

**File Edit View Camera Draw Tools Window Extensions Help**

**Default Tray**

- Hide Tray
- Rename Tray
- New Tray...
- Entity Info
- Materials
- Components
- Styles
- Layers
- Scenes
- Shadows
- Fog
- Match Photo
- Soften Edges
- Instructor
- Outliner

**Entity Info**

**15 Groups**

Layer: OpenStudio::Mc  
Name:  
Type: Type: <undefined>

**Materials**

**Components**

**Styles**

**Shadows**

**Instructor**

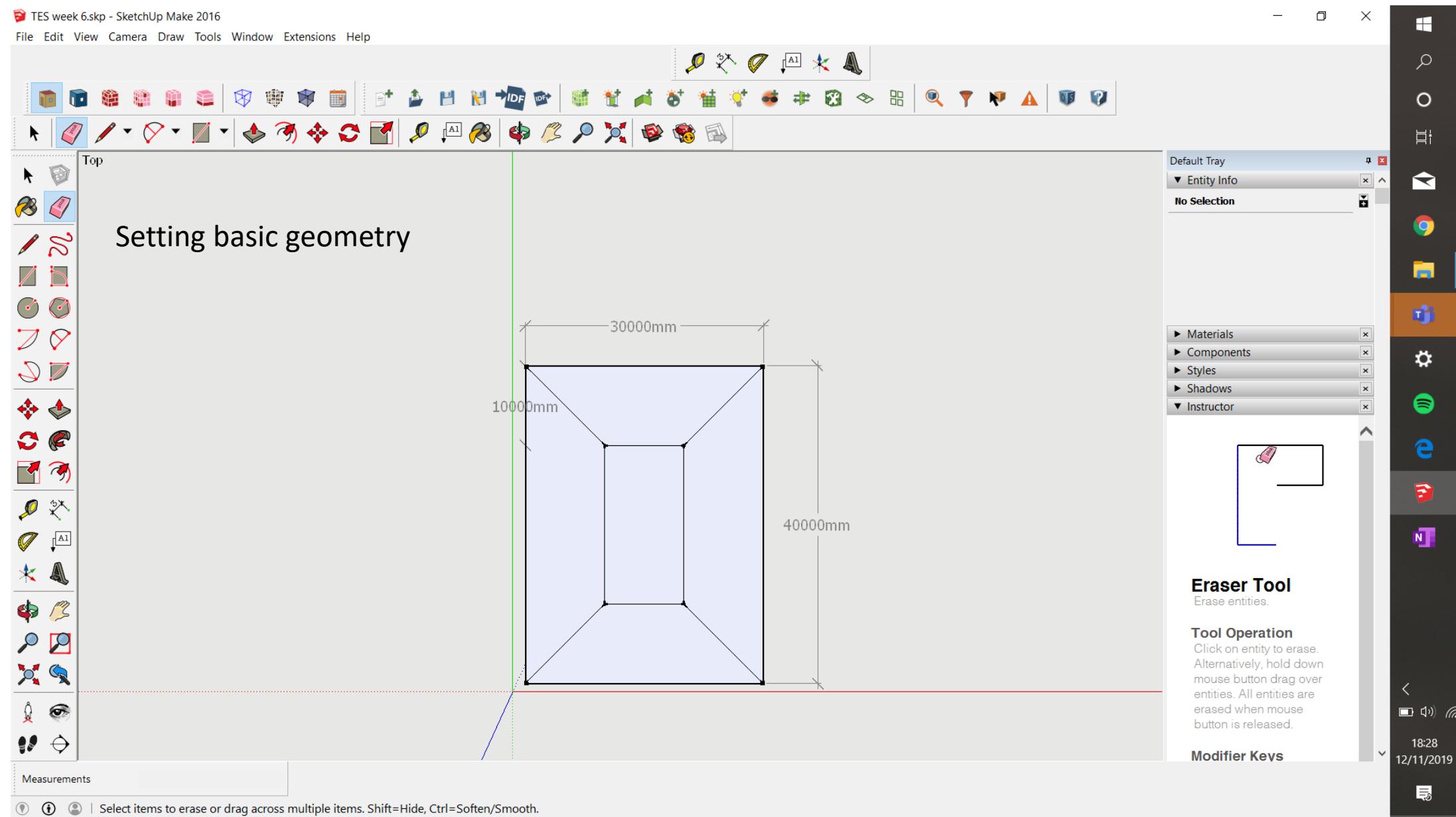
**Select Tool**  
Select entities to modify when using other tools or commands.

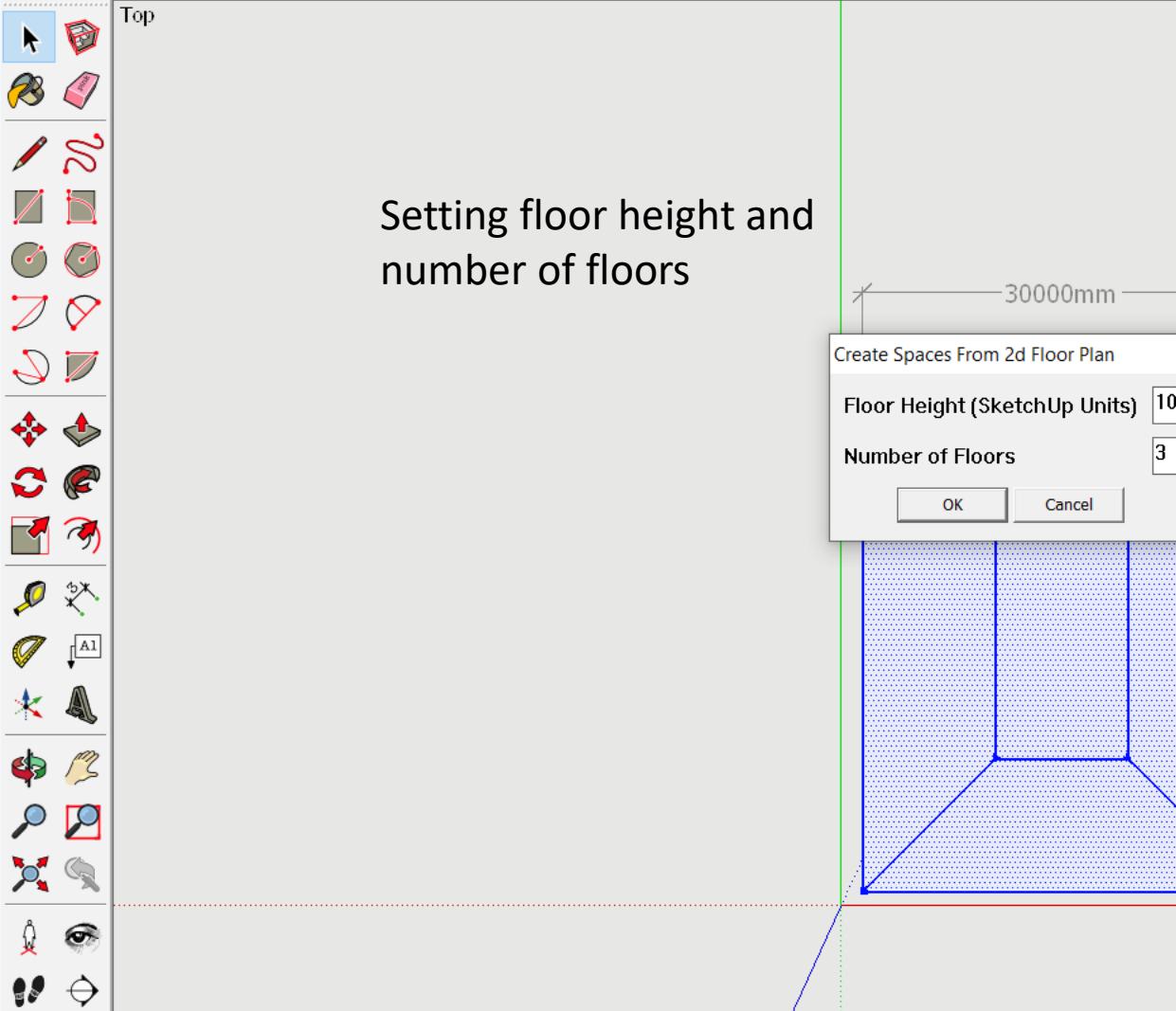
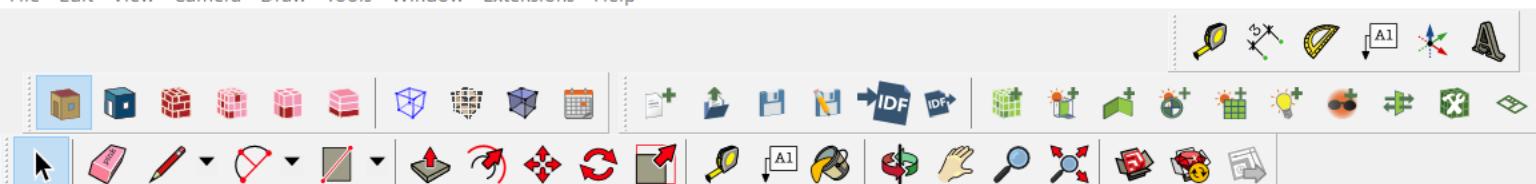
**Tool Operation**  
1. Click on an entity.

