

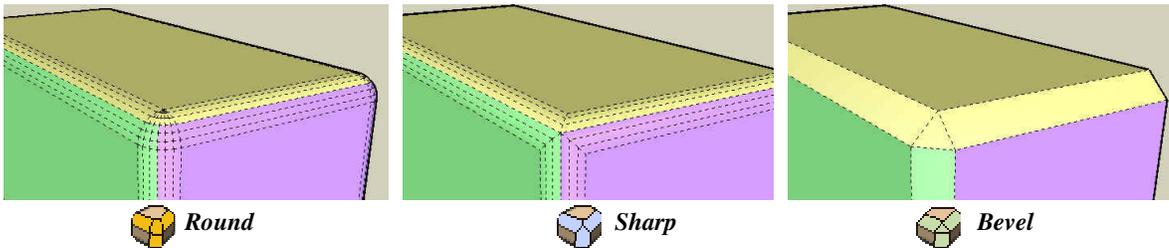
ROUND CORNER

3D-Rounding of Edges and Corners

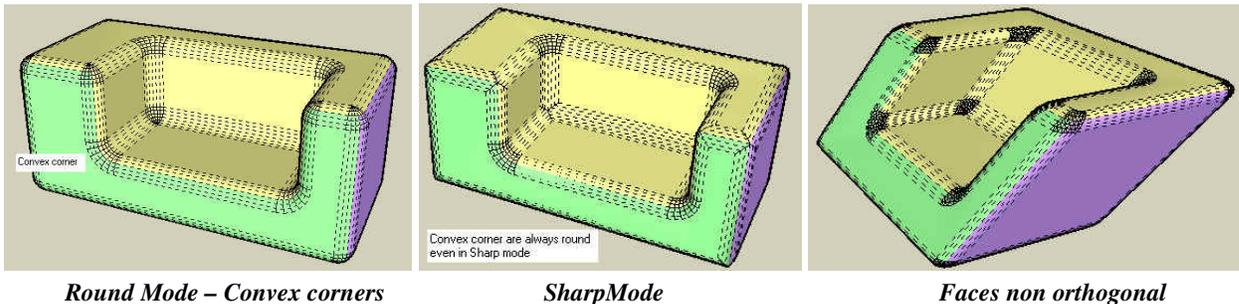
QUICKCARD – v2.1

1. Overview

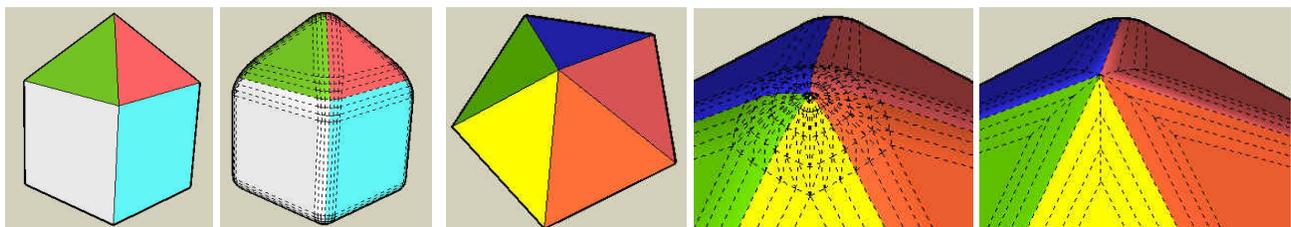
RoundCorner performs the rounding of the edges and corners of 3D shapes along a 2D profile, by default an arc of circle. It provides 3 modes: **Round corners**, **Sharp corners**¹ and **Bevel**:



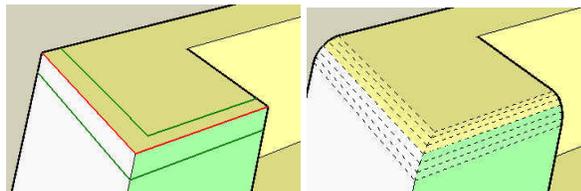
RoundCorner supports **convex corners** (always rendered as Round) and non-orthogonal edge faces:



RoundCorner also supports **corners with 4 or more edges**.



