

Chapter 2

Working with Mesh Primitives

Learning Objectives

After completing this chapter, you will be able to:

- *Understand viewport navigation controls*
- *Understand selection techniques*
- *Understand the Object and Edit modes*
- *Create and edit mesh primitives*
- *Understand the proportional editing*
- *Change the object color and the background color of a scene*
- *Render a still image*

INTRODUCTION

Mesh Primitives are polygonal shapes comprising of sub-objects: vertices, edges, and faces. In this chapter, you will first create simple 3D objects using mesh primitives and then edit these primitives by modifying vertices, edges, and faces to create complex 3D objects. You will also learn to change the background color of the scene and render still image.

VIEWPORT NAVIGATION CONTROLS

To adjust the view of an object in a viewport, you need to be familiar with the viewport navigation control tools. To navigate the viewport using these tools, choose **View > Navigation** from the **3D View Editor** menu bar. On doing so, a cascading menu will be displayed, as shown in Figure 2-1.

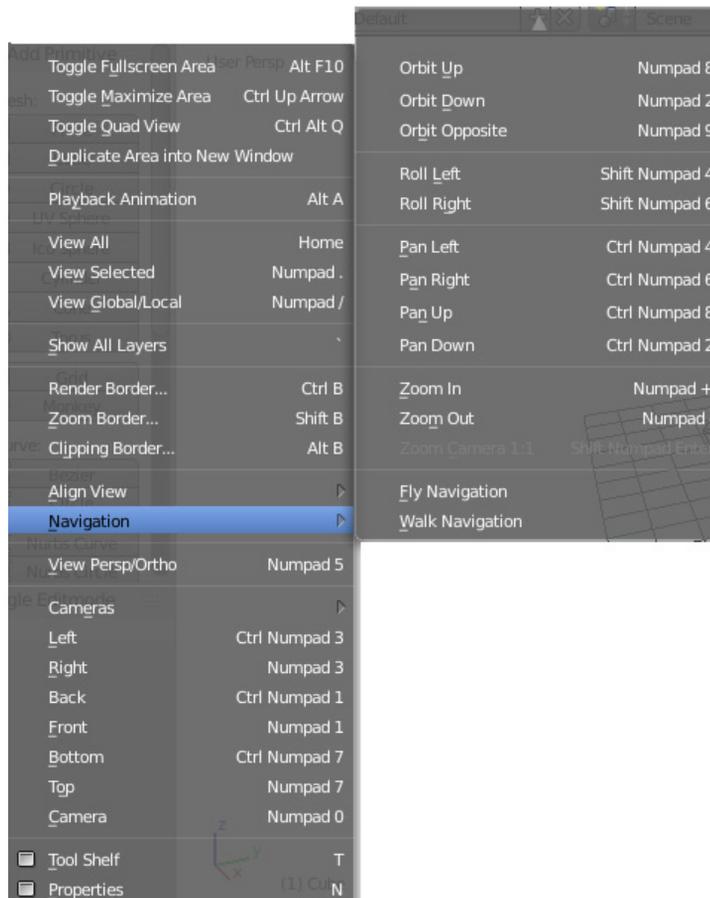


Figure 2-1 The cascading menu displayed

You can also navigate the viewport using the middle mouse button. To zoom the viewport, scroll the middle mouse button. Alternatively, press the CTRL key and hold the middle mouse button and drag the cursor to zoom in and zoom out the viewport. To orbit the viewport, hold down the middle mouse button and move in any direction. To pan the viewport, press the SHIFT key and hold down the middle mouse button and move in a desired direction. Note that here onwards the viewport is referred to as view in this book.

UNDERSTANDING OBJECT MODE

Object Mode is the default mode chosen in the **Mode** drop-down of **3D View Editor**. Figure 2-2 displays various parameters that will be available in **3D view Editor** when **Object Mode** is chosen from the **Mode** drop-down, refer to Figure 2-2.

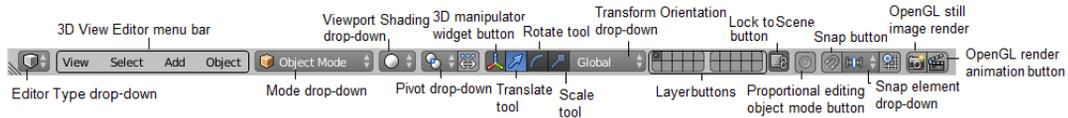


Figure 2-2 Various parameters in 3D View Editor

In this mode, you can create various types of primitives, curves, surfaces, and so on in the scene. Also, you can duplicate object(s), group the objects, as well as create new layers, add objects to existing layers, and select the objects in the scene using different selection techniques. The functioning of this mode is discussed next.

Selection Techniques

In Blender, there are various selection techniques to select the objects in the view. When you select multiple objects, the last selected object is termed as active object and will have yellow border around it whereas other selected objects will have orange border around them. Various selection techniques are discussed next.

1. **Point Selection** - Right-click on an object to select it. If more than one objects is to be selected, then press SHIFT and right-click on the objects one by one to add them to the selection.
2. **Border Selection** - Press B; dotted cross lines will be attached to the cursor. Click at a point in the view and then drag the cursor to form a dotted rectangle. The objects lying fully and partially within the dotted rectangle will be selected. Note that object(s) previously selected will also get added to this selection.
3. **Lasso Selection** - Press CTRL+LMB and then drag around the objects to be selected; dotted region is formed around the objects. The objects whose pivot points fall under this dotted region get selected. Note that object(s) previously selected will also be added to the selection.
4. **Circle Selection** - Press C; the circle will be attached to the cursor. Scroll the middle mouse button to change the size of the circle and then click; the objects fully and partially covered in the circle will be selected. Note that object(s) previously selected will also be added to the selection.

The other selection techniques are available in the **Select** menu of the **3D View Editor** menu bar, as shown in Figure 2-3.



Note

To isolate the object(s) from the scene, select the object(s) and press / from the numpad; the objects other than the selected object(s) will be hidden.

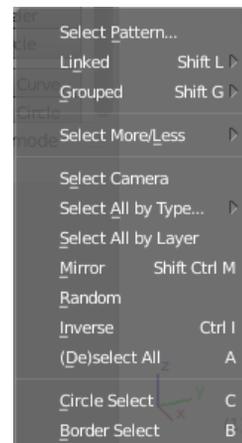


Figure 2-3 The Select menu

Snapping

Snapping restricts the movement of the cursor to an active or selected object, its sub-objects, 3D Cursor, or grid floor.

You can snap the cursor to the nearest point on the grid, selected object, active object, or to the center of the grid. Also, you can snap the selected object (in **Object Mode**) or its sub-object(s) (in **Edit Mode**) to grid and cursor. To do so, choose **Object > Snap** from the **3D View Editor** menu bar; a cascading menu will be displayed, as shown in Figure 2-4. Alternatively, press SHIFT+S to display the **Snap** menu, as shown in Figure 2-5.

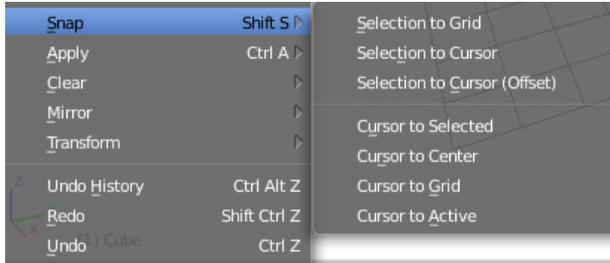


Figure 2-4 The cascading menu displayed

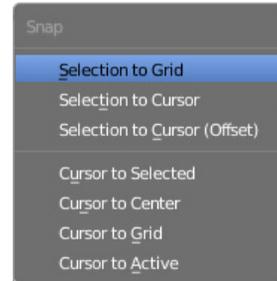


Figure 2-5 The Snap menu

You can snap the object(s) and its sub-object(s) during transformation in **Object Mode** as well as in **Edit Mode**. The transform snapping for these modes is discussed next.

The **Snap** button in **3D view Editor** is used to toggle the snap mode. The **Snap Element** drop-down located next to the **Snap** button is used to specify the element of the selected object that has to be snapped to the target object. Figure 2-6 displays the options in this drop-down. If you select the option other than **Increment** from this drop-down, the **Snap Target** drop-down will be added next to the **Snap Element** drop-down and the **Increment** button will be replaced by different button(s) for rest of the four options in the **Snap Element** drop-down, refer to Figure 2-7. The options in the **Snap Target** drop-down are used to specify the placement point of the target object to which the selected object will be snapped. The options in this drop-down are displayed in Figure 2-8.

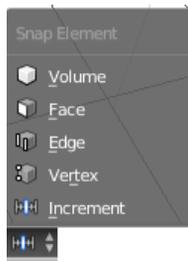


Figure 2-6 The Snap Element drop-down

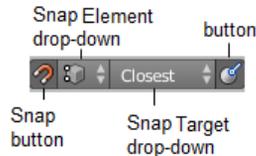


Figure 2-7 The Snap Target drop-down and a button added



Figure 2-8 The Snap Target drop-down

Creating Objects Using Mesh Primitives

To create an object using the mesh primitive, choose the **Create** tab in **Toolshelf** of **3D View Editor**. The primitives will be listed in the **Mesh** area of the **Add Primitive** panel. Choose the desired primitive from this area to create an object in the view. Note that the object will be created at a position where 3D cursor is located in the view. Figure 2-9 shows all the mesh primitives available in Blender.

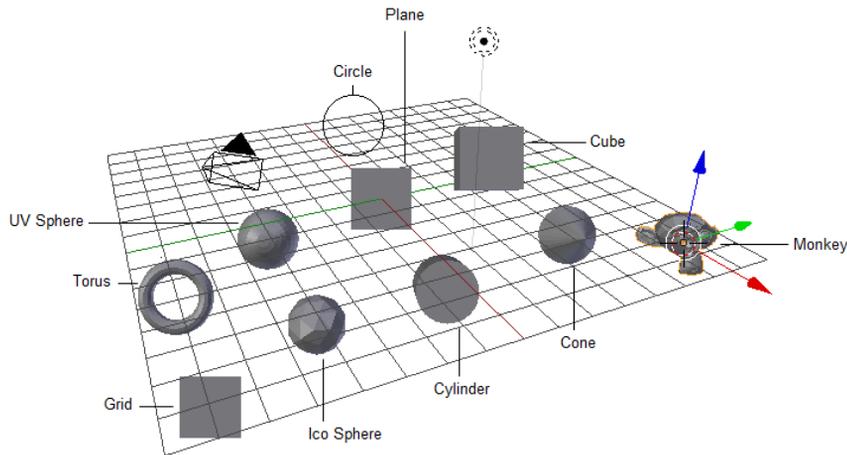


Figure 2-9 The mesh primitives available in Blender

As you create the object using a primitive, the **Add XXX** panel will be added to **Toolshelf** where **XXX** stands for the name of the primitive chosen. The parameters in this panel are used to change the dimensions, position and rotation coordinates of the object. The **Generate UVs** and the **Align to View** check boxes available in this panel are used to generate UVs and to align the object to view, respectively. Figure 2-10 shows the **Add UV Sphere** panel.

As you transform the object in the view, the **Add XXX** panel will disappear and the **Translate** panel will be displayed at the same place. The options in this panel are used to constrain the transformation of object along specific axes, change the orientation of the object, enable proportional editing, and so on. To change the other properties of the object, choose the **Object** button from the **Properties Editor**. On doing so, various panels such as **Transform**, **Delta Transform**, **Groups**, **Display**, and so on will be displayed in the **Properties Editor**.

To move, rotate, and scale the object manually in the view, select the object and choose the **Translate**, **Rotate**, and **Scale** tools, respectively from **3D View Editor**, refer to Figure 2-2 and then transform the object accordingly. Alternatively, choose **Object > Transform** from the **3D View Editor** menu bar and then choose the respective option from the cascading menu displayed. When you choose the **Grab/Move** option in the cascading menu, the object gets

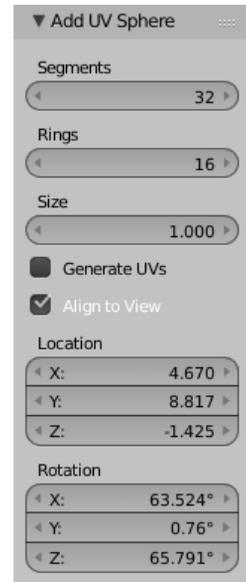


Figure 2-10 The Add UV Sphere panel

attached to the cursor and moves along with the cursor. Next, you need to click at a point in the view to place the object in the view. You can also use the G key, R key, and the S key to Grab/move, rotate, and scale the object, respectively.

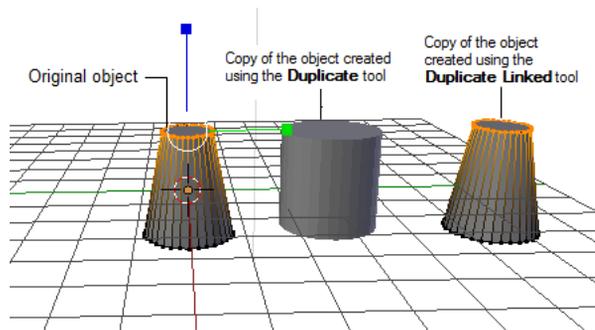
Duplicating Objects

In Blender, you can duplicate an object using the **Duplicate** tool. In duplication, a copy of the object is created and it is not linked to the original object. It means the modifications made in the copy do not affect the original object. Also, you can create an instance of an object by using the **Duplicate Linked** tool. The instances are linked to the original object, implying that the modifications made in the instances are reflected in the original object and vice-versa.

To duplicate the object(s) as a copy, select the object(s) in the view. Next, choose the **Tools** tab from **Toolshelf** in **3D View Editor**. Now, choose the **Duplicate** tool from the **Edit** panel in **Toolshelf**. Alternatively, press SHIFT+D. On doing so, the duplicated object(s) will be attached to the cursor as in the **Grab/Move** option discussed earlier. Next, click at a point in the view to position it. The **Duplicate** tool works in both **Object Mode** and **Edit Mode**.

To duplicate the object(s) as an instance, select the object(s) in the view. Next, choose the **Tools** tab from **Toolshelf** in **3D View Editor**. Now, choose the **Duplicate Linked** tool from the **Edit** panel in **Toolshelf**. Alternatively, press ALT+D. On doing so, the duplicated object(s) will be attached to the cursor as in the **Grab/Move** option discussed earlier. Next, click at a point in the view to position it. The **Duplicate Linked** tool works only in the **Object Mode**.

Figure 2-11 shows the object copied using the **Duplicate** and **Duplicate Linked** tools.



*Figure 2-11 The objects copied using the **Duplicate** and **Duplicate Linked** tools*



Note

If you press ENTER after pressing SHIFT+D, the duplicated object(s) will be created at the same place as that of original object(s).

Grouping Objects

To create a new group for specific type of objects, select the objects in the view or in **Outliner**. Next, choose **Object > Group** from the **3D View Editor** menu bar; a cascading menu will be

displayed, as shown in Figure 2-12. Choose the **Create New Group** option from the cascading menu or press CTRL+G. Note that the grouped objects are shown in the view with the green border when selected.

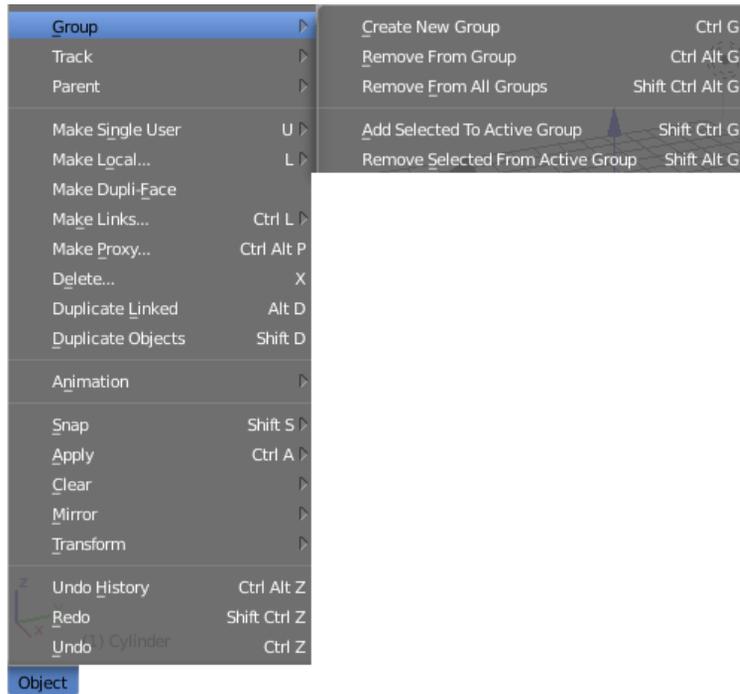


Figure 2-12 The cascading menu displayed

Similarly, you can use other options from this cascading menu to add or remove selected objects from the group(s). To select all the objects from the group, you need to first select an object from the group and then choose **Select > Grouped** from the **3D View Editor** menu bar; a cascading menu will be displayed. Choose **Group** from the cascading menu, as shown in Figure 2-13.

Some of the options discussed above are also available in the **Group** panel of **Properties Editor** when the **Object** button is chosen.



Note

In Blender, you can individually transform the objects in the group without affecting other objects in the group.

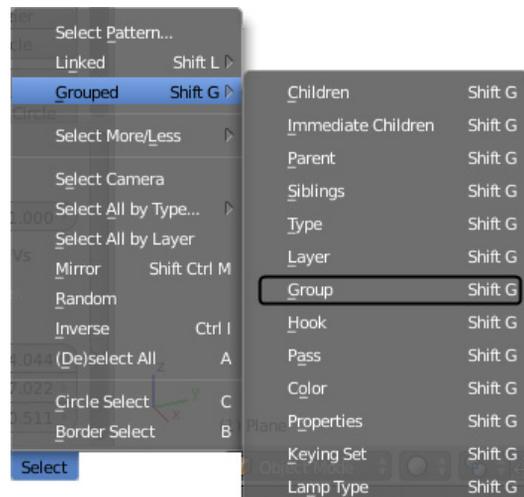


Figure 2-13 Choosing **Group** from the cascading menu displayed

Creating Layers

Layers are used to organize complex scenes. There are 20 layers available in Blender. For each of these layers twenty small light grey colored buttons are available in **3D View Editor**, refer to

Figure 2-2. When you select a layer button, it turns dark grey and the respective layer is selected. As you add objects in a layer, a small circle appears on that layer. By default, layer 1 button is chosen and the objects created in the scene are added to layer 1, refer to Figure 2-14.

Small orange colored circle on a layer button indicates that the layer is selected and there are objects in that layer. Small grey colored circle on a layer button indicates that there are objects in the layer but the layer is not selected, refer to Figure 2-14.

To move any object from one layer to another, select the object(s) and press M; the **Move to Layer** menu will be displayed, refer to Figure 2-15. All the layer buttons are available in this menu. Choose the desired layer button from this menu to move the selected object to that layer. Similarly, to keep an object on multiple layers, select the object(s) and press M. Next, press SHIFT and then choose the desired layer button(s). To select multiple layers, press and hold SHIFT and click on the desired layers one by one. Press ` to select all the layers in the scene.

