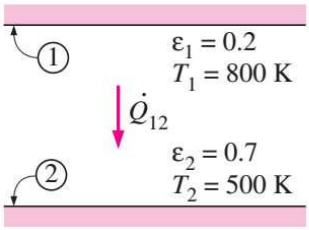
Week 6

**** Task 1** Considering the same example you solved in the previous assignment (radiative heat transfer between two parallel plates), how many shields with epsilon = 0.1 should you add in order to have the new heat transfer rate to be 1% of the case without shields ?**



Then when the $\varepsilon 1 = \varepsilon 2 = 0.1$

Q With no shield $= \frac{A\sigma(T_1^4 - T_2^4)}{\frac{1}{\epsilon}+\frac{1}{\epsilon}-1}$

Q With no shield $= \frac{Ax5.67x10^8(800x10^4 - 500x10^4)}{\frac{1}{0.1}+\frac{1}{0.1}-1}$

Q With no shield = 1035.82W

Q N shield $= \frac{1}{(N)+1}$ x Q With no shield

1% (Q With no shield) $= \frac{1}{(N)+1}$ x Q With no shield

1% (1035.82) $= \frac{1}{(N)+1}$ x 1035.82

$\frac{10.3582}{1035.82} = \frac{1}{(N)+1}$

$0.01 = \frac{1}{(N)+1}$

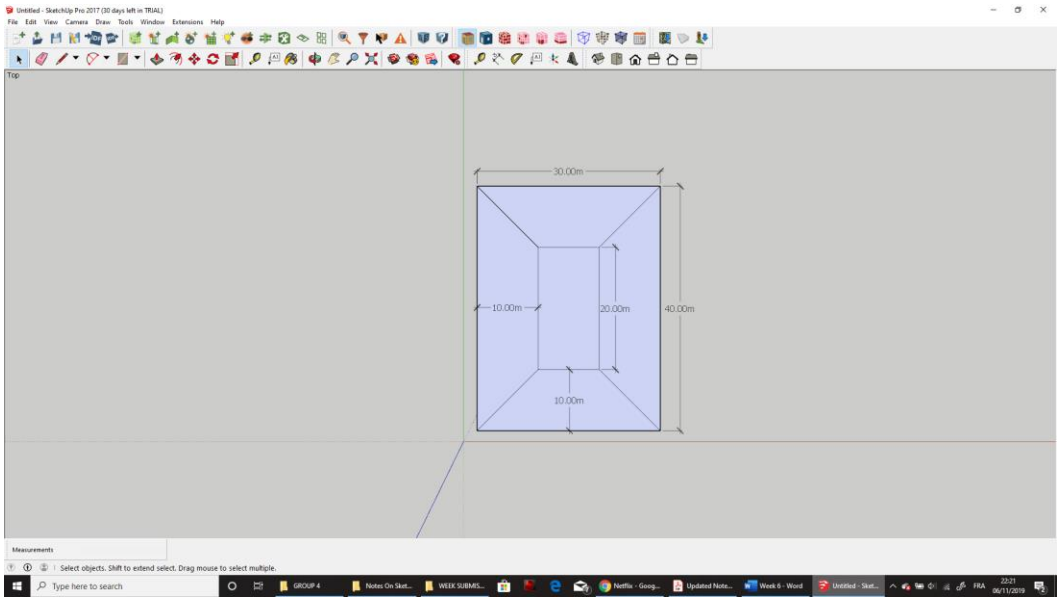
$N = \frac{1}{0.01} - 1$

N = 1.01

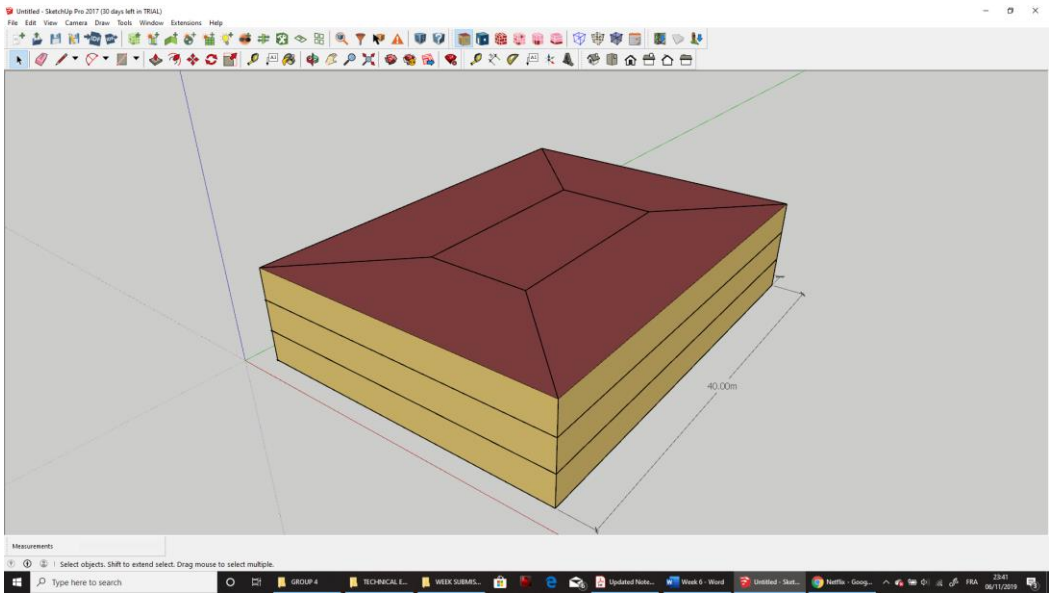
N=99

Task 2 You should create a pdf file with screenshots of all of the steps we went through (clearly from your own file) and explain briefly the reason behind the use of each step (in your own words!)**

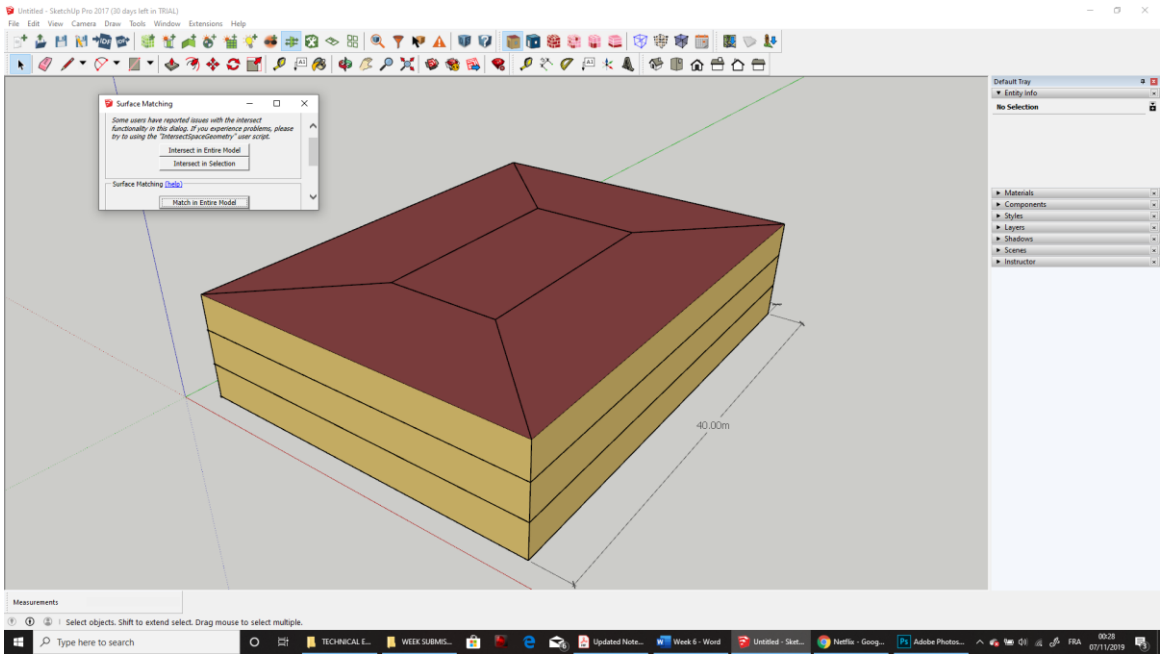
First Draw this diagram. Given here are the Dimensions.



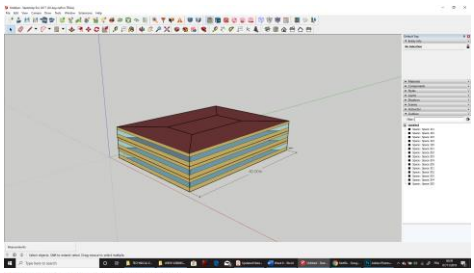
Then using the “Create Spaces from Diagram” Tool to create each floor. Set to 3 floors and set the desired height of each floors.

