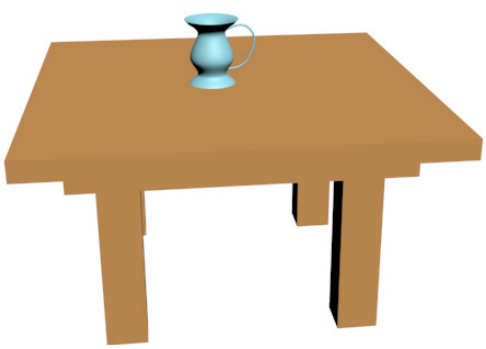
Chapter 5

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*





INTRODUCTION

In the previous chapter, you learned to create and modify different shapes using splines. In this chapter, you will learn to create 3D objects using splines. You will also learn the use of the **Lathe** modifier.

TUTORIALS

Tutorial 1

In this tutorial, you will create a model of a table consisting of a top, frame, and legs by extruding simple shapes. You will also create a jug with a handle and place it on the table, refer to Figure 5-1. **(Expected time: 30 min)**



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

The following steps are required to complete this tutorial:

a. Create the project folder.
b. Create the top.
c. Extrude the top.
d. Create the frame.
e. Create the leg.
f. Copy the legs.
g. Rotate the table.
h. Create the jug.
i. Create the handle.
j. Loft the handle.
k. Join the handle to the jug.
l. Smoothen the jug and add thickness to it.
m. Save and render the scene.

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Creating the Project Folder

Create the project folder with the name *c05_tut1* in the *3dsmax 2024* folder, as discussed in Tutorial 1 of Chapter 2.

Creating the Top

In this section, you will create a top of the table using the **Rectangle** tool.

1. Choose **Create > Shapes** in the **Command Panel**; the **Splines** option is displayed in the drop-down list located below the **Shapes** button.



2. Invoke the **Rectangle** tool from the **Object Type** rollout.

3. Activate the Top viewport.

4. Expand the **Keyboard Entry** rollout and set the value **200** in both the **Length** and **Width** spinners. Next, choose the **Create** button; a rectangle is created.

5. Invoke the **Zoom Extents All** tool from viewport navigation controls to zoom the rectangle to its extents in all viewports, as shown in Figure 5-2.

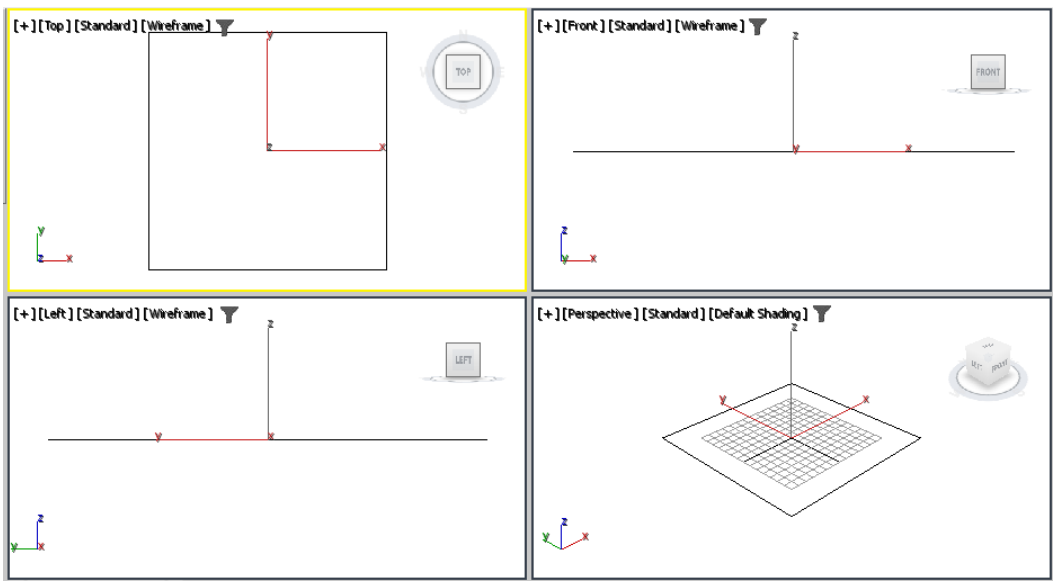

Figure 5-2 *The rectangle created for the table top*

6. In the **Name and Color** rollout, enter **Top** as the name of the object.

Extruding the Top

In this section, you will extrude *Top* to give it a thickness.

1. Make sure *Top* is selected. Next, choose the **Modify** tab in the **Command Panel.**



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2. Select **Extrude** from the **OBJECT-SPACE-MODIFIERS** section in the **Modifier List** drop-down list; the **Extrude** modifier is applied to the rectangle.

3. In the **Parameters** rollout, set the value **10** in the **Amount** spinner and press the ENTER key; *Top* is extruded by 10 units, as shown in Figure 5-3.

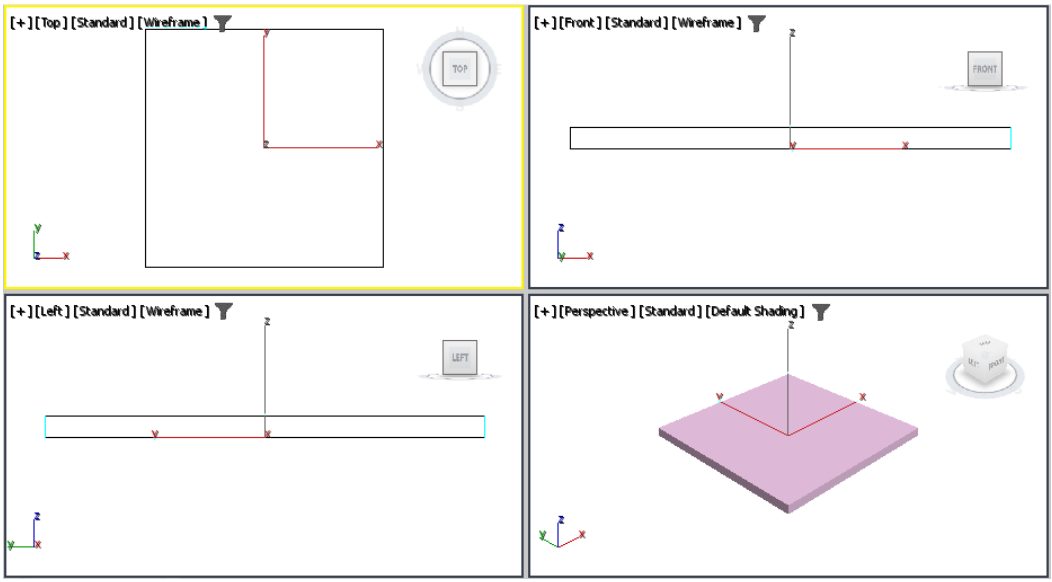

Figure 5-3 *The Top extruded by 10 units*

Creating the Frame

In this section, you will create a frame to support the legs of the table using the **WRectangle** tool.

1. Make sure the Top viewport is activated.

2. Choose **Create > Shapes** in the **Command Panel**; the **Splines** option is displayed in the drop-down list below the **Shapes** button. Select **Extended Splines** from this drop-down list; the extended spline tools are displayed in the **Object Type** rollout. Next, invoke the **WRectangle** tool.

3. Expand the **Keyboard Entry** rollout and set the values in the spinners as given next:

   Length: **160** Width: **160** Thickness: **12**

   Choose the **Create** button; *WRectangle001* spline is created.

4. In the **Name and Color** rollout, enter **Frame** as the name of the object.

   Next, you need to extrude *Frame*.

5. Make sure *Frame* is selected. Next, choose the **Modify** tab in the **Command Panel**. 

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6. Select **Extrude** from the **OBJECT-SPACE-MODIFIERS** section in the **Modifier List** drop-down list; the **Extrude** modifier is applied to *Frame*.

7. In the **Parameters** rollout, set the value **15** in the **Amount** spinner; *Frame* is extruded by 15 units, as shown in Figure 5-4.

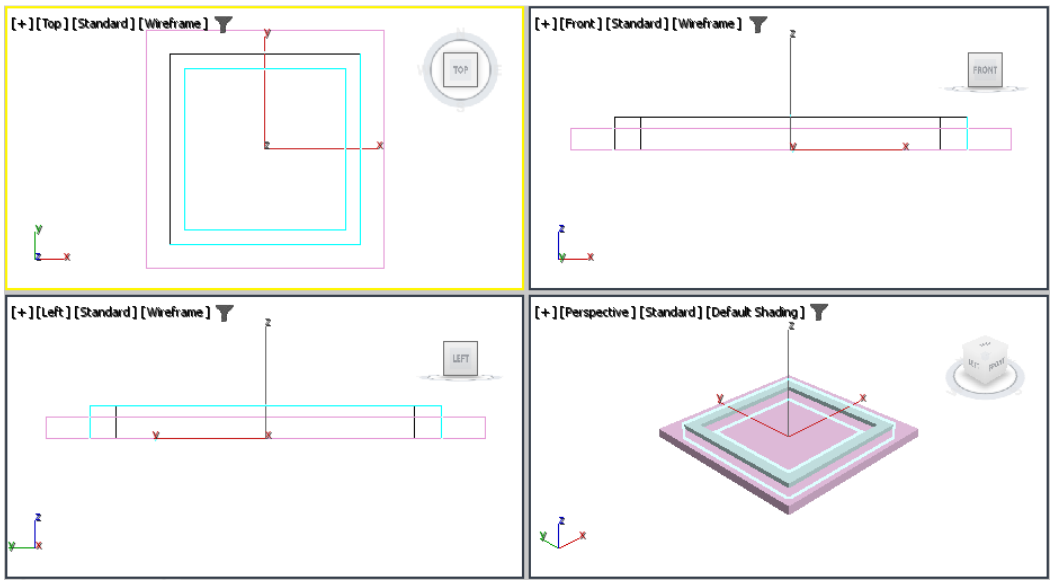

Figure 5-4 *The Frame extruded by 15 units*

8. Invoke the **Select and Move** tool from the **Main Toolbar** and then choose the **Transform Gizmo Y Constraint** button from the **Axis Constraints** toolbar.

9. In the Front viewport, move *Frame* so that its bottom touches the upper part of *Top*, as shown in Figure 5-5.

Creating the Leg

In this section, you will create a leg at one of the corners of *Frame* using the **Rectangle** tool.

