

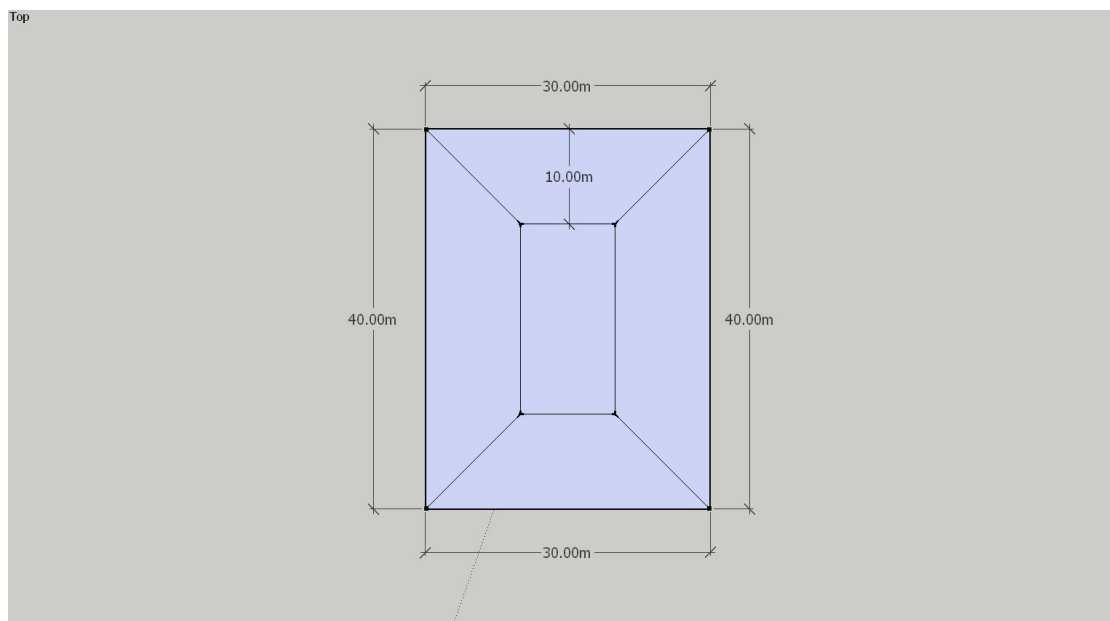
TASK 1 Considering the same example you solved in the previous assignment (radiative heat transfer between two parallel plates), how many shields with epsilon = 0.1 should you add in order to have the new heat transfer rate to be 1% of the case without shields ?

The new heat transfer rate is 1% of \dot{q}_{12}

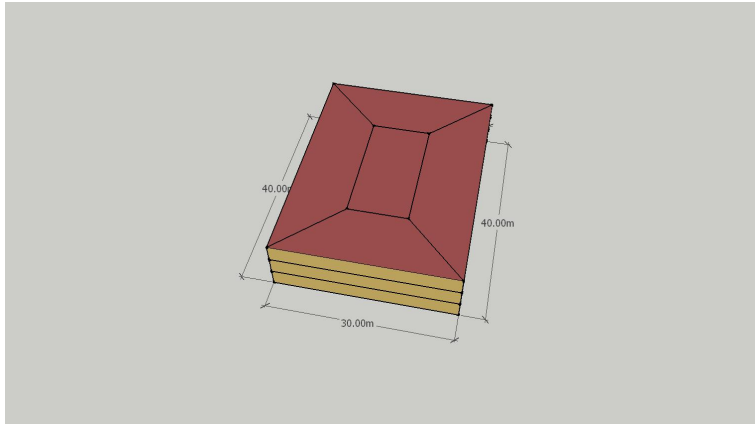
$$\begin{aligned}\dot{q}_{12, Nshields} &= \frac{1}{100} \dot{q}_{12} \\ \Rightarrow \frac{\sigma(T_1^4 - T_2^4)}{\frac{1}{\epsilon_1} + \frac{1}{\epsilon_2} - 1 + n(\frac{1}{\epsilon_3} + \frac{1}{\epsilon_3} - 1)} &= \frac{1}{100} \times \frac{\sigma(T_1^4 - T_2^4)}{\frac{1}{\epsilon_1} + \frac{1}{\epsilon_2} - 1} \\ \Rightarrow \frac{5.67 \times 10^{-8} \times (800^4 - 500^4)}{\frac{1}{0.2} + \frac{1}{0.7} - 1 + n(\frac{1}{0.1} + \frac{1}{0.1} - 1)} &= \frac{1}{100} \times \frac{5.67 \times 10^{-8} \times (800^4 - 500^4)}{\frac{1}{0.2} + \frac{1}{0.7} - 1} \\ \Rightarrow \frac{1}{0.2} + \frac{1}{0.7} - 1 + n(\frac{1}{0.1} + \frac{1}{0.1} - 1) &= 100 \times (\frac{1}{0.2} + \frac{1}{0.7} - 1) \\ \Rightarrow n &= 28\end{aligned}$$