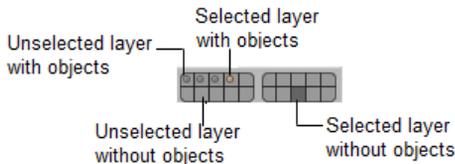


Figure 2-14 Various layer buttons



Figure 2-15 The Move to Layer menu



Note

To select layers 1 to 10, press 1 to 0, respectively and to select layers from 11 to 20, press ALT+1 to ALT+0, respectively.

UNDERSTANDING EDIT MODE

Edit Mode is used to modify the objects created using primitives, curves, surfaces, and so on to create complex objects. You need to hover the cursor in the view and press TAB to switch from **Object Mode** to **Edit Mode**. As you change from **Object Mode** to **Edit Mode**, the **Object** menu will be changed to the **Mesh** menu in the **3D View Editor** menu bar. The **Mesh** menu has various options to modify the sub-objects (vertices, edges, and faces) such as **Extrude**, **Inset Faces**, **Subdivide**, **Bevel**, and so on. These options are also available in the **Tools** tab of **Toolshelf**. Most commonly used options of the **Mesh** menu are discussed next.



Note

If you have activated pie menus, the **Mode** pie menu will be displayed on pressing the TAB key. You need to choose **Edit Mode** from this pie menu or press 6 to switch to **Edit Mode**. The procedure to activate the pie menus is discussed in Chapter 1.

Extrude

The **Extrude** option is available for all the three sub-object levels: Vertex, Edge, and Face. It is used to extrude the sub-objects either by dragging the cursor or by entering the value in the sliders available in the panels of **Toolshelf**. To extrude an object, select the object in the view and switch to **Edit Mode**. Next, choose the **Face Select**, **Edge Select**, or **Vertex Select** button depending on the sub-object to be extruded and then select the sub-object(s) from the view. Next, choose **Mesh > Extrude** from the **3D View Editor** menu bar or press ALT+E; various

options will be displayed in the cascading menu depending on the sub-object selected, refer to Figure 2-16. Choose the desired option from the cascading menu to extrude the sub-object.

Figure 2-17 shows the faces extruded using the **Region** and **Individual Faces** options. To change the amount, set the number of segments, constrain the extrusion to specific axis, and so on, you need to set the parameters in the panel displayed at the bottom in **Toolshelf**.

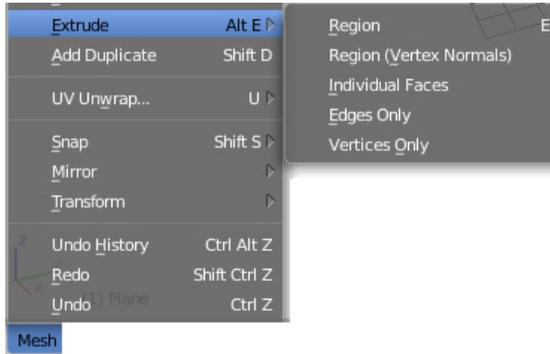
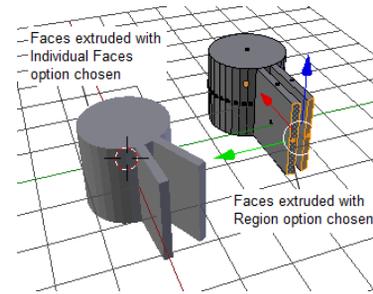


Figure 2-16 Various extrude options in the cascading menu



*Figure 2-17 Faces extruded using the **Individual Faces** and the **Region** option*

Bevel

The **Bevel** option is available for all the three sub-object levels: Vertex, Edge, and Face. It is used to bevel the sub-objects either by dragging the cursor or by entering the value in the sliders available in the panels of **Toolshelf**. To do so, make sure **Edit Mode** is activated. To bevel face of an object, choose the **Face Select** button and then select face(s) from the view. Next, choose **Mesh > Faces > Bevel** from the **3D View Editor** menu bar or press CTRL+B; a dotted line will be attached to the cursor. Drag and move the cursor in the view and click at a point; the **Bevel** panel will be added to **Toolshelf**. To change the bevel amount, amount type, number of segments, profile, and so on, you need to set the parameters in the **Bevel** panel of **Toolshelf**.

You can also interactively change the profile of the beveled part of the object by using the P key. To do so, press P and then either change the profile moving the mouse or specifying a numerical value using Numpad on the keyboard. Release the P key to exit the interactive mode.

Similarly, you can change the number of segments in the beveled area by using the S key.

You can also bevel edges and vertices of the object. Figure 2-18 shows upper face of a cylinder with various bevel amount types applied.

Subdivide

The **Subdivide** option is available for edge sub-object level. It is used to subdivide the selected edges. To do so, make sure **Edit Mode** is activated. Next, choose the **Edge Select** button and then choose **Mesh > Edges > Subdivide** from the **3D View Editor** menu bar; the selected edges will be divided with a single cut by default. To change the number of cuts, smoothness, type of cut, and so on, you need to set the parameters in the **Subdivide** panel of **Toolshelf**. Figures 2-19 and 2-20 show the subdivision of edges with **Smoothness = 0** and **Smoothness = 0.5**, respectively.

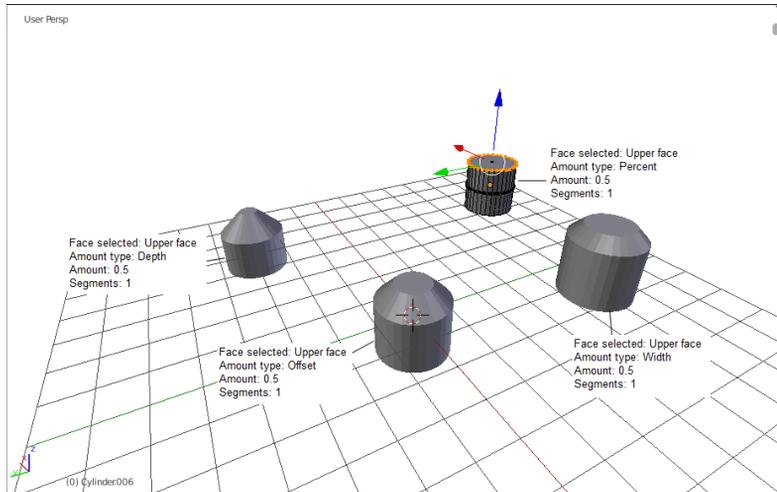


Figure 2-18 Upper face of a cylinder with various bevel amount types

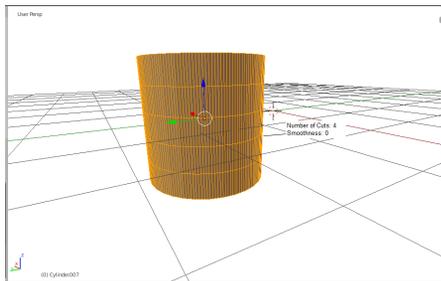


Figure 2-19 The subdivision of edges with **Smoothness = 0**

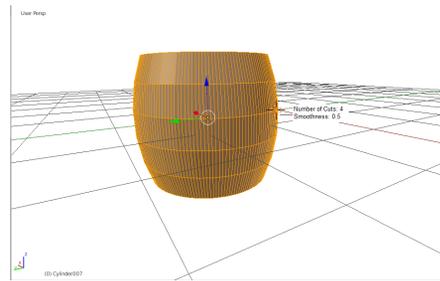


Figure 2-20 The subdivision of edges with **Smoothness = 0.5**

Proportional Editing

Proportional editing is useful for smooth deformation of the object in the **Object Mode** or its sub-objects in **Edit Mode**. The proportional editing in these modes is discussed next.

To activate proportional editing in the **Object Mode**, choose the **Proportional editing object mode** button from the **3D View Editor** menu bar or hover the cursor in the view and press **O**; the **Falloff** drop-down will be added next to the **Proportional editing object mode** button, refer to Figure 2-21 and a circle will be attached to the cursor. Now, select the object(s) in the view and then transform the object(s) as desired; selected object(s) will transform along with unselected objects around the selected object(s) within a area covered by the circle attached to the cursor. You can change the radius of this circle by scrolling the middle mouse button and holding the left mouse button. You can also use the **PAGE UP** and **PAGE DOWN** keys instead of scrolling the middle mouse button. The transformation of unselected objects within the circle will be inversely proportional to their distance with the selected object(s). The objects which are closer to the selected ones will transform more than those which are farther from the selected objects. The options in the **Falloff** drop-down are used to specify the falloff of the transformation.

Proportional editing in **Edit Mode** is similar to that in **Object Mode** with the difference that in **Edit Mode**, the **Proportional editing object mode** button will be replaced by the **Proportional editing mode** drop-down, refer to Figure 2-22 and the proportional editing is carried out on the sub-objects. Also, the type of transformation depends on the option chosen from the **Proportional editing mode** and **Falloff** drop-downs. The options in the **Proportional editing mode** drop-down are discussed next.

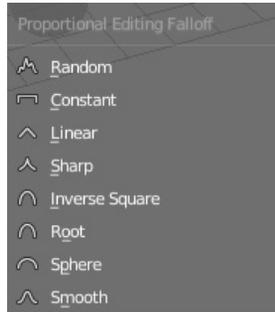


Figure 2-21 The Proportional Editing Falloff drop-down

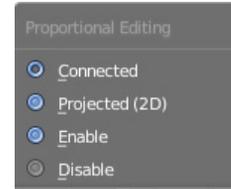


Figure 2-22 The Proportional editing mode drop-down

The **Enable** and **Disable** options in the **Proportional editing mode** drop-down are self explanatory.

When the **Connected** option is chosen, the unselected sub-objects which are connected to the selected sub-objects will only be affected.

When the **Projected 2D** option is chosen, the depth along the view is ignored.

RENDERING A STILL IMAGE

Rendering is a process of generating a 2D image from a 3D scene. It shows the lighting effects, materials applied, background, and other settings that you have applied to the scene. There are two types of render engines in Blender: **Blender Render** and **Cycles Render**. You can choose the desired render engine from the **Engine** drop-down in **3D View Editor**. By default, **Blender Render** is chosen in this drop-down. The basic rendering for a still scene is discussed next.

By default, the **Render** button is chosen in **Properties Editor**. There are various panels such as **Render**, **Dimensions**, **Shading**, **Output**, and so on in **Properties Editor** when the **Render** button is chosen. The options in the **Render** panel are discussed next. 

Choose the **Render** button or press F12 to render a still image in **UV/Image Editor**. To render an animation sequence in the **UV/Image Editor**, choose the **Animation** button. Similarly, choose the **Audio** button to mix audio in the rendering process. The options in the **Display** drop-down are used to choose the type of window/editor used for rendering. By default, **UV/Image Editor** is chosen in this drop-down. As a result, the rendered image/sequence will be displayed in **UV/Image Editor**. To display rendered image/sequence in a separate window, choose **New Window** from this drop-down. To display rendered image/sequence on a full screen, choose **Full Screen** from this drop-down. If you choose **Keep UI**, current user interface will not change and you need to open the **UV/Image Editor** to see the rendered image/animation sequence.

To return to the Blender layout, press the ESC key. To save the rendered image, choose **Image > Save As Image** from the **UV/Image Editor** menu bar; the **File Browser** will be displayed. Now, select the type of image format from the drop-down in the **Save as Image** panel and type the name of the image in the **File name** text box. Next, browse to the folder where you want to save the scene and choose the **Save As Image** button; the image file will be saved at the selected location.



Note

To see the quick render without light effects, choose the **Open GL still image render** button from **3D View Editor**.

Changing the Color of the Object

To change the color of the object without applying material to it, you need to first choose the **Material** button from the **Properties Editor**. Next, click on the **New** button located next to the **Material** drop-down; a material will be added along with some panels. Next, select the **Object Color** check box from the **Options** panel, as shown in Figure 2-23.

Now, choose the **Object** button from the **Properties Editor** and then click on the **Object Color** switch in the **Display** panel; the Color Picker window will be displayed, as shown in Figure 2-24. Select the desired color from this window; color of the selected object will be changed in the view.

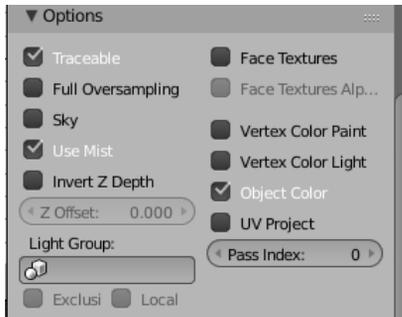


Figure 2-23 The **Object Color** check box selected

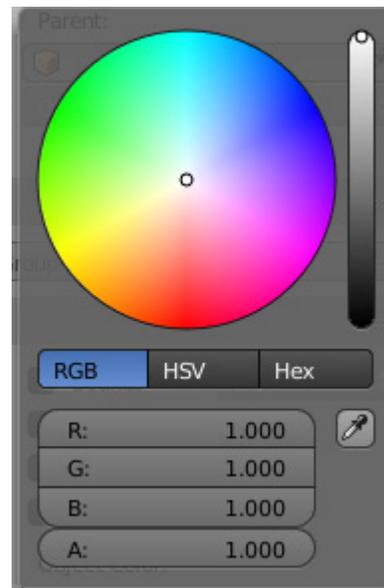


Figure 2-24 The Color Picker window

Changing the Background Color of the Scene

By default, the background color of the final output is grey at the time of rendering. To change the background color, choose the **World** button from the **Properties Editor**. Next, click on the **Horizon Color** color swatch in the **World** panel, refer to Figure 2-25; the Color Picker window

will be displayed. Select a new color in this window; the background will display the new color in the background on rendering.

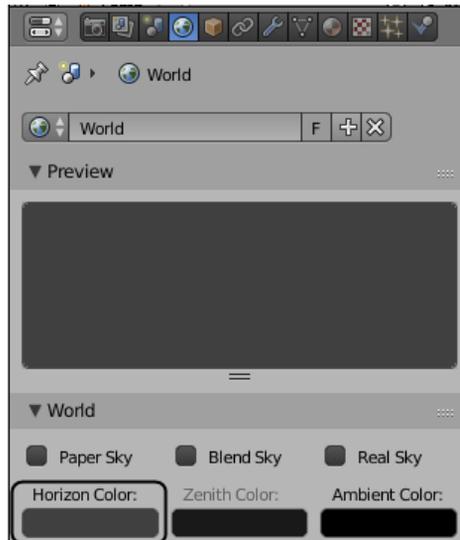


Figure 2-25 The *Horizon Color* swatch

TUTORIALS

Before you start tutorials of this chapter, you need to create a folder in which you will save all the files created and used in this book. To do so, navigate to the `Documents` folder and create a new folder with the name `blender2.79`.

Tutorial 1

In this tutorial, you will create 3D model of a TV unit, as shown in Figure 2-26, using **Object Mode**. (Expected time: 20 min)

The following steps are required to complete this tutorial:

- Create the folder.
- Create the back portion of the TV unit.
- Create the base of the TV unit.
- Create the drawers.
- Create shelves of the TV unit.
- Save and render the scene.



Figure 2-26 The model of a TV unit

Creating the Folder

1. Navigate to `\Documents\blender2.79`. Create a new folder with the name `c02`. Next, create a folder with the name `c02_tut1` in the `c02` folder.
2. Press CTRL+N or choose **File > New** from the **Info Editor** menu bar; a menu is displayed. Choose **Reload Start-Up File**; the menu disappears and the startup file is loaded.
3. Choose **File > Save** from the **Info Editor** menu bar; the **File Browser** is displayed
4. Navigate to `\Documents\blender2.79\c02\c02_tut1` and enter **TV unit** in the **File Name** edit box. Next, choose the **Save Blender File** button to save the file at the specified location.



Note

It is recommended that you frequently save the files while you are working on them by pressing the CTRL+S keys.

Creating the Back Portion of the TV Unit

In this section, you will create the back portion of the TV unit by using the **Cube** tool. You will also change the color of the back of the TV unit.

1. Choose **View > Toggle Quad View** from the **3D View Editor** menu bar or Press CTRL+ALT+Q; the quad view is displayed.



Note

If you left-click at any point other than the center on the view, the 3D Cursor shifts to that point. The new object is created at the current position of the 3D Cursor. To bring back the 3D Cursor to the center of the grid, press SHIFT+C.

2. Make sure the **Cube** is selected in the views. Choose the **Object** button from the **Properties Editor**. Click on the **Transform** panel to expand it.
3. Enter the following values in the **Scale** area of the **Transform** panel in the **Properties Editor**.

X: 6

Y: 0.15

Z: 6

4. Double-click on *Cube* in **Outliner** and enter **back** to rename it.

Next, you will change the color of *back*.

5. Choose the **Material** button from the **Properties Editor**. Next, choose the **New** button located next to the **Material** drop-down, refer to Figure 2-27; a new material is added to the **Material** drop-down along with various panels below it. Now, select the **Object Color** check box from the **Options** panel, refer to Figure 2-28.

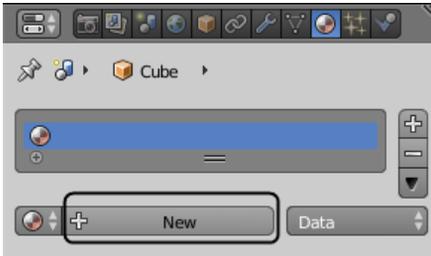


Figure 2-27 Choosing the **New** button

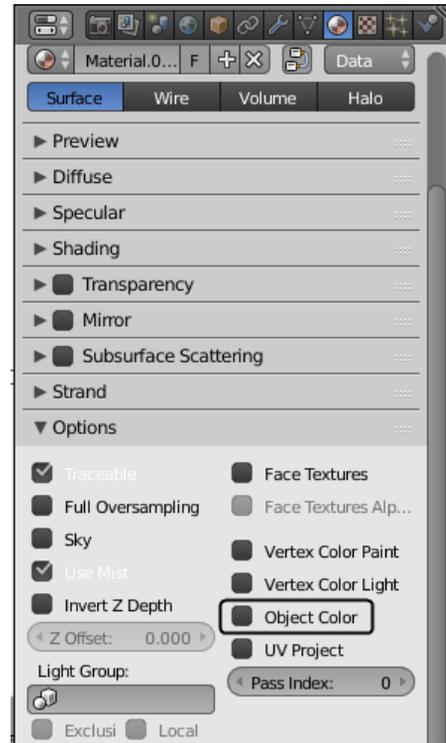


Figure 2-28 The **Object Color** check box in the **Options** Panel

6. Choose the **Object** button from the **Properties Editor**. Next, choose the **Object Color** switch from the **Display** panel; a Color Picker window is displayed. Enter the following values in the Color Picker window:

R: **0.115**

G: **0.005**

B: **0.008**

Figure 2-29 shows *back* in the quad view.

Next, you will create TV and a part above TV.

7. Choose the **Cube** tool from the **Add Primitive** panel in **Toolshelf**; a cube is created at the center of the view. Next, double-click on *Cube* in **Outliner** and enter **TV1** to rename it.