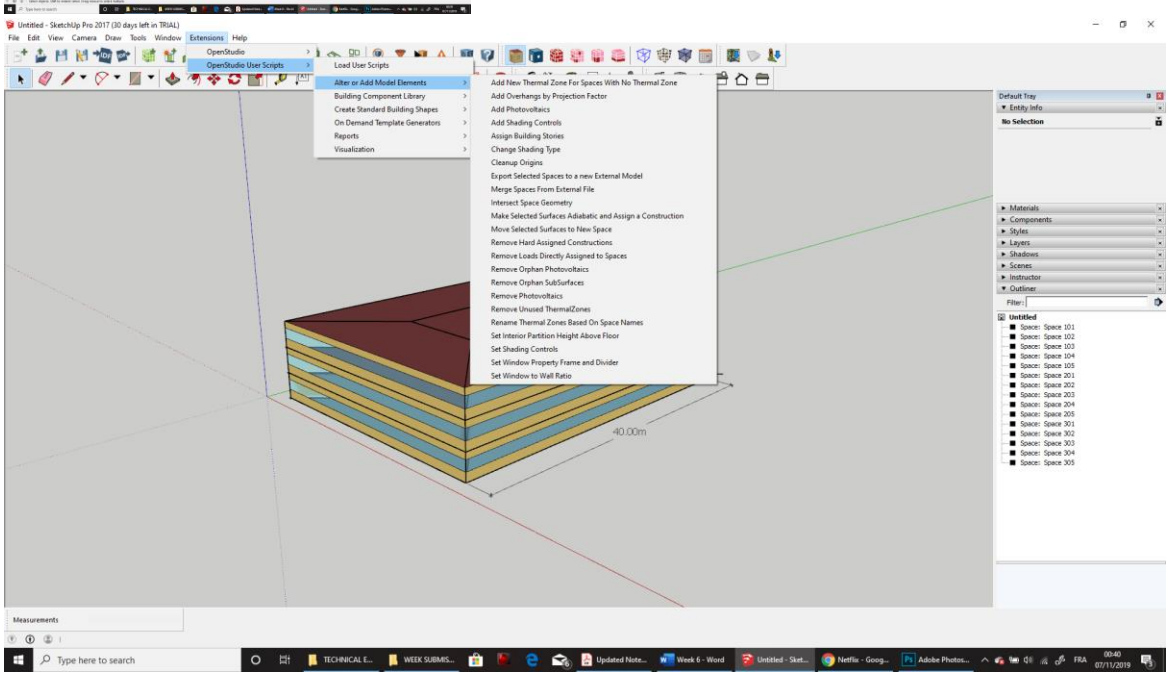


Afterword’s, Utilize “Surface Matching” Tool and “Match in Entire Model”.

