



Tips & Techniques for Working with Assemblies in I-deas NX Series

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UGS

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Tips and Techniques to...

- ▶ Decrease library retrieval time
- ▶ Simplify the display
- ▶ Create constraints and dimensions
- ▶ Organize the assembly hierarchy
- ▶ Interrogate the assembly
- ▶ Increase overall performance



Decrease Library Retrieval Time



Prune

- ▶ *Prune* is used to avoid retrieving items from the library
- ▶ **Pruned instances**
 - ▶ Are removed from display
 - ▶ Are not included in property calculations
 - ▶ Do participate in constraint network solves
 - ▶ Are not included in interference checks
 - ▶ Prune-Faceted is included in Facet Interference Check
- ▶ **GFL Options**
 - ▶ *Auto Prune Assembly / Drawing*

Get from Project Library

View: Assembly | 1 selected

Latest Version Only
 Top Assembly Only
 View Related Projects

Pend	Stat	Name	Type	Version	Part Number
		kelleys	PROJECT		
		Test...	LIBRARY		
		Toy Car Library	LIBRARY		
Ck		Toy Car Assembly	LIB ASSE	1	
rfl		Driver...	LIB ASSE	1	
rfl		Emergency Light Shaft and Sup	LIB ASSE	1	Step 11 - Bag
rfl		Emergency Light Stiffener Ass	LIB ASSE	1	
rfl		Emergency Light Support Struc	LIB ASSE	1	
rfl		Flashing Blue Light Assy...	LIB ASSE	1	
rfl		Front Bumper...	LIB ASSE	1	

Buttons: Check out, Copy, Update in Library..., **Options...**

Buttons: Reference, Clear, OK, Apply

I-DEAS GFL Options

Checkout Related Drawings:

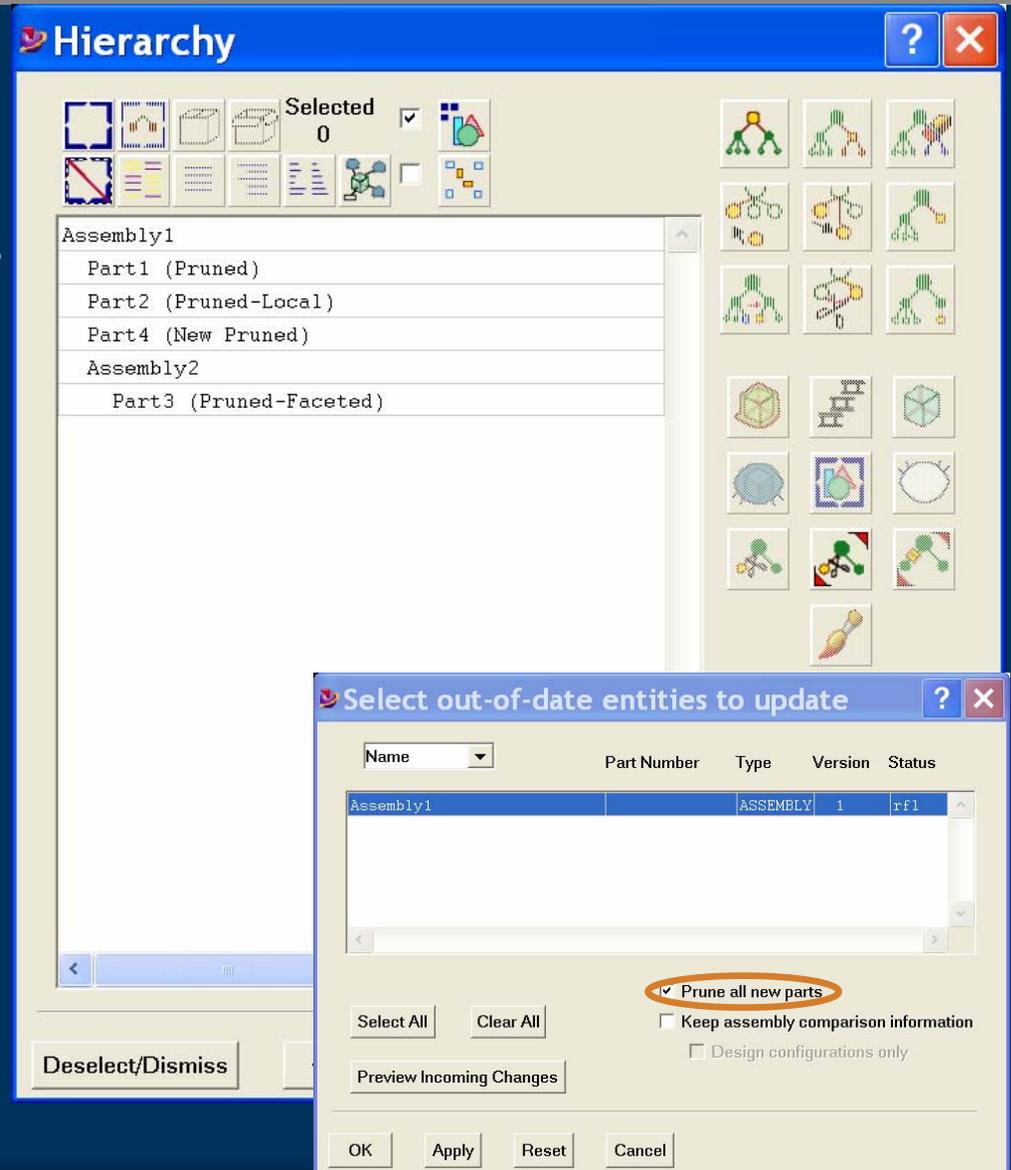
- No Related Drawings
- Reference Related Drawings
- Checkout Related Drawings

Auto Prune Assembly / Drawing
 Only Prune Parts with Facets

Buttons: OK, Cancel

Prune Status

- ▶ **Pruned**
 - ▶ Part is not in model file and has no faceted information stored for it
- ▶ **Pruned-Local**
 - ▶ Part exists in model file
- ▶ **New Pruned**
 - ▶ *Prune all new parts switch was on when assembly was updated from library*
- ▶ **Pruned-Faceted**
 - ▶ Faceted geometry for the instance has been stored with the assembly



The screenshot shows the NX Hierarchy window and the 'Select out-of-date entities to update' dialog box. The Hierarchy window displays a tree structure with the following items:

- Assembly1
 - Part1 (Pruned)
 - Part2 (Pruned-Local)
 - Part4 (New Pruned)
 - Assembly2
 - Part3 (Pruned-Faceted)

The 'Select out-of-date entities to update' dialog box shows a table with the following data:

Name	Part Number	Type	Version	Status
Assembly1		ASSEMBLY	1	rf1

The dialog box also has the following options:

- Prune all new parts
- Keep assembly comparison information
- Design configurations only

Buttons: Select All, Clear All, Preview Incoming Changes, OK, Apply, Reset, Cancel.

Decrease Library Retrieval Time



Unprune Selection Tools

- ▶ Invert Selection 
- ▶ Combined Total Size 
- ▶ Proximity Selection 
- ▶ Related To 

- Visible
- Label
- Filter...
- Area Options...
- Reconsider
- Deselect All
- Related To**
- History Access...
- Group Members...
- No Active View
- All
- Show
- Highlight Selection
- Backup Selection



The screenshot shows the 'Hierarchy' window in NX software. The window title is 'Hierarchy' and it has a blue header bar. Below the header is a toolbar with several icons, including a 'Selected' checkbox and a '1' indicator. The main area is a list of assembly components, with several items circled in orange: 'Black_1x1_Thin (Pruned)', 'Gray_4x2_Thin (Pruned)', 'Gray_Hybrid Shaft (Pruned-Faceted)', 'Black_16x1_Thick (Pruned)', 'Gray_Link Arm_Two Holes (Pruned)', 'Black_16x1_Thick (Pruned)', 'Black_Connector_3W (Pruned-Faceted)', 'Gray_Hybrid Shaft (Pruned-Faceted)', 'Black_Connector_3W (Pruned-Faceted)', 'Black_1x1_Thin (Pruned)', 'Gray_4x1_Thin (Pruned-Faceted)', 'Gray_4x1_Thin (Pruned-Faceted)', 'Front Gear Assy (Pruned-Local)...', 'Black_2x1_Thin (Pruned-Faceted)', 'Black_2x1_Thin (Pruned-Faceted)', 'Gray_2x1_Thin Smooth (Pruned)', 'Gray_2x1_Thin Smooth (Pruned)', 'Steering Support Assy (Pruned-Local)...', 'Steering Knuckle Assy - Left Side (Pruned-Local)...', 'Steering Assy (Pruned-Local)...', 'Gray_4x2_Thin (Pruned)', 'Gray_Link Arm_Two Holes (Pruned)', 'Emergency Light Shaft and Support (Pruned-Local)...', 'Emergency Light Support Structure (Pruned-Local)...', 'Black_4x1_Thin (Pruned-Faceted)'. The list is scrollable and has a search bar at the bottom. At the bottom of the window are buttons for 'Deselect/Dismiss', '<>', and 'Dismiss'.

