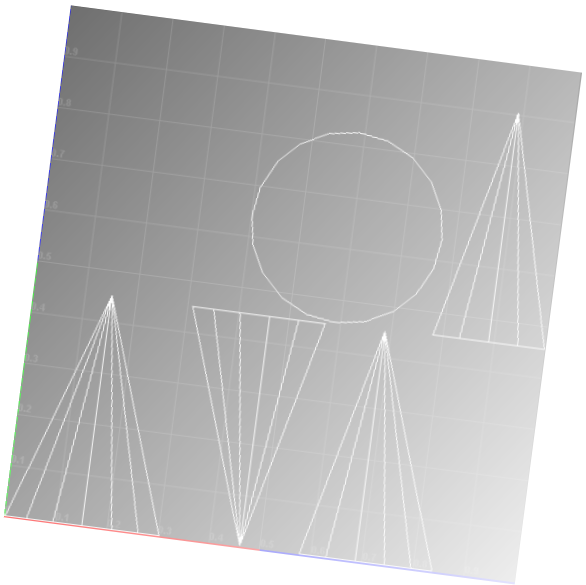
Chapter 5

UV Mapping

Learning Objectives

After completing this chapter, you will be able to:

- *Use different UV mapping techniques*
- *Use the UV Editor*
- *Use various tools and options in the UV Editor*



INTRODUCTION

UV mapping is a process of creating or editing UVs for an object, where U and V denote the axes of 2D texture and determine how the texture will be mapped to the surface of an object. In Maya, various types of UV mapping techniques are used to apply texture on an object. In this chapter, you will learn about the tools and techniques used in Maya to create and apply different UV maps.

UV MAPPING

UV mapping is a technique in which a 3D object is unfolded and split into 2D patches. It is used to place texture directly on the surface mesh. The UV coordinates are used to position textures on the surfaces. To access a UV mapping technique, select **Modeling** from the **Menuset** drop-down list in the Status Line. Next, choose the required mapping technique from the **UV** menu of the menubar. There are six types of UV mapping used in Maya and all of them are discussed in the chapter.

UV EDITOR

Menubar: UV > UV Editor

The **UV Editor**, as shown in Figure 5-1, is used to view and edit the UV texture coordinates within a 2D view.



Tip

*To pan in the **UV Editor**, press and hold the middle mouse button along with the ALT key.*

To view the UV coordinates of an object, create a cube in the viewport and then select it. Next, choose **UV > UV Editor** from the menubar; **UV Editor** will be displayed with the UV texture coordinates of the object. Figure 5-1 shows the UV coordinates of a cube primitive in the **UV Editor**. In the **UV Editor**, the tools are grouped together in the toolbar and are discussed next.

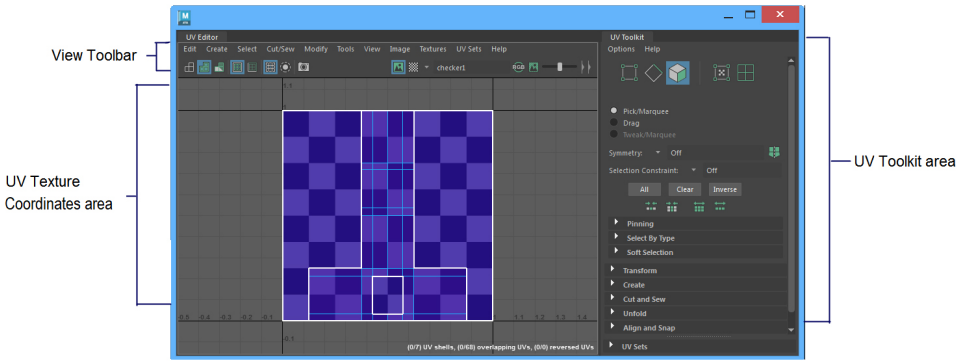


Figure 5-1** The **UV Editor

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com



Note

*You can select UVs and UV shells in the scene as well as in the **UV Editor**. However, you can only edit UVs in the **UV Editor**. To select UVs in the scene, right-click on a mesh; a marking menu will displayed. To select UVs, choose **UV > UV** from the marking menu. To select UV shells, choose **UV > UV Shell** from the marking menu. Now, click on the UVs to select individual UVs or marquee drag to select a region of UVs. When UVs are selected in the scene, CTRL+right-click on the mesh and choose **Grow Selection** or **Shrink Selection** from the marking menu to grow or shrink the UV selection. To select UVs in the **UV Editor**, right-click on the 2D view of the **UV Editor** and then select a component mode from the marking menu. Now, click or marquee drag to select the component.*

View Toolbar

The tools in the View Toolbar of the **UV Editor** are used to change the display of the UV Shells in the **UV Editor** and the viewport. Some of the tools are discussed next.

Wireframe

UV Editor menubar: View > Wireframe



This tool is used to display the UVs in wireframe. The background will be transparent. You can also choose **View > Wireframe > Option Box** from the menubar to display the **Wireframe Options** window. Using the options in this window, you can change the color of the wireframe.

Shaded

UV Editor menubar: View > Shaded



This tool is used to display the UVs in semi-transparent shading. You can change the color of the shading by choosing **View > Shaded > Option Box** from the **UV Editor** menubar.

UV Distortion

UV Editor menubar: View > UV Distortion



This tool is used to display the stretched and compressed UVs. The red faces indicate stretching and the blue faces indicate compression, and white faces indicate optimal UVs. You can also enable this option by choosing **View > UV Distortion** from the **UV Editor** menubar.

Texture Borders

UV Editor menubar: View > Texture Borders



The **Texture Border** tool is used to toggle the display of texture borders on the UV shells. To do so, choose this tool from the **UV Editor** toolbar; the border of UV texture coordinates will be displayed as a thick line.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Shell Borders

UV Editor menubar: View > Toggle Shell Borders



This tool is used to display the color of the UV borders selected components. This tool is helpful in finding the areas where shells share same edges.

Grid

UV Editor menubar: View > Grid



The **Grid** tool is used to display or hide the grid in the **UV Editor**.

Isolate Select



The **Isolate Select** tool is used to toggle between the display of the selected UVs and the isolated UVs in the **UV Editor**. To do so, select the UVs of the object to be displayed from the **UV Editor** and then choose the **Isolate Select** tool from the **UV Editor** toolbar to toggle the display of the selected UVs and the isolated UVs.

UV Snapshot



This tool is used to save image of the current UV layout.

Display Image



The **Display Image** tool is used to toggle the display of the texture images in the **UV Editor**.

Checker Map



The **Checker Map** tool is used to find out problems like stretched and overlapping UVs, by applying checker texture to UV mesh.

Channel Display



This tool is used to display either the RGBA or alpha channels.

UV Toolkit

The **UV Toolkit** is located at the right side of **UV Editor** and contains all tools to manipulate the UVs. In the **UV Toolkit**, the tools are arranged in various areas, as shown in Figure 5-2. These tools are discussed next.

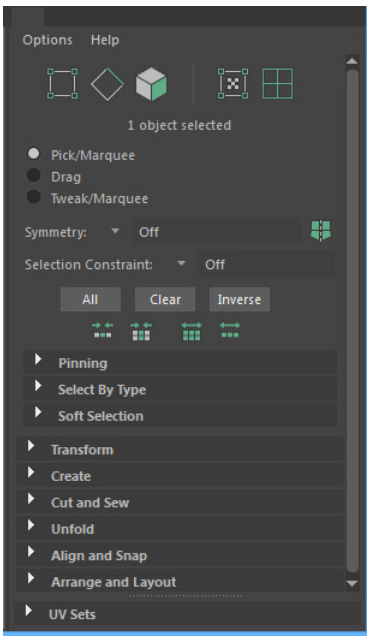


Figure 5-2 The UV Toolkit

Vertex Selection

This tool is used to select the vertex of the mesh in **UV Editor**. You can also invoke this tool by pressing F9.
To convert selection to vertices, hold down the CTRL key and then choose this tool. To convert the selection to the vertex perimeter, hold down the CTRL+SHIFT keys and then choose this tool. You can clear the selection by right-clicking on this tool.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Edge Selection

This tool is used to select the edges of the mesh in **UV Editor**. You can also invoke this tool by pressing F10. Hold down the CTRL key and then choose this tool to convert the selection into edges. Hold down the CTRL+SHIFT keys and then choose this tool to convert the selection into the edge perimeter. You can clear the selection by right-clicking on this tool.

Polygon Selection

This tool is used to select the polygons of the mesh in **UV Editor**. You can also invoke this tool by pressing F11. Hold down the CTRL key and then choose this tool to convert the selection into polygons. Hold down the CTRL+SHIFT keys and then choose this tool to convert selection to the polygon perimeter. You can clear the selection by right-clicking on this tool.