1. Activate the Top viewport and then choose **Create > Shapes** in the **Command Panel**.

2. Select **Splines** from the drop-down list located below the **Shapes** button and then invoke the **Rectangle** tool from the **Object Type** rollout.

3. Expand the **Keyboard Entry** rollout and set the value **20** in the **Length** and **Width** spinners each. Next, choose the **Create** button; the rectangle is created at the center of the table.

4. In the **Name and Color** rollout, enter **Leg01** as the name of the object.

5. Make sure *Leg01* is selected. Next, choose the **Modify** tab in the **Command Panel**. 

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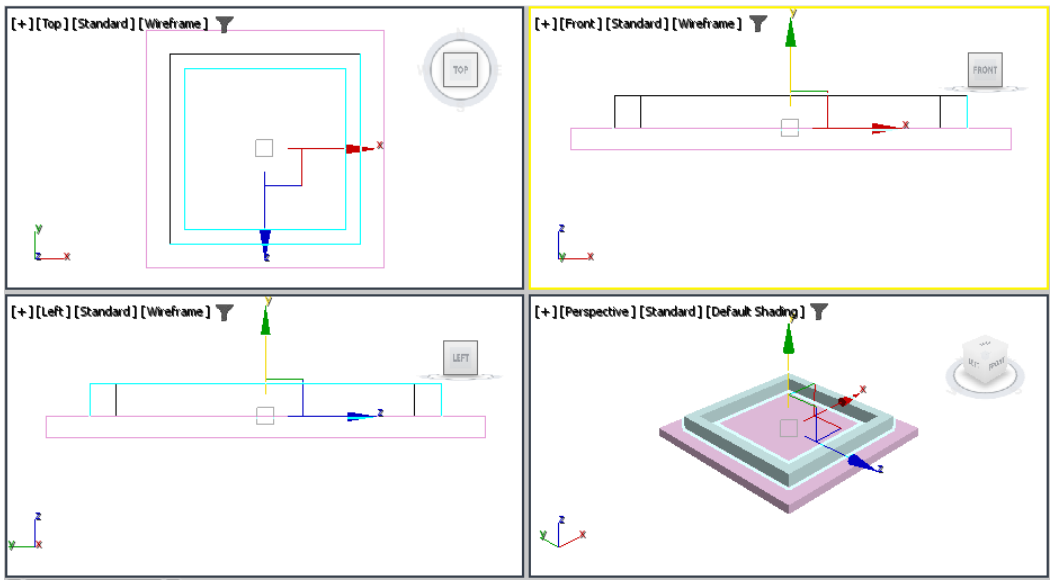

Figure 5-5 *The Frame aligned*

6. Select **Extrude** from the **OBJECT-SPACE-MODIFIERS** section in the **Modifier List** drop-down list; the **Extrude** modifier is applied to the rectangle.

7. In the **Parameters** rollout, set the value **100** in the **Amount** spinner; *Leg01* is extruded by 100 units.

8. Invoke the **Select and Move** tool from the **Main Toolbar** and then choose the **Transform Gizmo XY Plane Constraint** button from the **Axis Constraints** toolbar.

9. Move *Leg01* to the lower-left inner corner of *Frame*.

10. Activate the Front viewport. Choose the **Transform Gizmo Y Constraint** button from the **Axis Constraints** toolbar and move *Leg01* up so that its bottom touches the upper part of *Top* (not *Frame*).

11. Invoke the **Zoom Extents All** tool from the viewport navigation control to view all objects properly.

Copying the Legs

In this section, you will copy *Leg01* to the other three corners of *Frame*.

1. Activate the Top viewport. Make sure the **Select and Move** tool is invoked and then choose the **Transform Gizmo Y Constraint** button from the **Axis Constraints** toolbar, if it is not already invoked.

2. Select *Leg01* and then choose **Edit > Duplicate > Clone** from the menu bar; the **Clone Options** dialog box is displayed.

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3. In this dialog box, enter **Leg02** in the **Name** text box and make sure the **Copy** radio button is selected, as shown in Figure 5-6. Next, choose the **OK** button; *Leg02* is created over *Leg01*.

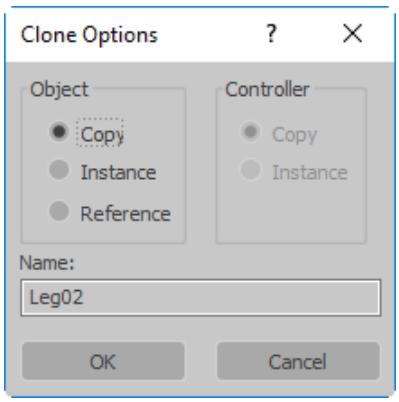

Figure 5-6 *The* ***Clone Options*** *dialog box*

4. Move *Leg02* to the upper-left corner of the frame.

5. Select *Leg02* and then choose **Edit > Clone** from the menu bar; the **Clone Options** dialog box is displayed. In this dialog box, enter **Leg03** in the **Name** text box and then choose the **OK** button. Next, choose the **Transform Gizmo X Constraint** button. Next, move *Leg03* to the upper-right corner of the frame.

6. Similarly, create a copy of *Leg03*. Next, name it as **Leg04** and place it at the lower-right corner of *Frame*; the four legs of table are created and aligned, as shown in Figure 5-7.

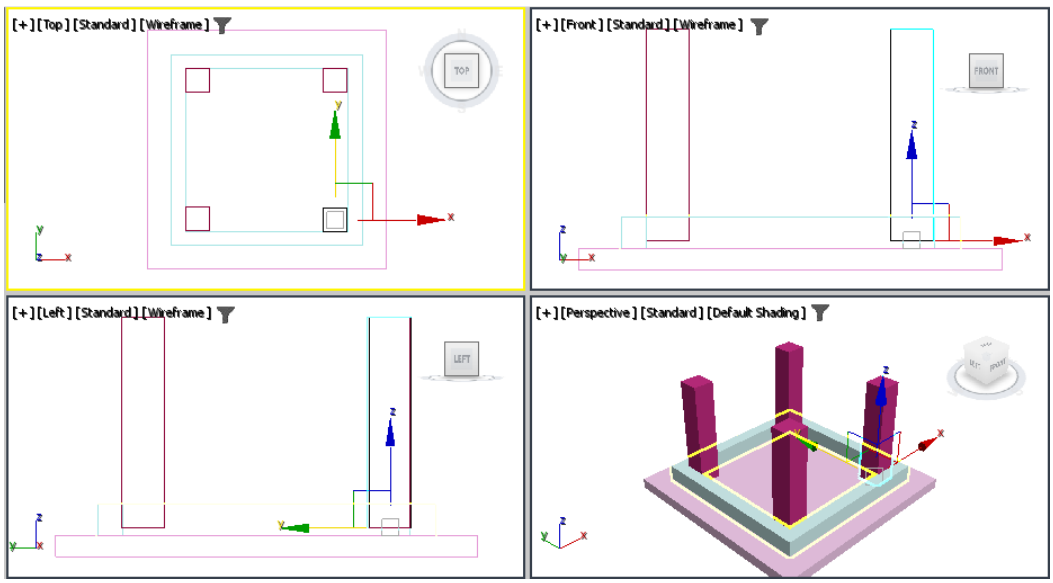

Figure 5-7 *The four legs of the table created and aligned to their correct places*

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7. Select all objects in the viewport. Choose **Group > Group** from the menu bar; the **Group** dialog box is displayed. In this dialog box, enter **Table** in the **Group name** text box and then choose the **OK** button to close the dialog box; *Table* group is created.

Rotating the Table

In this section, you will rotate the table so that it stands up on its legs.

1. Activate the Front viewport. Invoke the **Select and Rotate** tool from the **Main Toolbar** and then choose the **Transform Gizmo Y Constraint** button from the **Axis Constraints** toolbar.

2. Invoke the **Use Selection Center** tool from the Pivot Point flyout in the **Main Toolbar**.

   The **Use Selection Center** tool enables you to rotate the selected objects around their collective geometric center.

3. Right-click on the **Select and Rotate** tool in the **Main Toolbar**; the **Rotate Transform Type-In** dialog box is displayed. Set the value **180** in the **Z** spinner in the **Offset:Screen** area of this dialog box and then press the ENTER key; *Table* is rotated in upright position, as shown in Figure 5-8. Next, close this dialog box.

4. Invoke the **Zoom Extents All** tool from viewport navigation controls; *Table* is zoomed to its extents in all four viewports, refer to Figure 5-8.

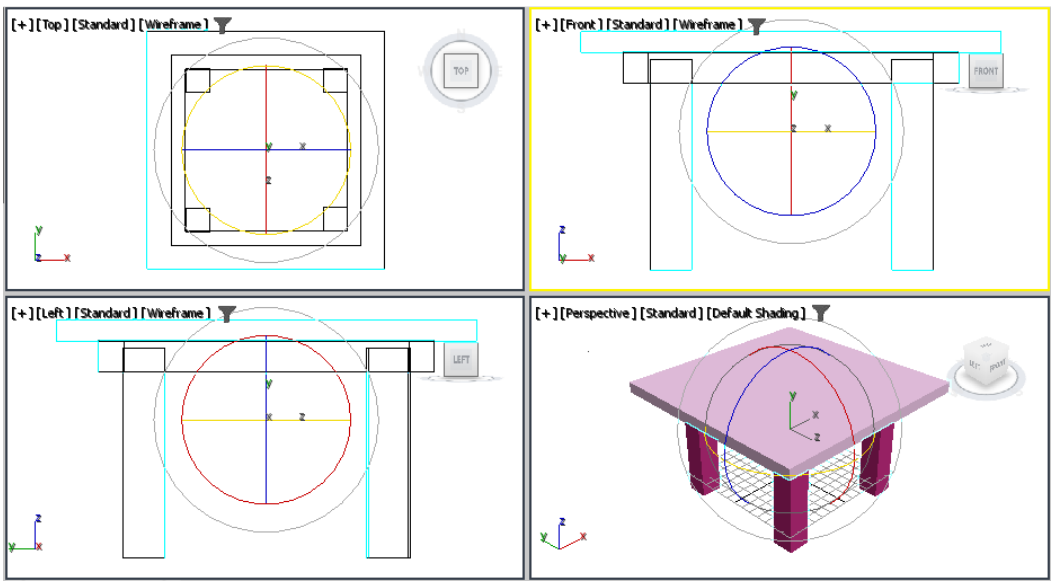

Figure 5-8 *Table rotated upright to stand on its legs*

5. Use the **Maximize Viewport Toggle** tool from the viewport navigation controls to maximize the Front viewport.

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Creating the Jug

In this section, you will create a jug on the table by using the **Line** tool and the **Lathe** modifier.