Pruned Instances Display

▶ No Display

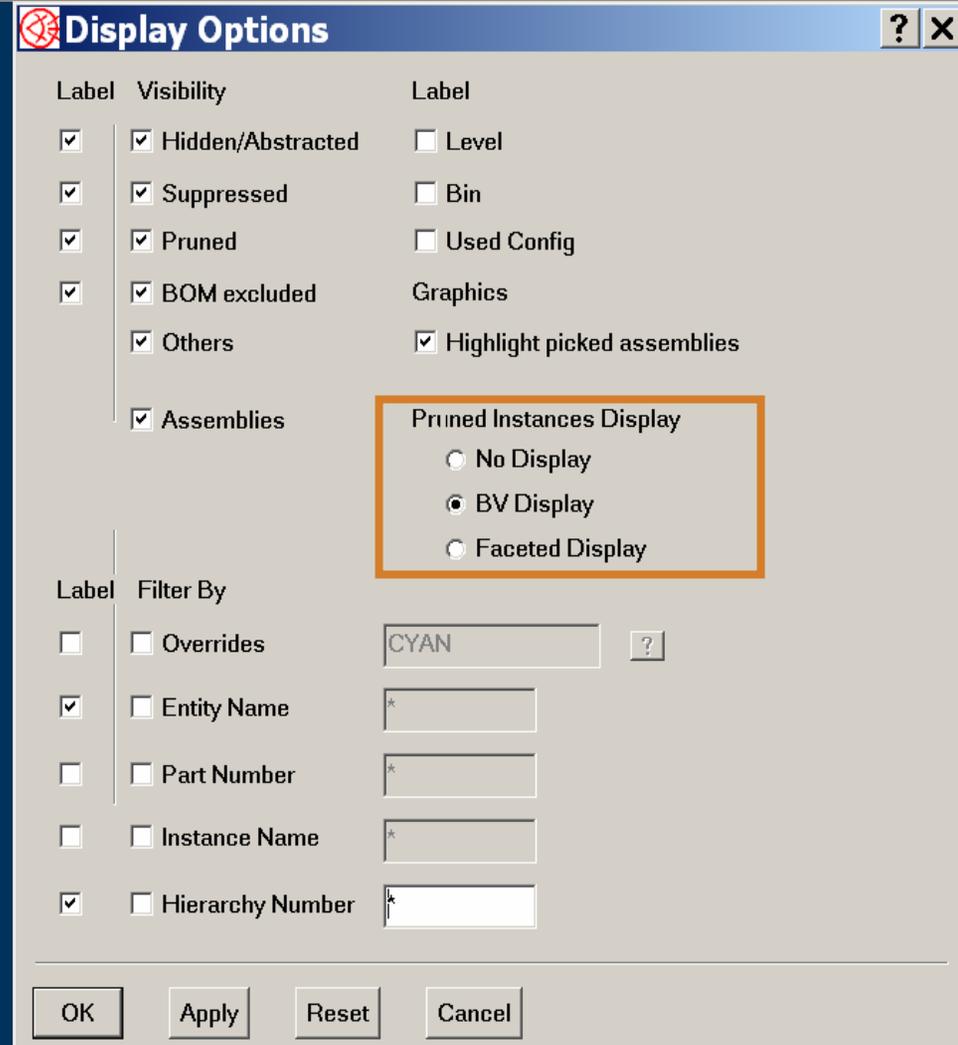
- ▶ Instance is removed from the display

▶ BV Display

- ▶ Bounding volume of instance is displayed

▶ Faceted Display

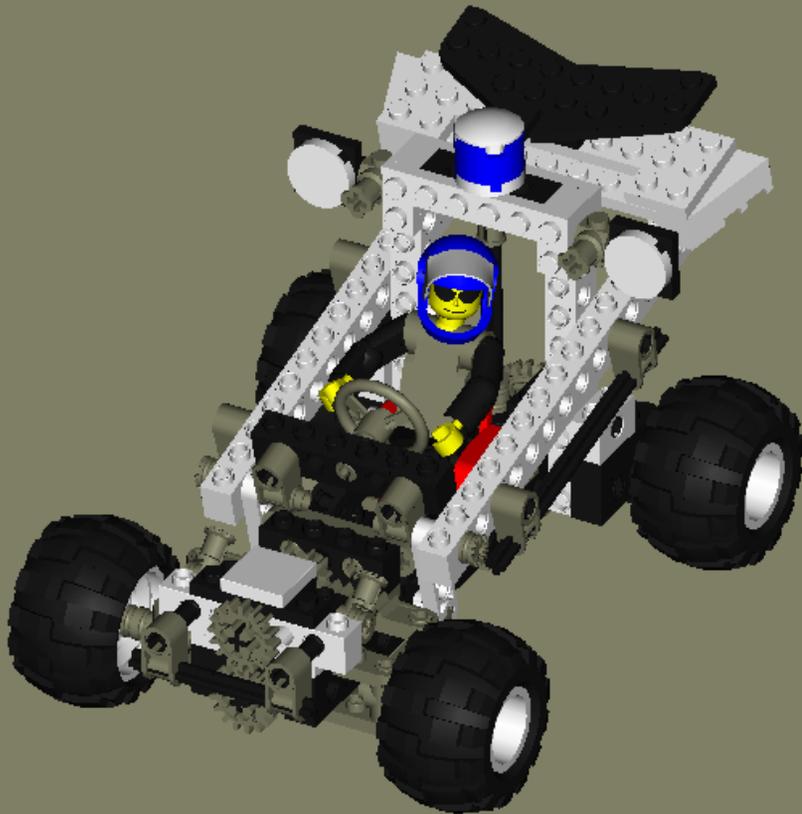
- ▶ Faceted model of instance is displayed if available



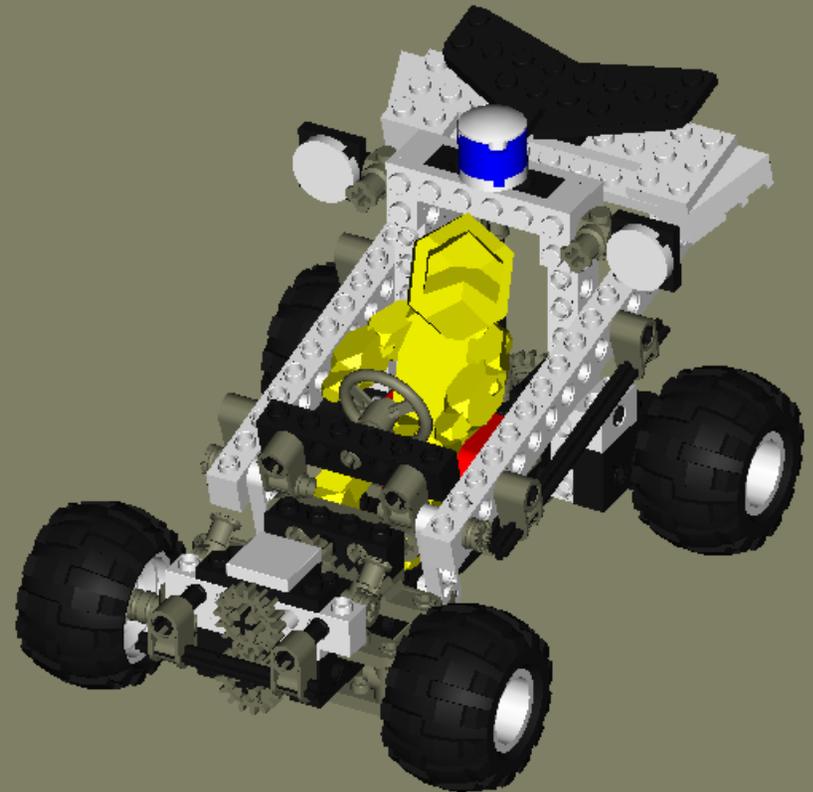
Label	Visibility	Label
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Hidden/Abstracted	<input type="checkbox"/> Level
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Suppressed	<input type="checkbox"/> Bin
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Pruned	<input type="checkbox"/> Used Config
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> BOM excluded	Graphics
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Others	<input checked="" type="checkbox"/> Highlight picked assemblies
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Assemblies	Pruned Instances Display
		<input type="radio"/> No Display
		<input checked="" type="radio"/> BV Display
		<input type="radio"/> Faceted Display
Label	Filter By	
<input type="checkbox"/>	<input type="checkbox"/> Overrides	CYAN ?
<input checked="" type="checkbox"/>	<input type="checkbox"/> Entity Name	*
<input type="checkbox"/>	<input type="checkbox"/> Part Number	*
<input type="checkbox"/>	<input type="checkbox"/> Instance Name	*
<input checked="" type="checkbox"/>	<input type="checkbox"/> Hierarchy Number	*

