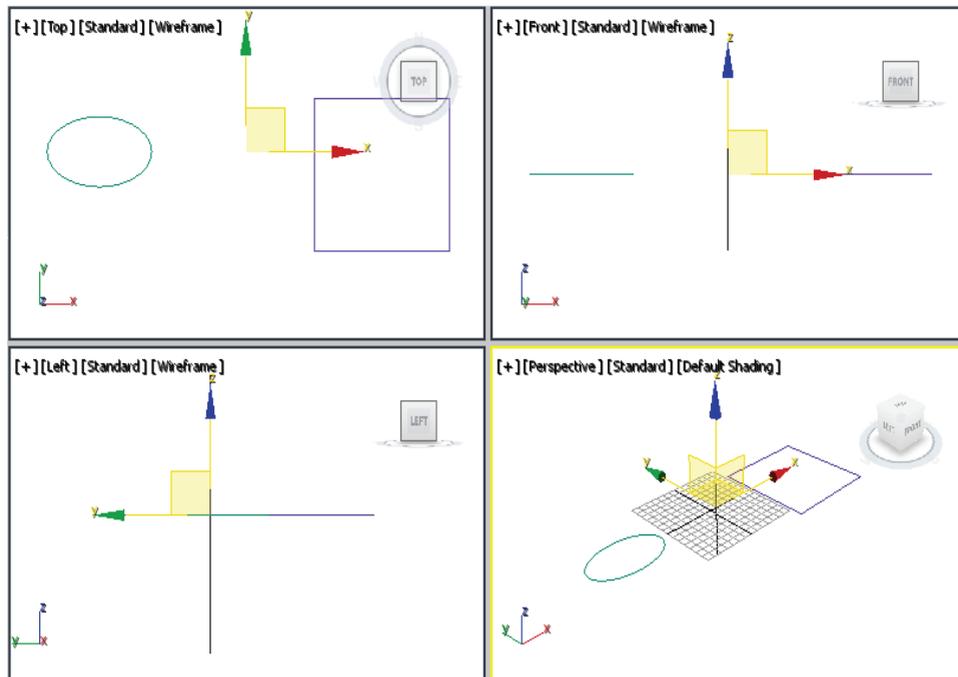


Figure 6-6 The ellipse, rectangle, and line created

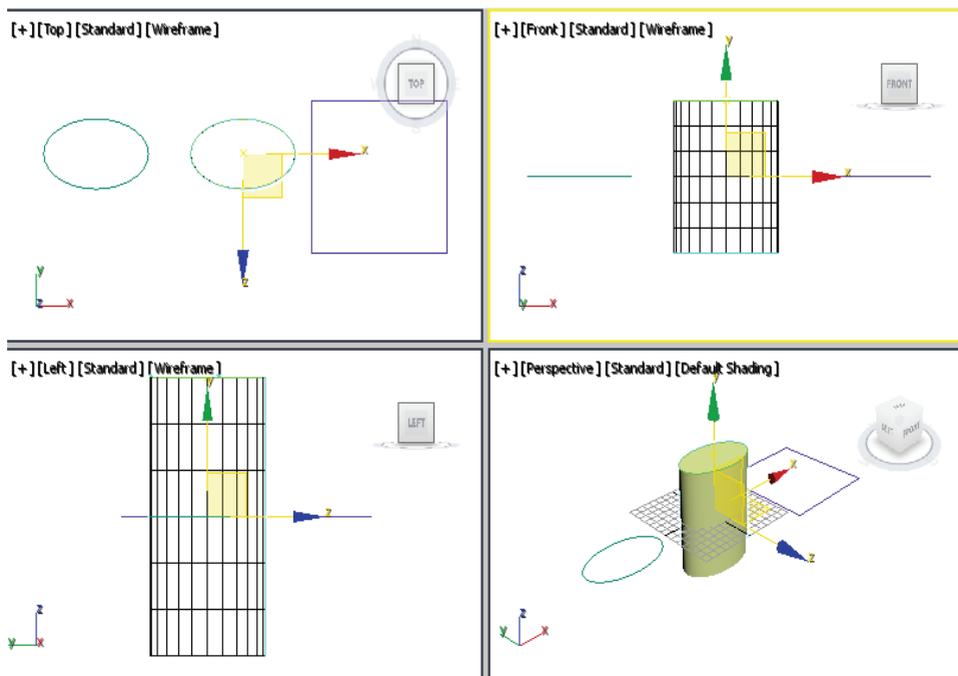
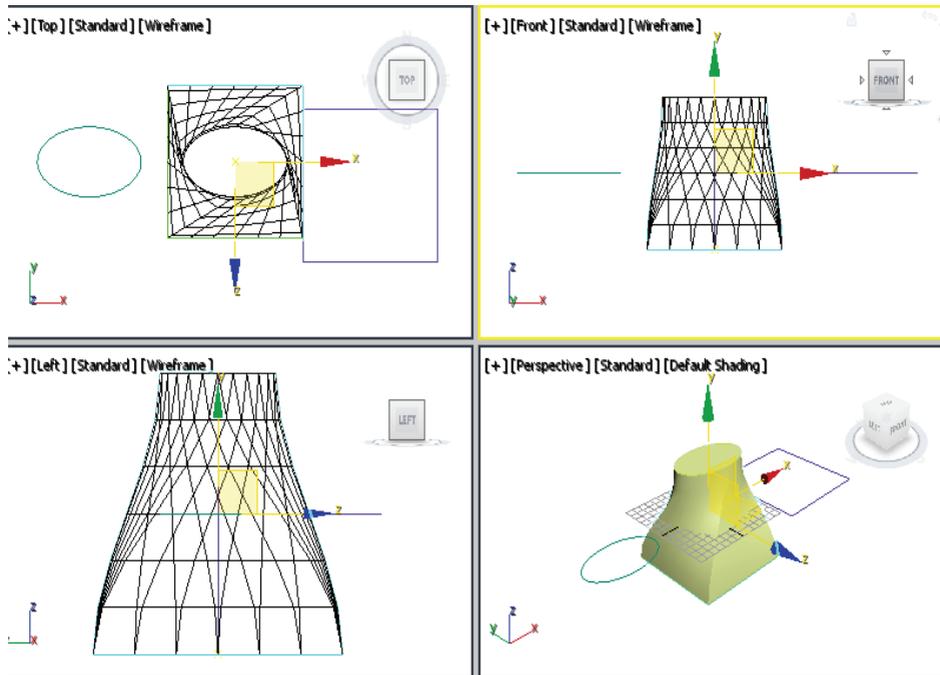
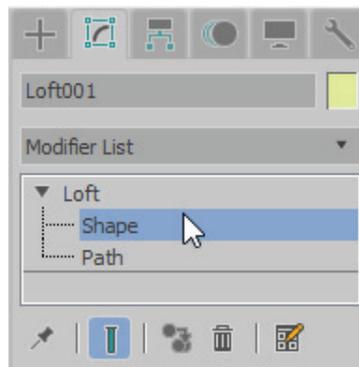


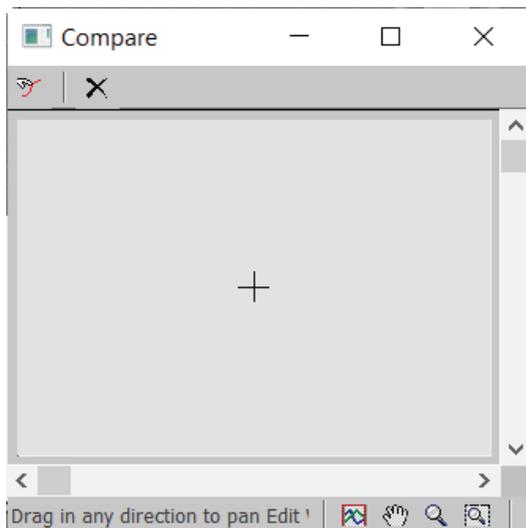
Figure 6-7 The lofted object and the shapes zoomed to their extents in all viewports



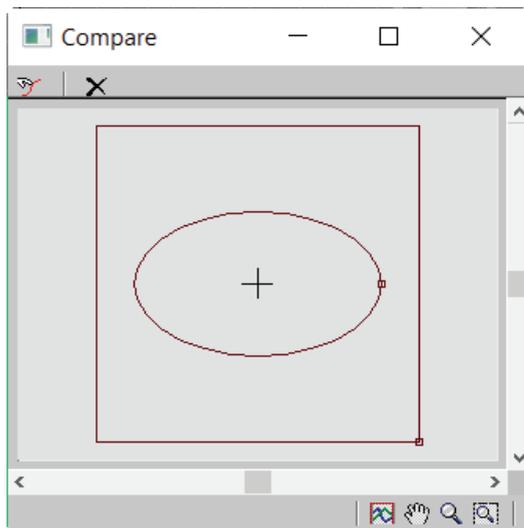
*Figure 6-8 The rectangle used as one of the lofted objects*



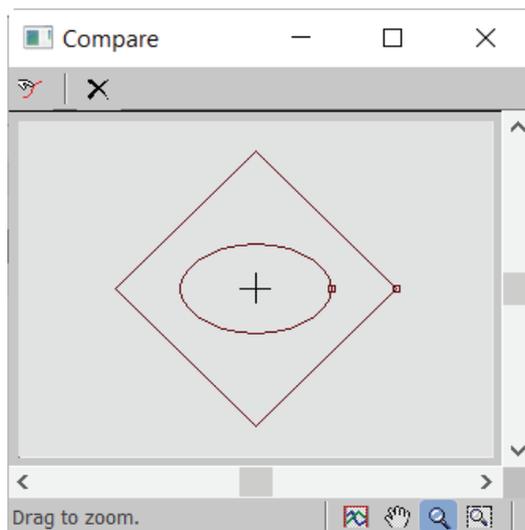
*Figure 6-9 The Shape sub-object level selected in the modifier stack*



*Figure 6-10* The *Compare* window



*Figure 6-11* The ellipse and rectangle displayed in the *Compare* window



*Figure 6-12* The rectangle rotated to align first vertices of both shapes

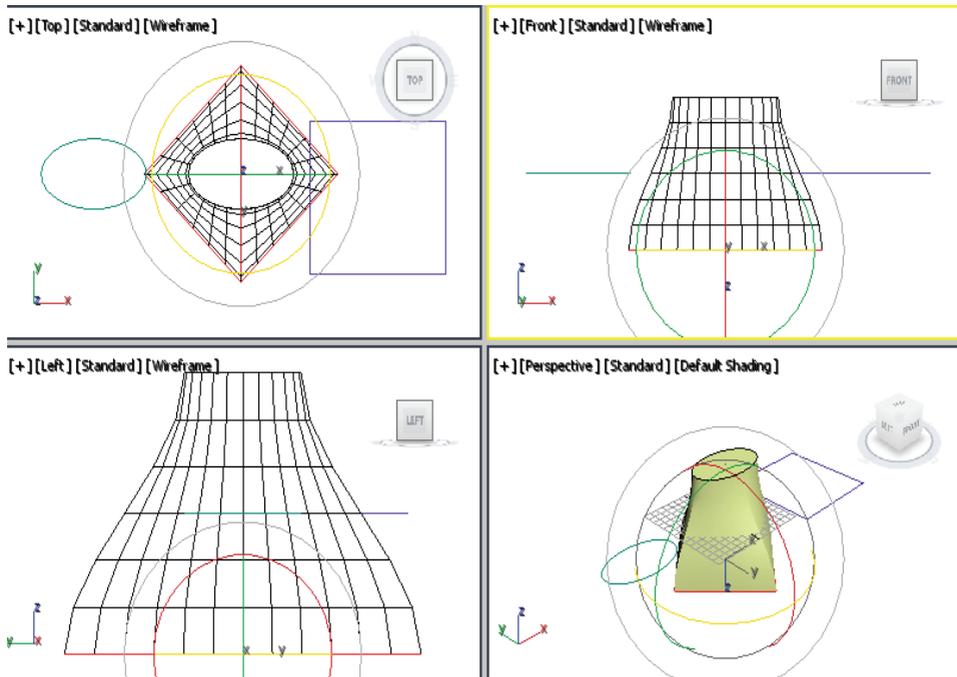


Figure 6-13 The twist removed from the lofted object by rotating the rectangle shape

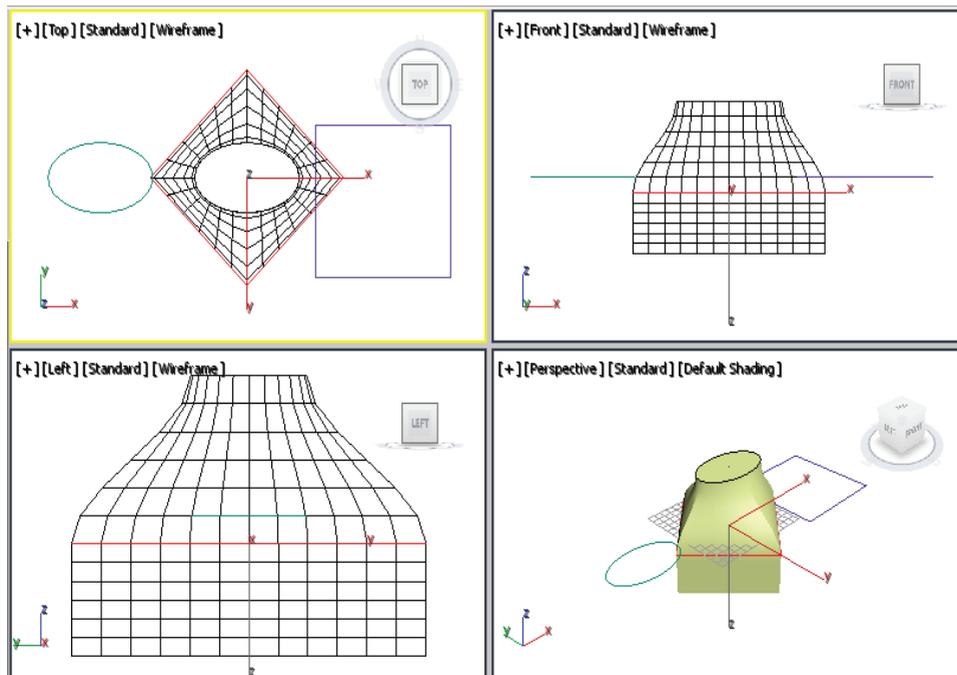


Figure 6-14 The rectangle shape moved to the 60% position on the path

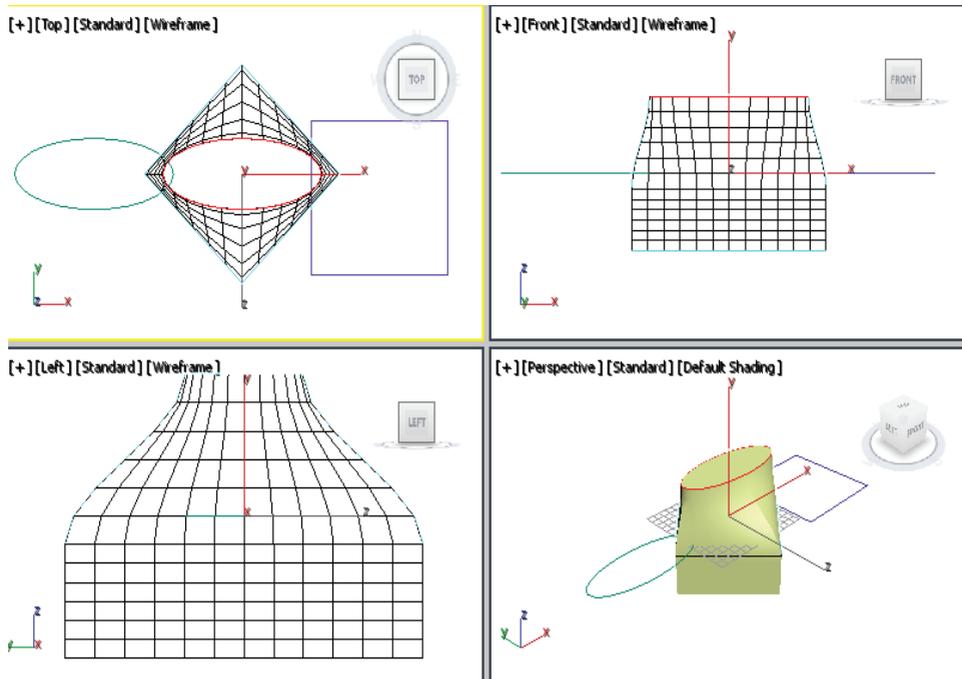


Figure 6-15 Width of the ellipse increased

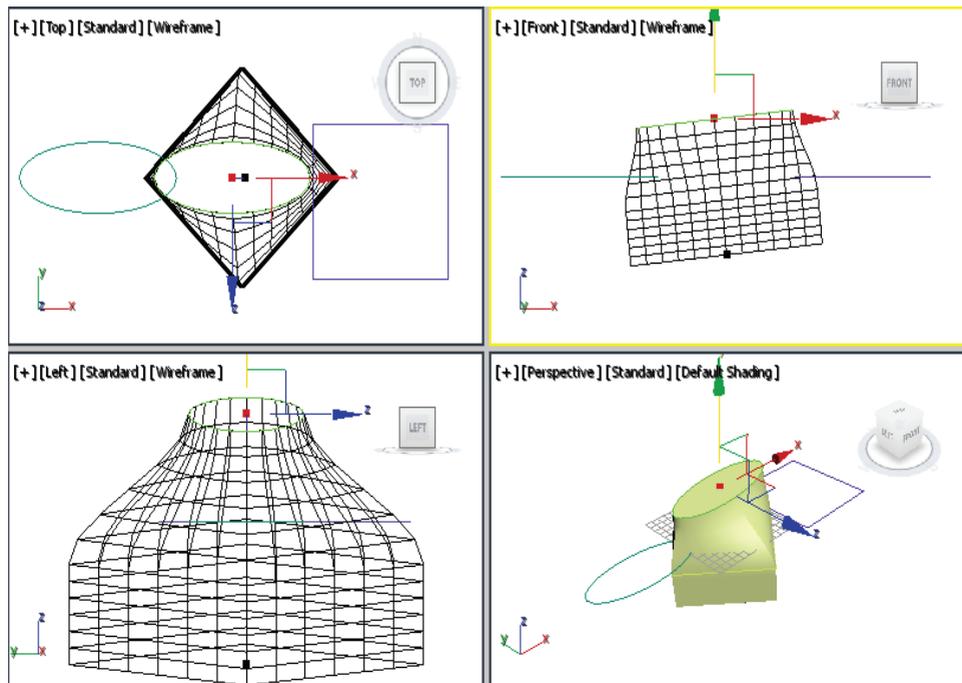


Figure 6-16 The top vertex of the path moved

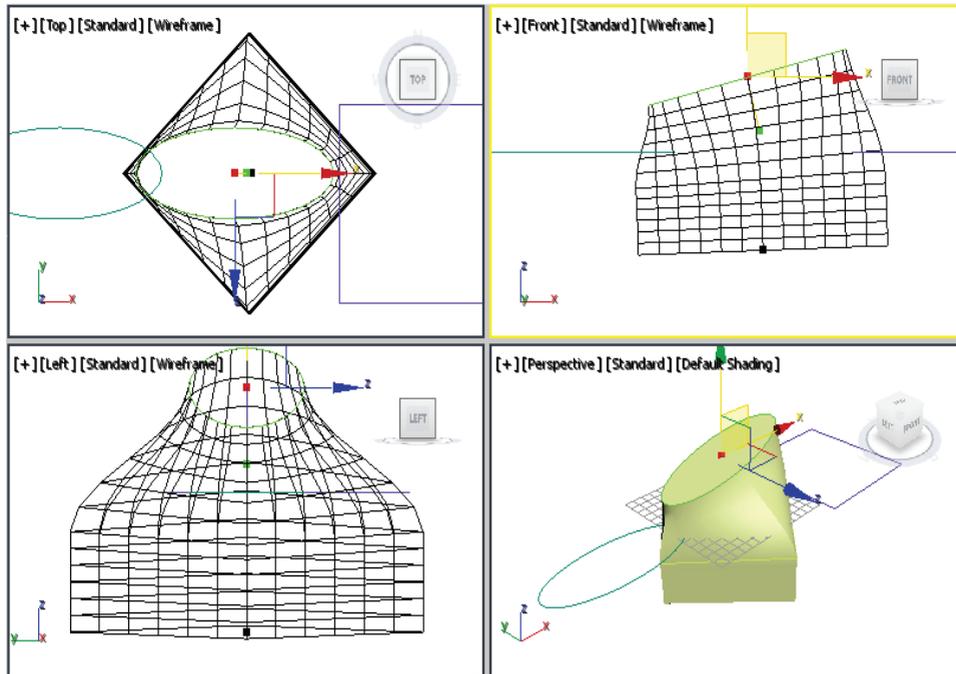


Figure 6-17 The lofted object curves with the path

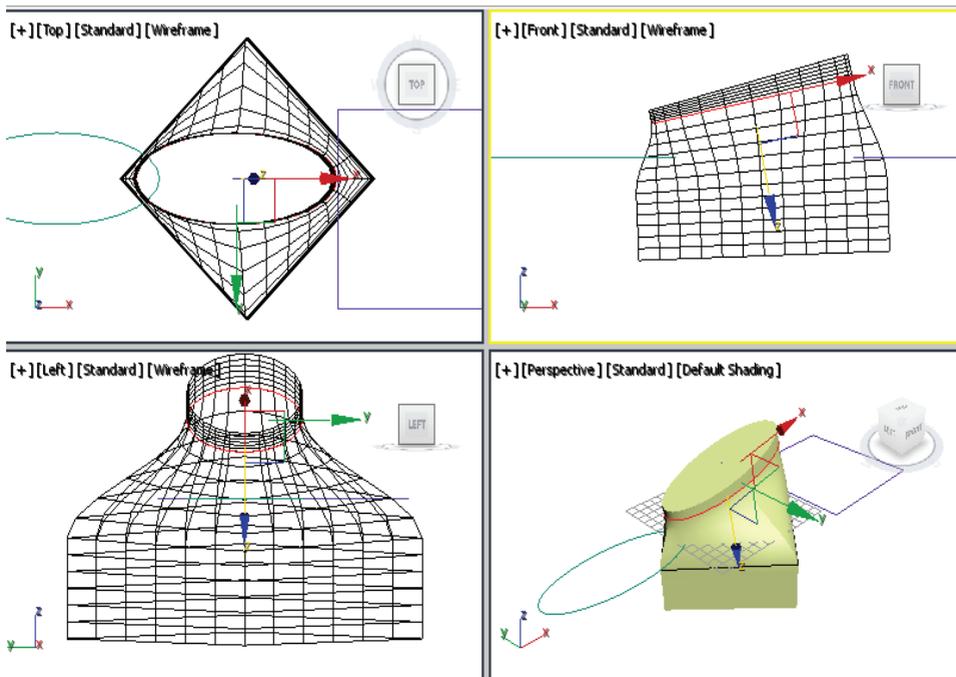


Figure 6-18 The ellipse moved away from the path (to the right)

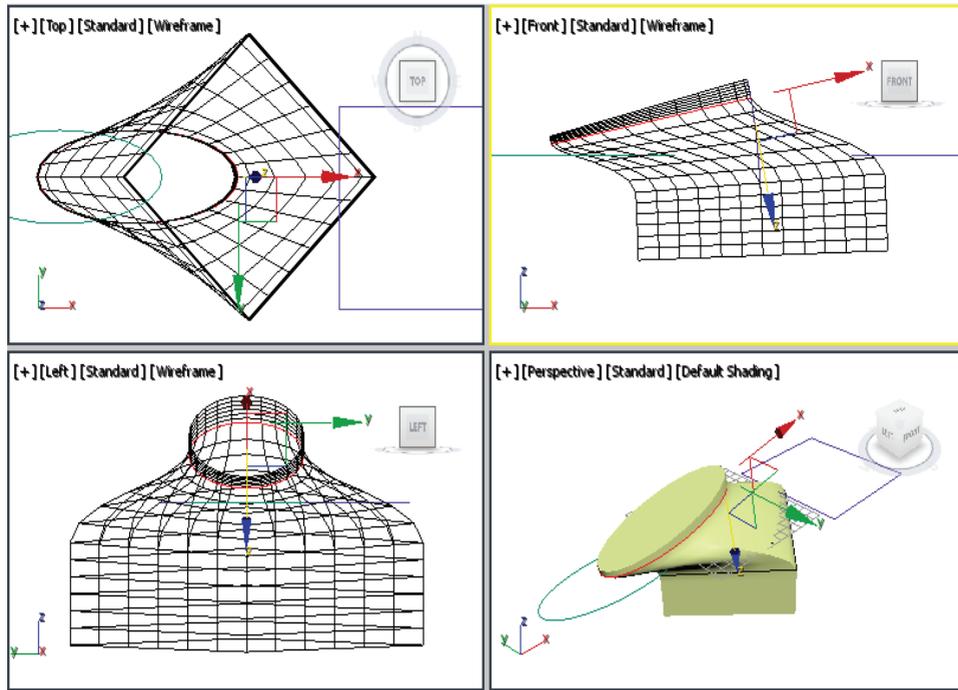


Figure 6-19 The ellipse aligned on the right by using the **Right** button

### Tutorial 3

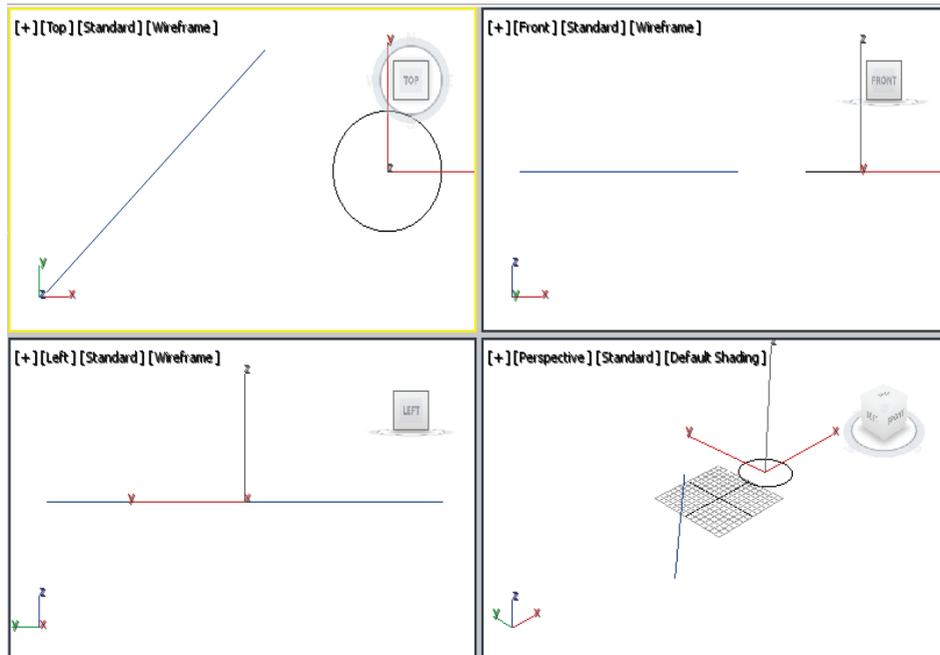


Figure 6-20 A line and a circle created

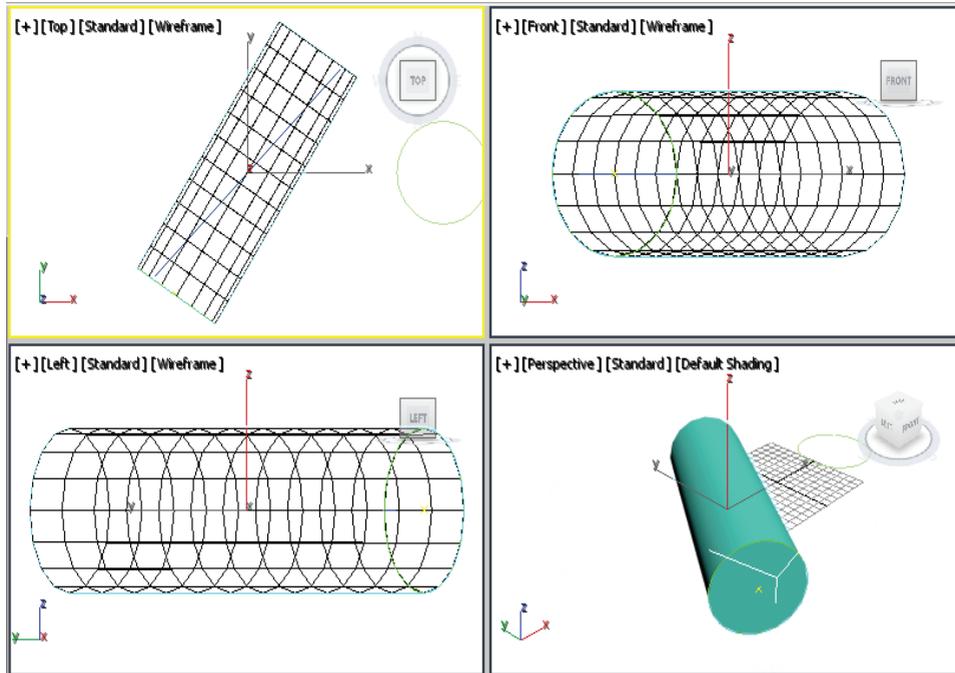


Figure 6-21 The lofted object zoomed

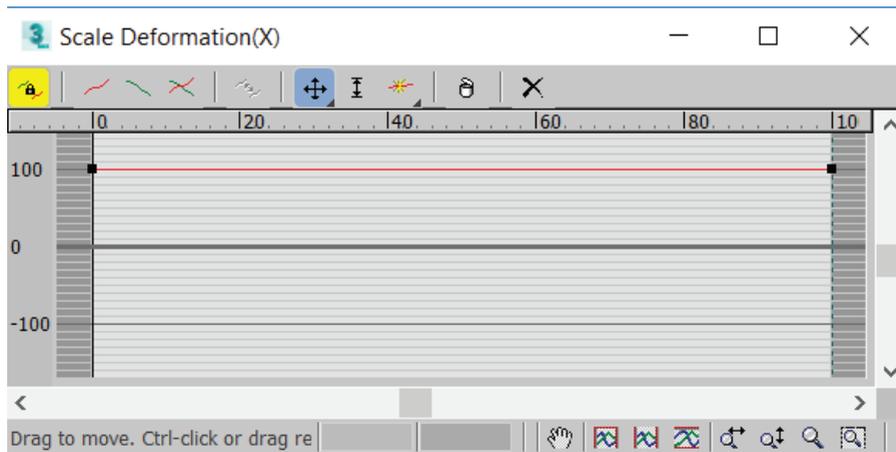


Figure 6-22 The Scale Deformation(X) dialog box

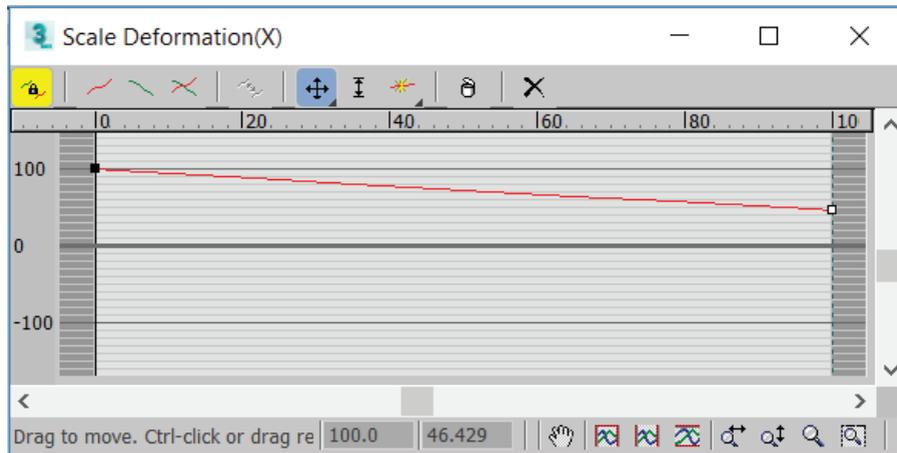


Figure 6-23 The vertex moved in the *Scale Deformation(X)* dialog box

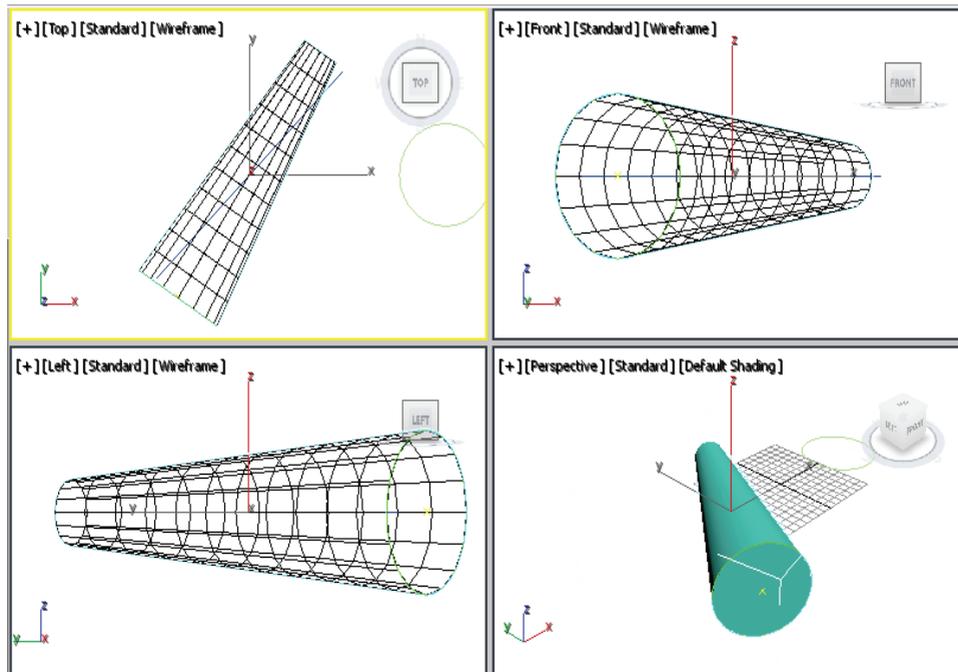
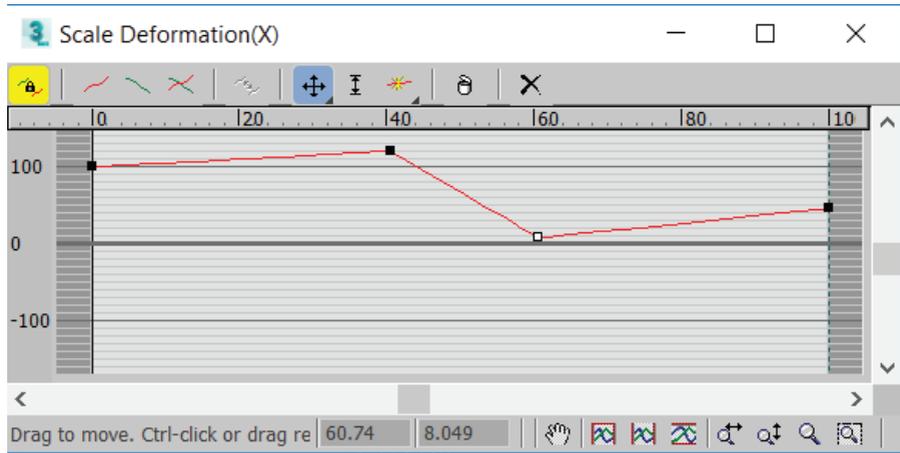
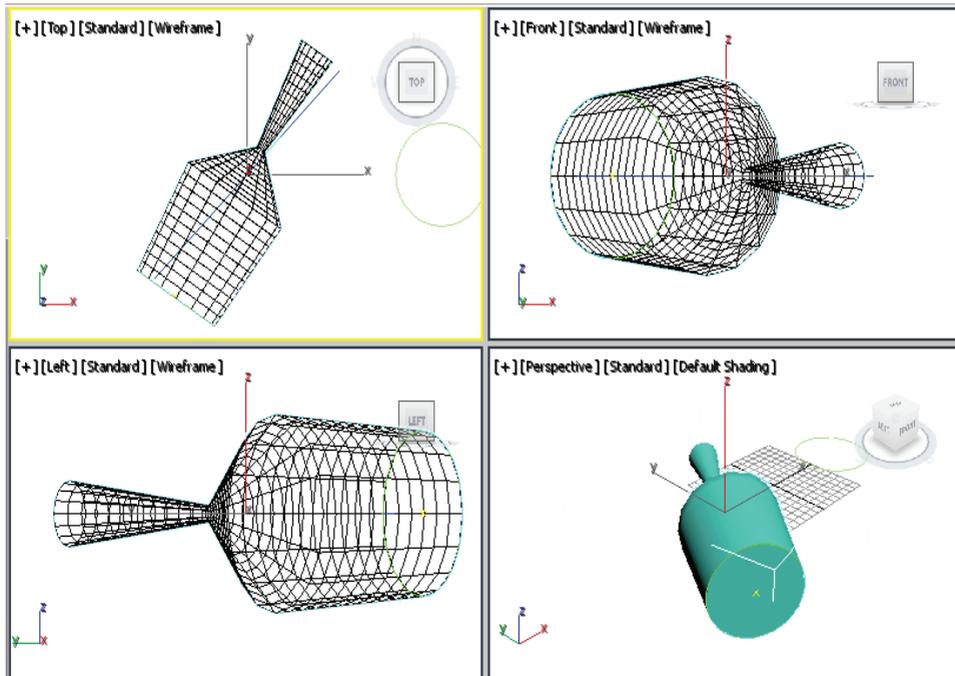


Figure 6-24 The lofted object tapered after moving the vertex in the *Scale Deformation(X)* dialog box



*Figure 6-25* Two vertices added and moved in the *Scale Deformation(X)* dialog box



*Figure 6-26* The modified lofted object after adding and moving the vertices

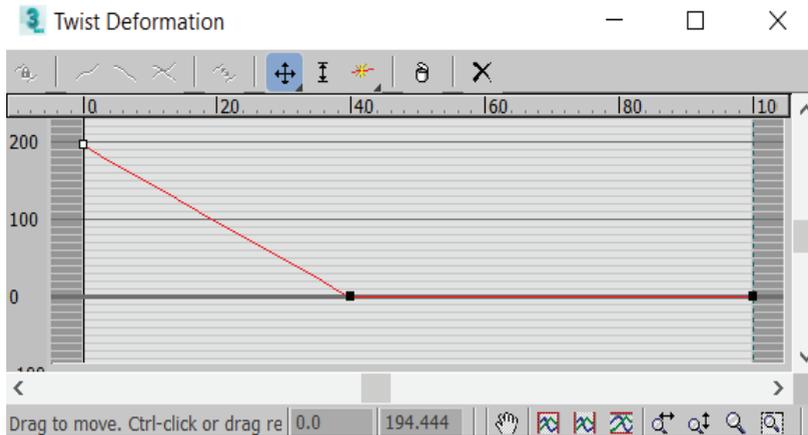


Figure 6-27 Moving the vertex up to 200 degrees

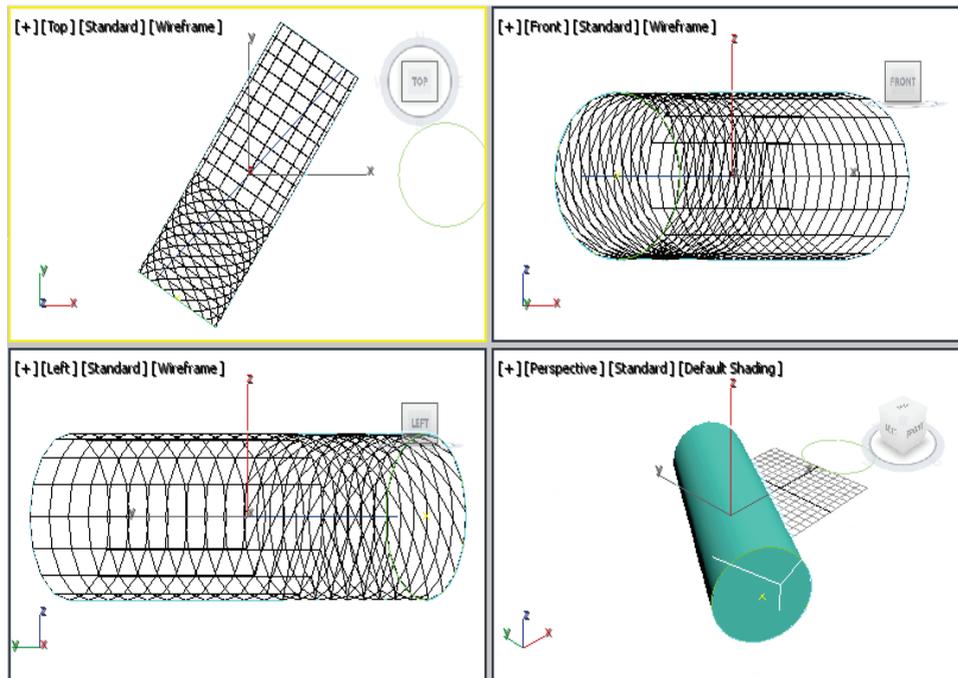


Figure 6-28 The modified loft object after adding a vertex and moving the left vertex

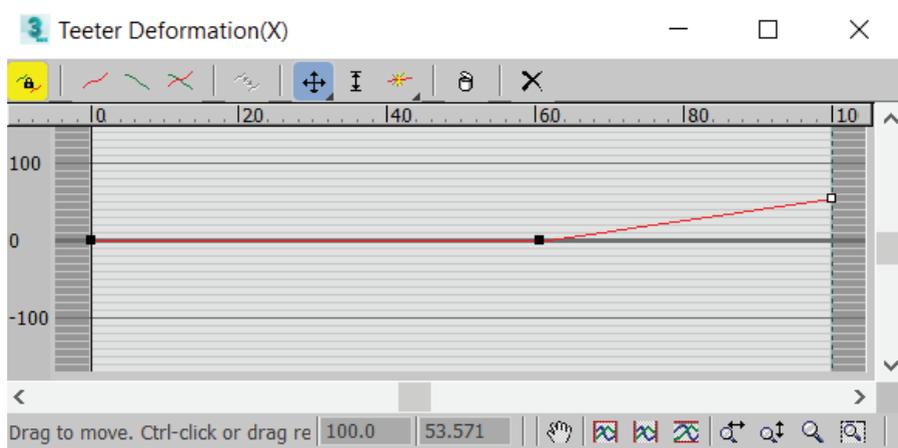


Figure 6-29 Moving the right-hand vertex up by five lines

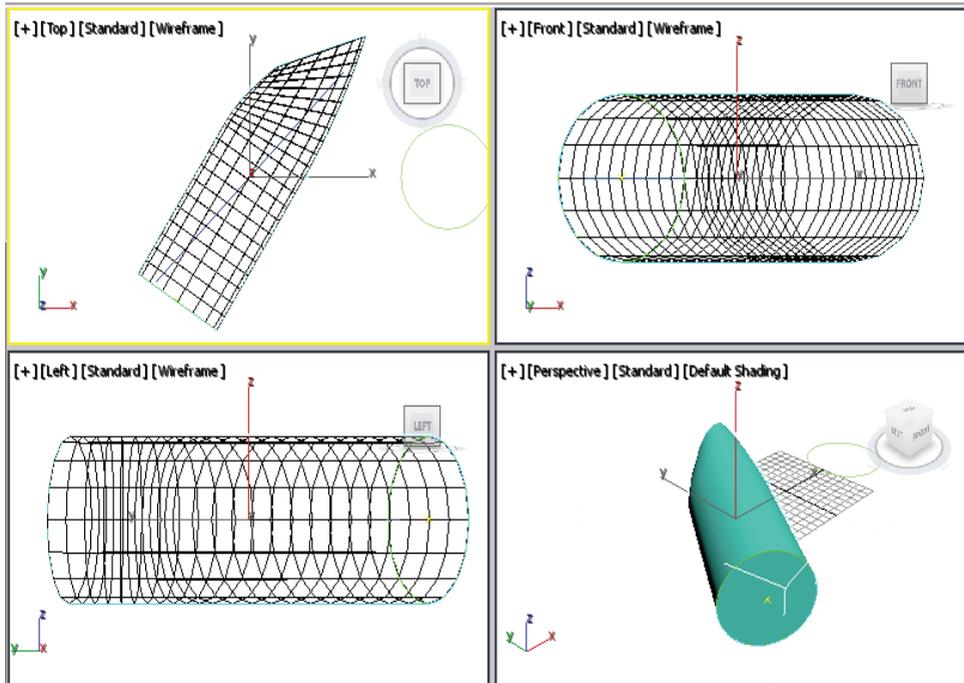


Figure 6-30 The lofted object tilted along the Y axis

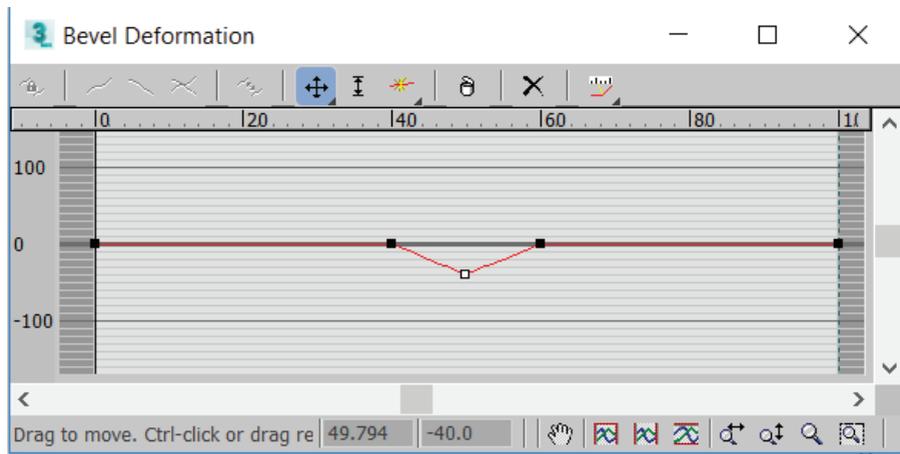


Figure 6-31 The three vertices added in the *Bevel Deformation* dialog box and the middle vertex moved down

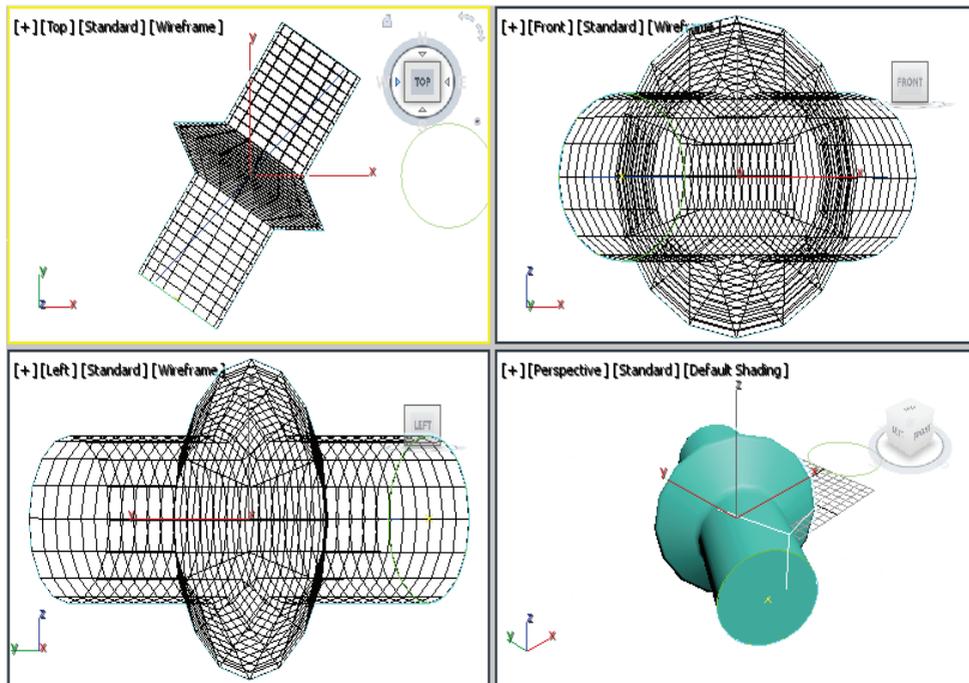


Figure 6-32 The lofted object beveled after inserting three vertices and moving the middle one

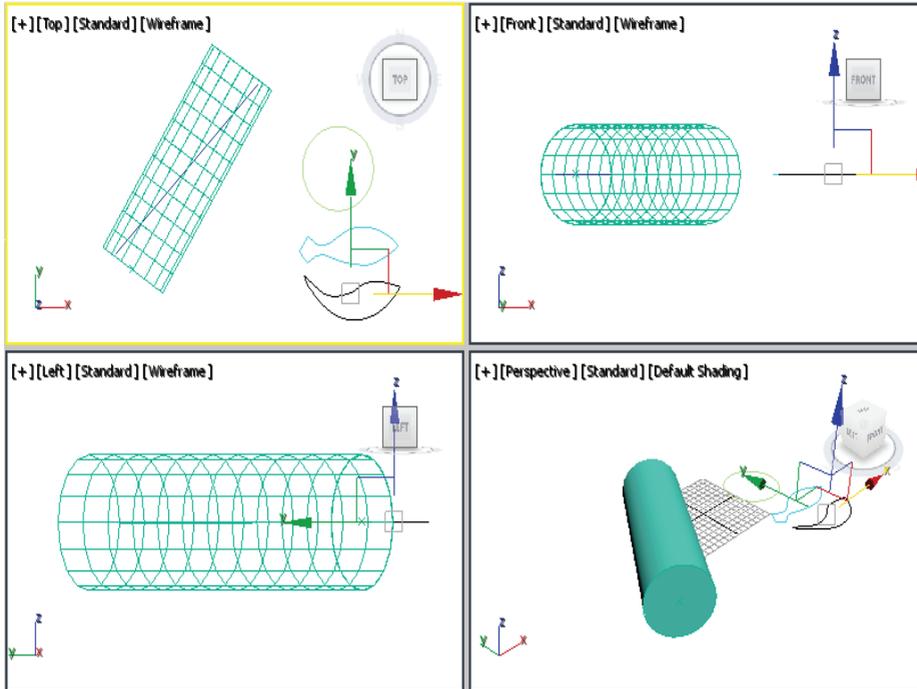


Figure 6-33 Two closed shapes created in the Top viewport

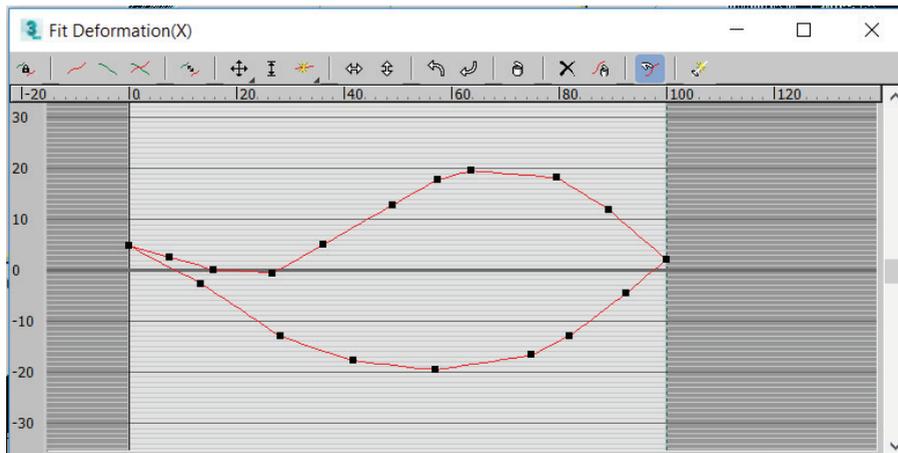


Figure 6-34 Fit Shape (Top) displayed in the Fit Deformation(X) dialog box

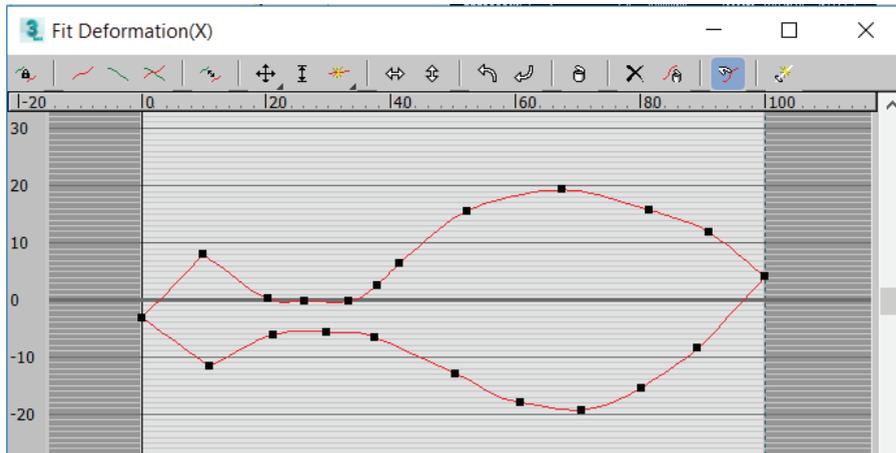


Figure 6-35 Fit Shape (Side) displayed in the *Fit Deformation(Y)* dialog box

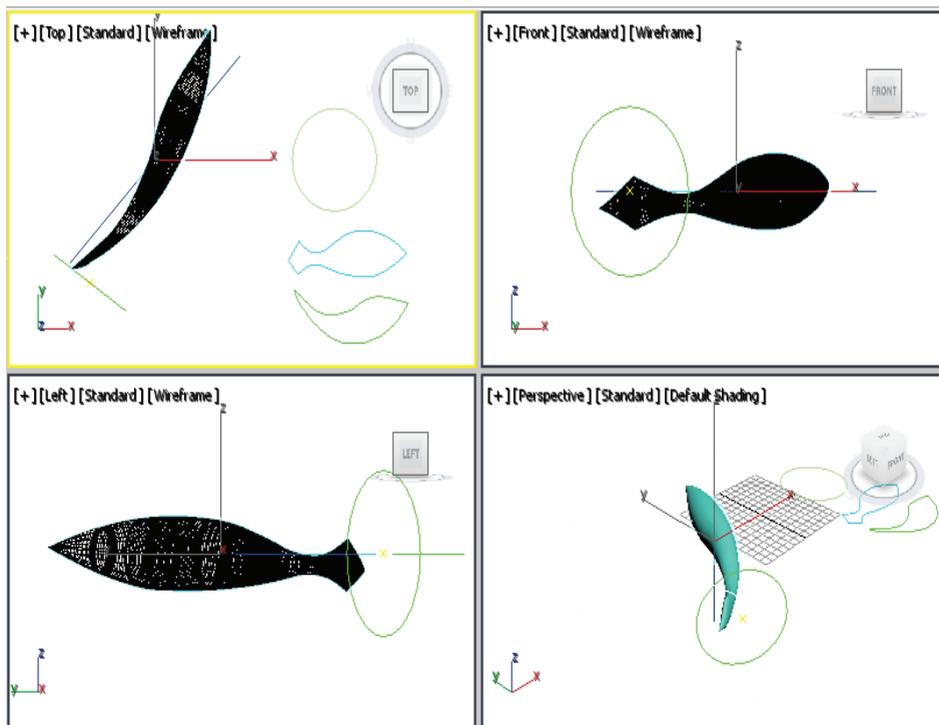
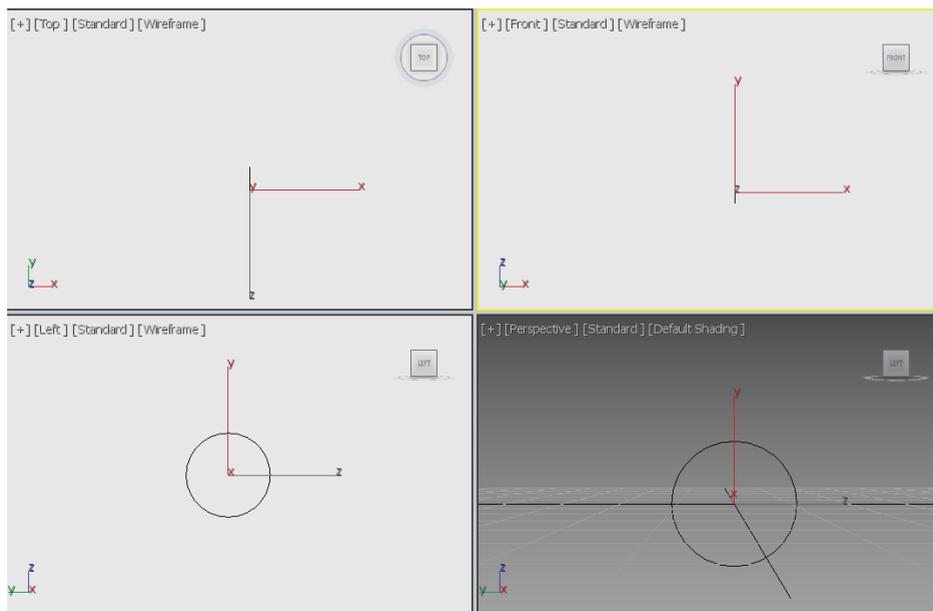


Figure 6-36 The lofted object showing the effect of fit shapes

**Tutorial 4**

*Figure 6-37 The model of a screw driver*



*Figure 6-38 The base zoomed in all viewports*

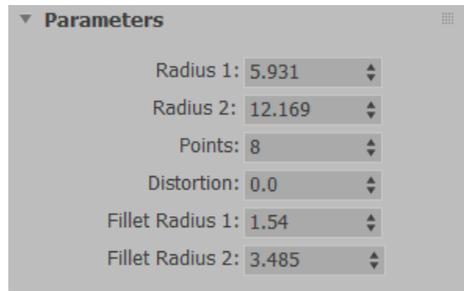


Figure 6-39 Parameters set in the *Parameters* rollout

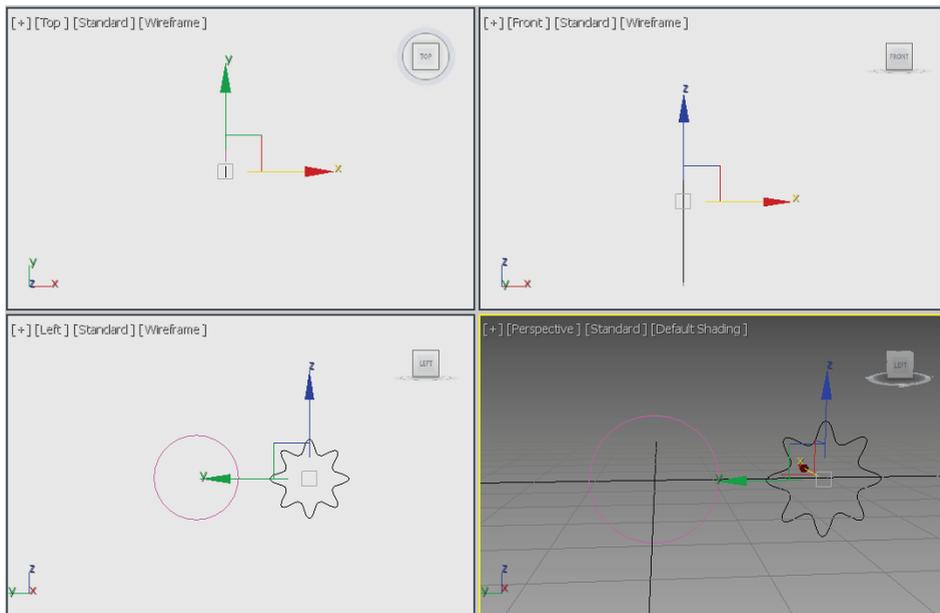
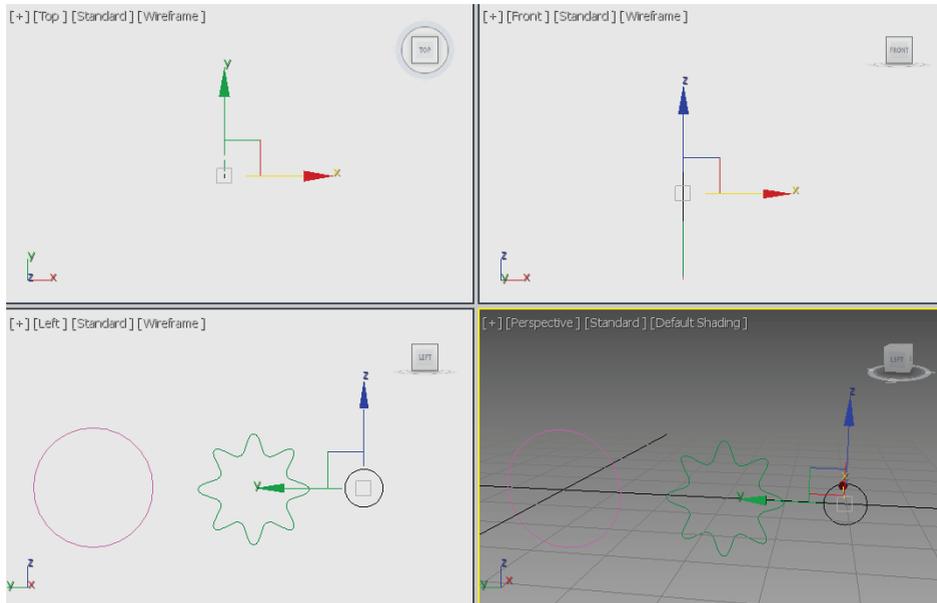
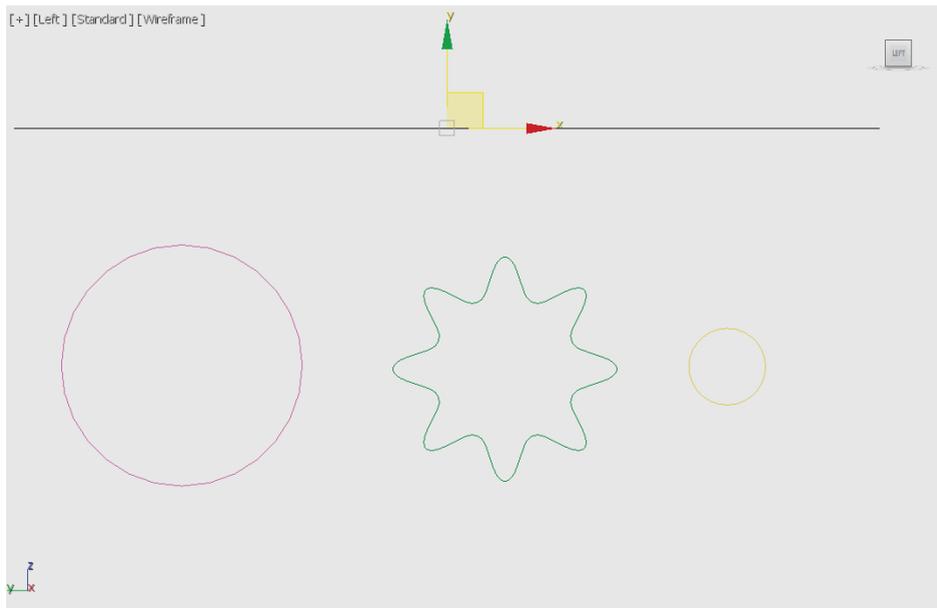


Figure 6-40 The design zoomed in all viewports



*Figure 6-41 The top\_base zoomed in all viewports*



*Figure 6-42 The line zoomed in the Left viewport*

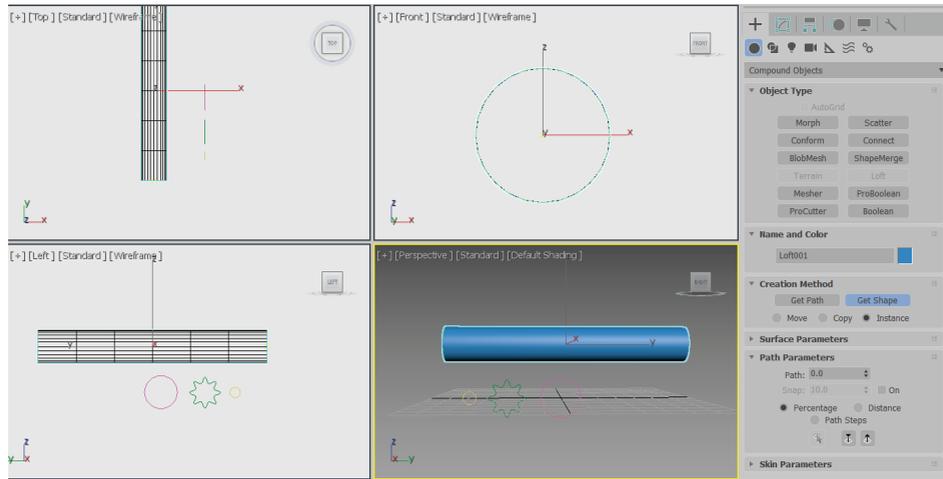


Figure 6-43 The circle lofted along the line

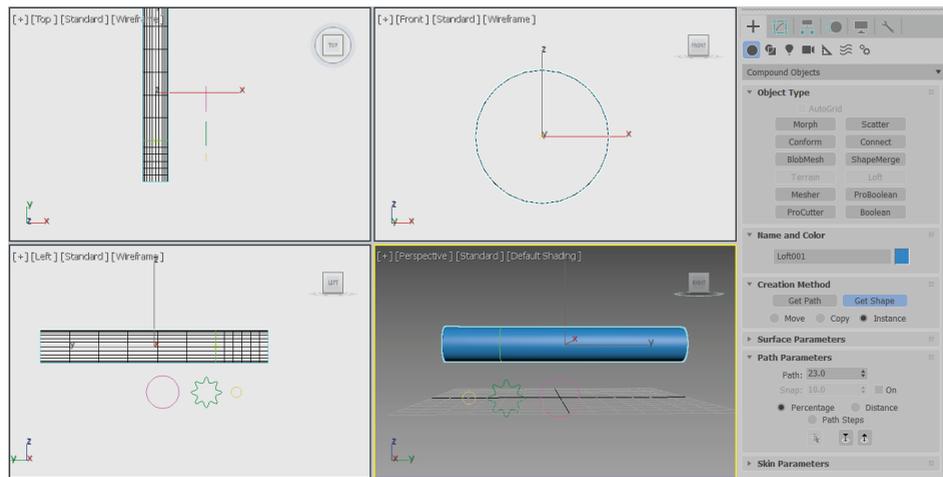
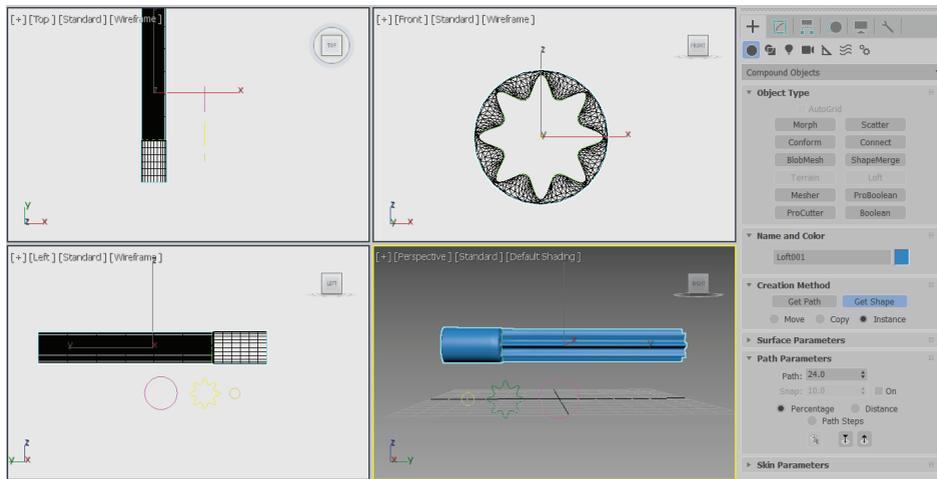
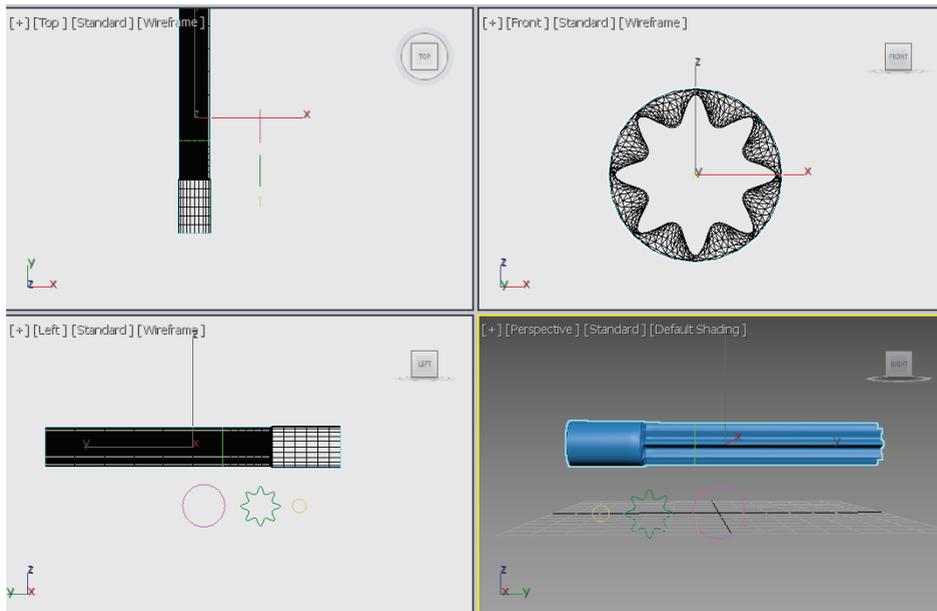


