

Week-6 task

Q1. 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 3 without shields?

ANS:

Case1: without shields

$$\epsilon_1 = 0.1$$

$$\epsilon_2 = 0.1$$

$$T_1 = 800\text{K}$$

$$T_2 = 500\text{K}$$

Net heat transfer without shields

$$Q_{\text{net}}/A = 5.67 \times 10^{-8} (800^4 - 500^4) / (1/0.1 + 1/0.1) - 1 = 1035.82 \text{W/m}^2$$

Case1: with shields to reduce the heat transfer by 1%

$$\epsilon_1 = 0.1$$

$$\epsilon_2 = 0.1$$

$$T_1 = 800\text{K}$$

$$T_2 = 500\text{K}$$

$$\epsilon_n = 0.1$$

Heat transfer with n shields,

In between

$$= 1\% \text{ of } Q_{\text{net}}/A$$

$$= 10.358 \text{W/m}^2$$

Heat transfer with n shields in between,

$$Q_n/A = 1/(N-1) \times Q_{\text{net}}/A = 1/100 \times Q_{\text{net}}/A$$

$$= N = 99$$

$$10.35 = 1/Q_{\text{net}} 1035.82$$

$$N=99$$

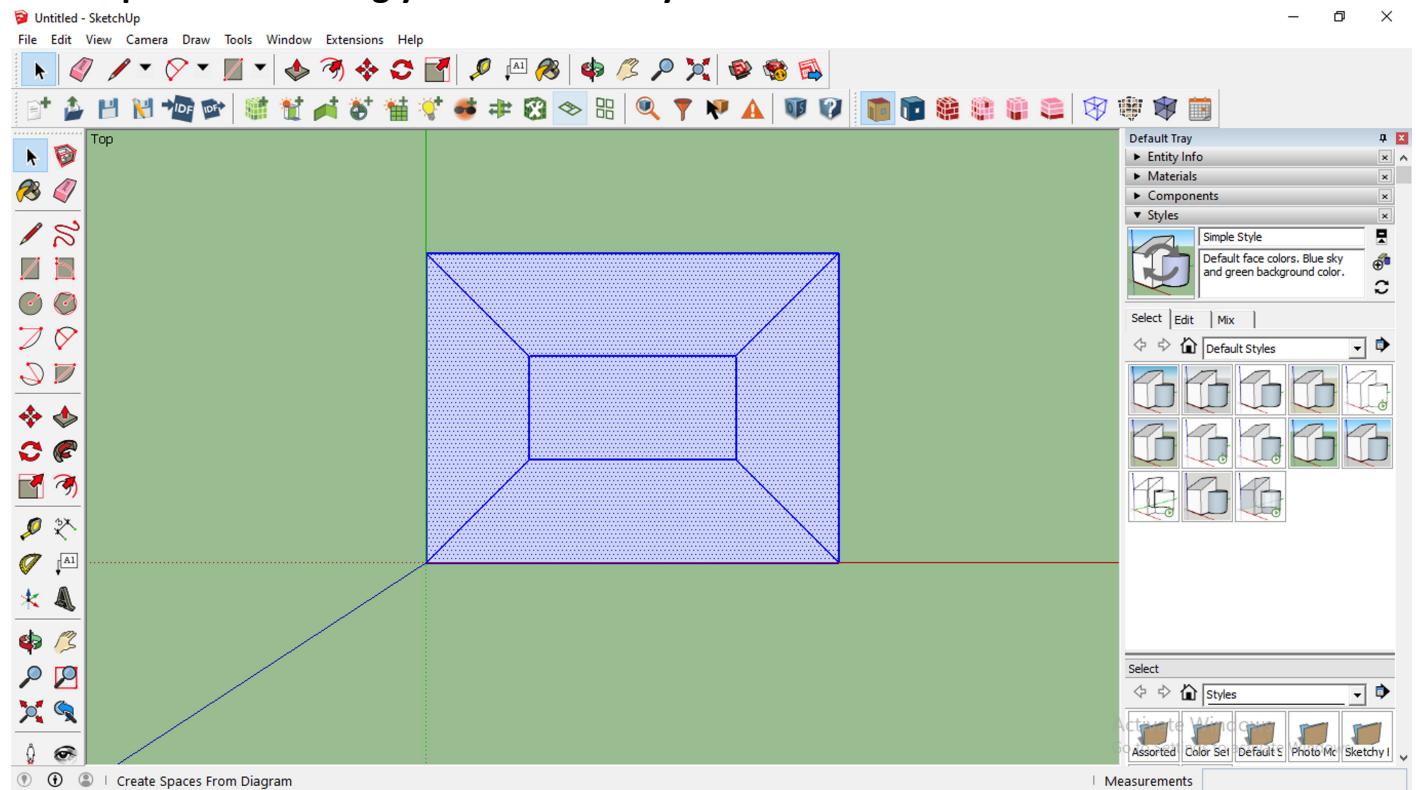
So the number of shields is 99

Q2.

Create PDF with screenshots of the steps and explain the reason behind

Step -1

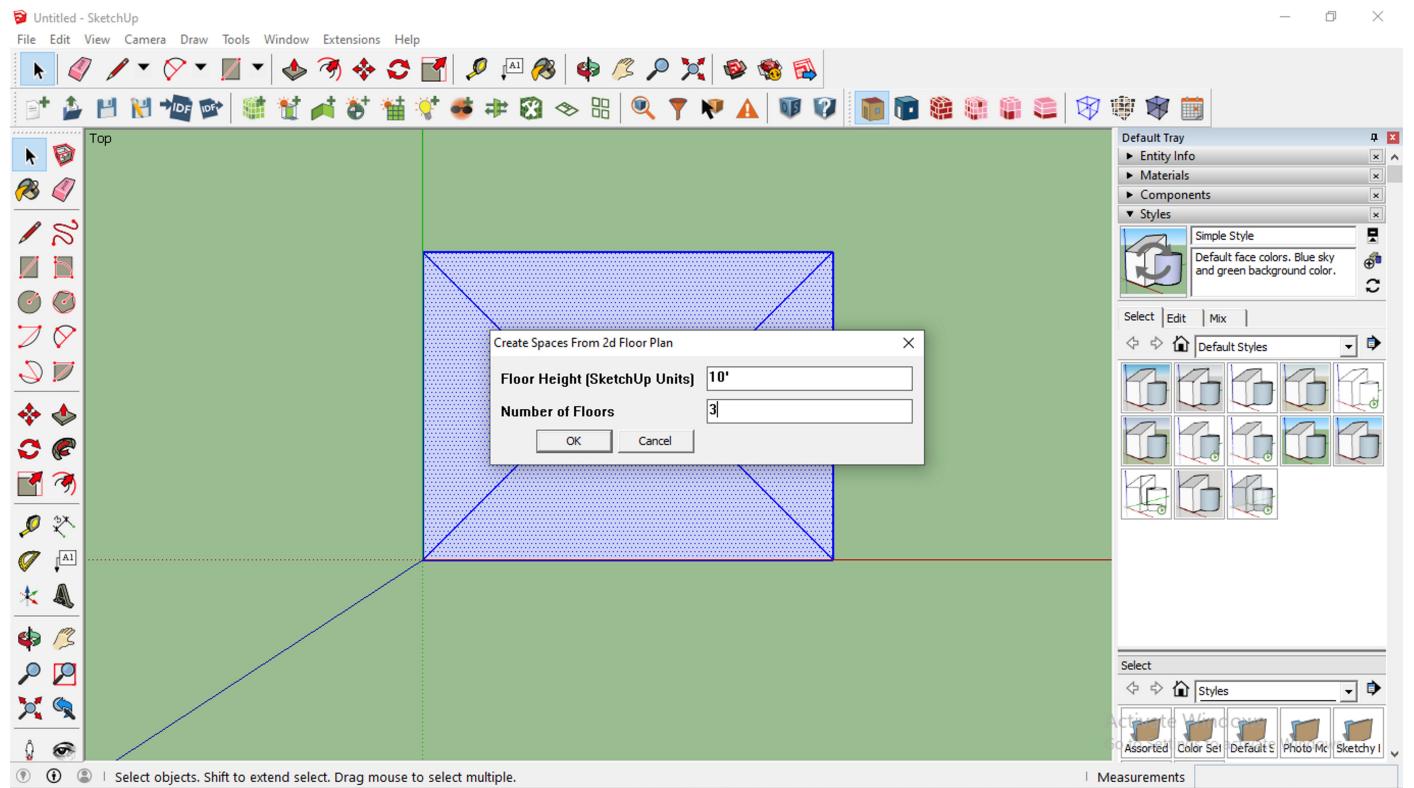
Create plan of a building you want to analyze



