LEARNING Blender

A Hands-On Guide to Creating 3D Animated Characters

Praise for *Learning Blender*

"Oliver Villar's book will give you a solid foundation in Blender and computer graphics in general. Filled with well-crafted examples and lessons, this book will give you the tools you need to succeed as an artist."

—David Andrade, Producer, Theory Studios

"The days are now over when beginners found learning Blender 3D difficult. Oliver Villar introduces to beginners the best of Blender's 3D features and 3D fundamentals in fun and exciting ways. His approach of completing a character from scratch, touching every aspect of 3D from Blender's point of view, is truly filled with explanations of techniques and important tools that will help readers to bring their ideas to life creatively while following professional workflows in 3D.

Starting with the fundamentals of 3D, this is a great resource for every beginner artist who is looking to learn Blender 3D. It's truly a book written with great dedication!"

—Waqas Abdul Majeed, CG Generalist, www.waqasmajeed.com

"I found Oliver Villar's book *Learning Blender* to be an essential tool for not only getting users acquainted with Blender, but also preparing them by explaining the history and the magic that has made Blender what it is now. His book also prepares users to be productive and informed by explaining the community and its various portals. His book is complete in explaining all the aspects of the UI and acquainting users with the classic G, S, and R. The exercises are perfect for getting users on the level to begin making their own worlds. I was even pleased to see him discussing F2, ripping with V, and even Knife Project, which are classics I usually consider to be more advanced. This book is a no-holds-barred approach to getting the most out of this capable little program. I must also add that the character created is attractive and well created, and is a fine example of using the program for character modeling. Oliver is truly a skilled artist and that shines through in his use of this program."

—Jerry Perkins, 3D Conceptor, Fenix Fire

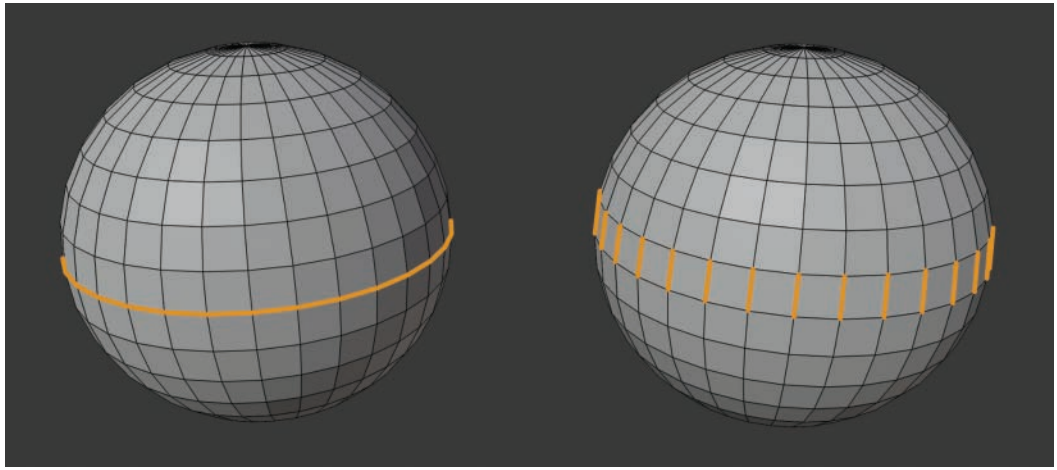

Figure 6.5 An edge loop (left) and an edge ring (right)

You can quickly select loops or rings with two keyboard shortcuts:

- **Selecting loops:** Place your cursor on top of an edge, press **Alt**, and right-click to select the whole loop.
- **Selecting rings:** Place your cursor on top of an edge, press **Ctrl+Alt**, and right-click to select the whole ring.

Hold down **Shift** combined with either of these shortcuts to add to the selection.

This technique works with vertices, edges, and faces, but in the case of faces, selecting a loop or a ring returns the same results.

A secondary option to select loops and rings is to do it from the Select menu in the 3D Viewport's header. You have to select at least one edge in the model. From the Select menu, choose Select Loops, and then choose Edge Loops or Edge Rings: Blender will select the loops or rings to which the selected elements belong.

Border Selection

A *border* is the series of edges that define the limits of a mesh that is not closed. Take a plane, for example. A plane's four edges are open, and that's a border. A cube, on the other hand, is closed.

