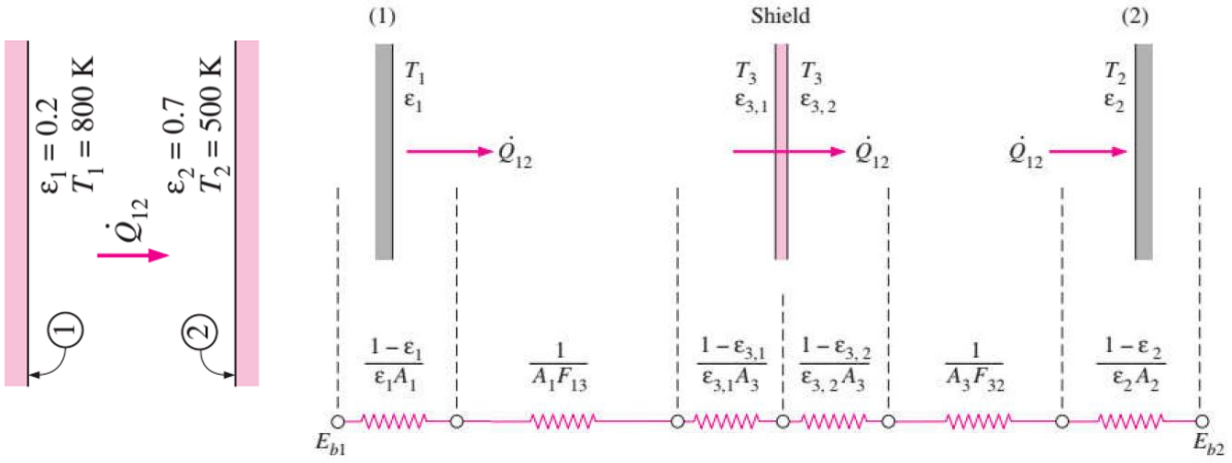
Task 1

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?



ANSWER

Without shield, $\boldsymbol{\varepsilon_1 = 0.2}$ ***and*** $\boldsymbol{\varepsilon_2 = 0.7}$,

$$\dot{Q}_{12} = \frac{E_{b1} - E_{b2}}{\frac{1-\varepsilon_1}{A\varepsilon_1} + \frac{1}{AF_{12}} + \frac{1-\varepsilon_2}{A\varepsilon_2}} = \frac{A\sigma(T_1^4 - T_2^4)}{\frac{1}{\varepsilon_1} + \frac{1}{\varepsilon_2} - 1}$$

With N shield $\boldsymbol{\varepsilon_3 = 0.1}$

$$\dot{Q}_{12Nshields} = \frac{E_{b1} - E_{b2}}{\frac{1-\varepsilon_1}{A\varepsilon_1} + \frac{1}{AF_{13}} + \frac{1-\varepsilon_3}{A\varepsilon_3} + N \times \left(\frac{1-\varepsilon_3}{A\varepsilon_3} + \frac{1}{AF_{33}} + \frac{1-\varepsilon_3}{A\varepsilon_3}\right) + \frac{1-\varepsilon_3}{A\varepsilon_3} + \frac{1}{AF_{32}} + \frac{1-\varepsilon_2}{A\varepsilon_2}}$$

$$= \frac{A\sigma(T_1^4 - T_2^4)}{\left(\frac{1}{\varepsilon_1} + \frac{1}{\varepsilon_3} - 1\right) + N\left(\frac{1}{\varepsilon_3} + \frac{1}{\varepsilon_3} - 1\right) + \left(\frac{1}{\varepsilon_3} + \frac{1}{\varepsilon_2} - 1\right)}$$

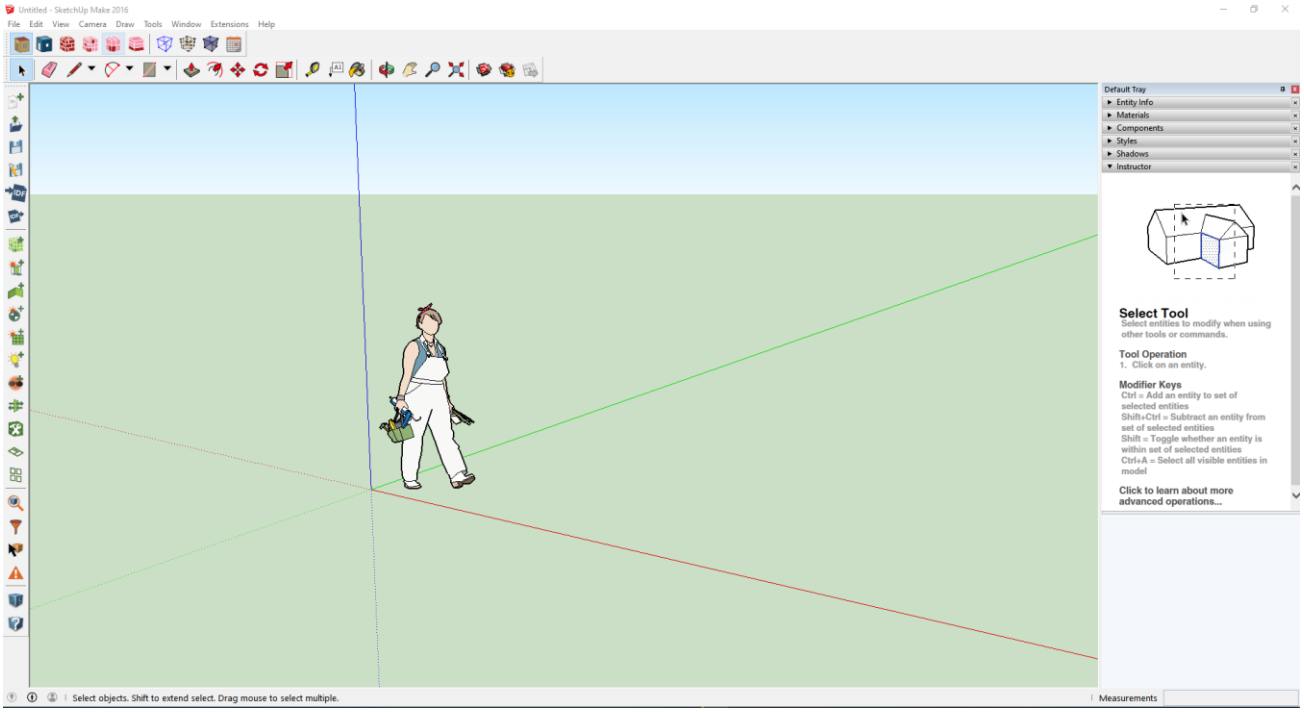
$$= \frac{A\sigma(T_1^4 - T_2^4)}{\left(\frac{1}{\varepsilon_1} + \frac{1}{\varepsilon_2} - 1\right) + (N+1)\left(\frac{1}{\varepsilon_3} + \frac{1}{\varepsilon_3} - 1\right)}$$

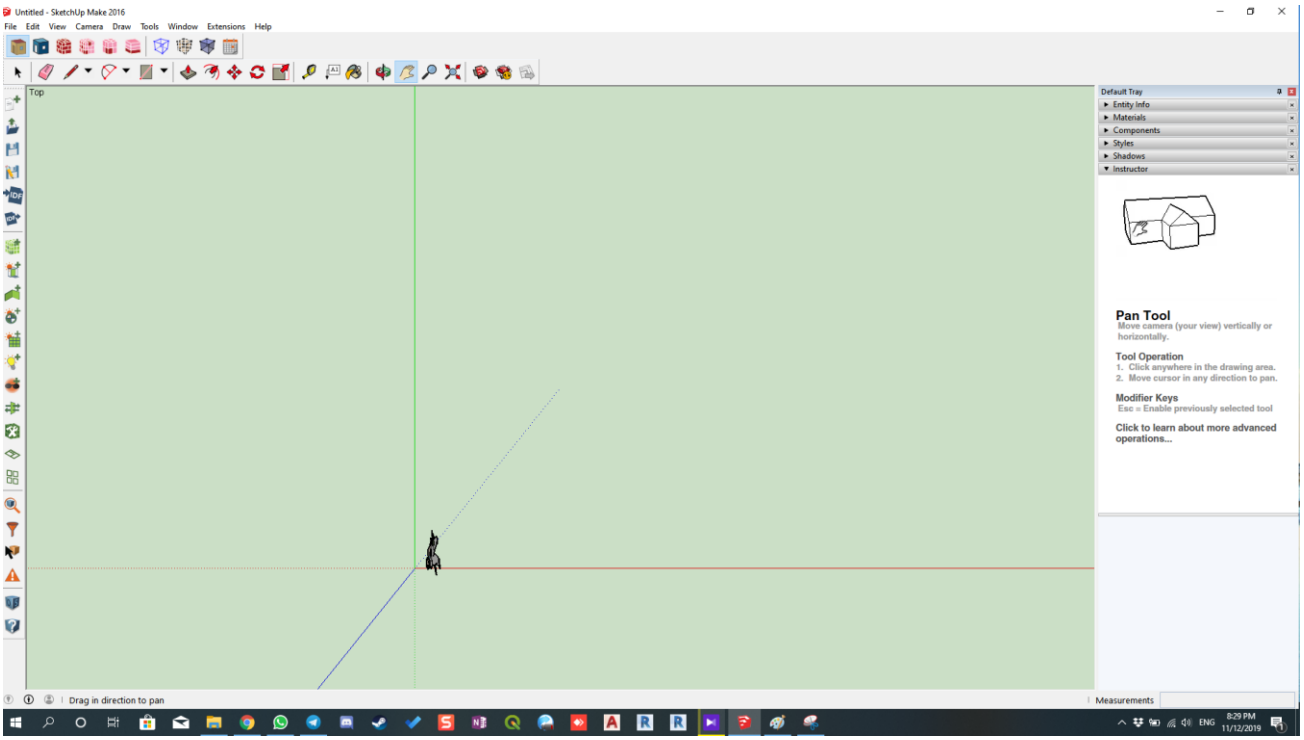
$$\frac{\dot{Q}_{12Nshields}}{\dot{Q}_{12}} = \frac{\left(\frac{1}{\varepsilon_1} + \frac{1}{\varepsilon_2} - 1\right) + (N+1)\left(\frac{1}{\varepsilon_3} + \frac{1}{\varepsilon_3} - 1\right)}{\frac{1}{\varepsilon_1} + \frac{1}{\varepsilon_2} - 1} = \mathbf{1} + (\boldsymbol{N}+\mathbf{1})\frac{\frac{1}{\varepsilon_3} + \frac{1}{\varepsilon_3} - 1}{\frac{1}{\varepsilon_1} + \frac{1}{\varepsilon_2} - 1} = 100$$

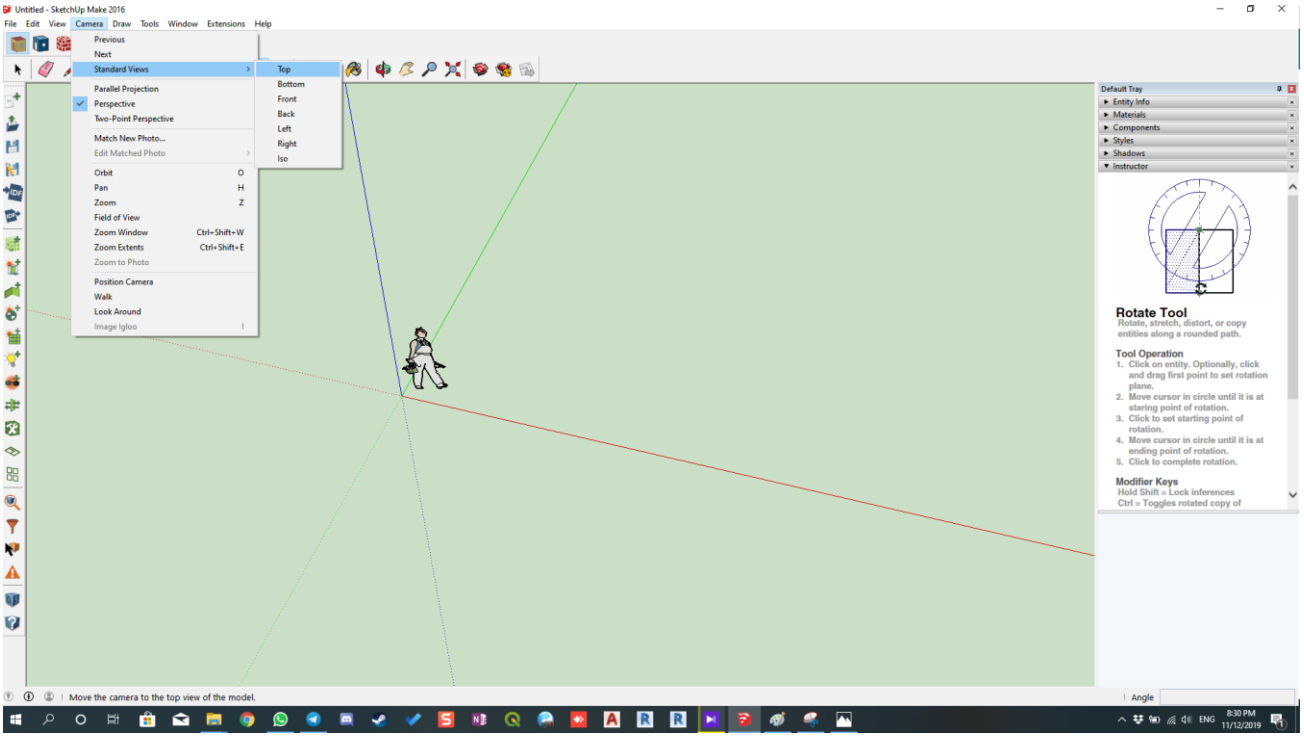
$$\Leftrightarrow \boldsymbol{N} = 99 \times \frac{\frac{1}{\varepsilon_1} + \frac{1}{\varepsilon_2} - 1}{\frac{1}{\varepsilon_3} + \frac{1}{\varepsilon_3} - 1} - 1 = 99 \times \frac{\frac{1}{0.2} + \frac{1}{0.7} - 1}{\frac{1}{0.1} + \frac{1}{0.1} - 1} - 1 \approx 27.3$$

