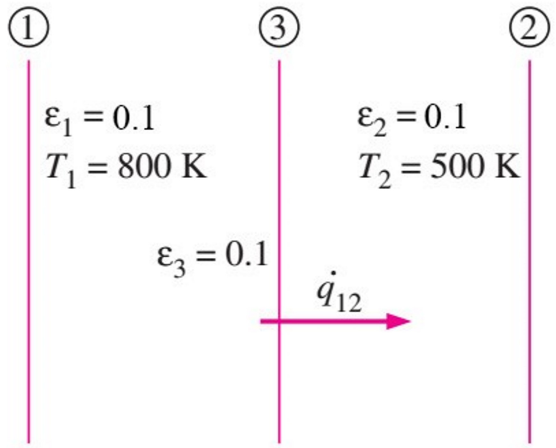
**Define the radiative heat transfer rate between two parellel plates shown in the picture:**




$$\dot{q}_{net_{1-2}} = \frac{\dot{Q}_{net_{1-2}}}{A} = \frac{A\sigma(T_2^4 - T_1^4)}{\frac{1}{\epsilon_1}+\frac{1}{\epsilon_2}-1} \div A$$

$$= \frac{\sigma(T_2^4 - T_1^4)}{\frac{1}{\epsilon_1}+\frac{1}{\epsilon_2}-1}$$

$$= \frac{\left(5.67 \times 10^{-8}\frac{\mathrm{W}}{m^2\,K^4}\right) \times (800^4 - 500^4)K^4}{\frac{1}{0.1}+\frac{1}{0.1}-1}$$

$$\approx 1035.82\ \frac{W}{m^2}$$

The new heat transfer rate should be 1% of the $\dot{q}_{net_{1-2}}$,

$i.e., \dot{q}'_{net_{1-2}} = \dot{q}_{net_{1-2,\,n\,shiels}} = \frac{1}{100} \times \dot{q}_{net_{1-2}}$,

$$\dot{q}_{net_{1-2,\,n\,shiels}} = \frac{\dot{Q}_{net_{1-2,\,n\,shields}}}{A}$$

$$= \frac{A\sigma(T_2^4 - T_1^4)}{\left(\frac{1}{\epsilon_1}+\frac{1}{\epsilon_2}-1\right)+\left(\frac{1}{\epsilon_{3,1}}+\frac{1}{\epsilon_{3,2}}-1\right)+\cdots\left(\frac{1}{\epsilon_{n,1}}+\frac{1}{\epsilon_{n,2}}-1\right)} \div \mathrm{A}$$

$$= \frac{\sigma(T_2^4 - T_1^4)}{\left(\frac{1}{\epsilon_1}+\frac{1}{\epsilon_2}-1\right)+\left(\frac{1}{\epsilon_{3,1}}+\frac{1}{\epsilon_{3,2}}-1\right)+\cdots\left(\frac{1}{\epsilon_{n,1}}+\frac{1}{\epsilon_{n,2}}-1\right)}$$

Autem, $\epsilon_1 = \epsilon_2 = \epsilon_3 = \cdots = \epsilon_n = 0.1$

Substitute $\epsilon = 0.1$ for $\epsilon_1, \epsilon_2, \epsilon_3, \ldots, \epsilon_n$, *and introduce to the equation*:

$$\dot{q}_{net_{1-2,\,n\,shiels}} = \frac{\sigma(T_2^4 - T_1^4)}{(n+1)(\frac{1}{\epsilon}+\frac{1}{\epsilon}-1)} = \frac{1}{\mathrm{n}+1} \times \frac{\sigma(T_2^4 - T_1^4)}{\frac{1}{\epsilon}+\frac{1}{\epsilon}-1}$$

