

## Week6 YUYUE

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 ?

$$q^{net_{1-2}} = \frac{\dot{Q}_{net_{1-2}}}{A} = \frac{A\sigma(T_2^4 - T_1^4)}{\frac{1}{\epsilon_1} + \frac{1}{\epsilon_2} - 1} / A = \frac{(5.67 * 10^{-8}) * (800^4 - 500^4)}{\frac{1}{0.1} + \frac{1}{0.1} - 1}$$
$$= 1036W/m^2$$

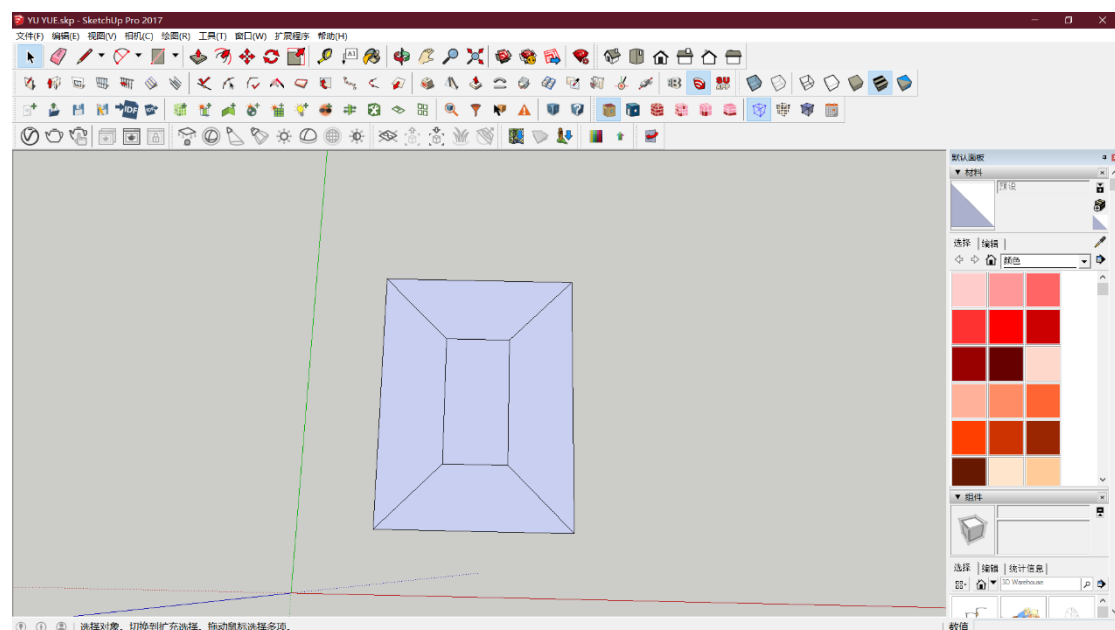
$$q^{net_{1-2,shields}} = \frac{\dot{Q}_{net_{1-2}}}{A} = \frac{A\sigma(T_2^4 - T_1^4)}{(n+1)\frac{1}{\epsilon_1} + \frac{1}{\epsilon_2} - 1} / A$$

$$\frac{\sigma(T_2^4 - T_1^4)}{(n+1)\frac{1}{\epsilon_1} + \frac{1}{\epsilon_2} - 1} = \frac{\sigma(T_2^4 - T_1^4)}{(100)\frac{1}{\epsilon_1} + \frac{1}{\epsilon_2} - 1}$$