Step -2

After that use the tool create space from diagram to add the stories in the building,

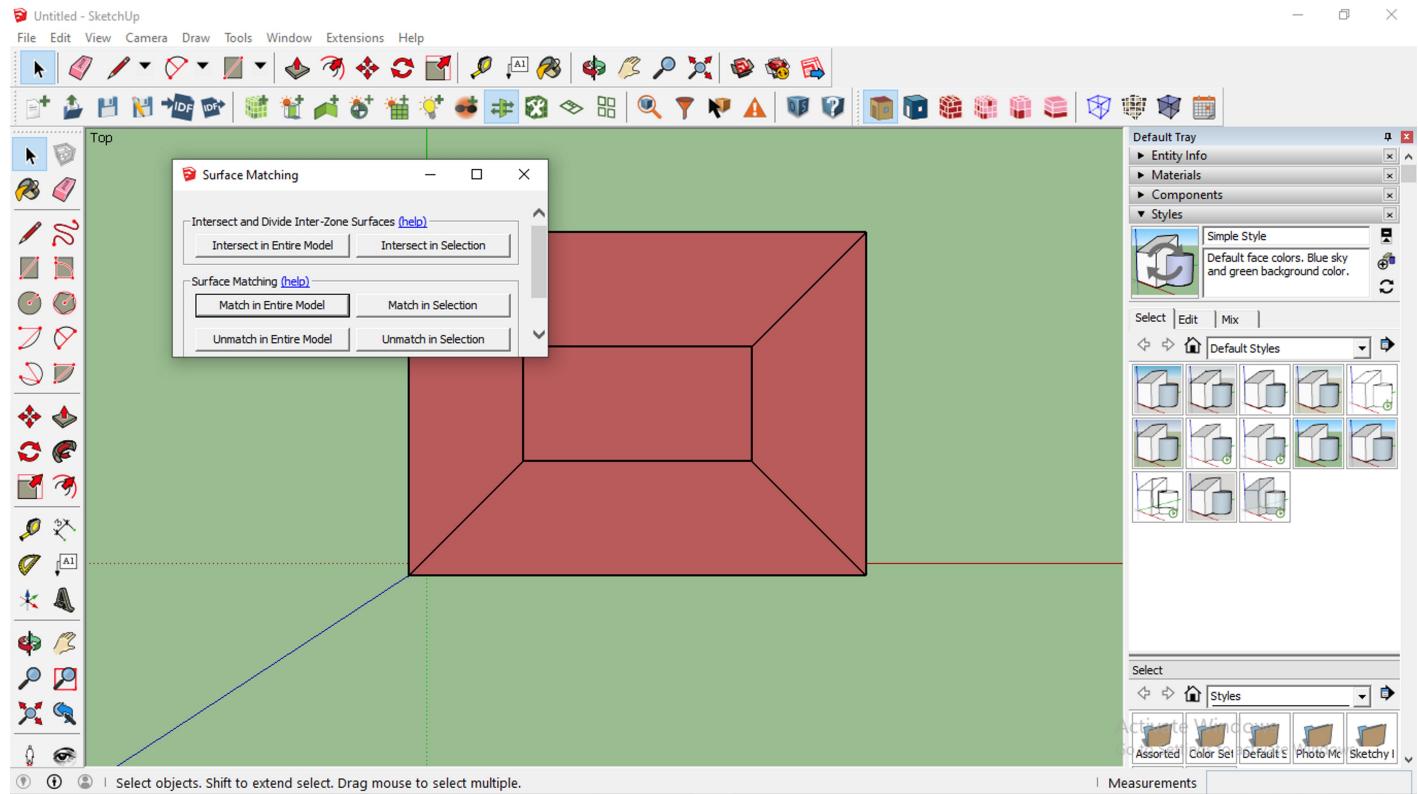
Enter the data as followed,



Step -3

Then match all the surface of the building using 'surface match tool'.

