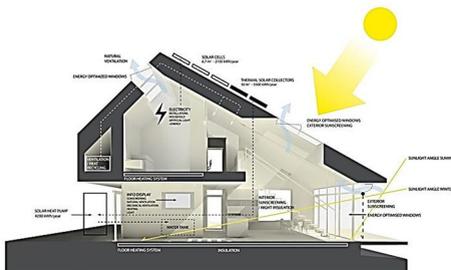# Basic tools

House for Living-2008
Arh. AART Architects

" Home for Life is designed as the world's first Active House and sets new standards for combining energy-efficient solutions with a healthy indoor climate."
*AART Architects, DK*

In this tutorial you will study how to:

- Create and edit walls
  - o Wall settings
  - o Wall intersection
  - o Place openings inside walls
- Create and edit slabs
  - o Slab settings
  - o Create holes in slabs
- Manage curtain walls
- Create and edit stairs
- Create and edit roofs
  - o Roof settings
 - o Trim walls with roofs
  - o Clean intersect roofs

Set the project units (cm) and the dimension units (m with 2 decimals) (OPTIONS»PROJECT PREFERENCES»WORKING UNITS & LEVELS, DIMENSIONS)

In STORY SETTINGS (CTRL+7) set the stories height using the following dimensions:280, 600 and 600 cm. The values of the upper stories are higher for a better plan visualization.
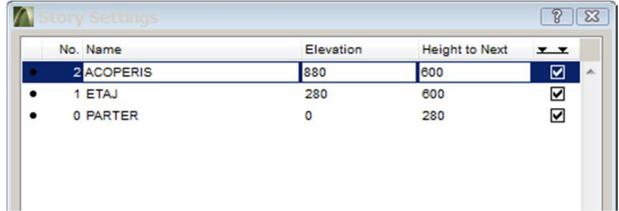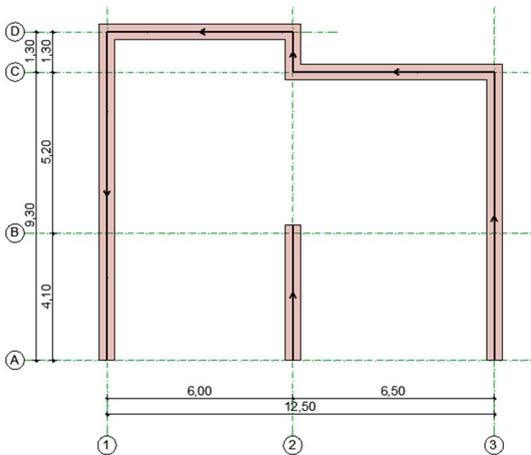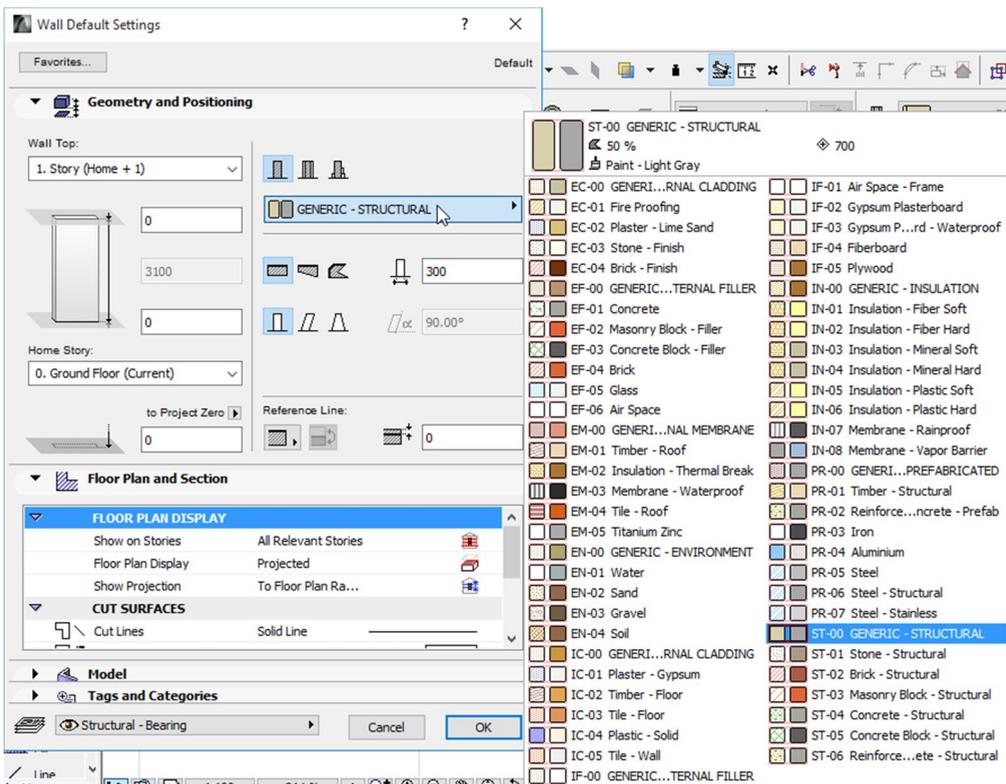
Set the drawing scale (1:50)

From DESIGN»GRID SYSTEM, create the following grid. Check DIMENSION LINES şi TOTAL options

.
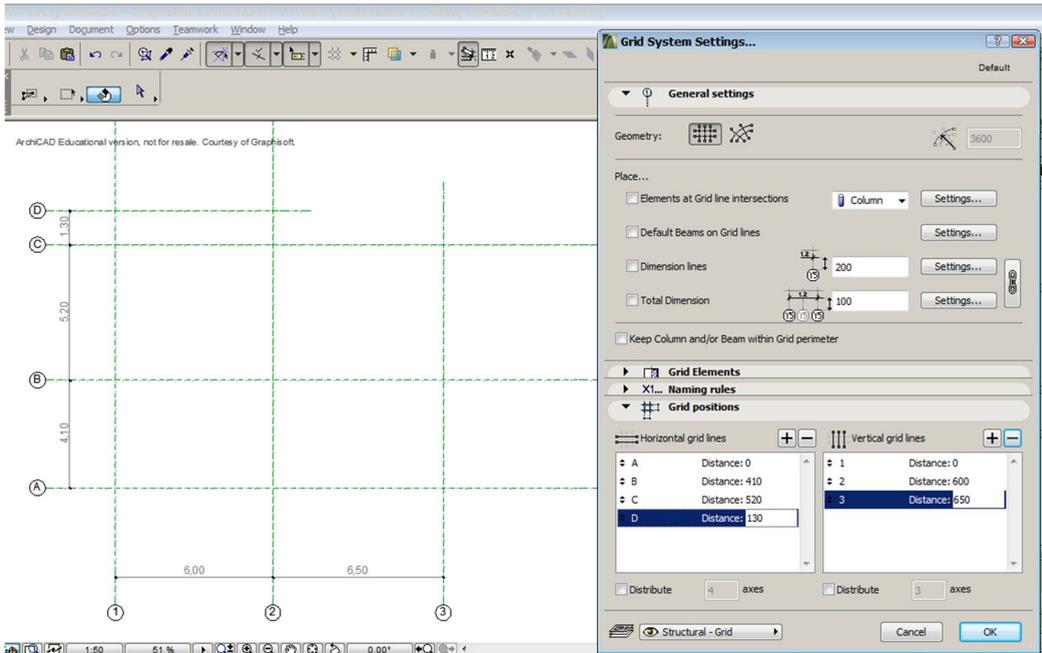
WALLS AND OPENINGS

Open the wall setting window and make the following settings: height – 280, thickness – 50 cm building material – GENERIC STRUCTURAL. Use the middle vector construction style of the wall

Draw the walls on 3, C, 2, D, 1 axes as shown below.Drag a copy of the wall from axis 3 to axis 2 and stretch it to 435 cm.
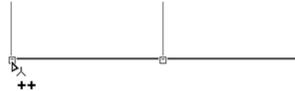
You can use DRAG A COPY or drag multiple copies commands.