1. Maximize the Front viewport and invoke the **Use Pivot Point Center** tool from the Pivot Point flyout in the **Main Toolbar**.

2. Invoke the **Zoom Region** tool from viewport navigation controls and zoom in on a small area surrounding the center of *Top*, as shown in Figure 5-9.



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

3. Choose **Create > Shapes** in the **Command Panel**. Make sure **Splines** is selected in the drop-down list below the **Shapes** button.

4. Invoke the **Line** tool from the **Object Type** rollout.

5. In the Front viewport, place the cursor over the center of the top surface of *Top*. Now, click at this point to specify it as the first vertex of the line.

6. Similarly, click at different points to create the profile of the jug, as shown in Figure 5-10. Note that the profile consists of nearly parallel segments. This will give the jug the required thickness when the **Lathe** modifier is applied to the shape.

7. Right-click to exit the **Line** tool; a double-line profile of the jug is created. Use the **Zoom** and **Pan** tools, if needed, to display the entire profile of the jug, refer to Figure 5-11.

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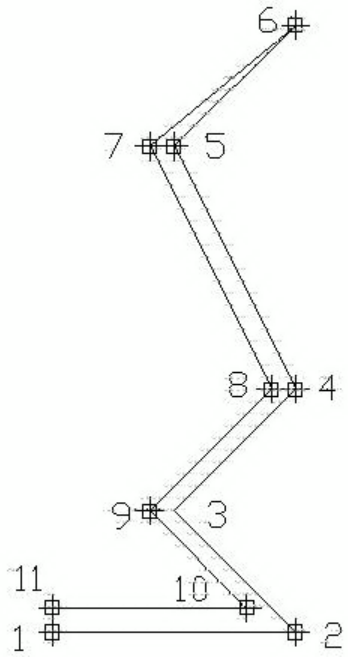

Figure 5-10 *The profile curve of the Jug*

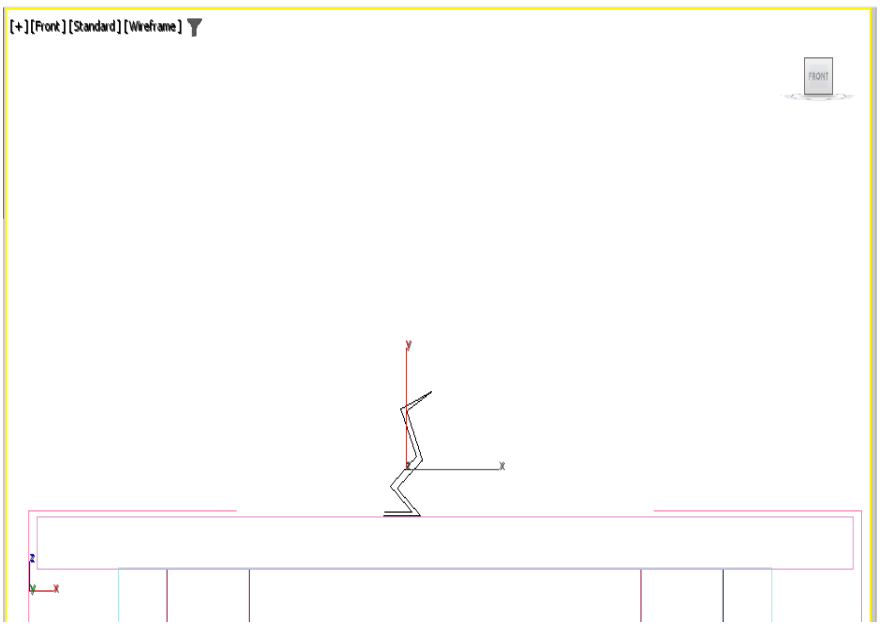

Figure 5-11 *The profile of the Jug*

8. Enter **Jug** in the **Name and Color** rollout.

Next, you will smoothen *Jug* by modifying its vertices.

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9. With *Jug* selected, choose the **Modify** tab in the **Command Panel**. In the **Selection** rollout, choose the **Vertex** button; the **Vertex** sub-object mode is selected and the vertices appear on the profile.

10. Right-click on the inner vertex, refer to Figure 5-12; a quad menu is displayed. Choose **Bezier** from the upper-left quadrant of the quad menu; the spline is curved and the bezier handles are displayed, as shown in Figure 5-12.

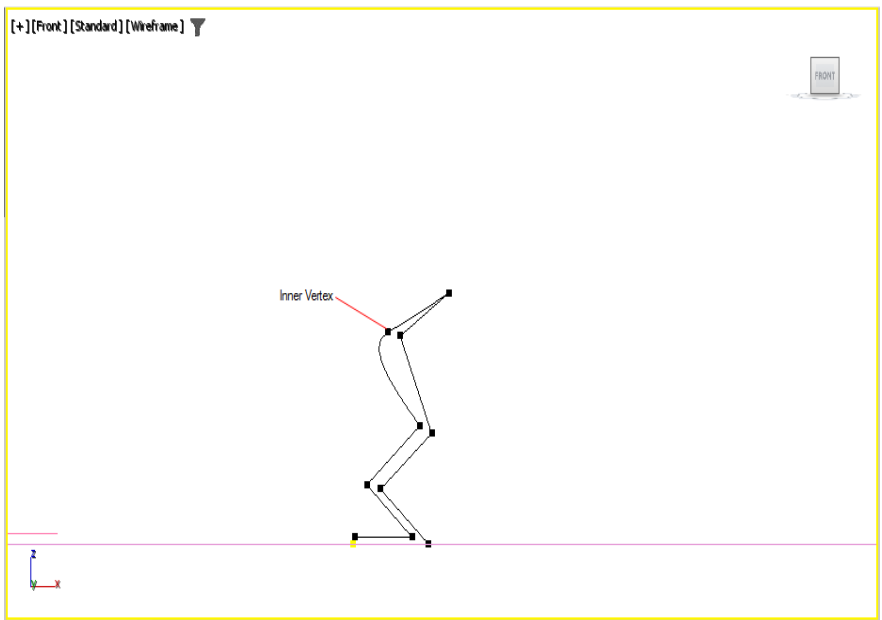

Figure 5-12 *The bezier handles displayed at the vertex*

11. Invoke the **Select and Move** tool from the **Main Toolbar** and choose the **Transform Gizmo XY Plane Constraint** button from the **Axis Constraints** toolbar.

12. Next, hold the upper green handle and drag it to left so that the curve looks similar to the one shown in Figure 5-13. If you make a change by mistake, choose the **Undo Scene Operation** button to undo the previous change.

13. Similarly, change the curvature of the other vertices and move some of them to get the shape of *Jug* similar to the one shown in Figure 5-14. You can move a vertex by directly clicking on it.

Note

You will find snaps useful for selecting vertices, but you may need to disable snaps while moving or changing the curvature of vertices.

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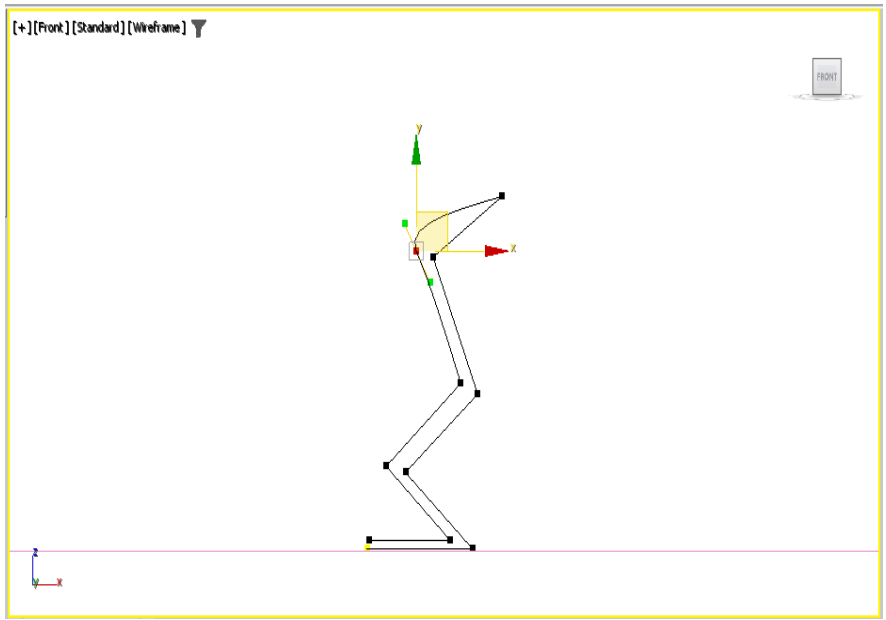

Figure 5-13 *The curve reshaped by dragging the bezier handle*

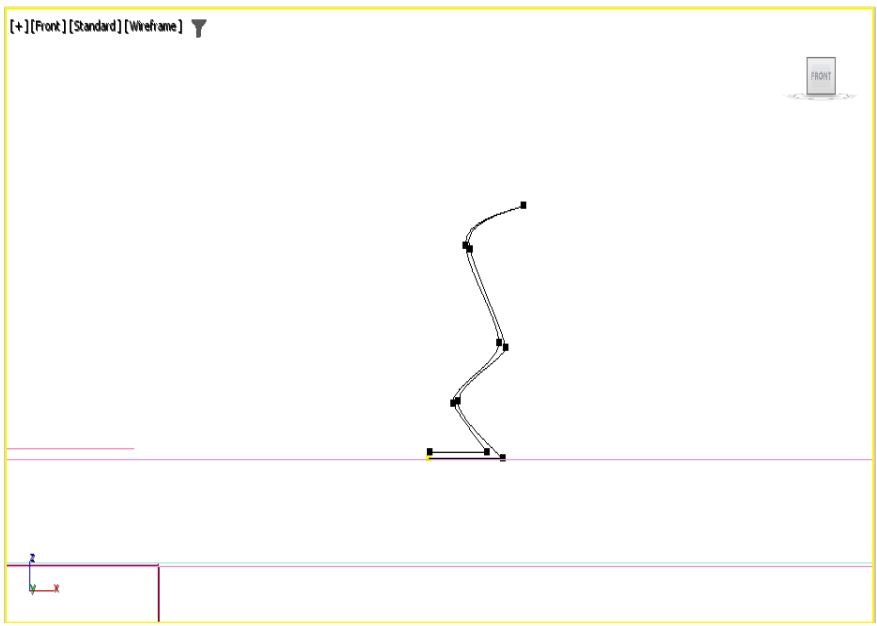

Figure 5-14 *The curve edited by moving the bezier handles of the vertices*

14. In the **Selection** rollout, choose the **Vertex** button again to exit the sub-object mode.

Next, you will spin the profile of *Jug* around its axis to form a complete jug.