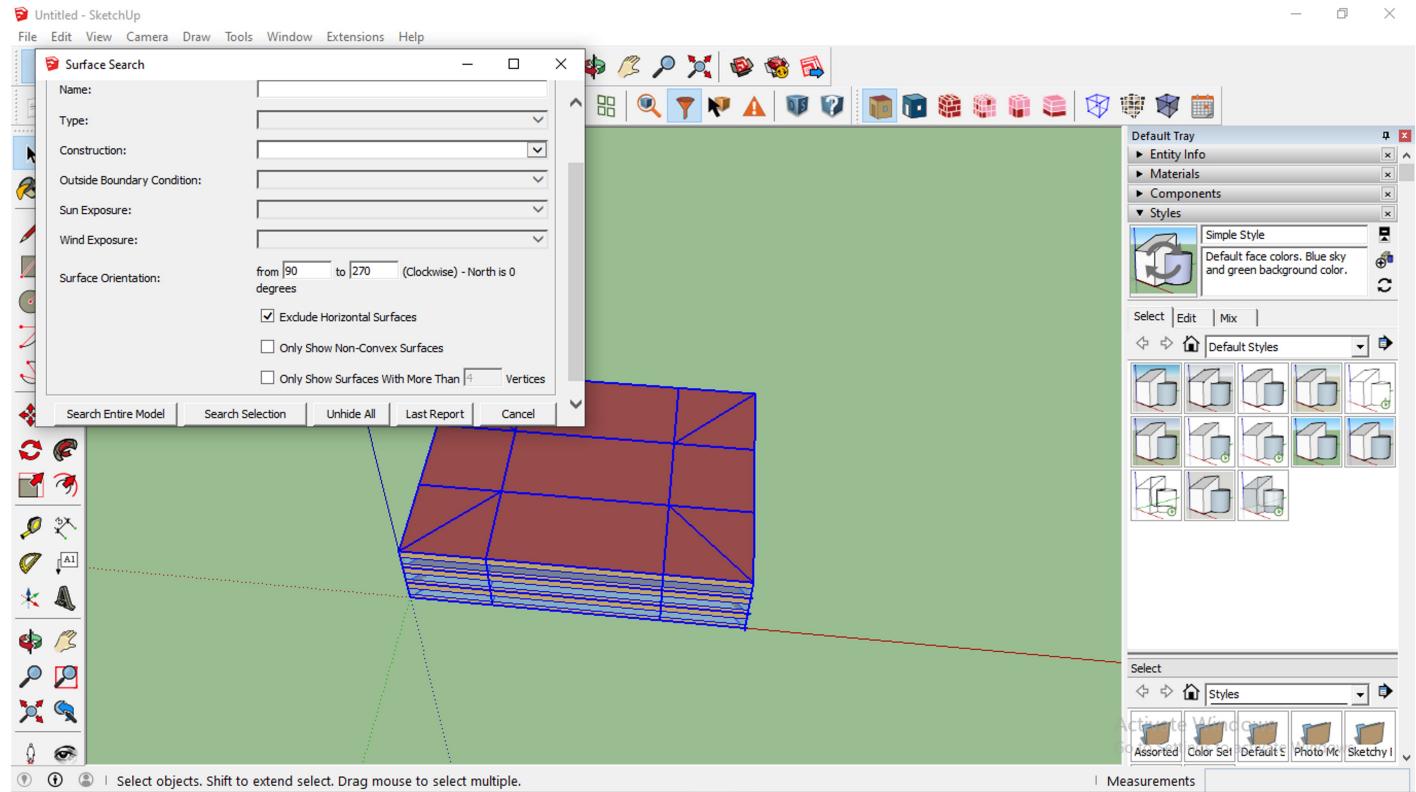
Click on match the entire model,



Step -4

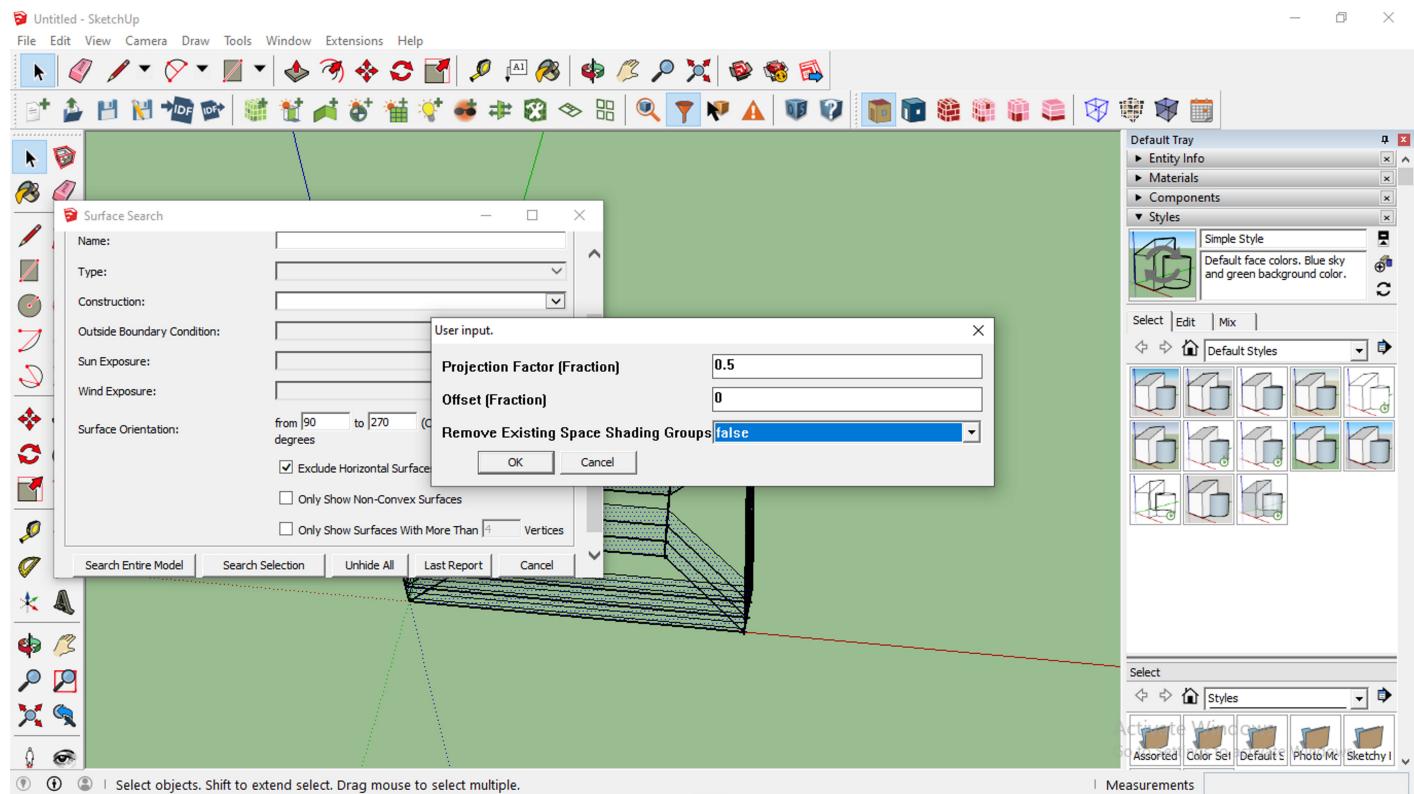
Then select the model expect the north face and by using 'surface search' filter the area

Provide values as you can see and click on search entire model,



Step -5

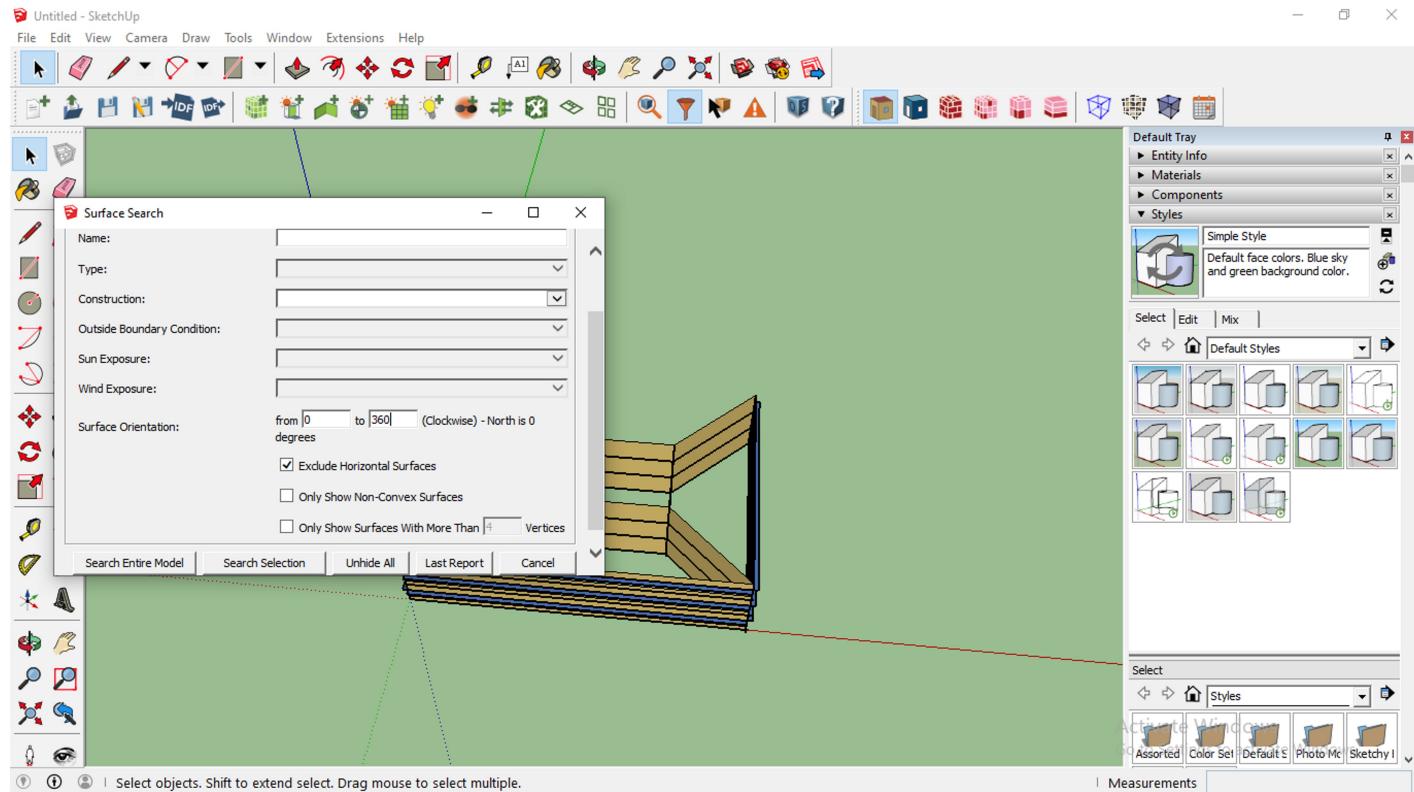
Go to extensions - open studio - add overhangs by projection factor-ok