Figure 6-44 The path set



*Figure 6-45 The design lofted along the path*



*Figure 6-46 The path set*

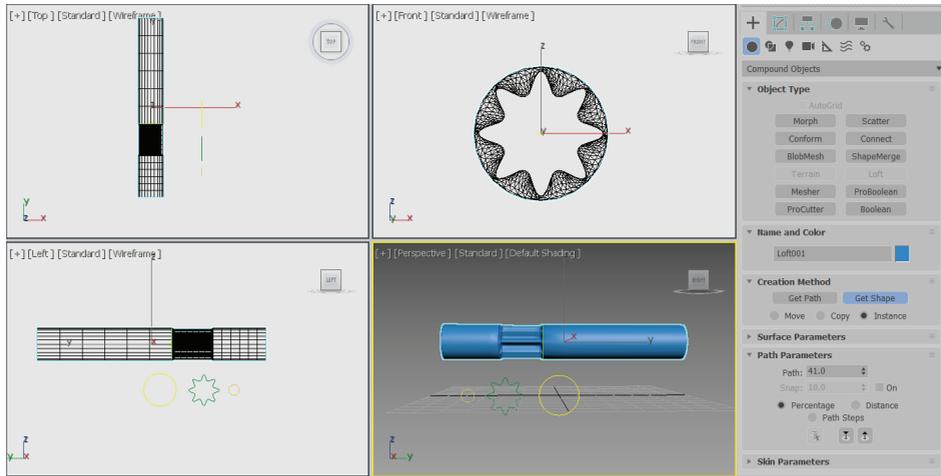


Figure 6-47 The base lofted along the path

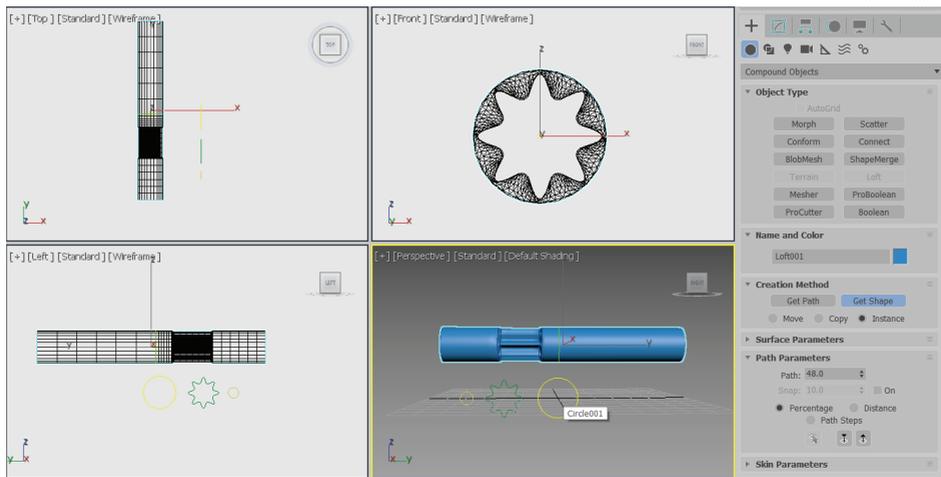


Figure 6-48 The base lofted along the path

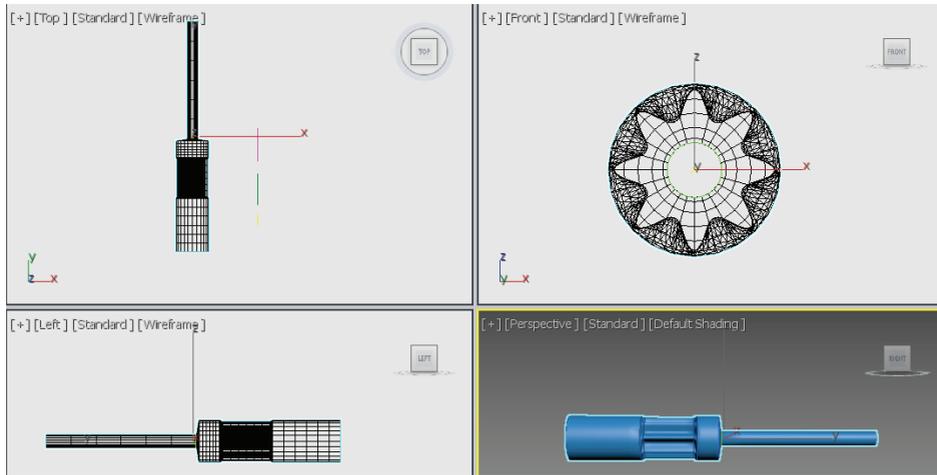


Figure 6-49 The top\_base lofted along the path

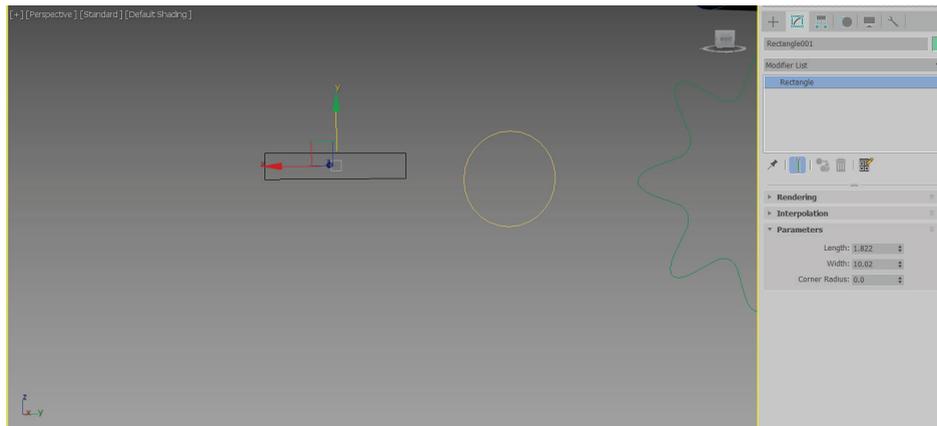


Figure 6-50 The rectangle created in the left viewport

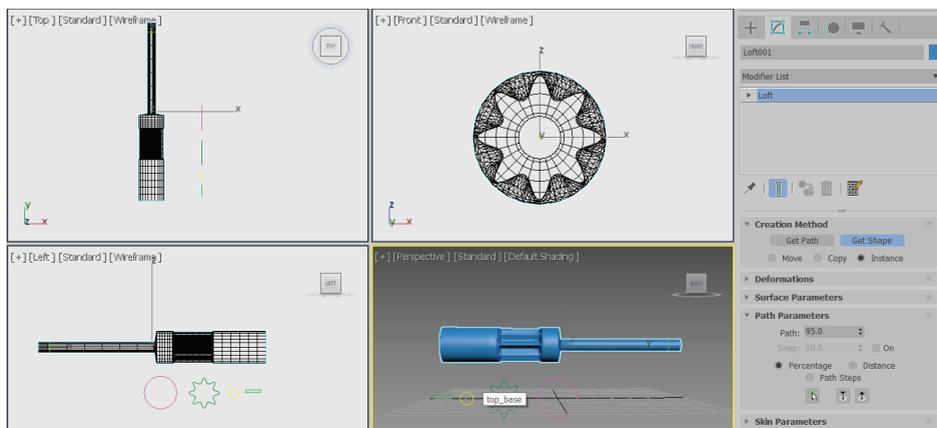


Figure 6-51 The path set

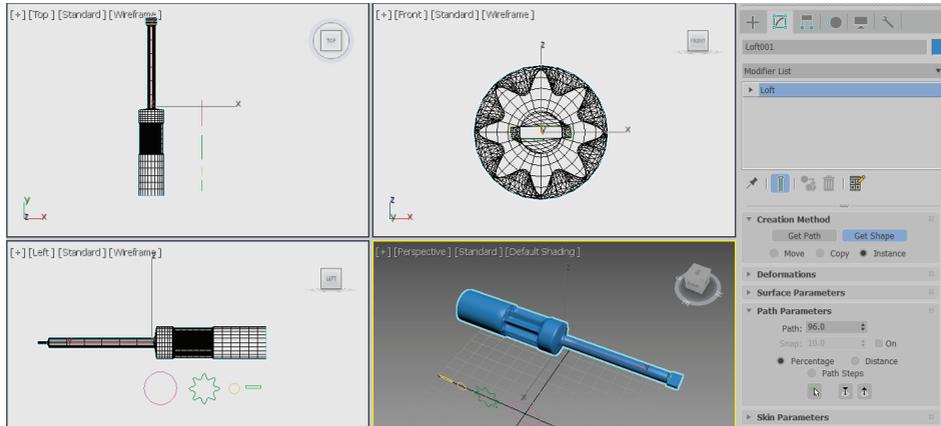


Figure 6-52 The rectangle lofted along the path

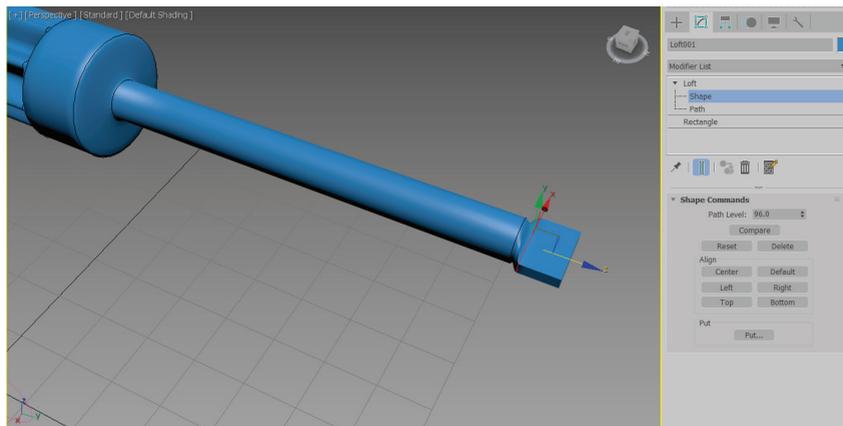


Figure 6-53 The rectangle shape selected

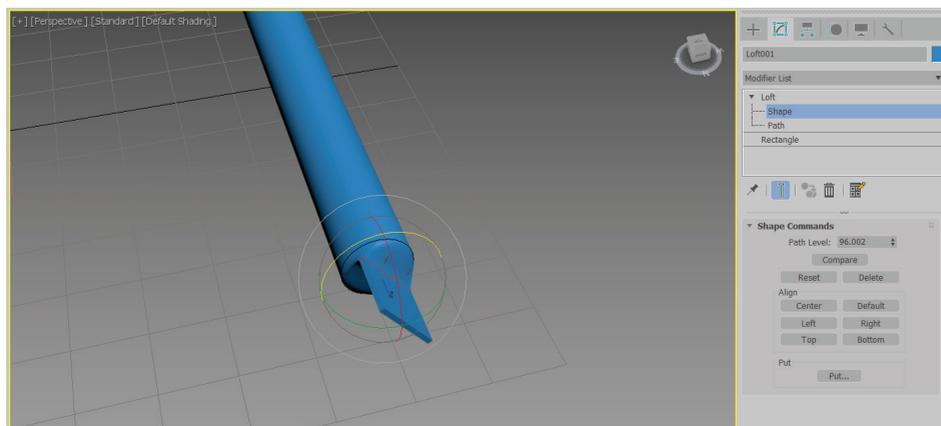
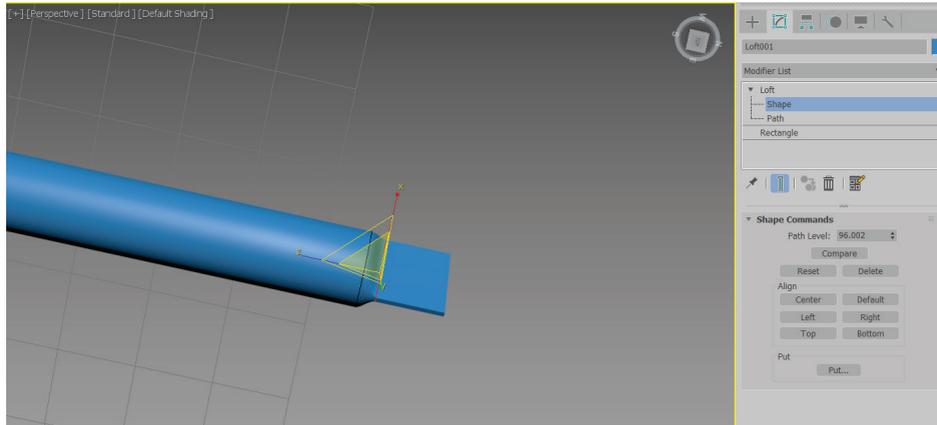
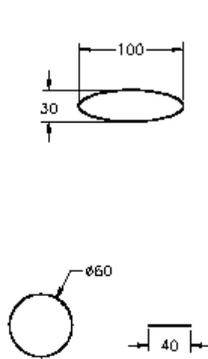


Figure 6-54 Rotating the rectangle shape

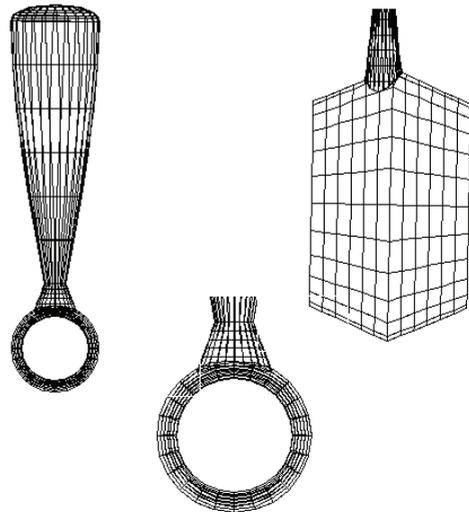
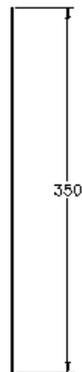


*Figure 6-55 The rectangle shape scaled*

## Exercise 1



*Figure 6-56 The circular and ellipse shapes*

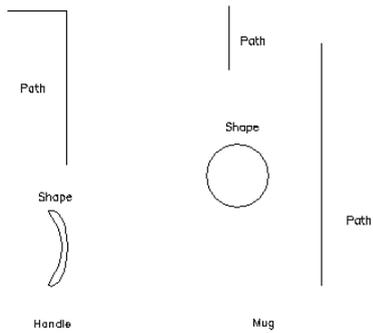


*Figure 6-57 Shapes to be lofted*



*Figure 6-58 The propeller model*

**Exercise 2**



*Figure 6-59 Lofted shapes*



*Figure 6-60 The travel mug*

# Chapter 7

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## Material Editor: Creating Materials

### Learning Objectives

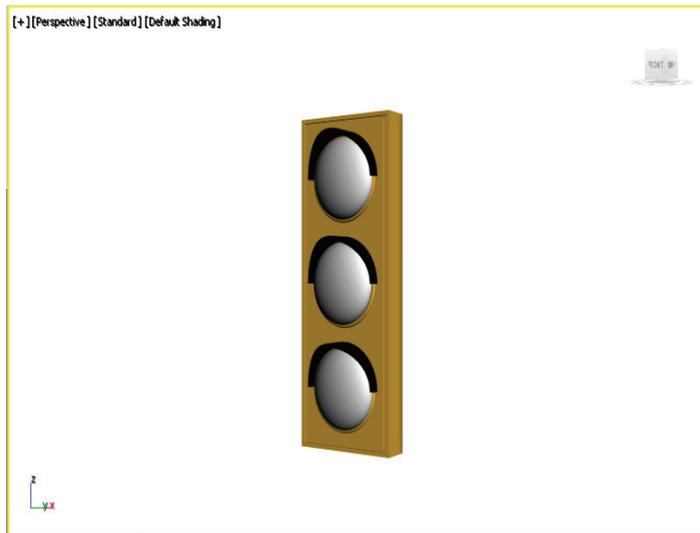
**After completing this chapter, you will be able to:**

- *Create materials in the material library*
- *Apply ambient and diffuse properties of the materials*
- *Assign materials to the objects*
- *Use ART renderer and Autodesk materials*
- *Render the scene for the final output*



**Tutorial 1**

*Figure 7-1 The traffic signal model with materials applied*



*Figure 7-2 The c07\_tut1\_start file*

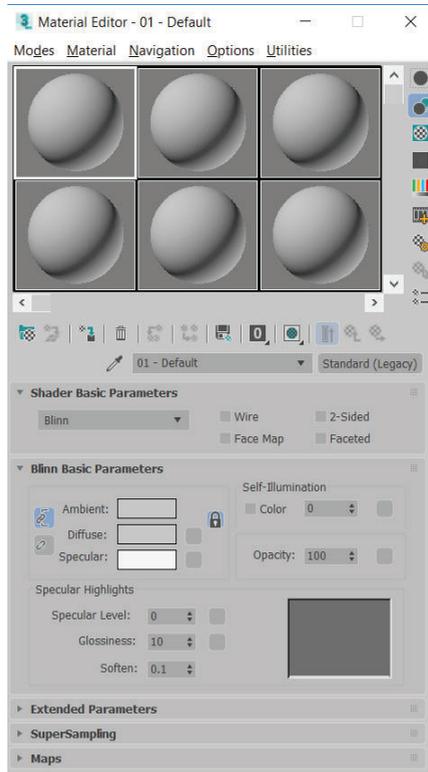


Figure 7-3 The Material Editor dialog box

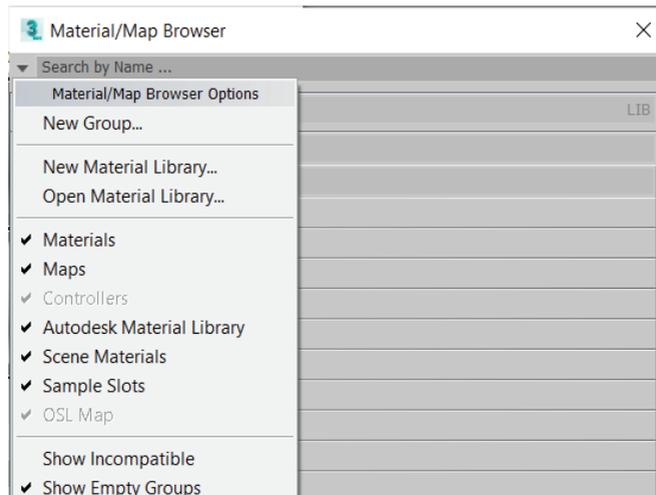


Figure 7-4 The Material/Map Browser Options flyout

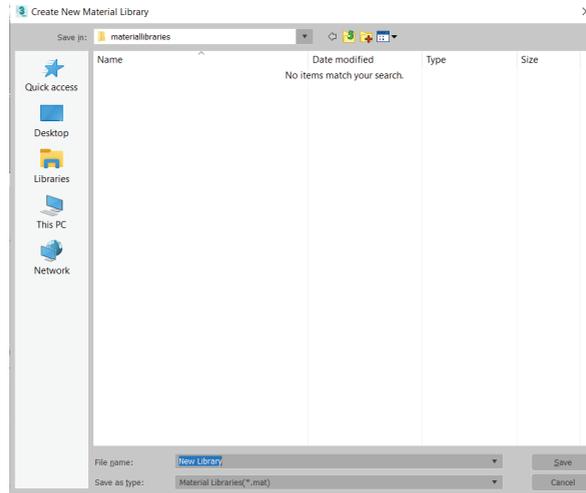


Figure 7-5 The Create New Material Library dialog box

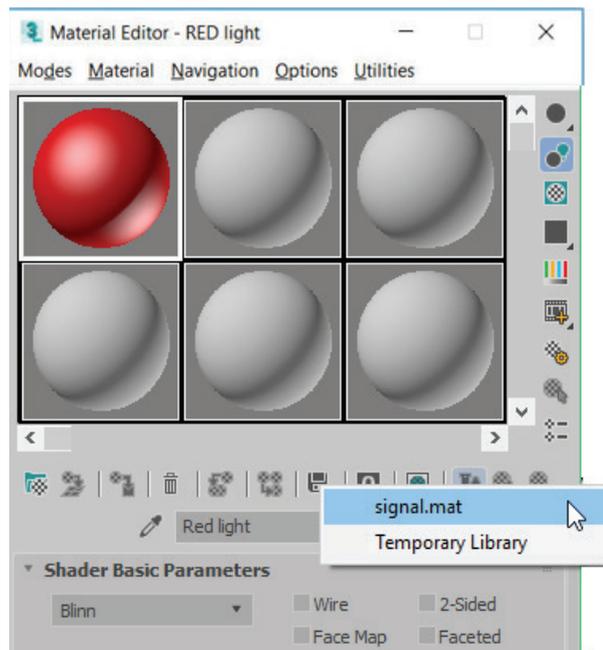


Figure 7-6 Choosing signal.mat from the flyout

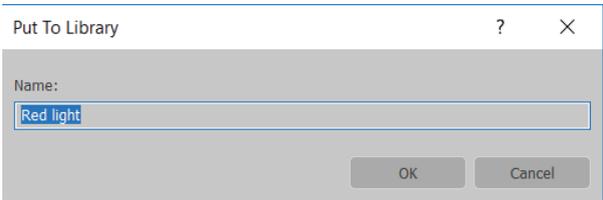


Figure 7-7 The Put To Library dialog box

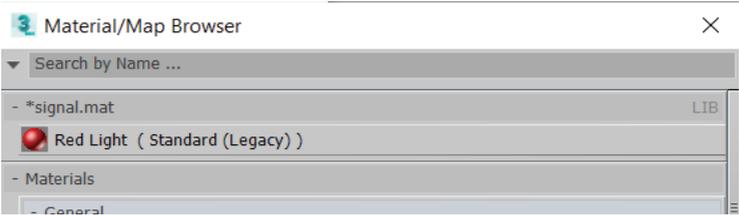


Figure 7-8 The Red light material added to the material library

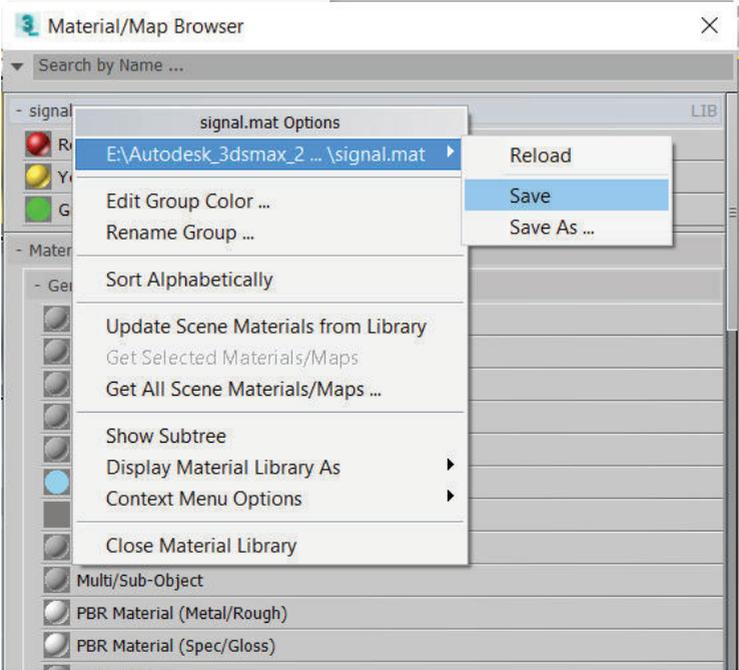


Figure 7-9 Saving the material library



*Figure 7-10 The rendered image*

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## Tutorial 2



*Figure 7-11 The textured scene*

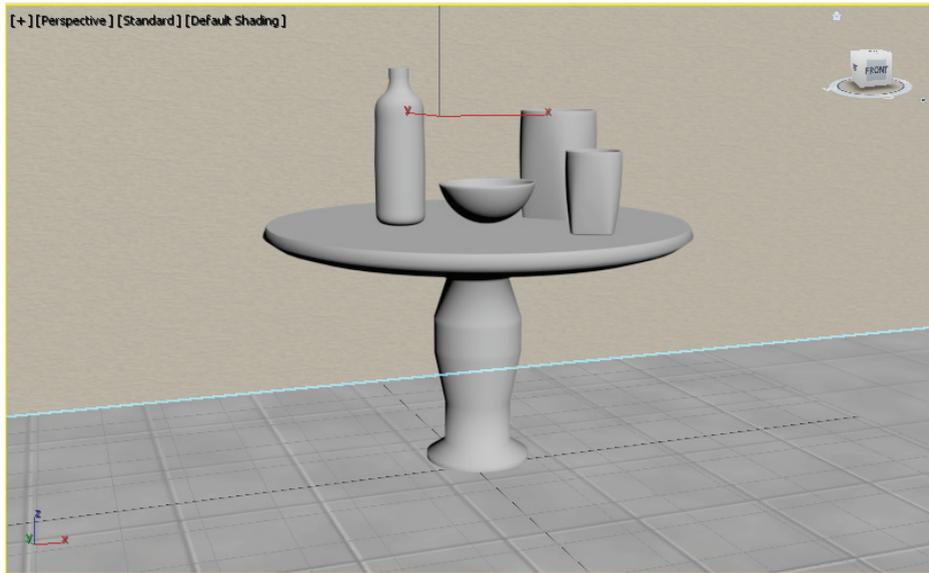


Figure 7-12 The c07\_tut2\_start file

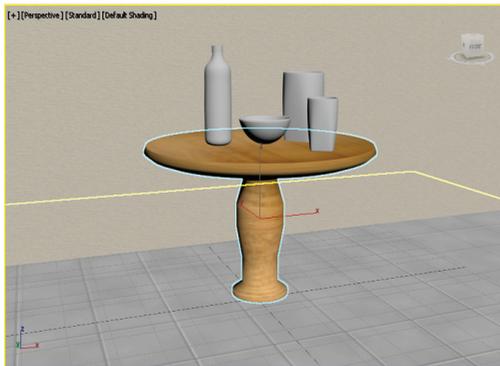


Figure 7-13 The wood material assigned to table

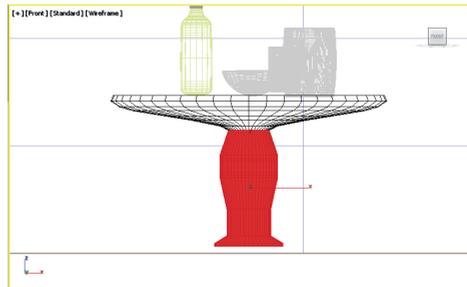
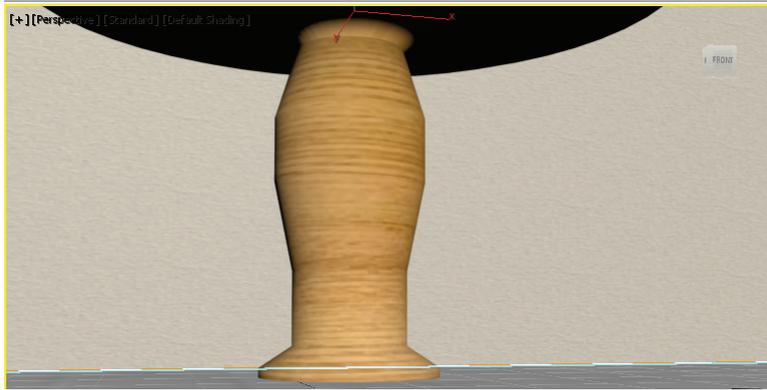
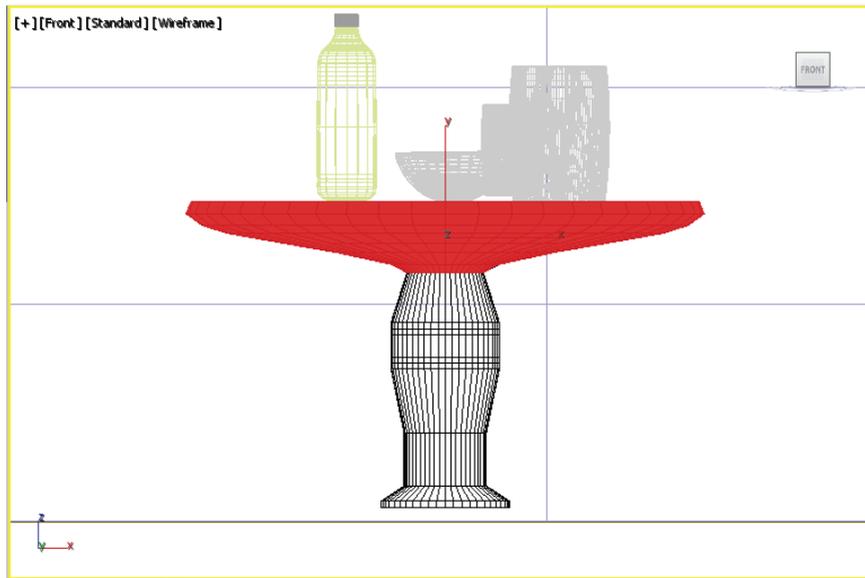


Figure 7-14 Polygons of table selected



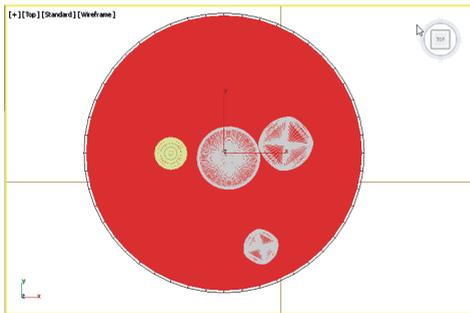
*Figure 7-15 The texture aligned on the bottom part of table*



*Figure 7-16 Polygons of table selected*



*Figure 7-17 The texture aligned on the middle part of table*



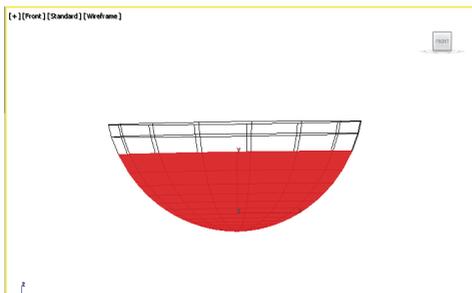
*Figure 7-18 Selected polygon of table*



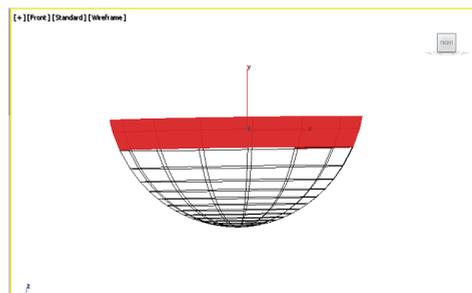
*Figure 7-19 The texture aligned on the upper part of table*



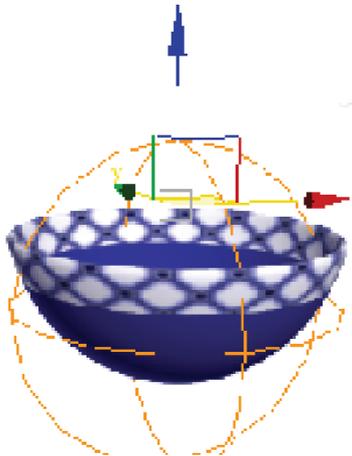
*Figure 7-20* The rendered image



*Figure 7-21* Selected polygons of bowl



*Figure 7-22* Rest of the polygons selected



*Figure 7-23* The **bowl** material applied to bowl



*Figure 7-24 The rendered image*

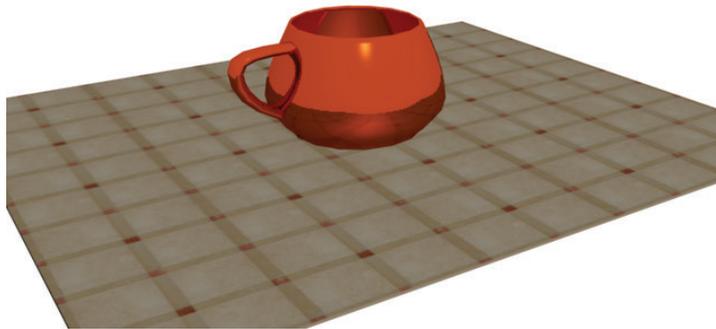
## **Exercise 1**



*Figure 7-25 The crayons*

**Exercise 2**

*Figure 7-26 The model of cups and glasses*

**Exercise 3**

*Figure 7-27 The model of a tea cup*

# Chapter 8

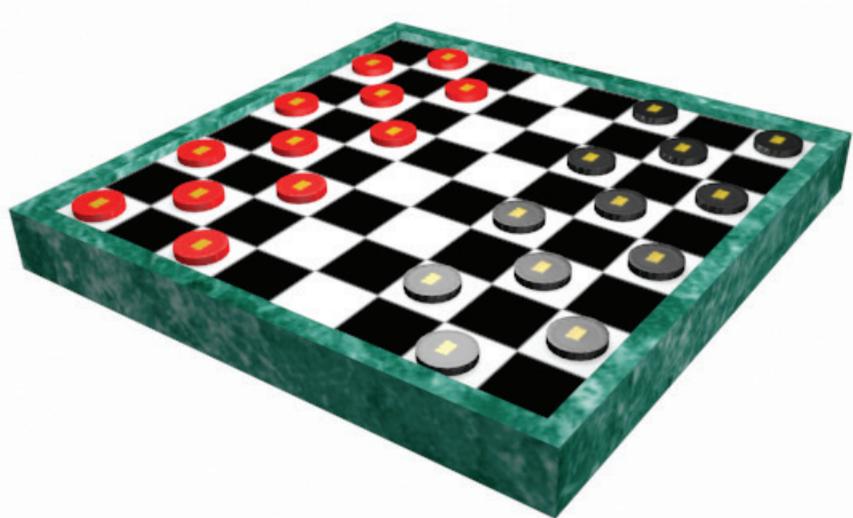
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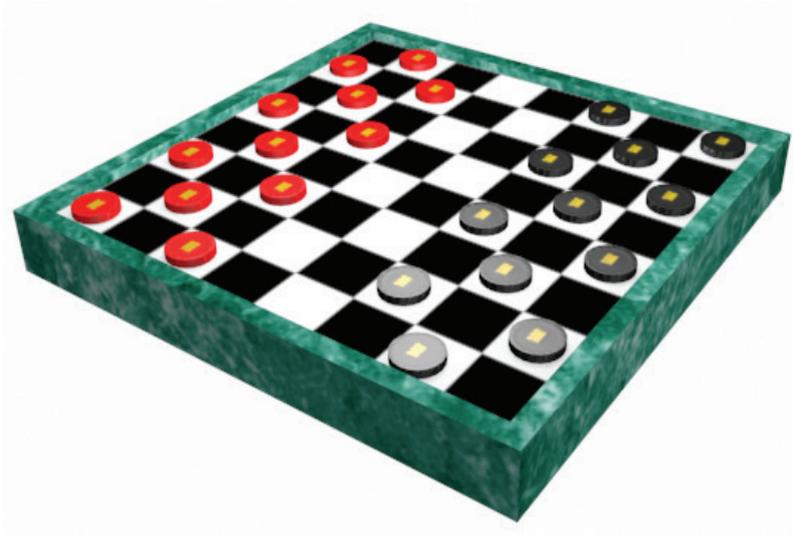
## Material Editor: Texture Maps-I

### Learning Objectives

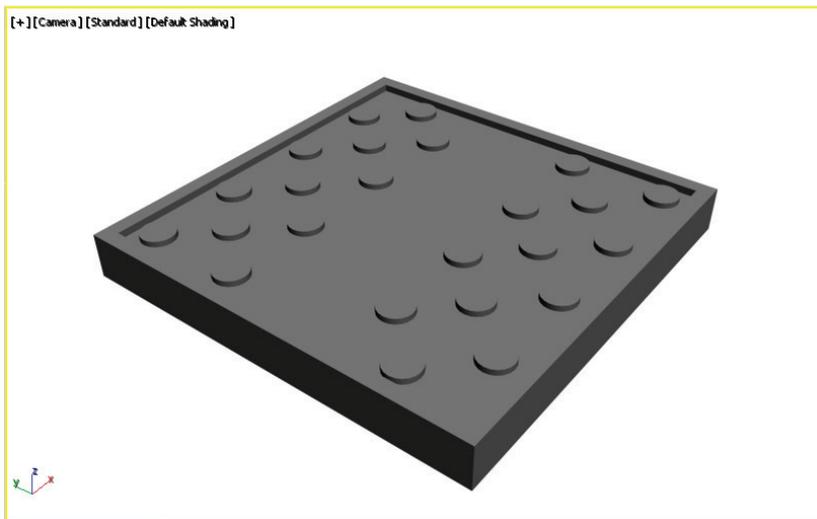
After completing this chapter, you will be able to:

- Apply texture maps
- Apply bump maps



**Tutorial 1**

*Figure 8-1 The checkerboard after applying materials*



*Figure 8-2 The c08\_tut1\_start file*

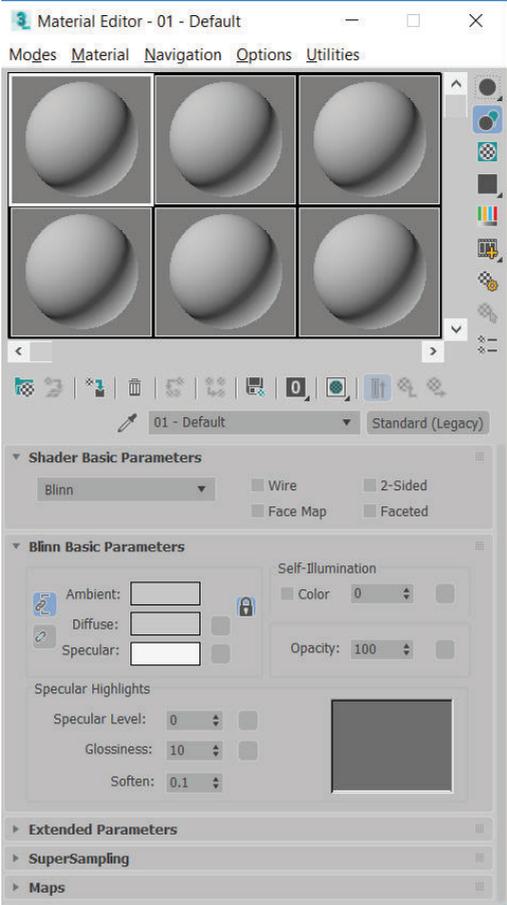
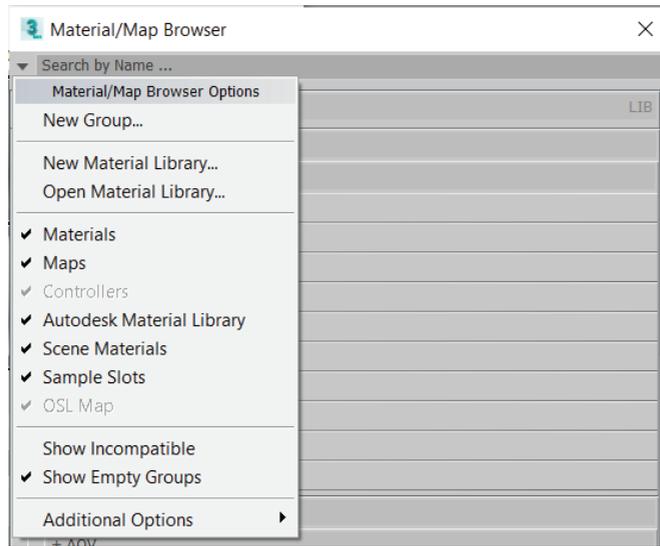
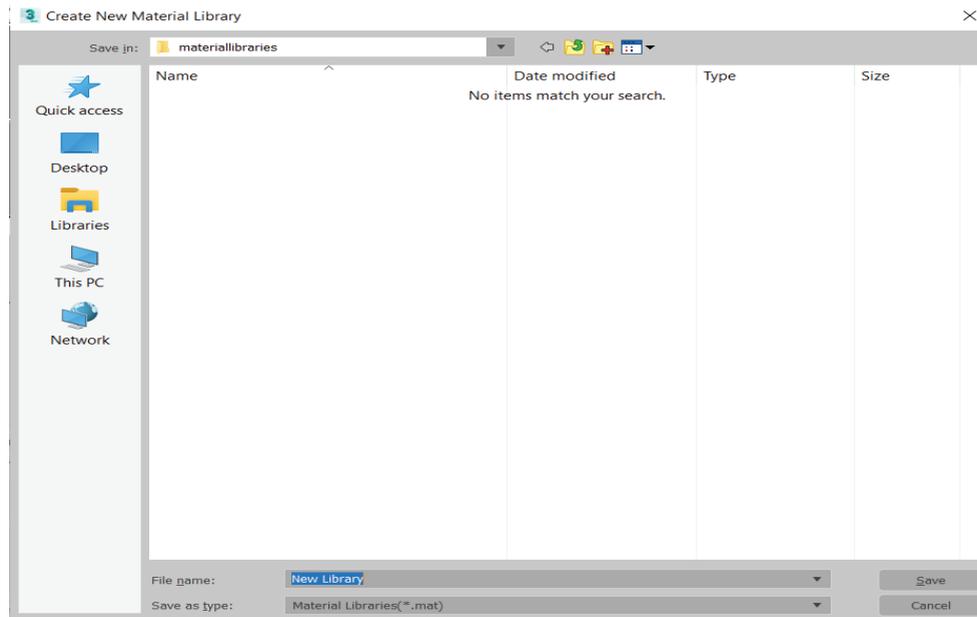


Figure 8-3 The Material Editor dialog box



*Figure 8-4* Choosing *New Material Library* from the flyout



*Figure 8-5* The *Create New Material Library* dialog box

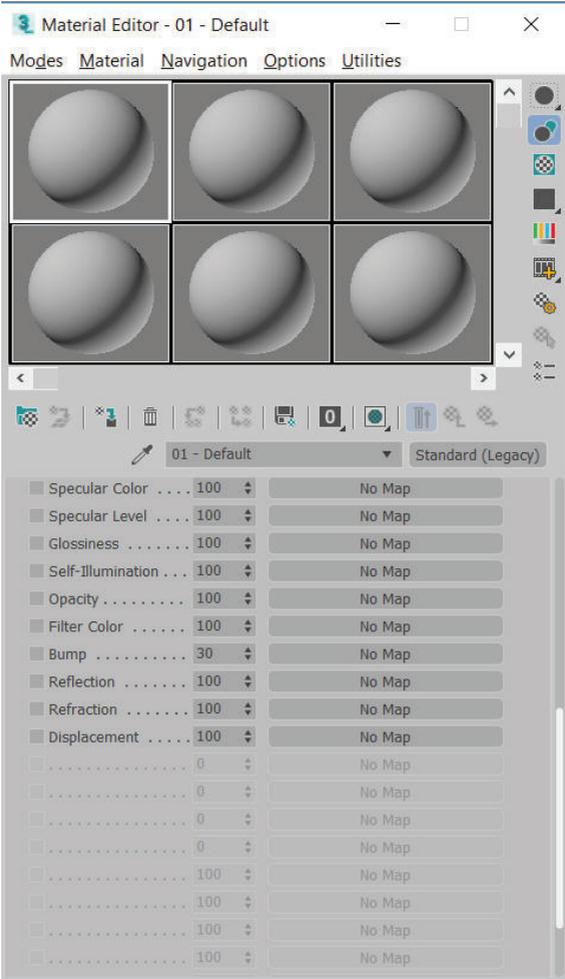
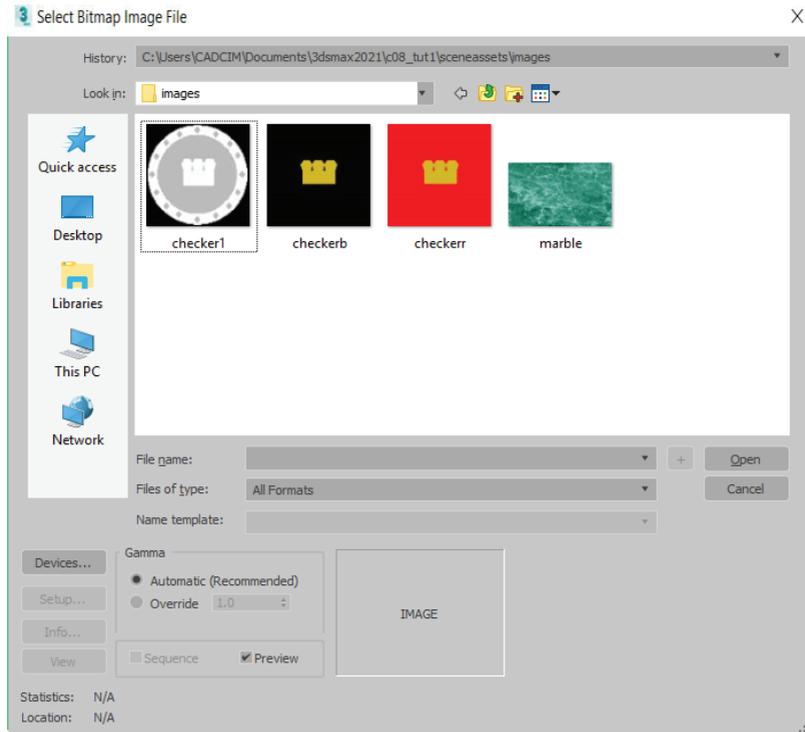
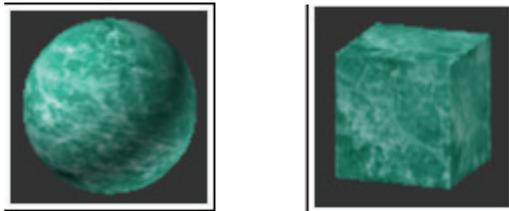


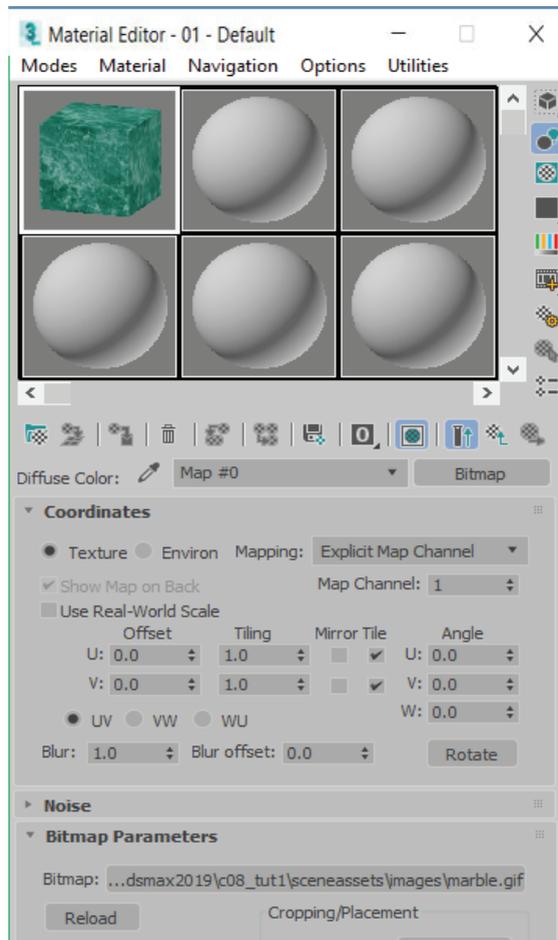
Figure 8-6 The Maps rollout expanded



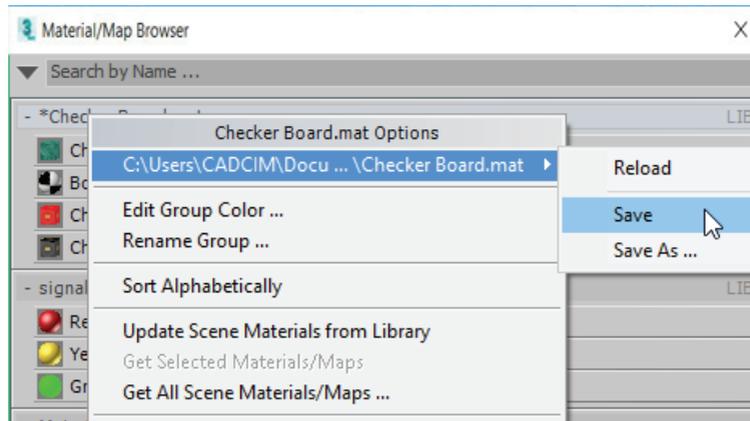
*Figure 8-7 The Select Bitmap Image File dialog box*



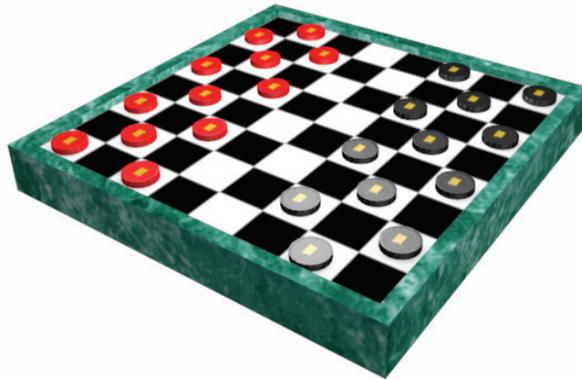
*Figure 8-8 The sample switched from sphere to square in the Material Editor dialog box*



*Figure 8-9* The **Coordinates** rollout after modifying the parameters



*Figure 8-10 Saving the Material Library*



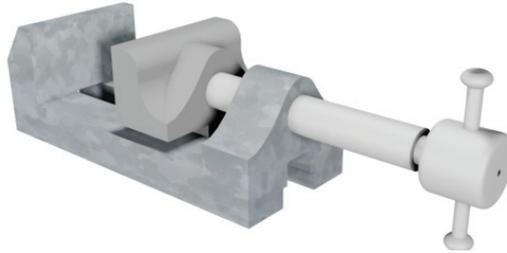
*Figure 8-11 The rendered scene after assigning materials*

## Exercise 1



*Figure 8-12 Company Logo*

## Exercise 2



*Figure 8-13 The model of a Vise*

# Chapter 9

---

## Material Editor: Texture Maps-II

### Learning Objectives

**After completing this chapter, you will be able to:**

- *Create transparent materials*
- *Apply transparency maps to objects*
- *Create procedural maps*



# Tutorial 1



Figure 9-1 Materials applied to models

][Camera-Flower][Standard][Default Shading]

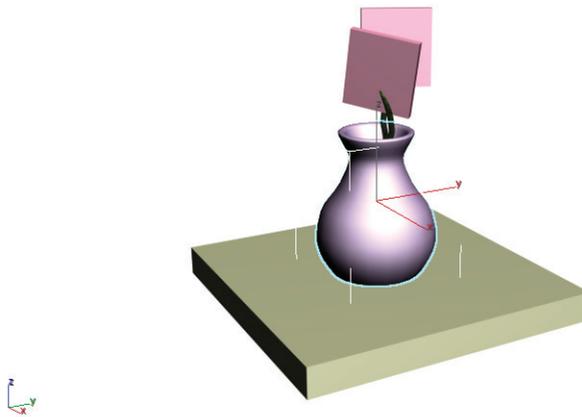
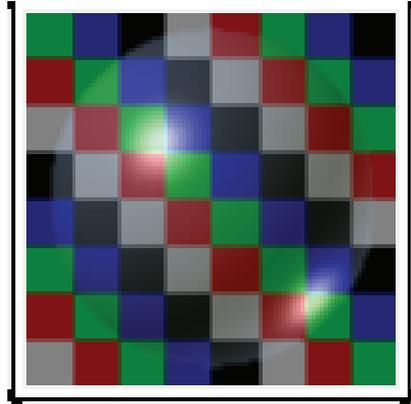
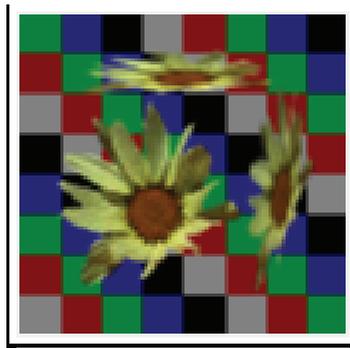


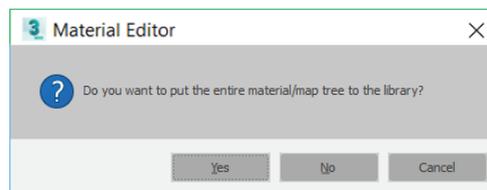
Figure 9-2 The c09\_tut1\_start file



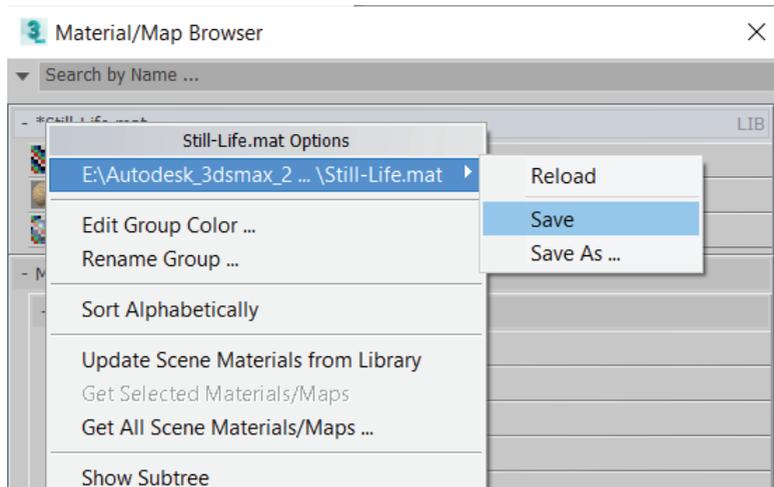
*Figure 9-3* The background displayed in the material sample slot in the **Material Editor** dialog box



*Figure 9-4* The material sample slot displayed in the **Material Editor** dialog box



*Figure 9-5* The **Material Editor** message box



*Figure 9-6 Saving the material library*



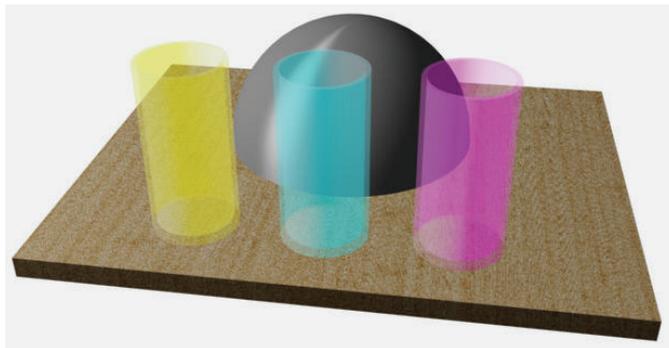
*Figure 9-7 The rendered image*



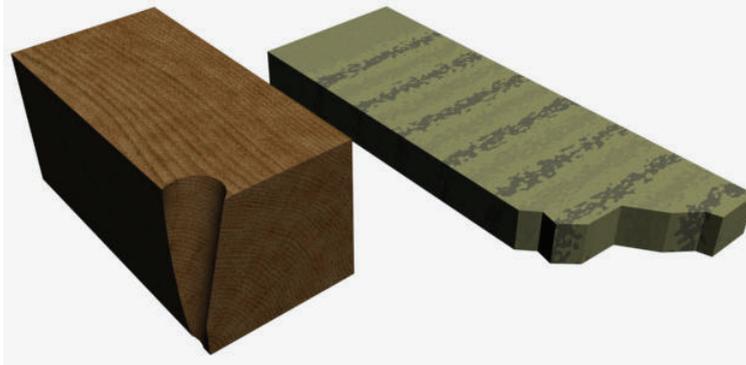
*Figure 9-8 The rendered image with materials assigned to the objects*

---

## **Exercise 1**



*Figure 9-9 Three glasses with assigned materials*

**Exercise 2**

*Figure 9-10 Broken piece of marble and a wooden board*

# Chapter 10

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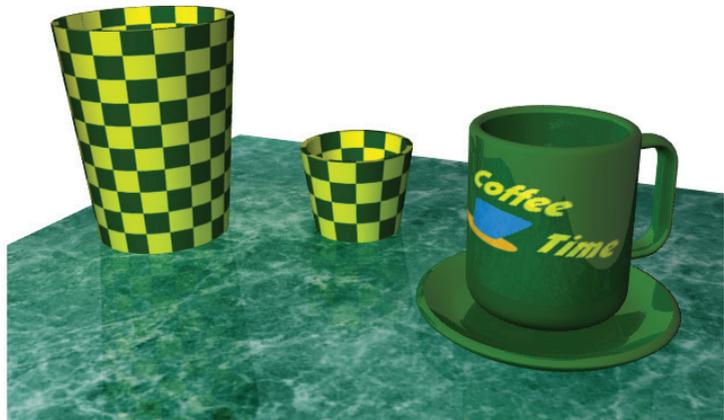
---

## Material Editor: Controlling Texture Maps

### Learning Objectives

**After completing this chapter, you will be able to:**

- *Modify mapping parameters*
- *Apply decal texture maps*
- *Apply reflection maps*
- *Set up background bitmaps*



# Tutorial 1



Figure 10-1 The textured scene

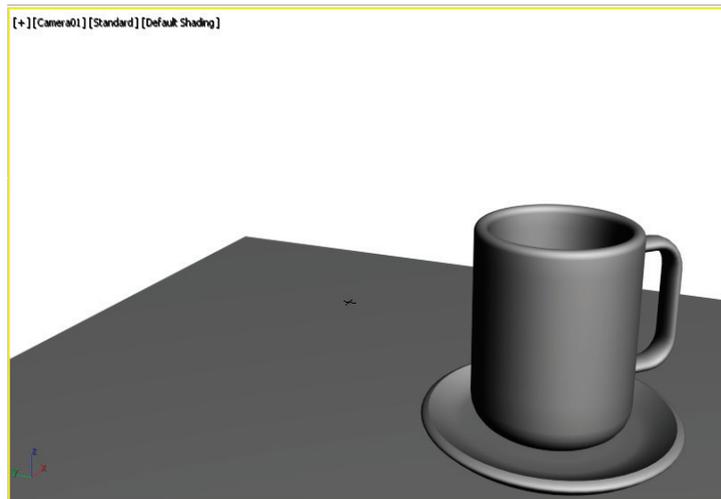
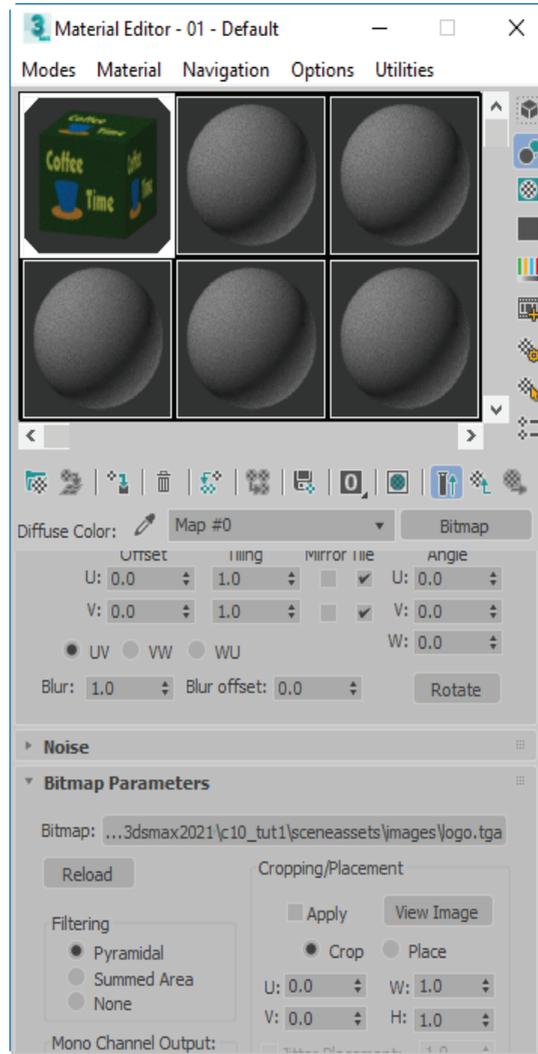
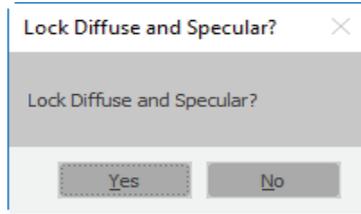


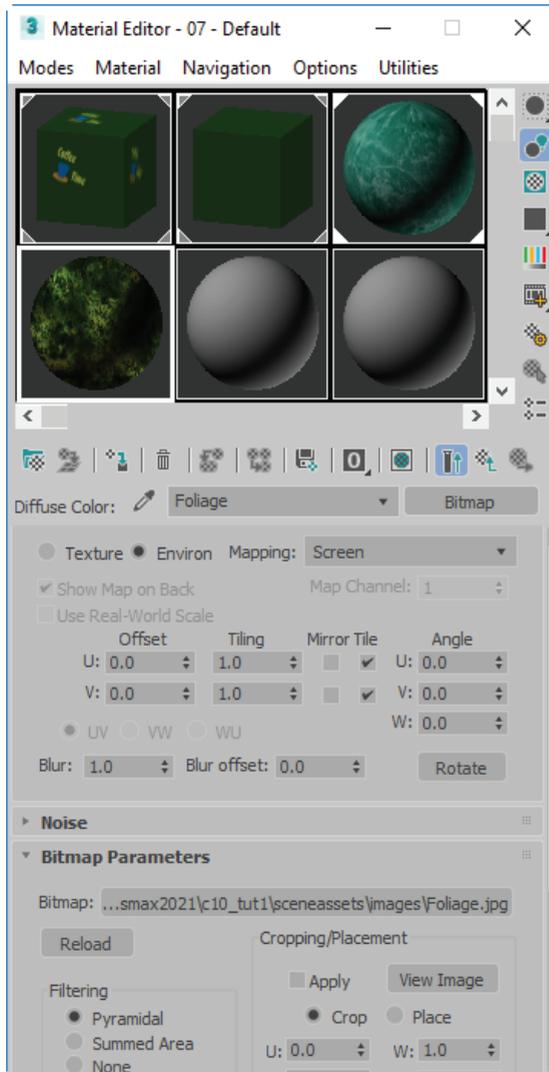
Figure 10-2 The c10\_tut1\_start file



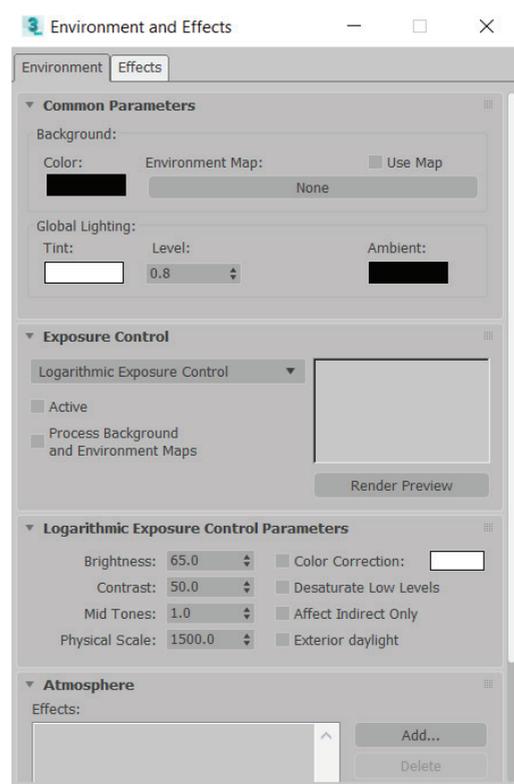
*Figure 10-3 The Coordinates rollout in the Material Editor dialog box*



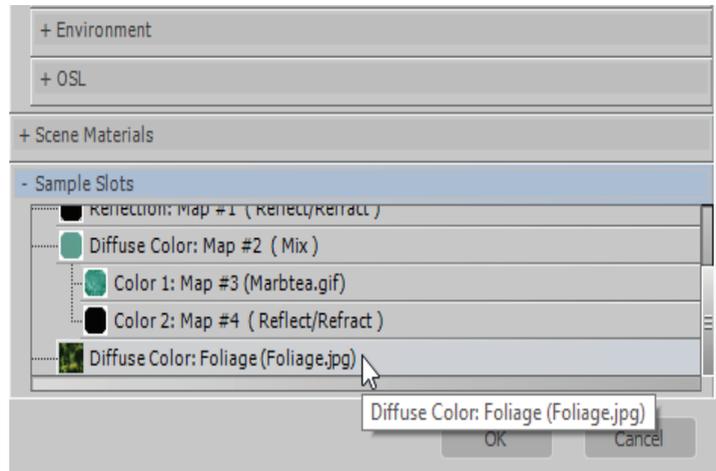
*Figure 10-4 The Lock Diffuse and Specular? message box*



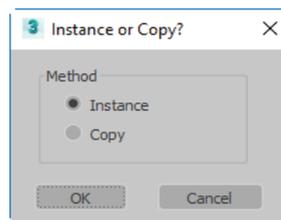
*Figure 10-5 The settings displayed in the Coordinates rollout*



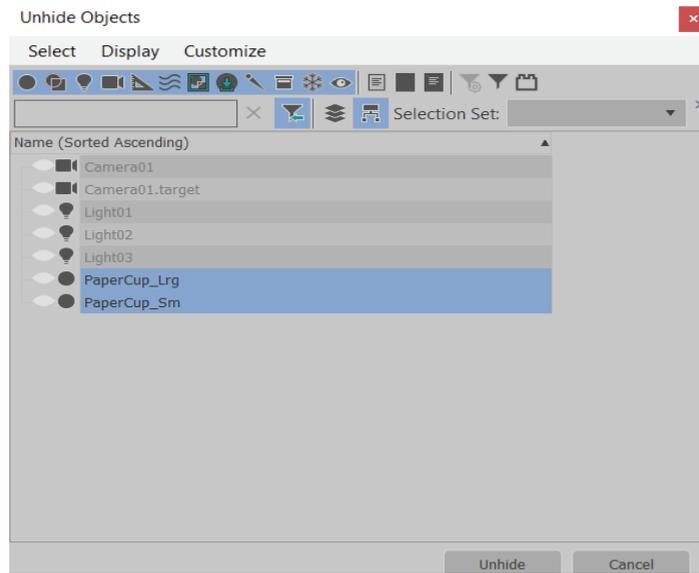
*Figure 10-6 The Environment and Effects dialog box*



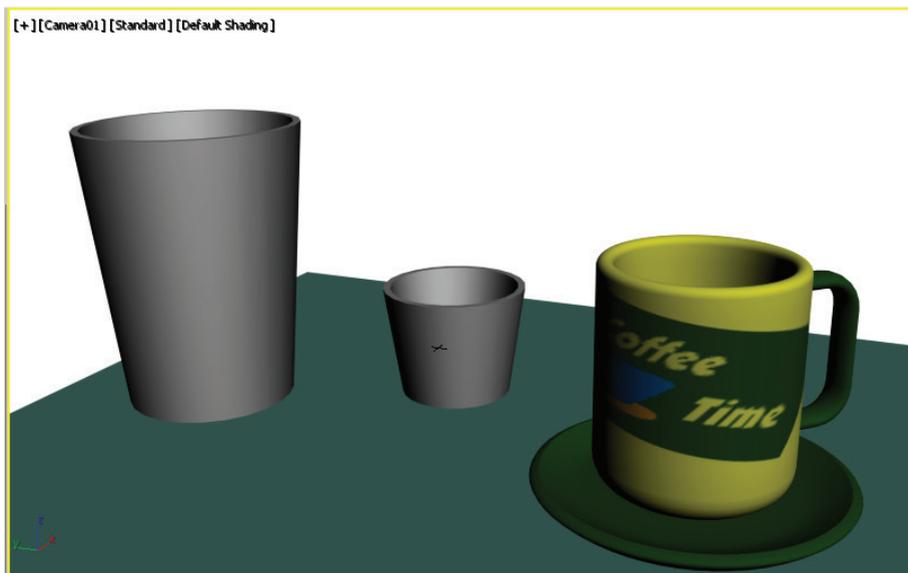
*Figure 10-7* Selecting *Diffuse Color: Foliage (Foliage.jpg)* from the *Sample Slots* rollout



*Figure 10-8* The *Instance or Copy?* dialog box



*Figure 10-9* Selecting *PaperCup\_Lrg* and *PaperCup\_Sm* in the *Unhide Objects* dialog box



*Figure 10-10* *PaperCup\_Lrg* and *PaperCup\_Sm* displayed in the viewport

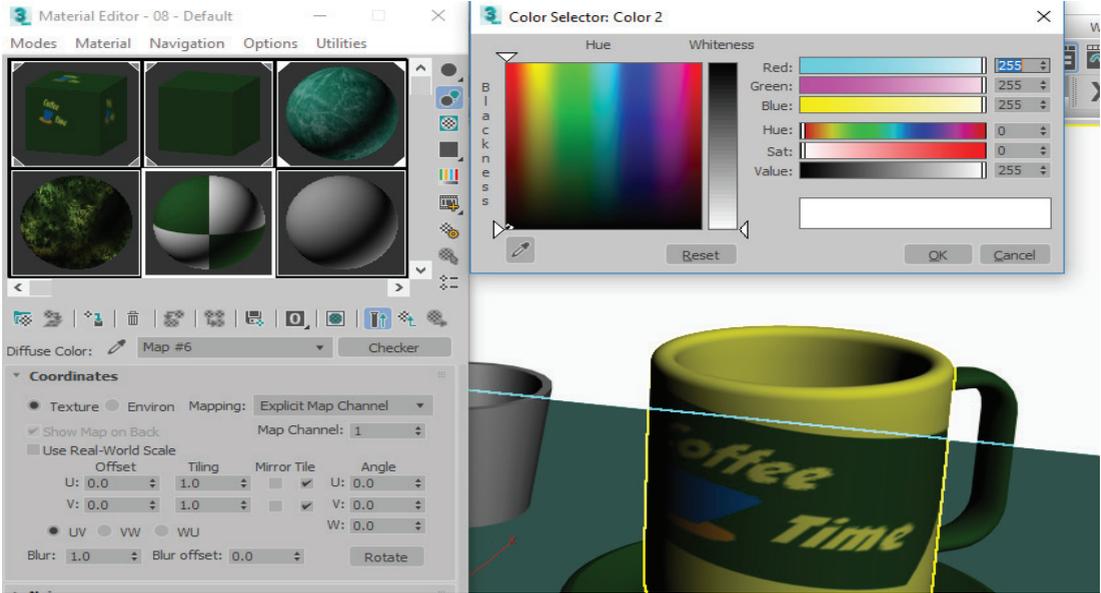


Figure 10-11 The Color Selector: Color 2 dialog box displayed

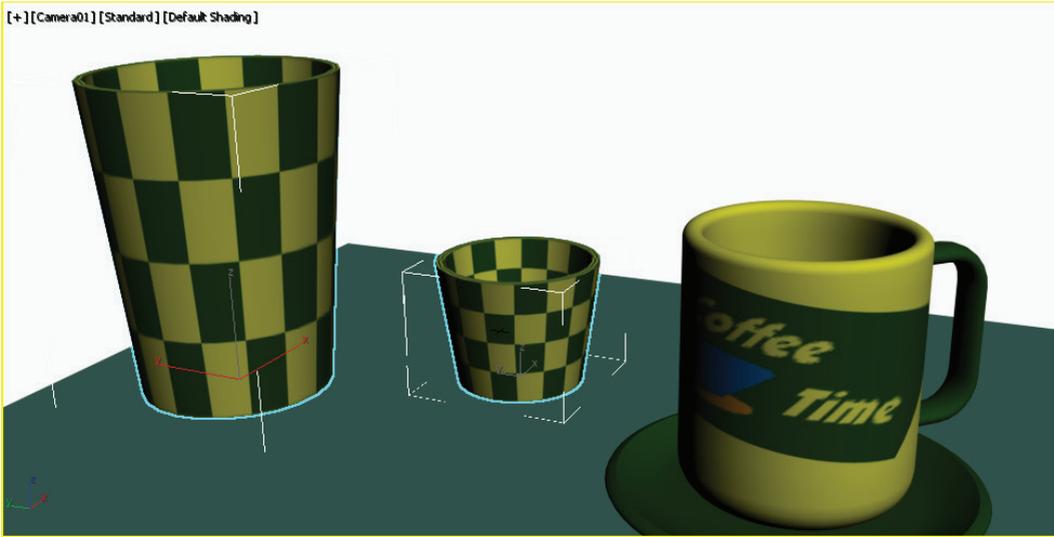


Figure 10-12 The textured material displayed on paper cups

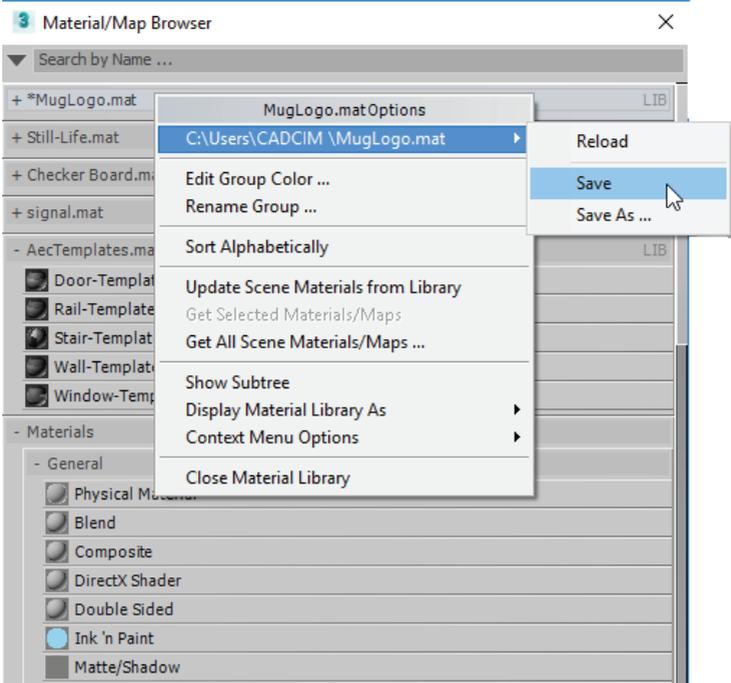
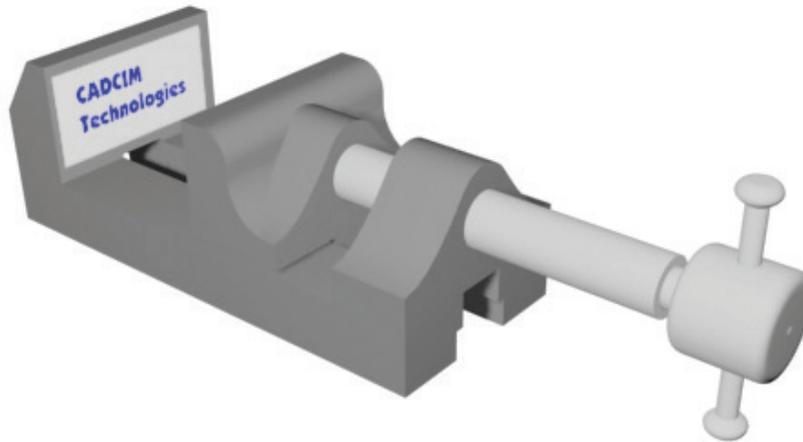