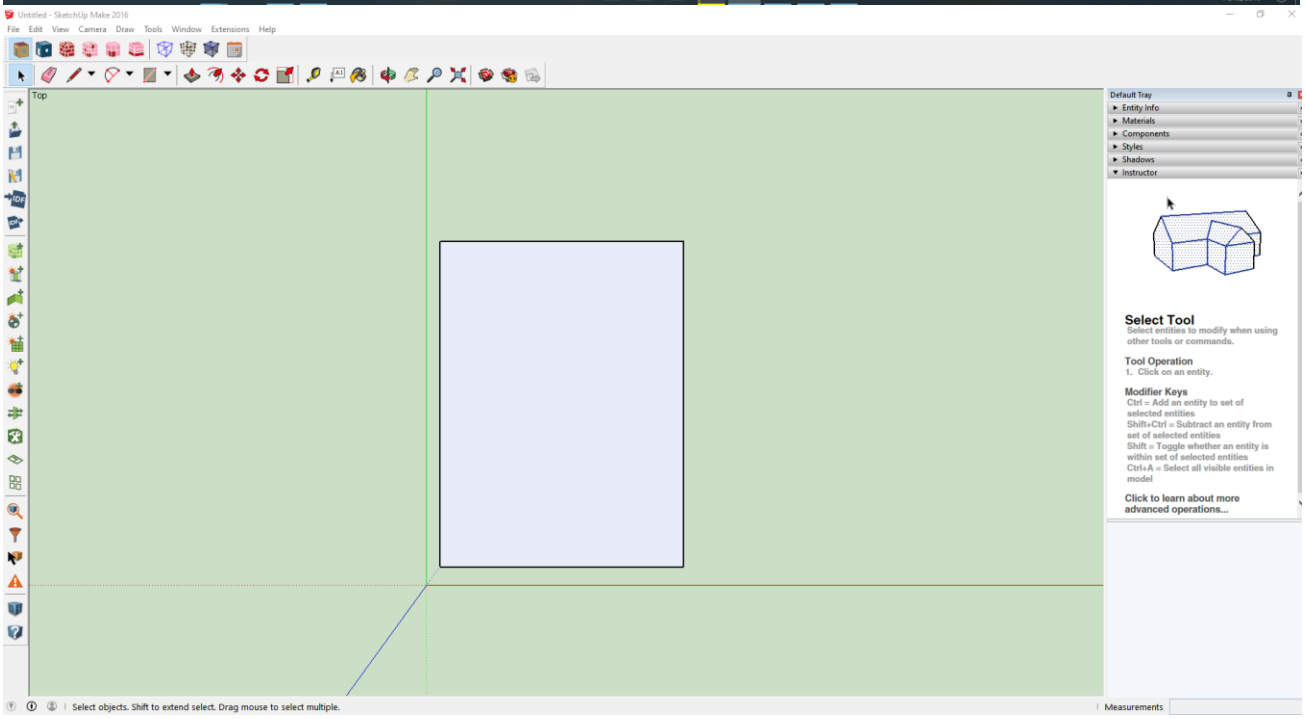
Conclusion: 27 shields can be added.

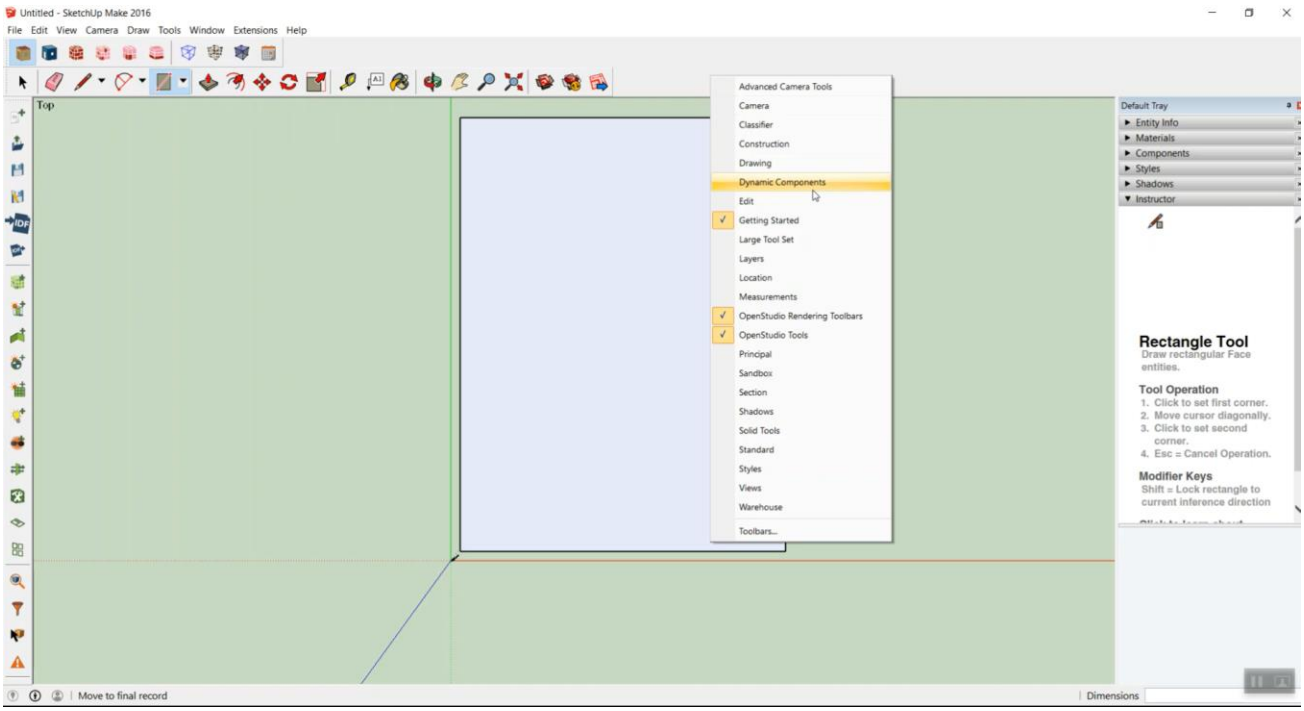
Task 2

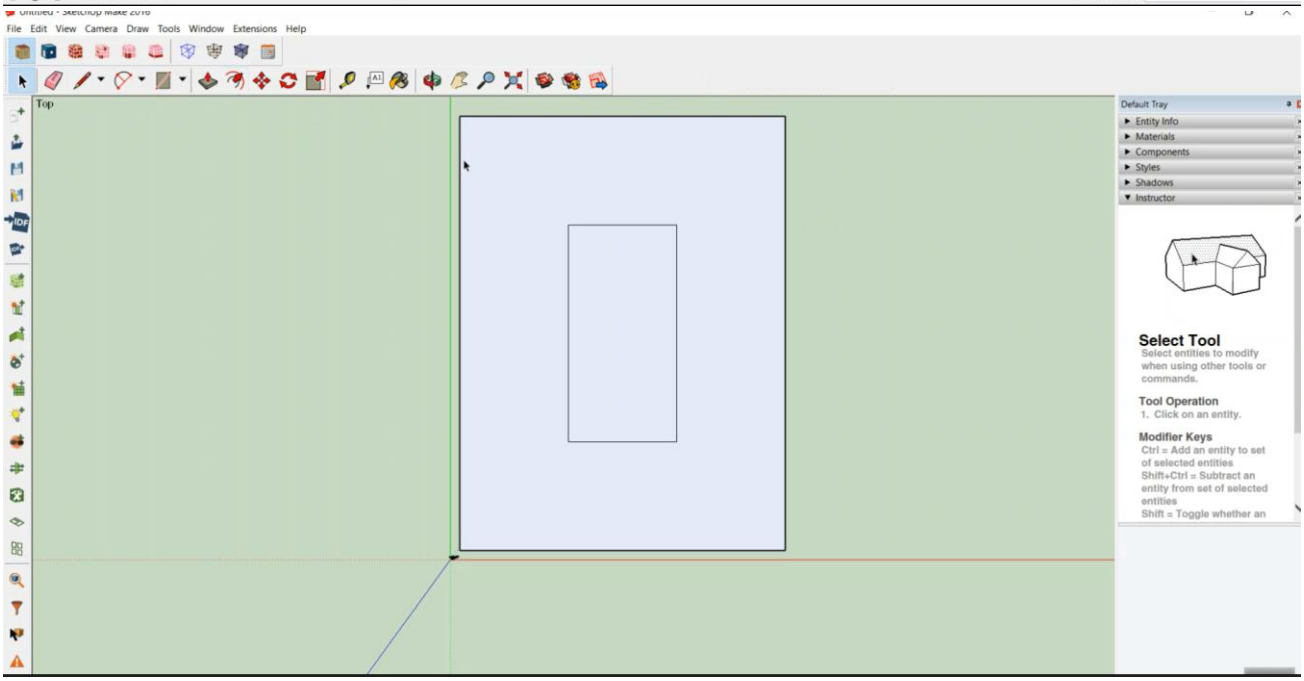

Untitled - SketchUp Make 2016
File Edit View Camera Draw Tools Window Extensions Help
Default Tray
Entity Info
Materials
Components
Styles
Shadows
Instructor
Select Tool
Select entities to modify when using other tools or commands.
Tool Operation
1. Click on an entity.
Modifier Keys
Ctrl = Add an entity to set of selected entities
Shift+Ctrl = Subtract an entity from set of selected entities
Shift = Toggle whether an entity is within set of selected entities
Ctrl+A = Select all visible entities in model
Click to learn about more advanced operations...
Select objects. Shift to extend select. Drag mouse to select multiple.
Measurements

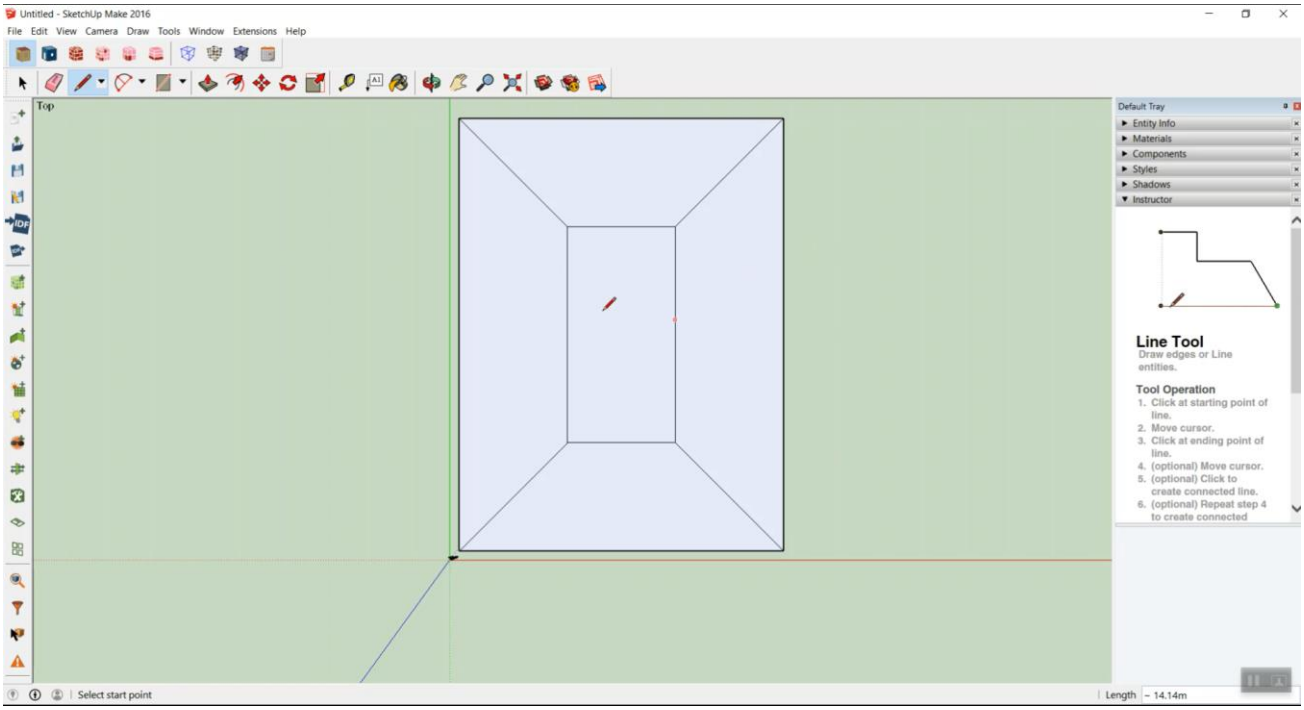

Untitled - SketchUp Make 2016
File Edit View Camera Draw Tools Window Extensions Help
Top
Default Tray
Entity Info
Materials
Components
Styles
Shadows
Instructor
Pan Tool
Move camera (your view) vertically or horizontally.
Tool Operation
1. Click anywhere in the drawing area.
2. Move cursor in any direction to pan.
Modifier Keys
Esc = Enable previously selected tool
Click to learn about more advanced operations...
Drag in direction to pan
Measurements
8:29 PM
11/12/2019