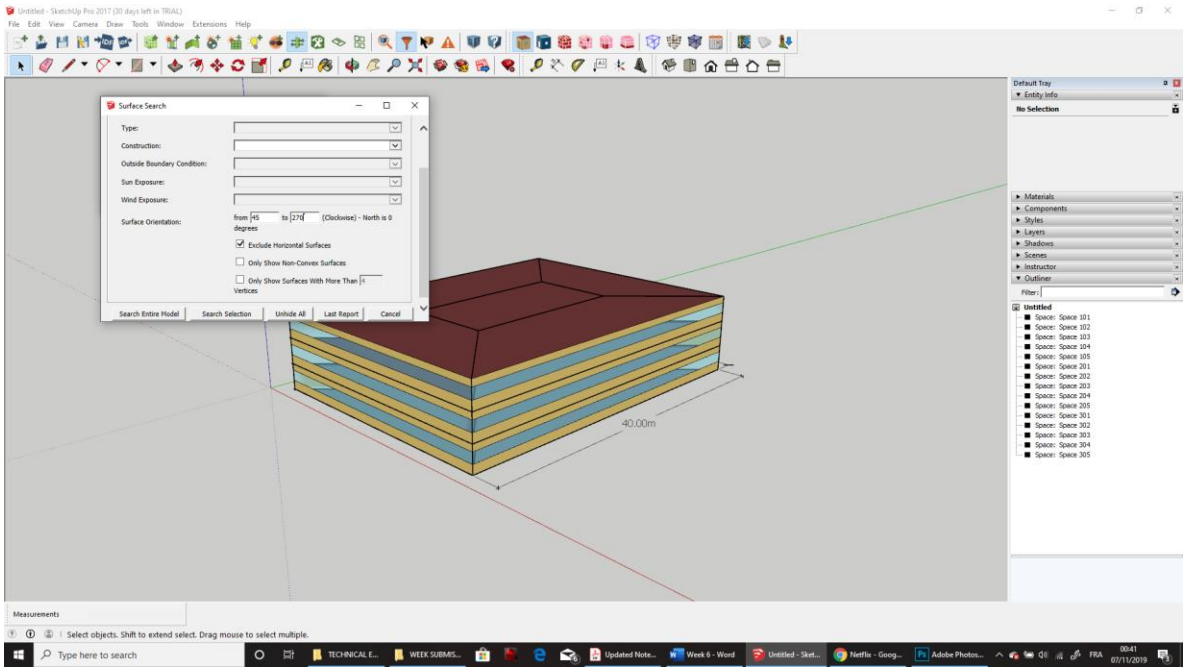


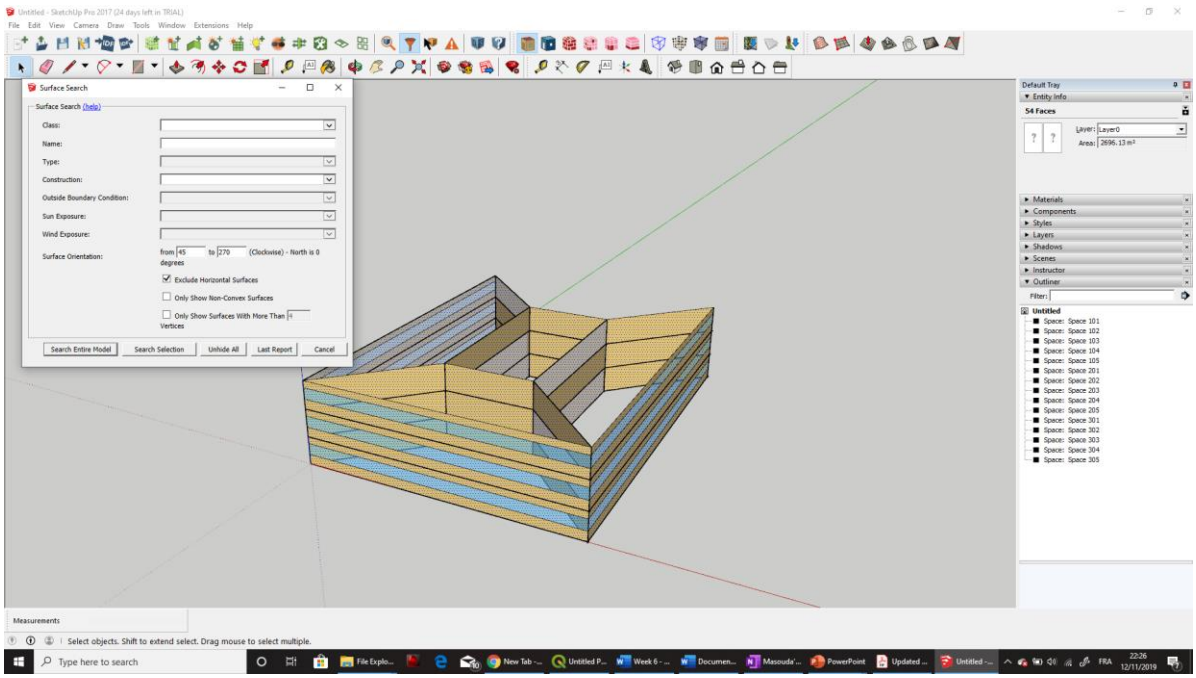
Then in order to create the windows, go to Extensions > Open Studio User Script > Set Window to Wall Ratio.