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15. Invoke the **Maximize Viewport Toggle** tool from the viewport navigation controls to restore all four viewports. Make sure the profile is selected and invoke the **Zoom Extents All Selected** tool from the viewport navigation controls; the profile is zoomed to its extent in all viewports.

16. Choose the **Modify** tab in the **Command Panel**. Select **Lathe** from the **OBJECT-SPACE-MODIFIERS** section in the **Modifier List** drop-down list; the profile spins around its axis in the middle.

17. Select the **Min** radio button in the **Align** area of the **Parameters** rollout; the profile forms the shape of a jug, refer to Figure 5-15. Invoke the **Zoom Extents All Selected** tool from the viewport navigation controls to zoom the object to its extent.

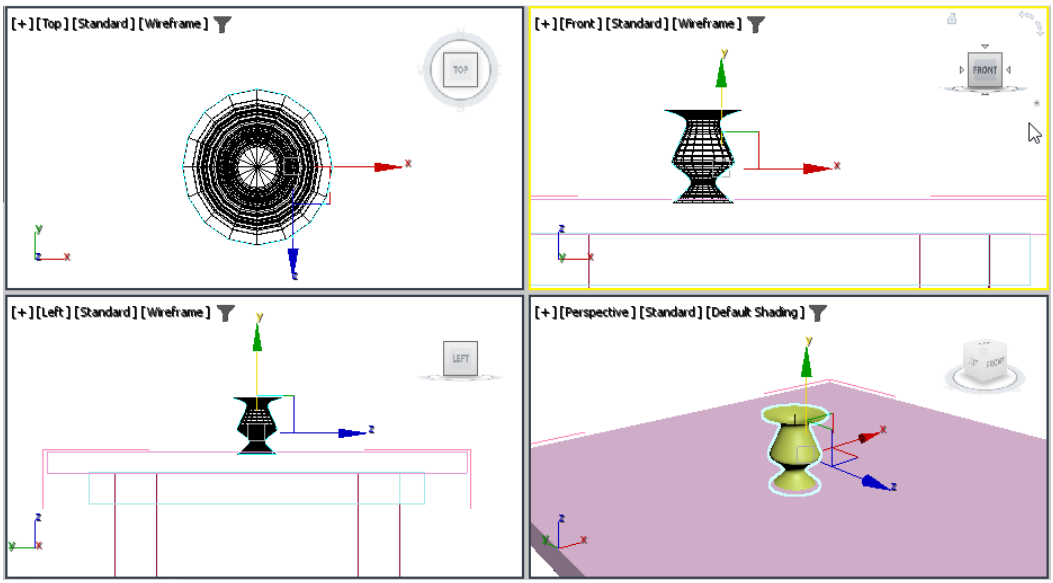

Figure 5-15 *The profile rotated to form the Jug*

18. Invoke the **Zoom Extents All** tool from the viewport navigation controls; all objects are zoomed to their extents in all viewports.

Creating the Handle

In this section, you will create a handle for *Jug* by using the **Circle** and **Loft** tools.

1. Maximize the Front viewport. Invoke the **Zoom Region** tool from the viewport navigation controls and zoom in the right-hand side of *Jug* such that you can create more space to accommodate the handle.

2. Choose **Create > Shapes** in the **Command Panel**. Next, make sure the **Line** tool is invoked from the **Object Type** rollout.

3. Click at a point slightly below the neck and make sure the point is placed inside the outer line of *Jug*, as shown in Figure 5-16.

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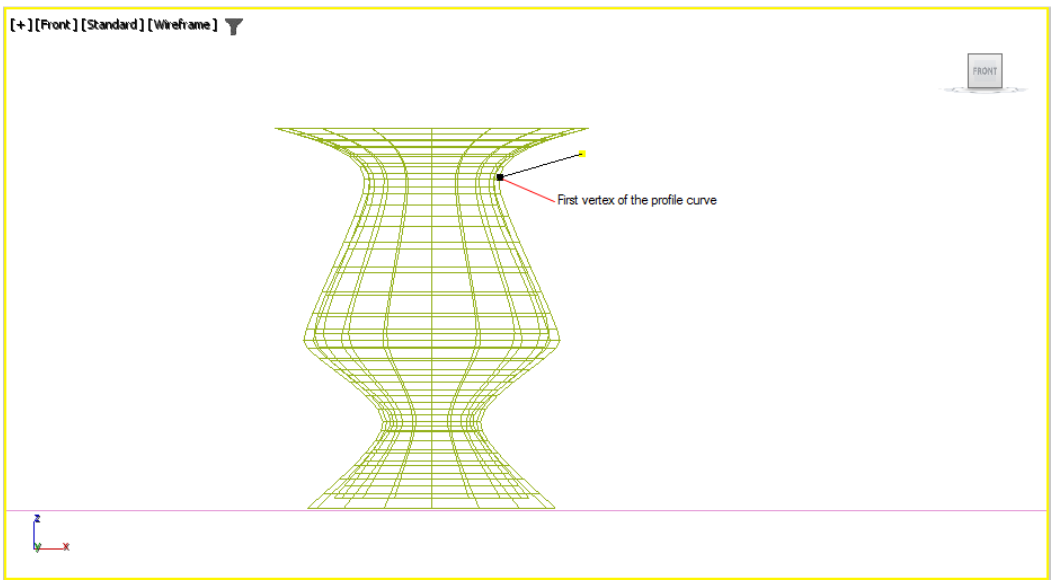

Figure 5-16 *The first vertex placed within the profile*

4. Similarly, click at other points to form a curve, refer to Figure 5-17. Right-click to exit the **Line** tool; the shape of the handle is created, as shown in Figure 5-17.

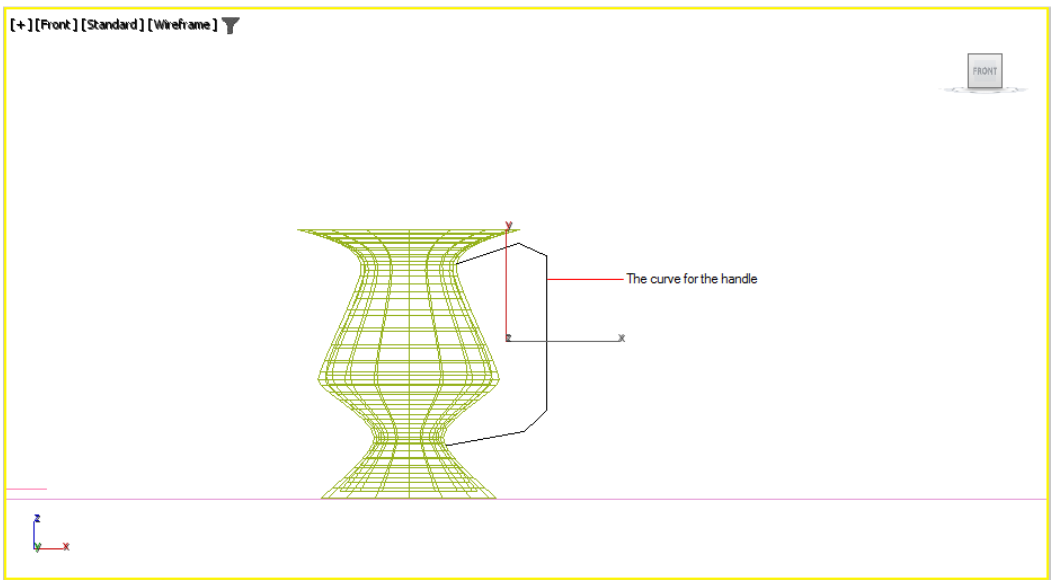

Figure 5-17 *The curve for the handle of the Jug*

You may need to adjust the coordinates given depending on the profile of your *Jug*.

5. In the **Name and Color** rollout, enter **Handle** as the name of the object.

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6. With *Handle* selected, choose the **Modify** tab in the **Command Panel**. In the **Selection** rollout, choose the **Vertex** button; the **Vertex** sub-object mode is selected and the vertices appear on the profile.

7. Invoke the **Select and Move** tool from the **Main Toolbar** and right-click on the second vertex. Choose **Bezier** from the quad menu and then move *Handle* to get the desired curve. Similarly, modify the rest of the vertices of *Handle* as needed to form a curved shape, as shown in Figure 5-18.

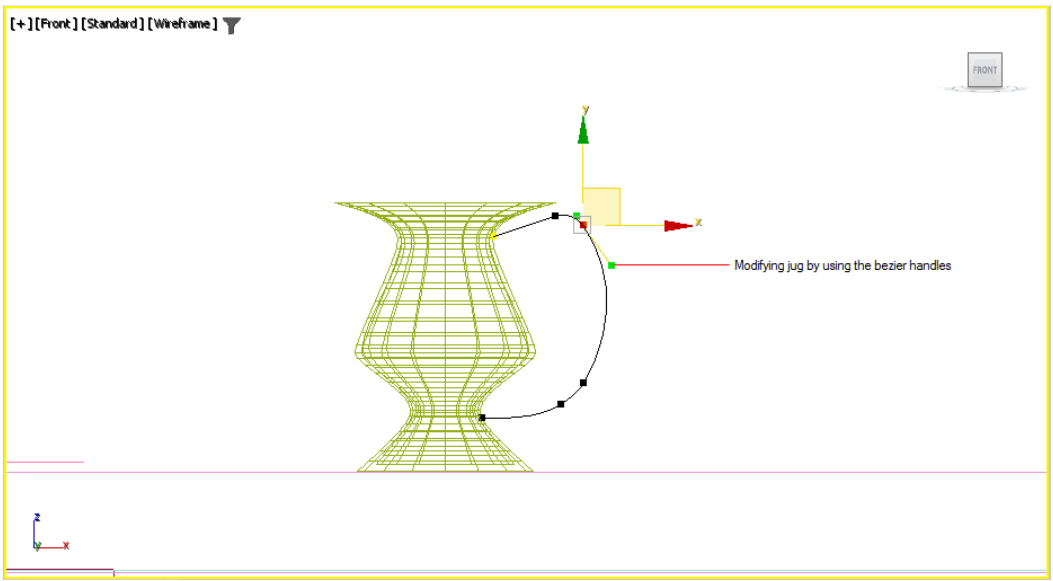

Figure 5-18 *The Handle modified by moving the bezier handles*

8. Choose the **Vertex** button again to exit the vertex selection mode.

Lofting the Handle

In this section, you will add thickness to the handle. This can be done by creating a circle and then lofting it along a path.

