

Modeling a Chess Set

In this tutorial, you will create four pieces of a chess set—a pawn, a bishop, a rook and a knight—using various modeling tools and techniques.



In this tutorial, you will learn how to:

- Create and edit spline objects.
- Use Lathe modifier to create a 3D object.
- Use Face extrusion to create geometry.
- Use Boolean compound objects.
- Use viewport background images.
- Use the Surface modifier.

Skill level: Beginner

Time to complete: 1 hour

Modeling a Pawn

In this lesson, you will model a pawn for a set of chessmen. In a wooden chess set of standard design, pawns are turned on a lathe. You will use 3ds Max to do something similar: draw the pawn's outline, and then use a Lathe modifier to fill out its geometry. The Lathe modifier revolves the outline around a central point to create a shape, not unlike the way wood is turned on an actual lathe.



Features and techniques covered in this lesson:

- Using spline shapes to draw the outline of an object.
This lesson also briefly introduces you to spline editing.
A spline is a type of curve that is interpolated between two endpoints and two or more tangent vectors. The term dates from 1756, and derives from a thin wood or metal strip used for drafting curves in architecture and ship design.
- Editing the shape vertices and edges to better control spline drawing.
- Using the Lathe modifier to turn a 2D outline into a 3D model.

Skill Level: Beginner

Time to complete: 15 minutes

Set up the lesson:

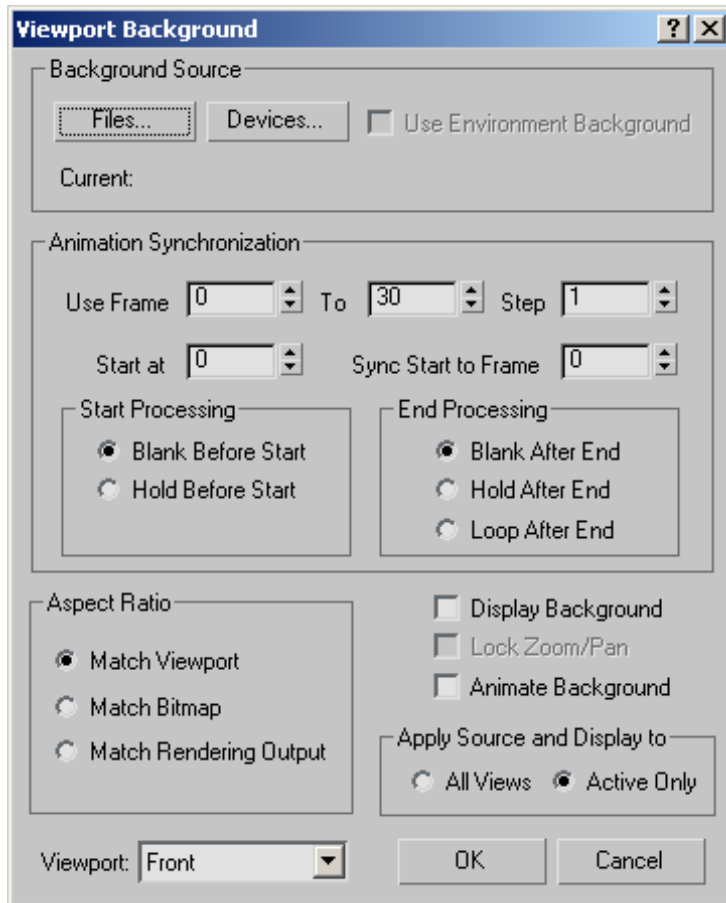


- Start 3ds Max or, if the program is already running, choose Reset from the Application menu.
No scene file is required for this tutorial.

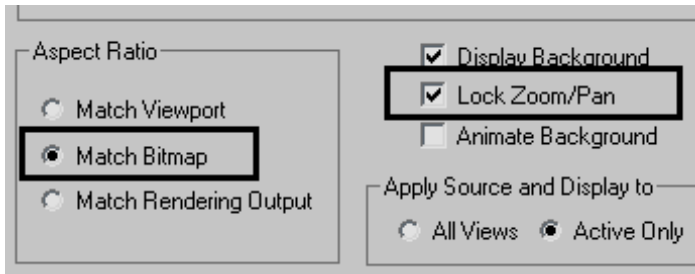
Set up the viewport background:

To create the profile of the pawn (and other chess pieces), you need to load a reference image into the viewport so you can trace over it.

