

**Task1 :**

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 ?

Considering the Main example :

$$3625.4 * \%1 = 36.25$$

$$\dot{Q}_{12, N \text{ shields}} = \frac{A\sigma(T_1^4 - T_2^4)}{\left(\frac{1}{\epsilon_1} + \frac{1}{\epsilon_2} - 1\right) + \left(\frac{1}{\epsilon_{3,1}} + \frac{1}{\epsilon_{3,2}} - 1\right) + \dots + \left(\frac{1}{\epsilon_{N,1}} + \frac{1}{\epsilon_{N,2}} - 1\right)}$$

$$5.67 \times 10^{-8} \frac{800^4 - 500^4}{\left(\frac{1}{0.2} + \frac{1}{0.7} - 1\right) + n \cdot \left(\frac{1}{0.1} + \frac{1}{0.1} - 1\right)} = 36.25 \quad \frac{19680.57}{5.42 + 19n} = 36.25$$

$$19680.57 = 36.25 \cdot (5.42 + 19n) \rightarrow 542.91 - 5.42 = 19n$$

$$537.49 = 19n \rightarrow n = 28.1$$

28 shields should add

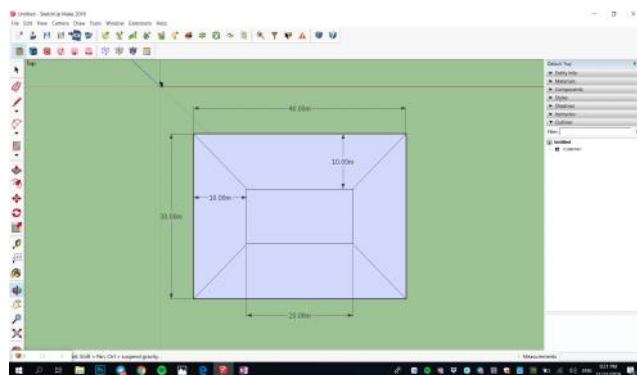
Considering the example in the previous assignment :

$$Q_{12, N \text{ shields}} = 0.01 Q_{12, no \text{ shields}}$$

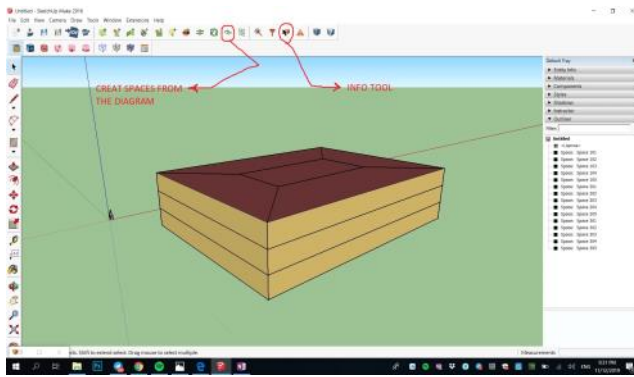
$$0.01 Q_{12, no \text{ shields}} = \frac{1}{n+1} Q_{12, no \text{ shields}}$$

$$0.01 = \frac{1}{n+1} \rightarrow \frac{1}{100} = \frac{1}{n+1} \rightarrow n = 99$$