TASK2 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!)

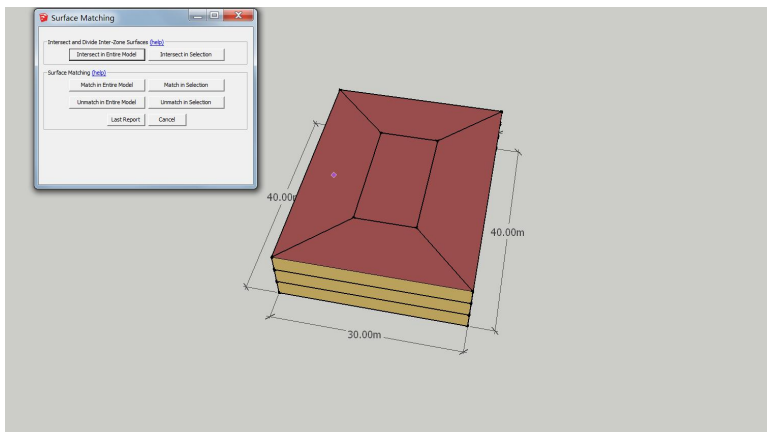
1. Drawing the plan of the building.



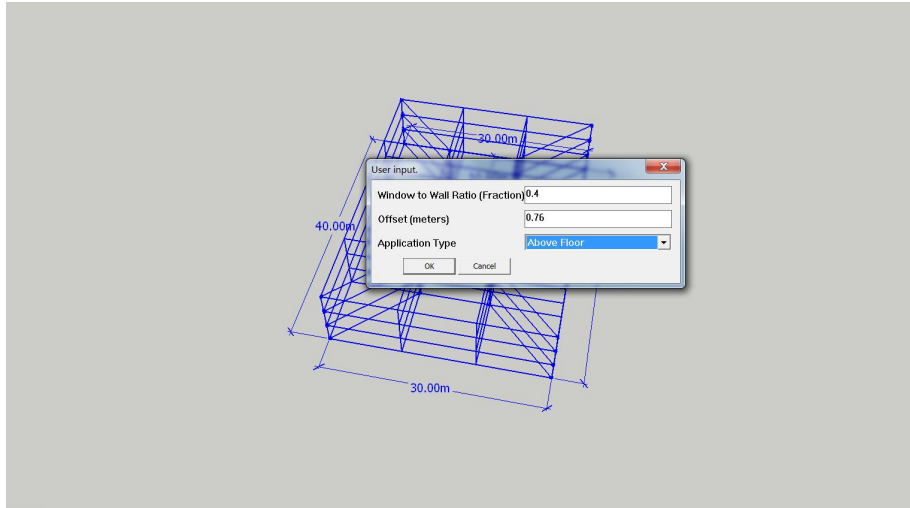
2. Choosing it and using the tool: create spaces from diagram and then modify the height of floor is 10, the number of floor is 3.