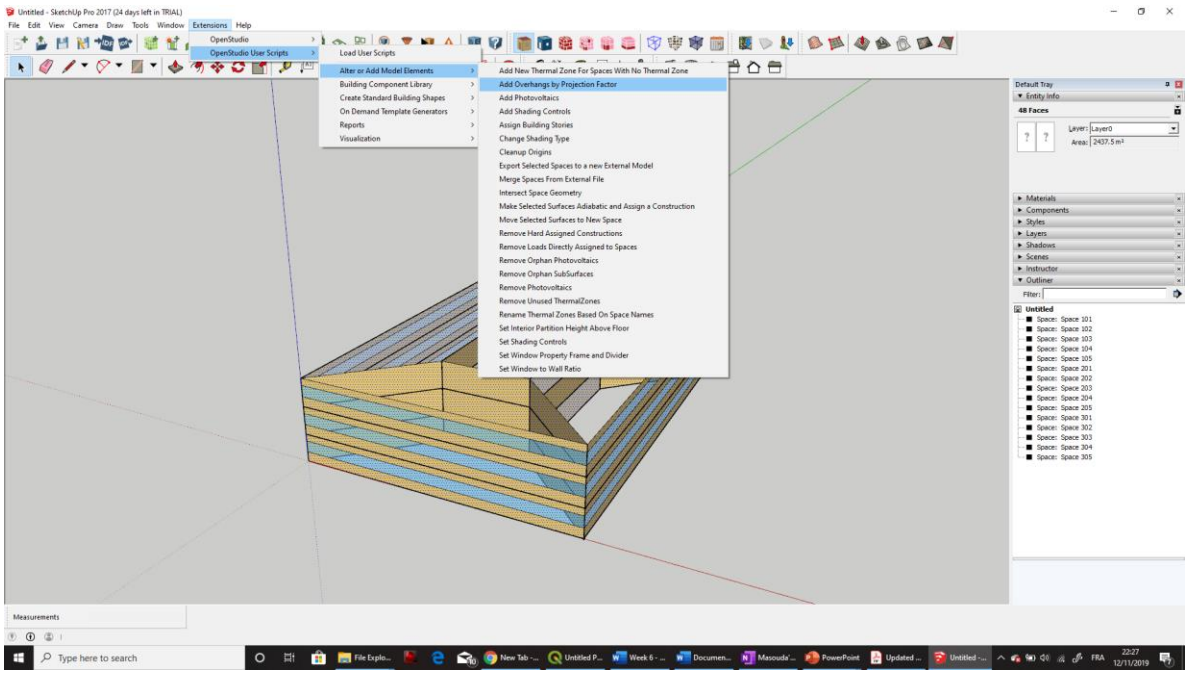


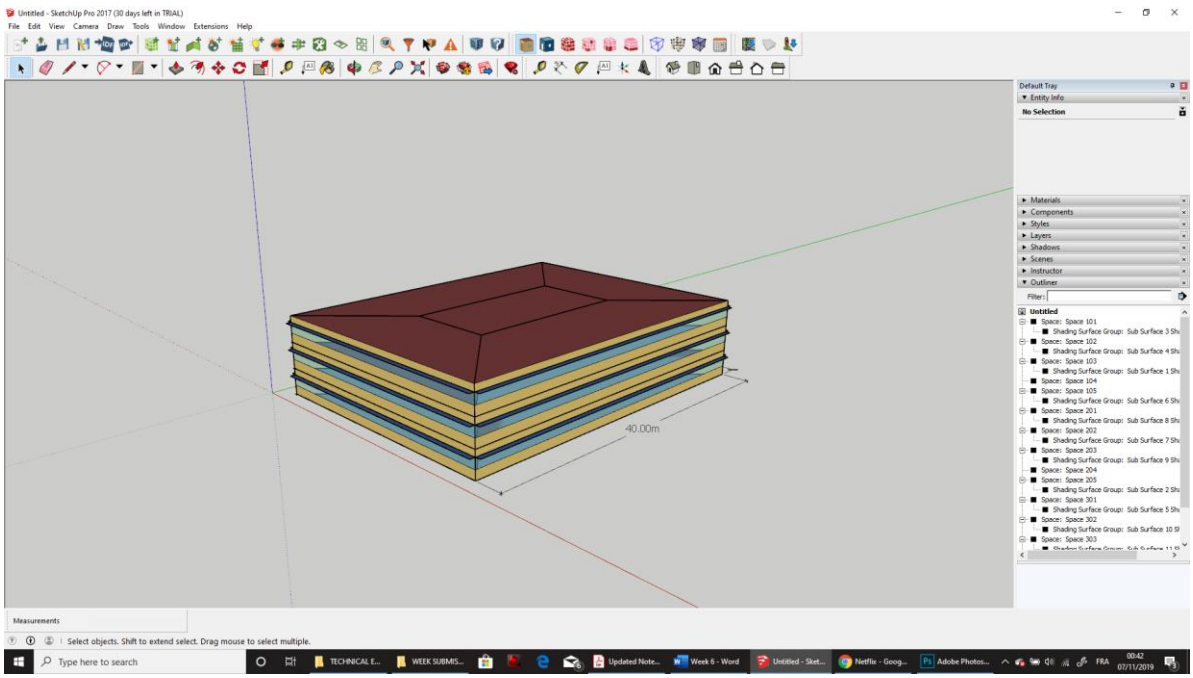
After that apply the Surface search tool to add shadows, and set the orientation from 90 to 270. Then click “Search Selection”.

