Weekly Submission - Week VI
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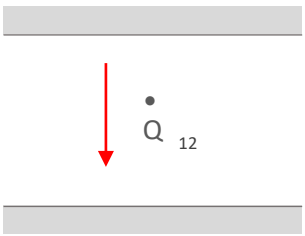
01. Considering the same example you solved in the previous assignment (radiative heat transfer between two parallel plates), how many shields with epsilon = 0.1 should you add in order to have the new heat transfer rate to be 1% of the case without shields ?
02. You should create a pdf file with screenshots 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!)

01.



Heat transfer without shield = 1,035.8 W
To be 1% of it, the heat transfer should be = 10.358 W

$$\dot{Q}_{12,\,N\ shield} = \frac{1}{N+1} \times \dot{Q}_{12,\,no\ shield}$$

$$10.358 = \frac{1}{N+1} \times 1{,}035.8\ W$$

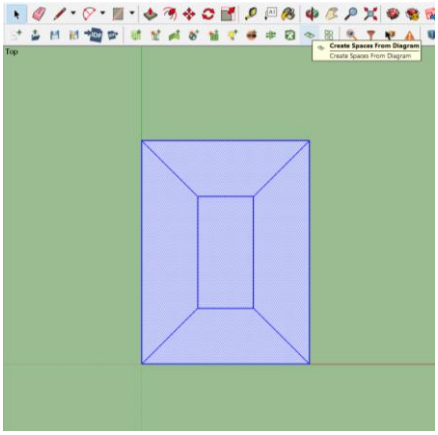
$$10.358 = \frac{1{,}035.8}{N+1} \rightarrow$$

$$10.358\ N + 10.358 = 1{,}035.8\ W$$

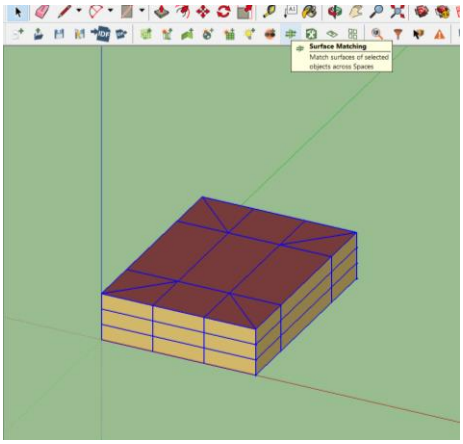
$$10.358\ N = 1{,}025.442$$

N = 99 shields

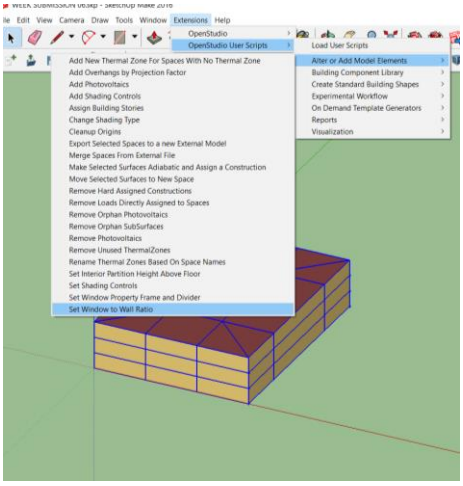
Step 01: Create a building with 3 floors



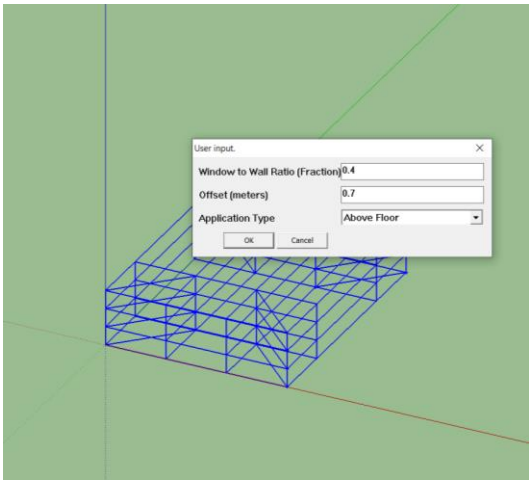
Step 02: With the building created, select the entire volum and click on “matching surfaces.