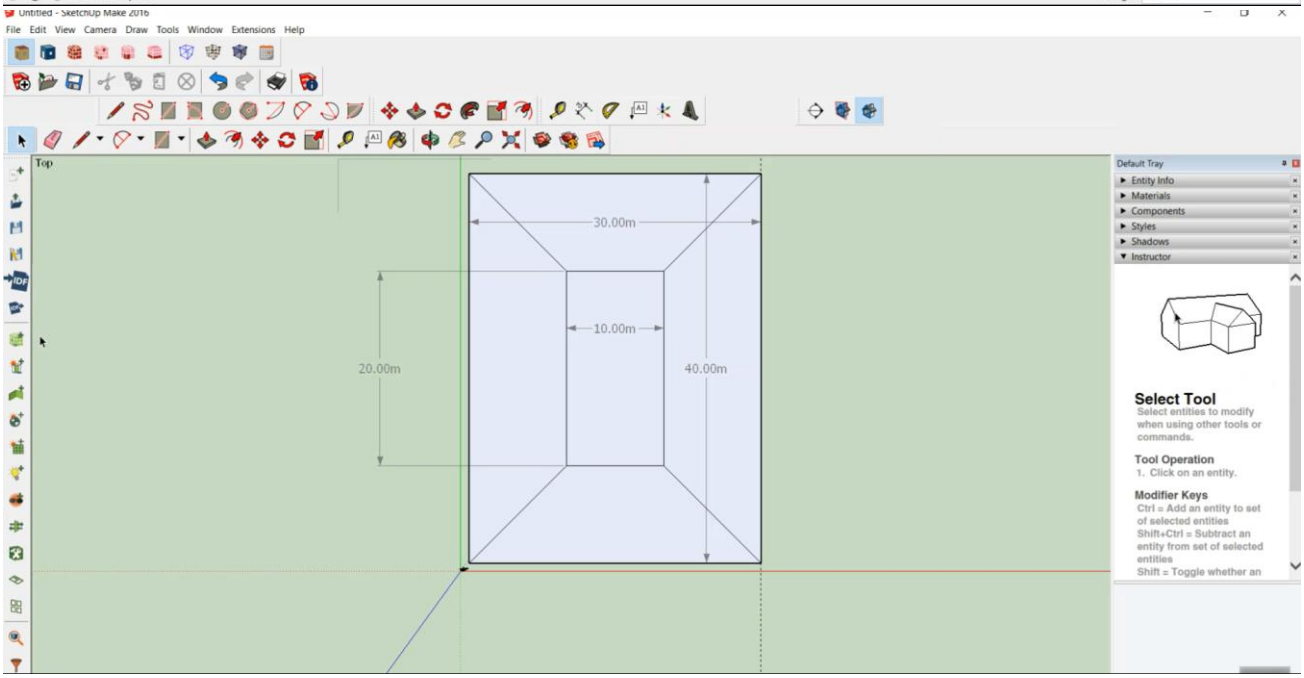

Untitled - SketchUp Make 2016
File Edit View Camera Draw Tools Window Extensions Help
Previous
Next
Standard Views
Parallel Projection
Perspective
Two-Point Perspective
Match New Photo...
Edit Matched Photo
Orbit O
Pan H
Zoom Z
Field of View
Zoom Window Ctrl+Shift+W
Zoom Extents Ctrl+Shift+E
Zoom to Photo
Position Camera
Walk
Look Around
Image Igloo
Top
Bottom
Front
Back
Left
Right
Iso
Default Tray
Entity Info
Materials
Components
Styles
Shadows
Instructor
Rotate Tool
Rotate, stretch, distort, or copy entities along a rounded path.
Tool Operation
1. Click on entity. Optionally, click and drag first point to set rotation plane.
2. Move cursor in circle until it is at staring point of rotation.
3. Click to set starting point of rotation.
4. Move cursor in circle until it is at ending point of rotation.
5. Click to complete rotation.
Modifier Keys
Hold Shift = Lock inferences
Ctrl = Toggles rotated copy of
Move the camera to the top view of the model.
Angle

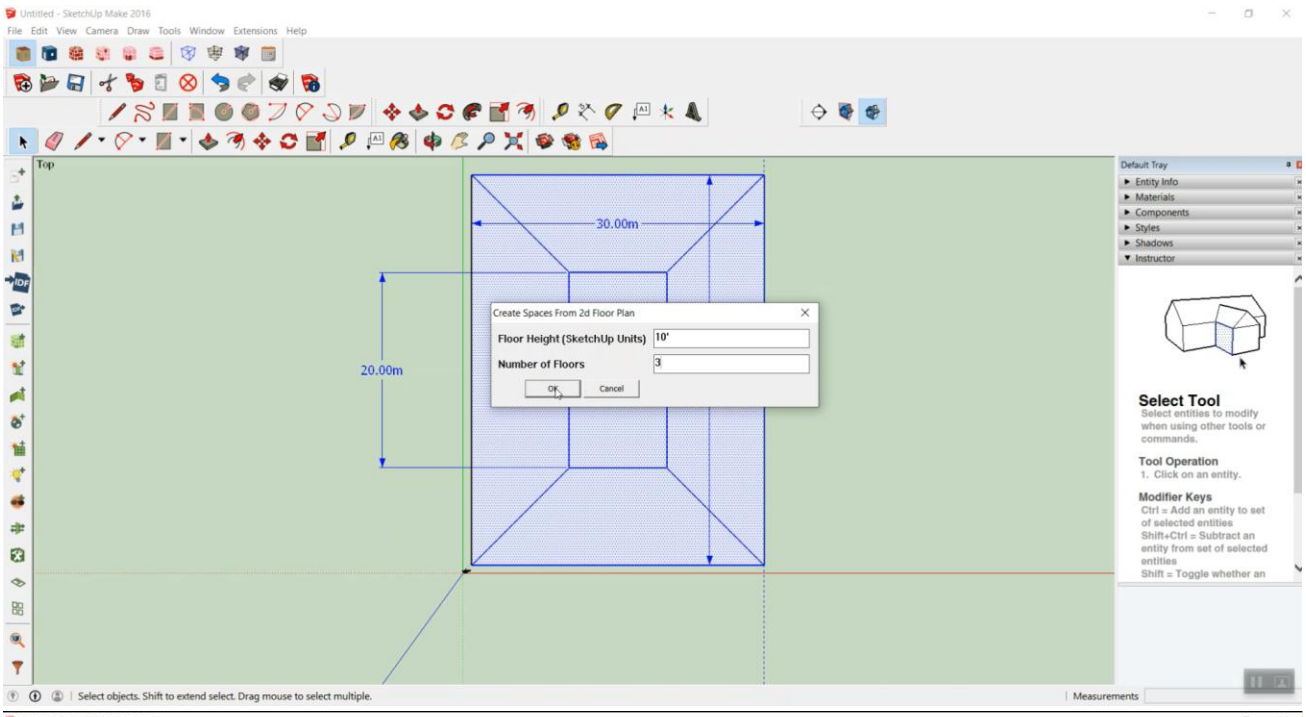

Untitled - SketchUp Make 2016
File Edit View Camera Draw Tools Window Extensions Help
Top
Default Tray
Entity Info
Materials
Components
Styles
Shadows
Instructor
Select Tool
Select entities to modify when using other tools or commands.
Tool Operation
1. Click on an entity.
Modifier Keys
Ctrl = Add an entity to set of selected entities
Shift+Ctrl = Subtract an entity from set of selected entities
Shift = Toggle whether an entity is within set of selected entities
Ctrl+A = Select all visible entities in model
Click to learn about more advanced operations...
Select objects. Shift to extend select. Drag mouse to select multiple.
Measurements

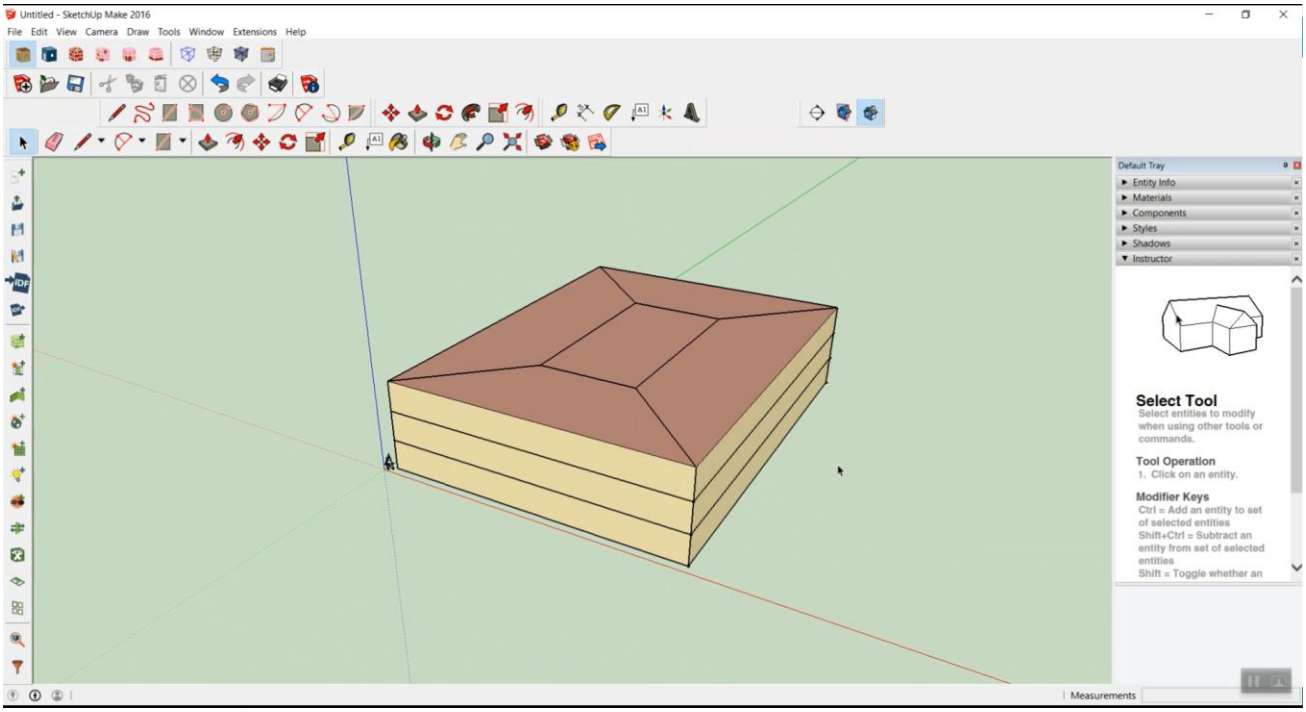

Untitled - SketchUp Make 2016
File Edit View Camera Draw Tools Window Extensions Help
Top
Advanced Camera Tools
Camera
Classifier
Construction
Drawing
Dynamic Components
Edit
Getting Started
Large Tool Set
Layers
Location
Measurements
OpenStudio Rendering Toolbars
OpenStudio Tools
Principal
Sandbox
Section
Shadows
Solid Tools
Standard
Styles
Views
Warehouse
Toolbars...
Default Tray
Entity Info
Materials
Components
Styles
Shadows
Instructor
Rectangle Tool
Draw rectangular Face entities.
Tool Operation
1. Click to set first corner.
2. Move cursor diagonally.
3. Click to set second corner.
4. Esc = Cancel Operation.
Modifier Keys
Shift = Lock rectangle to current inference direction
Move to final record
Dimensions