Figure 10-13 Saving the material library



Figure 10-14 The rendered image

## Exercise 1



*Figure 10-15 Vise with decal material*

# Chapter 11

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## Material Editor: Miscellaneous Materials

### Learning Objectives

**After completing this chapter, you will be able to:**

- Use standard Autodesk materials
- Apply the UVW Map modifier
- Apply materials to different faces of an object
- Create background for the scene
- Add background to the scene



**Tutorial 1**

*Figure 11-1 The textured model of the temple*



*Figure 11-2 The c11\_tut1\_start.max file*

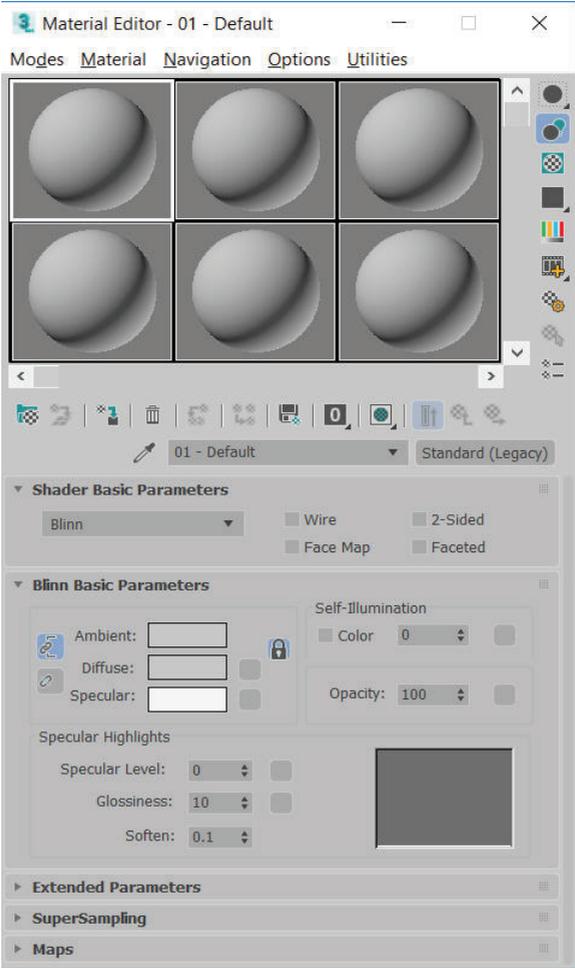
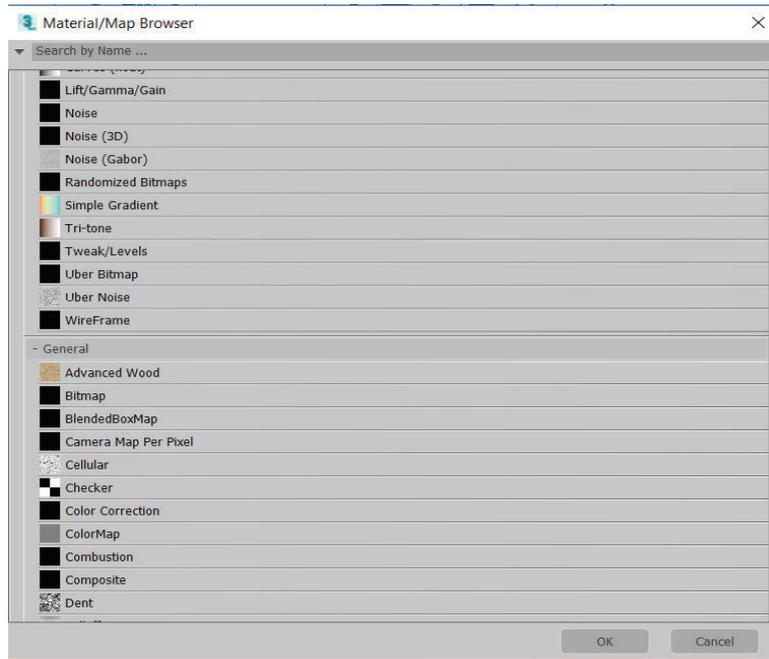
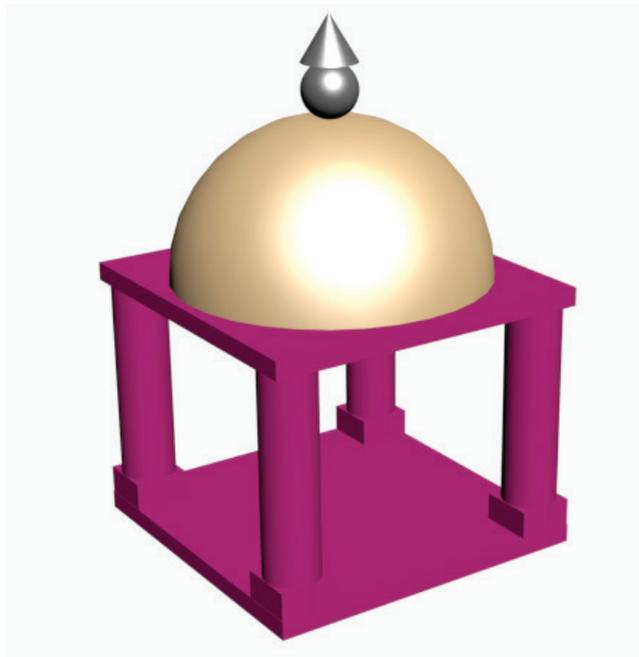


Figure 11-3 The Material Editor dialog box



*Figure 11-4 The Material/Map Browser dialog box*



*Figure 11-5 The Metal\_Dark\_Gold material assigned to Dome*

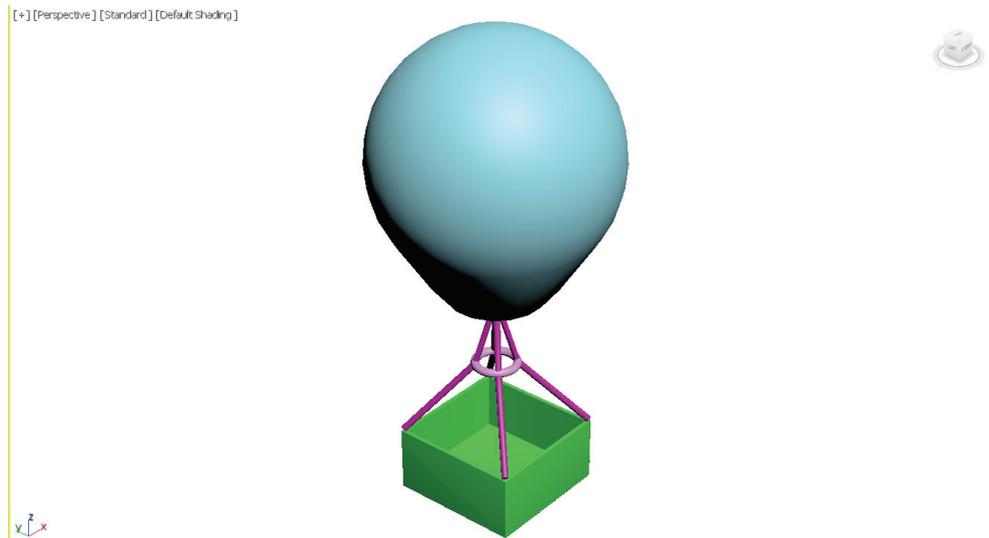


*Figure 11-6 The rendered image of the temple*

## Tutorial 2



*Figure 11-7 The textured scene of a balloon*



*Figure 11-8 The c11\_tut2\_start.max file*



*Figure 11-9 The Material/Map Browser dialog box*



Figure 11-10 The Set Number of Materials dialog box



Figure 11-11 Setting the color of the material to blue using the Color Selector dialog box

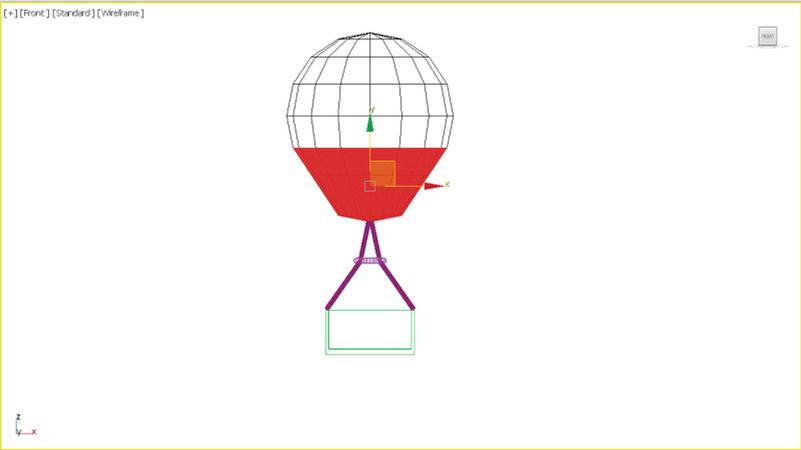
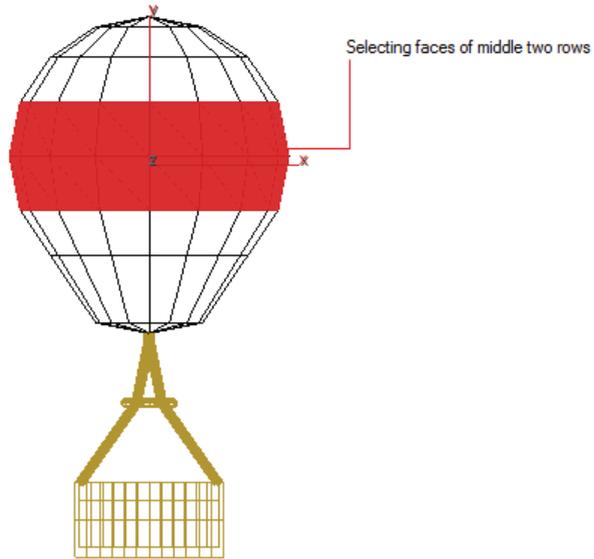
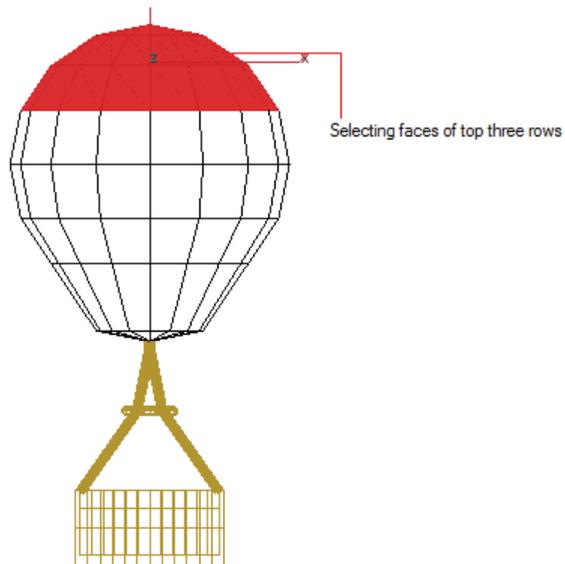


Figure 11-12 Selecting faces of bottom three rows



**Figure 11-13** *Selecting faces of middle two rows*



**Figure 11-14** *Selecting faces of top three rows*

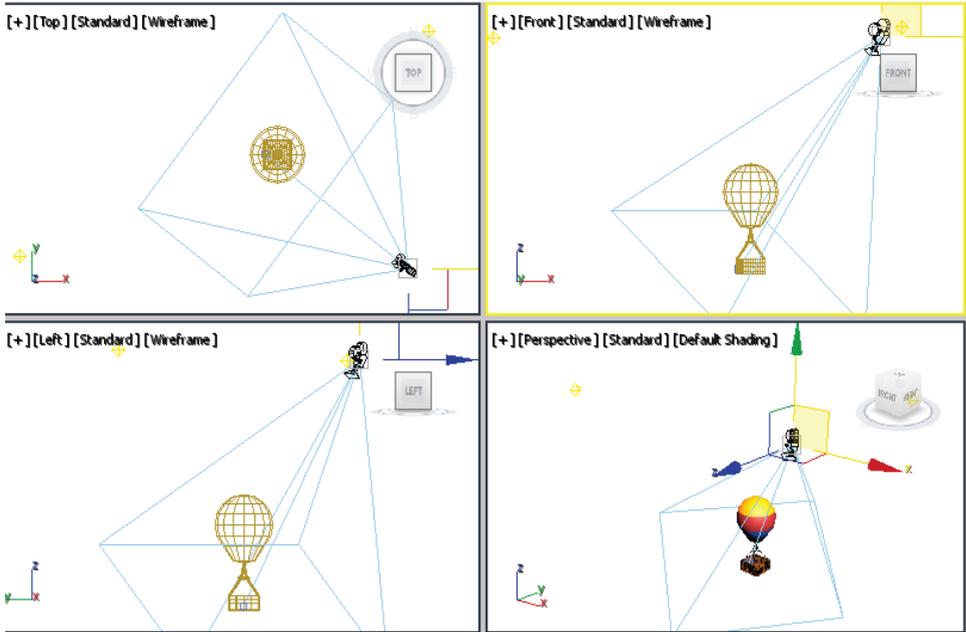


Figure 11-15 The camera placed and positioned in the Front viewport

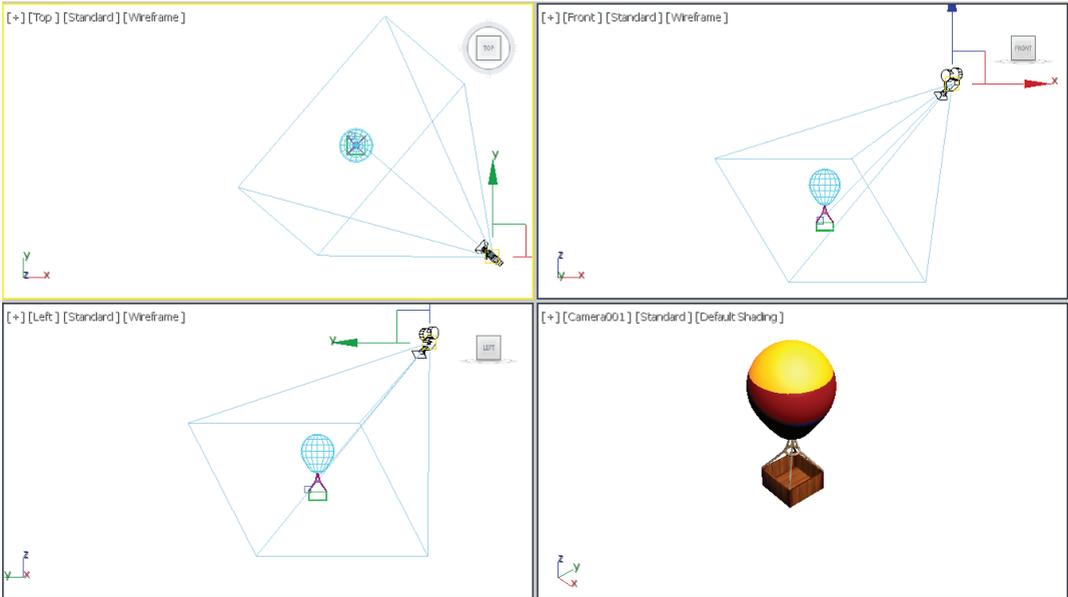


Figure 11-16 The view adjusted using the Field-of-View tool

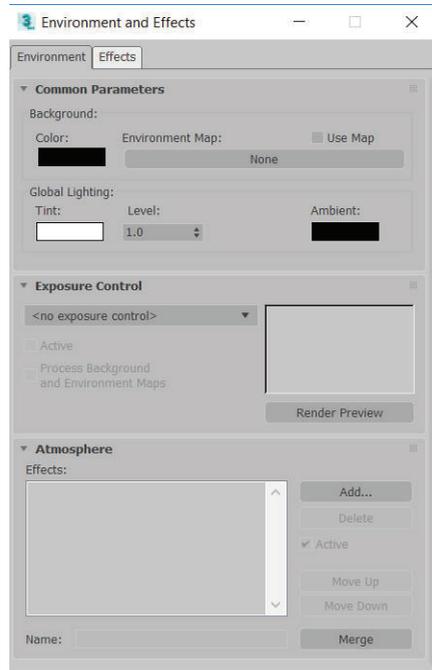


Figure 11-17 The Environment and Effects dialog box

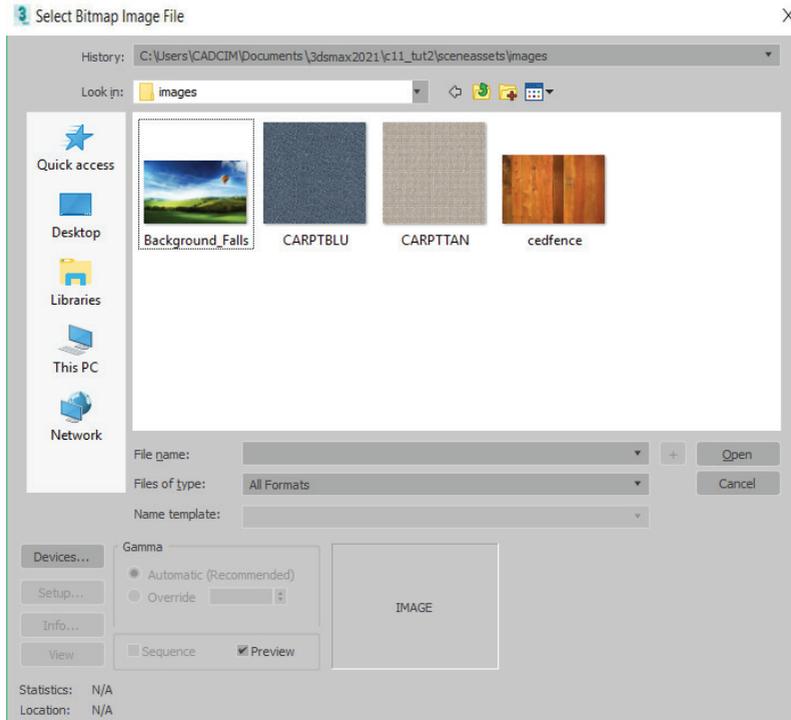


Figure 11-18 The Select Bitmap Image File dialog box



Figure 11-19 The rendered scene

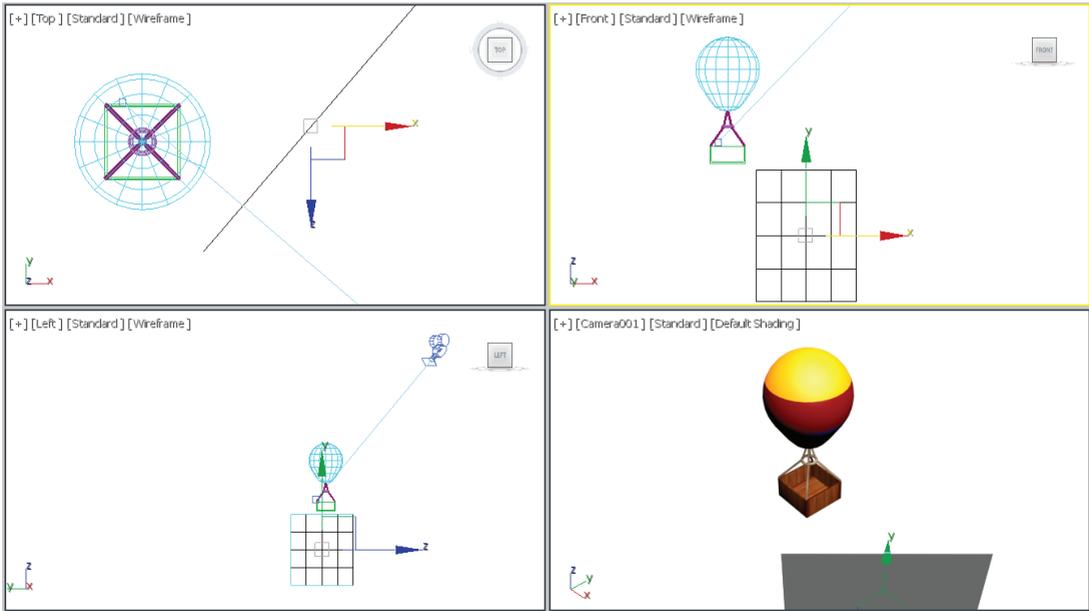


Figure 11-20 Plane001 aligned in all the viewports

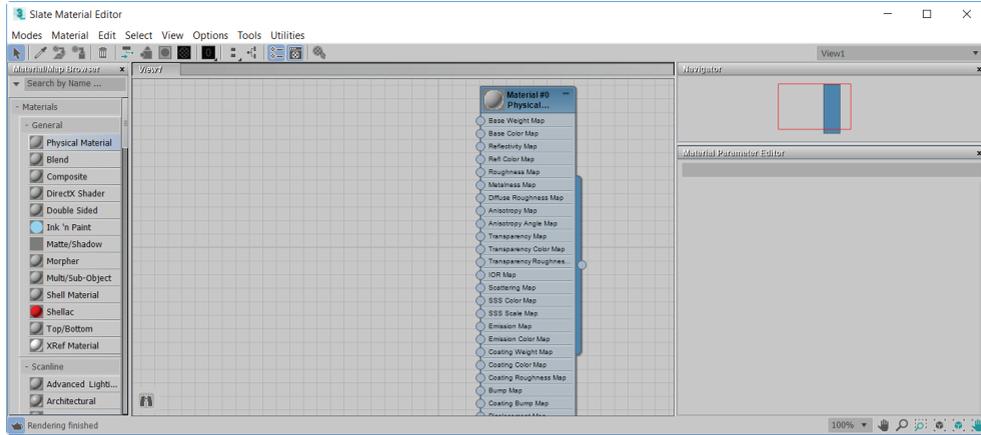


Figure 11-21 Physical Material dragged to the View1 area

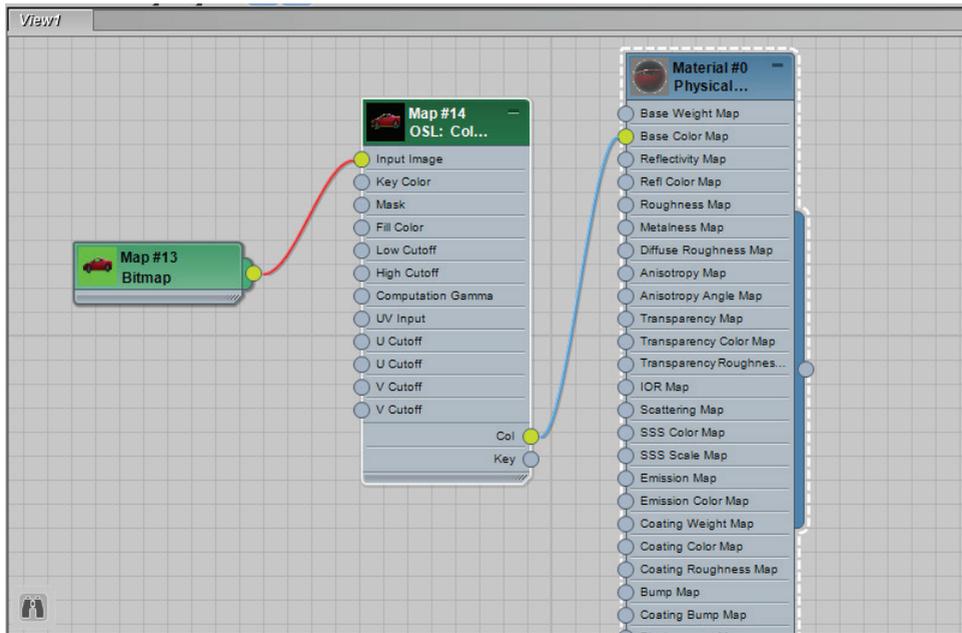


Figure 11-22 Connection between the Bitmap, OSL: Color Key, and Physical Material nodes



*Figure 11-23 The rendered image*



*Figure 11-24 The rendered image displayed after connecting the **OSL: Color Key** node to the **Physical Material** node*

**Exercise 1**

*Figure 11-25 The model of the table*

# Chapter 12

---

## Interior Lighting-I

### Learning Objectives

After completing this chapter, you will be able to:

- Create night interior scene
- Create daylight interior scene



**Tutorial 1**

*Figure 12-1 The illuminated night interior scene*



*Figure 12-2 The c12\_tut1\_start.max file*

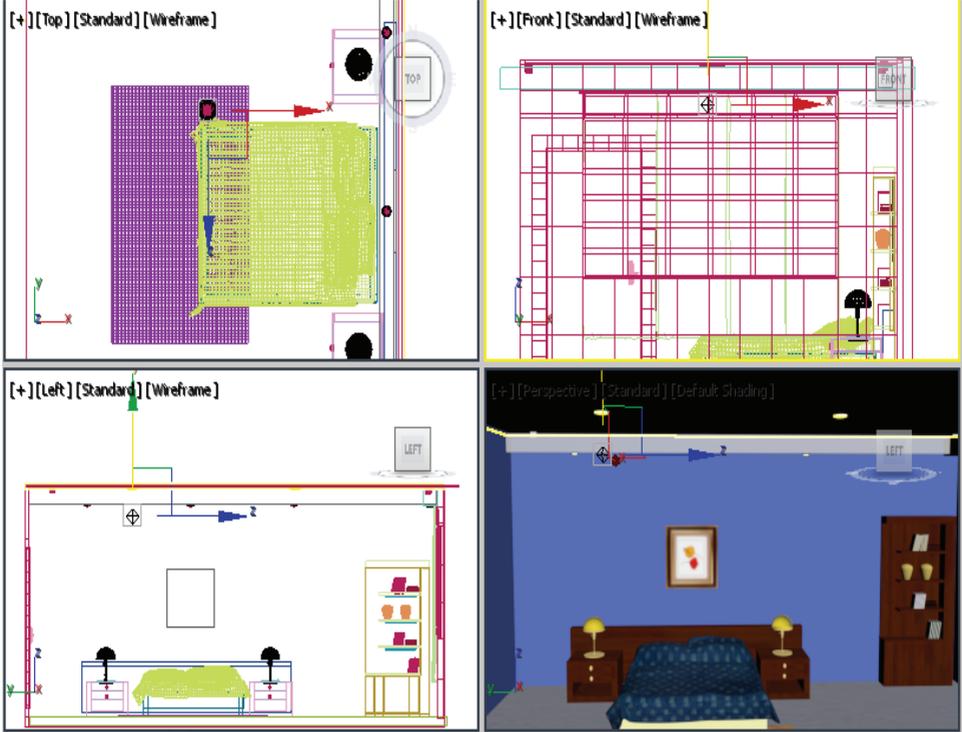


Figure 12-3 Omni001 aligned in all viewports

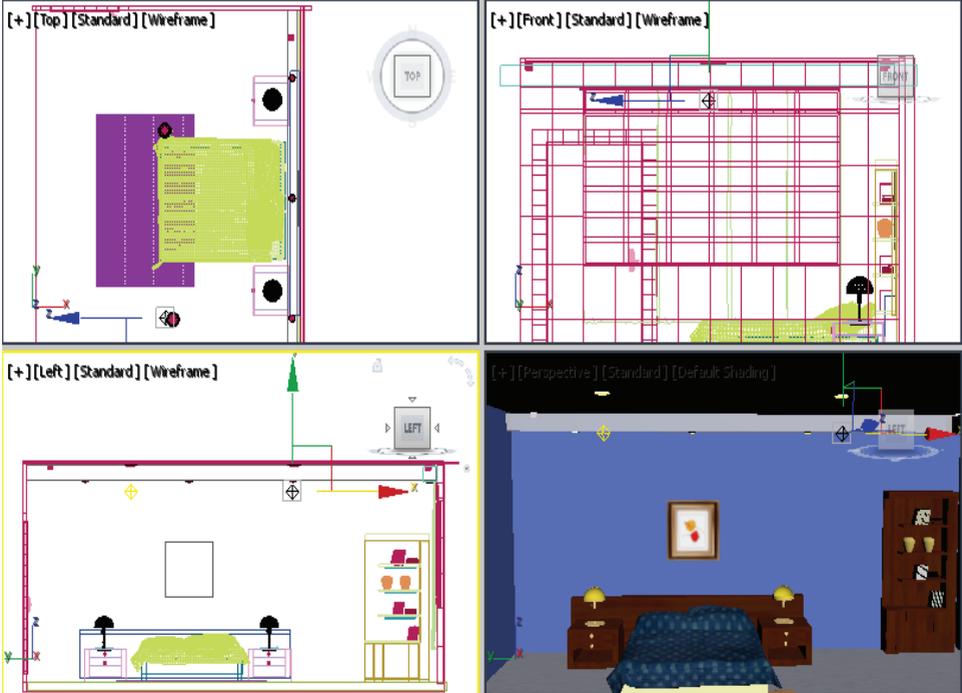
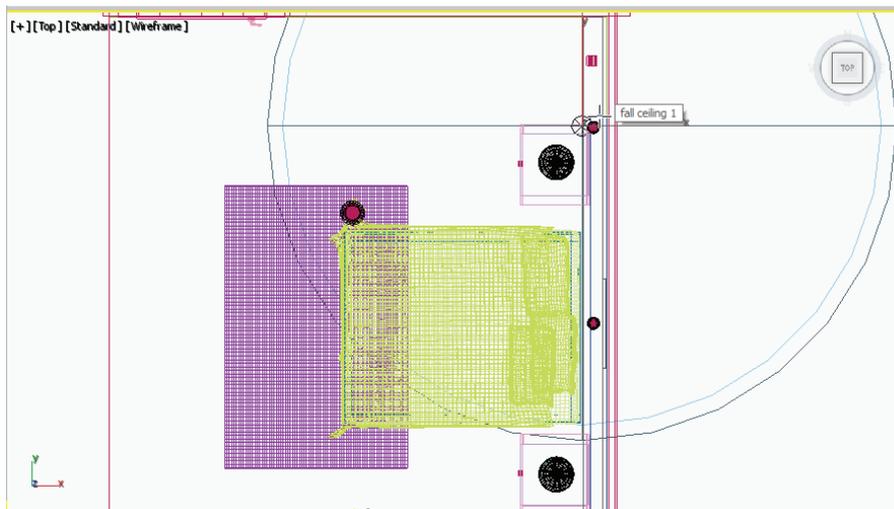


Figure 12-4 The copy of roof light1 aligned in all viewports



*Figure 12-5 The rendered image*



*Figure 12-6 The spot light created*

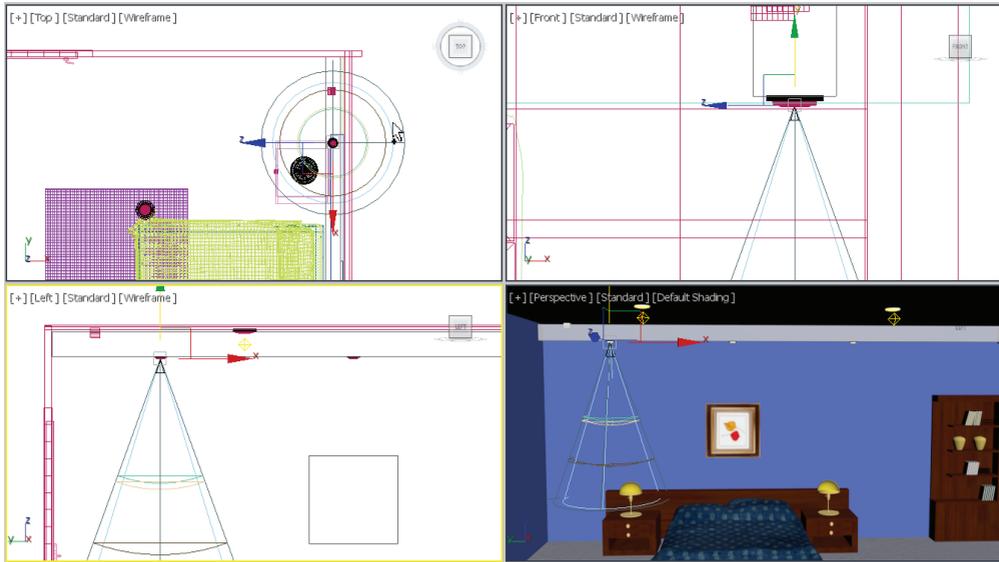
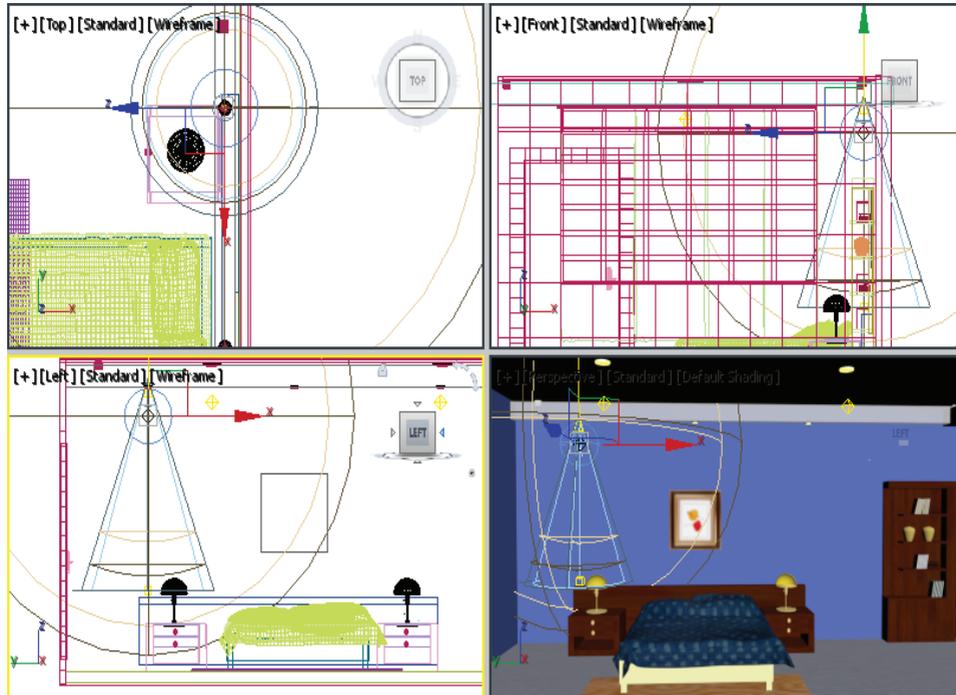


Figure 12-7 The spot light aligned



Figure 12-8 The rendered image



*Figure 12-9 The glow light 1 aligned*



*Figure 12-10 The rendered image*

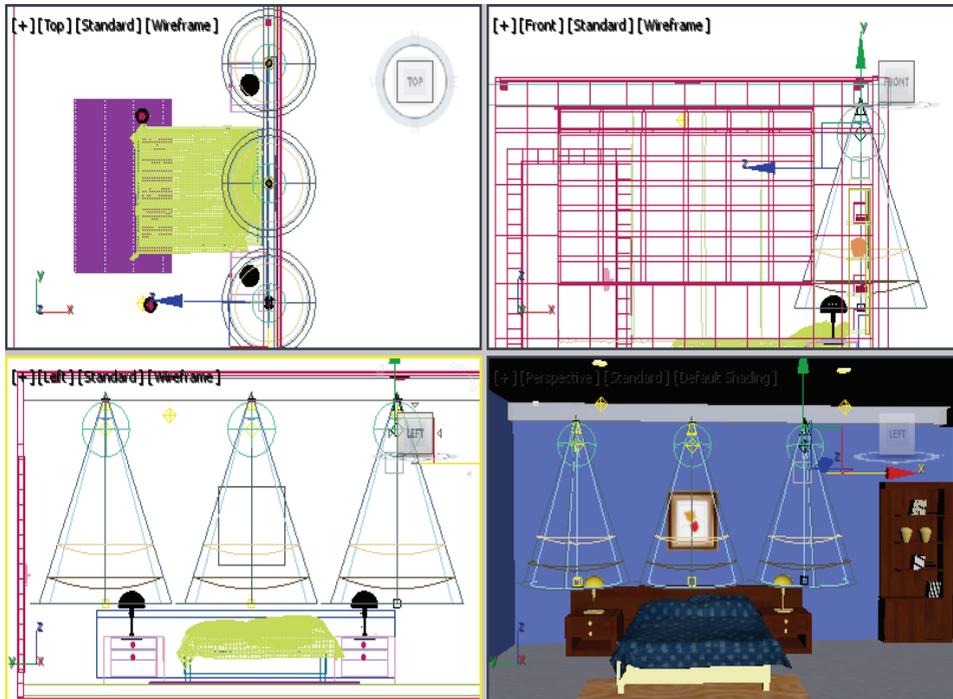
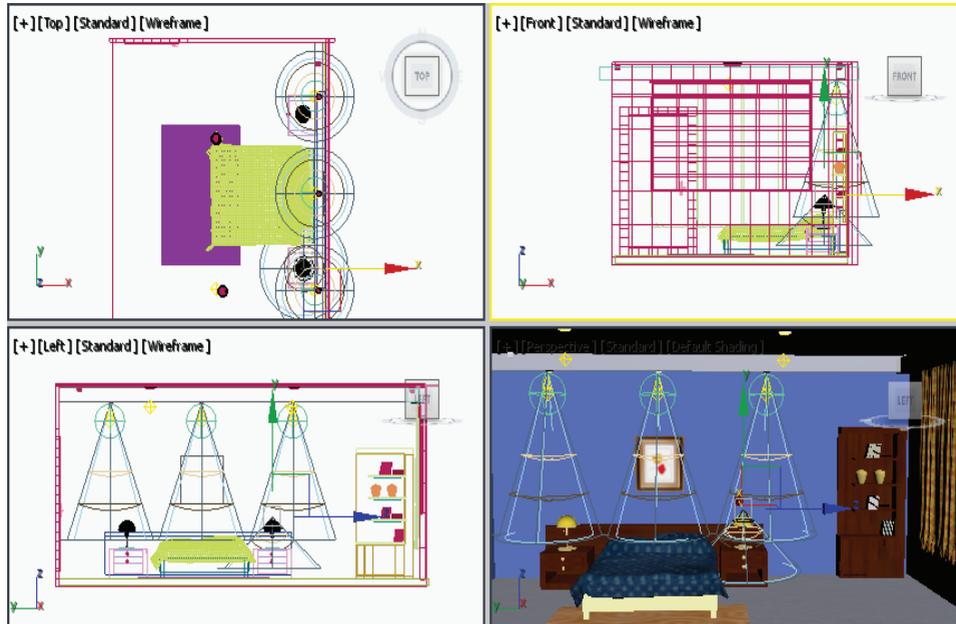


Figure 12-11 The copies of spot light 1 and glow light 1 created



Figure 12-12 The rendered image



*Figure 12-13 The lamp light 1 aligned in all viewports*



*Figure 12-14 The rendered image*



Figure 12-15 The rendered image

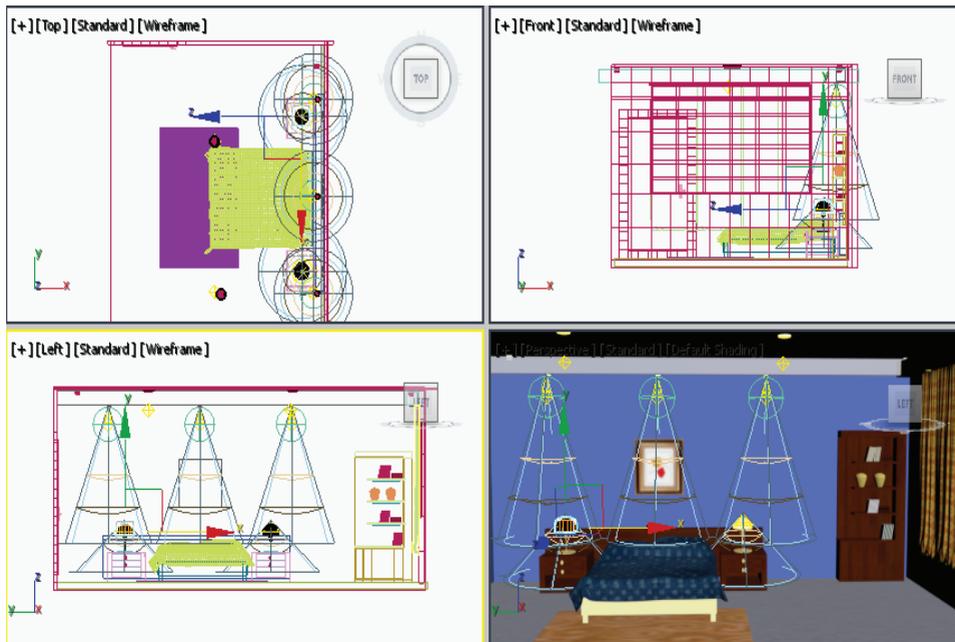


Figure 12-16 The copy of lamp light 1 aligned



*Figure 12-17 The rendered image*

---

**Tutorial 2**



*Figure 12-18 The daylight interior scene*



*Figure 12-19 The c12\_tut2\_start file*

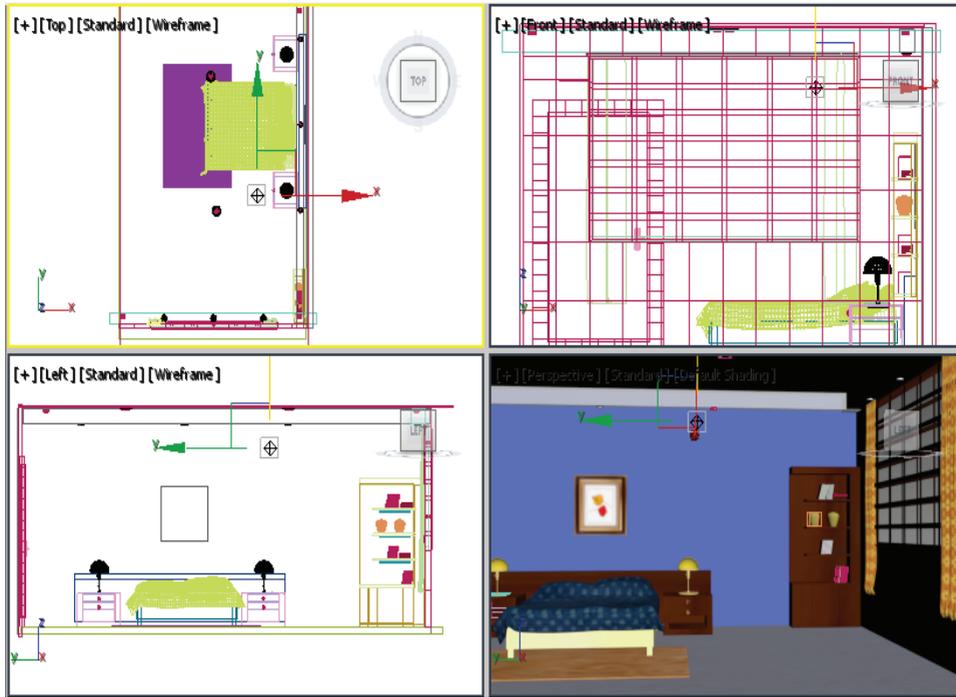


Figure 12-20 The omni 001 light aligned in all viewports

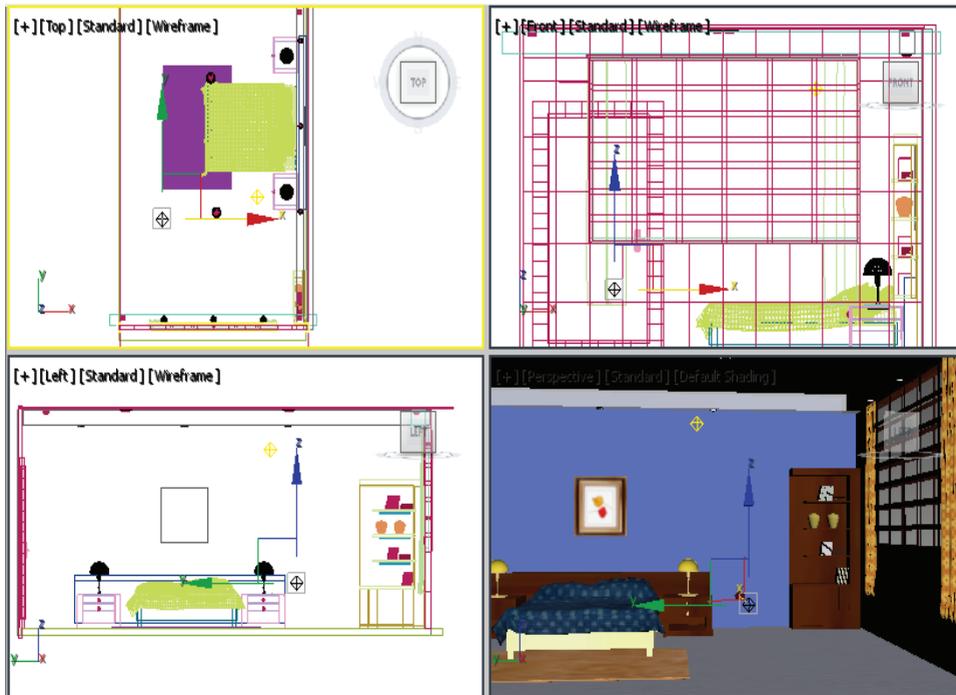


Figure 12-21 The Omni 002 aligned

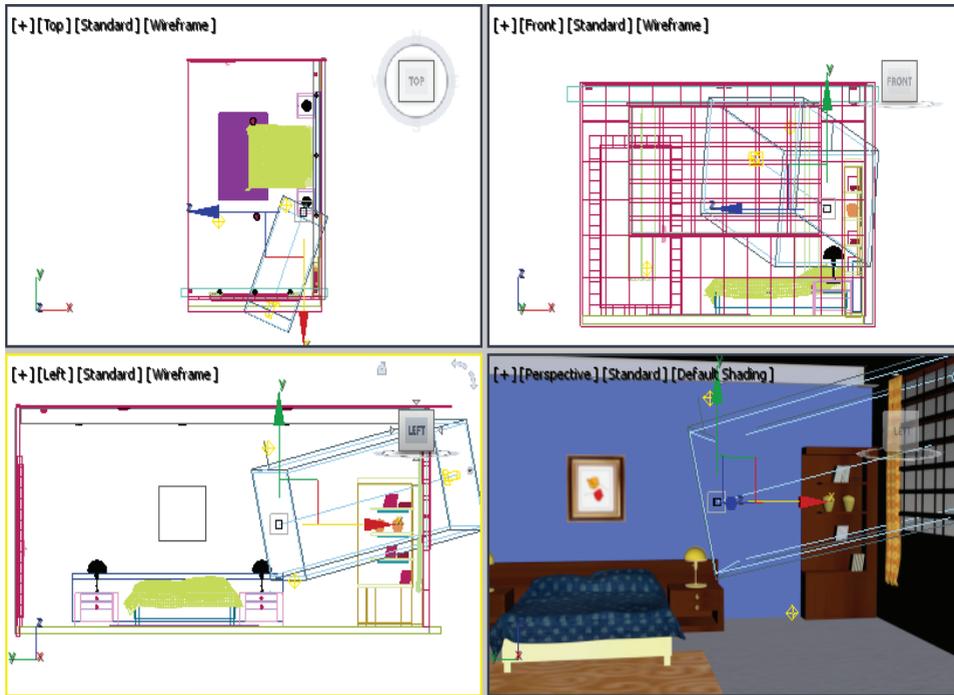


Figure 12-22 The Direct 001, Direct 001.Target aligned



Figure 12-23 The rendered image

**Exercise 1**



*Figure 12-24 The illuminated scene*

# Chapter 13

---

## Interior Lighting-II

### Learning Objectives

**After completing this chapter, you will be able to:**

- Use photometric lights for interior lighting
- Use IES files



**Tutorial 1**

*Figure 13-1 The illuminated night interior scene*



*Figure 13-2 The c13\_tut1\_start.max file*

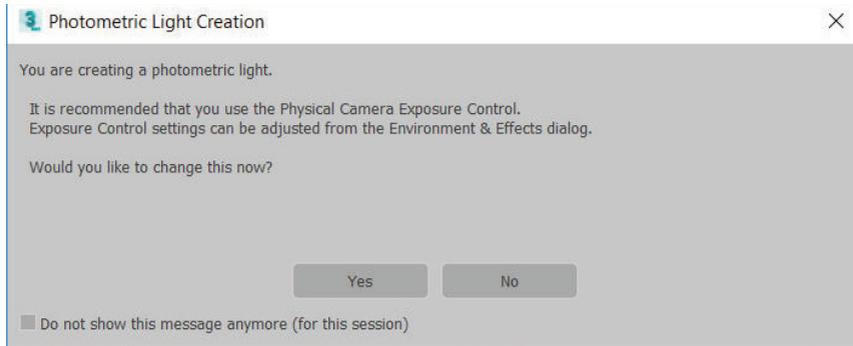


Figure 13-3 The Photometric Light Creation message box

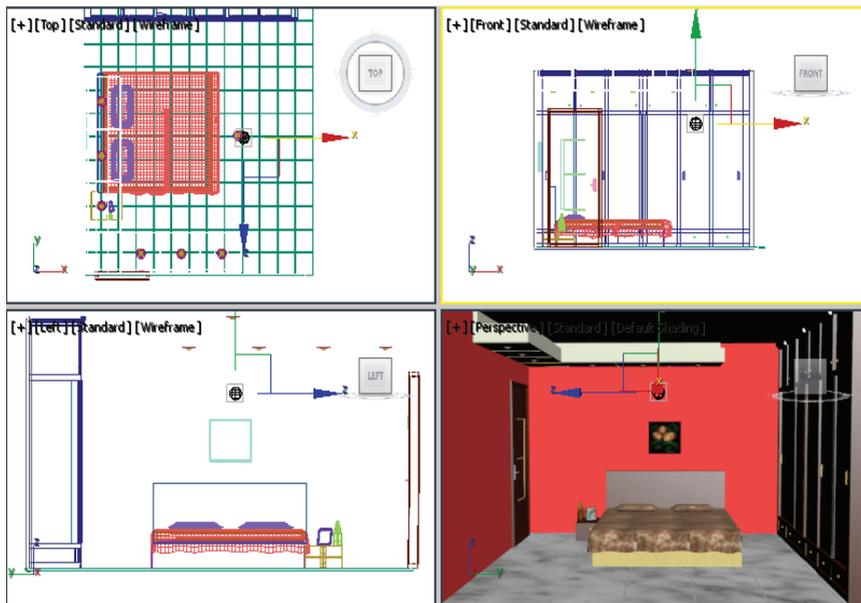
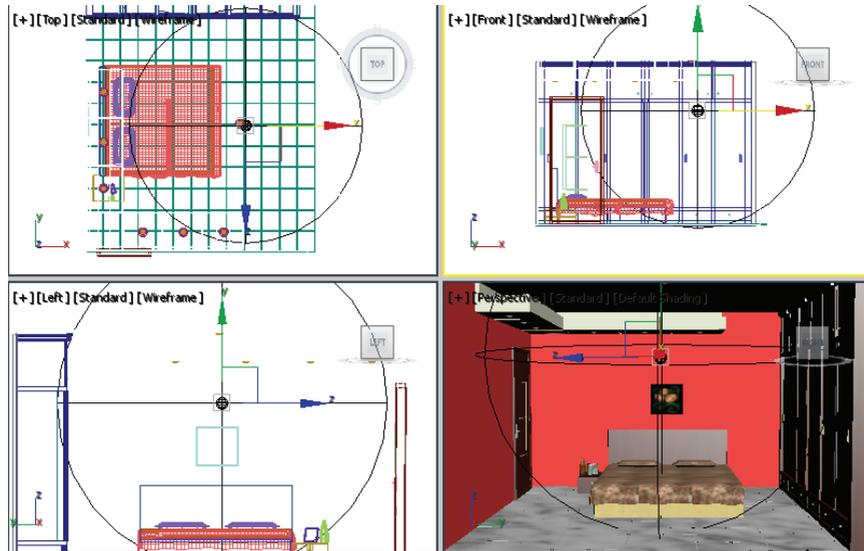


Figure 13-4 The rooflight1 aligned in all viewports



*Figure 13-5 The shape of rooflight1 changed*



*Figure 13-6 The rendered image with grains*



Figure 13-7 The rendered image without grains

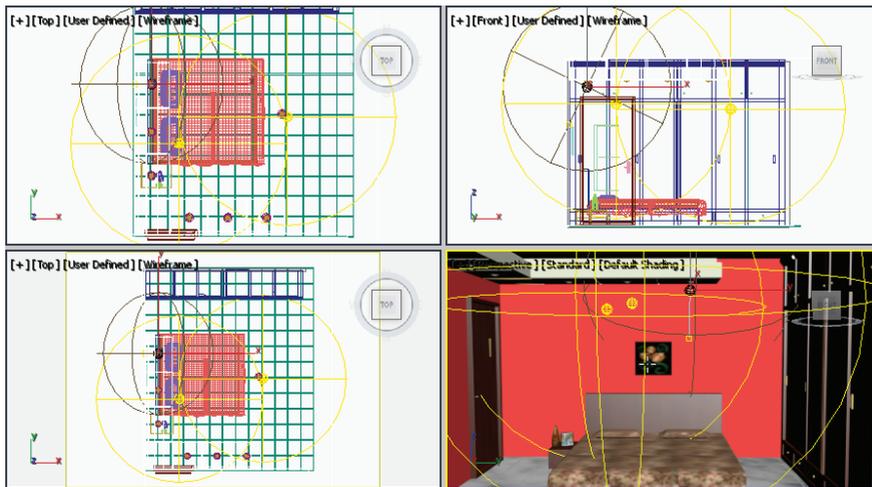
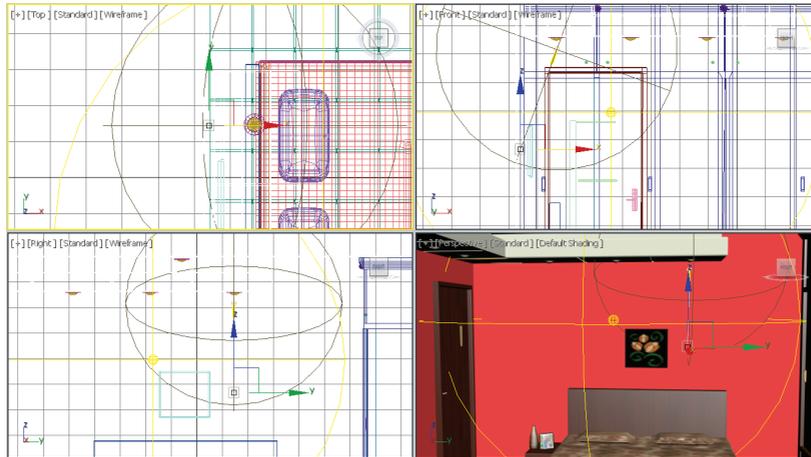


Figure 13-8 The spot light1 and spot light1.Target aligned in all viewports



*Figure 13-9 The spot light1.Target moved*



*Figure 13-10 The rendered image*



Figure 13-11 The rendered image

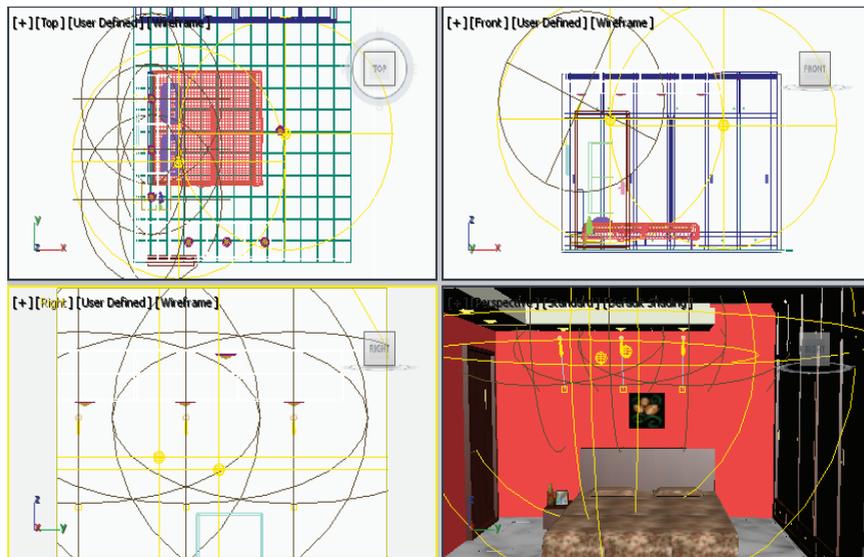


Figure 13-12 Copies of spot light1 and spot light1.Target aligned in all viewports



*Figure 13-13 The rendered image*

## Tutorial 2



*Figure 13-14 The scene with false ceiling lights*



Figure 13-15 The c13\_tut2\_start.max file

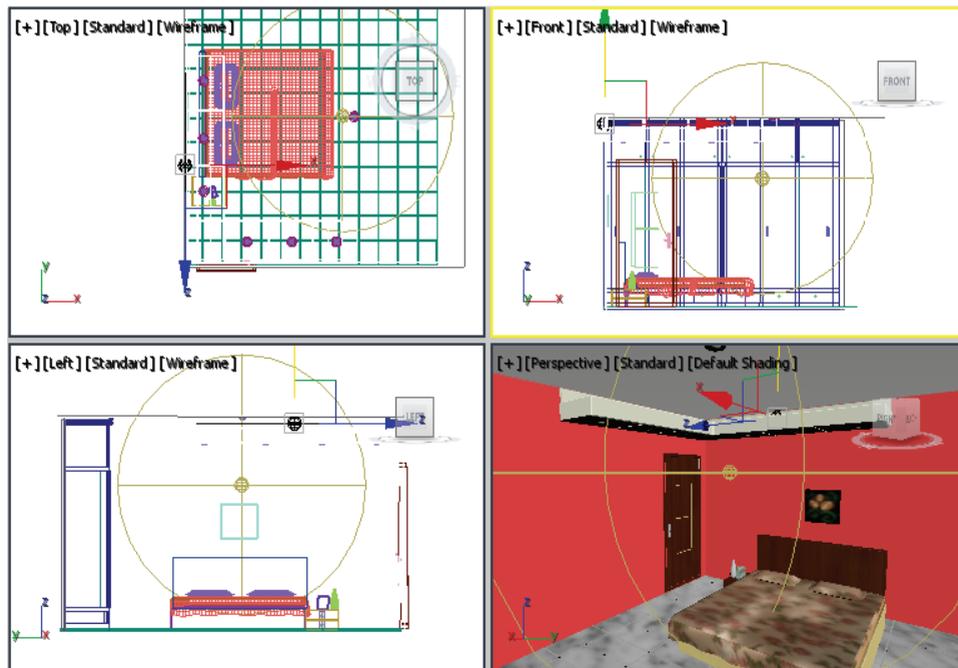


Figure 13-16 The ceilinglight1 aligned in all viewports



Figure 13-17 The rendered image

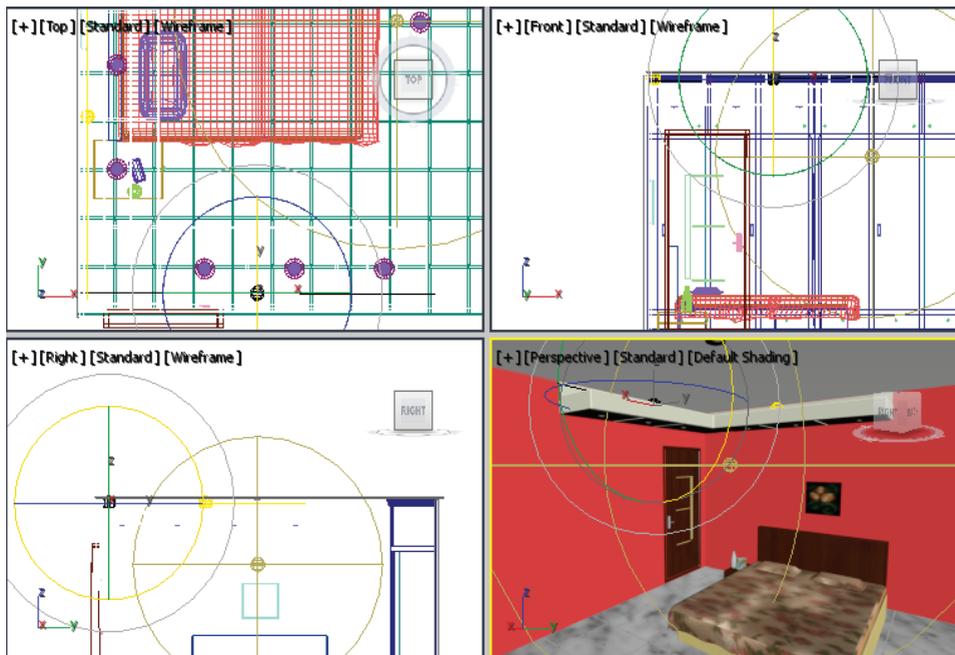


Figure 13-18 The ceilinglight002 aligned in all viewpoints



*Figure 13-19 The rendered image*

## Exercise 1



*Figure 13-20 The illuminated scene*

# Chapter 14

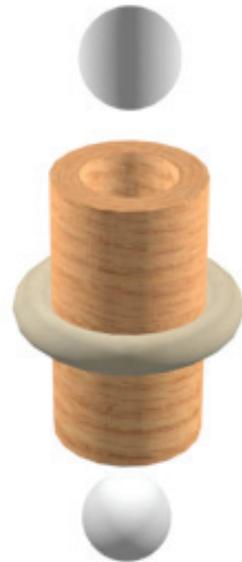
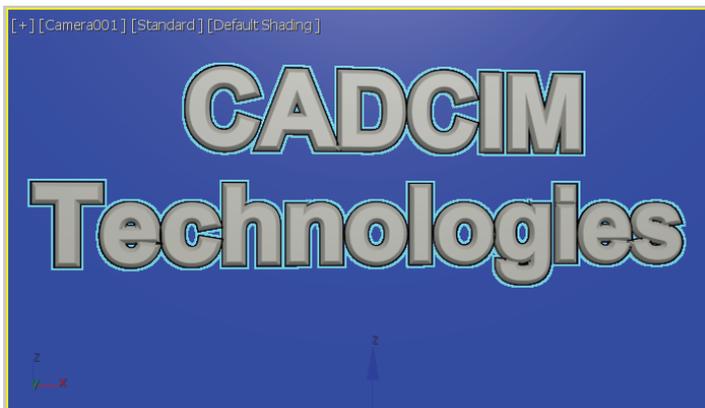
---

## Animation Basics

### Learning Objectives

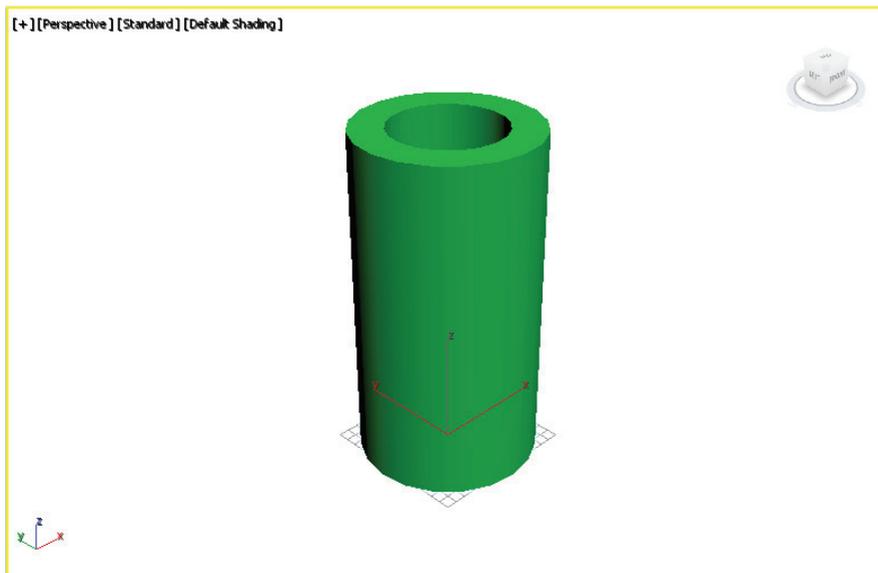
After completing this chapter, you will be able to:

- Adjust the number of frames in an animation
- Create keyframes



**Tutorial 1**

*Figure 14-1 Animated scene at frame 12*



*Figure 14-2 The Shaft zoomed*

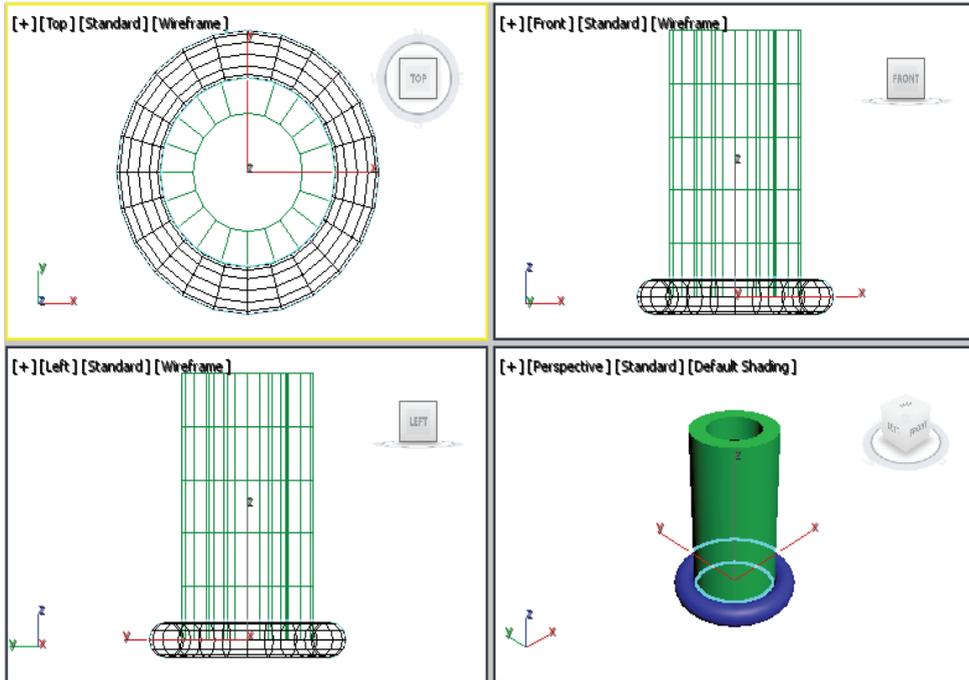


Figure 14-3 The objects zoomed to their extents

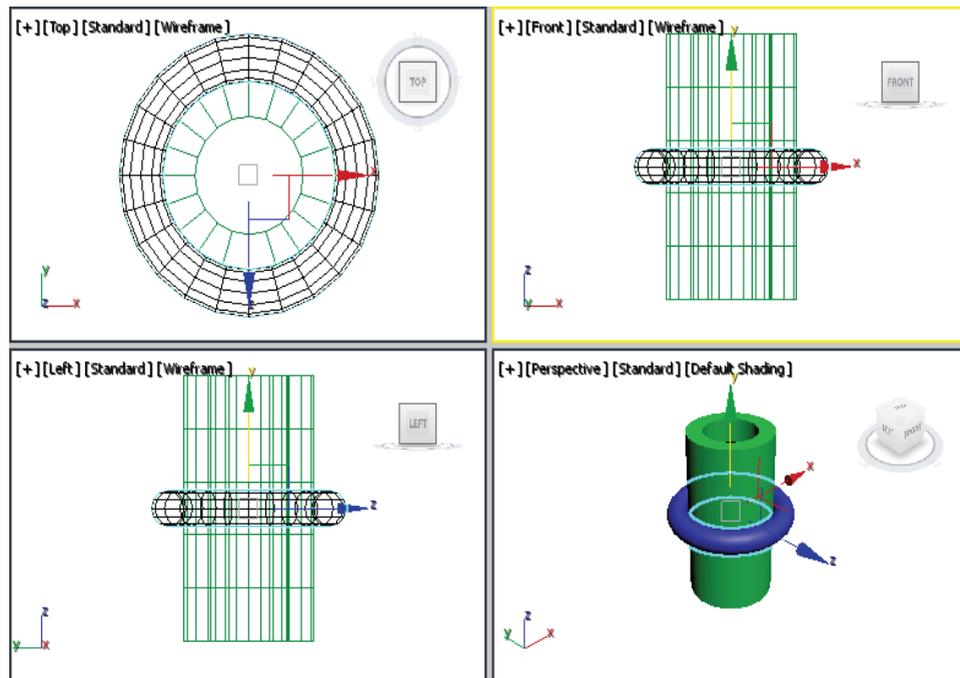


Figure 14-4 Bearing placed near the middle of Shaft

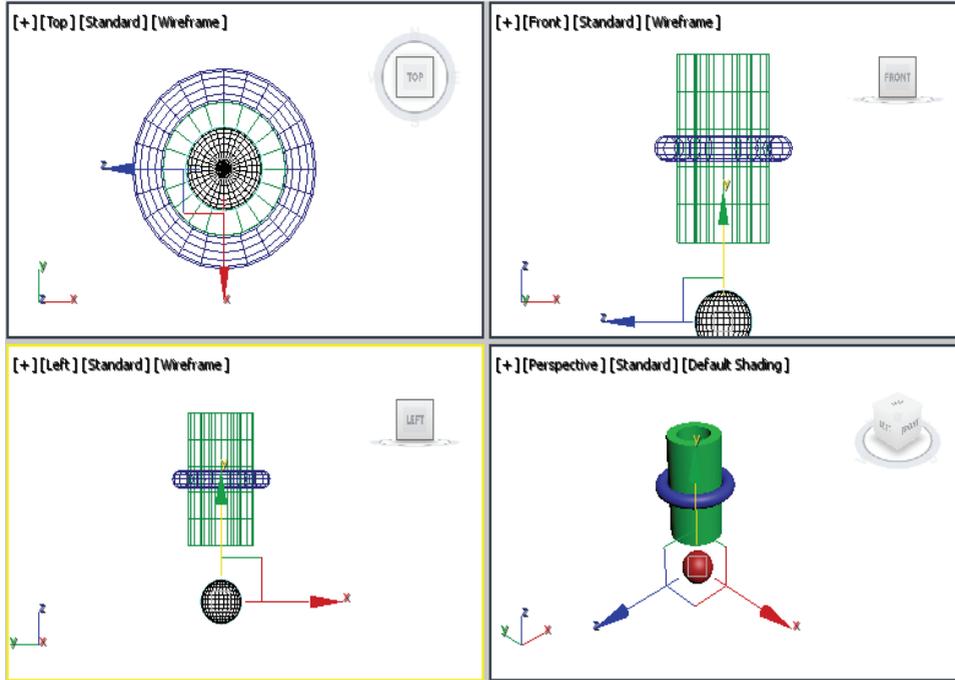


Figure 14-5 Ball01 created and moved down along the Y axis

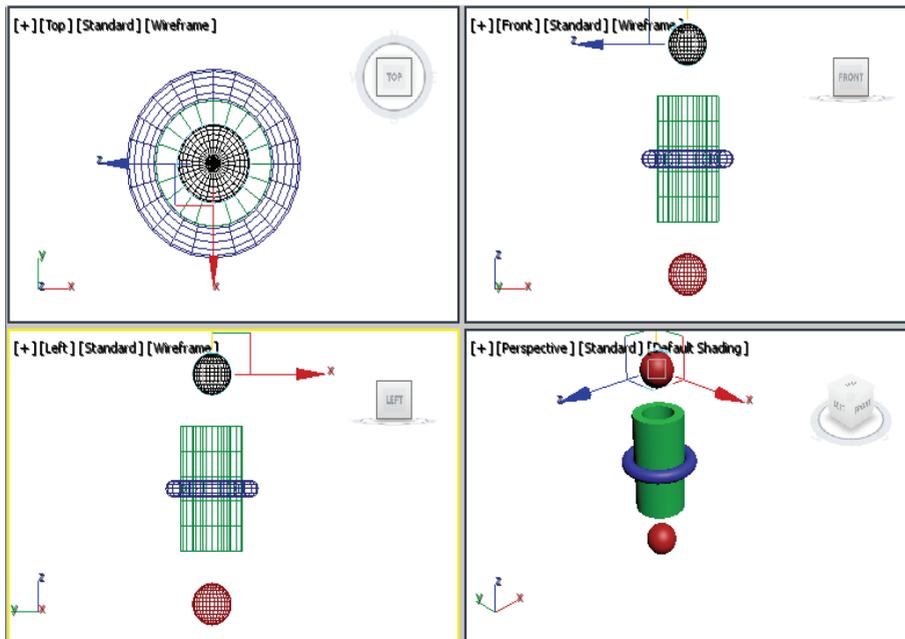


Figure 14-6 Ball02 created above Shaft

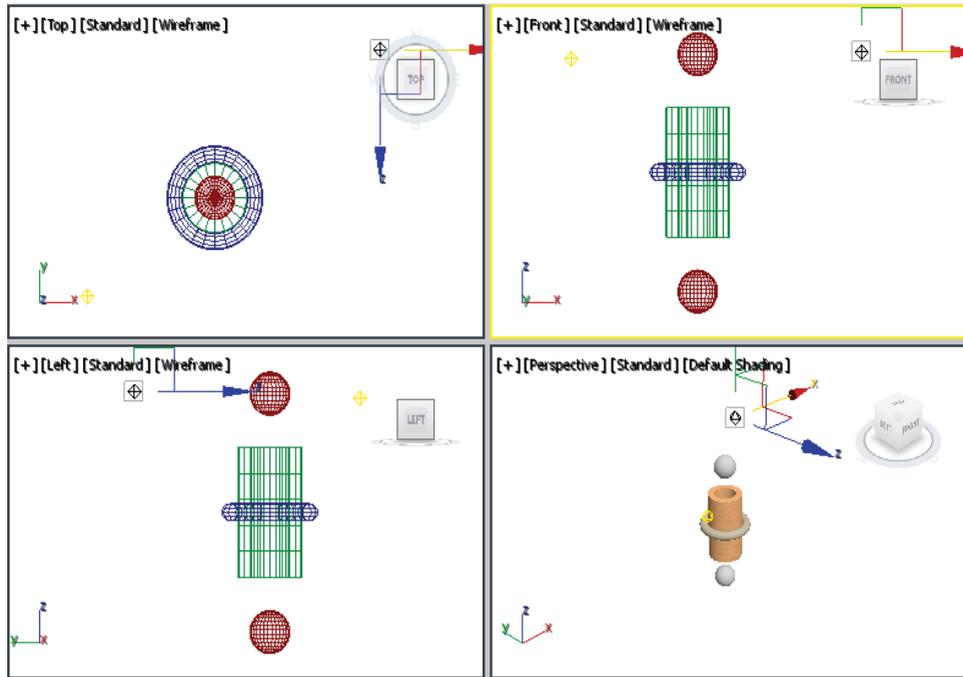


Figure 14-7 The two omni lights displayed in all viewports

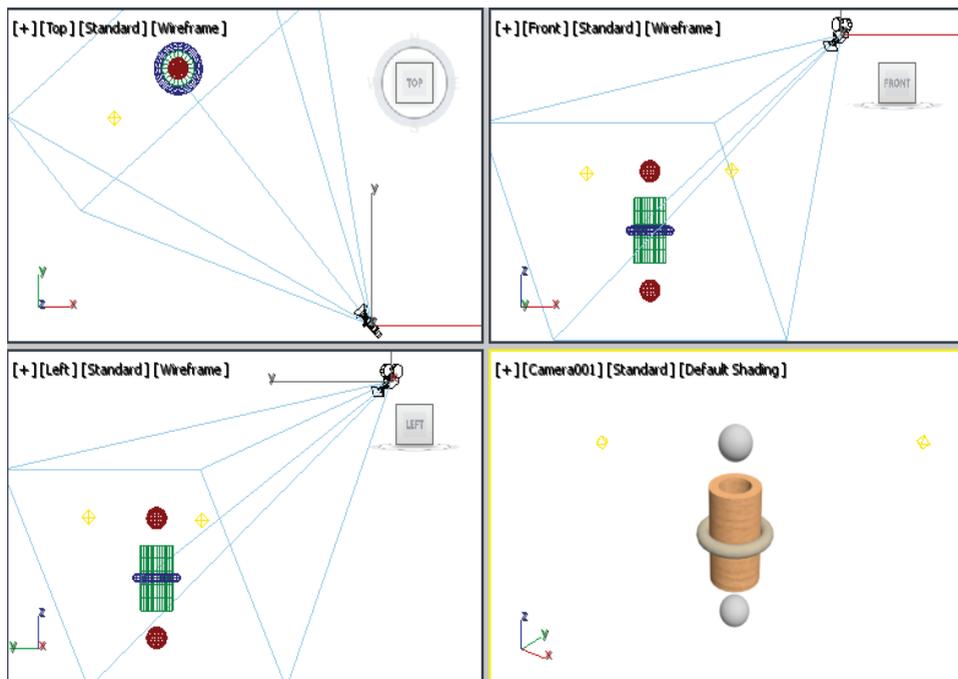
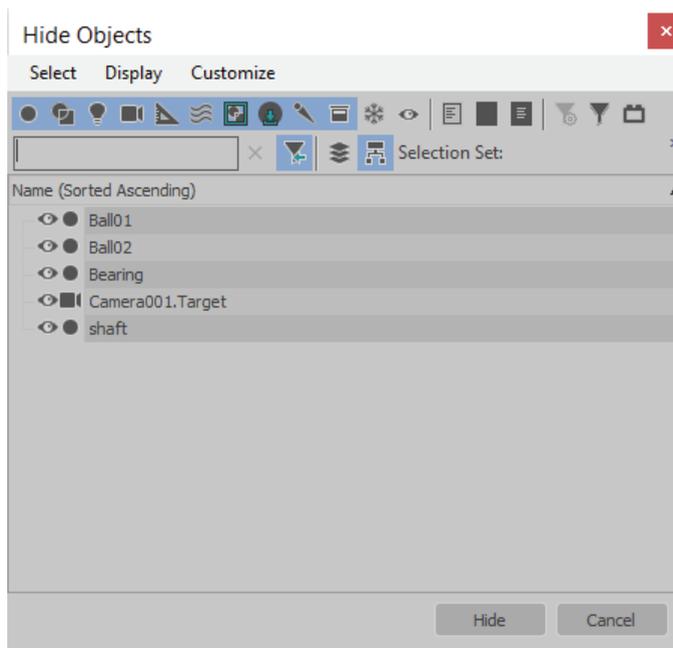


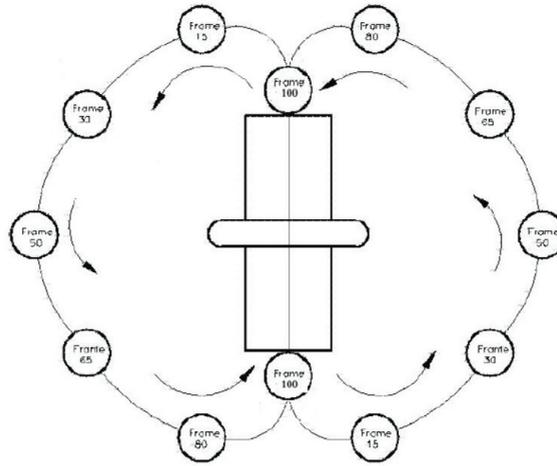
Figure 14-8 Placing the objects at the center of the Camera viewport



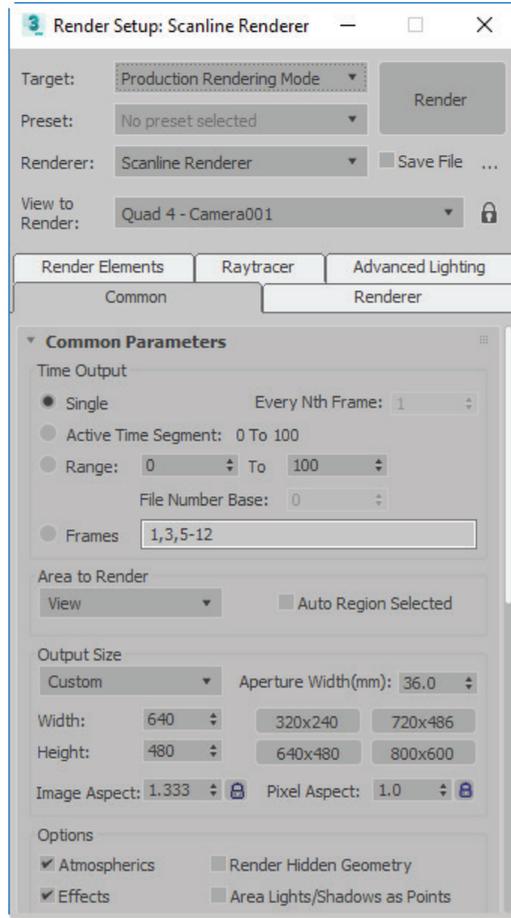
*Figure 14-9 The rendered image*



*Figure 14-10 The Hide Objects dialog box*



*Figure 14-11 The image showing the suggested paths for the two balls*



*Figure 14-12* The partial view of **Render Setup: Default Scanline Renderer** dialog box

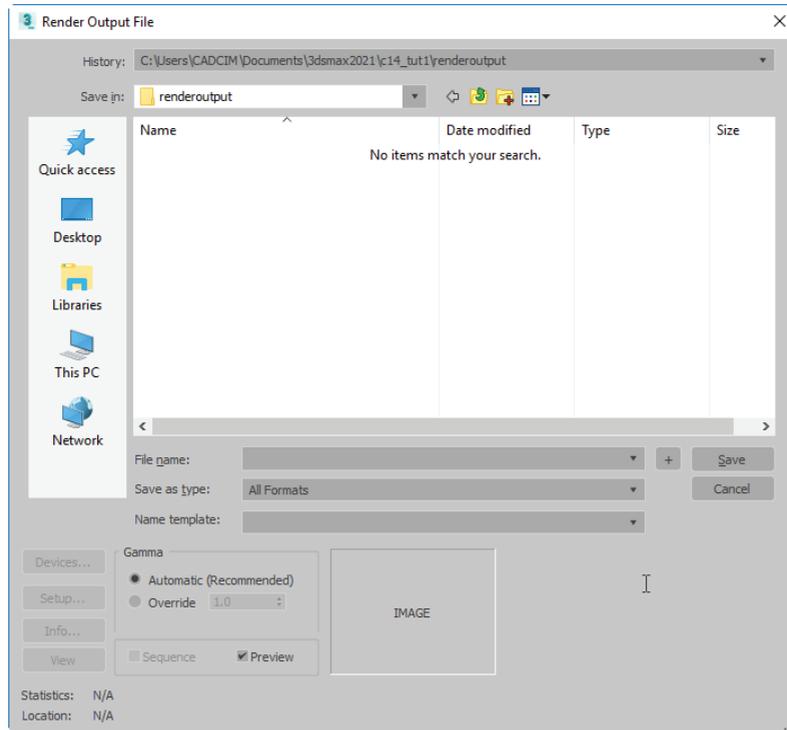


Figure 14-13 The Render Output File dialog box

## Tutorial 2

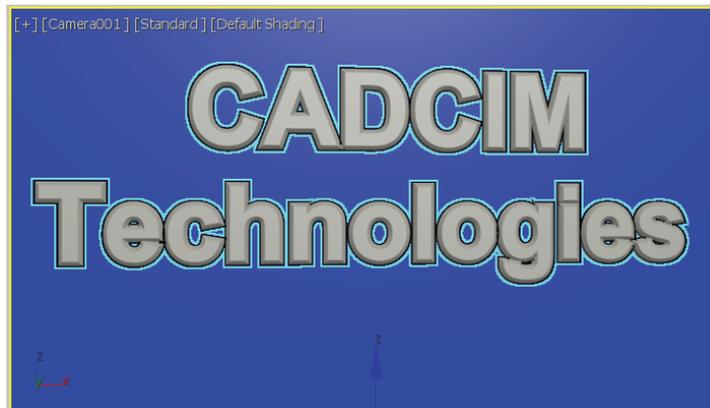


Figure 14-14 Animated logo at frame 39

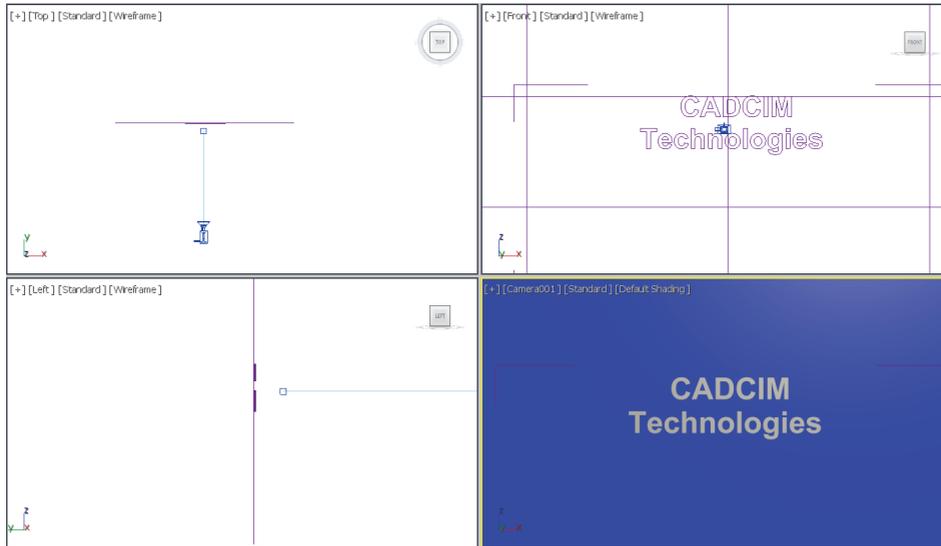


Figure 14-15 The *c14\_tut2\_start.max* file

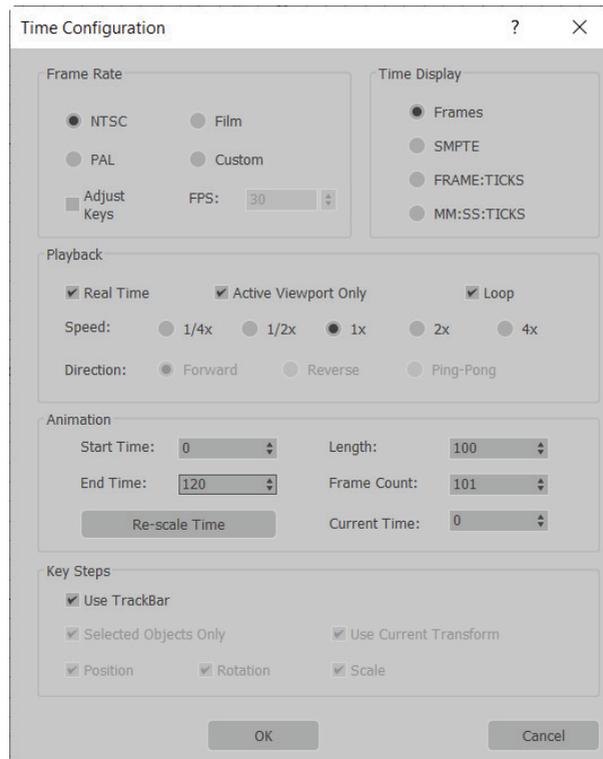


Figure 14-16 The *Time Configuration* dialog box



Figure 14-17 TextPlus001 modified



Figure 14-18 Textplus001 modified again



*Figure 14-19* Size of TextPlus001 modified



*Figure 14-20* TextPlus001 scaled



Figure 14-21 Bevel shape of TextPlus001 changed

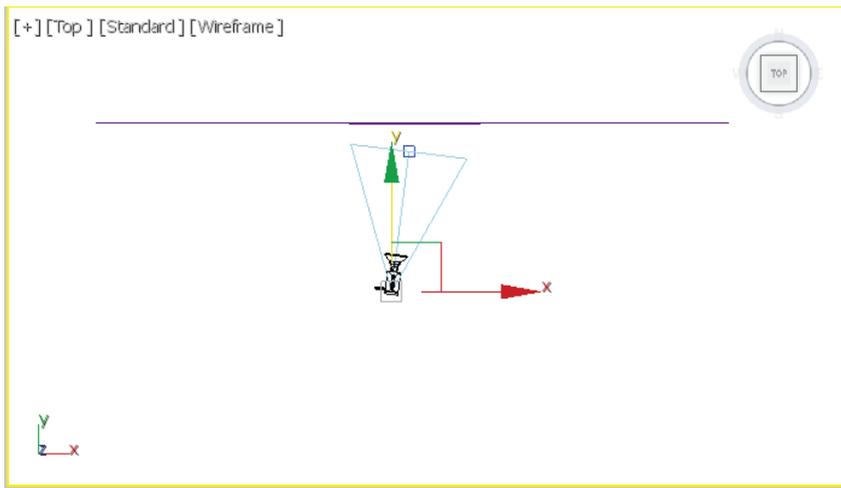
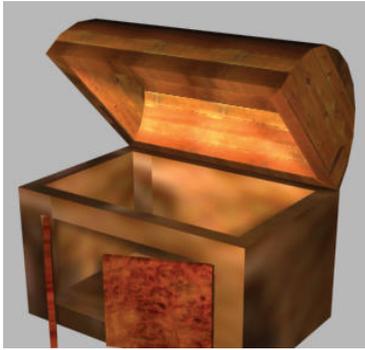
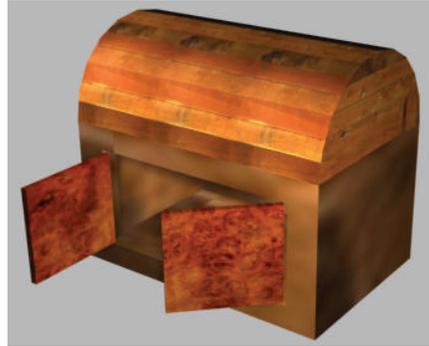


Figure 14-22 Camera001 moved

**Exercise 1**

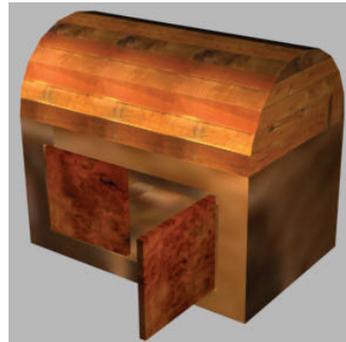
*Figure 14-23 Animation at frame 15*



*Figure 14-24 Animation at frame 30*



*Figure 14-25 Animation at frame 45*



*Figure 14-26 Animation at frame 60*

**Exercise 2**

*Figure 14-27 Animation at frame 0*

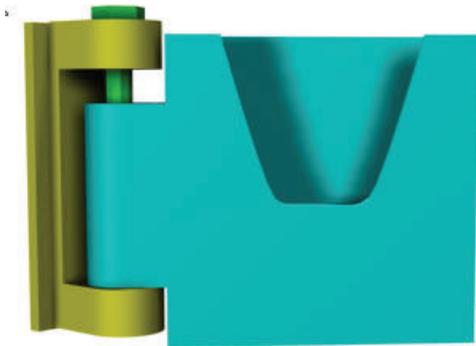


*Figure 14-28 Animation at frame 10*



*Figure 14-29 Animation at frame 30*

**Exercise 3**



*Figure 14-30 Animation at frame 0*



*Figure 14-31 Animation at frame 30*



*Figure 14-32 Animation at frame 40*

# Chapter 15

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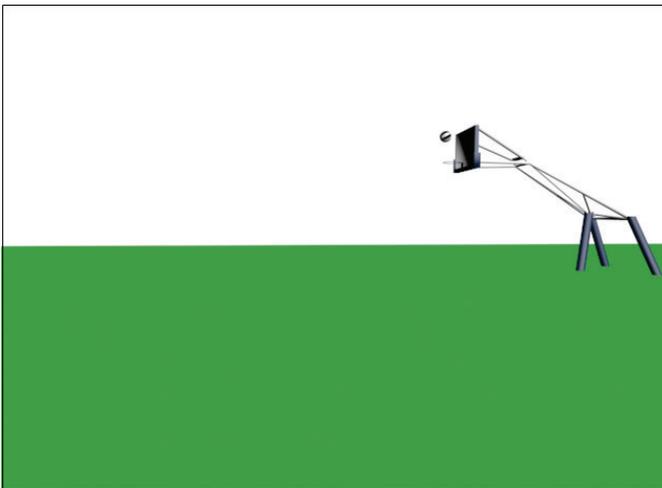
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## Complex Animation

### Learning Objectives

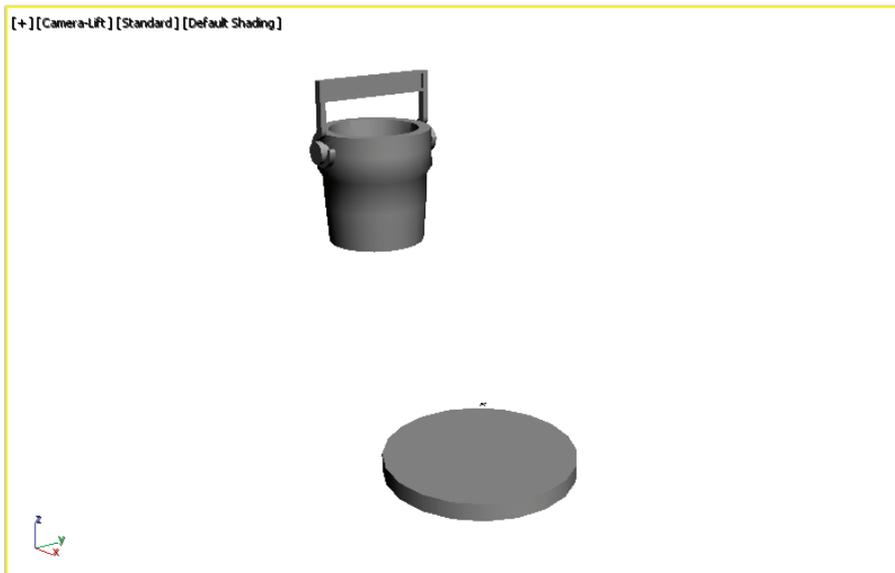
**After completing this chapter, you will be able to:**

- *Create dummy objects*
- *Use graph editor to add, copy, and position keys*
- *Create snapshot objects*
- *Hide objects during animation*
- *Animate and link camera*



**Tutorial 1**

*Figure 15-1 Animation at different frames*



*Figure 15-2 The c15\_tut1\_start.max file*

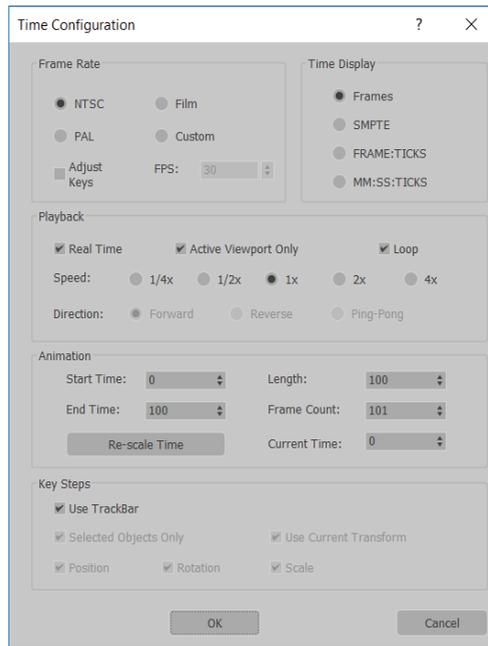


Figure 15-3 The Time Configuration dialog box

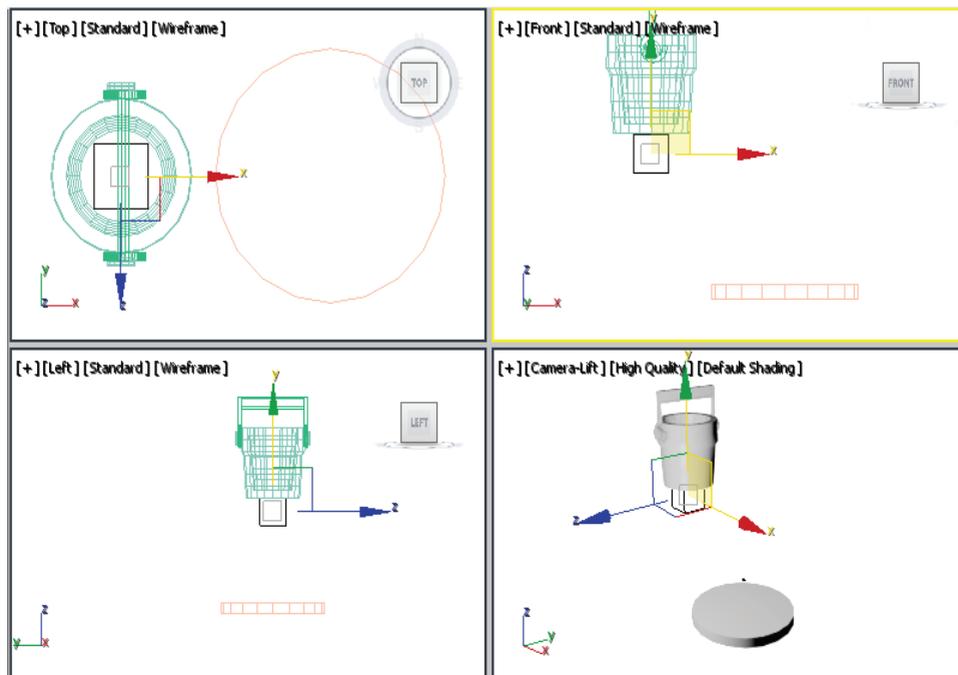


Figure 15-4 A dummy object created

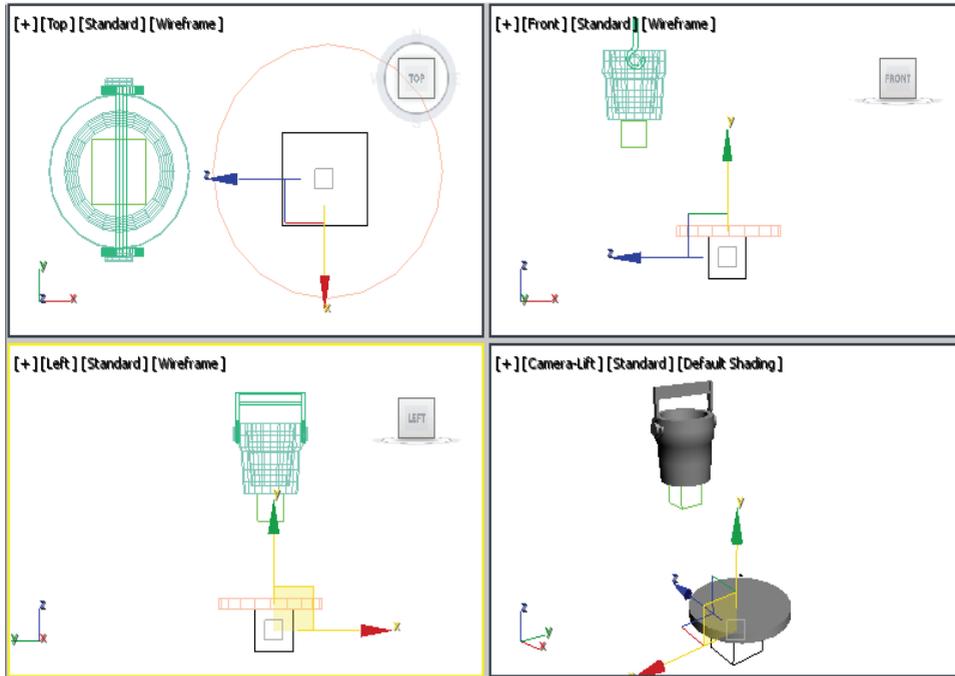


Figure 15-5 Adjusting the position of the cube below Base

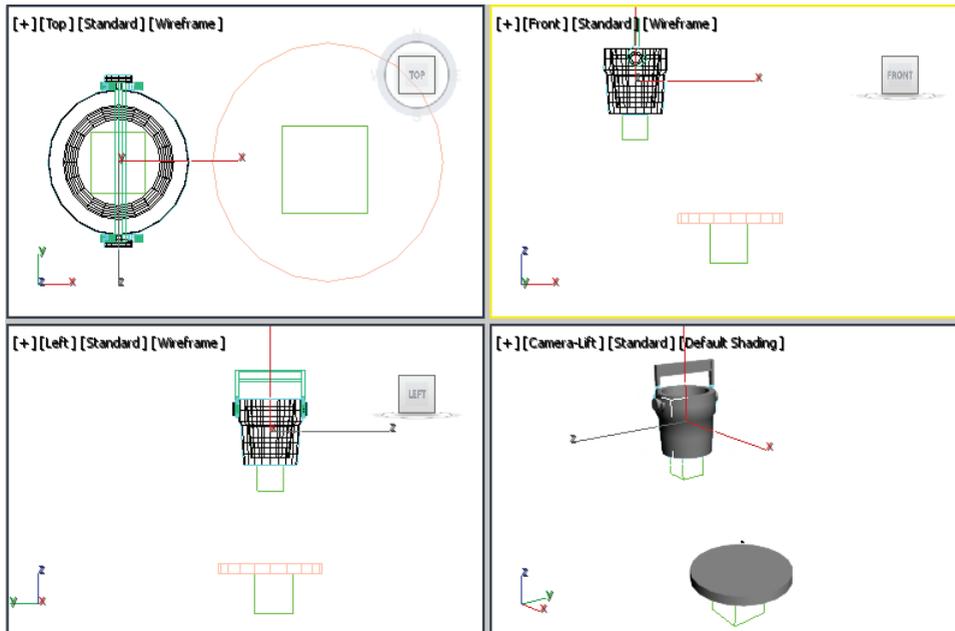


Figure 15-6 Linking Cauldron with Cal-Dummy

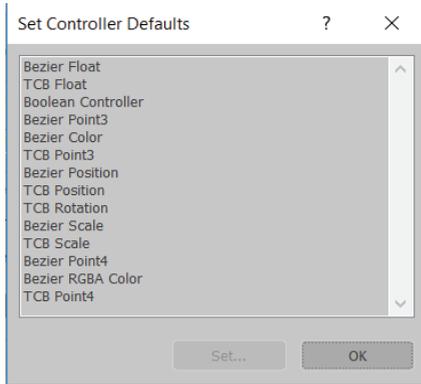


Figure 15-7 The Set Controller Defaults dialog box

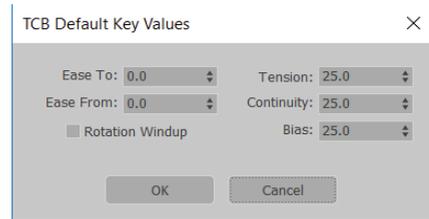


Figure 15-8 The TCB Default Key Values dialog box

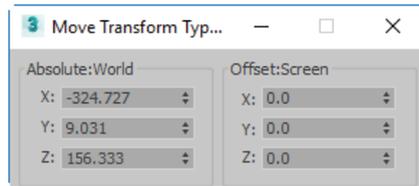


Figure 15-9 The Move Transform Type-In dialog box

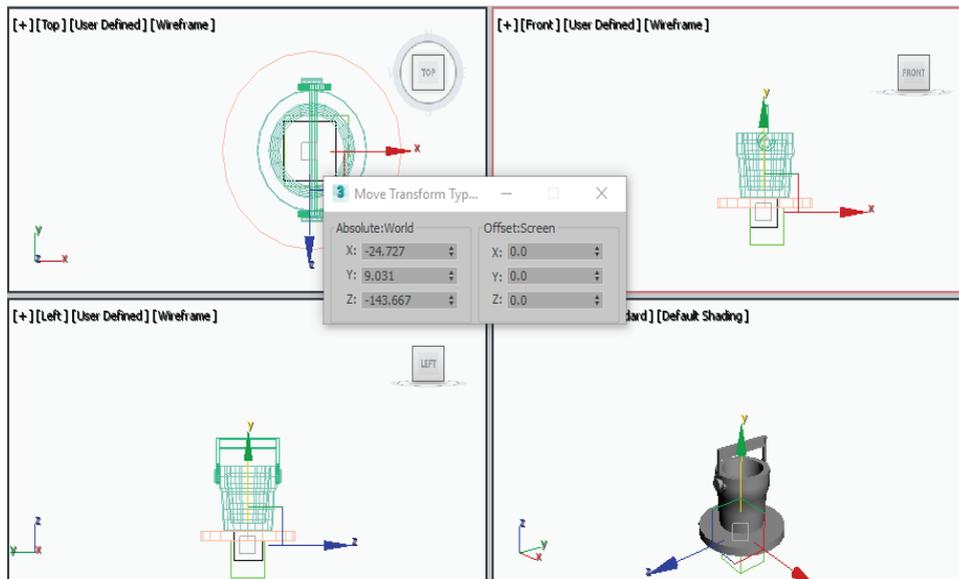
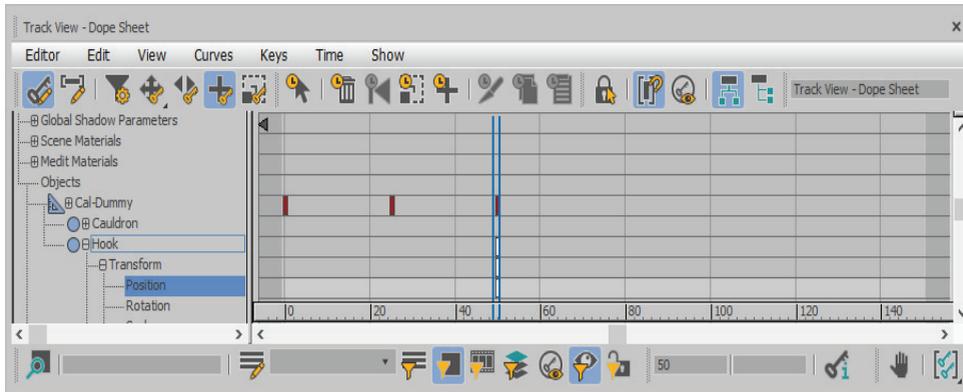
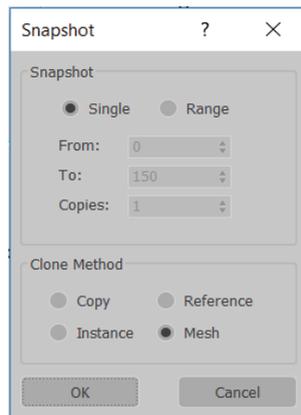


Figure 15-10 The Cauldron placed on the circular Base



*Figure 15-11* The new key added to the Hook's **Position** track



*Figure 15-12* The **Snapshot** dialog box

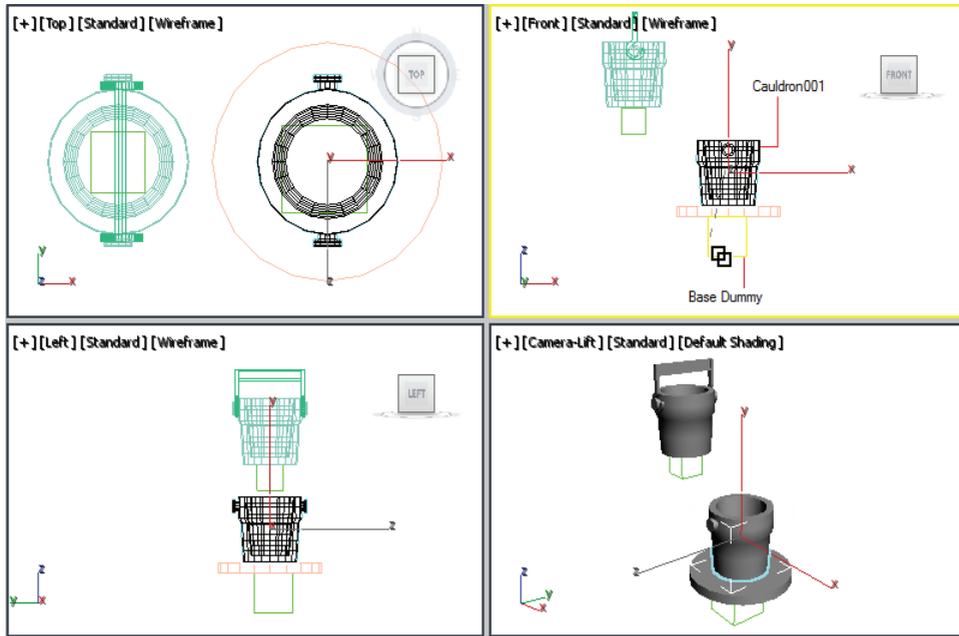


Figure 15-13 Linking Cauldron with Base-Dummy

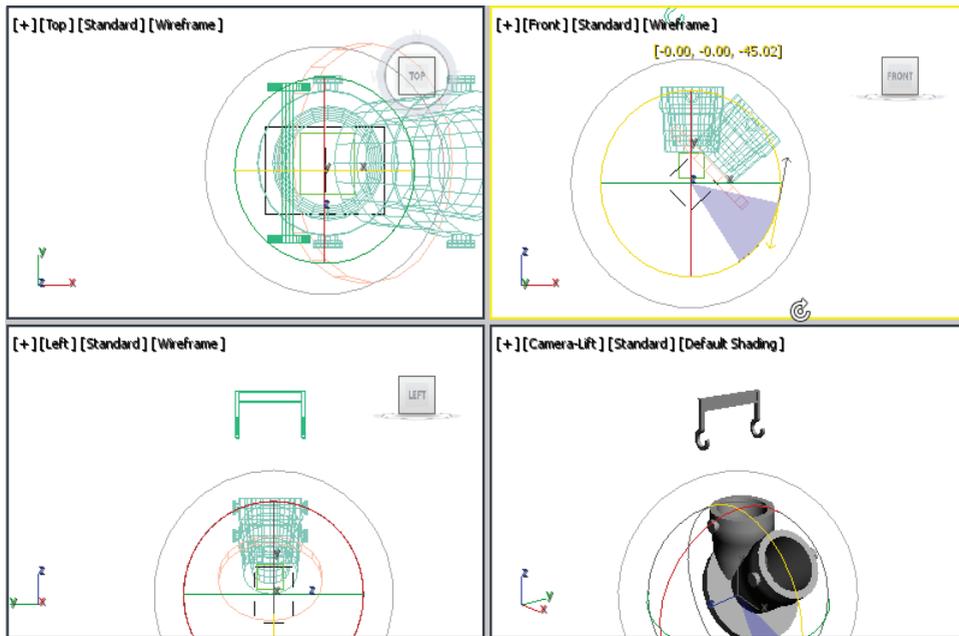
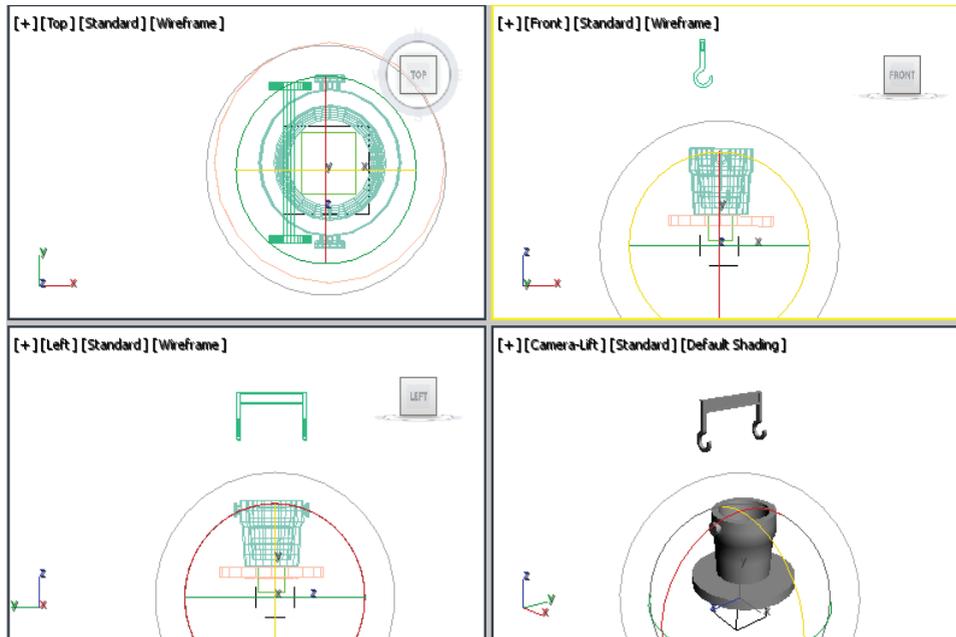
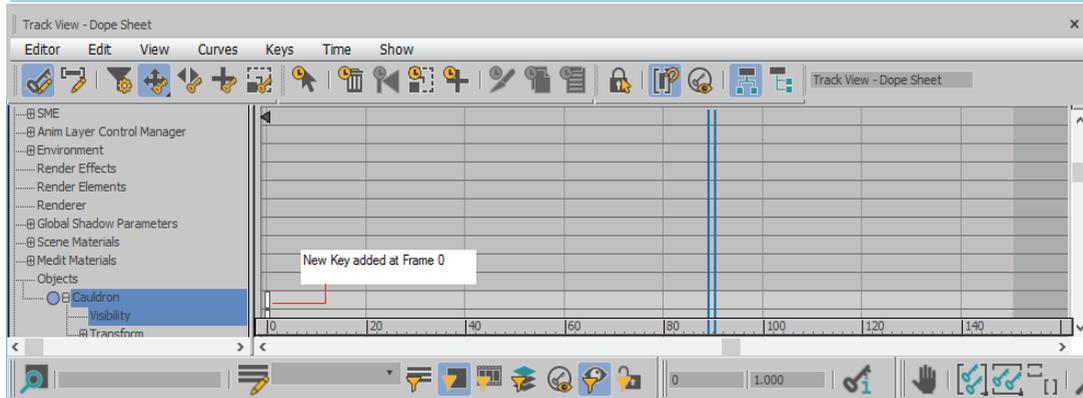


Figure 15-14 Rotating Base-Dummy -45 degrees on the Z axis



*Figure 15-15 Rotating Base-Dummy +45 degrees on the Z axis*



*Figure 15-16 Adding a new key in the Visibility track at frame 0*

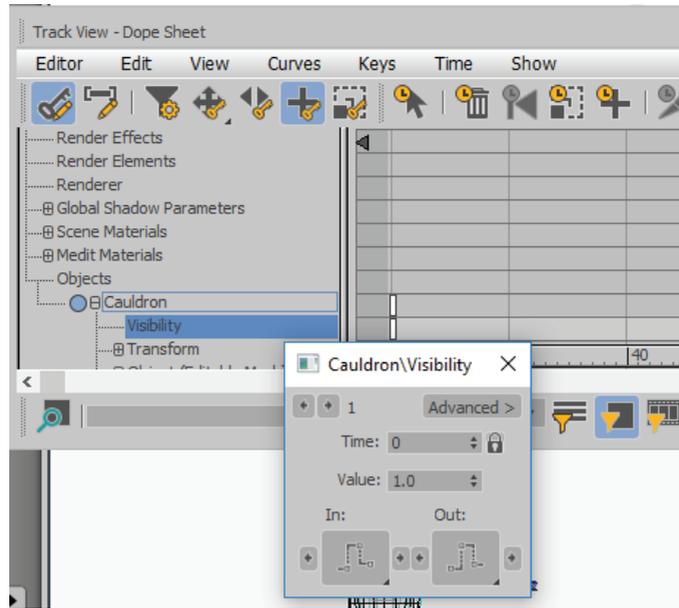
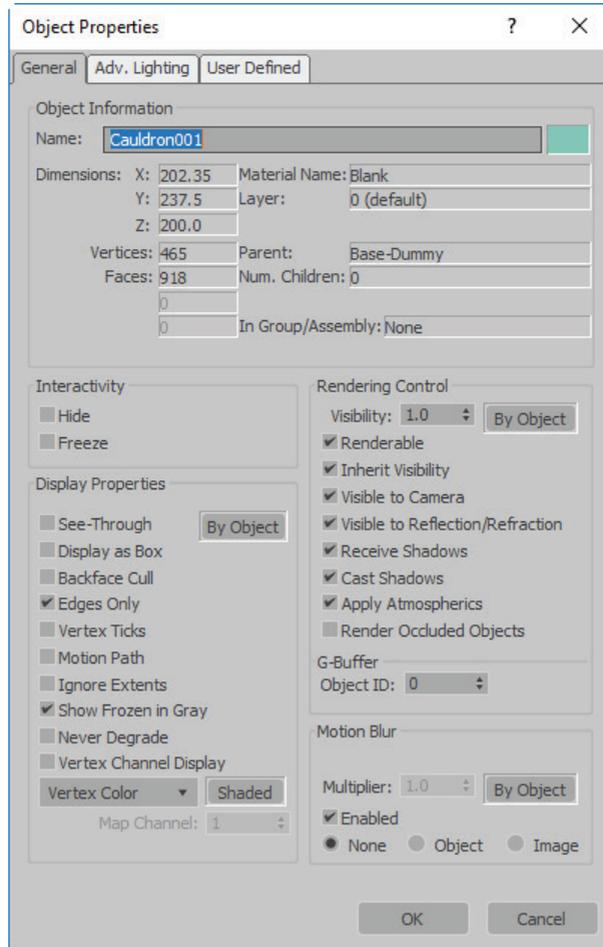


Figure 15-17 The Cauldron\Visibility dialog box



*Figure 15-18 The Object Properties dialog box*

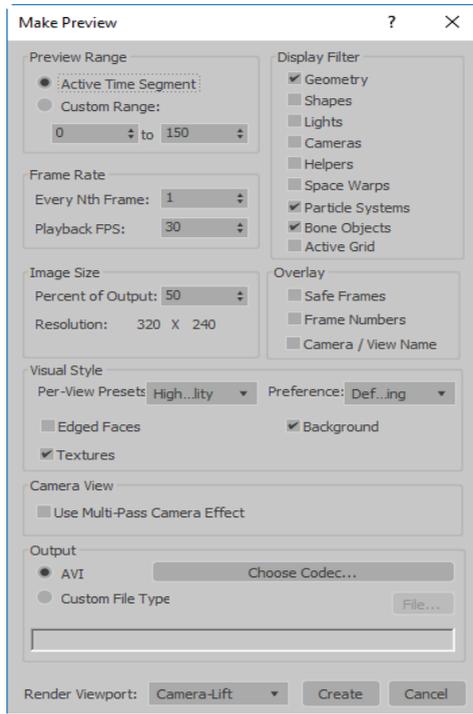


Figure 15-19 The Make Preview dialog box

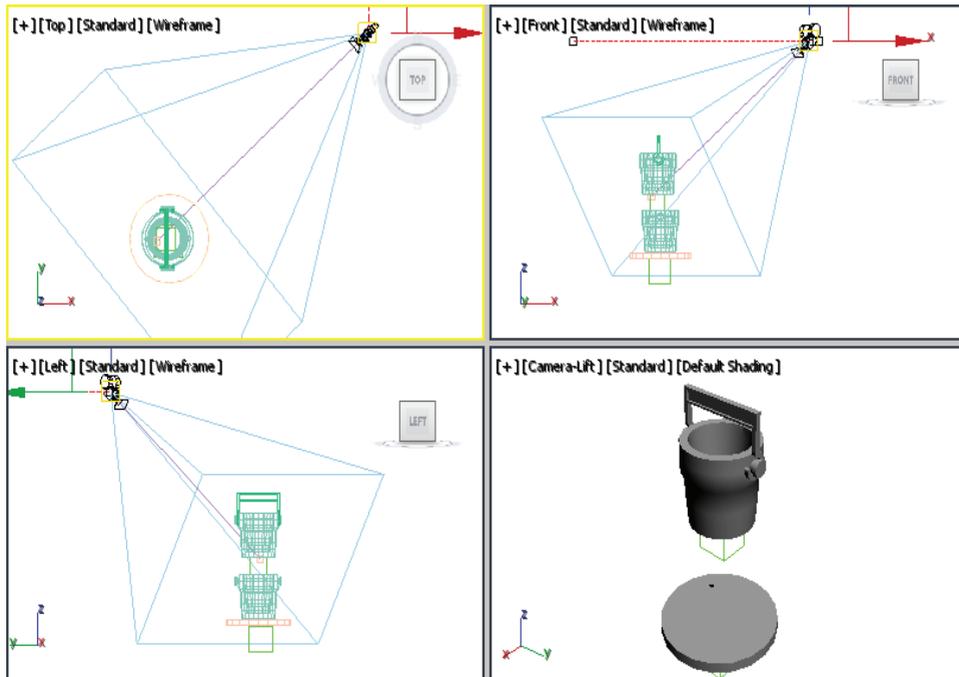
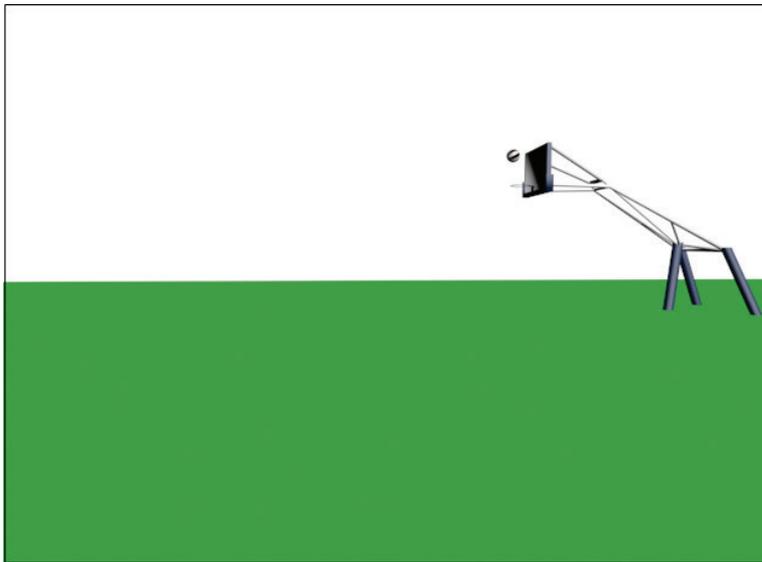
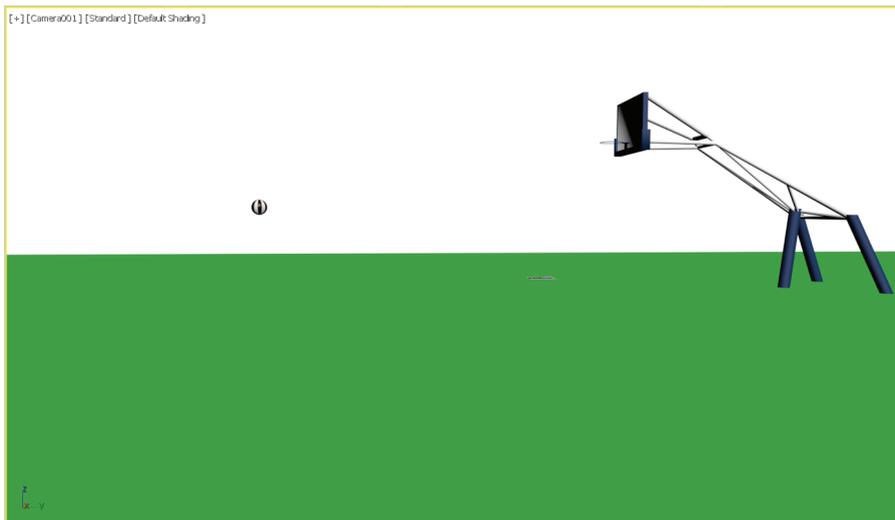


Figure 15-20 Adjusting the Camera-Lift and Camera-Lift.Target in all viewports

**Tutorial 2**

*Figure 15-21 Basketball animation at frame 11*



*Figure 15-22 The c15\_tut2\_start.max file*



Figure 15-23 The Time Configuration dialog box

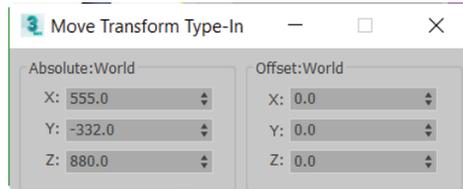


Figure 15-24 Values in the Move Transform Type-In dialog box

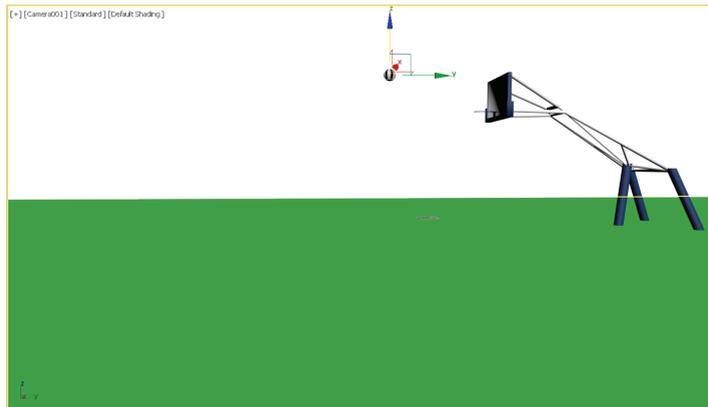
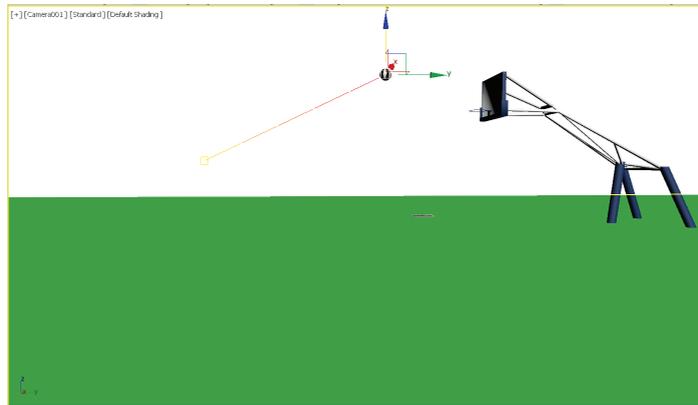
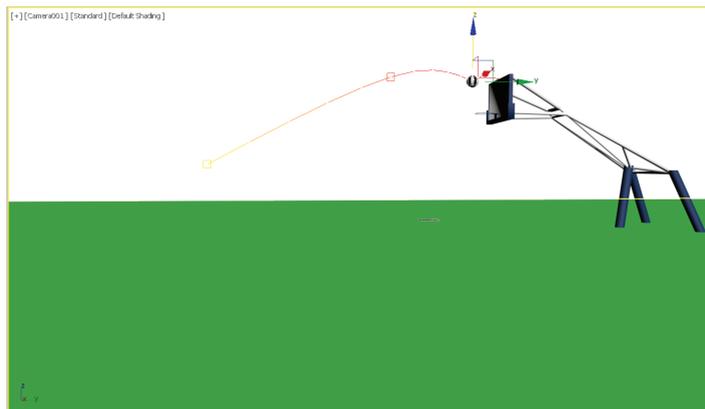


Figure 15-25 The basketball positioned at frame 5



*Figure 15-26 The basketball motion path displayed*



*Figure 15-27 The basketball positioned at frame 10*

Table 15-1 The transformation values of basketball

Frames to be selected	X	Y	Z
20	555	228.5	503
30	555	111	29
40	555	-134	368
50	555	-347	29
60	555	-508	251
70	555	-647	29
80	555	-780	159
90	555	-1011	29
120	555	-2448	29

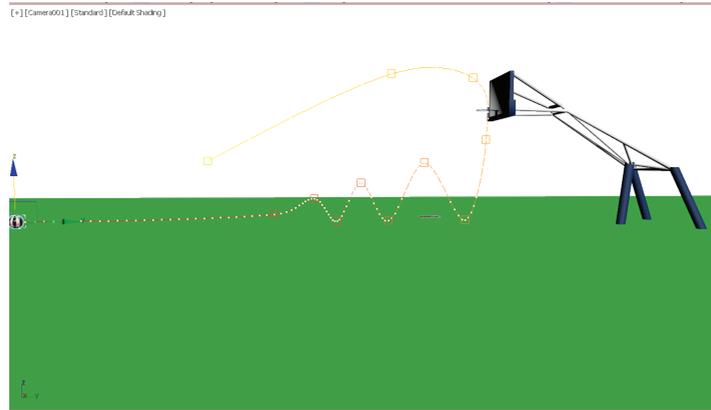


Figure 15-28 The basketball positioned at frame 120

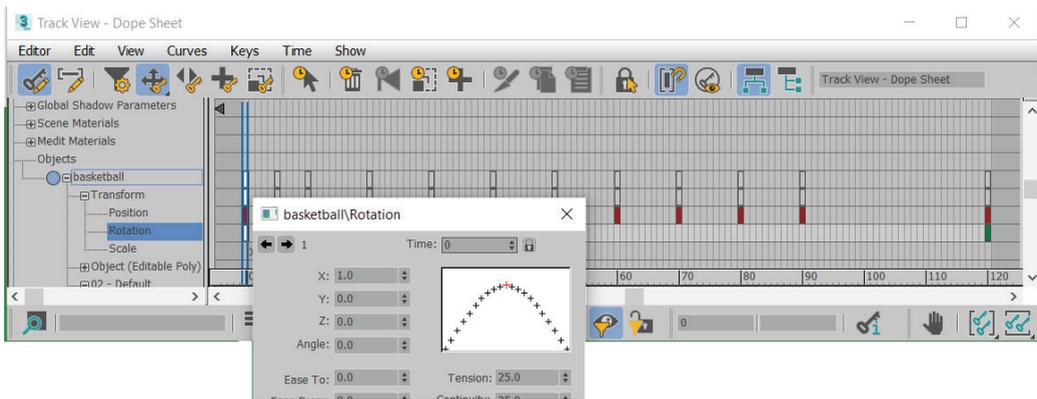


Figure 15-29 The basketball/Rotation dialog box

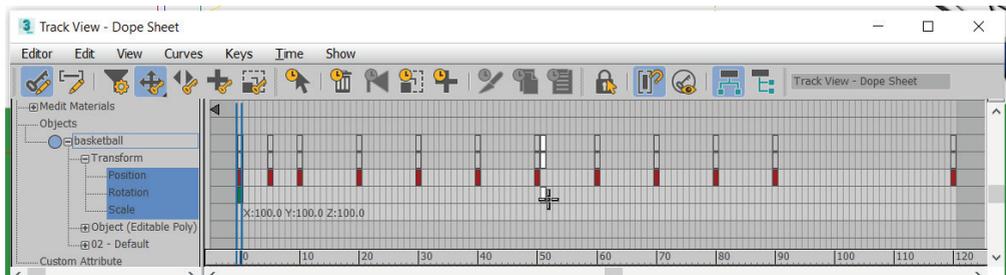
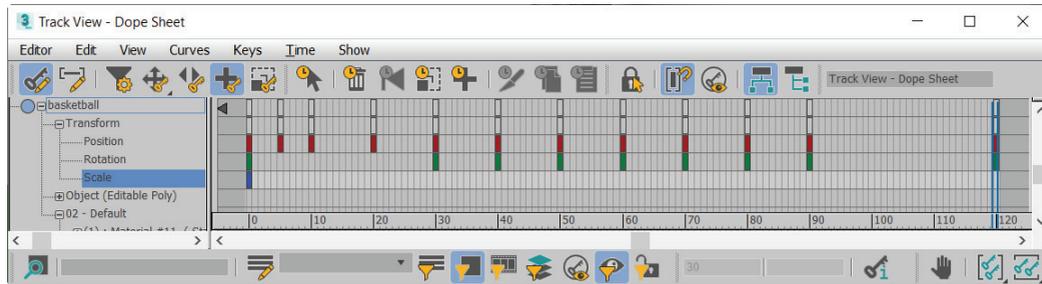
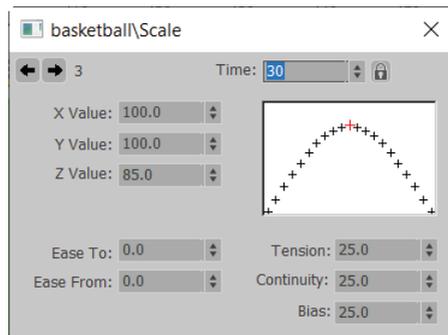


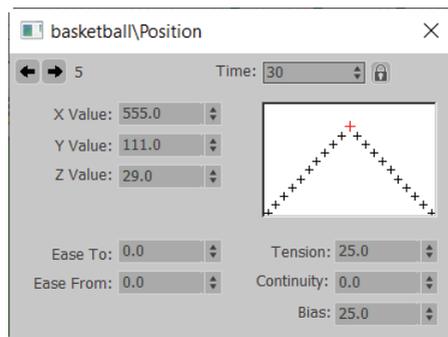
Figure 15-30 Keyframe dragged to frame 51



*Figure 15-31 Keyframe created at frame 0*

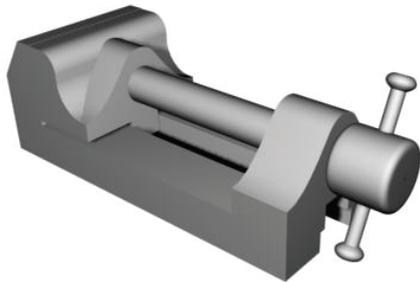


*Figure 15-32 The basketball/Scale dialog box*

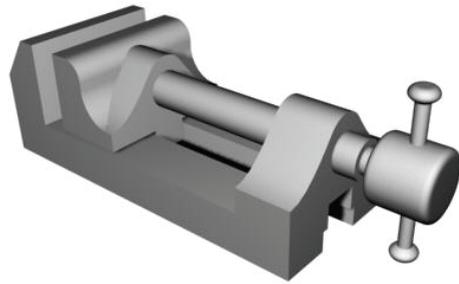


*Figure 15-33 The basketball/Position dialog box*

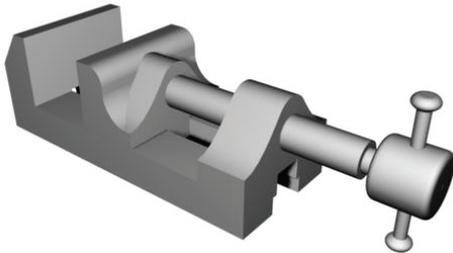
**Exercise 1**



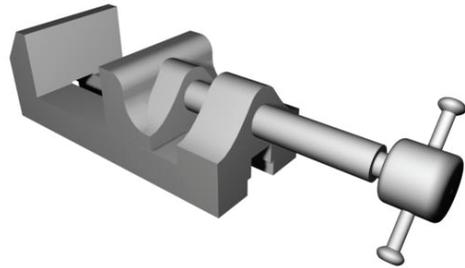
*Figure 15-34 Animation at frame 50*



*Figure 15-35 Animation at frame 75*



*Figure 15-36 Animation at frame 125*



*Figure 15-37 Animation at frame 150*

# Chapter 16

---

## Arnold Materials, Lights, and Rendering

### Learning Objectives

**After completing this chapter, you will be able to:**

- *Use arnold materials*
- *Set up arnold lights*
- *Modify arnold render settings*



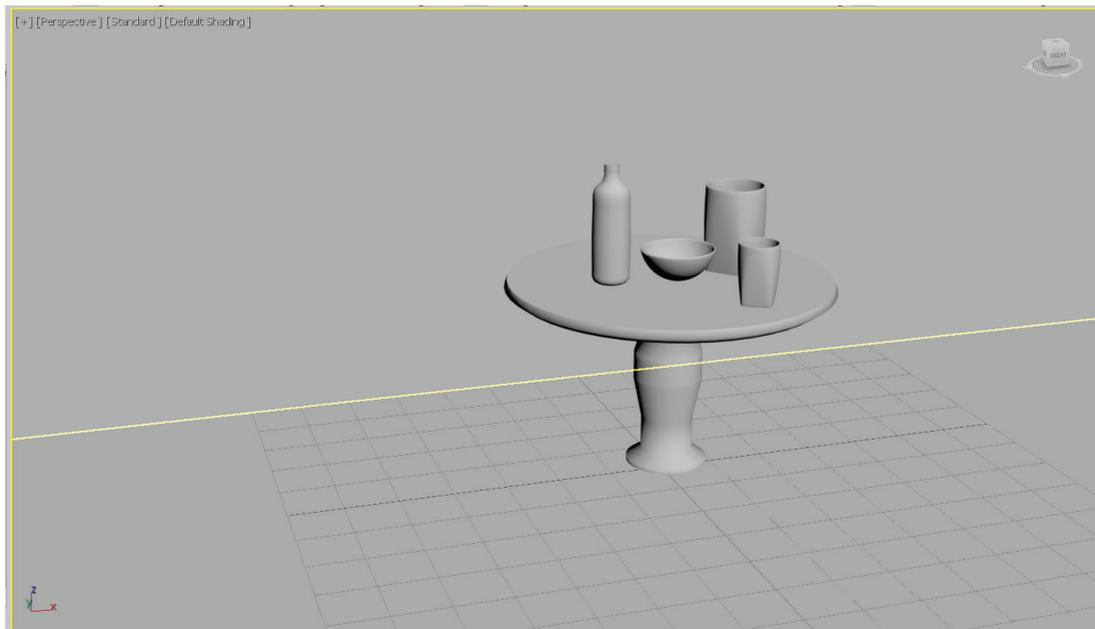
## Tutorial 1



*Figure 16-1* The illuminated scene with arnold quad lights



*Figure 16-2* Simulated sunlight with arnold distant light



*Figure 16-3* The c16\_tut1\_start.max file

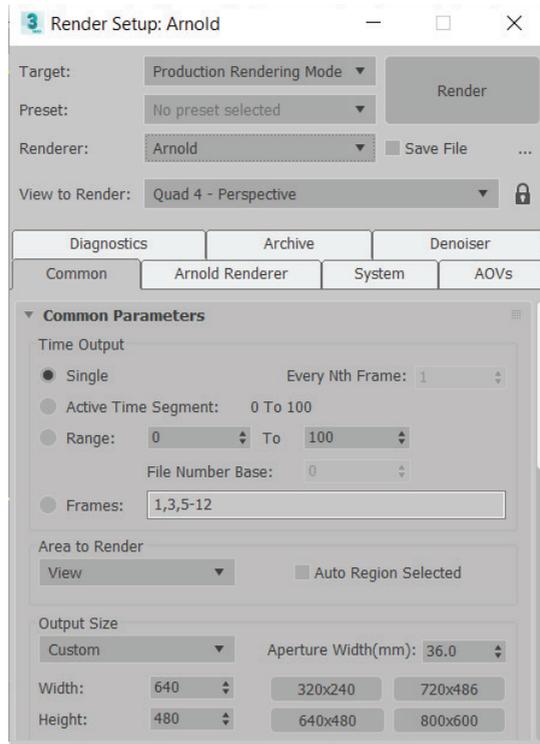
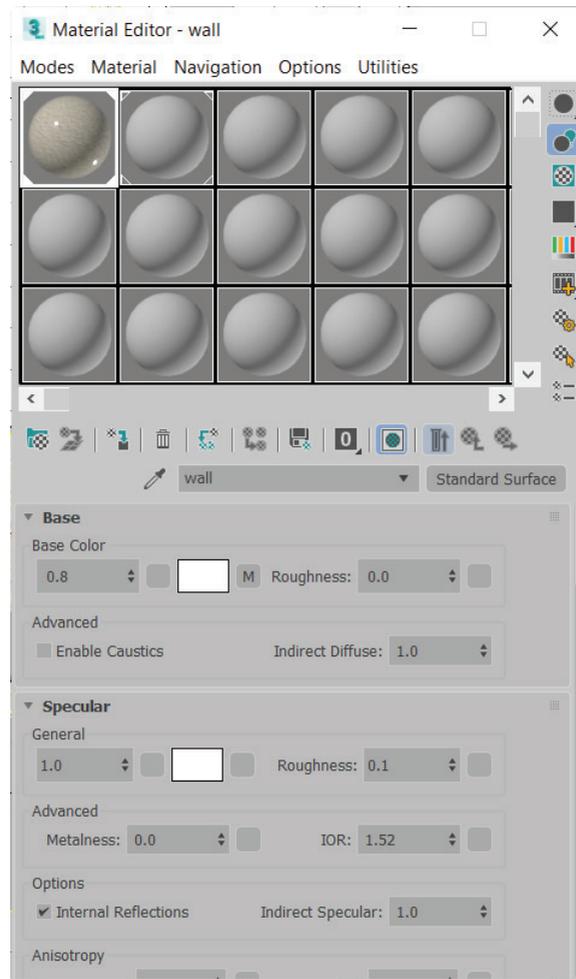
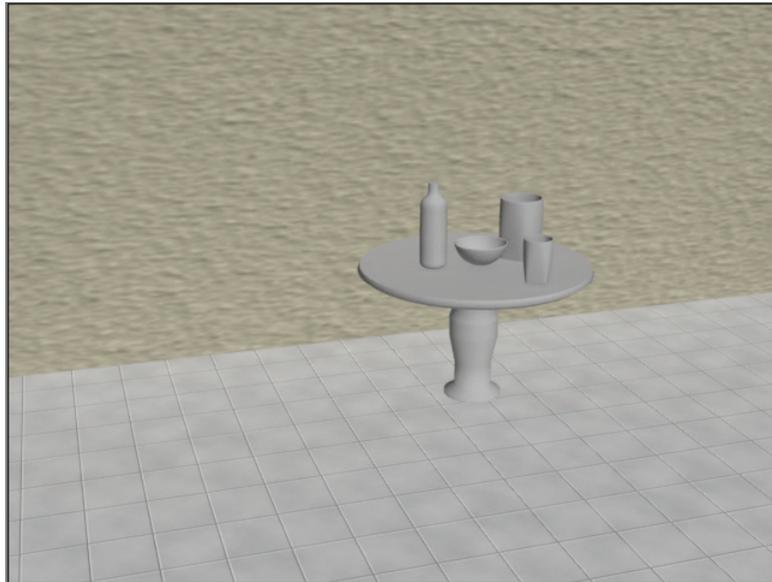


