#Week 7

**** Task 1**** **Provide a summary of the main concepts that went through about solar radiation (formulas are not needed)**

Solar radiation density:
Solar radiation refers to the fact that the sun transmits energy in the form of electromagnetic waves, which refers to the electromagnetic waves and particle flows emitted by the sun into space.
The energy transmitted by solar radiation is called solar radiant energy. Although the solar radiation energy received by the Earth is only a part of the total radiant energy emitted by the Sun into space, it is the main source of energy for the Earth's atmosphere and the main source of the Earth's solar thermal energy.

Solar radiation spectrum:
The solar radiation spectrum is a spectrum that describes the radiation ability of light of various wavelengths of solar radiation. This is of great significance for the study of solar radiation. The sun is an electromagnetic radiation source with a temperature of approximately 5800K.
Since its temperature is much higher than the general industrial temperature (less than 2000K), its wavelength range and energy distribution are also different from ordinary heat radiation.

Solar radiation characteristics:
1. The annual equator receives the most radiation, with the least polarity. This uneven heat distribution is bound to cause temperature differences at various latitudes on the Earth's surface, resulting in tropical, temperate and cold climates on the Earth's surface.
2. Summer astronomical radiation is large, and winter is small, leading to high temperatures in summer and low temperatures in winter. The weakening effect of the atmosphere on solar radiation includes its absorption, scattering and reflection.

Direct radiation:
Direct solar radiation is radiation that the sun directly projects into the ground in the form of parallel rays.
Diffuse radiation:
Diffuse radiation refers to the amount of solar radiation emitted in all directions except the direction of the sun, also known as sky radiation, scattered radiation. This is due to solar radiation scattered in the atmosphere and clouds, as well as solar radiation from the Earth's surface, land and buildings.

Atmospheric absorption:
Atmospheric absorption refers to the ability of electromagnetic radiation to absorb various components of the atmosphere as it diffuses in the atmosphere.

Atmospheric absorption is selective absorption. Solar radiation passes through a long atmospheric path and is subjected to a series of absorption to the surface. The absorbed energy is converted into heat energy, ionization energy or other forms of energy, which determines the important role of the physical and chemical state of the atmosphere

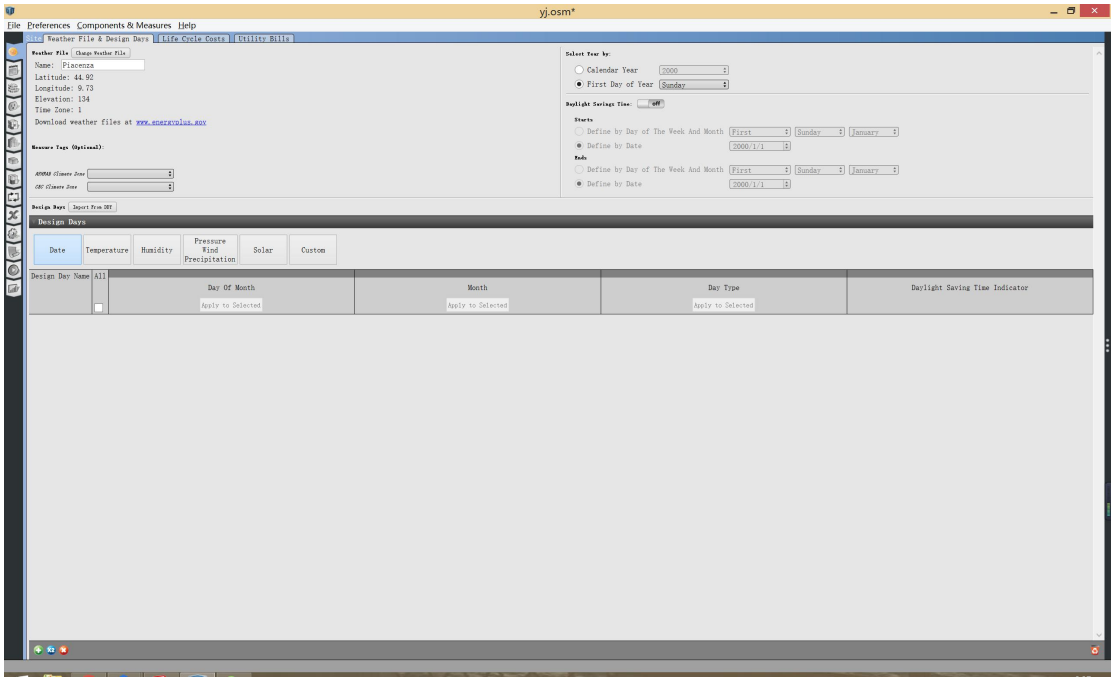
Solar energy: availability

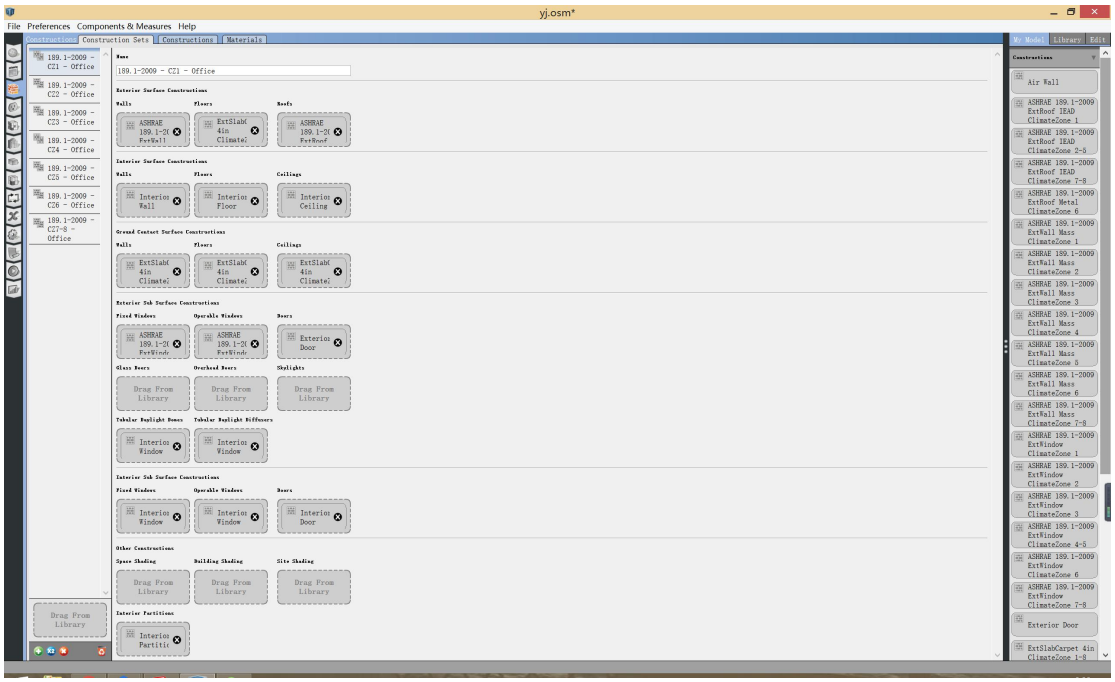
Solar radiation intensity refers to the intensity of solar radiation reaching the ground. The absorption, reflection and scattering of solar radiation by the atmosphere greatly weaken the solar radiation reaching the ground. However, there are still many factors that affect the intensity of solar radiation, so the amount of solar radiation reaching different regions is different.

