

3D modelling exercise with Sketchup Web

The Ekklesiasterion of the Temple of Isis in Pompeii

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(updated by Gabriel Bodard, Miranda Rainbow, Jane Skelding, Alicia Walsh)

An accompanying YouTube video walking through this exercise can be found here:

<https://www.youtube.com/watch?v=l9BsjNGmxwI>

You should also have received some downloadable files for the internal fresco decoration. Make sure you have downloaded them and know where they are for later. They are linked here for convenience:

- Tutorial handout (this document):
<https://github.com/SASDigitalHumanitiesTraining/3D/raw/main/Handouts/Sketchup-Tutorial-VVitale.pdf>
- Photographic and other documentation: https://github.com/SunoikisisDC/SunoikisisDC-2016/raw/master/SunoikisisDC2016_SummerSemester_Slides/08_handout2_documentation.pdf
- Image files for the frescos:
<https://github.com/valeriavitale/Sunoikisis3D/raw/master/EkklesiasterionTextures%20COMPLETE.zip>

You should have created a user account on the free web version of SketchUp: <https://app.sketchup.com/app>

This modelling exercise uses the Ekklesiasterion of the [Temple of Isis in Pompeii](#) as an example to walk you through the important tools in SketchUp for Web. The results should look something like the picture below.

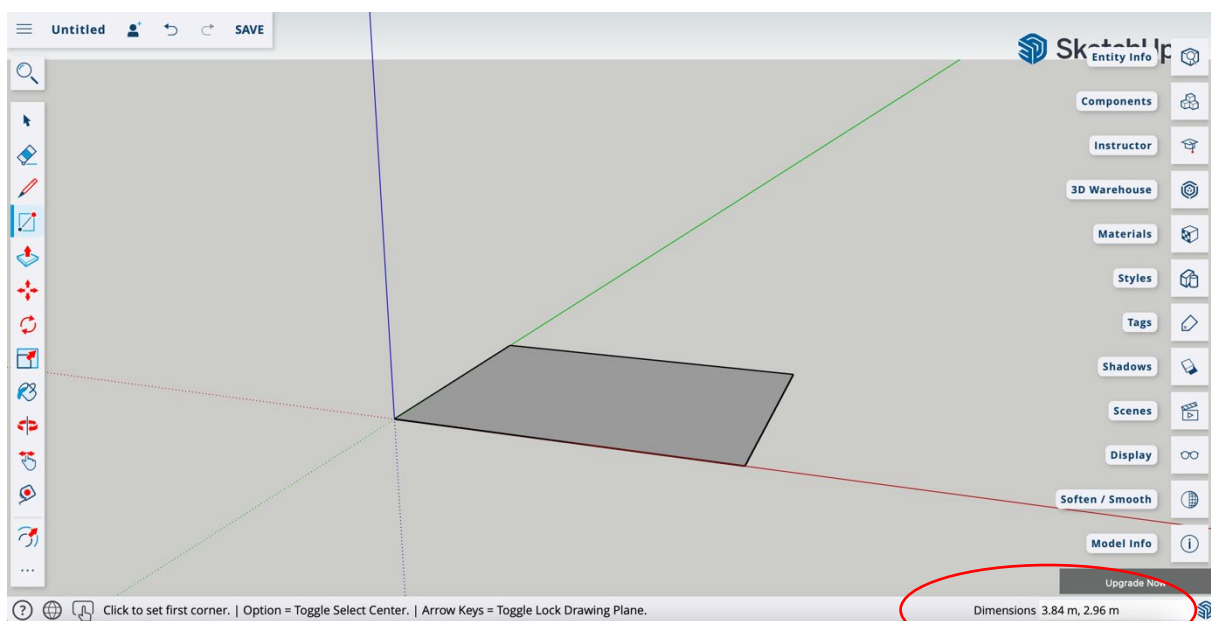


Tip: at any stage, if the instructions below tell you to change the view and perspective, it is very important to do so as the 3D model requires that to be operating on the right plane you need to be using the correct view. If you do not, shapes and tools may not act how you expect them to.