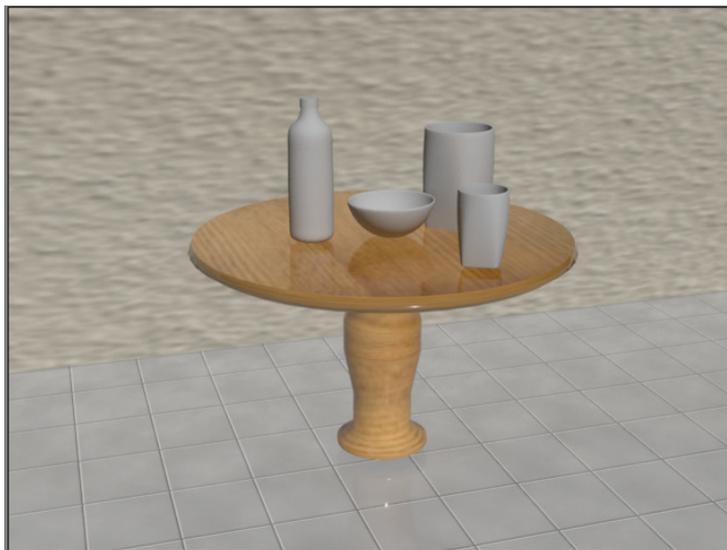
Figure 16-4 The Render Setup: Arnold dialog box



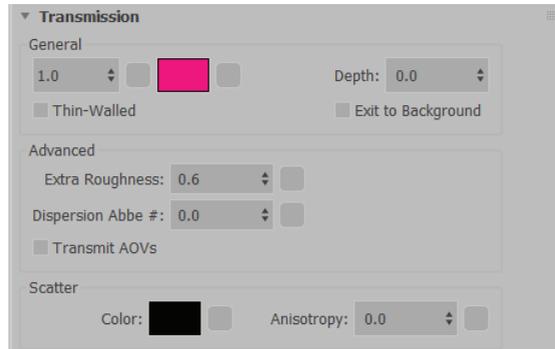
*Figure 16-5 The Material Editor dialog box with the wall material displayed*



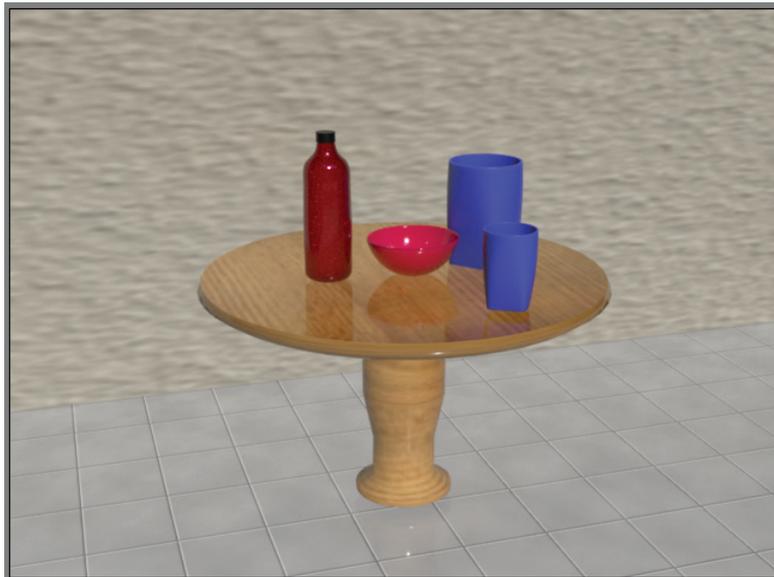
*Figure 16-7* The rendered image with the **wall** and **floor** material displayed



*Figure 16-8* The rendered image with the **table** material displayed



*Figure 16-9* Parameters set in the **Transmission** rollout



*Figure 16-10* The rendered image with all the materials displayed

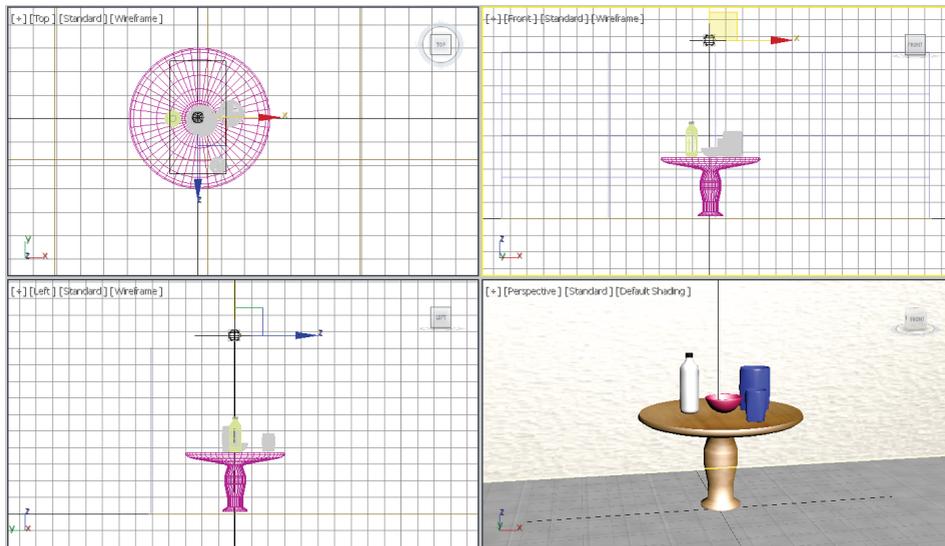
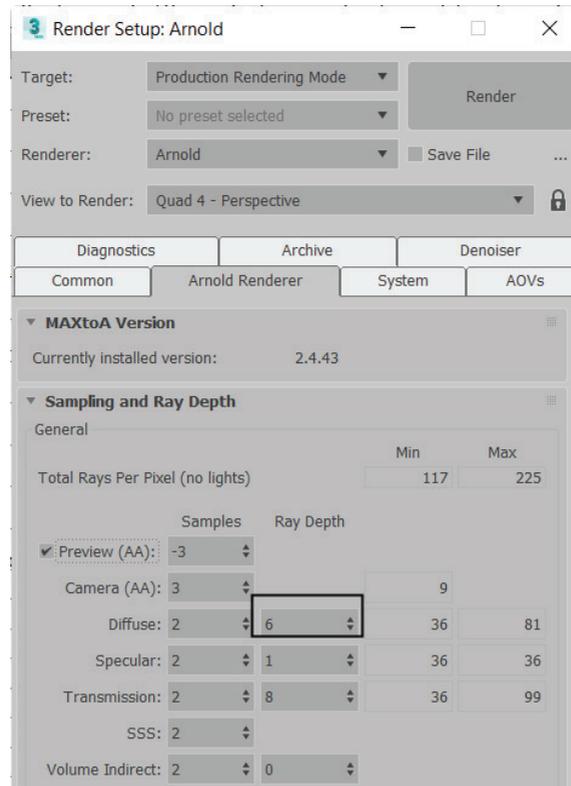


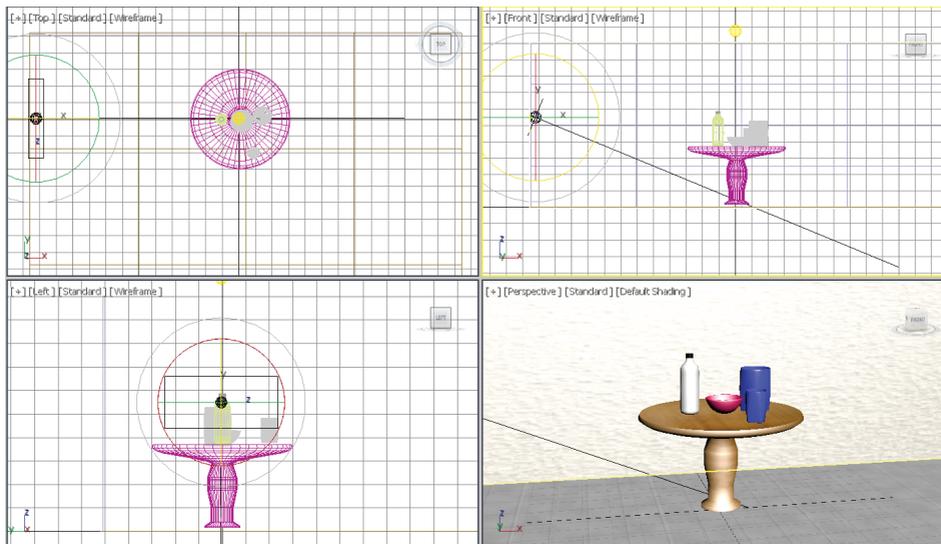
Figure 16-11 ArnoldLight001 aligned in all the viewports



Figure 16-12 The rendered image



*Figure 16-13 Value set in the Ray Depth spinner*



*Figure 16-14 The quadlight02 aligned in all the viewports*



Figure 16-15 The rendered image

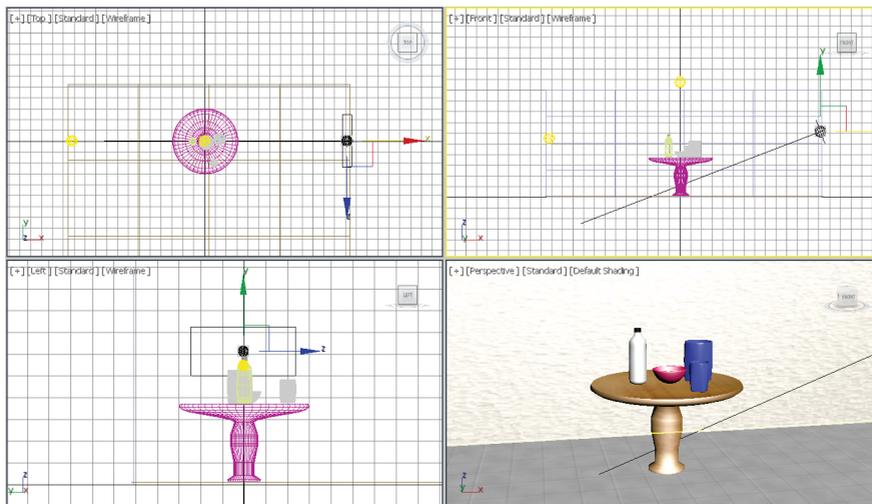


Figure 16-16 The quaddlight03 aligned in all the viewports

**Exercise 1**

*Figure 16-17 The final render*

# Chapter 17

---

## Creating a Walkthrough

### Learning Objectives

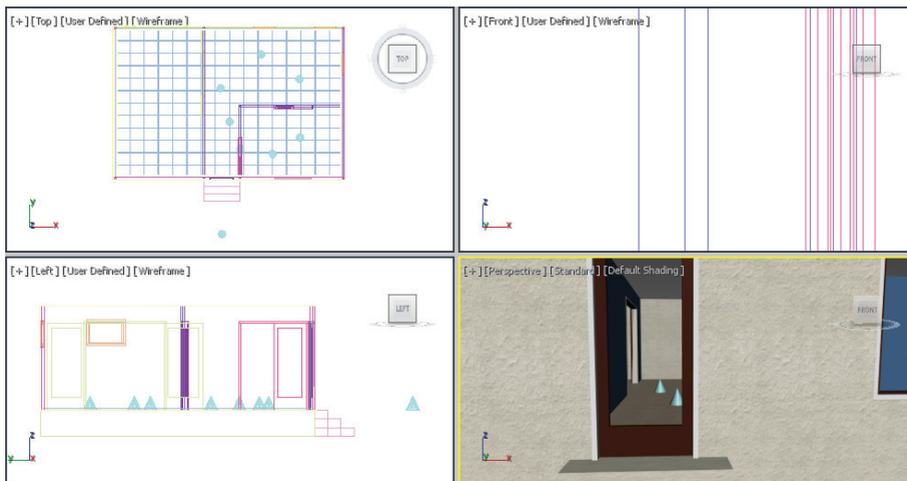
**After completing this chapter, you will be able to:**

- *Create a motion path for the camera to follow*
- *Modify the motion path*
- *Assign a path constraint controller to the position track of an object*
- *Adjust camera parameters and animate the camera*
- *Animate 3ds Max AEC objects*
- *Render the preview and final walkthrough*



**Tutorial 1**

*Figure 17-1 The final walkthrough at frame 70*



*Figure 17-2 The c17\_tut1\_start file*

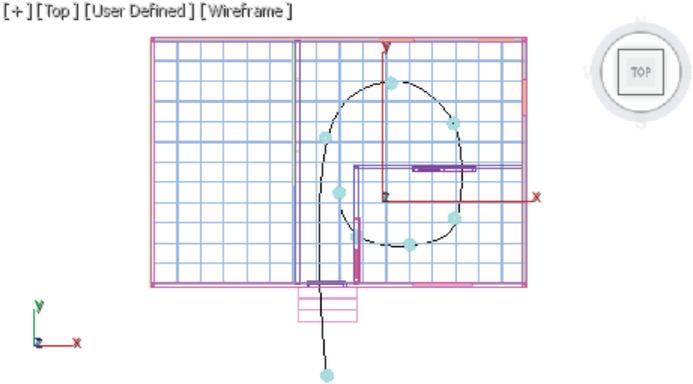


Figure 17-3 A line created to be used as a path

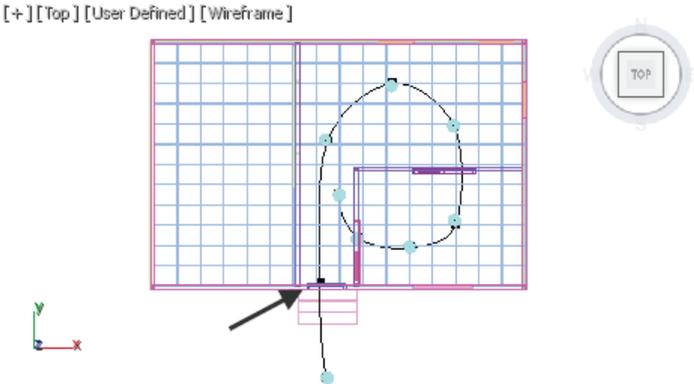


Figure 17-4 A new vertex added to the path

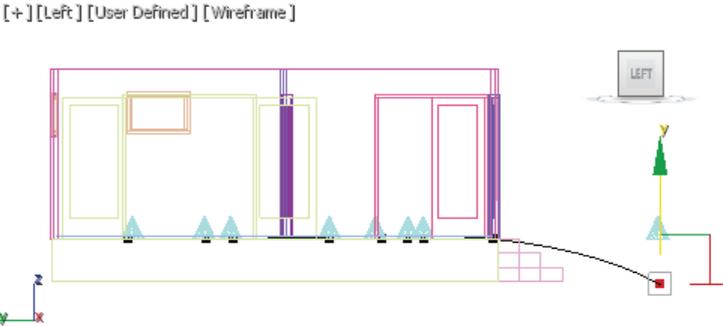
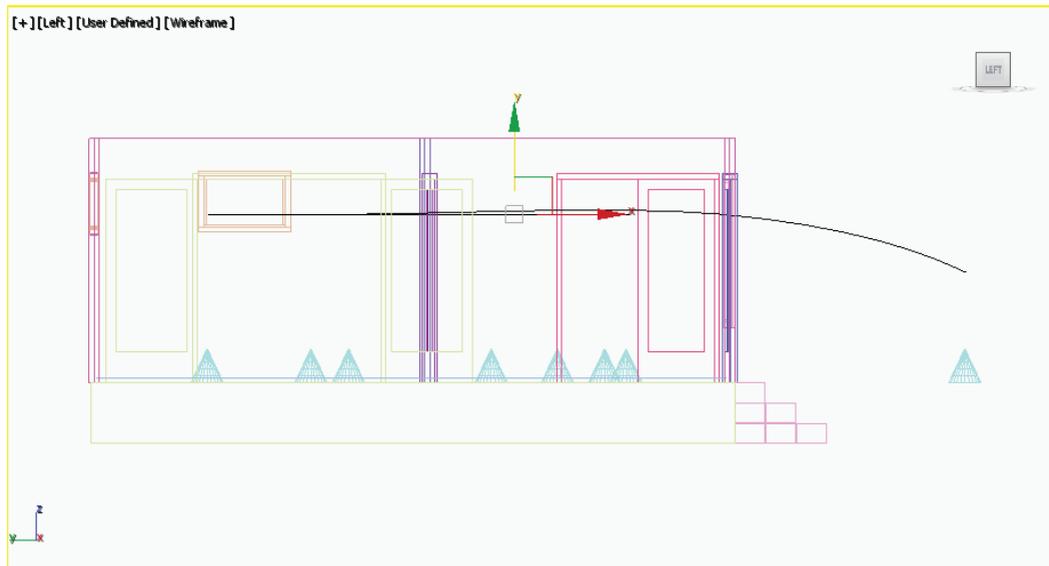
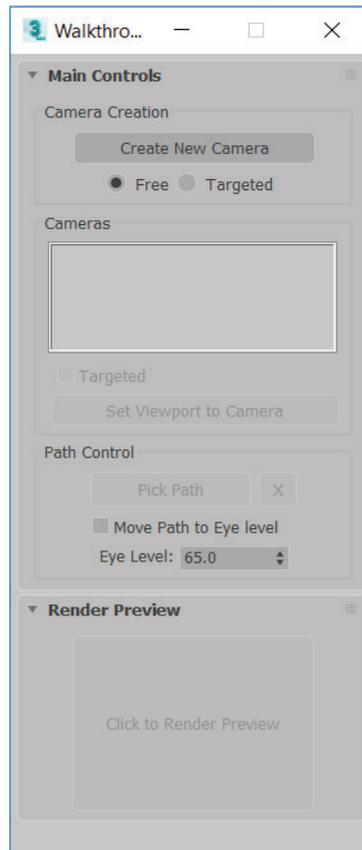


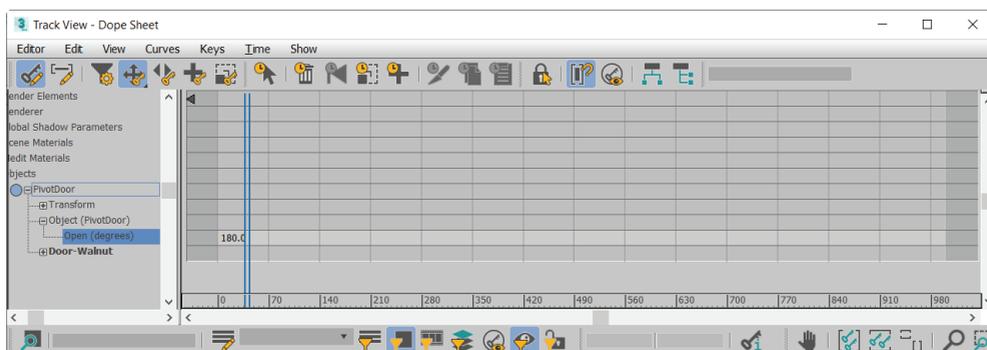
Figure 17-5 The first vertex moved down



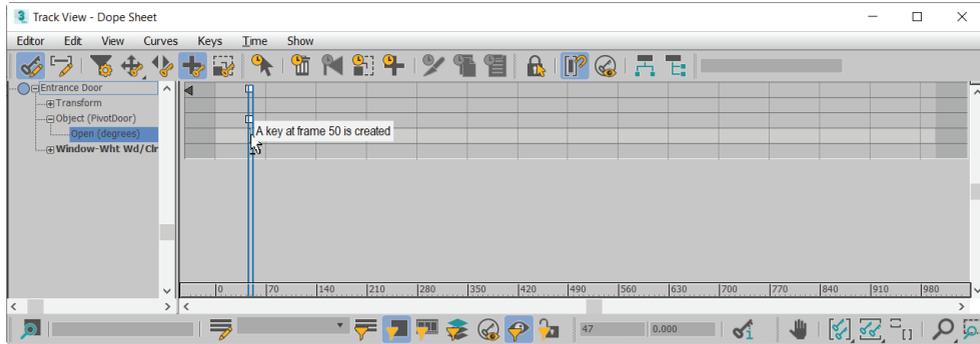
*Figure 17-6* The motion path moved up to the height of an average person's line of sight



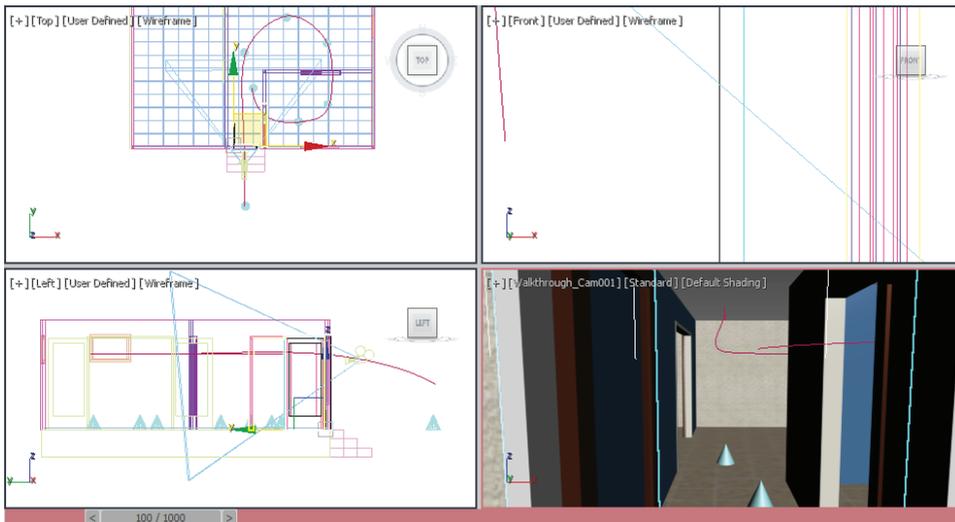
*Figure 17-7 The Walkthrough Assistant dialog box*



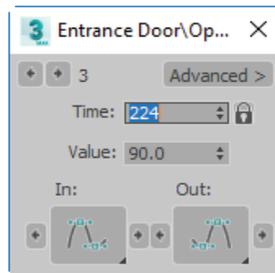
*Figure 17-8 The Track View - Dope Sheet window*



*Figure 17-9 The new key created at frame 50 for Entrance Door*



*Figure 17-10 The Entrance Door is opened 90 degrees at frame 100*



*Figure 17-11 The Entrance Door\ Open (degrees) dialog box*

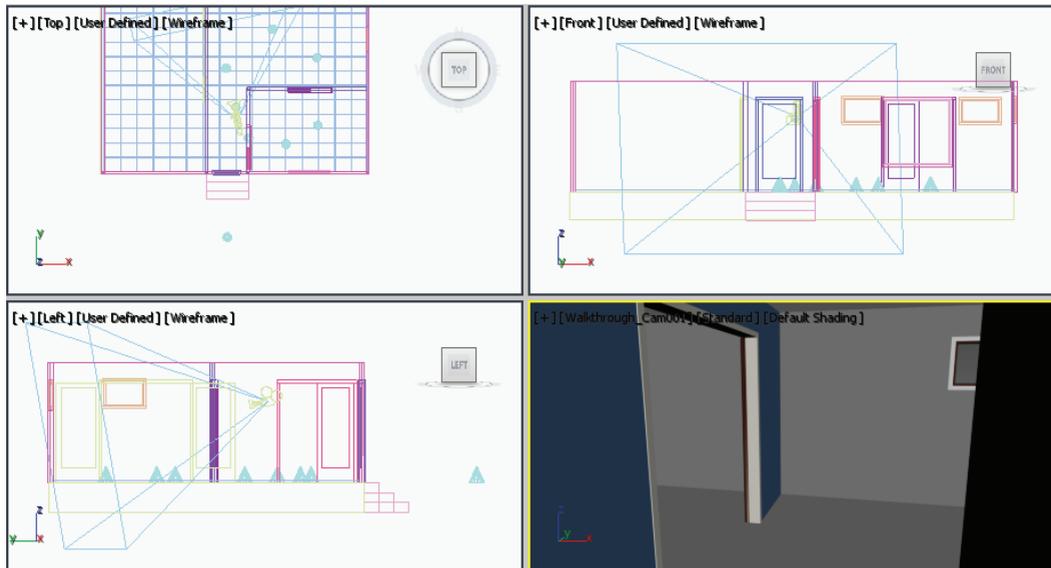


Figure 17-12 The motion path hidden in the viewports

## Exercise 1



Figure 17-13 Walkthrough for the lobby

# ***Project 1***

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## ***Creating a Windmill***



*Figure P1-1 The model of the windmill*

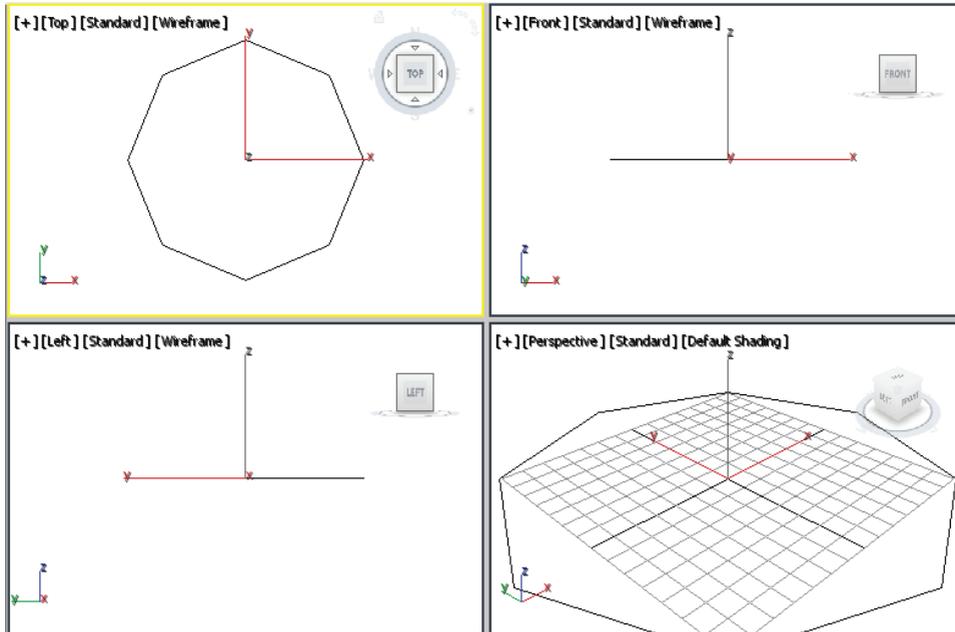


Figure P1-2 The shape created with the name NGon001

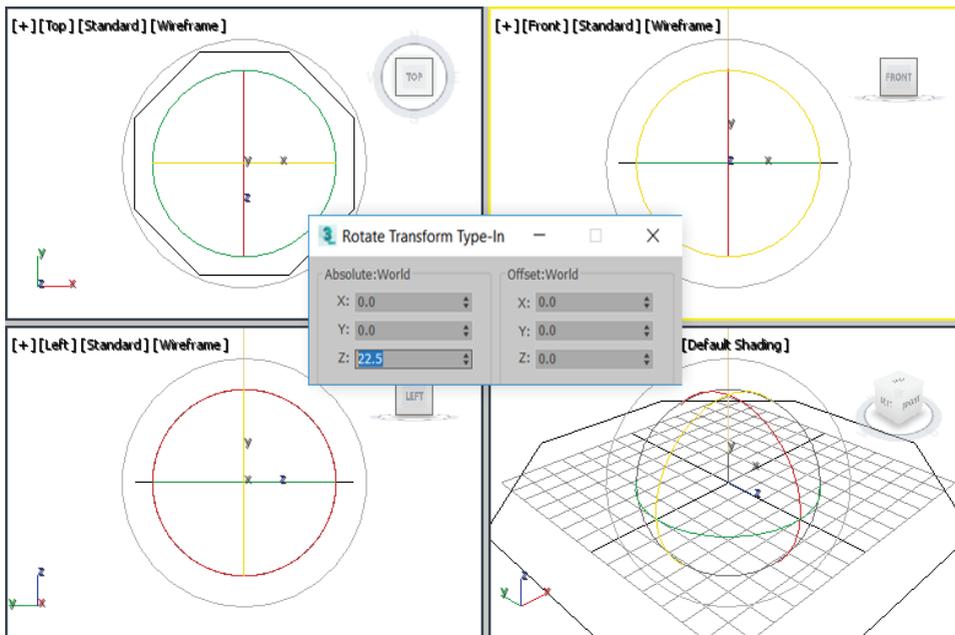


Figure P1-3 Rotating NGon001

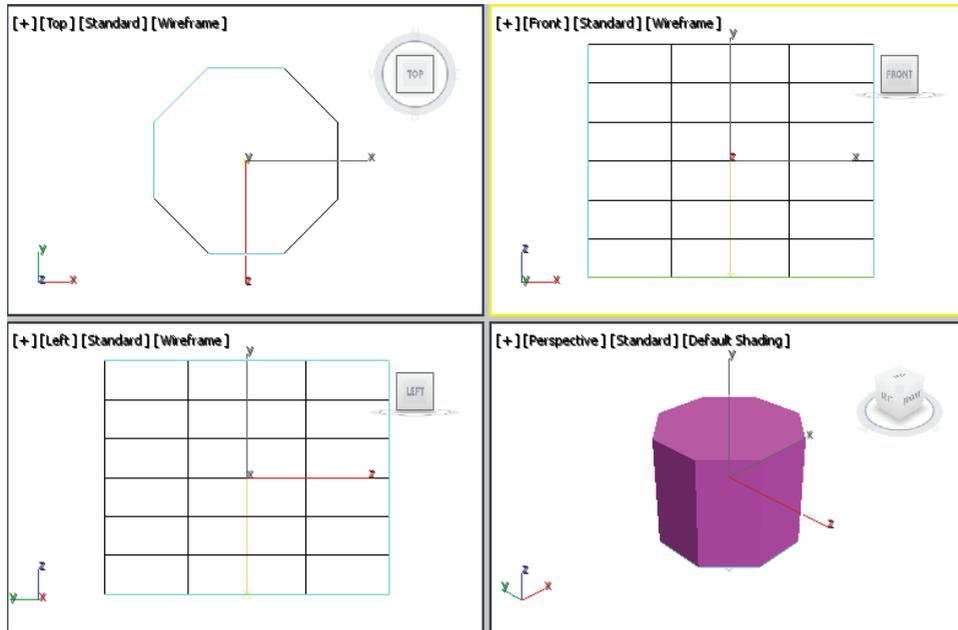


Figure P1-4 NGon001 lofted along the line in all viewports

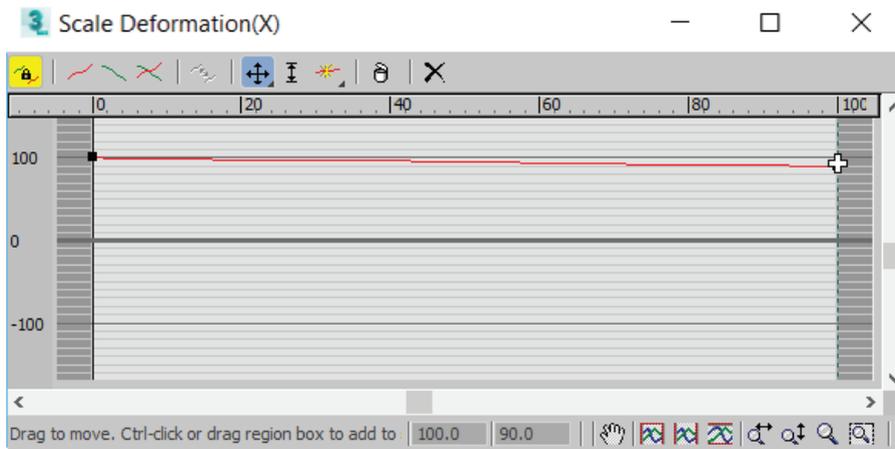


Figure P1-5 The Scale Deformation(X) dialog box

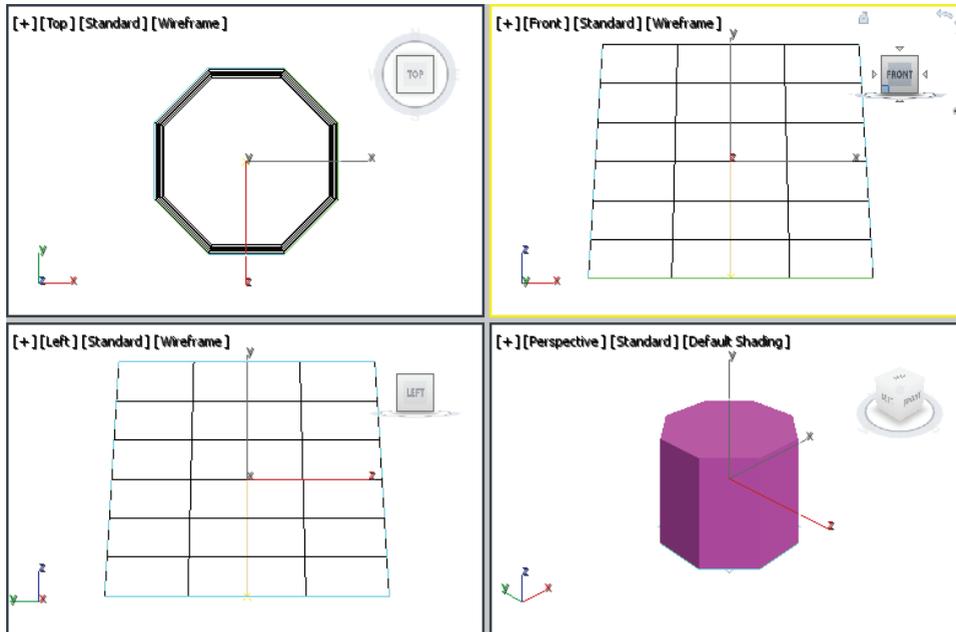


Figure P1-6 Loft001 tapered at its top

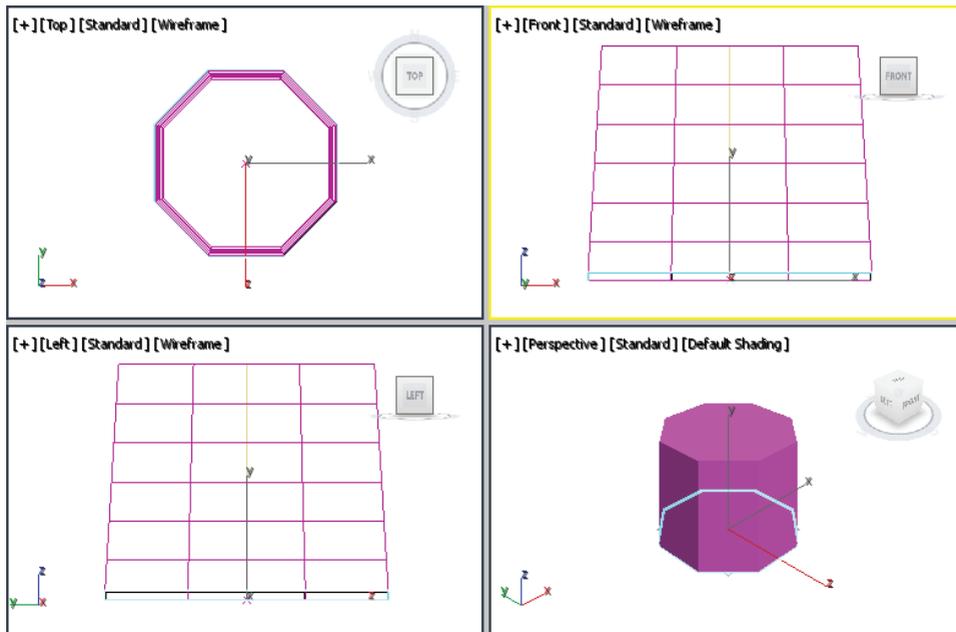


Figure P1-7 Floor created with a thickness of five units

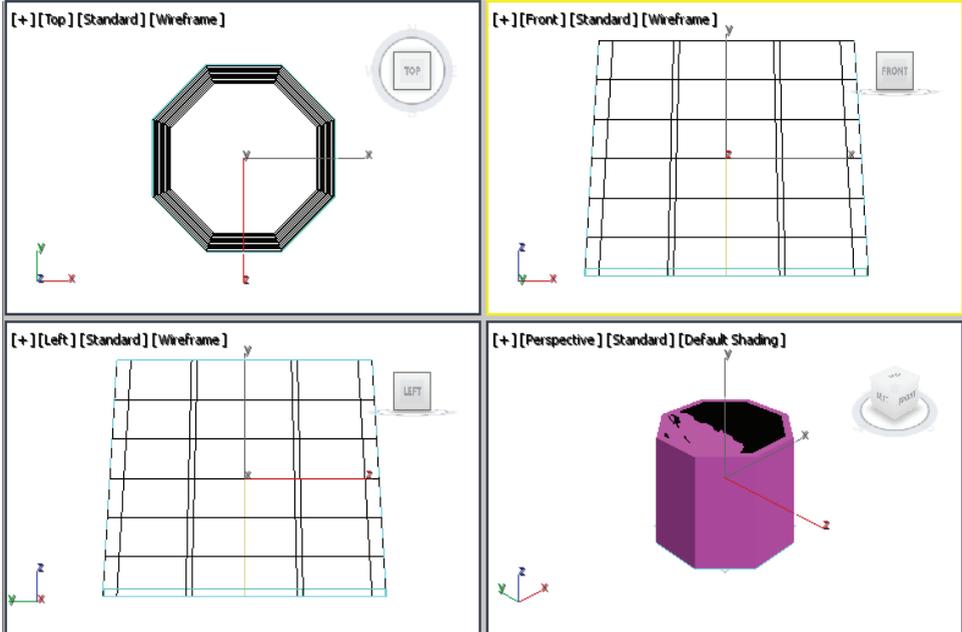


Figure P1-8 Loft001 displayed after performing the Boolean operation

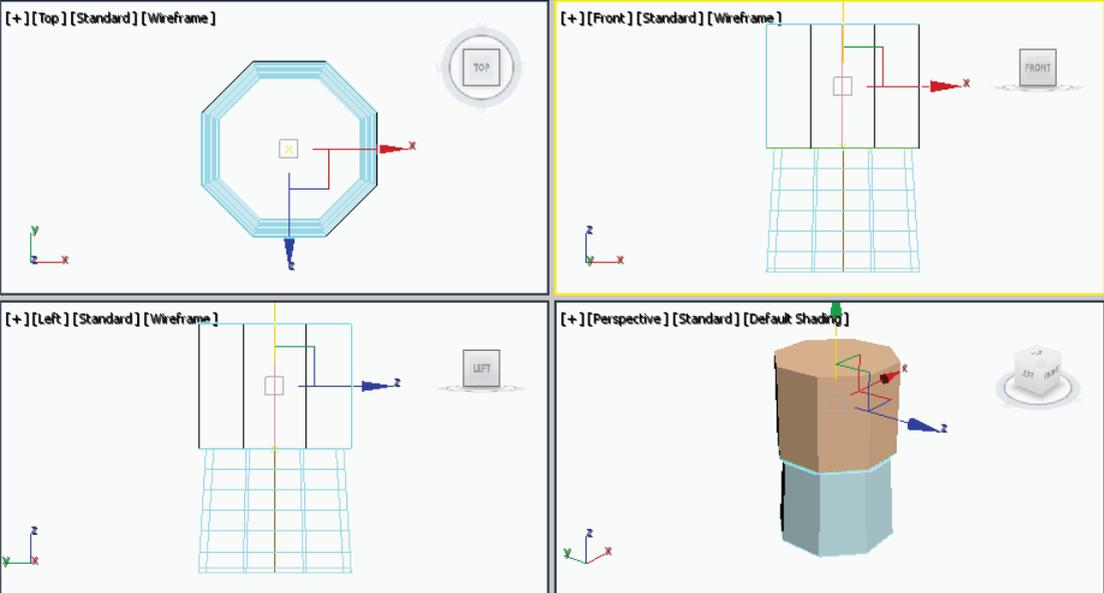


Figure P1-9 NGon003 lofted along the line

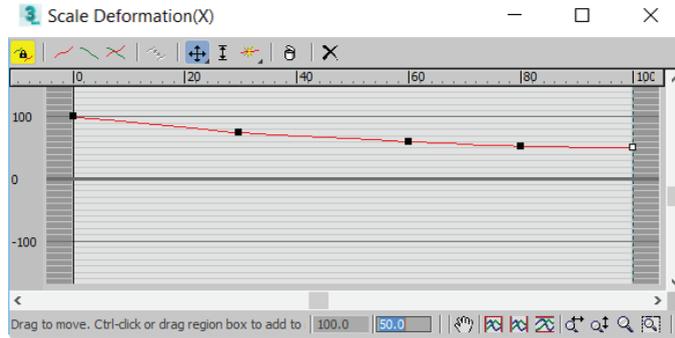


Figure P1-10 Inserting and moving the control points in the Scale Deformation(X) dialog box

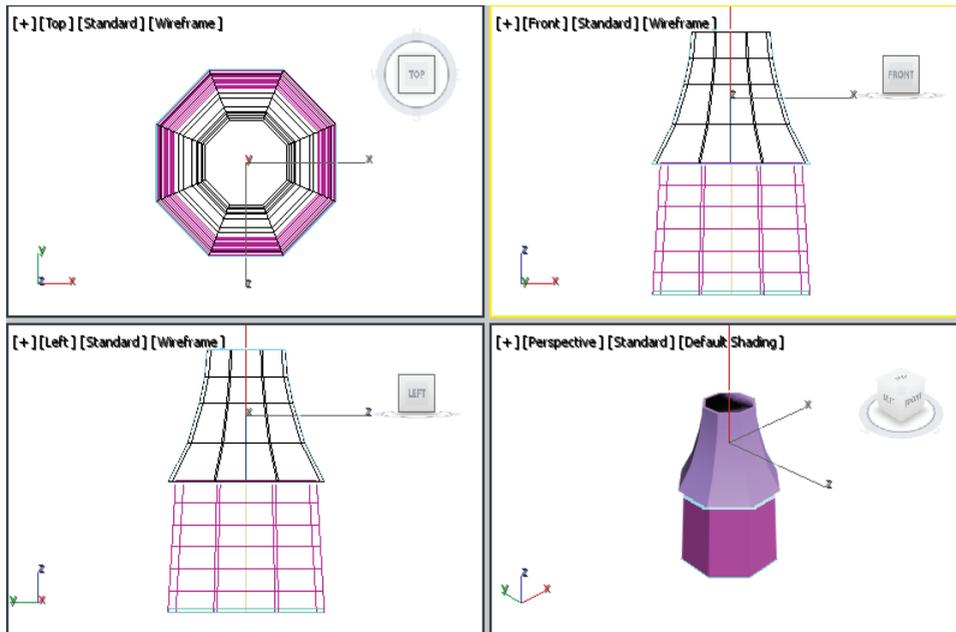


Figure P1-11 Walls created for the middle structure of the windmill

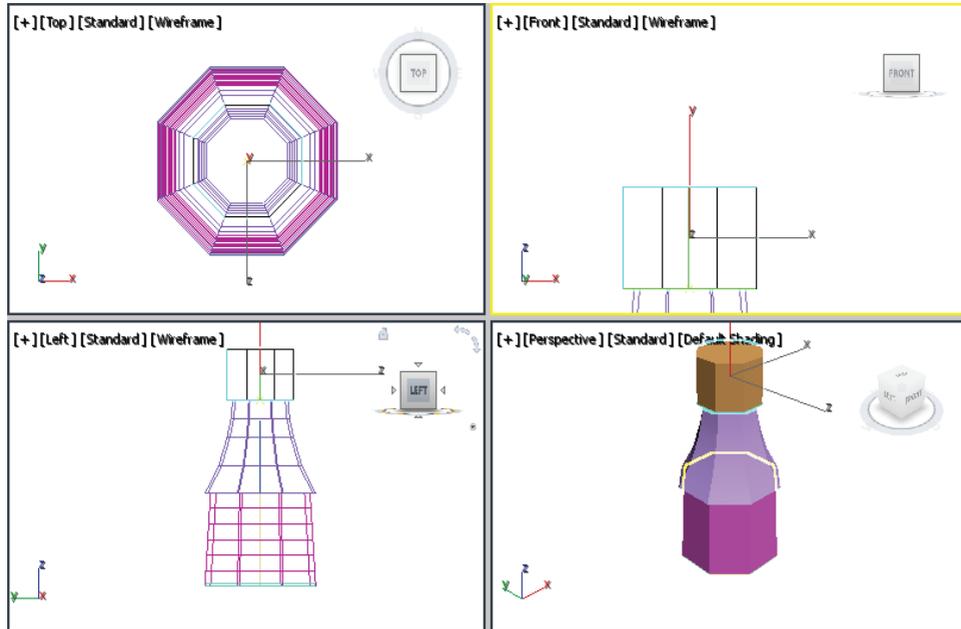


Figure P1-12 NGon002 lofted along the line

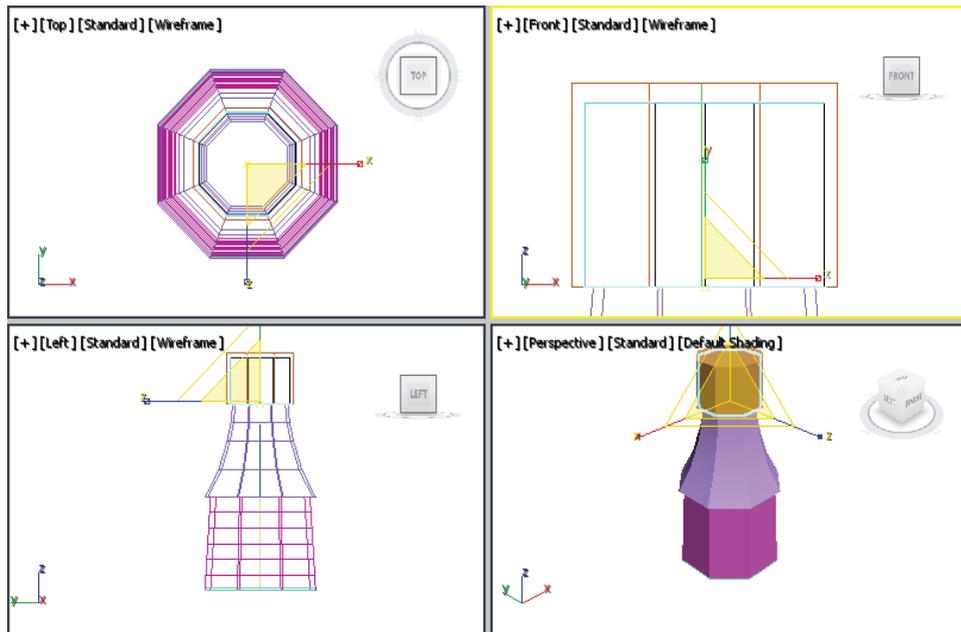


Figure P1-13 Top\_drill scaled uniformly

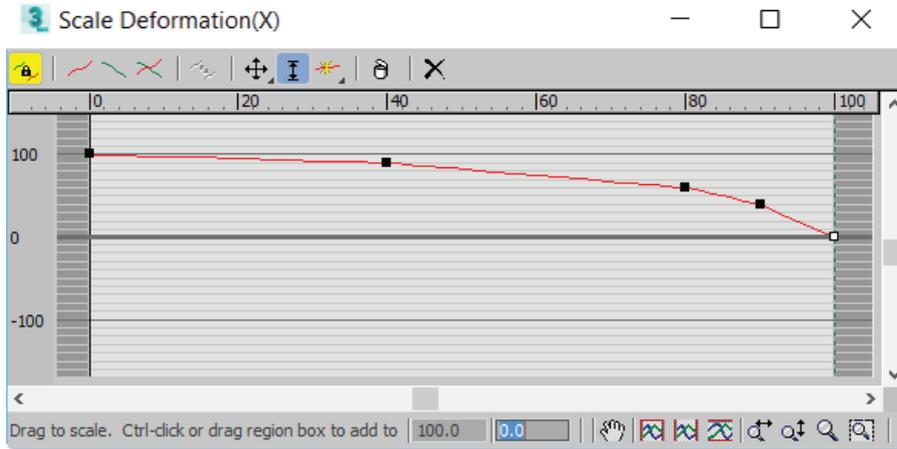


Figure P1-14 Top\_drill modified using the Scale Deformation(X) dialog box

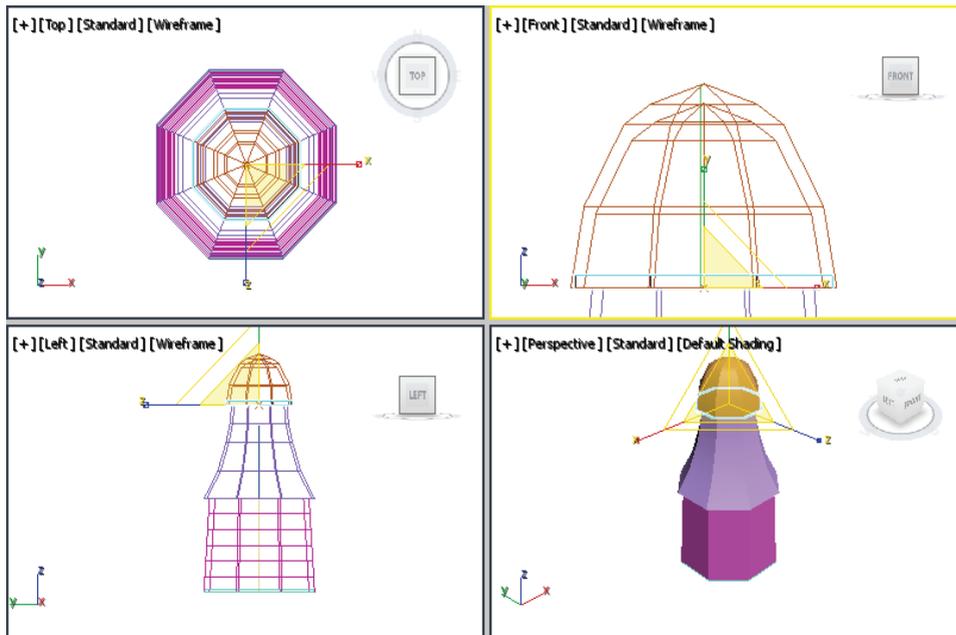


Figure P1-15 Floor\_top extruded

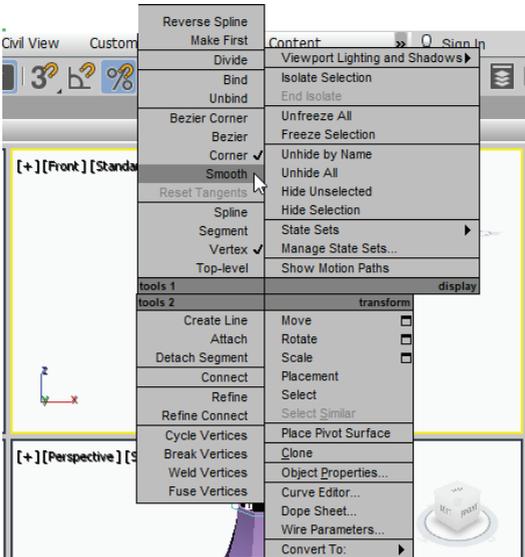


Figure P1-16 The quad menu displayed

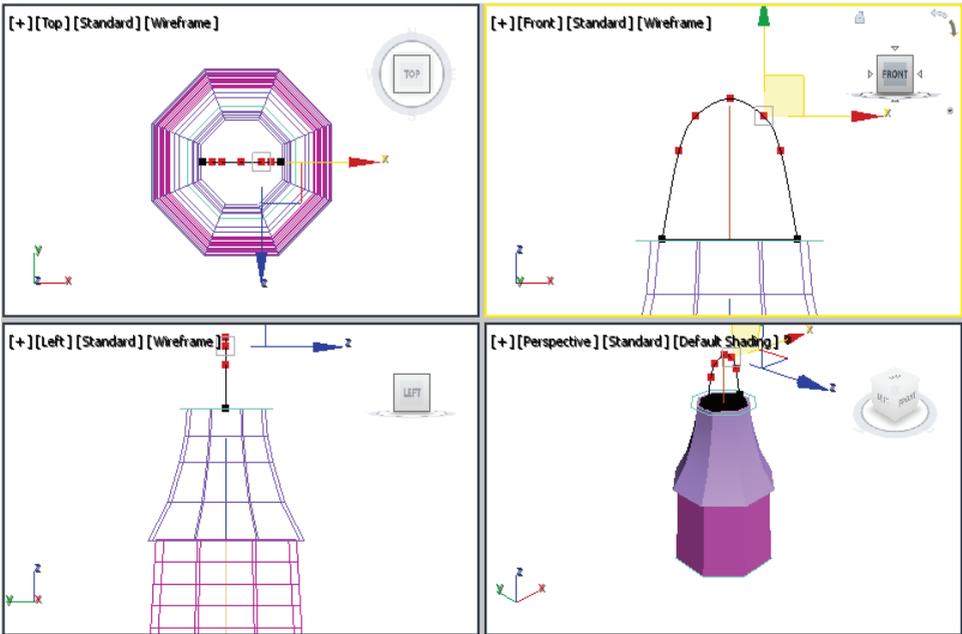


Figure P1-17 Ext01 line smoothed

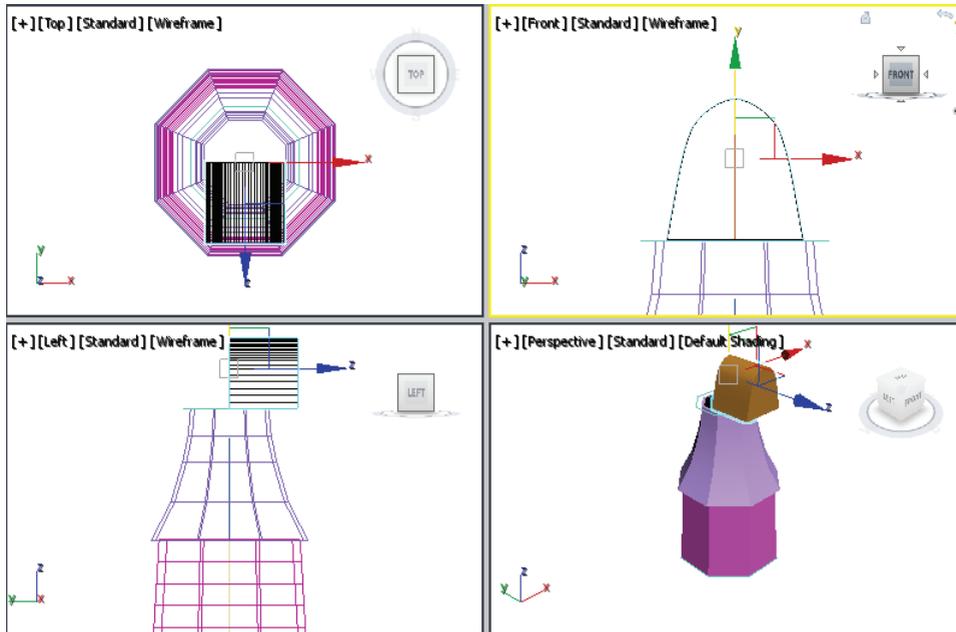


Figure P1-18 Ext01 line extruded

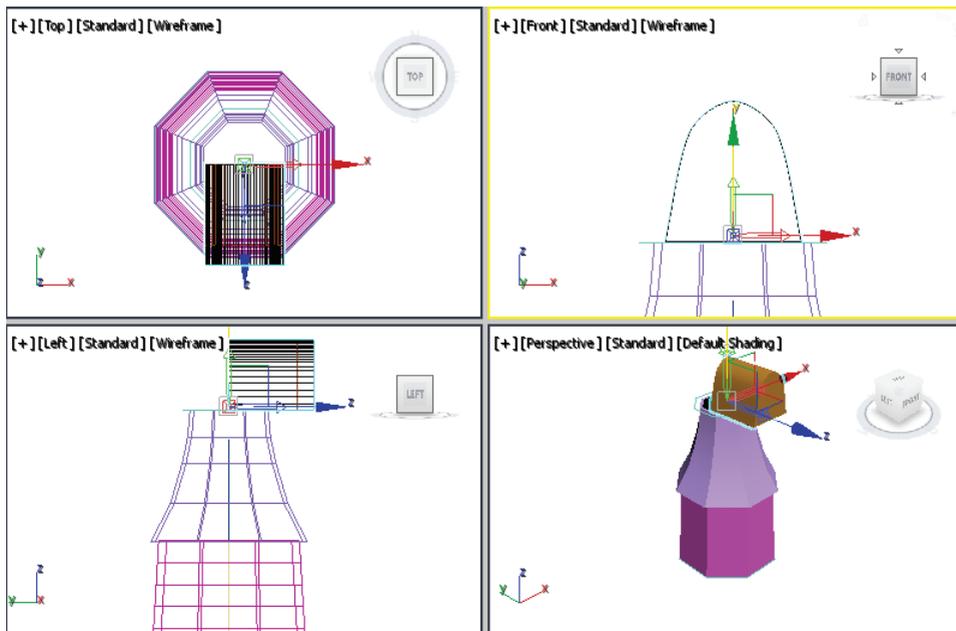


Figure P1-19 The pivot point aligned at the bottom of Drill02

[+][Perspective][Standard][Default Shading]

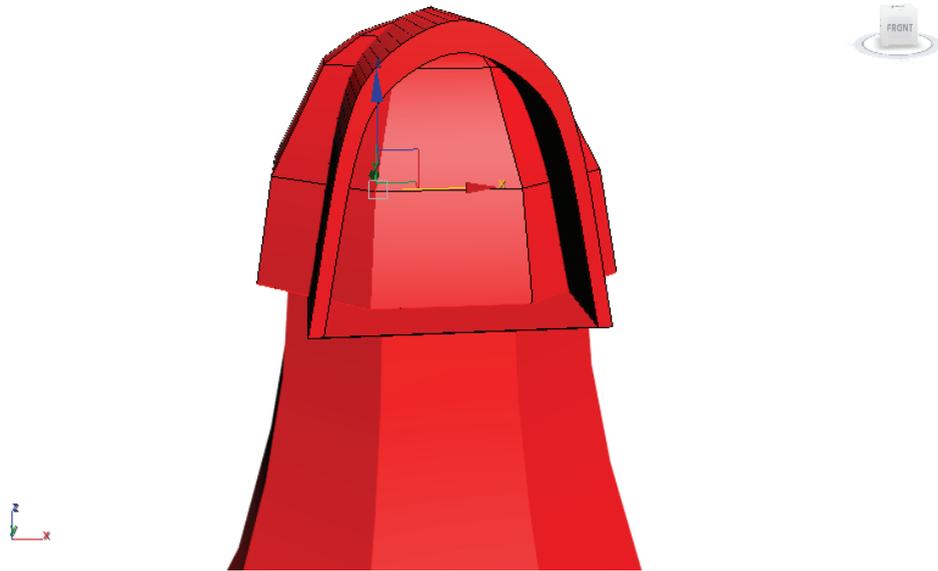


Figure P1-20 Moving edges of Base\_top

[+][Perspective][Standard][Default Shading]