1. Choose **Create > Shapes** in the **Command Panel**. Next, invoke the **Circle** tool. Create a circle anywhere in the viewport, as shown in Figure 5-19. Set the value **0.5** in the **Radius** spinner of the **Parameters** rollout.

2. Select *Handle* from the **Scene Explorer** located at the left in the interface.

3. Choose **Create > Geometry** in the **Command Panel**. Select **Compound Objects** from the drop-down list located below it. Next, invoke the **Loft** tool from the **Object Type** rollout; different rollouts for the loft object are displayed.

4. In the **Creation Method** rollout, make sure the **Instance** radio button is selected and then choose the **Get Shape** button; the shape of the cursor changes.

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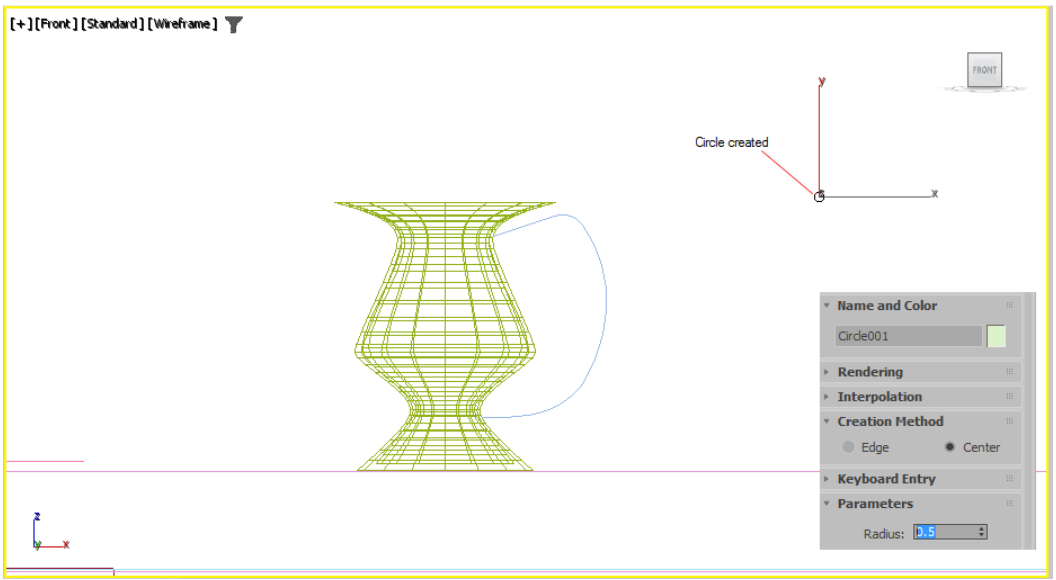

Figure 5-19 *The circle created*

5. Select the circle. Next, right-click in the viewport to exit the tool.

   The circle is placed on the vertices of the path (*Handle*) and is automatically named as **Loft001**.

6. Enter **Handle** in the **Name and Color** rollout. Invoke the **Select Object** tool to complete the operation.

7. Delete the circle. Next, invoke the **Maximize Viewport Toggle** tool to restore the four-viewport configuration. Now, invoke the **Zoom Extents All** tool to view all objects properly.

Smoothening and Adding Thickness to the Jug

In this section, you will add smoothness and thickness to *Jug* by increasing the segments in the **Lathe** modifier and using the **Shell** modifier.

1. Select *Jug*. Next, select **Lathe** from the modifier stack. In the **Parameters** rollout, set **26** in the **Segments** spinner; *Jug* is smoothened.

2. Make sure the **Modify** tab is chosen in the **Command Panel**. Select **Shell** from the **OBJECT-SPACE-MODIFIERS** section in the **Modifier List** drop-down list; the **Shell** modifier is added to the modifier stack.

3. In the **Parameters** rollout, set **0.65** in the **Outer Amount** spinner. You will notice that thickness is added to *Jug*.

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Joining the Handle and the Jug

In this section, you will join *Handle* with *Jug* using the **Boolean** tool.

1. Invoke the **Zoom Region** tool from the viewport navigation controls to zoom in the Top viewport and make sure that *Handle* is centered on *Jug*. If not, move *Handle* as required.

2. Select *Handle*. Next, select **Compound Objects** from the drop-down list below the **Geometry** button. Next, invoke the **Boolean** tool from the **Object Type** rollout; different rollouts for a boolean object are displayed.

3. Choose the **Add Operands** button in the **Boolean Parameters** rollout. Next, choose the **Union** button in the **Operand Parameters** rollout and select *Jug* in any viewport. Now, invoke the **Select Object** tool from the **Main Toolbar** to complete the operation; *Jug* and *Handle* are joined to make a single object, as shown in Figure 5-20.

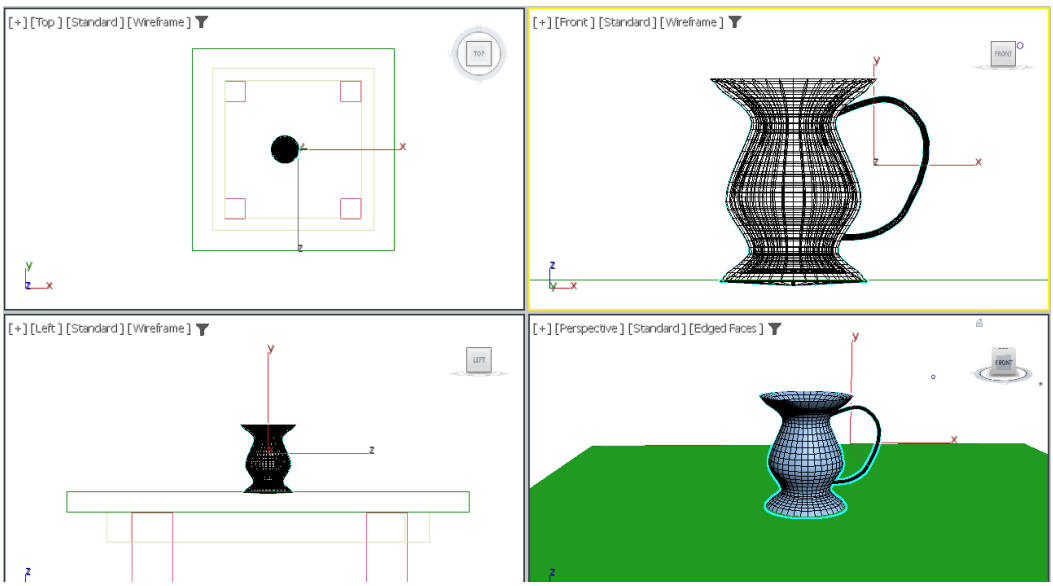

Figure 5-20 *Using the boolean operation to join the Handle and Jug*

4. In the **Name and Color** rollout, enter the name of the object as **jug**. Invoke the **Zoom Extents All** tool from viewport navigation controls to view the objects to their extents.

5. Select *Table*. In the **Name and Color** rollout, change the color of *Table* using the color swatch.

Saving and Rendering the Scene

In this section, you will save the scene that you have created and then render it. You can also view the final rendered image of this scene by downloading the *c05_3dsmax_2024_rndr.zip* file from *www.cadcim.com*. The path of the file is as follows: *Textbooks > Animation and Visual Effects > Autodesk 3ds Max > Autodesk 3ds Max 2024 for Beginners: A Tutorial Approach*

1. Choose **Save** from the **File** menu.

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2. Change the background color to white as discussed in the earlier chapters.

3. Activate the Perspective viewport. Next, invoke the **Render Production** tool from the **Main Toolbar**; the rendered image is displayed, refer to Figure 5-21.



Figure 5-21 *The rendered image*

Tutorial 2

In this tutorial, you will create the model of a lamp post, as shown in Figure 5-22, using various spline tools. **(Expected time: 25 min)**



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

The following steps are required to complete this tutorial:

a. Create the project folder.
b. Create the base.
c. Create the pillar.

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d. Create the joint.
e. Create the lamp holder.
f. Add details.
g. Save and render the scene.

Creating the Project Folder

Create a project folder with the name *c05_tut2* in the *3dsmax 2024* folder as discussed in Tutorial 1 of Chapter 2.

Creating the Base

In this section, you will create the base of the lamp post by using the **Box** tool.

1. Activate the Top viewport and then choose **Create > Shapes** in the **Command Panel**; the **Splines** option is displayed in the drop-down list located below it. Next, invoke the **Rectangle** tool from the **Object Type** rollout.

2. Expand the **Keyboard Entry** rollout and set the values in the spinners as given next:

   Length: **3** Width: **3**

   Choose the **Create** button; a square is created in all viewports.

3. Enter **base** in the **Name and Color** rollout. Invoke the **Zoom Extents All** tool; *base* is zoomed in all viewports, as shown in Figure 5-23.

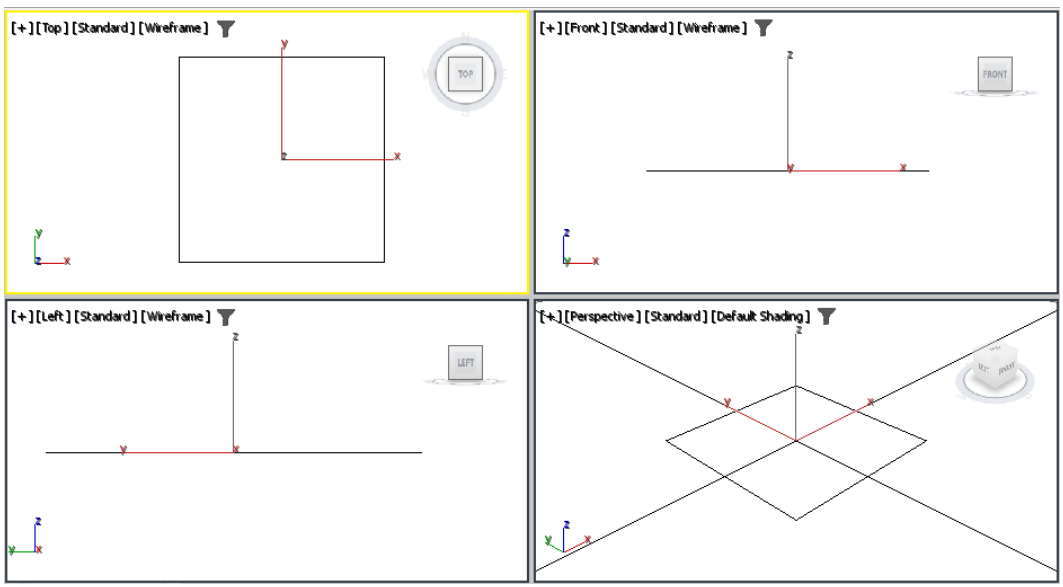

Figure 5-23 *The base zoomed in all viewports*

4. Choose the **Modify** tab in the **Command Panel**. Next, select the **Extrude** option from the **OBJECT-SPACE-MODIFIERS** section in the **Modifier List** drop-down list; the **Extrude**

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modifier is applied to *base* and displayed in the modifier stack. Also, various rollouts of this modifier are displayed in the **Command Panel**.