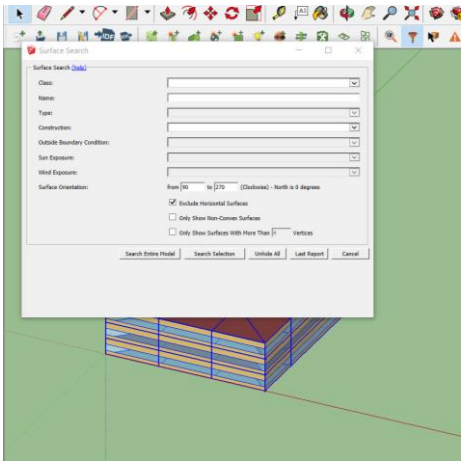
Step 03: Add Windows in Extensions > OpenStudio User Scripts Alter or Add Model Elements > Set window to Wall Ratio



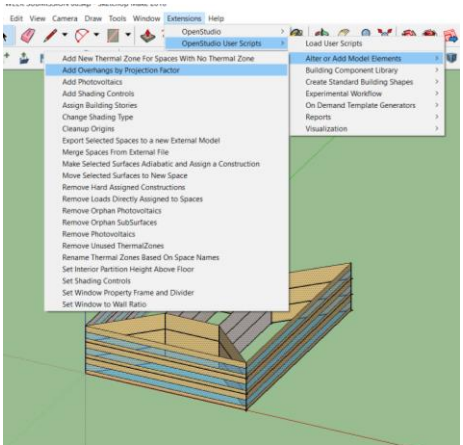
Step 04: Set the fraction of window to wall ratio, the offset in meters and the application type > ok



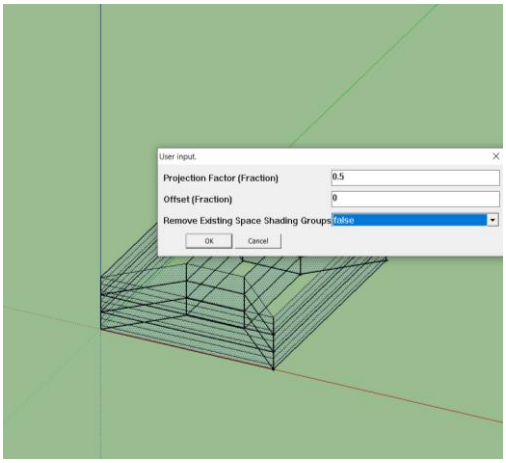
Step 05: Select the facade surface except the north, using search surface.



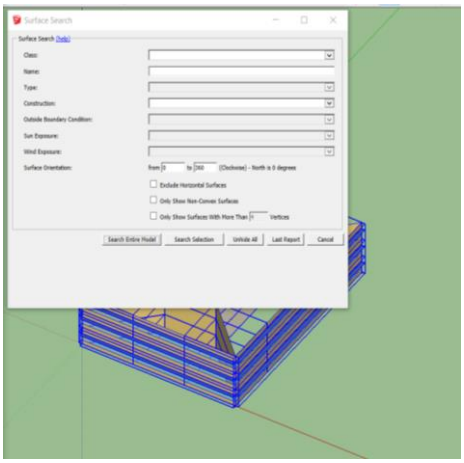
Step 06: Add overhang through Extensions> OpenStudio User Scripts > Alter or Add Model Elements > Add Overhangs by Projection Factor