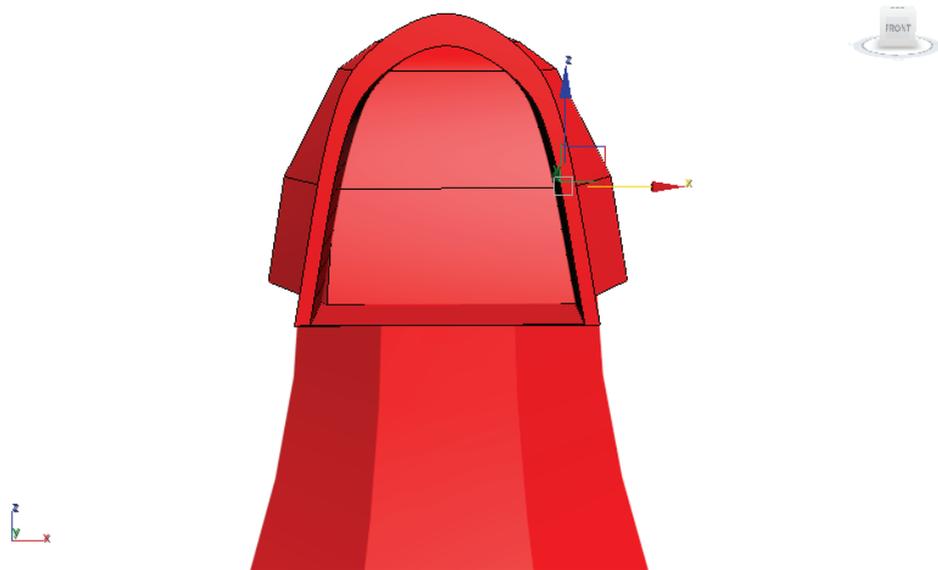


Figure P1-21 Selecting the inner polygons of Base\_top

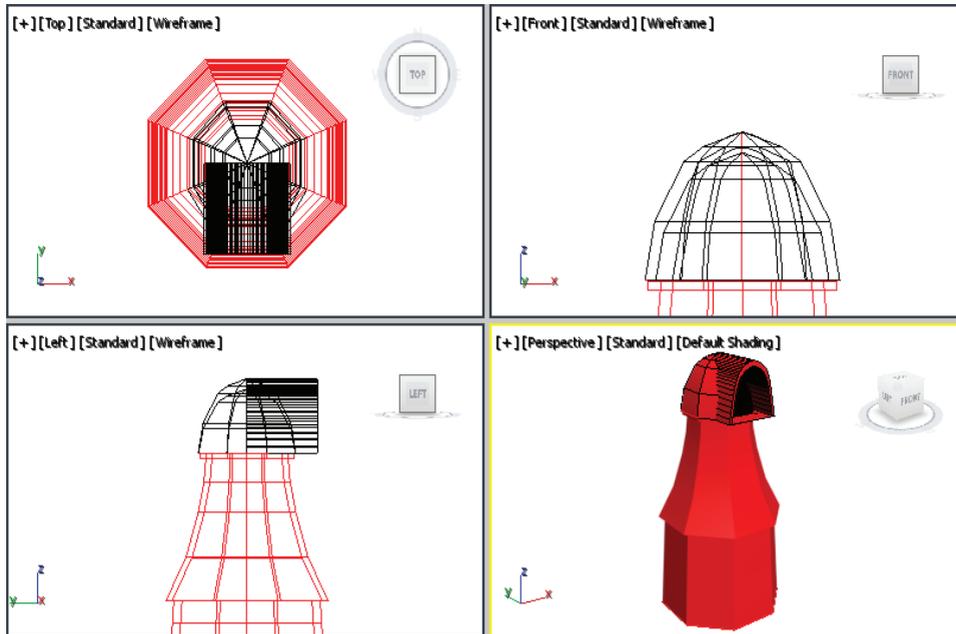


Figure P1-22 Deleting the inner polygons of the Base\_top

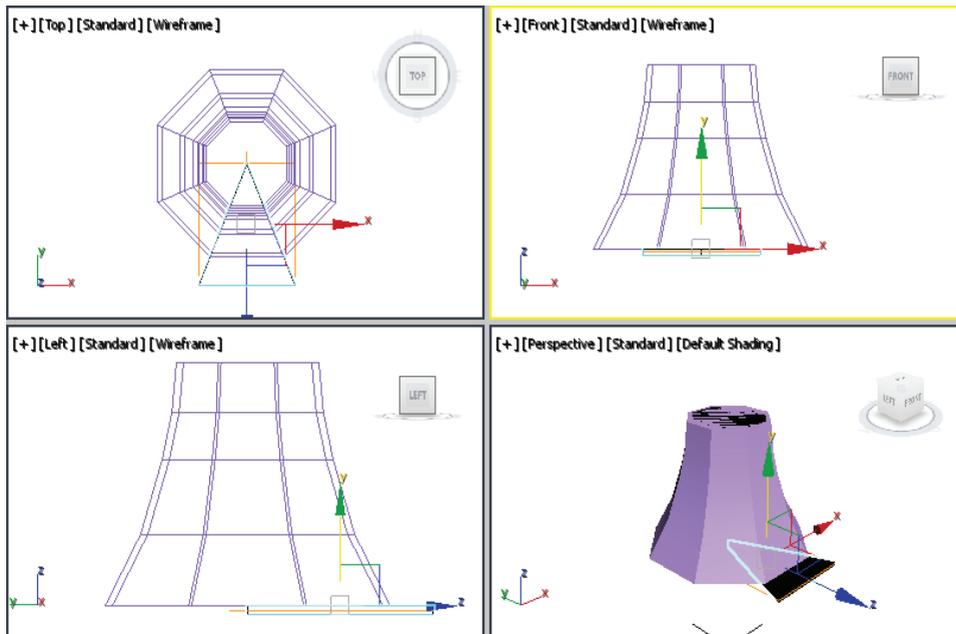


Figure P1-23 Deck01 extruded in all viewports

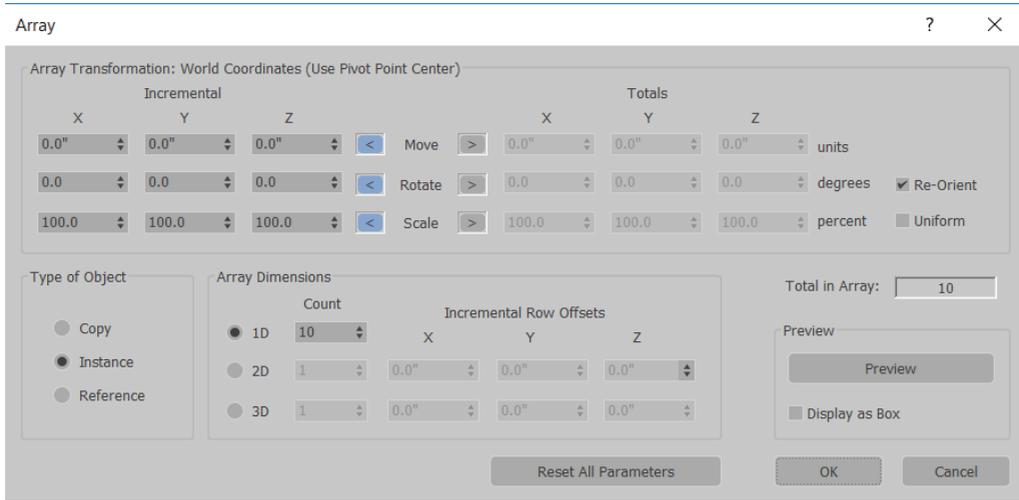


Figure P1-24 The Array dialog box

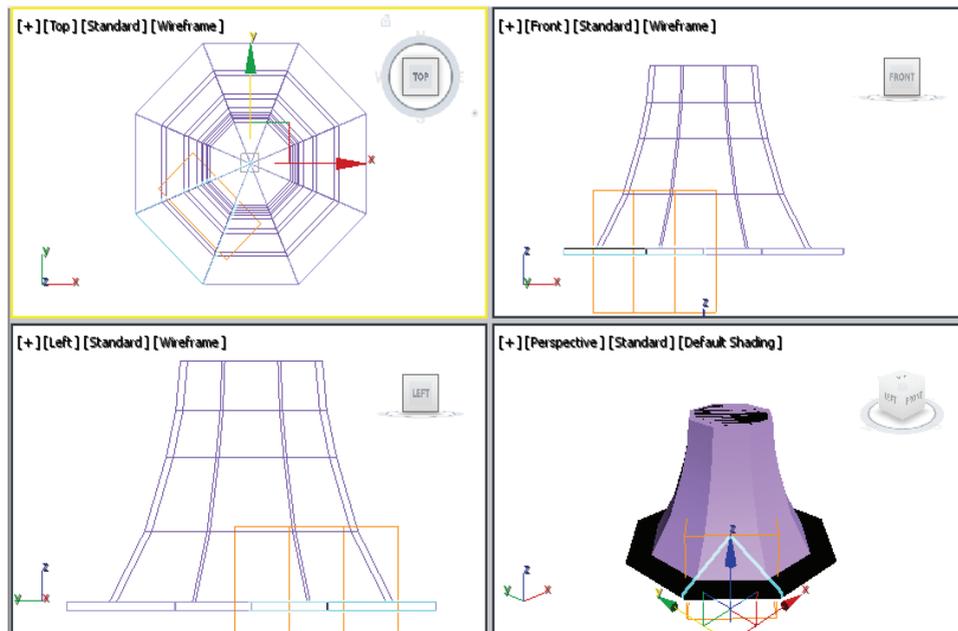


Figure P1-25 The array created

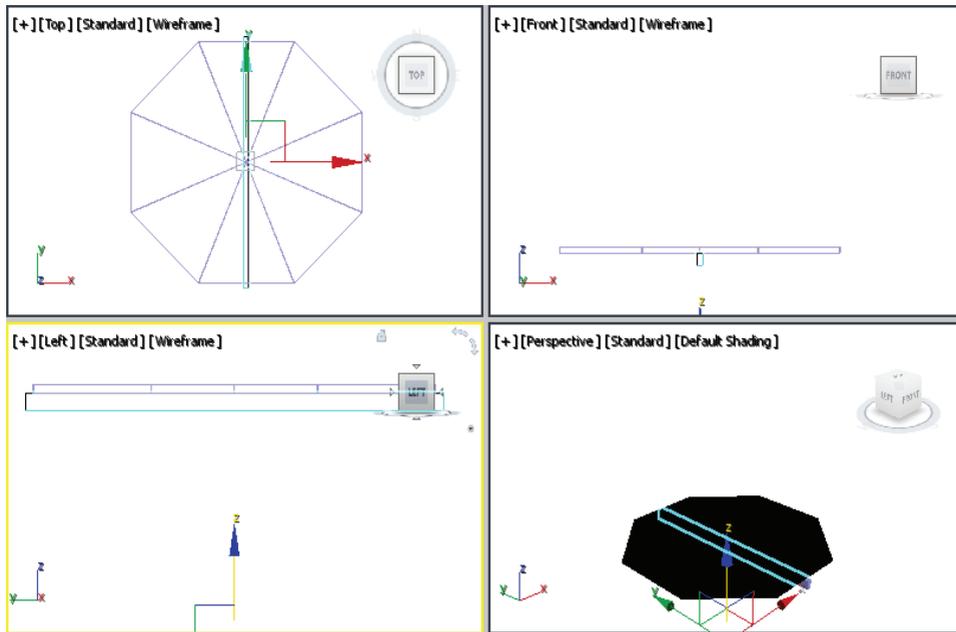


Figure P1-26 DeckBeam01 created and aligned

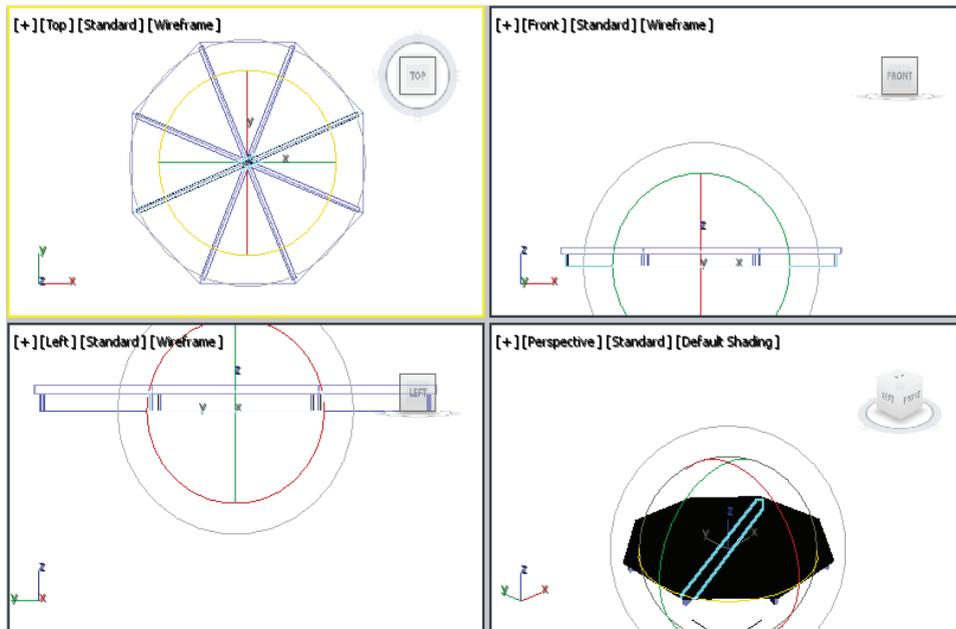


Figure P1-27 The copies of DeckBeam01 created

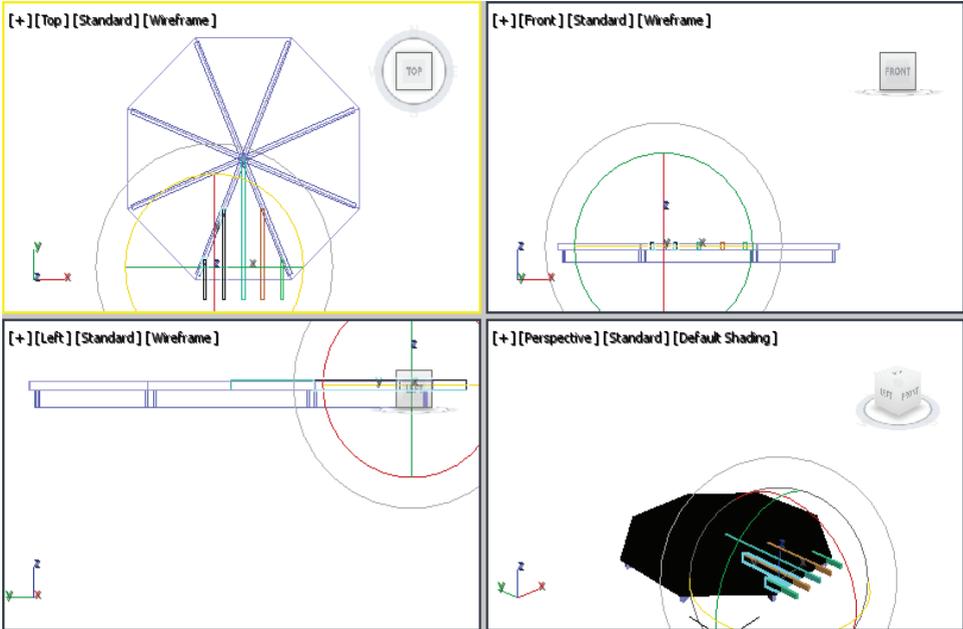


Figure P1-28 Two more deck boards created

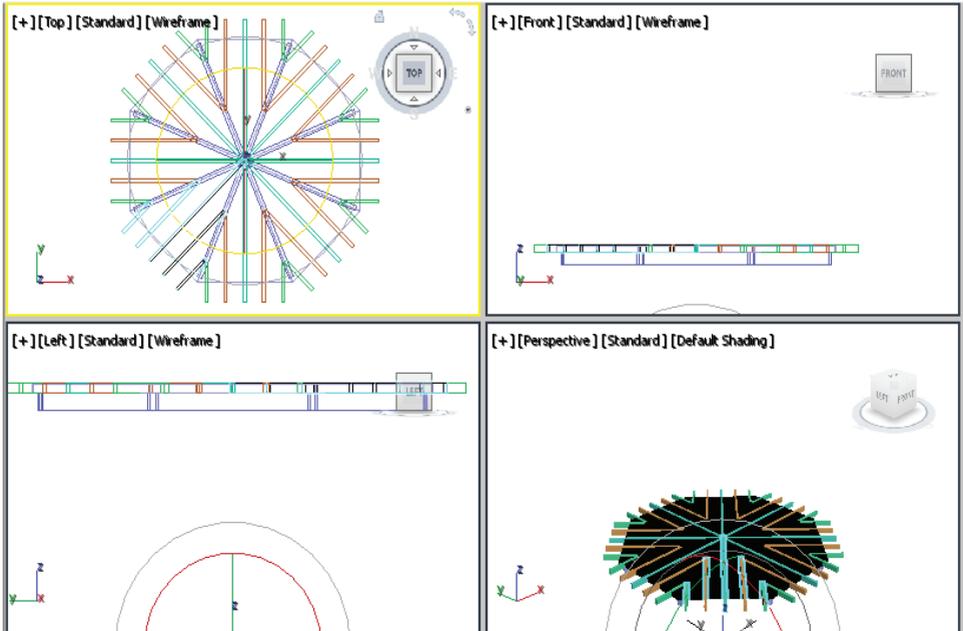


Figure P1-29 The array of deck support boards created using the Array tool

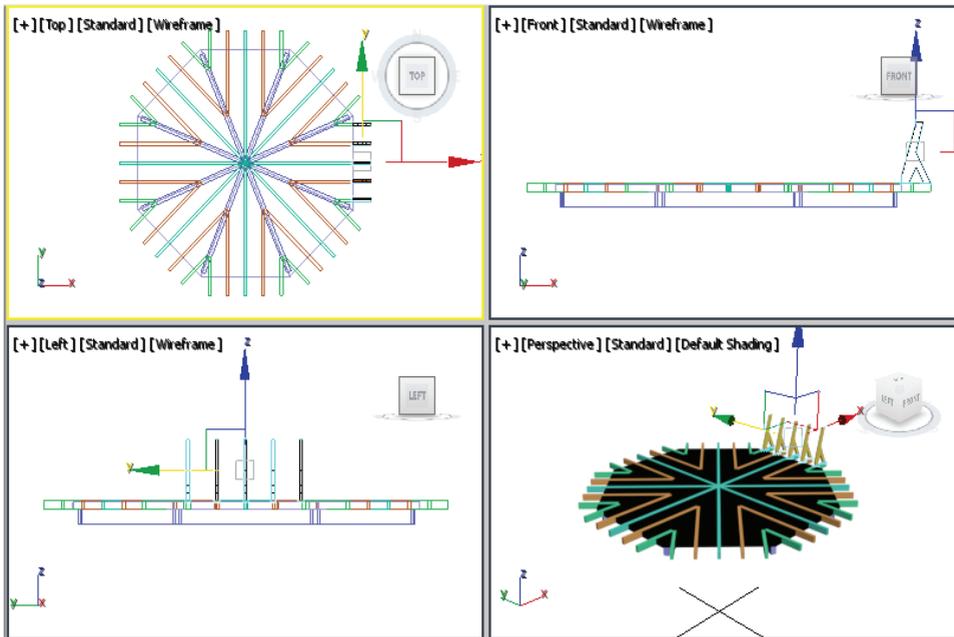


Figure P1-30 DeckRail\_Group01 created in all viewports

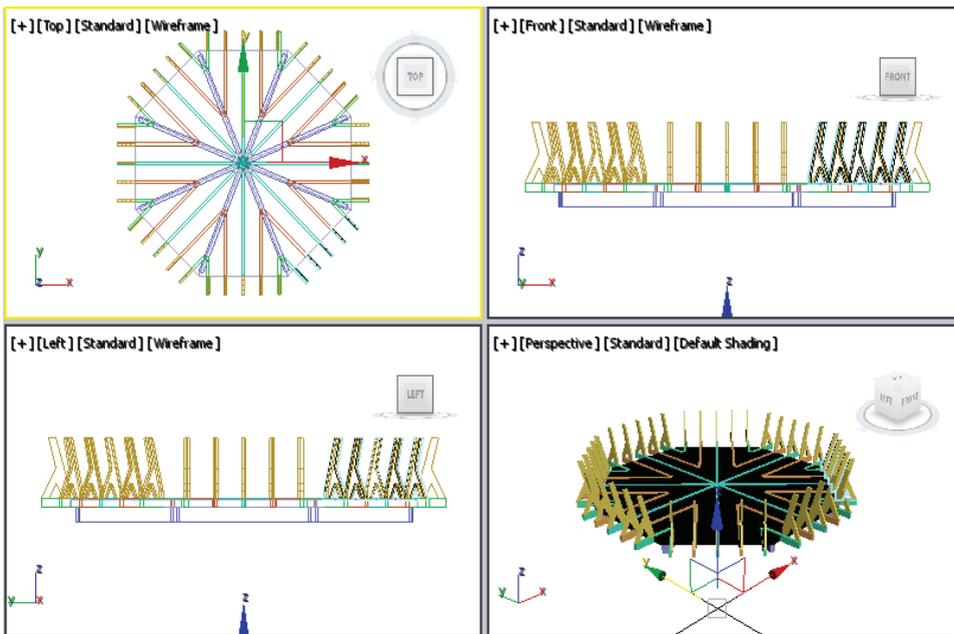


Figure P1-31 The set of DeckRail\_Group objects created

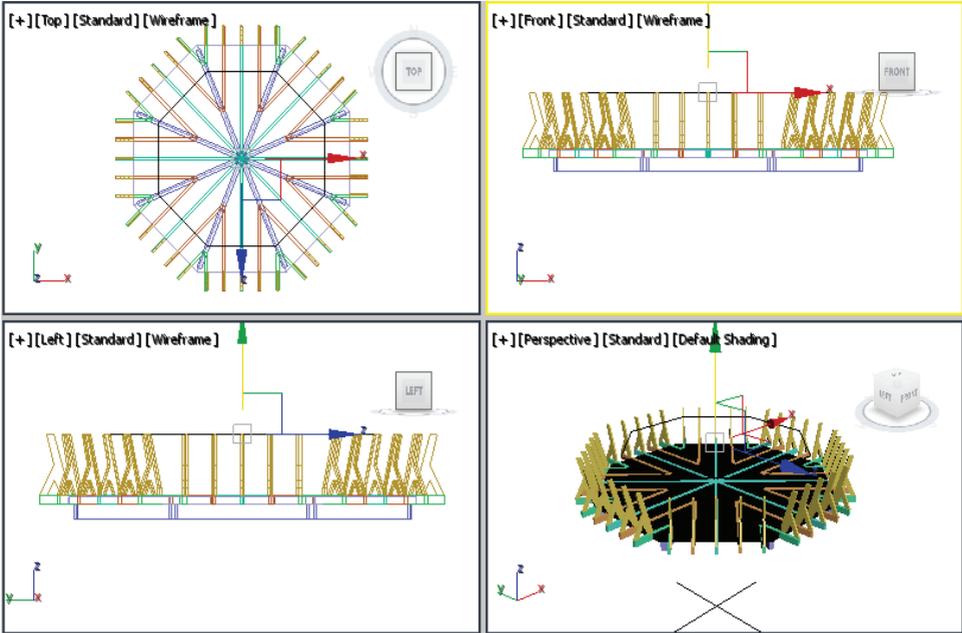


Figure P1-32 NGon004 created and positioned

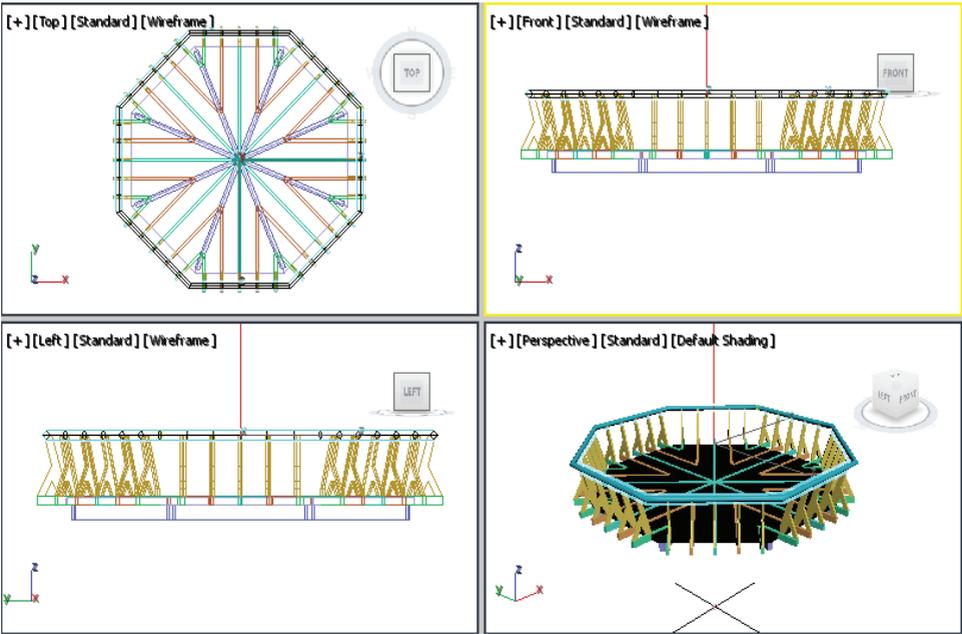
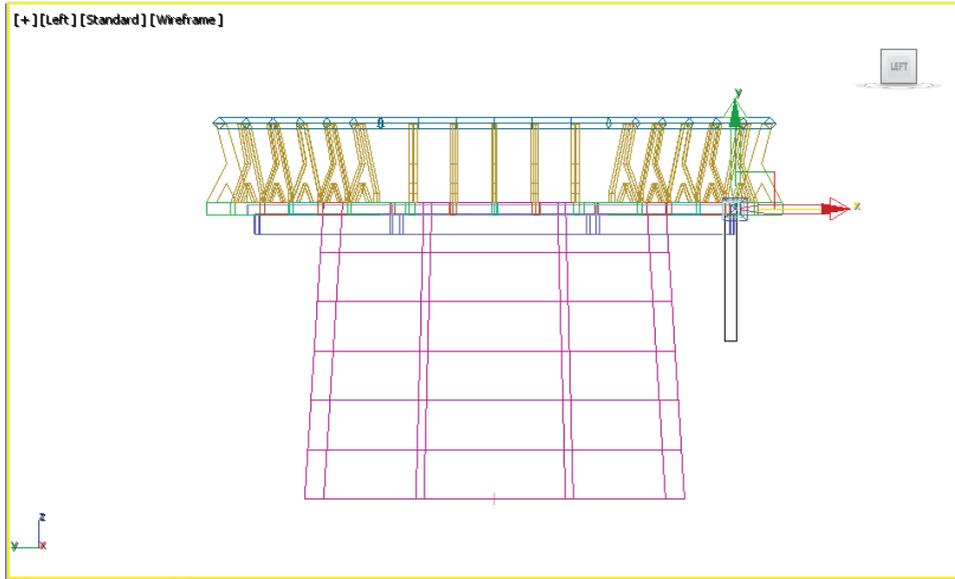
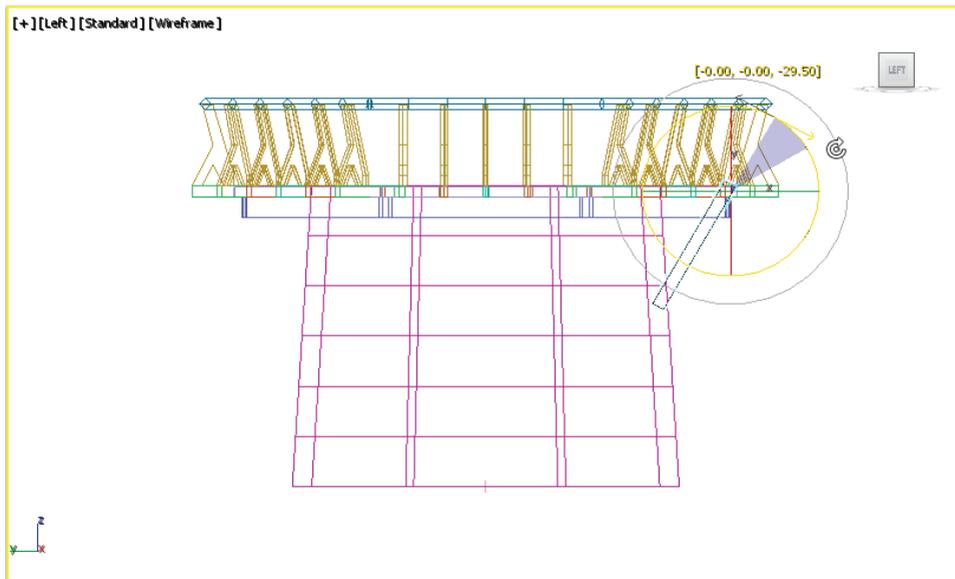


Figure P1-33 Handrail created in viewports



*Figure P1-34* The pivot point of DeckBrace01 moved to the top right corner



*Figure P1-35* DeckBrace01 rotated in the Left viewport

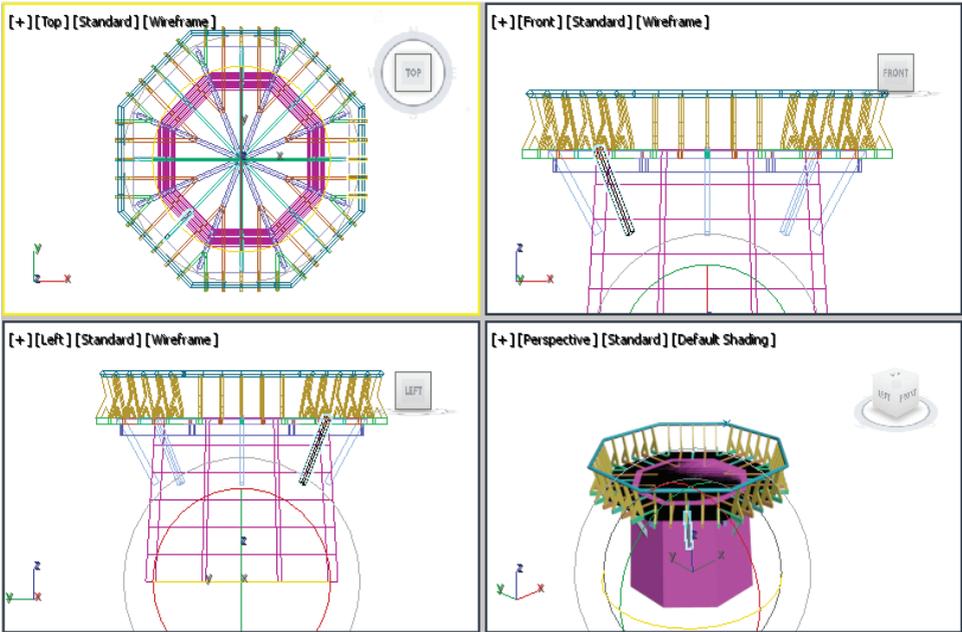


Figure P1-36 The clones of DeckBrace01 created

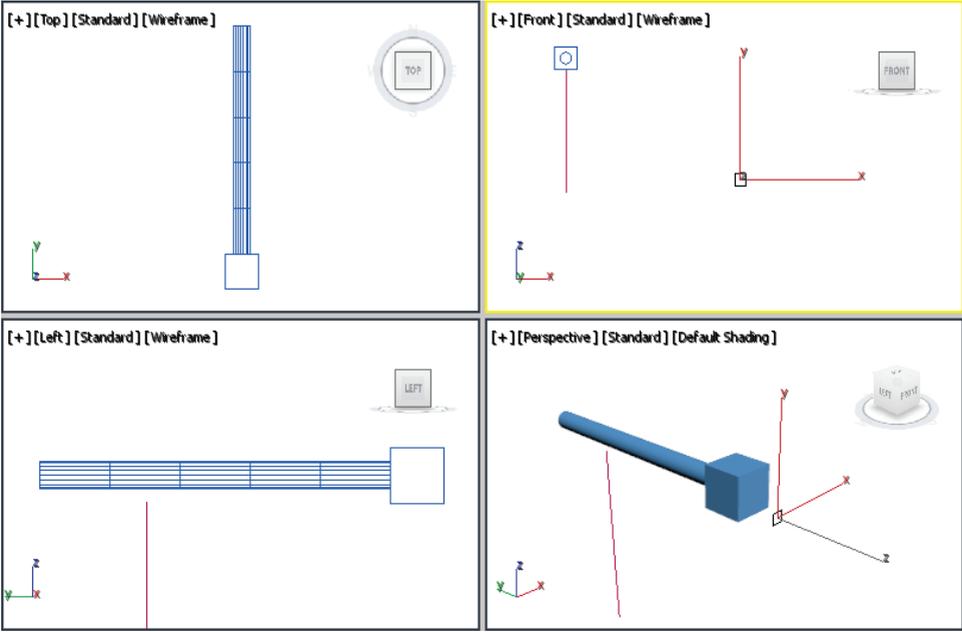


Figure P1-37 A line and a square created

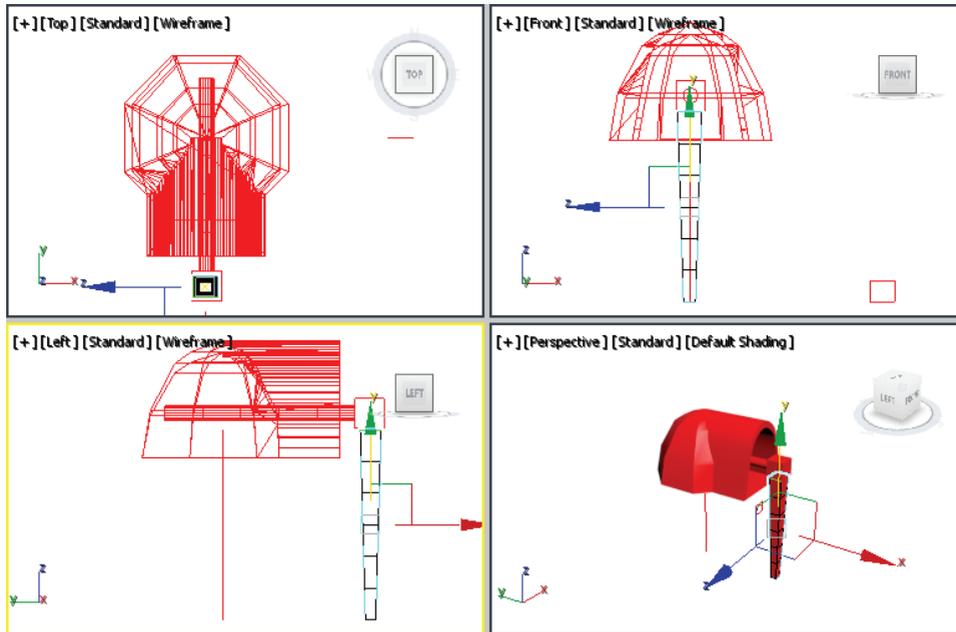


Figure P1-38 Hidden objects displayed in the viewports

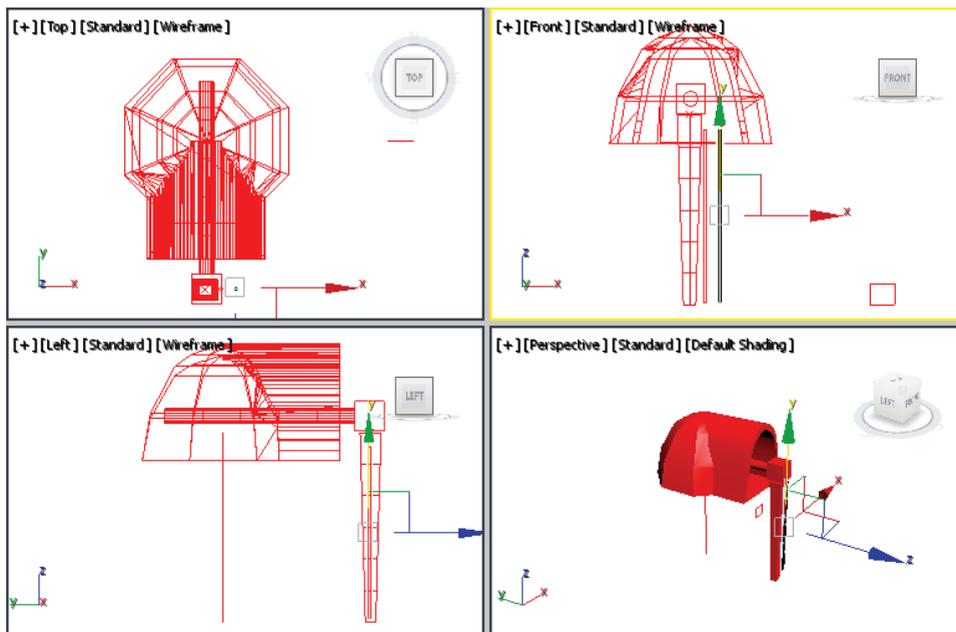


Figure P1-39 Rib01 and Rib02 created in viewports

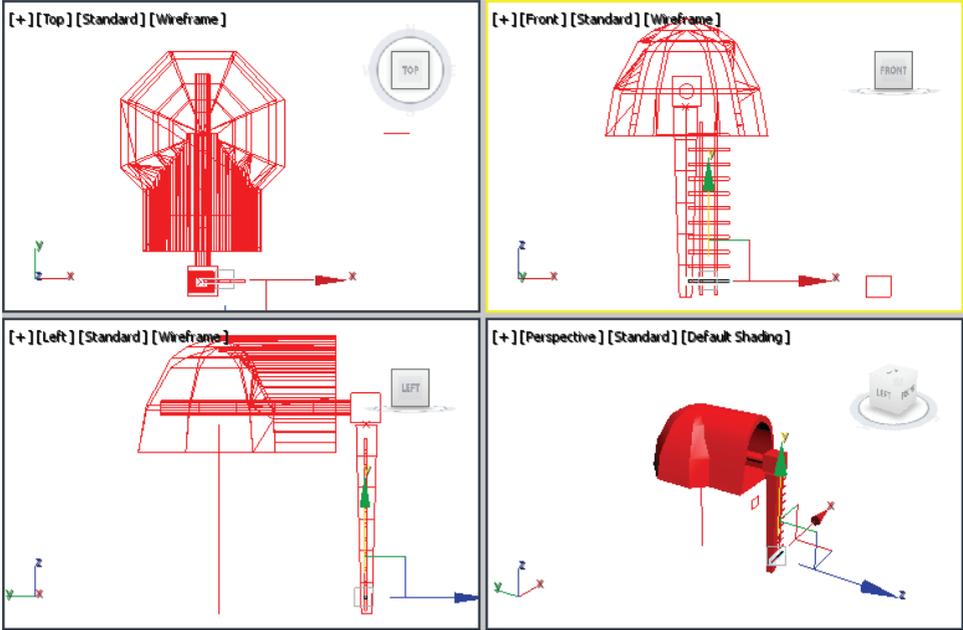


Figure P1-40 The array of horizontal ribs created

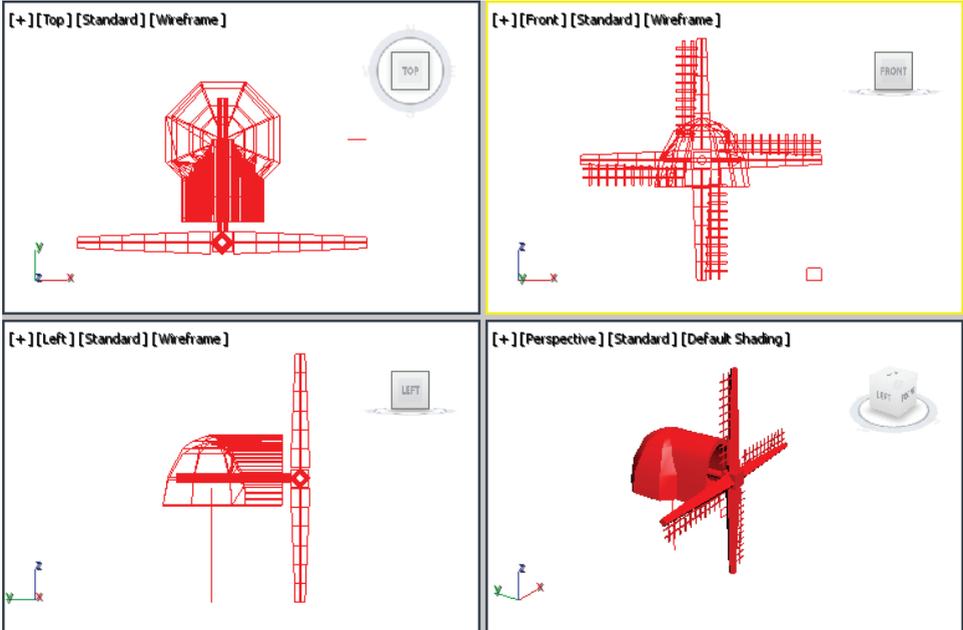


Figure P1-41 The blades of the windmill created

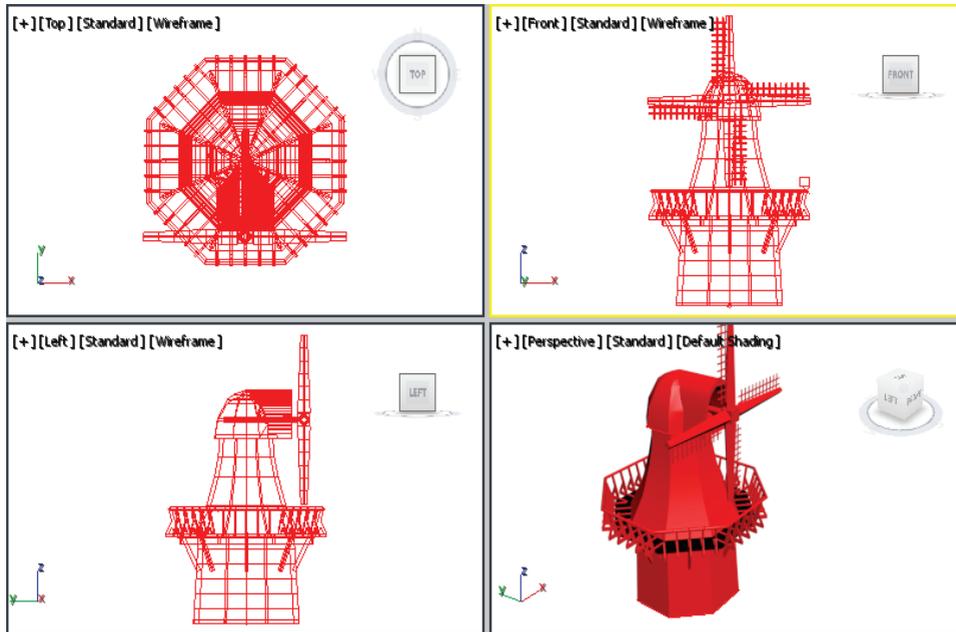


Figure P1-42 All objects of the windmill displayed

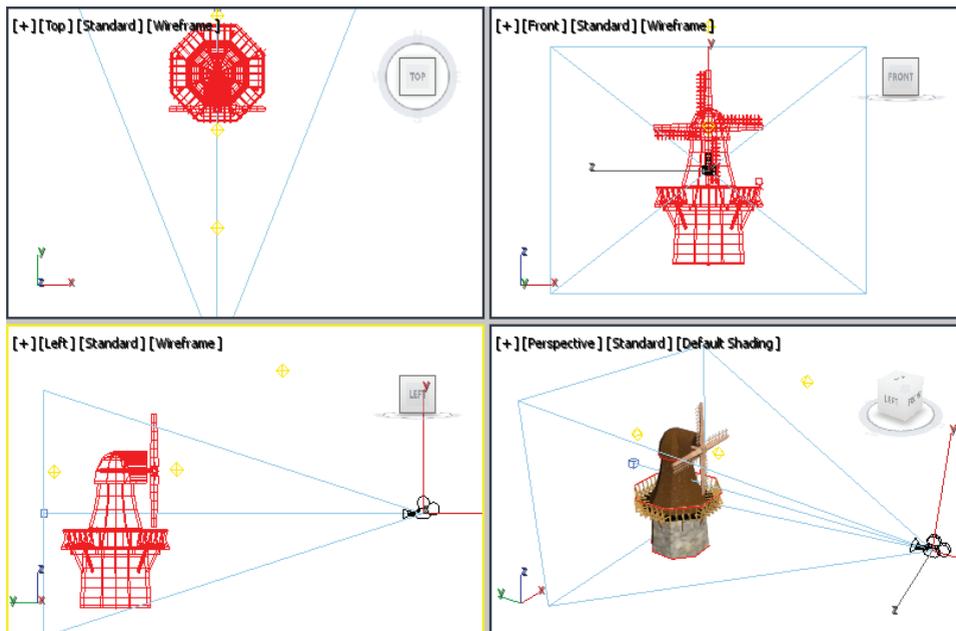
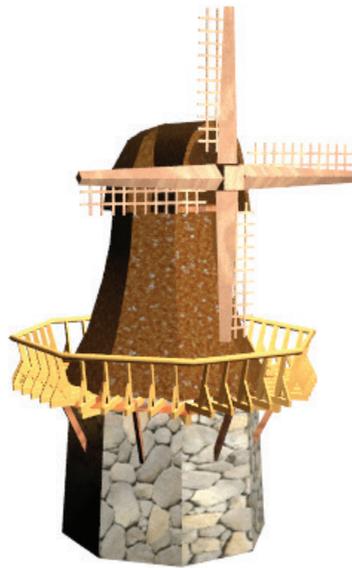
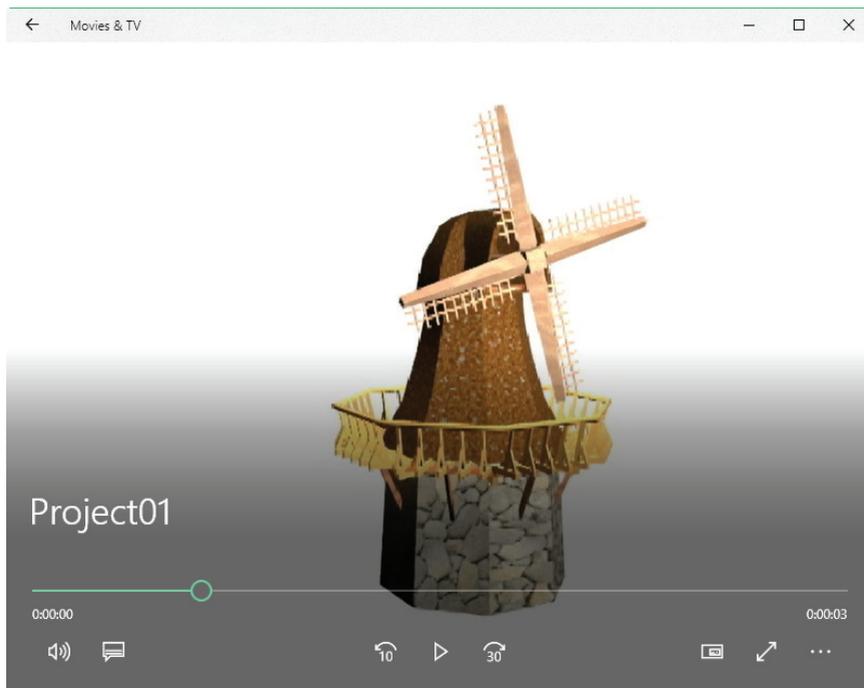


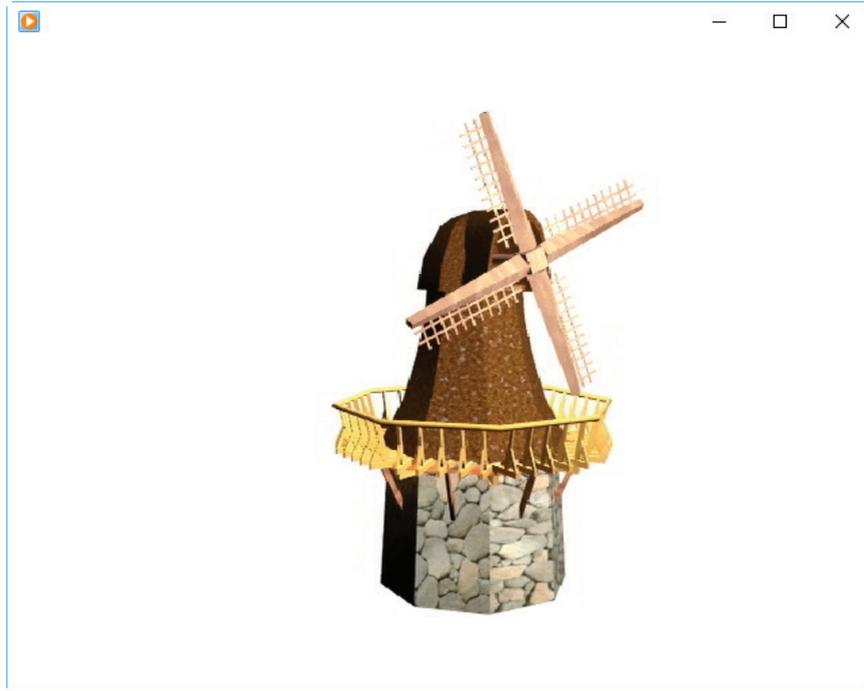
Figure P1-43 Lights and Camera created and positioned in the scene



*Figure P1-44* The scene displayed after rendering at frame 1



*Figure P1-45* The animation played in Movies & TV Player



*Figure P1-46 The animation played in Windows Media Player*

# **Project 2**

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## ***Creating a Diner***



*Figure P2-1 The scene of the diner*

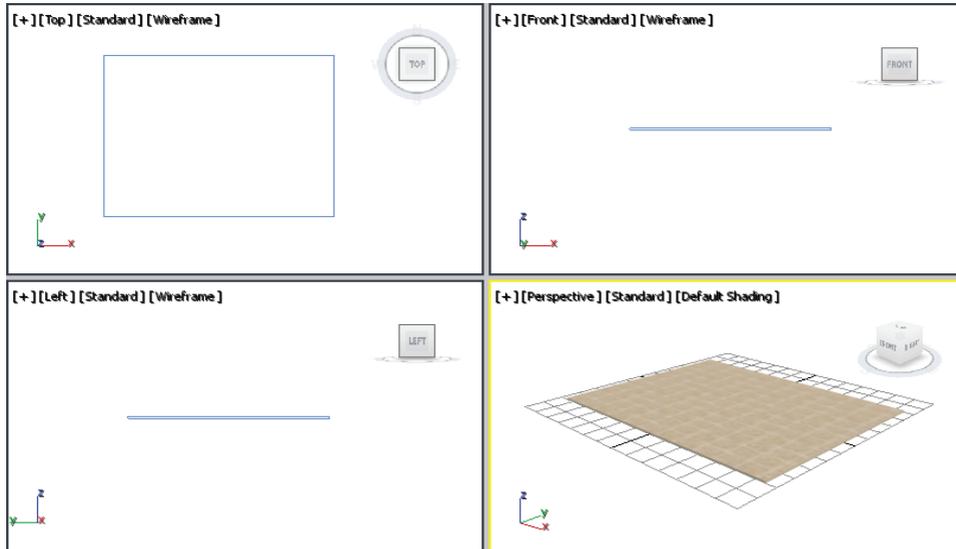


Figure P2-2 Floor created and a material assigned to it

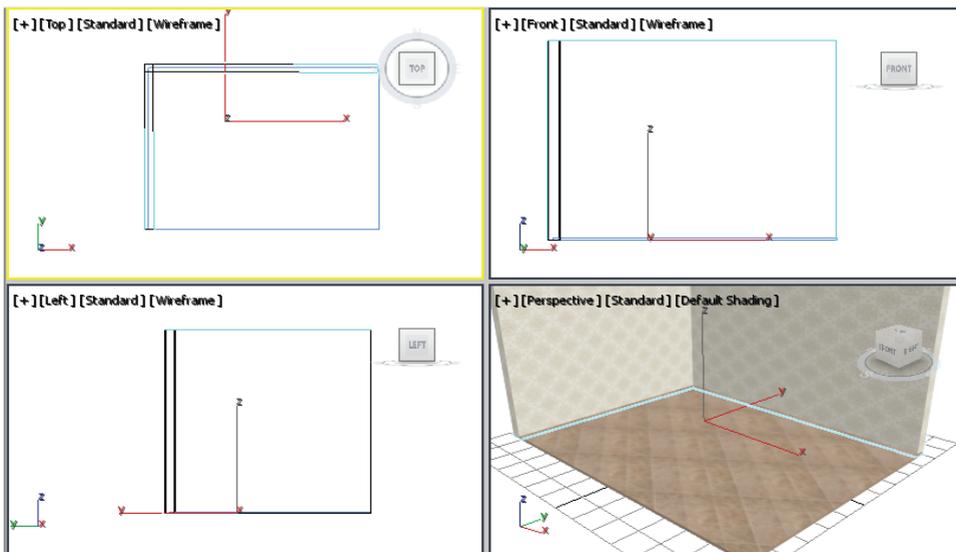


Figure P2-3 The wall01 in the viewports

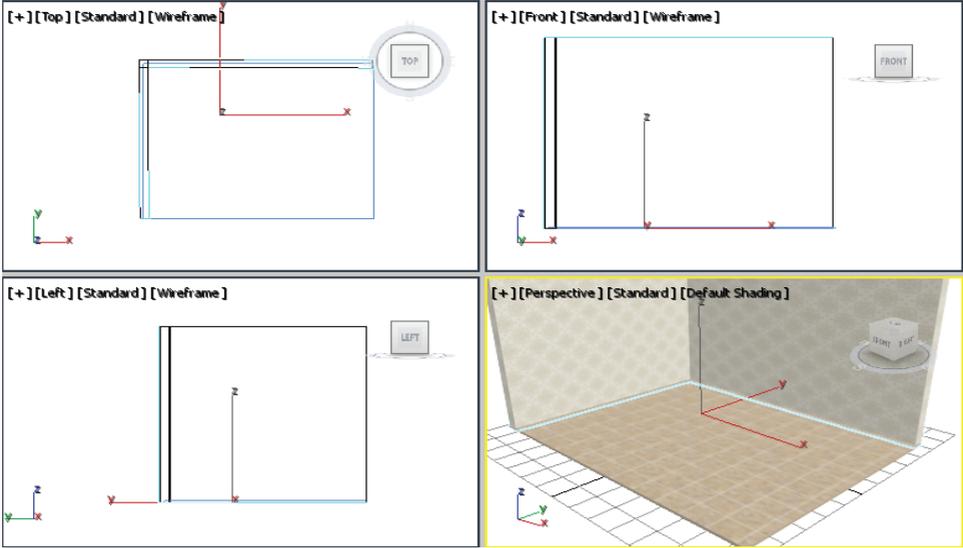


Figure P2-4 The material assigned to wall01 displayed in the viewport

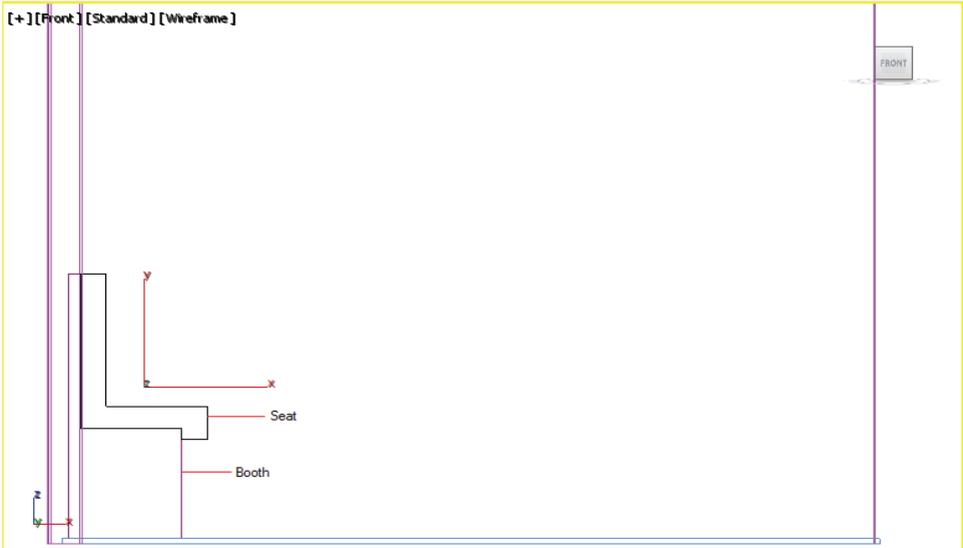


Figure P2-5 The profile of seat created

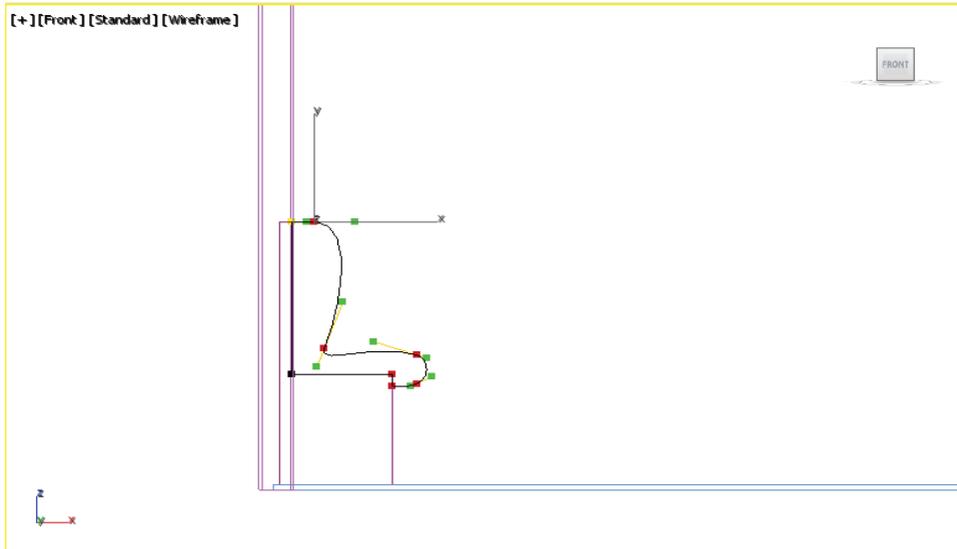


Figure P2-6 The vertices of Seat modified using the bezier handles

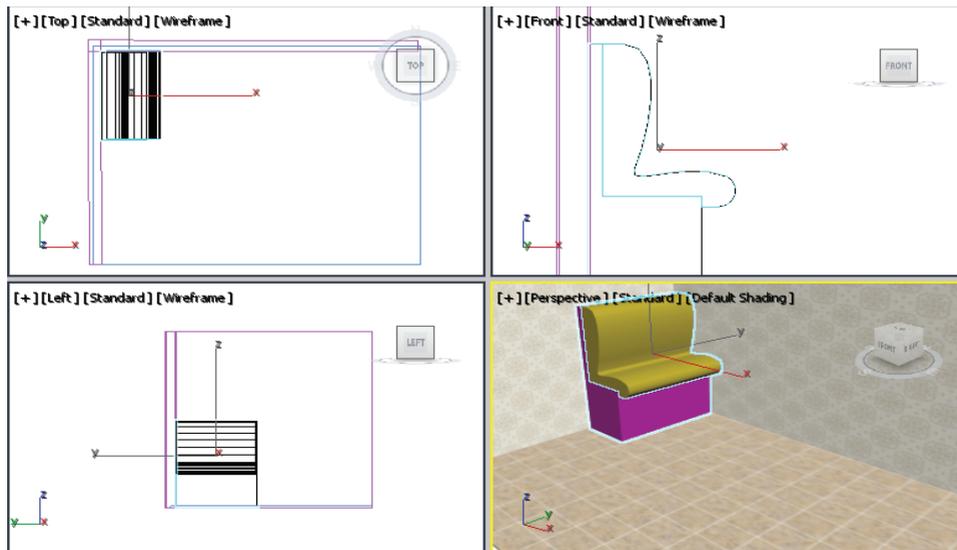


Figure P2-7 Booth and Seat created in the viewport

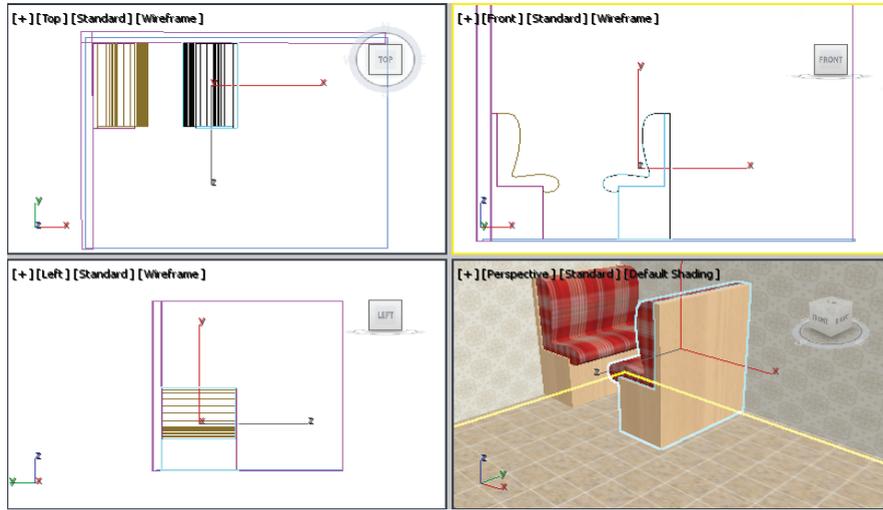


Figure P2-8 Mirror image created 40 units to the right of Booth01

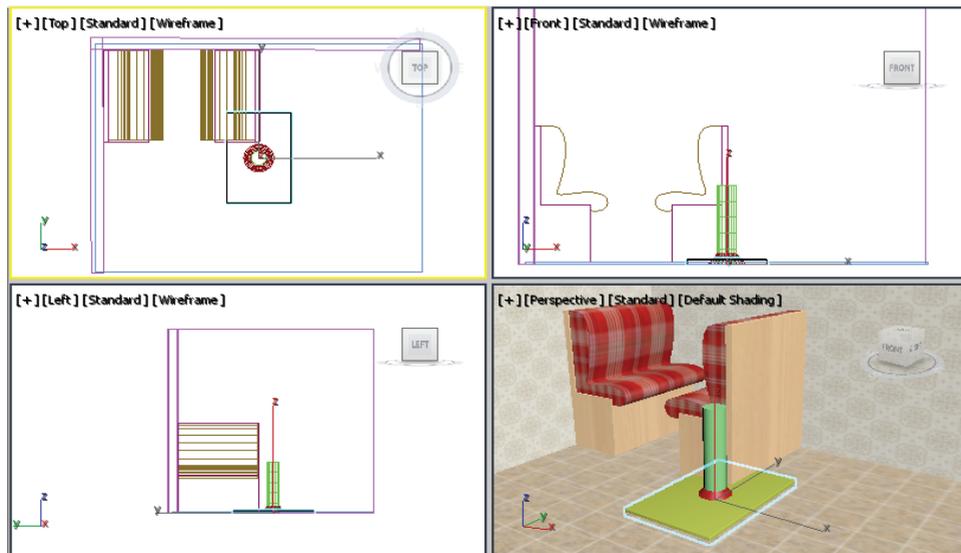


Figure P2-9 Top created

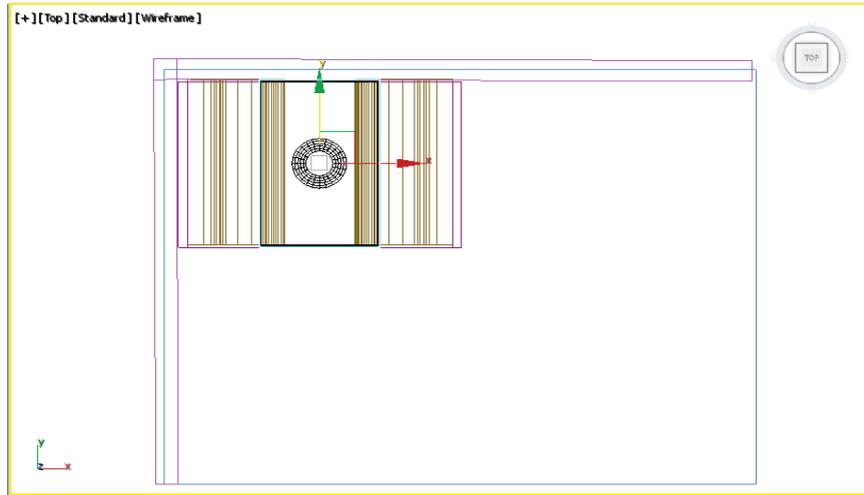


Figure P2-10 The table components aligned

1

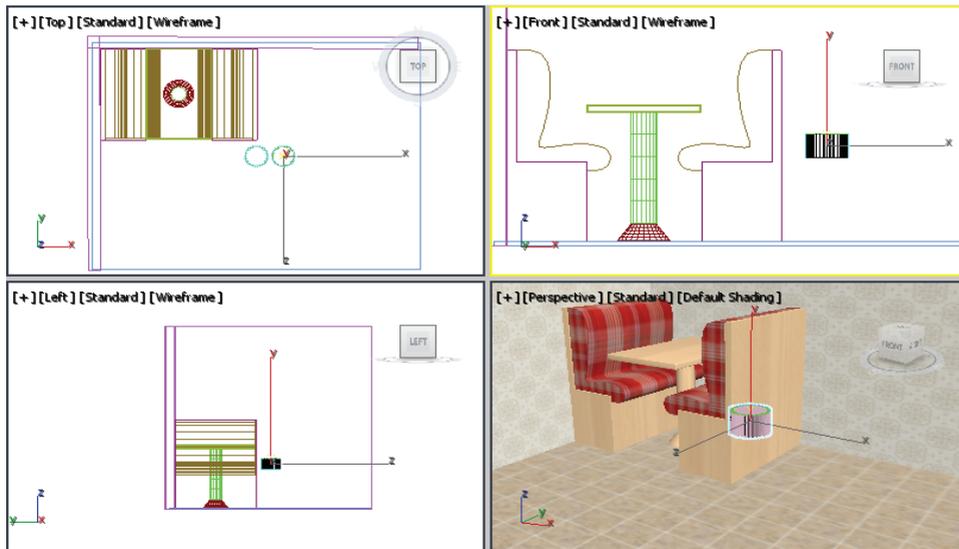


Figure P2-11 The lofted star shape

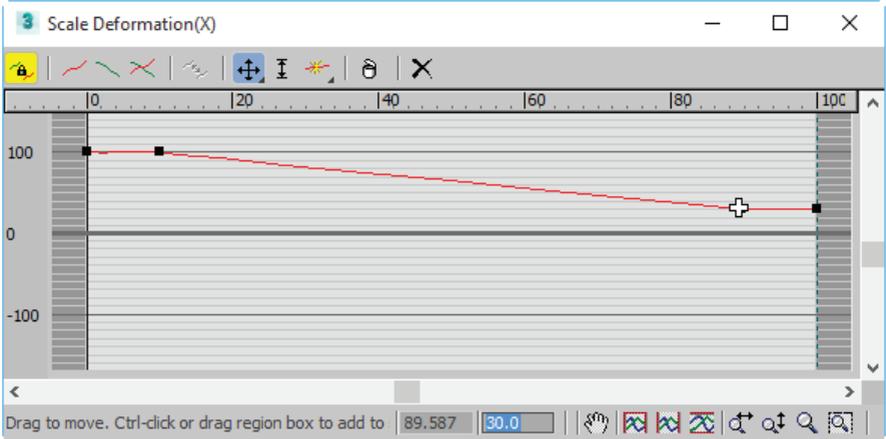


Figure P2-12 The vertices created and moved in the *Scale Deformation(X)* dialog box