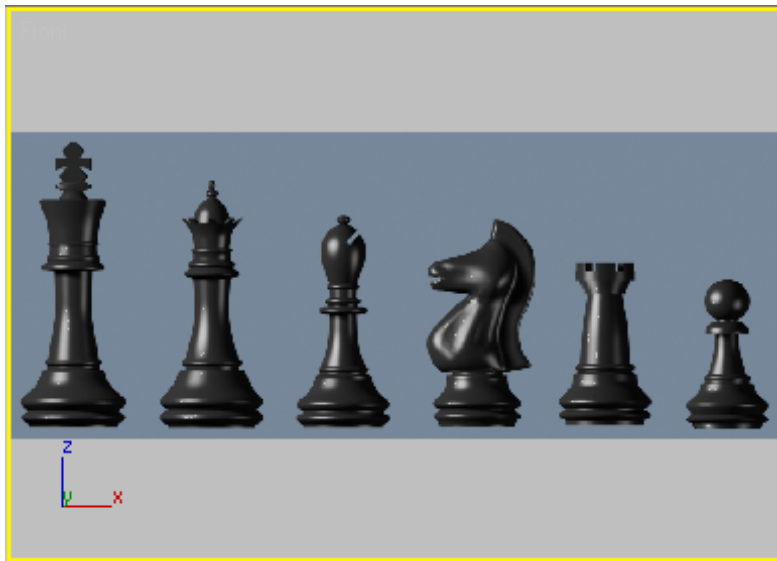
- 1 Right-click the Front viewport to make it current.
- 2 From the Views menu, select Viewport Background. The Viewport Background dialog appears.



- 3 Click the Files button. navigate to the `\sceneassets\images` folder and double-click `ref-chess.jpg` to load it.
- 4 In the Aspect Ratio group, choose Match Bitmap. This ensures the image in the viewport does not get distorted.
- 5 At the right of the dialog, turn on Lock Zoom/Pan. This ensures the background image reacts to zooms and pans you may use for viewport navigation.



- 6 Click OK to exit the dialog. A bitmap now appears in the Front view. Press G to disable the grid, as you won't need it for this exercise.

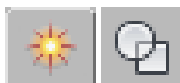


Now you are ready to begin drawing.

Start the pawn's outline:

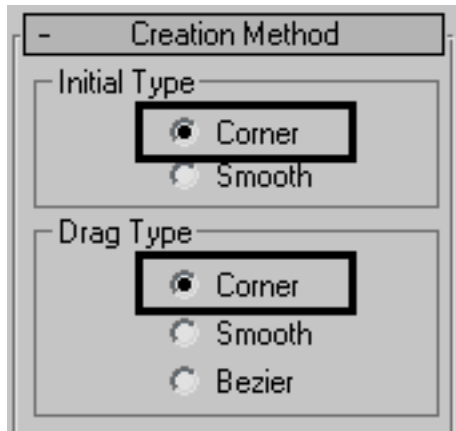
You will draw the pawn's outline beginning with the “knob” on top.

- 1 Zoom in on the pawn reference in the Front view.

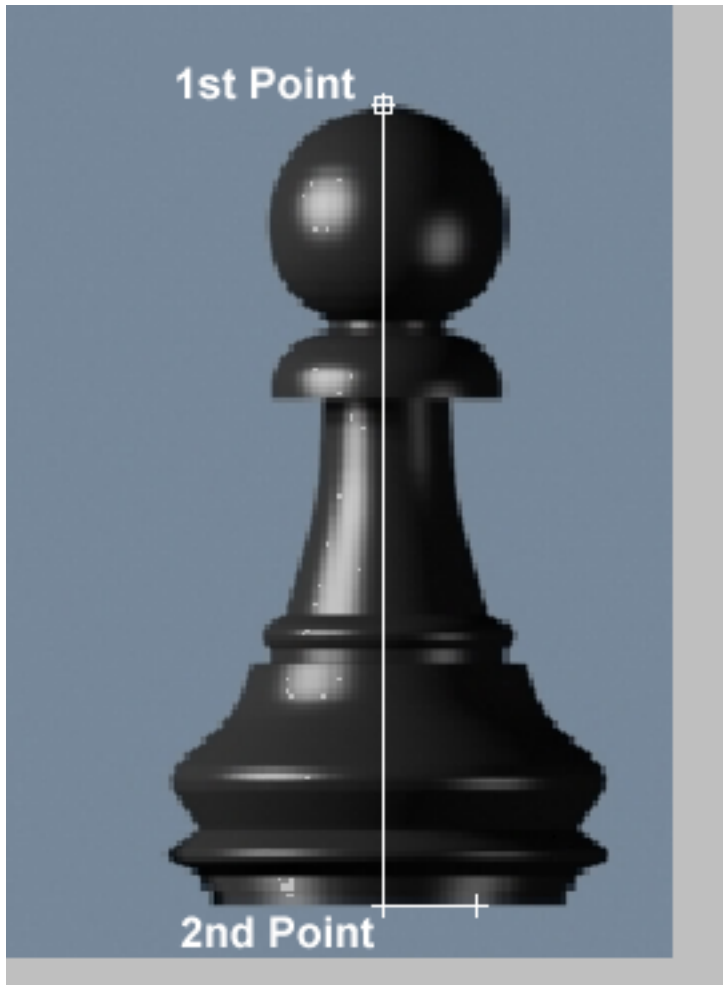


- 2 On the Create panel, click Shapes, and then click Line.