DRAG A COPY   **DRAG MULTIPLE COPIES**
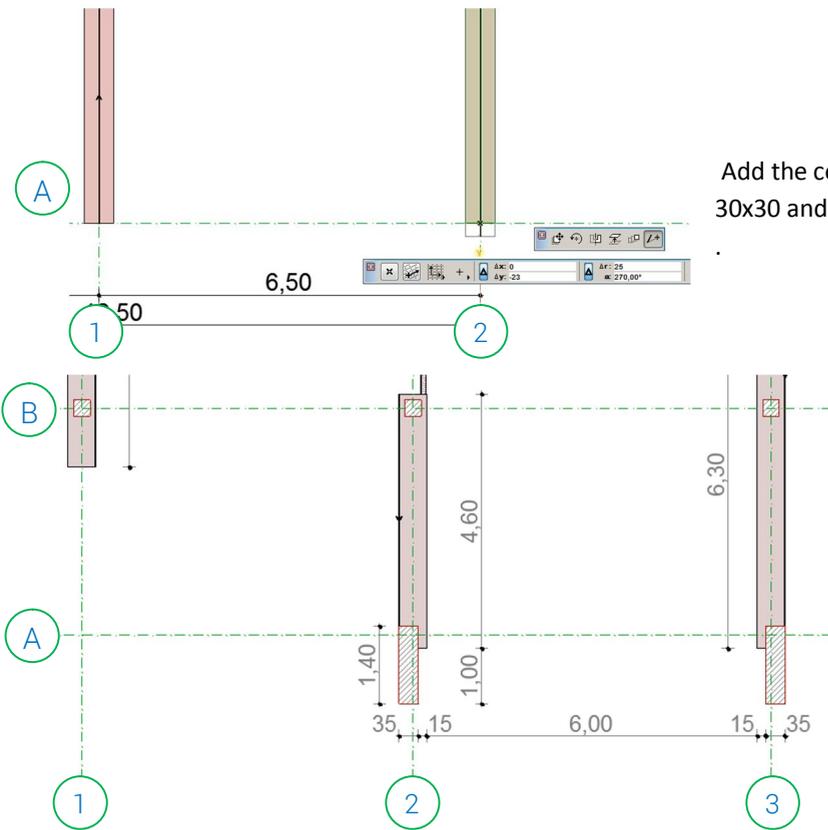CTRL+D urmat de CTRL   CTRL+D urmat de CTRL+ALT

In order to adjust dimensions, stretch them using CLICK& DRAG, and pressing SHIFT (for vertical and horizontal snapping). Press R in order to manually insert the dimensions. Stretch the walls as following:

- Wall from axis 2and 3 – 25cm towards the exterior
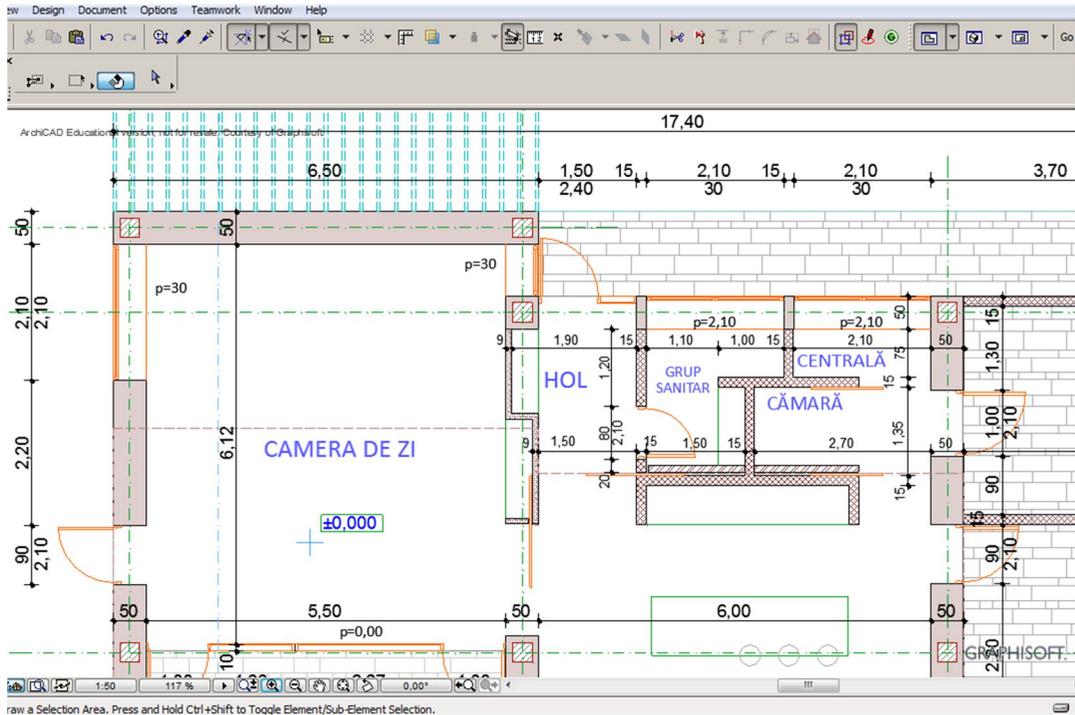- Wall from axis 1 – 305cm towards the interior

Add the columns as shown below: 30x30 and 35x140 cm, height- 280.

.

Draw the plan, using 9cm gypsum plasterboard (IF 02 GYPSUM PLASTERBOARD) and 15cm filler light concrete blocks (EF 03 CONCRETE BLOCK - Filler) partition walls
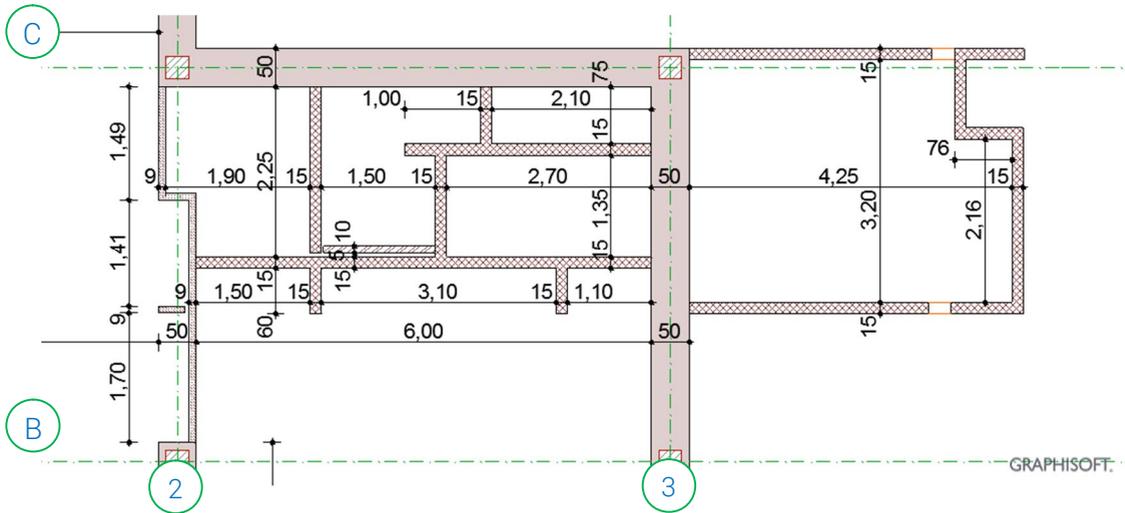
Insert the openings according to the dimensions shown below.