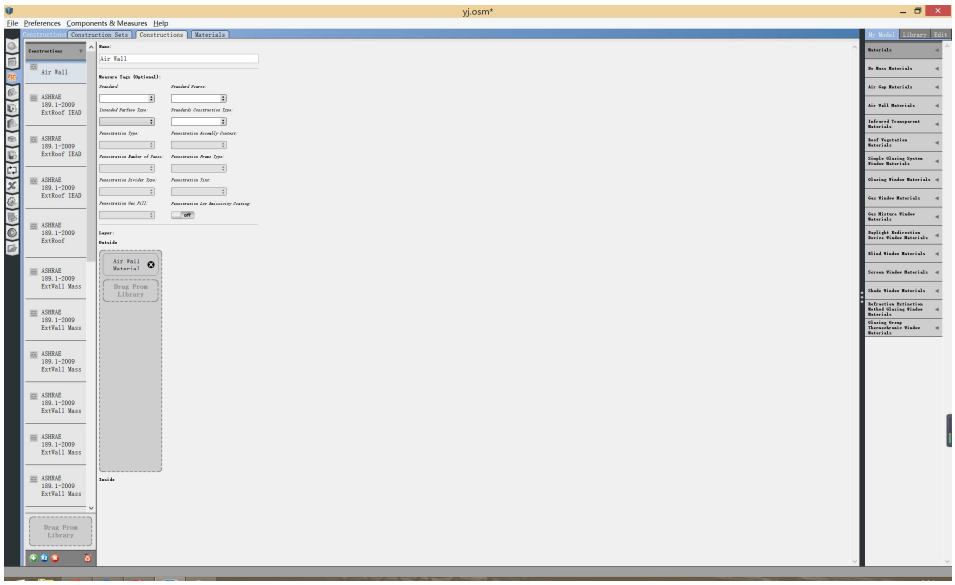
There are four main factors influencing the intensity of solar radiation.

1. Latitude position. If the latitude is low, the sun at noon is high. Solar radiation passes through the atmosphere in a short distance and is less weakened by the atmosphere.
2. Weather conditions. In fine weather, due to the small and thin clouds, the atmosphere weakens solar radiation and the solar radiation reaching the ground is strong. In rainy weather, due to the thick and thick clouds, the atmosphere of solar radiation is weakened, and the solar radiation reaching the ground is weak.