**Modifier Keys**  
Ctrl = Add an entity to set of selected entities  
Shift+Ctrl = Subtract an entity from set of selected entities



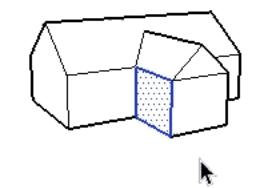
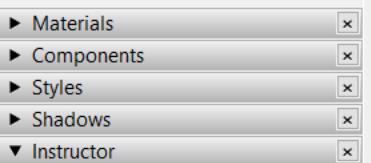
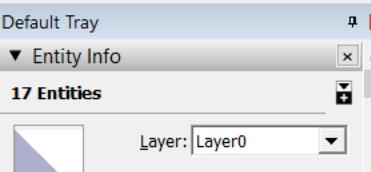
## 2. Open Studio simulation





Measurements

Select objects. Shift to extend select. Drag mouse to select multiple.



## Select Tool

Select entities to modify when using other tools or commands.

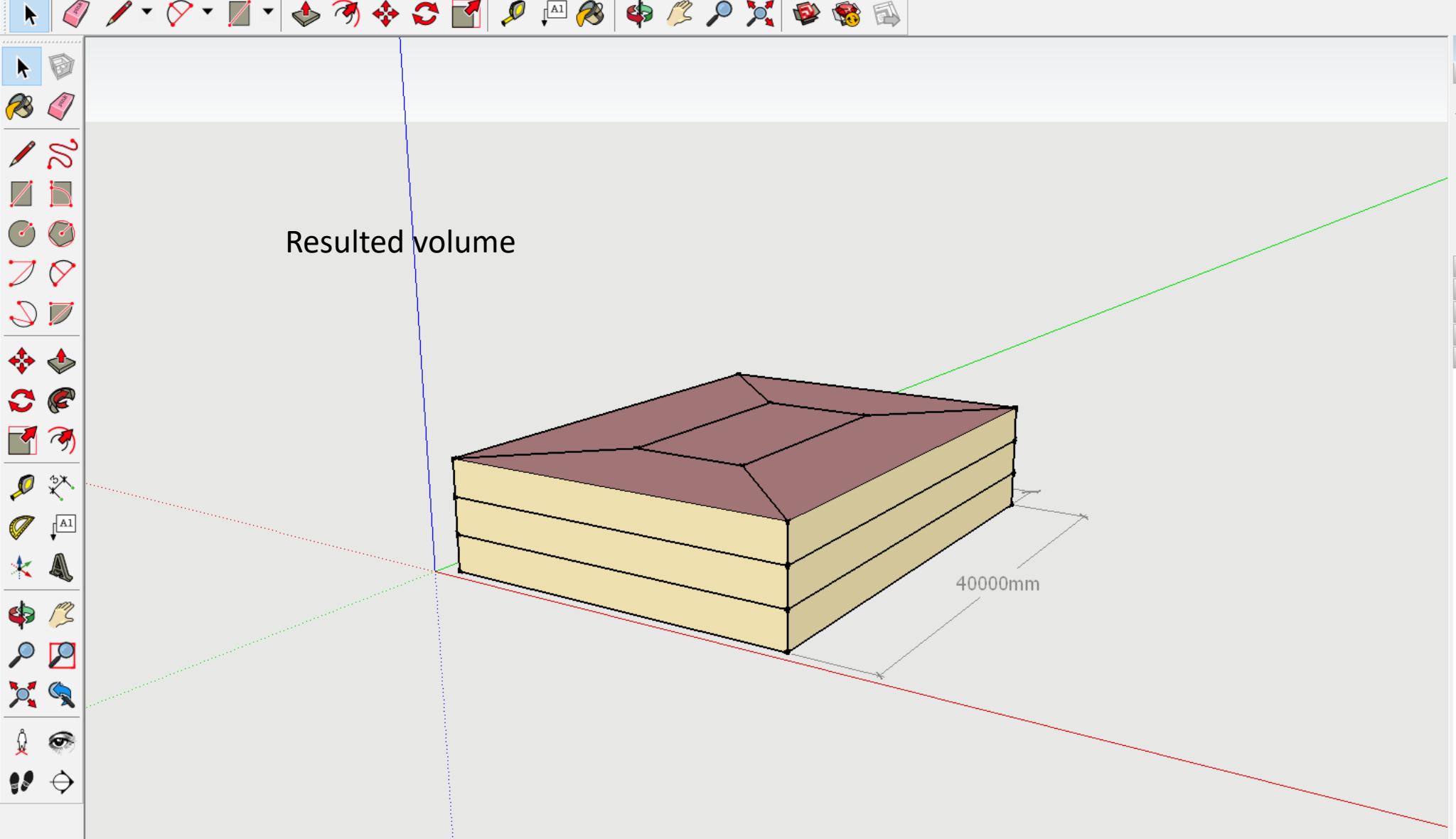
## Tool Operation

1. Click on an entity.

## Modifier Keys

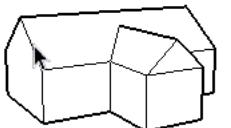
Ctrl = Add an entity to set of selected entities  
Shift+Ctrl = Subtract an

18:30  
12/11/2019



Default Tray  
Entity Info  
No Selection

Materials  
Components  
Styles  
Shadows  
Instructor



### Select Tool

Select entities to modify when using other tools or commands.

### Tool Operation

1. Click on an entity.

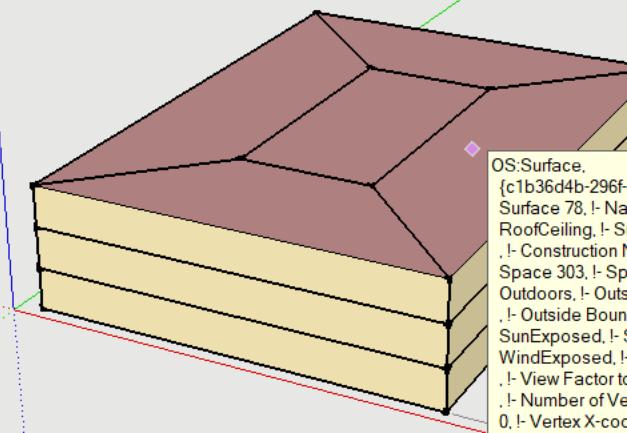
### Modifier Keys

Ctrl = Add an entity to set of selected entities  
Shift+Ctrl = Subtract an entity from set of selected entities





Checking volume info



OS:Surface,  
{c1b36d4b-296f-43c1-8fd2-63e86d8b8542}, l- Handle  
Surface 78, l- Name  
RoofCeiling, l- Surface Type  
.l- Construction Name  
Space 303, l- Space Name  
Outdoors, l- Outside Boundary Condition  
.l- Outside Boundary Condition Object  
SunExposed, l- Sun Exposure  
WindExposed, l- Wind Exposure  
.l- View Factor to Ground  
.l- Number of Vertices  
0, l- Vertex X-coordinate 1 {m}  
-40, l- Vertex Y-coordinate 1 {m}  
3.048, l- Vertex Z-coordinate 1 {m}  
0, l- Vertex X-coordinate 2 {m}  
0, l- Vertex Y-coordinate 2 {m}  
3.048, l- Vertex Z-coordinate 2 {m}  
-10, l- Vertex X-coordinate 3 {m}  
-10, l- Vertex Y-coordinate 3 {m}  
3.048, l- Vertex Z-coordinate 3 {m}  
-10, l- Vertex X-coordinate 4 {m}  
-30, l- Vertex Y-coordinate 4 {m}  
3.048; l- Vertex Z-coordinate 4 {m}