Step -6

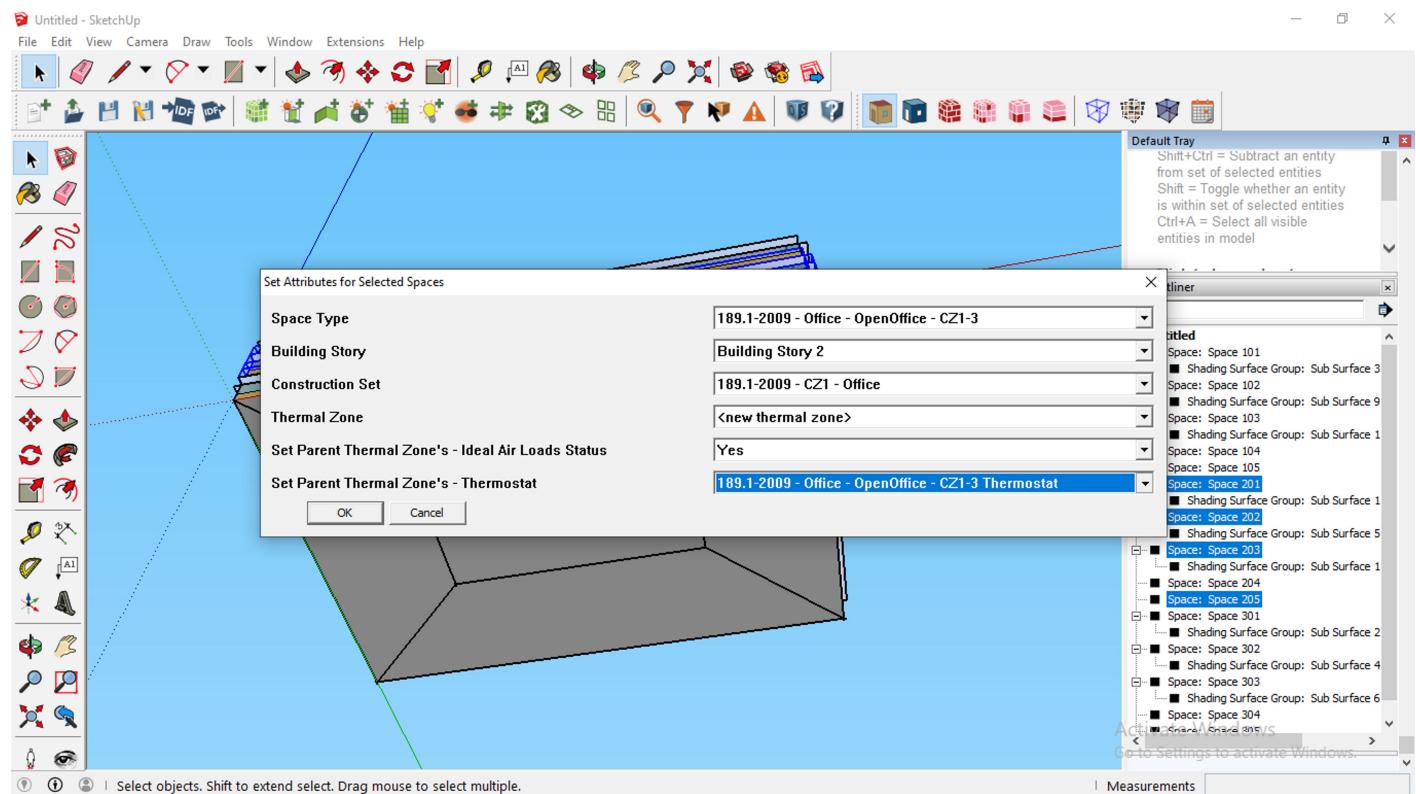
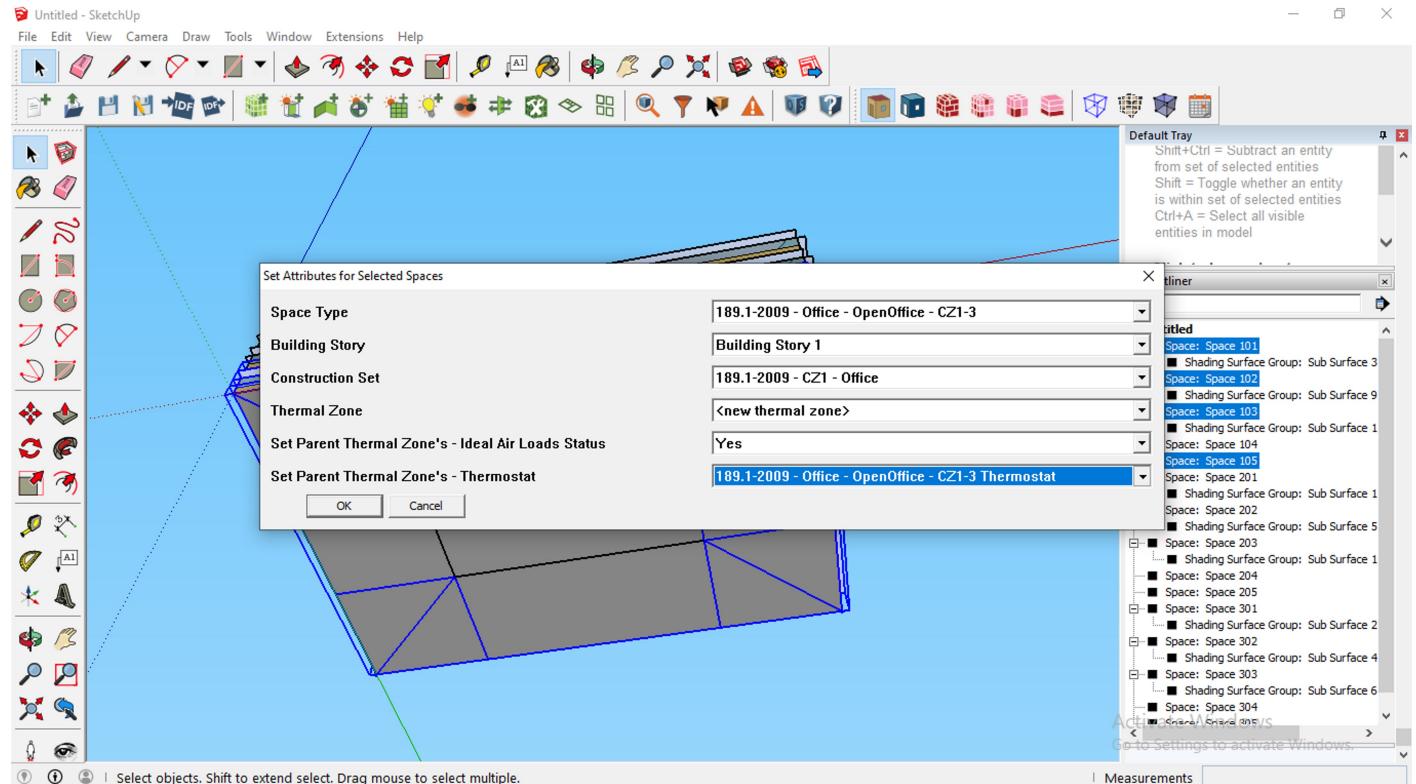
By use the tool 'surface search' filter the area