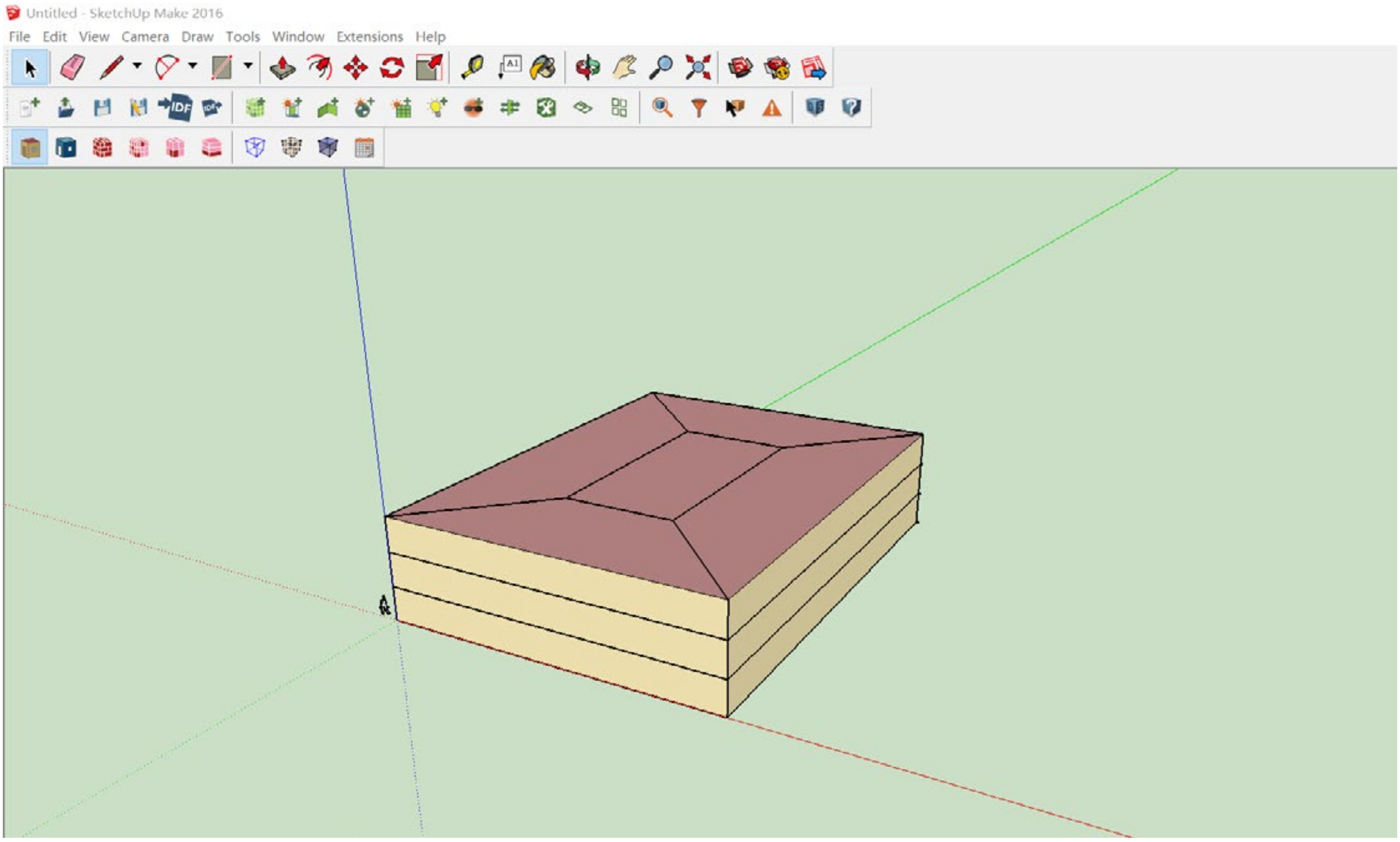
$$Since\ \dot{q}'_{net_{1-2}} = \dot{q}_{net_{1-2,\,n\,shiels}} = \frac{1}{100} \times \dot{q}_{net_{1-2}} = \frac{1}{100} \times \frac{\sigma(T_2^4 - T_1^4)}{\frac{1}{\epsilon_1}+\frac{1}{\epsilon_2}-1} = \frac{1}{100} \times \frac{\sigma(T_2^4 - T_1^4)}{\frac{1}{\epsilon}+\frac{1}{\epsilon}-1}$$

$$i.e., \quad \frac{1}{\mathrm{n}+1} \times \frac{\sigma(T_2^4 - T_1^4)}{\frac{1}{\epsilon}+\frac{1}{\epsilon}-1} = \frac{1}{100} \times \frac{\sigma(T_2^4 - T_1^4)}{\frac{1}{\epsilon}+\frac{1}{\epsilon}-1}$$

