



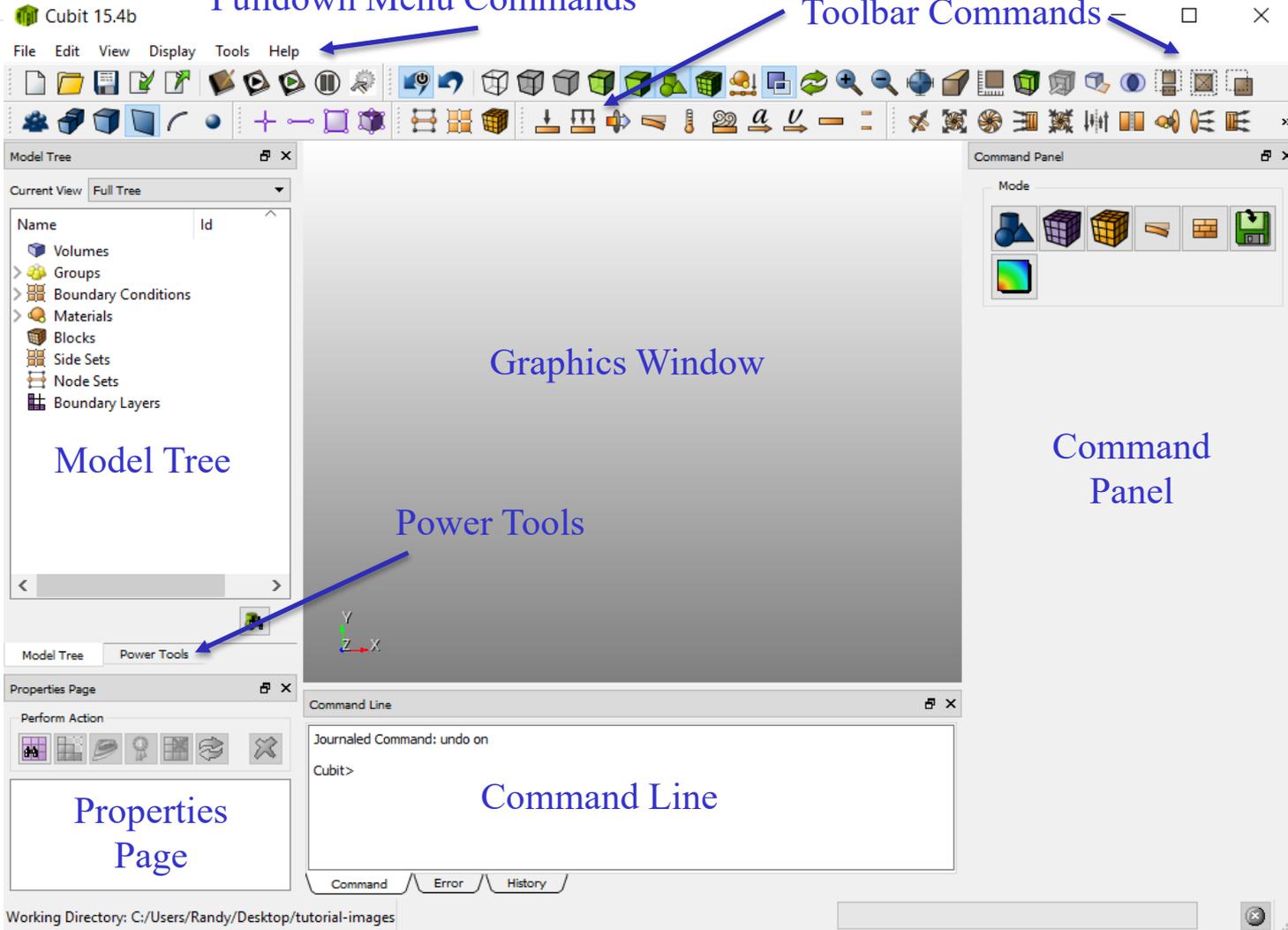
**Geometry and
Mesh Generation Toolkit**

CUBIT Fast-Start Tutorial

2. User Interface Basics

Pulldown Menu Commands

Toolbar Commands



Model Tree

Graphics Window

Power Tools

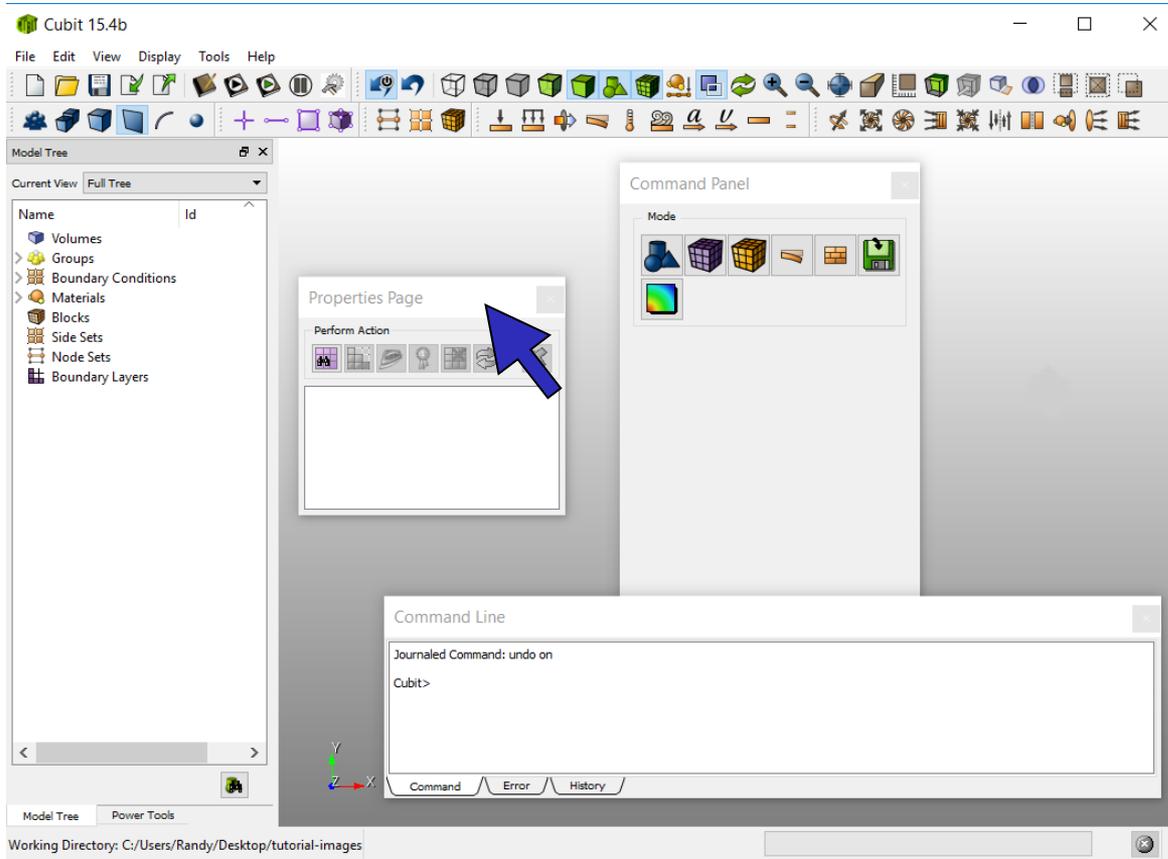
Command Panel

Properties Page

Command Line

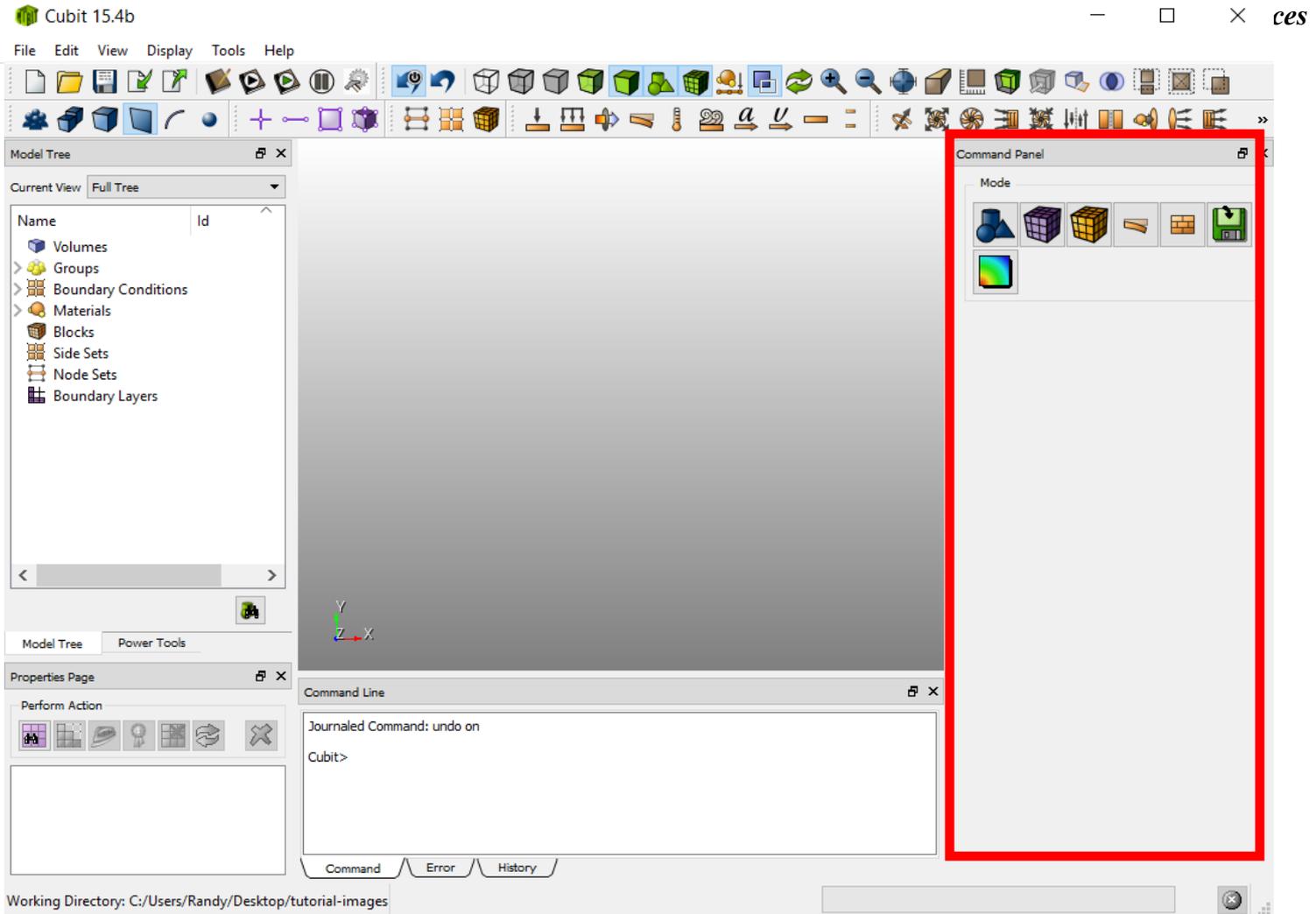
Working Directory: C:/Users/Randy/Desktop/tutorial-images

Float or dock dialogs and toolbars by clicking and dragging



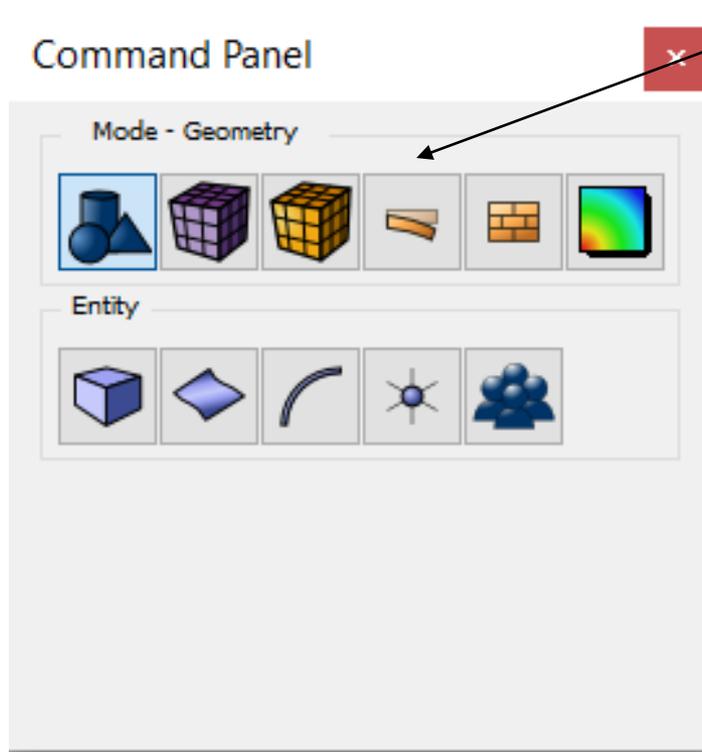
Press and hold the Ctrl button while dragging to avoid redocking

The Command Panel



Operation Mode Buttons

Simulation Modeling Sciences



Press an Icon to enter a new mode



- Geometry: Create, modify, cleanup...



- Mesh: Intervals, schemes, smoothing...



- Boundary Conditions



- Analysis Setup: Export mesh

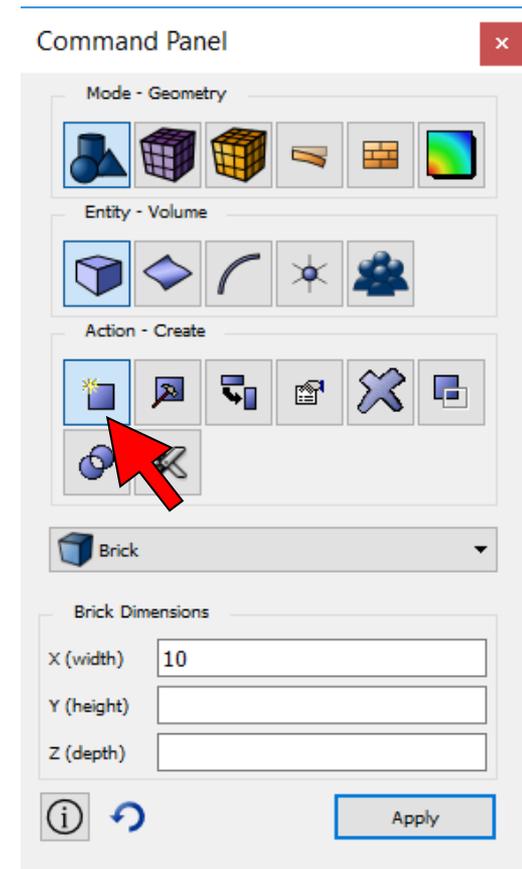
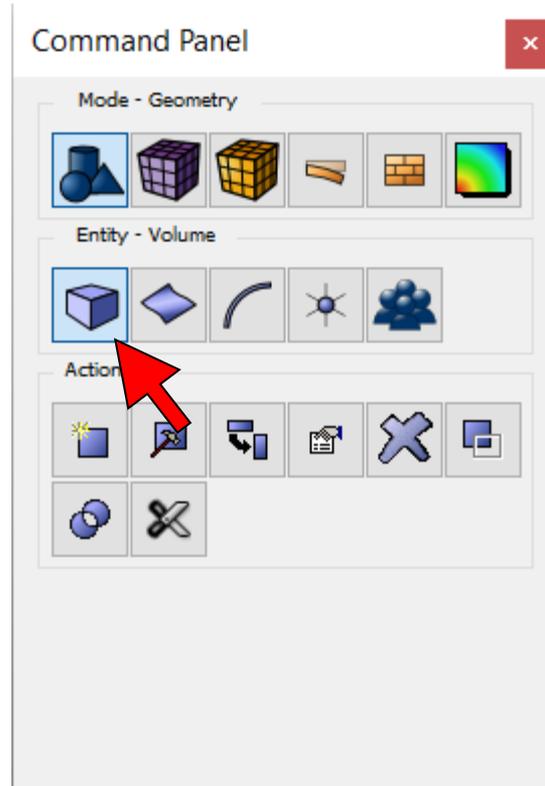
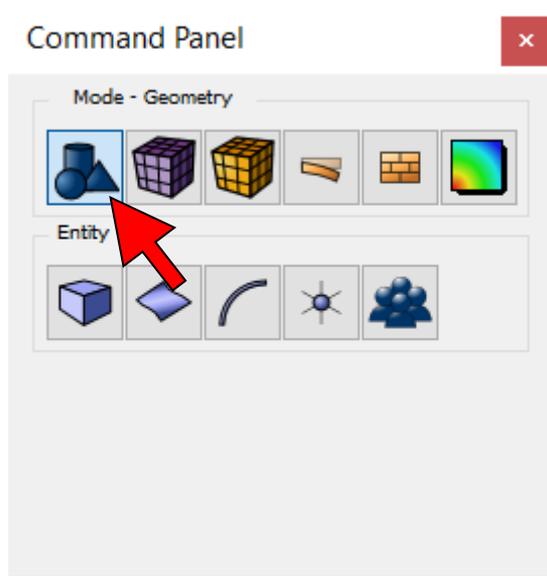


- Post Processing: Customizable shortcut

Operation Mode Buttons

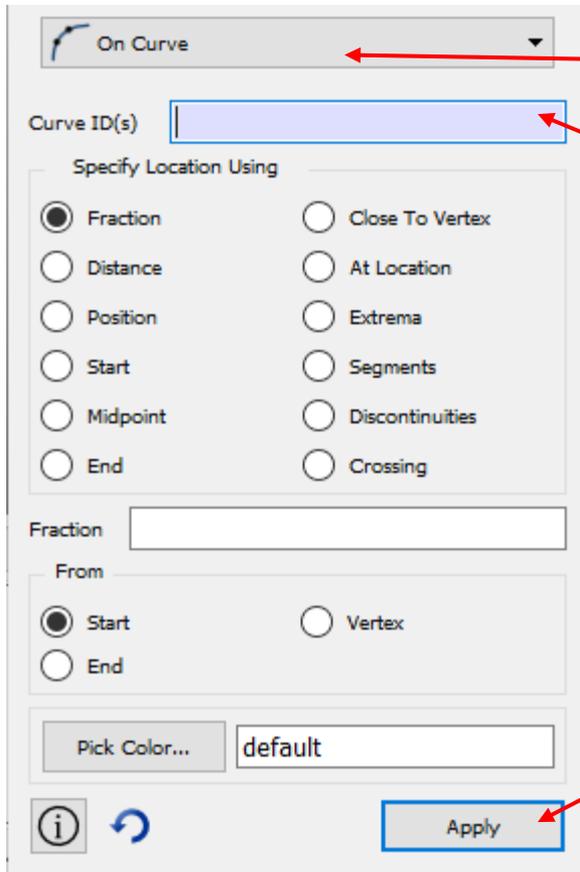
Simulation Modeling Sciences

Each Button press takes you to a lower level



Typical Dialog Layout

Simulation Modeling Sciences



- **Drop Down Menu**

- Select the type of operation (sub-action).

- **ID Input Field**

- You can type IDs here, or fill the box by picking

- **Command Options Input**

- **Execute Button**

- Click button or hit alt-a to execute the command.

Input Fields

Simulation Modeling Sciences

On Curve

Curve ID(s)

Specify Location Using

Fraction Close To Vertex

Distance At Location

Position Extrema

Start Segments

Midpoint Discontinuities

End Crossing

Fraction

From

Start Vertex

End

Pick Color... default

Apply

ID input allowed

Graphical Selections

Typed IDs

Ranges

(example: 1 to 3, all, ...)

Relations to other entities

(example: curve in surface 2)

Aprepro

Input placed in brackets { } will be evaluated when the command is executed, using

Aprepro

(example: {10*.02})



ID Input Fields

Simulation Modeling Sciences

- Done Selecting
- Select All
- Highlight
- Reset Zoom
- Rotate About
- Draw
- Isolate
- Visibility Off
- Measure
- Mesh
- Delete Mesh
- Show Quality
- Reset Entity
- List Information ▶
- Graphics View Hotkeys
- Delete

Right Click



Right clicking in the input field will display an additional command menu

Done Selecting – Move to next field in dialog

Select All – Select all input type entities

Select Other – Used when picking from graphics window. Cycles through nearby entities

These options only apply when something is selected in the graphics window

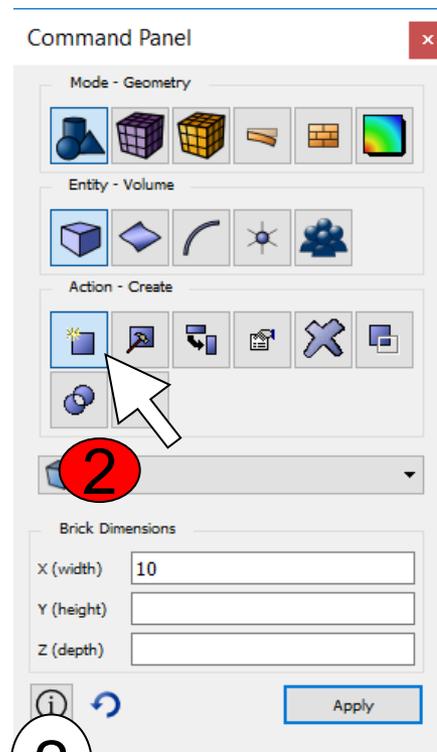
Exercise 1a: Become Familiar with the Interface

Simulation Modeling Sciences

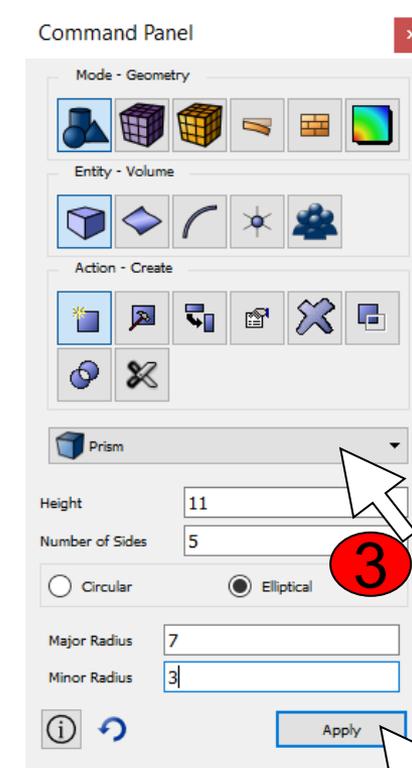
Create a pyramid for viewing



In Geometry
click *Volume*



2 Click *Create*

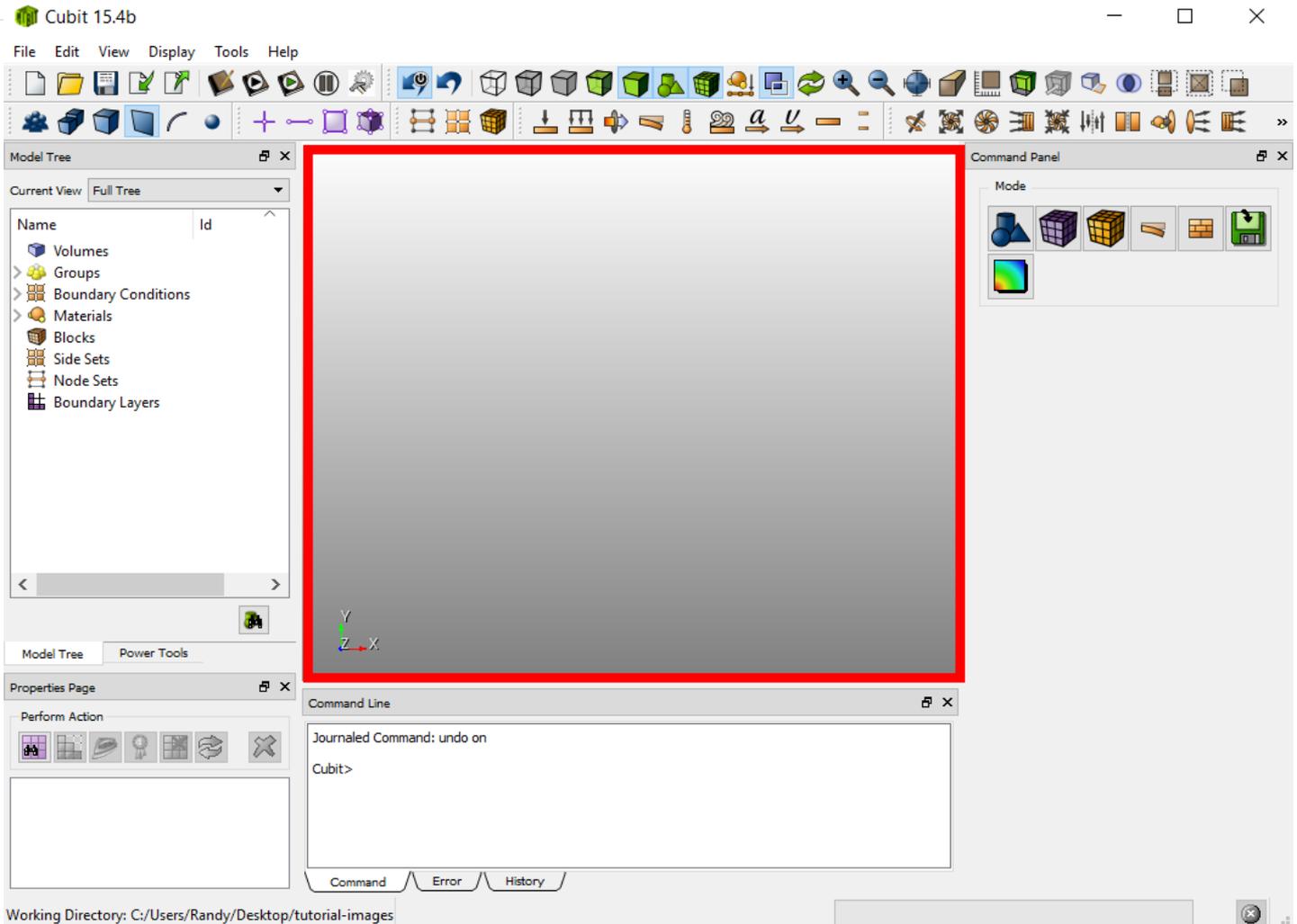


3 Select *Prism*

- 4
- Height = 11
- Sides = 5
- Select Elliptical
- Maj. Rad = 7
- Min. Rad. = 3
- 5
- Hit *Apply*

The Graphics Window

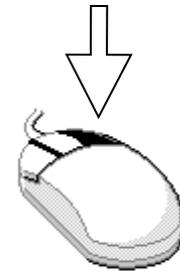
Simulation Modeling Sciences



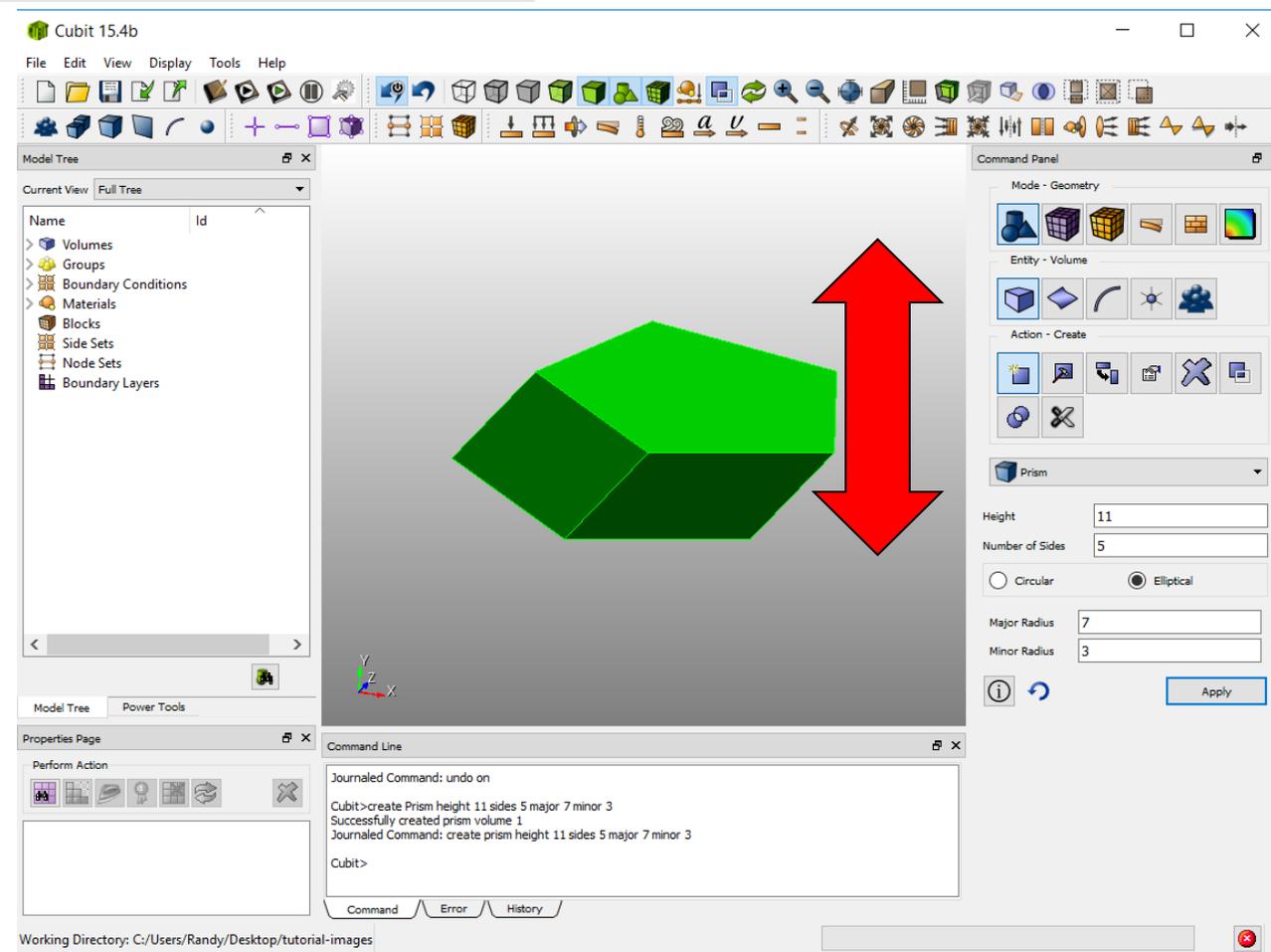
Zooming

Simulation Modeling Sciences

To zoom in and out, move the mouse into the graphics window, hold the right mouse button down, and move the mouse pointer vertically.



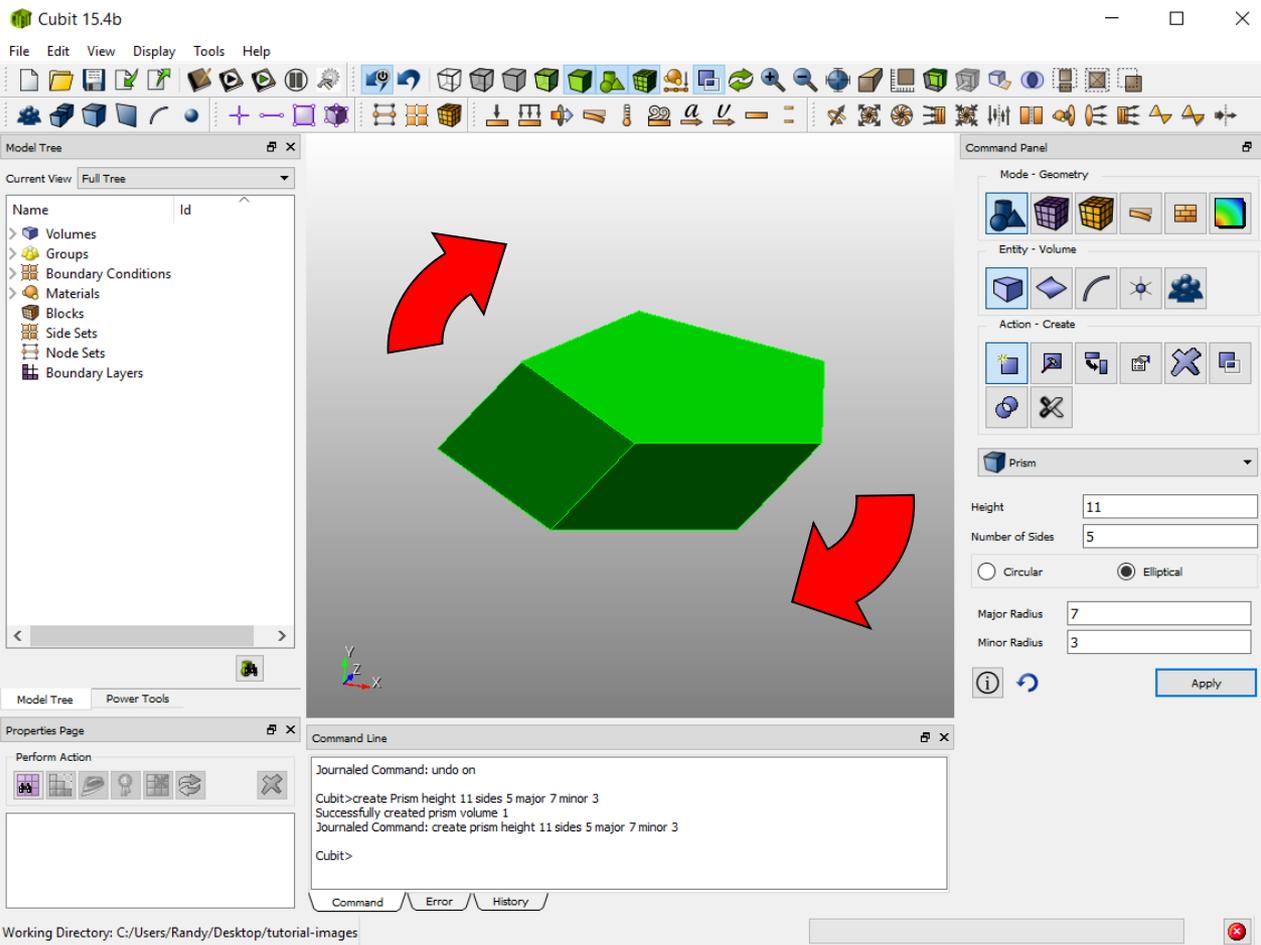
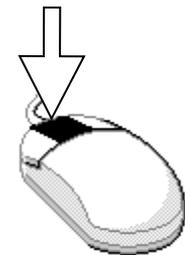
Mouse settings may be changed in Tools/Options/Mouse.



Rotate

Simulation Modeling Sciences

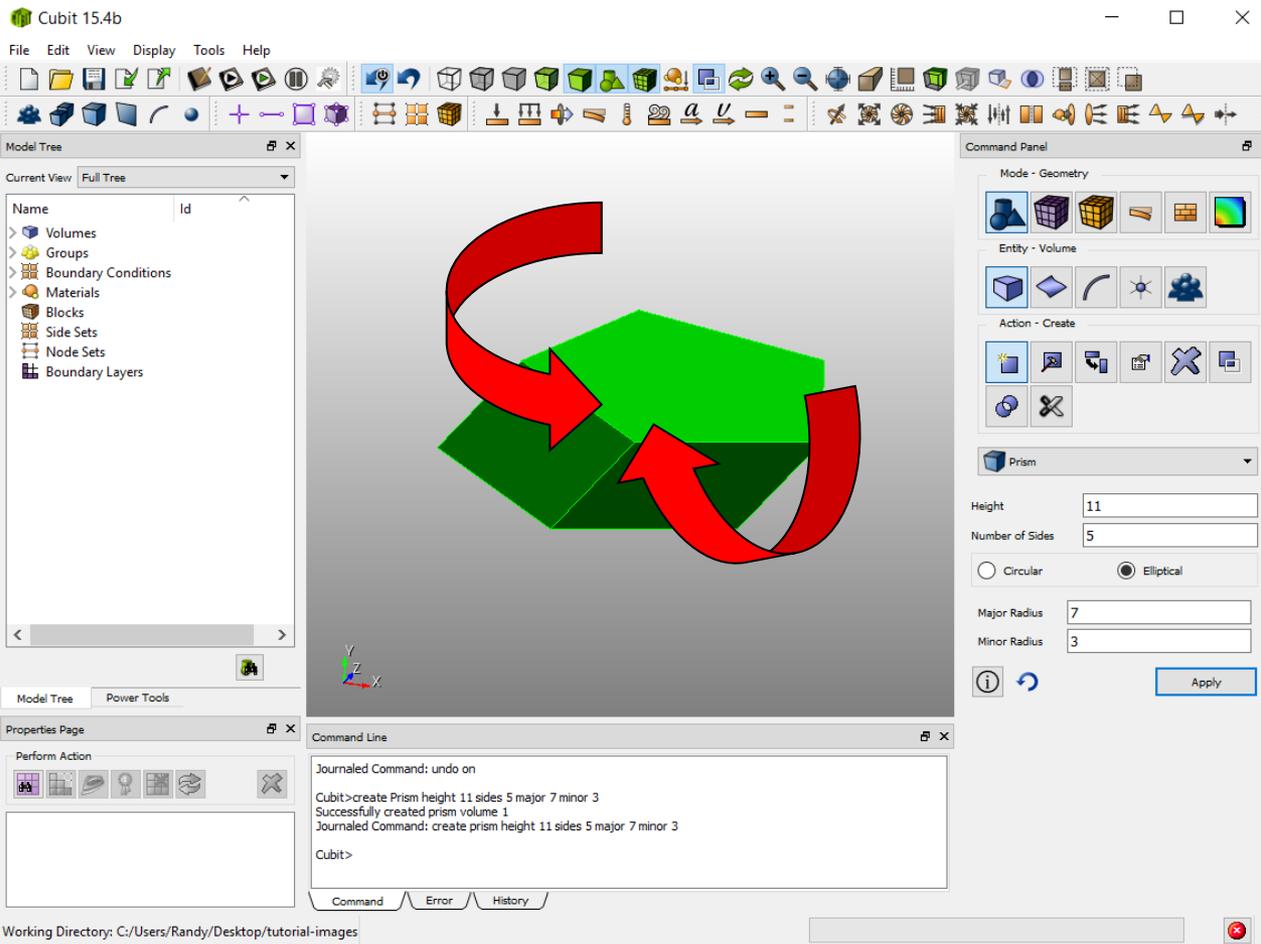
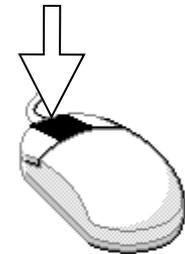
To rotate the model about an axis normal to the screen, move the mouse near the edge of the graphics window, hold the middle mouse button down, and move the mouse pointer along the edge of the window



Spin

Simulation Modeling Sciences

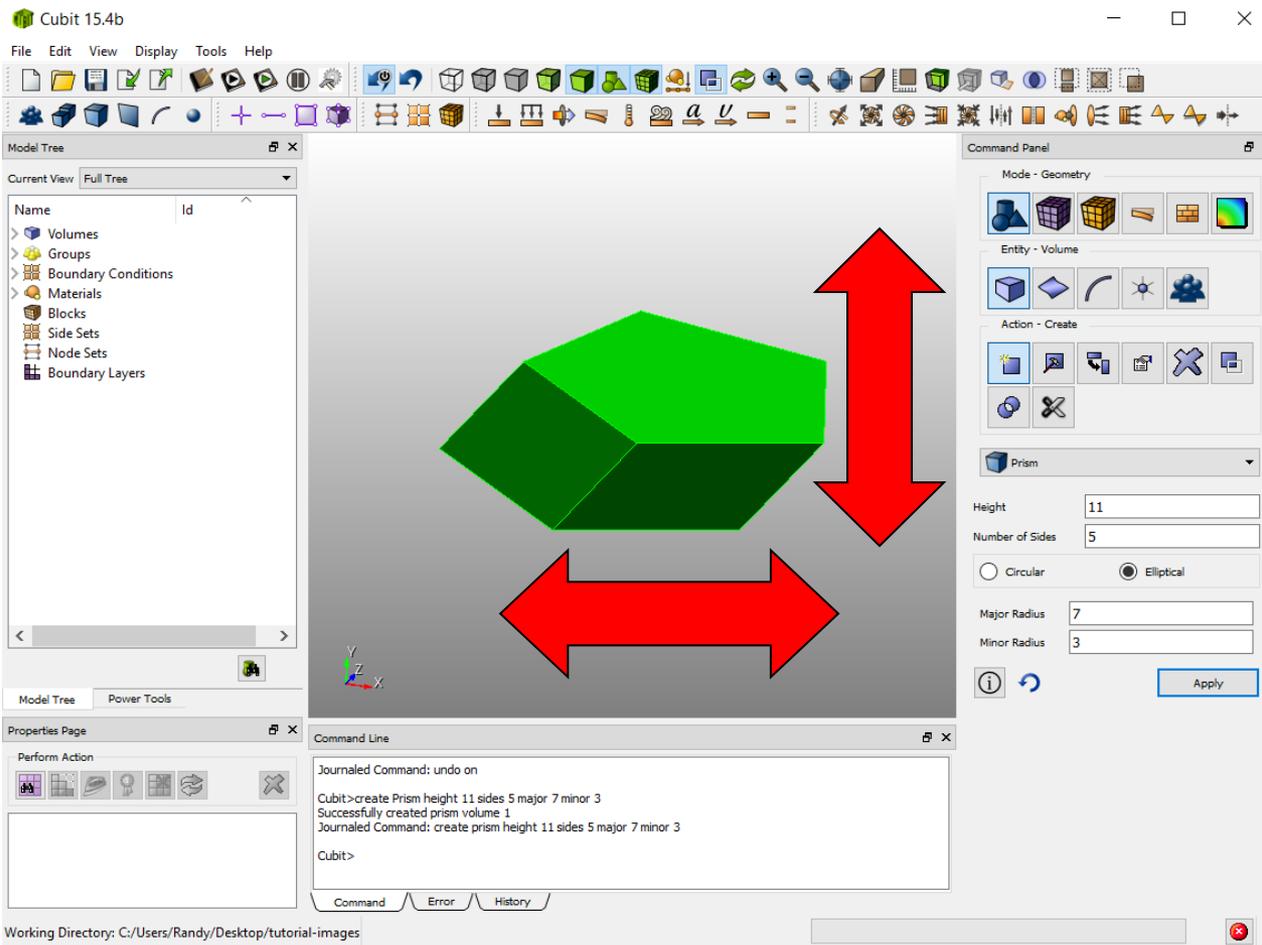
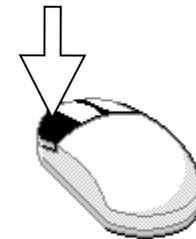
To rotate the model about the spin center, move the mouse near the center of the graphics window, hold the middle mouse button down, and move the mouse pointer.



Panning

Simulation Modeling Sciences

To pan, move the mouse into the graphics window, hold the left mouse button down, and move the mouse pointer horizontally or vertically.



Customizing Mouse behavior

Simulation Modeling Sciences

Select Tools:Options

In Options: Select Mouse

The screenshot shows the CUBIT 15.4b software interface. The 'Tools' menu is open, and the 'Options...' option is highlighted with a red box. A red arrow points from this box to the 'Options' dialog box. In the 'Options' dialog, the 'Mouse' option is selected in the left-hand tree view. The right-hand pane shows a table of mouse button configurations.

| Mouse Button | Function |
|--------------------------------|-------------------|
| Left Button | Select |
| Left Button + Control | Multiple Select |
| Left Button + Control and Drag | Rubberband Select |
| Middle Button | Tab Off Picker |
| Right Button | Context Menu |
| Left Button + Drag | Rotate |
| Middle Button + Drag | Zoom |
| Right Button + Drag | Pan |

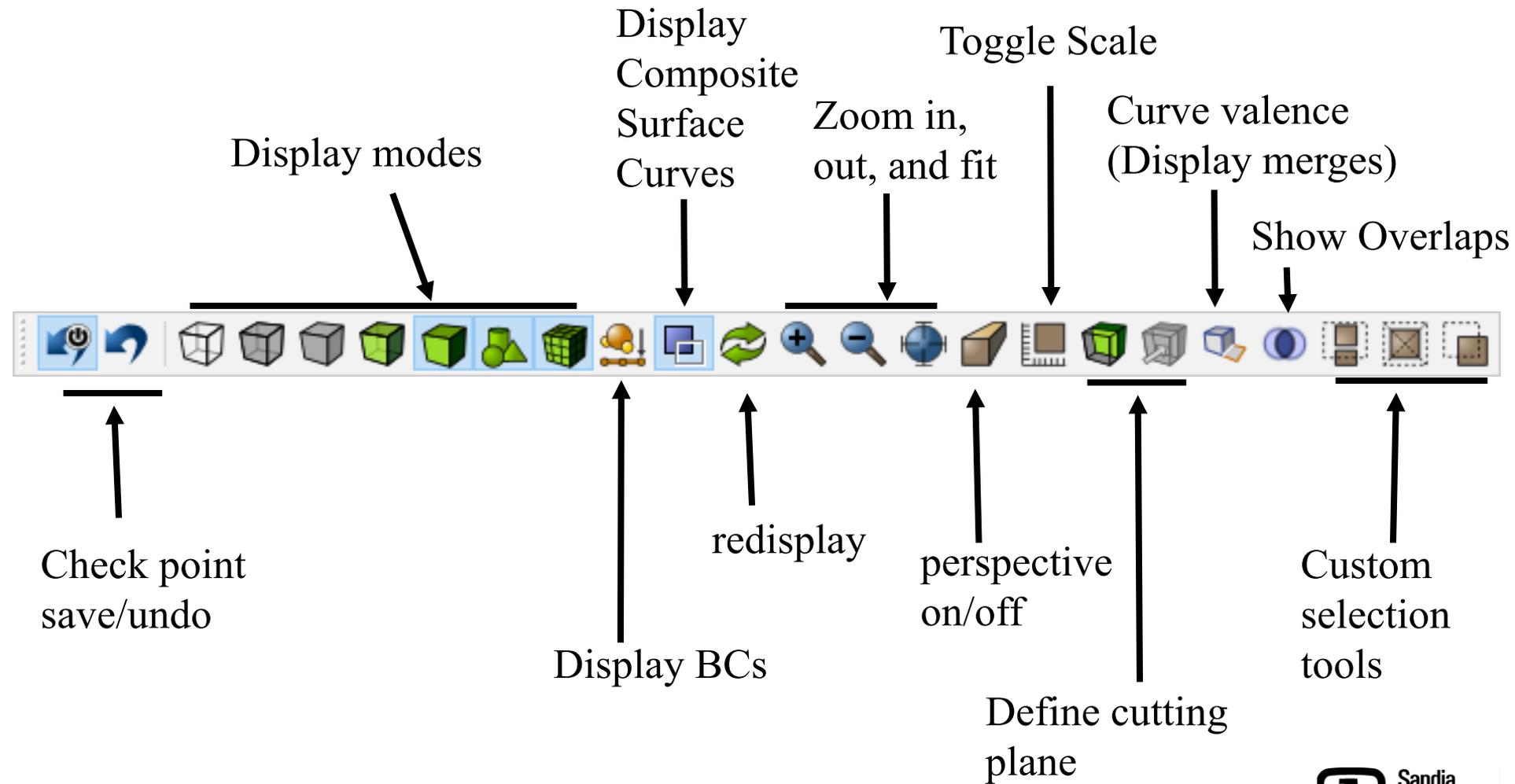
Notes in the dialog:

- Note: Use Zoom + Control to perform a zoom box.
- Note: Mac users substitute "Command" for "Control".
- Emulate Command Line Settings

Buttons: Save, Close

Display Tool Bar

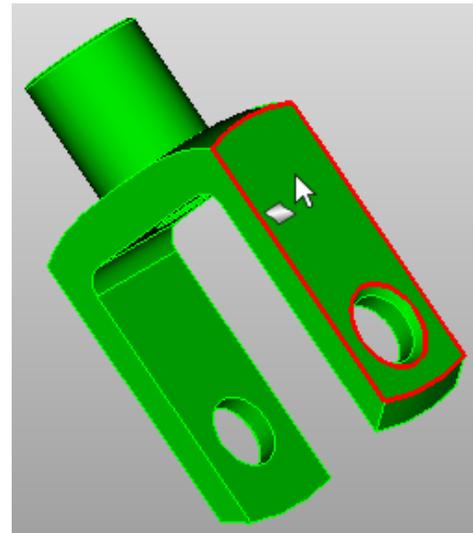
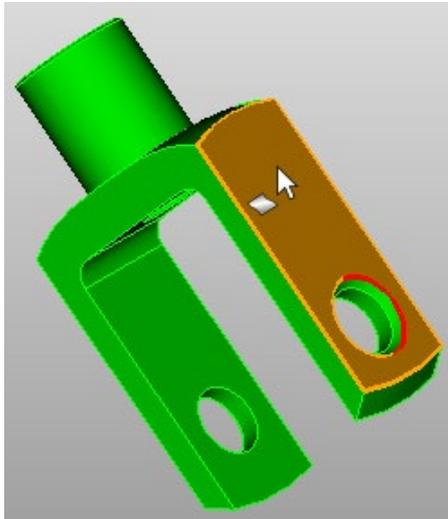
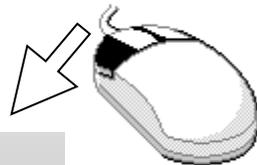
Simulation Modeling Sciences



Selecting Entities in the Graphics Window

Simulation Modeling Sciences

To select an entity, click and release the left mouse button. Entity is selected when the button is released.

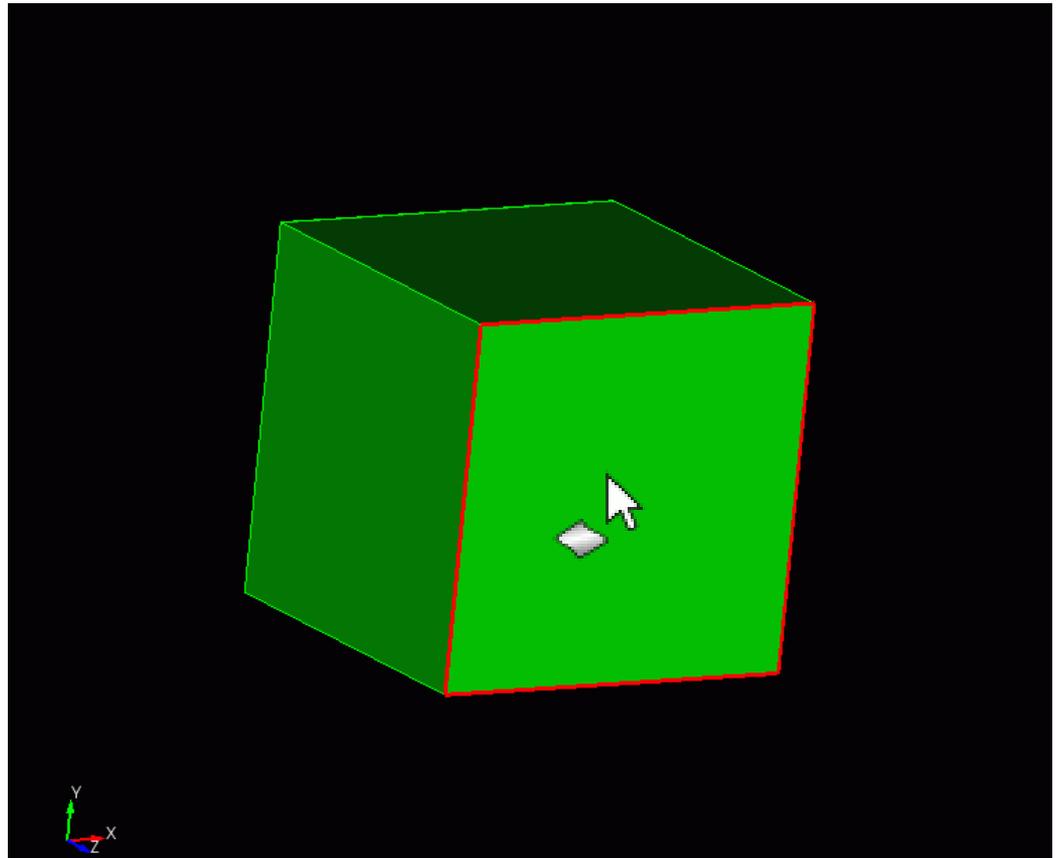


Pre-selection filter highlights the current geometry that would be selected on a mouse click. The cursor style indicates the entity type that will be selected.

Selecting Surfaces in the Graphics Window

Simulation Modeling Sciences

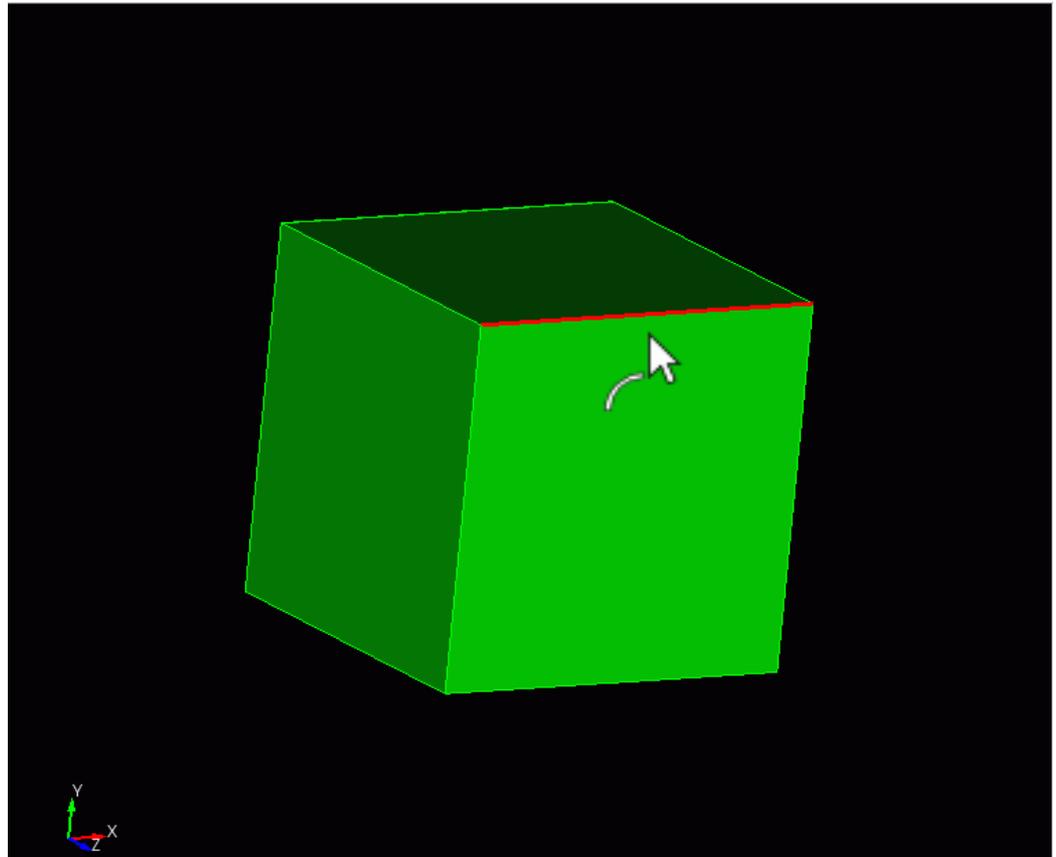
Move cursor to a surface.
The bounding curves of
the surface are
highlighted and cursor
indicates surface type.



Selecting Curves in the Graphics Window

Simulation Modeling Sciences

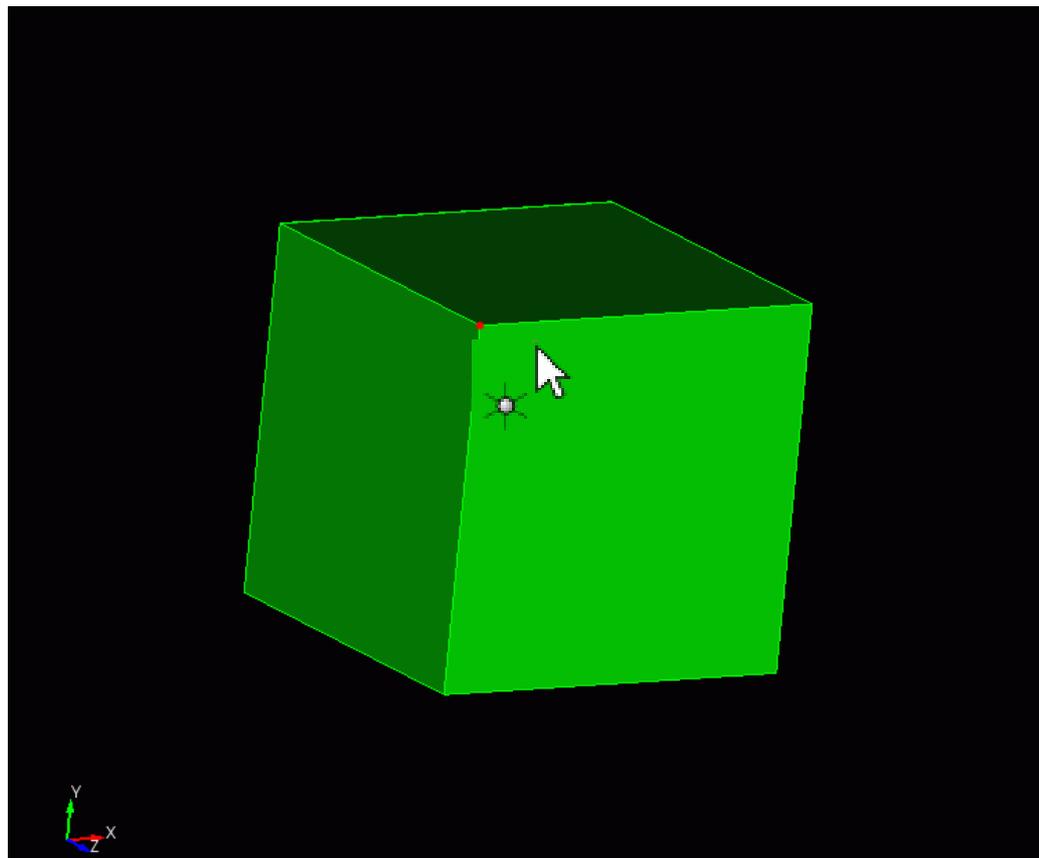
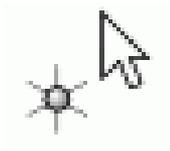
Move the cursor to a curve. The curve is highlighted and the cursor indicates curve type.



Selecting Vertices in the Graphics Window

Simulation Modeling Sciences

Move the cursor to a vertex. The vertex is highlighted and the cursor indicates vertex type.



Selecting Other Entities in the Graphics Window

Simulation Modeling Sciences



- Volumes, can be selected by **double clicking on surfaces**



- Hex Elements



- Tet Elements



- Quad Elements



- Tri Elements



- Element Edges



- Nodes



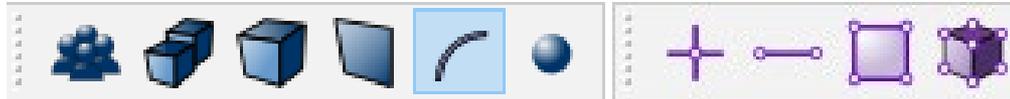
- Groups



- Bodies

Entity Selection Filter

Simulation Modeling Sciences

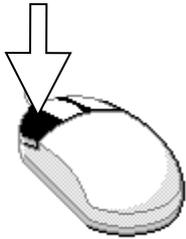


- **Toolbar buttons toggle entity types that will be included in pre-selection**
- **Default**
 - Volume
 - Surface
 - Curve
 - Vertex
- **Active ID Input field “hijacks” pre-selection so that only the expected entity type is selectable**

Pop-Up Menu with Selection

Simulation Modeling Sciences

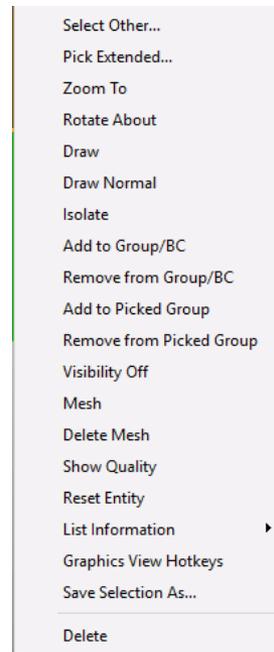
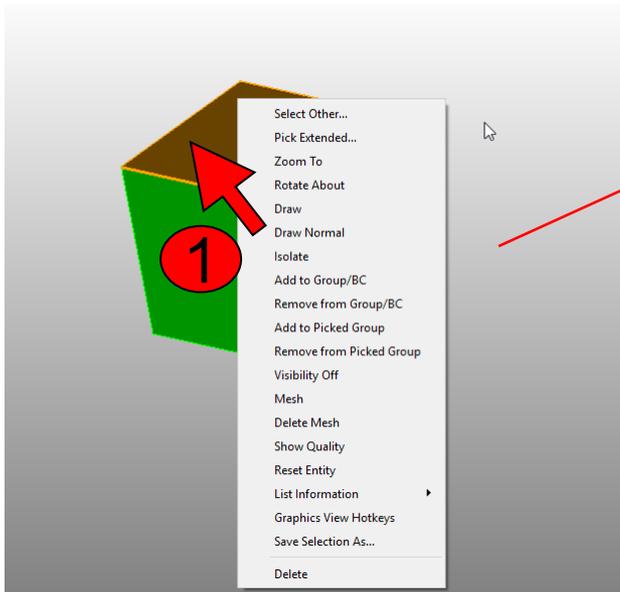
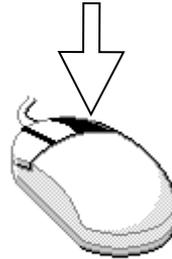
1



Select an entity in the graphics window
(Hold Ctrl key to make multiple selections)

2

Right Click



Right Click Menu options

Select Other: Cycles through nearby entities

Pick Extended: show the pick extended dialog

Zoom To: zoom to selected entity and set the entity's centroid as current spin center.

Draw: Draw the selected entity

Visibility Off: Turn the visibility of the current entity off

Measure: Measure between two selected entities (two entities must be selected)

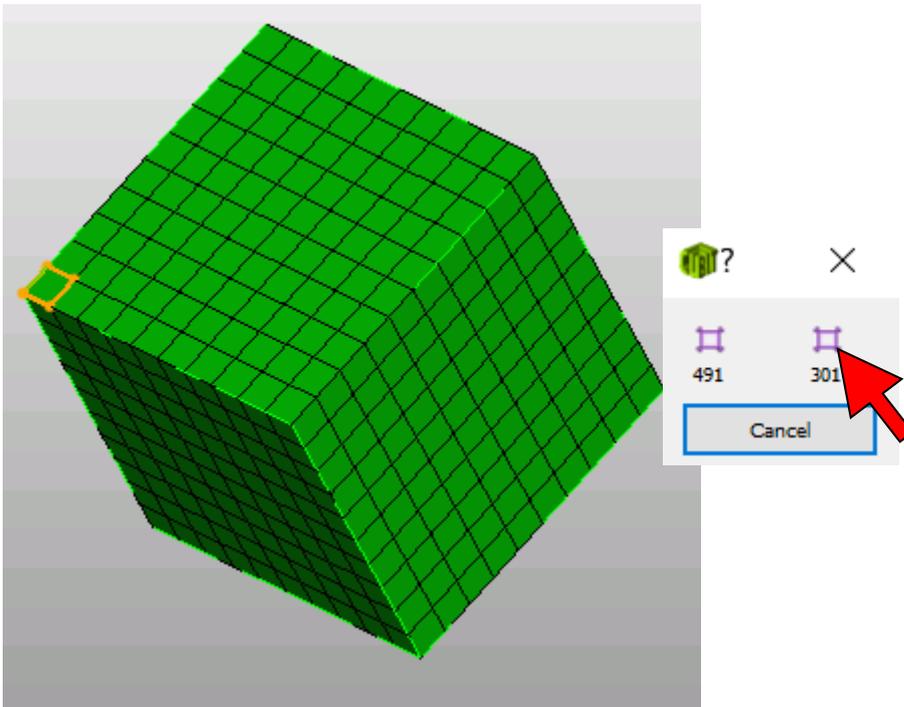
Reset Entity: Resets the scheme and sizing information to the default

List Information: List information for selected entities in the command window

Delete: Delete the current selection

Select Other Menu

Simulation Modeling Sciences



From right click menu with active selection click on “Select Other”.

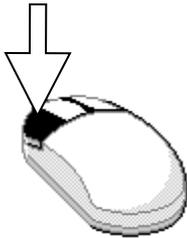
Presents other possible targets within the current pick radius. Entity is highlighted as the mouse passes over its button.

Pop-Up Menu Without Selection

Simulation Modeling Sciences

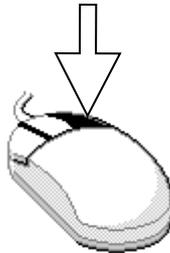
①

Pick in an open area of the graphics window



②

Right Click



Right Click Menu options

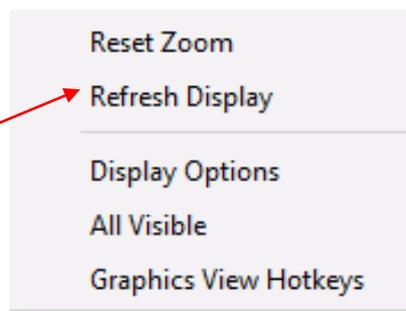
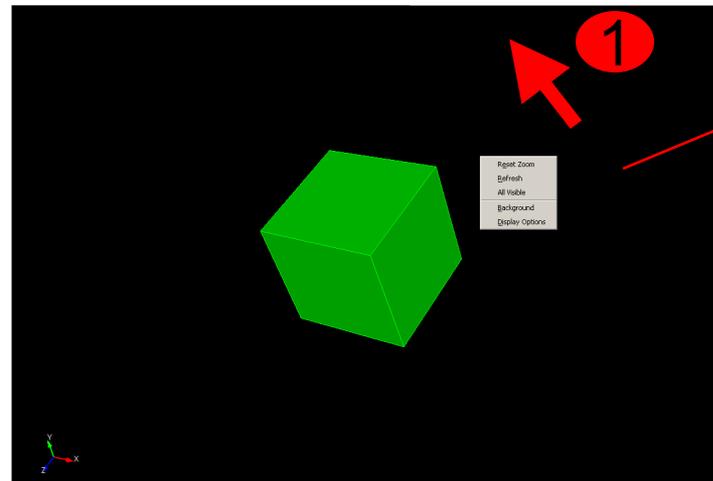
Reset Zoom: Set zoom to include all visible entities

Refresh Display: Refresh the display

Display Options: Set other display options (line width, text size...)

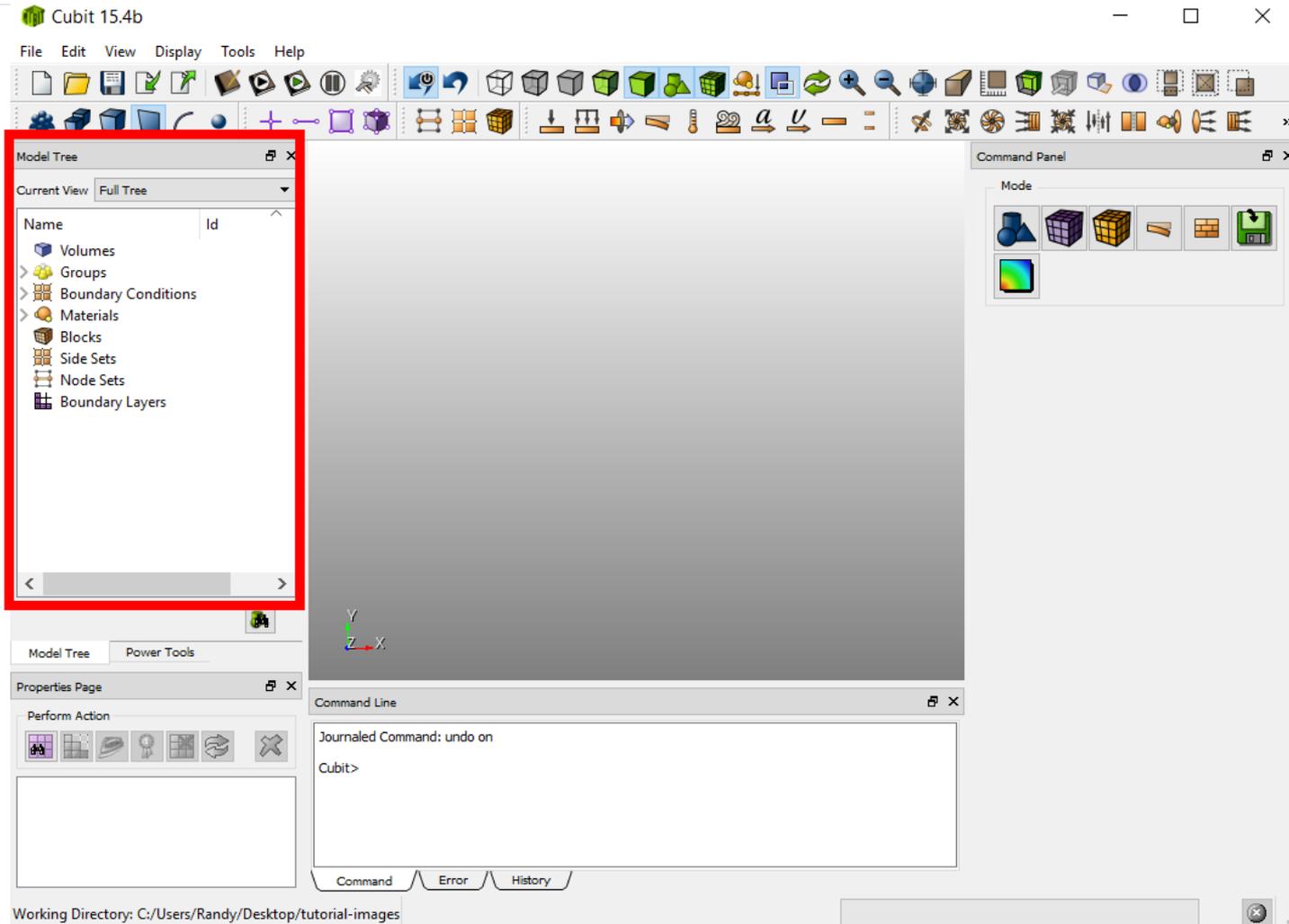
All Visible: Turn the visibility of the all entities on

Graphics View Hotkeys: shows map of all hotkeys



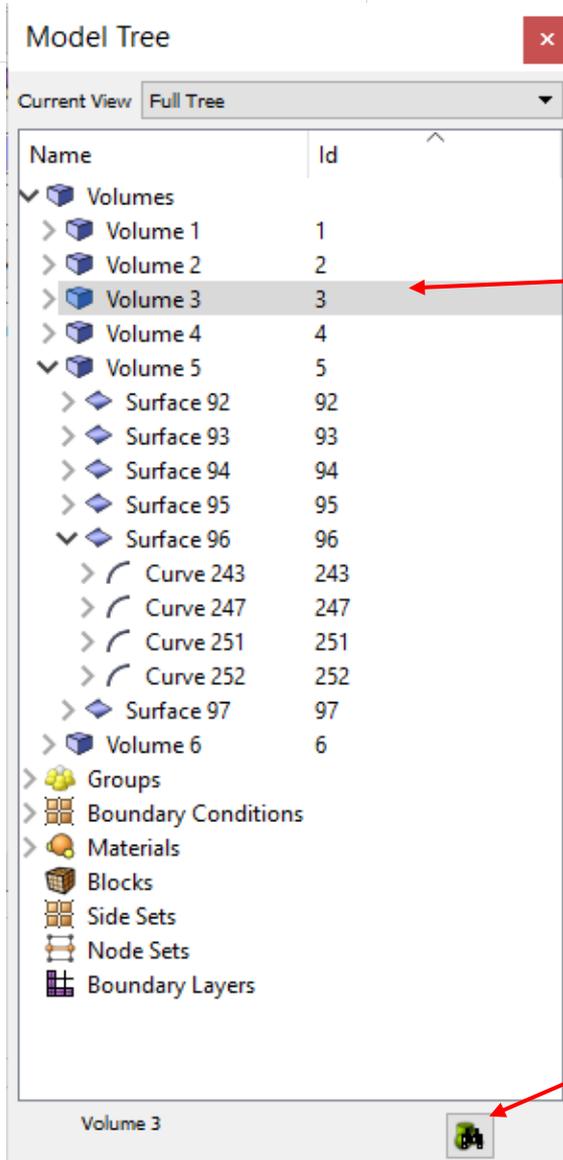
The Model Tree

Simulation Modeling Sciences



Using the Model Tree

Simulation Modeling Sciences



List Type

Current Selection

List View

Expand tree to show selected entity

Model Tree Options

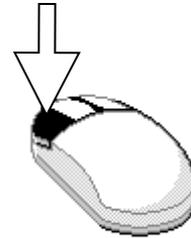
Model Tree

| Name | Id |
|-----------------------|-----|
| ✓ Volumes | |
| > Volume 1 | 1 |
| > Volume 2 | 2 |
| > Volume 3 | 3 |
| > Volume 4 | 4 |
| ✓ Volume 5 | 5 |
| > Surface 92 | 92 |
| > Surface 93 | 93 |
| > Surface 94 | 94 |
| > Surface 95 | 95 |
| ✓ Surface 96 | 96 |
| > Curve 243 | 243 |
| > Curve 247 | 247 |
| > Curve 251 | 251 |
| > Curve 252 | 252 |
| > Surface 97 | 97 |
| > Volume 6 | 6 |
| > Groups | |
| > Boundary Conditions | |
| > Materials | |
| Blocks | |
| Side Sets | |
| Node Sets | |
| Boundary Layers | |

- Zoom To
- Rotate About
- Fly Into
- Locate
- Draw
- Draw Elements
- Isolate
- Visibility Off
- Visibility On
- Rename
- Mesh
- Cleanup Volume
- Remesh Volume
- Delete
- Refresh Tree
- Collapse tree
- View Descendants
- View Ancestors
- View Neighbors

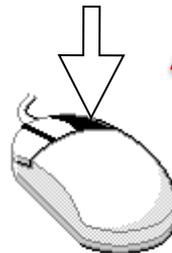
1

Select an entity in the tree



2

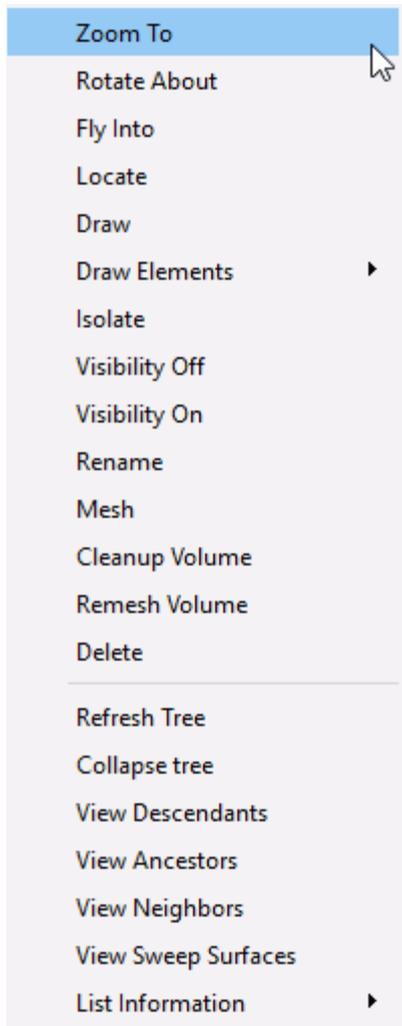
Right Click



- Zoom To
- Rotate About
- Fly Into
- Locate
- Draw
- Draw Elements
- Isolate
- Visibility Off
- Visibility On
- Rename
- Mesh
- Cleanup Volume
- Remesh Volume
- Delete
- Refresh Tree
- Collapse tree
- View Descendants
- View Ancestors
- View Neighbors
- View Sweep Surfaces
- List Information

Model Tree Options

Simulation Modeling Sciences



Right Click Menu options

Zoom To: zoom to selected entity and set the entities centroid as current spin center.

Rotate About: rotate using the selected entity as the center

Fly Into: slowly zoom into selected entity

Locate: point to the selected entity

Draw: draw the selected entity

Draw Elements: draw the mesh elements associated with selection

Isolate: draw and center the selected entity

Visibility On: Turn the visibility of the current entity on

Visibility Off: Turn the visibility of the current entity off

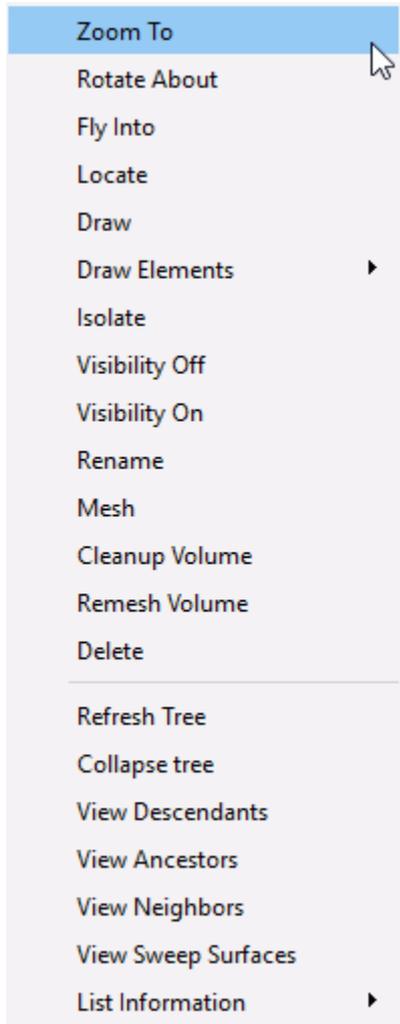
Measure: For curves only: Measure between the two vertices of the curve

Rename: Change the entity's name

Mesh: Mesh the selected entities

Model Tree Options

Simulation Modeling Sciences



Right Click Menu options

Cleanup Volume: execute cleanup hex/tet command on volume

Remesh Volume: execute tet remesh command on selection

Delete: delete the selected entity (volumes, free entities only)

Refresh Tree: reset the list to Full Tree

Collapse Tree: collapse all expanded items in the tree

View Descendants: show a tree with the current entity at the top expandable to show descendants (lower dimension)

View Ancestors: show a tree with the current entity at the top expandable to show ancestors (higher dimension)

View Neighbors: show a tree with the current entity at the top expandable to show all entities that are attached to it

View Sweep Surfaces: show a tree with only sweep surfaces shown

List Information: List properties of the selected entities in the command window.

The Properties Page

Simulation Modeling Sciences

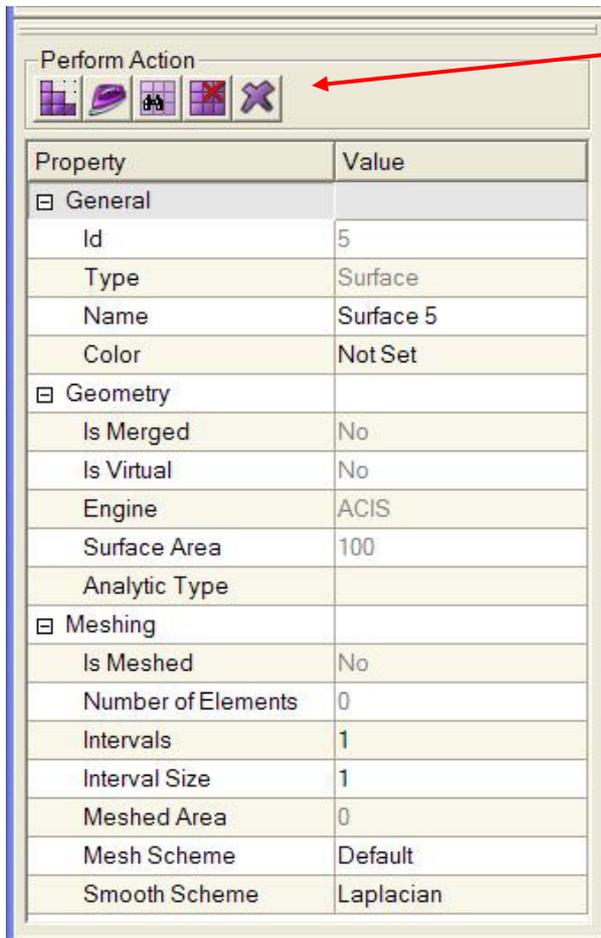
The screenshot displays the CUBIT 15.4b software interface. At the top, the title bar reads "Cubit 15.4b" and the menu bar includes "File", "Edit", "View", "Display", "Tools", and "Help". Below the menu bar is a comprehensive toolbar with various icons for file operations, modeling, and simulation. The main workspace is divided into several panels:

- Model Tree:** Located on the left, it shows a hierarchical view of the model with categories like Volumes, Groups, Boundary Conditions, Materials, Blocks, Side Sets, Node Sets, and Boundary Layers.
- Command Panel:** Located on the right, it contains a "Mode" section with icons for different modeling operations.
- Properties Page:** Located at the bottom left, this window is highlighted with a red box. It features a "Perform Action" section with several icons and a large empty text area below it.
- Command Line:** Located at the bottom right, it shows the command history, including "Journaled Command: undo on" and "Cubit>".

At the bottom of the window, the "Working Directory" is shown as "C:/Users/Randy/Desktop/tutorial-images".

Using the Properties Page

Simulation Modeling Sciences



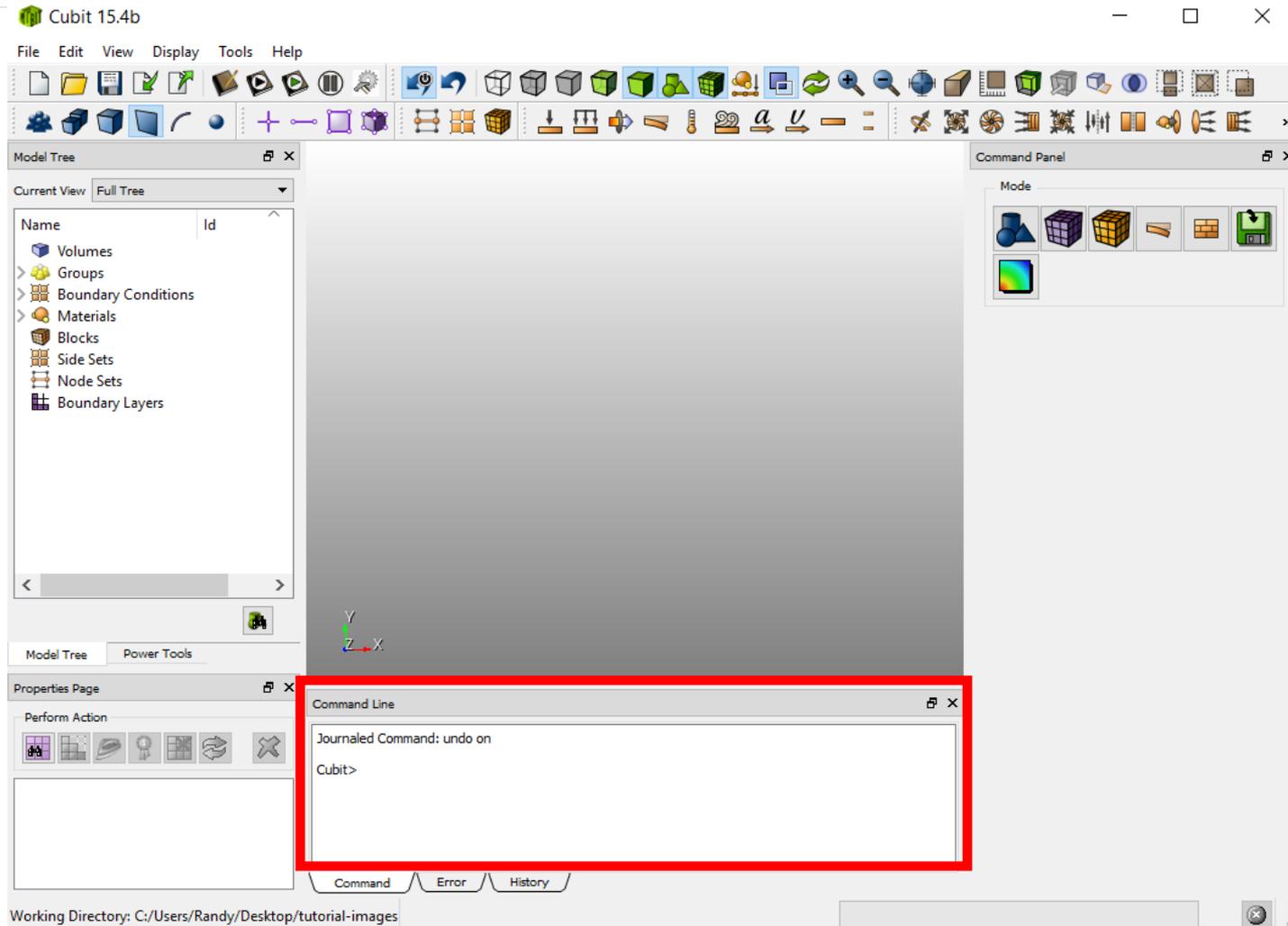
Action Buttons

- Mesh
- Smooth
- Preview
- Delete Mesh
- Delete Entity

Entity properties. Grayed properties cannot be edited. Others can be changed from this page.

The Command Window

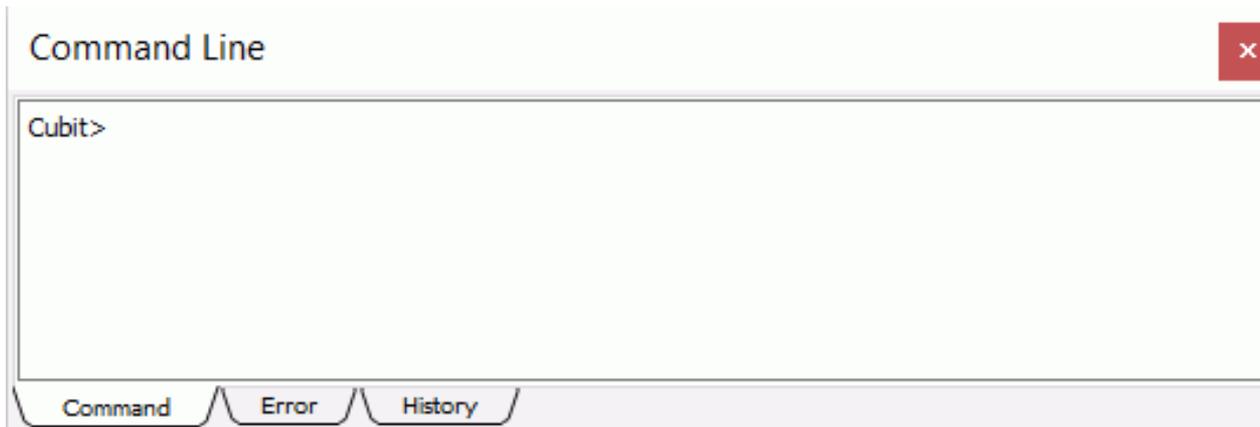
Simulation Modeling Sciences



Entering Commands

Simulation Modeling Sciences

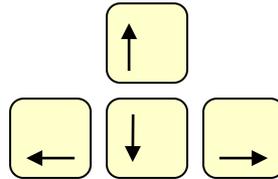
- **All commands can be entered in the command window**
- **Partial words OK**
- **Can use general ID ranges**
 - draw curve 1 to 5 except 4
 - draw curve in volume 2



Repeating Commands

Simulation Modeling Sciences

Use the keyboard up and down arrows to see the previously executed commands



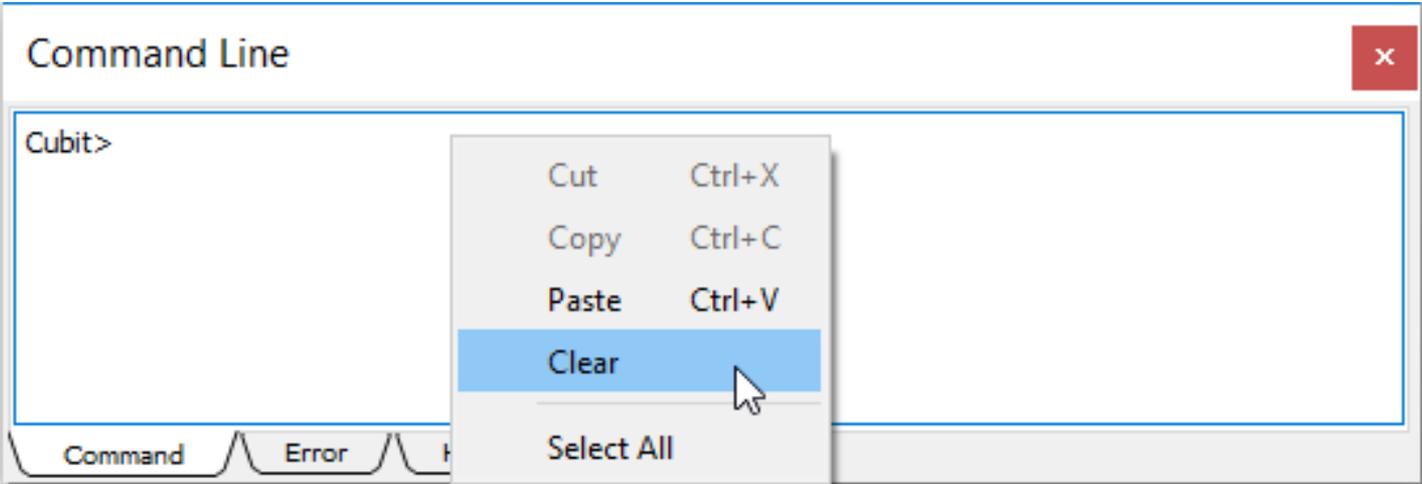
You can also select a previous command, right-click and choose copy/paste



The Command Menu

Simulation Modeling Sciences

Right click in the Command window to view the command menu





Command Syntax Help

Simulation Modeling Sciences

- After entering part of a command, type ‘?’
Lists commands that start with what has been typed, respecting word order

```
CUBIT> create?
```

- Type help followed by keywords
Lists all commands that use the listed keywords in any order

```
CUBIT> help create vertex
```

- Command syntax meaning
 - { } - At least one of the items in curly braces must be included in the command
 - [] - Items inside square brackets are optional
 - <> - A parameter of some type is expected at the location of the pointed braces
 - | - Can be read as OR; separates options inside of braces



Echoing IDs to the Command Line

Simulation Modeling Sciences

- **Fill in IDs on the command line by picking**

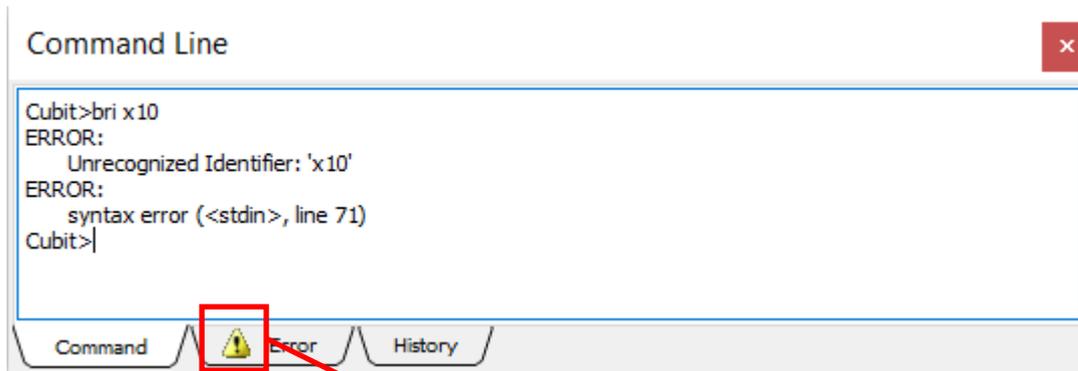
- Type the command up to the point where an ID is needed

```
CUBIT> draw surface
```

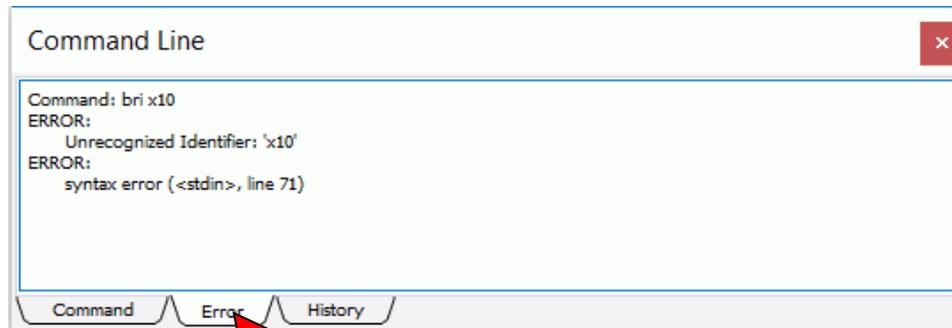
- Pick the entity with the mouse
- Type ‘e’ to echo the ID to the command window

```
CUBIT> draw surface 34
```

The Error Tab



Icon alerts user that an error has occurred

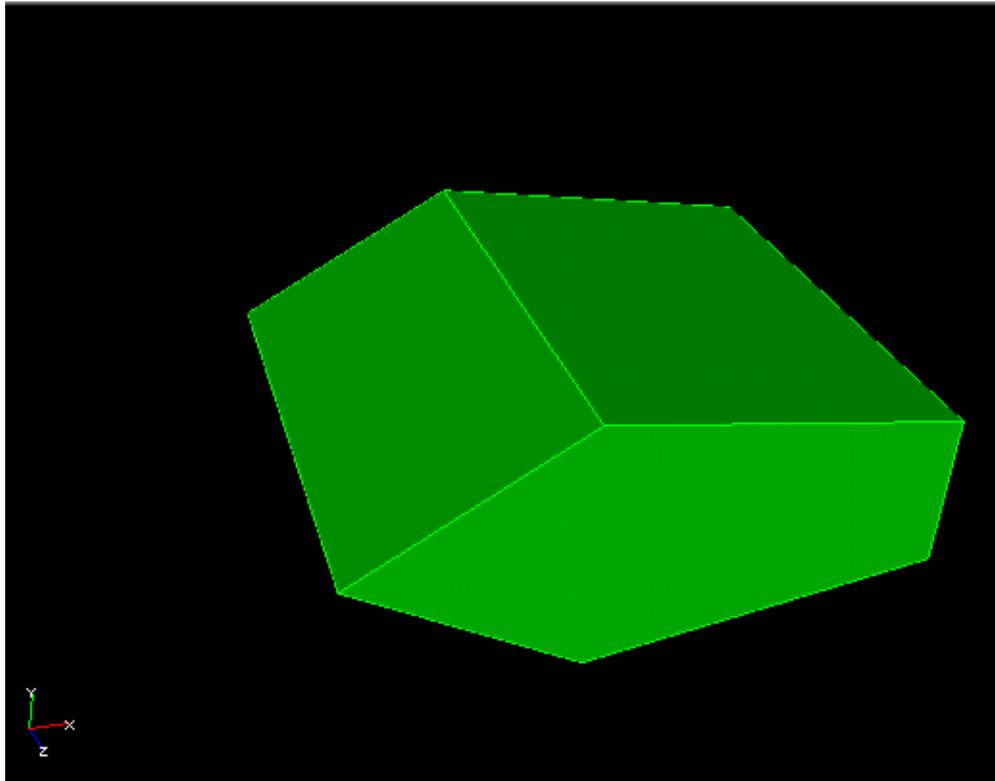


Click on the tab to see the error output

Exercise

Become Familiar with the Interface

Simulation Modeling Sciences



Practice

-Zoom, rotate, spin, pan

-Use the tool buttons to change mode and zoom



-Select different entity types



-Draw surface all except 1 from command line

```
CUBIT> draw surf all except 1
```