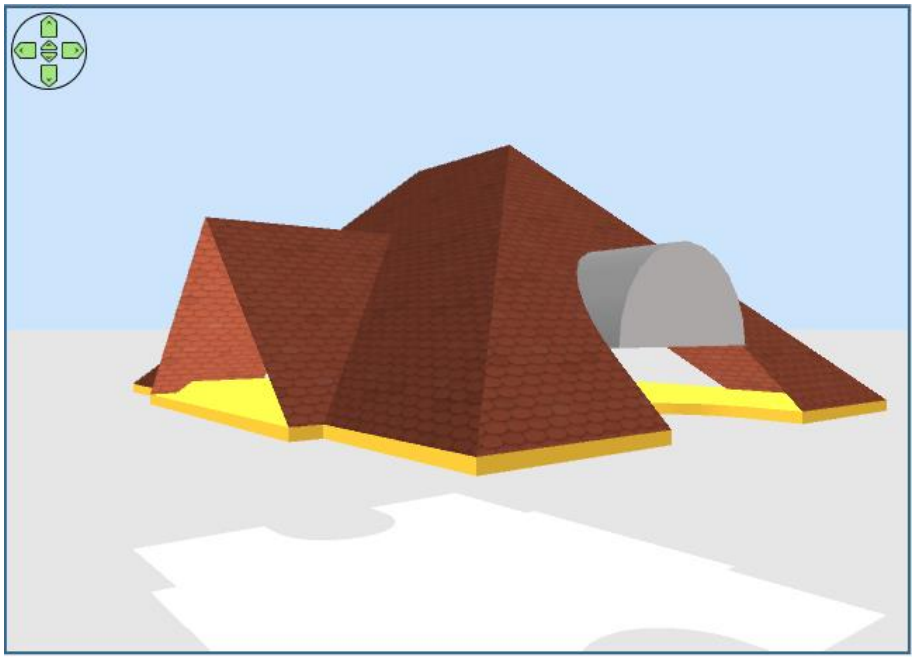
Sweet Home 3D



Tutorial

for

Roof Generator plugin

version 1.0

© Hans Dirkse & Dorin Vatavu - 2022-2023

Table of Contents

1 - Introduction 3
1 - Background 3
2 - Warning 3
3 - Copyright notice 3
4 - Software used 3
4a - Note 3
5 - Installation 4
5a - Verify installation 4
6 - Colors 4
2 - Quickstart 5
3 - Graphical interface 6
4 – Examples and exercises 8
4.1 - Basic L-shaped roof - sloping sides 8
4.2 - Basic L-shaped roof - gabled roof 13
4.3 - Roof example #3 - roof for patio 15

1 - Introduction

1 - Background

This plugin uses an implementation of the *Straight Skeleton* [Felkel's, Obdrzalek - 1998] algorithm implementation in Java, modified to construct weighted skeletons by "twak" (Kelly, Tom and Wonka, Peter) as part of a research project. [Video].

It uses one or more SH3D rooms as 2D closed polygons. Every **edge** of the polygon will generate a **roof face** (a plane) at a specific angle.
Sometimes, when **edges** are colinear and have the same angle, they will generate a single **roof face**.

2 - Warning

This version (v4.0) is different from previous versions with the intention to be simpler to users and produce results more close to real roofs. Key differences are:

- make roof faces invisible in the preview
- roof thickness could be used as is or to reproduce only the cover of the roof
- could compute roof for buildings with courtyards such as a school, stadium or prison

3 - Copyright notice

1. The *Roof Generator* software is licensed under The GNU General Public License
2. Some of the textures in the images were found on the internet. Copyright belongs to their respective creators.
3. For copyright reasons the textures and models used in this tutorial are only those accepted as free from SH3D.

4 - Software used

1. **Sweet Home 3D** version 7 and above - © Emmanuel Puybaret
   - *Preferences* are set to use **decimal values**
2. **Roof Generator** plugin version 4 - © Dorin, © Daniels118
3. **Autodimensioning** plugin version 1.5 - © Dorin
4. **AdvancedEditing** plugin version 1.7 - © starrunner

4a - Note

This is a preliminary version of this tutorial.

The Roof Generator plugin is under heavy development. The last published version may be higher than the one used here (v4.0).
This tutorial will be updated in the future to reflect changes in features and user interface.

5 - Installation

A plug-in can be installed by double-clicking on its SH3P file.

Under Linux, if it doesn't work, install it with the Terminal command
`path/to/SweetHome3D path/to/plugin.sh3p`
or copy the SH3P file in the subfolder
`/home/[user_name]/.eteks/sweethome3d/plugins`
of your user folder.
For more information about installation please read here.

5a - Verify installation

- Click Help → About → Libraries and check the section *Plugins*
- Here you can verify that the plugin has been installed and check the correct version number
- Clicking on a plugin will open the plugins folder. Verify that you have only one file of GenerateRoof.sh3p.
  - Tip: Some operating systems (e.g. Windows) don't overwrite existing files and instead rename them like GenerateRoof(1).sh3p GenerateRoof(2).sh3p, etc. **Remove ALL** (including GenerateRoof.sh3p) and reinstall the last version.
- Click *Tools → Plugins manager*
  - Only if you have this plugin installed.