$n = 99$

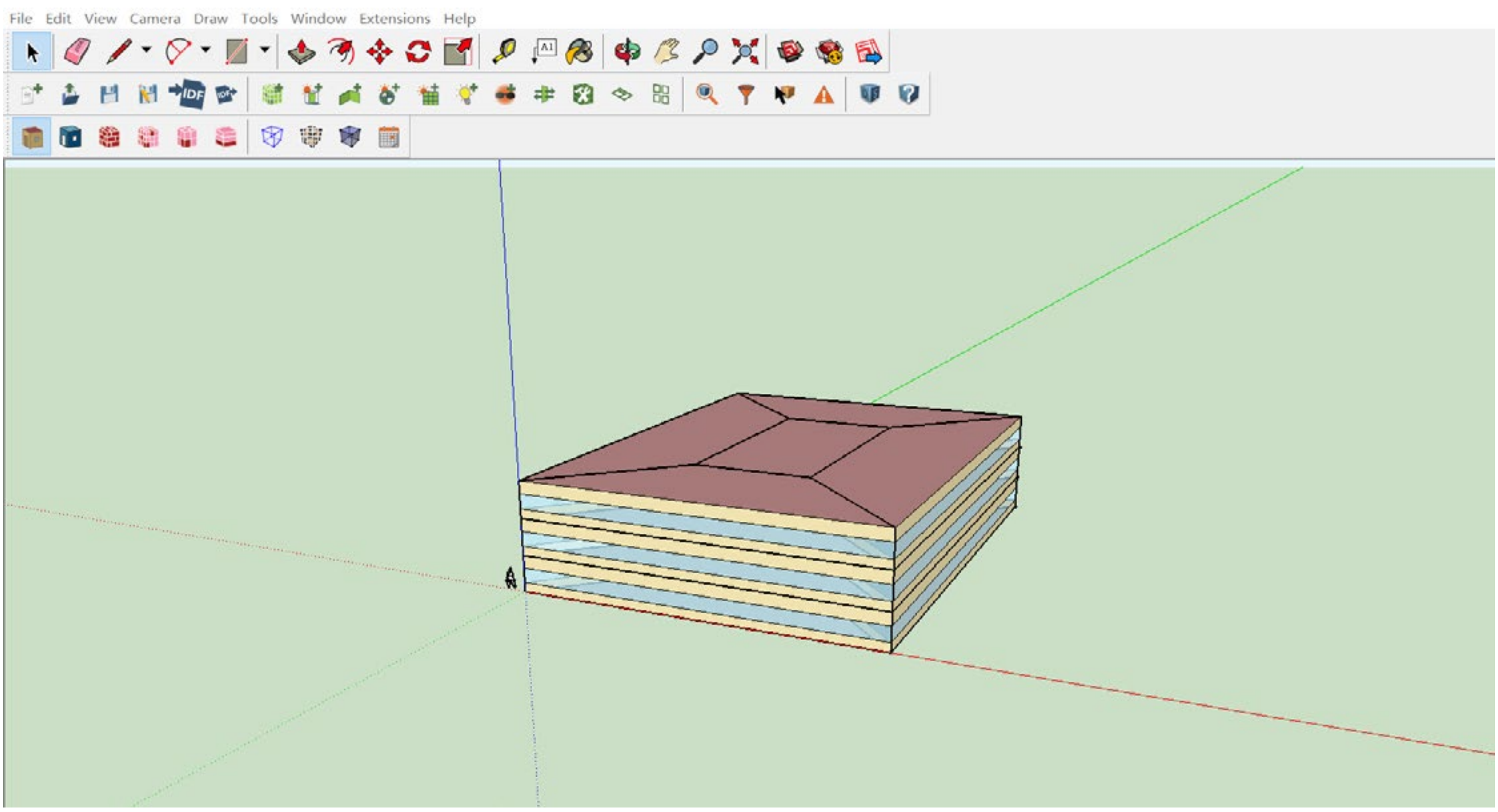
To have the new heat transfer rate be 1% of the previous rate without any shields, we need 99 shields which $\epsilon = 0.1$

Q.E.D.