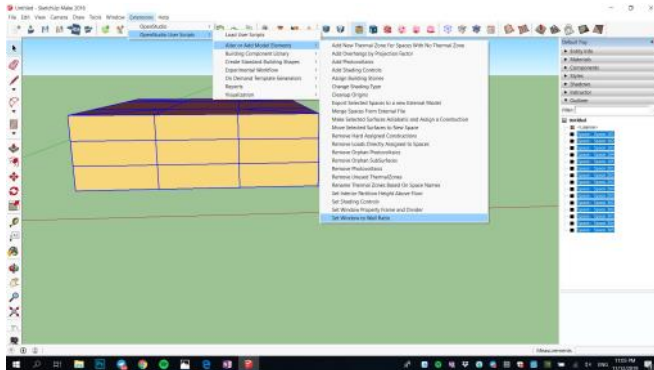
99 shields should add

**Task2 :**

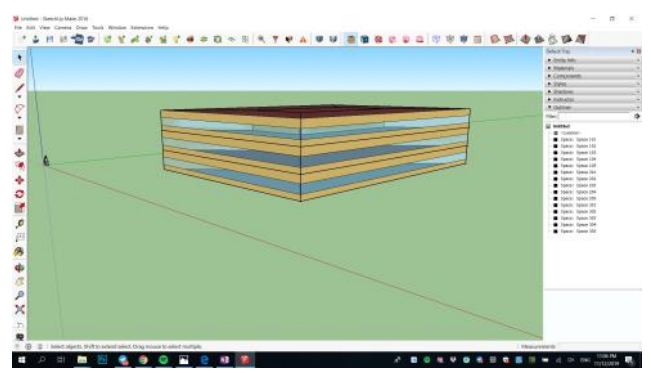
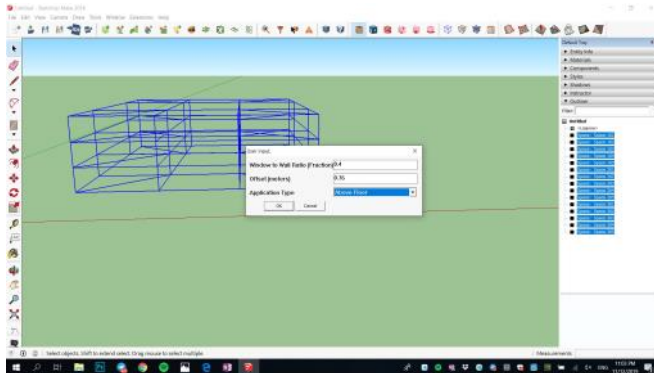
At first , I draw the floor plan with rectangle 30\*40 and then with offset of 10m



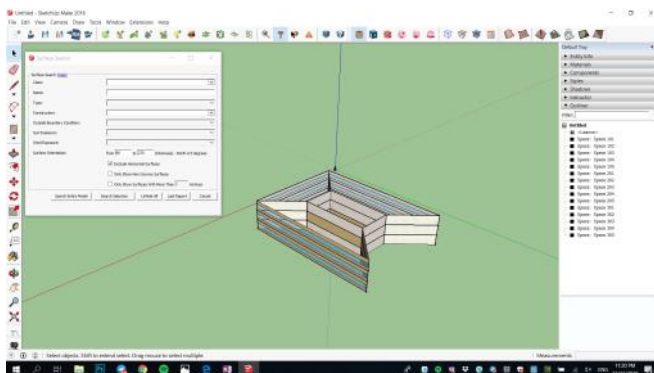
Then I clicked on create spaces from the diagram and after that I use info tool icon for information



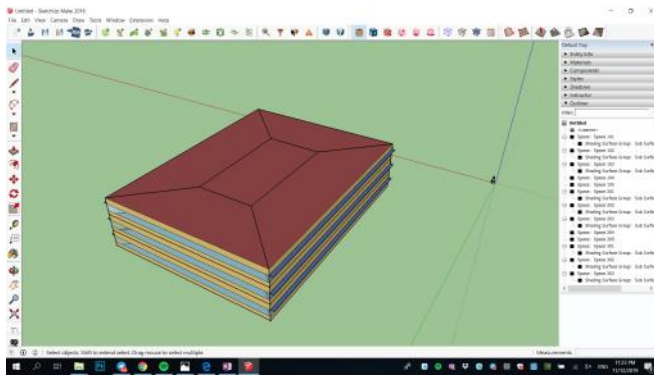
I used surface matching tool to define interior and outer walls, after that I used extensions tab and then OpenStudio user scripts and ...



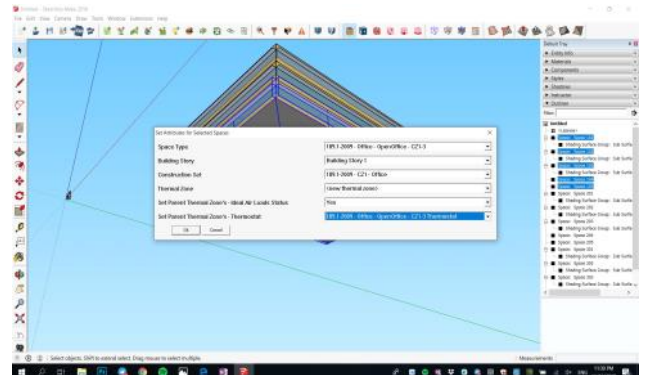
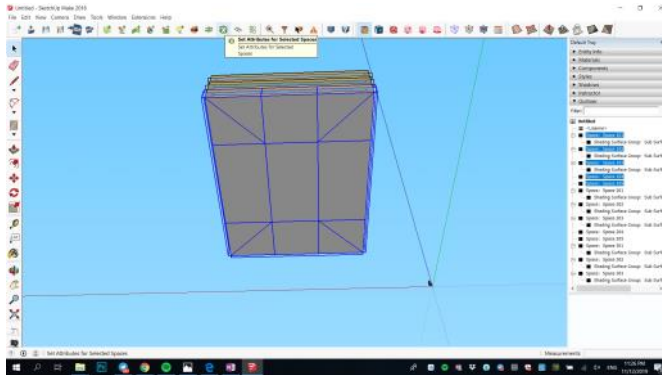
Windows are created .



