Advanced Modeling in Solidworks
Refresher:

- Do these sketches create 3D features in Solidworks?
Helpful SolidWorks tools

- Normal To is your friend when sketching
- Reference Geometry > Axis
- Linear Pattern > Linear Pattern or Circular Pattern
- Hold down the center button of your mouse to rotate your part
- Press Space Bar on keyboard to get this
  - Allows you to easily orient the part being modeled
Constraint-based Modeling

๏ Collection of features
- Ex: Extrude, Extruded cut, Revolve, Fillet/Round, Chamfer, Sweep, Loft, etc.

๏ Parts Tree
- Pay attention to the parent/child relationship between a feature and it’s sketch
Sketch Planes

- Canvas for drawing the construction geometry of a part (profile, construction lines, etc.)
Local Coordinate Systems make geometry creation easier.

Origin for LCS can be anywhere on model.
Blend Extrusion

- Loft: create a profile on the base plane, define the second plane (with a second profile) to which the initial profile will be extruded to.
Solid Primitives

๏ Almost every object can be decomposed into its most fundamental, 3-dimensional geometries

๏ Solidworks can only create a limited set of 3D objects

๏ Combine these to make a complex object!
Make this part...

(A) Cylinder

Wedge
Block B

(B) Cylinder

Wedge
Block A
What are the fundamental 3D geometries of these parts?
Feature Definition

- The order in which a part’s features are added to it is important!
- Look for major features first.
How would you model this part?
Feature Definition - How not to do it

Too many steps!
Don’t make two parts from one!
Try this…

- Model this hollowed out, angled, box with a hole in it.
It looks something like...

Box
↓
Shell
↓
Hole
Break Time…get up and move!
2-Dimensional

Generally, three parallel projections (principle) are used.
Adjacent Views

Note: all necessary information to model a part is given in its technical drawing.

*Do the math to find the dimension of a feature that is not directly given to you.
Take a closer look…

Orthographic Projection Rule 1: Every point or feature in one view must be aligned on a parallel projector in any adjacent view.

- Note the projection lines located on the right and top views that represent the hole on the front view.
What are the fundamental 3D geometries of this part?
What are the fundamental 3D geometries of this part?
What are the fundamental 3D geometries of this part?
What are the fundamental 3D geometries of this part?
What are the fundamental 3D geometries of this part?
Activity

- Only provided PDFs of the drawing files
- Use what you’ve learned about decomposing parts into primitive shapes and technical drawings
- Model the (1) **Base**, (2) **Casing**, (3) **Head**, (4) **Grip**, (5) **Jaw**, (6) **Shaft**, (7) **Plate**, (8) **Pin** (all measurements are in inches)

- Note: Think about the part’s main features and how to best model them. In what order should you model these features?