

week 6

QUESTION 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 ?

$$11-2 \text{ no shields} = 5.67 \cdot 10^{-8} \cdot (800^4 - 500^4) / (1/0.2 + 1/0.7 - 1) = 3625.4 \text{ W/m}^2$$

when the heat transfer = 1%

$$q_{1-2} = 36.25 \text{ W/m}^2$$

when $\Sigma 1 = 0.1$

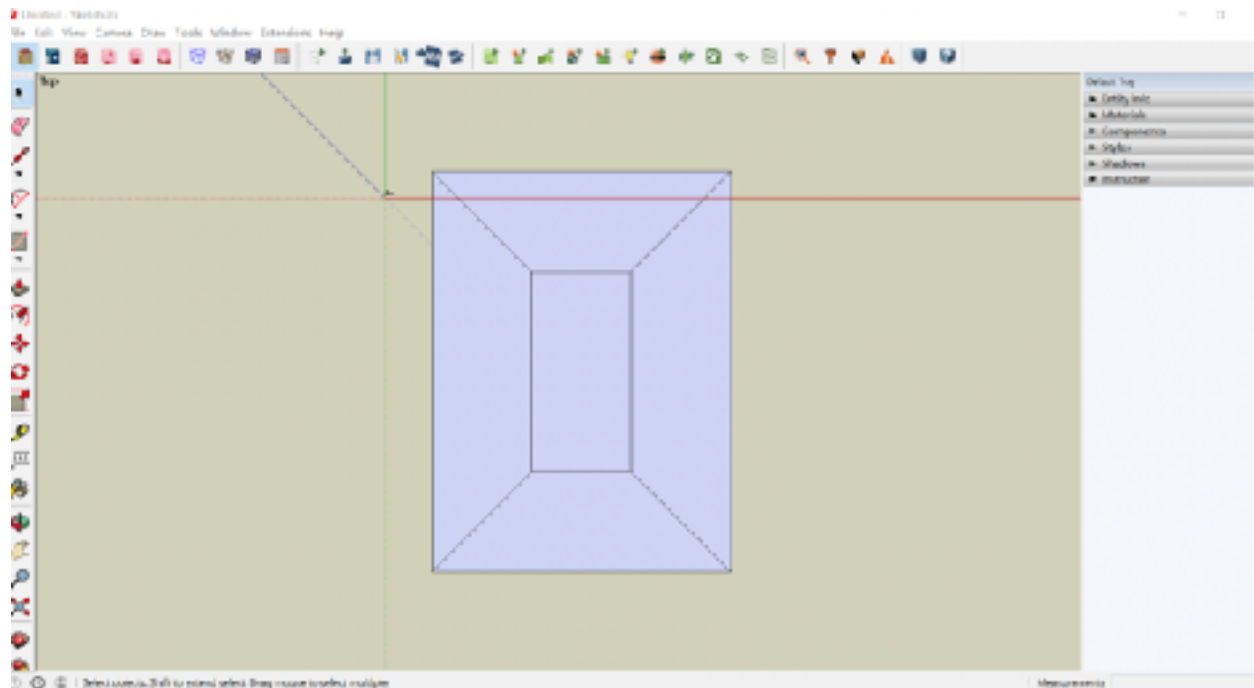
$$q_{1-2} \text{ with } N \text{ shields} = (N+1) \cdot q_{1-2} \text{ single shield}$$