UV Selection

This tool is used to make UV selection. You can also invoke this tool by pressing F12. Hold down the CTRL key and then choose this tool to convert the selection to UVs. Hold down the CTRL+SHIFT keys and then choose this tool to convert selection to the UV perimeter. You can clear the selection by right-clicking on this tool.

UV Shell Selection

This tool is used to make UV shell selection. You can also invoke this tool by pressing ALT+F12. Hold down the CTRL key and then choose this tool to convert selection to UV shells. You can clear the selection by right-clicking on this tool.

Symmetry

This options in the **Symmetry** drop-down list are used to activate the symmetry selection. To quickly mirror current selection about a chosen axis, choose the **Symmetrize** button located on the right of the **Symmetry** drop-down list.

Pinning

The tools in the **Pinning** area are used to lock and unlock the UVs for manipulation, refer to Figure 5-3. The tools in this area are discussed next.

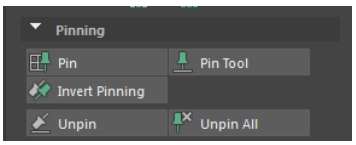


Figure 5-3 *The* ***Pinning*** *area*

Pin

This tool is used to paint over selected UVs to lock them. The locked UVs cannot be moved. The pinned areas of the mesh are highlighted in blue color.

Pin Tool

This tool is used to paint over UVs to lock them. To change settings of this tool, hold the SHIFT key and then choose this tool; the **Tool Settings (Pin UV Tool)** panel will be displayed. From this panel, you can change the **Size** and **Strength** of the brush.

Invert Pinning

This tool is used to lock or unlock the selected UVs.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Unpin
This tool is used to unlock the selected UVs in **UV Editor**.

Unpin All
This tool is used to unlocked all the pinned UVs in the **UV Editor**.

Select By Type
The tools in the **Select By Type** area are used to select the UVs in different modes. These tools are discussed next.

Back-Facing / Front-Facing
These tools are used to select the UVs that have clockwise and counterclockwise winding order.

Overlapping/Non-Overlapping
These tools are used to select the overlapped and non-overlapped UVs of the mesh in the **UV Editor**.

Texture Borders
This tool is used to select the open ends of a UV shell.

Unmapped
This tool is used to select the UVs corresponding to unmapped faces. This will select any areas where texture maps do not appear or appear incorrectly.

Soft Selection
The options in this area are used to select the range of the UVs using a gradient. In this area, select the **Soft Select** check box; the **Volume** drop-down and the curve area are activated. Next, you can select the range of UVs by using curve in the curve area. The **Reset Curve** button is used to reset the curve into the original position.

Transform
The tools in this area are used to transform the selected UVs precisely in the **UV Editor**. Some of the tools in this area are discussed next.

Pivot
The options in this area are used to define a custom pivot that you can use with the transformation tools.

Move
The options in this area are used to translate the selected UVs in increments. You can specify the increment in the **Move** input field and then click on any of the seven buttons to move the selected UVs in the corresponding direction. The tools in the **Tools** area,

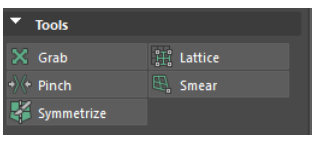


Figure 5-4 *The* ***Tools*** *area*

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

refer to Figure 5-4, are used to move UVs in the UV space efficiently. Press and Hold SHIFT and then choose **Move Tool** to open the corresponding tool setting window. These tools are discussed next.

Lattice

The **Lattice** tool is used to create a lattice around the UVs to deform the 2D texture coordinates. To do so, choose the **Lattice Tool** button from the **Tools** area. Now, press and hold the right mouse button in the **UV Editor** area; a marking menu will be displayed. Choose **UV** from the marking menu and marquee select the UVs of the object; a UV lattice will be displayed on the selected UVs. Now, you can deform the 2D coordinates by moving the lattice control points.

Grab

The **Grab** tool moves UVs along the direction of dragging the cursor. This tool is useful for making subtle adjustments to the texture of the model. To use this tool, place the cursor on the UVs that you want move and then drag the cursor to change the polygons of the UVs.

Pinch

The **Pinch** tool is used to sharpen the soft UVs. This tool pulls the UVs toward the center of the cursor of the tool.

Symmetrize

The **Symmetrize** tool is used to mirror UVs across the U and V axes. The symmetry line is displayed as bold line.

Smear

The **Smear** tool is used to move the UVs in the direction tangent to their original position on the surface.

Rotate

The options in this area are used to rotate the selected UVs by increment.

Scale

The options in this area are used to scale the selected UVs by increment.

Create

The tools in the **Create** area, refer to Figure 5-5, are used to create new UV mappings for the meshes. These tools are discussed next.

Automatic

Menubar: Create > Automatic

The **automatic mapping technique** is used to project UV texture coordinates on the selected objects from multiple angles at the same time. This type of mapping is mainly used to create UVs for complex objects on which other mapping techniques cannot be applied. The automatic mapping

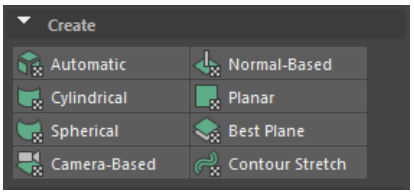


Figure 5-5 *The* ***Create*** *area*

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

technique is best suitable for the objects that are hollow and are projected outward. On applying this technique, a number of projection planes of different colors are created around the polygonal object, as shown in Figure 5-6.

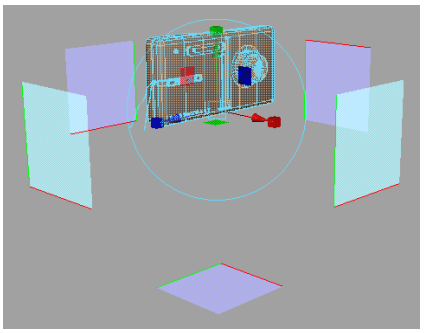


Figure 5-6 *The projection planes created on applying automatic mapping*

The color of a projection plane indicates the projection orientation of the object. For example, the light blue color of the projection plane indicates that the projection face is oriented away from the polygonal object, whereas the lavender color of the projection plane indicates that this plane is facing toward the polygonal object. You can also change the default settings of the automatic UV mapping. To do so, choose **Create > Automatic > Option Box** from the **UV Editor** menubar; the **Polygon Automatic Mapping Options** window will be displayed. From this window, you can set the number of projection planes using the **Planes** attribute.

Cylindrical

Menubar: UV > Create > Cylindrical

The cylindrical mapping technique is used for cylindrical projection of UVs on a polygonal object. This technique works best for objects that can be completely enclosed in the cylindrical projection area. Before applying cylindrical mapping, you need to assign texture to the object. To understand the cylindrical mapping, create a polygon cylinder in the viewport and press and hold the right mouse button over it; a marking menu will be displayed. Choose **Assign Favorite Material > Lambert** from the marking menu; the **Attribute Editor** will be displayed on the right side of the viewport. In the **Attribute Editor**, choose the checker button on the right of the **Color** attribute in the **lambert#** tab; the **Create Render Node** window will be displayed. Choose the **Checker** button from this window; the checker texture will be assigned to the object. Press 6 to display the checker texture on the object. You will observe that the checker pattern created on the object is in distorted form.

The checker texture helps you to judge how the texture will appear. If the checkers in the checker map stretch, the texture will also stretch. To avoid the texture from stretching, select the cylinder from the viewport and choose **UV > Create > Cylindrical** from the menubar; the cylindrical mapping projection manipulators will be displayed on the object, as shown in Figure 5-7.

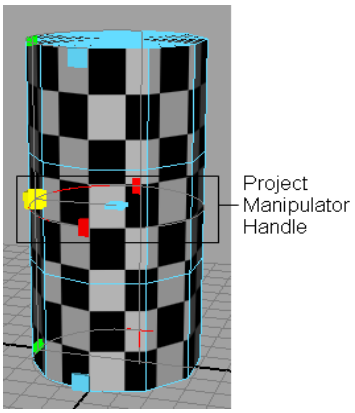


Figure 5-7 *The cylindrical mapping projection manipulators*

You can now use these manipulators to adjust the cylindrical mapping as required. You can also change the default settings of the cylindrical mapping. To do so, choose **UV > Create > Cylindrical > Option Box** from the menubar; the **Cylindrical Mapping Options** window will

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

be displayed, as shown in Figure 5-8. In this window, set the values of the attribute as required and then choose the **Project** button.