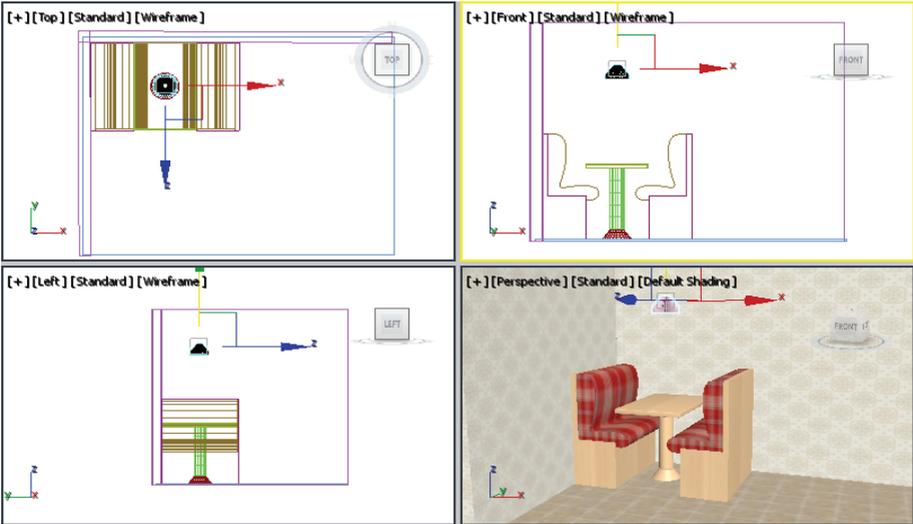


Figure P2-13 Shade moved into position

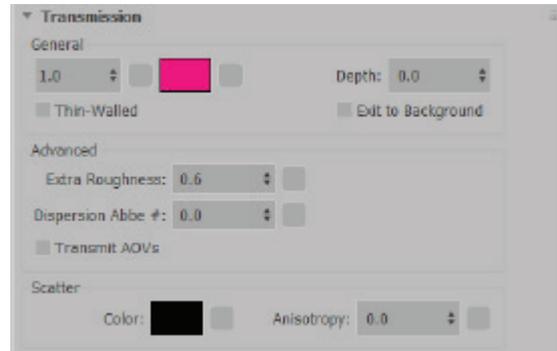


Figure P2-13 (a) Parameters set in the *Transmission* rollout

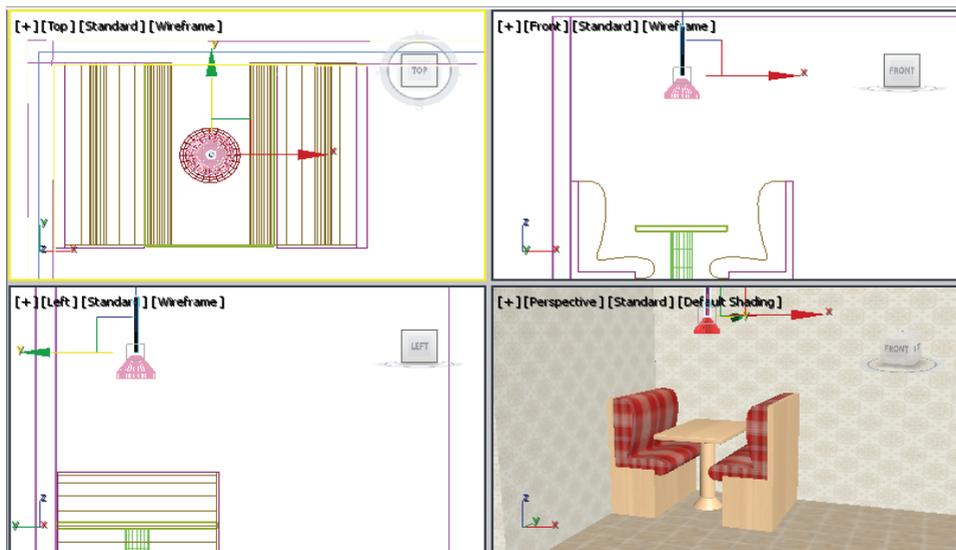


Figure P2-14 A suspension cylinder created

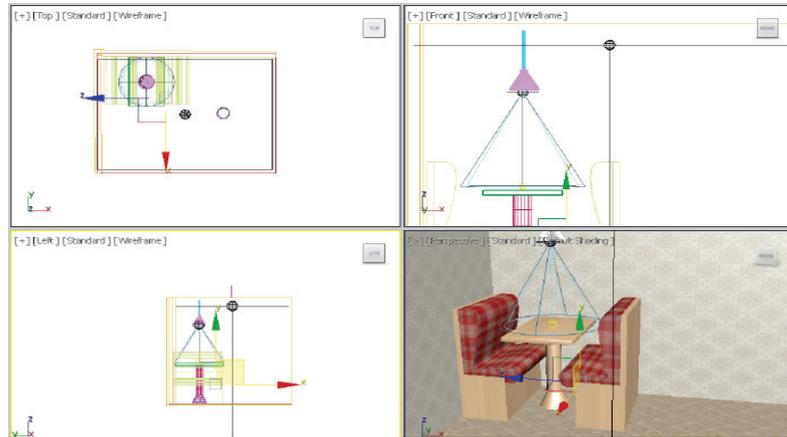


Figure P2-15 A light placed inside the lamp shade

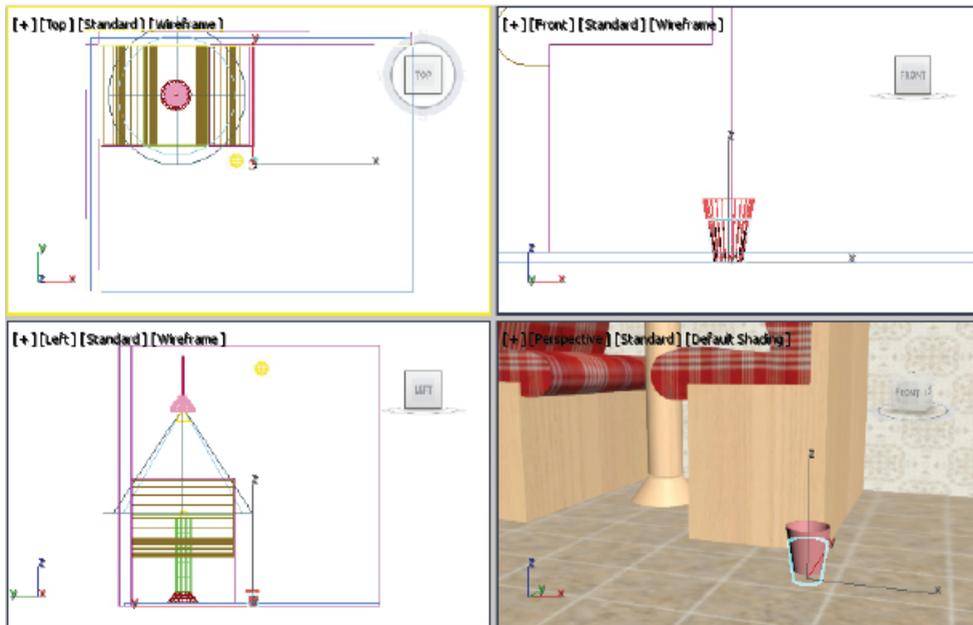


Figure P2-16 A glass with water created

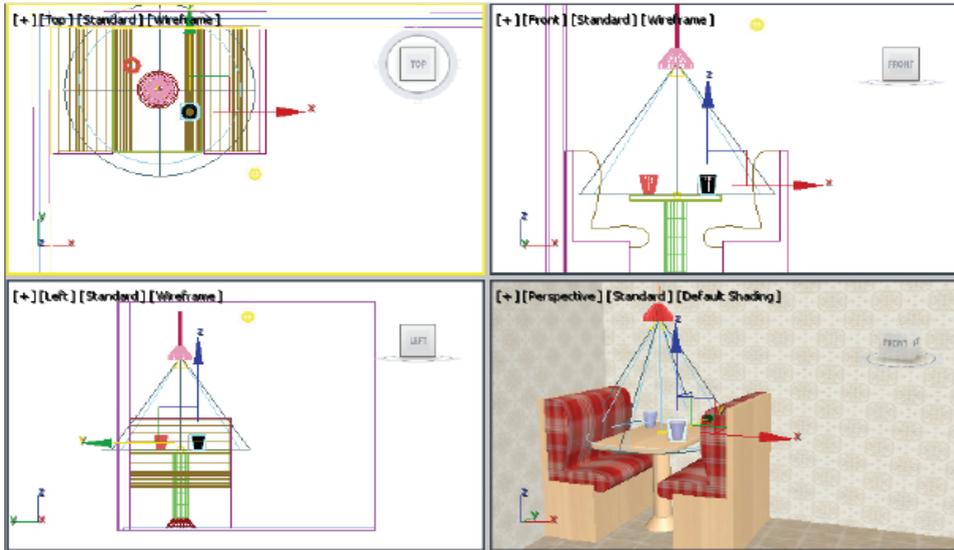


Figure P2-17 Drink02 created and positioned

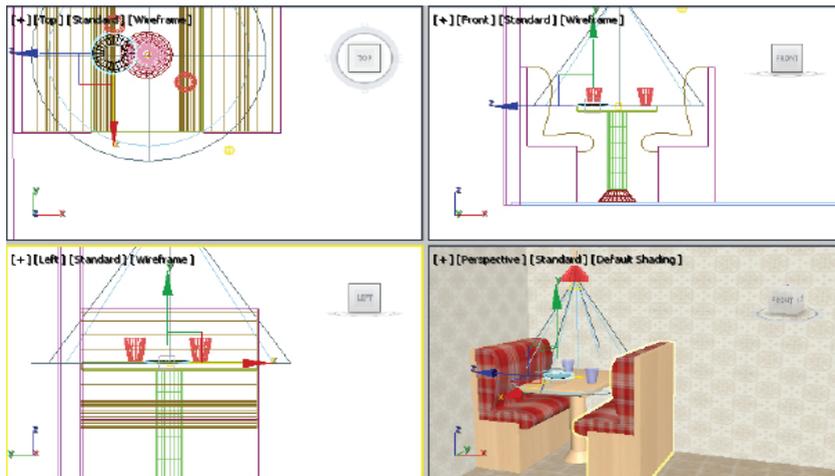


Figure P2-18 Plate01 created and positioned

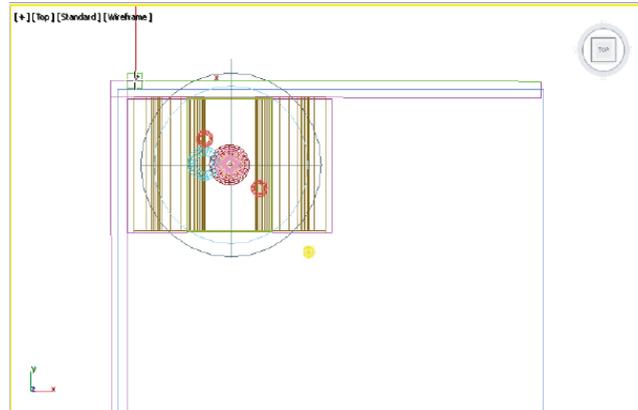


Figure P2-19 Clicking on the upper edge of wall01

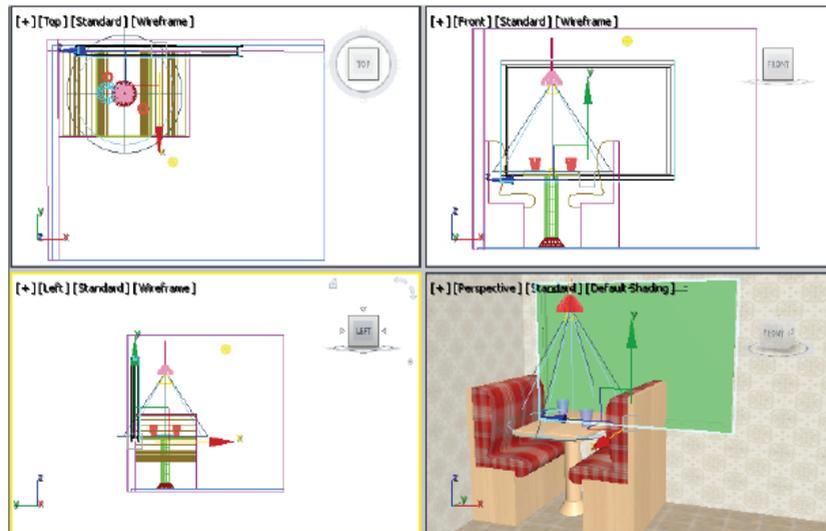


Figure P2-20 window01 aligned in the viewports

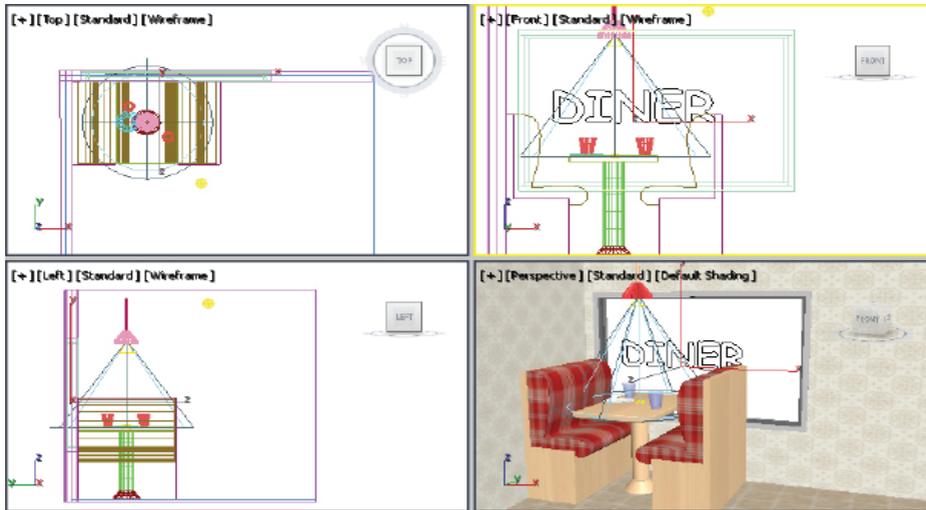


Figure P2-21 The text created

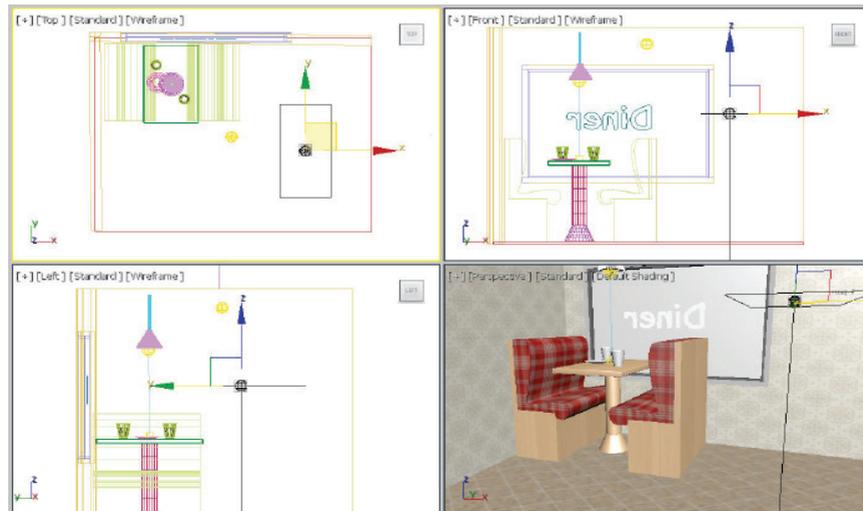


Figure P2-22 Arnold light created and positioned

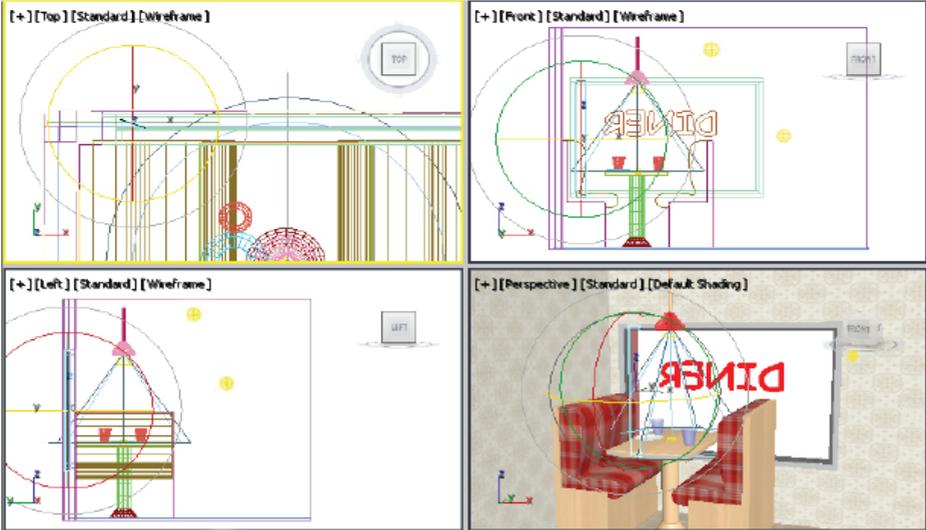


Figure P2-23 Blind01 created and positioned

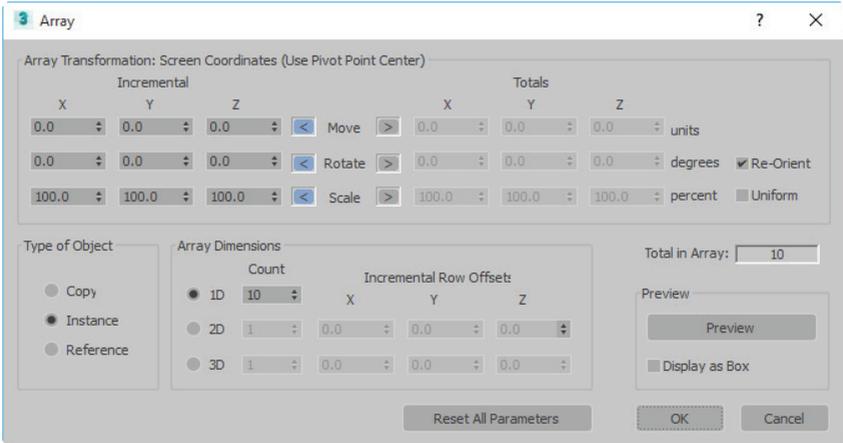


Figure P2-24 The Array dialog box

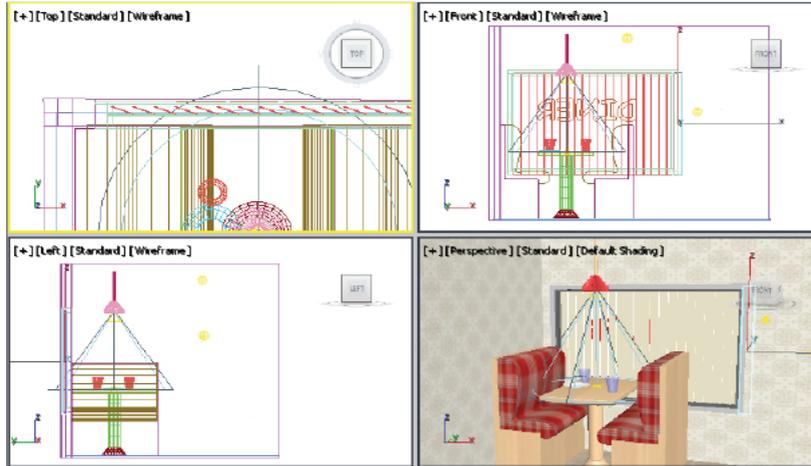


Figure P2-25 The blinds created using the Array tool

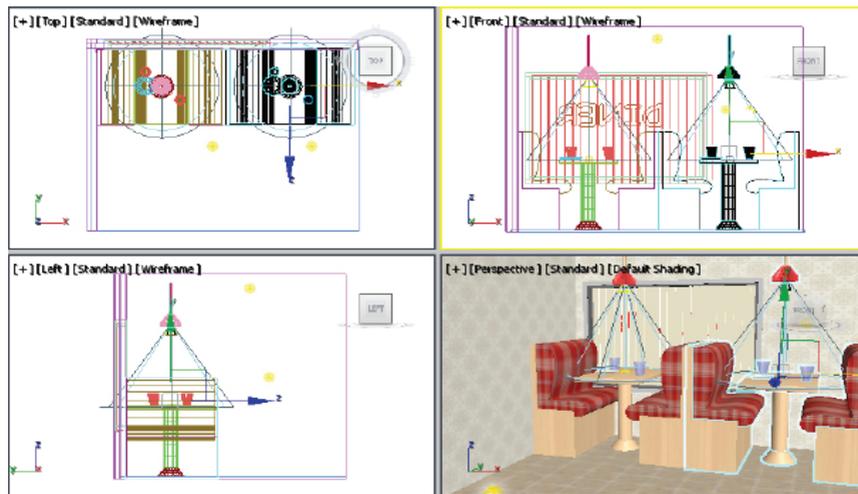


Figure P2-26 The selected objects copied and positioned

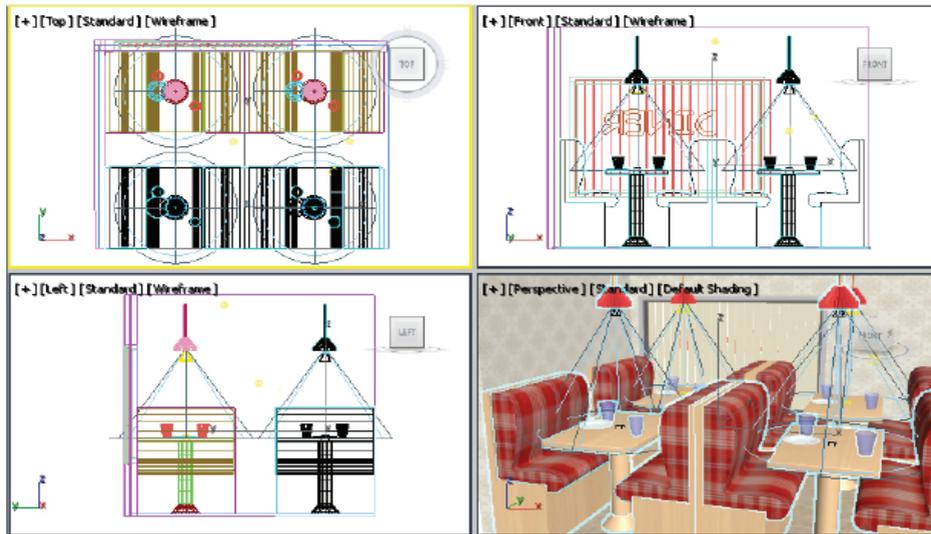


Figure P2-27 DinerSet03 created and aligned in the Top viewport

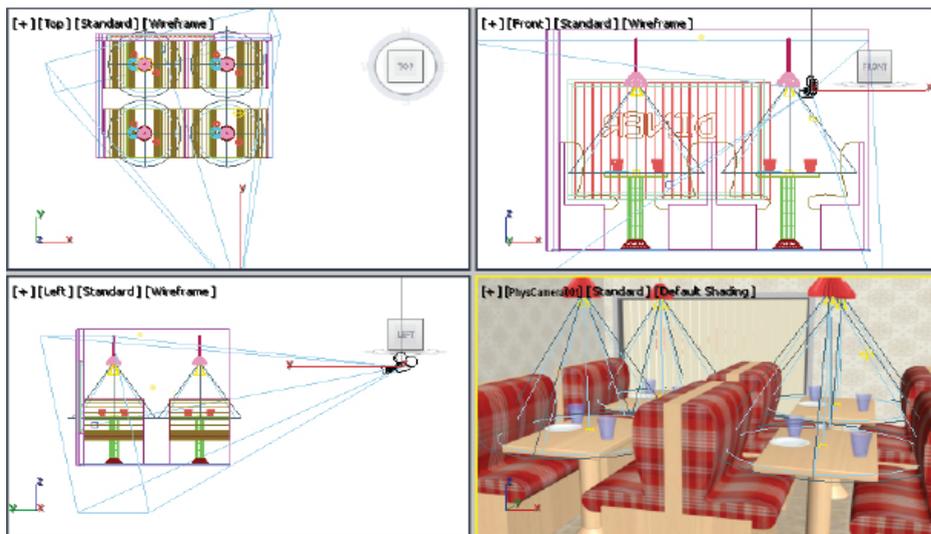
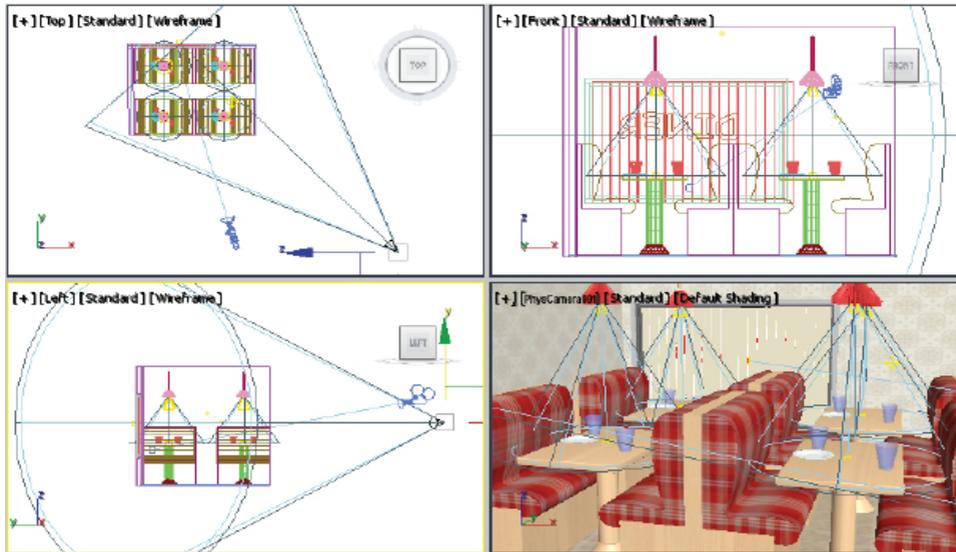


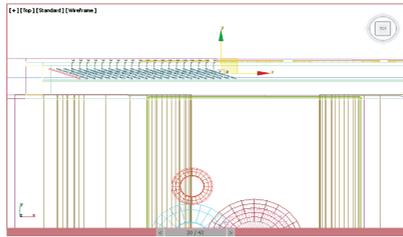
Figure P2-28 Aligning objects at the center of the PhysCamera001 viewport



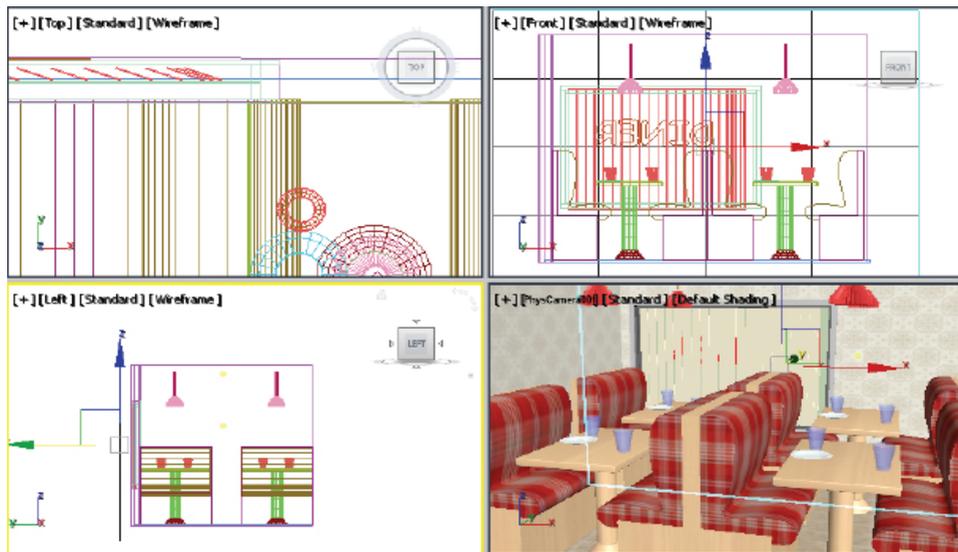
*Figure P2-29* The spotlight target moved and placed in the middle of the window



*Figure P2-30* The rendered view of the scene



*Figure P2-31 The blinds at the midpoint of the animation*



*Figure P2-32 The Plane created and aligned on back of Wall01*



*Figure P2-33 The final animation rendered at frame 20*

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# **Project 3**

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## **Architectural Project**



*Figure P3-1 The structure of a residential garage*

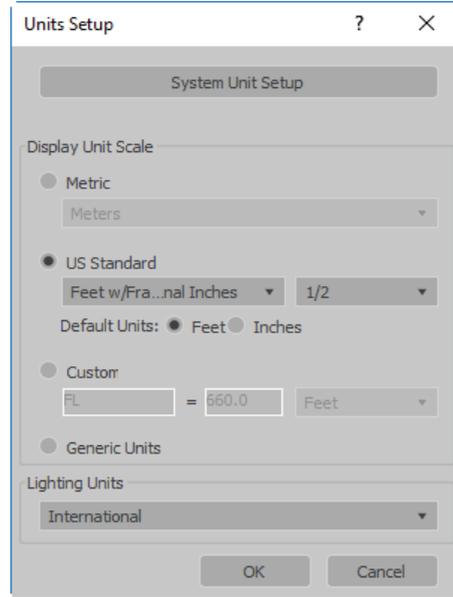


Figure P3-2 The Units Setup dialog box

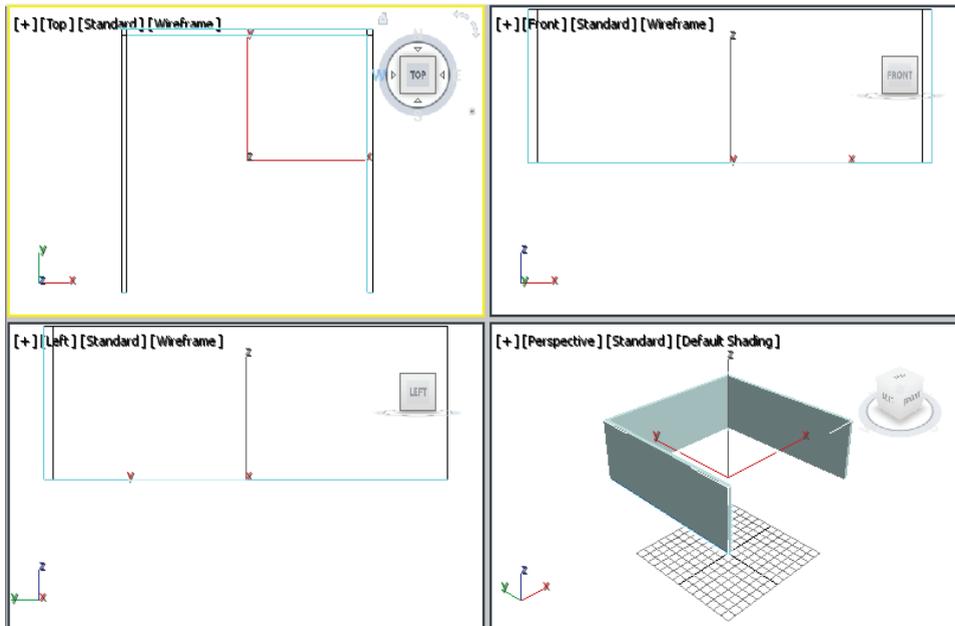


Figure P3-3 The 3D Wall001 created on top of the selected path

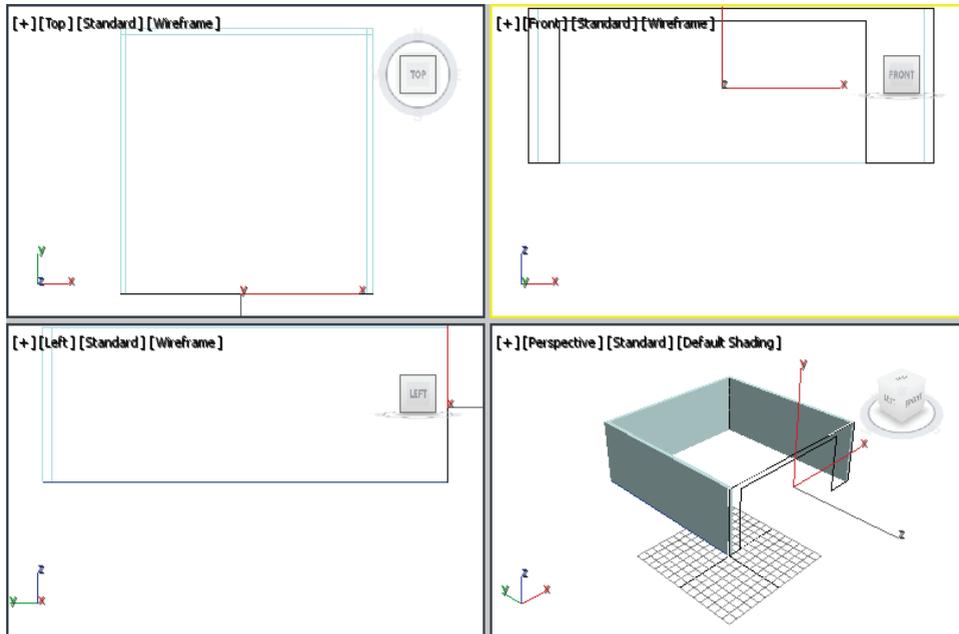


Figure P3-4 The front wall created

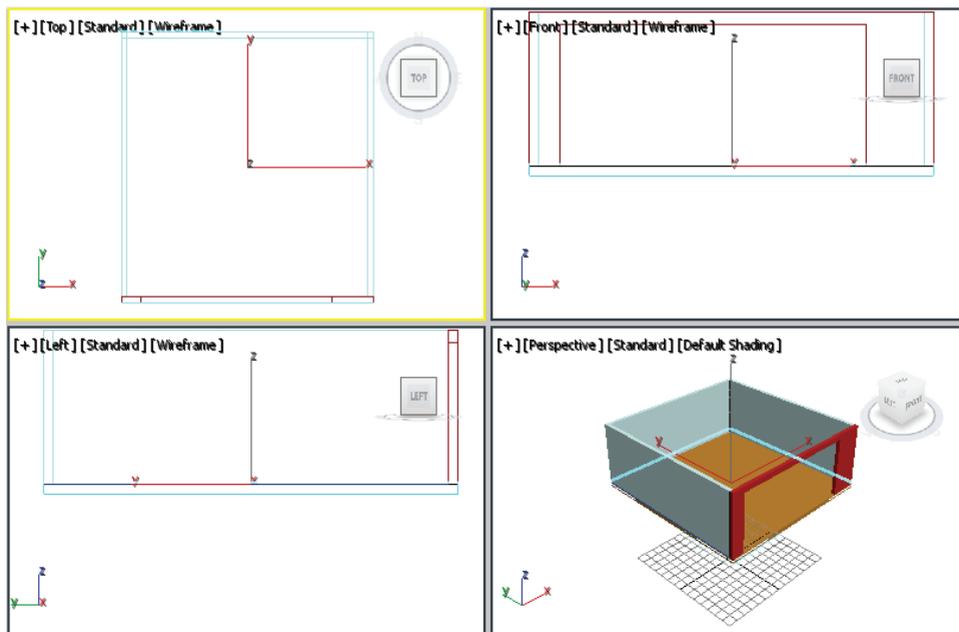


Figure P3-5 The floor and walls created

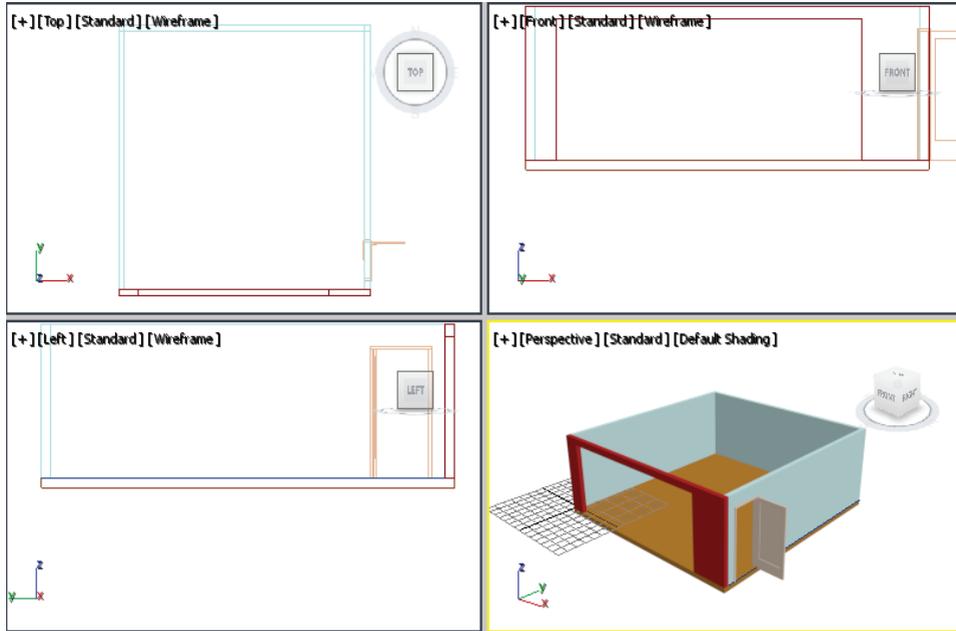


Figure P3-6 The door created

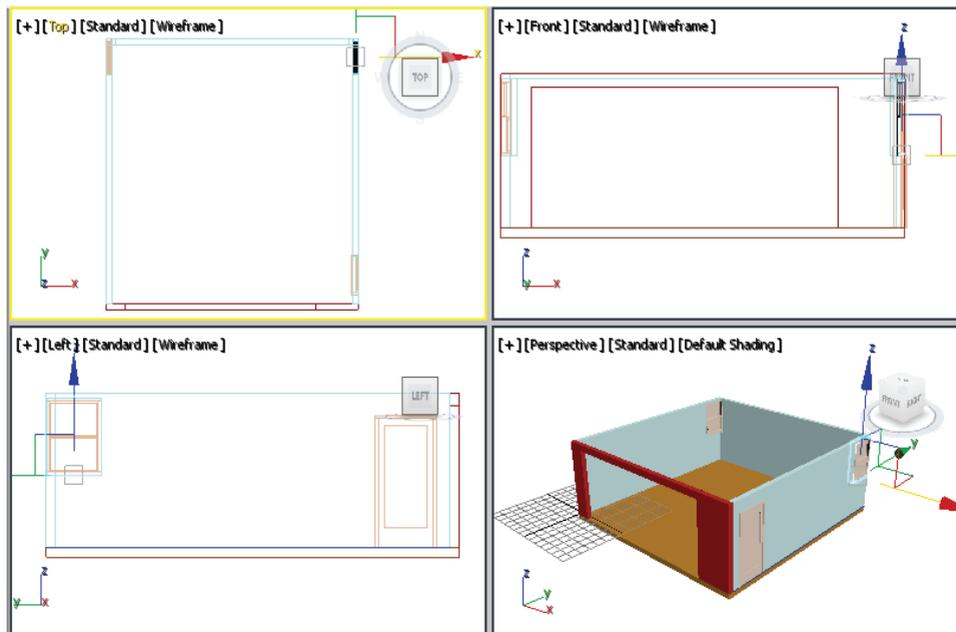


Figure P3-7 The sliding windows created

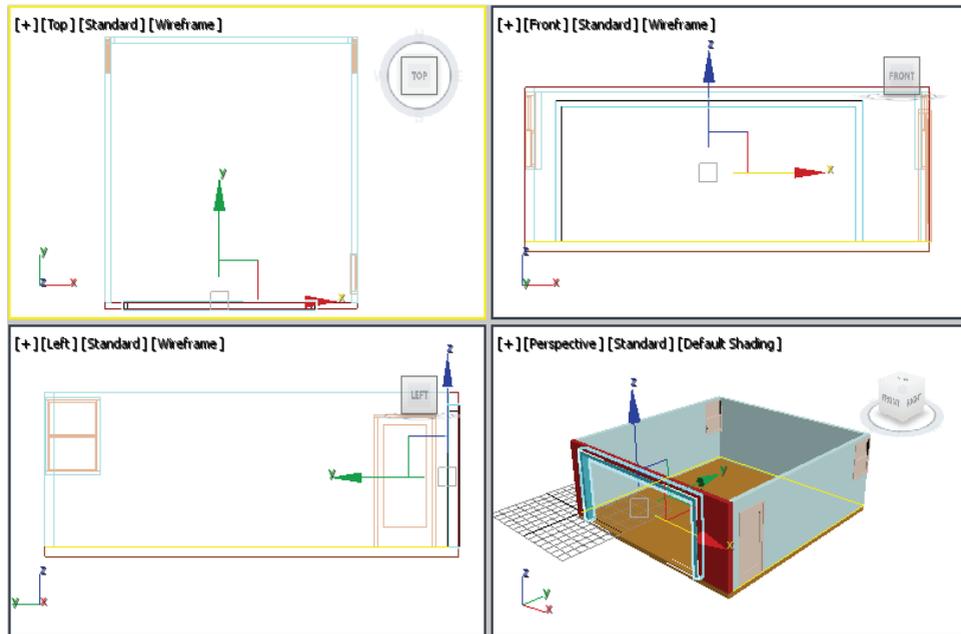


Figure P3-8 Overhead Door Frame created and positioned

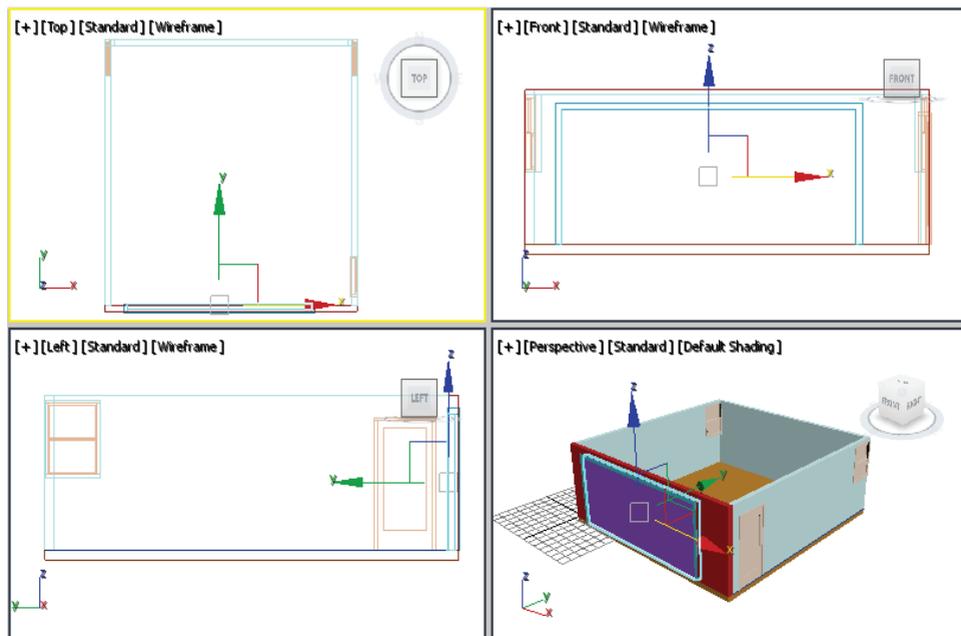


Figure P3-9 Overhead Door created and positioned

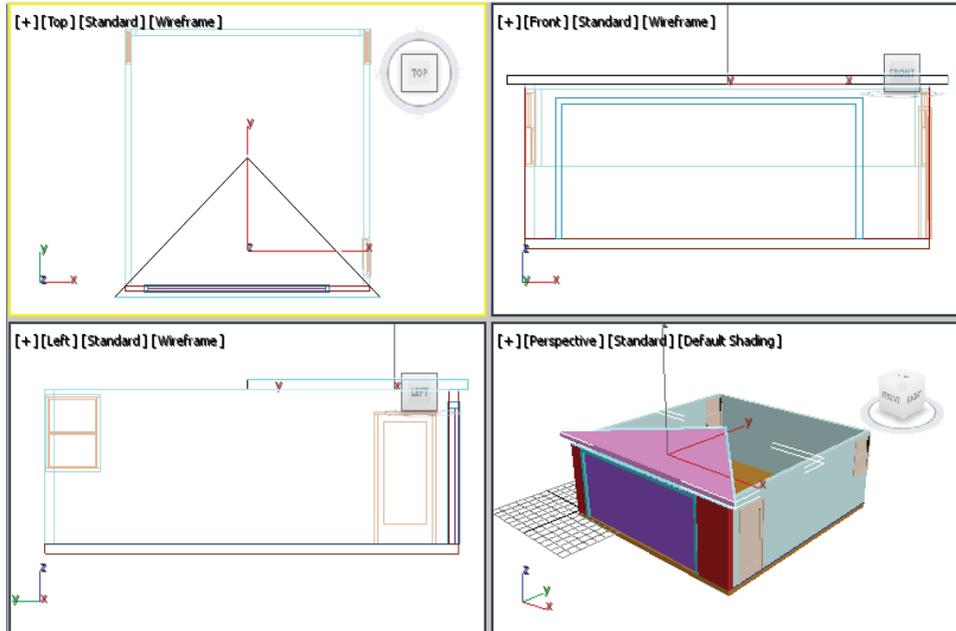


Figure P3-10 Roof Section01 modified

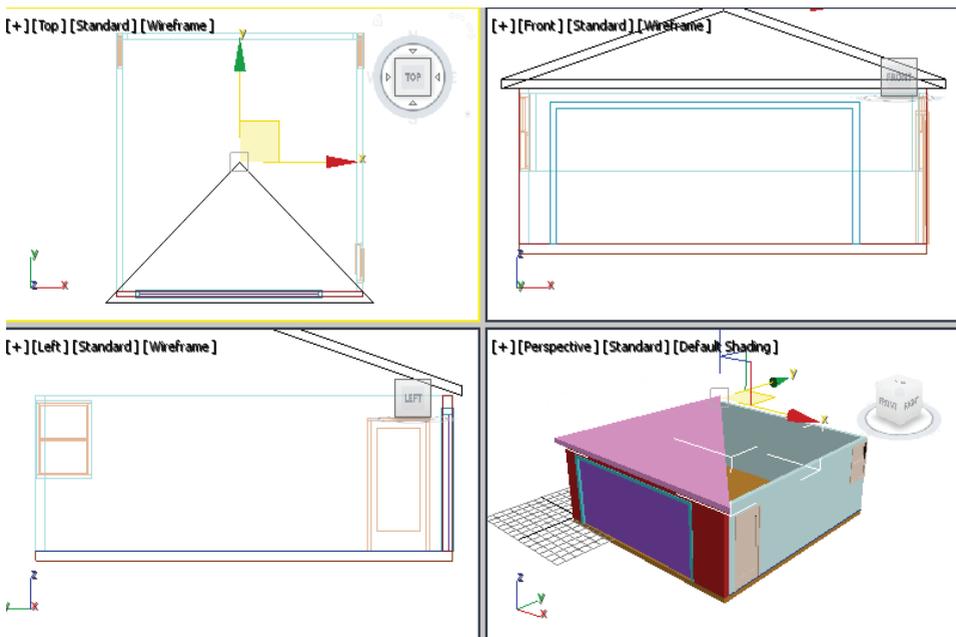


Figure P3-11 The peak of Roof Section01 moved

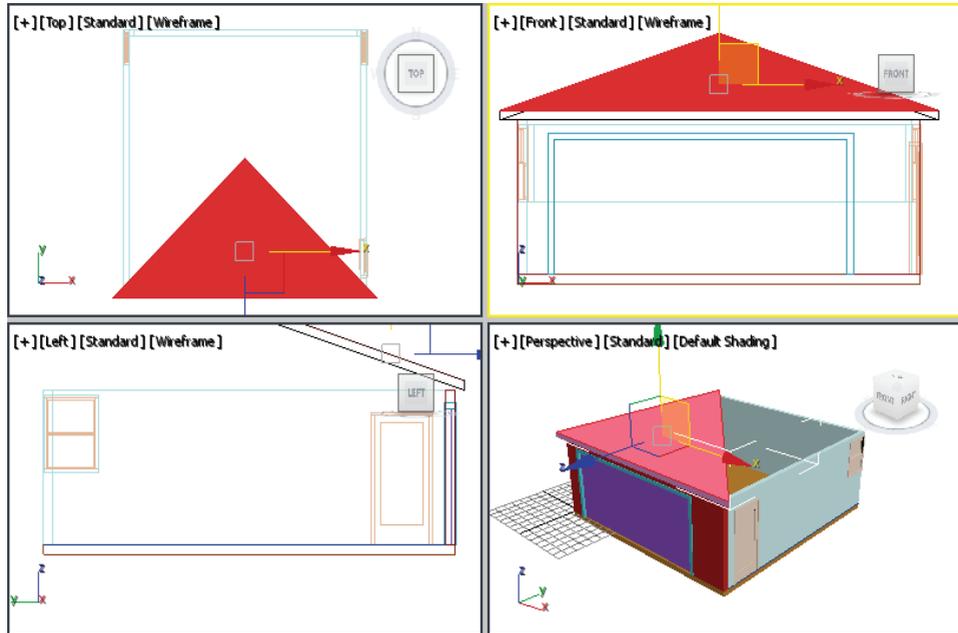


Figure P3-12 The front face of the Roof Section01 selected

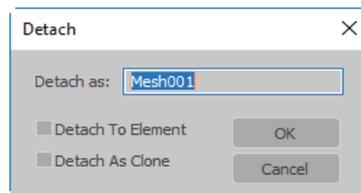


Figure P3-13 The *Detach* dialog box

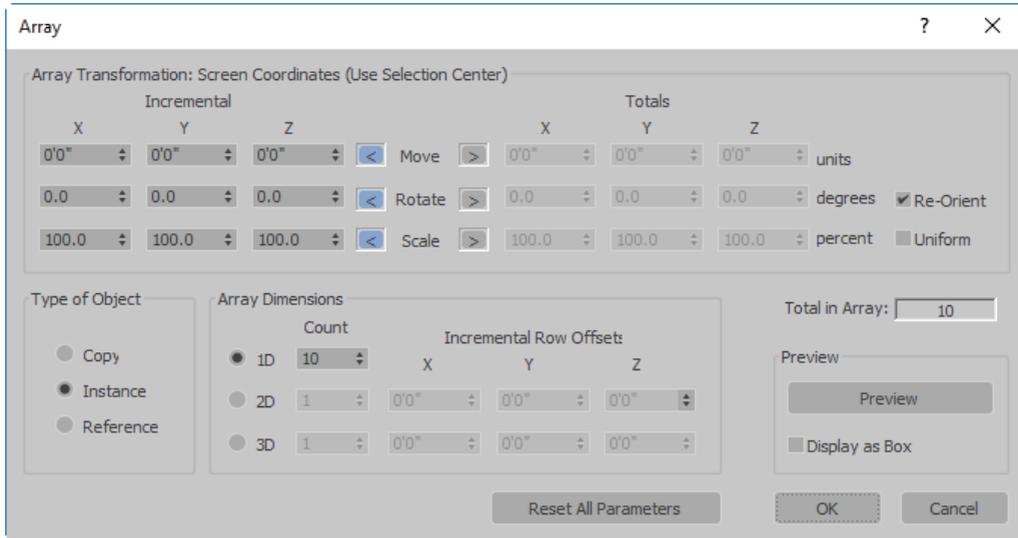


Figure P3-14 The Array dialog box

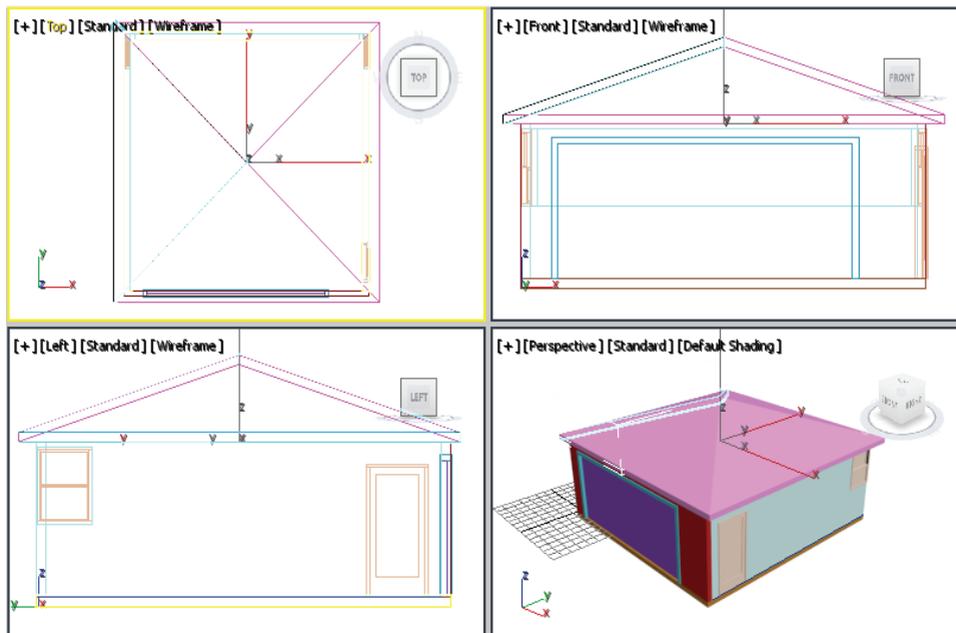


Figure P3-15 The array created to complete the roof

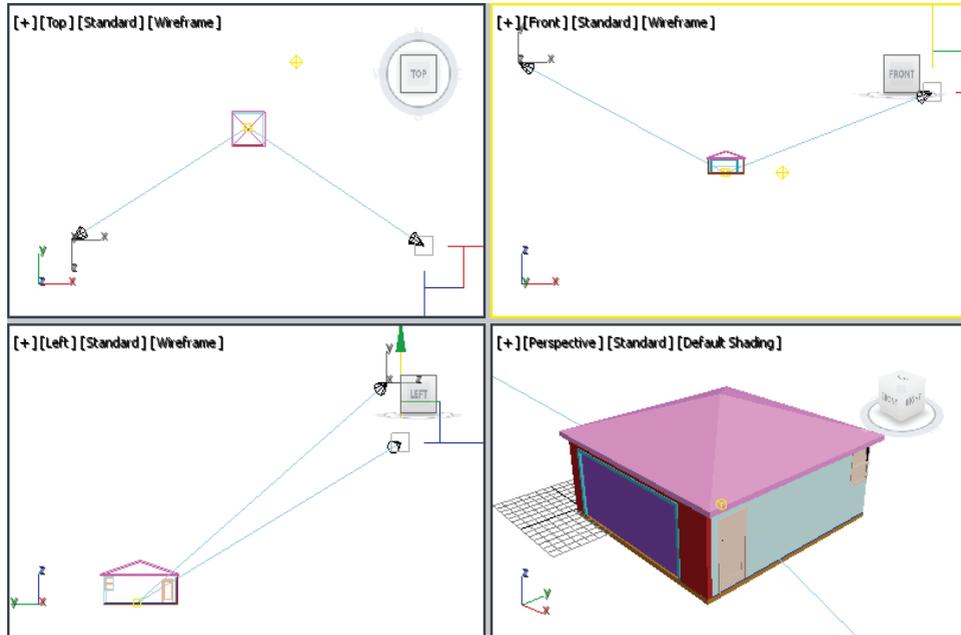


Figure P3-16 The lights displayed and positioned in all viewports

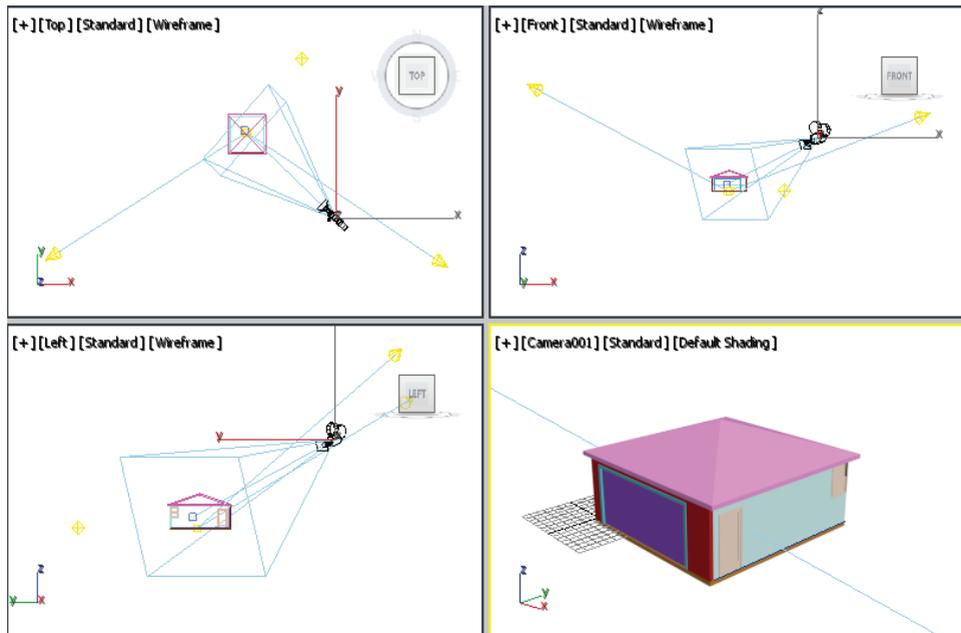


Figure P3-17 The view displayed in the Camera001 viewport

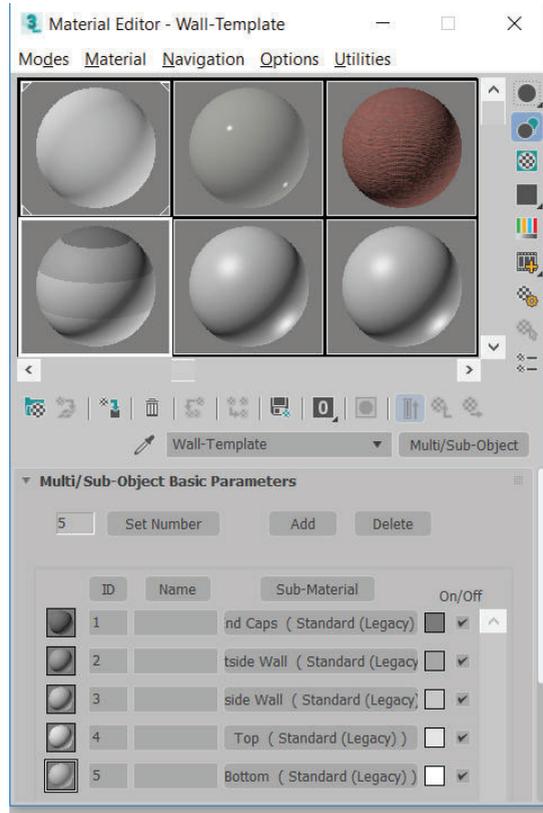


Figure P3-18 The Multi/Sub-Object material created

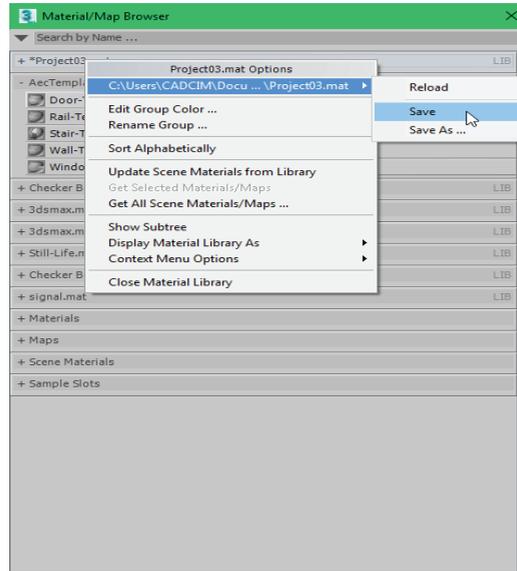


Figure P3-19 Saving the material library

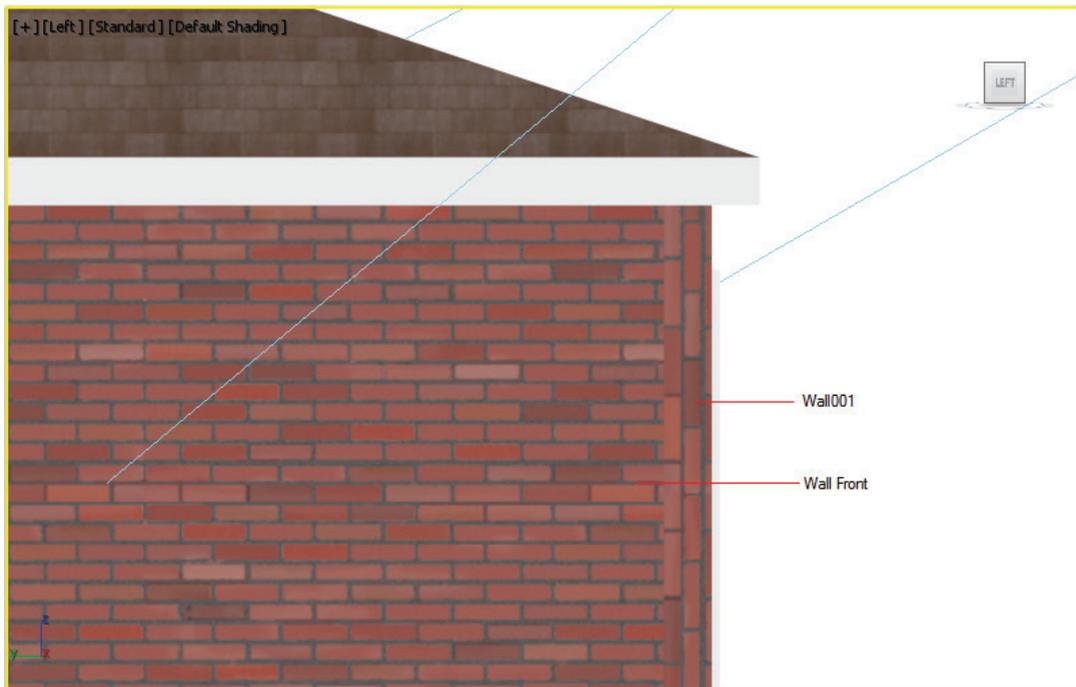


Figure P3-20 Wall001 and Wall Front zoomed in the Left viewport

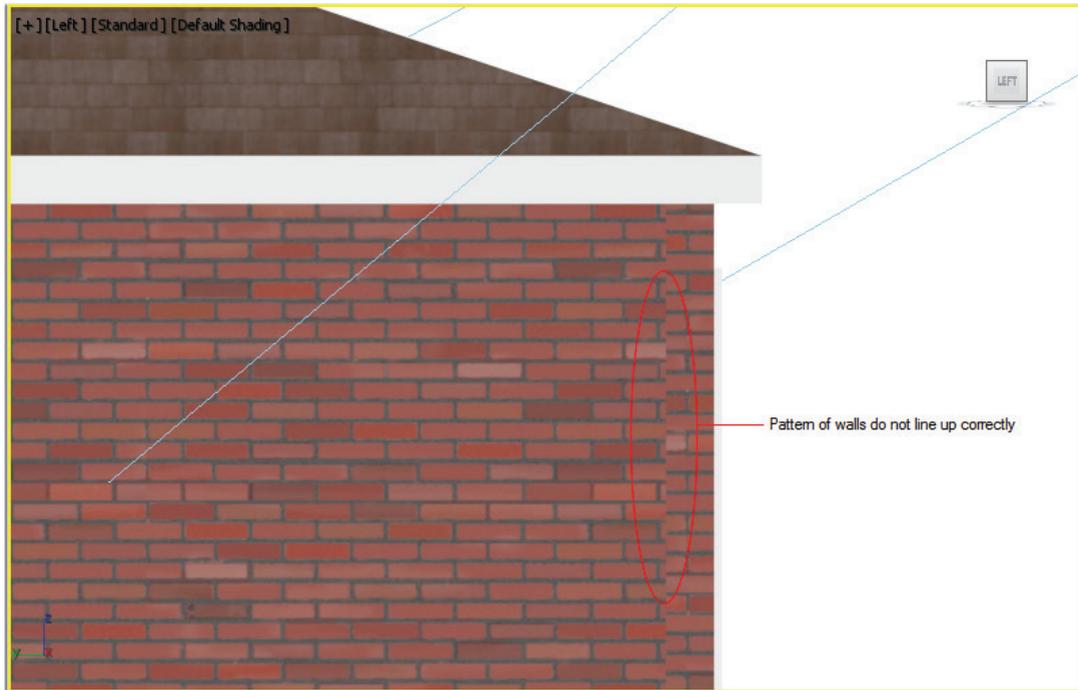


Figure P3-21 Pattern of Wall001 and Wall Front not lined up correctly

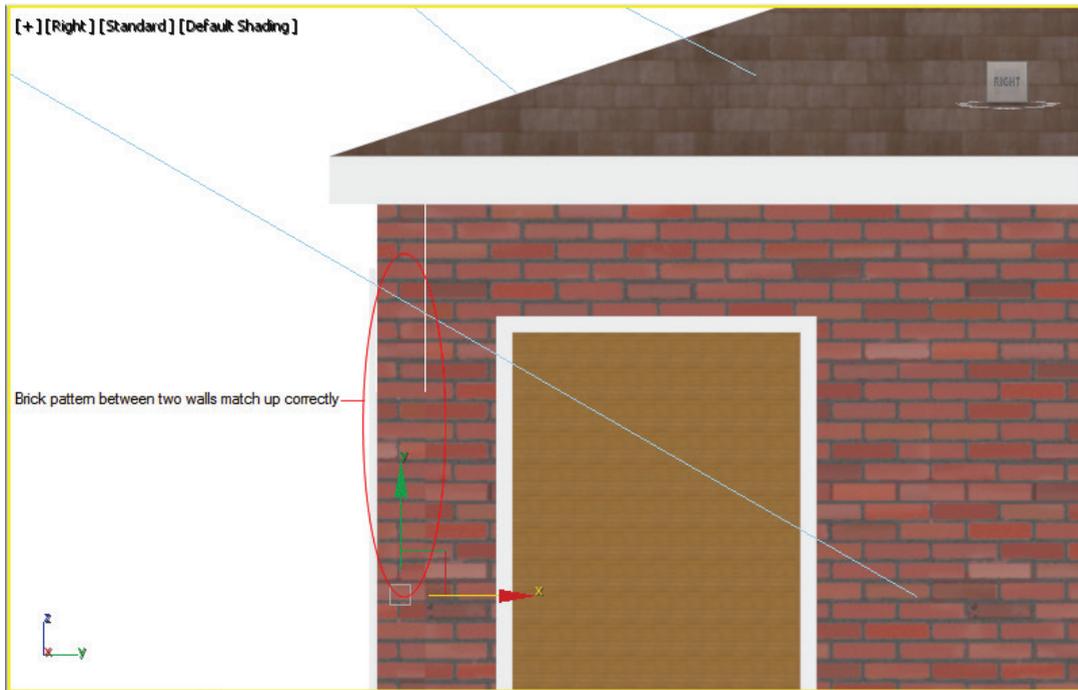


Figure P3-22 The brick pattern between two walls matched up correctly

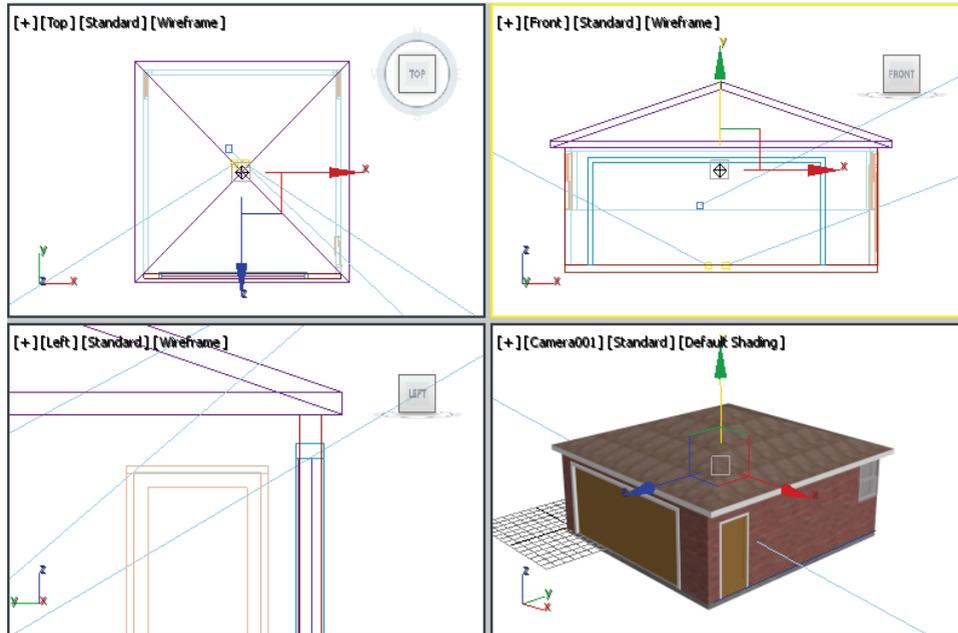


Figure P3-23 The light aligned on the top of walls

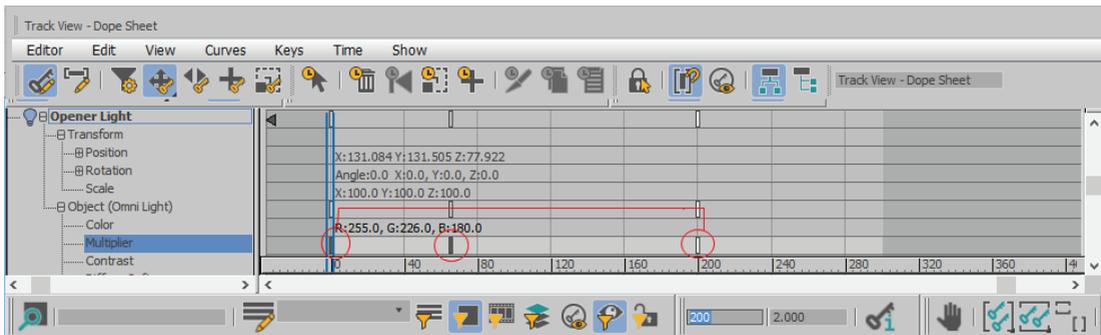


Figure P3-24 Keys inserted at frames 0, 65, and 200 in the Multiplier track

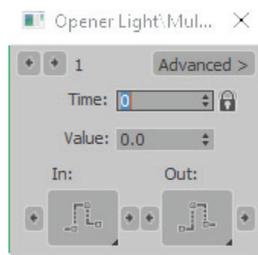
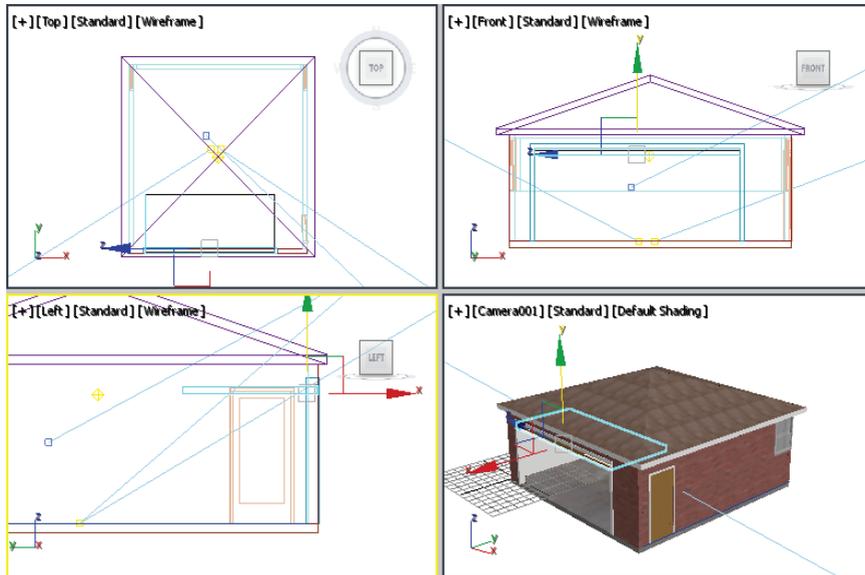
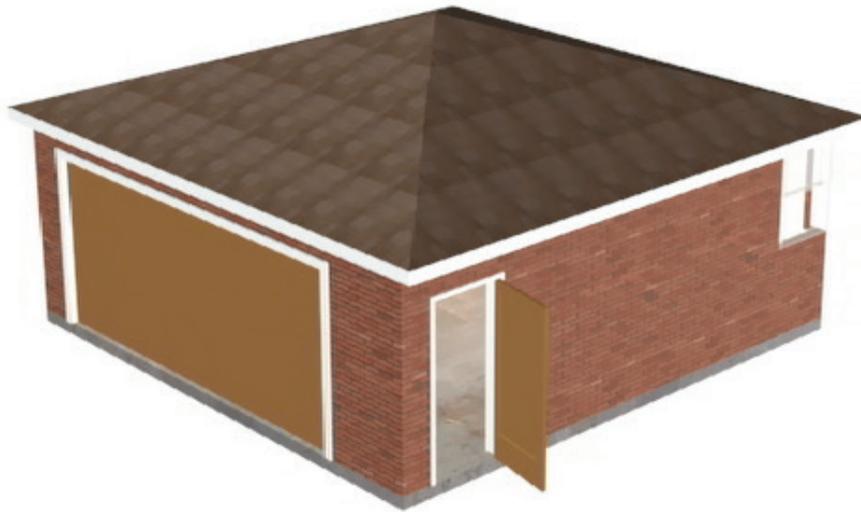


Figure P3-25 The Opener Light Multiplier dialog box





*Figure P3-28 The movement of the Overhead Door*



*Figure P3-29 The rendered image at frame 180*

# **Project 4**

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## **Corporate Design Project**



*Figure P4-1 The model of the logo*

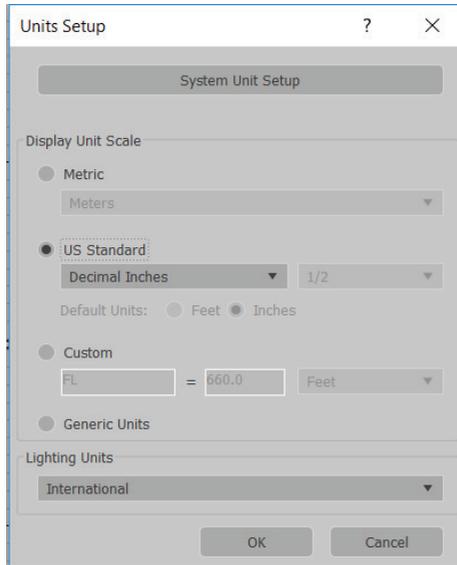


Figure P4-2 The Units Setup dialog box

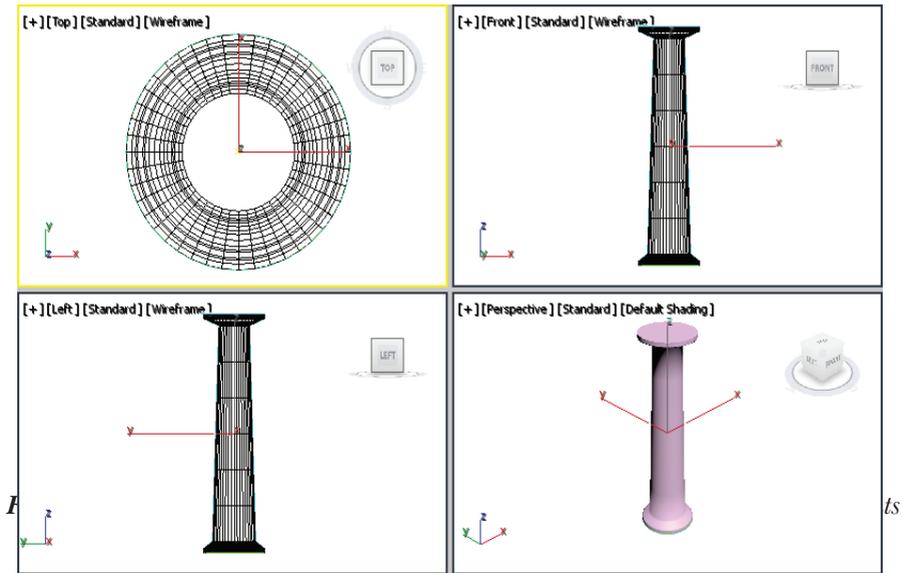


Figure P4-4 Column01 modified using the Scale Deformation(X) dialog box

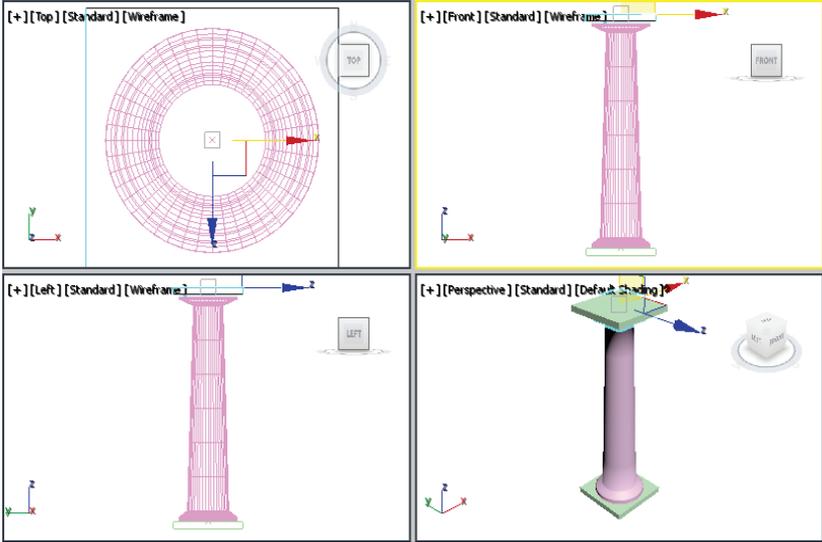


Figure P4-5 Column01Top is aligned with the top of Column01

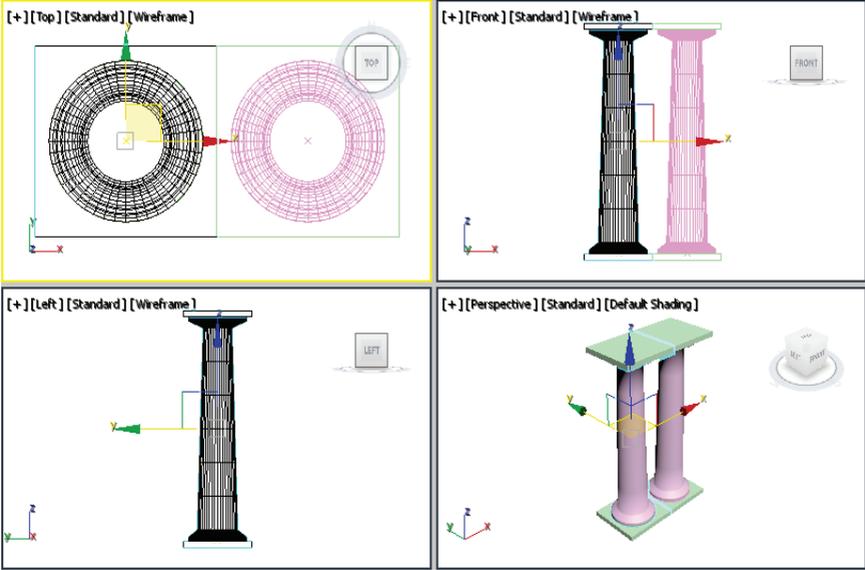


Figure P4-6 Column02 Assembly created

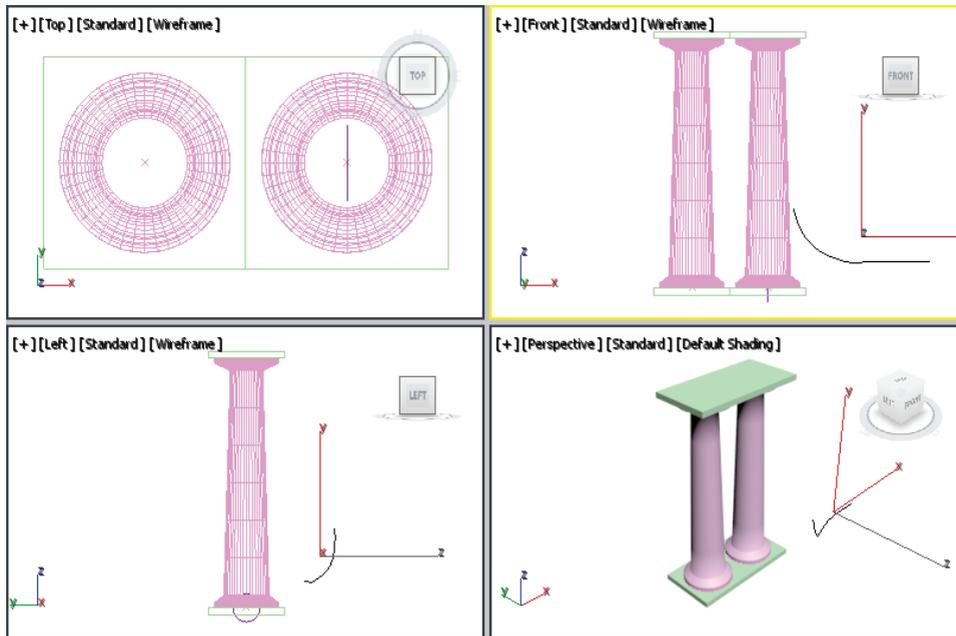


Figure P4-7 The path created for the left-hand horn

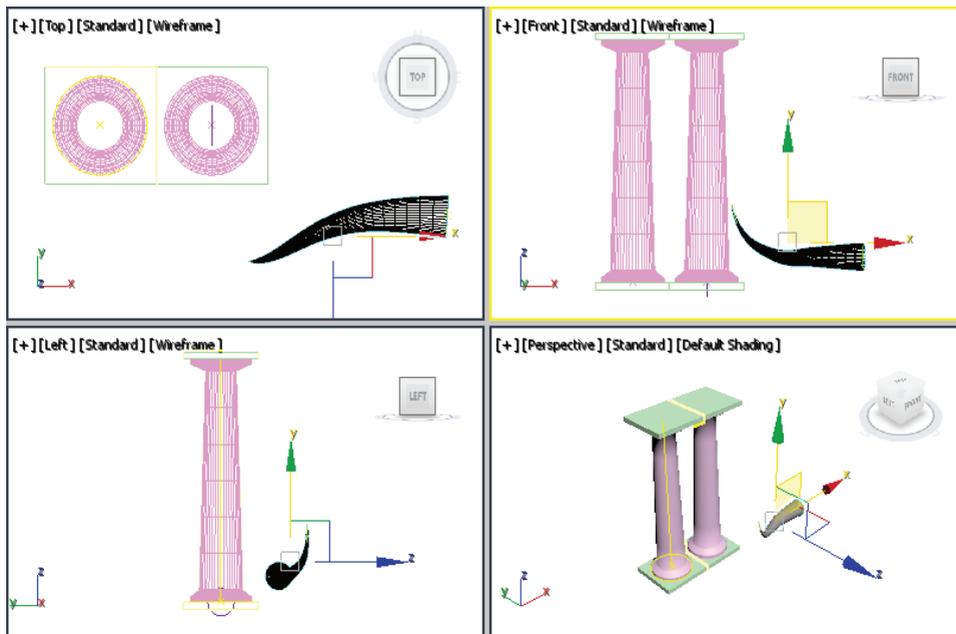


Figure P4-8 Horn-Left modified using the Scale Deformation(X) dialog box

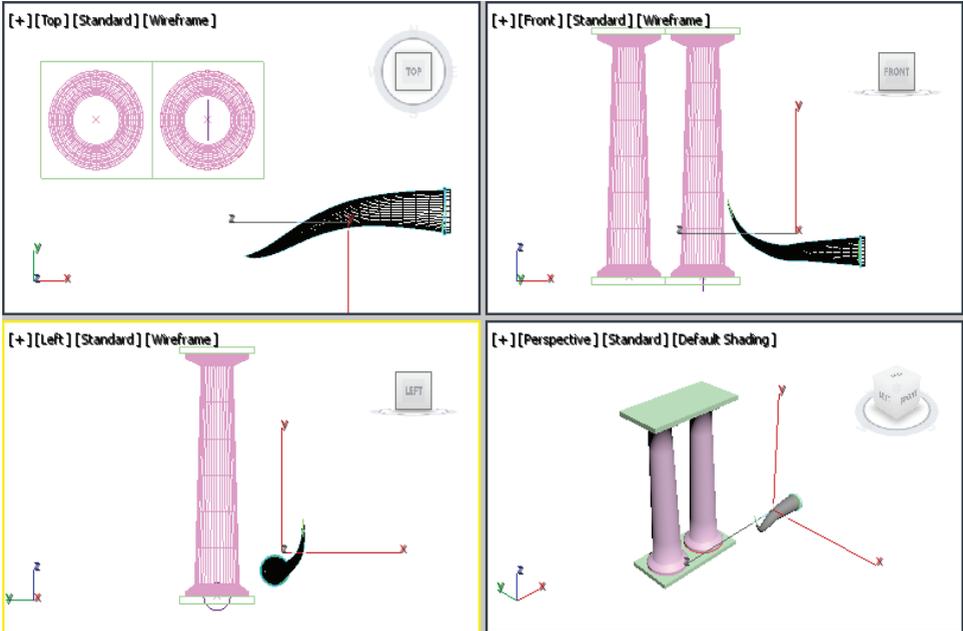


Figure P4-9 HornAssemblyLeft created

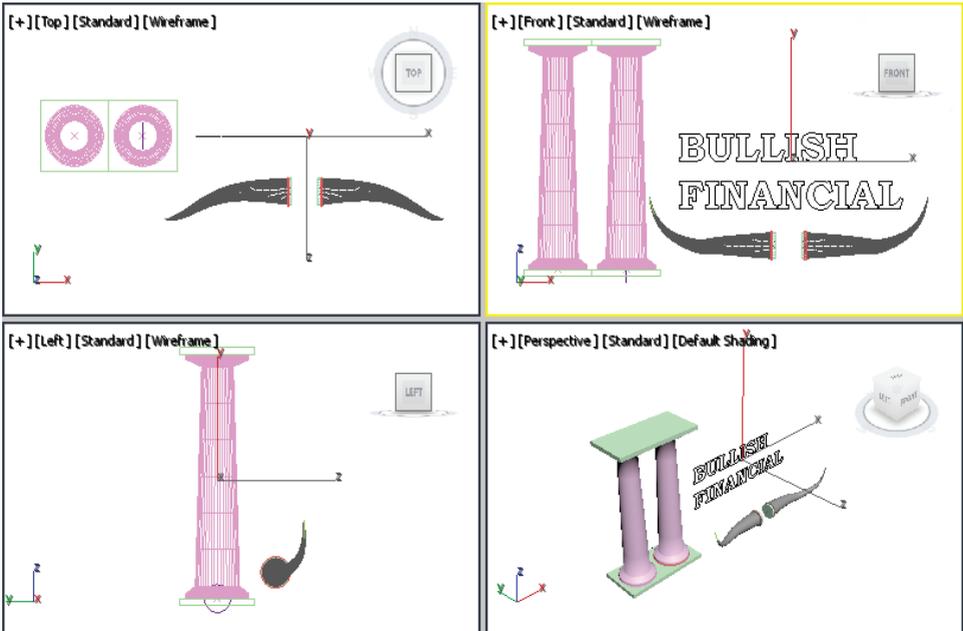


Figure P4-10 The text displayed as a single object

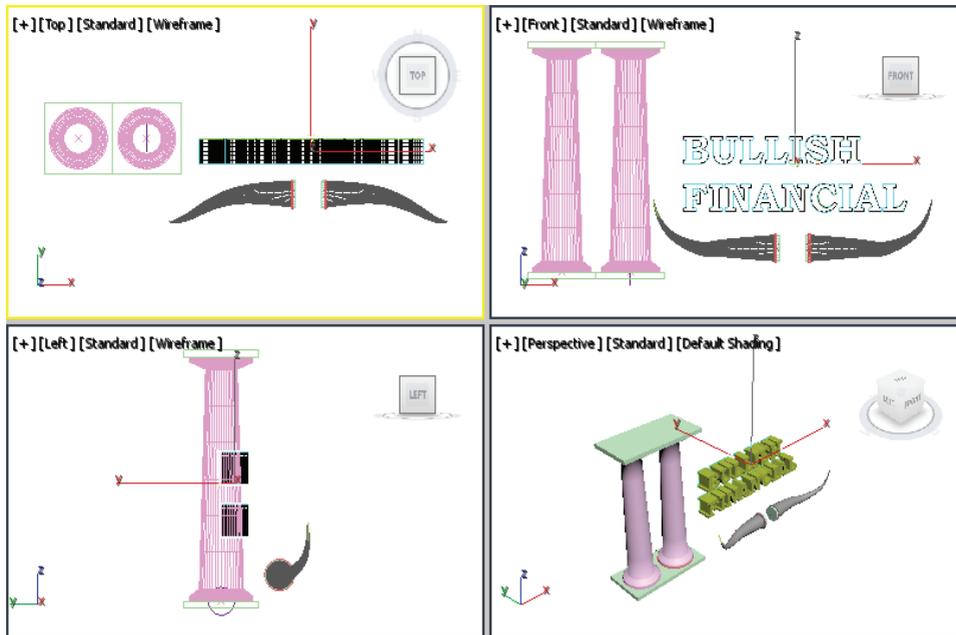


Figure P4-11 The logo text lofted

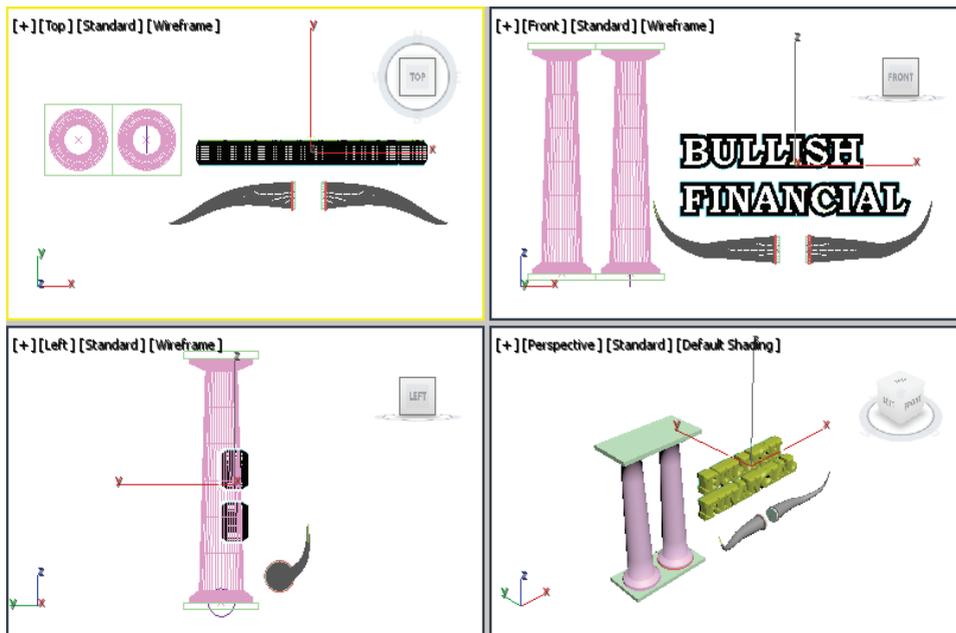


Figure P4-12 The bevel deformation applied to Logo Text and the text centered over the horns