3. Altitude. At high altitudes, the air is thin, the solar radiation in the atmosphere is weakened, and the solar radiation reaching the surface is strong; otherwise, it is weak.
4. The sunshine takes a long time and the sun is strong. The sunshine time is short and the solar radiation is weak.

**** Task 2** You create a pdf file with screenshots of all of the steps we went through in the second lesson on openStudio and explain briefly the reason behind the use of each step (in your own words!)**



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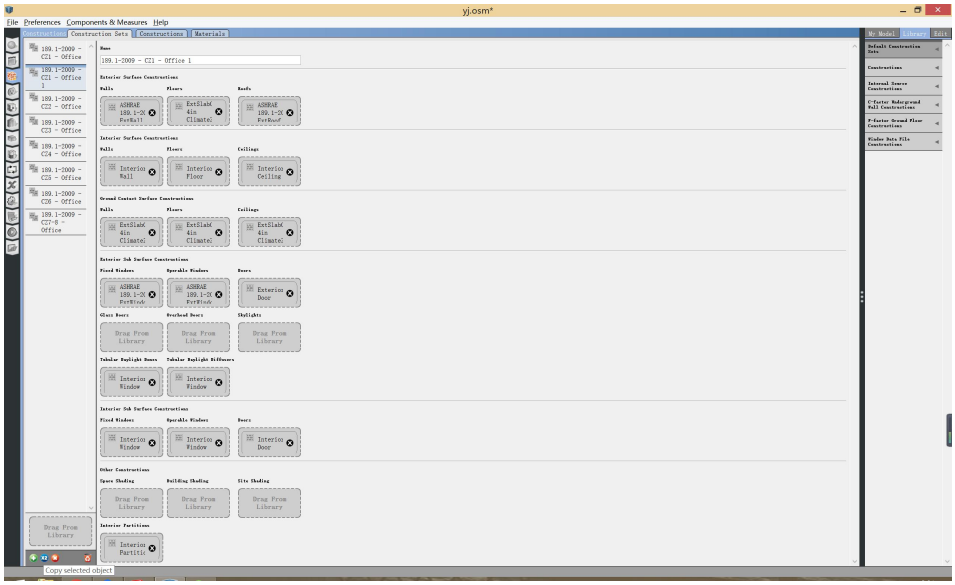