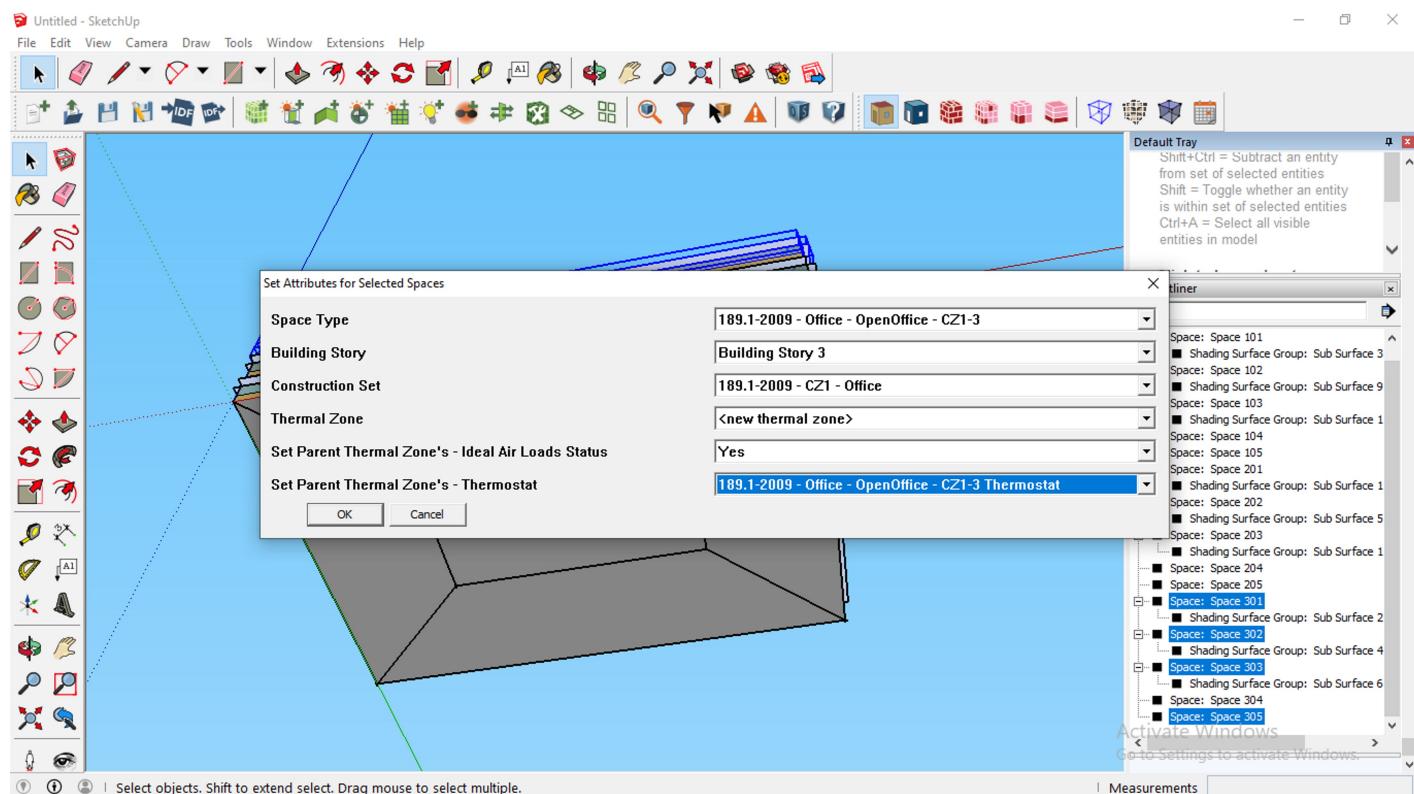
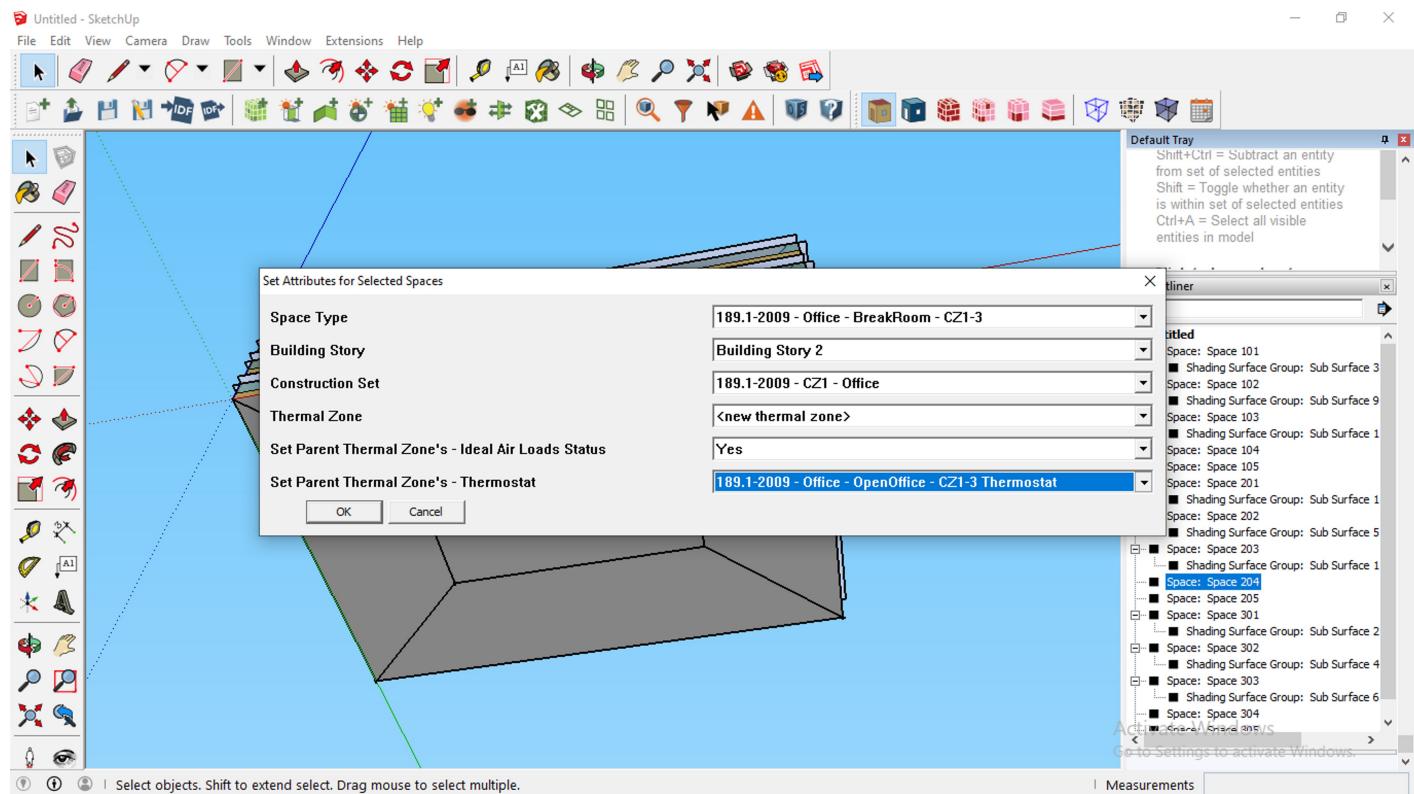
Provide values as you can see and click on search entire model,