OK Apply Reset Cancel

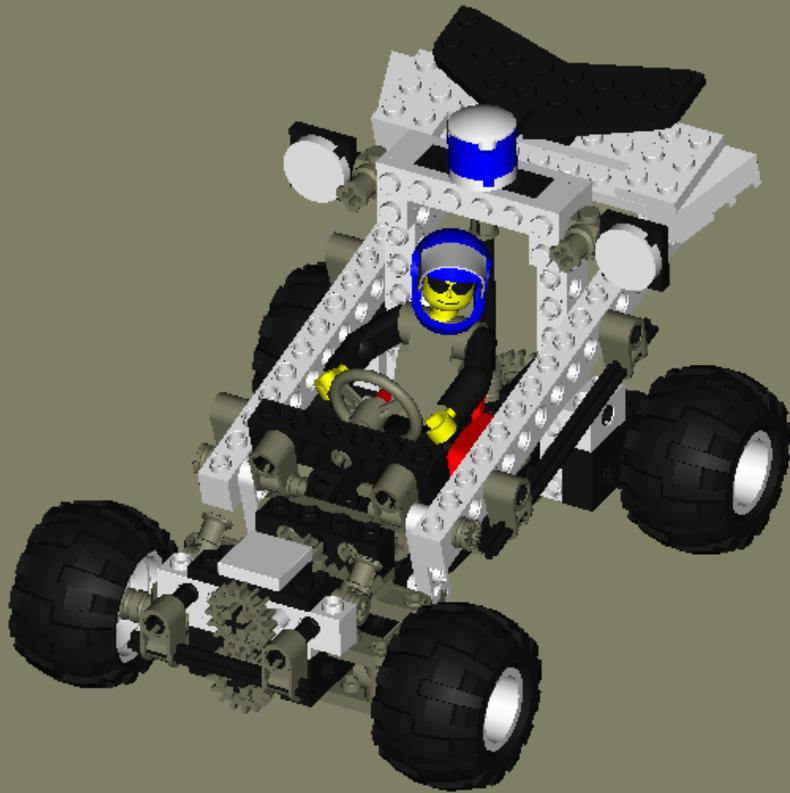
All Unpruned



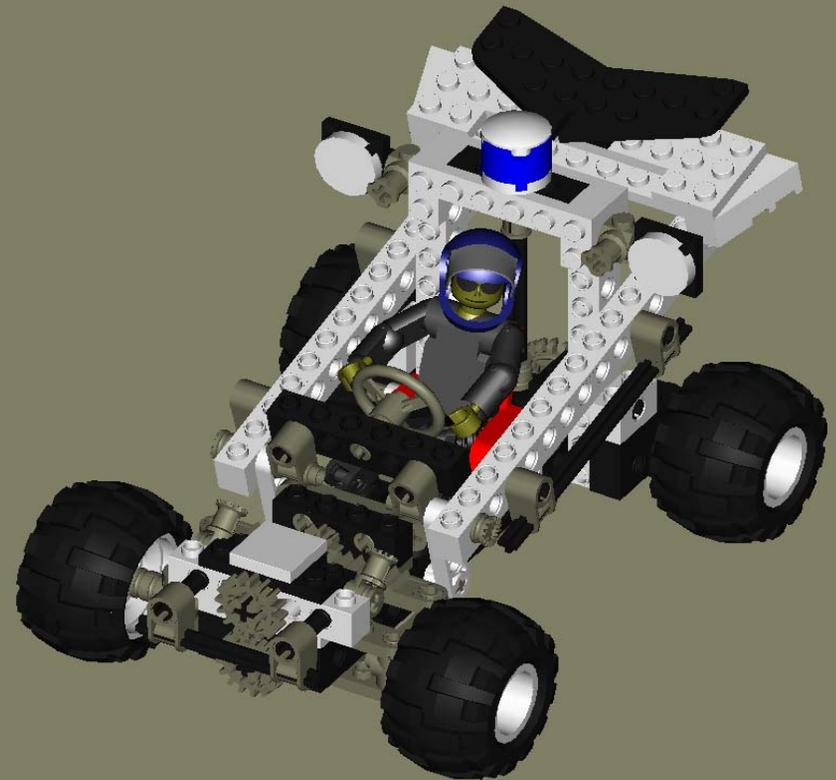
Driver Assembly Pruned
BV Display



All Unpruned



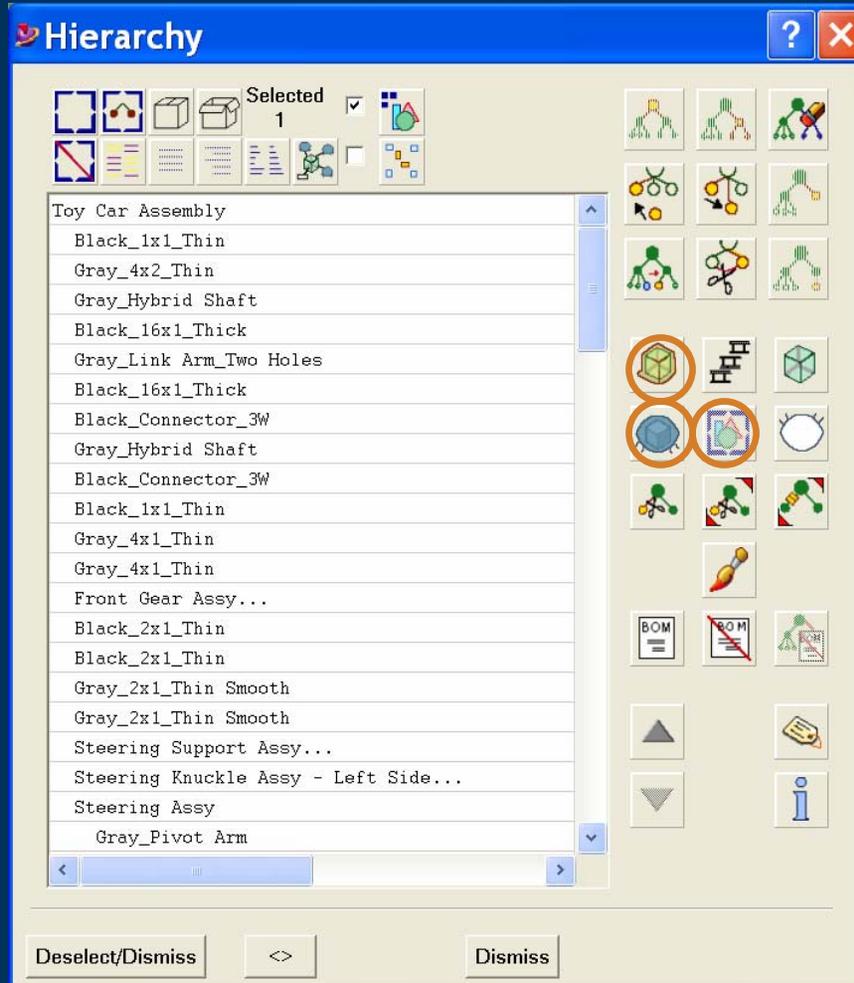
Driver Assembly Pruned
Faceted Display





Suppress

- ▶ Removed from display
- ▶ Does not participate in constraint network solves
- ▶ Is not included in property calculation or interference checks
- ▶ Is not shown in drawing views
- ▶ May be included or excluded in BOM



Abstract

- ▶ Choose part geometry or annotation to display



Hide

- ▶ Removed from display
- ▶ Participates in constraint network solves
- ▶ Included in property calculation and interference checks
- ▶ Shown in drawing views
- ▶ Is included in the BOM by default

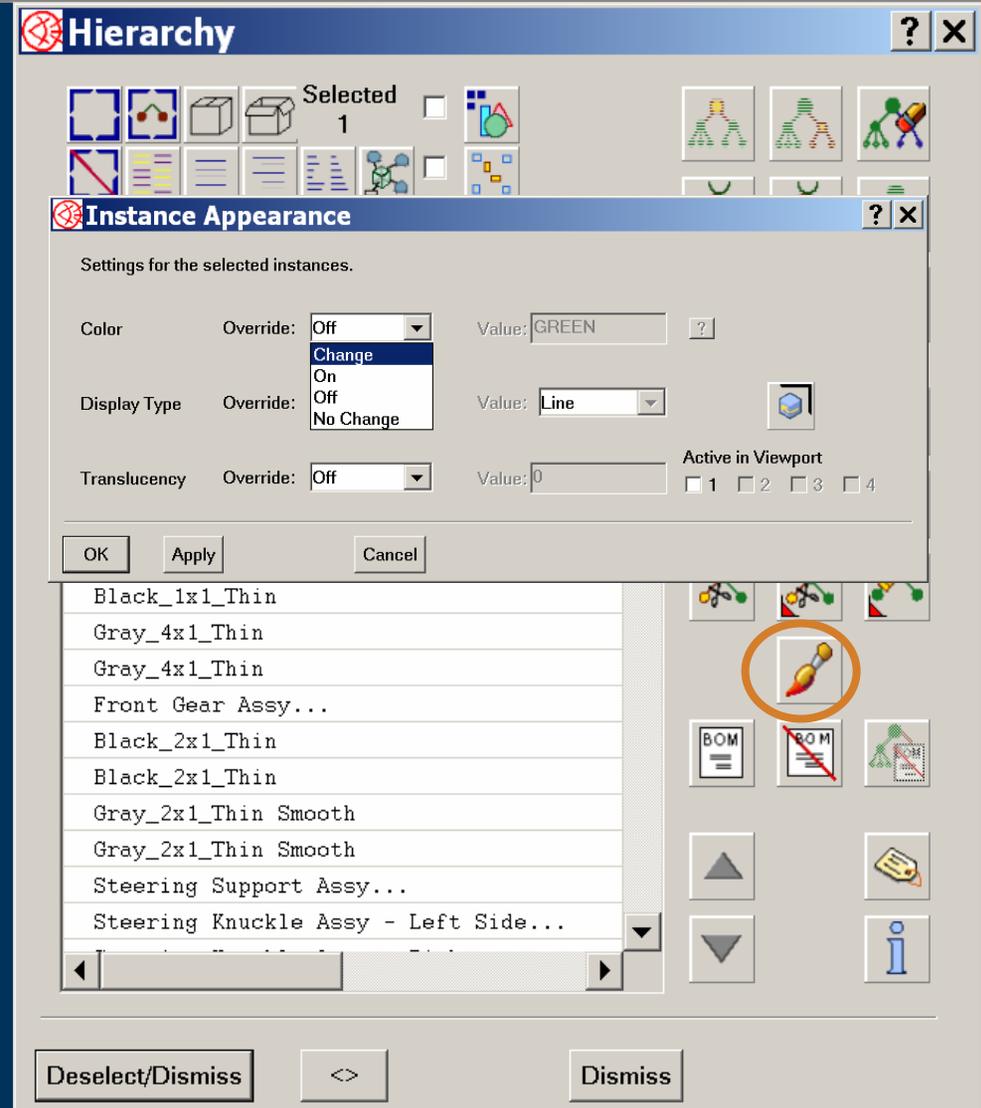
Instance Appearance

▶ The following part instance appearance attributes can be modified without affecting the part:

▶ Color

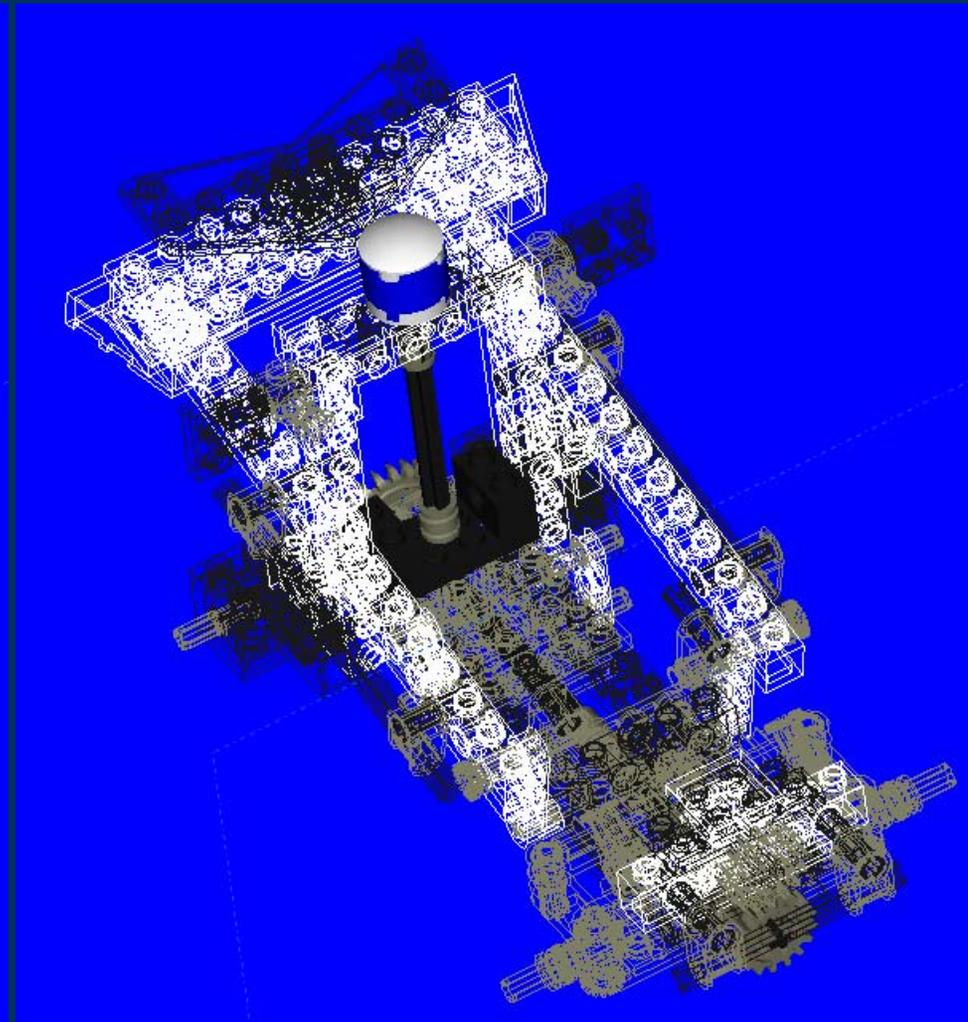
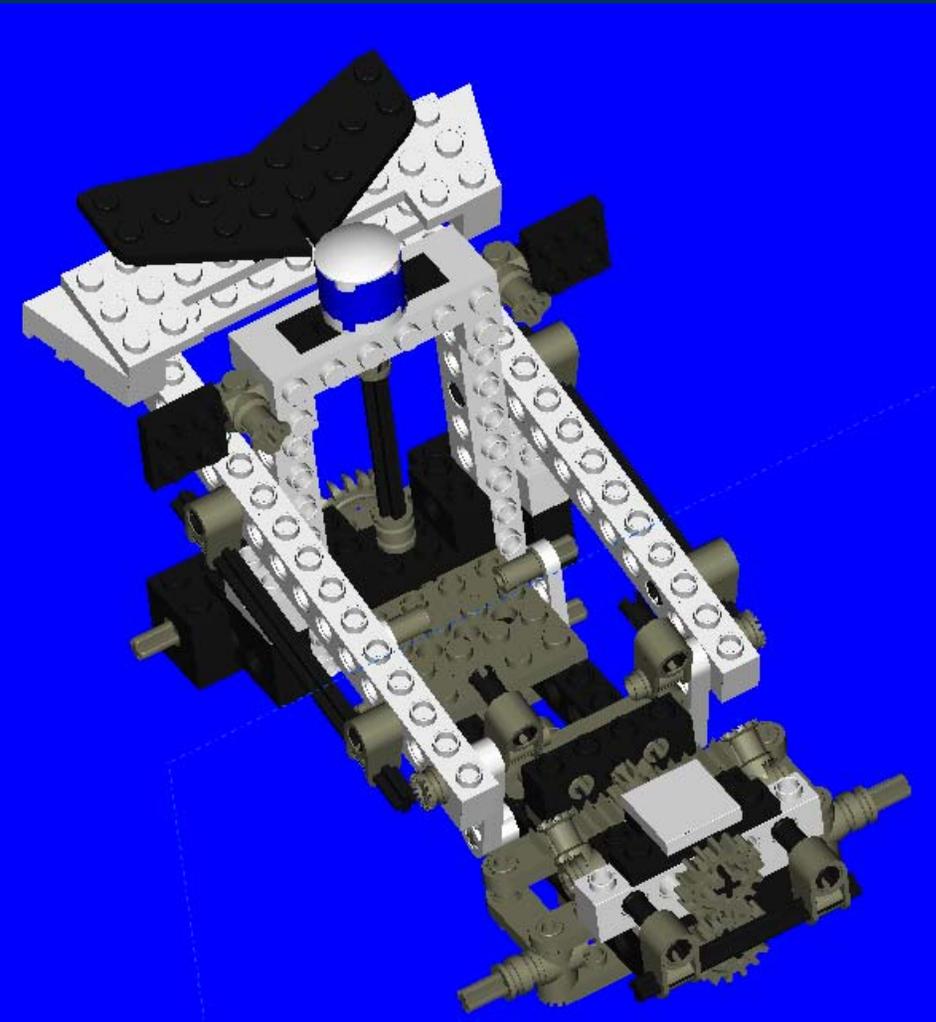
▶ Display Type

▶ Translucency



Shaded Display

Mixed Mode Display



Organize the Assembly Hierarchy



Hierarchy Tools

► Pack  and Unpack 

► Sort 

► Up and Down 

The screenshot shows the 'Hierarchy' dialog box with a list of assembly components. A 'Sort' dialog box is overlaid on top, showing sorting options. In the 'Sort' dialog, the 'Sort by' dropdown is set to 'Entity Name', and the 'Then by' dropdown is set to '(none)'. The 'Sort by' dropdown is also open, showing options: '(none)', 'Instance Name', and 'Hierarchy Id'. In the 'Hierarchy' dialog, the 'Up' and 'Down' arrow buttons are circled in orange. In the 'Sort' dialog, the 'OK', 'Apply', 'Reset', and 'Cancel' buttons are visible. The 'Hierarchy' dialog also has a 'Selected' checkbox and a '1' indicator. The 'Sort' dialog has a 'Sort by' dropdown and two 'Then by' dropdowns, each with 'Ascending' and 'Descending' radio buttons. The 'Hierarchy' dialog has a list of components including 'Toy Car Assy', 'Black_1x1_Thin', 'Gray_4x2_Thin', 'Gray_Hybrid Shaft', 'Black_16x1_Thick', 'Gray_Link Arm_Two Holes', 'Black_16x1_Thick', 'Black_Connector_3W', 'Gray_Hybrid Shaft', 'Black_Connector_3W', 'Black_1x1_Thin', 'Gray_4x1_Thin', 'Gray_4x1_Thin', 'Front Gear Assy...', 'Black_2x1_Thin', 'Black_2x1_Thin', 'Gray_2x1_Thin Smooth', 'Gray_2x1_Thin Smooth', 'Steering Support Assy...', and 'Steering Knuckle Assy - Left Side...'. The 'Sort' dialog has 'OK', 'Apply', 'Reset', and 'Cancel' buttons. The 'Hierarchy' dialog has 'Deselect/Dismiss' and 'Dismiss' buttons. The 'Sort' dialog has a 'Sort by' dropdown and two 'Then by' dropdowns, each with 'Ascending' and 'Descending' radio buttons. The 'Hierarchy' dialog has a 'Selected' checkbox and a '1' indicator. The 'Sort' dialog has a 'Sort by' dropdown and two 'Then by' dropdowns, each with 'Ascending' and 'Descending' radio buttons. The 'Hierarchy' dialog has a list of components including 'Toy Car Assy', 'Black_1x1_Thin', 'Gray_4x2_Thin', 'Gray_Hybrid Shaft', 'Black_16x1_Thick', 'Gray_Link Arm_Two Holes', 'Black_16x1_Thick', 'Black_Connector_3W', 'Gray_Hybrid Shaft', 'Black_Connector_3W', 'Black_1x1_Thin', 'Gray_4x1_Thin', 'Gray_4x1_Thin', 'Front Gear Assy...', 'Black_2x1_Thin', 'Black_2x1_Thin', 'Gray_2x1_Thin Smooth', 'Gray_2x1_Thin Smooth', 'Steering Support Assy...', and 'Steering Knuckle Assy - Left Side...'. The 'Sort' dialog has 'OK', 'Apply', 'Reset', and 'Cancel' buttons. The 'Hierarchy' dialog has 'Deselect/Dismiss' and 'Dismiss' buttons.



Tips

- ▶ Create relationship at lowest level possible
- ▶ Lock one instance to the assembly and constrain other instances to it
- ▶ As much as possible, constrain one instance before moving onto the next
- ▶ Use parallel, perpendicular, and coincident instead of equivalent angular or linear dimension
- ▶ Constrain to most persistent geometry
 - ▶ Ref geometry
 - ▶ Surfaces
 - ▶ Centerlines
 - ▶ Edges
 - ▶ Vertices



Tips

- ▶ Apply largest degree of freedom (DOF) constraint or dimension first
- ▶ Create relationships with direction intent or that have the Flip option available during creating
- ▶ Remove inconsistent dimensions and constraints
- ▶ Remove unnecessary redundant dimensions and constraints, but remember that some redundant constraints are useful
- ▶ Resolve any missing geometry constraints and dimensions
- ▶ Use Find Problems in Relations Browser to find and resolve any problematic constraint loops

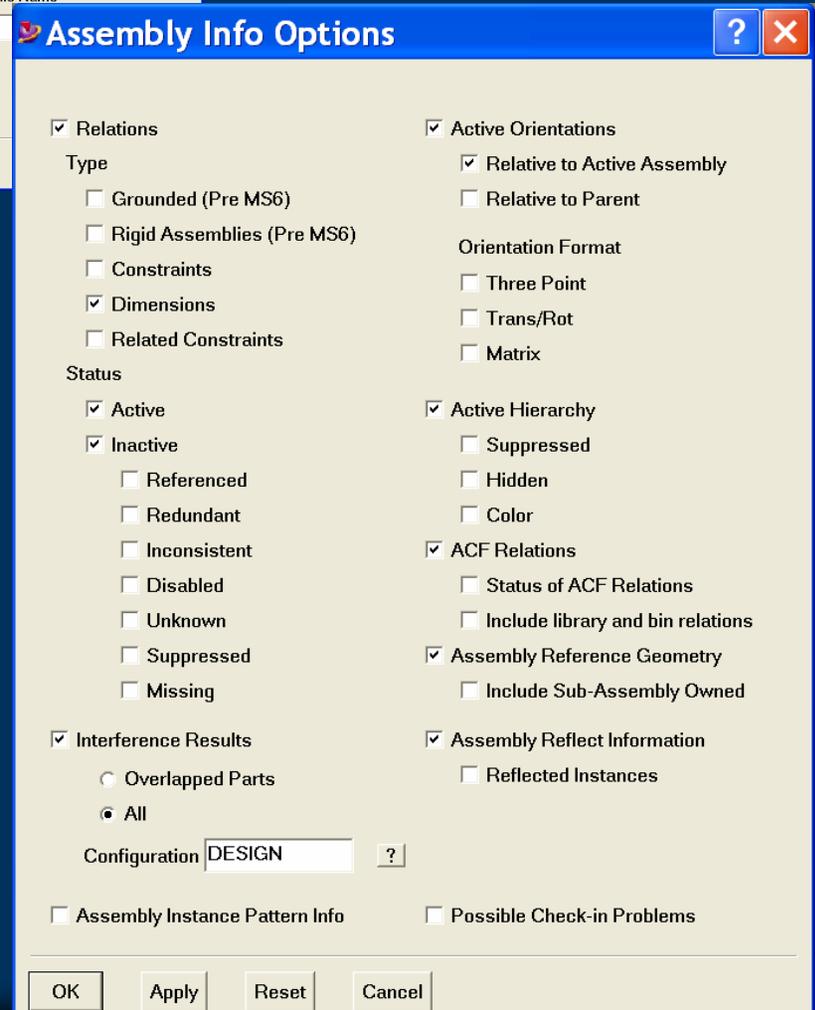
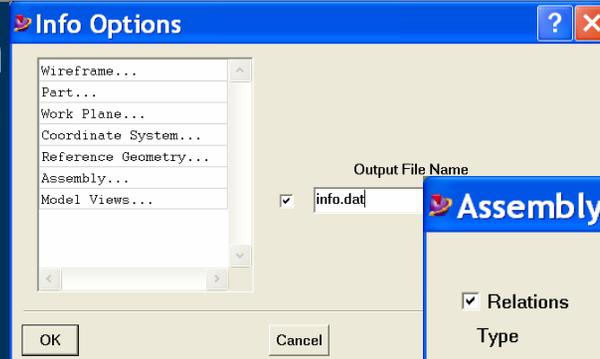