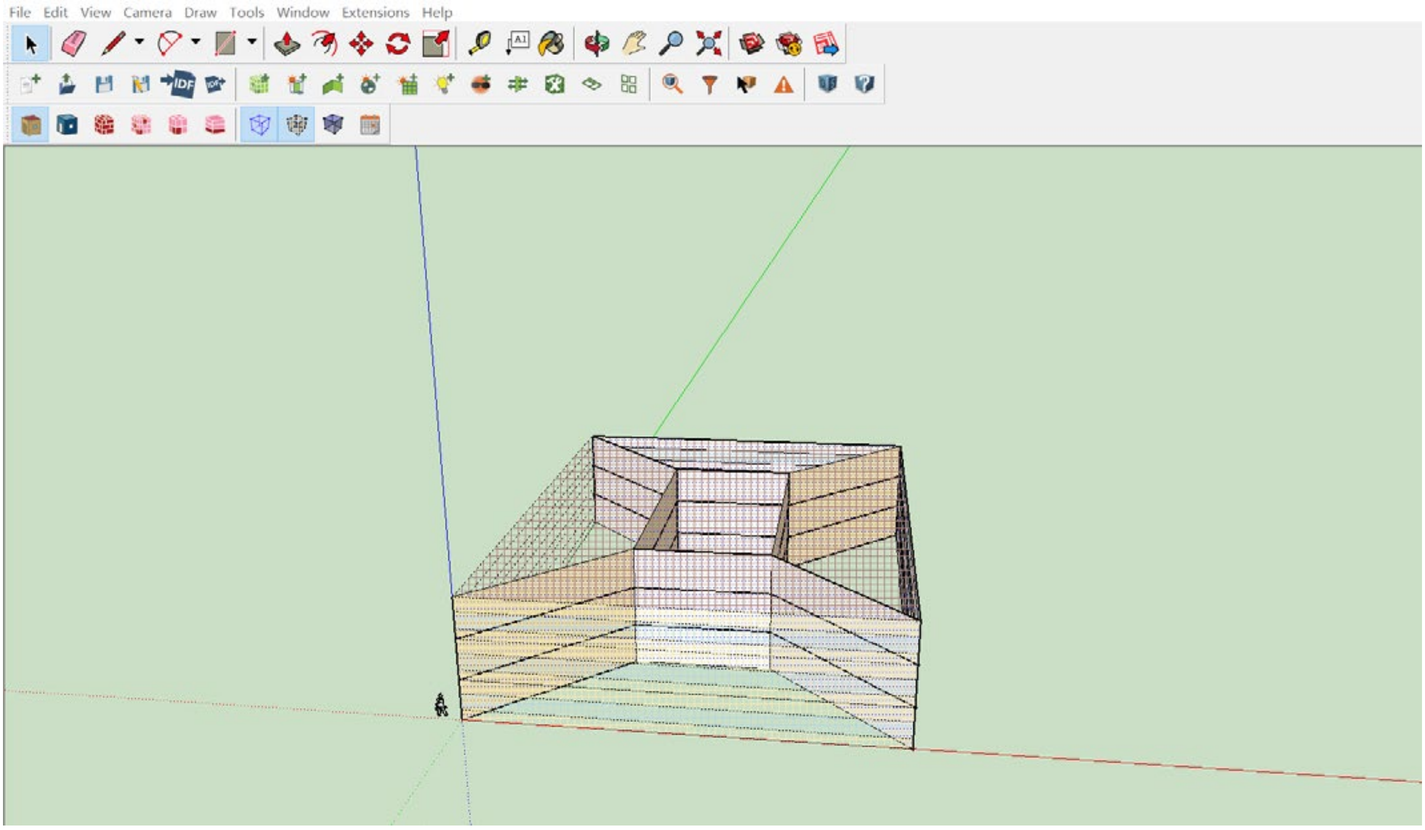

Draw a base.

Choose "create spaces from diagram" and create a 3 floor building.