$$N=99$$

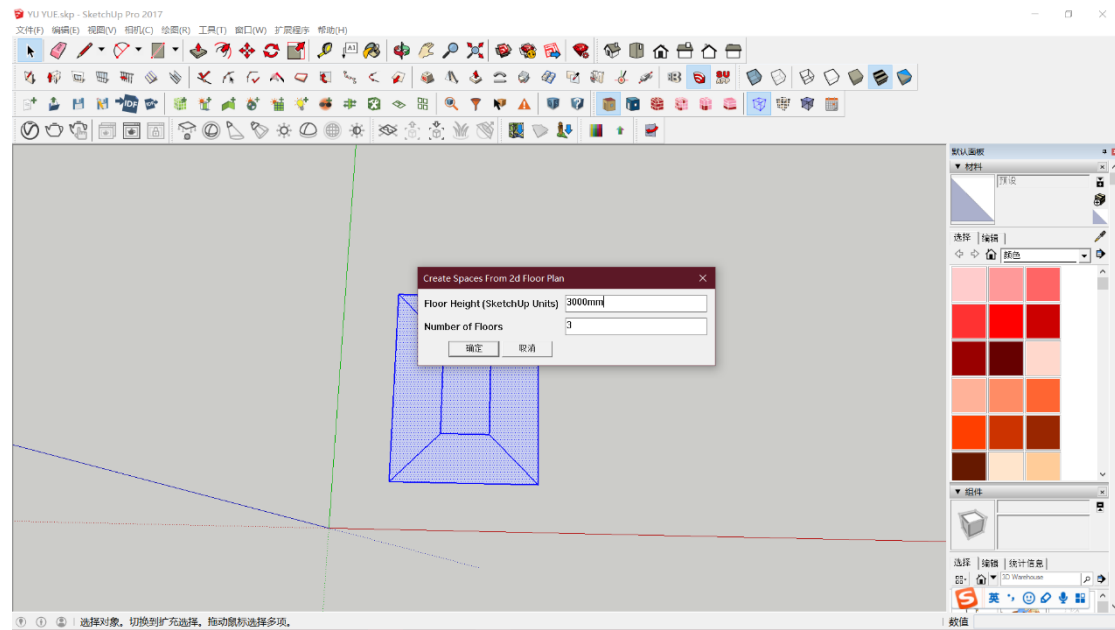
## 2.Open studio

Draw the rectangle and lines in sketchup

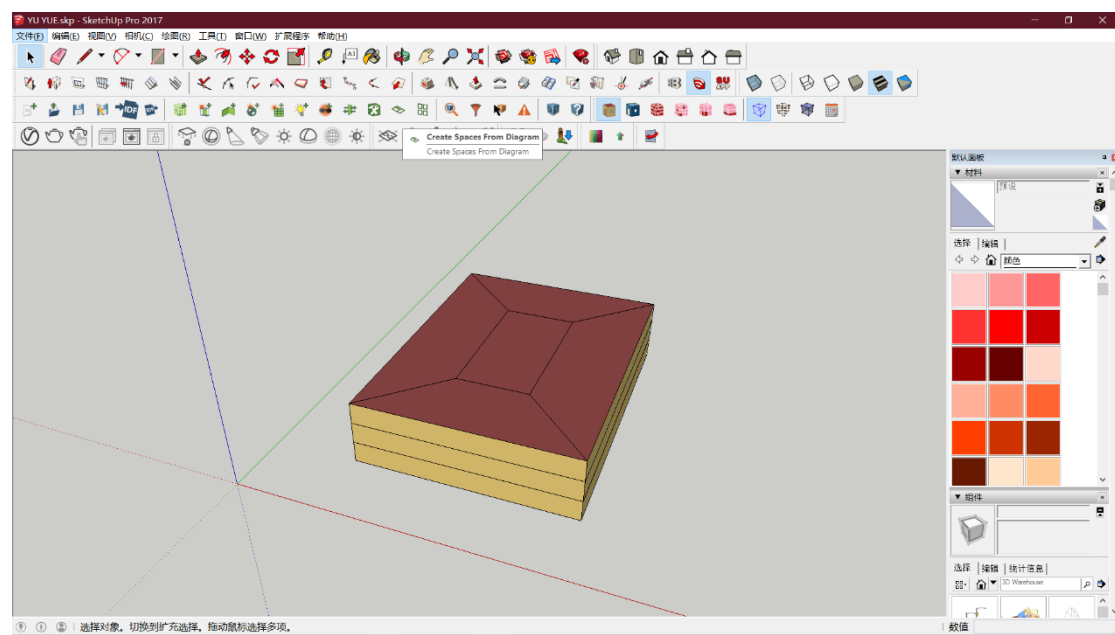


Click "create spaces from diagram" to create building

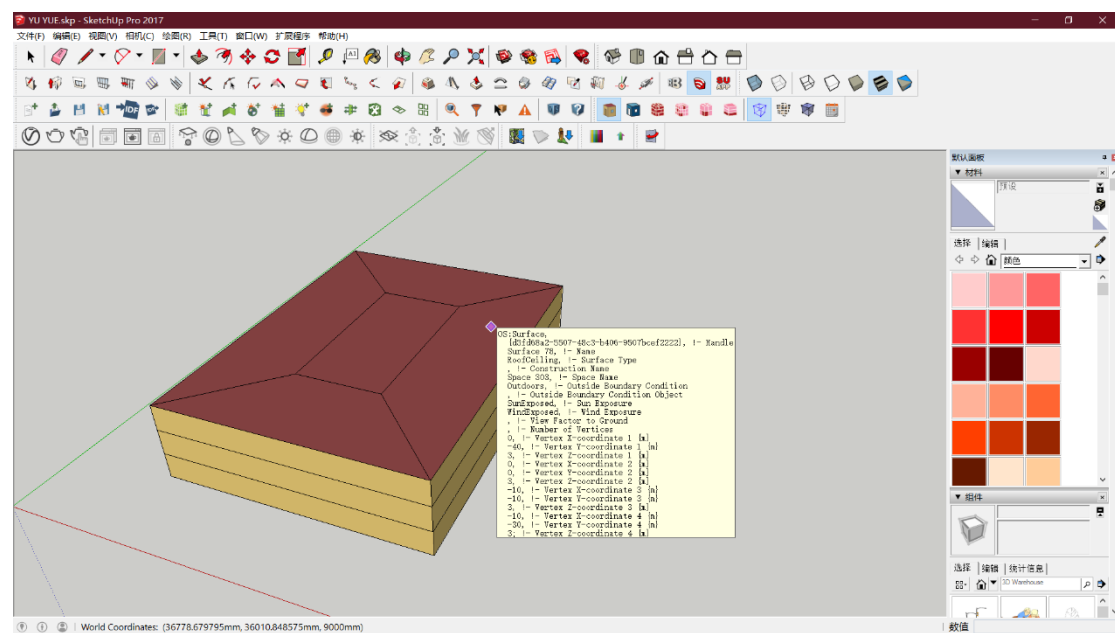
1



2