Default Tray

Entity Info

No Selection

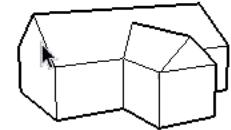
Materials

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

**Surface matching process**

**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

**Select Tool**  
Select entities to modify when using other tools or commands.

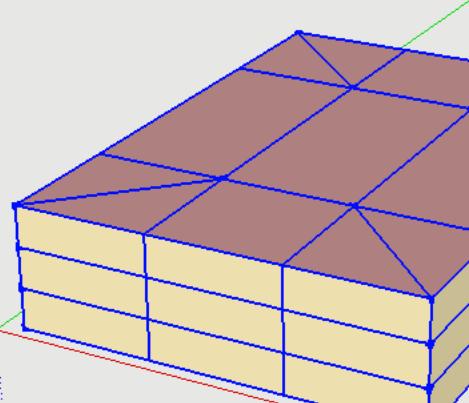
**Tool Operation**  
1. Click on an entity.

**Modifier Keys**  
Ctrl = Add an entity to set of selected entities  
Shift+Ctrl = Subtract an entity from set of selected entities

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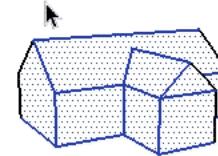
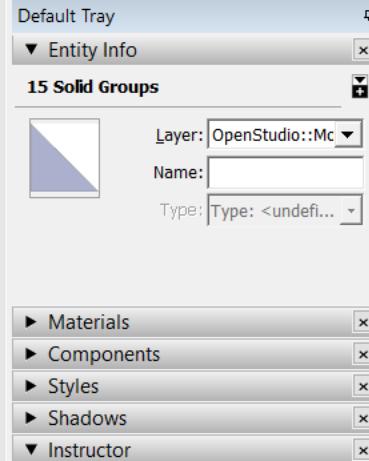
## Adding windows



40000mm

- 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



### Select Tool

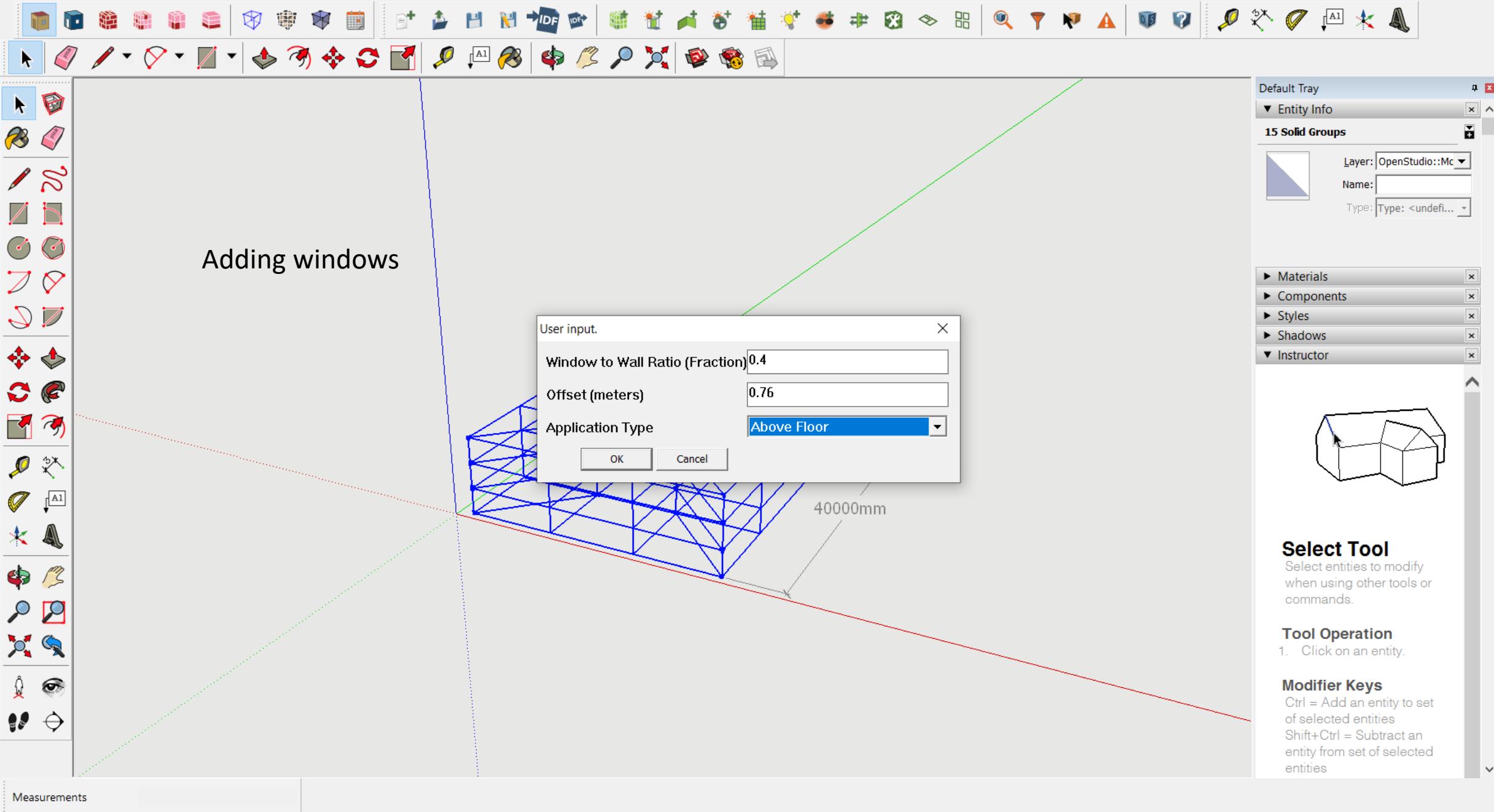
Select entities to modify when using other tools or commands.