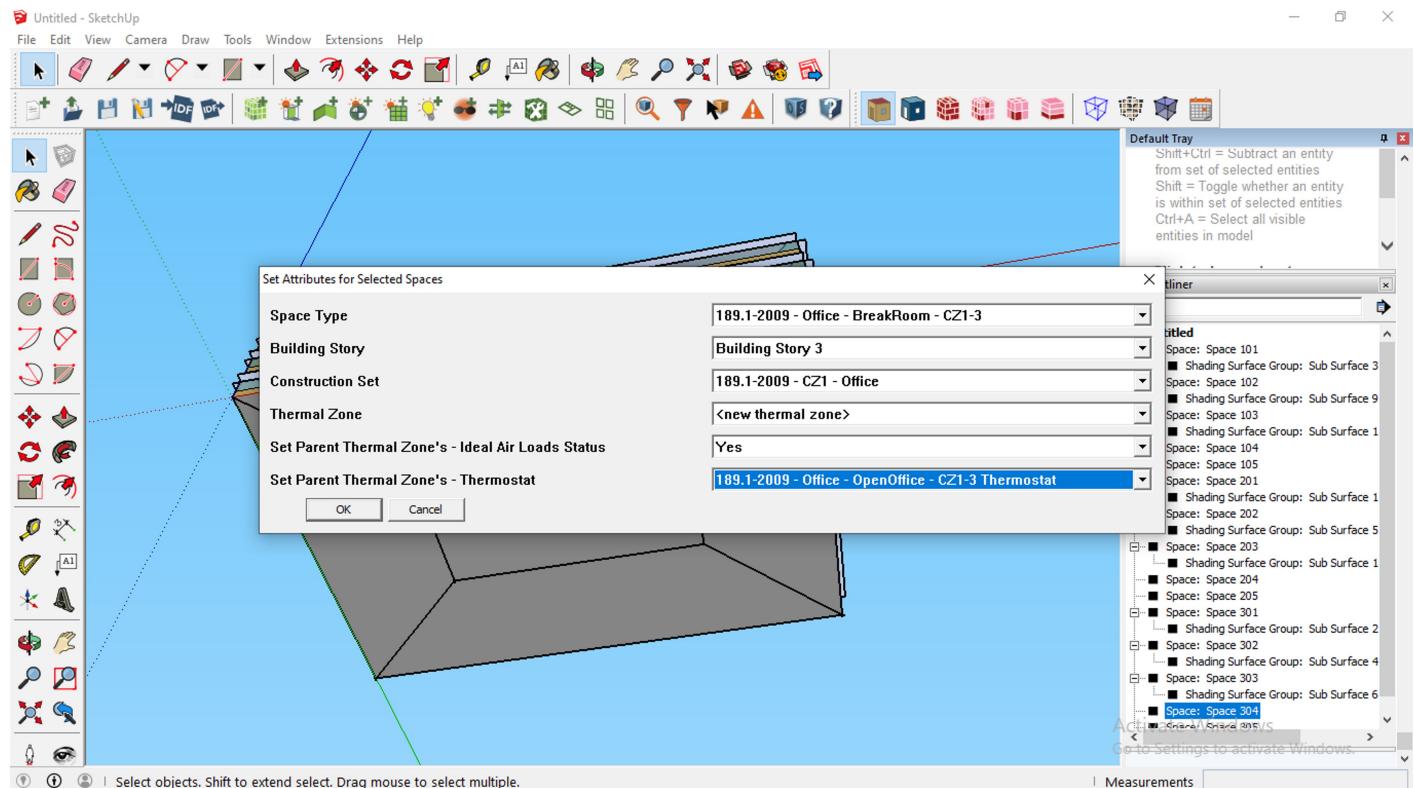


Step -7

By use the tool 'set attributes for selected spaces' select the floors separately,
Provide values as you can see and click on ok,
Follow the same for each floors .