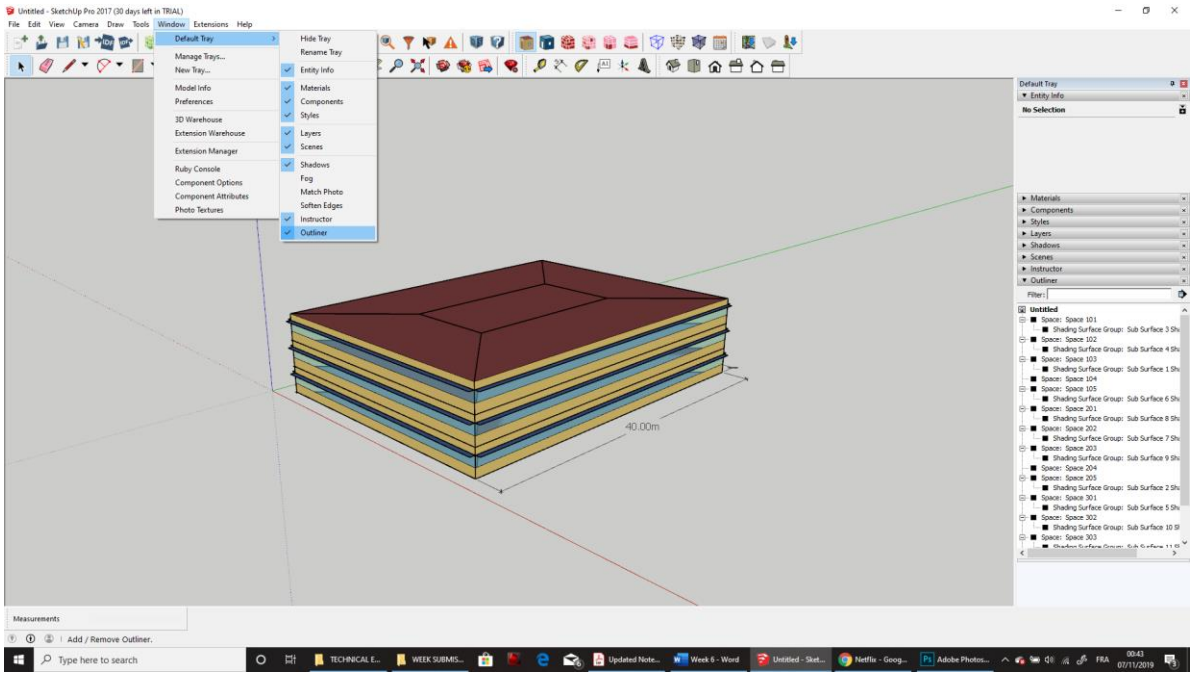

Surface Search
Type:
Construction:
Outside Boundary Condition:
Sun Exposure:
Wind Exposure:
Surface Orientation:
from 45 to 270 (Clockwise) - North is 0 degrees
Exclude Horizontal Surfaces
Only Show Non-Convex Surfaces
Only Show Surfaces With More Than 4 Vertices
Search Entire Model
Search Selection
Unhide All
Last Report
Cancel
40.00m
Default Tray
Entity Info
No Selection
Materials
Components
Styles
Layers
Shadows
Scenes
Instructor
Outliner
Untitled
Measurements
Select objects. Shift to extend select. Drag mouse to select multiple.


Surface Search
Surface Search (help)
Class:
Name:
Type:
Construction:
Outside Boundary Condition:
Sun Exposure:
Wind Exposure:
Surface Orientation:
from 45 to 270 (Clockwise) - North is 0 degrees
Exclude Horizontal Surfaces
Only Show Non-Convex Surfaces
Only Show Surfaces With More Than 4 Vertices
Search Entire Model
Search Selection
Unhide All
Last Report
Cancel
Default Tray
Entity Info
54 Faces
Materials
Components
Styles
Layers
Shadows
Scenes
Instructor
Outliner
Untitled
Measurements
Select objects. Shift to extend select. Drag mouse to select multiple.

In ordere to put the Overhangs, go to Extensions > Open Studio User Script > Add Overhang by Projection.