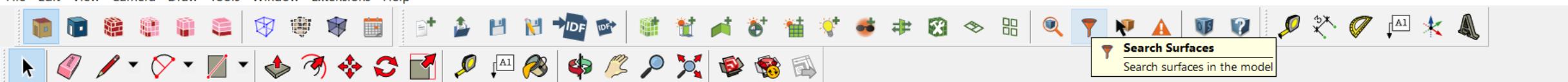
### Tool Operation

1. Click on an entity.

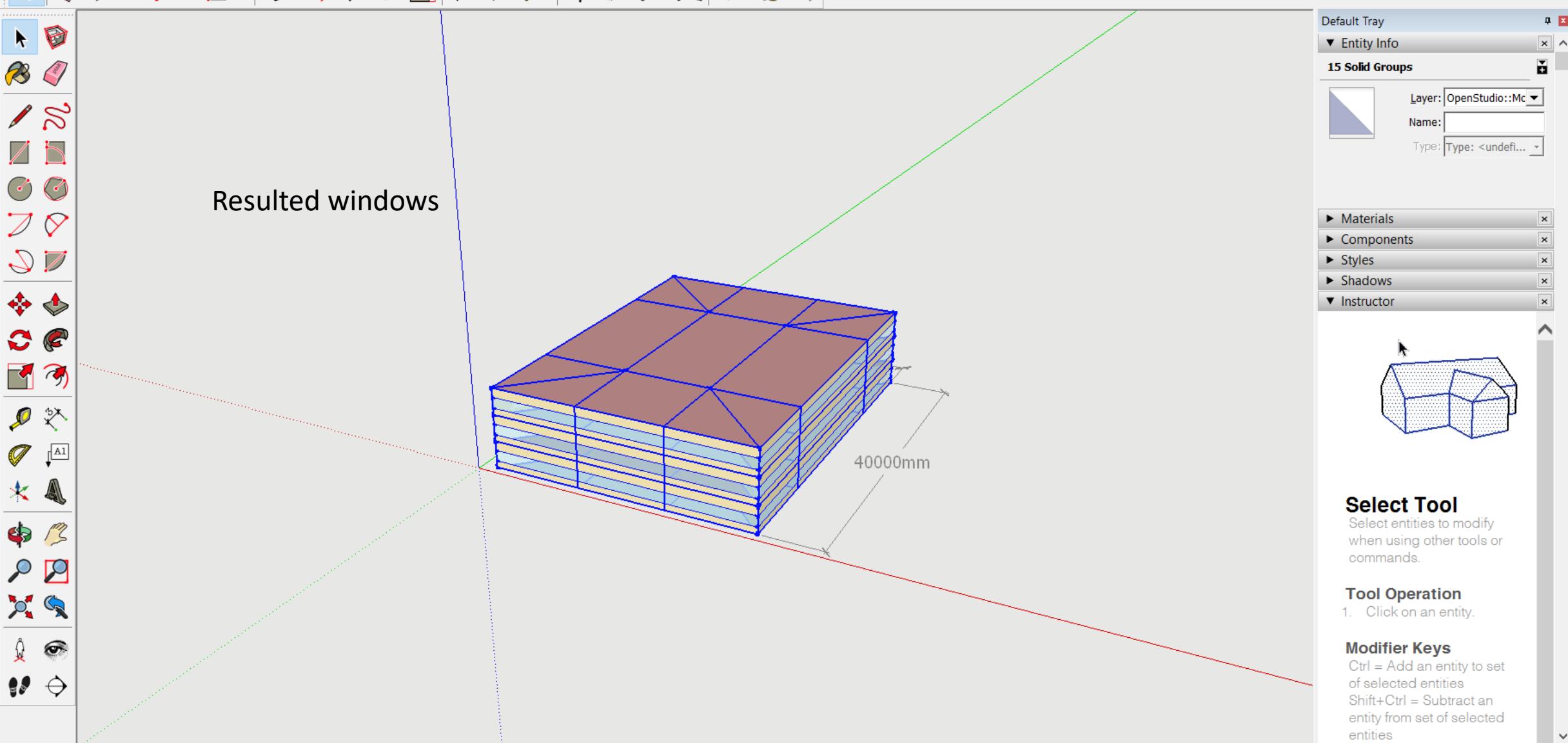
### Modifier Keys

Ctrl = Add an entity to set of selected entities  
Shift+Ctrl = Subtract an entity from set of selected entities

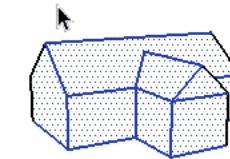




Search Surfaces  
Search surfaces in the model



Resulted windows



### Select Tool

Select entities to modify when using other tools or commands.

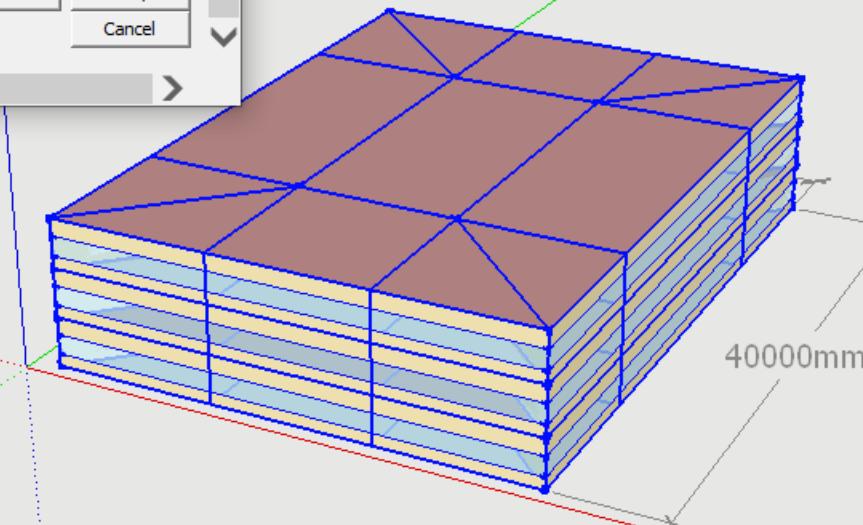
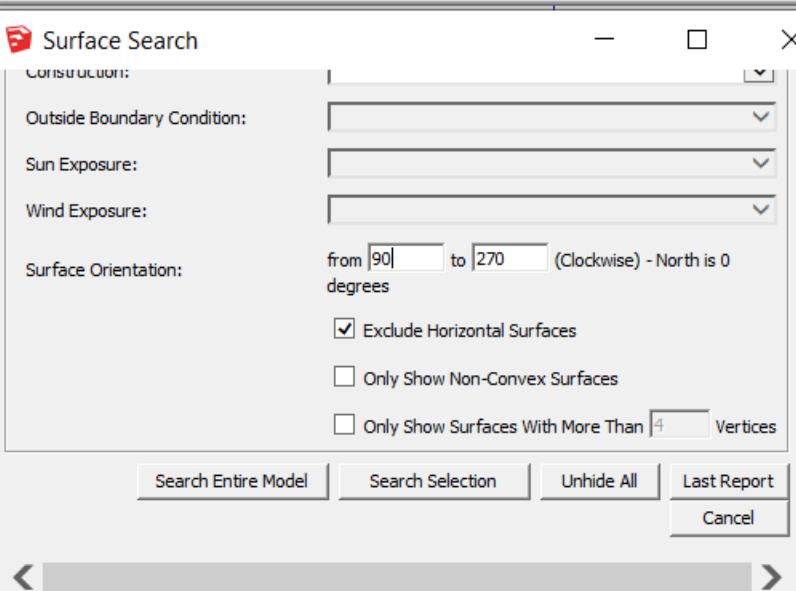
### Tool Operation

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





Selecting surfaces except  
north area

Default Tra

Entity

15 Solid



Mater

Comp

Styles

Shado

Instruc

Sel

Sele  
wh  
com

Too

1. C

Mod

**Resulted selection**

The image shows a 3D model of a rectangular planter box. The box is composed of several horizontal layers of different materials, including soil and plants. A green dashed line highlights the top surface of the box. A dimension line indicates a width of 4000mm.

**Surface Search**

**Entity Info**

**48 Faces**

**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

18:41  
12/11/2019

**Adding shading/ overhangs**

The screenshot shows the SketchUp interface with the 'Extensions' menu open, specifically the 'OpenStudio' submenu. A user script called 'Add Overhangs by Projection Factor' is selected. The main workspace displays a 3D building model with several floors and a central vertical element. A callout arrow indicates a dimension of 4000mm for a specific wall section.

- OpenStudio
  - Load User Scripts
  - Alter or Add Model Elements
    - 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
  - Building Component Library
  - Create Standard Building Shapes
  - Experimental Workflow
  - On Demand Template Generators
  - Reports
  - Visualization

**Default Tray**

**Entity Info**

48 Faces

Layer: Layer0  
Area: 2437502753 mm<sup>2</sup>

**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

18:41  
12/11/2019

**Surface Search**

Type: [dropdown]

Construction: [dropdown]

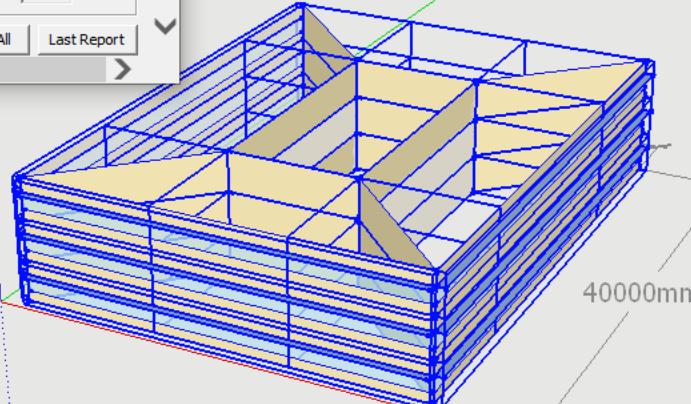
Outside Boundary Condition: [dropdown]

