Sheet metal parts & Assemblies

Aalto University
School of Engineering

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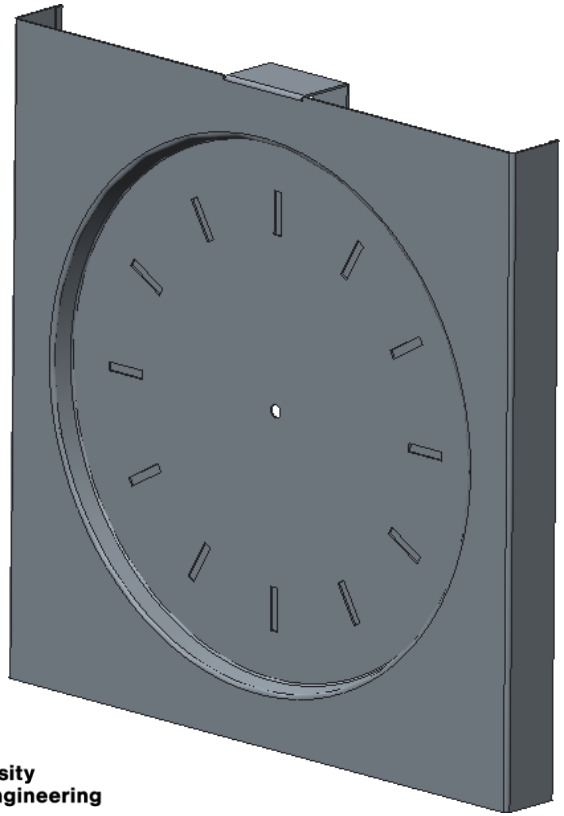
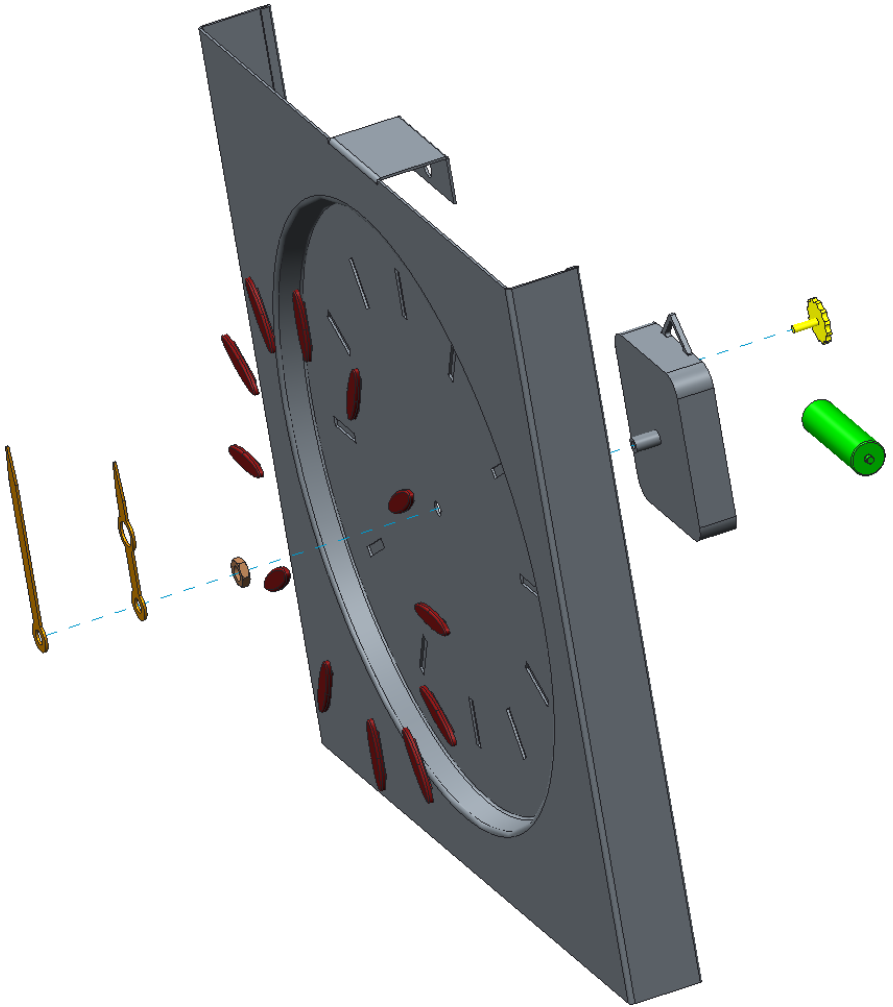
2.11.2020