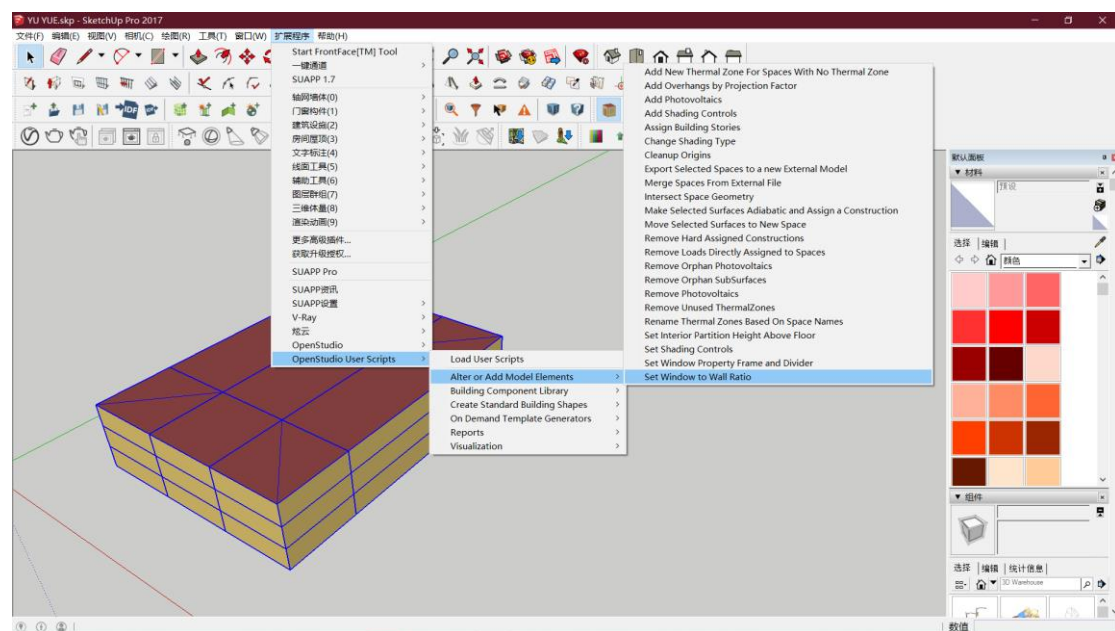


use info tool to see the properties of each surface and the boundary conditions

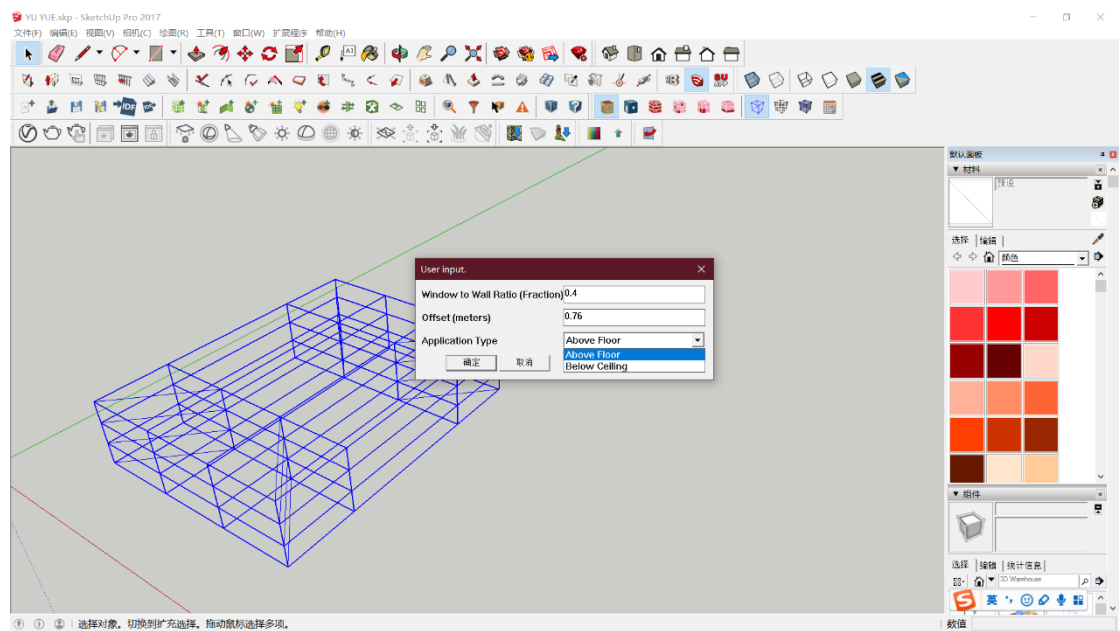


select walls, click “extension→OpenStudio user scripts→ alter or add model elements→ set window to wall ration” to add window