Sun Exposure: [dropdown]

Wind Exposure: [dropdown]

Surface Orientation: from 0 to 360 (Clockwise) - North is 0 degrees  
 Exclude Horizontal Surfaces  
 Only Show Non-Convex Surfaces  
 Only Show Surfaces With More Than 4 Vertices

Search Entire Model | Search Selection | Unhide All | Last Report



4000mm

**Default Tray**

**Entity Info**

**15 Groups**

Layer: OpenStudio::Mc  
Name:   
Type: Type: <undefined>

**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

18:43  
12/11/2019

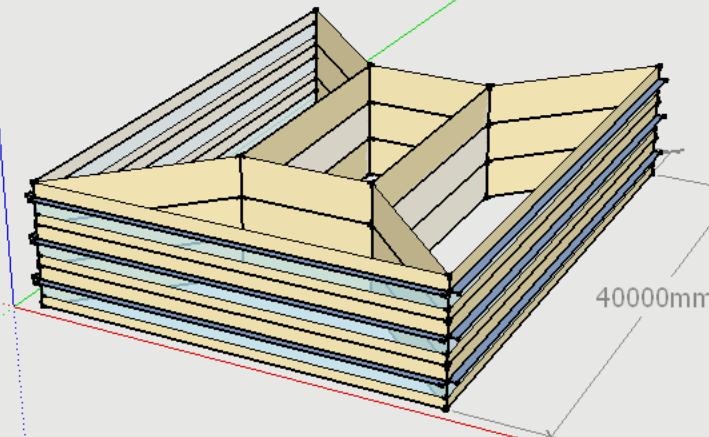
Measurements

Select objects. Shift to extend select. Drag mouse to select multiple.





## Resulted elements



Default Tray

Entity Info

No Selection

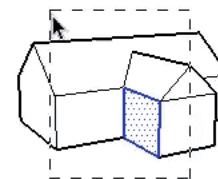
Materials

Components

Styles

Shadows

Instructor



## Select Tool

Select entities to modify when using other tools or commands.

## Tool Operation

1. Click on an entity.

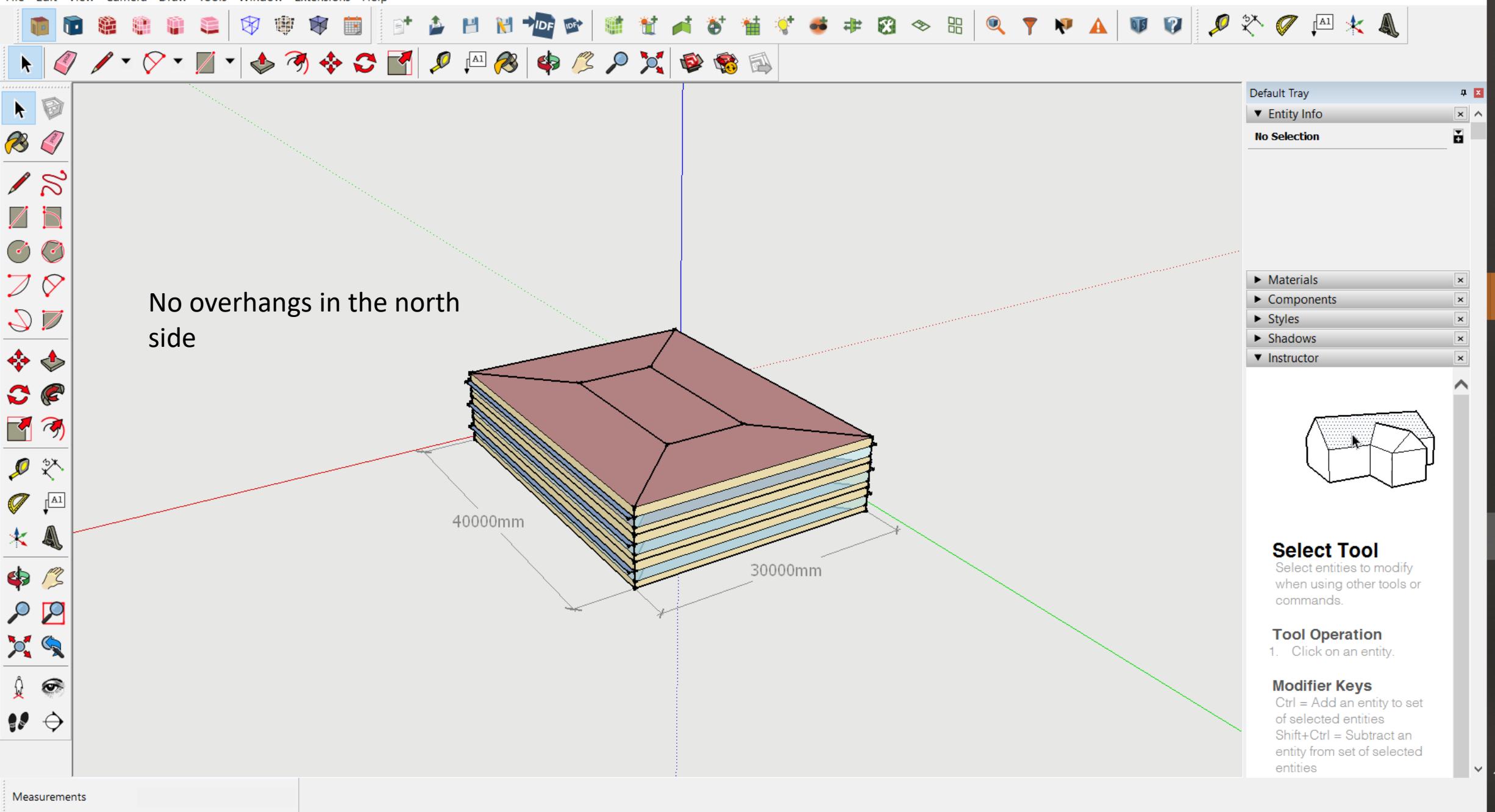
## Modifier Keys

Ctrl = Add an entity to set of selected entities  
Shift+Ctrl = Subtract an entity from set of selected entities

Measurements

Select objects. Shift to extend select. Drag mouse to select multiple.

18:43  
12/11/2019



File Edit View Camera Draw Tools Window Extensions Help

Default Tray >

- Hide Tray
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- Layers
- Scenes
- Shadows
- Fog
- Match Photo
- Soften Edges
- Instructor
- Outliner**

Entity Info

15 Groups

Layer: OpenStudio::Mc  
Name:  
Type: Type: <undefined>

Materials Components Styles Shadows Instructor

Measurements

1 Add / Remove Outliner.

Turning on outliner

Select Tool

Select entities to modify when using other tools or commands.