Drawing the base

To start:

1. Create a new project, selecting the **Decimal - metres** setting.
2. Select the Rectangle tool and then snap the cursor to the origin.
3. Draw a rectangle as before
4. When the rectangle is about the right shape, release the mouse and without clicking anywhere else, start typing the following measurements: 13.2, 7.5 and the numbers will start to appear in the bottom right-hand corner of the window where it says Dimensions

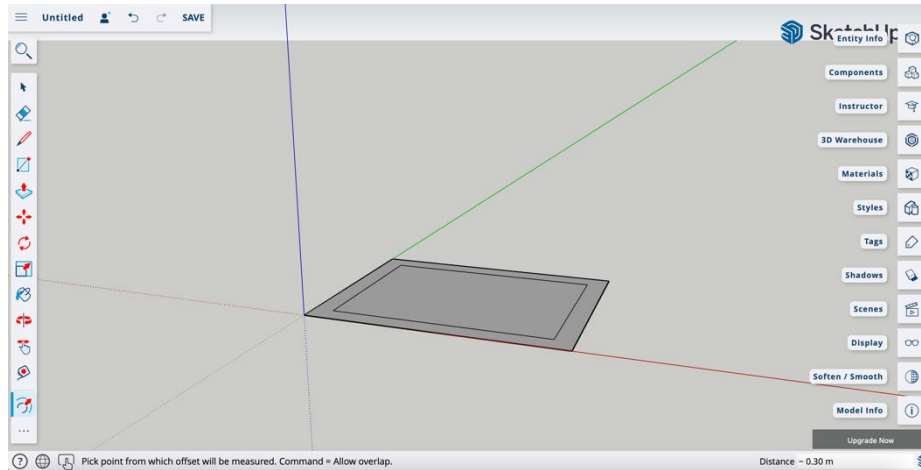


5. Press the Return key on your keyboard, and your rectangle will be modified according to the manually entered values. You may need to zoom in (or out) to the scaled rectangle.

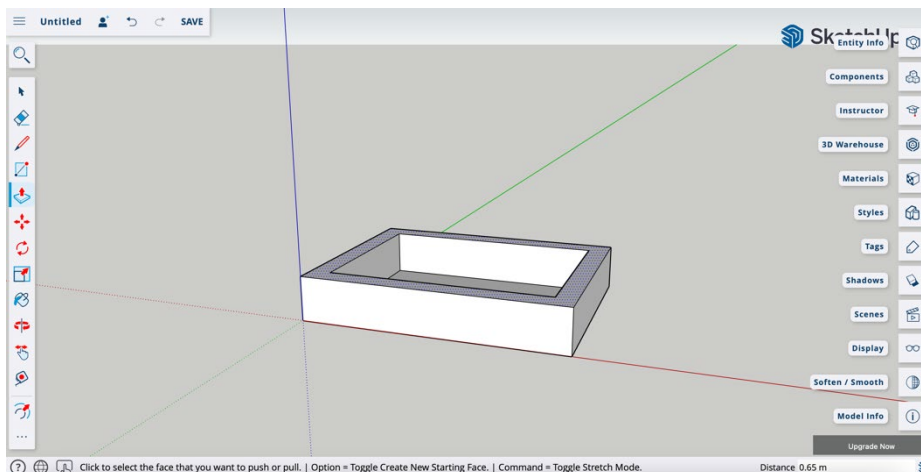
Building the external walls

Now, we want to create what will look like a smaller rectangle inside the first rectangle to create the thickness of the walls.

6. To do this, use the Offset tool. Expand the Tool menu with the three dots at the bottom, and Offset is then visible in the enlarged menu, click on it to choose the tool.
7. Click and drag inside your rectangle.
8. This should create a smaller rectangle of similar dimensions.



9. Release the mouse and type 0.44 to create a precise offset.
10. From the Tools menu, select the Push-pull tool. Click on the outer rectangle and drag to and start extruding the outer rectangle.
11. Release the mouse, type the value 6, and press enter.



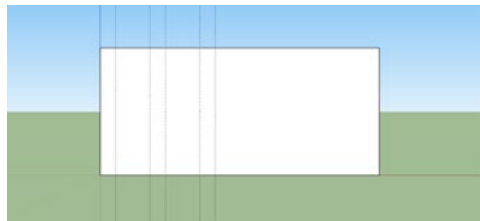
Drawing guidelines

12. Select the Scenes tool from the right hand side and then under Standard Views choose South Elevation Front.
13. Next, from the Tools menu, select the Tape Measure tool.