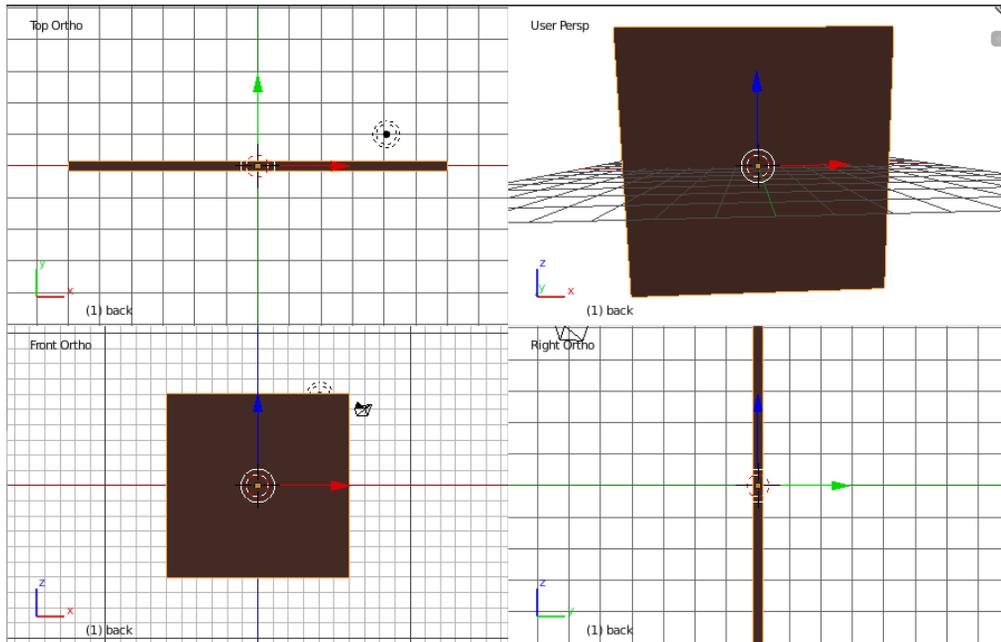


Figure 2-29 The back of the TV unit

- Make sure the **Object** button is chosen in the **Properties Editor** and enter the following values in the **Scale** area of the **Transform** panel in the **Properties Editor**.

X: 4 Y: 0.065 Z: 2.3

Next, you will change the color of *TV1*.

- Choose the **Material** button from the **Properties Editor**. Next, choose the **Material001** option from the **Material** drop-down.
- Choose the **Object** button from the **Properties Editor** and then choose the **Object Color** swatch; the Color Picker window is displayed. Enter the following values in the **Object Color** swatch:

R: 0.099 G: 0.099 B: 0.099

TV1 turns dark grey.

- Align *TV1* in all the views using the **Translate** tool from **3D View Editor**, as shown in Figure 2-30.
- Choose the **Plane** tool from the **Add Primitive** panel in **Toolshef**; a plane is created at the center of the view. Next, double-click on *Plane* in **Outliner** and enter **TV Screen** to rename it.

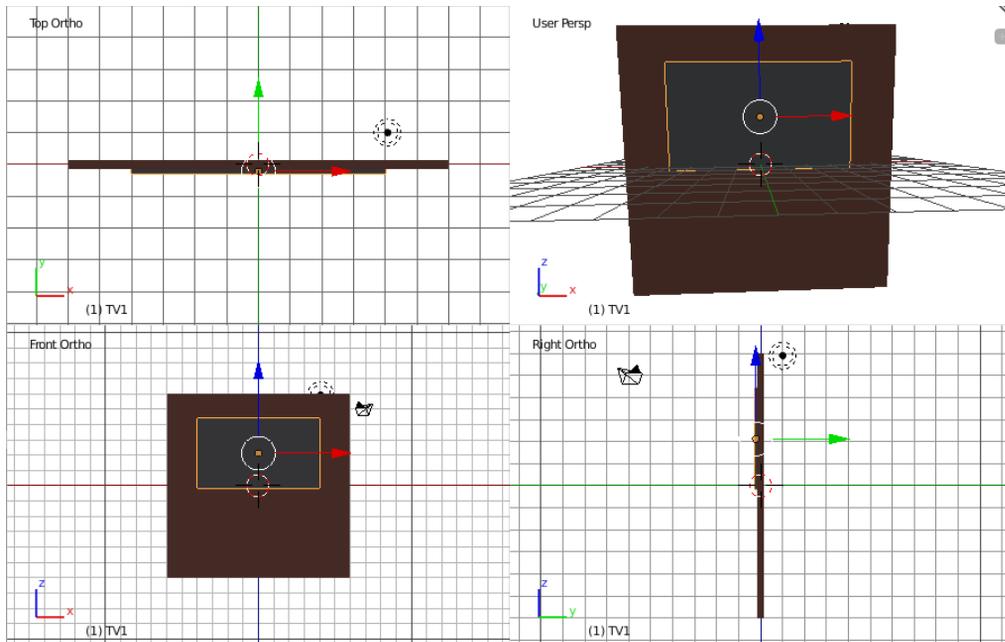


Figure 2-30 The TV1 aligned

- Make sure the **Object** button is chosen in the **Properties Editor**. Next, enter the following values in the **Transform** panel of the **Properties Editor**.

Scale area:

X: **3.75** Y: **2.1**

Rotation area:

x: **90**

TV Screen is scaled and oriented. Now, align it in all the views, as shown in Figure 2-31.

Next, you will create a part above *TV Screen* using the **Cube** tool.

- Choose the **Cube** tool from the **Add Primitive** panel in **Toolshelf**; a cube is created at the center of the view. Next, double-click on *Cube* in **Outliner** and enter **Top1** to rename it.
- Make sure the **Object** button is chosen in the **Properties Editor**. Next, enter the following values in the **Scale** area of the **Transform** panel in the **Properties Editor**.

X: **4** Y: **0.150** Z: **0.08**

- Change the color of *Top1* as done for *back*.
- Align *Top1* on the upper side of *back*, as shown in Figure 2-32.

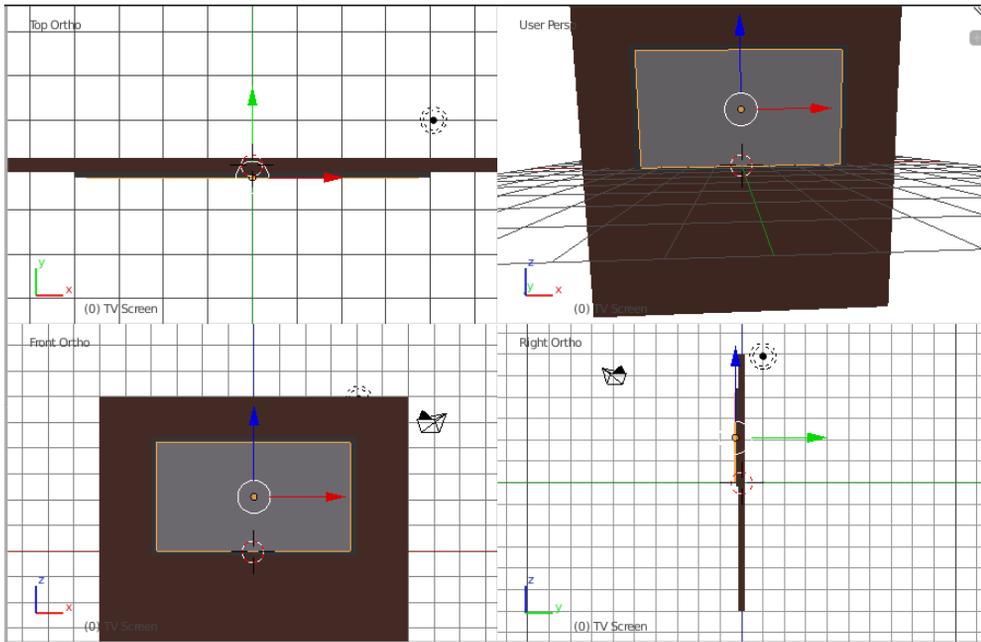


Figure 2-31 The TV Screen aligned

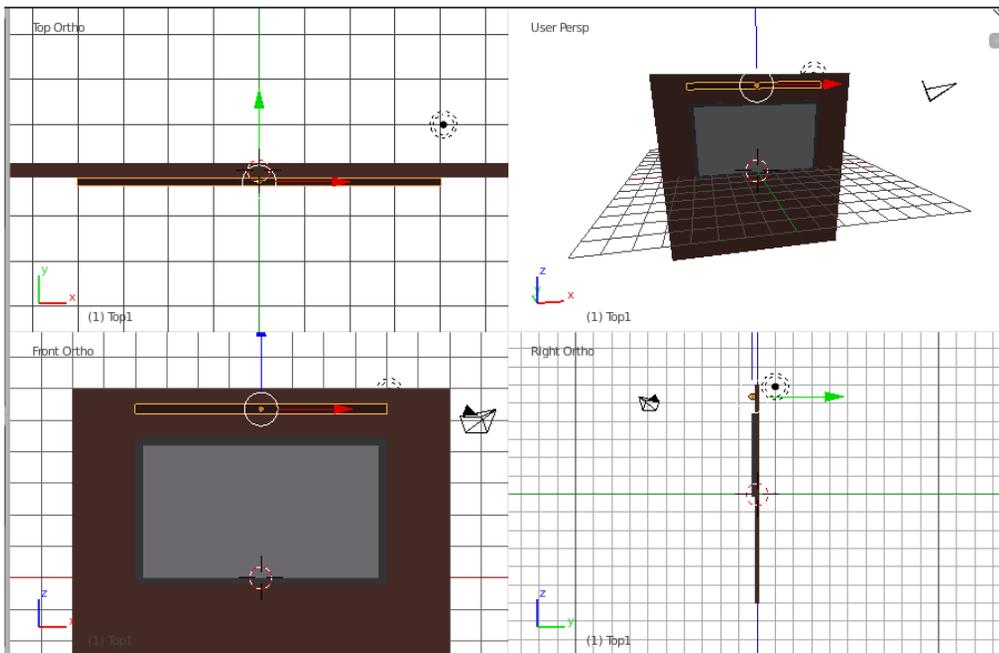


Figure 2-32 The Top1 aligned

Next, you will group all parts created so far as *back portion*.

18. Select all parts created so far with border selection technique. Make sure you do not select *lamp* and *camera*.
19. Choose **Object > Group > Create New Group** from the **3D View Editor** menu bar; A group of all selected objects is created with the name *Group*.
20. Make sure the **Object** button is chosen in the **Properties Editor**. Enter **back portion** in the edit box of the **Groups** panel, refer to Figure 2-33; the name of the group is changed to *back portion*.



Tip

1. You can also rename a group using **Outliner**. To do so, choose **Groups** from the **Display** drop-down of **Outliner**. The list of all the groups in the scene is displayed in **Outliner**. Double-click on a group and enter its name in the edit box created.

2. The green border around the object in the scene indicates that the object belongs to one or more groups.

Creating the Base of the TV Unit

1. Choose the **Cube** tool from the **Add Primitive** panel in **Toolshelf**; a cube is created at the center of the view. Next, double-click on *Cube* in **Outliner** and enter **base** to rename it.
2. Make sure the **Object** button is chosen in the **Properties Editor**. Next, enter the following values in the **Transform** panel of the **Properties Editor**.

Scale area:

X: **2** Y: **0.1** Z: **6**

Rotation area:

x: **90** Z: **90**

3. Change the color of *base* as done for *back*.
4. Align *base* in all the views, as shown in Figure 2-34.

Next, you will create supports for *base*.

5. Choose the **Cylinder** tool from the **Add Primitive** panel in **Toolshelf**; a cylinder is created with the name *Cylinder* at the center of the view.
6. Change the color of *Cylinder* to dull white, as discussed earlier.

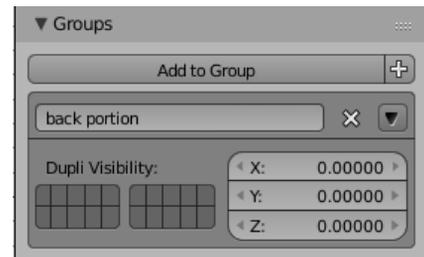


Figure 2-33 The **Groups** panel

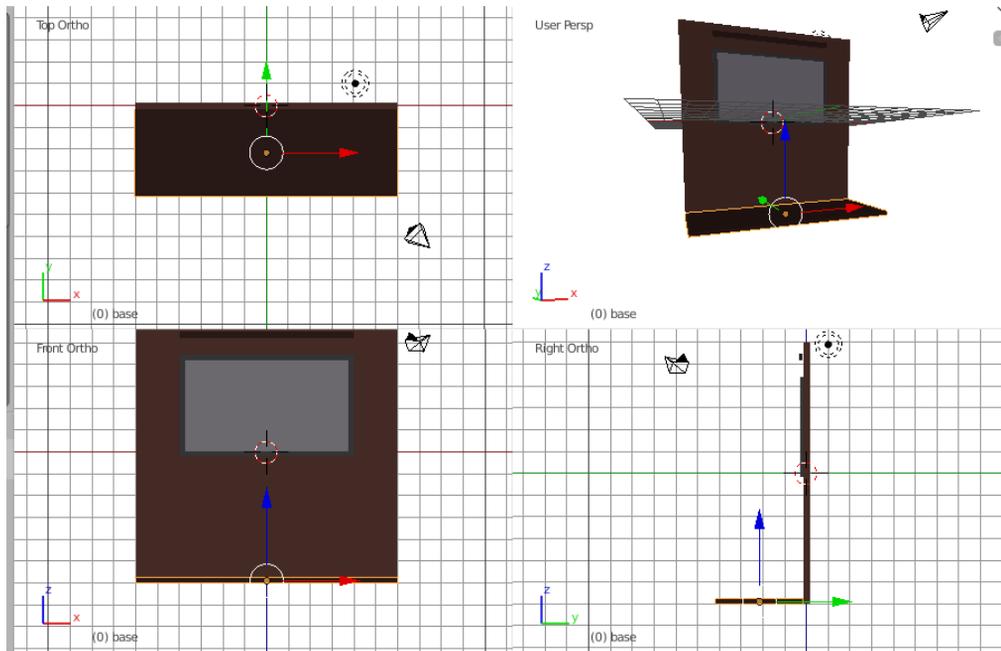


Figure 2-34 The base aligned

7. Enter the following values in the **Add Cylinder** panel of **Toolshef**.

Vertices: 64	Radius: 0.15	Depth: 0.6
---------------------	---------------------	-------------------
8. Align *Cylinder* with *base* in all the views, as shown in Figure 2-35.
9. Choose the **Cylinder** tool from the **Add Primitive** panel in **Toolshef**; a cylinder is created with the name *Cylinder.001* at the center of the view.
10. Enter the following values in the **Add Cylinder** panel of **Toolshef**.

Vertices: 64	Radius: 0.25	Depth: 0.15
---------------------	---------------------	--------------------
11. Select *Cylinder* from any of the views. Next, press SHIFT+S; the **Snap** menu is displayed.
12. Choose **Cursor to Selected** from this menu. You will notice that 3D cursor moves from the center of the grid to the center of *Cylinder*.
13. Select *Cylinder.001* from any of the views. Next, press SHIFT + S again and select **Selection to Cursor** from the **Snap** menu displayed; center of *Cylinder.001* is aligned with the center of *Cylinder*. Now, move *Cylinder.001* to the bottom of *Cylinder*, as shown in Figure 2-36.
14. Make sure *Cylinder001* is selected. Next, press SHIFT and select *Cylinder*. Choose **Object > Group > Create New Group** from the **3D View Editor** menu bar. Next, rename the newly created group as *basesupport*.

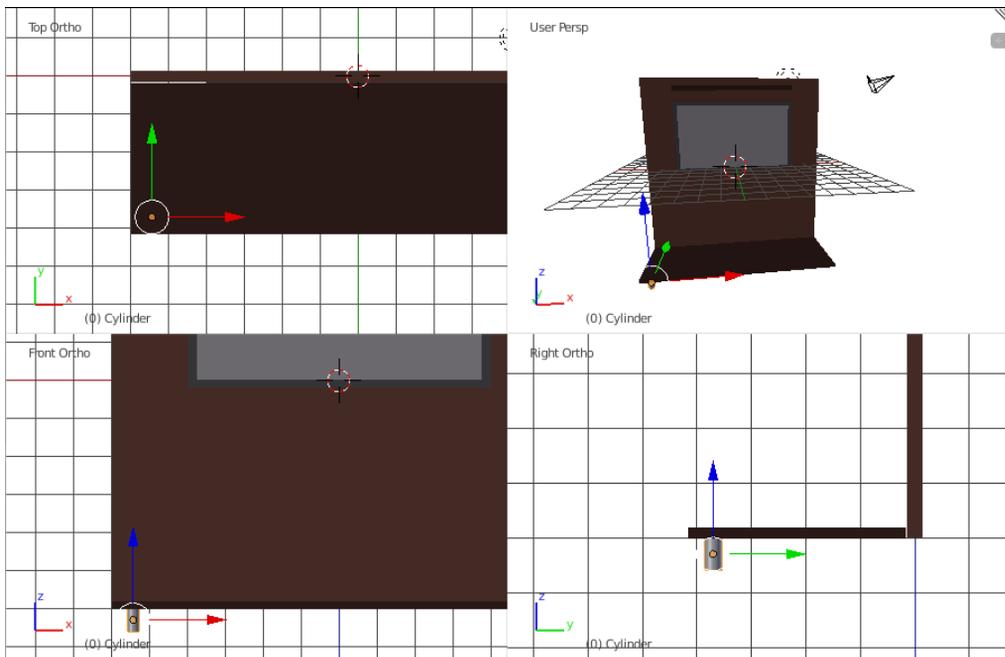


Figure 2-35 The cylinder aligned

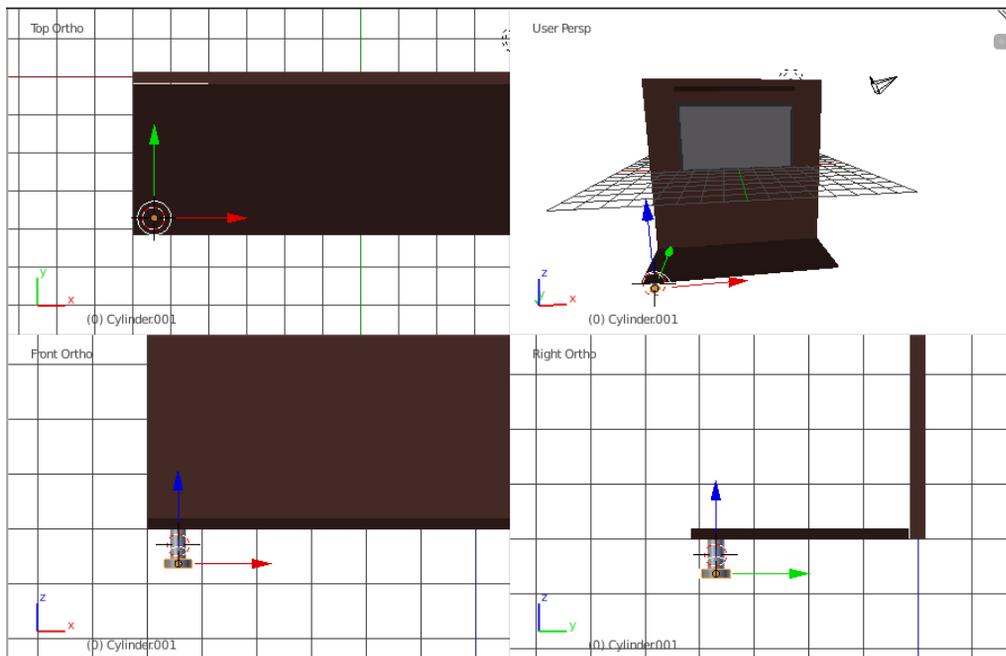


Figure 2-36 The Cylinder001 moved

15. Press **SHIFT + D** and then press **ENTER**; a copy of *cylinder* and *cylinder001* is created. Create two more copies of these two cylinders. Next, align all the copies of *cylinder* and *cylinder001*, as shown in Figure 2-37. You will notice that all the copies are automatically added to the *basesupport* group.