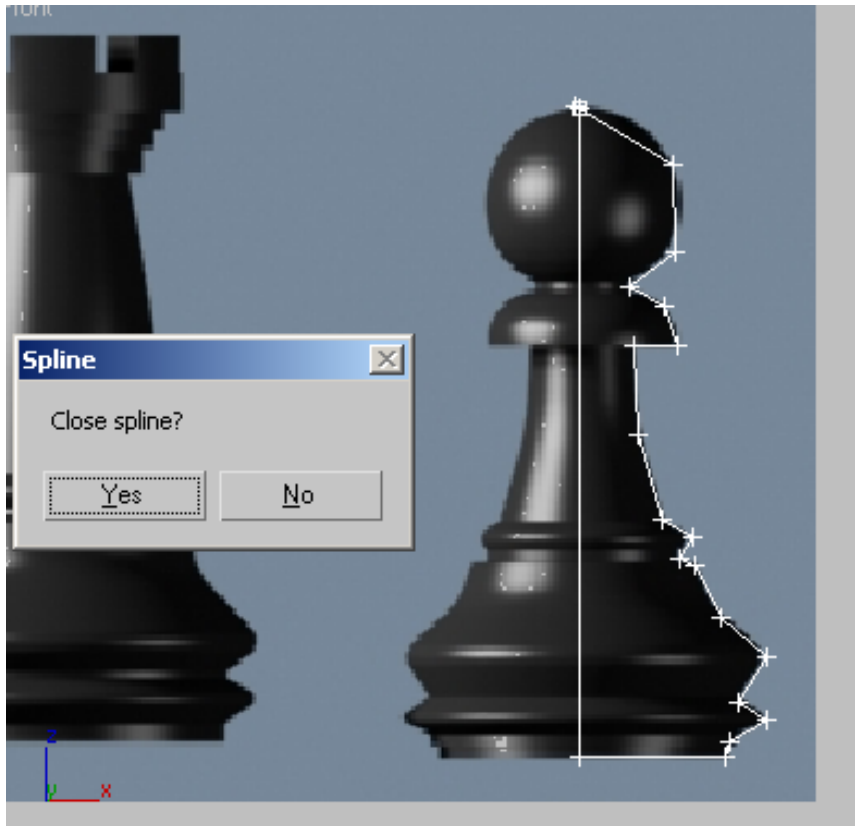
- 3 On the Creation Method rollout, set both Initial Type and Drag Type to Corner. This ensures all line segments will be linear.



- 4 In the Front viewport, click a point near the top center. Press and hold the Shift key to constrain the line to the vertical axis and then click a second point at the base of the pawn.





- 5 With the Shift key still pressed, click a point in the bottom-right edge of the base.
- 6 From this position, click a few points on the right contour of the reference image to create a rough profile, going up the side of the image. You do not need to be very precise at this time as you will be able to edit the profile later. To close the spline and end the command, click on the first point.



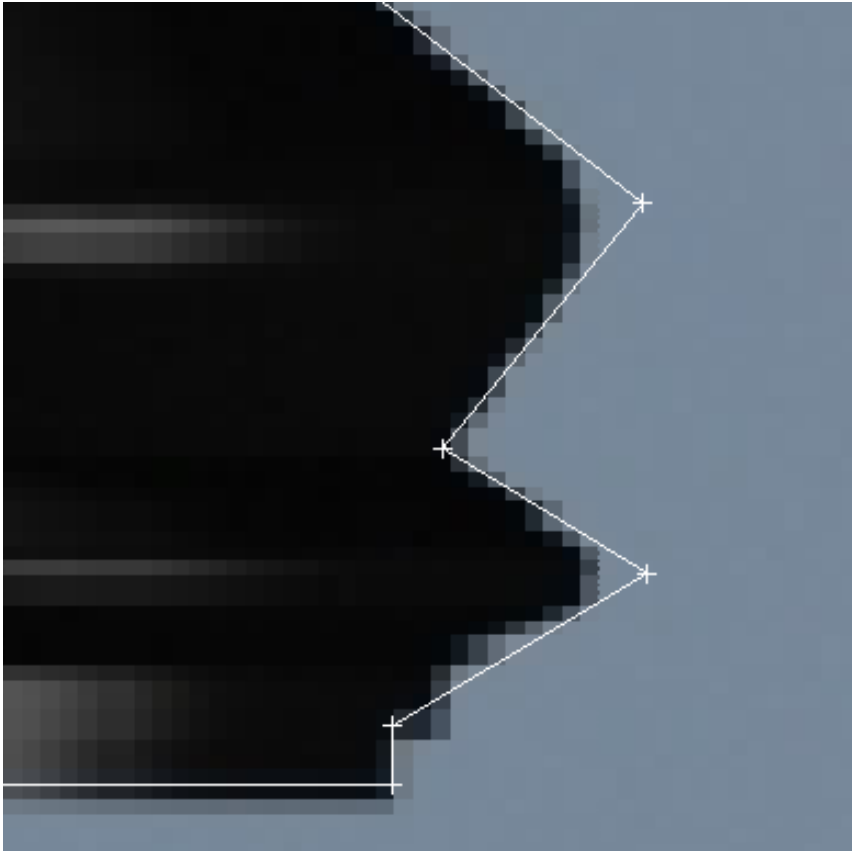
- 7 When prompted, click Yes to close the spline.