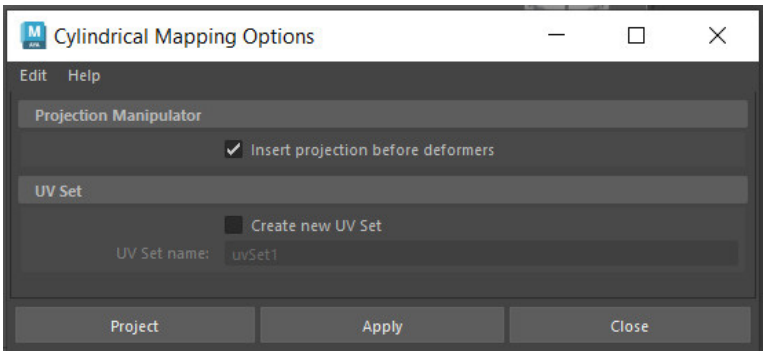


Figure 5-8 *The* ***Cylindrical Mapping Options*** *window*

Spherical

Menubar: UV > Create > Spherical

The spherical mapping technique creates UVs using a projection based on a spherical shape wrapped around a mesh. This technique works best for spherical objects that can be completely enclosed in a spherical projection area.

Before applying spherical mapping to an object, you need to assign a texture to the object. To do so, press and hold the right mouse button over the object in the viewport; a marking menu will be displayed. Choose **Assign Favorite Material > Lambert** from the marking menu; the **Attribute Editor** will be displayed on the right side of the viewport.

In the **Attribute Editor**, choose the checker button on the right of the **Color** attribute; the **Create Render Node** window will be displayed. Choose the **Checker** button from this window; the checker texture will be assigned to the object. Press 6 to display the checker texture on the object. You will observe that the created checker pattern is in a distorted form.

Next, select the object in the viewport and then choose **UV > Create > Spherical** from the menubar; the spherical mapping projection manipulators will be displayed on the object, as shown in Figure 5-9.

You can adjust these mapping manipulators to set the mapping coordinates. You can also change the default settings of the spherical mapping. To do so, choose **Create > Spherical > Option Box** from the menubar; the **Spherical Mapping Options** window will be displayed, as shown in Figure 5-10. Set the required parameters in the window and then choose the **Project** button.

Camera-Based

Menubar: UV > Create > Camera-Based

The camera-based mapping technique is used to create UV texture for the coordinates on a polygonal object, based on the current camera view. In this type of projection, UVs are created on the object based on faces visible in the view plane. To create UVs using this tool, select a

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

polygonal object from the viewport, press and hold the right-mouse button over it. Next, choose **Face** from the marking menu displayed; the face mode will be activated. Now, select the faces for which you want to create the UVs. After selecting the faces, choose **UV > Create > Camera-Based** from the menubar; the projection will be applied to the selected faces.

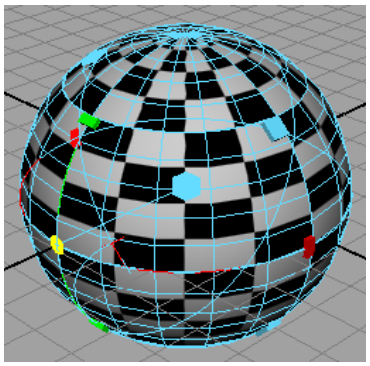


Figure 5-9 *The spherical mapping projection manipulators*

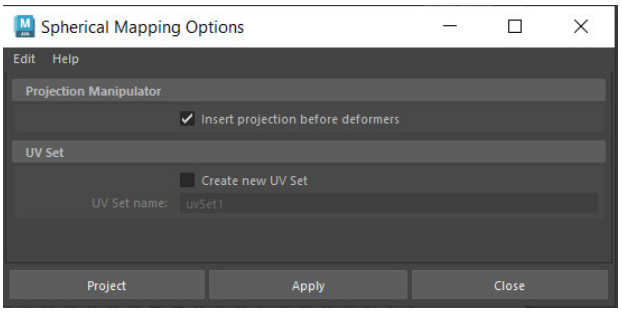


Figure 5-10 *The* ***Spherical Mapping Options*** *window*

Normal-Based

Menubar: UV > Create > Normal-Based

The normal-based mapping technique creates UVs based on the normals of associated vertices. It creates a planar projection based on the average vector of the face normals and the active selection.

Best Plane

Menubar: UV > Create > Best Plane

Best Plane UV mapping is used to project UVs on the selected faces or vertices of a polygon mesh by projecting the best possible plane connecting components you specify. It is especially useful for projecting the UV's onto a subset of selected faces. You can select the faces you want to map and then choose **UV > Create > Best Plane** from the menubar; the projection will be applied.

Planar

Menubar: UV > Create > Planar

The planar mapping technique is used to map UV texture coordinates on the mesh through an imaginary plane. This is the best suited technique for objects with a flat surface. On applying this projection to an object, the projection manipulator handles will be displayed on that object, as shown in Figure 5-11. Using these manipulator handles, you can set the planar mapping. You can also apply the planar mapping on specific faces of an object. To do so, select a polygonal object from the viewport. Next,

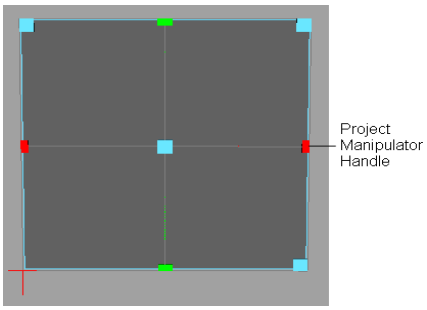


Figure 5-11 *The planar mapping projection manipulator handle*

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

press and hold the right mouse button over the object; a marking menu will be displayed. Choose **Face** from the marking menu displayed; the face selection mode will be activated. Now, you can select the faces on which you want to apply the planar mapping. After selecting the faces, choose **UV > Create > Planar** from the menubar; the planar mapping will be applied on the selected faces. You can also modify the default settings of the planar mapping. To do so, choose **Create > Planar > Option Box** from the menubar; the **Planar Mapping Options** window will be displayed, as shown in Figure 5-12. Set the required parameters in the window and then choose the **Project** button.

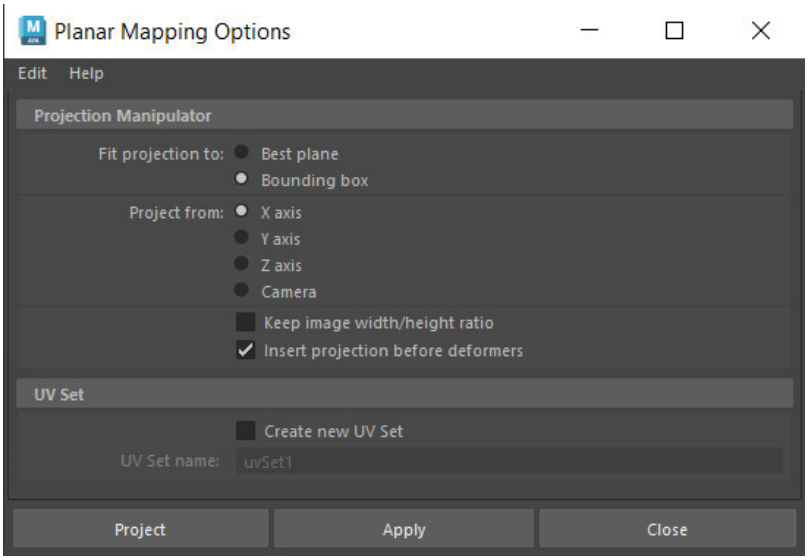


***Figure 5-12** The **Planar Mapping Options** window*

Contour Stretch

Menubar: UV > Create > Contour Stretch

The contour stretch technique is used to project a texture image onto the selected polygons of an object. Contour stretch mapping analyzes a four-cornered selection to determine how to stretch the UV coordinates of the polygons over the image. It does not have the same alignment and positioning options as are available in other mapping methods.

Cut and Sew

The options in the **Cut and Sew** area are used to weld or separate the selected edges. These tools are discussed next.

Auto-Seams

The **Auto-Seams** tool finds out best edges on the mesh or UV shells to act as a seam.

Cut

The **Cut** tool is used to create the border to split UVs.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Cut Tool
The **Cut Tool** is used to interactively split UVs by dragging them along the edges. Press CTRL to temporarily activate the **Sew Tool** and weld the UVs together.

Create UV Shell
This tool separates faces connected to the selected components and then convert the separated faces into a new UV shell.

Create Shell (Grid)
This tool creates a normalized square UV shell that is evenly distributed in the 0 to 1 grid space. The cutting is done along the edge perimeter of the current selection.

Sew
This tool attaches UVs along the selected borders but does not move them together.

Sew Tool
This tool welds the UVs along the edges when you drag the mouse pointer.

Stretch Together
This tool is used to stitch two selected edges by moving one shell toward another. The **A to B** and **B to A** tools let you set the direction of the stitch. Choose the **A to B** tool to transform the smallest UV shell before sticking to the target. Choose the **B to A** tool to transform the largest UV shell before sticking to the target.

Unfold
The tools in this area are used to spread UVs around a seam. These tools are discussed next.

Optimize
This tool is used to automatically spread UVs for better texture distribution.