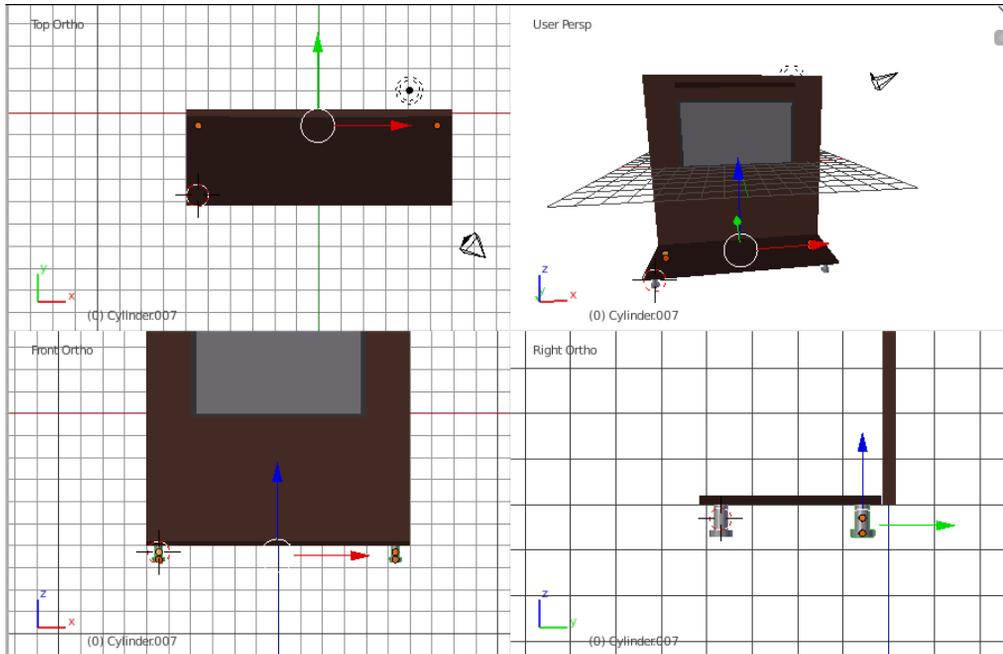


Figure 2-37 All the copies of cylinder aligned

16. Press **SHIFT + C** to place the 3D Cursor at the center of the view.

Creating the Drawers of the TV Unit

1. Choose the **Cube** tool from the **Add Primitive** panel in **Toolshelf**; a cube is created at the center of the view. Next, double-click on *Cube* in **Outliner** and enter **side** to rename it.
2. Make sure the **Object** button is chosen in the **Properties Editor**. Next, enter the following values in the **Scale** area of the **Transform** panel in the **Properties Editor**.

X: 0.08 Y: 2.0

3. Change the color of *side* to black as discussed earlier. Align *side* in all the views, as shown in Figure 2-38.

Next, you will create a drawer of the TV unit.

4. Choose the **Cube** tool from the **Add Primitive** panel in **Toolshelf**; a cube is created at the center of the view. Next, double-click on *Cube* in **Outliner** and enter **drawer** to rename it.
5. Make sure the **Object** button is chosen in the **Properties Editor**. Next, enter the following values in the **Scale** area of the **Transform** panel in the **Properties Editor**.

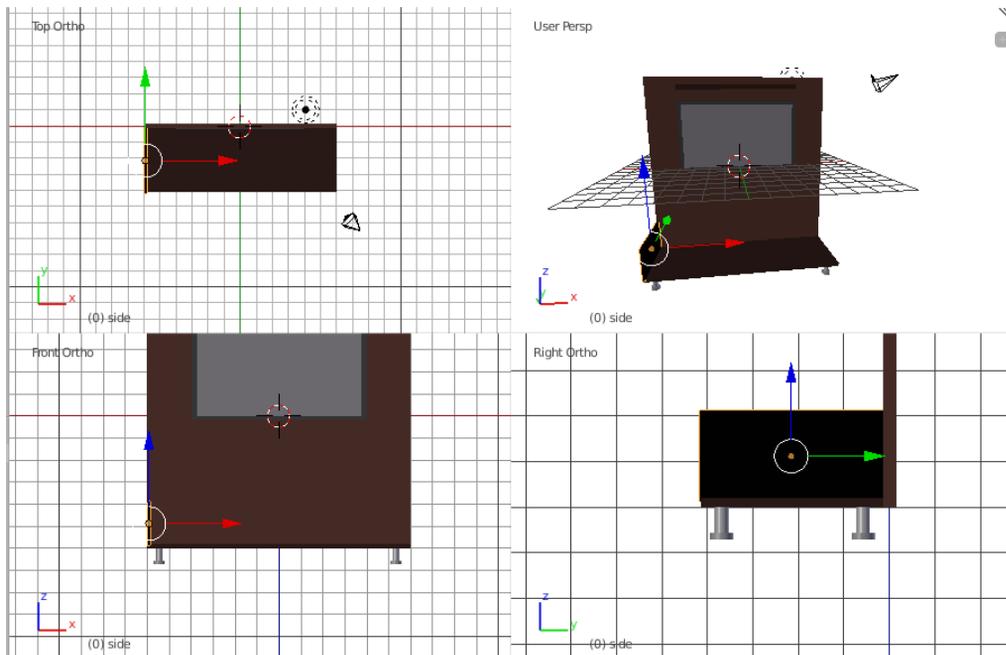


Figure 2-38 The side aligned

- Align *drawer* in all the views, as shown in Figure 2-39.

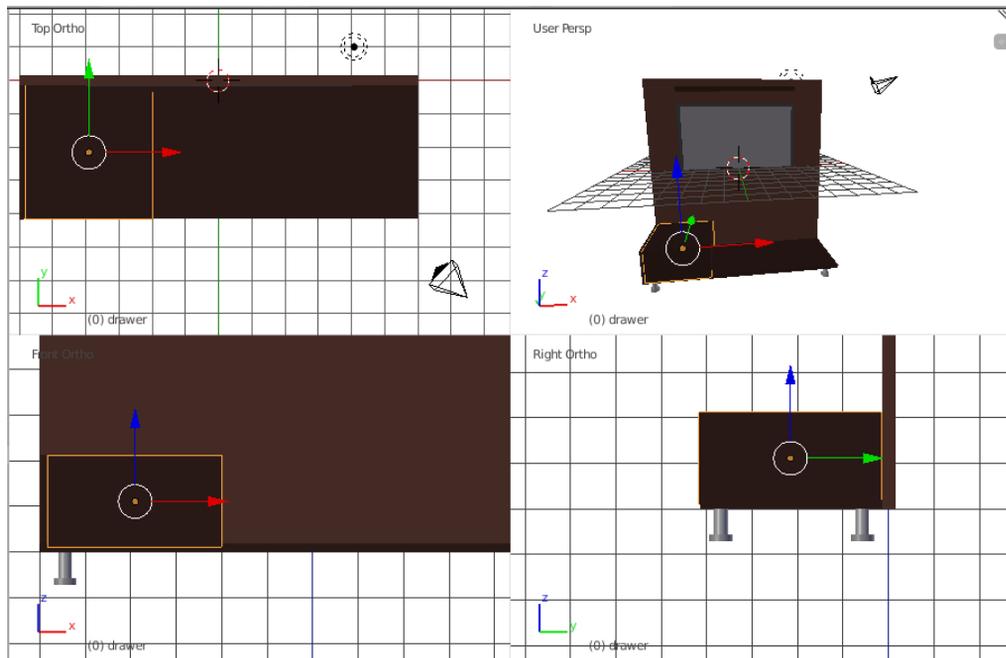


Figure 2-39 The drawer aligned

7. Select *drawer* and *side*. Press SHIFT +D and ENTER; a copy of *drawer* and *side* is created. Create one more copy of *drawer* and *side*. Also, make one more separate copy of *side*. Next, align all the copies of *drawer* and *side* in all the views, as shown in Figure 2-40.

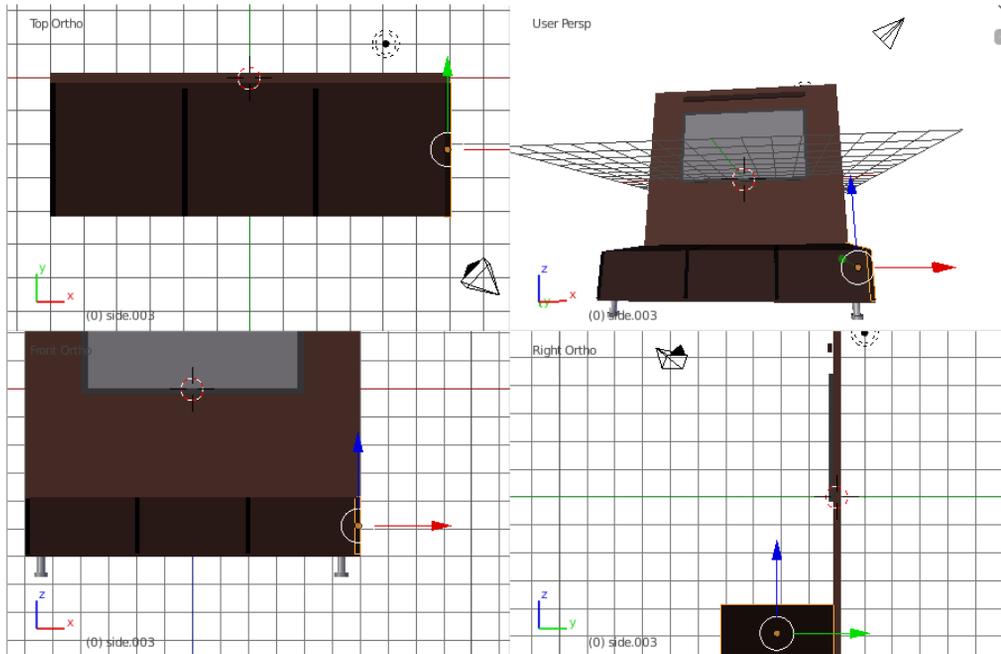


Figure 2-40 All the copies of *side* and *drawer* aligned

Next, you will create handles for the drawers.

8. Choose the **Torus** tool from the **Add Primitive** panel in **Toolshelf**; a torus is created at the center of the view. Rename it as *handle*, as discussed earlier.
9. Enter the following values in the **Add Torus** panel of **Toolshelf**.
Major Segments: **96** Major radius : **0.5** Minor radius: **0.05**
10. Press SHIFT+D and ENTER; a copy of *handle* is created with the name *handle001*. Next, create one more copy of *handle* and then align *handle* and its copies, as shown in Figure 2-41.

Creating Shelves of the TV Unit

1. Select *base* in the view. Press SHIFT+D and ENTER; the copy of *base* with the name *base.001* is created. Rename it as *shelfbottom* in **Outliner**, as discussed earlier. Next, align *shelfbottom* above the drawers, as shown in Figure 2-42.
2. Select *side* in the view. Press SHIFT+D and ENTER; a copy of *side* is created. Rename it as *shelfside* in **Outliner**, as discussed earlier.

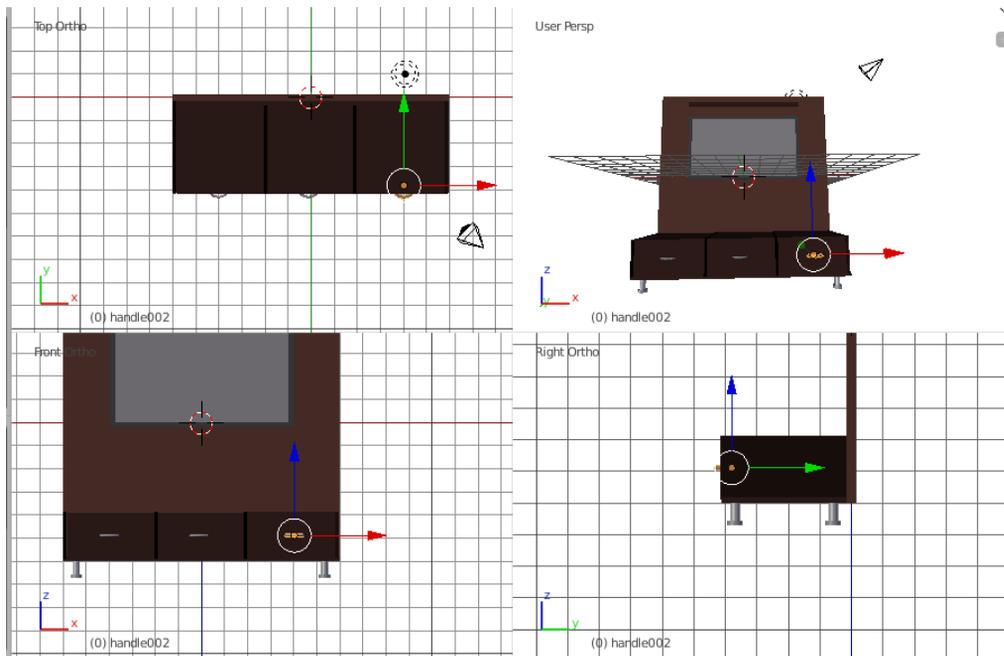


Figure 2-41 The handle and its copies aligned

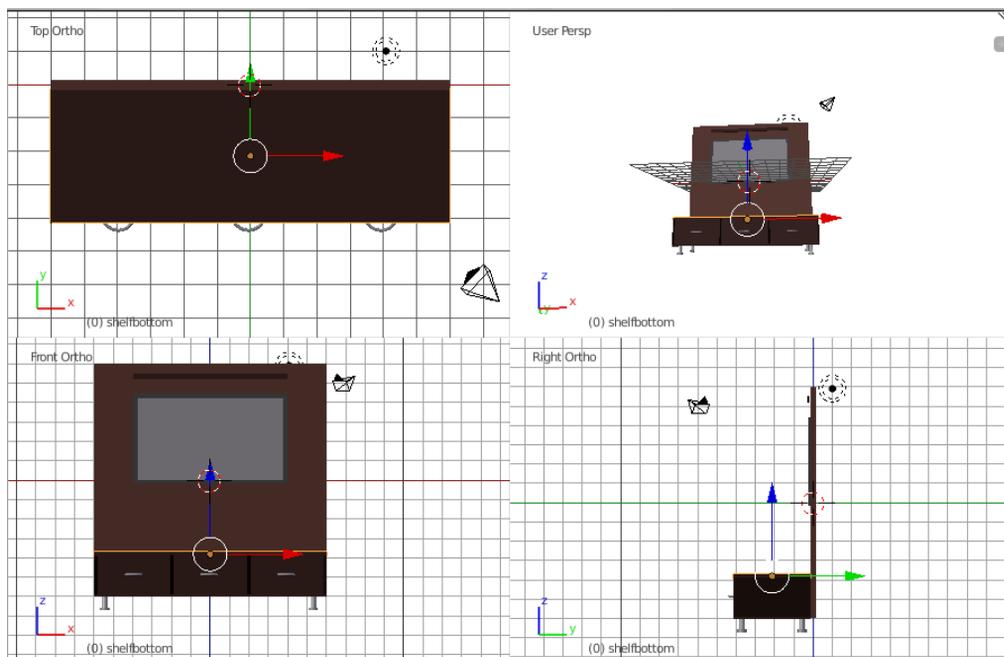


Figure 2-42 The shelfbottom aligned

3. Make sure the **Object** button is chosen in the **Properties Editor**. Next, enter the following values in the **Scale** area of the **Transform** panel in the **Properties Editor**.

Y: 1.25

Z: 0.75

4. Align *shelvside* in all the views, as shown in Figure 2-43.

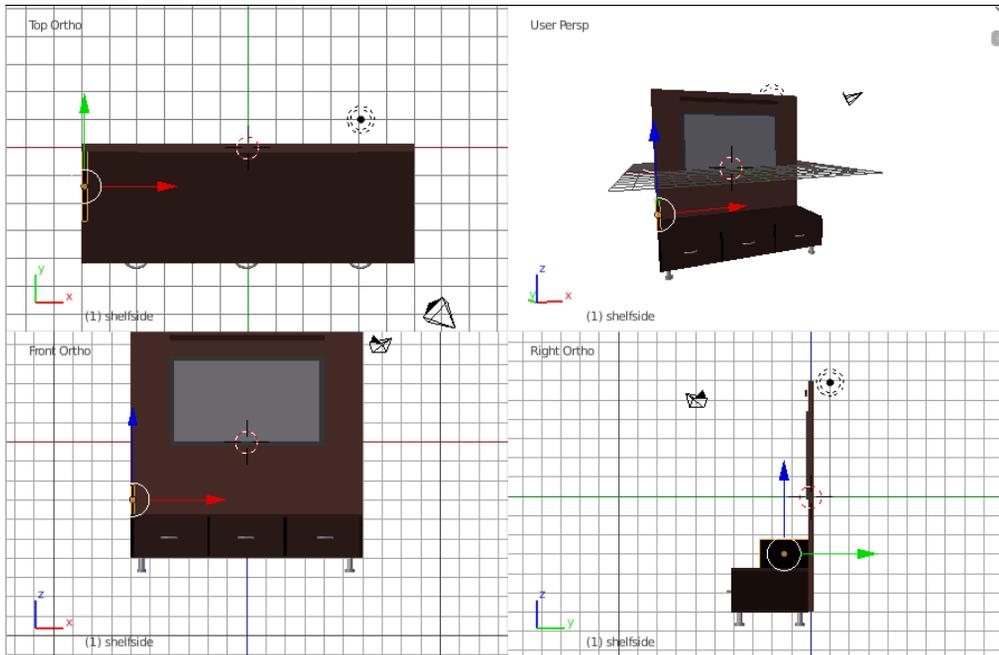


Figure 2-43 The shelvside aligned

5. Press SHIFT+D; the copy of *shelvside* with the name *shelvside.001* is created. Create three more copies of *shelvside*. Next, align all the copies in the views, as shown in Figure 2-44.