Interrogate the Assembly



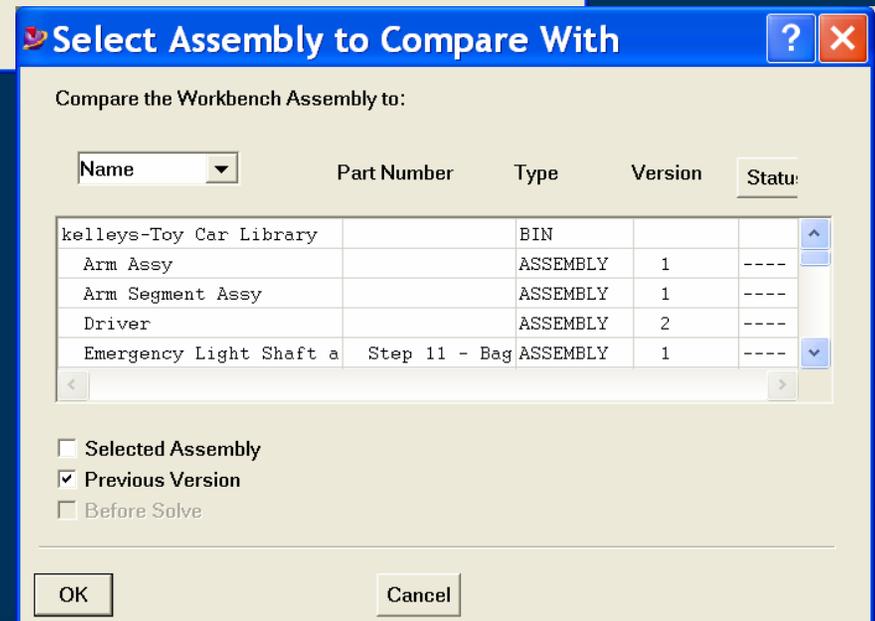
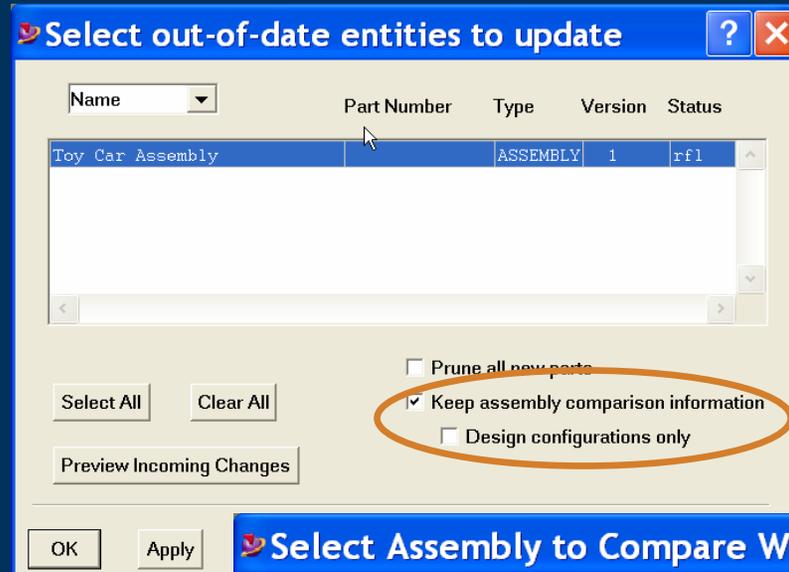
Assembly Information

- ▶ Relations
- ▶ Interference Results
- ▶ Assembly Instance Pattern Info
- ▶ Active Orientations
- ▶ Active Hierarchy
- ▶ ACF Relations
- ▶ Assembly Reference Geometry
- ▶ Assembly Reflect Information
- ▶ Possible Check-in Problems



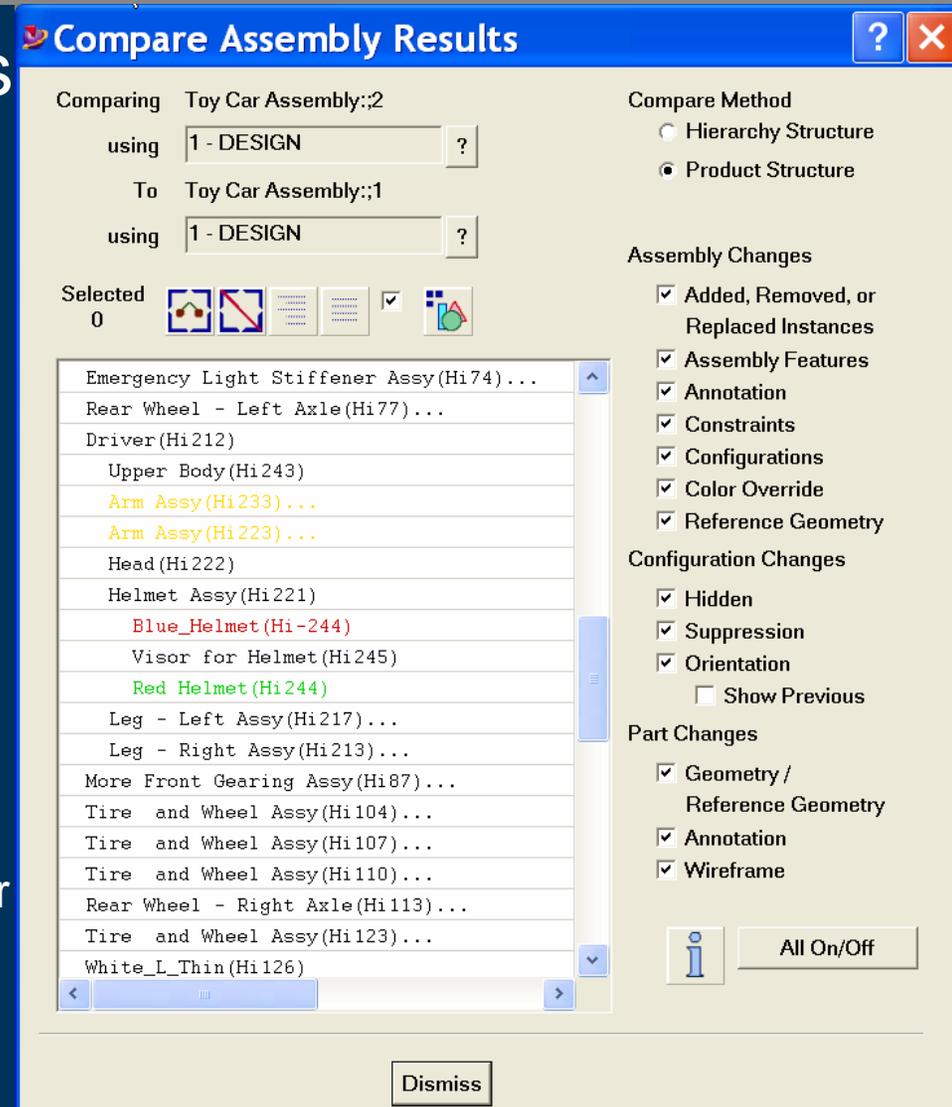
Assembly Compare

- ▶ Assembly before and after update from library
- ▶ Assembly before and after last solve
- ▶ Two different configurations of the same assembly
- ▶ Two different versions of the same assembly
- ▶ Two different assemblies



Compare Assembly Results

- ▶ Assembly Changes
- ▶ Configuration Changes
- ▶ Part Changes
- ▶ Graphics Display and Hierarchy Listing
 - ▶ **Green** indicates added
 - ▶ **Yellow** indicates modified
 - ▶ **Red** indicates deleted
 - ▶ Hidden, deleted, suppressed, or pruned instances are shown in graphics region by bounding volumes



Compare Assembly Results

Comparing Toy Car Assembly;:2
using 1 - DESIGN ?
To Toy Car Assembly;:1
using 1 - DESIGN ?