$$N = 27.5$$

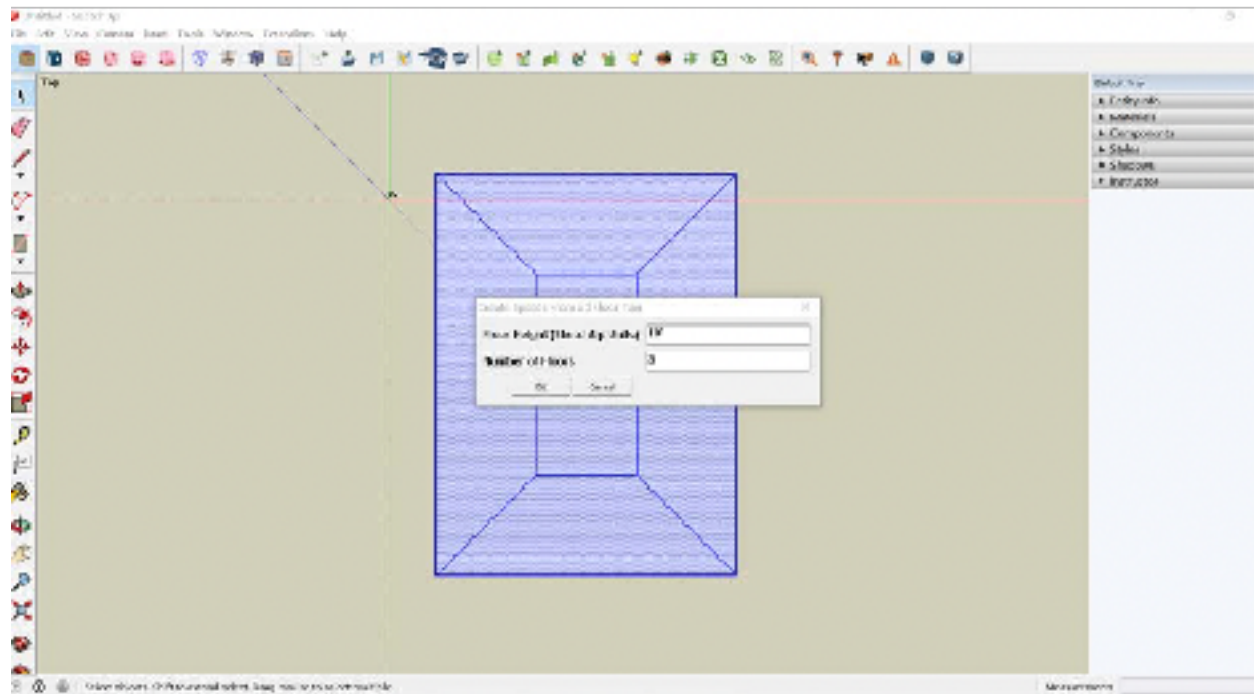
so 28 shields will be needed to achieve the 1% heat transfer