File Preferences Components & Measures Help
Air Wall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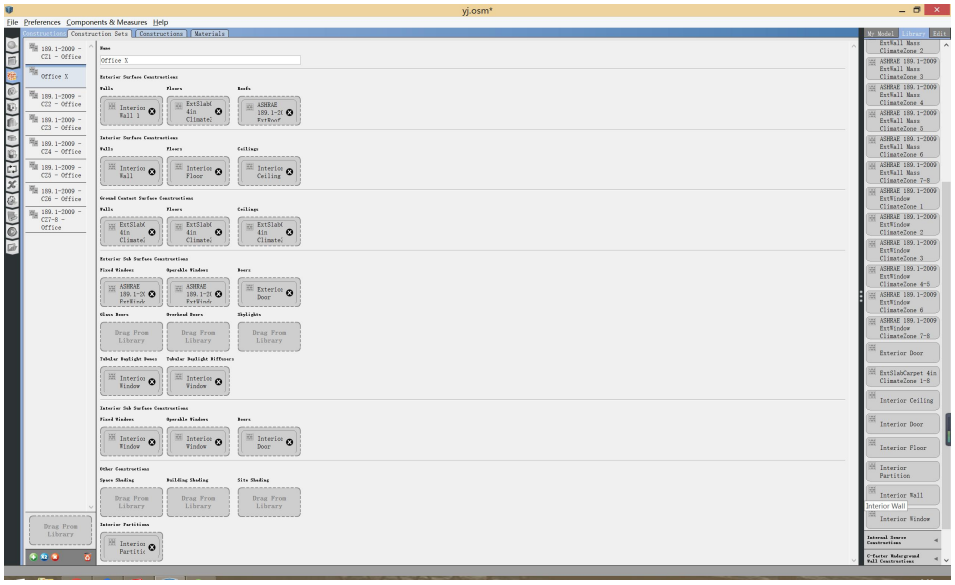
File Preferences Components & Measures Help
189.1-2009 - CZ1 - Office 1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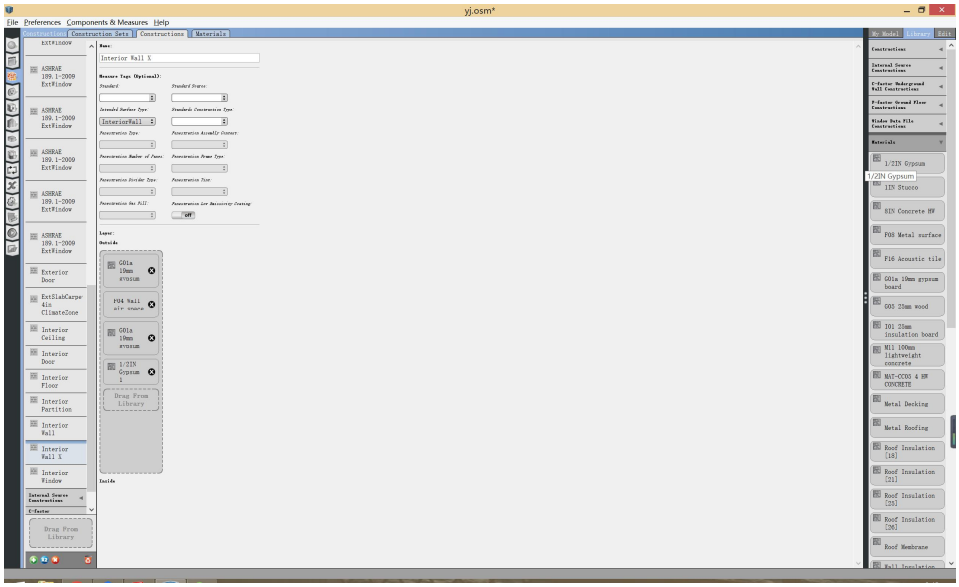
File Preferences Components & Measures Help
Office X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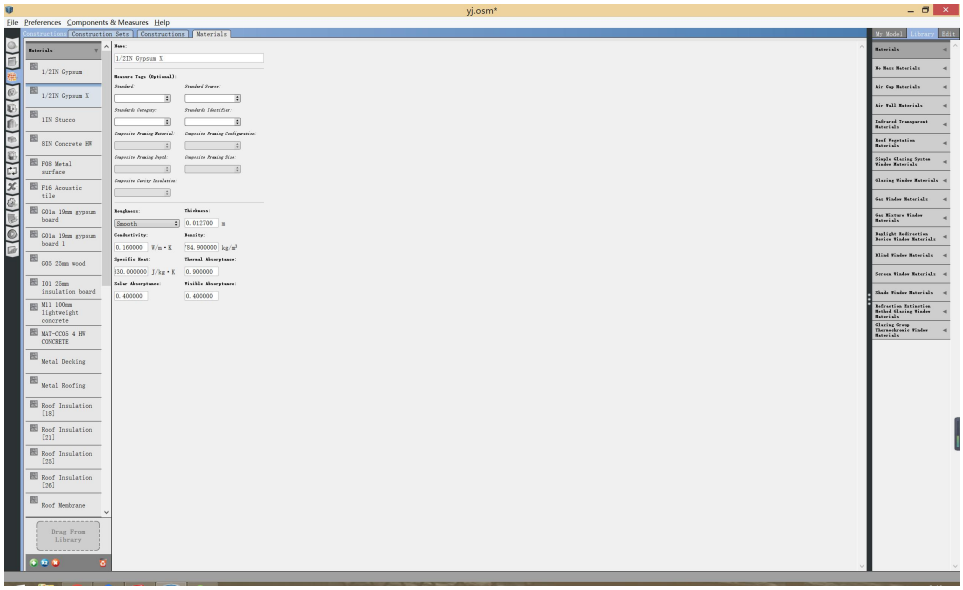
File Preferences Components & Measures Help
Interior Wall X
1/2IN Gypsum
5IN Stucco
8IN Concrete HW
F08 Metal surface
F16 Acoustic tile