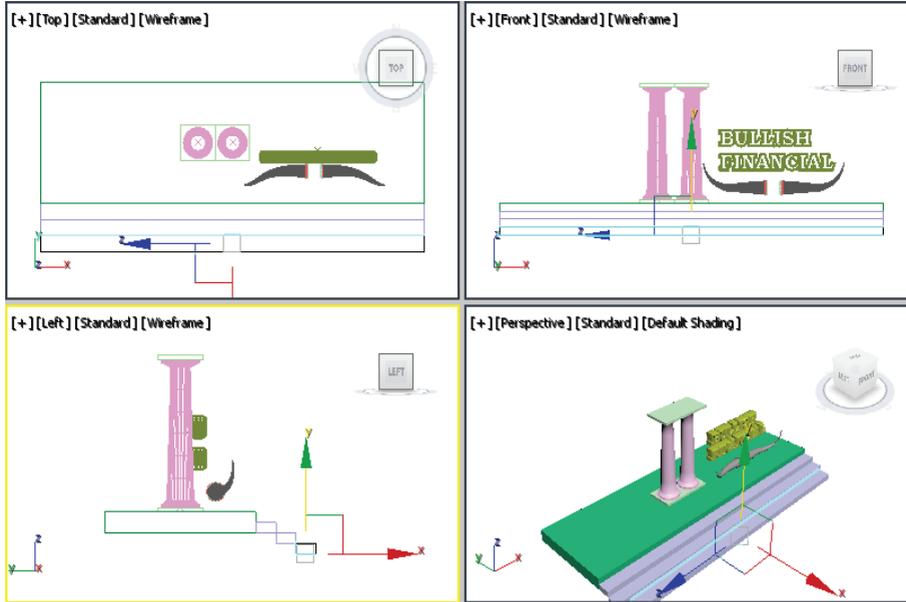


Figure P4-13 The floor and three stairs created and aligned

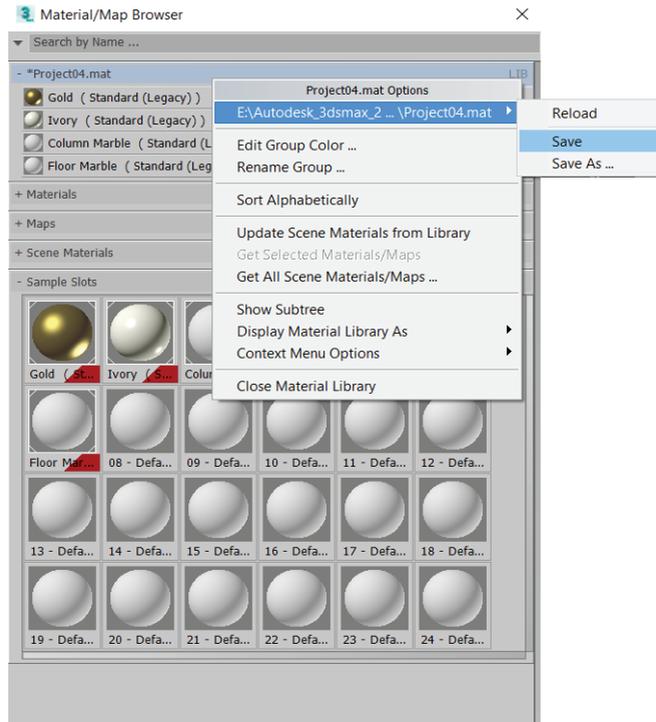


Figure P4-14 Saving the material library

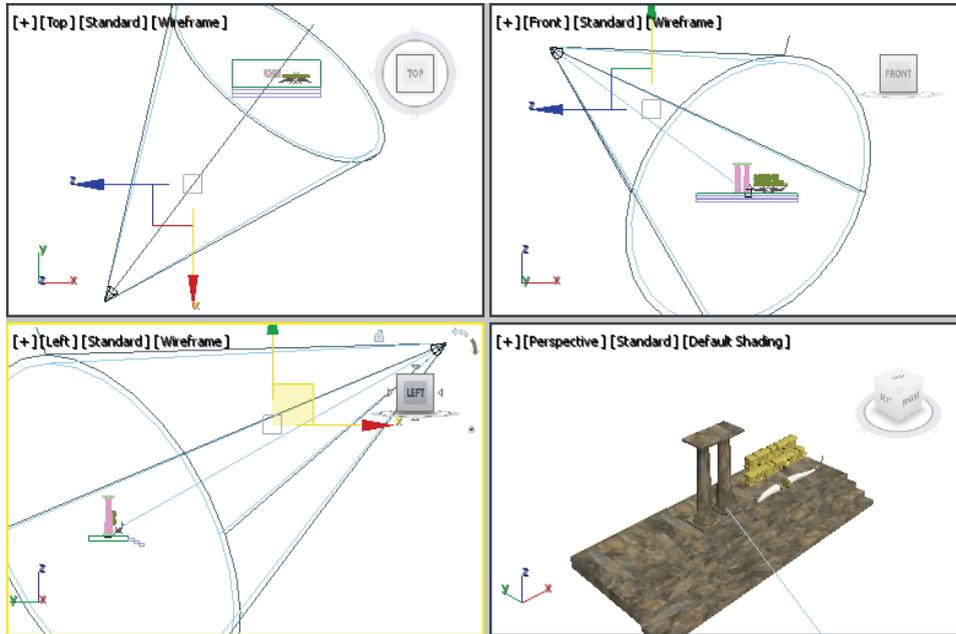


Figure P4-15 The spotlights created and positioned

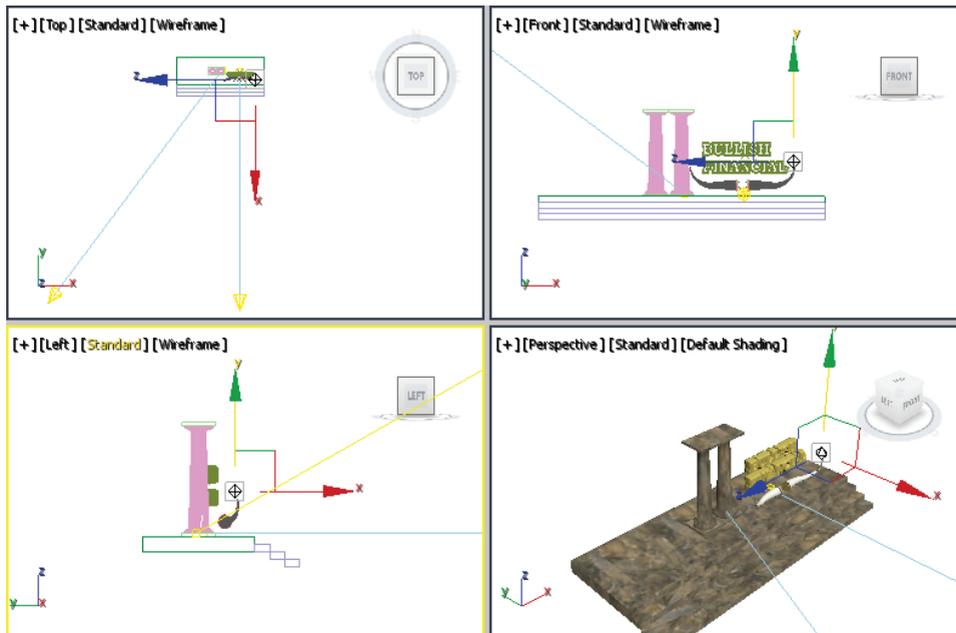


Figure P4-16 The omni light positioned

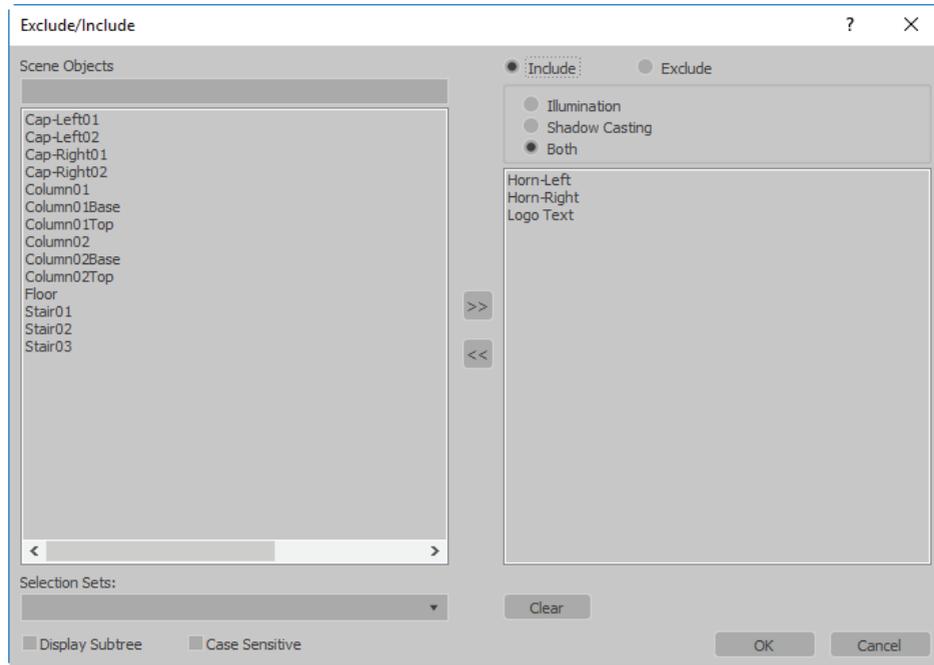


Figure P4-17 The Exclude/Include dialog box

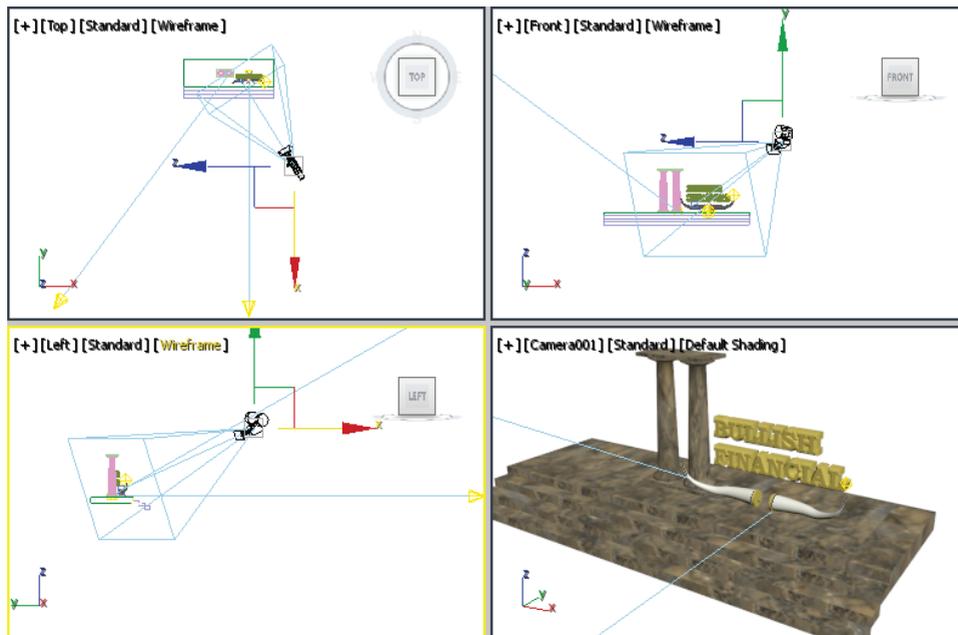
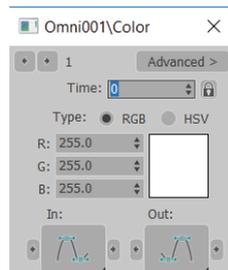


Figure P4-18 The camera created and aligned



*Figure P4-19* The scene rendered after creating the lights and camera



*Figure P4-20* The *Omni001\Color* dialog box

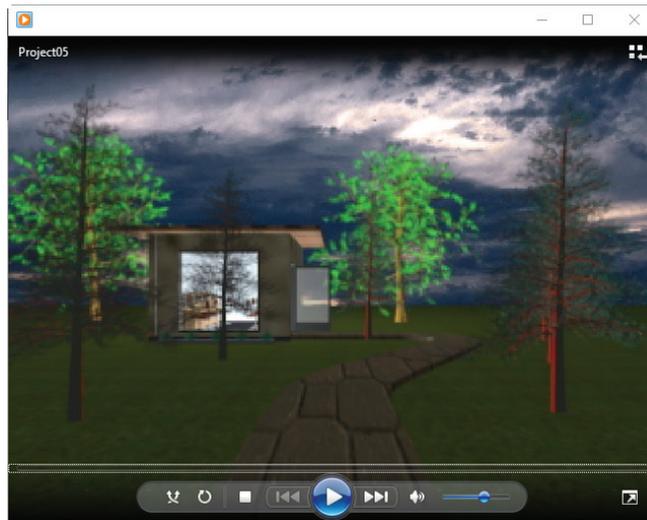


*Figure P4-21 A rendered image of the final animation at frame 0*

# Project 5

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## Creating a Computer Center



*Figure P5-1 Walkthrough towards the computer center*

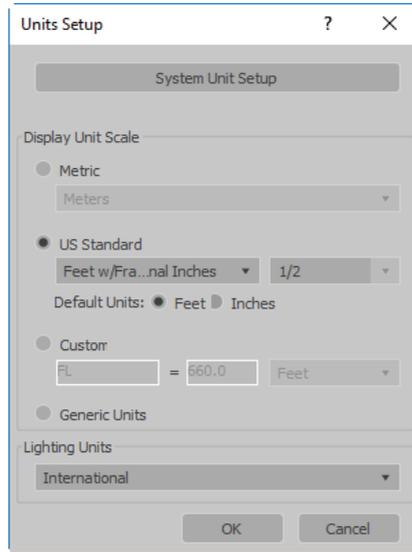


Figure P5-2 The Units Setup dialog box

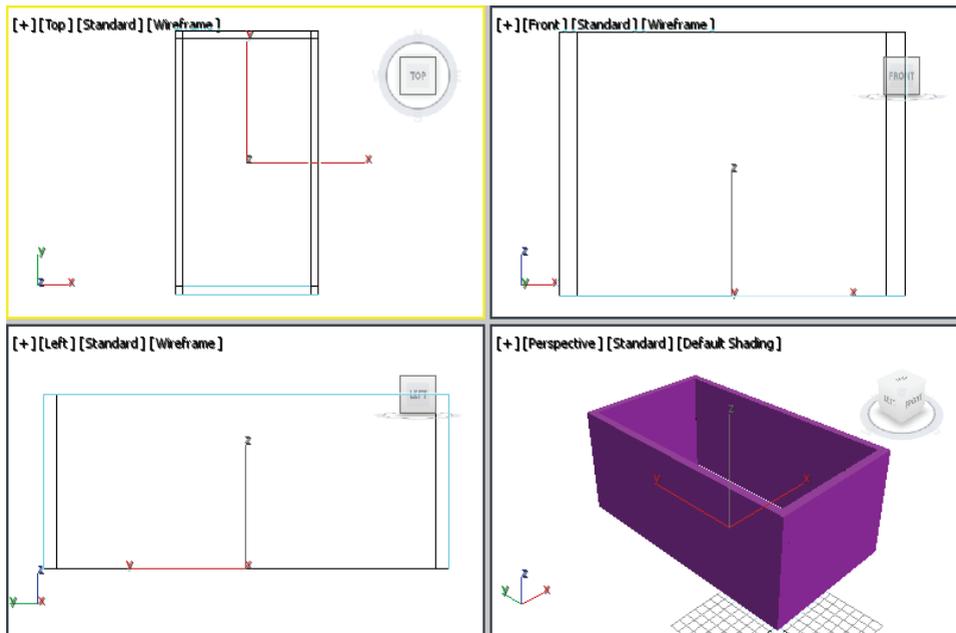


Figure P5-3 Walls of the computer center

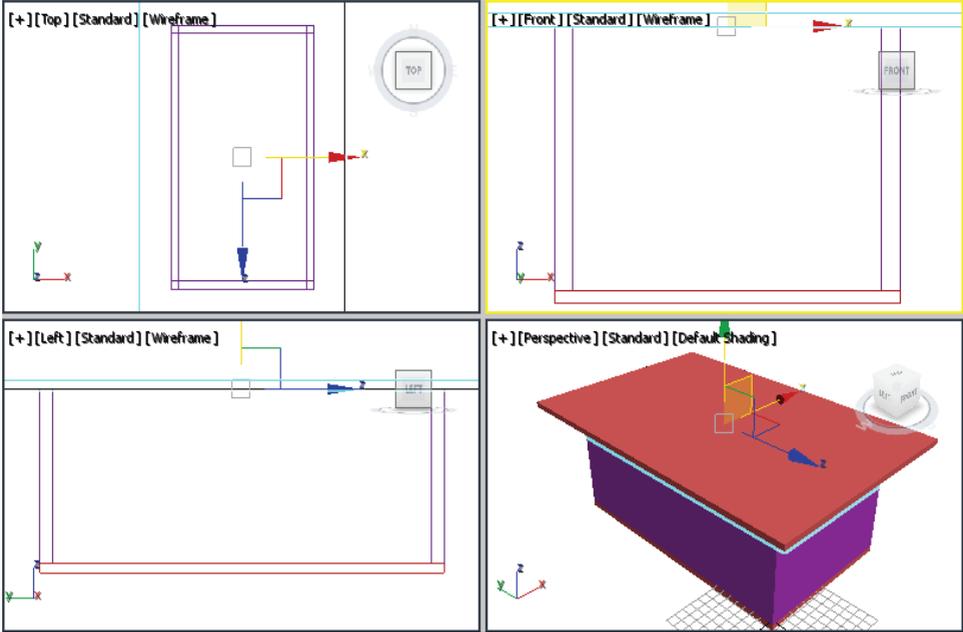


Figure P5-4 Roof created and placed above Walls

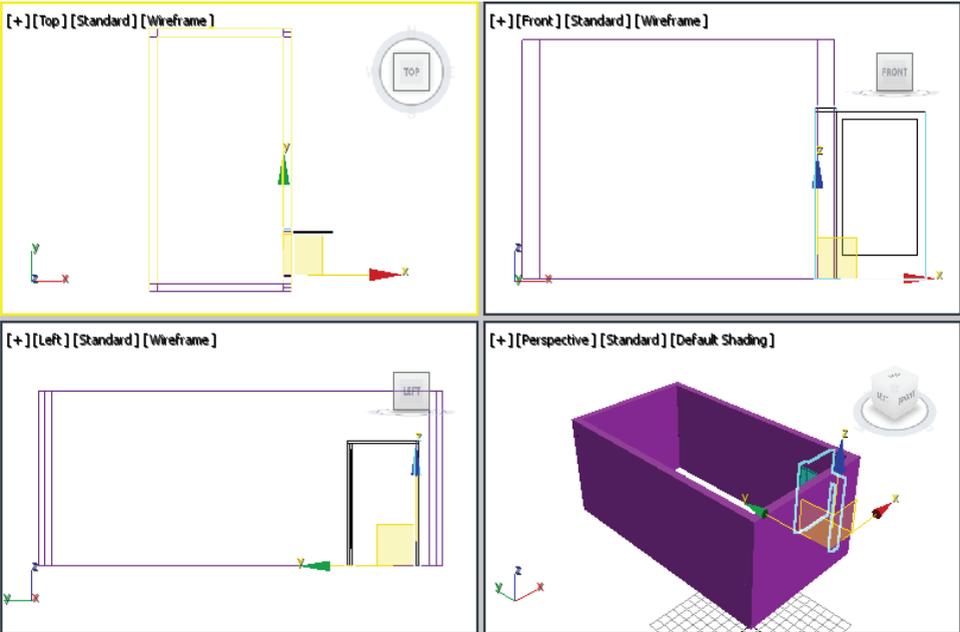


Figure P5-5 The door created on the right wall

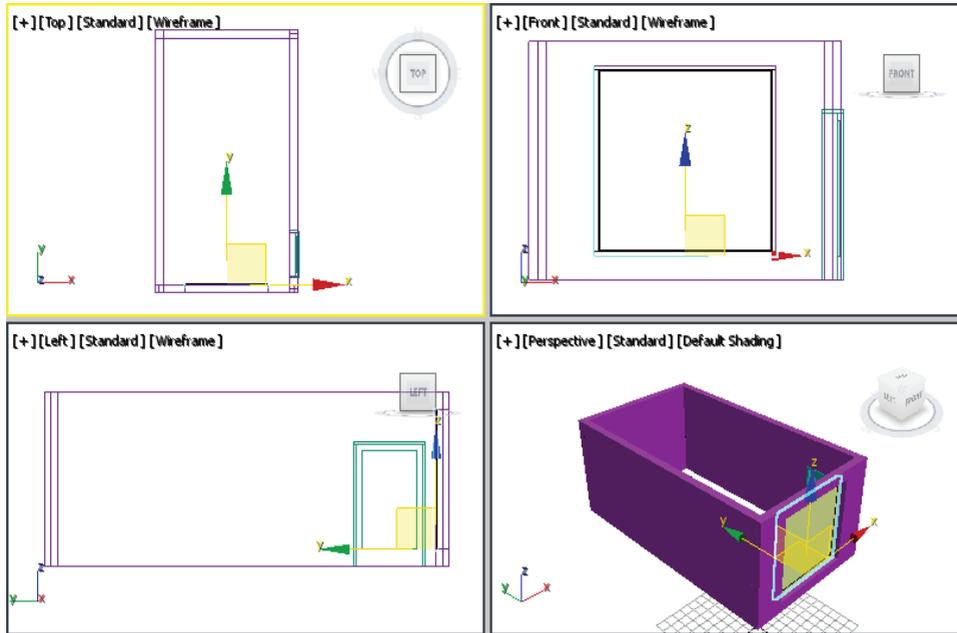


Figure P5-6 The alignment of the window on the front wall

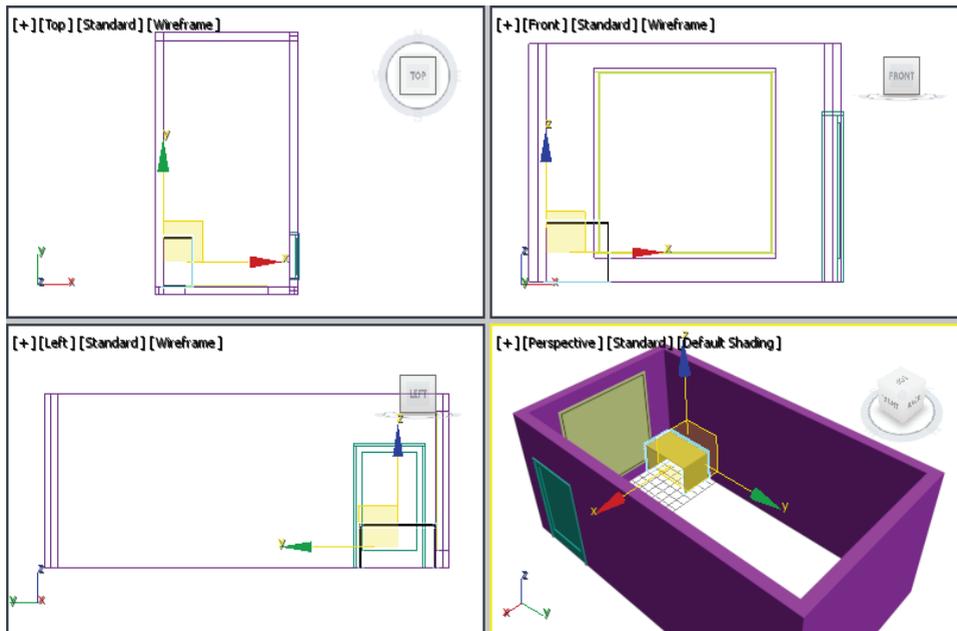


Figure P5-7 The top and sides of the first computer station

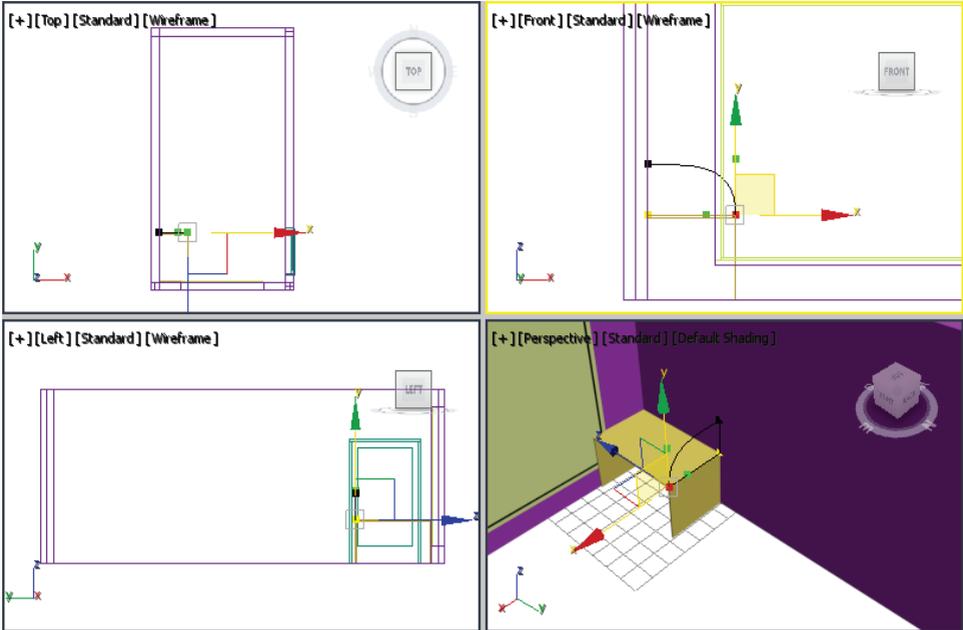


Figure P5-8 Side01 spline modified in the Front viewport

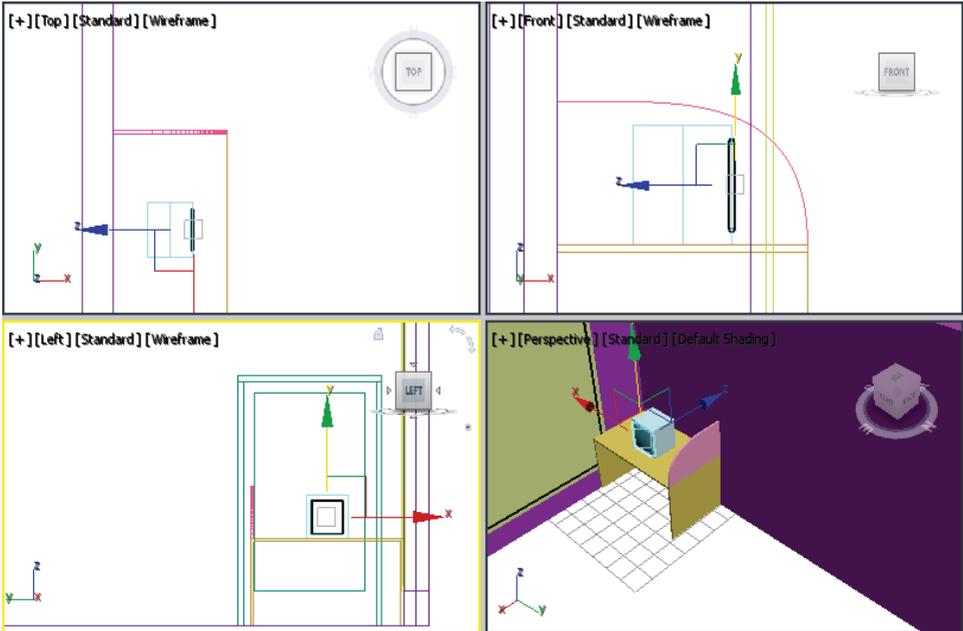


Figure P5-9 The chamfer box created and centered on the monitor

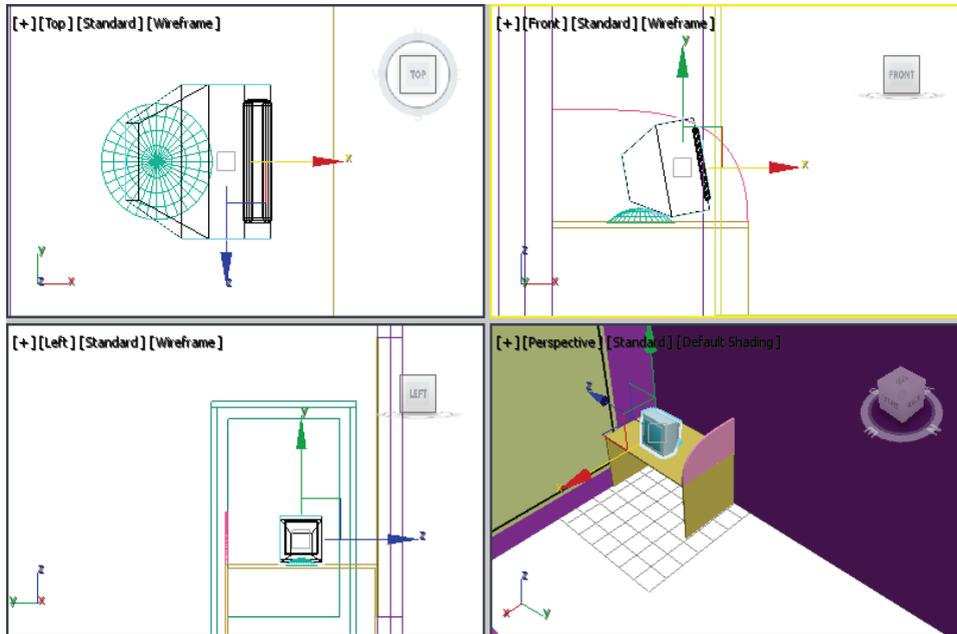


Figure P5-10 The shape of the monitor modified and the base created

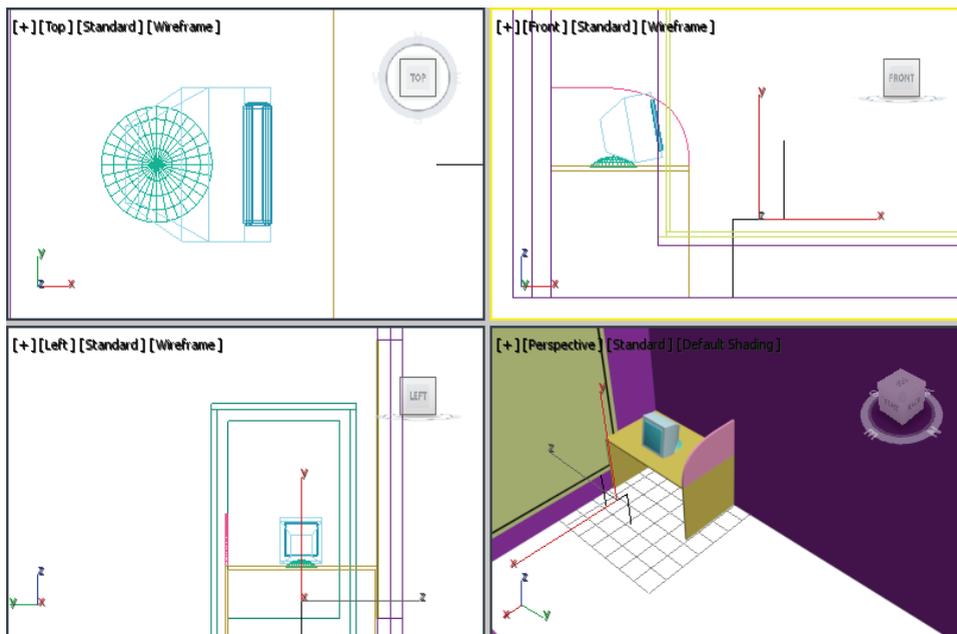


Figure P5-11 The path created for the chair frame

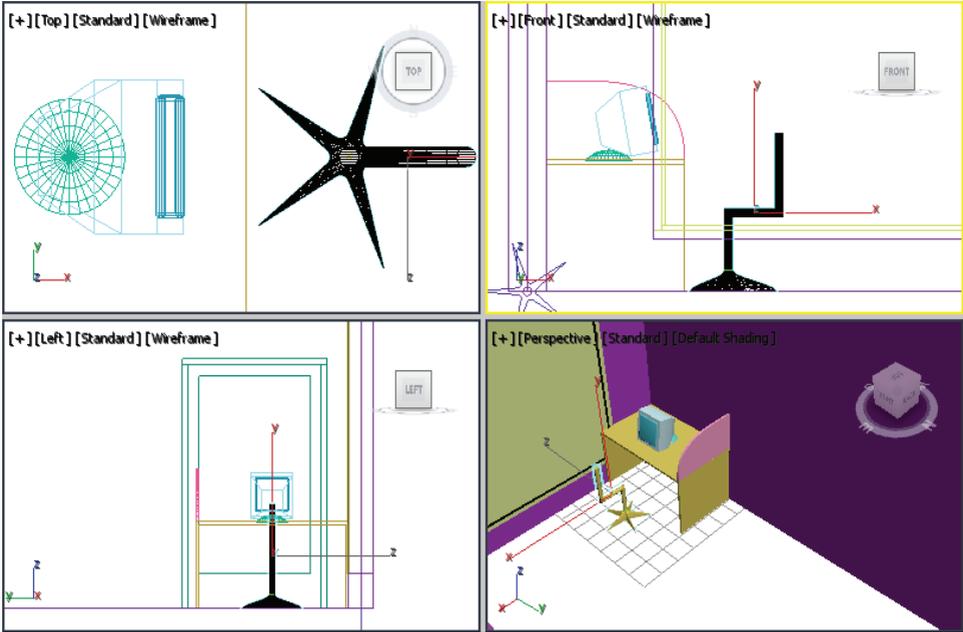


Figure P5-12 The Chair Frame created

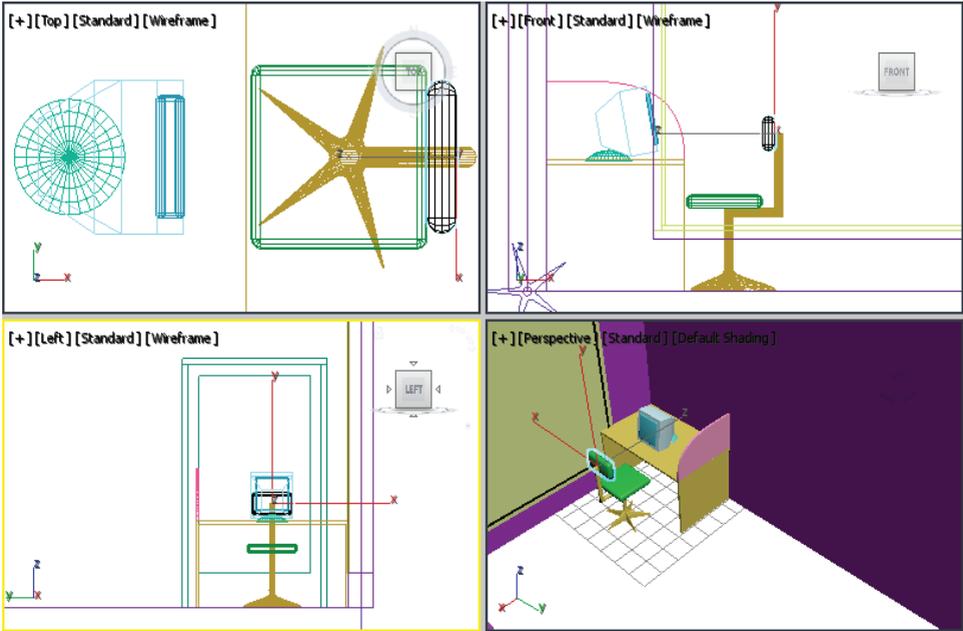


Figure P5-13 The chair created

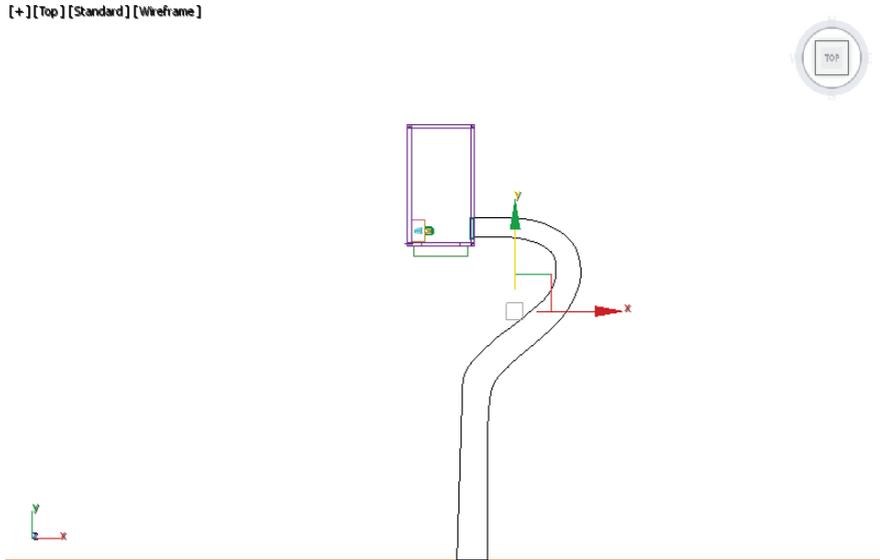


Figure P5-14 Path leading to computer center

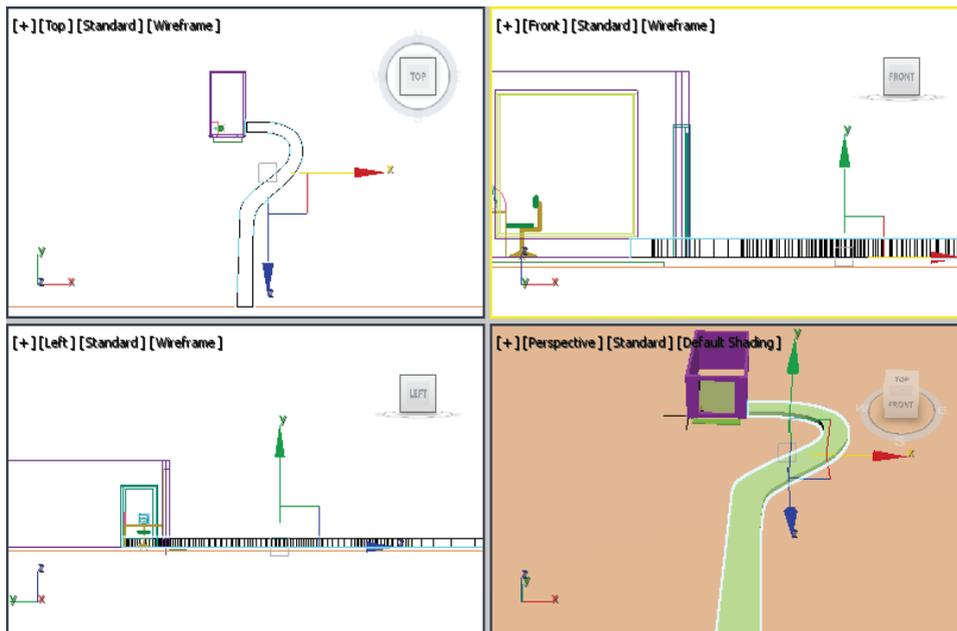


Figure P5-15 Path extruded

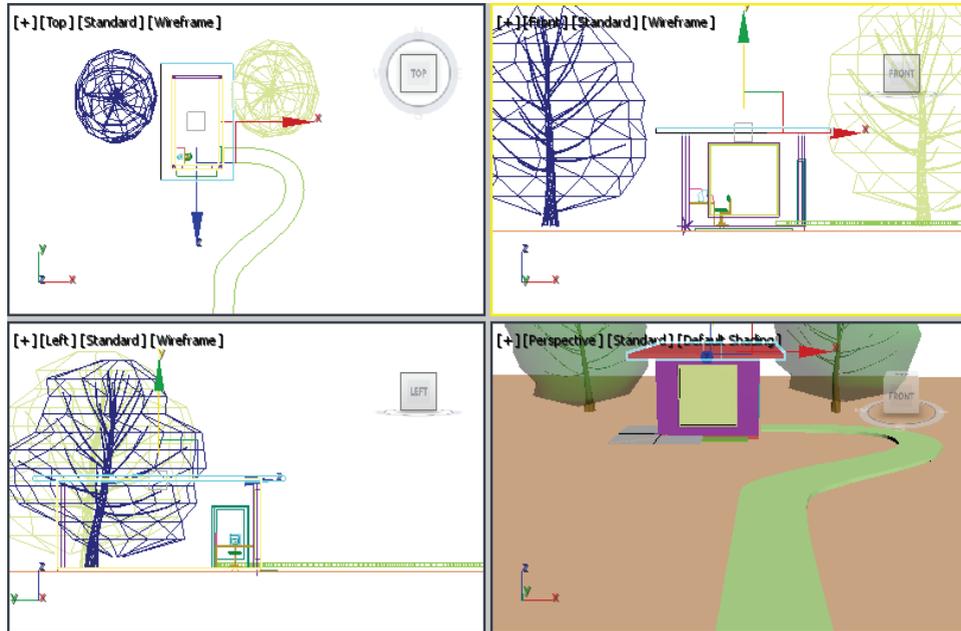


Figure P5-16 The roof aligned on the top of walls

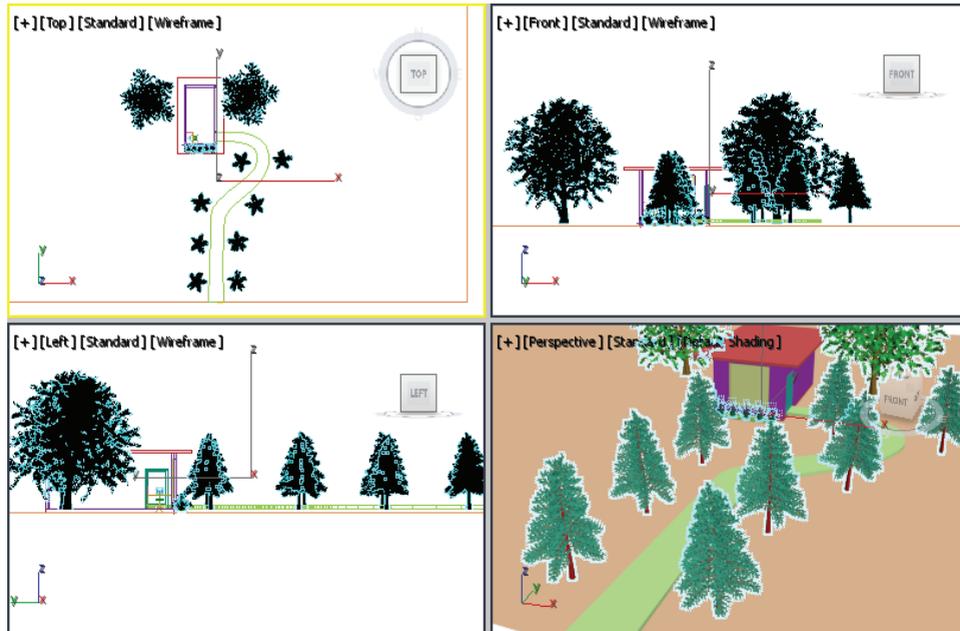


Figure P5-17 The trees aligned around Path

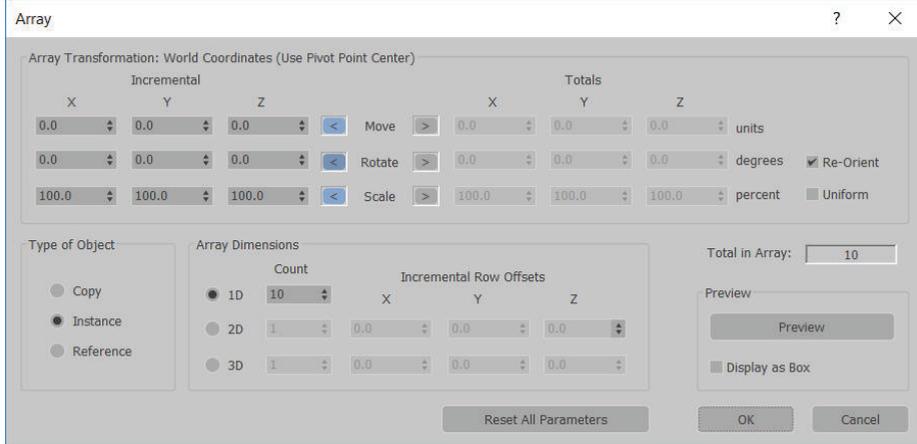


Figure P5-18 The Array dialog box

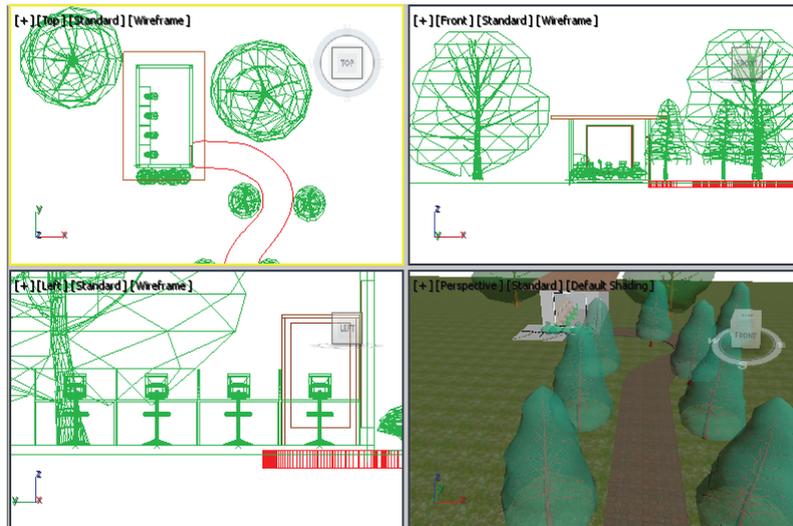


Figure P5-19 The first row of computer stations created

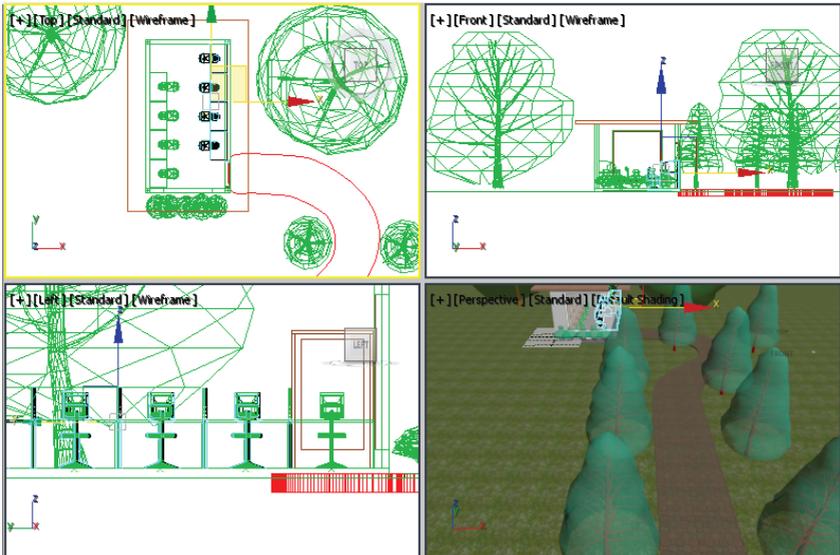


Figure P5-20 The second row of computer stations created and aligned

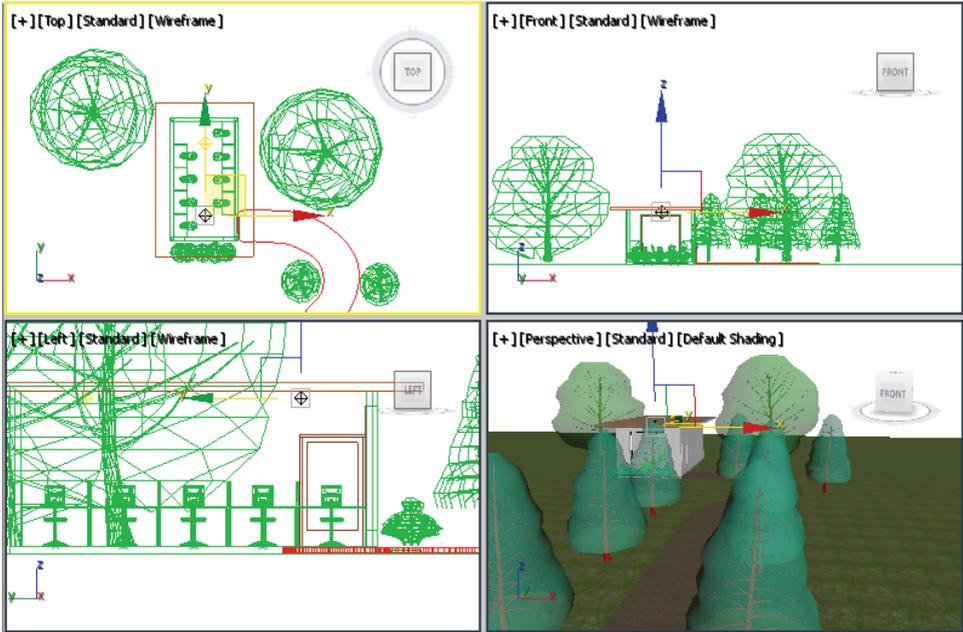


Figure P5-21 The omni lights created and aligned in the viewports

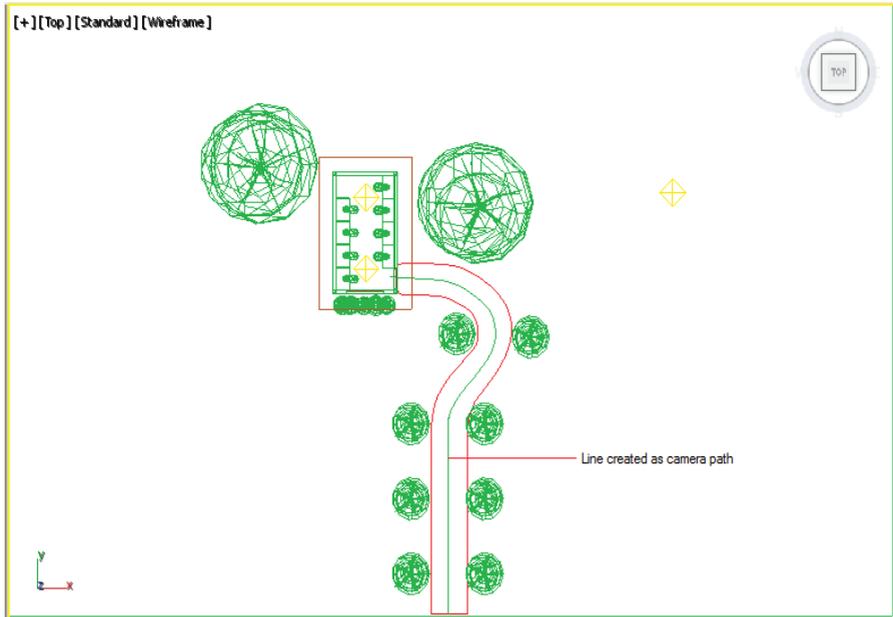


Figure P5-22 Line created as Camera Path

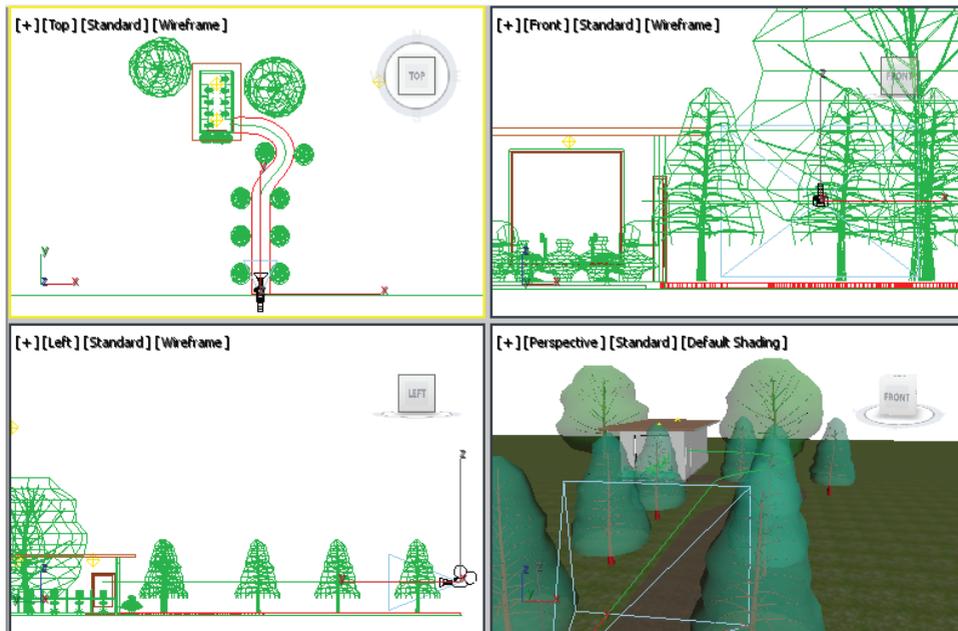
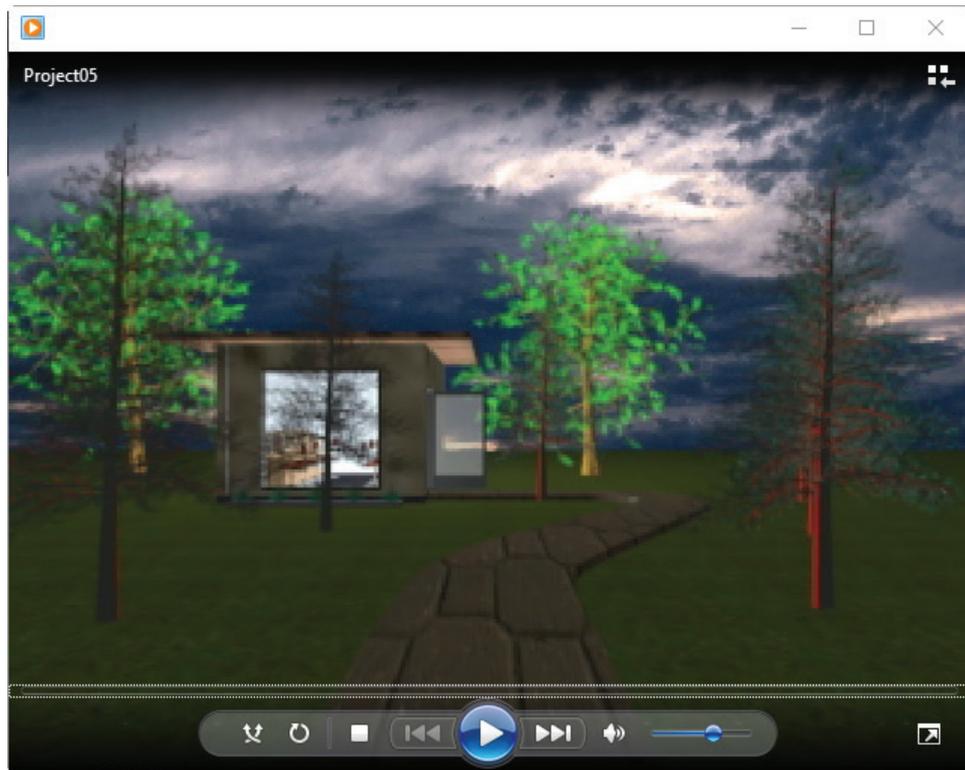


Figure P5-23 The camera placed at the start point of Camera Path



*Figure P5-24 The final animation being played leading the path to the computer center*

# ***Student Project***



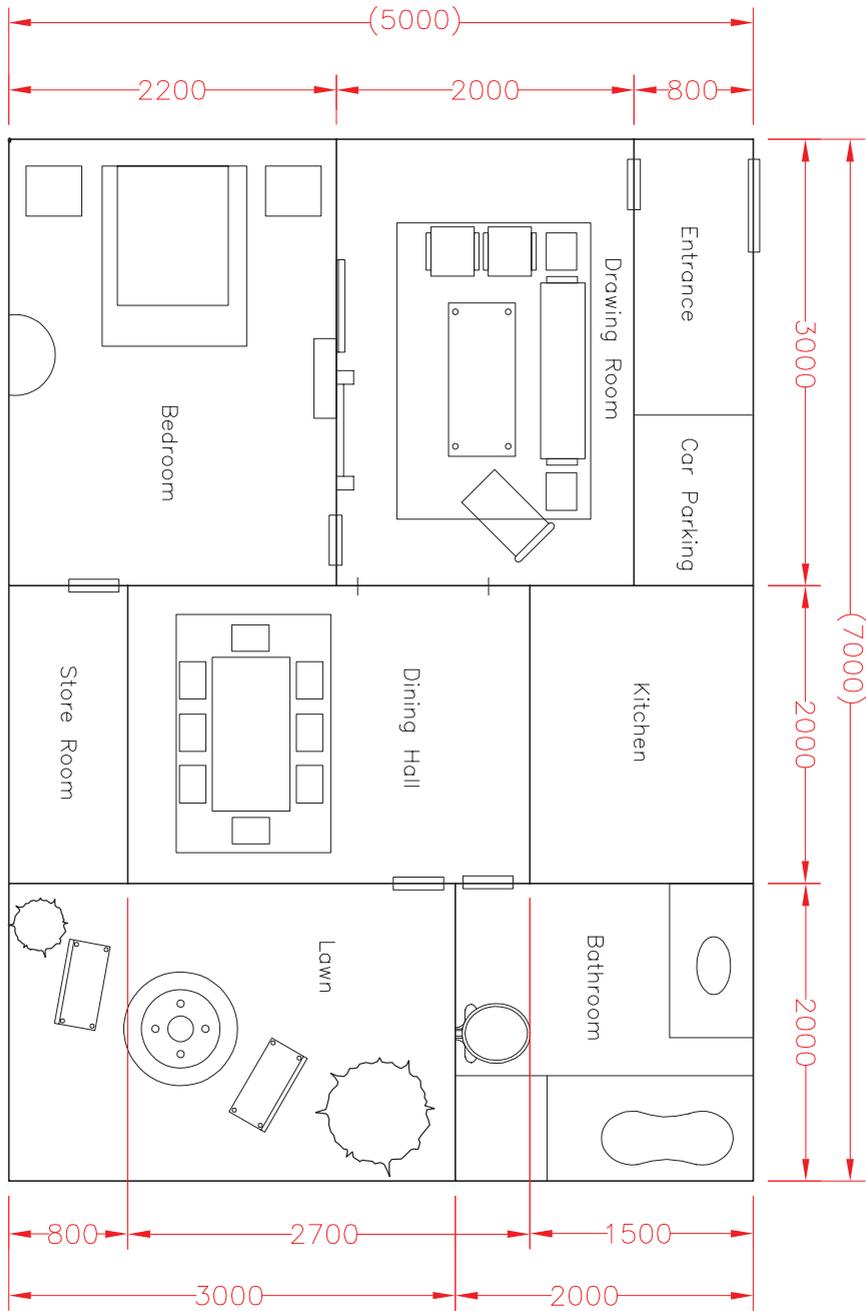
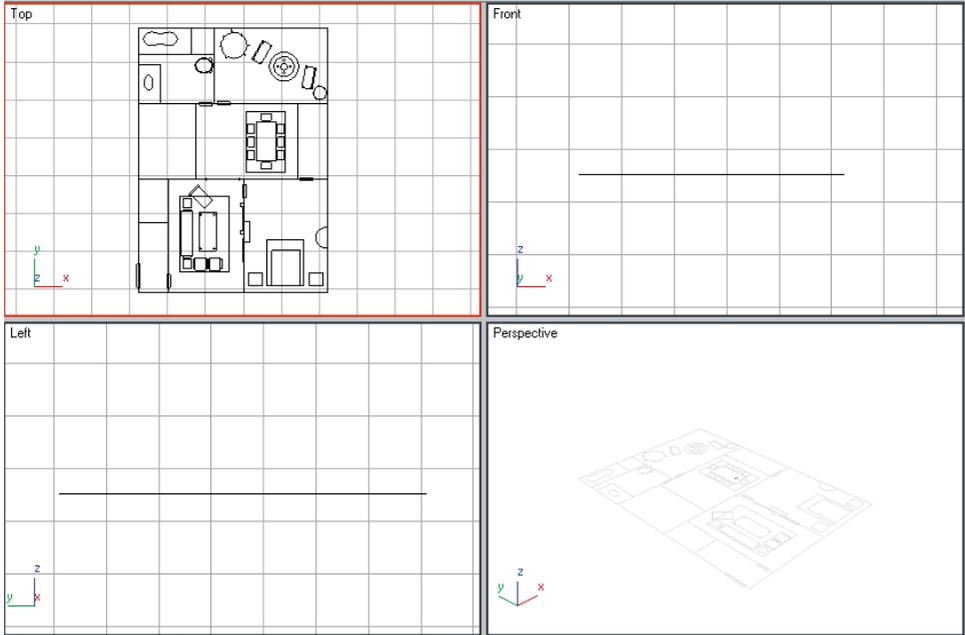


Figure SP-1 The AutoCAD drawing for the student project (house)



*Figure SP-2 The drawing file imported to Autodesk 3ds Max 2021*



*Figure SP-3 Bedroom (View 1)*



*Figure SP-4 Bedroom (View 2)*



*Figure SP-5 Bedroom (View 3)*



*Figure SP-6 Kitchen*



*Figure SP-7 Dining room (View 1)*



*Figure SP-8 Dining room (View 2)*



*Figure SP-9 Dining room (View 3)*



*Figure SP-10 Drawing room (View 1)*



*Figure SP-11 Drawing room (View 2)*



*Figure SP-12 Drawing room (View 3)*



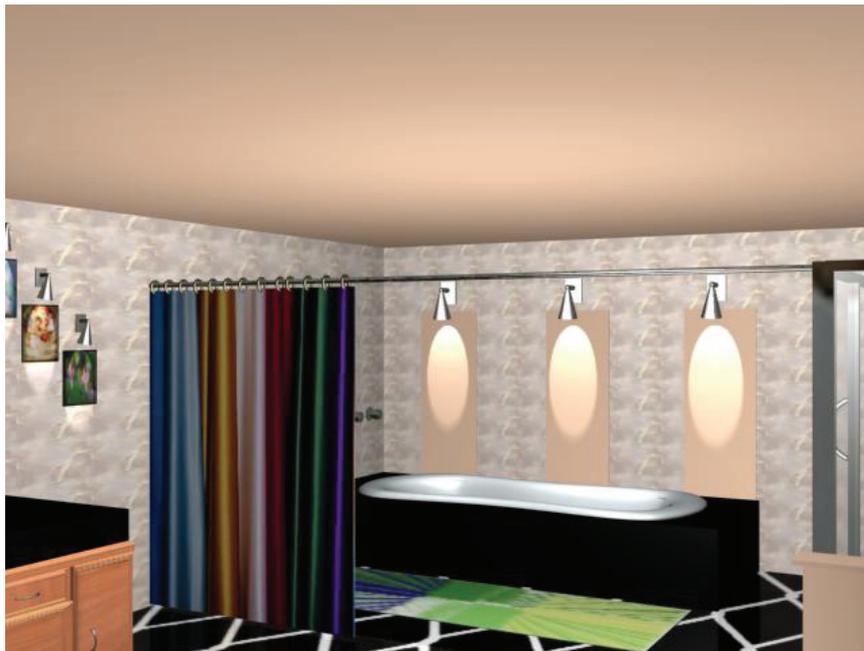
*Figure SP-13 Bathroom (View 1)*



*Figure SP-14 Bathroom (View 2)*



*Figure SP-15 Bathroom (View 3)*



*Figure SP-16 Bathroom (View 4)*



*Figure SP-17 Bathroom (View 5)*



*Figure SP-18 Bathroom (View 6)*



*Figure SP-19 The lawn*