## Week7 Assignment

### Task1：

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

### Summary:

### Solar Constant

At the average distance between the sun and the earth, the outer surface of the atmosphere is perpendicular to the solar ray and the solar surface energy is received per unit surface area. In the whole year, the distance between the sun and the earth is constantly changing. But the amount of change in solar energy that reaches the interface at the atmosphere caused by this change is small.

### Solar Radiation

Solar radiation refers to the sun transmitting energy outward in the form of electromagnetic waves. Solar radiation passes through the atmosphere receiving two weakenings of the atmosphere, namely absorption and scattering. Absorption of gases with partial absorption capacity in the atmosphere, such as ozone and water vapor. Scattering is the re-radiation of solar radiation.

### Direct and Diffuse Radiation

Solar radiation is divided into direct radiation and diffuse radiation. Direct radiation refers to radiation from the sun whose direction does not change. Diffuse is the solar radiation that change direction after being reflected and scattered by the atmosphere.

### Atmospheric Absorption

Atmospheric absorption is mainly caused by three different atmospheric gases. Contrary to popular belief, water vapor causes the most absorption, followed by carbon dioxide and then ozone. Atmospheric absorption helps people by preventing high-energy from reaching the surface which limits our exposure to harmful radiation.

### Air Mass

The air mass coefficient defines the direct optical path length through the Earth’s atmosphere, expressed as a ratio relative to the path length vertically upwards at the zenith. The air mass can be used to help characterize the solar spectrum after solar radiation has traveled through the atmosphere.

### Solar Energy: Availability

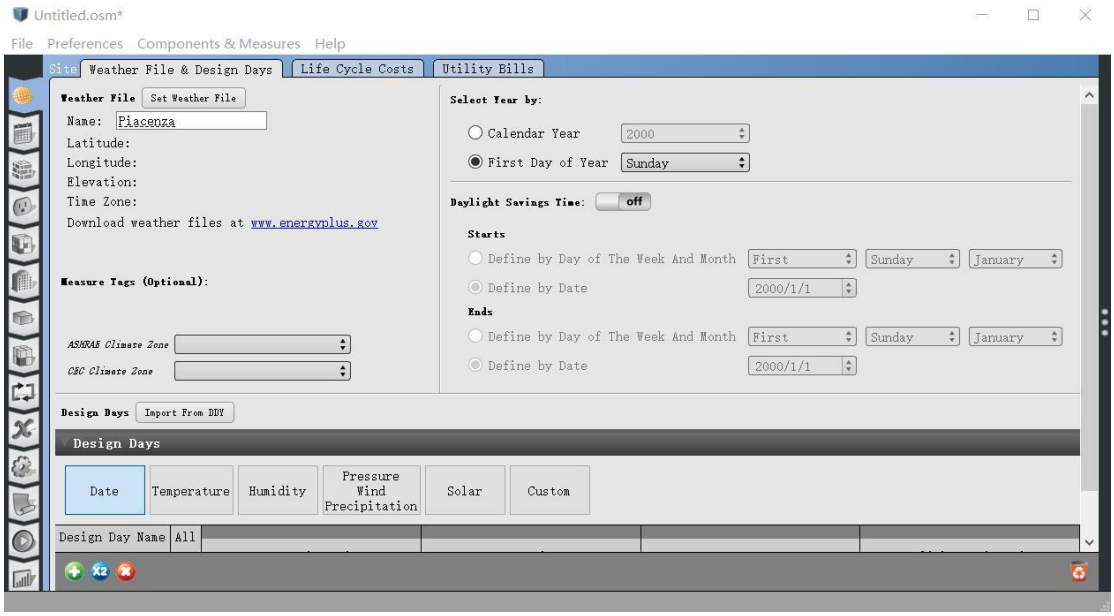
Available solar radiation refers to the exchange of heat between the ground and the

atmosphere by long-wave radiation. And the atmosphere acts as a heat preservation on the ground. The available solar radiation is related to the sun position in the sky, the weather condition, the site attitude over the see level and sunshine hours.