This week’s tasks





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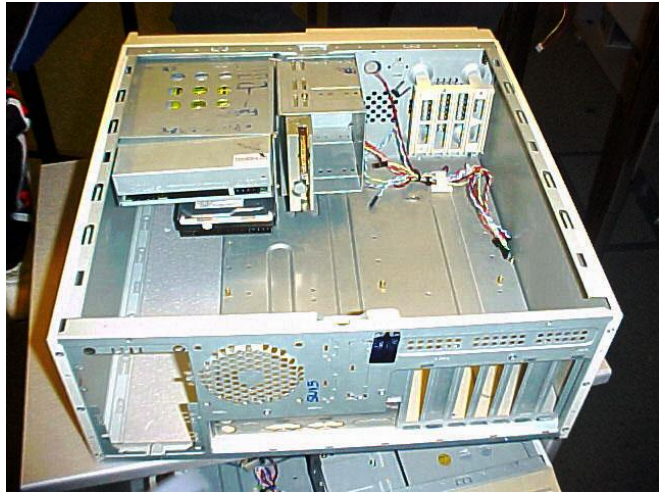
Sheet Metal Parts

Sheet metal products



Sheet metal process and tools

Punching

https://youtu.be/bEb8rrfhLnI

Bending

https://youtu.be/_q6ykOOfem8

Production line

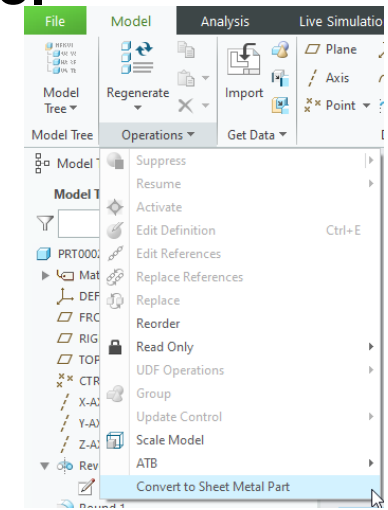
https://youtu.be/w6bufh_baGw

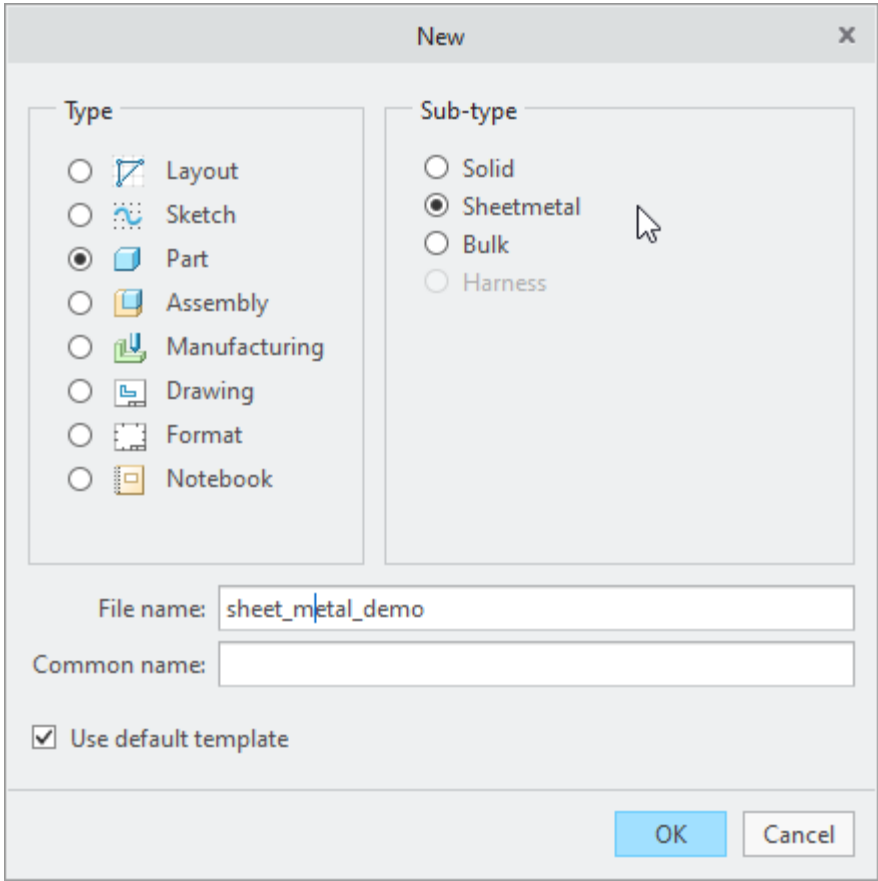
https://youtu.be/v1Z1it4knGM

Sheetmetal

Sub-type in Part mode

Solid part can be converted into Sheetmetal using *Convert to Sheet Metal Part* tool





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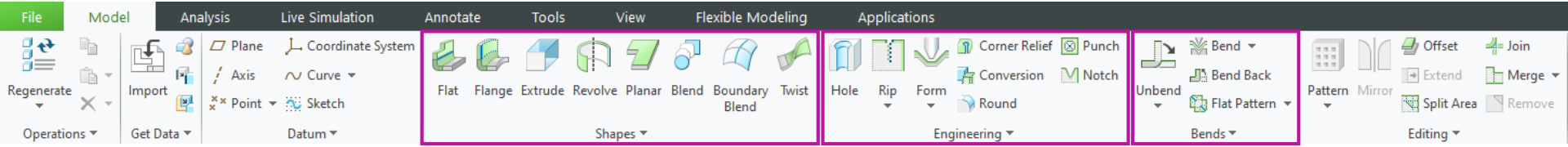
Tools



Shape creation

- Adding geometry into model

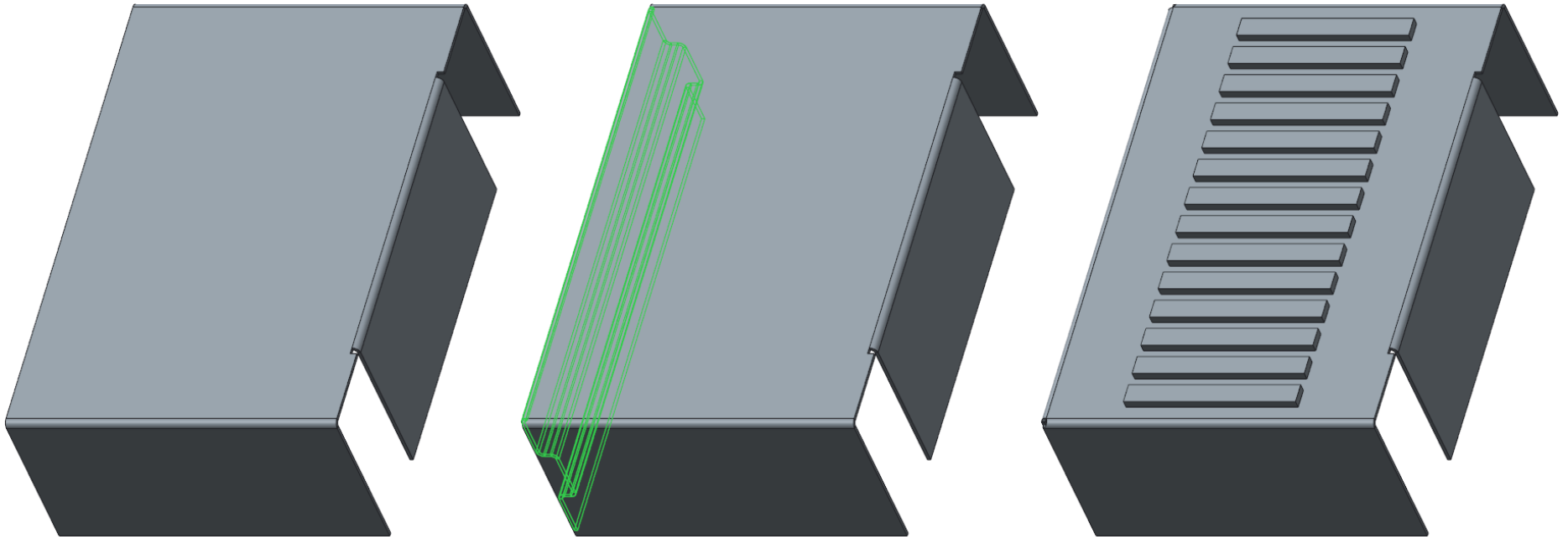
Engineering

- Modifying geometry (holes, forms)

Bends

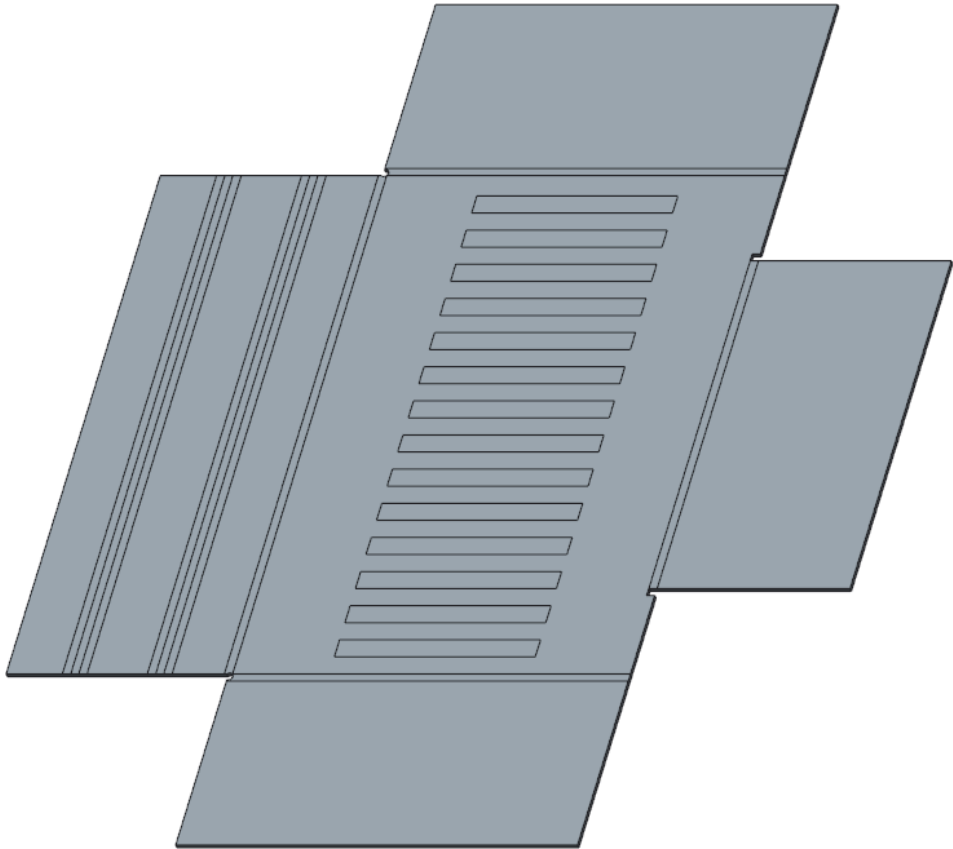
Modeling order

Modeling order

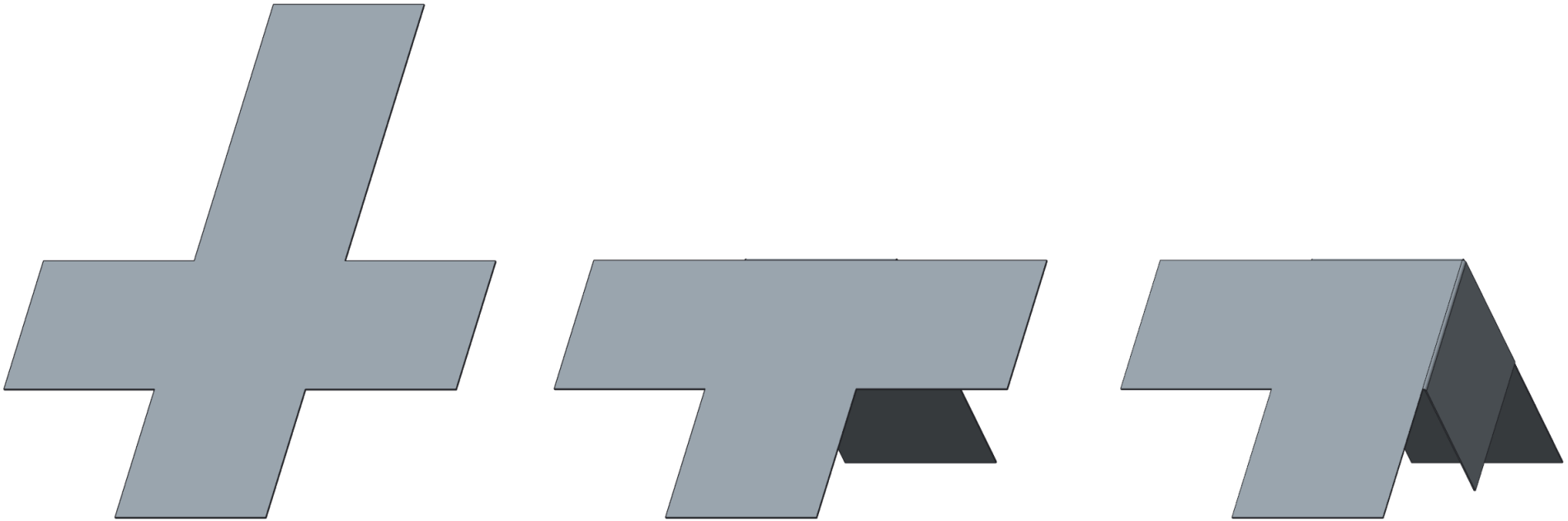


Modeling order

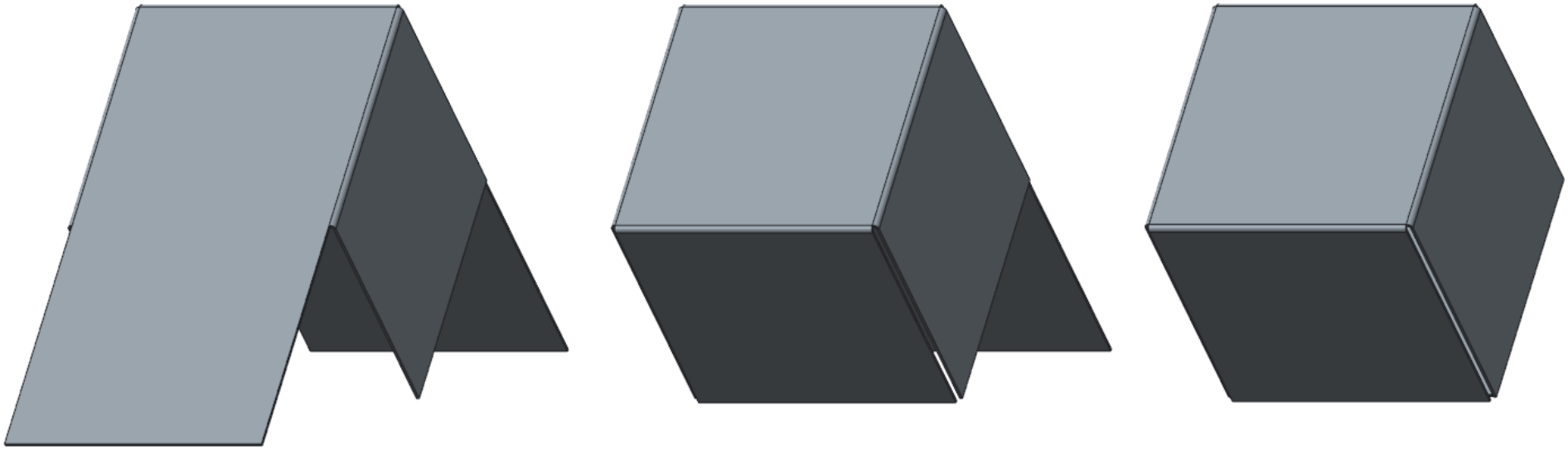
Ready unfolded product



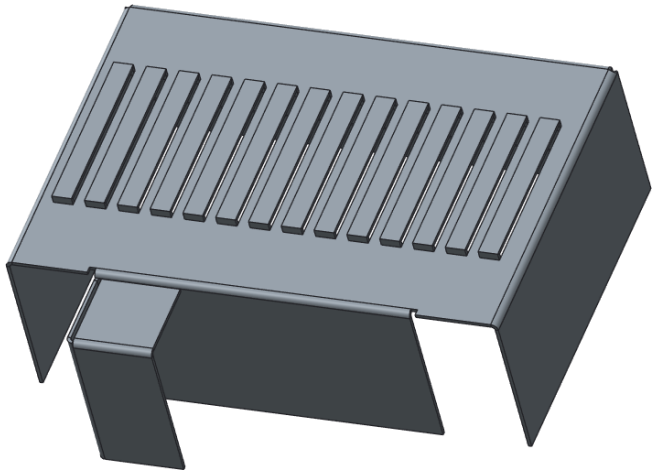
Bending sheet into shapes



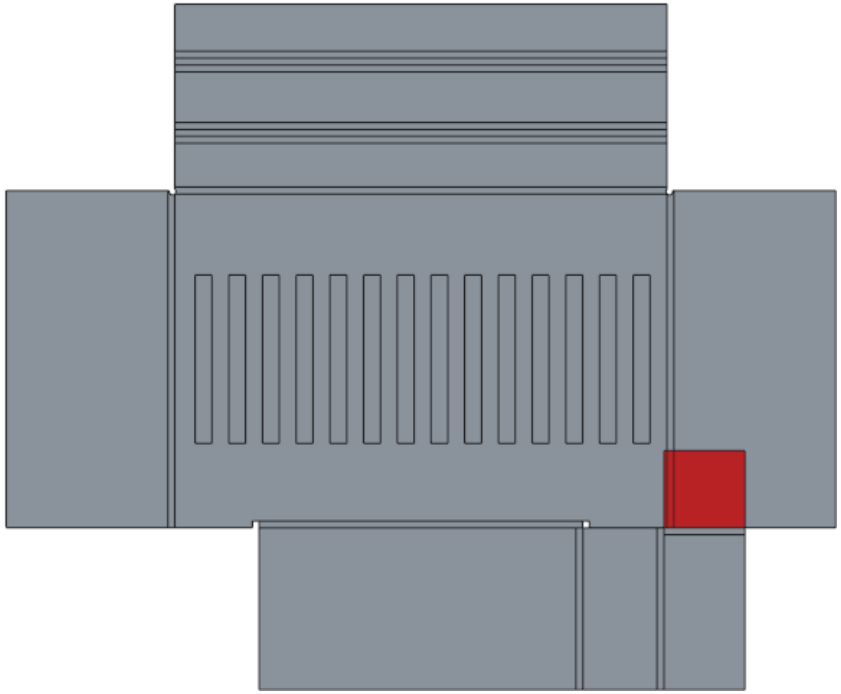
Bending sheet into shapes



Overlapping geometry



Unfolding



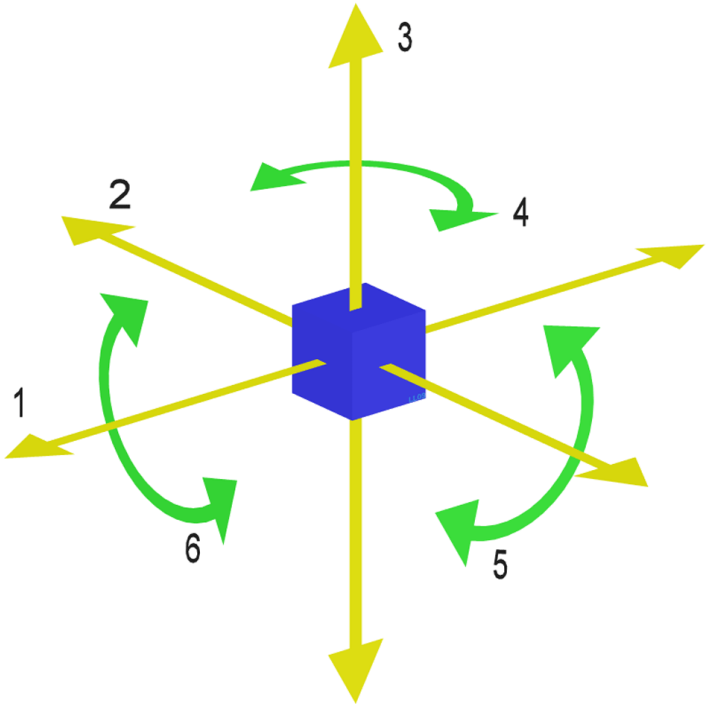
Assemblies

Degrees of Freedoms

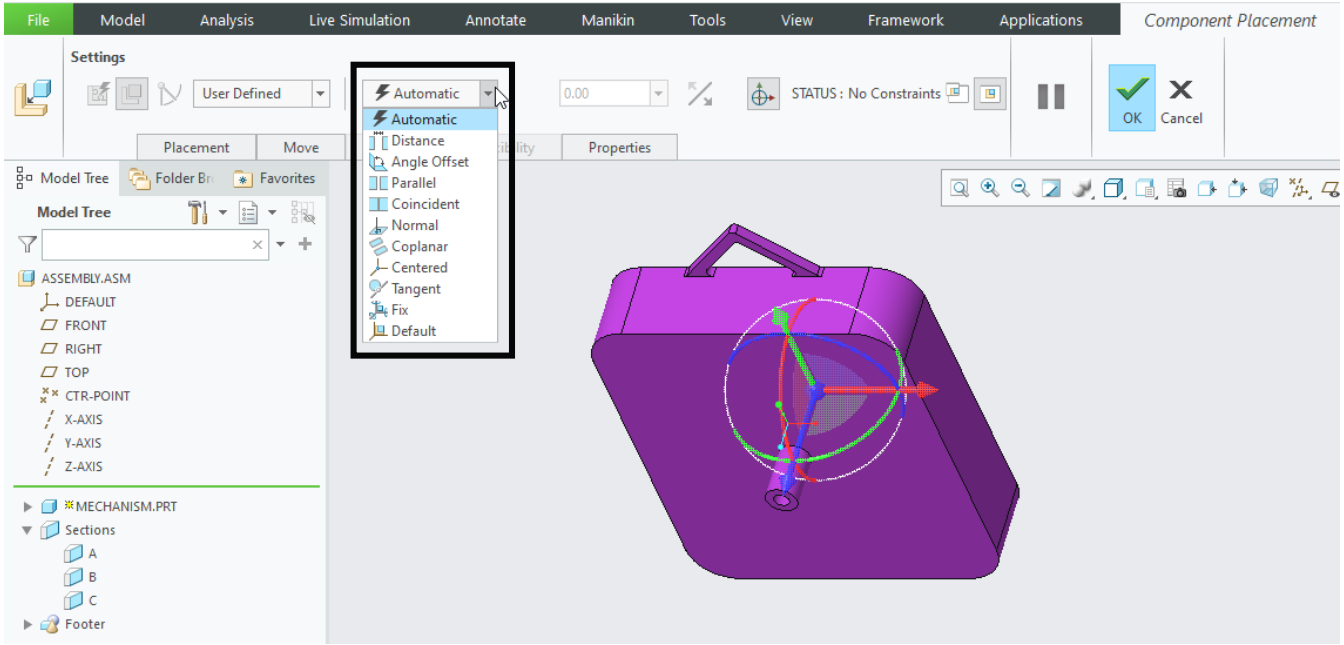
DoFs

Object in 3D world

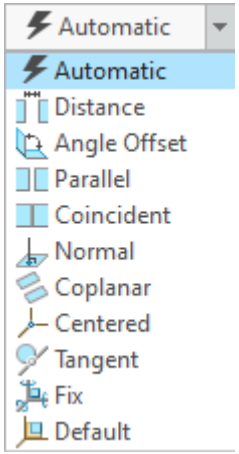
- 3 translations
- 3 rotations



Assembly constrains



Assembly constrains



Automatic; Shows available constraints in the list after you choose a reference.

Distance; Offsets the component reference from the assembly reference.

Angle Offset; Positions the component at an angle to the assembly reference.

Parallel; Orients the component reference parallel to the assembly reference.

Coincident; Positions the components reference coincident with the assembly reference.

Normal; Positions the component reference normal to the assembly reference.

Coplanar; Positions the component reference coplanar to the assembly reference.

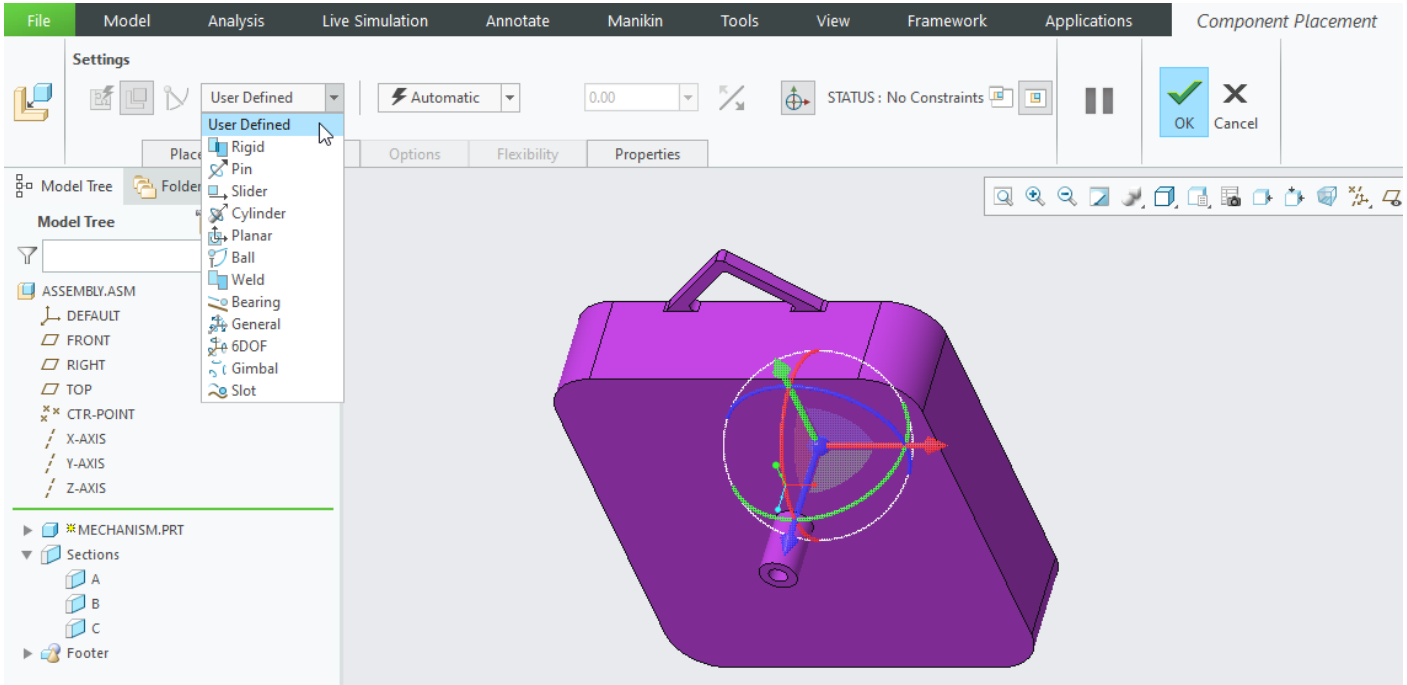
Centered; Centers the component reference and the assembly reference.

Tangent; Positions two references of different types so that they face each other. The point of contact is a tangent.

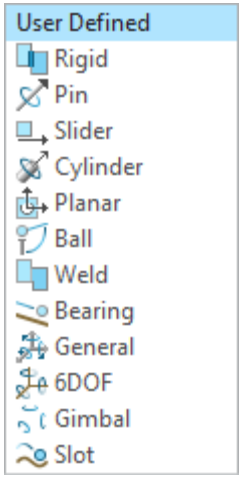
Fix; Fixes the current location of a component that was moved or packaged.

Default; Aligns the component coordinate system with the default assembly coordinate system.

Predefined sets



Predefined sets



User Defined; Creates a user-defined constraint set.

Rigid; Allows no movement in the assembly.

Pin; Contains a rotational movement axis and translation constraints.

Slider: Contains a translational movement axis and rotation constraints.

Cylinder; Contains a 360° rotational movement axis and translational movement.

Planar; Contains a planar constraint to allow rotation and translation along the reference planes.

Ball; Contains a point alignment constraint for 360° movement.

Weld; Contains a coordinate system and an offset value to "weld" the component in a fixed position to the assembly.

Bearing; Contains a point alignment constraint to allow rotation along a straight trajectory.