Finally RoundCorner handles rounding in a kind of **follow-me mode**:



CAUTION: you should keep in mind that the Round Corner mode is very greedy in generation of faces and edges. For a standard cube (8 corners), with rounding made of 6 segments, you would generate a minimum of $8 \times 36 + 12 \times 6 = 360$ new faces (possibly 680 when faces are not orthogonal and corners must be triangulated). In contrast, Sharp corner would only generate the rounding edges, with no corner, and create $12 \times 6 = 60$ new faces.

¹ Sharp corners was the only mode supported in my older plugin *RoundEdge* (by Bezier), which is therefore considered as version 1.0 of the present script.

2. Installation

NOTE: Although the script technically works in Sketchup 6 and 5, **it is advised to use it with Sketchup 7 preferably**: it runs faster, and it also cuts nicely existing coplanar edges on bordering faces.

- The plugin requires **LibFredo6 v3.2 or higher**, if you do not have it installed already.
- **Unzip 'RoundCorner 2.0.zip'**, by doing a *Select All* and then *Extract in the Plugins directory of Sketchup*, answering YES to all prompts for file overwriting, in order to make sure you reconstruct the folder hierarchy. NEVER change the name of files or move them from their folder. The footprint should be (Windows environment):

Name	Type
c:\program files\google\google sketchup 7\plugins\	Folder
LIBFREDO6_Dir_32	Folder
ROUNDCORNER_Dir_20	Folder
LibFredo6.rb	RB File
ZLoader__RoundCorner.rb	RB File

On Mac, the right directory for unzipping is:

Macintosh HD/Library/Application Support/Google SketchUp 7/SketchUp/plugins

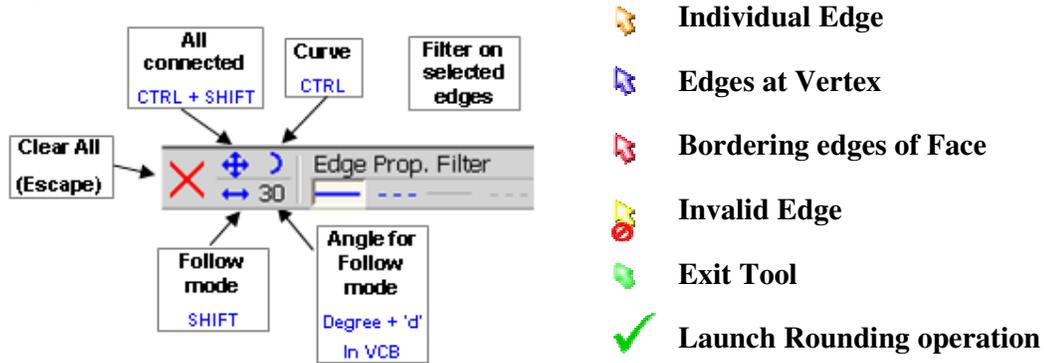
- **Language:** Initially *English* and *French*²
- **Menus:** by default, it is installed in *Tools > Fredo6 Collection > RoundCorner*
- **Icon toolbar:** by Default '*Round Corner*'. 3 icons are available: 
- **Default Parameters:** Plugin configuration and specific parameters, via dialog box.

As a general method to discover the script without reading the full documentation, check out the palette tooltips and the contextual menu (right click).

² Kind contributors can generate the translation in other languages via the menu '*Translation*' and publish the text file (extension *.lang*) on *Sketchucation forum*.

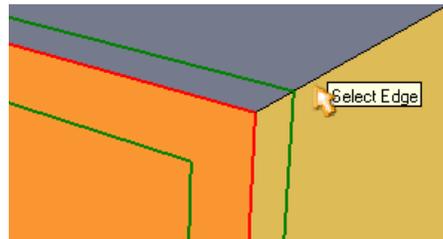
3. Edge Selection

RoundCorner works on a selection of edges in the top level geometry of the current model (i.e. it does not select inside groups or components). It includes an **interactive Selector** which allows selecting edges by picking them individually or by group (for instance, a curve), but also by picking faces and vertices. Edges must have exactly 2 faces. The script filters the edges according to their property (plain, smooth, soft, hidden), as configured by the user. By default only plain edges can be selected.