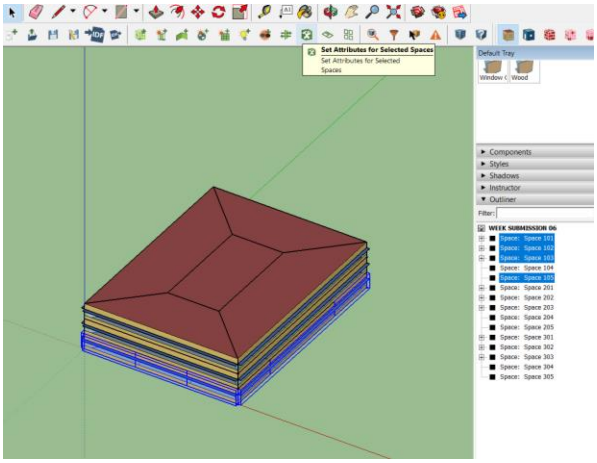
Step 07: Insert the values for projection factor, offset and mark as false the Remove Existing Space Shading Groups option.



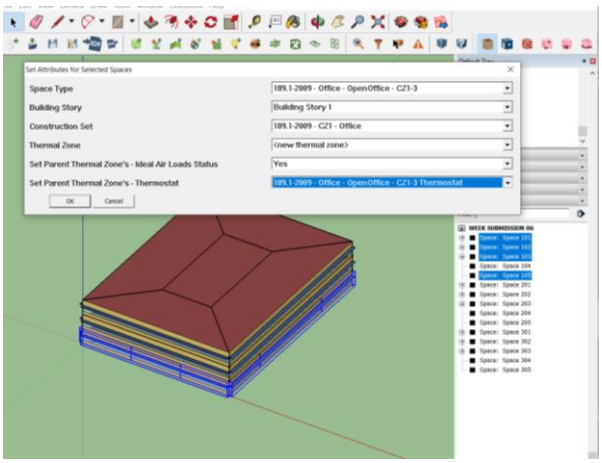
Step 08: Select the entire building and with the “Search Surface”tool choose 0-360 surfaces.



Step 09: Select the outer spaces in the first floor and click on “Set Attributes for Selected Spaces”