Optimize Tool
You can use this tool to untangle and relax the UVs by dragging over them.

Unfold
This tool unwraps the UVs. It ensures that UVs do not overlap.

Unfold Tool
This tool allows you to unfold UVs by dragging over them.

Unfold Along
This tool supports the legacy algorithm. It allows you to unwrap selected mesh in the specified direction. The direction is defined by the **U** and **V** tools available on right of this tool. When the **U** tool is chosen, the unfolding is done using a horizontal constraint. When the **V** tool is chosen, the unfolding is done using a vertical constraint.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Straighten UVs

This tool allows you to align the adjacent UVs whose edges are within certain angle threshold. The threshold is defined by using the edit box available on the right of this tool. The **U** and **V** tools on the right of the edit box define the direction along which the UV edge loops will be straighten.

Straighten Shell

This tool allows you to untangle all UVs along the border of a UV shell. To properly use this tool, you must select internal or border UVs. Do not mix both in the selection to get predictable result. If you are using internal UVs, the UVs must fall along the same edge loop.

Align and Snap

The options in this area are used to align and place UVs relative to each other.

Align

The buttons available in this area are used to align the UVs. To do so, select the UVs and then choose one of the six buttons to align the UVs so that they are coplanar in the specified direction. Choose the **Linear Align** button to align selected UVs along a linear line running through the selected UVs.

Snap

The buttons and tools in this area allow you to snap UV shells. To do so, select UV shells and then choose one of the nine buttons to position UVs in the UV space. The **Snap Together** tool allows you to snap two shells together using a selected UV point on each shell. The direction is defined by the **AB** and **BA** buttons available on right of this tool. The **Snap and Stack** tool allows you to snap and stack multiple shells together using the selected component on each shell. The **Match Grid** tool moves selected UVs to its nearest grid intersection. The **Match UVs** tool moves the selected UVs to a certain threshold distance. Hold SHIFT and choose the **Match UVs** tool to set the threshold. The **Normalize** tool allows you to scale the UVs to fit within 0 to 1 grid space.

Arrange and Layout

The tools in this area are used to position and align UVs relative to each other. These tools are discussed next.

Distribute

This option allows you to distribute the selected UV shells in the chosen direction with a specified unit space between them. You can click the arrow icons corresponding to the **Distribute** attribute to define the direction. You can also choose the **Target** button if you want to distribute them evenly in the direction of the last selected shell. The last selected shell acts as a target shell.

Orient Shells

This tool is used to rotate the selected UV shells so they are placed parallel to the most adjacent U or V axis.

Orient to Edges

This tool rotates the selected shells so that they are positioned parallel to the selected edge.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Stack Shells
This tool moves selected shells to the center of the UV space so that they overlap.

Unstack Shells
This tool is used to unstack the overlapped shells.

Stack and Orient
This tool stacks and rotates the shells so that they are positioned parallel to the adjacent U or V axis.

Stack Similar
This tool stacks those shells which are topologically similar.

Gather Shells
This tool gathers those UV shells to 0 to 1 space which are placed outside the 0 to 1 grid space.

Randomize Shells
This tool randomly transforms the shells in the UV space.

Measure
Select two UVs and then choose this tool to display a chosen measurement between the selected UVs. This tool has the following options: **U Distance**, **V Distance**, **Pixel Distance**, and **Angle Between**.

Layout
This tool automatically arranges a UV shell in the 0 to 1 grid for maximize usage of the UV space.

Layout Along
This tool automatically arranges a UV shell in the 0 to 1 grid for full usage of the UV space along a specified direction. The direction can be specified using the **U** and **V** buttons located next to this tool.

UV Sets
Using UV sets, you can create multiple layers of texture coordinates for a mesh. These sets are useful when you are stacking multiple UV layouts to perform multi-texturing on a surface. The options in the **UV Sets** area allow you to create UV sets for multi-texturing. To create an empty UV set, select the object and then choose the **Create empty UV set** button; a set with the name **UVSet** is displayed in the UV Set list. If you want to view the creation options, hold SHIFT and then choose the **Create empty UV set** button to open the **Create UV Set Options** window. Specify the desired values and then choose the **Create** button to create the set. Now, select the set and create UVs using one of the mapping operations.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

TUTORIALS

Tutorial 1

In this tutorial, you will model a wooden box and then apply texture to it. The final rendered output of the model is displayed in Figure 5-13. **(Expected time: 15 min)**

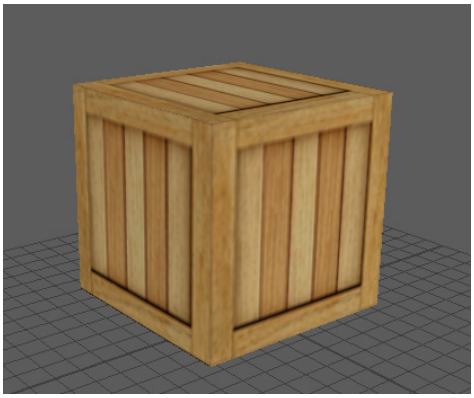


Figure 5-13 *The final rendered output of the model*

The following steps are required to complete this tutorial:

a. Create a project folder.
b. Download the texture file.
c. Create a polygon cube.
d. Fit the texture using the 2D UV coordinates.
e. Change the background color of the scene.
f. Save and render the scene.

Creating a Project Folder

Create a new project folder with the name *c05_tut1* at *\Documents\maya2025* and then save the file with the name *c05tut1* folder, as discussed in Tutorial 1 of Chapter 2.

Downloading the Texture File

In this section, you need to download the texture file.

1. Download the *c05_maya_2025_tut.zip* file from *www.cadcim.com*. The path of the file is as follows: *Textbooks > Animation and Visual Effects > Maya > Autodesk Maya 2025: A Comprehensive Guide*.

2. Extract the contents of the zip file to the *Documents* folder. Next, copy the *woodbox-texture.jpg* file from *\Documents\maya2025\c05_maya_2025_tut* to *\Documents\maya2025\c05_tut1\sourceimages*.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Creating a Polygon Cube

In this section, you need to create a polygon cube.

1. Choose **Create > Objects > Polygon Primitives > Cube** from the menubar and click in the viewport; a cube is created in the persp viewport.

2. In the **Channel Box / Layer Editor**, expand the **polyCube1** node in the **INPUTS** area and then set **8** as the value for the **Width**, **Height**, and **Depth** attributes.

Fitting Texture Using the 2D UV Coordinates

In this section, you need to apply the texture to the polygon cube using the 2D UV coordinates.

1. Choose **Windows > Editors > Rendering Editors > Hypershade** from the menubar; the **Hypershade** window is displayed.

2. Choose the **Lambert** shader from the **Create** panel; a lambert shader node is created in the **Browser** panel with the name **lambert#**. Press and hold the CTRL key and double-click on the **lambert#** shader in the **Browser** panel; the **Rename node** window is displayed, as shown in Figure 5-14. Enter **Wood box** in the **Enter new name** text box and then choose the **OK** button; the **Lambert** shader is renamed to *Wood box*. Also, the **Wood box** tab is displayed in **Property Editor**.

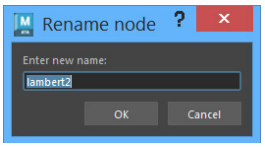


***Figure 5-14** The **Rename node** window*

3. In the **Wood box** tab of **Property Editor**, click on the checker button next to the **Color** attribute, as shown in Figure 5-15; the **Create Render Node** window is displayed. In this window, choose the **File** button; the **File Attributes** area is displayed in the **file1** tab of the **Property Editor**. Click on the folder icon located on the right of the **Image Name** attribute; the **Open** dialog box is displayed. In this dialog box, select the **woodbox-texture.jpg** file and then choose the **Open** button.

4. Select the polygon cube in the viewport. In the **Hypershade** window, press and hold the right mouse button over the **Wood box** shader; a marking menu is displayed. Choose the **Assign Material To Selection** option from this marking menu; the texture is applied to the cube. Now, click anywhere in the viewport and press 6 to view the texture in the viewport. Figure 5-16 shows the polygon cube with the texture applied.

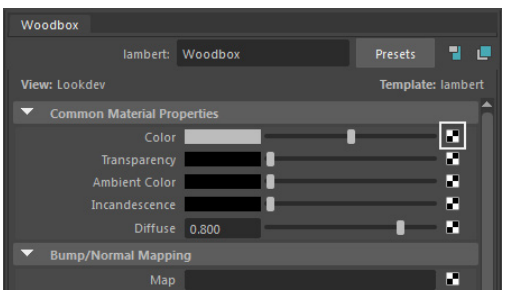


***Figure 5-15** Clicking on the checker button next to the **Color** attribute in the **Common Material Properties** panel*

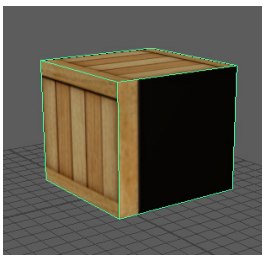


***Figure 5-16** The wood texture applied to the cube*

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

5. Make sure the cube is selected and then choose **Windows > Editor > Modeling Editors > UV Editor** from the menubar; the **UV Editor** is displayed. Next, choose **View > Grid** from the **UV Editor** menubar; the grid becomes invisible and the UV shell for the cube is displayed, as shown in Figure 5-17.