5. In the **Parameters** rollout, set the value **0.4** in the **Amount** spinner and press the ENTER key; *base* is extruded, as shown in Figure 5-24.

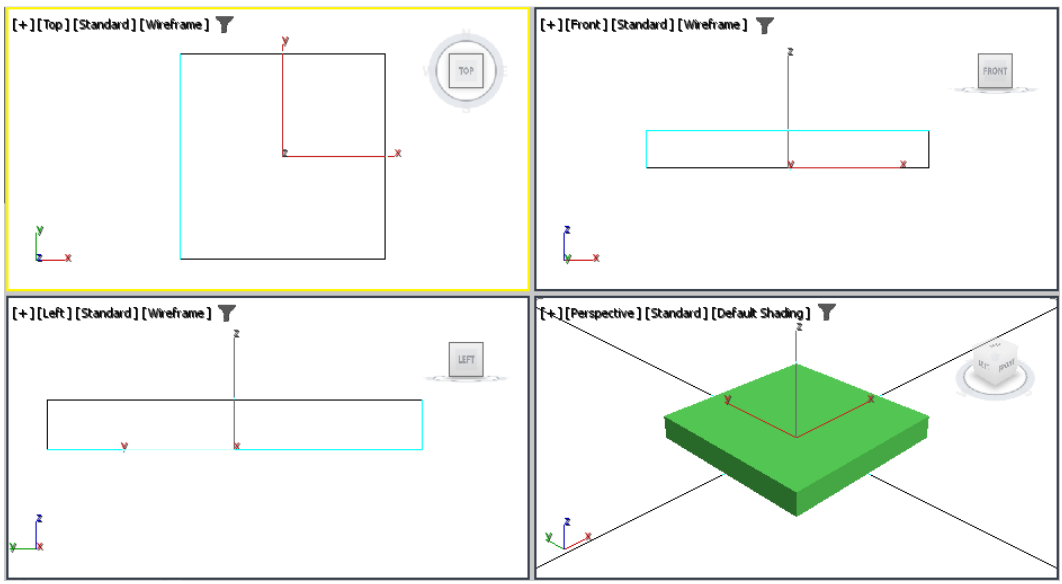

Figure 5-24 *The base extruded in all viewports*

Creating the Pillar

In this section, you will create the pillar of the lamp post using the **Line** tool.

1. Activate the Front viewport. Next, invoke the **Maximize Viewport Toggle** tool from viewport navigation controls to maximize the Front viewport.

2. Invoke the **Zoom** tool and zoom out to create more space at the top of *base*. Choose **Create > Shapes** in the **Command Panel**; the **Splines** option is displayed in the drop-down list. Next, invoke the **Line** tool from the **Object Type** rollout.

3. Click at the center of the top edge of *base* and create a curved shape, as shown in Figure 5-25. Enter **pillar** in the **Name and Color** rollout. Next, right-click to exit the **Line** tool.

   To get the perfect shape shown in Figure 5-25, you need to follow the steps given next.



Note

To achieve the smoothness in the curve, the number of vertices should be more.

4. Choose the **Modify** tab and then in the modifier stack, click on the arrow on the left of the **Line** to view all sub-object levels. Next, select the **Vertex** sub-object level. Now, select

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the vertices one by one and move them by using the **Select and Move** tool from the **Main Toolbar** to get the desired shape.

5. Select the upper vertices of *pillar*, as shown in Figure 5-26 and then right-click; a quad menu is displayed. Choose **Smooth** from the quad menu; the upper portion of *pillar* is smoothened. Select the **Vertex** sub-object level again to exit the sub-object mode.

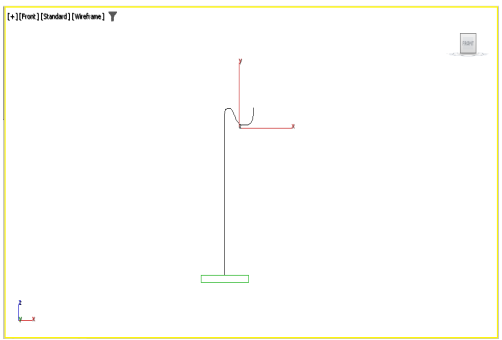

Figure 5-25 *The line created*

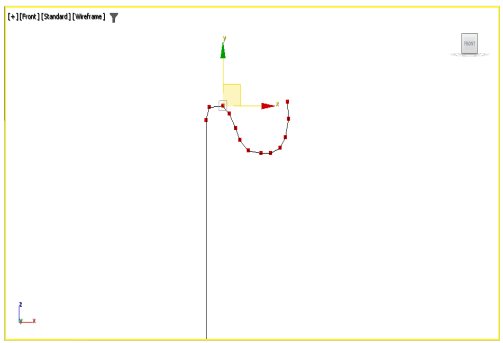

Figure 5-26 *The selected vertices*

Next, you will add thickness to *pillar*.

6. Expand the **Rendering** rollout and select the **Enable In Renderer** and **Enable In Viewport** check boxes.

7. Make sure the **Radial** radio button is selected and set the value **0.15** in the **Thickness** spinner; the thickness is added to *pillar*, as shown in Figure 5-27.

Creating the Joint

In this section, you will create a joint between the pillar and the lamp holder using the **Ellipse** tool.

1. Activate the Left viewport. Next, invoke the **Maximize Viewport Toggle** tool from viewport navigation controls to maximize the Left viewport.

2. Choose **Create > Shapes** in the **Command Panel**; the **Splines** option is displayed in the drop-down list below the **Shapes** button. Next, invoke the **Ellipse** tool from the **Object Type** rollout.

3. Expand the **Keyboard Entry** rollout and set the values of the parameters as given next:

   Length: **0.3** Width: **0.2**

   Choose the **Create** button; an ellipse is created in the viewport. Enter **joint** in the **Name and Color** rollout.

4. In the **Rendering** rollout, make sure that the **Enable In Renderer** and **Enable In Viewport** check boxes are selected. Also, make sure that the **Radial** radio button is selected. Next, set

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the value **0.05** in the **Thickness** spinner and press the ENTER key; *joint* is displayed at the bottom of the viewport, as shown in Figure 5-28.

5. Invoke the **Maximize Viewport Toggle** tool to display all viewports. Make sure the **Select and Move** tool is invoked in the **Main Toolbar** and align *joint* in all viewports, as shown in Figure 5-29.

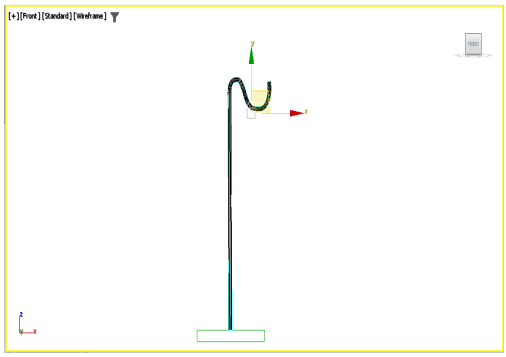

Figure 5-27 *The thickness added to pillar*

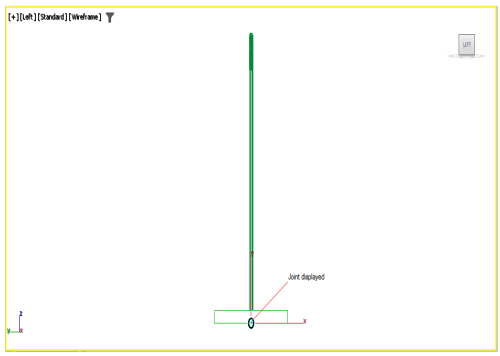

Figure 5-28 *The joint displayed*

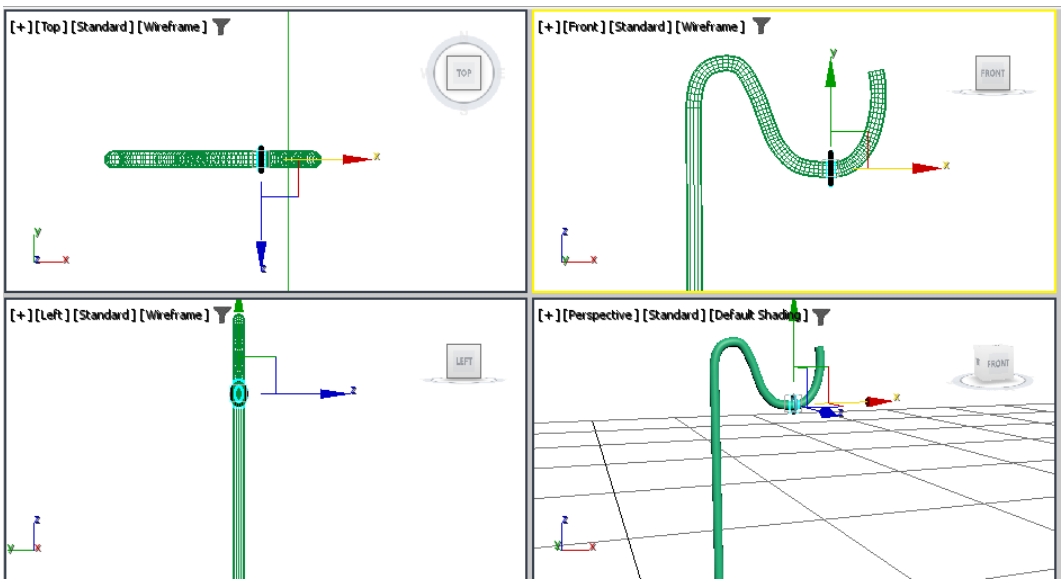

Figure 5-29 *The joint aligned in all viewports*

Creating the Lamp Holder

In this section, you will create the lamp holder using the **NGon** tool and the **Edit Poly** modifier.