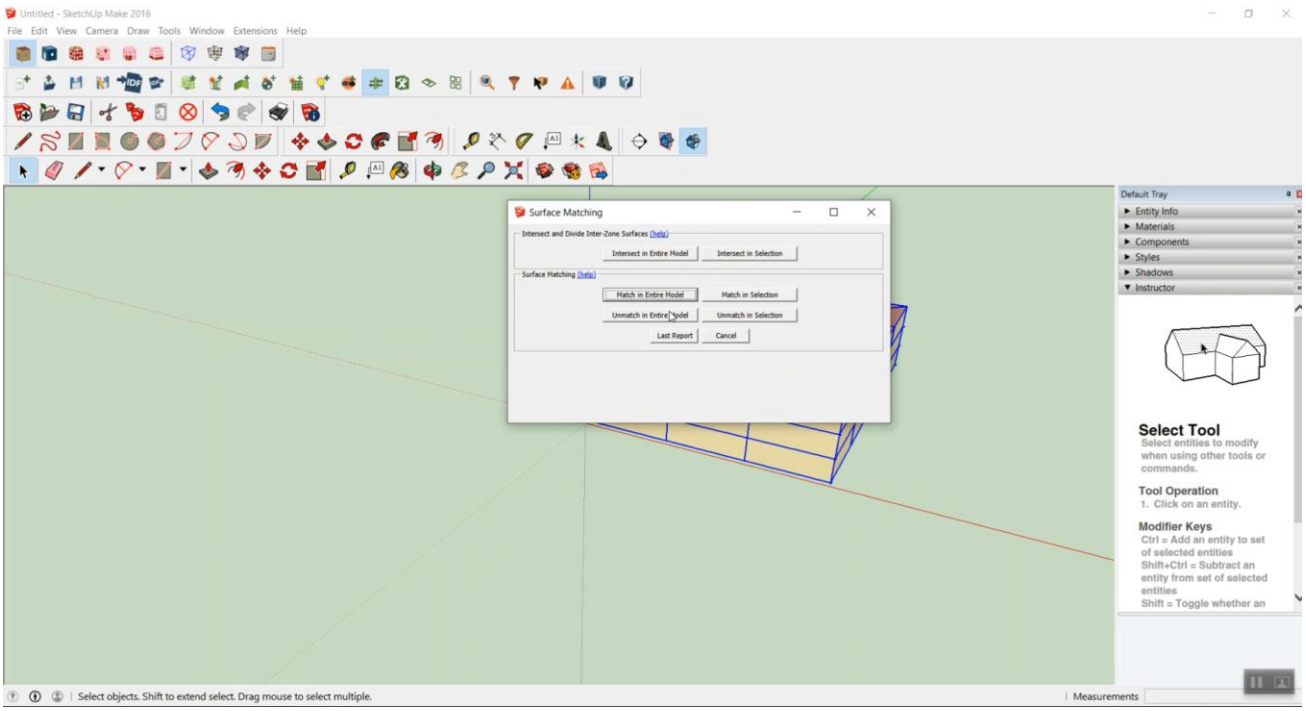

File Edit View Camera Draw Tools Window Extensions Help
Top
Default Tray
Entity Info
Materials
Components
Styles
Shadows
Instructor
Select Tool
Select entities to modify when using other tools or commands.
Tool Operation
1. Click on an entity.
Modifier Keys
Ctrl = Add an entity to set of selected entities
Shift+Ctrl = Subtract an entity from set of selected entities
Shift = Toggle whether an

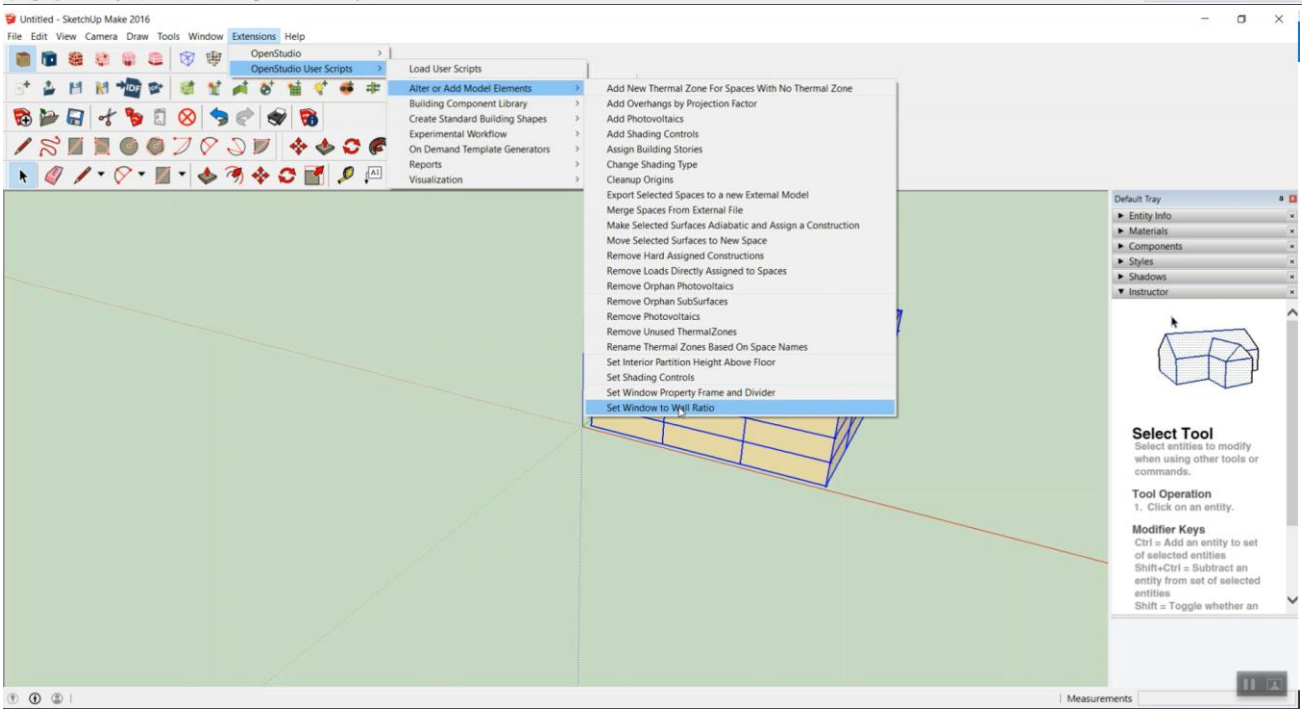

Untitled - SketchUp Make 2016
File Edit View Camera Draw Tools Window Extensions Help
Top
Default Tray
Entity Info
Materials
Components
Styles
Shadows
Instructor
Line Tool
Draw edges or Line entities.
Tool Operation
1. Click at starting point of line.
2. Move cursor.
3. Click at ending point of line.
4. (optional) Move cursor.
5. (optional) Click to create connected line.
6. (optional) Repeat step 4 to create connected
Select start point
Length ~ 14.14m

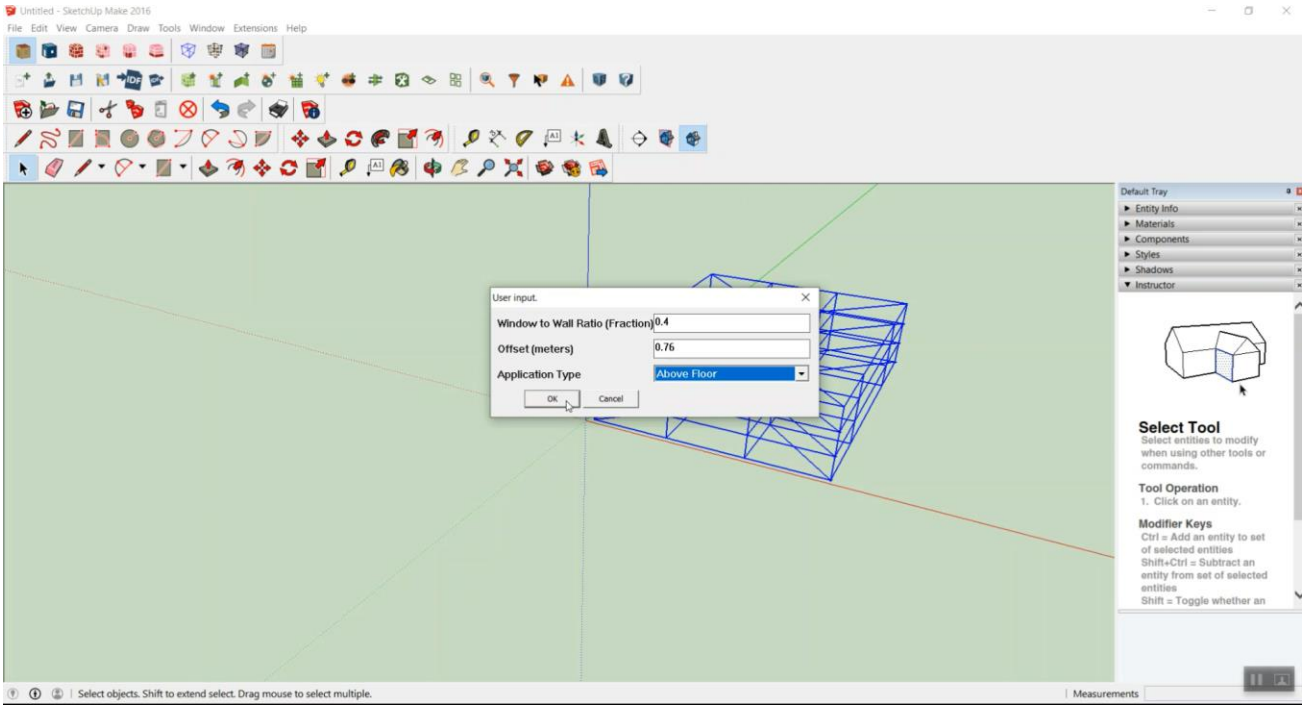

Untitled - SketchUp Make 2016
File Edit View Camera Draw Tools Window Extensions Help
Top
30.00m
10.00m
20.00m
40.00m
Default Tray
Entity Info
Materials
Components
Styles
Shadows
Instructor
Select Tool
Select entities to modify when using other tools or commands.
Tool Operation
1. Click on an entity.
Modifier Keys
Ctrl = Add an entity to set of selected entities
Shift+Ctrl = Subtract an entity from set of selected entities
Shift = Toggle whether an

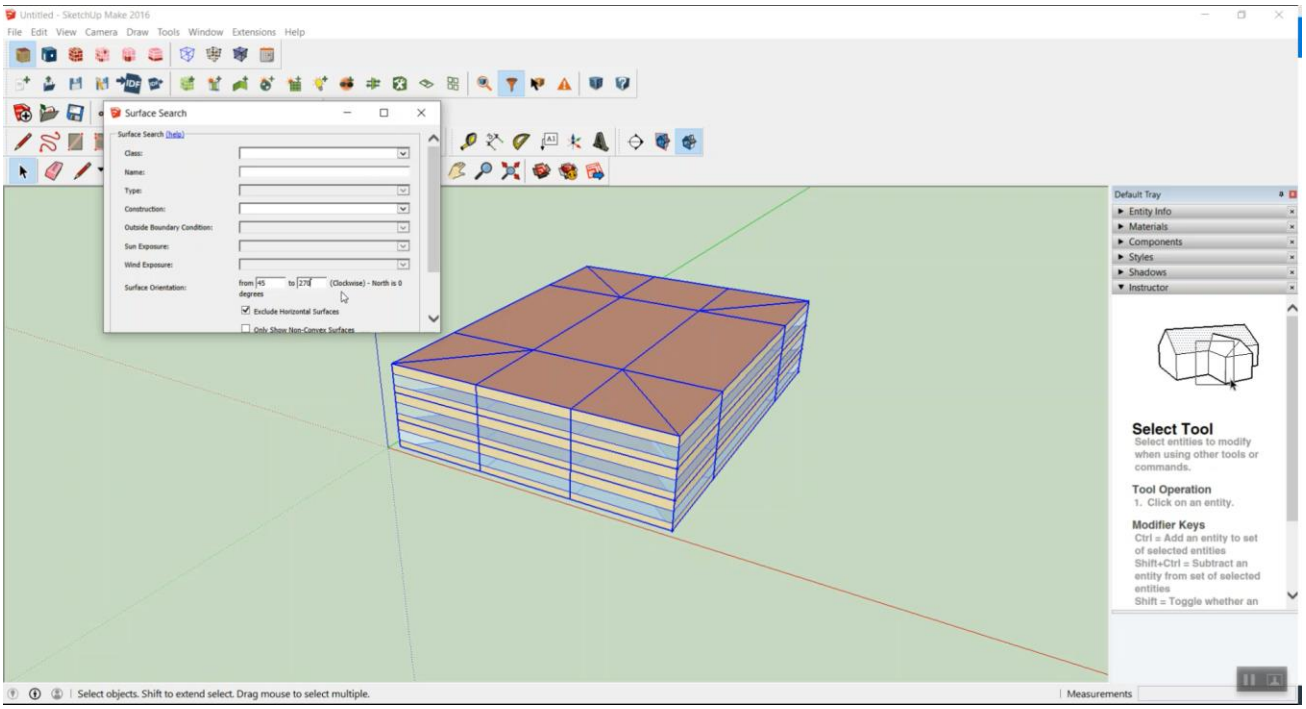

Untitled - SketchUp Make 2016
File Edit View Camera Draw Tools Window Extensions Help
Top
30.00m
20.00m
Create Spaces From 2d Floor Plan
Floor Height (SketchUp Units)
10'
Number of Floors
3
OK
Cancel
Default Tray
Entity Info
Materials
Components
Styles
Shadows
Instructor
Select Tool
Select entities to modify when using other tools or commands.
Tool Operation
1. Click on an entity.
Modifier Keys
Ctrl = Add an entity to set of selected entities
Shift+Ctrl = Subtract an entity from set of selected entities
Shift = Toggle whether an
Select objects. Shift to extend select. Drag mouse to select multiple.
Measurements