6 - Colors

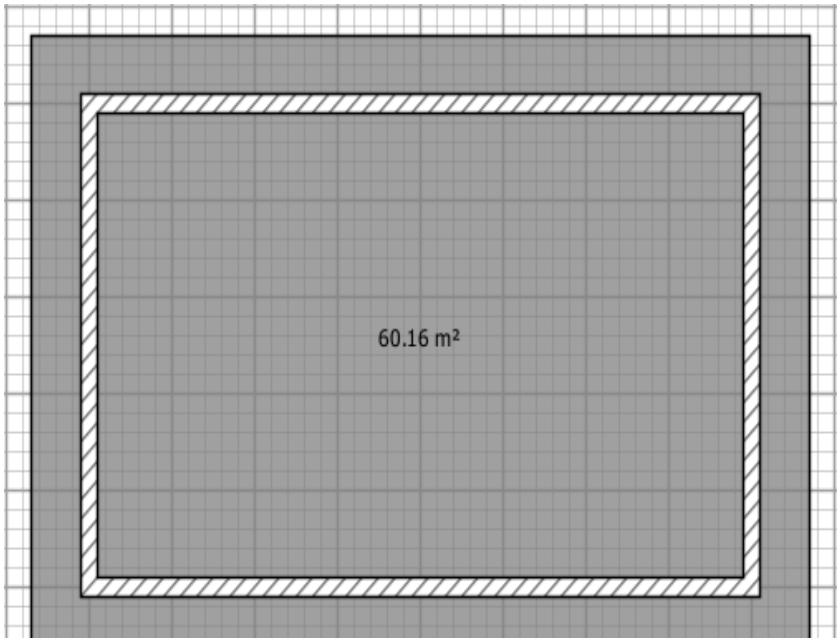
blue text = menu selection in SH3D
blue italics = selection in pop-up window
underlined = use CLICK to follow the link

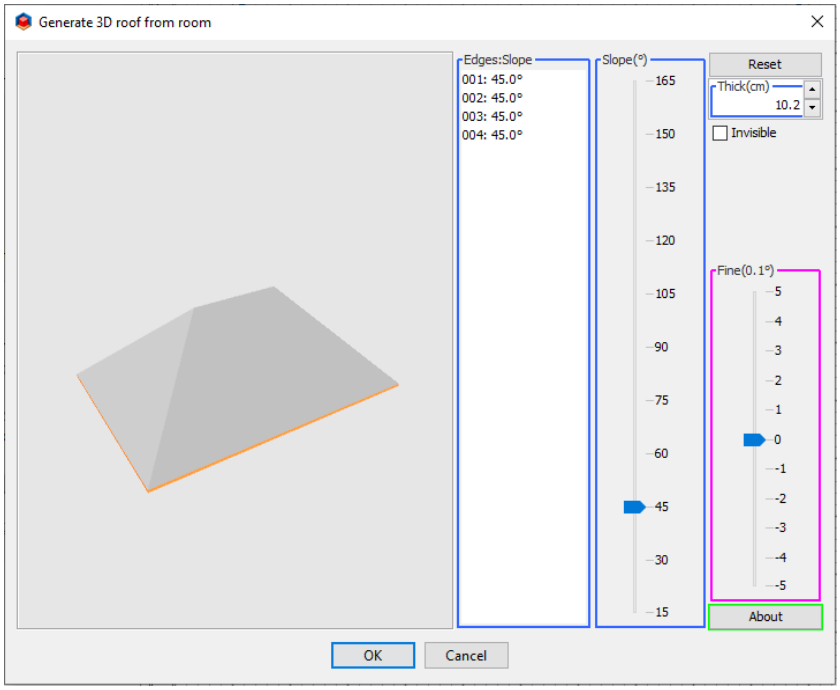
2 - Quickstart

The simplest way to use this plugin:

1. ***draw a room*** that covers the area where you want a roof, or use a suitable existing room
2. ***select the room***
3. select Tools » Generate roof…
4. ready

The rest of this tutorial elaborates on this basic procedure.





3 - Graphical interface

Preamble

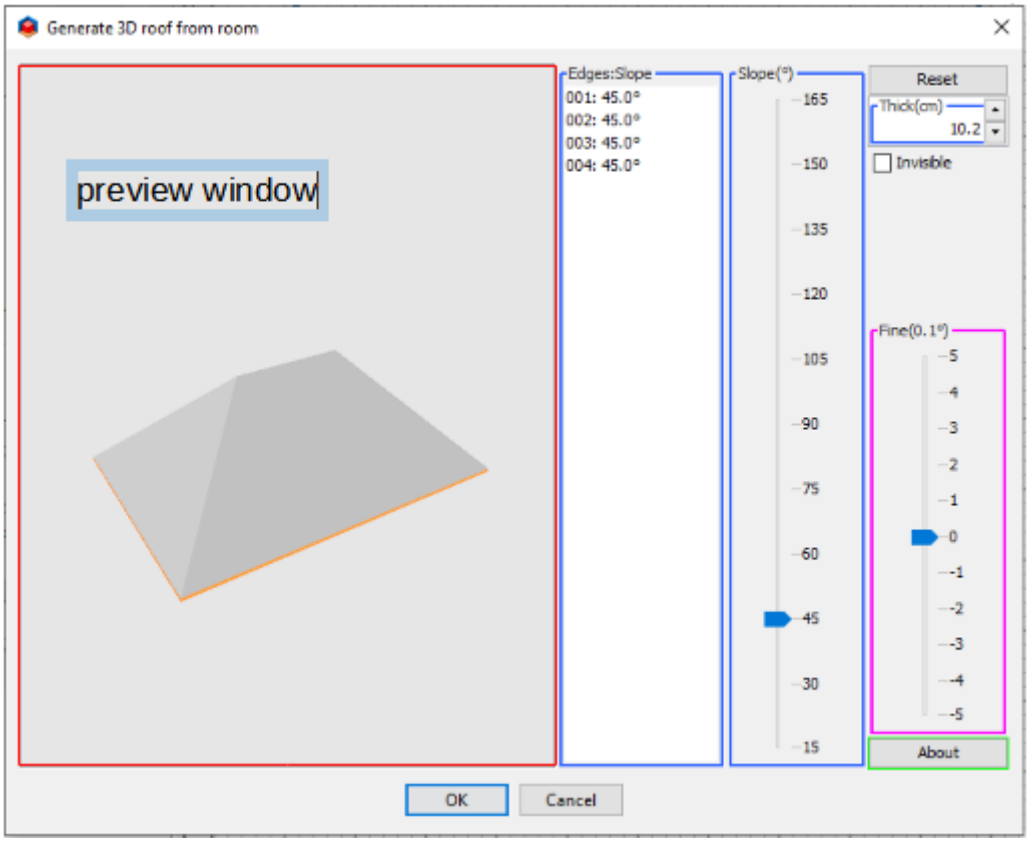
- Every edge of a roof projection will generate a roof face;
- The selected edge(s) are represented in the preview with a thin red line under the border;
- When two or more edges are co-linear and have the same slope, they will generate roof faces on the same plane and may* appear as a single face in the preview (*If coplanar faces are separated by other shapes, they won't merge into a single face.);

- In such a case, when selecting a face in the preview, all the edges that generated it will be selected in the list of edges and as red thin lines on the preview;
- In this case, you can select a desired edge, change the angle (slope) to separate corresponding face from others.

Navigation

This plugin tries to respect the general rules of use:

- on preview CTRL+click to select multiple faces
- on the *Edges:slope* list just like on any other list:
  - SHIFT+click to select a range of elements;
  - CTRL+click to select multiple individual items.



Preview window

- Use your mouse to rotate the view
- Click on a face to select it;
- By holding **CTRL** you can select multiple faces at the same time.
- Clicking somewhere outside the roof to deselect all.

Edges: slope

- Shows the edges which generate faces of the roof and their slope angle
- By holding **CTRL** you can select multiple individual edges at the same time.
- By holding **SHIFT** you can select a range of edges.

Slope (º)

- Here you can set the slope of selected edges in **1**º steps. When moving the indicator the value of the slope will change.

- When focus is on the ***Slope*** slider, you can use the **UP** and **DOWN** arrows to increase/decrease the slope value.

Fine (0.1º)

- Here you can increase or diminish the slope of selected edge(s) in **0.1**º steps. When moving the indicator the value of the slope will change.
- When focus is on the ***Fine*** slider, you can use the **UP** and **DOWN** arows to increase/decrease the slope value.
- For some values you have to use a combinations of ***Slope*** and ***Fine*** like this: E.g.: If you want 37.7º you have to set ***Slope*** to 38º and ***Fine*** to -3.

Thickness

- This sets the thickness of the roof between the limits of approximately 2.5 to 40 cm (1”~16” inch).

Invisible

- Make selected face(s) invisible/visible, e.g. to look underneath the roof.

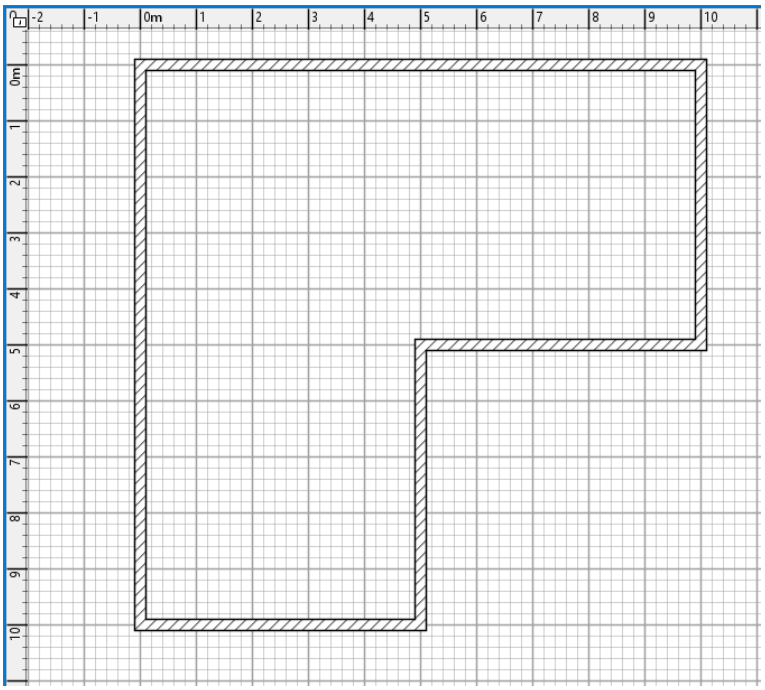
Reset

- Clicking the button will:
  - resets all slope angles to 45º,
  - the thickness to 10,2 cm (4” inch)
  - makes all face visible.

4 – Examples and exercises

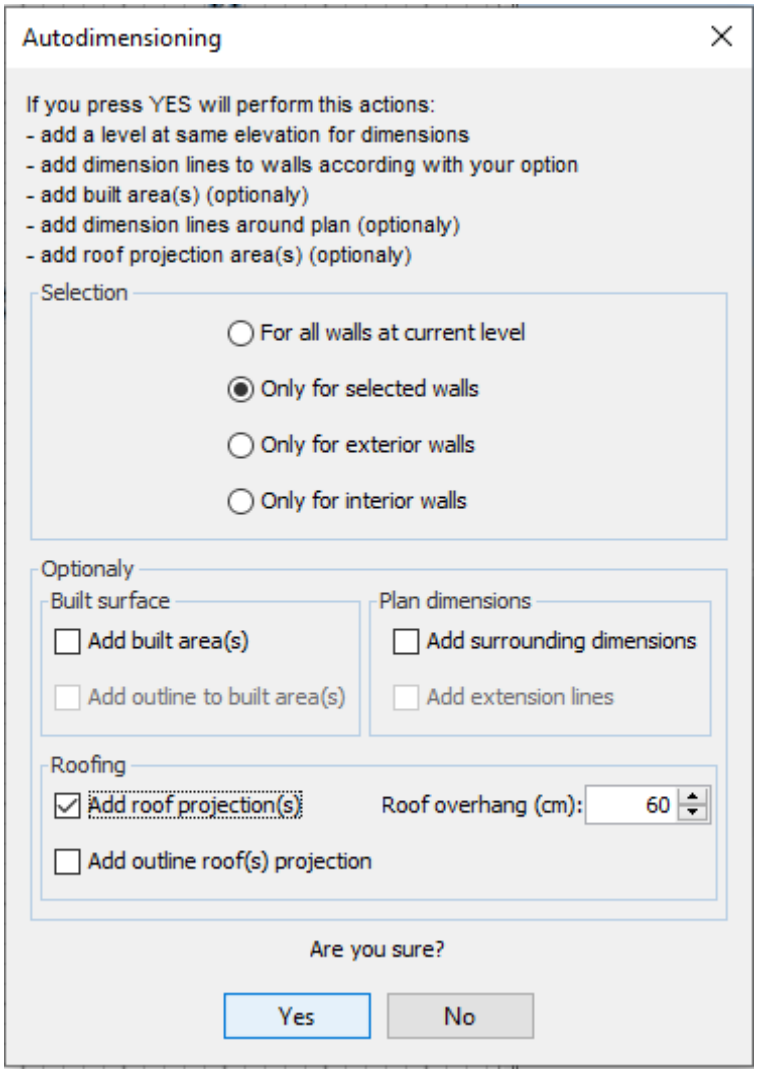
4.1 - Basic L-shaped roof - sloping sides

Step 1
If you have a suitable room, you can skip this step and proceed to step 3.



Draw a basic house
coordinates: 0,0 - 1000,0 - 1000,500 - 500,500 - 500,1000 - 0,1000

Step 2

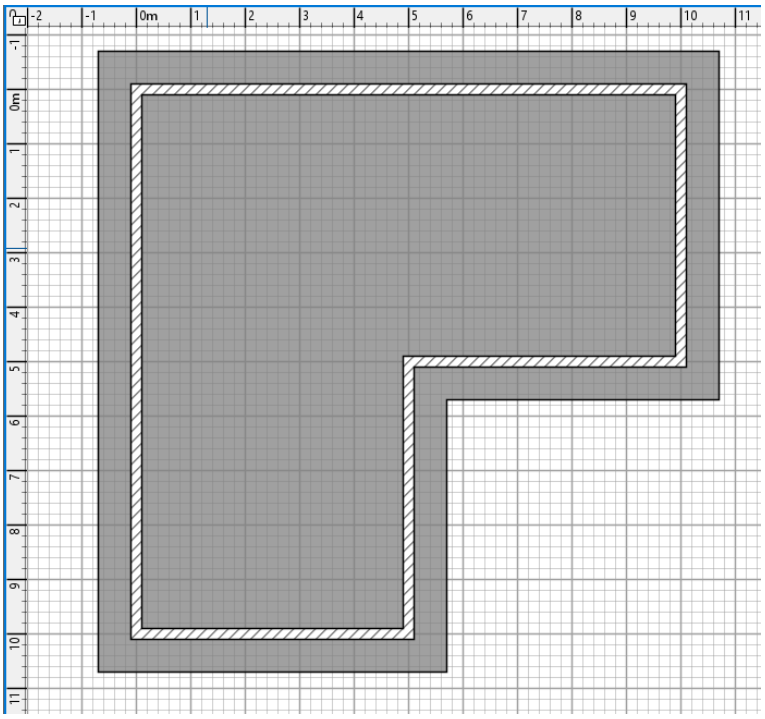


Select Tools » Autodimensioning
Select *Only for selected walls* (**without** any walls selected if you don't need dimensions)
Check *Add roof projection*
Set the desired *Roof overhang* *(standard = 60 cm)*
Click *Yes*

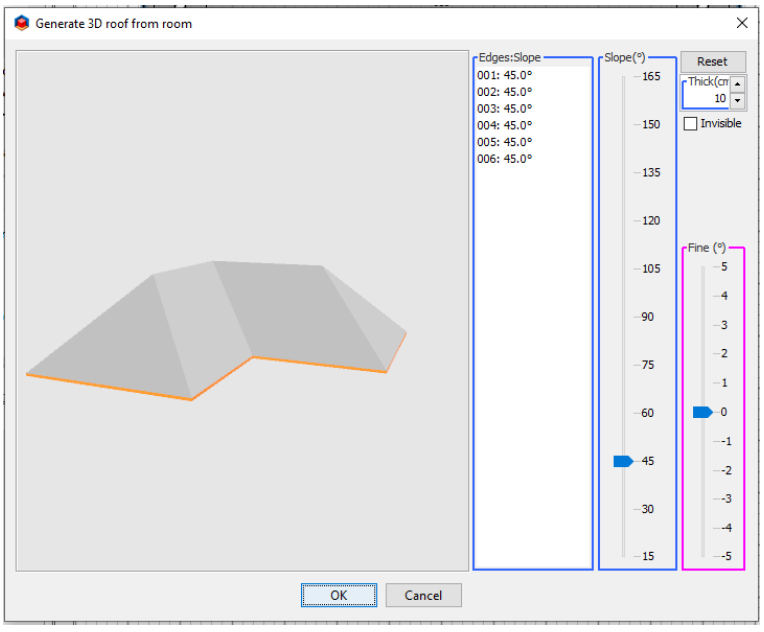
The resulting room will be used as the basis to calculate the roof.

Step 3

- Click the newly created room to select it



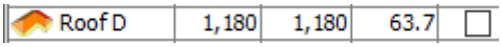
- Select Tools » Generate roof…



Above you see the roof resulting from the room made with the coordinates in step 1.

- Select some faces and change their slope (if you wish) like this:
  - e.g. select all faces **except** the two triangle faces;
  - set their slope at 38º .
- Click *OK* to accept the roof.
- The pop-up window closes.

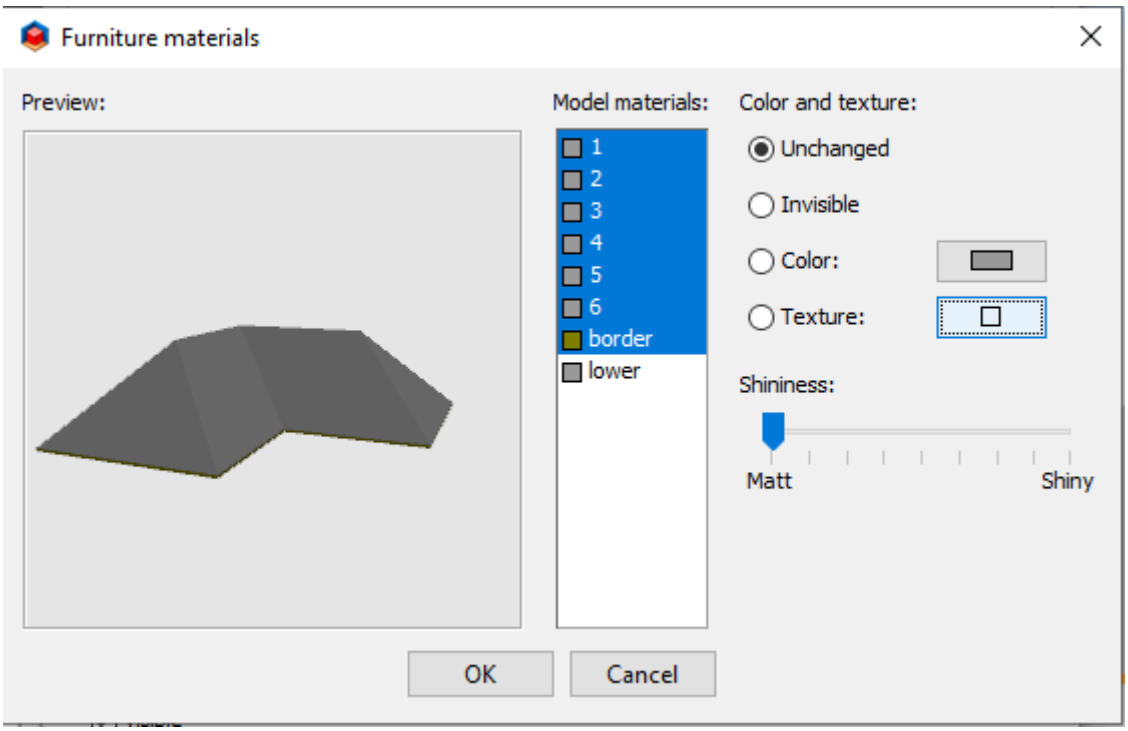
- The newly created roof appears in the 3D window, and in the furniture list.



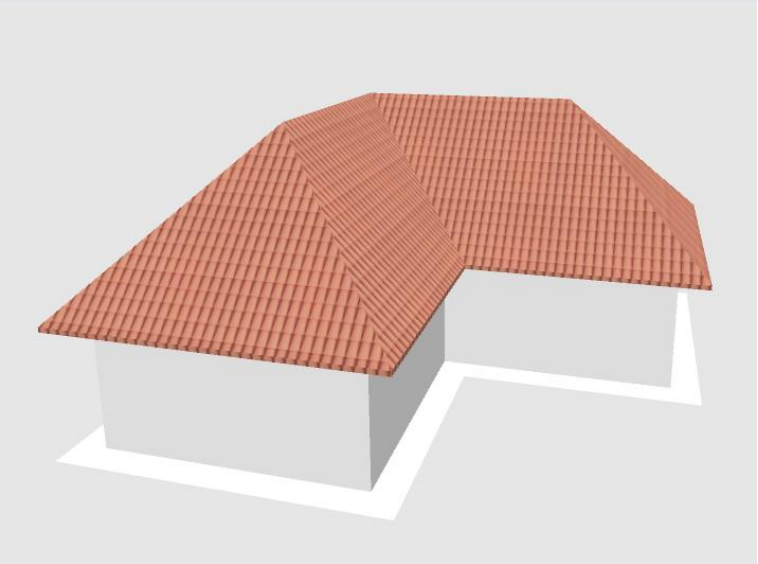
Step 4 - Apply textures

To apply textures to the roof:

- Select the roof (if it's not already selected)
- Select *Modify furniture → Materials: → Modify → Materials*
- *Select all or only some of the roof faces (in this case all + border)*
- *You could select individual faces and set different individual texture for each if you want a multicoloured roof.*
- *Set texture for selected faces*



- Select the desired texture(s) or color(s) to apply to all roof sides.



- The finished roof with texture applied.

4.2 - Basic L-shaped roof - gabled roof

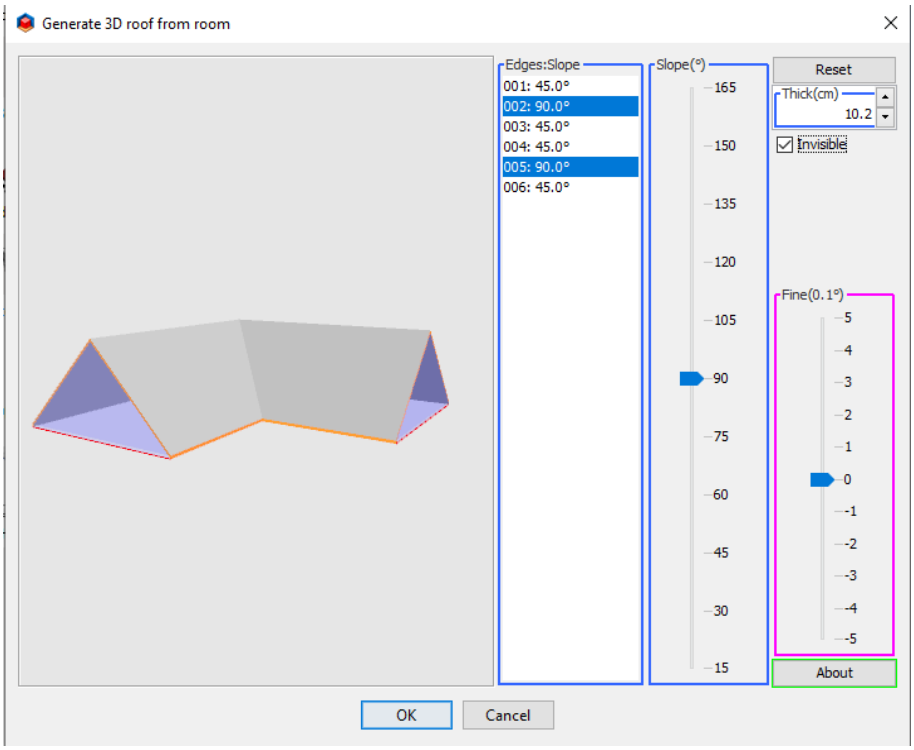
Using the previous example, we can easily change the style of the roof.

Select the level with roof projection (i.e. the room) and select it again

or

Select the previously generated roof.

- select Tools → Generate roof...
- the previous roof will be reloaded and you will be able to modify it
  - select the triangular faces and set their slope to 90º
  - with these faces selected, check the *Invisible* check box

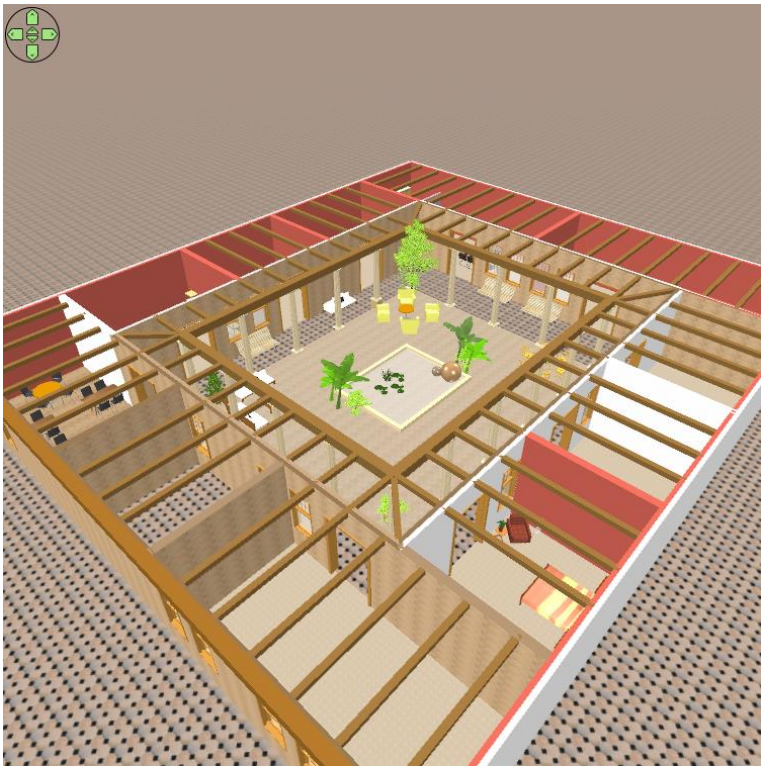


- Click **OK** to accept the roof;
- The selected roof will be replaced.

- You will have to repeat **Step 4 - Apply textures** in the previous example.

4.3 - Roof example #3 - roof for patio

This example will produce a roof for an inner courtyard, such as you may find in a Morrocon riad or a Spanish colonial style house. The house (without the roof) could look something like the picture below.



This is not a very complicated process, and once you understand it, it is pretty straightforward. However, it does involve temporary walls and rooms. Let's start

What will we do:

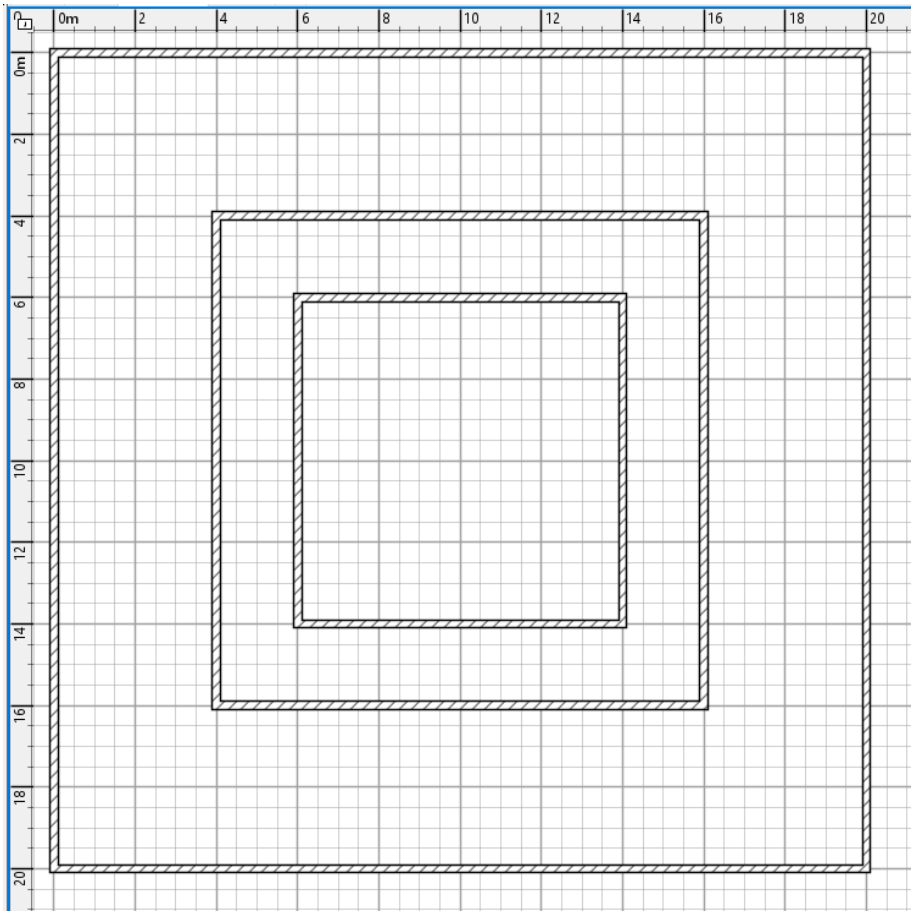
- draw a 20x20 meter house with a 12x12 meter courtyard;

- draw a 2 meter wide walkway around the courtyard, covered with a sloping roof.

Step 1 - Draw the walls

- set height for all walls to 300 cm
- coordinates from top left - outer walls of house
  - 0,0 - 2000,0 - 2000,2000 - 0,2000
- coordinates from top left - inner walls of courtyard
  - 400,400 - 1600,400 - 1600,1600 - 0,1600
- coordinates from top left - temporary walls of walkway and roof boundary
  - 600,600 - 1400,600 - 1400,1400 - 600,1400

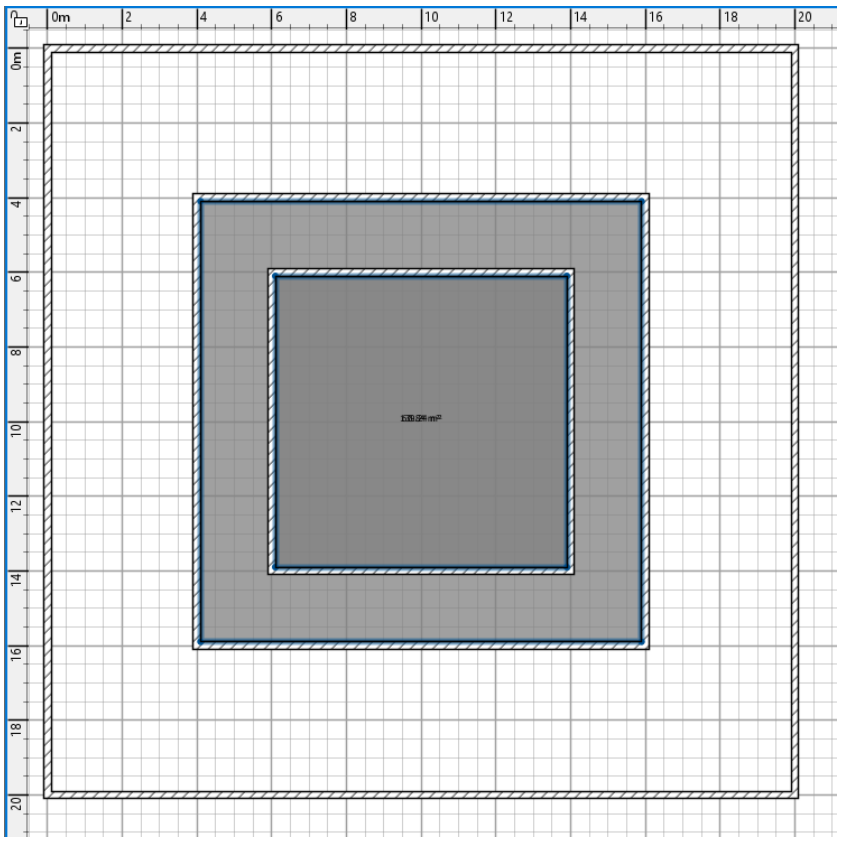
This is what it should look like



Step 2 - Draw the rooms

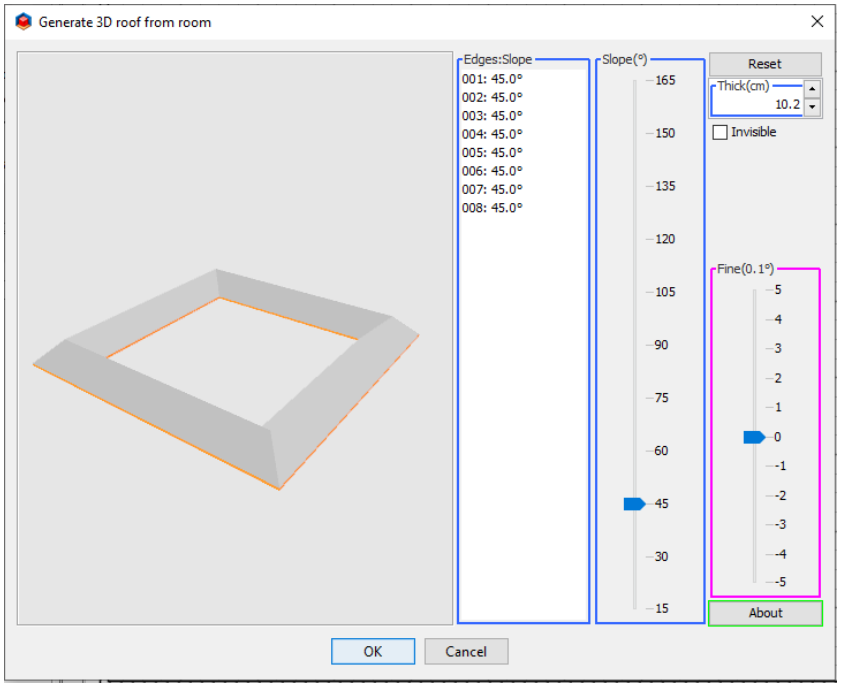
Draw the two rooms that will form the final roof:

- select the room tool and double-click in the space between the two inner walls to create a large room.
- now double-click in the inner space to create a smaller room on top of the first room.
- this should produce two rooms as in the picture below:



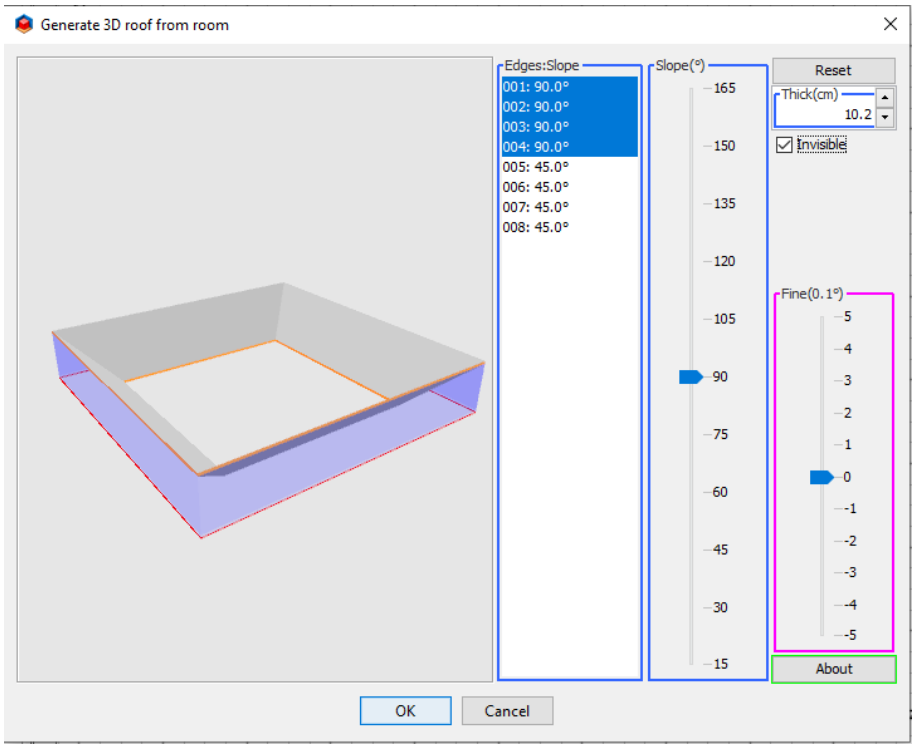
Step 3 - Draw the roof

- Select the outer room and the inner room
- Click Tools - Generate roof...
- Result - your roof

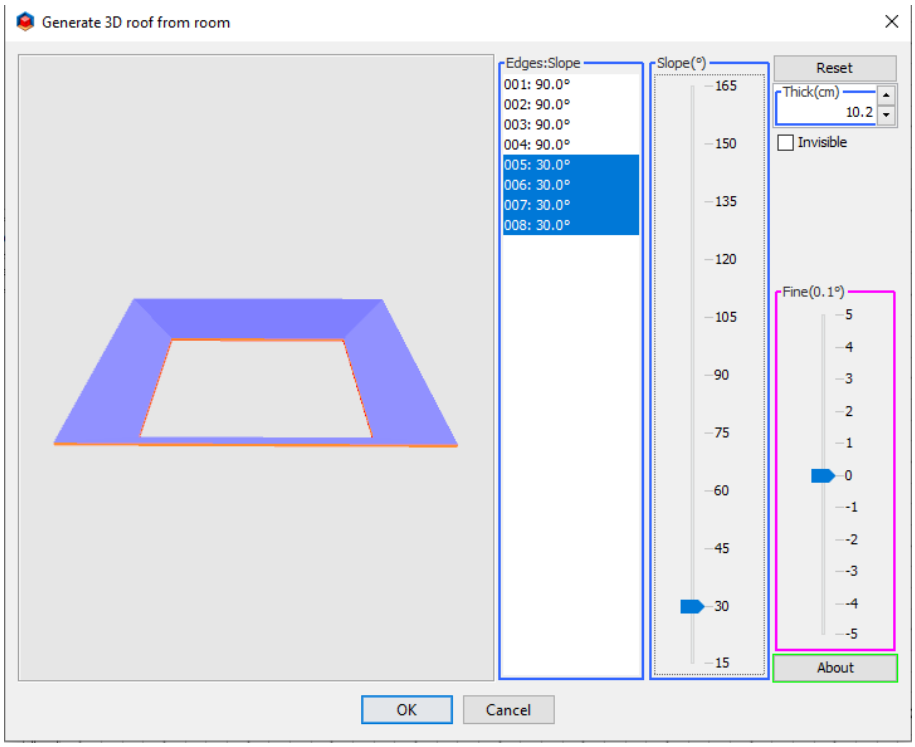


Step 4 - Make it fit

- Set the outer slopes to 90º - then make them invisible

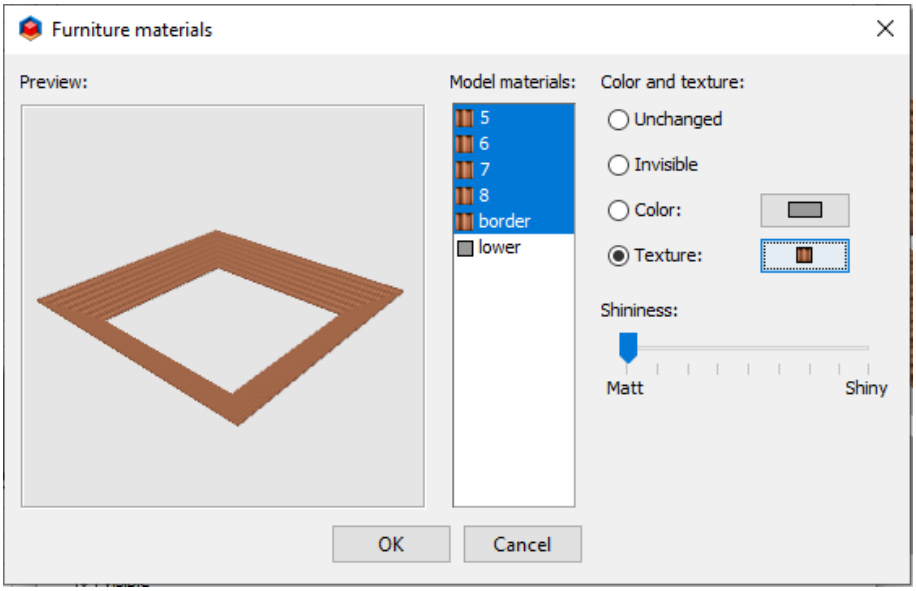


- Set the inner slopes to 30º



- You can now delete the temporary walls.

Step 5 - Add textures



Step 6 - The result

With some added work, it could look like this...