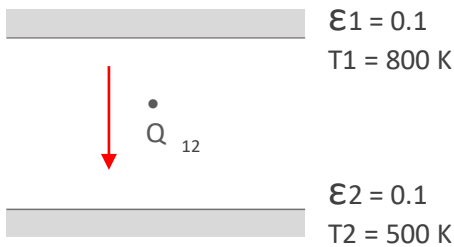


01. Considering the same example you solved in the previous assignment (radiative heat transfer between two parallel plates), how many shields with $\epsilon = 0.1$ should you add in order to have the new heat transfer rate to be 1% of the case without shields?

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

$$= 10.358 \text{ W}$$

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

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

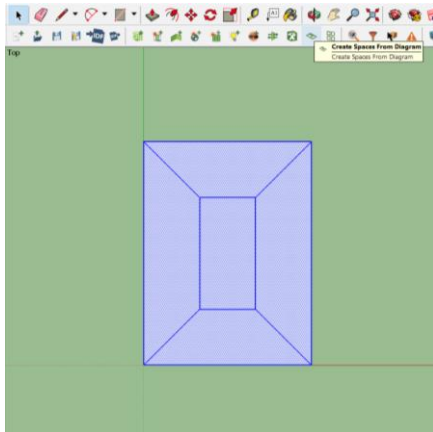
$$10.358 = \frac{1,035.8}{N+1} \rightarrow$$

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

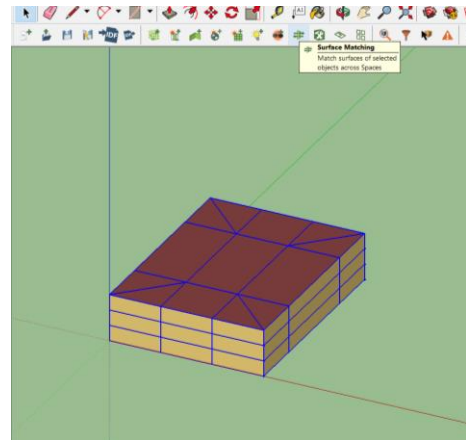
$$10.358 N = 1,025.442$$

$$N = 99 \text{ shields}$$

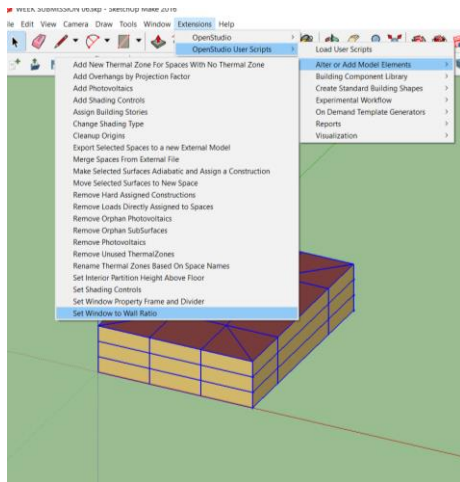
Step 01: Create a building with 3 floors



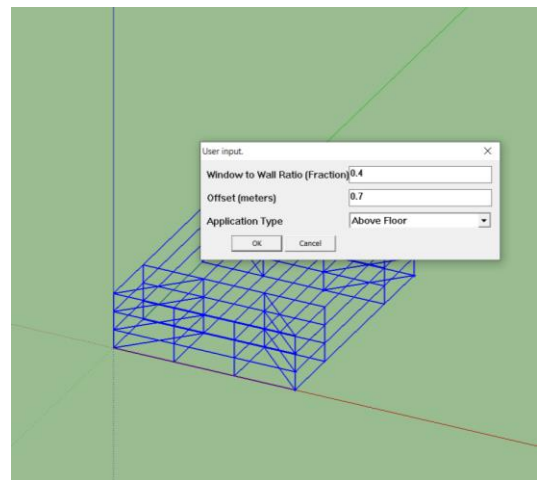
Step 02: With the building created, select the entire volum and click on “matching surfaces.”