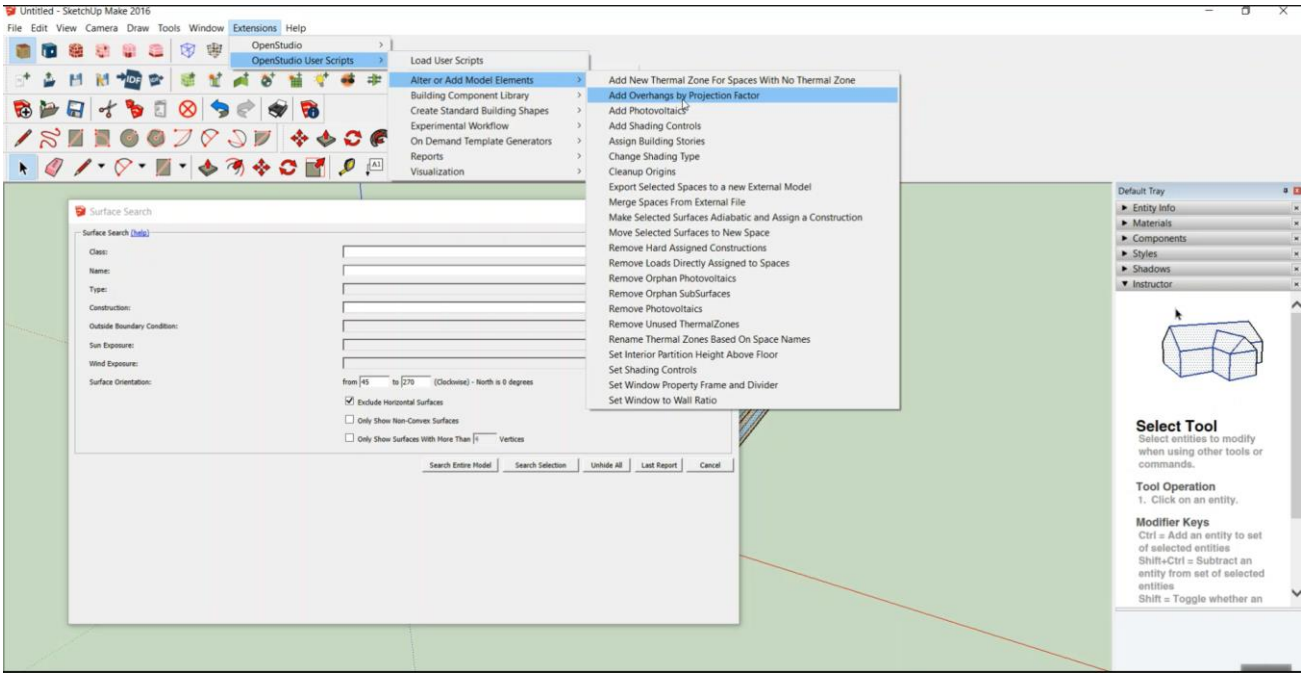

Untitled - SketchUp Make 2016
File Edit View Camera Draw Tools Window Extensions Help
Default Tray
Entity Info
Materials
Components
Styles
Shadows
Instructor
Select Tool
Select entities to modify when using other tools or commands.
Tool Operation
1. Click on an entity.
Modifier Keys
Ctrl = Add an entity to set of selected entities
Shift+Ctrl = Subtract an entity from set of selected entities
Shift = Toggle whether an
Measurements

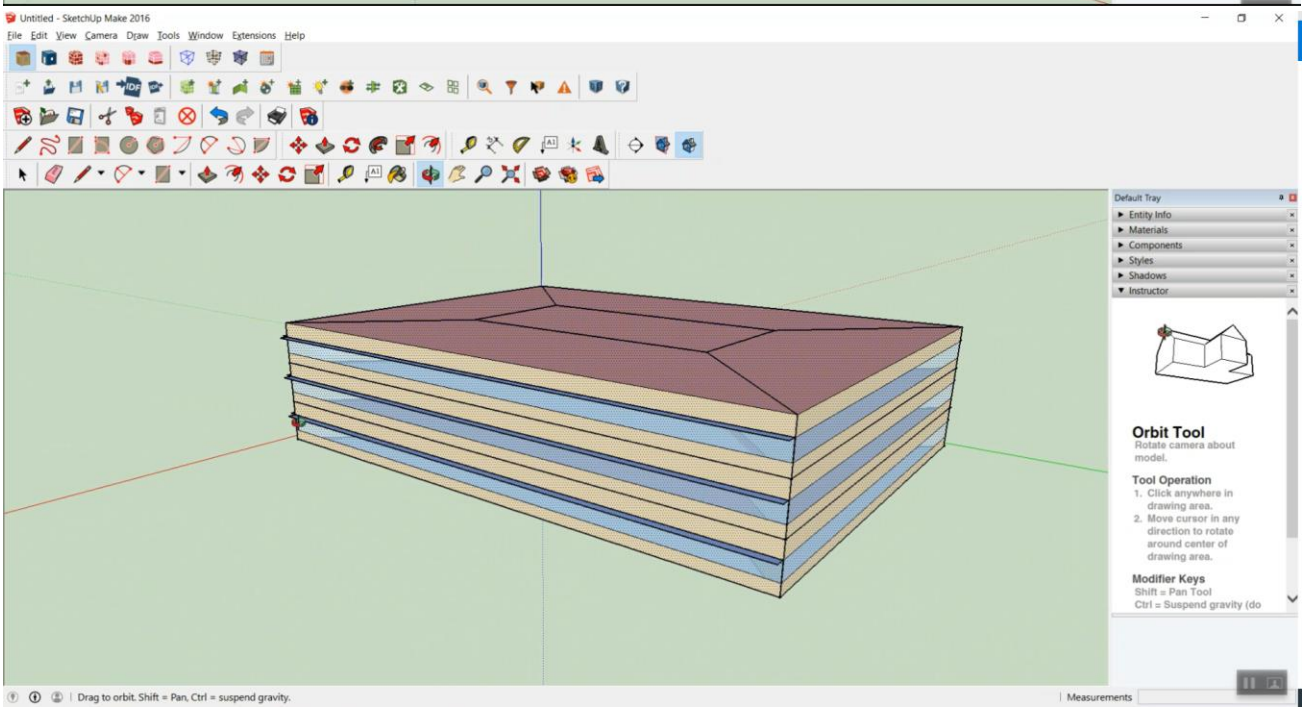

Untitled - SketchUp Make 2016
File Edit View Camera Draw Tools Window Extensions Help
Surface Matching
Intersect and Divide Inter-Zone Surfaces (help)
Intersect in Entire Model
Intersect in Selection
Surface Matching (help)
Match in Entire Model
Match in Selection
Unmatch in Entire Model
Unmatch in Selection
Last Report
Cancel
Default Tray
Entity Info
Materials
Components
Styles
Shadows
Instructor
Select Tool
Select entities to modify when using other tools or commands.
Tool Operation
1. Click on an entity.
Modifier Keys
Ctrl = Add an entity to set of selected entities
Shift+Ctrl = Subtract an entity from set of selected entities
Shift = Toggle whether an
Select objects. Shift to extend select. Drag mouse to select multiple.
Measurements

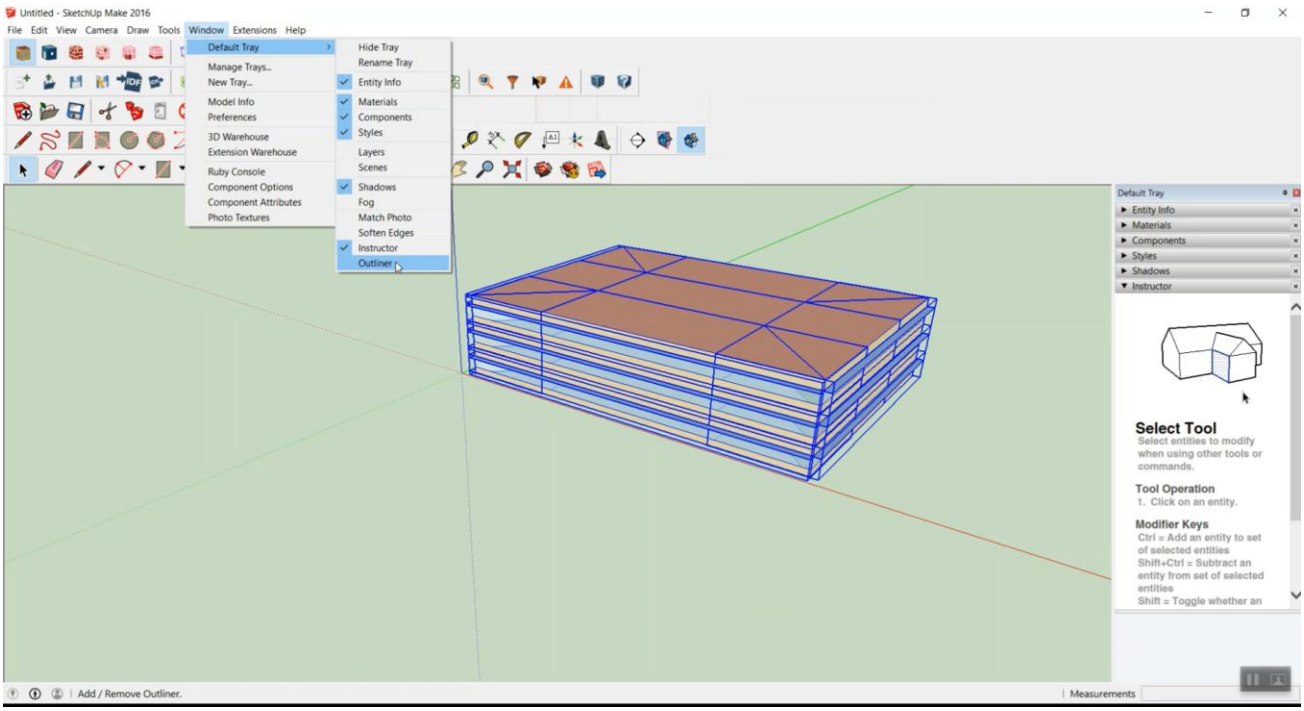

Untitled - SketchUp Make 2016
File Edit View Camera Draw Tools Window Extensions Help
OpenStudio
OpenStudio User Scripts
Load User Scripts
Alter or Add Model Elements
Building Component Library
Create Standard Building Shapes
Experimental Workflow
On Demand Template Generators
Reports
Visualization
Add New Thermal Zone For Spaces With No Thermal Zone
Add Overhangs by Projection Factor
Add Photovoltaics
Add Shading Controls
Assign Building Stories
Change Shading Type
Cleanup Origins
Export Selected Spaces to a new External Model
Merge Spaces From External File
Make Selected Surfaces Adiabatic and Assign a Construction
Move Selected Surfaces to New Space
Remove Hard Assigned Constructions
Remove Loads Directly Assigned to Spaces
Remove Orphan Photovoltaics
Remove Orphan SubSurfaces
Remove Photovoltaics
Remove Unused ThermalZones
Rename Thermal Zones Based On Space Names
Set Interior Partition Height Above Floor
Set Shading Controls
Set Window Property Frame and Divider
Set Window to Wall Ratio
Default Tray
Entity Info
Materials
Components
Styles
Shadows
Instructor
Select Tool
Select entities to modify when using other tools or commands.
Tool Operation
1. Click on an entity.
Modifier Keys
Ctrl = Add an entity to set of selected entities
Shift+Ctrl = Subtract an entity from set of selected entities
Shift = Toggle whether an
Measurements

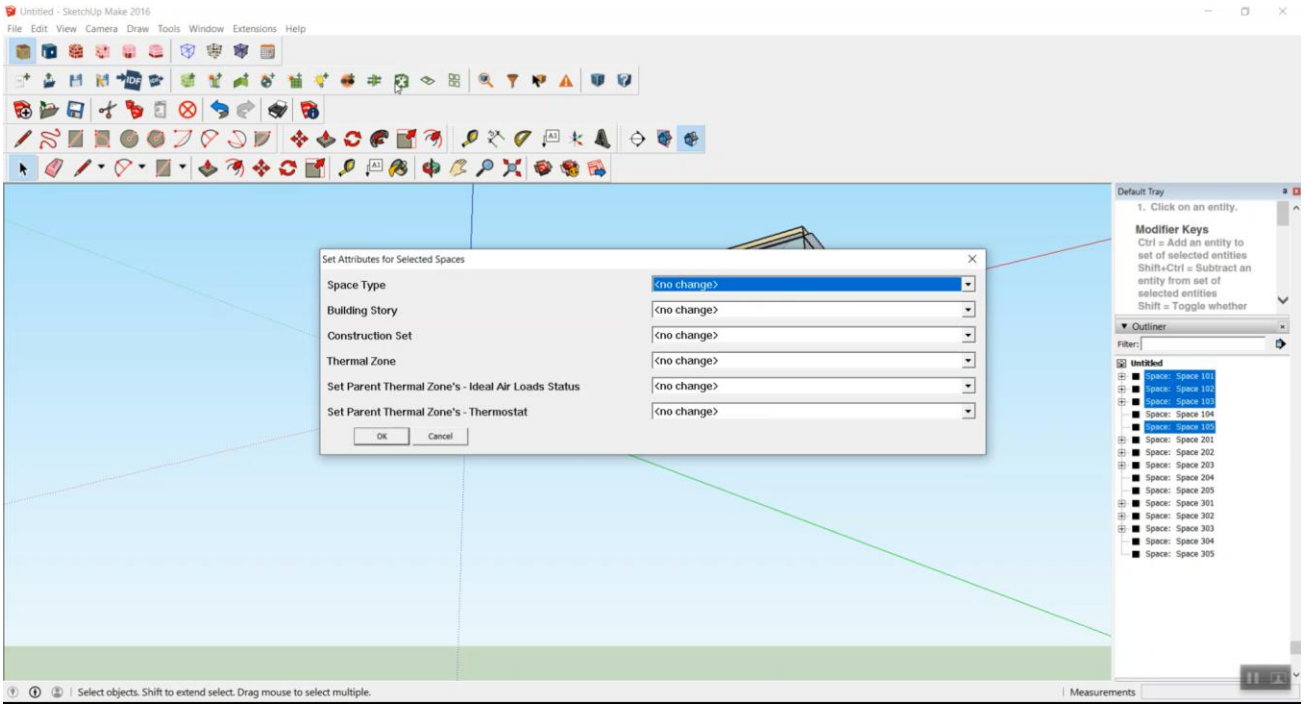

Untitled - SketchUp Make 2016
File Edit View Camera Draw Tools Window Extensions Help
User input.
Window to Wall Ratio (Fraction) 0.4
Offset (meters) 0.76
Application Type Above Floor
OK
Cancel
Default Tray
Entity Info
Materials
Components
Styles
Shadows
Instructor
Select Tool
Select entities to modify when using other tools or commands.
Tool Operation
1. Click on an entity.
Modifier Keys
Ctrl = Add an entity to set of selected entities
Shift+Ctrl = Subtract an entity from set of selected entities
Shift = Toggle whether an
Select objects. Shift to extend select. Drag mouse to select multiple.
Measurements