1. Activate the Top viewport. Choose **Create > Shapes** in the **Command Panel**; the **Splines** option is displayed in the drop-down list below the **Shapes** button. Next, invoke the **NGon** tool from the **Object Type** rollout.

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2. Expand the **Keyboard Entry** rollout and set the value **0.4** in the **Radius** spinner. Choose the **Create** button; *NGon001* is created in the viewport. Enter **lamp holder** in the **Name and Color** rollout. In the **Parameters** rollout, set the value **8** in the **Sides** spinner.

3. Choose the **Modify** tab in the **Command Panel**. Next, select **Extrude** from the **Modifier List** drop-down list; the **Extrude** modifier is applied to *lamp holder*.

4. Set the value **1.2** in the **Amount** spinner of the **Parameters** rollout and press the ENTER key; *lamp holder* is extruded. Next, align it in all viewports, as shown in Figure 5-30.

   The *lamp holder* is aligned slightly below *joint* because you will modify its shape in the following steps by applying the **Edit Poly** modifier.

5. Select **Edit Poly** from the **OBJECT-SPACE-MODIFIERS** section in the **Modifier List** drop-down list; the **Edit Poly** modifier is applied to *lamp holder*.

6. Click on the arrow in the modifier stack; all sub-object levels are displayed. Select the **Edge** sub-object level. Now, activate the Front viewport and select the edge, as shown in Figure 5-31.

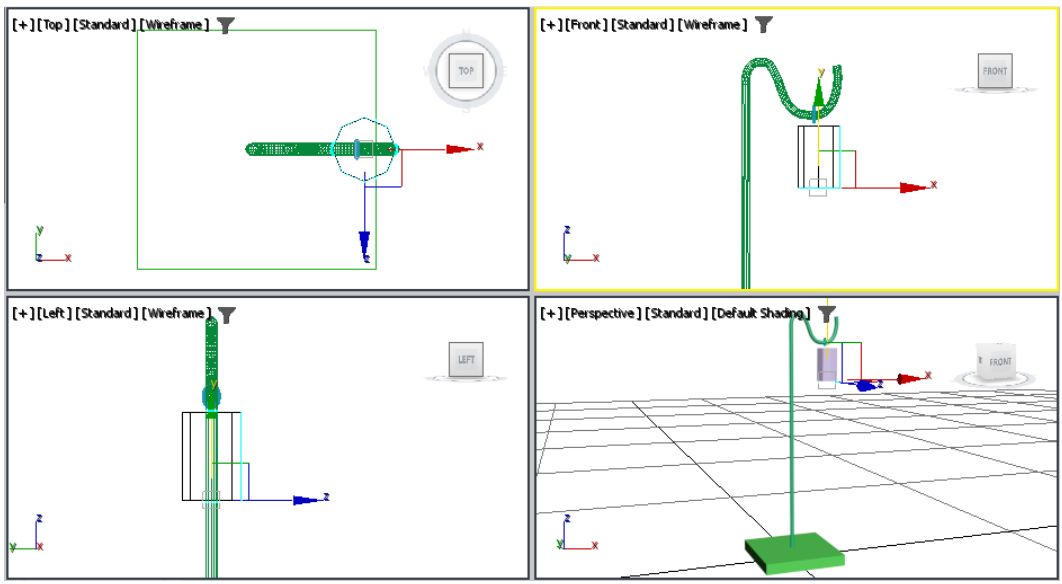

Figure 5-30 *The lamp holder aligned in all viewports*

7. In the **Selection** rollout, choose the **Ring** button; the ring of edges are selected. Next, in the **Edit Edges** rollout, choose the **Settings** button on the right of the **Chamfer** button; the **Chamfer** caddy control is displayed in the viewport. Set the value **0.03** in the **Chamfer-Amount** spinner and **1** in the **Segments** spinner and then choose the **OK** button to close the caddy control; the selected edges are chamfered, as shown in Figure 5-32.

8. Select the **Polygon** sub-object level from the **Selection** rollout and then select all polygons between the chamfered edges, as shown in Figure 5-33.

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9. In the **Edit Polygons** rollout, choose the **Settings** button on the right of the **Bevel** button; the **Bevel** caddy control is displayed in the viewport. Set the value **-0.01** in the **Bevel-Height** spinner and **-0.02** in the **Bevel-Outline** spinner and then choose the **OK** button to close the caddy control; the selected polygons are beveled, as shown in Figure 5-34.

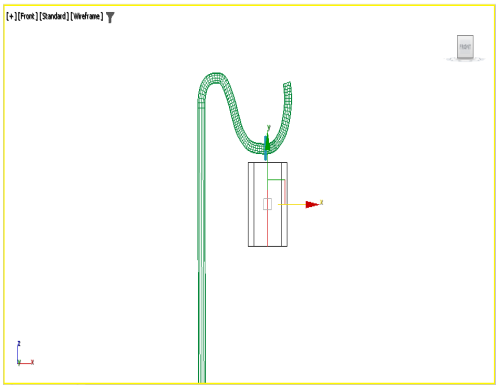

Figure 5-31 *The edge selected*

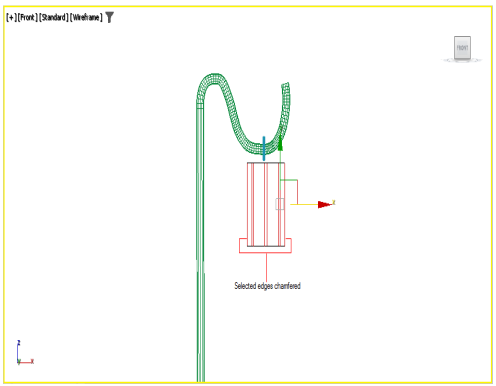

Figure 5-32 *Selected edges chamfered*

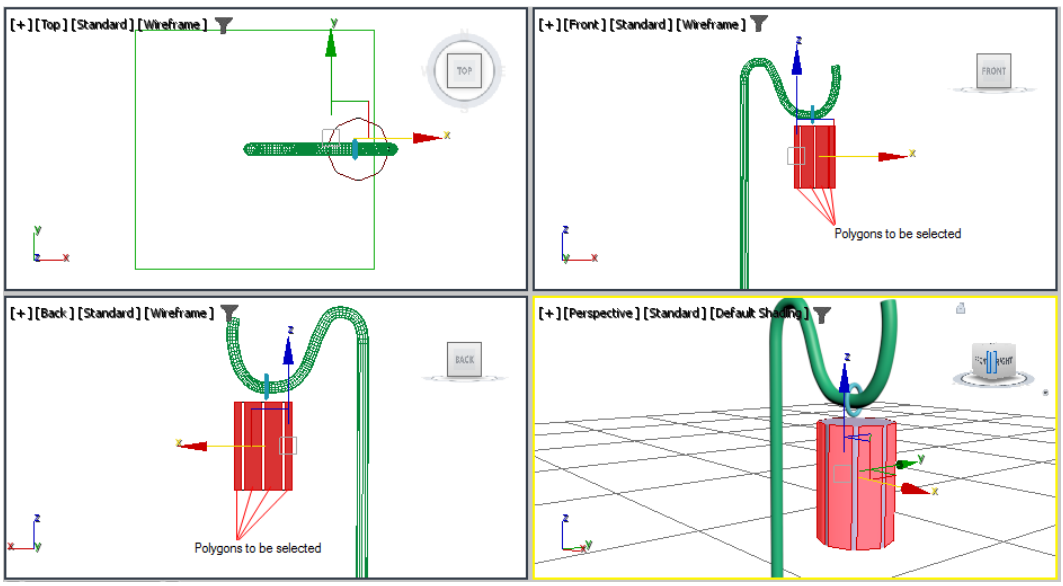

Figure 5-33 *The selected polygons between chamfered edges*

10. Select the uppermost and lowermost polygons, as shown in Figure 5-35.

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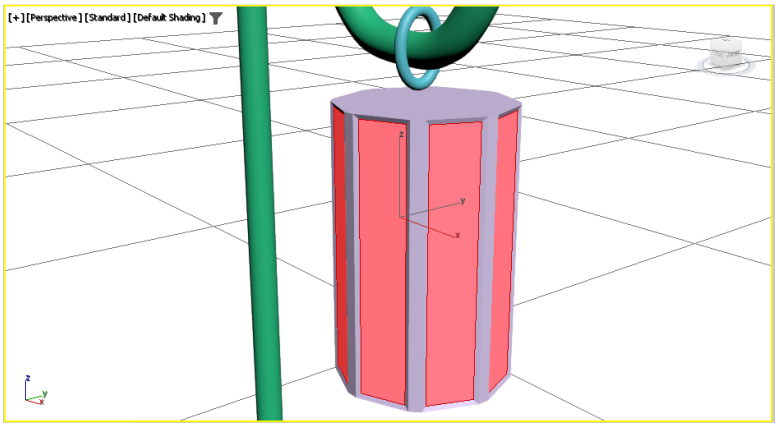

Figure 5-34 *The selected polygons beveled*

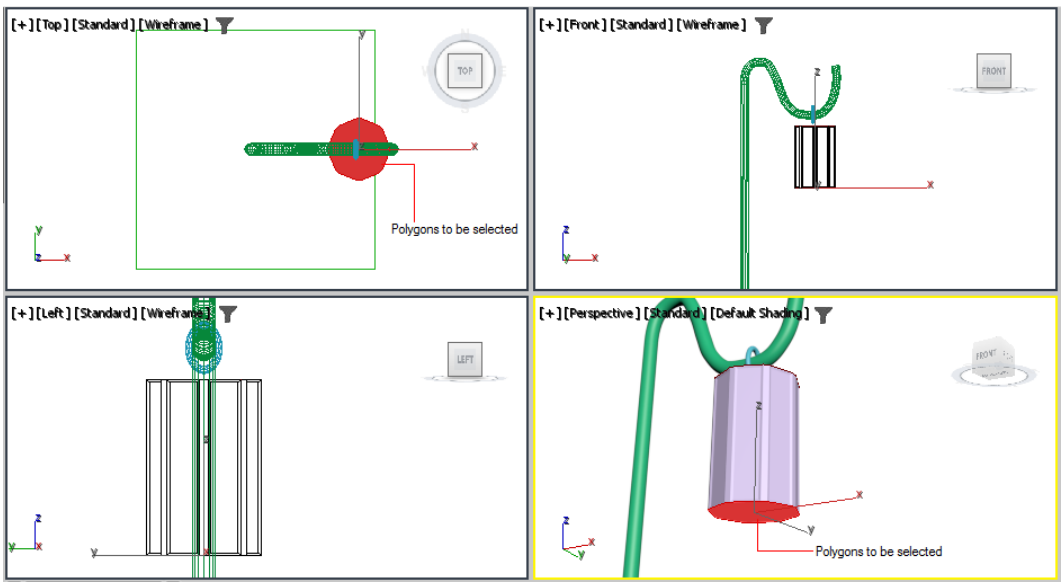

Figure 5-35 *The selected polygons*

11. In the **Edit Polygons** rollout, choose the **Settings** button on the right of the **Bevel** button; the **Bevel** caddy control is displayed in the viewport. Set the value **0.13** in the **Bevel-Height** spinner and **-0.08** in the **Bevel-Outline** spinner and then choose the **OK** button to close the caddy control; the selected polygons are beveled, as shown in Figure 5-36.