For the main entrance choose the door with sidelight and a transom placed 30 cm from the top edge.
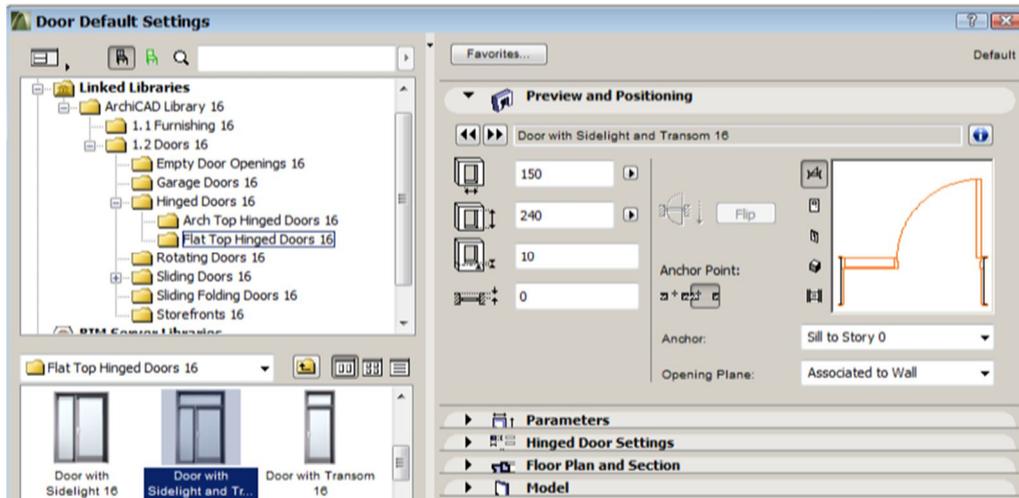

CURTAIN WALLS

Create the curtain walls setting the height to 240cm.
After you select it, enter the 3D curtain wall settings
:

- In the SCHEME section
  - Keep a sigle 120cm primary gridline, eliminating others by pressing the "-" button
  - Keep the two secondary gridlines having 210cm, and 30cm
  - To convert the opaque panels in transparent ones click inside the shaded rectangles from the preview section
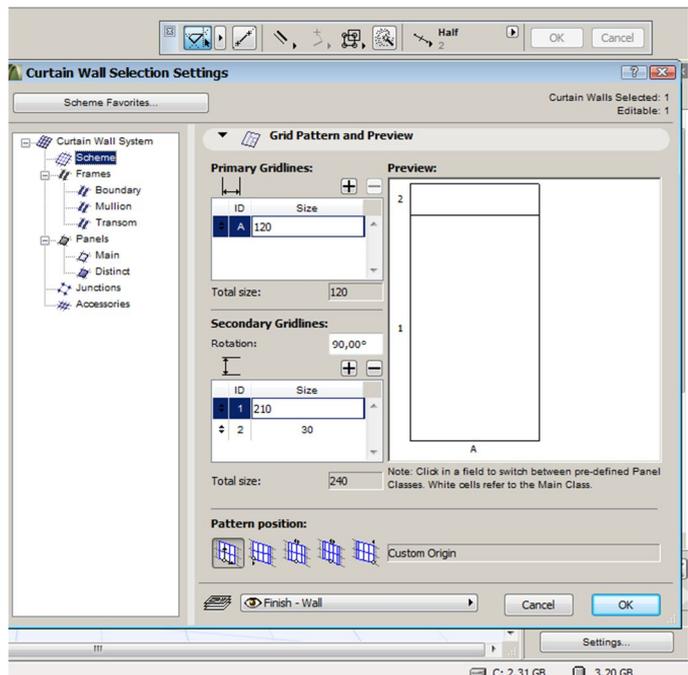
- In the FRAMES section set relative the vertical and horizontal frame dimensions.

Element Dimensiune	a	b	h
• Boundary	8	20	15
• Mullion	5	20	15
• Transom	5	10	11

Insert the doors in the panels according to the image. In the 3D window, select the side panels, then set them to CW DOOR 19 panel type. By pressing CTRL+T enter the settings of the right panel, set the SIDE HUNG MIRRORED opening type. This action will mirror the opening type of this door.
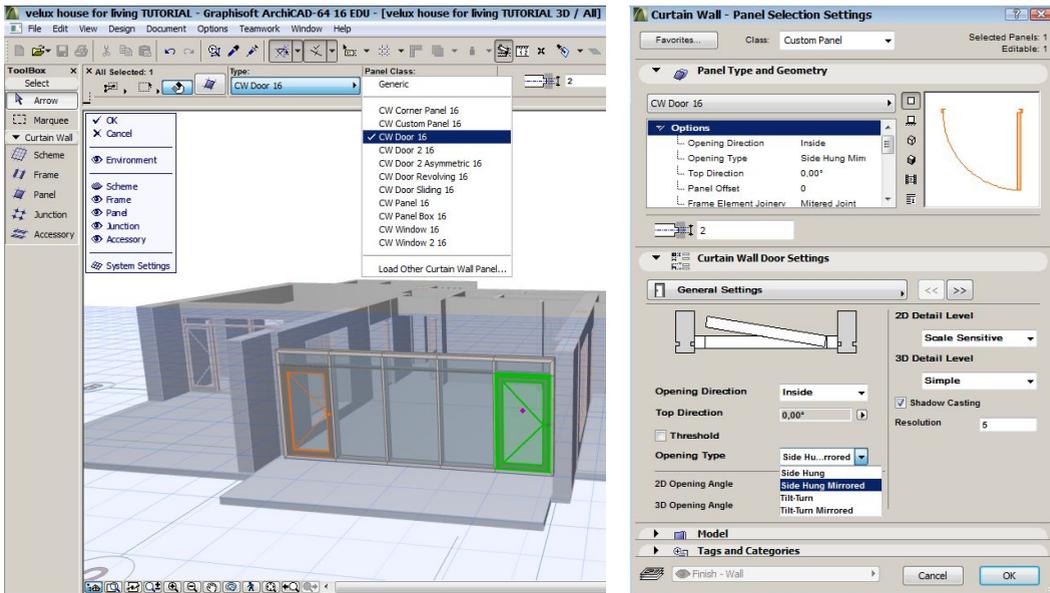

.
Copy the curtain wall to the B axis using the right interior end as an anchor

Enter the 3D edit window and close the visual layers of the curtain wall, leaving open only SCHEME and ENVIRONMENT.

Adjust the dimension of the curtain wall by moving the left side of the scheme to the interior limit of the wall. For better accuracy lock the X-Y movement directions by pressing the SHIFT key.