1) Selecting and Deselecting Edges by Mouse click

The general method is to click in the model to select and unselect edges. Selected edges will appear in **Red**, with borders in **Green**. At any time, you can change the selection mode and the parameters (using the palette, contextual menu or shortcuts), as described in next section.



Clicking on Edges

- The cursor turns into an **Orange arrow pointer**. You can select or unselect edges by just clicking on them (click down and release).

Clicking on Vertices

- The cursor turns into a **Blue arrow pointer**. You will select all edges at the vertex:
 - If all edges at the vertex are already selected, it will unselect them all
 - If only some edges are already selected, it will select all edges at the vertex.

Clicking on Faces

- The cursor turns into a **Red arrow pointer**. You will select all edges of the face. Note that:
 - If all edges of the face are already selected, it will unselect them all
 - If only some edges are already selected, it will select all the edges of the face.

When *Show Hidden Geometry* is Off, the face selection automatically extends to the **plain** edges bordering the surface (as in the default Sketchup Select tool).

When *Show Hidden Geometry* is On, the face selection automatically extends to the **'valid'** edges bordering the surface (if you only filter plain edge, the behavior is the same whether *Show Hidden Geometry* is on or off).

Double-click in the model

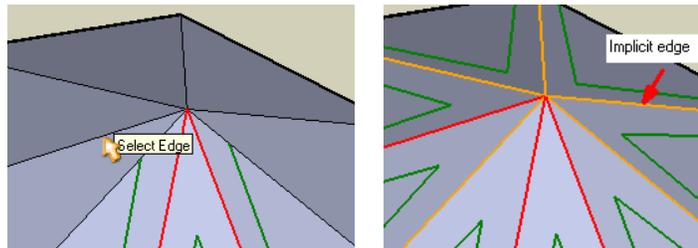
Double-click is a short cut to select all connected edges to the element click (vertex, edge or face) .

Invalid target

 When you mouse over an invalid target, for instance a group, a component, or an edge that is coplanar or does not have the required property, the cursor turns into a **Yellow arrow pointer** with a 'forbidden' sign. The tooltip indicates the reason for invalid selection.

Implicit inclusion of edges

When a Vertex has 4 edges or more, you can only select one, two or All edges. So when you click on the third edge, the script will automatically include all other edges, shown in **orange**.



Clicking in the empty space

 When the mouse pointer is in the empty space, the cursor will turn into a **Green arrow** (click to exit tool) if no edge is selected, or into a **Green check mark** if there are valid selected edges (Click to launch operation).

Clearing the selection

 Type **Escape** or click on the palette button

2) Selection modifiers

By default, the plugin selects individual edges. You can modify this default mode, as in HoverSelect.



CTRL alone: extend to **Curve** edges (if applicable)



SHIFT alone (Follow mode): extend to collinear and co-facial edges, as well as edges which are roughly in prolongation of the selected edge (angle < 30 degrees by default, but you can modify it **via the VCB³**). This mode also selects a curve by one of its edge.



CTRL + SHIFT alone: extend to **all connected edges** of the selected edge. This mode indeed includes the 2 others.

Note: Ctrl and Shift keys works

- in **Toggle mode** (quick down and up) which sets *permanently* the mode
- in **Modifier mode** (maintain down for more than 1 second while selecting), which only apply the modified mode while the keys are down.

³ Type the angle in degrees, followed by 'd'

4. Executing the Rounding

When you are finished with the selection, you can execute the rounding by 3 methods:

- 1) Type Return or Enter on the keyboard
- 2) Click in the empty space (the cursor shows a green check mark)
- 3) Click on the check mark button in the palette



When starting the operation, the cursor transforms into a **Green hourglass**. A progress bar is shown in the status bar. The cursor turns **Red** when committing the geometry (which can take long, a few seconds), and then **Blue** for the clean up part, usually short.

Due to the large number of faces created, the operation can take several seconds and up to minutes for models with numerous edges.