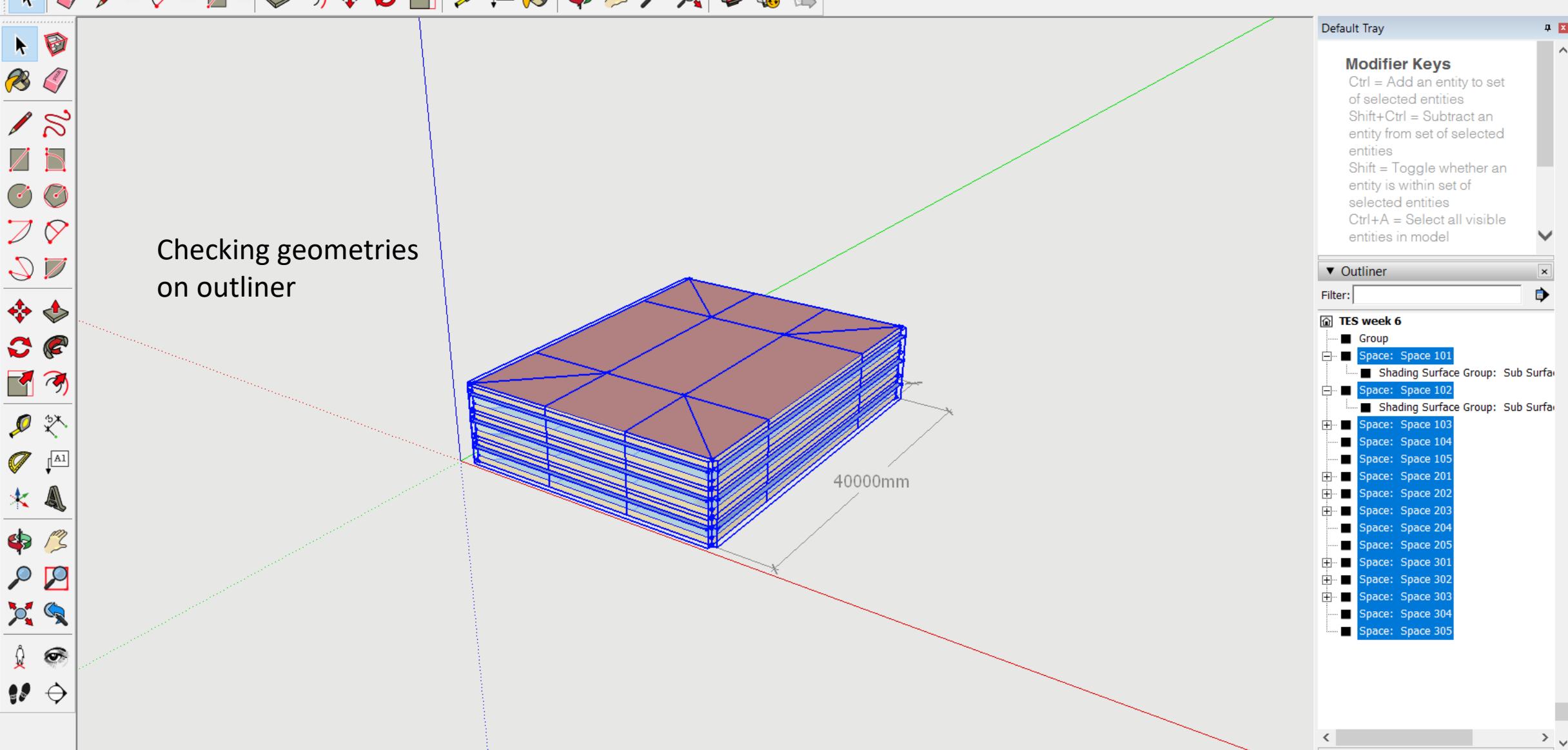
Tool Operation

- 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

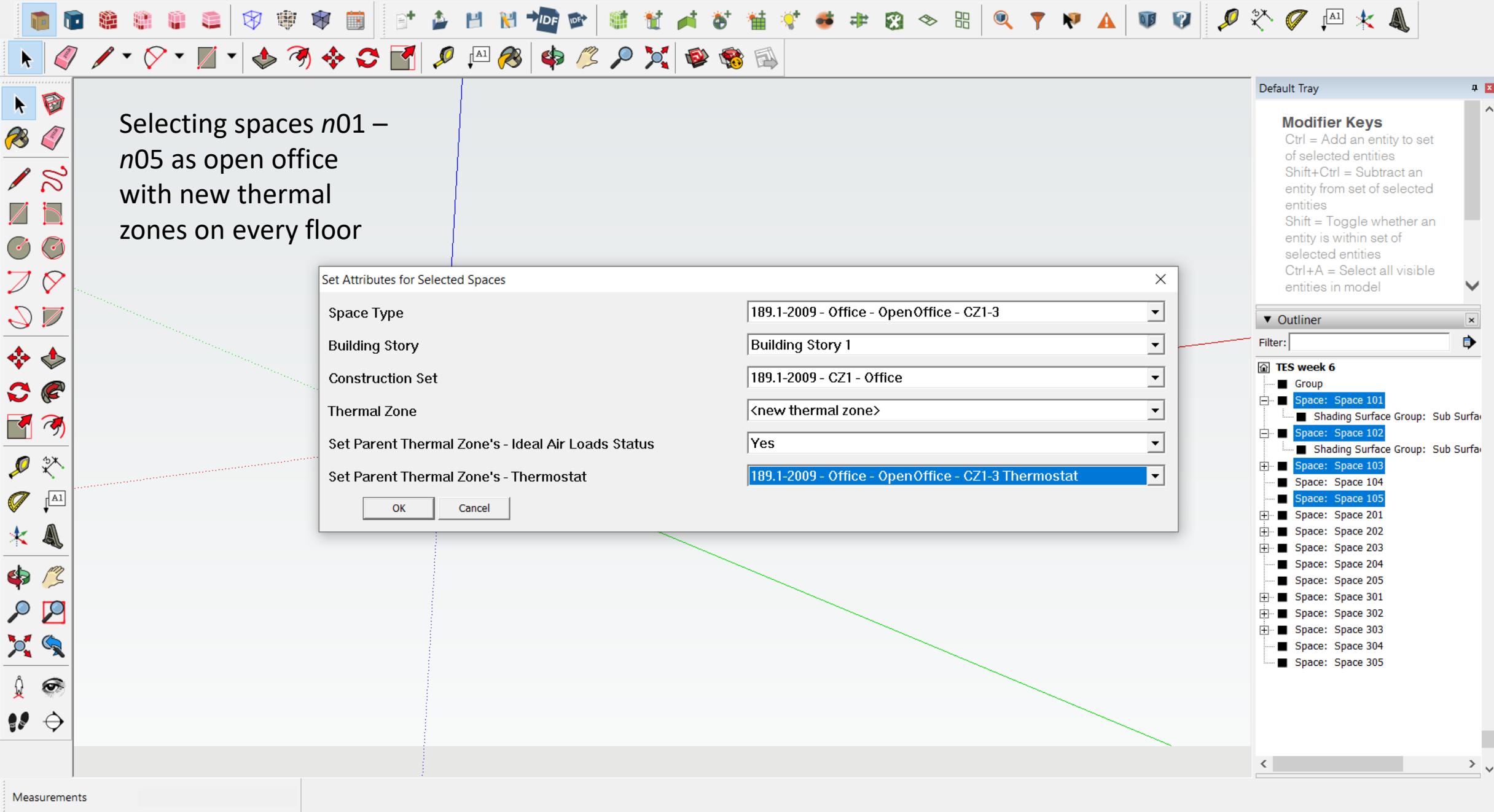
18:45  
12/11/2019

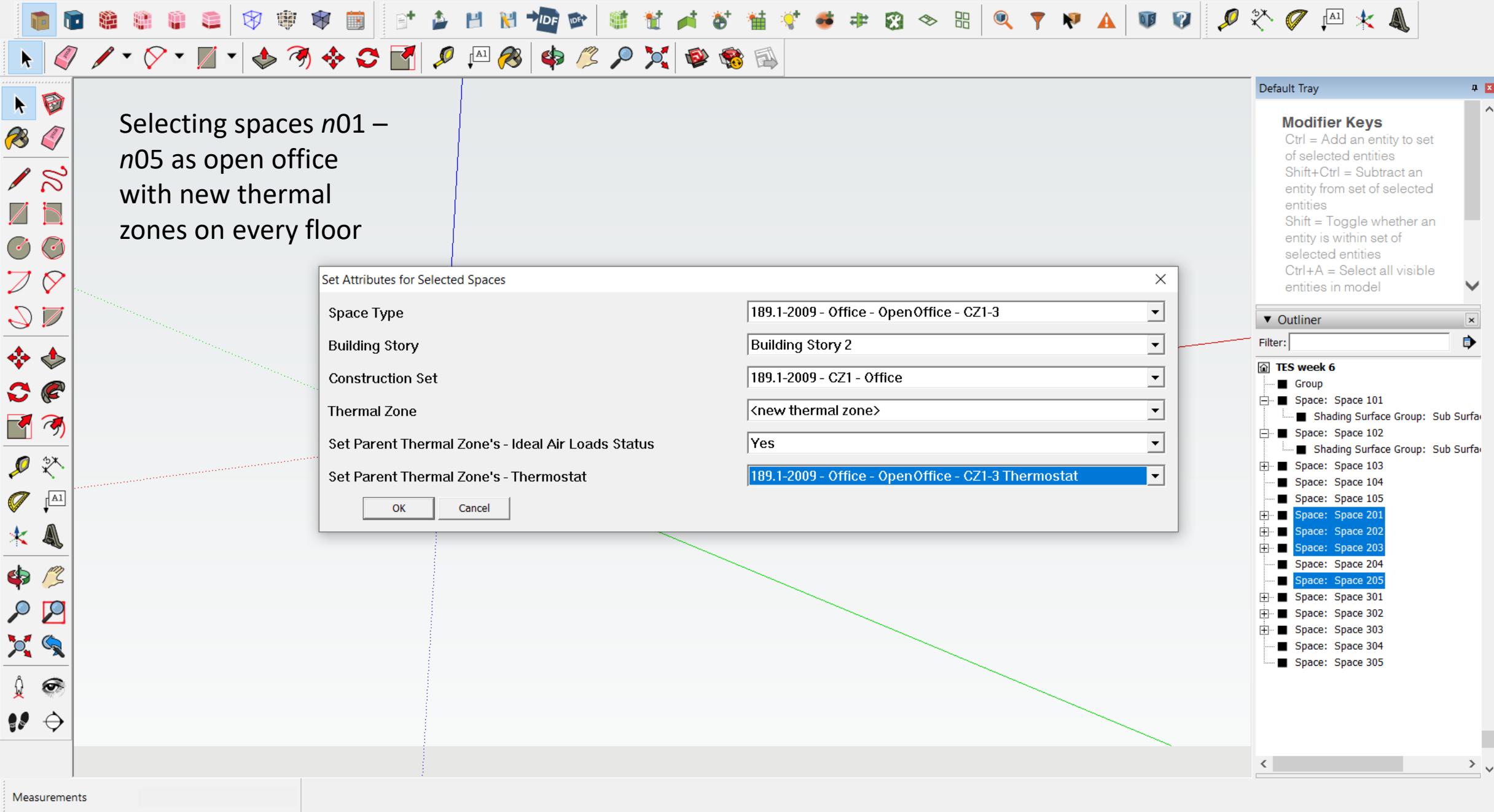


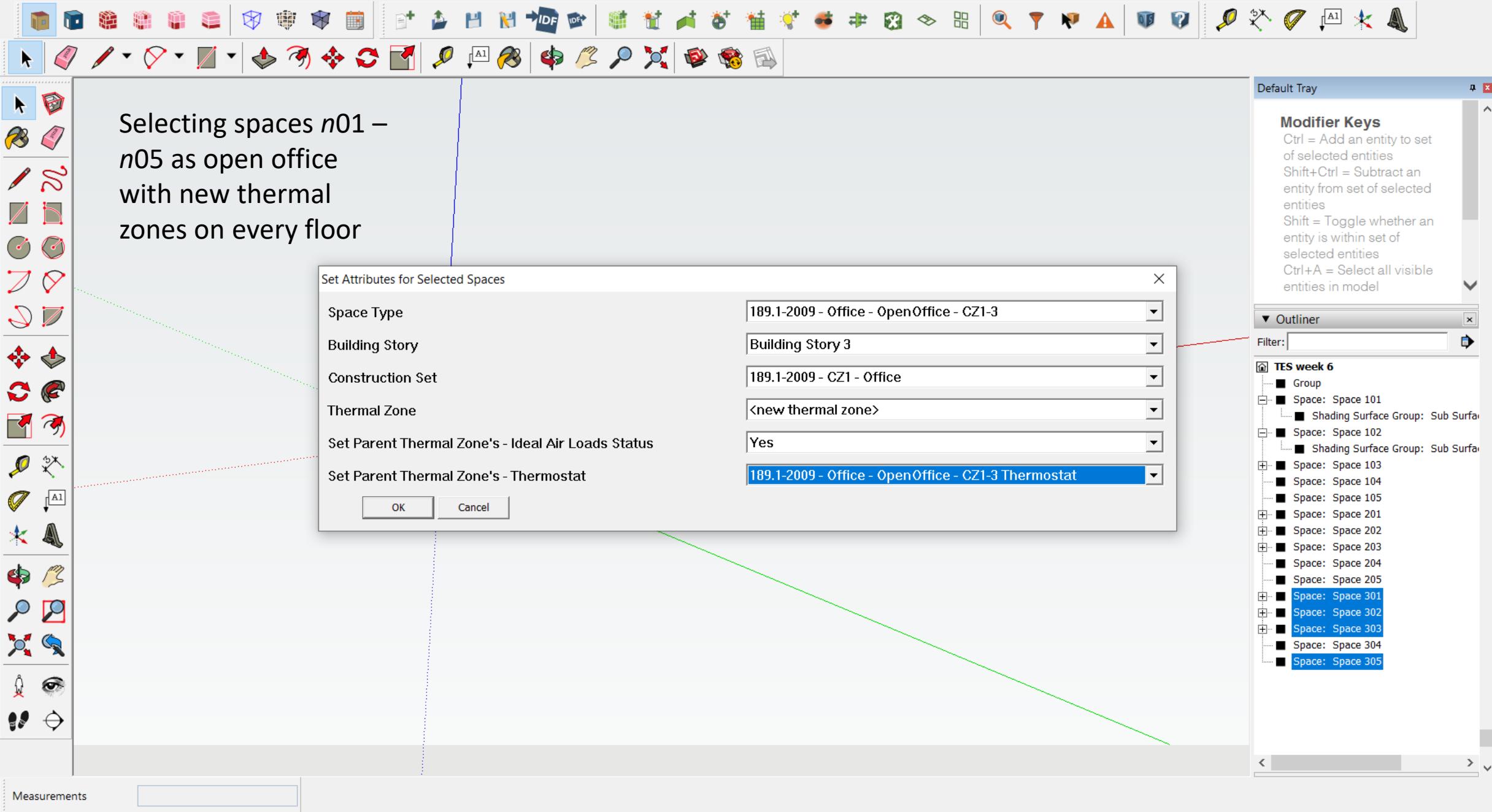
Measurements

Select objects. Shift to extend select. Drag mouse to select multiple.

18:46  
12/11/2019









Selecting spaces n04 as break room with new thermal zone on every floor

Set Attributes for Selected Spaces

Space Type	189.1-2009 - Office - BreakRoom - CZ1-3
Building Story	Building Story 1
Construction Set	189.1-2009 - CZ1 - Office
Thermal Zone	<new thermal zone>
Set Parent Thermal Zone's - Ideal Air Loads Status	Yes
Set Parent Thermal Zone's - Thermostat	189.1-2009 - Office - OpenOffice - CZ1-3 Thermostat

OK Cancel

#### Default Tray

##### 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

#### Outliner

Filter:
TES week 6
■ Group
■ Space: Space 101
■ Shading Surface Group: Sub Surface
■ Space: Space 102
■ Shading Surface Group: Sub Surface