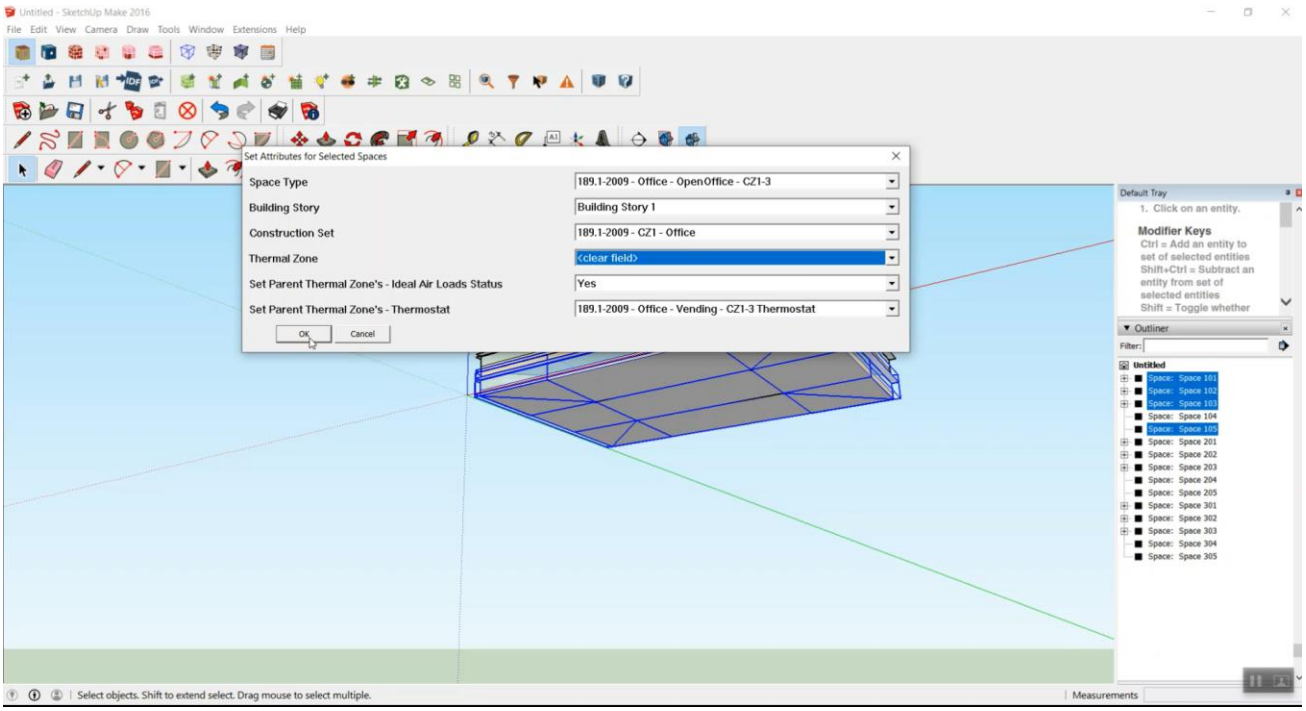

Untitled - SketchUp Make 2016
File Edit View Camera Draw Tools Window Extensions Help
Surface Search
Surface Search (help)
Class:
Name:
Type:
Construction:
Outside Boundary Condition:
Sun Exposure:
Wind Exposure:
Surface Orientation:
from 45 to 270 (Clockwise) - North is 0 degrees
Exclude Horizontal Surfaces
Only Show Non-Convex Surfaces
Default Tray
Entity Info
Materials
Components
Styles
Shadows
Instructor
Select Tool
Select entities to modify when using other tools or commands.
Tool Operation
1. Click on an entity.
Modifier Keys
Ctrl = Add an entity to set of selected entities
Shift+Ctrl = Subtract an entity from set of selected entities
Shift = Toggle whether an
Select objects. Shift to extend select. Drag mouse to select multiple.
Measurements

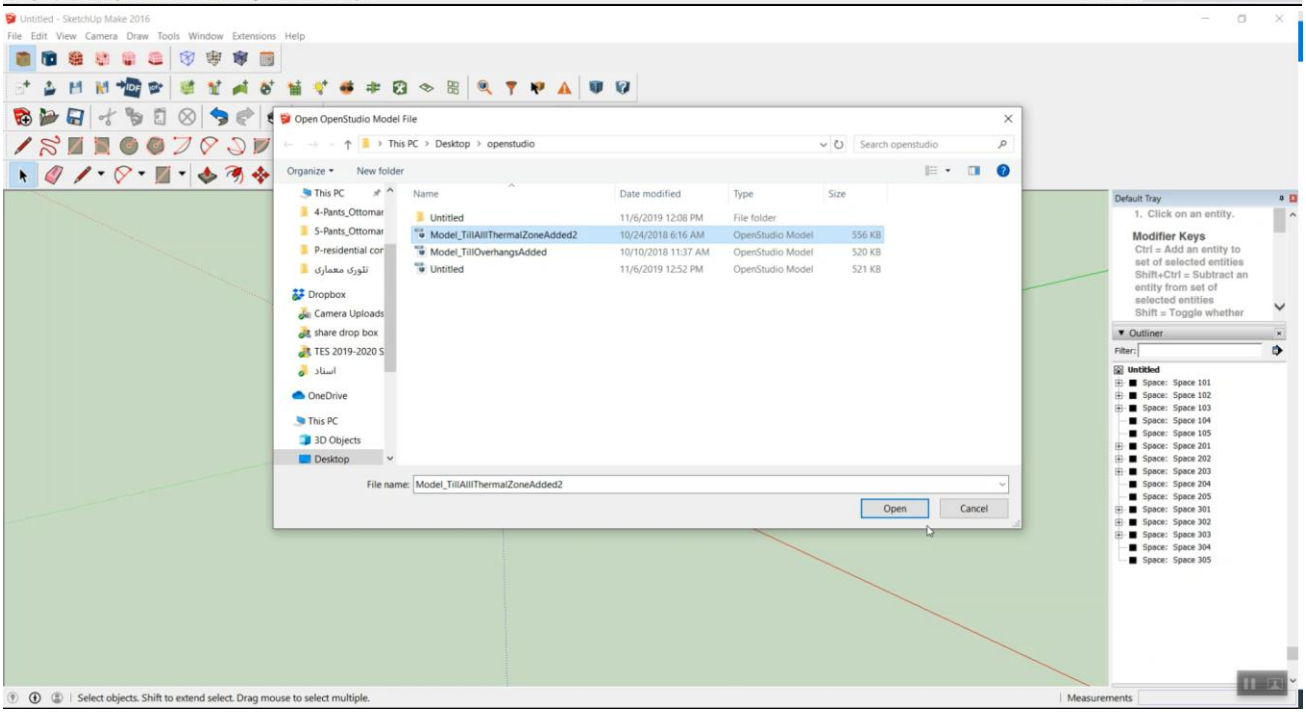

Untitled - SketchUp Make 2016
File Edit View Camera Draw Tools Window Extensions Help
OpenStudio
OpenStudio User Scripts
Load User Scripts
Alter or Add Model Elements
Building Component Library
Create Standard Building Shapes
Experimental Workflow
On Demand Template Generators
Reports
Visualization
Add New Thermal Zone For Spaces With No Thermal Zone
Add Overhangs by Projection Factor
Add Photovoltaics
Add Shading Controls
Assign Building Stories
Change Shading Type
Cleanup Origins
Export Selected Spaces to a new External Model
Merge Spaces From External File
Make Selected Surfaces Adiabatic and Assign a Construction
Move Selected Surfaces to New Space
Remove Hard Assigned Constructions
Remove Loads Directly Assigned to Spaces
Remove Orphan Photovoltaics
Remove Orphan SubSurfaces
Remove Photovoltaics
Remove Unused ThermalZones
Rename Thermal Zones Based On Space Names
Set Interior Partition Height Above Floor
Set Shading Controls
Set Window Property Frame and Divider
Set Window to Wall Ratio
Surface Search
Class:
Name:
Type:
Construction:
Outside Boundary Condition:
Sun Exposure:
Wind Exposure:
Surface Orientation:
Exclude Horizontal Surfaces
Only Show Non-Convex Surfaces
Search Entire Model
Search Selection
Unhide All
Last Report
Cancel
Default Tray
Entity Info
Materials
Components
Styles
Shadows
Instructor
Select Tool
Select entities to modify when using other tools or commands.
Tool Operation
1. Click on an entity.
Modifier Keys
Ctrl = Add an entity to set of selected entities
Shift+Ctrl = Subtract an entity from set of selected entities
Shift = Toggle whether an

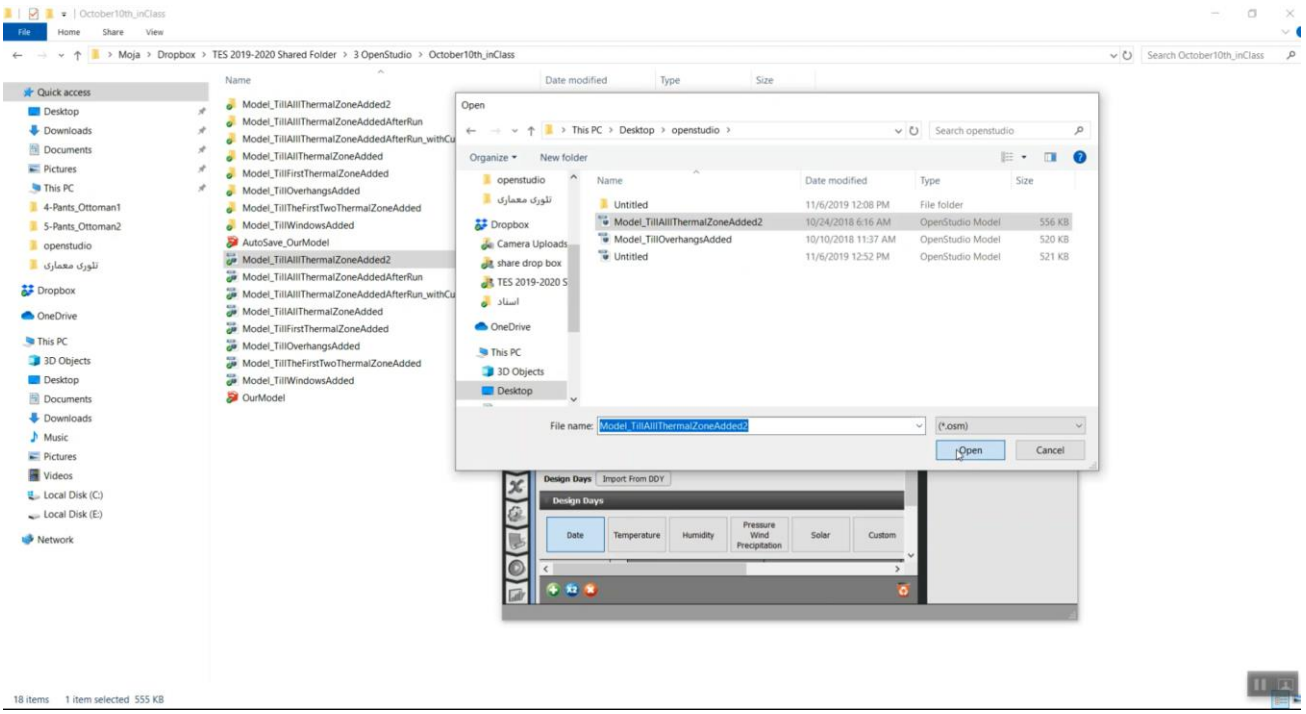

Untitled - SketchUp Make 2016
File Edit View Camera Draw Tools Window Extensions Help
Default Tray
Entity Info
Materials
Components
Styles
Shadows
Instructor
Orbit Tool
Rotate camera about model.
Tool Operation
1. Click anywhere in drawing area.
2. Move cursor in any direction to rotate around center of drawing area.
Modifier Keys
Shift = Pan Tool
Ctrl = Suspend gravity (do
Drag to orbit. Shift = Pan, Ctrl = suspend gravity.
Measurements