G01a 19mm gypsum board
G05 25mm wood
I01 25mm insulation board
M11 100mm lightweight concrete
MAT-CC05 4 HW CONCRETE
Metal Decking
Metal Roofing
Roof Insulation [18]
Roof Insulation [21]
Roof Insulation [25]
Roof Insulation [26]
Roof Membrane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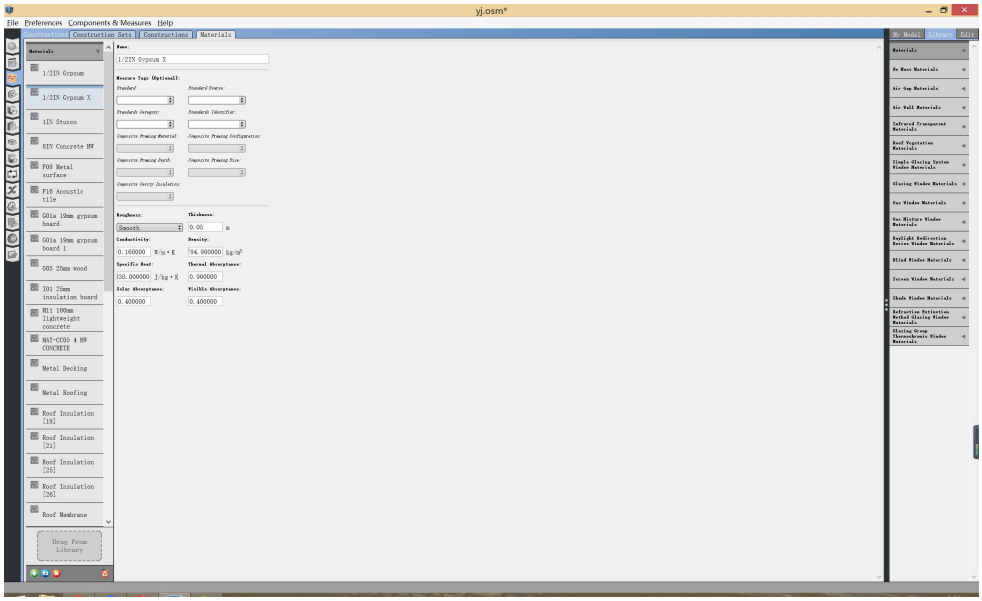
File Preferences Components & Measures Help
1/2IN Gypsum X
Roughness:
Smooth
Thickness:
0.011700 m
Conductivity:
0.160000 W/m·K
Density:
784.900000 kg/m³
Specific Heat:
130.000000 J/kg·K
Thermal Absorptance:
0.900000
Solar Absorptance:
0.400000
Visible Absorptance:
0.400000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File Preferences Components & Measures Help
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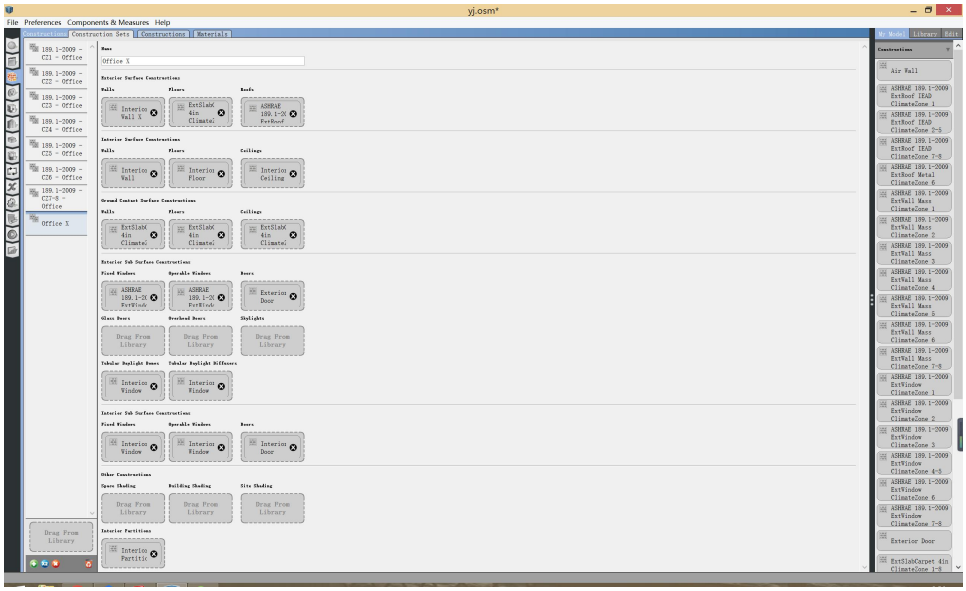
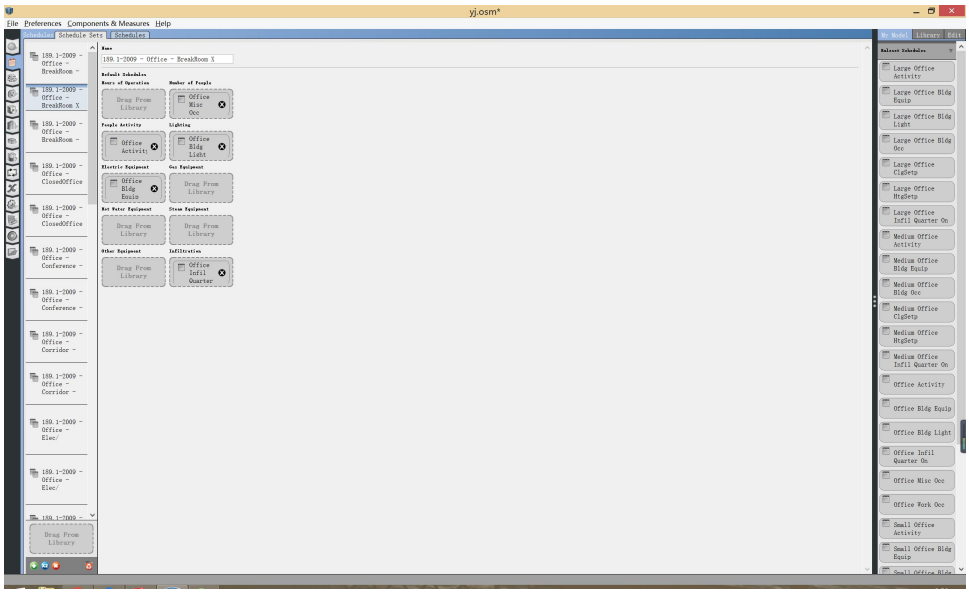
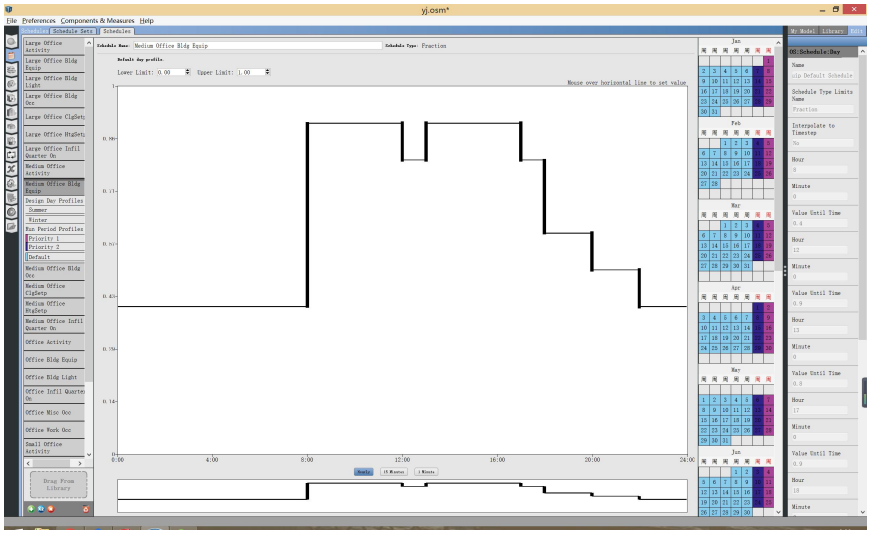
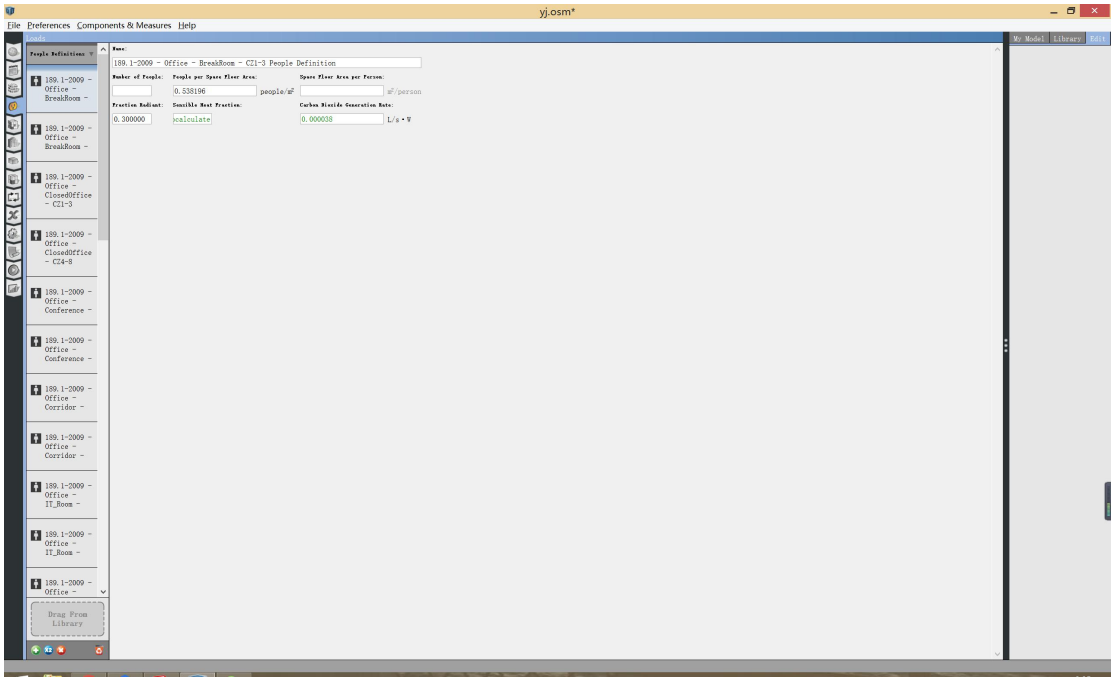
Changed the materials





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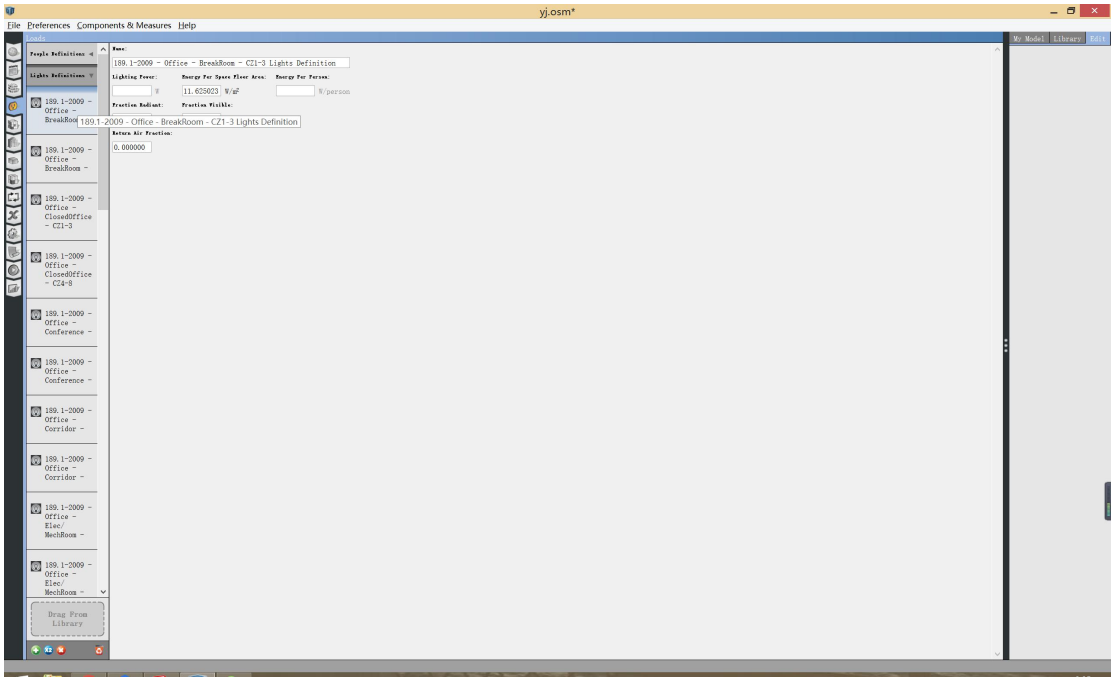
File Preferences Components & Measures Help
People Definitions
189.1-2009 - Office - BreakRoom - CZ1-3 People Definition
Number of People:
People per Space Floor Area:
0.538196
people/m²
Space Floor Area per Person:
m²/person
Fraction Radiant:
0.300000
Sensible Heat Fraction:
Carbon Dioxide Generation Rate:
0.000038
L/s * W
My Model
Library
Edit
Drag From Library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File Preferences Components & Measures Help
People Definitions
Lights Definitions
189.1-2009 - Office - BreakRoom - CZ1-3 Lights Definition
Lighting Power:
Energy Per Space Floor Area:
11.625023
W/m²
Energy Per Person:
W/person
Fraction Radiant:
Fraction Visible:
Return Air Fraction:
0.000000
My Model
Library
Edit
Drag From Library