■ 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



Selecting spaces n04 as break room with new thermal zone on every floor

**Set Attributes for Selected Spaces**

Space Type	189.1-2009 - Office - BreakRoom - CZ1-3
Building Story	Building Story 2
Construction Set	189.1-2009 - CZ1 - Office
Thermal Zone	<new thermal zone>
Set Parent Thermal Zone's - Ideal Air Loads Status	Yes
Set Parent Thermal Zone's - Thermostat	189.1-2009 - Office - OpenOffice - CZ1-3 Thermostat

OK Cancel

**Default Tray**

**Modifier Keys**

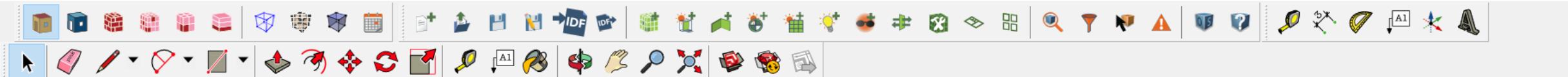
- Ctrl = Add an entity to set of selected entities
- Shift+Ctrl = Subtract an entity from set of selected entities
- Shift = Toggle whether an entity is within set of selected entities
- Ctrl+A = Select all visible entities in model

**Outliner**

Filter:

- TES week 6
  - Group
  - Space: Space 101
    - Shading Surface Group: Sub Surface
  - Space: Space 102
    - Shading Surface Group: Sub Surface
  - 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





Selecting spaces n04 as break room with new thermal zone on every floor

Set Attributes for Selected Spaces

Space Type	189.1-2009 - Office - BreakRoom - CZ1-3
Building Story	Building Story 3
Construction Set	189.1-2009 - CZ1 - Office
Thermal Zone	<new thermal zone>
Set Parent Thermal Zone's - Ideal Air Loads Status	Yes
Set Parent Thermal Zone's - Thermostat	189.1-2009 - Office - OpenOffice - CZ1-3 Thermostat

OK Cancel

## Default Tray

## 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

## Outliner

Filter:
TES week 6
■ Group
■ Space: Space 101
■ Shading Surface Group: Sub Surface
■ Space: Space 102
■ Shading Surface Group: Sub Surface
■ 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

## 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](http://www.energyplus.gov)

## Measure Tags (Optional):

ASHRAE Climate Zone

CEC Climate Zone

Opening file in open studio and Piacenza weather data inserted

## 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

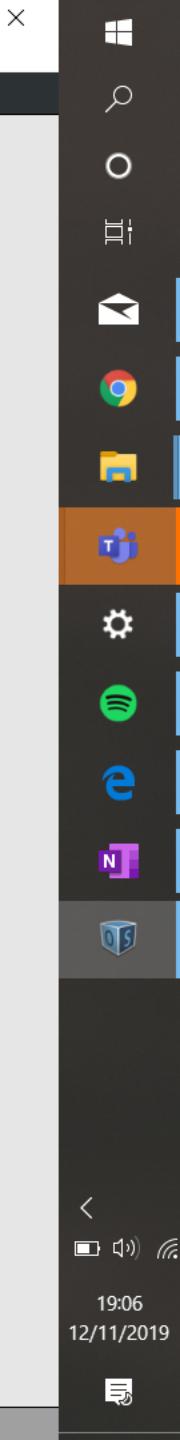
 Define by Day of The Week And Month First Sunday January Define by Date 01/01/2000

## Design Days Import From DDY

## Design Days

Date	Temperature	Humidity	Pressure Wind Precipitation	Solar	Custom
------	-------------	----------	-----------------------------	-------	--------

Design Day Name	All	Day Of Month	Month	Day Type	Daylight Saving Time Indicator
		Apply to Selected	Apply to Selected	Apply to Selected	
Piacenza Ann Clg .4% Condns DB=>MWB	<input type="checkbox"/>	21	8	SummerDesignDay	<input type="checkbox"/>
Piacenza Ann Clg .4% Condns DP=>MDB	<input type="checkbox"/>	21	8	SummerDesignDay	<input type="checkbox"/>
Piacenza Ann Clg .4% Condns Enth=>MDB	<input type="checkbox"/>	21	8	SummerDesignDay	<input type="checkbox"/>
Piacenza Ann Clg .4% Condns WB=>MDB	<input type="checkbox"/>	21	8	SummerDesignDay	<input type="checkbox"/>
Piacenza Ann Htg 99.6% Condns DB	<input type="checkbox"/>	21	1	WinterDesignDay	<input type="checkbox"/>
Piacenza Ann Htg Wind 99.6% Condns WS=>MCDB	<input type="checkbox"/>	21	1	WinterDesignDay	<input type="checkbox"/>
Piacenza Ann Hum_n 99.6% Condns DP=>MCDB	<input type="checkbox"/>	21	1	WinterDesignDay	<input type="checkbox"/>



Run Simulation Output Tree

Run Finished  
Warnings: 10  
Errors: 0  
Output

```
Warming up {2}
Warming up {3}
Warming up {4}
Warming up {5}
Warming up {6}
Starting Simulation at 01/01 for RUN PERIOD 1
Updating Shadowing Calculations, Start Date=01/21
Continuing Simulation at 01/21 for RUN PERIOD 1
Updating Shadowing Calculations, Start Date=02/10
Continuing Simulation at 02/10 for RUN PERIOD 1
Updating Shadowing Calculations, Start Date=03/02
Continuing Simulation at 03/02 for RUN PERIOD 1
Updating Shadowing Calculations, Start Date=03/22
Continuing Simulation at 03/22 for RUN PERIOD 1
Updating Shadowing Calculations, Start Date=04/11
Continuing Simulation at 04/11 for RUN PERIOD 1
Updating Shadowing Calculations, Start Date=05/01
Continuing Simulation at 05/01 for RUN PERIOD 1
Updating Shadowing Calculations, Start Date=05/21
Continuing Simulation at 05/21 for RUN PERIOD 1
Updating Shadowing Calculations, Start Date=06/10
Continuing Simulation at 06/10 for RUN PERIOD 1
Updating Shadowing Calculations, Start Date=06/30
Continuing Simulation at 06/30 for RUN PERIOD 1
Updating Shadowing Calculations, Start Date=07/20
Continuing Simulation at 07/20 for RUN PERIOD 1
Updating Shadowing Calculations, Start Date=08/09
Continuing Simulation at 08/09 for RUN PERIOD 1
Updating Shadowing Calculations, Start Date=08/29
Continuing Simulation at 08/29 for RUN PERIOD 1
Updating Shadowing Calculations, Start Date=09/18
Continuing Simulation at 09/18 for RUN PERIOD 1
Updating Shadowing Calculations, Start Date=10/08
Continuing Simulation at 10/08 for RUN PERIOD 1
Updating Shadowing Calculations, Start Date=10/28
Continuing Simulation at 10/28 for RUN PERIOD 1
Updating Shadowing Calculations, Start Date=11/17
Continuing Simulation at 11/17 for RUN PERIOD 1
Updating Shadowing Calculations, Start Date=12/07
Continuing Simulation at 12/07 for RUN PERIOD 1
Updating Shadowing Calculations, Start Date=12/27
Continuing Simulation at 12/27 for RUN PERIOD 1
Writing tabular output file results using HTML format.
Computing Life Cycle Costs and Reporting
Writing final SQL reports
EnergyPlus Run Time=00hr 00min 18.09sec
Script executing from: C:/Users/Shidqina/AppData/Local/Temp/OpenStudio.F10252/resources/run/6-UserScript-0
Found UserScript 'OpenStudio Results'.
result = true
Processed 1 base script and 0 merged scripts
```

100%

## Running simulation



## Results Summary

Reports: OpenStudio Results

[Open ResultsViewer  
for Detailed Reports](#)

- Model Summary
- Annual Overview
- Monthly Overview
- Utility Bills/Rates
- Envelope
- Space Type Breakdown
- Space Type Summary
- Interior Lighting Summary
- Plug Loads Summary
- Exterior Lighting
- Water Use Equipment
- HVAC Load Profiles
- Zone Conditions
- Zone Overview
- Zone Equipment Detail
- Air Loops Detail
- Plant Loops Detail
- Outdoor Air
- Cash Flow
- Site and Source Summary
- Schedule Overview

# OpenStudio Results

## Model Summary

### Building Summary

Information	Value	Units
Building Name	Building 1	building_name
Net Site Energy	2,248,905	kBtu
Total Building Area	38,750	ft <sup>2</sup>
EUI (Based on Net Site Energy and Total Building Area)	58.04	kBtu/ft <sup>2</sup>
OpenStudio Standards Building Type		

### Weather Summary

	Value
Weather File	Piacenza - ITA IGDG WMO#=160840
Latitude	44.92
Longitude	9.73
Elevation	440 (ft)
Time Zone	1.00
North Axis Angle	0.00
ASHRAE Climate Zone	

### Sizing Period Design Days



## Results Summary

Reports: EnergyPlus Results

[Open ResultsViewer  
for Detailed Reports](#)

Program Version: EnergyPlus, Version 8.5.0-c87e61b44b, YMD=2019.11.12 19:10

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Tabular Output Report in Format: HTML

Building: Building 1

Environment: RUN PERIOD 1 \*\* Piacenza - ITA IGDG WMO#=160840

Simulation Timestamp: 2019-11-12 19:10:19

Report: Annual Building Utility Performance Summary

[Table of Contents](#)

For: Entire Facility

Timestamp: 2019-11-12 19:10:19

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	2372.72	659.09	659.09
Net Site Energy	2372.72	659.09	659.09
Total Source Energy	6126.68	1701.86	1701.86
Net Source Energy	6126.68	1701.86	1701.86

## 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
Steam	0.300
Gasoline	1.050