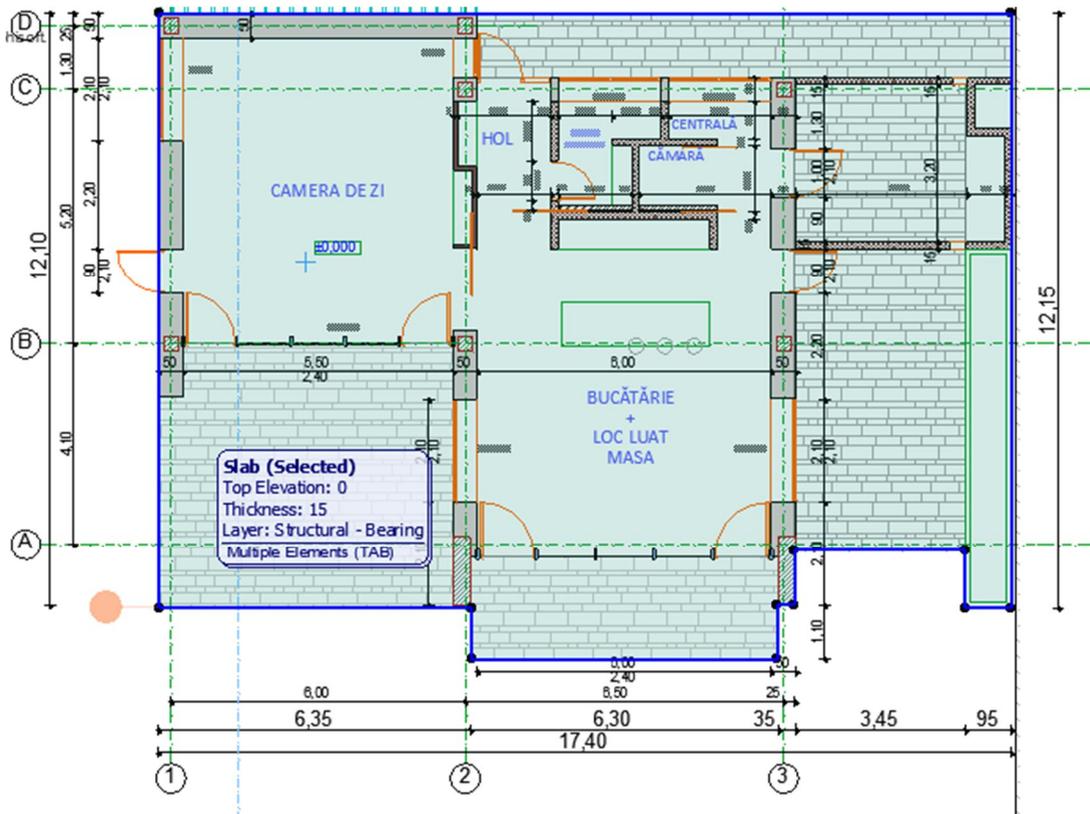Do the same to manually adjust the height of the curtain wall to the wall edge.
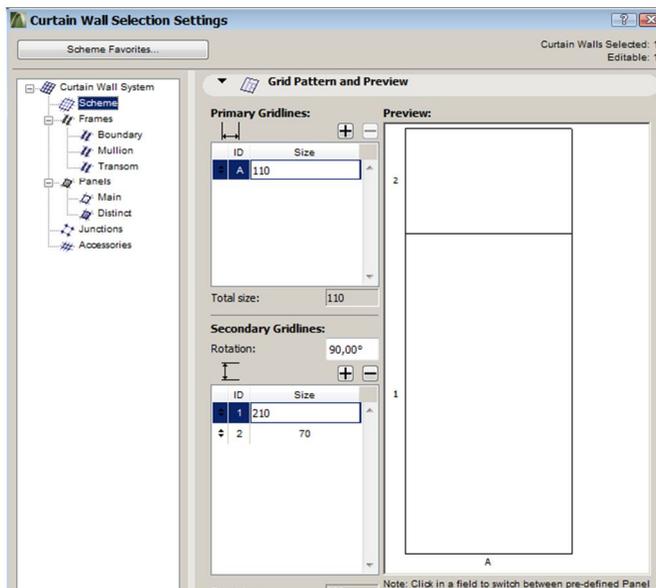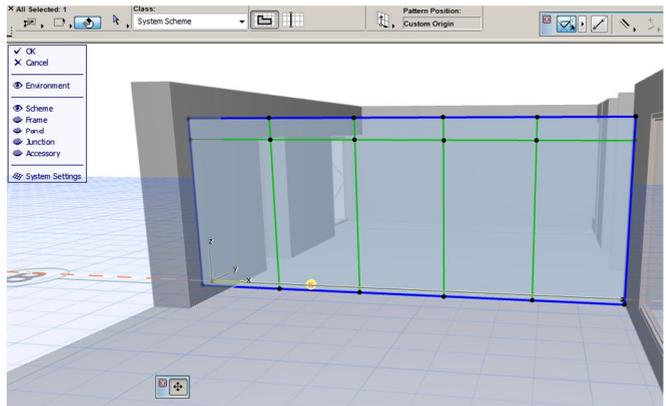
In the SCEME SETTINGS change the vertical gridlines spacing to 110 cm.
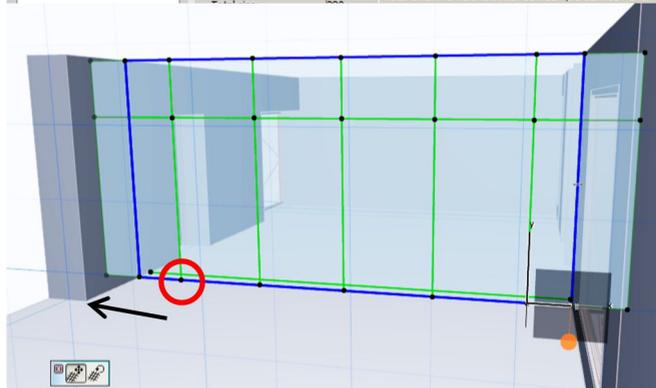
Select the closest scheme node and pressing SHIFT key pull the entire scheme to match the grid lines with the existing opening

On the ground floor level draw the following slab, with 15cm thickness.

Transferring walls between stories the openings will also keep the openings. Their editing will be done according to the plan using DRAG (CTRL+D), STRETCH (CLICK&DRAG of anchor points) and DELETE.

You can input numeric dimensions in the command's settings

In the NAVIGATOR PROJECT MAP panel, STORIES section, use the EDIT ELEMENTS BY STORIES to copy the walls from axes 1, 2 3, D to the next story. The Windows Copy/Paste commands (CTRL+C / CTRL+V) will have the same effect. You can navigate between stories using the CTRL + [up/down arrow] shortcut. Select ORIGINAL LOCATION for pasting elements on the same corresponding place.
On STORY 1 click on the WALL button and press CTRL+A to select all walls and set the height to 600 cm.

With the same method copy the axes grid system, the similar dimension lines and the curtain wall between axes 1-2. Draw the other elements using the dimensions below:

!

The method for selecting all the instances of the same element is the same as the one shown for walls.

For the non-terrace roofs the height of the walls must be set at a higher value, in order to be able to trim them with the inclined plane.

- Walls – h=600cm
- Openings
- Slab – 40cm thickness
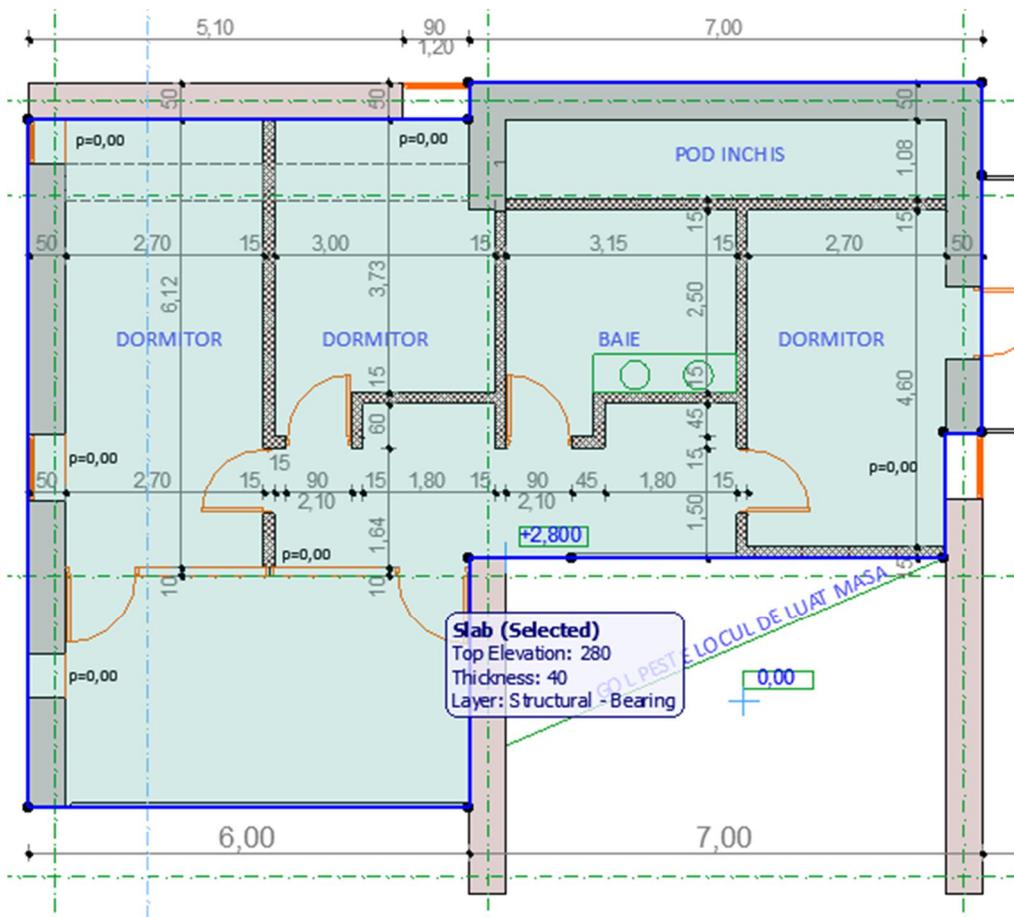
In STORY 1 select the curtain wall and edit it in the 3D window, setting the grid spacing to 137,5cm. Activate the FRAME visualization mode and move (CTRL+D) the vertical grid elements (47,5 cm to the sides) to obtain two 90cm doors in the extremes.