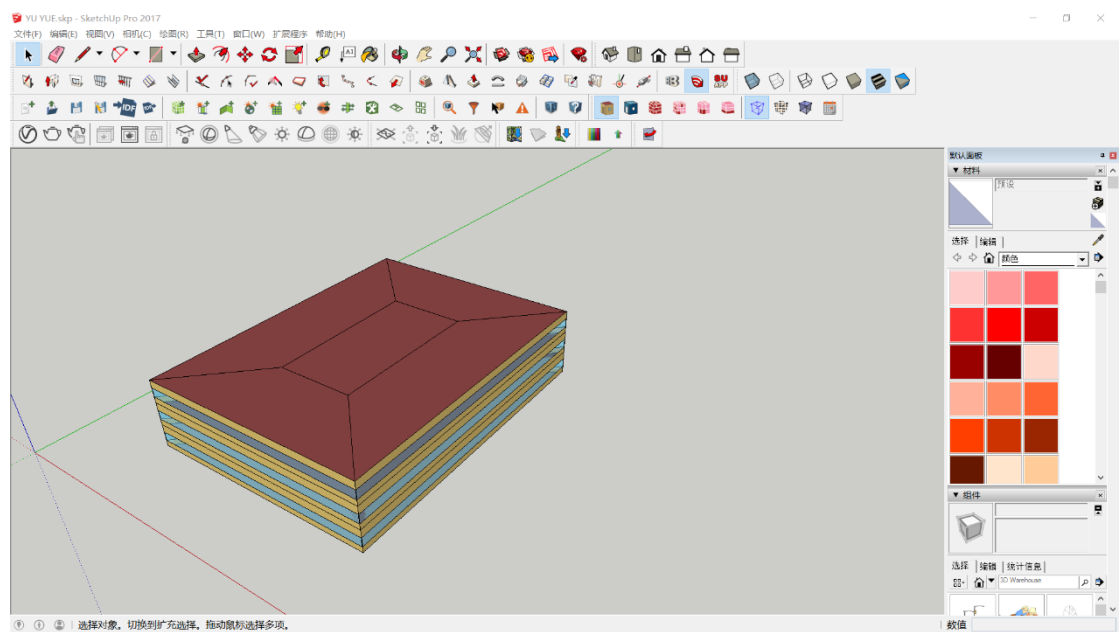
1



2

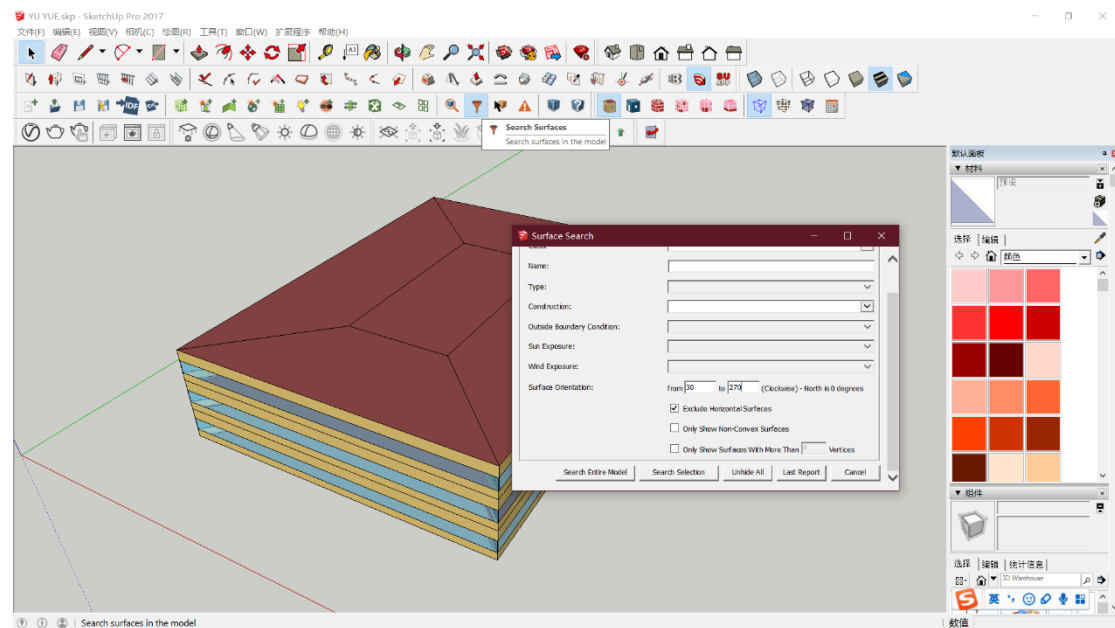


3

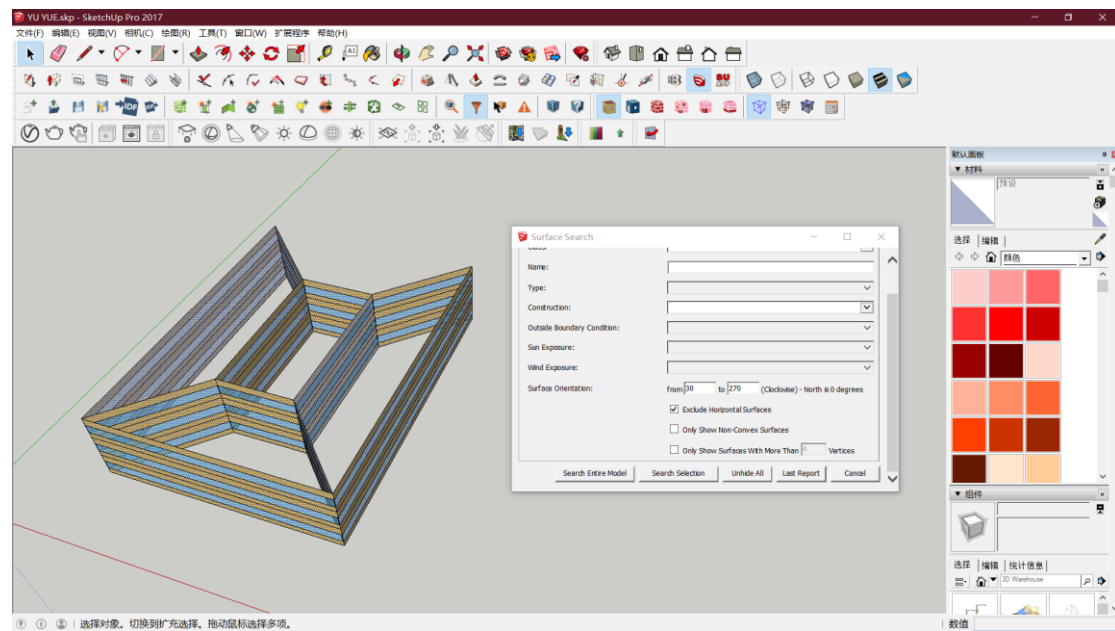


Choose desire surfaces except north

1

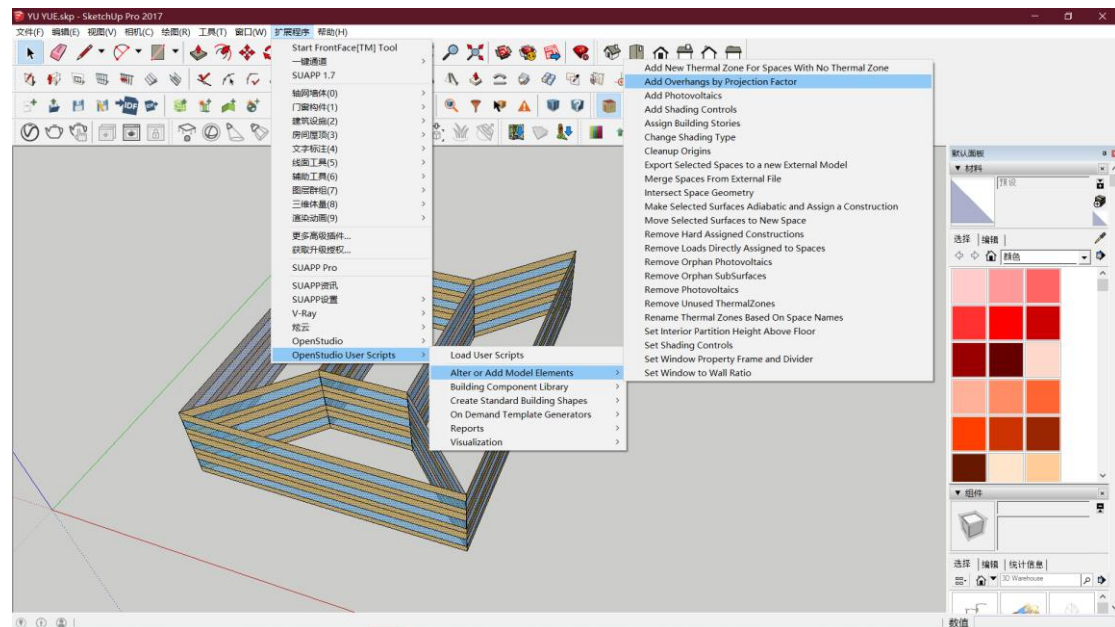