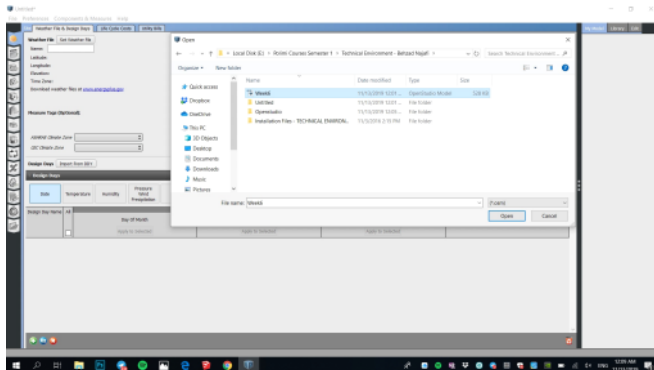
I used the surface selection and select all the surfaces except the north with 90-270



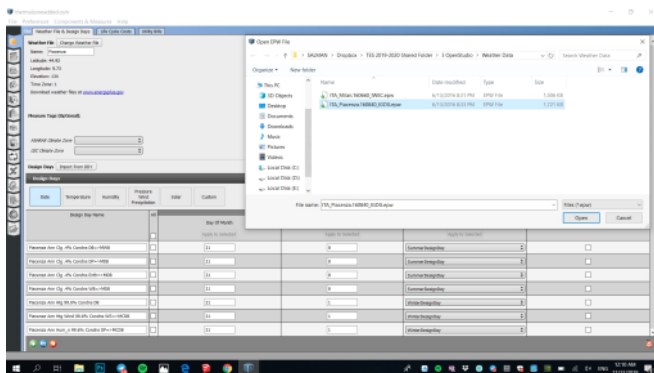
I used the extensions window to add overhangs and then I choose 0-360 surface



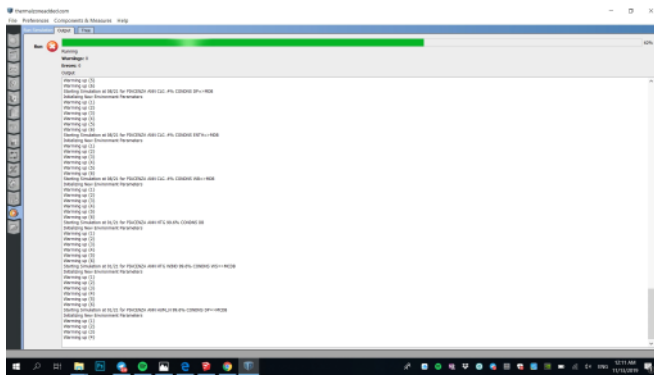
It's time for creating new thermal zone . My work with Sketchup is done and I save the project as an OpenStudio project because after that I want to open it in OpenStudio software .



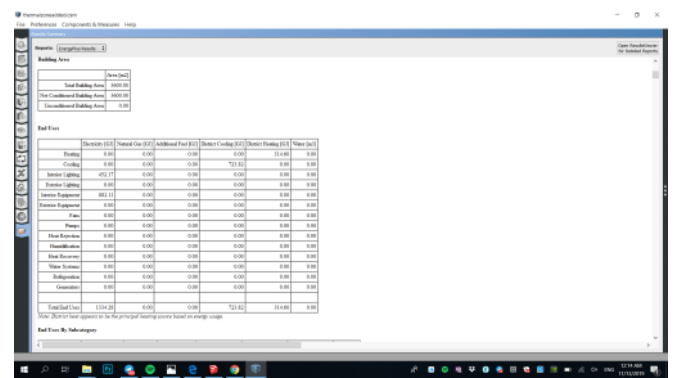
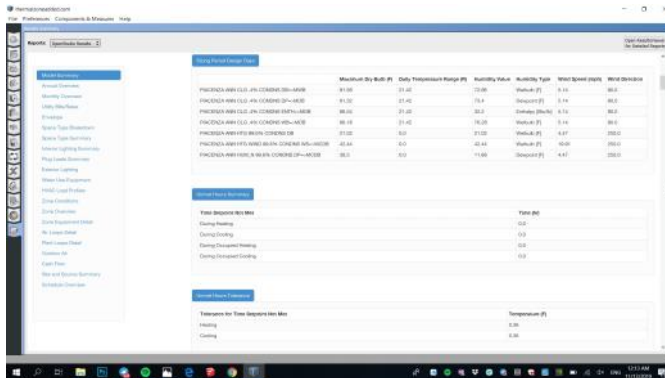
I opened the file I created in Sketchup



Add the weather data of Piacenza .



Run the model !



Now I have 2 kinds of data : 1) OpenStudio Data 2) Energy+ Data