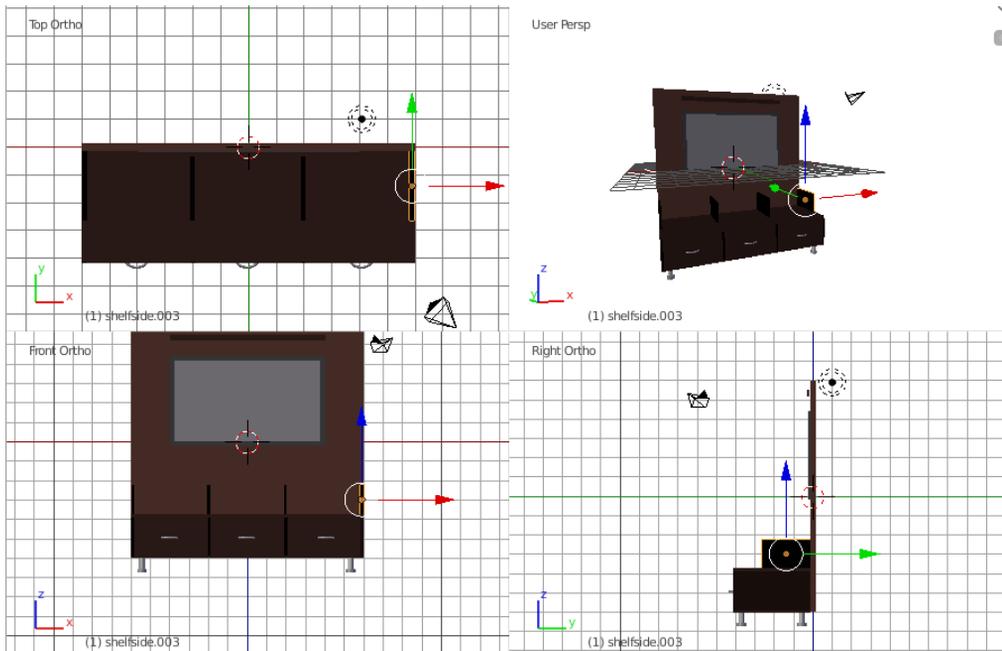


Figure 2-44 The copies of shelvside aligned

6. Select *shelfbottom* in the view. Press SHIFT + D and ENTER; a copy of *shelfbottom* is created. Next, rename it as *shelftop* and align it in all the views, as shown in Figure 2-45.

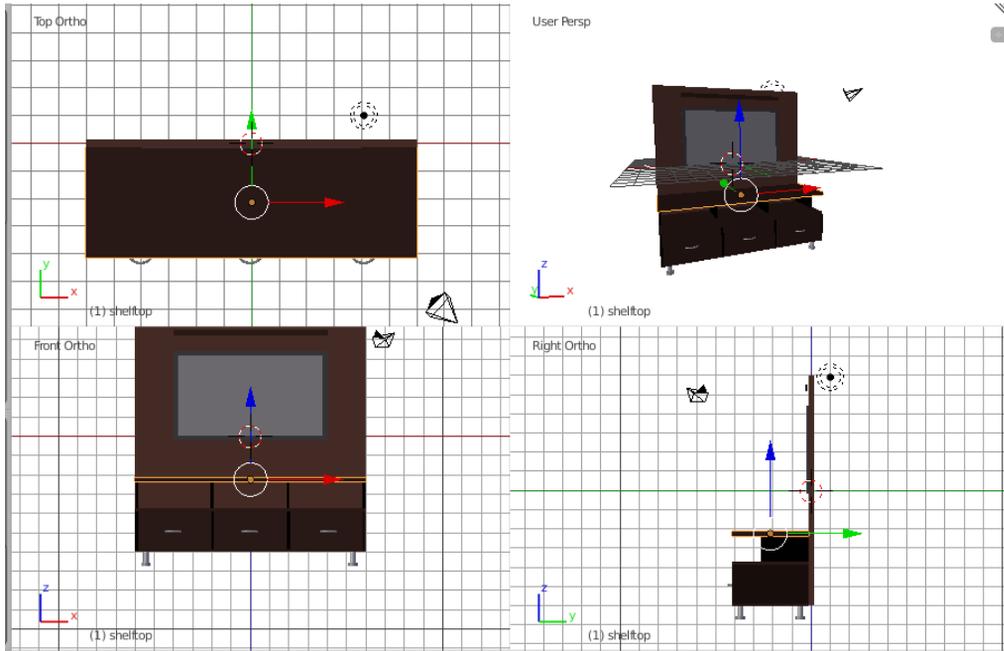


Figure 2-45 The shelftop aligned

Changing the Background Color of the Scene

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

1. Choose the **World** button from the **Properties Editor**. Next, click on the **Horizon Color** switch in the **World** panel, refer to Figure 2-46; the Color Picker window is displayed.
2. Select white color in this window; the background will display the white color on rendering.

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 *c02_blender_2.79_rndr.zip* file from www.cadcim.com. The path of the file is as follows: *Textbooks > Animation and Visual Effects > Blender > Blender 2.79 for Digital Artists*

1. Choose **File > Save** from the **Info Editor** menu bar.



Figure 2-46 The Horizon Color switch

2. Adjust the view in the User Persp view. Next, choose the **Open GL still image render** button from **3D View Editor**; the rendered image is displayed in the **UV/Image Editor**; refer to Figure 2-26.

Tutorial 2

In this tutorial, you will create 3D model of a dining table set, as shown in Figure 2-47, by using **Edit Mode**. (Expected time: 30 min)



Figure 2-47 The dining table set

The following steps are required to complete this tutorial:

- a. Create the folder.
- b. Create top of the table.
- c. Create legs of the table.
- d. Create base and legs of the chair.
- e. Create back of the chair.
- f. Save and render the scene.

Creating the Folder

1. Navigate to `|Documents|blender2.79| c02` and create a new folder with the name `c02_tut2`.
2. Press CTRL+N or choose **File > New** from the **Info Editor** menu bar; a menu is displayed. Choose **Reload Start-Up File**; the menu disappears and the startup file is loaded.
3. Choose **File > Save** from the **Info Editor** menu bar; the **File Browser** is displayed
4. Navigate to `|Documents|blender2.79|c02|c02_tut2` and enter **Dining table set** in the **File Name** edit box. Next, choose the **Save Blender File** button to save the file at the specified location.

Creating Top of the Table

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

1. Press CTRL+ALT+Q; the quad view is displayed.
2. Choose the **Cube** tool from the **Add Primitive** panel in **Toolshelf**; a cube is created at the center of the view. Next, double-click on *Cube* in **Outliner** and enter **tabletop** to rename it.
3. Enter the following values in the **Scale** area of the **Transform** panel in **Properties Editor**:

X: 12

Y: 20

Z: 0.2

The cube is modified, refer to Figure 2-48.

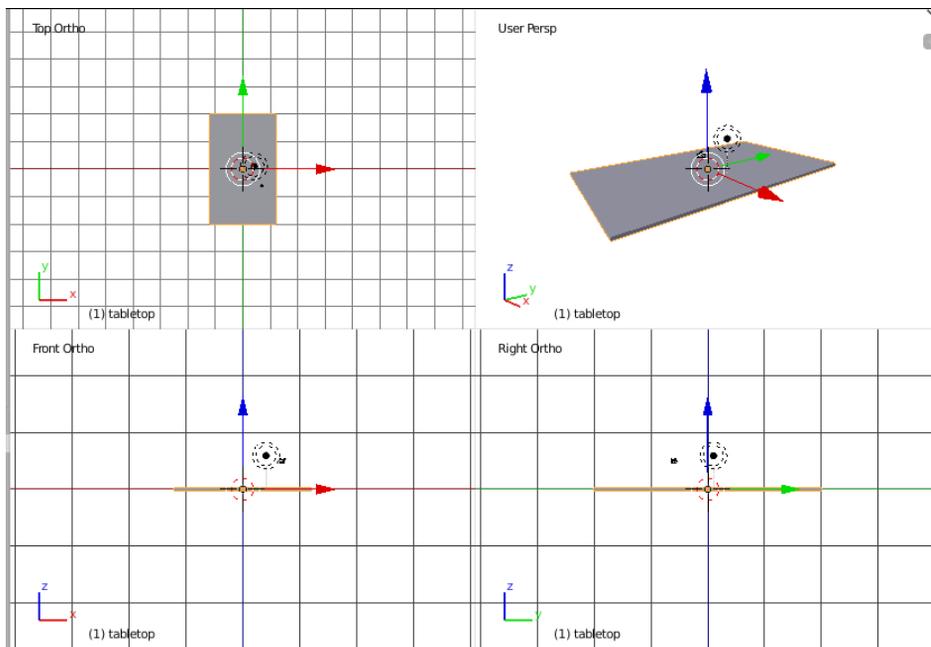


Figure 2-48 The modified cube displayed

4. Press the TAB key and choose **Edit Mode** from the pie menu displayed. Next, choose the **Edge Select** button from **3D View Editor**; all the edges of *tabletop* are highlighted.
5. Press and hold the SHIFT key and select all the vertical edges of *tabletop* to deselect them, refer to Figure 2-49.
6. Choose **Mesh > Edges > Subdivide** from the **3D View Editor** menu bar; two edges (one horizontal and one vertical) passing through the center of *tabletop* and dividing it into four parts get added.
7. Enter 16 in the **Number of Cuts** slider of the **Subdivide** panel in **Toolshelf**; *tabletop* is subdivided, as shown in Figure 2-50.

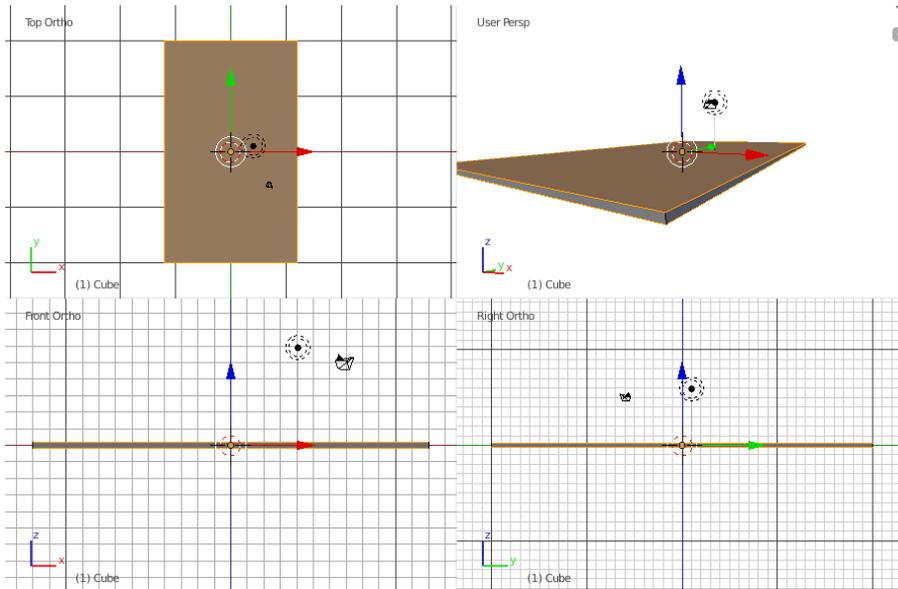


Figure 2-49 All the corner edges deselected

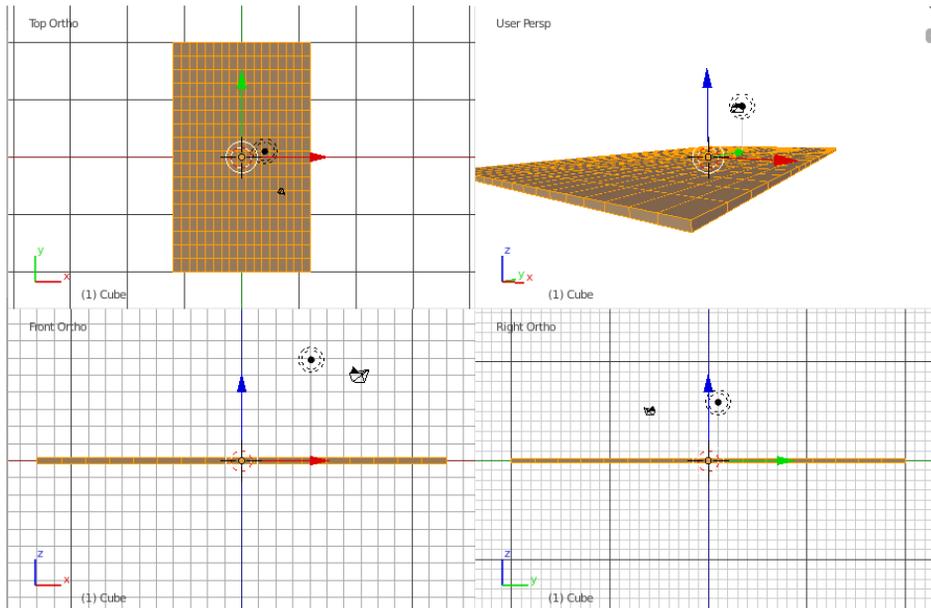


Figure 2-50 The tabletop subdivided

Next, you will make the corners of *tabletop* smooth. To achieve this, you need to use the **Bevel** tool on the corner edges.

8. Select all the four vertical edges in the User Persp view, as shown in Figure 2-51.

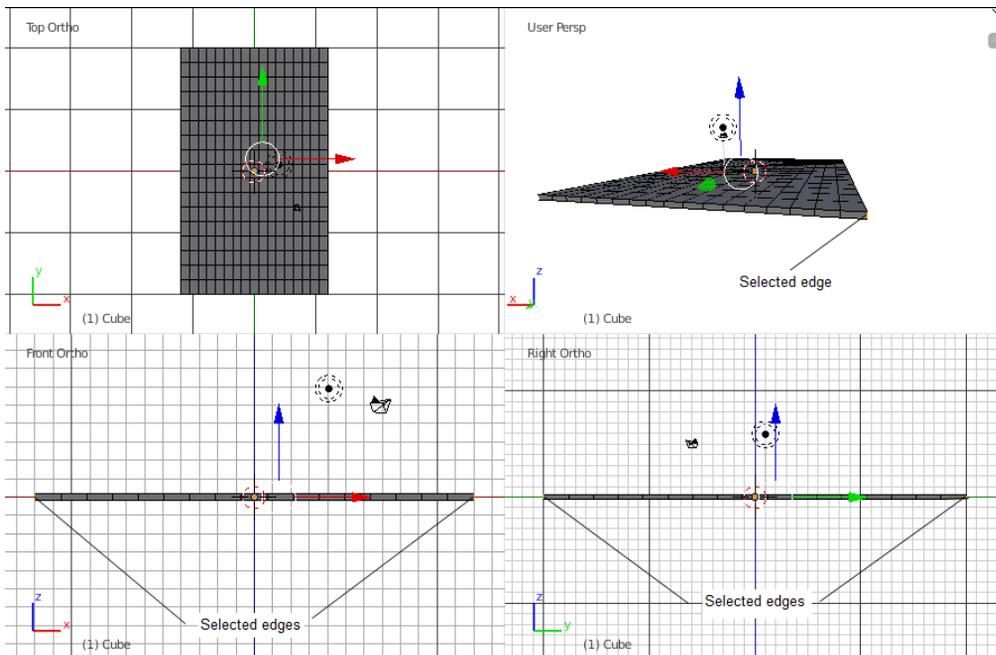


Figure 2-51 Four corner edges selected

9. Choose **Mesh > Edges > Bevel** from the **3D View Editor** menu bar or press CTRL+B; a dotted line is attached to the cursor. Next, drag and move the cursor in the view and click at a point; the **Bevel** panel is added to **Toolshef**. Set the parameters in the **Bevel** panel as follows:

Amount Type: **Depth**

Amount: **0.05**

Segments: **4**

tabletop is smoothed at the corners, refer to Figure 2-52.

Creating Legs of the Table

In this section, you will create legs of the table using the **Cylinder** tool.

1. Choose the **Cylinder** tool from the **Add Primitive** panel in **Toolshef**; a cylinder is created at the center of the view. Next, double-click on *Cylinder* in **Outliner** and enter **leg** to rename it.

2. Enter the following values in the **Add Cylinder** panel of **Toolshef**.

Vertices: **64**

Radius: **0.5**

Depth: **2**

3. Press / on numpad; *tabletop* gets hidden and *leg* becomes isolated and you get more room to modify *leg*, refer to Figure 2-53.

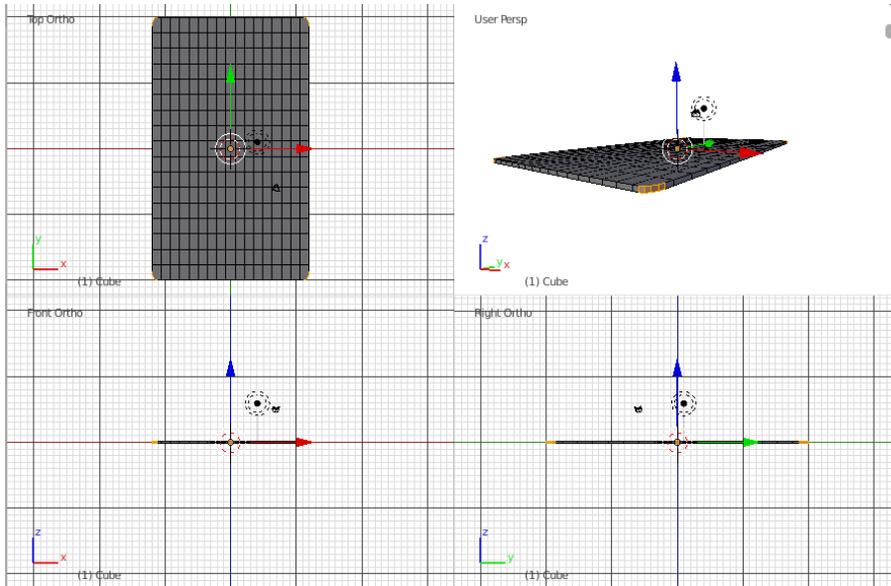


Figure 2-52 The tabletop smoothed at the corners

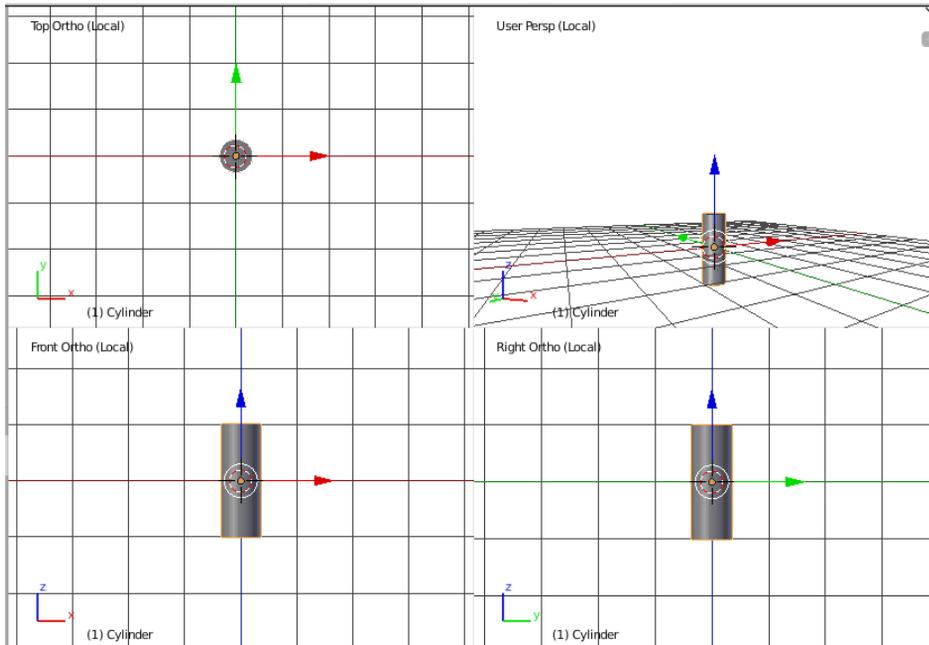


Figure 2-53 The leg displayed

4. Press the TAB key and choose **Edit Mode** from the pie menu displayed. Next, choose the **Face Select** button from **3D View Editor**; all the faces of *leg* are highlighted.
5. Choose the **Tools** tab from **Toolshelf**. Select the bottom face of *leg* and then vertical edges

of *cylinder* and then choose **Mesh > Faces > Bevel** from the **3D View Editor** menu bar or press CTRL+ B and then click at a point in the view; the **Bevel** panel is added to **Toolshelf**.