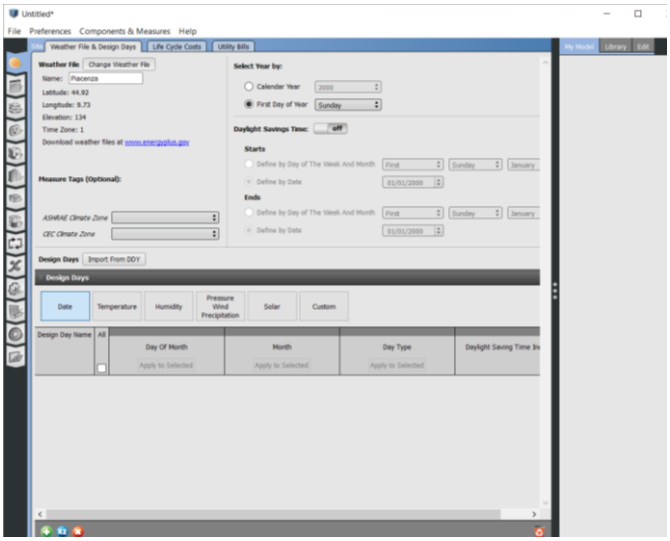


Step 10: Add specifications to the outer and inner spaces

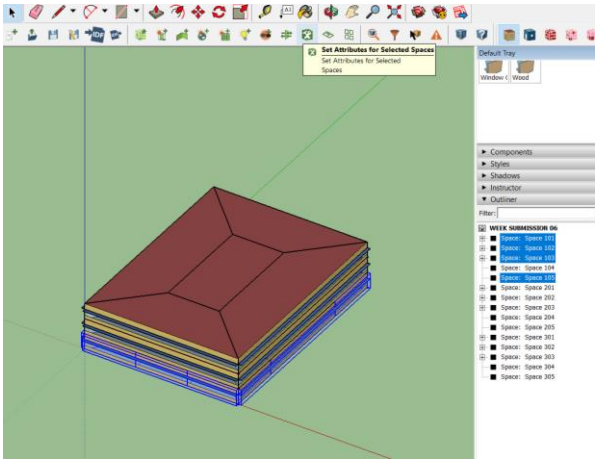


Step 11: Repeat the process for the second and third floor

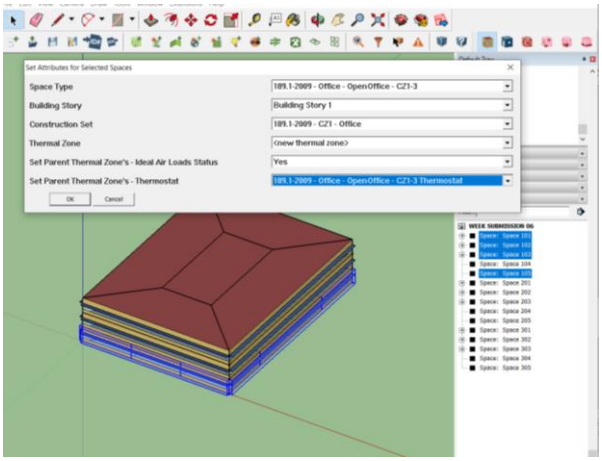
Step 12 Open OpenStudio Application, Open your file and Set Piacenza weather in Weather File



Step 15: Select the outer spaces in the first floor and click on “Set Attributes for Selected Spaces”

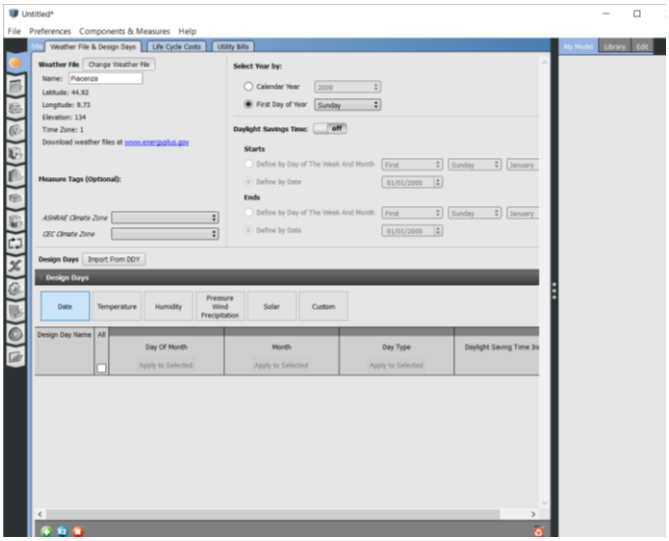


Step 16: Add specifications to the outer and inner spaces

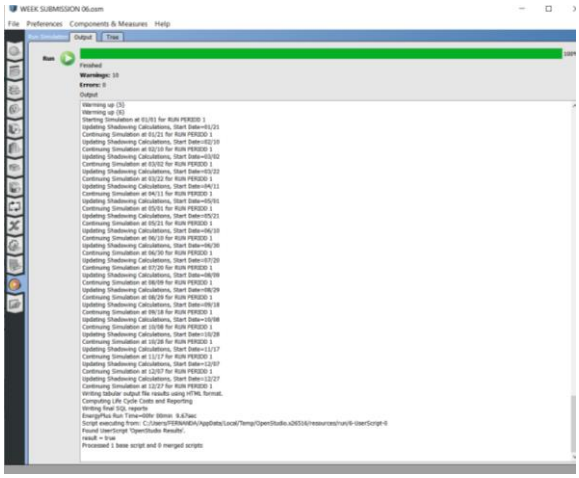


Step 19: Repeat the process for the second and third floor

Step 21: Open OpenStudio Application, Open your file and Set Piacenza weather in Weather File



Step 13: Run simulation process



Step 14: Review the results clicking on Results Summary