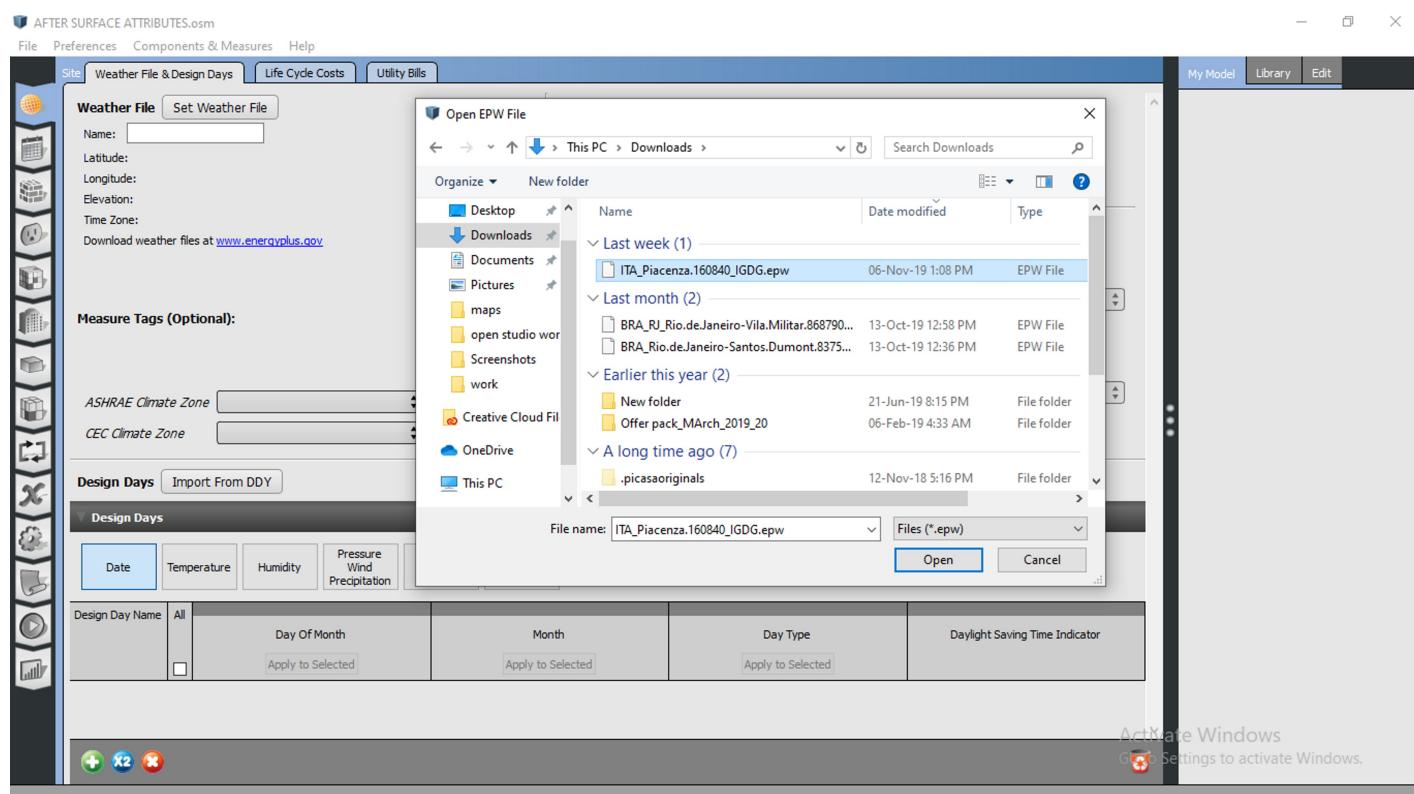




Step -8

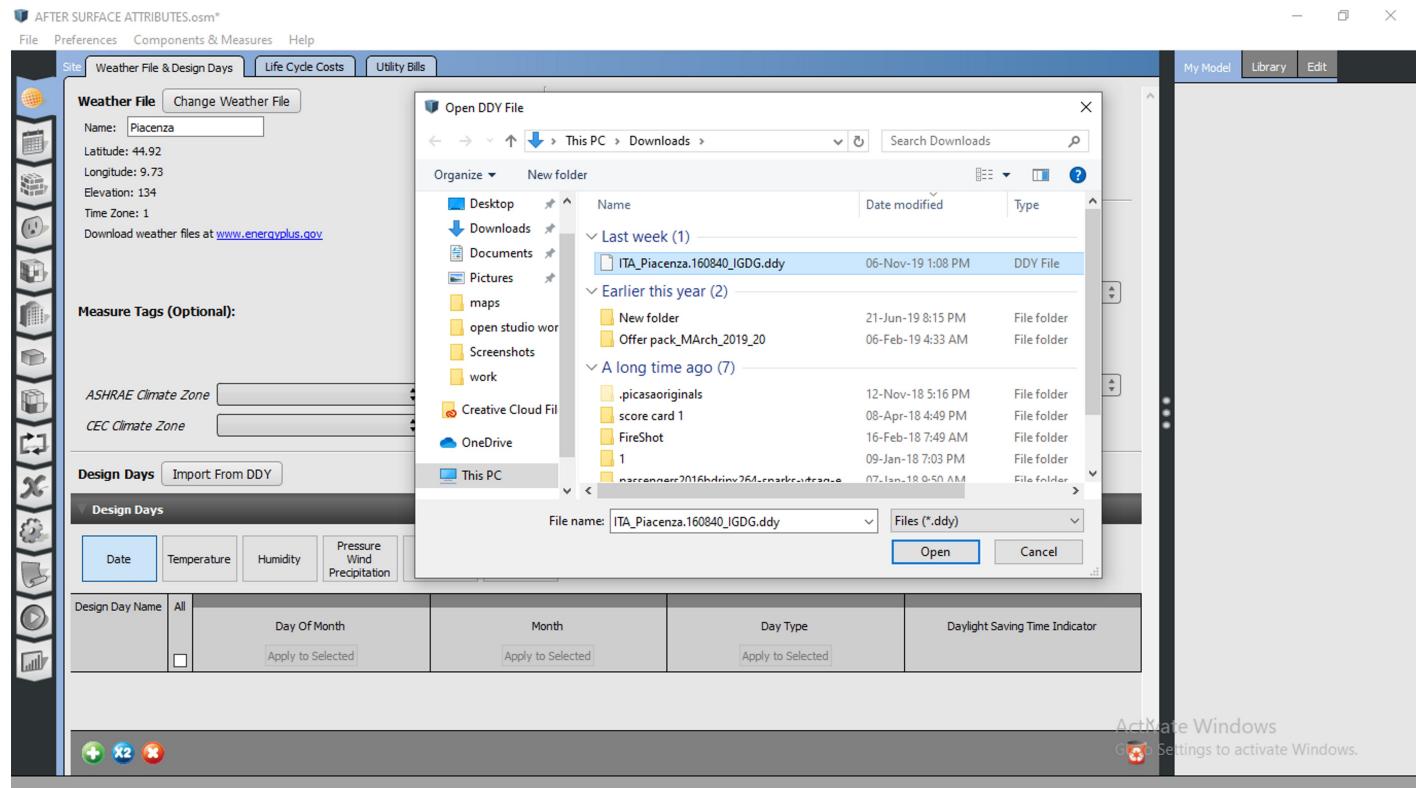
Now save the file using the option 'save as'. And open the file which you saved in the format of '.OSM'.

After opening insert the piacenza.epw file in weather details.



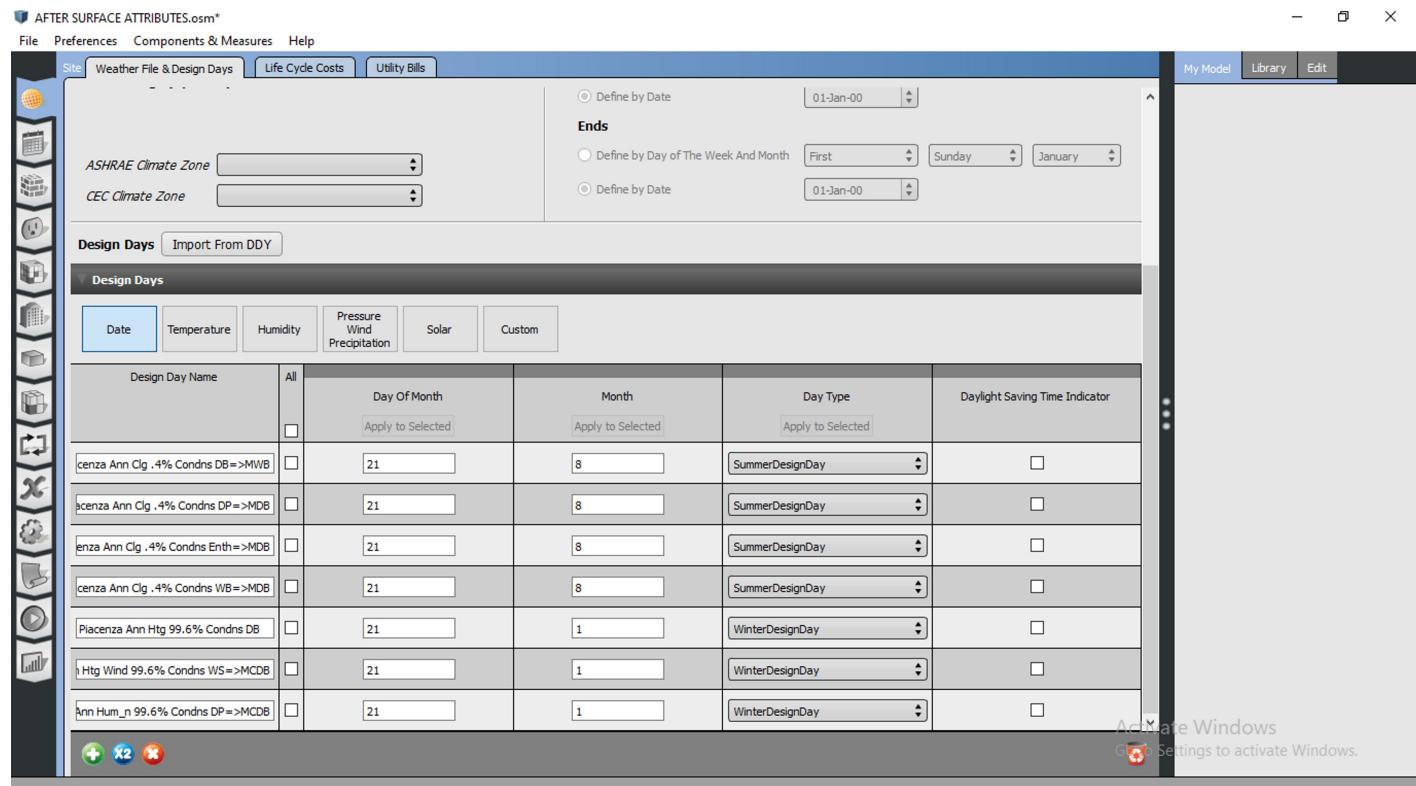
Step -9

After that insert the same piacenza.epw file in Design days details.