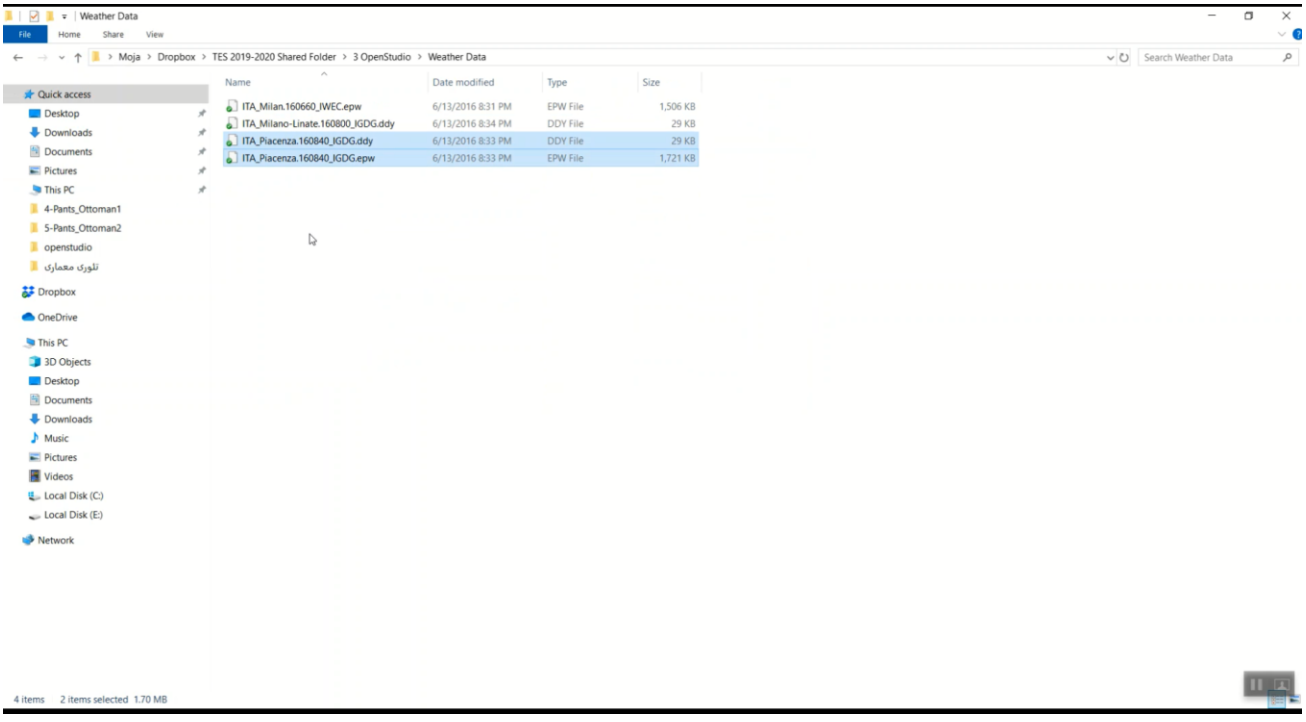

Untitled - SketchUp Make 2016
File Edit View Camera Draw Tools Window Extensions Help
Default Tray
Manage Trays...
New Tray...
Model Info
Preferences
3D Warehouse
Extension Warehouse
Ruby Console
Component Options
Component Attributes
Photo Textures
Hide Tray
Rename Tray
Entity Info
Materials
Components
Styles
Layers
Scenes
Shadows
Fog
Match Photo
Soften Edges
Instructor
Outliner
Default Tray
Entity Info
Materials
Components
Styles
Shadows
Instructor
Select Tool
Select entities to modify when using other tools or commands.
Tool Operation
1. Click on an entity.
Modifier Keys
Ctrl = Add an entity to set of selected entities
Shift+Ctrl = Subtract an entity from set of selected entities
Shift = Toggle whether an
Add / Remove Outliner.
Measurements

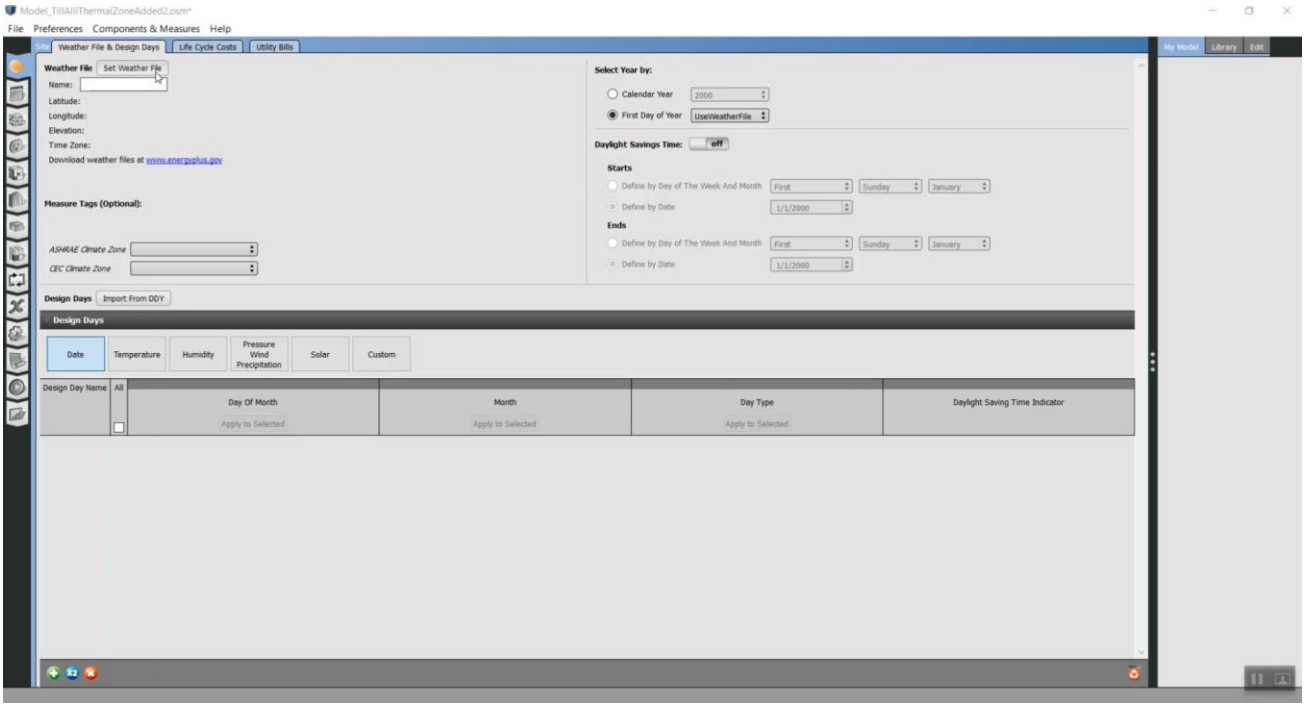

Untitled - SketchUp Make 2016
File Edit View Camera Draw Tools Window Extensions Help
Set Attributes for Selected Spaces
Space Type
Building Story
Construction Set
Thermal Zone
Set Parent Thermal Zone's - Ideal Air Loads Status
Set Parent Thermal Zone's - Thermostat
<no change>
OK
Cancel
Default Tray
1. Click on an entity.
Modifier Keys
Ctrl = Add an entity to set of selected entities
Shift+Ctrl = Subtract an entity from set of selected entities
Shift = Toggle whether
Outliner
Filter:
Untitled
Space: Space 101
Space: Space 102
Space: Space 103
Space: Space 104
Space: Space 105
Space: Space 201
Space: Space 202
Space: Space 203
Space: Space 204
Space: Space 205
Space: Space 301
Space: Space 302
Space: Space 303
Space: Space 304
Space: Space 305
Select objects. Shift to extend select. Drag mouse to select multiple.
Measurements

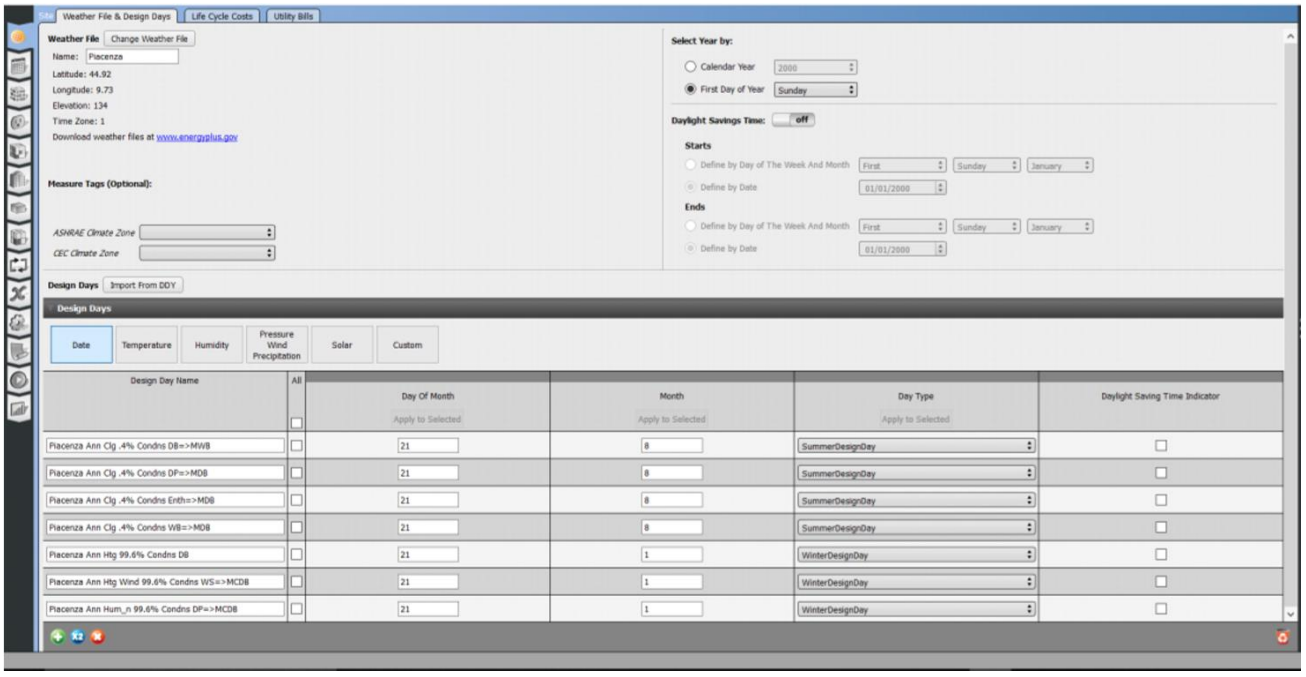

Untitled - SketchUp Make 2016
File Edit View Camera Draw Tools Window Extensions Help
Set Attributes for Selected Spaces
Space Type
189.1-2009 - Office - OpenOffice - CZ1-3
Building Story
Building Story 1
Construction Set
189.1-2009 - CZ1 - Office
Thermal Zone
<clear field>
Set Parent Thermal Zone's - Ideal Air Loads Status
Yes
Set Parent Thermal Zone's - Thermostat
189.1-2009 - Office - Vending - CZ1-3 Thermostat
OK
Cancel
Default Tray
1. Click on an entity.
Modifier Keys
Ctrl = Add an entity to set of selected entities
Shift+Ctrl = Subtract an entity from set of selected entities
Shift = Toggle whether
Outliner
Filter:
Untitled
Space: Space 101
Space: Space 102
Space: Space 103
Space: Space 104
Space: Space 105
Space: Space 201
Space: Space 202
Space: Space 203
Space: Space 204
Space: Space 205
Space: Space 301
Space: Space 302
Space: Space 303
Space: Space 304
Space: Space 305
Select objects. Shift to extend select. Drag mouse to select multiple.
Measurements