QUESTION 2

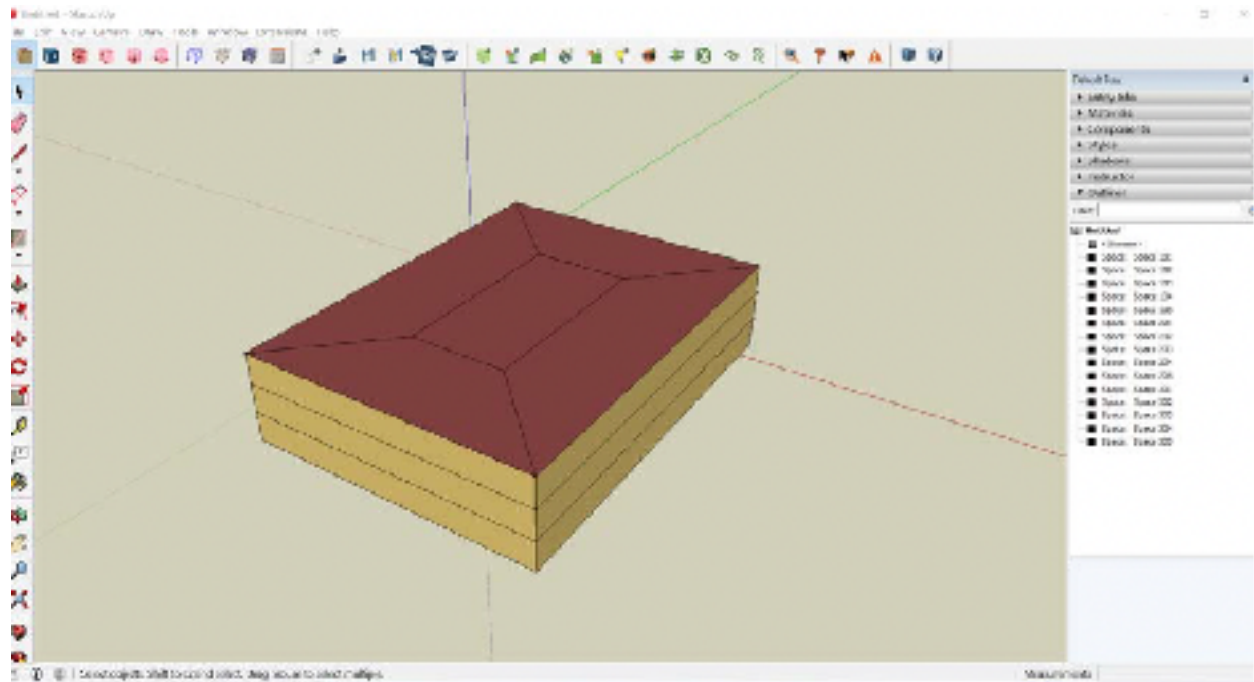
1. Create a 40m*30m rectangle



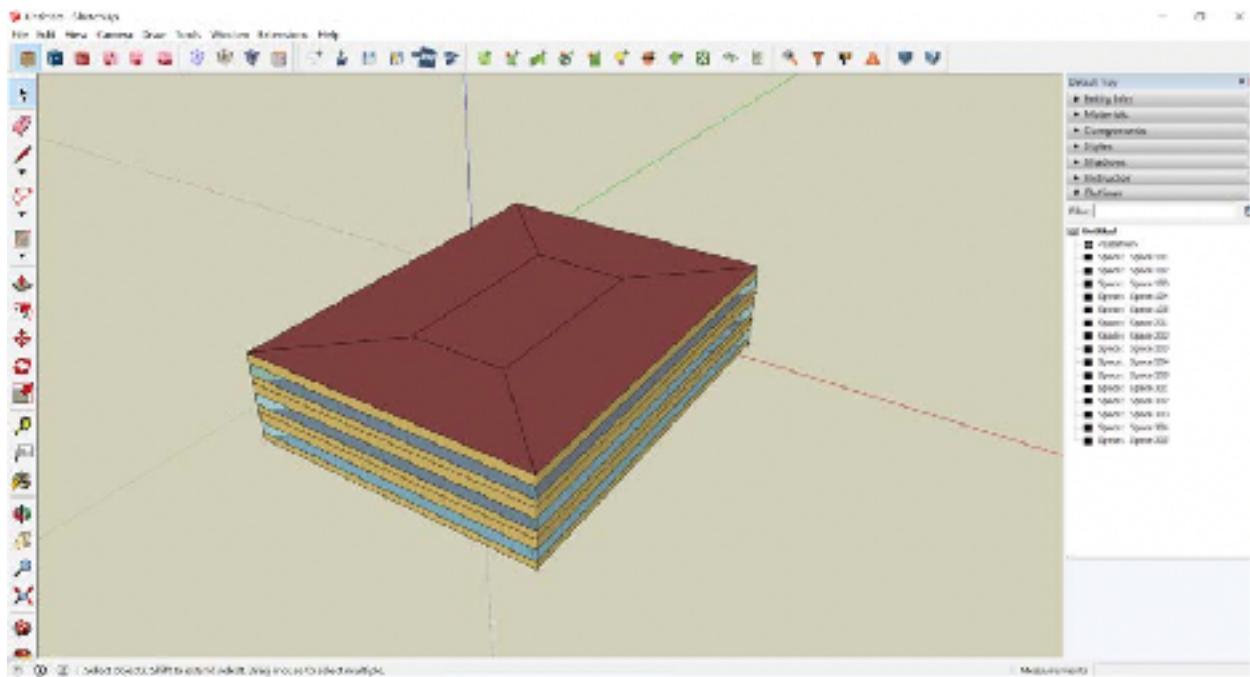
2.create spaces from diagram



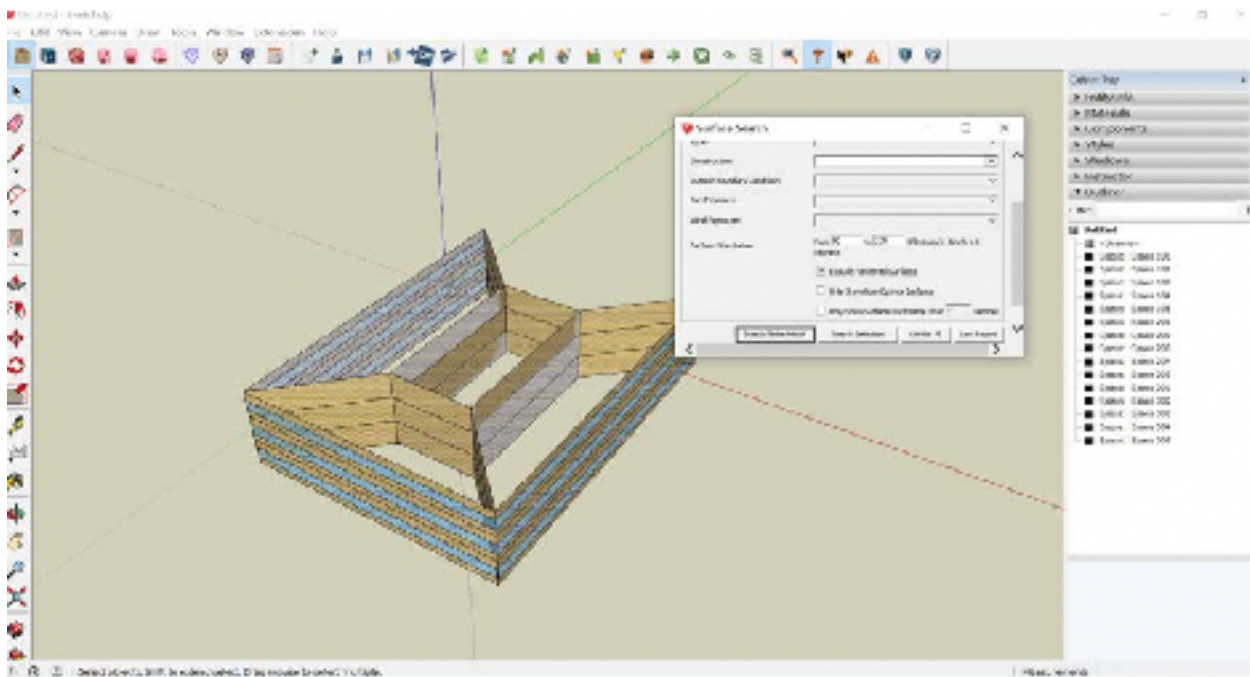
3.surfaces matching



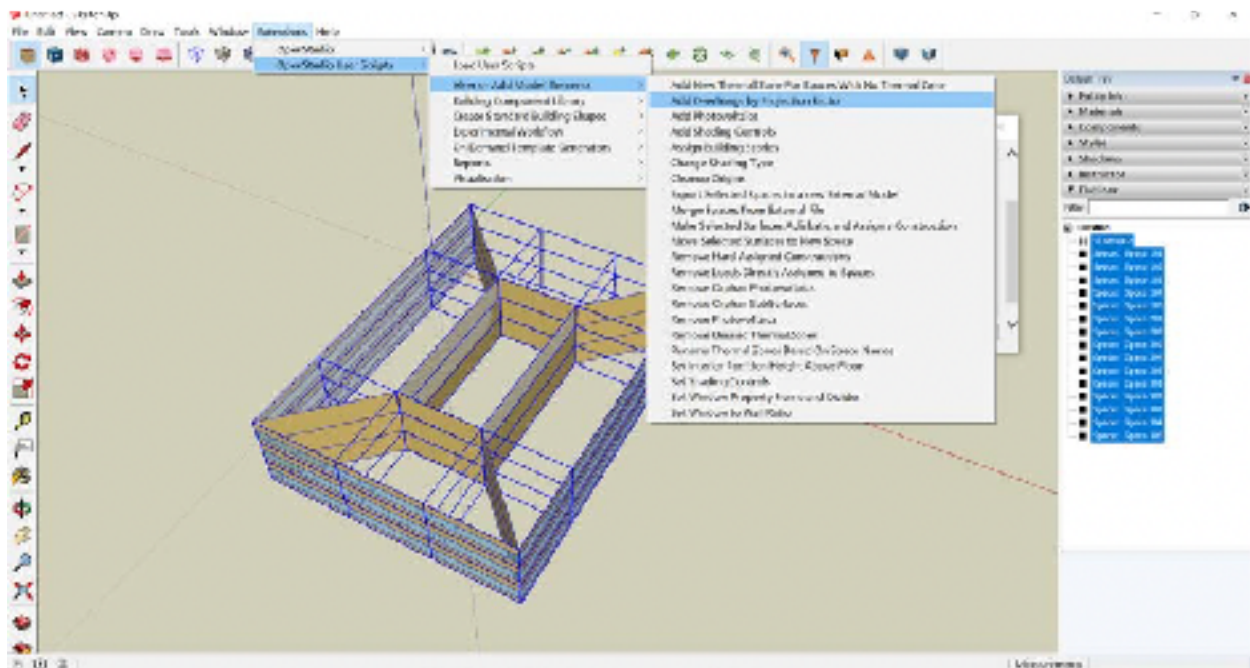
4.install the windows



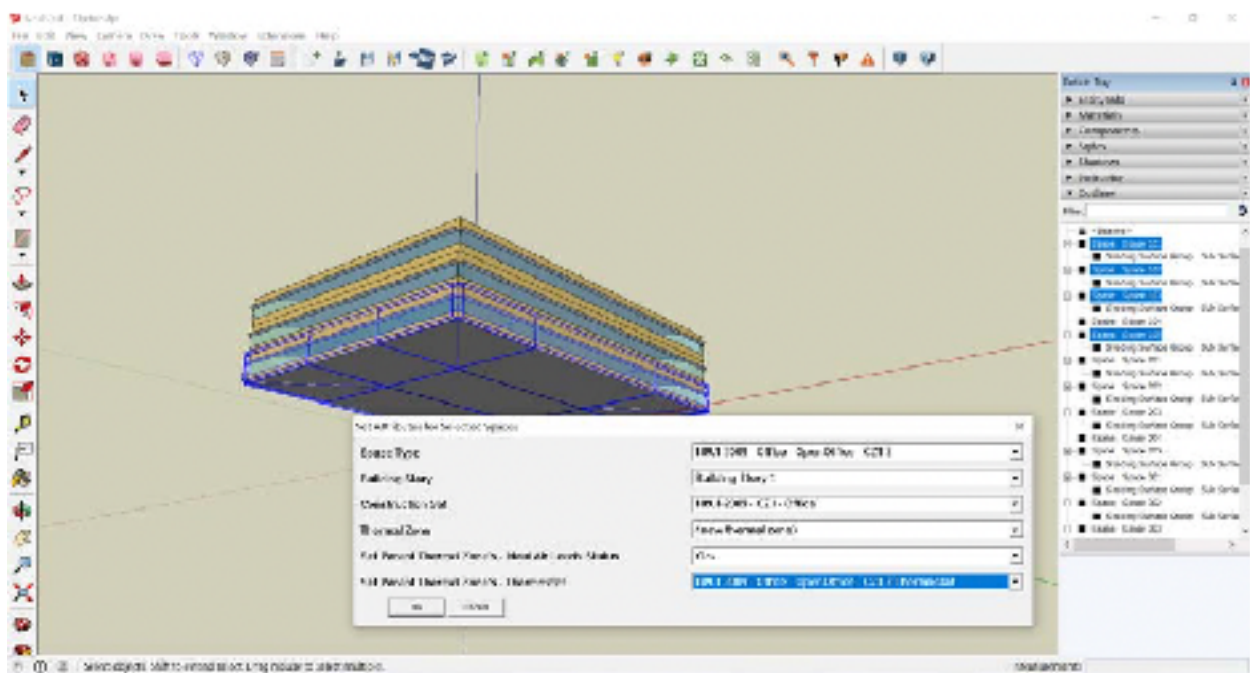
5. search surfaces



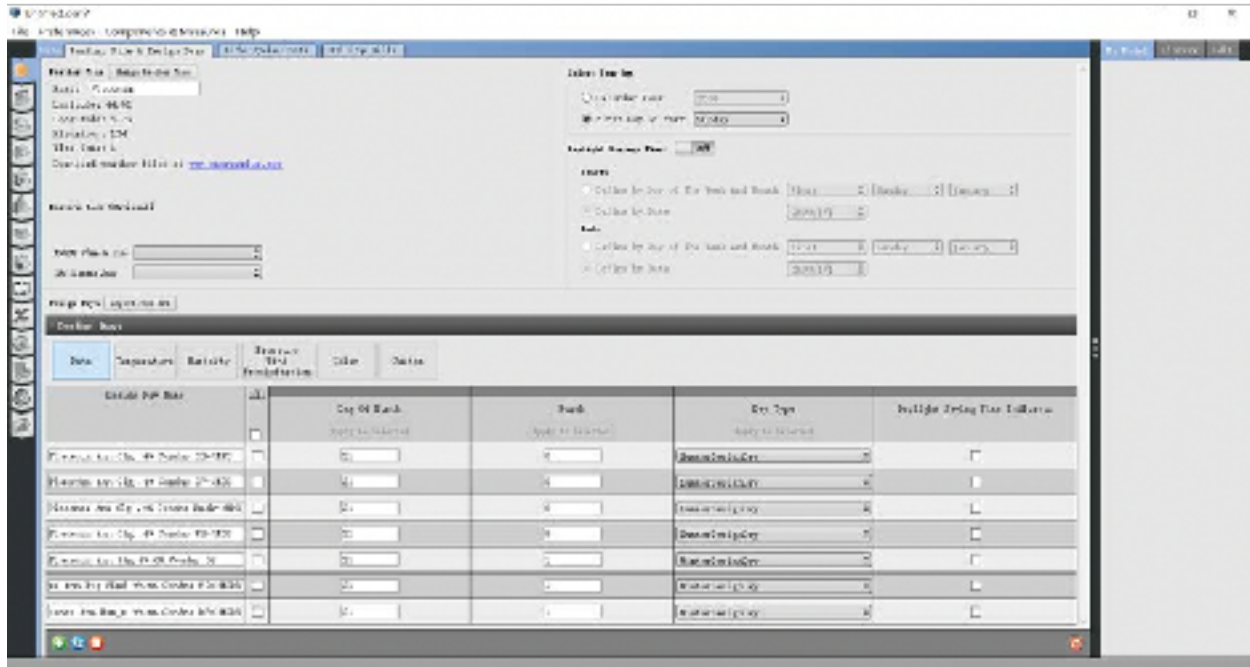
6.add the external shading