Selected 0

Compare Method
 Hierarchy Structure
 Product Structure

Assembly Changes
 Added, Removed, or Replaced Instances
 Assembly Features
 Annotation
 Constraints
 Configurations
 Color Override
 Reference Geometry

Configuration Changes
 Hidden
 Suppression
 Orientation
 Show Previous

Part Changes
 Geometry / Reference Geometry
 Annotation
 Wireframe

All On/Off

Dismiss

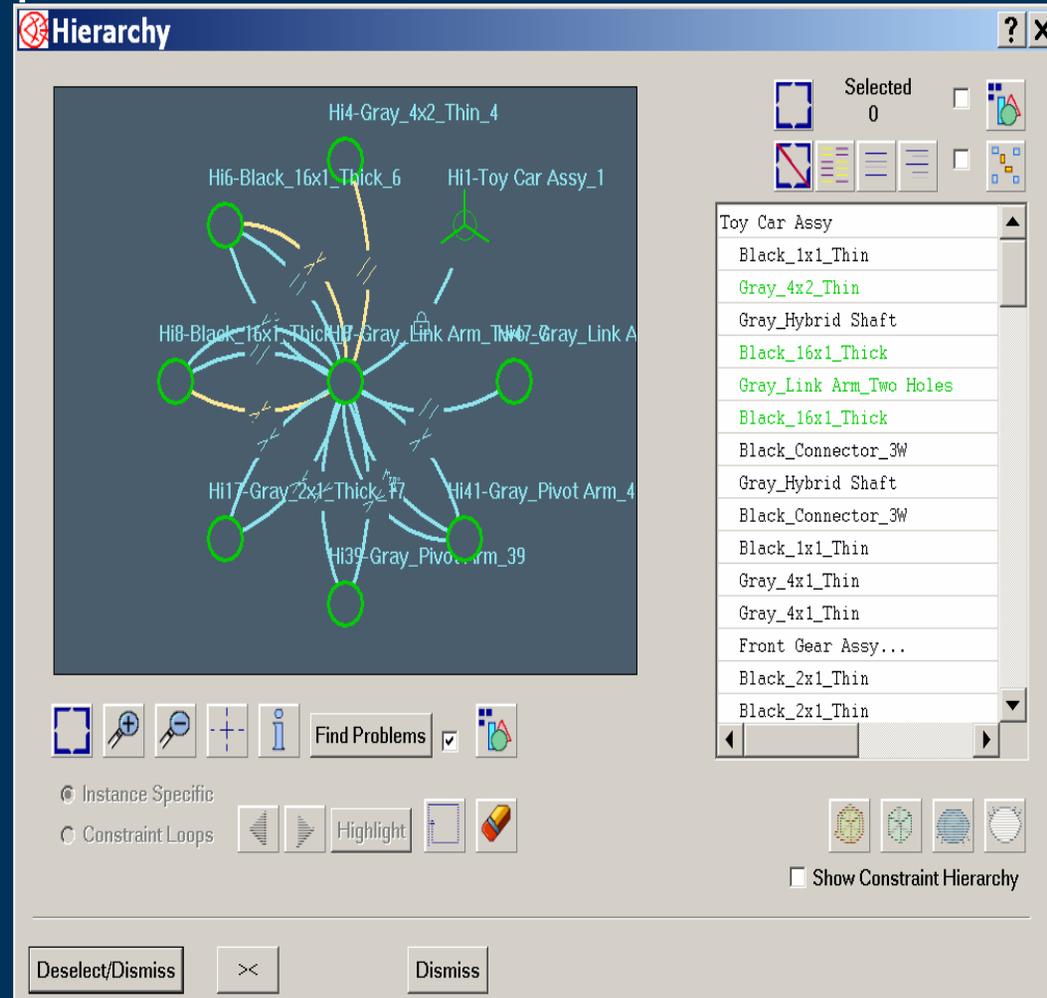
Emergency Light Stiffener Assy(Hi74)...
Rear Wheel - Left Axle(Hi77)...
Driver(Hi212)
Upper Body(Hi243)
Arm Assy(Hi233)...
Arm Assy(Hi223)...
Head(Hi222)
Helmet Assy(Hi221)
Blue_Helmet(Hi-244)
Visor for Helmet(Hi245)
Red Helmet(Hi244)
Leg - Left Assy(Hi217)...
Leg - Right Assy(Hi213)...
More Front Gearing Assy(Hi87)...
Tire and Wheel Assy(Hi104)...
Tire and Wheel Assy(Hi107)...
Tire and Wheel Assy(Hi110)...
Rear Wheel - Right Axle(Hi113)...
Tire and Wheel Assy(Hi123)...
White_L_Thin(Hi126)

Combined Hierarchy and Assembly Relations Browser Form

The screenshot displays the NX Hierarchy browser interface. On the left, a list of assembly components is shown, with 'Gray_Link Arm_Two Holes' selected. The main area features a network diagram of assembly relations, with a central yellow node and several peripheral green nodes connected by blue lines. On the right, a detailed list of the selected component's sub-components is visible, including 'Black_1x1_Thin', 'Gray_4x2_Thin', and 'Gray_Link Arm_Two Holes'. The interface includes various navigation and control buttons, such as 'Deselect/Dismiss', '<>', '><', 'Dismiss', and 'Find Problems'. Two buttons, '<>' and '><', are circled in orange. At the bottom right, there is a 'Show Constraint Hierarchy' checkbox and a 'Show Constraint Hierarchy' label.

Select Instance or Relationship

- ▶ A selected instance in the hierarchy will be centered in the *Relations Browser*
- ▶ If a constraint or dimension is selected, the participating instances will be shown in green in the hierarchy
- ▶ Multiple relationships can be selected and all participating instances will be highlighted in green in the hierarchy



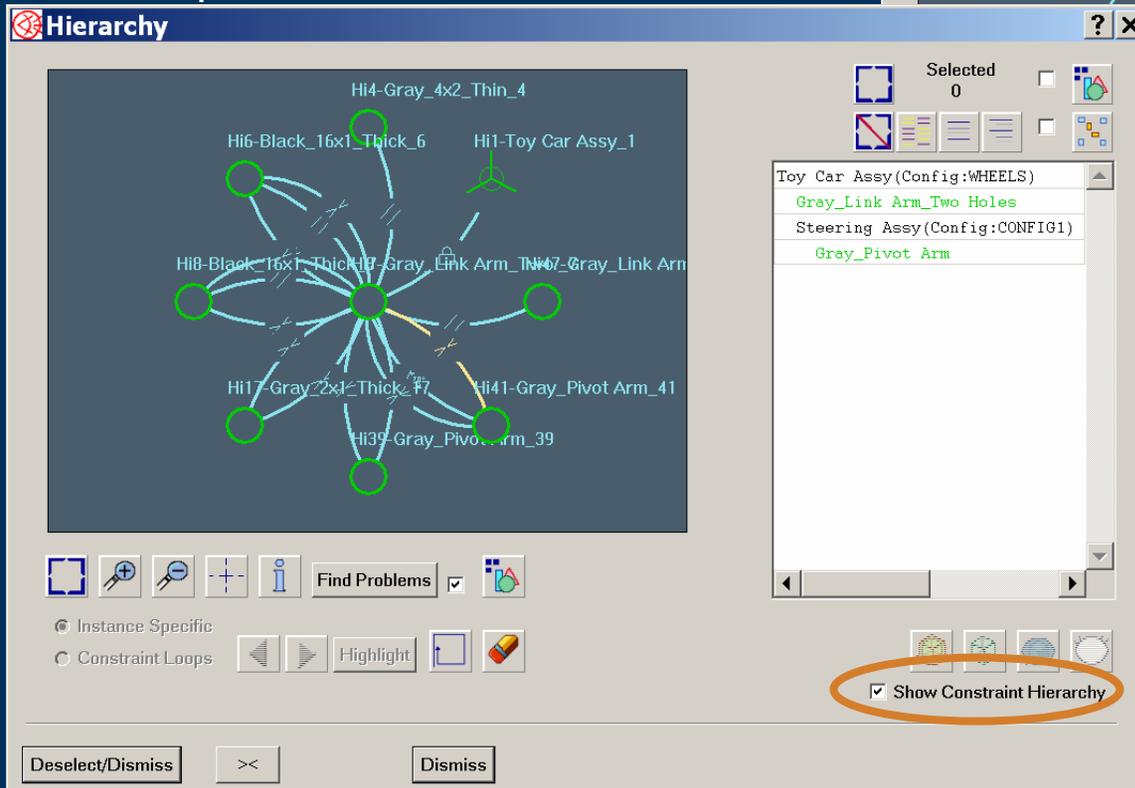
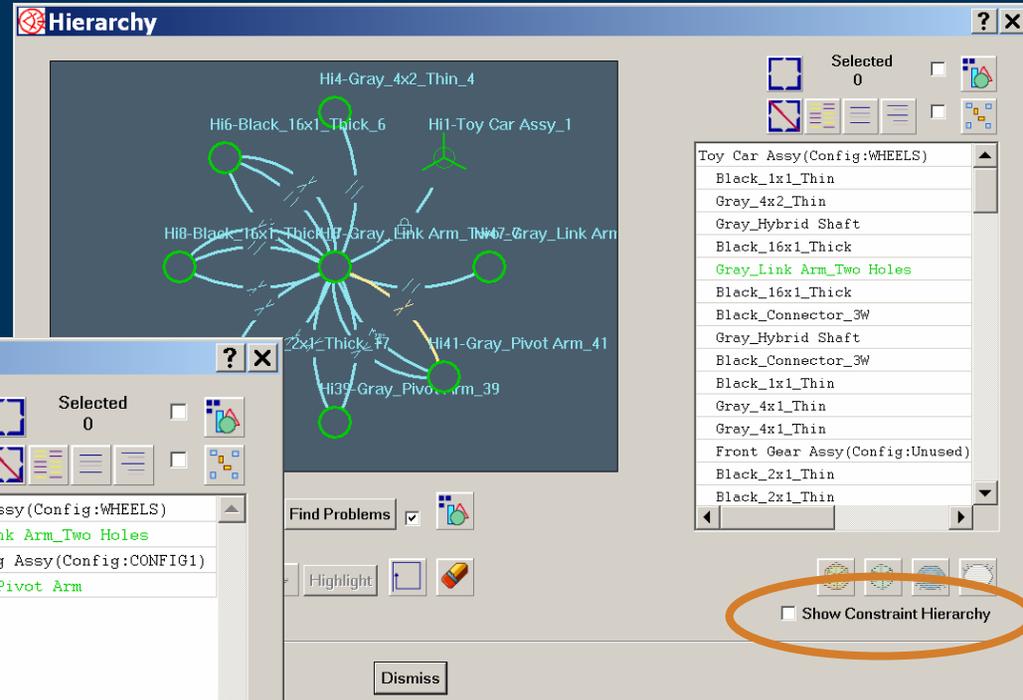
The screenshot shows the 'Hierarchy' window in NX software. The main area displays a network diagram with nodes and edges. The nodes are labeled with instance names, and some are highlighted in green. The right side of the window shows a list of instances, with 'Gray_4x2_Thin' selected. Below the diagram are various icons and a 'Find Problems' button. At the bottom are 'Deselect/Dismiss', '<<', and 'Dismiss' buttons.