6. Enter **0.150** in the **Amount** slider and choose **Width** from the **Amount Type** drop-down of the **Bevel** panel; face of *leg* is beveled, as shown in Figure 2-54.

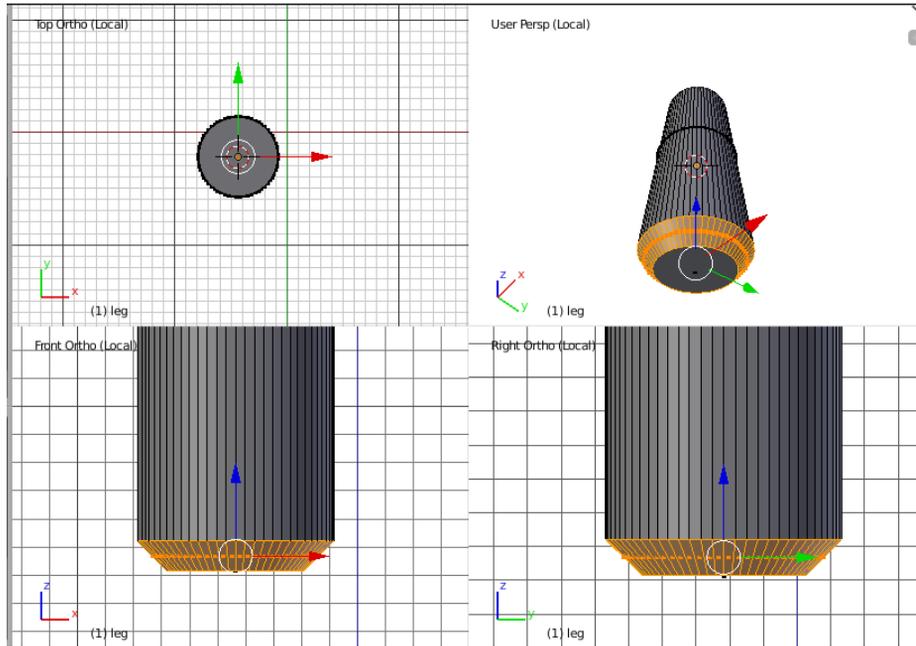


Figure 2-54 The face of *leg* beveled

7. Select the bottommost face of *leg* again. Next, choose **Extrude Region** from the **Add** area of the **Mesh Tools** panel in **Toolshelf** and then click at a point in the view; the **Extrude Region and Move** panel is displayed at the bottom in **Toolshelf**.
8. Enter **0.25** in the **Z** slider of the **Extrude Region and Move** panel; the selected face of *leg* is extruded, as shown in Figure 2-55.
9. Make sure the bottommost face of *leg* is selected. Next, choose **Extrude Region** from the **Add** area of the **Mesh Tools** panel in **Toolshelf** and then click at a point in the view; the **Extrude Region and Move** panel is displayed at the bottom in **Toolshelf**.
10. Enter **0.1** in the **Z** slider of the **Extrude Region and Move** panel; the selected face of *leg* is extruded, as shown in Figure 2-56.
11. Make sure the bottommost face of *leg* is selected. Next, choose the **Scale** tool from **3D View Editor**.

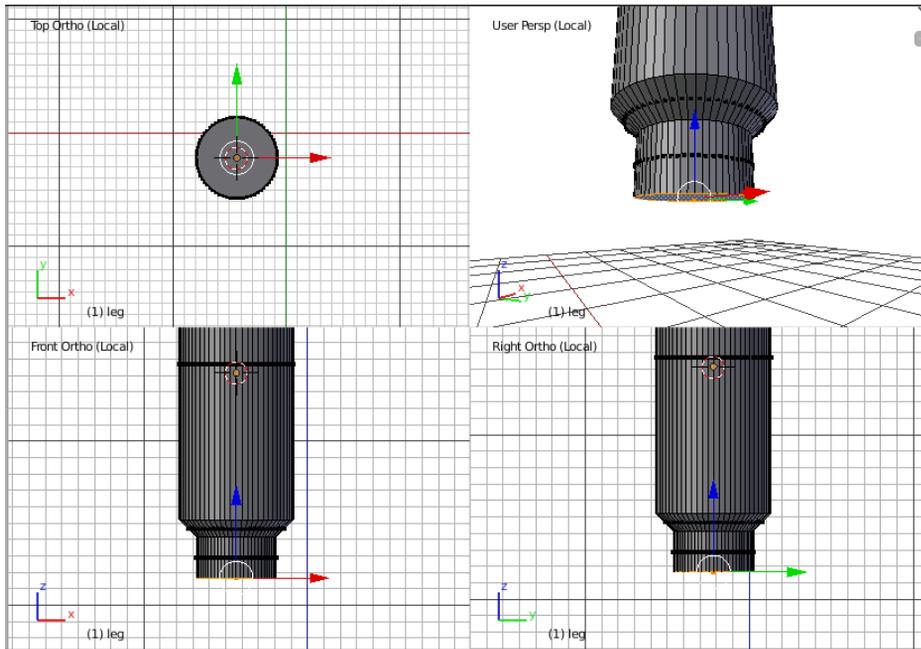


Figure 2-55 The bottommost face extruded

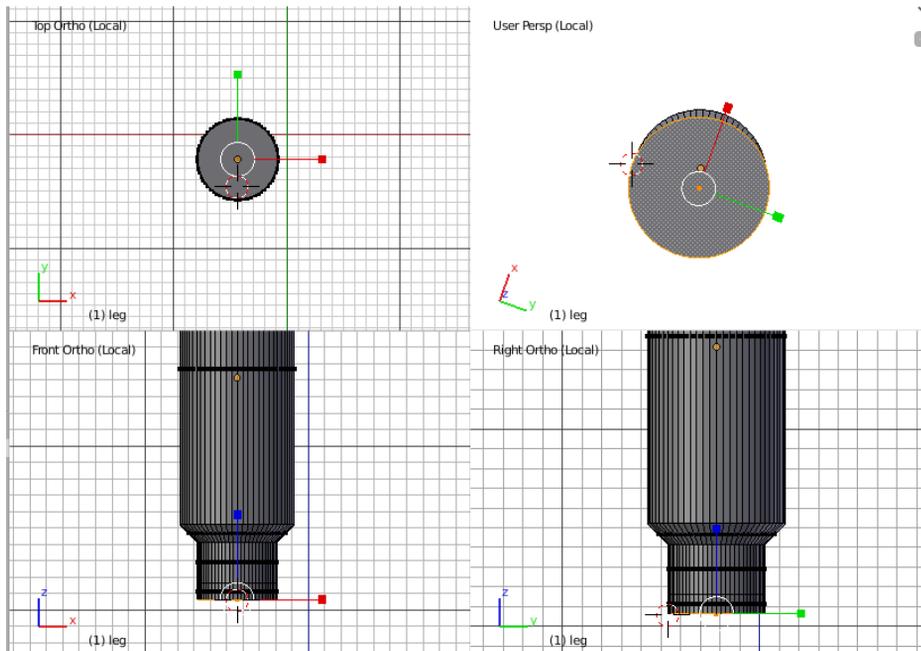


Figure 2-56 The bottommost face extruded

12. Press and hold the left mouse button and move the cursor. Next, click at a point in the view to scale the selected face to some extent manually; the **Resize** panel is added to **Toolshef**

In this panel, enter **1.5** in the **X**, **Y**, and **Z** sliders and select the **X**, **Y**, and **Z** checkboxes; the selected face is uniformly scaled, as shown in Figure 2-57.

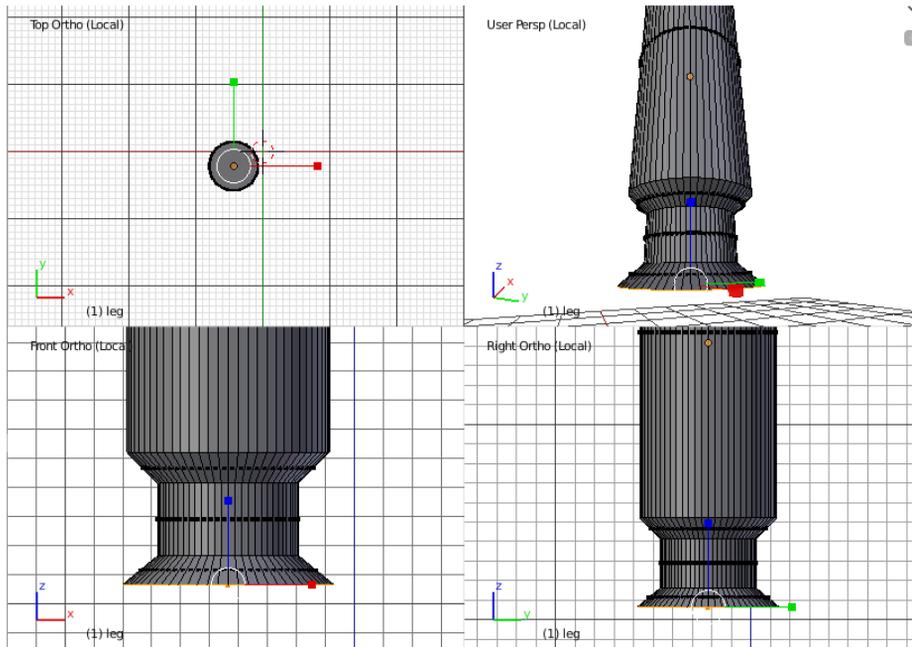


Figure 2-57 The selected face scaled

13. Make sure the bottommost face of *leg* is selected. Next, choose **Extrude Region** from the **Add** area of the **Mesh Tools** panel in **Toolshelf** and then click at a point in the view; the **Extrude Region and Move** panel is displayed at the bottom in **Toolshelf**.
14. Enter **10** in the **Z** slider of the **Extrude Region and Move** panel; the selected face of *leg* is extruded, as shown in Figure 2-58.
15. Choose the **Edge Select** tool from **3D View Editor**. Next, choose the **Loop Cut and Slide** tool from the **Add** area in the **Mesh Tools** panel of **Toolshelf** and click on *leg*, refer to Figure 2-59 and then move the edge loop to the lower portion of the leg, as shown in Figure 2-59.
16. Similarly, create four more edge loops using the **Loop Cut and Slide** tool and then place them, as shown in Figure 2-60.
17. Select the edge from *leg*, as shown in Figure 2-61. Next, choose **Mesh > Edges > Edge Rings** from the **3D View Editor** menu bar; all the edges in a ring are selected.
18. Choose the **Scale** tool from **3D View Editor**. Next, press and hold the left mouse button and move the cursor and click at a point in the view; the **Resize** panel is displayed at the bottom in **Toolshelf**.
19. Enter **0.75** in the **X**, **Y**, and **Z** sliders in the **Vector** area of the **Resize** panel. Also, select the **X**, **Y**, and **Z** in this panel; all the edges in the ring are scaled, as shown in Figure 2-62.

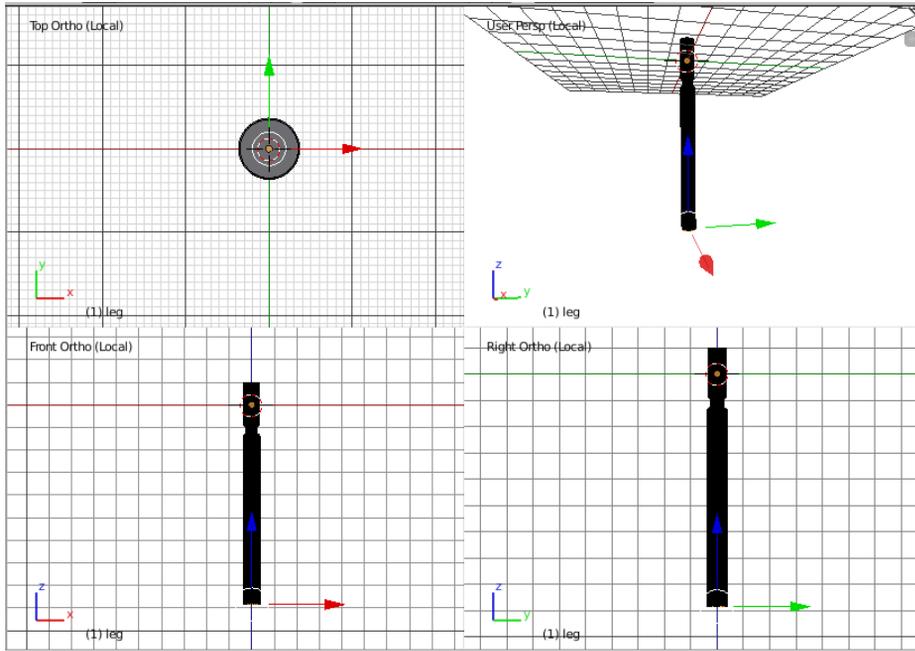


Figure 2-58 The bottommost face extruded

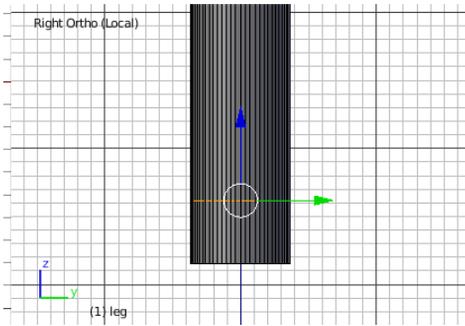


Figure 2-59 The edge loop created

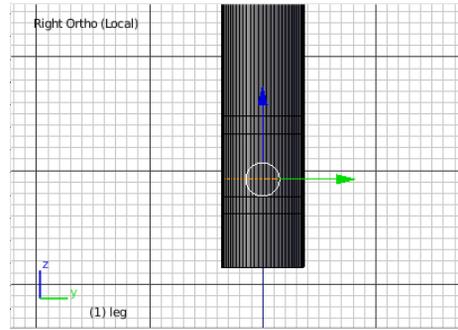


Figure 2-60 Four edge loops created

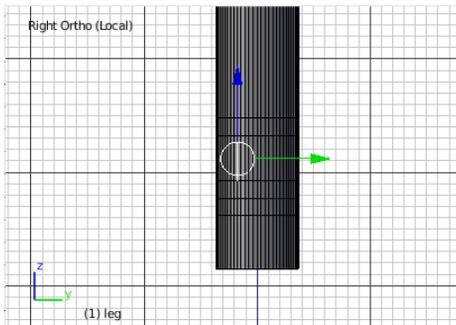


Figure 2-61 The edge selected

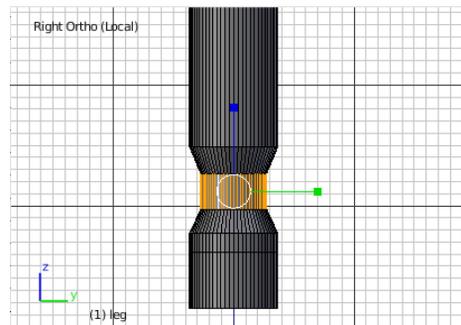


Figure 2-62 The edges in the ring scaled

20. Select the edge from the bottommost loop of *leg*, refer to Figure 2-63. Next, choose **Mesh > Edges > Edge Loops** from the **3D View Editor** menu bar; the bottommost edge loop is selected. Now, repeat the steps 18 and 19 to scale this edge loop, refer to Figure 2-63.
21. Press the TAB key and then choose **Object Mode** from the pie menu displayed. Next, press the / key on numpad; *tabletop* is displayed along with *leg*.
22. Select *leg*. Press SHIFT+D and then ENTER; copy of *leg* is created with the name *leg001*. Next, create two more copies of *leg*. Now, align *leg* and all its copies with *tabletop*, as shown in Figure 2-64.

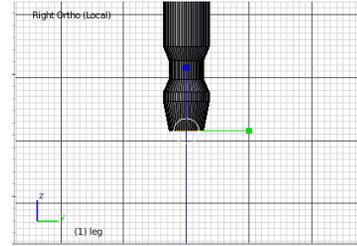


Figure 2-63 The bottommost edge loop scaled

23. Select *tabletop*, *leg*, and all the copies of *leg* using the SHIFT key. Next, press CTRL+J; all the selected parts are combined to form a single mesh. Note that the combined mesh is automatically renamed with the name of the last selected part. Rename the combined mesh as *table* in **Outliner**, as discussed earlier.

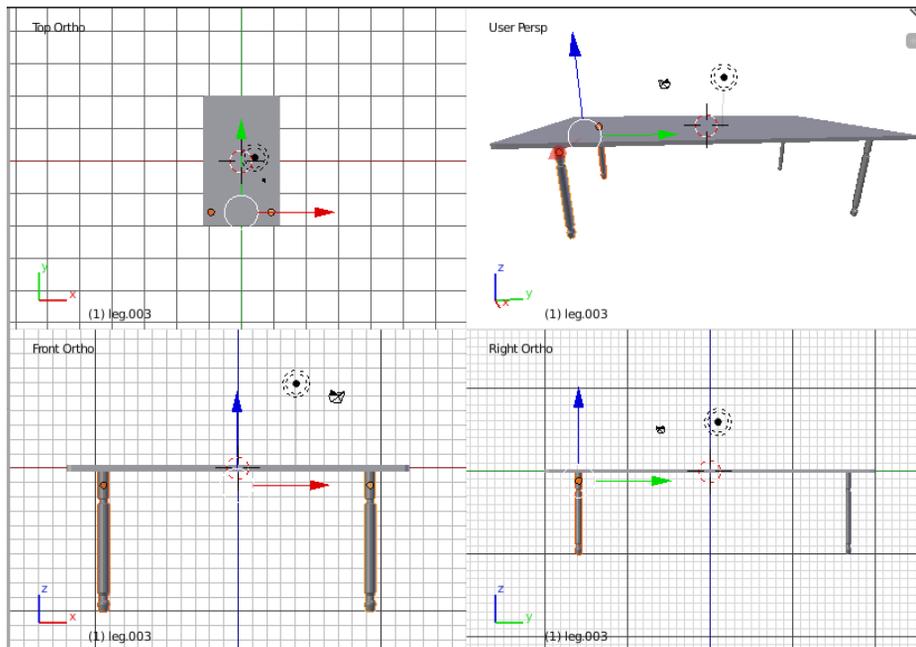


Figure 2-64 The leg and its copies aligned

24. Change the color of *table* to color of your choice as discussed in Tutorial 1, refer to Figure 2-65.

Creating Seat of the Chair

In this section, you will create seat of the chair using the **Cube** tool.

1. Choose the **Cube** tool from the **Add Primitive** panel in **Toolshelf**; a cube is created at the center of the view. Next, double-click on *Cube* in **Outliner** and enter **chair** to rename it.

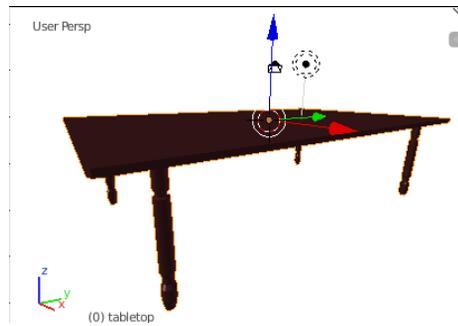


Figure 2-65 The table displayed

2. Move *chair* to one side of *table*. Next, enter the following values in the **Scale** area of the **Transform** panel in the **Properties Editor**:

X: 6

Y: 5

Z: 0.5

Chair is modified.

3. Press / on numpad; *chair* becomes isolated and *table* is hidden, refer to Figure 2-66.

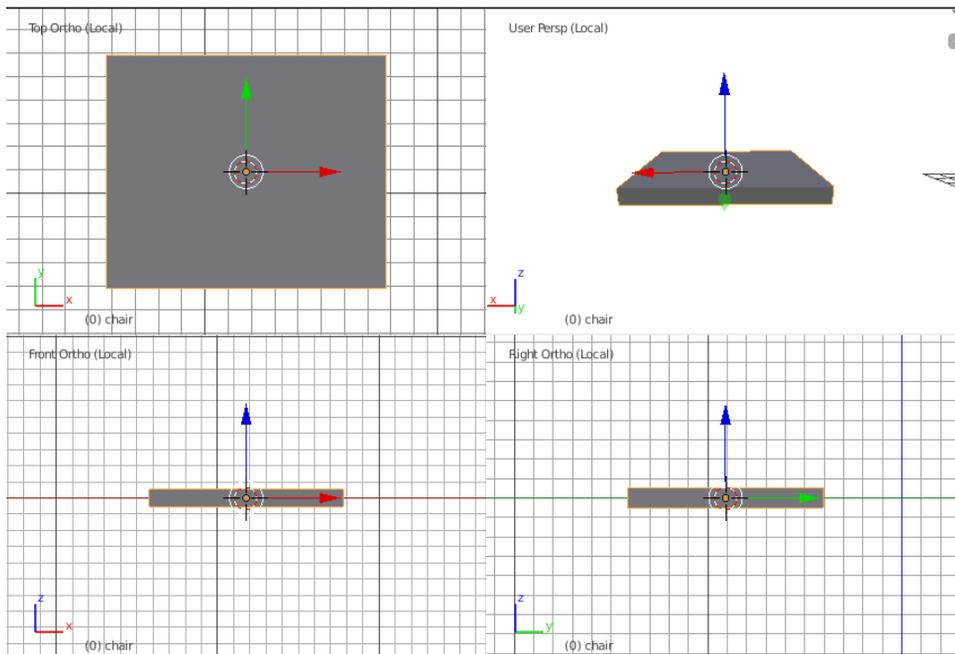


Figure 2-66 The chair modified

4. Press the TAB key and choose **Edit Mode** from the pie menu displayed. Next, choose the **Edge Select** button from **3D View Editor**; all the edges of *chair* are highlighted.
6. Choose the **Loop Cut and Slide** tool from the **Add** area in the **Mesh Tools** panel of **Toolshelf** and click on *chair* in the Top Ortho view; an edge is added to *chair*. Place the newly added edge, as shown in Figure 2-67.

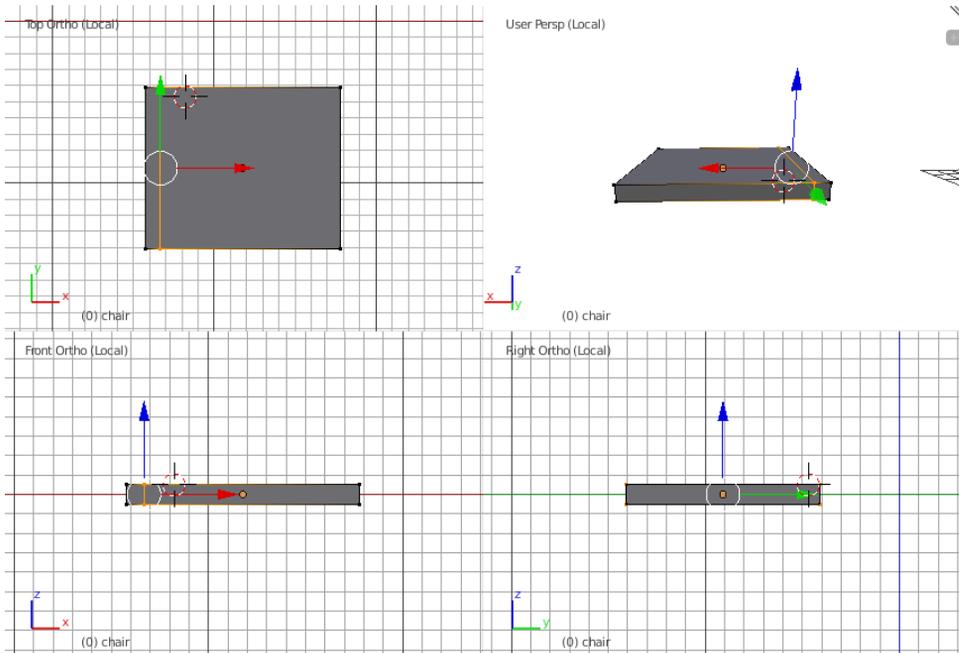


Figure 2-67 The edge added to chair

7. Similarly, add three more edges to *chair* using the **Loop Cut and Slide** tool and place them, as shown in Figure 2-68.

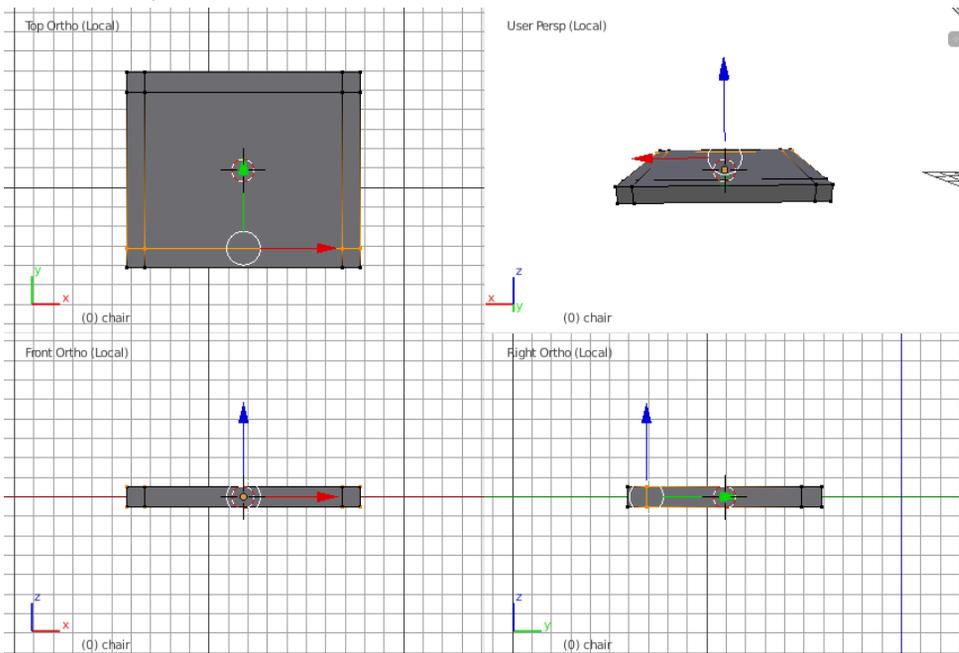
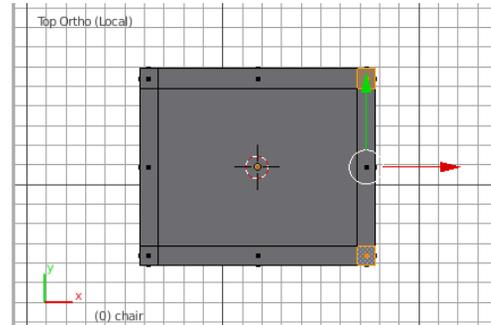


Figure 2-68 Three more edges added to chair

Creating Back of the Chair

1. Choose the **Face Select** tool from **3D View Editor**. Next, select the two faces from the Top Ortho(Local) view, as shown in Figure 2-69.

2. Choose the **Tools** tab from **Toolshelf**. Next, choose the **Extrude Individual** from the **Add** area in the **Mesh Tools** panel of **Toolshelf** and move the cursor in the view and click at a point; the **Extrude Individual Faces** panel is displayed at the bottom in **Toolshelf**.



3. Enter **-19** in the **offset** slider in the **Extrude Individual Faces** panel; the selected faces are extruded, as shown in Figure 2-70.

4. Press the **TAB** key and switch to **Object Mode** from the pie menu displayed.

Figure 2-69 The two faces selected

5. Choose the **Cube** tool from the **Add Primitive** panel in **Toolshelf**; a cube is created at the center of the view. Next, double-click on *Cube* in **Outliner** and enter **back** to rename it.

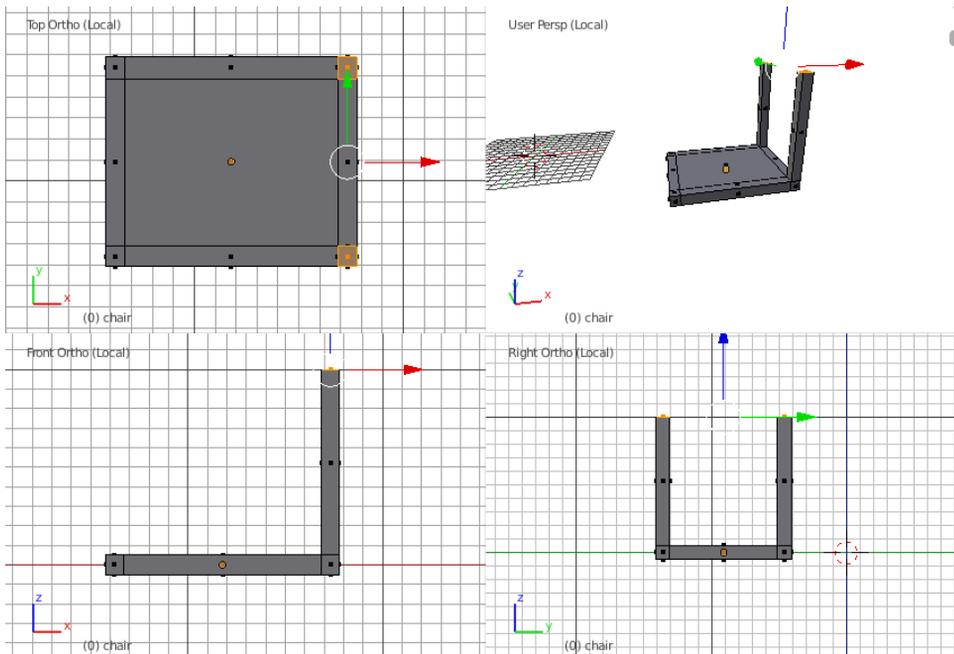


Figure 2-70 The two faces extruded

6. Enter the following values in the of the **Transform** panel in the **Properties Editor**:

Scale area:

X: **0.39**

Y: **0.5**

Z: **4.25**

Rotation area:

X: 90

back is modified.



Note

You may need to change the value in the Z slider for back depending on the width of the extruded face of chair.

7. Align *back* with *chair*, as shown in Figure 2-71.

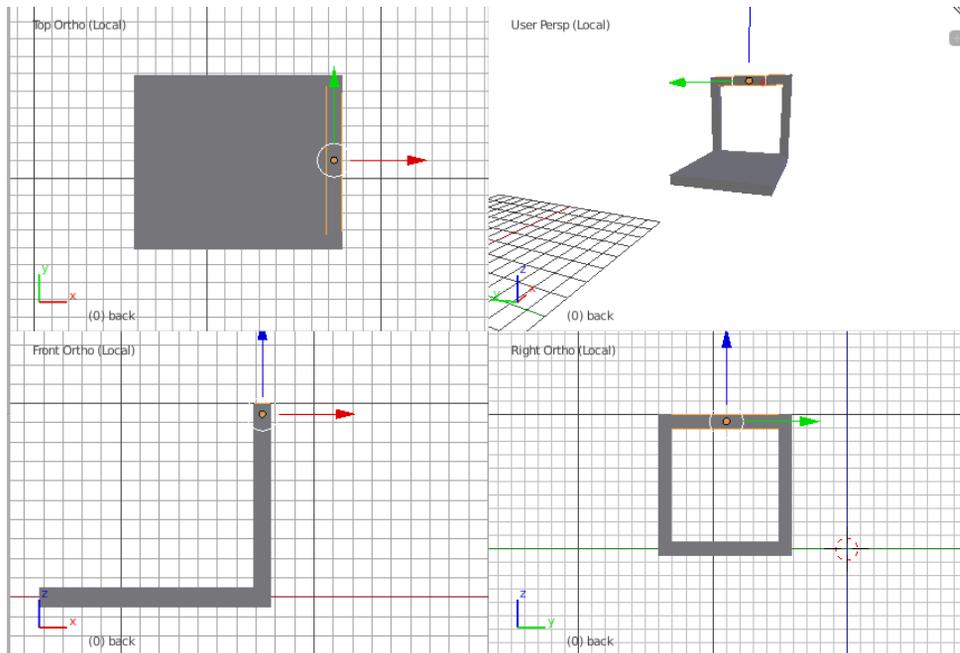


Figure 2-71 The back aligned

8. Switch to **Edit Mode** as discussed earlier. Next, choose the **Edge Select** tool and select one of the horizontal edges of *back* in the Right Ortho (Local) view, as shown in Figure 2-72.
9. Choose **Edges > Edge Rings** from the **3D View Editor** menu bar; all the edges in the ring are selected.
10. Choose the **Subdivide** tool from the **Add** area in the **Mesh Tools** panel of **Toolshelf**. Next, enter **12** in the **Number of Cuts** slider of the **Subdivide** panel in **Toolshelf**; *back* is subdivided, as shown in Figure 2-73.



Note

The subdivisions carried out above will help you get a smooth curvature when shape of the chair is modified using proportional editing.

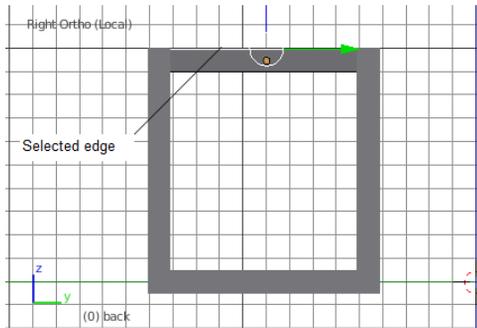


Figure 2-72 The selected edge

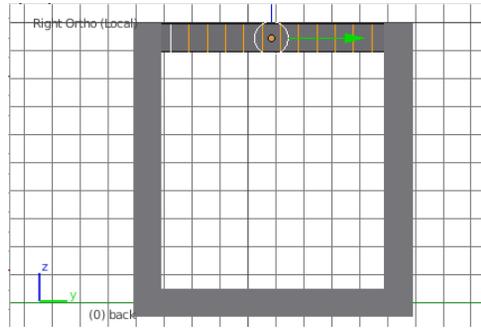


Figure 2-73 The back subdivided

11. Switch to **Object Mode** and make sure *back* is selected. Next, press SHIFT+D and ENTER; a copy of *back* is created with the name *back001*. Align it, as shown in Figure 2-74.

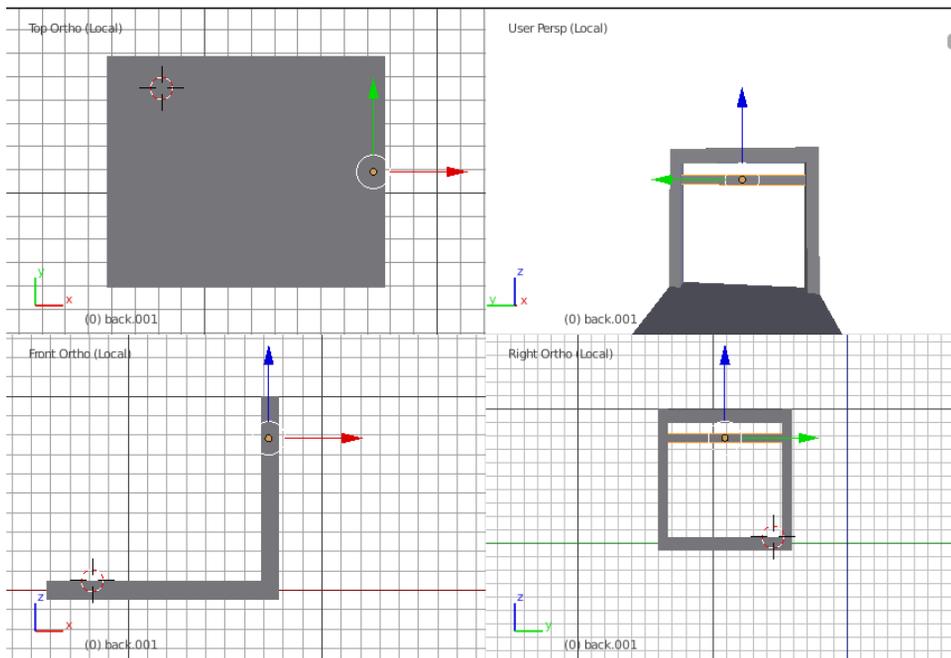


Figure 2-74 The back001 aligned

12. Enter the following values in the **Scale** area of the **Transform** panel in **Properties Editor**:

X: **0.05**

Y: **0.3**

Z: **4.25**

back001 is modified.

13. Create five copies of *back001* as discussed earlier and align them, as shown in Figure 2-75.

14. Create one more copy of *back001*. It is automatically renamed as *back007*. Next, enter **180** in the **X** slider of the **Rotation** area in the **Transform** panel of the **Properties Editor**; *back007* is rotated. Next, align it, as shown in Figure 2-76. Make sure that *back007* is at the front of other back parts.
15. Create five copies of *back007* and align them, as shown in Figure 2-77.