6. Press and hold the right mouse button in the empty space of the **UV Editor**; a marking menu is displayed. Choose **UV** from the marking menu and select all the UVs. Invoke **Scale Tool** from the Tool Box; various handles are displayed. Scale the selected UVs using the marque selection along the X axis by dragging the red handle and then align the edges with the vertical lines of the *woodbox-texture.jpg*. The entire texture is mapped on to the cube, except on to the two areas that are not covered in the V area. Figure 5-18 shows the selected 2D UV texture coordinates after scaling them.

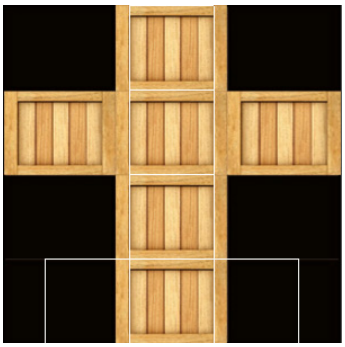


Figure 5-17 *The UV shell for cube*

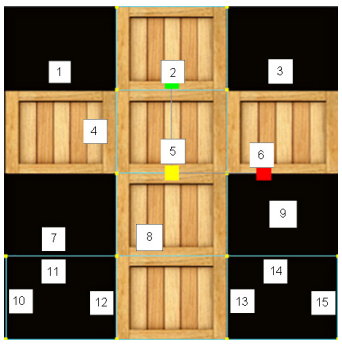


Figure 5-18 *The 2D UV texture coordinates after scaling*



Note

*In the **UV Editor**, the area of the texture within the UV coordinates will only be visible on the object in the viewport.*

7. Press and hold the right mouse button in the empty space of **UV Editor**; a marking menu is displayed. Next, choose **Edge** from the marking menu. Select edge 12 from **UV Editor**, refer to Figure 5-19. Now, choose **Cut/Sew > Cut** from the **UV Editor** menubar; the UVs of selected edges are separated from the edge. Next, select edge 4, refer to Figure 5-18 and choose **Cut/Sew > Move and Sew** from the **UV Editor** menubar; the edge corresponding to the selected edge of the 2D texture coordinate is moved and sewed. Figure 5-20 displays the 2D UV coordinate partially mapped over the texture.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

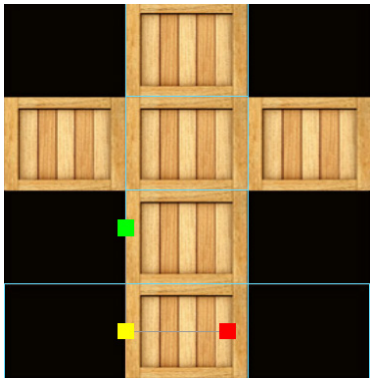


Figure 5-19 *Edge 12 to be selected from the* ***UV Editor***

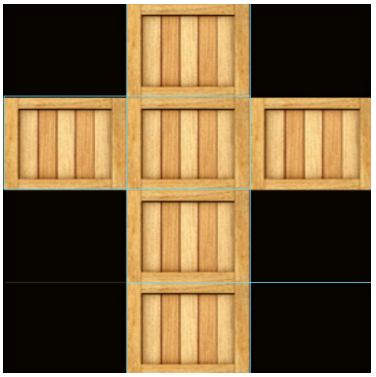


Figure 5-20 *The 2D UV coordinate partially mapped over the texture*

8. In **UV Editor**, select edge 13, refer to Figure 5-18. Choose **Cut/Sew > Cut** from the **UV Editor** menubar; the UVs of selected edges are separated from the edge. Now, select edge 6, refer to Figure 5-18. Choose **Cut/Sew > Move and Sew** from the menubar; the edge corresponding to the selected edge of the 2D texture coordinate is moved and sewed to match the 2D UV coordinate completely with the texture. Figure 5-21 displays the UV coordinate completely mapped over the texture.

9. Close **UV Editor** and the **Hypershade** window. Now, you can rotate the view in the persp viewport to check that the texture is properly applied on the polygon cube, or not. You can also scale the UVs, if the texture is stretched.

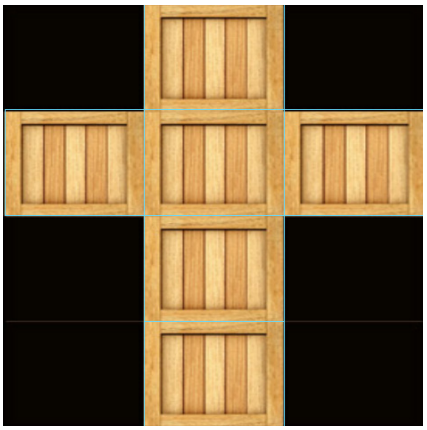


Figure 5-21 *The 2D UV coordinate completely mapped over the texture*

Changing the Background Color of the Scene

In this section, you need to change the background color of the scene.

1. In the **Outliner** window, click on the **persp** camera; the **perspShape** tab is displayed in the **Attribute Editor**.

2. In the **perspShape** tab, expand the **Environment** area and drag the **Background Color** slider bar toward right to change the background color to white. Close the **Outliner** window.

Saving and Rendering the Scene

In this section, you will save the scene that you have created and then render it. You can view the final rendered image of the model by downloading the *c05_maya_2025_rndr.zip* file from *www.cadcim.com*. The path of the file is as follows: *Textbooks > Animation and Visual Effects > Maya > Autodesk Maya 2025: A Comprehensive Guide*.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

1. Choose **File > Save Scene** from the menubar.

2. Maximize the persp viewport if not already maximized. Choose the **Display render setting** button from the Status Line; the **Render Settings** window is displayed. In this window, select **Maya Software** in the **Render Using** drop-down list and then close the window. Choose the **Render the current frame** button from the Status Line to render the scene, refer to Figure 5-13.

Tutorial 2

In this tutorial, you will create the model of a hut and then unwrap it, refer to Figures 5-22 and 5-23. **(Expected time: 30 min)**

The following steps are required to complete this tutorial:

a. Create a project folder.
b. Create the hut.
c. Assign a texture to the hut.
d. Unwrap the hut.
e. Change the background color of the scene.
f. Save and render the scene.

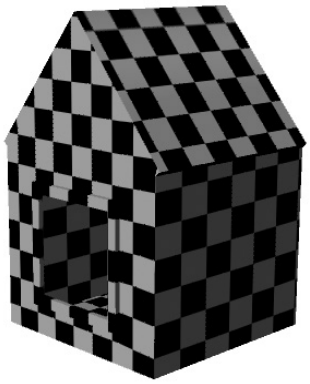


Figure 5-22 *Front view of the unwrapped model of the hut*

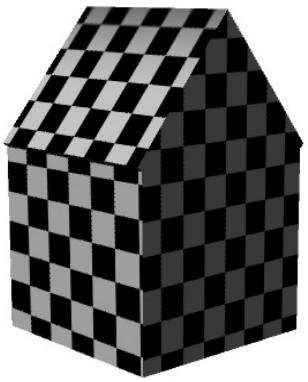


Figure 5-23 *Back view of the unwrapped model of the hut*

Creating a Project Folder

Create a new project folder with the name *c05_tut2* at *\Documents\maya2025* and then save the file with the name *c05tut2*, as discussed in Tutorial 1 of Chapter 2.

Creating the Hut

In this section, you need to create the model of the hut.

1. Choose **Create > Objects > Polygon Primitives > Cube** from the menubar and create a cube in the viewport.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

2. Make sure that the cube is selected in the viewport. In the **Channel Box / Layer Editor**, expand the **polyCube1** node of the **INPUTS** area and set the parameters as follows:

Width: **8**	Height: **7**
Depth: **8**	Subdivisions Width: **2**

3. Next, rename the cube to **hut**, as discussed earlier.

4. Activate the front-Z viewport. Make sure *hut* is selected. Press and hold the right mouse button over it; a marking menu is displayed. Choose **Vertex** from the marking menu; the vertex selection mode is activated. Next, marquee-select the top-center vertices of *hut*, refer to Figure 5-24. Choose **Move Tool** from the Tool Box and move the selected vertices upward along the Y-axis, refer to Figure 5-24.