Edit the pawn's outline:

- 1  With the spline still selected, go to the Modify panel.
- 2  On the Selection rollout, click the Vertex button.
- 3 In the Front viewport, zoom in on the bottom part of the profile you created.



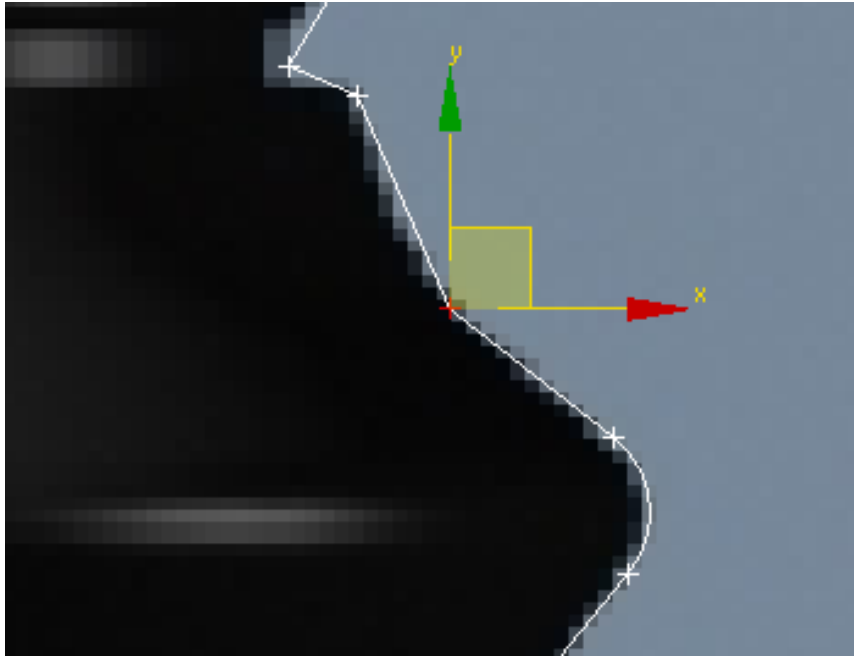
- 4 Use the Select And Move tool to adjust the vertices as shown in the following illustration.



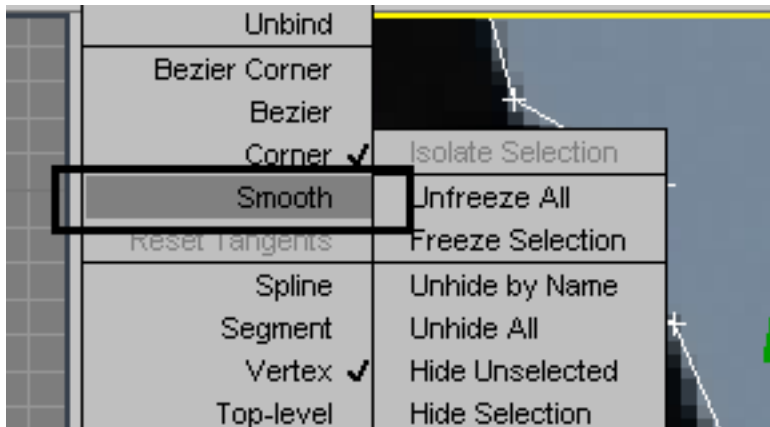
- 5 Select the two right-most vertices and in the Modify panel > Geometry rollout, activate the Fillet button.
- 6 With the Fillet command active, place the cursor on one of the selected vertices and then click and drag to round off the two corners, as shown below.



- 7 Pan up to work on the middle section of the profile.
- 8 Select the vertex above the rounded corner you just created. If necessary, move it to a better position, based on the reference image.



- 9 With the vertex selected, right-click in the viewport and from the quad menu that appears, choose Smooth.



- 10 Adjust the vertex position to match the reference image.



11 Pan up to the next set of vertices.



In some situations, you might need to add a vertex.