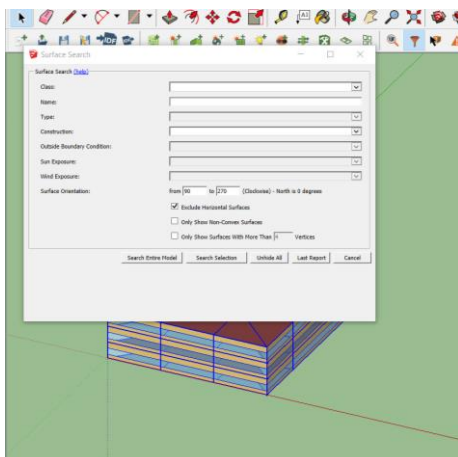
Step 03: Add Windows in Extensions > OpenStudio User Scripts > Alter or Add Model Elements > Set window to Wall Ratio



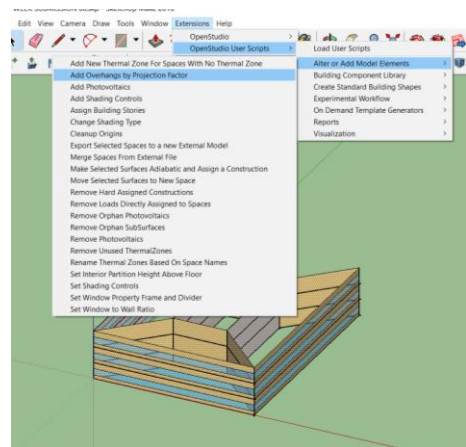
Step 04: Set the fraction of window to wall ratio, the offset in meters and the application type > ok



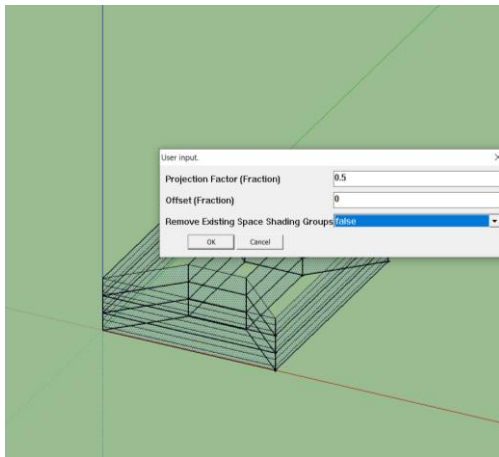
Step 05: Select the facade surface except the north, using search surface.



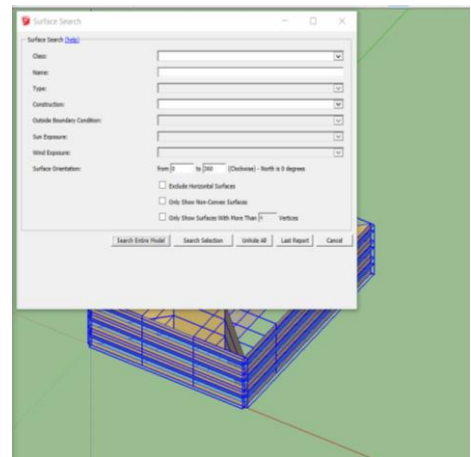
Step 06: Add overhang through Extensions> OpenStudio User Scripts > Alter or Add Model Elements > Add Overhangs by Projection Factor



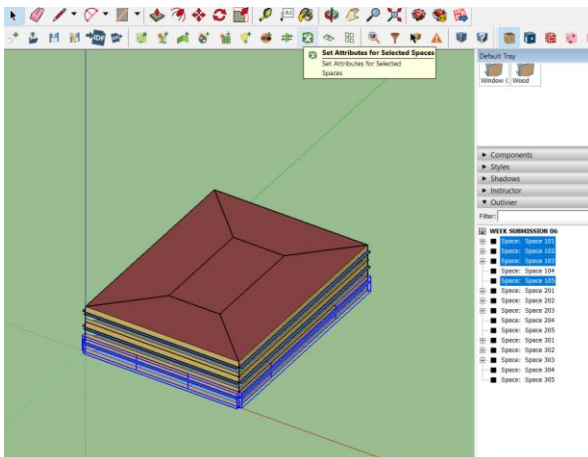
Step 07: Insert the values for projection factor, offset and mark as false the Remove Existing Space Shading Groups option.