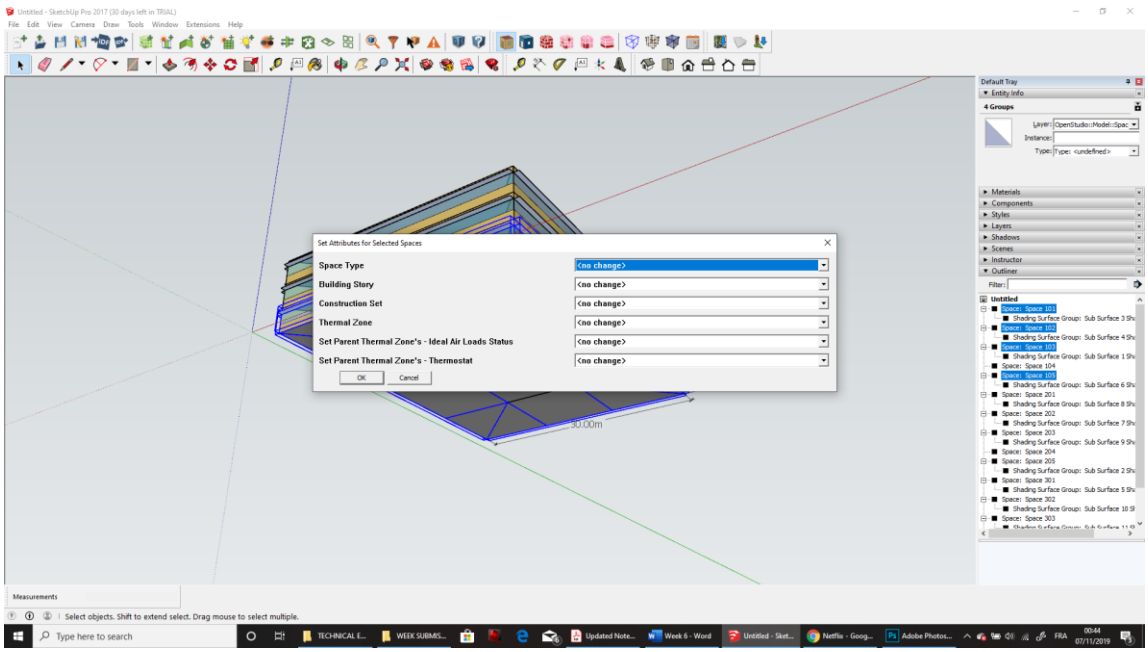


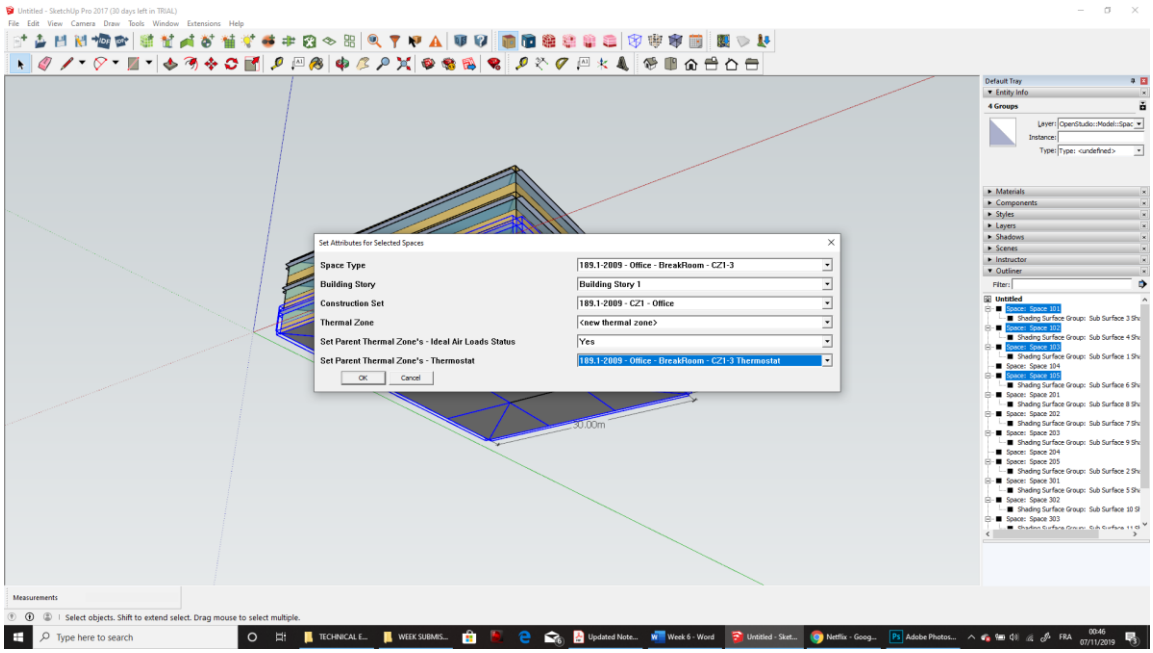




1. To put the attributes of selected spaces, you should set first the “Outliner” on the Default Tray, and then click the “Set Attributes for Selected Spaces” tool and set the attributes accordingly.

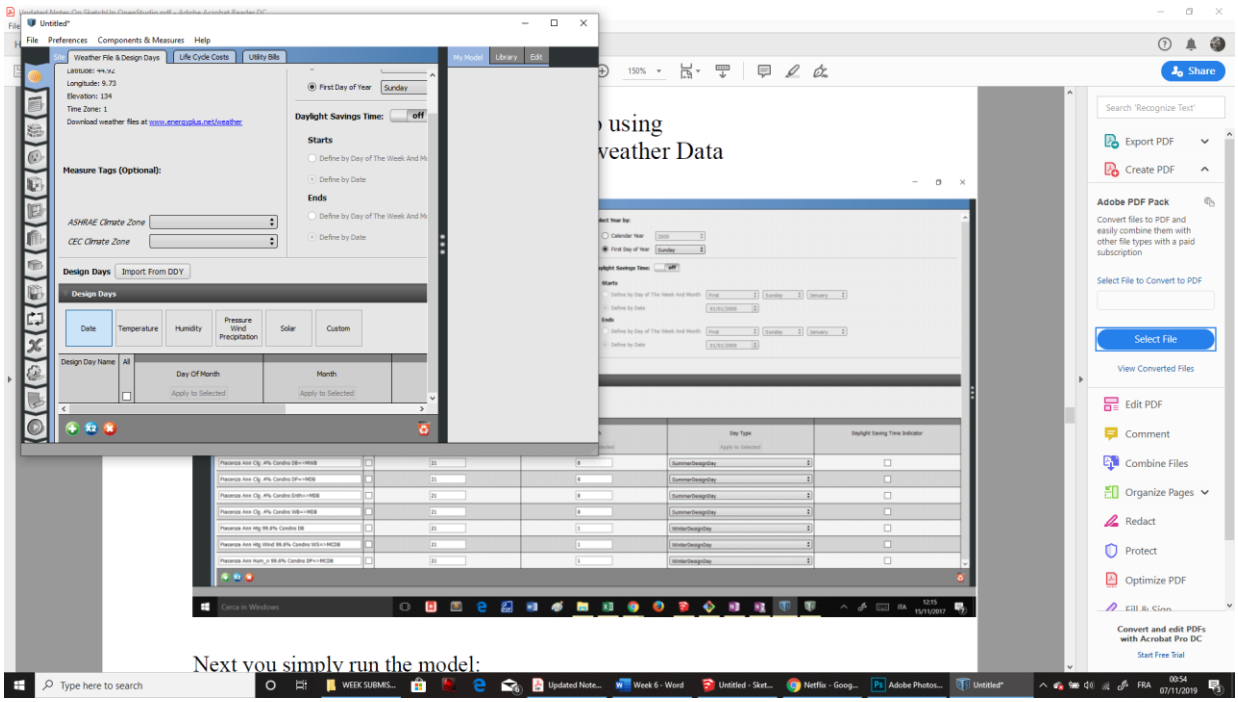
- First Floor:



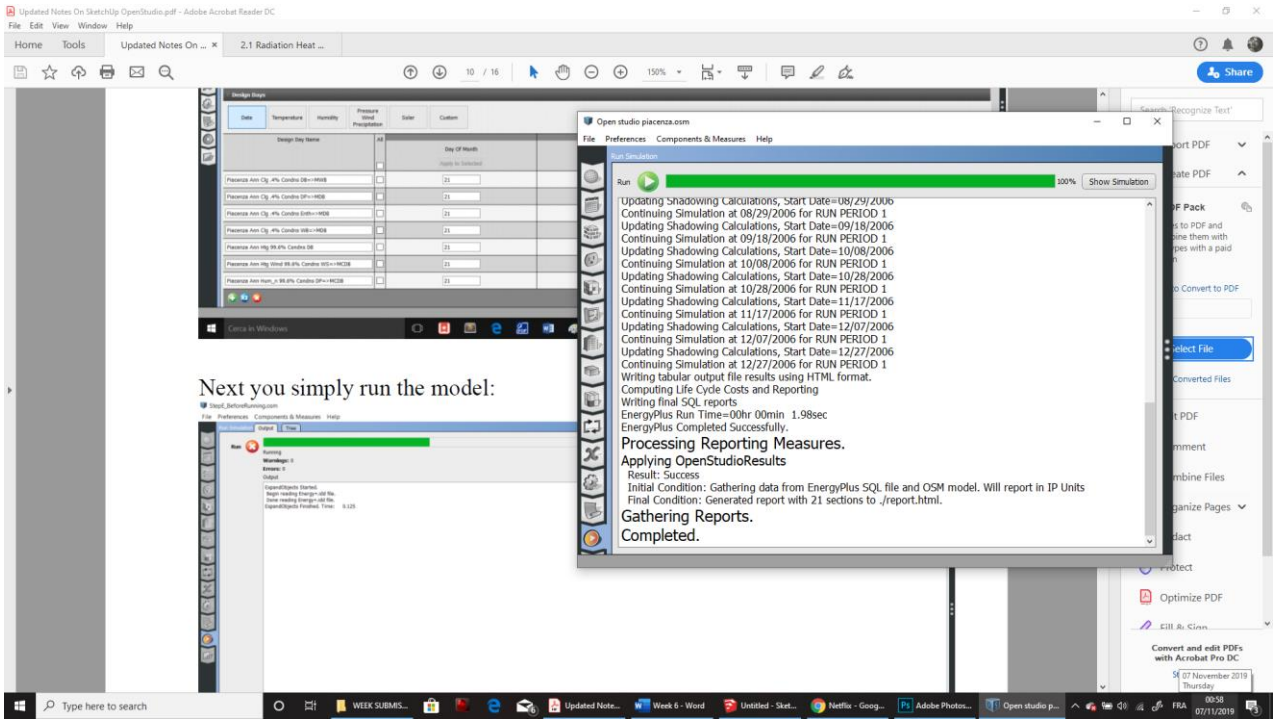


In order to save the file, remember that you should click “Save OpenStudio Model As” the write the file name and save it.

Open the OpenStudio File> Import the Weather file of Piacenza. You can Check the Space Type to see each floor’s attributes.



Run Simulation



To check the Result Summary afterwards. First Open Studio, then change from open studio results into Energy Plus