14. Click on the edge on the left to create a guide and drag it in any place. Release and enter 0.73. This will create a vertical dotted line as in the picture below.

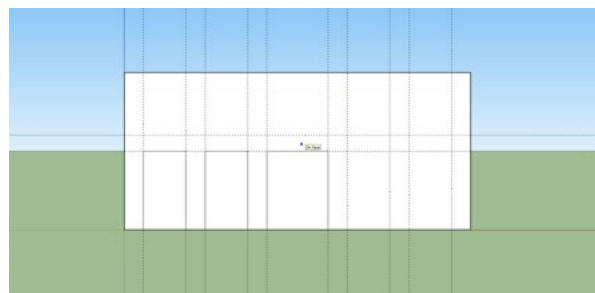
Tip: If any lines end up the wrong width, change to the Select tool, highlight them and hit delete. You can then go back to the Tape Measure and do it again.

15. Always beginning at the left edge, repeat the last step with the following values: 2.35, 3.08, 4.7, 5.43. You should now have 5 vertical guides.
16. Repeat the last two steps starting from the right-hand edge. At the end you should have ten vertical guides.
17. Following the same procedure, create two more guides starting from the lower edge. Enter 3 for the first and 3.6 for the second.

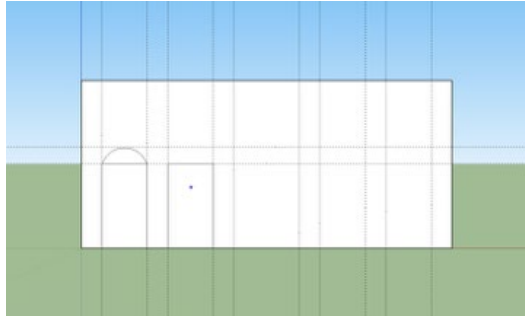


Drawing the arched doors

18. Select the Rectangle tool again and draw three rectangles at the intersections of the first three guides working from the left-hand side in. The tool should automatically snap at the intersection points (you should visualise a green x when those points are selected)



19. Select the 2-Point Arc tool. Position the cursor on the upper edge of the first rectangle. Click on the upper left corner of the rectangle and release the button.
20. Repeat for the upper right one. Follow the upper edge with the cursor until you visualise the midpoint. Then, move the cursor vertically until you meet the next horizontal guide.



21. Repeat for the following two rectangles.
22. Select the eraser tool and click on the upper edge of the rectangle/lower edge of the arc. You should now have an arched door. Repeat twice.

Duplicate first two doors

23. Choose the Select tool from the Toolbar. On the first arch, select the two sides and the curved top (3 lines). Use control (PC) or shift (Mac) to allow multiple selection.
24. Duplicate the arch by clicking control+c (PC) or command+c (Mac) and then control+v (PC) or command+v (Mac) to paste the new copy.
25. Click to place the new arch on the right side of the wall, consistently with the position of the previous ones. You have copied the arch and moved the new copy.
26. Repeat for the final door.

Delete guides

27. Use the Search tool to find Delete Guides and click to remove.

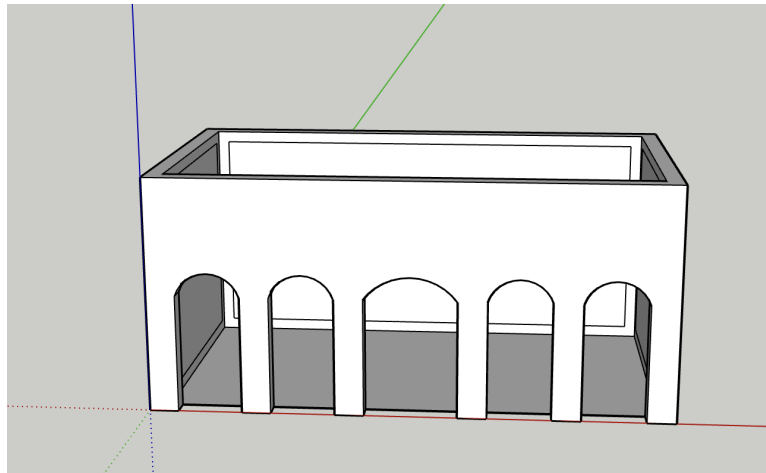
Creating the door openings

28. Use the Pan and Orbit to have a perspective view
29. Select the Push-Pull tool and push the area of the first arch towards the inside until it disappears. Double-click on the other arches. The software will automatically apply the last value of the tool again.