If the units were set to centimeters without decimals, Archicad will automatically round the showing values, but the real dimension will be exact.
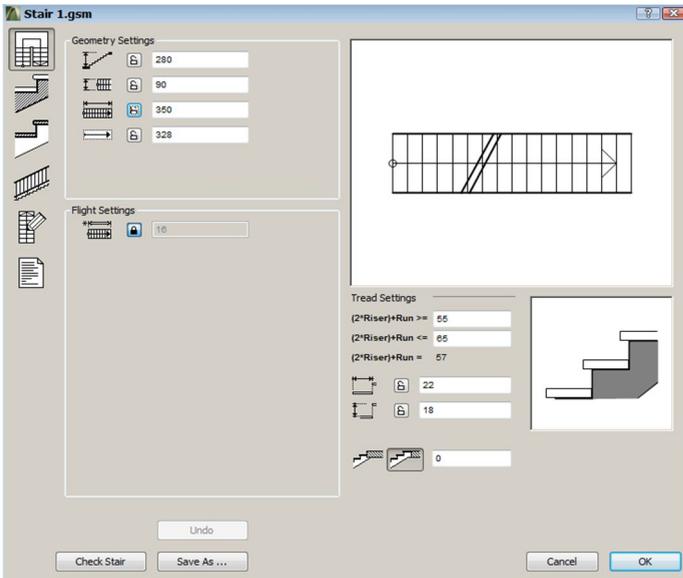
!
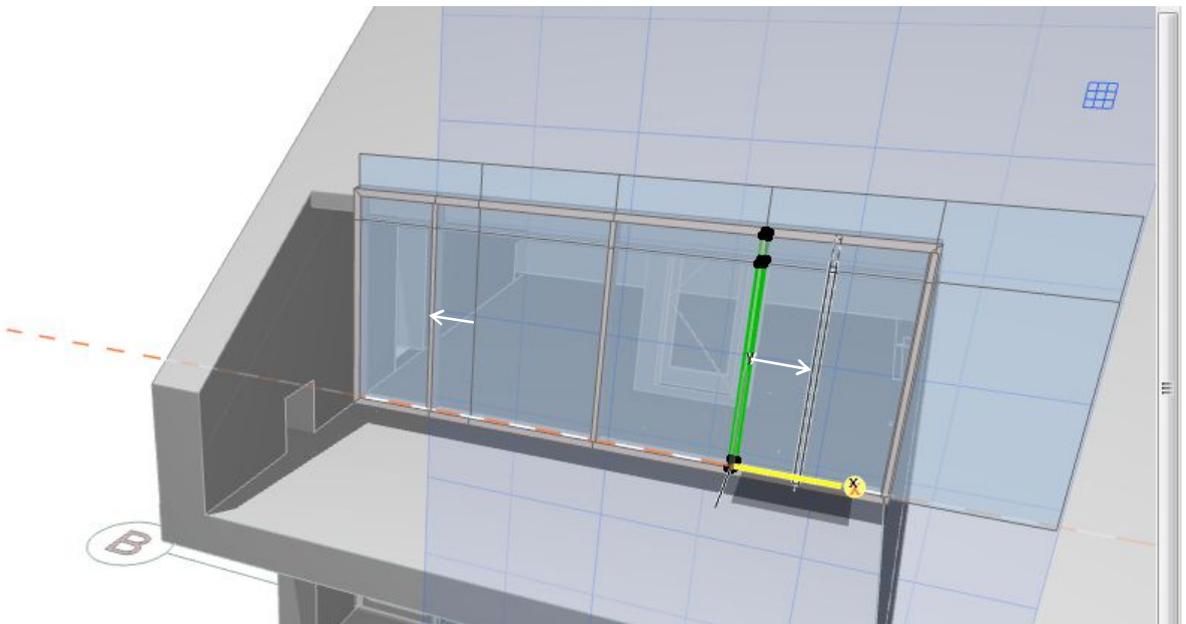
THE STAIR
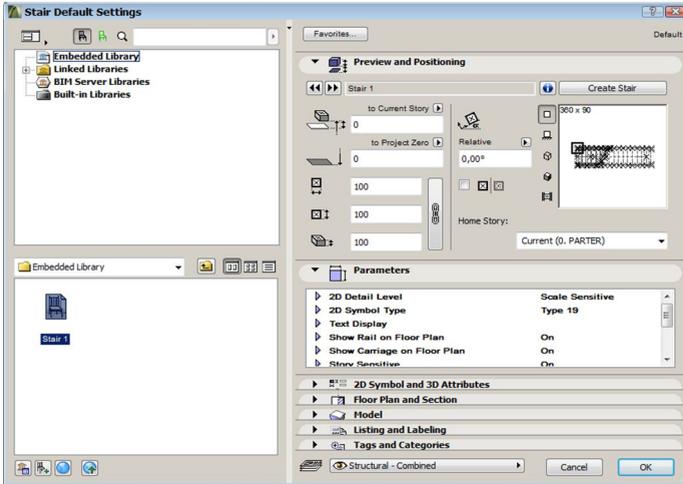
! For data safety we recommend to save the projects before accessing the STAIR CREATION MODULE.

With STORY 0 open, access the STAIR MODULE and generate a new custom stair (CREATE STAIR)
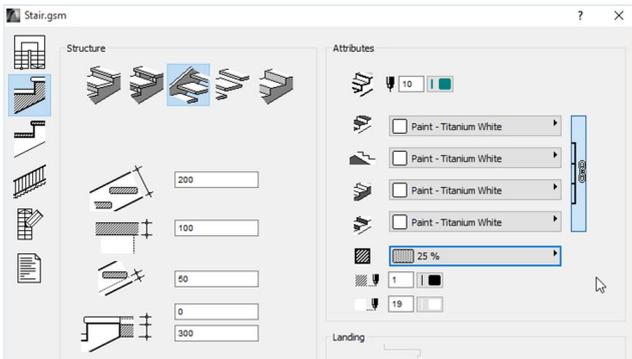

TREAD SETTINGS
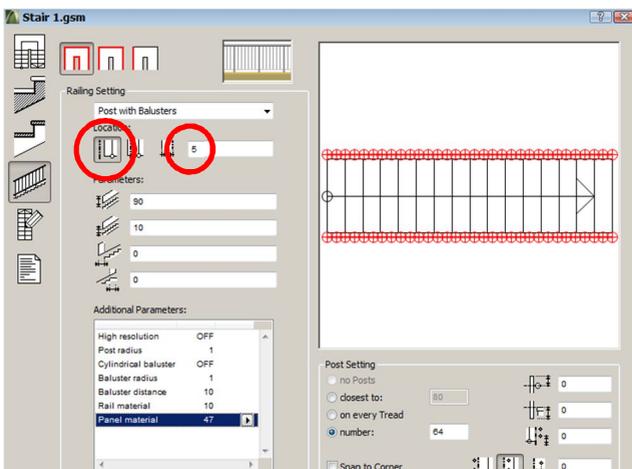
- 2*Riser+Run>=55
- 2*Riser+Run<=601
- Tread width-22
- Tread height-18

GEOMETRY SETTINGS

- Stair height-280
- Stair width-90

! If you encounter errors, please check the 2*Riser+Run formula

Select the middle structure type – without counter-step. Set the stair material to PAINT – TITANIUM WHITE.

In the RAILING SETTINGS, set the type to POST WITH BALUSTERS, and the position to 5 cm outside the stair. The number of posts will be 64 (relatively 4 elements for a tread).