5. Make sure the **Modeling** menuset from the **Menuset** drop-down list is selected. Next, press and hold the right mouse button over *hut*; a marking menu is displayed. Choose **Object Mode** from the marking menu; the object selection mode is activated. Select *hut* and then choose **Mesh Tools > Tools > Insert Edge Loop** from the menubar and insert four edges, refer to Figure 5-25. Now, choose **Scale Tool** from the Tool Box and scale the inserted horizontal edges along the Y axis to make them straight, refer to Figure 5-25. Choose **Move Tool** from the Tool Box and align the horizontal lines, as shown in figure 5-25.

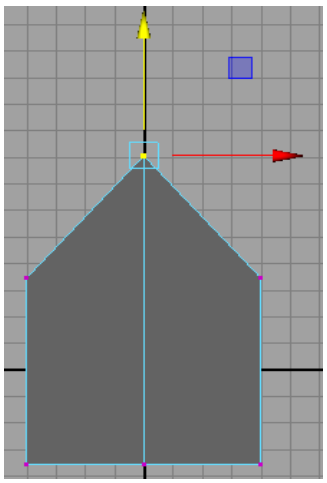


Figure 5-24 *Vertices moved upward*

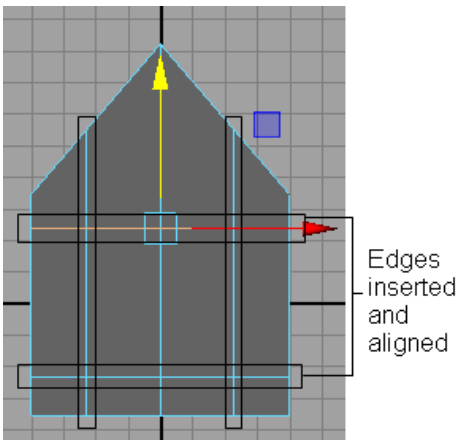


Figure 5-25 *Four edges inserted in the hut*

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

6. Press and hold the right mouse button over *hut*; a marking menu is displayed. Choose **Face** from the marking menu; the face selection mode is activated. Next, select the faces of *hut*, as shown in Figure 5-26, and press DELETE; the selected faces are deleted.

7. Press and hold the right mouse button over *hut*; a marking menu is displayed. Choose **Edge** from the marking menu; the edge selection mode is activated. Now, select the edges of *hut*, refer to Figure 5-27.

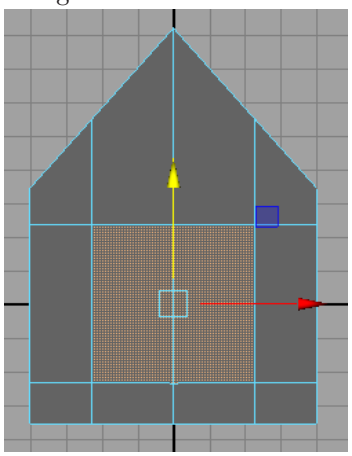


Figure 5-26 *The faces to be selected*

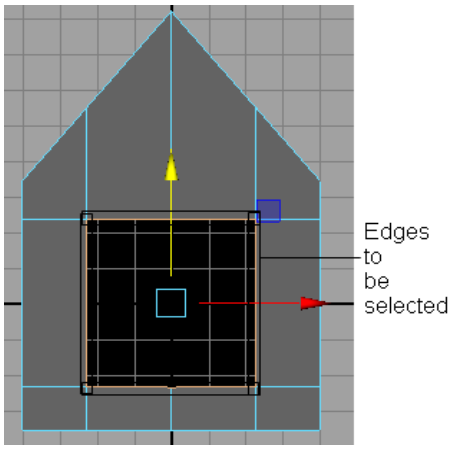


Figure 5-27 *The edges to be selected*

8. Choose **Edit Mesh > Components > Extrude** from the menubar; the **polyExtrudeEdge1** In-View Editor is displayed in the viewport. Next, invoke **Scale Tool** by pressing the R key and uniformly scale the selected edges inward, refer to Figure 5-28.

9. Maximize the persp viewport. Next, press and hold the right mouse button over *hut*; a marking menu is displayed. Choose **Face** from the marking menu; the face selection mode is activated. Select the faces using the SHIFT key, refer to Figure 5-29 and choose **Edit Mesh > Components > Extrude** from the menubar; the **polyExtrudeFace1** In-View Editor is displayed in the viewport. Enter **0.2** in the **Thickness** edit box of the **polyExtrudeFace1** In-View Editor, refer to Figure 5-29.

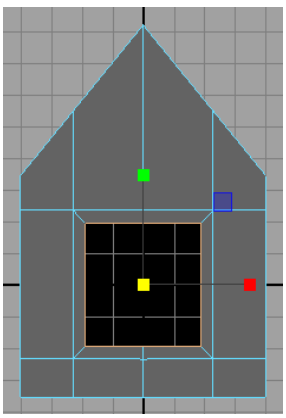


Figure 5-28 *Scaling the edges of the hut inward*

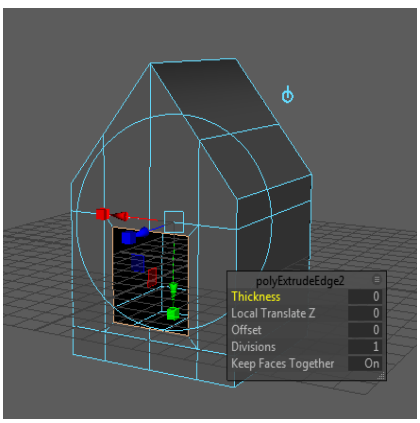


Figure 5-29 *The faces of hut extruded*

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

10. Select the top faces of the *hut* using the SHIFT key, as shown in Figure 5-30. Next, choose **Edit Mesh > Components > Extrude** from the menubar, the **polyExtrudeFace2** In-View Editor is displayed in the viewport. Enter **0.25** in the **Thickness** edit box of the **polyExtrudeFace2** In-View Editor, refer to Figure 5-31.

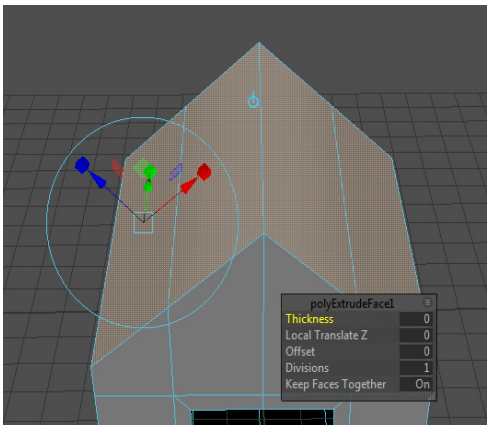


Figure 5-30 *The selected faces of the hut*

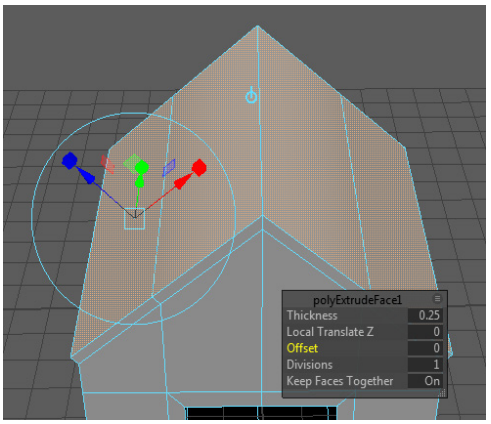


Figure 5-31 *Selected faces of the hut extruded*

Assigning Texture to the Hut

In this section, you need to assign texture to the hut.

1. Choose **Select Tool** from the Tool Box; the **Extrude** tool is deactivated. Press and hold the right mouse button over *hut*; a marking menu is displayed. Choose **Object Mode** from the marking menu; the object selection mode is activated. Select the *hut*. Next, press and hold the right mouse button over it; a marking menu is displayed. Choose **Assign Favorite Material > Lambert** from the marking menu, as shown in Figure 5-32; the **lambert2** tab is displayed in the **Attribute Editor**.

2. In the **Common Material Attributes** area of the **lambert2** tab, click on the checker button beside the **Color** attribute; the **Create Render Node** window is displayed. Choose the **Checker** button from this window, as shown in Figure 5-33.

3. Press 6; the checker texture is displayed on *hut*. You will notice that the checker pattern appears distorted.

Unwrapping the Hut

In this section, you need to unwrap the hut for proper distribution of UVs.

1. In the persp viewport, press and hold the right mouse button over *hut*; a marking menu is displayed. Choose **Face** from the marking menu; the face selection mode is activated. Select the front faces of *hut*, as shown in Figure 5-34. Next, choose **UV > Create > Planar > Option Box** from the menubar; the **Planar Mapping Options** window is displayed. In the **Projection Manipulator** area of the window, select the **Z axis** radio button corresponding to

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

the **Project from** attribute. Next, choose the **Apply** button; the checker pattern is distributed uniformly. Choose the **Close** button to close the window.