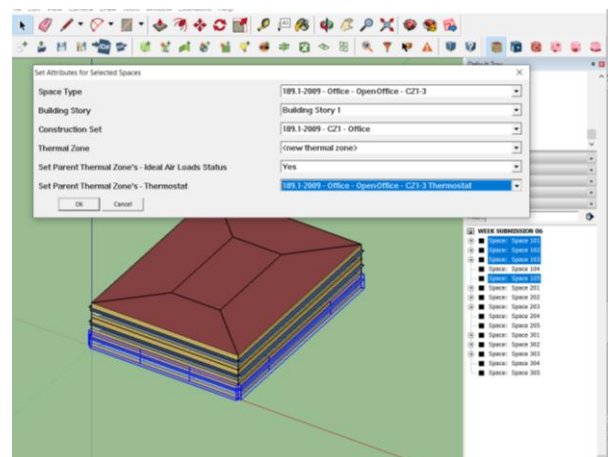
Step 08: Select the entire building and with the “Search Surface” tool choose 0-360 surfaces.



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

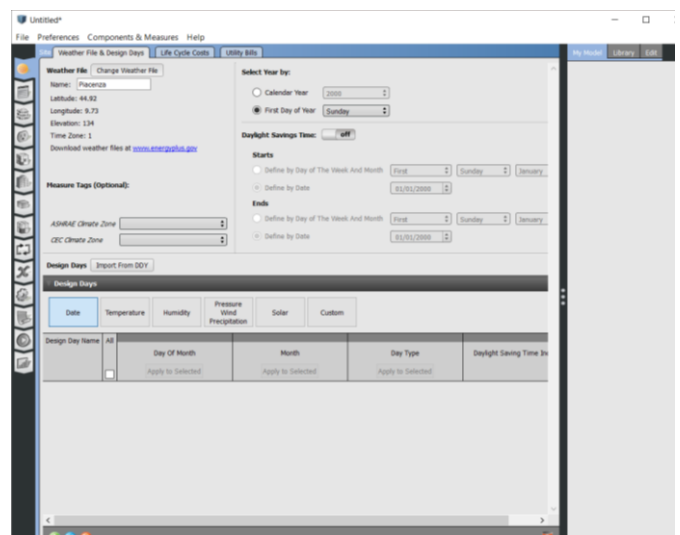


Step 10: Add specifications to the outer and inner spaces

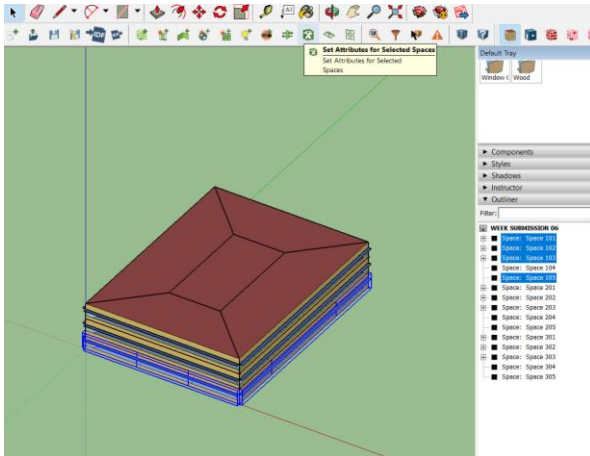


Step 11: Repeat the process for the second and third floor

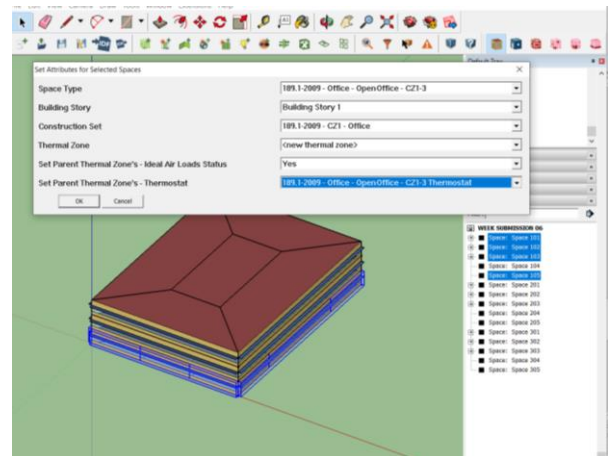
Step 12 Open OpenStudio Application, Open your file and Set Piacenza weather in Weather File



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

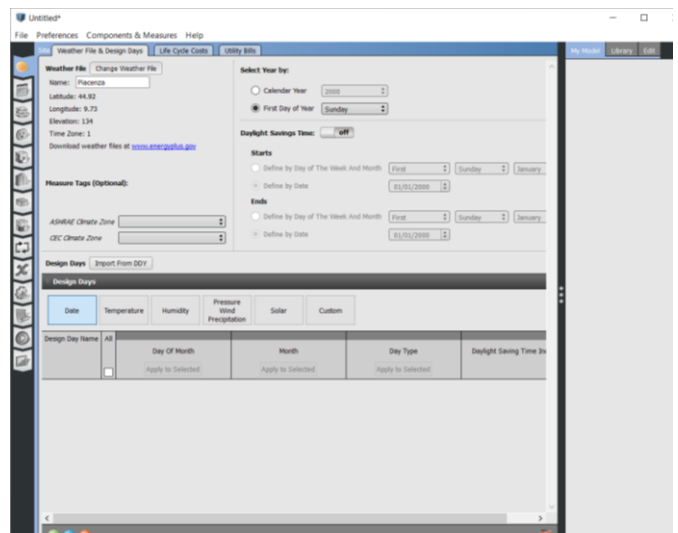


Step 16: Add specifications to the outer and inner spaces



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



[illegible]

Results Summary

Reports:

OpenStudio Results

Open ResultsViewer for Detailed Reports

Model Summary

Annual Overview

Monthly Overview

Utility Bills/Rates

Envelope

Space Type Breakdown

Space Type Summary