2

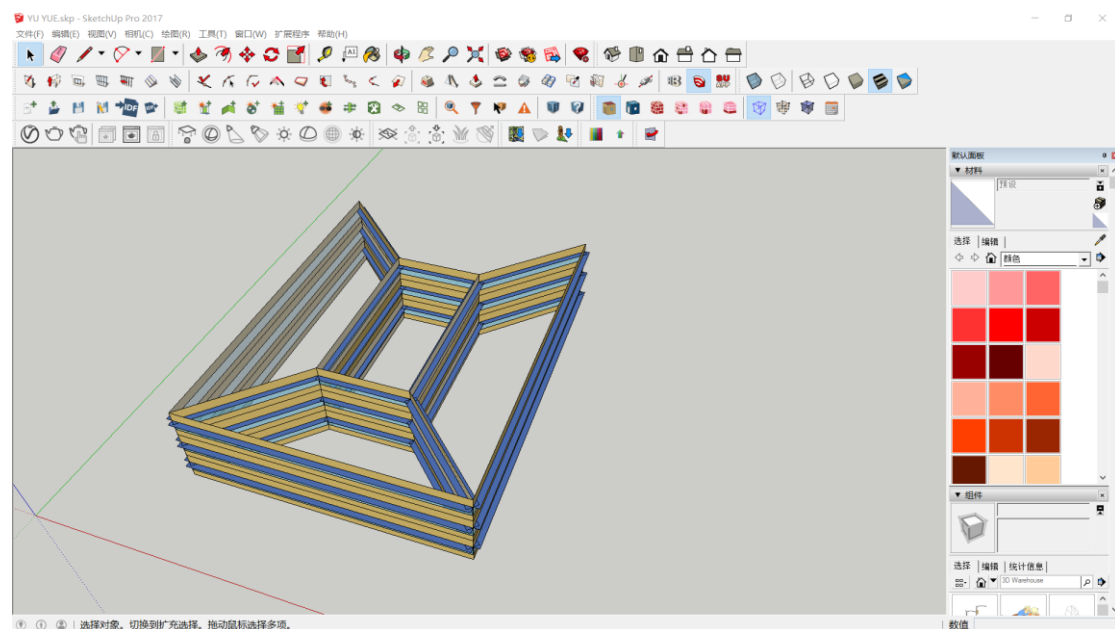


Click "extension→OpenStudio user scripts→ alter or add model elements→add overhangs by projection factor" to add overhang (external shading)