To select a border quickly, hold down **Alt** while you left-click the outer edges of the mesh twice.

Grow and Shrink Selection

When you have a selection of vertices, edges, or faces, you can press **Ctrl+NumPad +** (plus sign) or **Ctrl+NumPad -** (minus sign) to grow or shrink the scope of the selection through the connected elements.

Select Similar

After making a selection, pressing **Shift+G** (or using the Select Similar options within the Select menu from the 3D Viewport's header) shows different options depending on the type of element that you just selected. When you select an element, such as an edge, and use the Select Similar tool, for example, you can select all the similar edges in that mesh automatically. You can select by length, face angles, direction, and several other parameters.

Pay attention to the Adjust Last Operation menu (remember that you can press **F9** to see it), as it gives you options for modifying the selection. An especially useful option is the threshold, which lets you define the amount of similarity with the original selection and requires a certain value for the other elements to be selected.

Linked Flat Faces

You can find the Linked Flat Faces option in the Select menu of the 3D Viewport, within the Select Linked submenu. This option selects all the faces around the selection as long as they are on a flat surface and the selection reaches an edge that has an angle. The sharpness value in the Operator panel lets you tell Blender how big the angle between faces has to be to limit the selection.

Select Boundary Loop and Loop Inner-Region

You can find options for selecting the boundary loop and the loop inner region in the Select menu of the 3D Viewport's header and in the Select Loops submenu.

When you have a selection of several faces on a surface, you can use the Select Boundary Loop tool. This tool leaves only the boundary loop selected on the borders of the previously selected faces (see Figure 6.6).

The Select Loop Inner-Region tool is exactly the opposite of Select Boundary Loop. This tool allows you to select a closed loop on a surface and to select all elements inside that loop (see Figure 6.6).

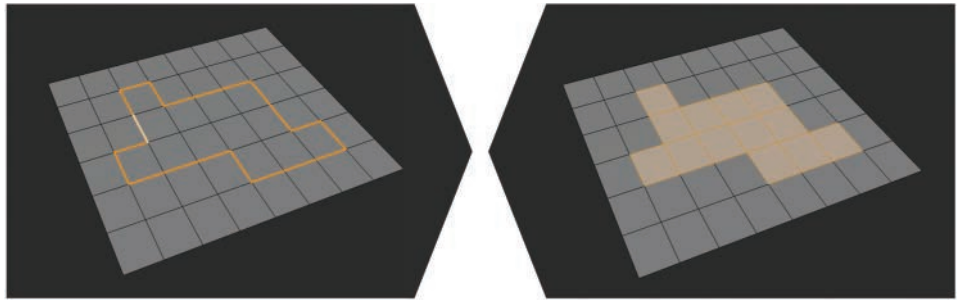

Figure 6.6 The effect of the Select Boundary Loop tool (left) and Select Loop Inner-Region selection (right). Each image shows the effect of its selection tool applied to the selection in the other image. The image on the left shows the result of the Select Boundary Loop tool applied to the selection in the right image.

Checker Deselect

The Checker Deselect tool is actually a reverse take on selections. First, you select an area; then you use Checker Deselect to deselect given elements, thus ending up with the desired selection. You can access this tool from the Select menu on the 3D Viewport's header.

Basically, this tool generates a pattern based on three values that you set up in the Adjust Last Operation panel: nth selection, skip, and offset. Then you use this pattern to deselect some of the elements in the selection you made.

Other Selection Methods

In the 3D Viewport header's Select menu, you'll find all the selection methods discussed previously, as well as several others. The methods mentioned in this chapter generally are the ones that are used most often, but I encourage you to check out the rest of them, as you may find some that are useful. Also, keep in mind that you can always go to the Select menu in case you don't remember the keyboard shortcut for any of the methods. (Note that the Proportional Editing option cannot be accessed from the Select menu; it's accessed from the 3D Viewport's header.)

Using Mesh Modeling Tools

This section provides a reference for the main modeling tools (alphabetically ordered) that are available in Blender. You'll learn how to use them, see what options they have (view the Adjust Last Operation panel in the bottom-left corner of the 3D Viewport, or press **F9**), and know what their effects are. Test them and learn them, as they will be used a lot in the following chapters. Don't worry if you don't remember all their features, however; you can come back to this chapter whenever necessary.