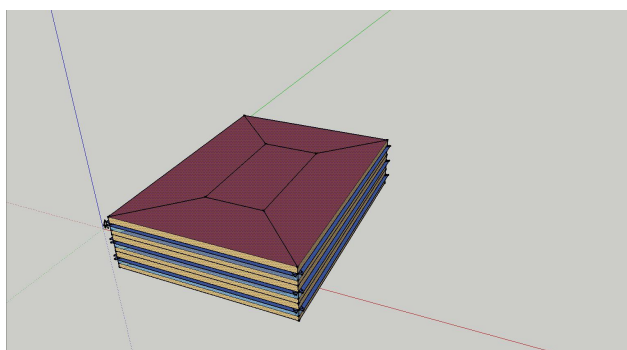
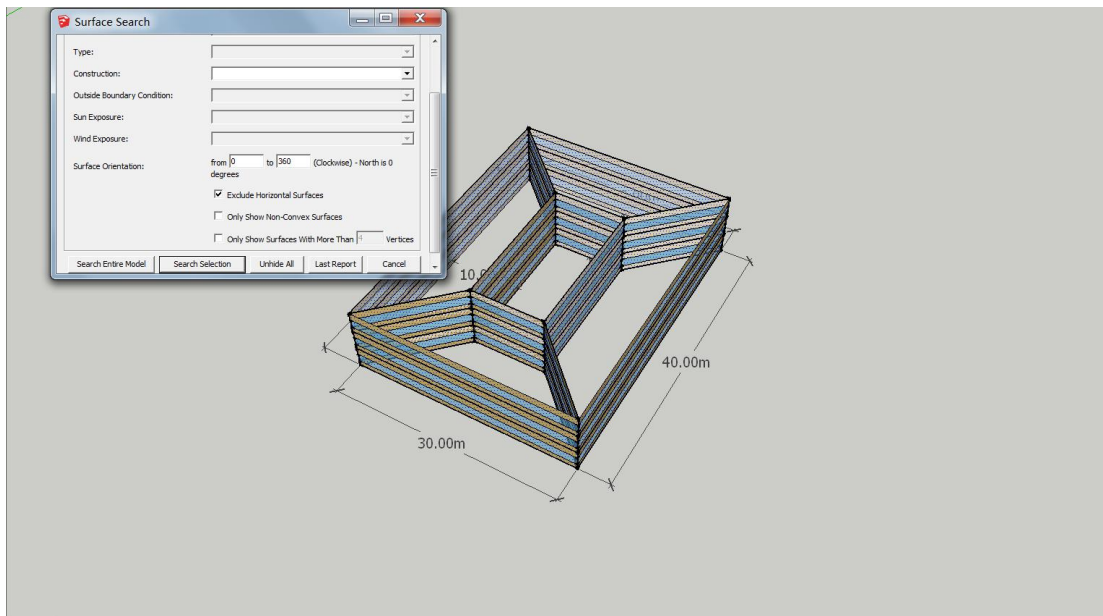
3. Selecting the model and using tool named surface matching, clicking “match entire model”.



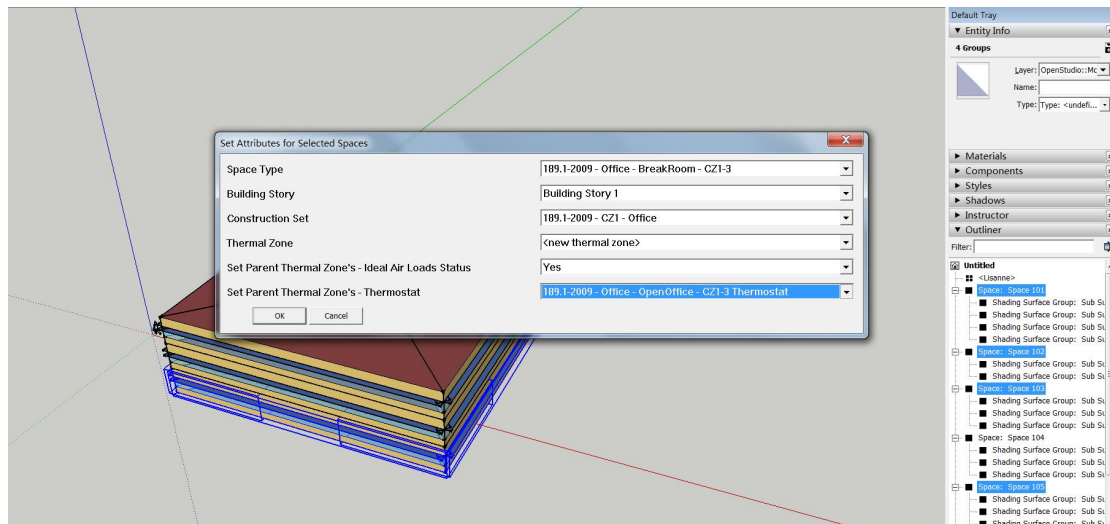
4. Adding windows, clicking “openstudio user scripts” “alter or add model elements” “set window to wall ratio”