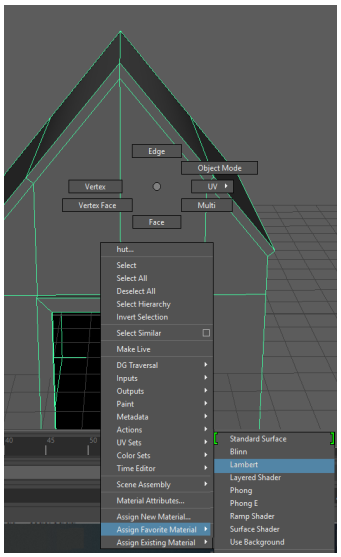


Figure 5-32 *Choosing the* ***Lambert*** *material from the marking menu*

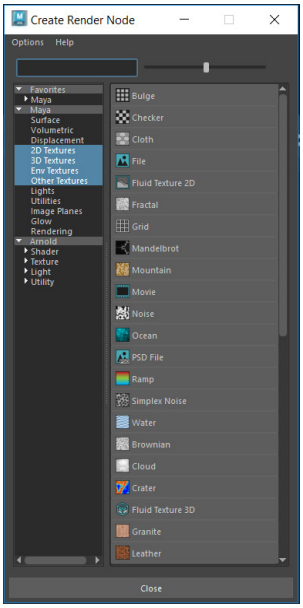


Figure 5-33 *Choosing the* ***Checker*** *button from the* ***Create Render Node*** *window*

2. Choose **Windows > Editors > Modeling Editors > UV Editor** from the menubar; the **UV Editor** is displayed with unwrapped hut, as shown in Figure 5-35.

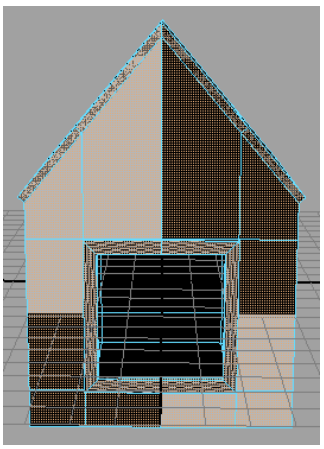


Figure 5-34 *Front faces of the hut selected*

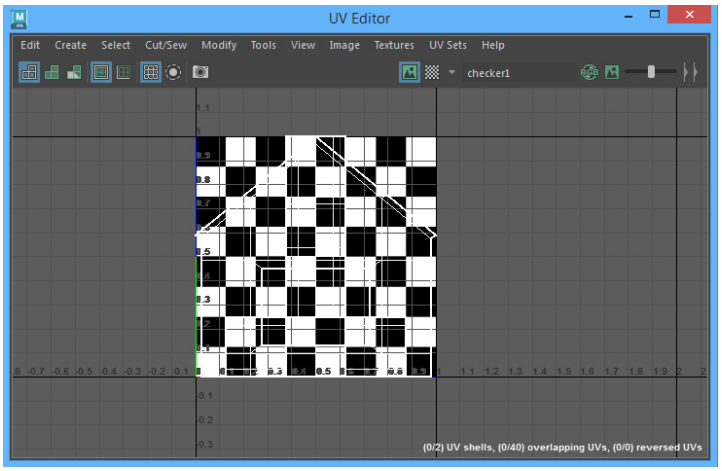


Figure 5-35 *The* ***UV Editor*** *displaying the unwrapped hut*

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

3. In the **UV Editor**, press the W key and move the selected part out of the UV texture area, as shown in Figure 5-36.

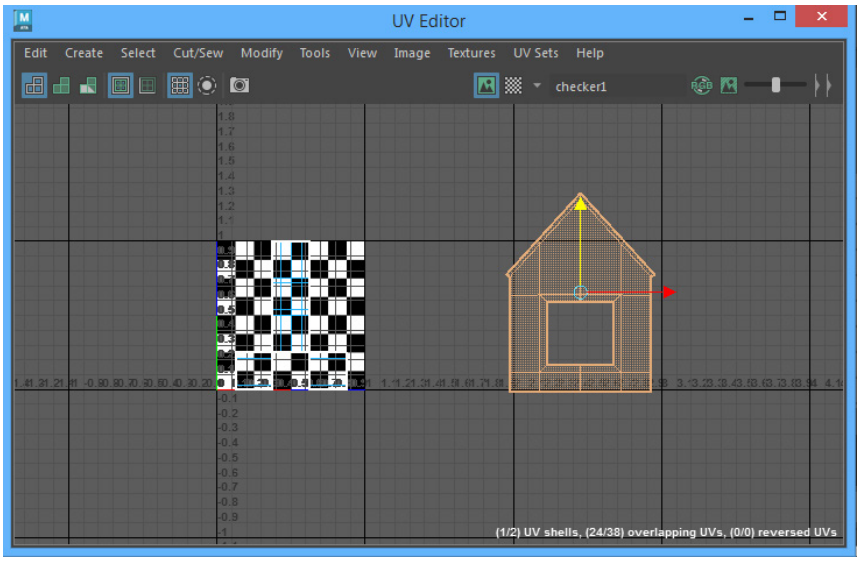


Figure 5-36 *Scaling the front part of the hut*

Next, you will project a uniform texture on the left side of *hut*.

4. In the persp viewport, press and hold the right mouse button over *hut*; a marking menu is displayed. Choose **Face** from this marking menu; the face selection mode is activated. Next, select the faces of the left part of *hut*, as shown in Figure 5-37.

5. Choose **UV > Create > Planar > Option Box** from the menubar; the **Planar Mapping Options** window is displayed. In the **Projection Manipulator** area of the window, select the **X axis** radio button corresponding to the **Project from** parameter. Next, choose the **Apply** button; the checker pattern is distributed uniformly. Now, choose the close button to close the window.

6. In the **UV Editor**, move the selected part of *hut* in such a way that it lies at the left side to the front part of *hut*. Next, invoke the **Scale Tool** and scale the hut uniformly, as shown in Figure 5-38.

7. Repeat the same procedure to unwrap the right part of the *hut*, and then move it to the right of the front part in **UV Editor**, refer to Figure 5-39. Next, press and hold the right mouse button over the front part of *hut* in **UV Editor**; a marking menu is displayed. Choose **Edge** from the marking menu. Next, select the right edges of the front part, as shown in Figure 5-39. You will notice that the left edges of the right side of *hut* get selected automatically.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

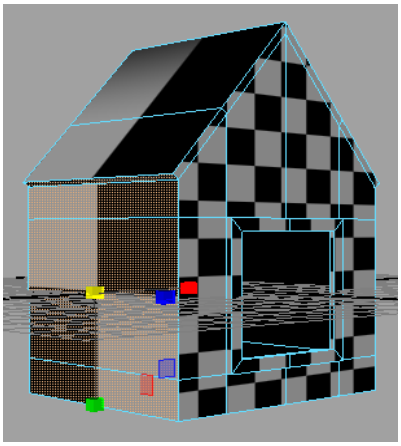


Figure 5-37 *Faces of the left part of hut selected*

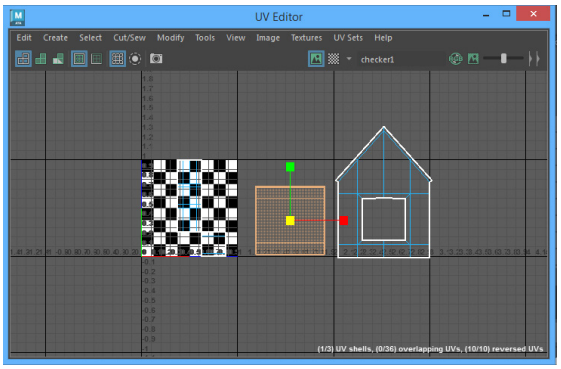


Figure 5-38 *Scaling the UVs of side and front parts of the hut*

8. In **UV Editor**, choose the **Cut/Sew > Move and Sew** tool from the menubar; the selected edges get attached, as shown in Figure 5-40.

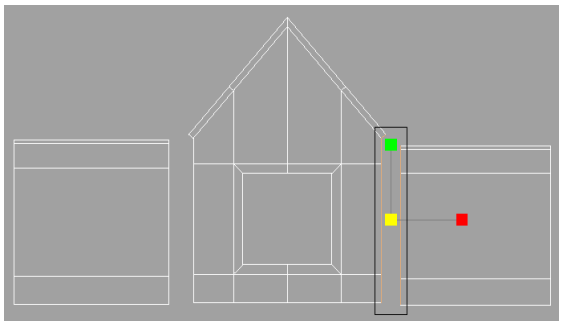


Figure 5-39 *Right edge of the front part selected*

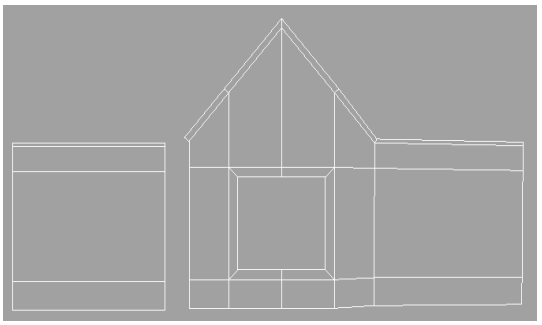


Figure 5-40 *The right side edges of the front attached to left side edges of the right part*

9. Similarly, choose the left edges of the front part of *hut*. You will notice that the left edges of the left part of *hut* get selected. On choosing the **Cut/Sew > Move and Sew** tool from the menubar, the faces get distorted.