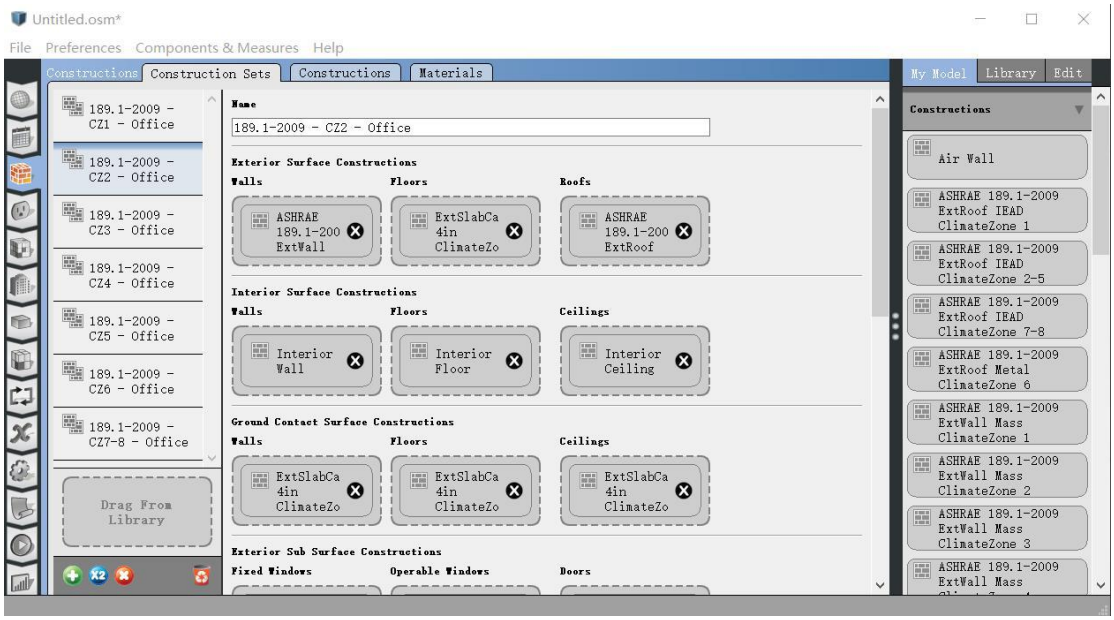
## Task2：

Create a pdf file with screenshots of all of the steps we went through in the second lesson on open studio and explain briefly the reason behind the use of each step.

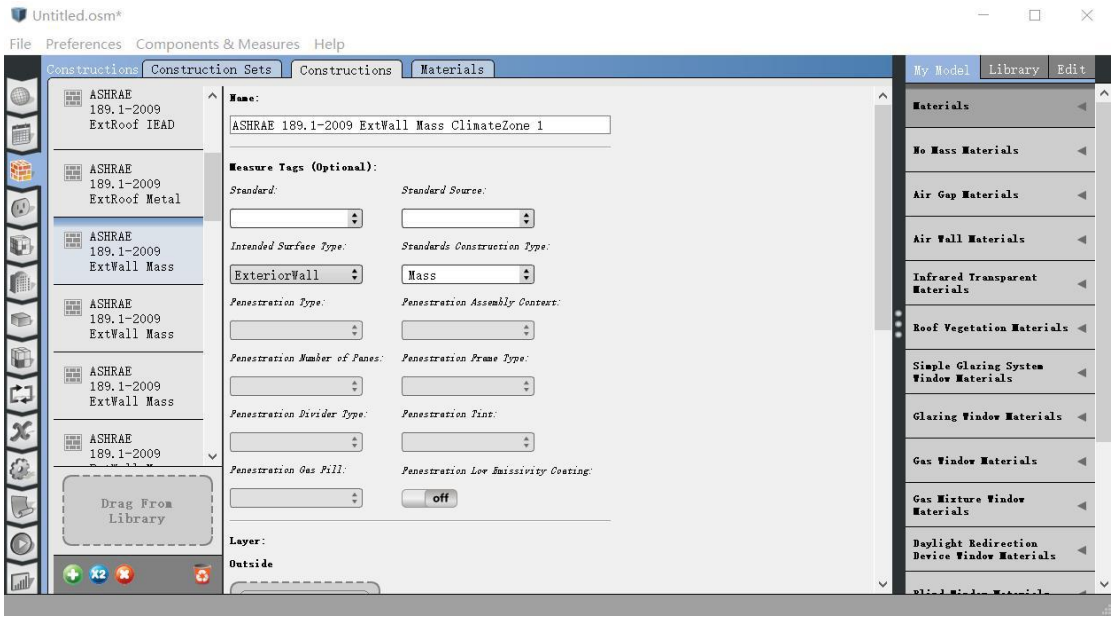
1. open a model by OpenStudio and set the climate date of Piacenza.



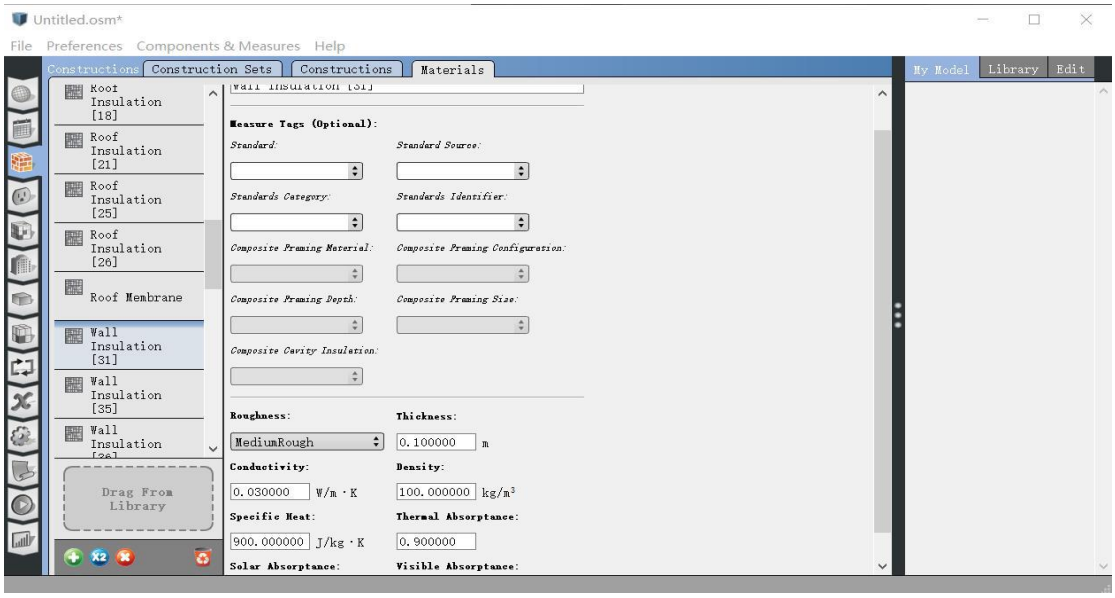

2. Click the “construction” and build a building.



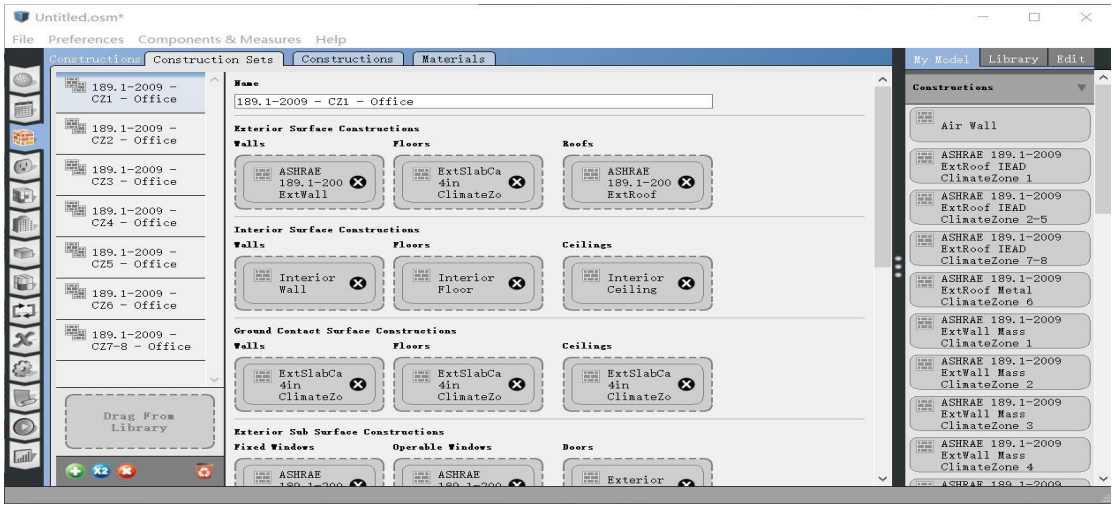

3. Customize the wall in the construction sets.



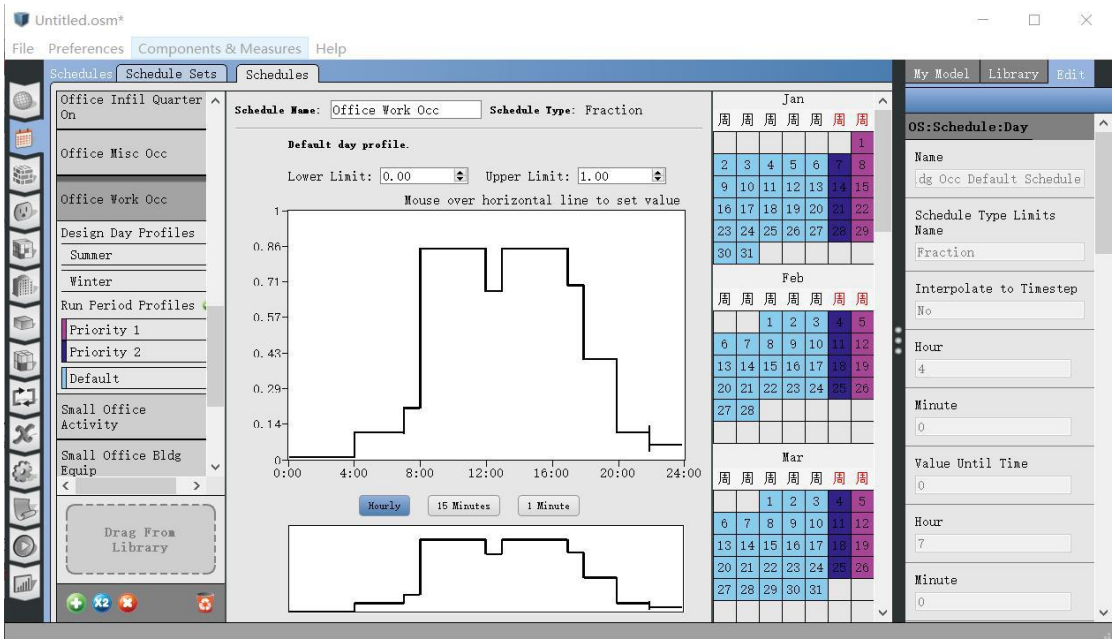

4. Choose the type of the wall and insert it.




5. Insert the wall.



6. Adding the information about the activities, equipments and so on.




7. Click the “loads” to change the other specifications.