Adding textures to the walls

In this section we will be adding textures to the walls. In this case we will be using the files mentioned at the start and inserting them to replicate the frescos on the walls.

30. Pan around so that you can see the interior of the three non-arched walls. Select (Space) one of the non-arched walls on the inside. Create an offset (F) of 0.3. Repeat three times to create a second internal rectangle on each wall as in the picture below, this will function as a frame for the fresco we will add next.



31. Choose Import from the main menu or type “insert” into the search tool. This will bring up the Import File box. Choose My Device, and then browse the folder where you saved the image files provided. Select the appropriate one (when looking through the arches, the walls are, respectively, from left to right: south, west, north)
32. Once you click Open you will see a preview of the image you selected attached to the cursor. Click on the lower left corner of the inner rectangle created with the offset. Then, at any point on the right edge of the same rectangle. The image will follow the cursor and adapt to the dimensions of the selected area. Repeat for the other two images.

Tip: Only if you want to upload your model to the Sketchfab platform.

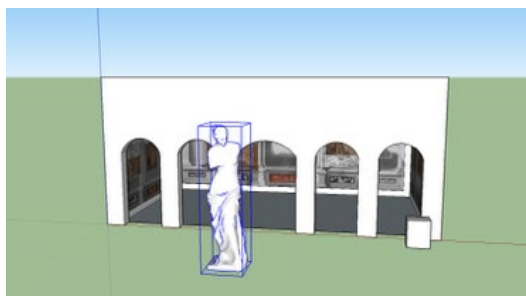
Feel free to ignore otherwise and move to the next step. If we want our textures to show in Sketchfab, we have to separate them from the surfaces they are covering, to avoid errors in the Sketchfab visualisation. Select (Space) one of the images we have just positioned on the wall, then choose the Move tool (M). Start moving the image slightly away from the surface it is texturing. Be sure that you are moving it on the right axis. Enter the value 0.02. Repeat for all the three images.

Adding stock 3D object

33. Select the Rectangle tool (R) and draw a rectangle near the right side of the last arch on the right. It is not important exactly where you put it (use the image as a reference). Enter the values 0.8, 0.6
34. Select the Push-Pull tool (P) and extrude the surface. Enter 0.8 as the value.
35. From the icons on the right-hand side of the screen, click on 3D Warehouse, and accept terms of use.
36. A dialogue box has now appeared on your screen. In the search field type “ancient statue” and press enter.
37. Click on the statue that you like and wait until the download is complete. Do not choose a model that is too big, or it might not be able to be loaded. Then close the window.

Tip: Sometimes the model looks like it has not downloaded but if you zoom out you might find it is floating in mid-air. You can simply use the Select tool to highlight it and then the Move tool to move it to where you need it to be.

38. The statue should now be connected to your cursor. Click to make it independent (you can see a blue box around it).
39. Select the Scale tool (S). All the vertexes of the blue binding box are now green cubes. Select the one at the top right corner and start dragging it. You are now scaling the statue uniformly. Enter the value that suits the pedestal.
40. Select the Move tool and place the statue onto the pedestal you have just created.
41. Take some time to look at the model. Then, decide where you want to place the pedestal to support the 3D model created in the previous exercise. Decide how large, wide and high it has to be.



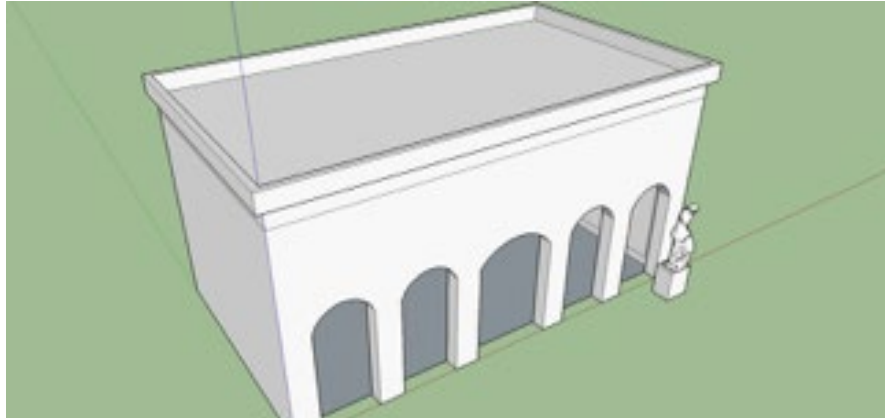
Importing your own 3D object

Optional. If you have a 3D object in your own files, e.g. from an earlier photogrammetry exercise, you may also want to import it from your device as follows:

42. Type Insert into the search tool. This time, select from the Types menu “collada files”. Find the file from your previous exercise and open it. Wait for the download to be completed.
43. The file is now attached to your cursor. It is very likely to appear near the origin point (where the three axes intersect) and to be very, very small. Click to separate the mesh from the cursor and then select the scale tool.
44. Using the uniform scaling option (click and drag one of the corners of the bounding box), enlarge it enough to bring it to scale. Then, move it to the top of the pedestal you created. If you need to rotate the artefact, with the move tool selected, bring the cursor over one of the red crosses you see on each face until a circle appears. If you click and drag, you are now rotating the object. You can do it manually or enter an angle value and press enter.

Building the cornice

45. From the right-hand menu objects select Scene, Standard Views, West Elevation (Left). It is important to select this view to ensure the next step works correctly.
46. Select the Rectangle tool (R) and draw a rectangle on top of the building. Enter the values 7.5, 0.5.
47. Select the Push/Pull tool (P) and extrude the rectangle 13.2. The building is now entirely covered.
48. Select the Offset tool (F) and create an outer rectangle of the top surface. Enter the value 0.2.
41. Use the Push/Pull tool (P) to extrude the outer rectangle by 0.5
49. Double click the inner surface so that it also extrudes upward in line with the outer rectangle. You should now have a flat roof.
50. Select (Space) the inner lines, press control on your keyboard and delete the extra lines from the upper surface.



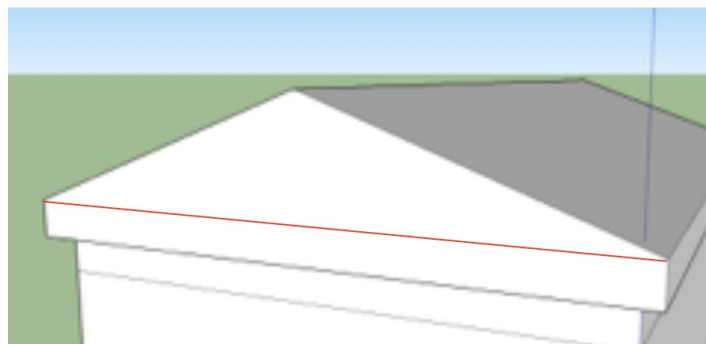
Raising the roof

51. Select the Line tool (L) and move it along the shorter edge until you see the midpoint. The midpoint is shown in green. Draw a line from the midpoint to the midpoint on the opposite shorter edge.
52. Select the line, pick the Move tool (M) and drag the line upwards to make a point, size it to 1.5. Use the blue dotted line as a reference for moving elements vertically.

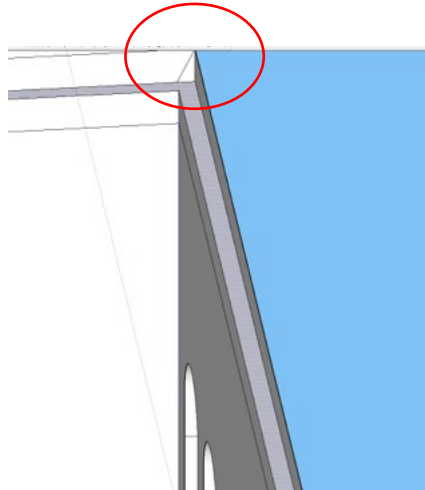


Cutting back the cornice

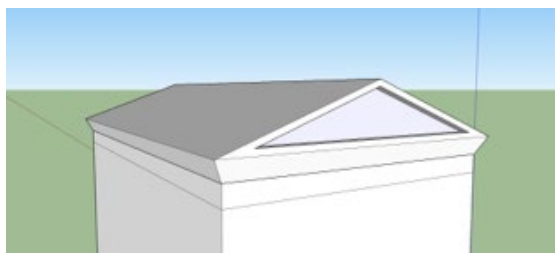
53. Select the Line tool (L) and draw a line that joins the two vertexes in the pediment, creating the base line of a triangle.



54. Using the icons on the right select Scene, Camera, Parallel Projection. Go to the Standard view/West Elevation (left).
55. Select the Line tool (L) again and draw a line joining the upper right corner of the second rectangle to the upper right corner of the first one.

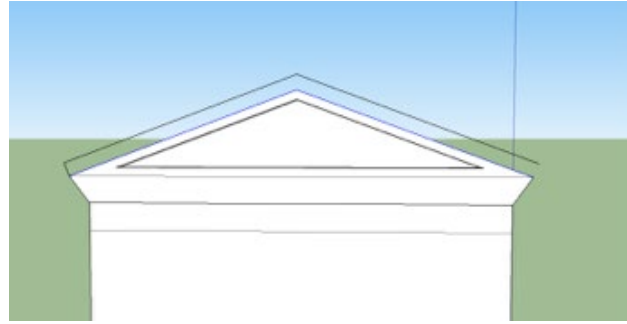


56. Revert to perspective view.
57. Select the lower surface of the second rectangle.
58. Select the Follow Me tool, then double click on the triangle you drew previously. The cornice should be all around the building.



Adding details to pediment

59. Select the Offset tool (F) and create an inner line inside the pediment and type 0.15 to size it.
60. Select the Push/Pull tool (P) and push the inner surface inside by 0.15
61. Repeat on the other side.
62. Select the Select tool (Space) and click on the edges of the pediment.
63. Select the Offset tool (F) and move the edges up by 0.2.



64. Select the Line tool (L), then draw a line between the extrusion and the pediment point to connect the vertices to close the shape.
65. Select the Push/Pull tool (P) to extrude the shape that was created, then drag it to the centre by 0.25.
66. Repeat on the other side.

Adding roof ridge tile

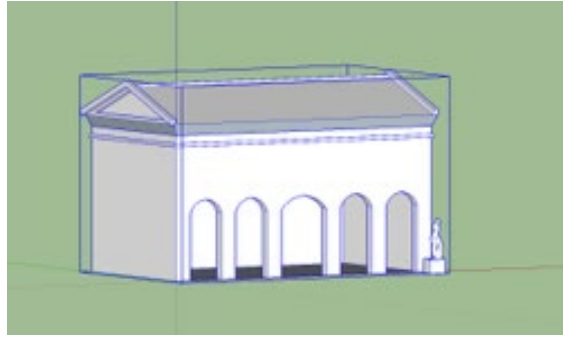
67. Select the 2-point Arc tool, place the first endpoint on one of the edges of the roof ridge where it meets the end wall. Then create the second point as parallel as possible on the opposite side of the roof. Move up after fixing the two points to find an optimal position.
68. Select the Push-Pull tool, then extrude the arc until it reaches the opposite side.

Adding a cornice moulding

69. From the right-hand menu icons select Scene, Standard Views, West Elevation (Left).
70. Select a 2-point Arc tool (A), then draw an arc on the side of the building to create a moulding. Create the shape that you prefer.
71. Select all the edges of the roof base. Then select the Follow Me tool and click on the arch's area. You should see the moulding go all around the building.

Grouping the elements

72. Select (Space) all (Control+A in Windows and Command+A in MAC), then, from the search box type Make group and select. There is a blue box around all the elements: they are now a single entity that can be easily moved and rotated together.



Now your exercise is finished! But you can keep adding details, textures or external objects. You can find more tutorials on the Sketchup website.