12. Select the **Polygon** sub-object level again in the **Selection** rollout to deactivate it.

13. Invoke the **Select and Move** tool from the **Main Toolbar** and align *lamp holder*, refer to Figure 5-36.

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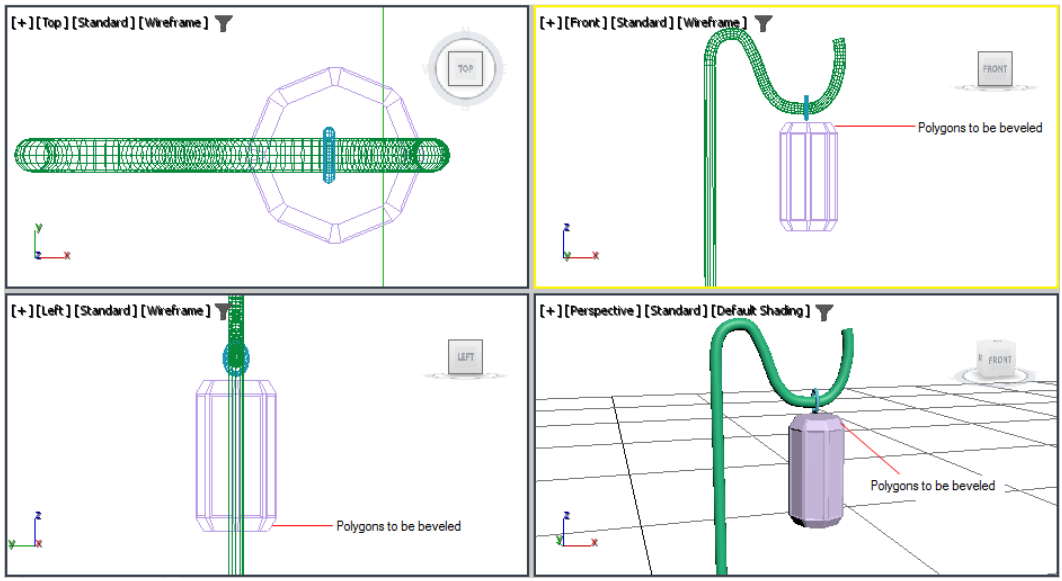

Figure 5-36 *The selected polygons beveled*

Adding Details

In this section, you will use the **Line** tool to add details to the lamp post.

1. Activate the Front viewport. Choose **Create > Shapes** in the **Command Panel**; the **Splines** option is displayed in the drop-down list. Next, invoke the **Line** tool from the **Object Type** rollout.

2. In the **Rendering** rollout, make sure that the **Enable In Renderer** and **Enable In Viewport** check boxes are selected. Also, set the value **0.06** in the **Thickness** spinner.

3. In the **Creation Method** rollout, make sure the **Smooth** radio buttons are selected in the **Initial Type** and **Drag Type** areas. Next, create a curve, as shown in Figure 5-37. Right-click to exit the **Line** tool.

4. Repeat steps 1, 2, and 3 and create a second curve, as shown in Figure 5-38.

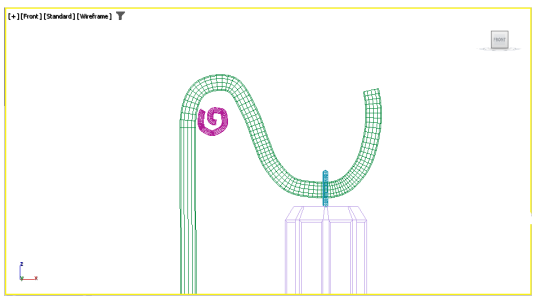

Figure 5-37 *The curve created*

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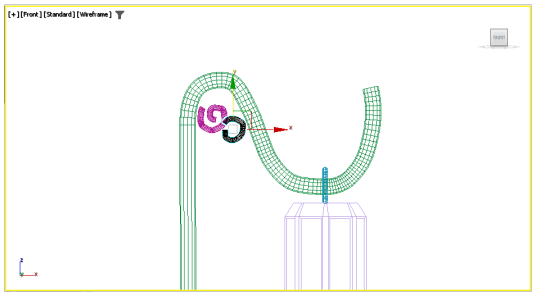

Figure 5-38 *The second curve created*

Next, you will create two joints between the curves and *pillar*.

5. Make sure the **Line** tool is activated. In the **Rendering** rollout, make sure the **Enable in Renderer** and **Enable In Viewport** check boxes are selected. Also, set the value **0.03** in the **Thickness** spinner. Next, create two joints, as shown in Figure 5-39.

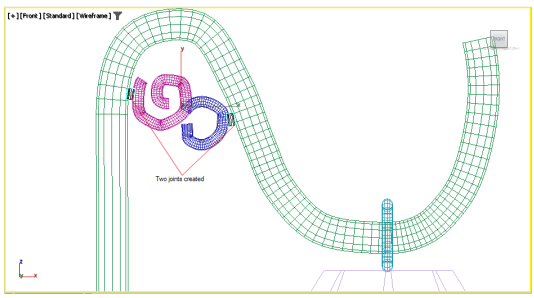

Figure 5-39 *Two joints created*

Saving and Rendering the Scene

In this section, you will save the scene that you have created and then render it. You can also view the final rendered image of this model by downloading the *c05_3dsmax_2024_rndr.zip* file from *www.cadcim.com*. The path of the file is as follows: *Textbooks > Animation and Visual Effects > Autodesk 3ds Max > Autodesk 3ds Max 2024 for Beginners: A Tutorial Approach*

1. Change the background color of the scene to white, as discussed in Tutorial 1 of Chapter 2.

2. Choose **Save** from the **File** menu.

3. Activate the Perspective viewport. Next, invoke the **Render Production** tool from the **Main Toolbar**; the rendered image of a lamp post is displayed, refer to Figure 5-40.

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Figure 5-40 *The rendered image of a lamp post*

Self-Evaluation Test

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

1. Which of the following tools is used to render a scene?

   (a) **Rendered Frame Window** (b) **Render Production**
   (c) **Render Setup** (d) None of these

2. You need to choose _____ from the **Edit** menu to invoke the **Clone Options** dialog box.

3. You can use the _____ tool to switch between the single and four-viewports configuration.

4. The _____ button is used to reverse the latest changes made.

5. When you choose **Bezier** from the quad menu, the spline becomes a straight line at the selected vertex along with the display of a single Bezier handle. (T/F)

6. You need to increase the number of vertices in a curve to achieve smoothness. (T/F)

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Review Questions

Answer the following questions:

1. Which of the following tools is used to arrange the objects, lights, and cameras in a viewport?

   (a) **Select and Uniform Scale** (b) **Select and Move**
   (c) **Select and Rotate** (d) All of these

2. The _____ button in the **Align** area of the **Parameters** rollout is used to properly align a shape created using the **Lathe** modifier.

3. The _____ tool enables you to rotate the selected objects around their collective geometric center.

4. The _____ modifier is used to spin a spline around its axis to form an object.

5. You can draw a square by invoking the **Rectangle** tool and then dragging the cursor while holding the CTRL key. (T/F)

EXERCISES

The rendered output of the model used in the following exercises can be accessed by downloading *c05_3dsmax_2024_exr.zip* from *www.cadcim.com*. The path of the file is as follows: *Textbooks > Animation and Visual Effects > Autodesk 3ds Max > Autodesk 3ds Max 2024 for Beginners: A Tutorial Approach*

Exercise 1

Create a cup and a saucer, as shown in Figure 5-41, by using the profile curves shown in Figure 5-42. **(Expected time: 25 min)**



Figure 5-41 *The cup and saucer*

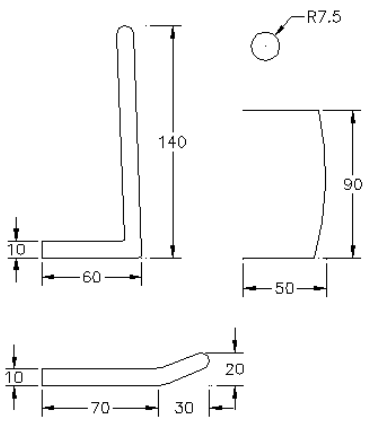

Figure 5-42 *Profile curves of the cup and saucer*

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Exercise 2

Create a pair of cocktail glasses, as shown in Figure 5-43, by applying dimensions of your choice. **(Expected time: 20 min)**



Figure 5-43 *A pair of cocktail glasses*

Exercise 3

Create a candle stand, as shown in Figure 5-44, by applying dimensions of your choice. **(Expected time: 20 min)**

Exercise 4

Create a pair of glasses, as shown in Figure 5-45, by applying dimensions of your choice. **(Expected time: 20 min)**

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Figure 5-44 *A candle stand*



Figure 5-45 *A pair of glasses*

Exercise 5

Create a pair of wine glasses, as shown in Figure 5-46, by applying dimensions of your choice.

(Expected time: 20 min)



Figure 5-46 *A pair of wine glasses*

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Answers to Self-Evaluation Test

1. b, **2. Clone**, **3. Maximize Viewport Toggle**, **4. Undo**, **5.** F, **6.** T

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