> **Note**
>
> All the tools discussed here can be found in the menus explained in the previous section, but in this section, I specify only the keyboard shortcuts for them. Also, with many of these tools, you can drag things with your mouse to move them. Remember that you can use the keyboard shortcuts to aid the transform: Press **Shift** to move things with more precision; press **Ctrl** to snap; or enter numerical values and then use the **X**, **Y**, and **Z** keys to constrain the movements to their respective axes.

Bevel

Bevel is a very useful tool, especially for technical and inorganic models; it is used to create bevels and chamfers. It can be used with vertices, edges, and faces. (The Bevel tool works with vertices only when you enable the Only Vertex option in the Adjust Last Operation panel after invoking the tool.) You can see how it's used in Figure 6.7.

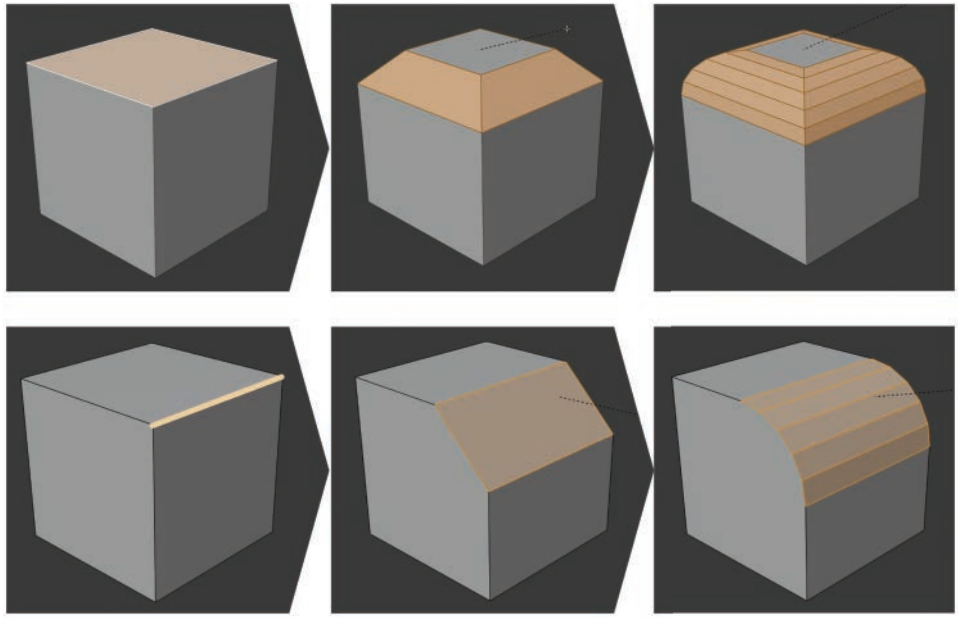

Figure 6.7 Using the Bevel tool in a face (top) and in an edge (bottom)

To use the Bevel tool:

1. Select the element you want to bevel.
2. Press **Ctrl+B** and drag your mouse to increase or decrease the bevel size.
3. Roll the scroll wheel to increase or decrease the bevel divisions (segments). Alternatively, press **S** and move the mouse or enter a number to define the segments amount.
4. Press **P** and move the mouse to change the profile (shape) of the bevel. (Numerical input of a specific profile value is allowed.)
5. Left-click to apply or right-click to cancel.

In the Bevel tool options of the Adjust Last Operation panel, you'll find the size calculation method, the size of the bevel, the amount of segments, and the bevel's profile (in or out), as well as an option that lets you apply the bevel only to vertices. (You can launch the Bevel tool in vertices-only mode directly by pressing **Ctrl+Shift+B**.)

Tip

Blender's Bevel tool is similar to the Chamfer tool in 3ds Max.

Bisect

The Bisect tool lets you create a line across a selection and project it to generate an edge loop that divides the mesh. After that, you're able to leave only one side of the mesh from that division visible (from the Adjust Last Operation menu), which is useful for creating cross sections of objects (see Figure 6.8).