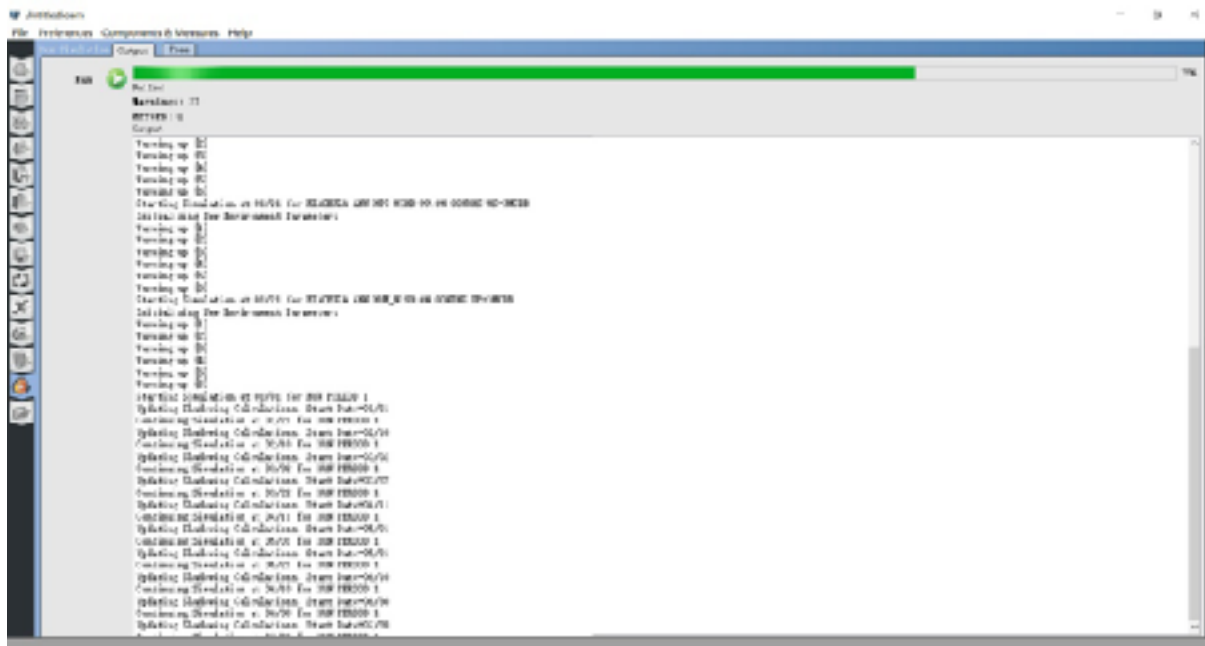
7.Set attributes for selected spaces



8.Launch OpenStudio add weather file



9.run the analysis



10. see the result

Source: EnergyPlus v8.8.0.100	View Results (opens in new browser window)																				
Program: Design Energy Plus, Version 8.8.0.100 (64-bit), VM: 8/20/11, 11:17:23																					
Title: Output Report in Format: HTML																					
Building: Building 1																					
Location: SUN, PT30700 : 19 Resources: 10/1/2010 8/20/11-1/2011																					
Simulation: Starting: 2011-11-23 11:17:23																					
LIGHT: ADDITIONAL LIGHT FROM OBJECTS: FURNITURE																					
Use: Fetus Facility																					
Duration: 2011-11-23 23:11:21																					
Values gathered over 9000.00 hours																					
Site and Source Loads																					
	<table> <tr> <th></th><th>Total Energy (kWh)</th><th>Energy for Zone Heating/Preheat/Heat Loss</th><th>Energy for Mechanical Cooling/Power Rejection</th></tr> <tr> <td>Total Site Energy</td><td>2750.68</td><td>2750.68</td><td>254.61</td></tr> <tr> <td>Site Site Energy</td><td>330.66</td><td>330.66</td><td>3.0000</td></tr> <tr> <td>Total Source Energy</td><td>8112.92</td><td>8112.92</td><td>8112.92</td></tr> <tr> <td>Site Source Energy</td><td>8112.92</td><td>8112.92</td><td>8112.92</td></tr> </table>		Total Energy (kWh)	Energy for Zone Heating/Preheat/Heat Loss	Energy for Mechanical Cooling/Power Rejection	Total Site Energy	2750.68	2750.68	254.61	Site Site Energy	330.66	330.66	3.0000	Total Source Energy	8112.92	8112.92	8112.92	Site Source Energy	8112.92	8112.92	8112.92
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