Assemblies: Putting it Together in Fusion 360

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Key Learning Objectives

At the end of this class, you will be able to:

- Describe how multi-component assembly design varies between Fusion 360 and Inventor.
- Describe the two methods for creating multi-component designs in Fusion 360.
- Learn how to assign joints and as-built joints to a multi-component design to fully constrain it.
- Learn how to use the tools available in Fusion 360 to incorporate motion into a multi-component design.
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*Autodesk Inventor uses Constraints or Joints to constrain components. The Autodesk Fusion 360 software only uses Joints.*

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What is a Multi-Component Design?

Credit: Petr Danov from Autodesk Gallery

Credit: Aleksej Gerlinkski from Autodesk Gallery

Credit: Leonel Calleros from Autodesk Gallery

Credit: Michael Provost from Autodesk Gallery
Multi-Component Assembly Design Methods
There are **two methods** that can be used to design a product with multiple components:

- **Distributed Design**
- **Multi-Body Design**
Distributed Design

- The distributed design method uses previously created designs which are inserted into a new design file.
- Once inserted components still have all Degrees of Freedom.
Distributed Design

- McMaster-Carr Content Library provides many standard components that can be used in Fusion 360.
Demonstration: Distributed Design
Multi-Body Design

- The Multi-Body design method enables you to create the geometry of the entire (or part of) assembled design as separate bodies in one design file.
- The bodies are converted to components in the design file.
Multi-Body Design

Multi-Body Design Tools

- Operation field ➔ New Body
- Split Body
- Combine Body
Multi-Body Design

Component Creation Tools

- Bodies folder ➔ Create Components from Bodies
- Operation field ➔ New Component
- CREATE panel ➔ (New Component)
Demonstration: Multi-Body Design
Constraining Components
Joint Origins

- To fully define a joint between two components, a joint origin reference must be selected on both components.
- Based on these joint origins, the components are positioned.

**HINT**: <Ctrl> key to lock the entity type
Joint Origins

- Two options to create a new Joint Origin: **Simple** and **Between two faces**
- Must be created where you have write access to the design.
Joints

- To assign a Joint:
  1. Click 🔄 (Joint) in the ASSEMBLY panel.
  2. Select the joint origins.
  3. Ensure alignment is correct.
  4. Select a joint type to define the permitted movement.
**As-Built Joints**

- Components are selected. Joint origin selection is not required. References are assumed based on current placement.
- Joint type selection and a position reference (if motion is permitted), are required.

**Tip:** Rigid Groups (/Footer) lock the relative position of all components at once.
Demonstration: Constraining Components
Incorporating Motion in a Multi-Component Design
Incorporating Motion

- There are multiple commands in Fusion 360 that can help control motion:

  - **Joint Limits**
  - **Drive Joints**
  - **Contact Sets**

Assigning a limit of 180° to the Revolute joint will eliminate interference.
Incorporating Motion

- There are multiple commands in Fusion 360 that can help control motion:

  - Motion Study
  - Motion Linking
Demonstration: Incorporating Motion
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