1

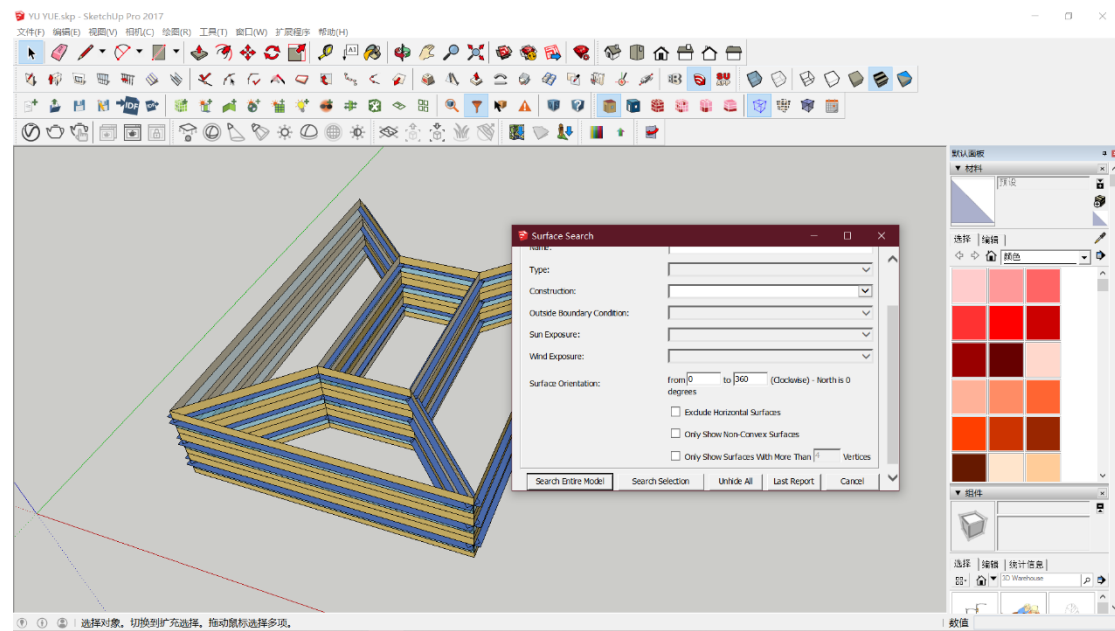


2

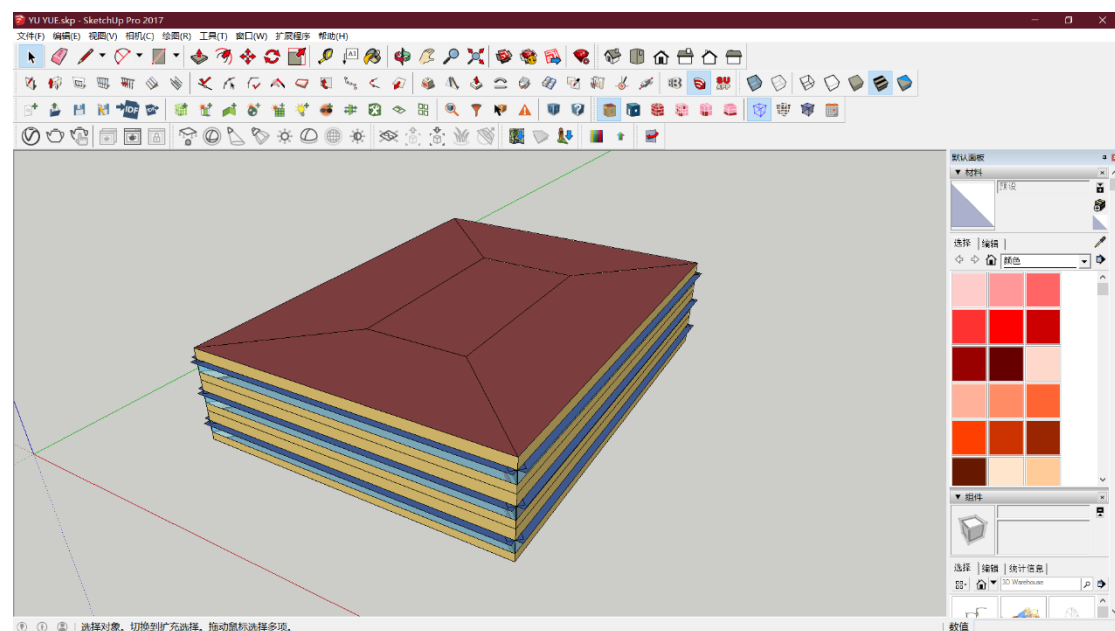


Go back to the previous selection to choose 0-360 surfaces

1

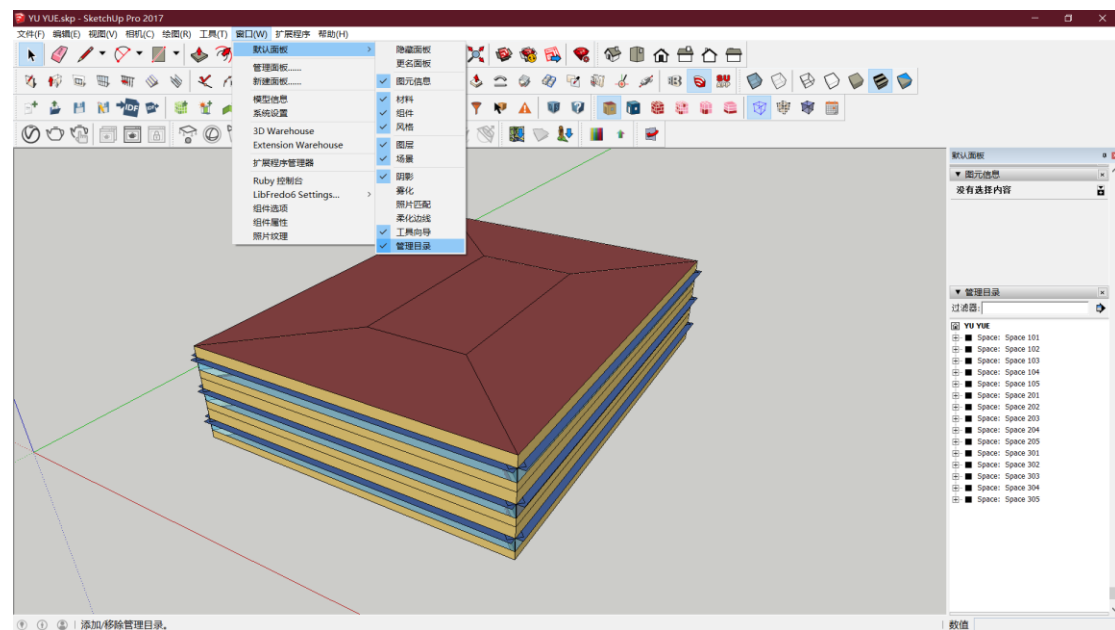


2



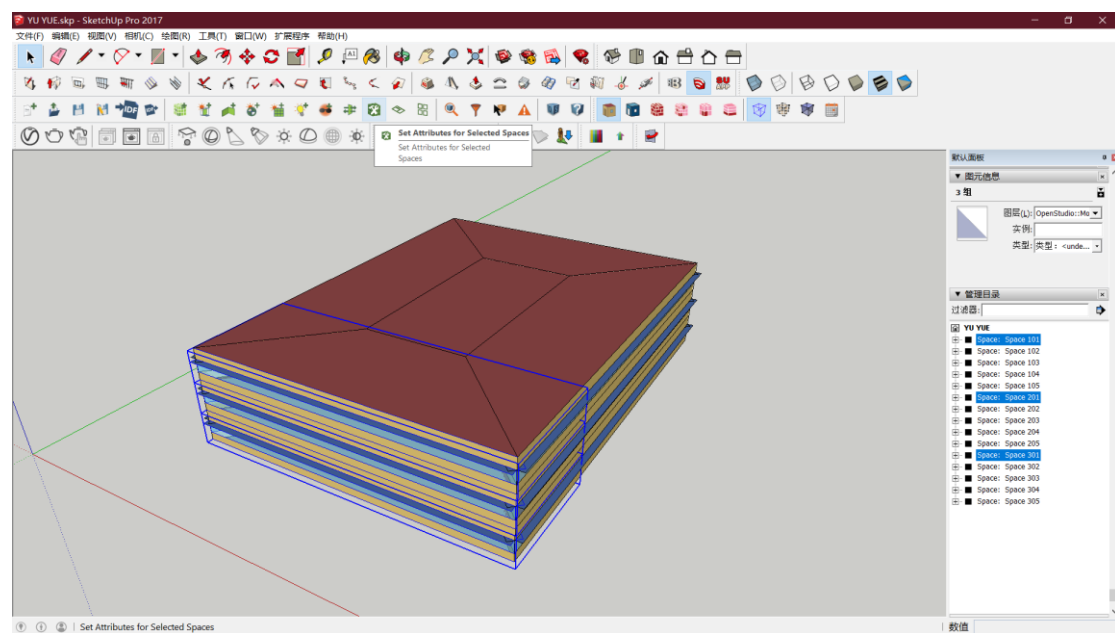