In the ADDITIONAL PARRAMETERS section select the same material for the railing (PAINT – TITANIUM WHITE), and the value 1 for the baluster radius.
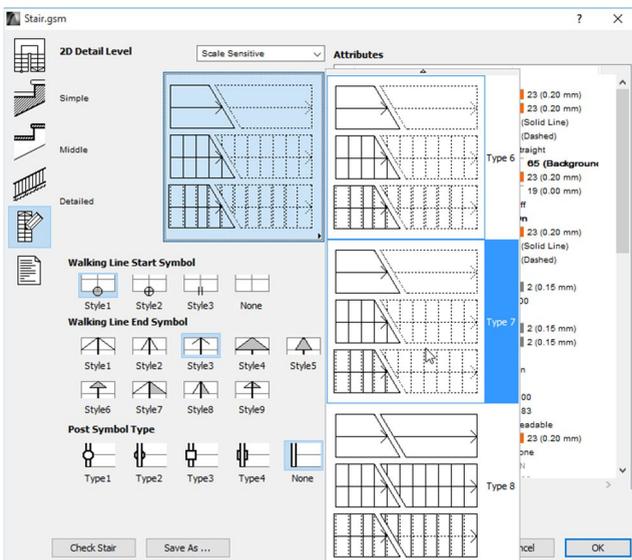
For the SYMBOL SETTING, choose type 7.

In this window you can modify other parameters concerning the representation of the stair – such as – line types and colors, fills, arrow style, post symbol style, etc.

After all the operations, press the CHECK STAIR button, and if you don't get errors, save the new object as STAIR 1.

Place the stair in the upper corner of the wall in axis 2.from STORY 0. For the

correct visualization in the STORY 1 view, access the stair settings and, in section FLOOR PLAN AND SECTION, choose the HOME&ONE STORY UP option from the FLOOR PLAN DISPLAY field.

In the same window, go to the 2D SYMBOL AND 3D ATTRIBUTES>STORY SENSITIVITY AND 2D ABOVE HOME STORY, deselect BREAKLINE option..
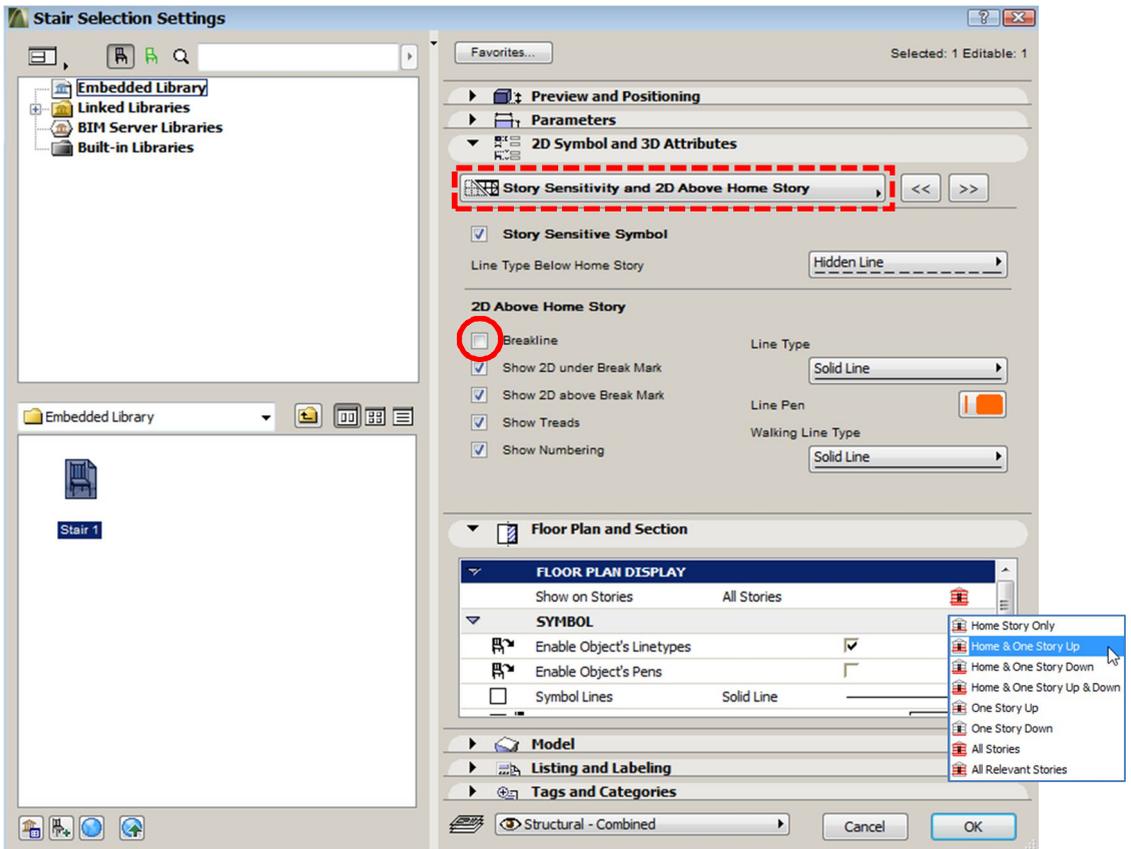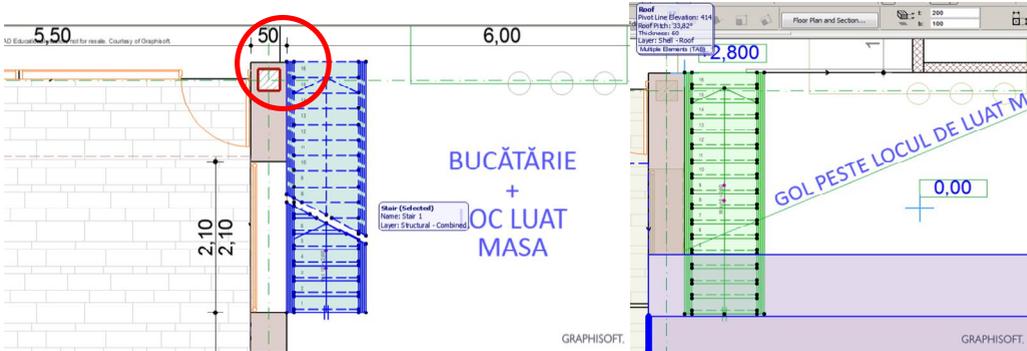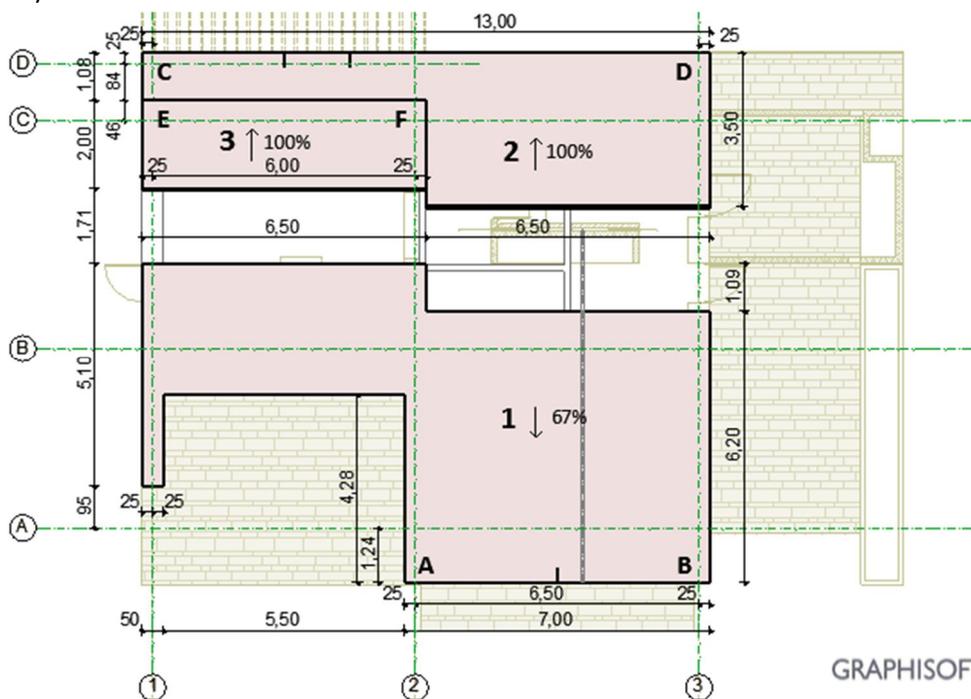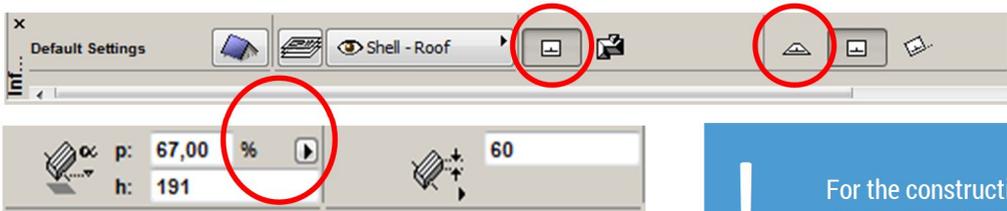
THE ROOF