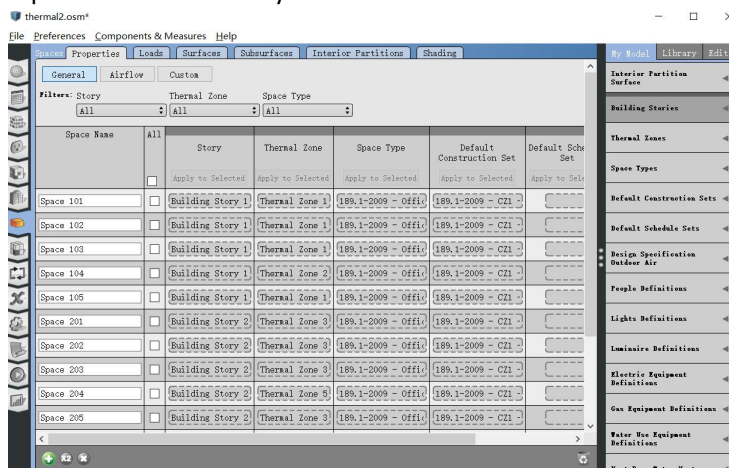
5. Adding overhang to those facades and clicking “search surface” “0-360” “exclude horizontal” and “search selection”



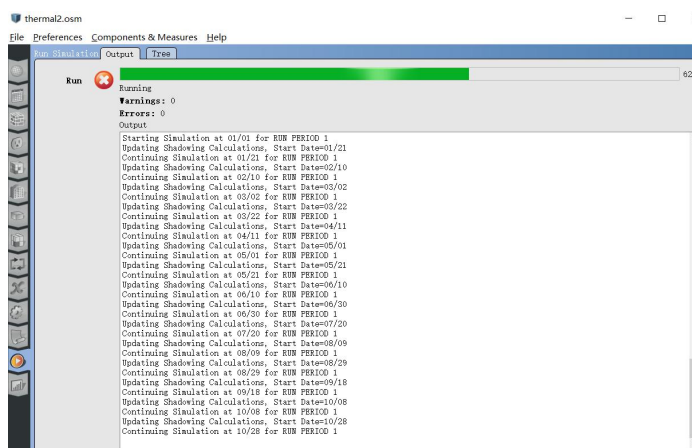
6. Opening outline and choosing the spaces in the list. Using the tool “set attributes to selected spaces” and choosing attributes



7. Opening software: open studio , adding weather file , choosing piacenza of the weather data.
open the osm file that you did



8. Let's run the software



9. Finally, you can get the results on the final lab

thermal2.com

ResultsViewer

File Preferences Help

Select FileResultsViewer.p25712

Filter Criteria

Clear

Table View

Variable Na

DistrictCooling-Facility

DistrictHeating-Facility

Electricity-Facility

Site Outdoor Air Drybu

Site Outdoor Air Drybu

Zone Air Relative Humid

Zone Air Relative Humid

Zone Air Relative Humid

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Zone Air Relative Humid

Zone Air Temperature

Zone Air Temperature

Zone Air Temperature

Zone Air Temperature

Zone Air Temperature

Zone Air Temperature

Zone Air Temperature

Welcome (ResultsViewer.p25712) EplusTol.htm

Table of Contents

Program Version:EnergyPlus, Version 8.5.0-c87e61b44b, YMD=2019.11.09 15:27

Tabular Output Report in Format: HTML

Building: Building 1

Environment: RW PERIOD 1 ** Piacenza - ITA ICDC WMO#-160840

Simulation Timestamp: 2019-11-09 15:27:11

Table of Contents

Report: Annual Building Utility Performance Summary

For: Entire Facility

Timestamp: 2019-11-09 15:27:11 Values gathered over 8760.00 hours

Site and Source Energy

	Total Energy [GJ]	Energy Per Total Building Area [MJ/m2]	Energy Per Conditioned Building Area [MJ/m2]
Total Site Energy	3219.54	894.32	894.32
Net Site Energy	3219.54	894.32	894.32
Total Source Energy	9973.70	2770.47	2770.47
Net Source Energy	9973.70	2770.47	2770.47

Site to Source Energy Conversion Factors

	Site>Source Conversion Factor
Electricity	3.167

Open ResultsViewer for Detailed Reports

Value	Units
Building 1	building_name
3.051535	kBtu
38.750	m^2
78.75	kBtu/m^2

160840