10. Press and hold the right mouse button over the left side of *hut*; a marking menu is displayed. Choose **UV** from the marking menu and then marquee select all the UVs of the left part of *hut*, as shown in Figure 5-41.

11. Choose **Modify > Flip** from the menubar; the selected UVs flip in the U direction.

12. Press and hold the right mouse button over the left part of *hut*; a marking menu is displayed. Choose **Edge** from the marking menu. Next, choose the right edges of the left part of *hut* and then choose **Cut/Sew > Move and Sew** tool from the menubar; the selected edges of the front and side parts of *hut* are attached, as shown in Figure 5-42.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

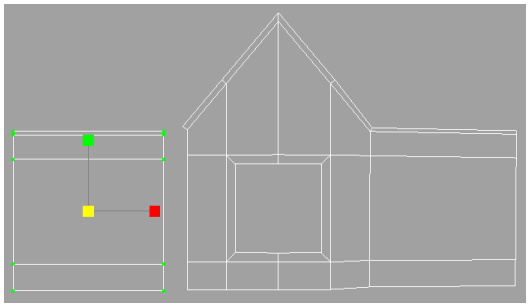


Figure 5-41 *UVs of the left part selected*



Figure 5-42 *Front and left parts of the hut*

13. Similarly, unwrap the roof, back side, and bottom sides of *hut*. The final model will have uniform distribution of checkers on all the sides, as shown in Figure 5-43.



Note

The checkers in the viewport should form a square shape.

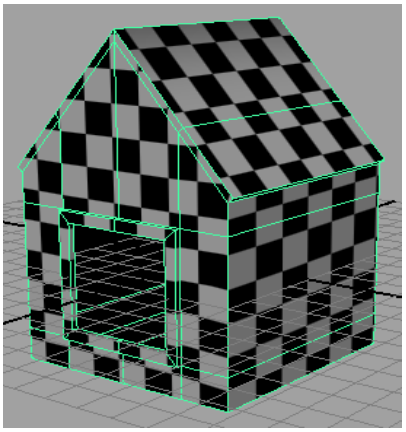


Figure 5-43 *Final model of hut with uniform distribution of checkers*

Changing the Background Color of the Scene

In this section, you will change the background color of the scene.

1. In the **Outliner** window, click on the **persp** camera; the **perspShape** tab is displayed in the **Attribute Editor**. Select the **persp** camera in the **Outliner** window; the **perspShape** tab is displayed in the **Attribute Editor**.

2. In the **perspShape** tab, expand the **Environment** area and drag the **Background Color** slider bar toward right to change the background color to white.

Saving and Rendering the Scene

In this section, you will save the scene that you have created and then render it. You can view the final rendered image of the model by downloading the *c05_maya_2025_rndr.zip* file from *www.cadcim.com*. The path of the file is as follows: *Textbooks > Animation and Visual Effects > Maya > Autodesk Maya 2025: A Comprehensive Guide*.

1. Choose **File > Save Scene** from the menubar.

2. Maximize the persp viewport if not already maximized. Choose the **Display render setting** button from the Status Line; the **Render Settings** window is displayed. In this window, select **Maya Software** in the **Render Using** drop-down list and then close the window. Choose the **Render the current frame** button from the Status Line to render the scene, refer to Figure 5-22.

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

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 key and mouse combinations is used to pan in the UV Editor?

   (a) ALT+MMB (b) CTRL+MMB
   (c) SHIFT+MMB (d) ALT+CTRL+MMB

2. Which of the following mapping techniques is used to map complex objects?

   (a) Planar (b) Spherical
   (c) Cylindrical (d) Automatic

3. You can select UVs and UV shells in the scene as well as in the _____.

4. The _____ is used for creating UVs through a spherical projection around a polygonal object.

5. You can view and edit the 2D texture coordinates of an object by using the _____.

6. You can show or hide the texture image in the viewport by pressing the _____ key in the keyboard.

7. The **UV Distortion** tool is used to display the stretched and compressed UVs. (T/F)

8. Spherical mapping is mainly used for planar objects. (T/F)

9. The navigation options in the **UV Editor** are different from those that are displayed in the normal viewport area. (T/F)

10. The Counter Stretch mapping technique analyzes a four-cornered selection to determine how to stretch the UV coordinates of the polygons over the image. (T/F)

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Review Questions

Answer the following questions:

1. Which of the following is a UV mapping technique used in Maya?

   (a) Planar (b) Cylindrical
   (c) Spherical (d) All of these

2. Which of the following tools is used to create a lattice around the UVs for deformation?

   (a) **UV Lattice Tool** (b) **Lattice UV Tool**
   (c) **Lattice** (d) **Grab**

3. The _____ tool is used to unwrap a selected mesh without overlapping the UVs.

4. The _____ tool is used to automatically spread UVs for better texture distribution.

5. The _____ tool is used to arrange the UVs in a cleaner layout.

6. The _____ tool automatically arranges a UV shell in the 0 to 1 grid for maximum utilization of the UV space along a specified direction.

7. The **Sew** tool attaches UVs along the selected borders but does not move them together. (T/F)

8. The **Straighten UVs** tool allows you to align the adjacent UVs whose edges are within certain angle threshold. (T/F)

9. The **Create Shell (Grid)** tool creates a normalized square UV shell that is evenly distributed in the 0 to 1 grid space. (T/F)

10. The **Camera-Based** tool is used to create UV texture for the coordinates on a polygonal object, based on the current camera view. (T/F)

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

EXERCISES

The rendered output of the models used in the following exercises can be accessed by downloading the *c05_maya_2025_exr.zip* file from *www.cadcim.com*. The path of the file is as follows: *Textbooks > Animation and Visual Effects > Maya > Autodesk Maya 2025: A Comprehensive Guide*.

Exercise 1

Create a model of the interior of a house, as shown in Figure 5-44, and unwrap it.

(Expected time: 20 min)

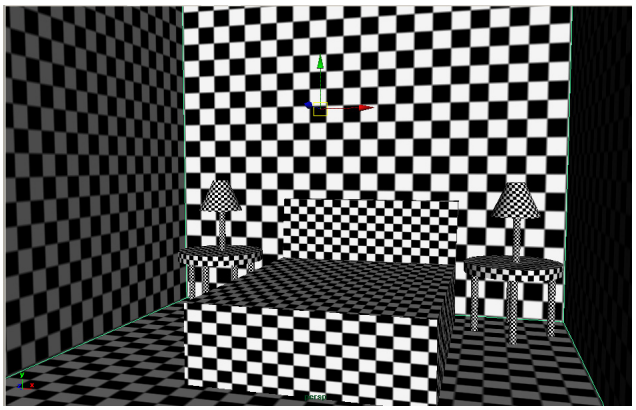


Figure 5-44 *The unwrapped model of the interior of a house*

Exercise 2

Create a model of the exterior of a house, as shown in Figure 5-45, and unwrap it.

(Expected time: 20 min)

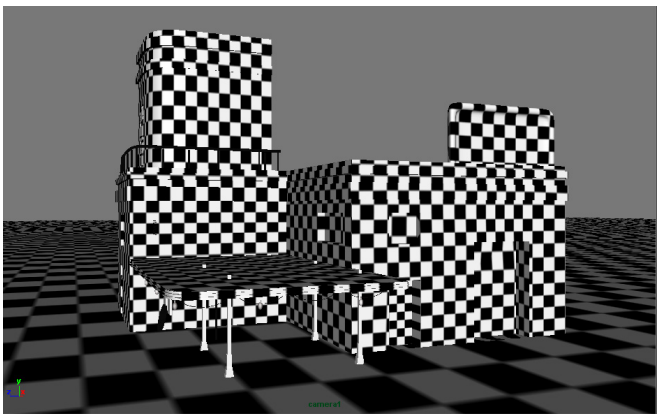


Figure 5-45 *The unwrapped model of the exterior of a house*

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com

Answers to Self-Evaluation Test

1. a, **2.** d, **3. UV Editor**, **4.** spherical mapping, **5. UV Editor**, **6.** 6, **7.** T, **8.** F, **9.** F, **10.** T

Evaluation Copy. Do not reproduce. For information visit www.cadcim.com