Open the ROOF settings and choose ALL RELEVANT STORIES in FLOOR PLAN AND SECTION»FLOOR PLAN DISPLAY.
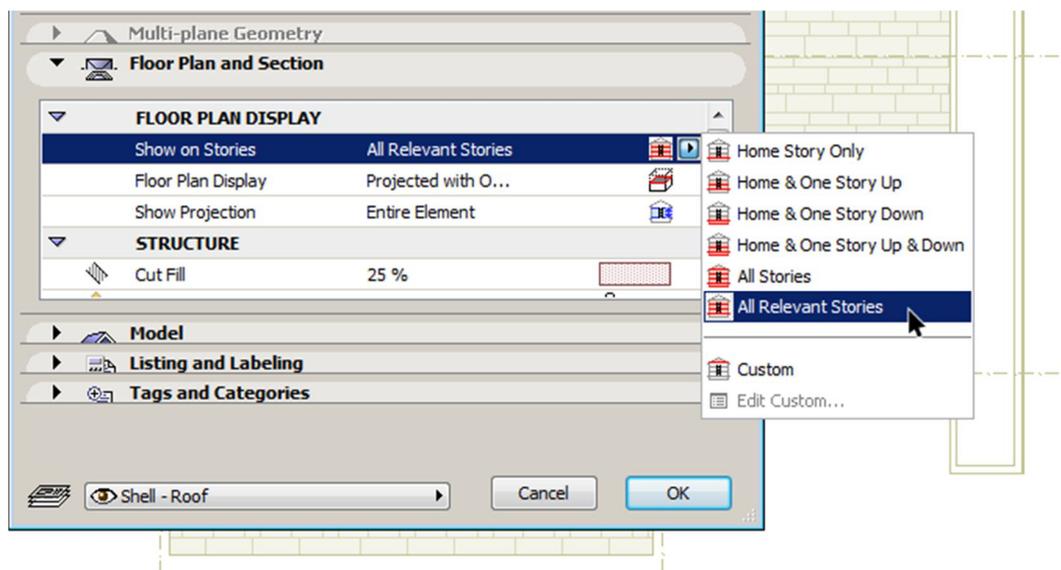
 Draw the following roofs accordingly, using the SINGLE PLANE ROOF and the COMPLEX ROOF geometry.
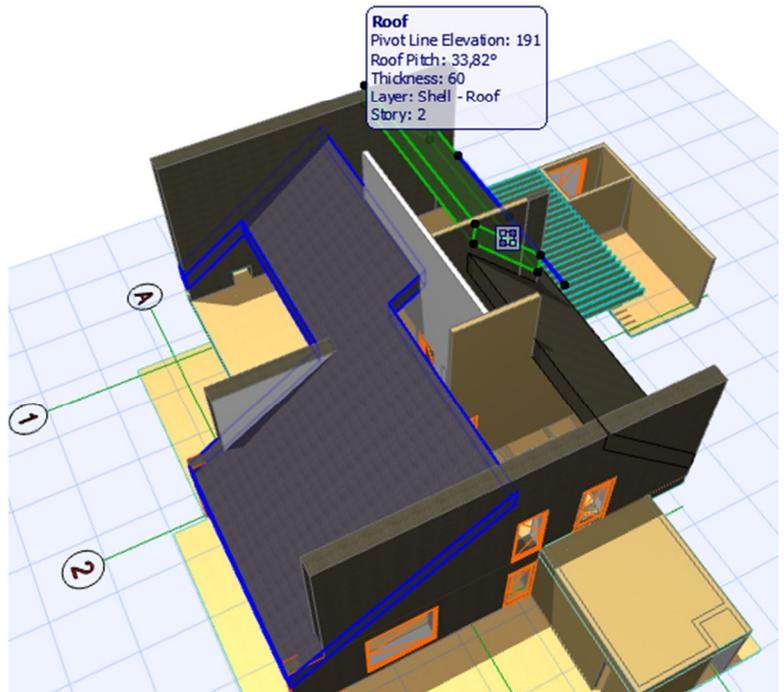
Roof 1

- base – segment AB,
- soffit (underside of the base of the roof) height – 191 cm
- slope – 67%
- roof thickness – 60 cm

Roof 2

- base – segment CD,
- soffit height – 321 cm
- slope – 100%
- roof thickness – 60 cm

Roof 3

- base – segment EF,
- soffit height – 414 cm
- slope – 100%
- roof thickness – 60 cm

> **!** For the construction plans, the roof slope must be specified in percent, not in decimal degrees.

Press the ROOF button in the TOOLBOX. Open the 3D window. Select Roof 3 and CTRL+CLICK on the future intersecting edge of Roof1. Select Roof1 and repeat the operation for the corresponding edge of Roof3.

Repeat the action to adjust all roof intersections.

Roof Selection Settings   Ctrl+T
Select & Activate Tool
X Delete
Move ▶
Layers ▶
Convert Selection to Morph(s)
Capture Profile of Selection
Trim Elements to Roof/Shell
Merge Trimming Bodies
Solid Element Operations…
Clear All Connections
Connect ▶
Show Selection/Marquee in 3D   F5
Show All in 3D   Ctrl+F5
Show Stored Selection/Marquee in 3D
Crop to Single-plane Roof…   Ctrl+0
Zoom to Selection   Ctrl+Shift+'
Orbit   O
Deselect All
Editing Plane ▶

Properties
Generic Perspective

The CTRL+CLICK solution for the trimming of the roofs is also functional, but it doesn't provide an active connection which can update to a possible change in the project.

In order to adjust the top of the wall to the roof, select both element groups and select CONNECT»TRIM ELEMENTS TO ROOF/SHELL from the RIGHT-CLICK menu.
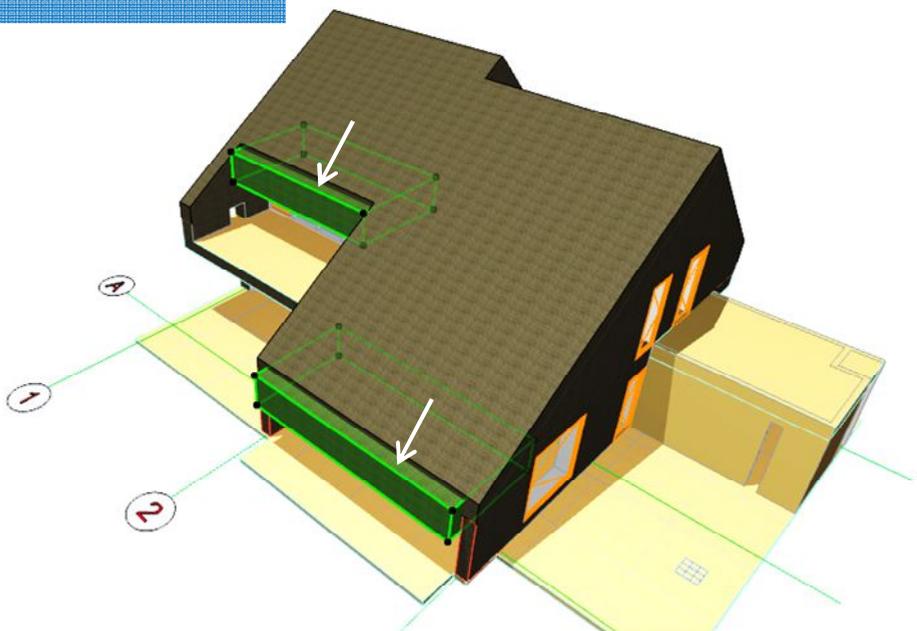
Create the following slabs, placing them between the side walls as follows:

- between axes 2-3 - elevation -237, width – 300, thickness – 100,
- between axes 1-2 - elevation -523, width – 300, thickness – 100.
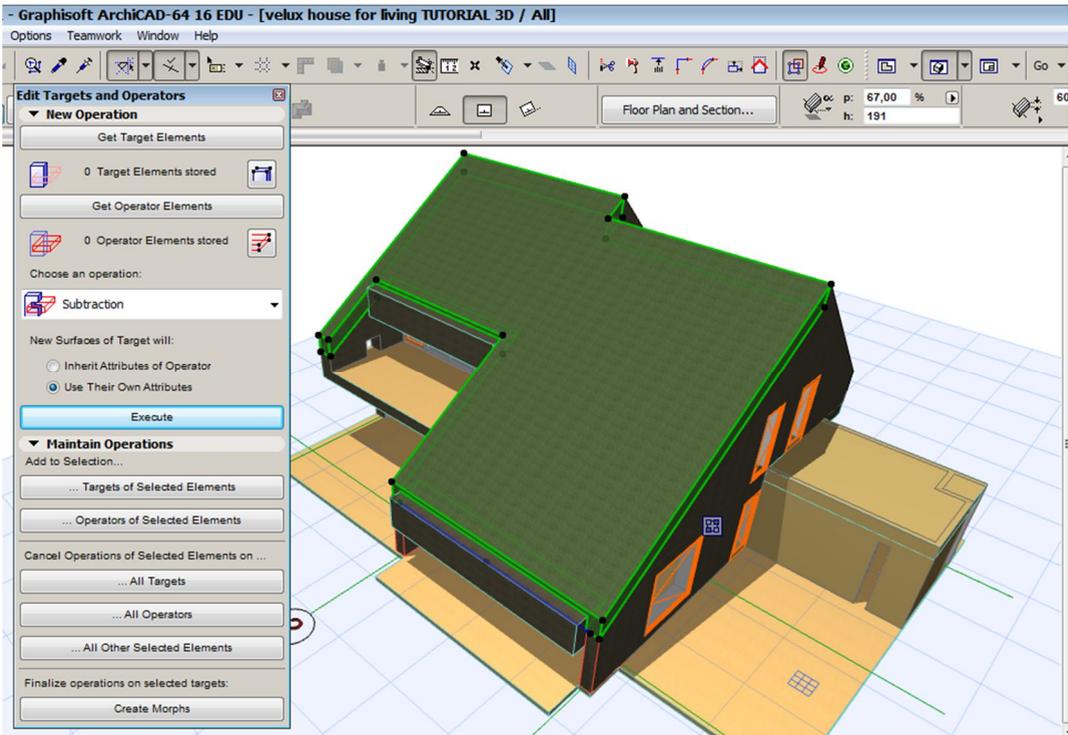
Select the 2 slabs and activate the CONNECT» SOLID ELEMENT OPERATIONS from the RIGHT-CLICK menu. Press GET OPERATOR ELEMENTS. Select Roof1 and press GET TARGET ELEMENTS. Choose from the operation list SUBTRACTION, and press EXECUTE.
Move the two slabs on the HIDDEN layer

> **!** If you delete the operators instead of hiding them, the result of the operation will disappear.
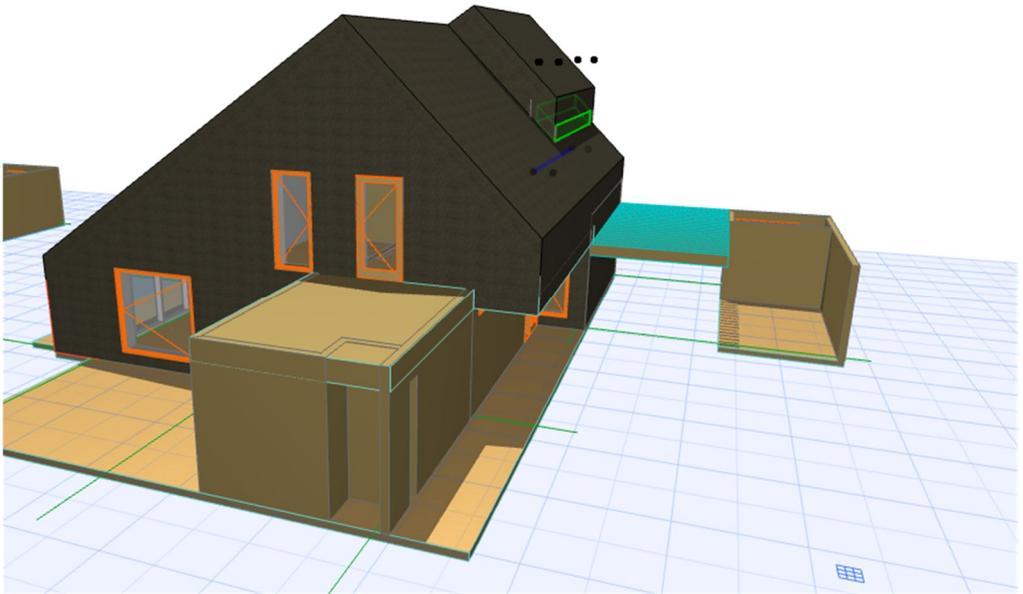
For closing the gap between roofs 2 and 3, use a wall and the solid operations, selecting in turn the SUBTRACT WITH DOWNWARD EXTRUSION and SUBTRACT WITH UPWARD EXTRUSION options.
 Insert the roof windows with the SKYLIGHT tool and DRAG A COPY (CTRL+D + CTRL), MULTIPLY (CTRL+U) și MIRROR a copy (CTRL+M + CTRL) commands.
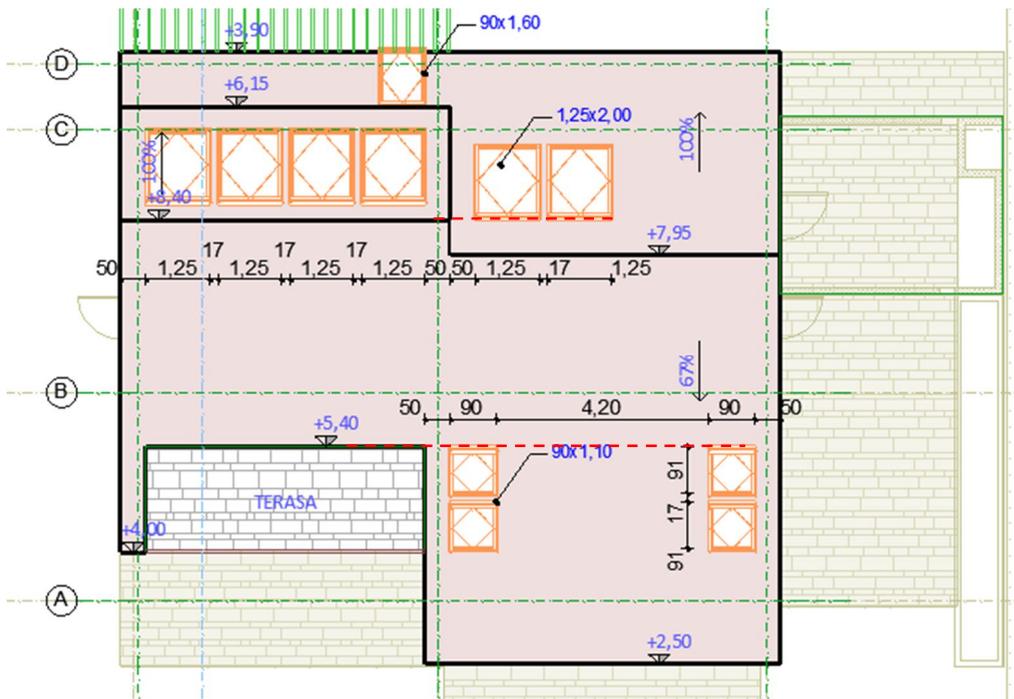
! The SKYLIGHT windows automatically detect the slope of the roof. Their correct projection positioning will determine the correct placement in the 3D volume.