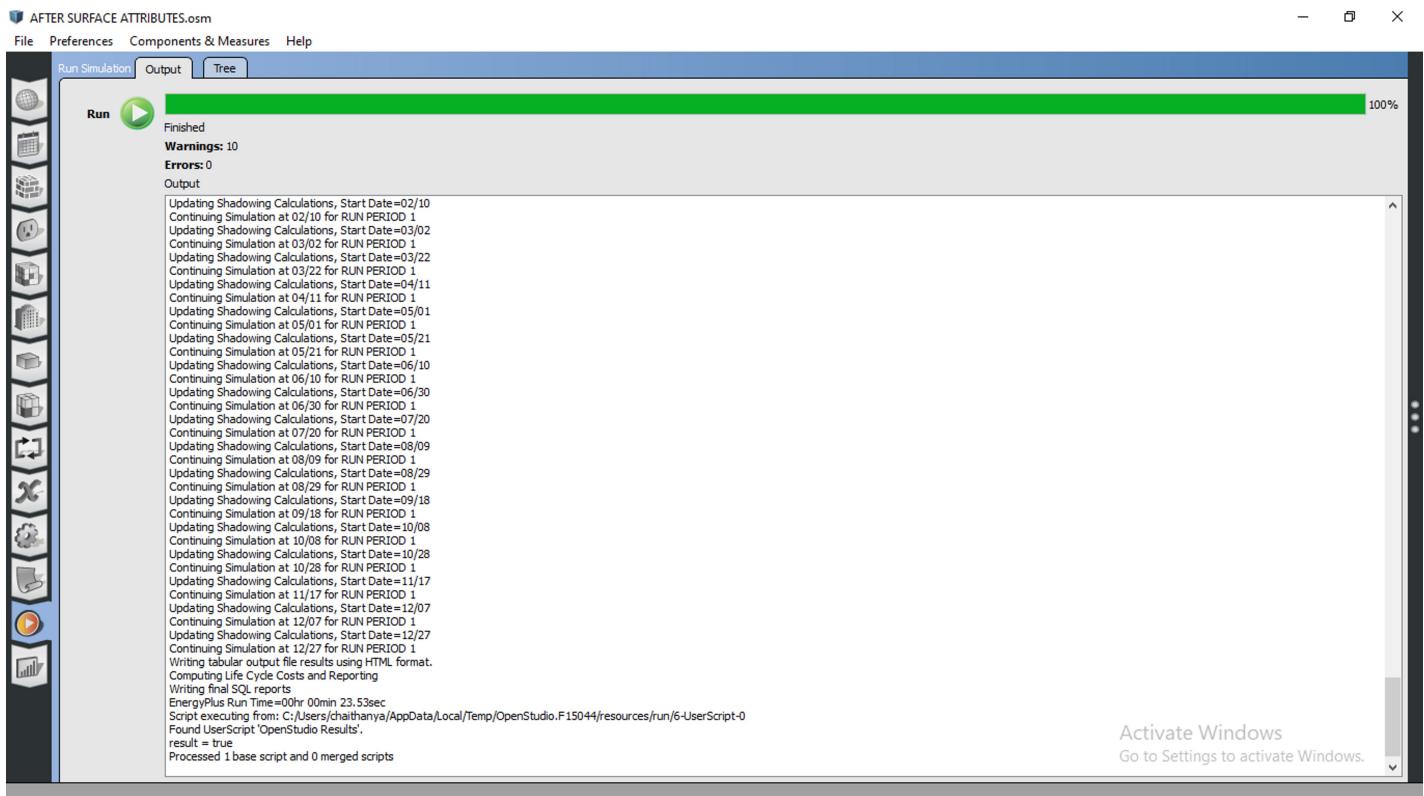
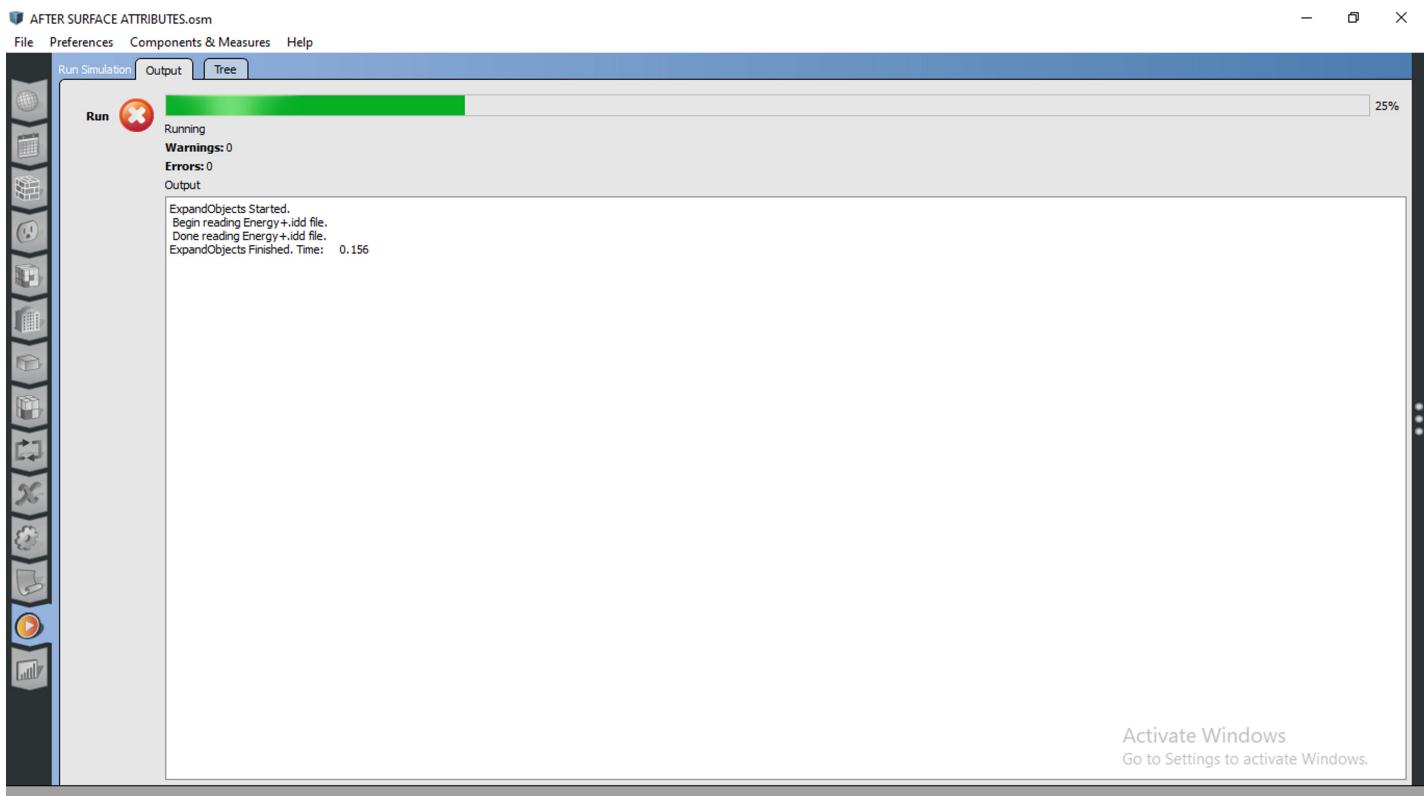
Step -10

After opening you will have these data entered automatically in the section 'design days'.



Step -10

After that run the file and wait for it to complete,



Step -11

Once its complete you can have these reports as seen the image.

Results Summary

Reports: EnergyPlus Results ▾ [Open ResultsViewer for Detailed Reports](#)

Program Version: EnergyPlus, Version 8.5.0-c87e61b44b, YMD=2019.11.12 22:53

Tabular Output Report in Format: HTML [Table of Contents](#)

Building: Building 1

Environment: RUN PERIOD 1 ** Piacenza - ITA IGDG WMO#=160840

Simulation Timestamp: 2019-11-12 22:53:34

Report: Annual Building Utility Performance Summary [Table of Contents](#)

For: Entire Facility

Timestamp: 2019-11-12 22:53:34

Values gathered over 8760.00 hours

Site and Source Energy

	Total Energy [GJ]	Energy Per Total Building Area [MJ/m ²]	Energy Per Conditioned Building Area [MJ/m ²]
Total Site Energy	2369.07	658.07	658.07
Net Site Energy	2369.07	658.07	658.07
Total Source Energy	6122.85	1700.79	1700.79
Net Source Energy	6122.85	1700.79	1700.79

Activate Windows
Go to Settings to activate Windows.