12 On the Modify panel > Geometry rollout, choose Refine.

13 Click the line where you need to insert the vertex.

A new vertex is added to the spline.



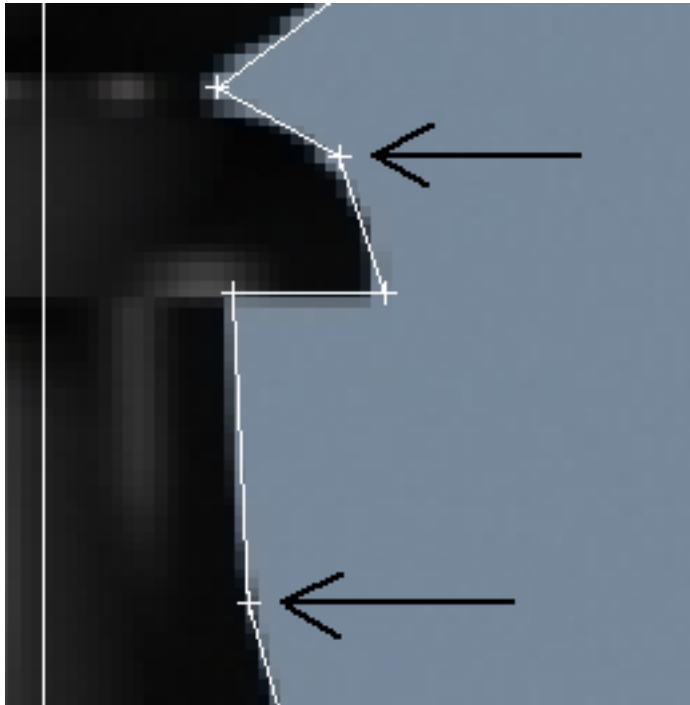
14 Using the Move tool, adjust the position of vertices as shown in the following illustration.



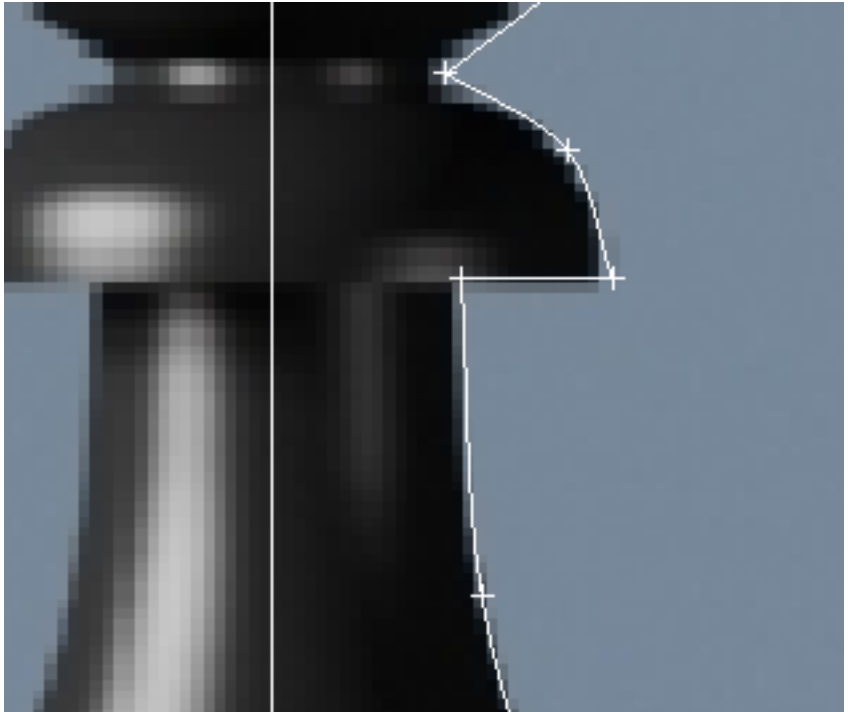
- 15** Select the vertex sticking out to the right and fillet it to create a curve, as you did earlier.



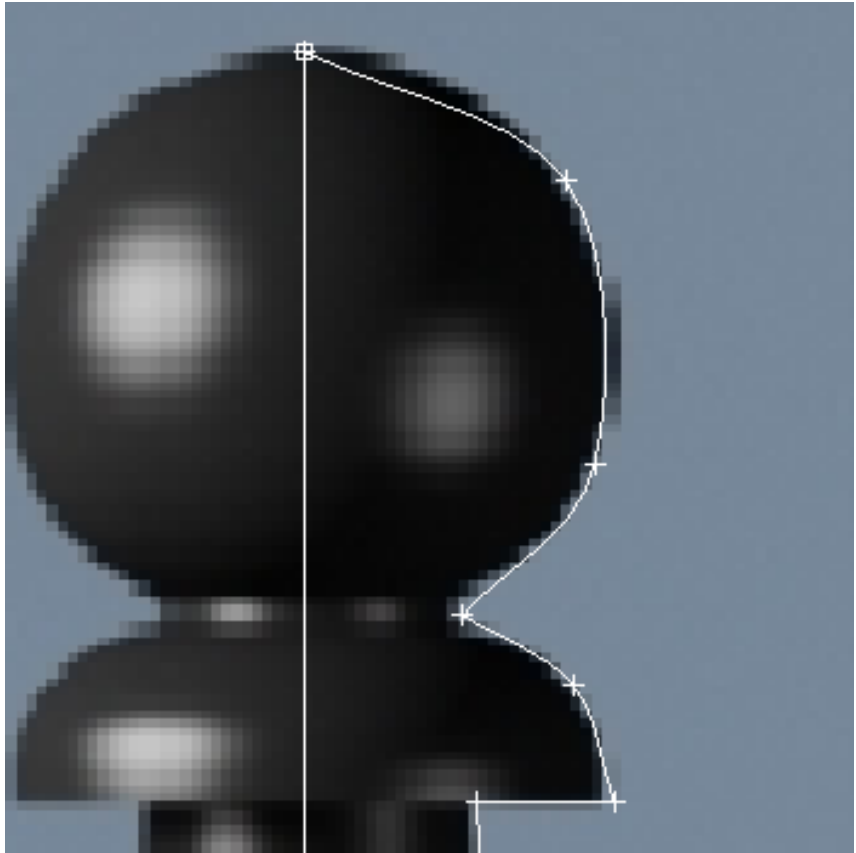
- 16** Pan up the profile. Select the two vertices shown in the following illustration.



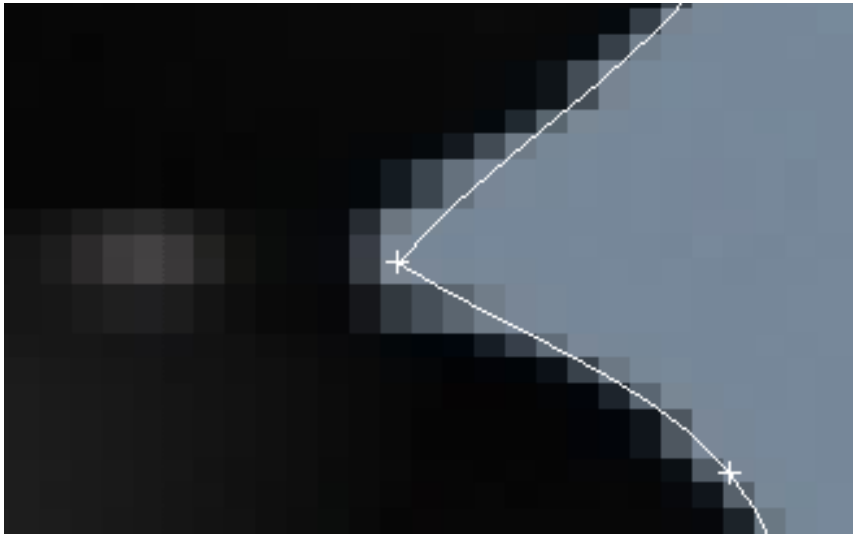
- 17 Using the quad menu, convert the two selected vertices to Smooth vertices, as you did earlier. Move them to fine-tune their positions.



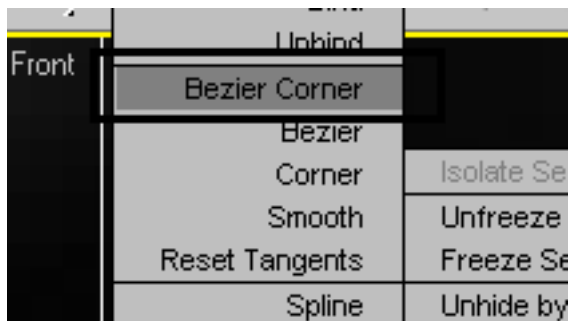
- 18** Pan up to the top part of the profile. Select the two vertices to the right of the knob and make them Smooth vertices. Again, use the Select And Move tool to fine-tune their positions.



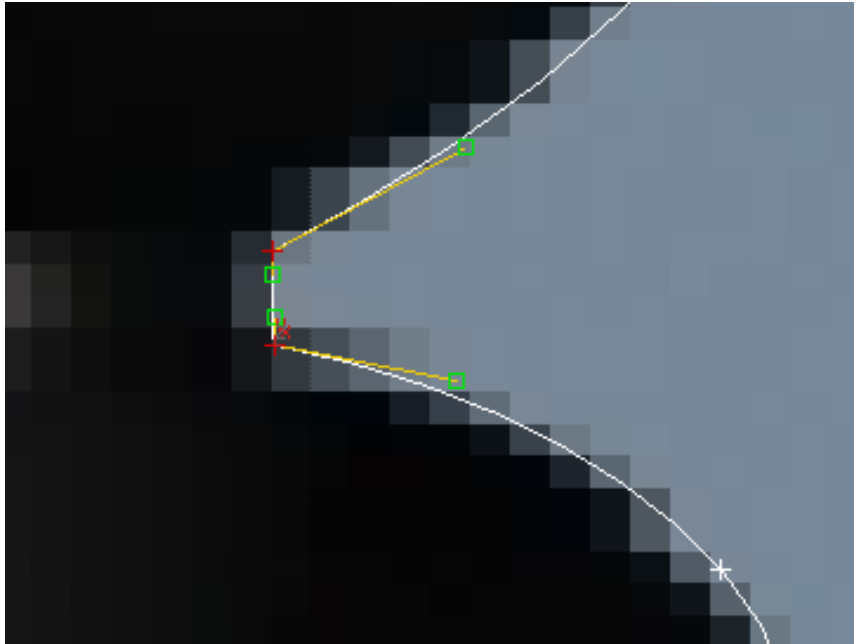
19 Zoom in to the base of the knob.



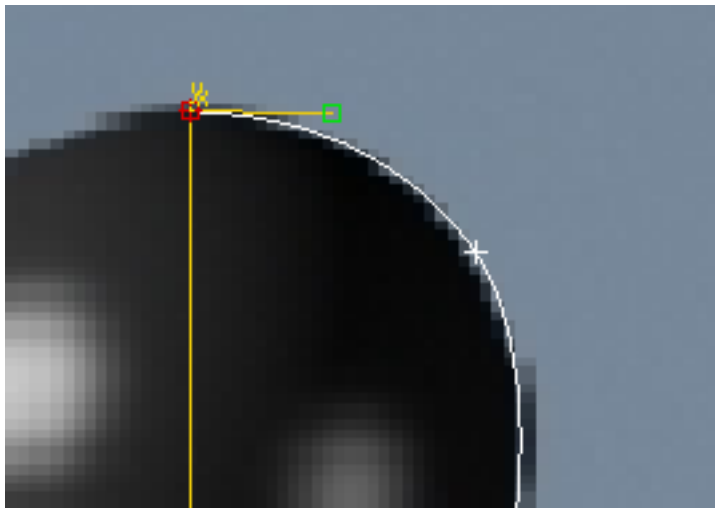
- 20 If you have only one vertex at the base of the knob, use the Refine tool as you did earlier to add another vertex.
- 21 Select both vertices and right-click to access the quad menu.
- 22 Use the quad menu to convert both vertices to Bezier Corner.



- 23 Use Select And Move to adjust the positions of the vertices and their handles to get the proper curvatures around the base of the knob.



- 24 Select the first vertex you created, at the very top of the profile. Use the quad menu to convert it to Bezier Corner.
- 25 Adjust the handles to match the curvature on the reference image.



- 26 Continue refining your profile, adjusting vertex positions and types to match the reference image.

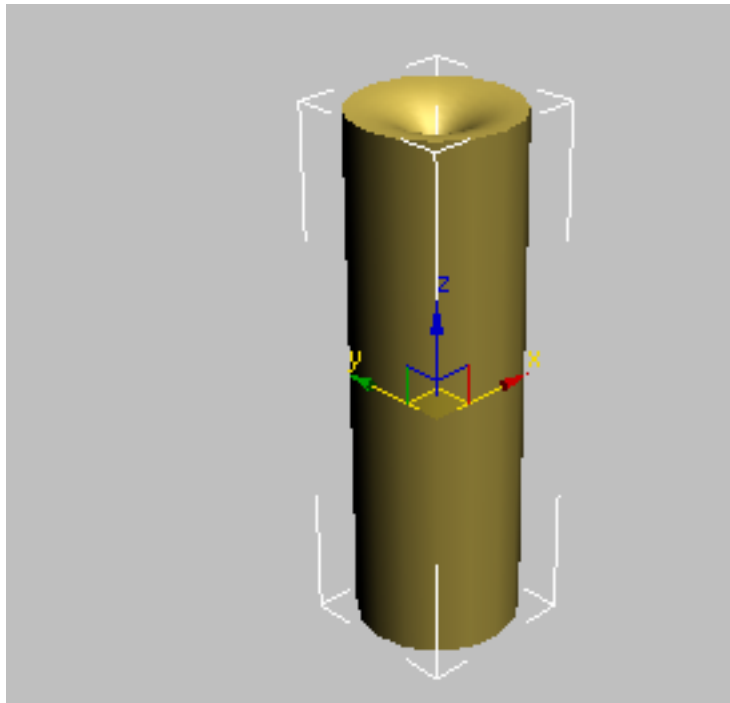


- 27 When you are done, click the vertex button in the Selection rollout of the Modify panel to exit the sub-object level.

Lathe the outline:

At this point, you can continue with the file you created in the previous steps, or you can open the file *pawn_outline_edited.max*, and continue from there. This scene is in the folder, `\scenes\modeling\intro_to-modeling\`.

- 1 Select the pawn and click Modifier List above the modifier stack display. This is a drop-down list of various modifiers.
- 2 From the list, choose Lathe.



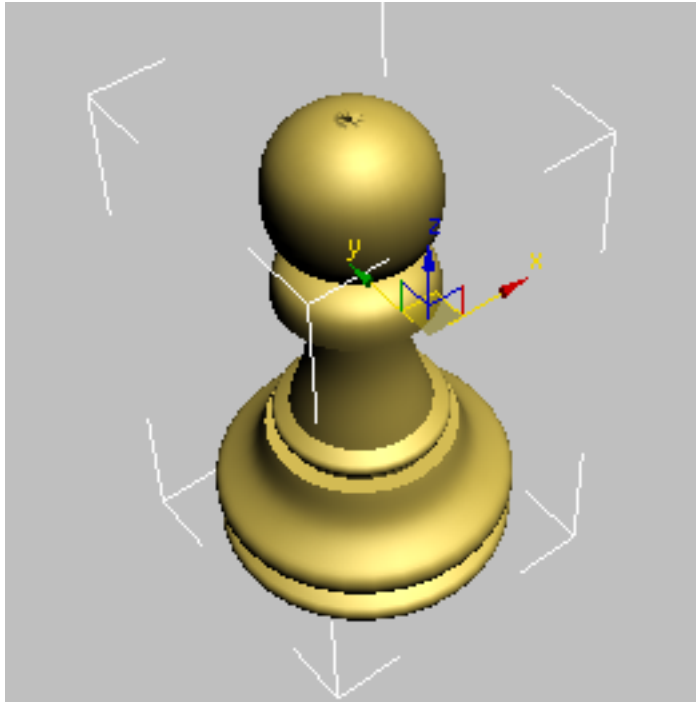
The pawn is now a 3D object.

The pawn model might not look as you expected, but that's only because the axis of revolution, by default, is based on the spline's pivot point rather than the left side of the profile. You will fix that in the next step.

- 3 On the Parameters rollout of the Lathe modifier, find the Align group and click Min.

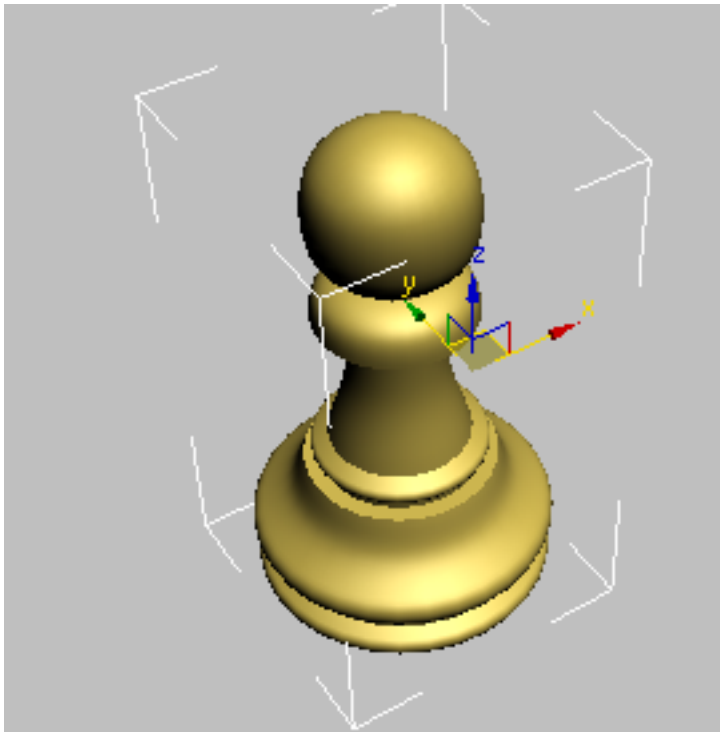
The pawn now looks better, albeit a bit "choppy."

- 4 On the Parameters rollout of the Lathe modifier, increase the Segments value to 32.



The pawn is now smoother, as you can see if you render the Perspective viewport, but the center seems a bit pinched.

- 5 On the Parameters rollout of the Lathe modifier, turn on Weld Core. This combines all the vertices at the center of the model into one.



In the Introduction to Materials and Mapping tutorials, you'll provide the chess pieces with more-convincing color and texture and create a shiny, reflective, wood-grain chessboard.

Summary

In this lesson you learned spline creation and editing. You also learned to create 3D geometry using the Lathe modifier.