Welcome to SolidWorks
Computer Aided Design (CAD)

Part

Assemblies

Drawings
Design Analyses

Finite Element Analysis (FEA)

Topology Optimization
Production Preparation

Computer Aided Manufacturing (CAM) Simulation

CAD to XR (AR/VR/MR/Web)
Solid Modeling

- Defined by:
  - Boundary representation (B-rep)
    - connected surfaces create an inside and outside of the part

- Have these properties:
  - Mass
  - Volume
  - Moment of inertia
Constraints

○ Defined as a limitation or restriction

○ Apply constraints to any geometry drawn in Solidworks (under the discretion of the user)

*Constraints in Solidworks look like this.
Implicit Constraints

- Geometric relationships implied by the way the profile is drawn and interpreted by Solidworks
  - Note: Solidworks only makes closed profiles, so your profiles must have closure.
More Implicit Constraints

- Same Size
- Coincident
- Concentric
Explicit Constraints

- Defined by the operator:
  - Dimensional constraints: assigning a specific length to a line, radius to a circle, etc.
  - Geometric constraints: specifying the ways in which lines/shapes/features relate to one another
Levels of Constraint

- **Fully constrained**
  - Every element has been completely dimensioned/specified

- **Underconstrained**
  - Not all elements are dimensioned/specified (leaves interpretation up to Solidworks)

- **Overconstrained**
  - Adding a new constraint would conflict with existing constraints (Solidworks won’t let another dimension be added)
Example of an Overconstrained Sketch

**Driven Dimension:** is *driven by* the model. *Changing the model* changes this driven dimension value.

**Driving Dimension:** *drives* the model. *Changing this driving dimension* changes the model.
Take a Break Buddy!

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One of the basic steps... Extrusion

- **Linear Extrusion**: starts with closed polygon (profile) drawn on a plane, and then swept along a defined path for a defined length.
Extruding a primitive shape allows you to make some of these 3D objects…
Path-based Extrusion

- **Sweep**: create a profile and define its path to be extruded along.
Revolute Extrusions

- Start with a drawn profile and define an axis of rotation about which the profile is rotated for a defined angle.
Path-based and Revolute Extrusions allow you to make some of these 3D objects....
Activity

- Complete the **Lesson 1: Parts tutorial**
  - How to get there: Tutorials>Getting Started>Lesson 1: Parts

- Complete **Revolves and Sweeps tutorial**
  - How to get there: Tutorials>Basic Techniques>Revolves and Sweeps

***Let me know if you have any questions!***