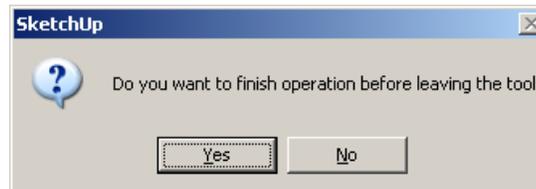
You can interrupt the operation at any time by:

- Clicking in the view port
- Typing **Escape**

After one or two seconds you'll be prompted for your choice:



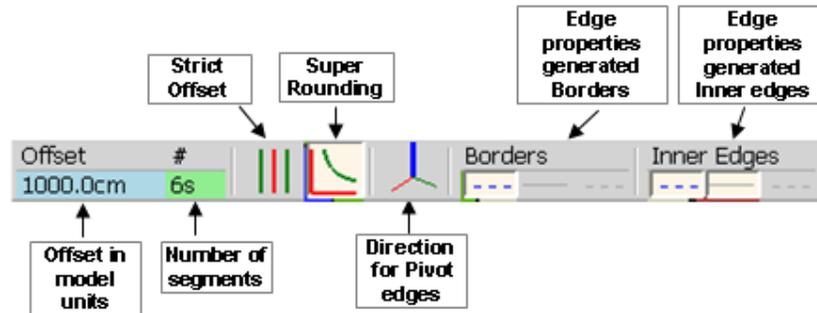
If you type a key which is a short cut to another tool, like Space, then you only have the option to abort or finish the operation before leaving the tool.



Performance is very sensitive to the number of segments used for rounding (because the number of created faces is square the number of segments!). Remember that Sketchup is subject to the syndrome of exponential slow-down.

5. Parameters

The script includes a number of parameters that can be configured by the user. All options are available via the VCB, the palette and/or contextual menu. Parameters are preserved across usage of the script.



Since version 2.1, parameters are preserved across Sketchup sessions. In addition, you have the possibility to store the current state of the parameters in memory slots, designated by letter A, B, ..., which are also preserved across Sketchup sessions.

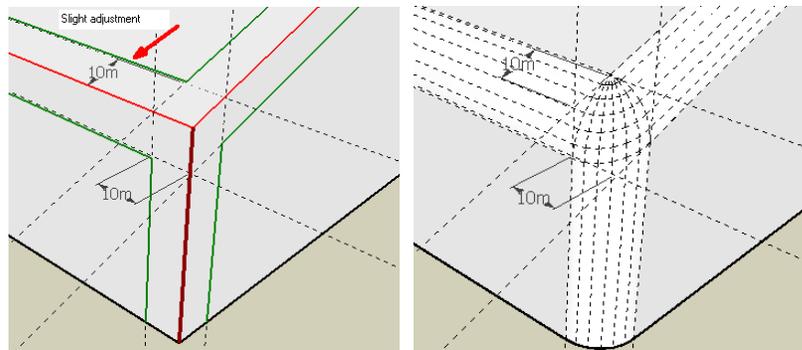
- Click on the small disk icon to Save the parameters
- Click on the letter (when Yellow) to restore the parameters



1) Parameter: Offset

Offset
10m

The offset is the **distance from the edge to the border of the rounding**. It is always given by reference to 2 orthogonal faces. If the faces of the edge are not orthogonal, the actual offset may have to be adjusted in order to align with the borders of the other edges at corners.



In version 2.0, the offset is uniform for all edges of the selection.

VCB: The offset value can be set in the VCB by typing the **number in the current model unit** (or indicating the unit after the number, like *3.2cm*). Formulas are accepted in the VCB.

Note: the VCB supports both comma and dot notations for decimal numbers, regardless of your system settings.

2) Parameter: Profile and Number of segments

6s

The rounding of edges is based on a 2D profile, which must be symmetrical. In version 2.0, the default profile used is an **arc of circle**. The profile is also specified by a number of segments (1 segment corresponds to a Bevel function).

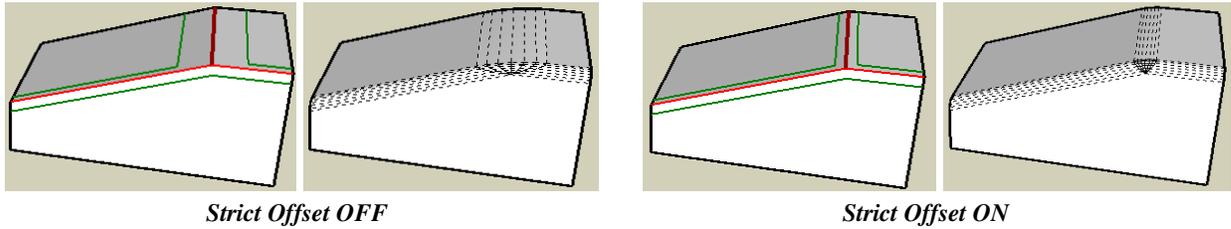
VCB: The number of segments can be typed in the VCB as an **integer followed by 's'**.

NOTE: it is advised to use an **even** number of segments in order to split correctly the texturing on faces.

3) Option: **Strict Offset** (key F4)



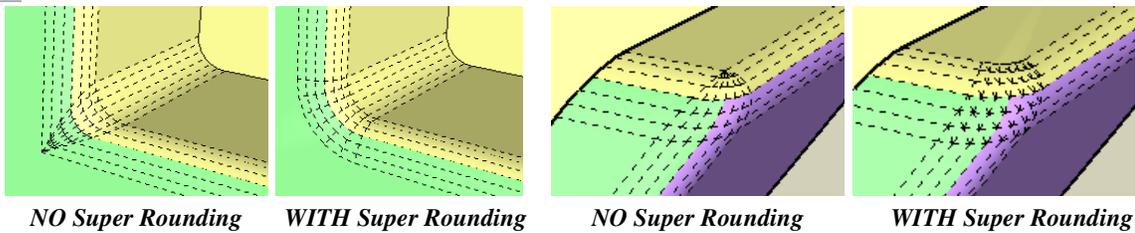
When the 2 faces of an edge are not orthogonal, the offset is automatically adjusted based on the angle between faces. The distance between the edge and the border can be larger than the nominal offset. In some cases, this may be too large:



4) Option: **Super Rounding** (Round Edges only) (key F5)



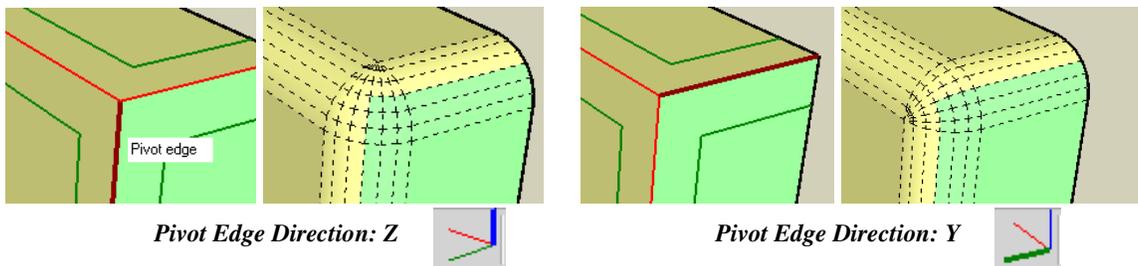
Easier to show on a graphic than to tell with words! The option is meaningful only for convex corners or corners whose faces are not orthogonal.



5) Option: **Direction for Pivot edges** (Round Edges only)

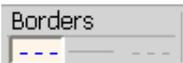


Pivot edges is a simple concept to reflect the orientation of round corners. They are indicated in dark red.



The Direction for pivot edge can be modified by typing an **Arrow key** to indicate the axis in the model. The current active direction is indicated in an icon located in the palette.

6) Option: **Edge property for created borders**



Edges forming the borders of roundings are created Soft (but not Smooth) by default. You can however alter this setting by selecting or unselecting the properties.

7) Option: **Edge property for created corners and rounding inner edges**



Edges forming the corner shapes and inner edges for roundings are created Soft and Smooth by default. You can however alter this setting by selecting or unselecting the properties.

6. Default Parameters

You can set persistently some parameters across Sketchup sessions via the Default Parameters dialog box.

1) Parameters and Options of RoundCorner

<i>Active Options at start up</i>	
Number of Parameter Savings designator (A, B, C, ...)	2
Number of segments for roundings	6
Filter on Edge selection	<input checked="" type="checkbox"/> Plain <input type="checkbox"/> Soft <input type="checkbox"/> Smooth <input type="checkbox"/> Hidden
Respect Strict Offset	<input type="checkbox"/>
Super Rounding (Convex and round edges only)	<input checked="" type="checkbox"/>
Main Direction for pivot edges (orientation of round corners)	Z
Properties of Border edges	<input checked="" type="checkbox"/> Soft <input type="checkbox"/> Smooth <input type="checkbox"/> Hidden

2) Edge Colors in preview mode

You can modify the colors of the preview mode:

<i>Colors for Edges and Borders</i>	
Color for Regular edges	Red
Color for Pivot edges	DarkRed
Color for Pivot edges at convex corners	Purple
Color for Pivot edges when Round	DarkOrange
Color for Borders	Green
Color for Implicit edges	Orange
Color for Excluded edges	Yellow

3) Parameters for Edge Selection

<i>Parameters for Edge Selection</i>	
Aperture for picking in pixel (0 means Sketchup default)	0
Edge Selection mode	Edge by Edge
Maximum Edge Angle for Follow mode (degree)	30.0

4) Configuration of the Plugin

You can also configure the integration of the plugin in Sketchup (toolbar in particular):

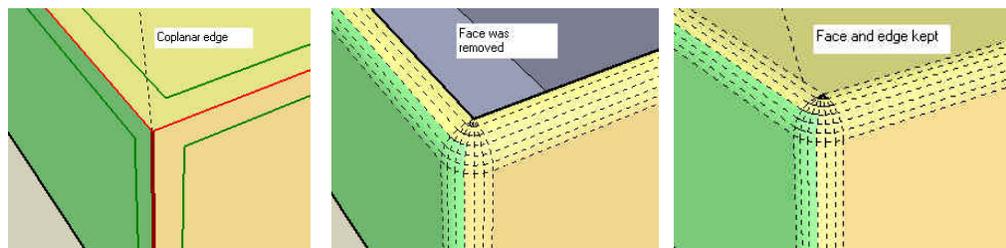
<i>Plugin Configuration</i>	
Folder for Alternate Icons, cursors and other images	<input type="checkbox"/> IMAGES_DanielS-2
Toolbar name	Round Corner
Icons visible in the toolbar	<input checked="" type="checkbox"/> Round Corner <input checked="" type="checkbox"/> Sharp Corner <input checked="" type="checkbox"/> Bevel
Top Menu	Fredo6 Collection (Sketchup - Tools)

7. Limitations – Known Issues

The variety of geometrical topology is such that RoundCorner may encounter situations where it cannot provide a solution. In such cases, the script will warn the user by a dialog box and a message.

1) Coplanar edges in Sketchup 6

In Sketchup 6, there is no automatic edge cutting as in Sketchup 7. Thus you may encounter problems with coplanar edges terminations at corners, usually with faces removed:



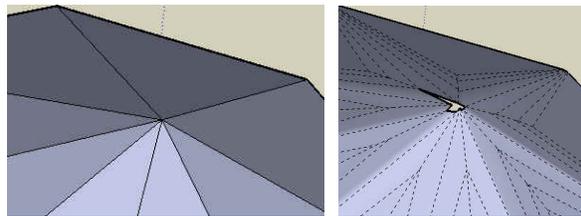
Original shape

Sketchup 5 or 6

Sketchup 7

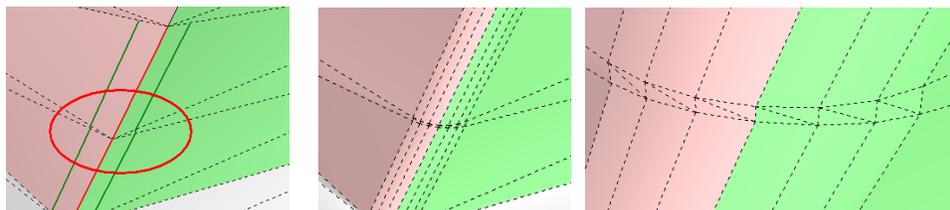
2) Sharp Corner mode when more than 5 edges at corner

Usually when the edges positions are not symmetrical and the option 'Strict Offset' is turned on, the script cannot build the sharp termination.



3) Triangulated shapes

When several edges meet at a corner on with triangulated faces, the script tries to connect the edges. But be aware that the result is not 'smooth'; this is because faces are not aligned.



4) Corners with 4 edges or more, among which some are convex

Here are some examples, provided by Daniel S. Not sure I can fix it.