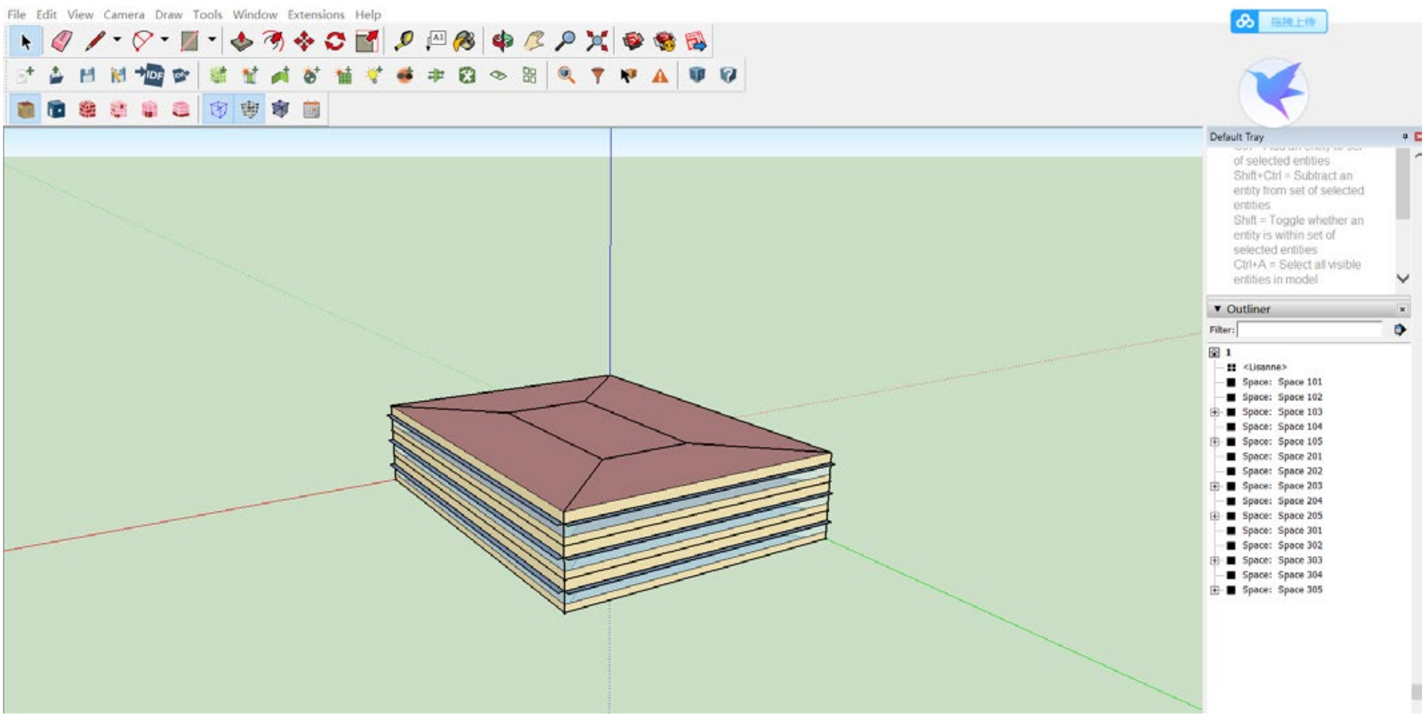


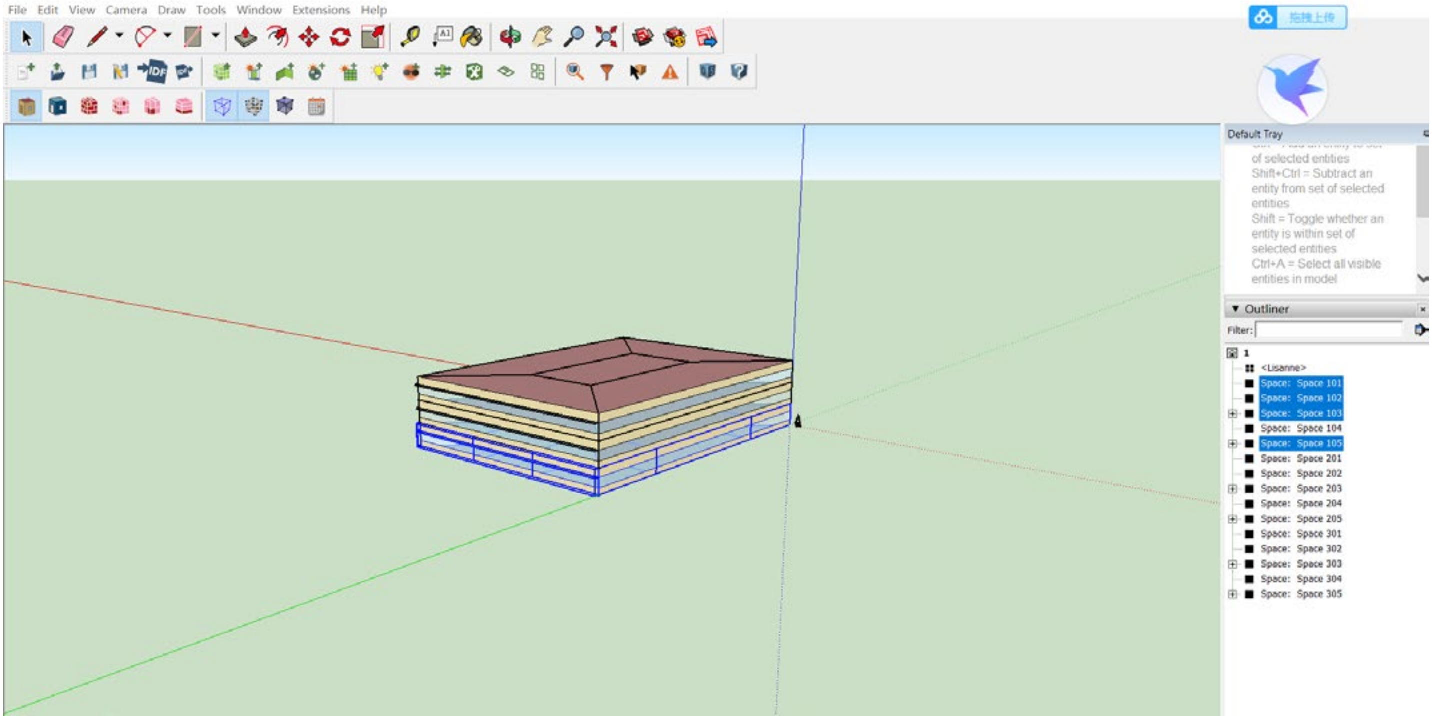

Choose "surface matching tool" to distinguish between inner and outer surfaces

Choose "set window to wall ratio" to create windows.