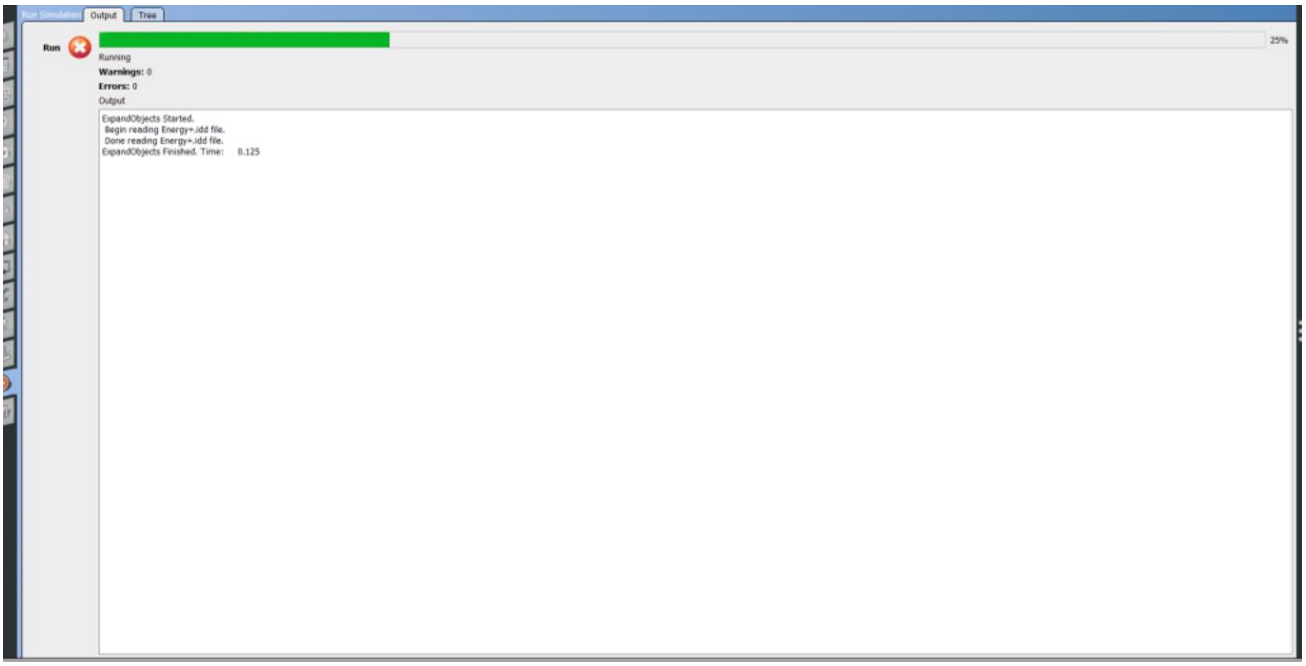

Untitled - SketchUp Make 2016
File Edit View Camera Draw Tools Window Extensions Help
Open OpenStudio Model File
This PC > Desktop > openstudio
Search openstudio
Organize
New folder
This PC
4-Pants_Ottomar
5-Pants_Ottomar
P-residential cor
تئوری معماری
Dropbox
Camera Uploads
share drop box
TES 2019-2020 S
اسناد
OneDrive
This PC
3D Objects
Desktop
Name
Date modified
Type
Size
Untitled
11/6/2019 12:08 PM
File folder
Model_TillAllThermalZoneAdded2
10/24/2018 6:16 AM
OpenStudio Model
556 KB
Model_TillOverhangsAdded
10/10/2018 11:37 AM
OpenStudio Model
520 KB
Untitled
11/6/2019 12:52 PM
OpenStudio Model
521 KB
File name:
Model_TillAllThermalZoneAdded2
Open
Cancel
Default Tray
1. Click on an entity.
Modifier Keys
Ctrl = Add an entity to set of selected entities
Shift+Ctrl = Subtract an entity from set of selected entities
Shift = Toggle whether
Outliner
Filter:
Untitled
Space: Space 101
Space: Space 102
Space: Space 103
Space: Space 104
Space: Space 105
Space: Space 201
Space: Space 202
Space: Space 203
Space: Space 204
Space: Space 205
Space: Space 301
Space: Space 302
Space: Space 303
Space: Space 304
Space: Space 305
Select objects. Shift to extend select. Drag mouse to select multiple.
Measurements

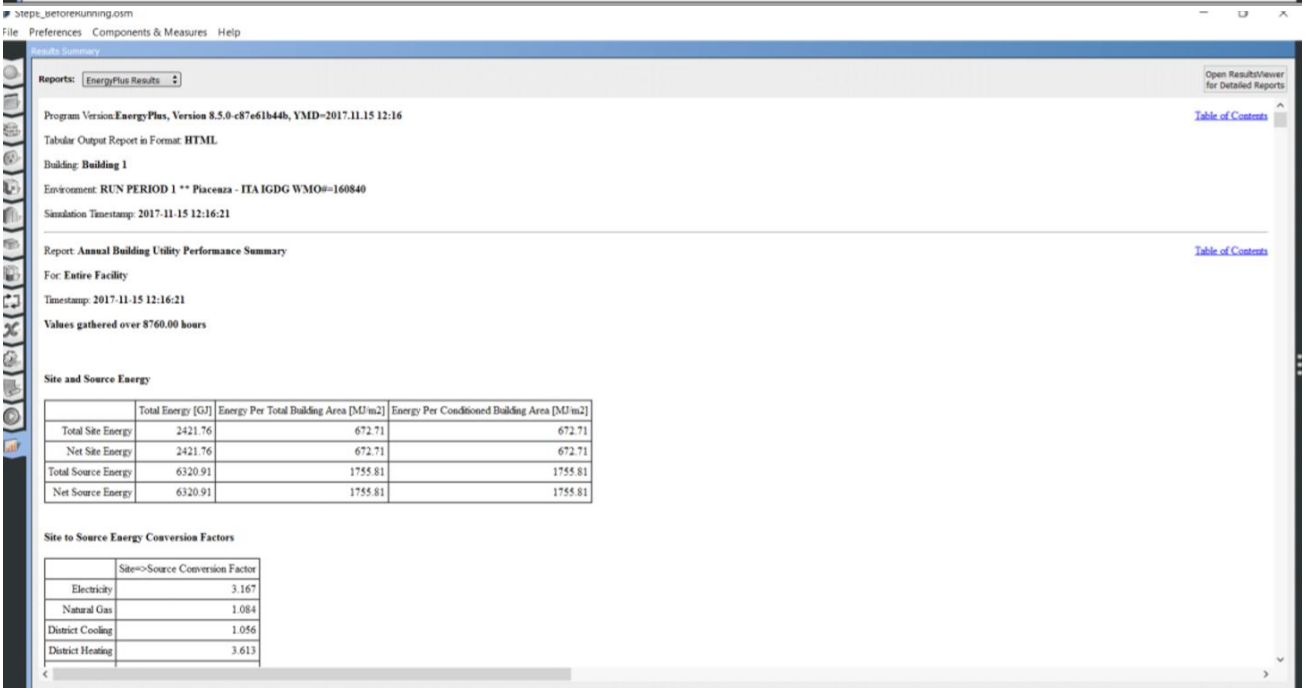

October10th_inClass
Moja › Dropbox › TES 2019-2020 Shared Folder › 3 OpenStudio › October10th_inClass
Search October10th_inClass
Quick access
Desktop
Downloads
Documents
Pictures
This PC
4-Pants_Ottoman1
5-Pants_Ottoman2
openstudio
Dropbox
OneDrive
3D Objects
Music
Videos
Local Disk (C:)
Local Disk (E:)
Network
Name
Date modified
Type
Size
Model_TillAllThermalZoneAdded2
Model_TillAllThermalZoneAddedAfterRun
Model_TillAllThermalZoneAddedAfterRun_withCu
Model_TillAllThermalZoneAdded
Model_TillFirstThermalZoneAdded
Model_TillOverhangsAdded
Model_TillTheFirstTwoThermalZoneAdded
Model_TillWindowsAdded
AutoSave_OurModel
Model_TillAllThermalZoneAdded2
Model_TillAllThermalZoneAddedAfterRun
Model_TillAllThermalZoneAddedAfterRun_withCu
Model_TillAllThermalZoneAdded
Model_TillFirstThermalZoneAdded
Model_TillOverhangsAdded
Model_TillTheFirstTwoThermalZoneAdded
Model_TillWindowsAdded
OurModel
Open
This PC › Desktop › openstudio ›
Search openstudio
Organize
New folder
openstudio
تئوری معماری
Dropbox
Camera Uploads
share drop box
TES 2019-2020 S
اسناد
OneDrive
This PC
3D Objects
Desktop
Name
Date modified
Type
Size
Untitled
11/6/2019 12:08 PM
File folder
Model_TillAllThermalZoneAdded2
10/24/2018 6:16 AM
OpenStudio Model
556 KB
Model_TillOverhangsAdded
10/10/2018 11:37 AM
OpenStudio Model
520 KB
Untitled
11/6/2019 12:52 PM
OpenStudio Model
521 KB
File name:
Model_TillAllThermalZoneAdded2
(*.osm)
Open
Cancel
Design Days
Import From DDY
Design Days
Date
Temperature
Humidity
Pressure
Wind
Precipitation
Solar
Custom
18 items
1 item selected 555 KB


Weather Data
Moja › Dropbox › TES 2019-2020 Shared Folder › 3 OpenStudio › Weather Data
Search Weather Data
Quick access
Desktop
Downloads
Documents
Pictures
This PC
4-Pants_Ottoman1
5-Pants_Ottoman2
openstudio
Dropbox
OneDrive
3D Objects
Music
Videos
Local Disk (C:)
Local Disk (E:)
Network
Name
Date modified
Type
Size
ITA_Milan.160660_IWEC.epw
6/13/2016 8:31 PM
EPW File
1,506 KB
ITA_Milano-Linate.160800_IGDG.ddy
6/13/2016 8:34 PM
DDY File
29 KB
ITA_Piacenza.160840_IGDG.ddy
6/13/2016 8:33 PM
DDY File
29 KB
ITA_Piacenza.160840_IGDG.epw
6/13/2016 8:33 PM
EPW File
1,721 KB
4 items
2 items selected 1.70 MB


Model_TillAIIITherm alZoneAdded2.osm*
File Preferences Components & Measures Help
Weather File & Design Days
Life Cycle Costs
Utility Bills
My Model
Library
Edit
Weather File
Set Weather File
Name:
Latitude:
Longitude:
Elevation:
Time Zone:
Download weather files at www.energyplus.gov
Measure Tags (Optional):
ASHRAE Climate Zone
CEC Climate Zone
Select Year by:
Calendar Year
2000
First Day of Year
UseWeatherFile
Daylight Savings Time:
off
Starts
Define by Day of The Week And Month
First
Sunday
January
Define by Date
1/1/2000
Ends
Define by Day of The Week And Month
First
Sunday
January
Define by Date
1/1/2000
Design Days
Import From DDY
Design Days
Date
Temperature
Humidity
Pressure Wind Precipitation
Solar
Custom
Design Day Name
All
Day Of Month
Apply to Selected
Month
Apply to Selected
Day Type
Apply to Selected
Daylight Saving Time Indicator


Weather File & Design Days
Life Cycle Costs
Utility Bills
Weather File
Change Weather File
Name: Piacenza
Latitude: 44.92
Longitude: 9.73
Elevation: 134
Time Zone: 1
Download weather files at www.energyplus.gov
Measure Tags (Optional):
ASHRAE Climate Zone
CEC Climate Zone
Select Year by:
Calendar Year
2000
First Day of Year
Sunday
Daylight Savings Time:
off
Starts
Define by Day of The Week And Month
First
Sunday
January
Define by Date
01/01/2000
Ends
Define by Day of The Week And Month
First
Sunday
January
Define by Date
01/01/2000
Design Days
Import From DDY
Design Days
Date
Temperature
Humidity
Pressure Wind Precipitation
Solar
Custom
Design Day Name
All
Day Of Month
Apply to Selected
Month
Apply to Selected
Day Type
Apply to Selected
Daylight Saving Time Indicator
Piacenza Ann Clg .4% Condns DB=>MWB 21 8 SummerDesignDay
Piacenza Ann Clg .4% Condns DP=>MDB 21 8 SummerDesignDay
Piacenza Ann Clg .4% Condns Enth=>MDB 21 8 SummerDesignDay
Piacenza Ann Clg .4% Condns WB=>MDB 21 8 SummerDesignDay
Piacenza Ann Htg 99.6% Condns DB 21 1 WinterDesignDay
Piacenza Ann Htg Wind 99.6% Condns WS=>MCDB 21 1 WinterDesignDay
Piacenza Ann Hum_n 99.6% Condns DP=>MCDB 21 1 WinterDesignDay


Run Simulation
Output
Tree
Run
25%
Running
Warnings: 0
Errors: 0
Output
ExpandObjects Started.
Begin reading Energy+.idd file.
Done reading Energy+.idd file.
ExpandObjects Finished. Time: 0.125


Steps_beforekunning.osm
File Preferences Components & Measures Help
Results Summary
Reports: EnergyPlus Results
Open ResultsViewer for Detailed Reports
Program Version:EnergyPlus, Version 8.5.0-c87e61b44b, YMD=2017.11.15 12:16
Table of Contents
Tabular Output Report in Format: HTML
Building: Building 1
Environment: RUN PERIOD 1 ** Piacenza - ITA IGDG WMO#=160840
Simulation Timestamp: 2017-11-15 12:16:21
Report: Annual Building Utility Performance Summary
Table of Contents
For: Entire Facility
Timestamp: 2017-11-15 12:16:21
Values gathered over 8760.00 hours
Site and Source Energy
Total Energy [GJ] | Energy Per Total Building Area [MJ/m2] | Energy Per Conditioned Building Area [MJ/m2]
Total Site Energy | 2421.76 | 672.71 | 672.71
Net Site Energy | 2421.76 | 672.71 | 672.71
Total Source Energy | 6320.91 | 1755.81 | 1755.81
Net Source Energy | 6320.91 | 1755.81 | 1755.81
Site to Source Energy Conversion Factors
Site=>Source Conversion Factor
Electricity | 3.167
Natural Gas | 1.084
District Cooling | 1.056
District Heating | 3.613