Interrogate the Assembly



Show Constraint Hierarchy

- ▶ Toggle on to show only those instances participating in the selected constraint and their parent assemblies



Dynamic Highlighting

- ▶ Constraint ID
- ▶ Hierarchy numbers with geometry involved
- ▶ Status

Info

- ▶ Type
- ▶ Owning assembly
- ▶ Constraint ID
- ▶ Name of instance and geometry involved in the relationship
- ▶ Primary constraint
- ▶ Status

The screenshot displays the NX software interface with two panels open: 'Hierarchy' and 'Relations Information'.

Hierarchy Panel: Shows a tree view of the assembly structure. The selected item is '(Black_16x1_Thick_8)'. Below the tree, the constraint 'GC318, Coincident, (Hi22-F18, Hi8-F289), Enabled' is highlighted with an orange oval.

Relations Information Panel: Displays the following data:

Type	Assembly VG
Owning Assembly	Toy Car Assy
Constraint Id	GC318
Instance 1	Black_2x1_Thin_22, F18
Instance 2	Black_16x1_Thick_8, F289
Primary Constraint	Coincident
Status	Enabled



Increase Overall Performance



Display Options

- ▶ *Highlight picked assemblies*

Display Options

Label	Visibility	Label
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Hidden/Abstracted	<input type="checkbox"/> Level
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Suppressed	<input type="checkbox"/> Bin
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Pruned	<input type="checkbox"/> Used Config
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Pruned-Faceted	<input type="checkbox"/> Graphics
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> JT Items	<input type="checkbox"/> Highlight picked assemblies
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> BOM excluded	<input type="checkbox"/> Pruned Instances Display
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Others	<input type="radio"/> No Display
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Assemblies	<input type="radio"/> BV Display
		<input checked="" type="radio"/> Faceted Display

Label Filter By

Overrides

Entity Name

Part Number

Instance Name

Hierarchy Number

OK Apply Reset Cancel

Display Preferences

- ▶ *Save graphics levels of detail per entity*
- ▶ *Display off screen entities*
- ▶ *Use saved level of details for Shaded Software displays*

Display Preferences

Viewport triad

Viewport outline

Viewport label

Origin display

Auto draw

Double buffering

Enable Display Reduction

Display Reduction Level

Display off screen entities

Extra isolines

Show line data during shaded software

Save graphic levels of detail per entity

Number of levels to save (1-8)

Use saved levels for Shaded Software displays

List entity when graphics is generated

Lock saved graphic levels of detail

Tessellated Geometry...

OK Reset Cancel

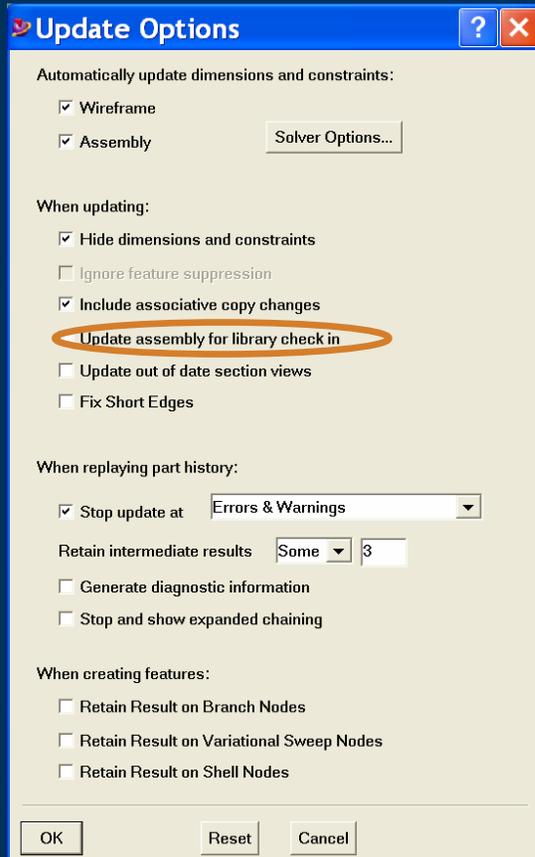


Increase Overall Performance



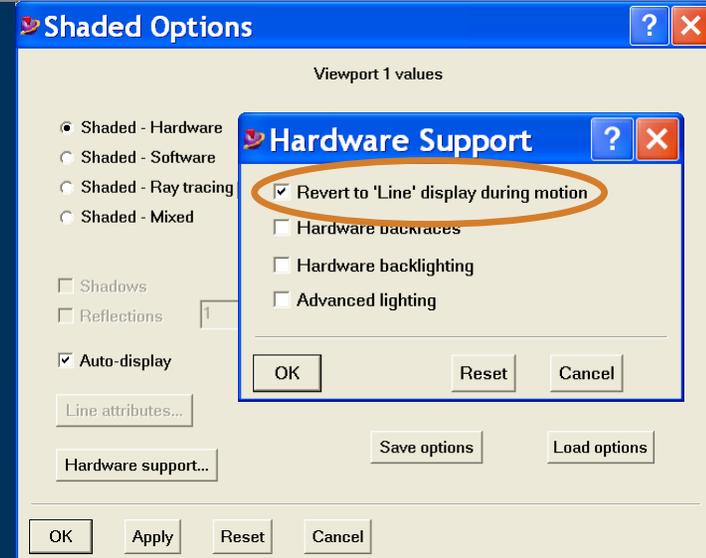
Shaded Options → Hardware Support

- ▶ *Revert to 'Line' display during motion*



Update Options

- ▶ *Update assembly for library check in*



Exporting and Importing Large Assemblies

- ▶ Files > 30 MB
 - ▶ Increase *Total Virtual Memory Limit (TVM)* to at least 1500 in *Options* → *Preferences* → *Memory Usage*

***NOTE: Only recommended if have enough RAM available to do this

- ▶ Files > 80 MB
 - ▶ Set *OI_STREAMPROTOCOL=file* prior to running I-deas

- ▶ Alternative Variables
 - ▶ *IMSIGES_USEOA=1*
 - ▶ *IMSSTEP_USEOA=1*



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