Click “Windows → default tray → outline” to have outline in our tray



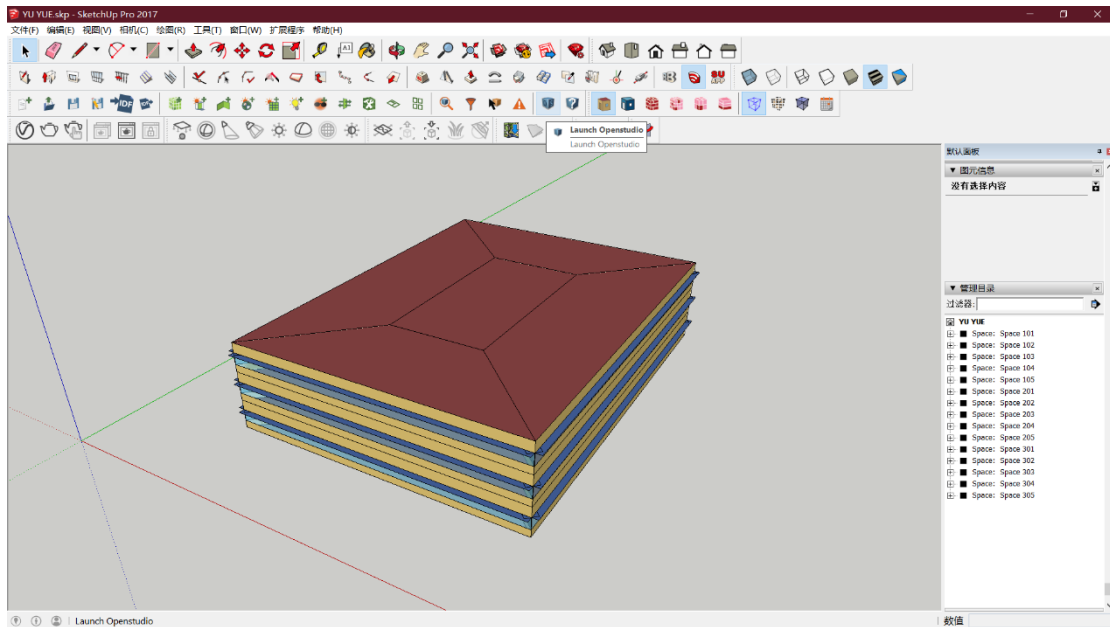
choose the spaces of each thermal zone and click “set attributes for selected spaces” to add specifications:

1

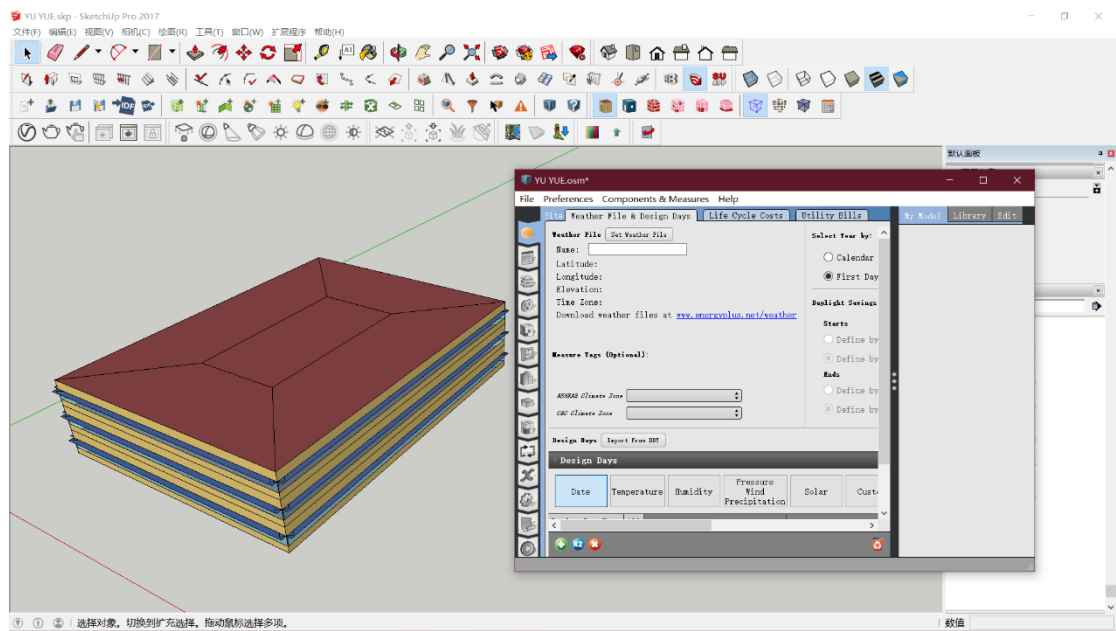




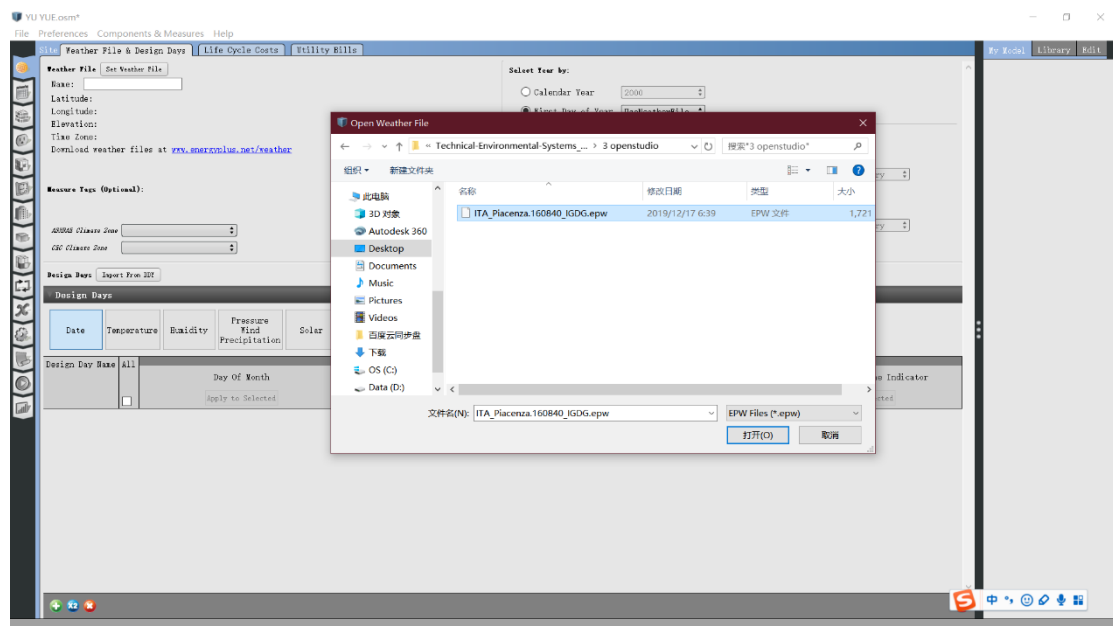
1



2



Add the weather Data



Run the model:

