

# 1 Editing Meshes

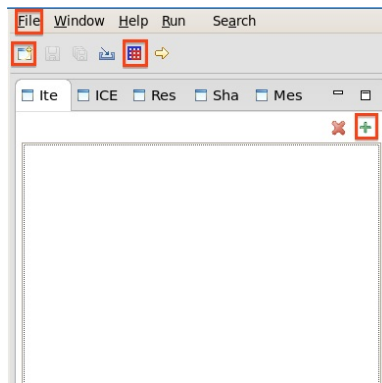
This document is designed to outline the basic user controls of the Mesh Editor plugin in ICE.

## 1.1 Getting Started

Once ICE is installed on your system, there are no additional dependencies or preparation required to use the Mesh Editor.

### 1.1.1 Opening a Mesh Editor

To open a Mesh Editor in ICE, you have four options:



The UI elements which can be used to open a Mesh Editor are highlighted. Instruction for how to use each one, from top to bottom, left to right, are given below.

1) Click the File menu, then New, then Other... and select the Create Item Wizard in the new dialog and press Next. Then, select Mesh Editor from the list and press Finish.

2) Click the New button, select Create Item Wizard in the new dialog and press Next. Then, select Mesh Editor from the list and press Finish.

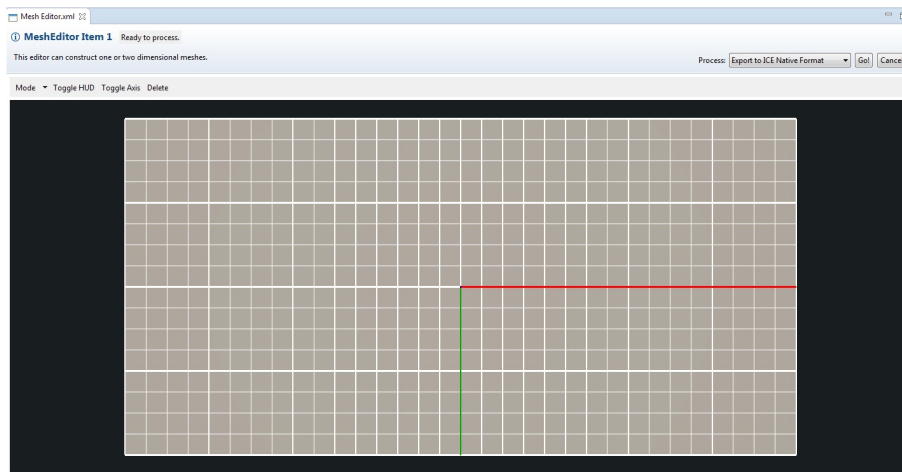
3) Click the Mesh Editor button.

4) Enter the ICE Perspective by clicking the Open Perspective button in the upper right corner of the screen, select ICE from the dialog that pops up, and

click OK. Afterwards, click the Create an Item button, select Mesh Editor, and click OK.

## 2 Working With the Mesh Editor

The mesh editor will initially open to an empty grid, as shown below. There is currently no way to import pre-existing meshes from another source directly into the Mesh Editor.



### 2.1 Navigation

Meshes are constructed on the background grid. Gridlines are spaced one unit apart from each other. The origin is the initial center of the screen with the x axis in red and the y axis in green coming out from it in the positive x and y directions, respectively.

#### 2.1.1 Camera Controls

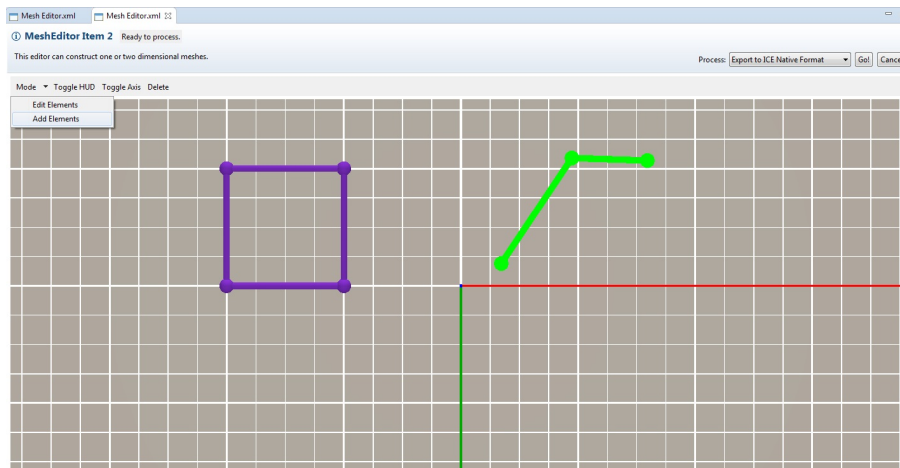
The camera is controlled with keyboard and mouse commands. The W, A, S, and D keys are used to move the camera around the editor's area, while scrolling the mouse wheel is used to zoom the camera in and out.

If the controls are not working, ensure that the Mesh Editor has focus by clicking inside of it.

Camera Controls	
Action	Key(s)
Scroll Up	W or Up Arrow
Scroll Down	S or Left Arrow
Scroll Left	A or Right Arrow
Scroll Right	D or Down Arrow
Zoom In	Scroll mouse wheel up
Zoom out	Scroll mouse wheel down

## 2.2 Adding Elements

2D meshes are constructed in the editor by specifying one quadrilateral at a time. To add a new polygon, the Mesh Editor must be in Add Elements Mode. This mode is the editor's default setting, and it can later be reset by clicking the Mode button in the top left corner.



### 2.2.1 Placing Vertices

In Add Elements Mode, clicking anywhere on the grid will place a new vertex at that location. These new, temporary vertices and the edges between them will be colored in green, to show that the polygon is still under construction.

Alternatively, you may select a vertex not already in the new polygon. This allows you to reuse vertices and/or edges already present in the mesh to form part of your new polygon.

Once the fourth vertex has been specified, the polygon will be displayed

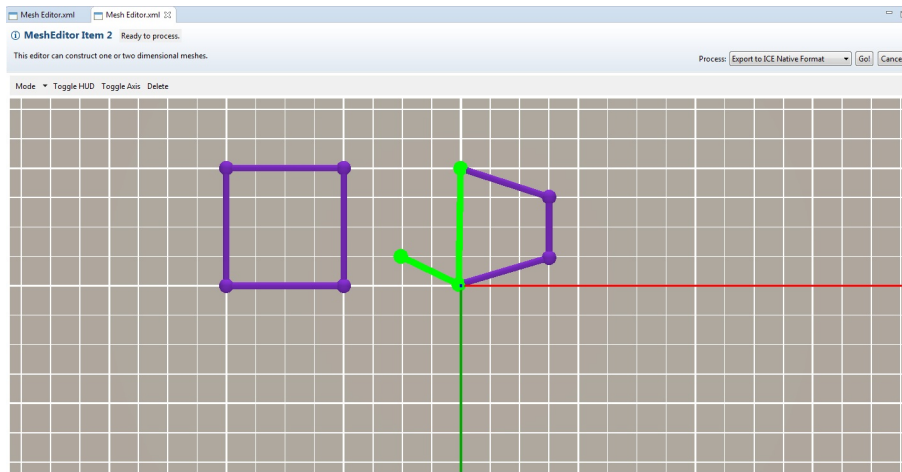
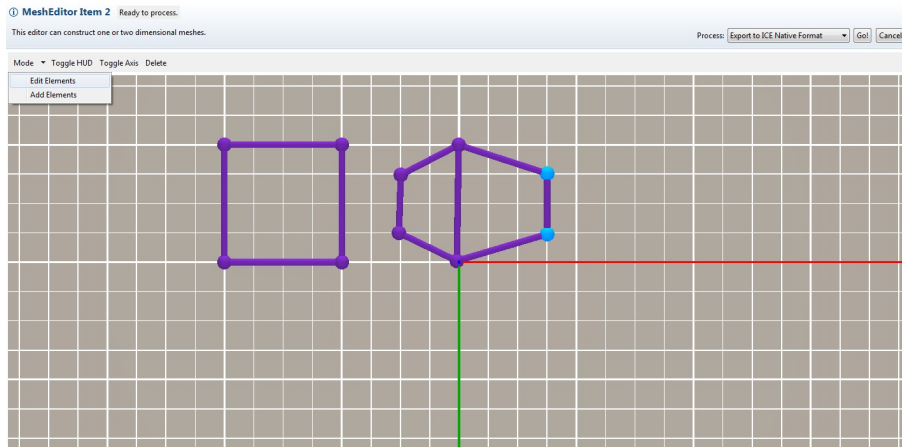


Figure 1: One of the edges from the trapezoid is being combined with a new edge in the creation of the current polygon.

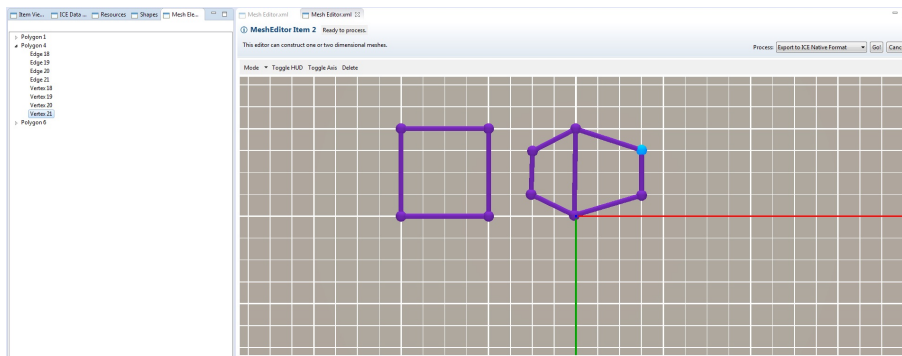
in full. Clicking one more time will change it to purple to show that it has been completed. At any time before this, you can press the backspace, delete, or escape buttons to cancel the new polygon, removing it from the editor and allowing you to start the process over.

### 2.3 Editing Elements

To edit an already present element of the mesh, you must switch to Edit Elements Mode. The Mode button in the upper left corner allows you to switch between modes, as shown below.



A vertex can be selected by either clicking it in the Mesh Editor, or by selecting it from the tree in the ICE Perspective's Mesh Elements View. Holding down shift while clicking will allow multiple vertices to be selected at once, while holding down control during a click will toggle a vertex's state either into or out of the selection. Selected elements are displayed in blue. The current selection can be cleared by pressing the backspace, delete, or escape buttons.



Click on a selected vertex and drag it to change its location. The clicked vertex will stay beneath your mouse cursor, while all other selected vertices will be moved as well, keeping their relative position to the dragged vertex. White circles are displayed to show each vertex's new location. Pressing backspace, delete, or escape during the drag will deselect the vertices and cancel the movement.

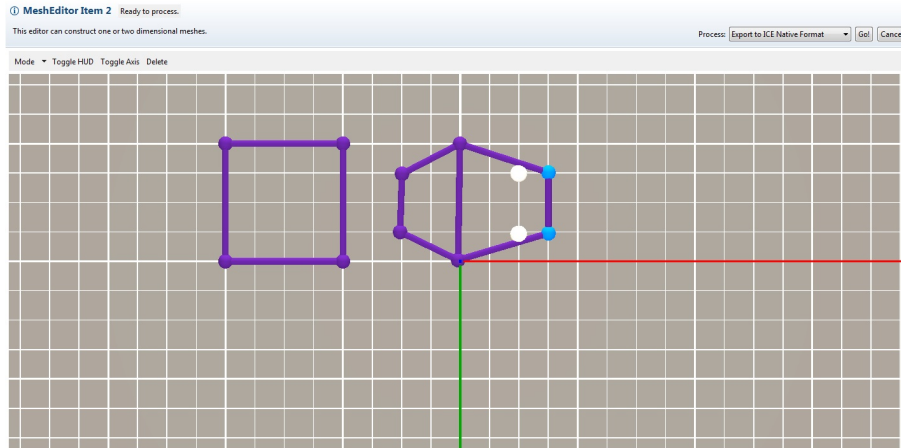


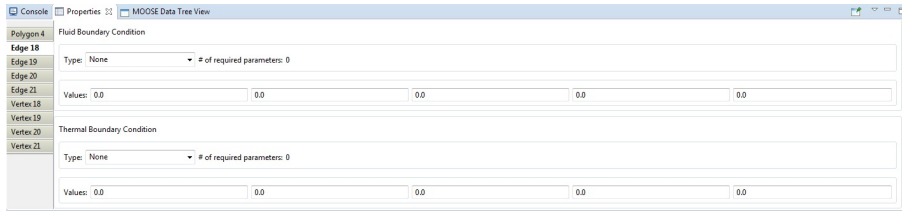
Figure 2: Two vertices are selected. When the bottom vertex is moved left, the top vertex is moved left by an equal amount.

Edit Mode Controls	
Action	Key(s)
Select vertex	Left click
Add to selection	Shift + left click
Toggle (Add/Remove) Selection	Ctrl + left click
Move selected vertices	Left click on vertex and drag mouse
Clear selection/Cancel move	Backspace, Delete, or Escape

Alternatively, you can edit a vertex more precisely by setting its exact coordinates. First, select it in the Mesh Elements View, then open the Properties View. The vertex's x and y coordinates will be displayed in editable text boxes.



Selecting a polygon in the same way, then opening the tab for one of its edges in the Properties View, will display the edge's boundary conditions for that polygon. These are editable, just like the vertices are.



## 2.4 Deleting Elements

Polygons in the mesh can be deleted. All four vertices for the polygon must be selected, then press the Delete button on the toolbar. Vertices and edges which are still part of other, undeleted, polygons will remain, but all others will be removed from the editor.

## 2.5 Additional Controls

The Toggle Axis button on the toolbar will show/hide the axes in the editor.