Interior Lighting Summary

Plug Loads Summary

Exterior Lighting

Water Use Equipment

HVAC Load Profiles

Zone Conditions

Zone Overview

Zone Equipment Detail

Air Loops Detail

Plant Loops Detail

Outdoor Air

Cash Flow

Site and Source Summary

Schedule Overview

No Data to Show for Exterior Lighting

Water Use Equipment

No Data to Show for Water Use Equipment

HVAC Load Profiles

Monthly Load Profiles - view table

Month	Cooling Load (MBtu)	Heating Load (MBtu)	Total Load (MBtu)
Jan	5	80	85
Feb	10	55	65
Mar	20	35	55
Apr	30	15	45
May	75	5	80
Jun	100	0	100
Jul	155	0	155
Aug	135	0	135
Sep	85	0	85
Oct	50	5	55
Nov	20	25	45
Dec	5	85	90

Zone Conditions

Temperature (Table values represent hours spent in each temperature range)

Zone	Unmet Htg	Unmet Cng	< 56 (F)	56- 61 (F)	61- 66 (F)	66- 68 (F)	68- 70 (F)	70- 72 (F)	72- 74 (F)	74- 76 (F)	76- 78 (F)	78- 83 (F)	>= 88 (F)	Unmet Cng	Unmet Htg	Mean Temp
	(h)	(h)	(F)	(F)	(F)	(F)	(F)	(F)	(F)	(F)	(F)	(F)	(h)	(h)	(F)	