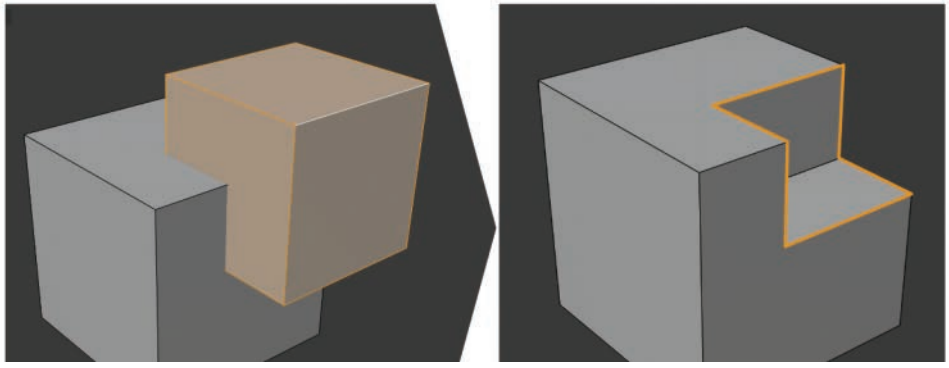

Figure 6.8 Using the Bisect tool on the default cube

To use the Bisect tool:

1. Select the part of the mesh you want to divide. (Sometimes, you want to divide the entire mesh, which you can select by pressing **A**.)
2. Select the Bisect tool from the menus or Search (**F3**). (This tool has no keyboard shortcut.)
3. Left-click the first point of the line you want to draw, and drag to indicate the line's direction.
4. Release the mouse button to apply. A manipulator will show up for adjusting the cut.
5. From the Adjust Last Operation menu, choose the options that direct how the Bisect tool will perform.

Boolean Operations

The Intersect (Boolean) and Intersect (Knife) tools let you use two parts of a mesh and cut new edges in their intersections (see Figure 6.9). There are some differences between the tools, both of which you can find in the Face menu (**Ctrl+F**). Keep in mind that these tools work only when elements of a mesh (inside the same object) intersect.

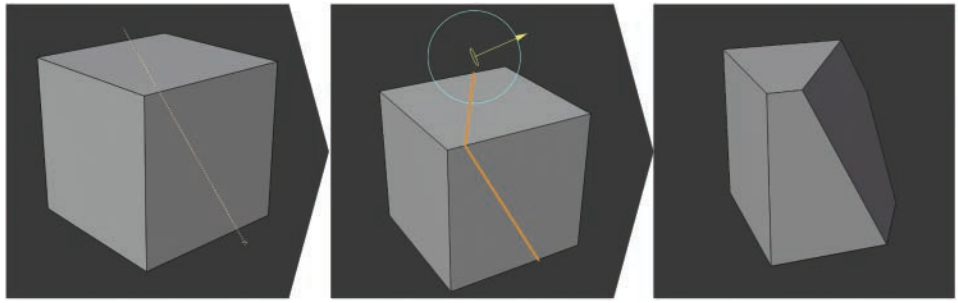

Figure 6.9 The selection of one cube inside another (left), the result of the Intersect (Boolean) tool in Difference mode (middle), and the effects of the Intersect (Knife) tool (right)

Intersect (Boolean)

The Intersect (Boolean) tool acts similarly to a Boolean modifier operation. Booleans let you subtract volumes from and add volumes to a mesh by intersecting it with another mesh. In Blender, you do this by using the Boolean modifier, but you can also do it in Edit Mode with the Intersect (Boolean) tool.

To use the Intersect (Boolean) tool:

1. Select the part of the mesh that you want to use as a cutter.
2. Press **Ctrl+F** and select Intersect (Boolean).
3. Select the type of Boolean operation that you want to apply from the Adjust Last Operation panel.

Intersect (Knife)

Intersect (Knife) works similarly to the Intersect (Boolean) tool, but instead of subtracting or adding volume, it cuts the mesh and generates new edges on the surface. It also separates the different intersecting meshes through those edges. This tool is very useful when you need to perform a cut with a given shape on a mesh. Just model a cutter mesh and use this tool to generate such a cut.

To use the Intersect (Knife) tool:

1. Select the part of the mesh that you want to use as a cutter.
2. Press **Ctrl+F** and select Intersect (Knife). The meshes are cut as though you had used the Knife tool, with the shape of the cutter mesh, but kept them in their positions.
3. Remove any parts that you don't need (such as the cutter element).

> **Note**
>
> Boolean operations are usually performed with the use of the Boolean modifier on an object level, but these modeling tools can speed the process when there's no need for having a nondestructive and interactive Boolean operation.