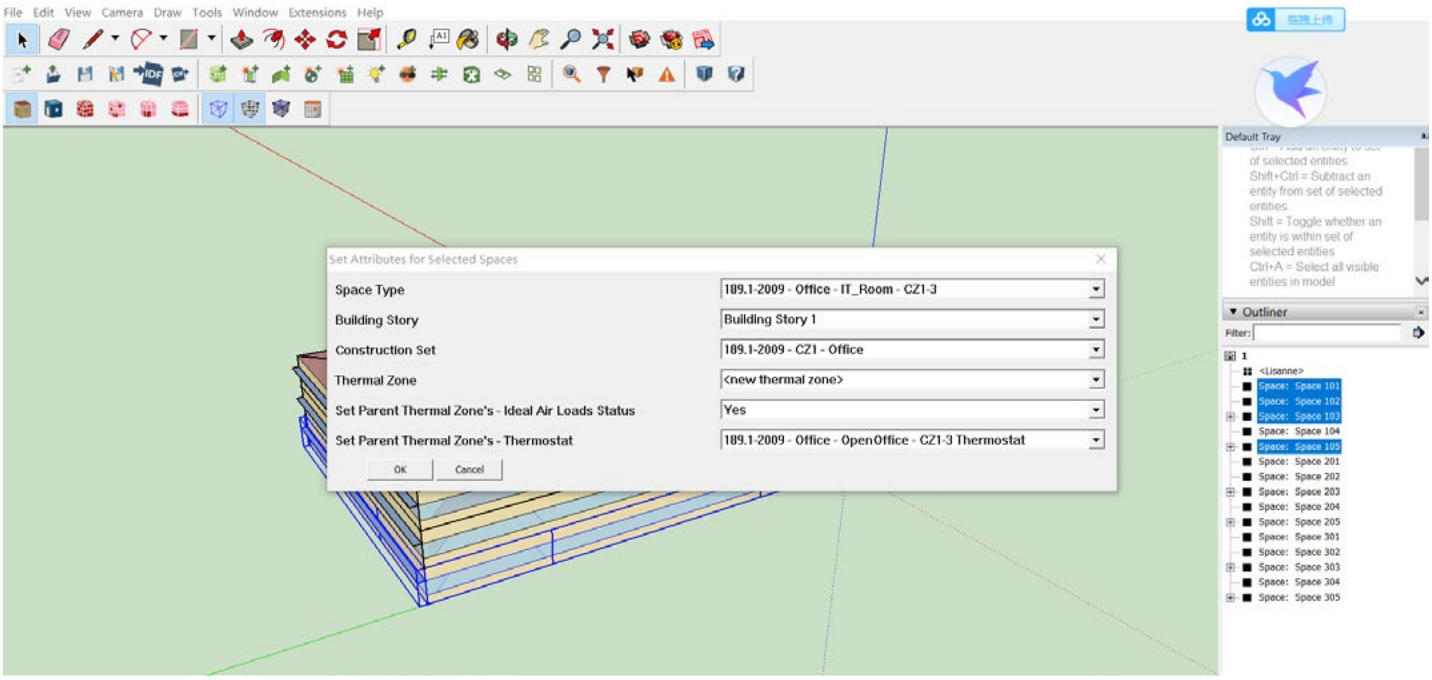



Choose "add overhang by projection factor" to create external shading.



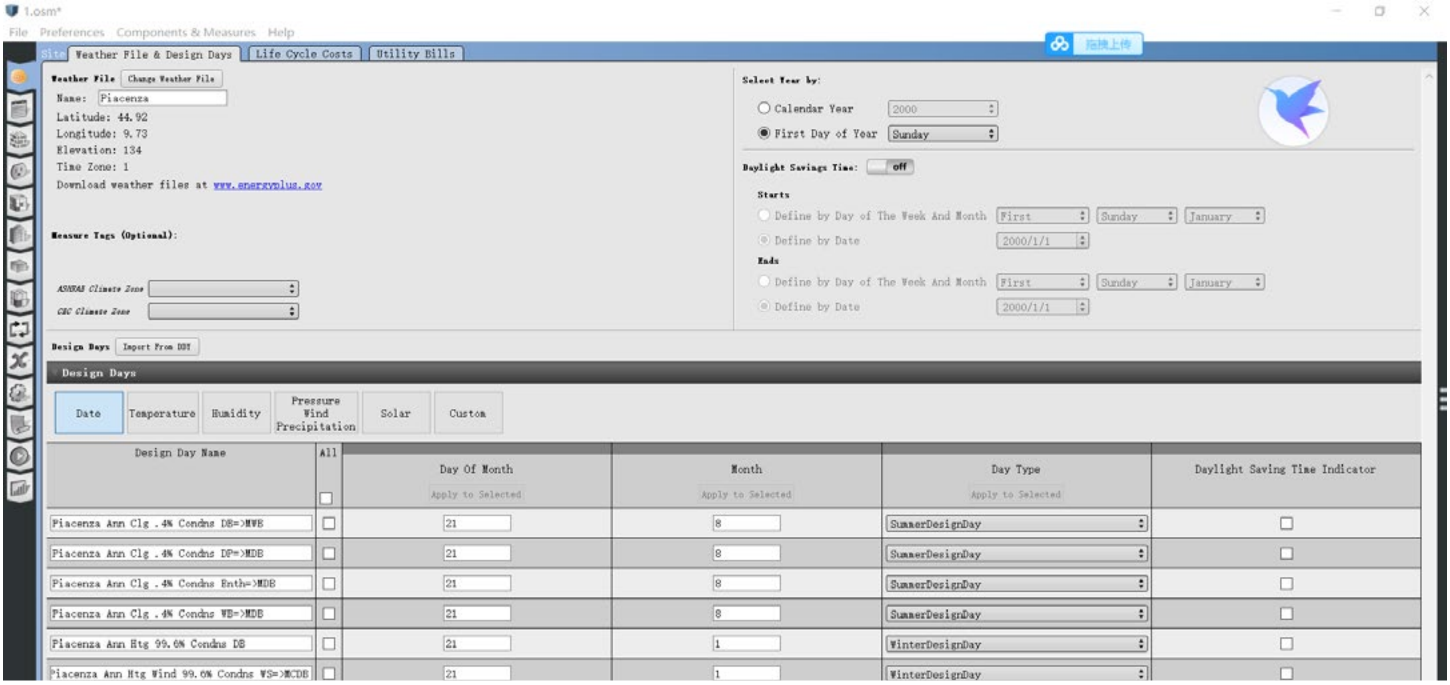



Select all the surfaces except north.




Choose "Default Tray" and click "Outliner"button

Choose the "Set Attributes for Selected Space" button




Add the weather data and run the model and wait for the result.