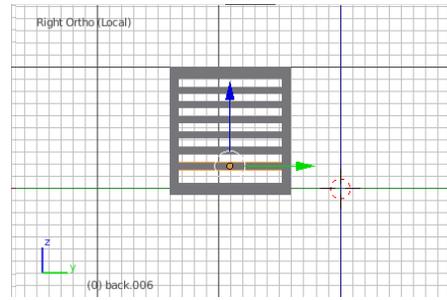


Figure 2-75 The copies of *back001* aligned

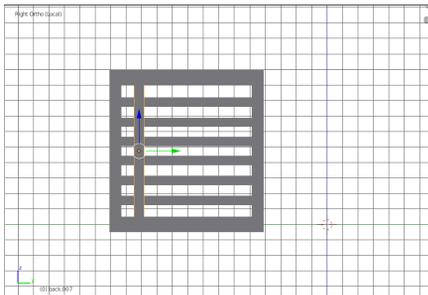


Figure 2-76 The *back007* aligned

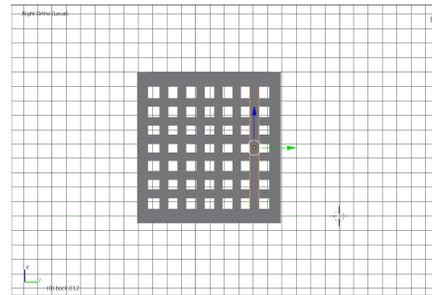


Figure 2-77 The copies of *back007* aligned

Creating Legs of the Chair

In this section, you will create legs of the chair using the **Extrude Individual** tool.

1. Press CTRL+ALT+Q; User Persp(Local) view is displayed. Next, press CTRL+7 and then press 5; the Bottom Ortho (Local) view is displayed.
2. Select *chair* from **Outliner** and then switch to **Edit Mode**, as discussed earlier. Next, choose the **Face Select** tool from **3D View Editor**. Next, select four faces from the Bottom Ortho(Local) view, as shown in Figure 2-78.
3. Press 4 and then 5; the User Persp (local) view is displayed. Now, adjust the User Persp (local) view to view *chair* properly. Now, press CTRL+ALT+Q to switch over to quad view.
4. Choose the **Tools** tab from **Toolshelf**. Next, choose the **Extrude Individual** from the **Add** area in the **Mesh Tools** panel of **Toolshelf** and move the cursor in the view and click at a point; the **Extrude Individual Faces** panel is displayed at the bottom in **Toolshelf**.

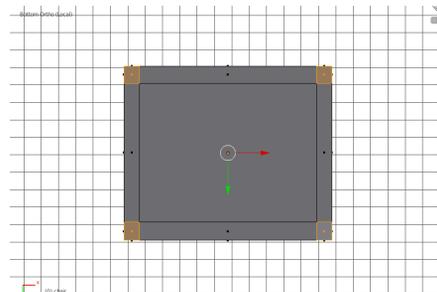


Figure 2-78 Four faces are selected

- Enter **-18** in the **offset** slider of the **Extrude Individual Faces** panel; the selected faces are extruded, as shown in Figure 2-79.

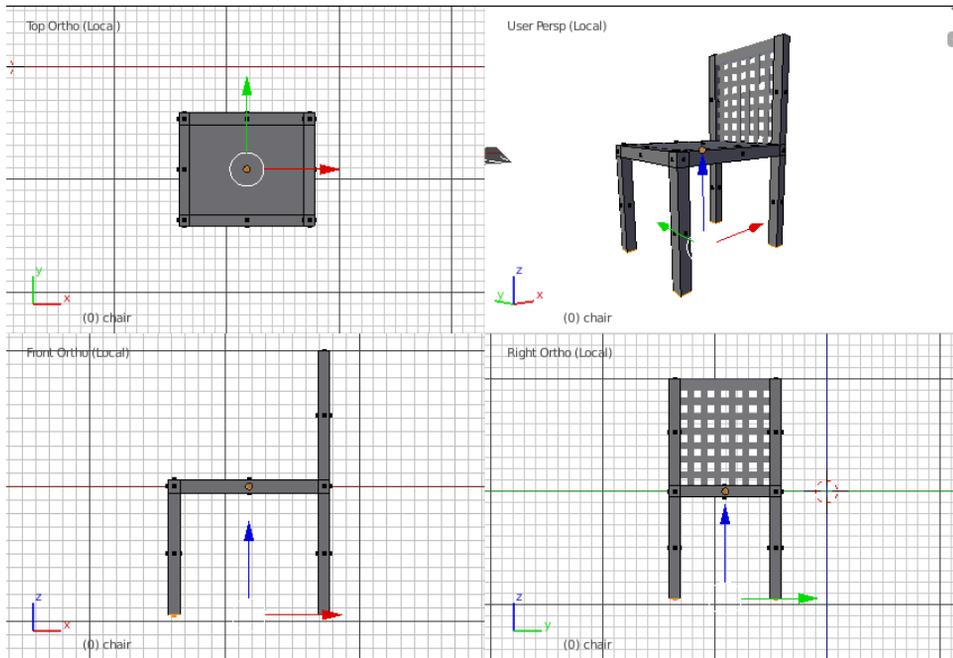


Figure 2-79 Selected faces extruded

Next, you need to properly shape the chair using the proportional editing mode.

- Select *chair*. Next, subdivide parts of *chair* by selecting the respective edges, as shown in Figure 2-80.

Next, you need to combine some of the parts of *chair* before using the proportional editing mode.

- Select *back* and then *chair*. Next, press CTRL+J; the selected parts are combined to form a single mesh and is automatically named as *chair* as discussed earlier.

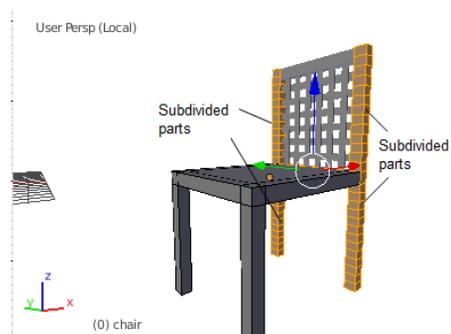


Figure 2-80 Selected edge rings subdivided

- Switch to **Edit Mode**. Select the vertices of *chair*, as shown in Figure 2-81. Adjust the view of UserPersp (local), refer to Figure 2-82. Next, choose **Enable** from the **Proportional Editing mode** drop-down or press O; the proportional editing mode is enabled.
- Choose the **Translate** tool from **3D View Editor**. Next, press and hold the left mouse button and move the selected vertices in the left direction; a circle is attached to the cursor. Increase the radius of the circle by using the middle mouse button, refer to Figure 2-82. Next, click at a point to get a curve as shown in Figure 2-82.



Note

You can also select faces or edges instead of vertices in proportional editing.

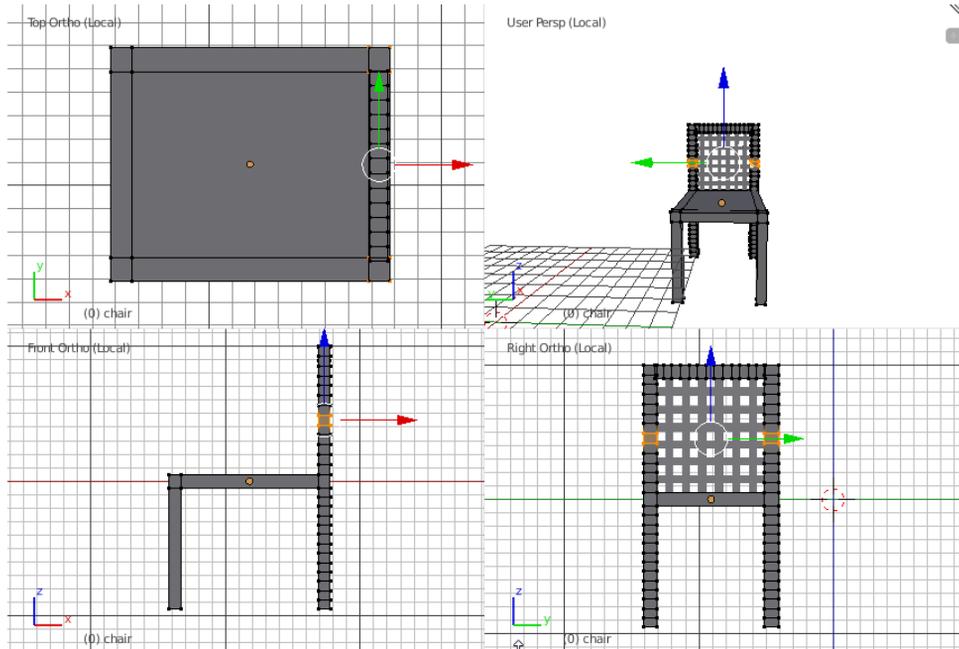


Figure 2-81 Selected vertices of chair

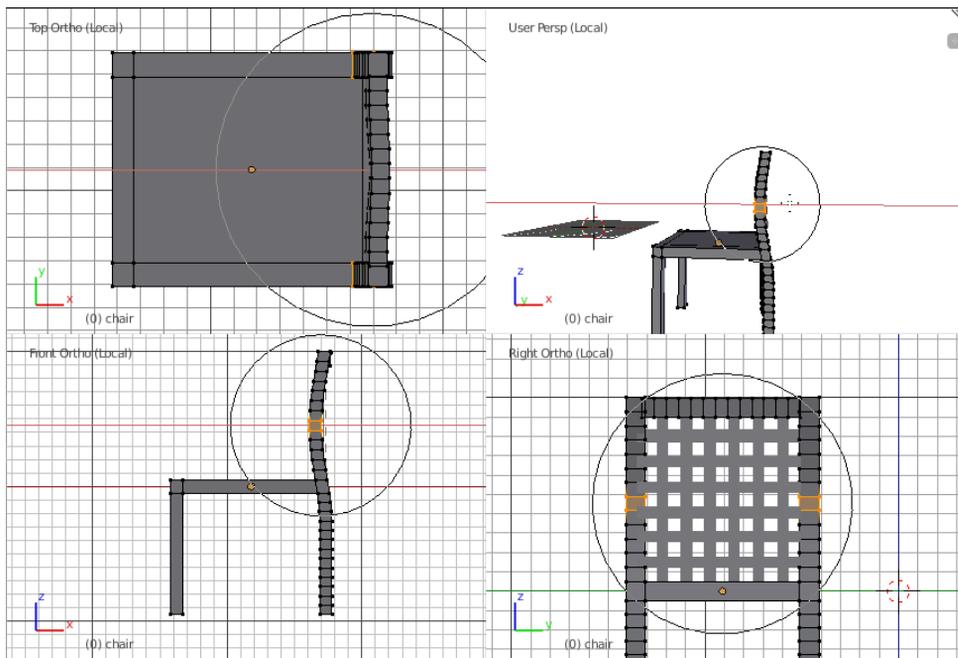


Figure 2-82 Vertices of chair moved

10. Similarly, select the center vertices of the top of *chair* and move them to get a curve, as shown in Figure 2-83. Also, select the center vertices of the two legs of *chair* to get a curve, as shown in Figure 2-84.

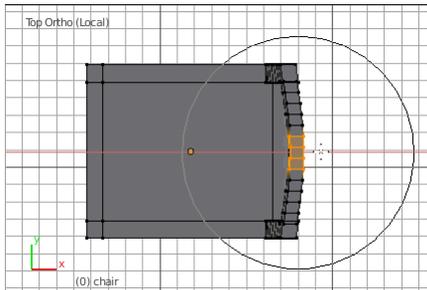


Figure 2-83 Center vertices of top of *chair* selected and moved

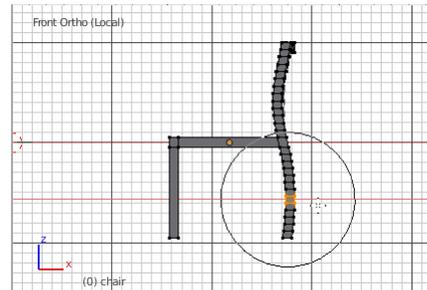


Figure 2-84 Center vertices of two legs selected and moved

11. Switch to **Object Mode**. Select *back001* to *back012* from **Outliner** using the SHIFT key and then press CTRL+J. Next, rename the combined mesh as *back*.
12. Switch back to **Edit Mode** and select the center vertices from *back*, refer to Figure 2-85. Make sure proportional editing mode is enabled. Next, move the vertices to get a curve, refer to Figure 2-85. Next, move the top vertices of *back* such that the top of *back* fits properly into the top portion of *chair*, refer to Figure 2-86.

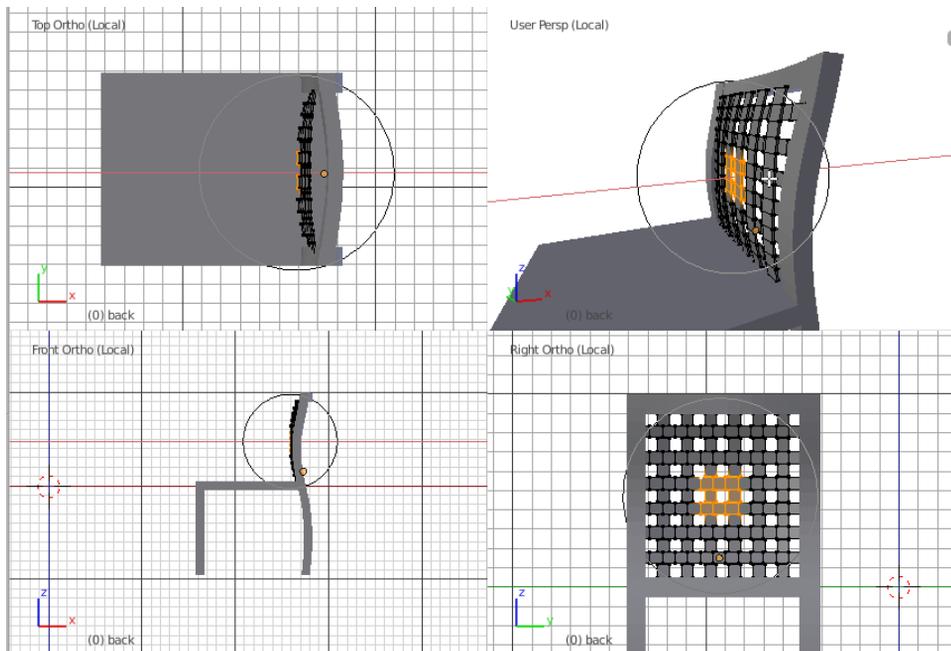


Figure 2-85 Center vertices of *back* selected and moved

13. Select *back* and then *chair*. Next, press CTRL+J; the selected parts are combined to form a single mesh and is automatically named as *chair*.
14. Change the color of *chair* as done for *table*, refer to Figure 2-87.

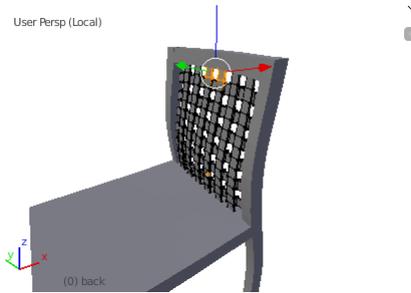


Figure 2-86 Top vertices of back selected and moved

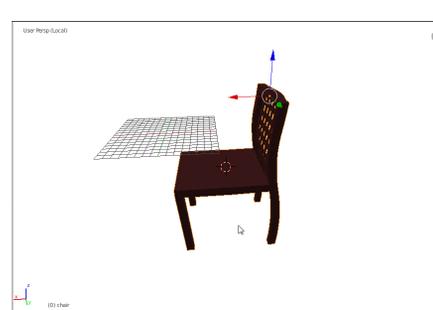


Figure 2-87 The chair displayed

Next, you will unhide the hidden table and make five copies of chair.

15. Press the / key on numpad; *table* is displayed. Next, create five copies of *chair* and align them around *table* in all the views. Figure 2-88 shows the dining table set in the User Persp view.

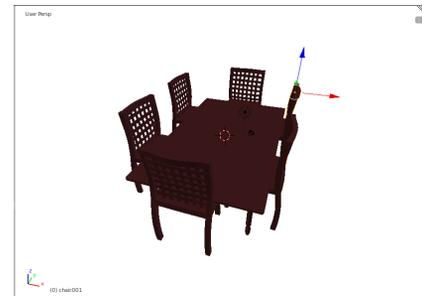


Figure 2-88 Dining table set

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 *c02_blender2.79_rndr.zip* file from www.cadcim.com. The path of the file is as follows: *Textbooks > Animation and Visual Effects > Blender > Blender 2.79 for Digital Artists*

1. Change the background color of the scene as discussed in Tutorial 1.
2. Choose **File > Save** from the **Info Editor** menu bar.
3. Adjust the view in the User Persp view. Next, choose the **Open GL still image render** button from **3D View Editor**; the rendered image is displayed in the **UV/Image Editor**; refer to Figure 2-47.

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 combinations of shortcut keys is used to restore the 3D cursor at the centre of the grid?
 - (a) SHIFT+S
 - (b) SHIFT+C
 - (c) CTRL+C
 - (d) SHIFT+D
2. The _____ editing mode is used for smooth deformation of object.
3. The _____ tool is used to duplicate an object as an instance of the original object.
4. The _____ border around the selected object indicates that the object is a part of the group.
5. In Blender, you can individually transform the objects in a group without affecting other objects in the group. (T/F)

Review Questions

Answer the following questions:

1. Which of the following combinations of shortcut keys is used to duplicate an object?
 - (a) SHIFT+S
 - (b) SHIFT+C
 - (c) CTRL+C
 - (d) SHIFT+D
2. Which of the following combinations of shortcut keys is used to select all layers in a scene?
 - (a) SHIFT+S
 - (b) SHIFT+~
 - (c) CTRL+C
 - (d) SHIFT+D
3. You need to press - key on numpad to isolate the selected object(s) in a scene. (T/F)
4. Selected layer with objects has small orange colored circle on its layer button. (T/F)
5. You need to press CTRL+C to group selected objects. (T/F)

EXERCISES

Exercise 1

Create model of a center table using **Object Mode**, refer to Figure 2-89.

(Expected time: 15 min)



Figure 2-89 The center table

Exercise 2

Create model of a small house using **Edit Mode**, refer to Figure 2-90.

(Expected time: 20 min)

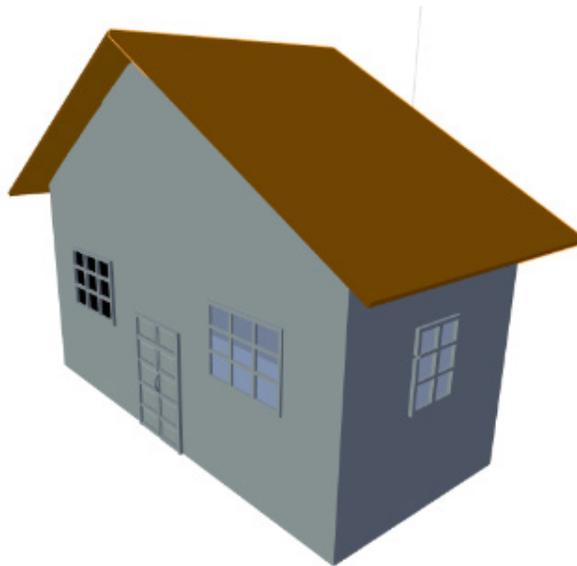


Figure 2-90 The house model

Answers to Self-Evaluation Test

1. b, 2. proportional, 3. Duplicate Linked, 4. green, 5. T