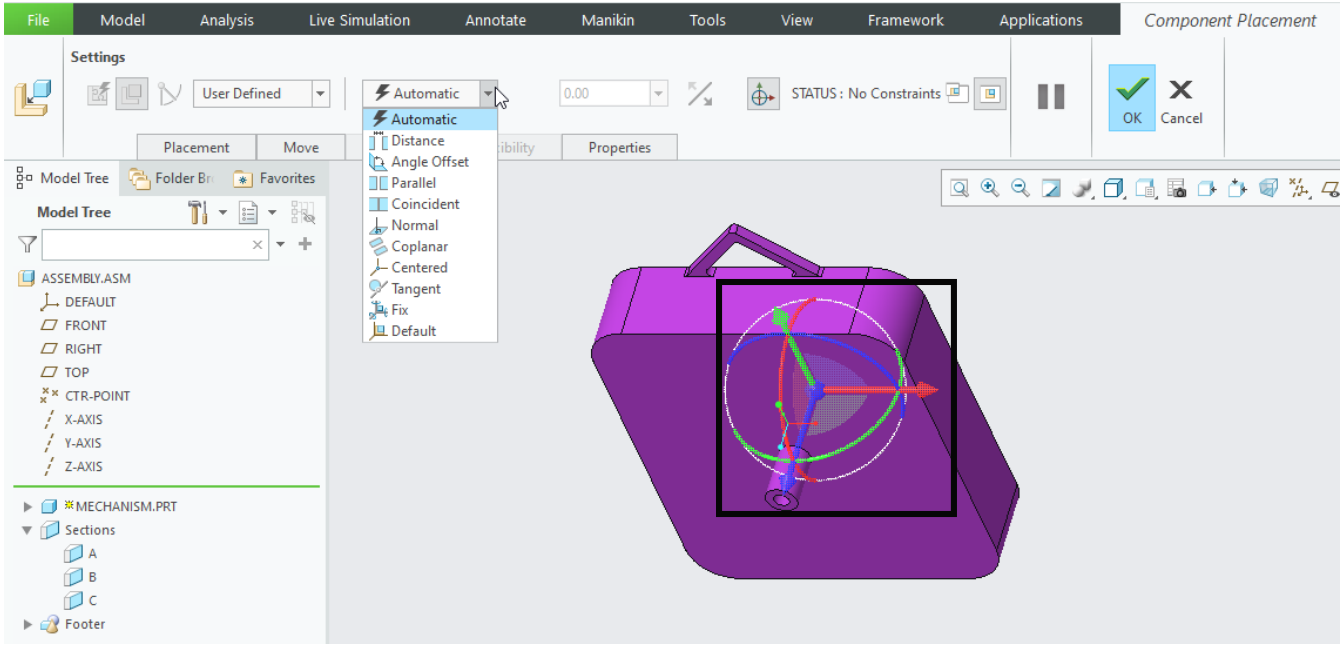
General; Creates a user-defined set of two constraints.

6DOF; Contains a coordinate system and an offset value, to allow movement in all directions.

Gimbal; Contains a coordinate system on the part and a coordinate system in the assembly to allow rotation in all directions about a pivot axis.

Slot; Contains a point alignment to allow rotation along a nonstraight trajectory.

Degrees of Freedom



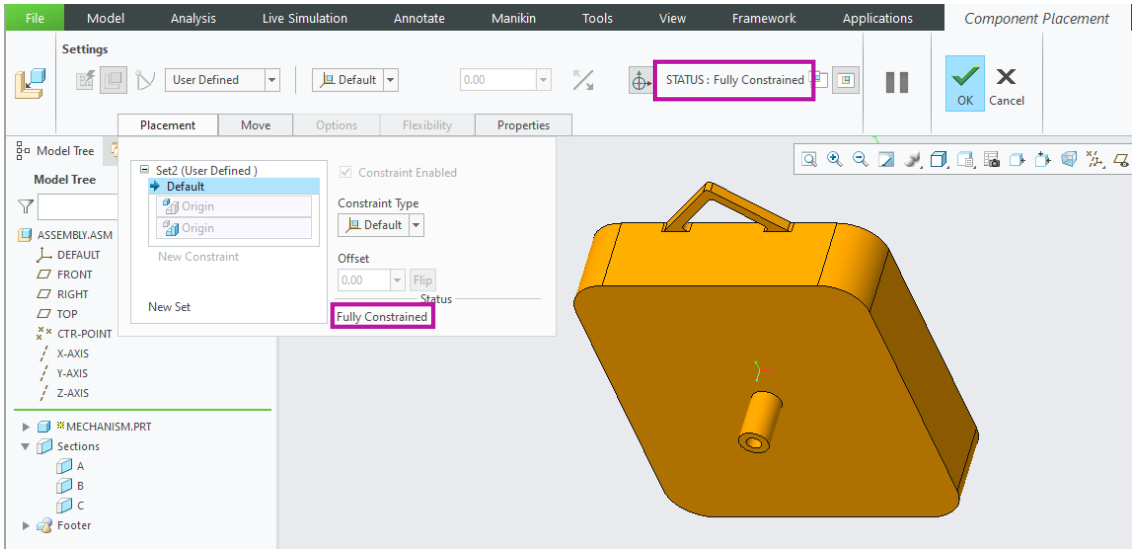
Fully Constrained

Yellow

- Fully constrained

Purple

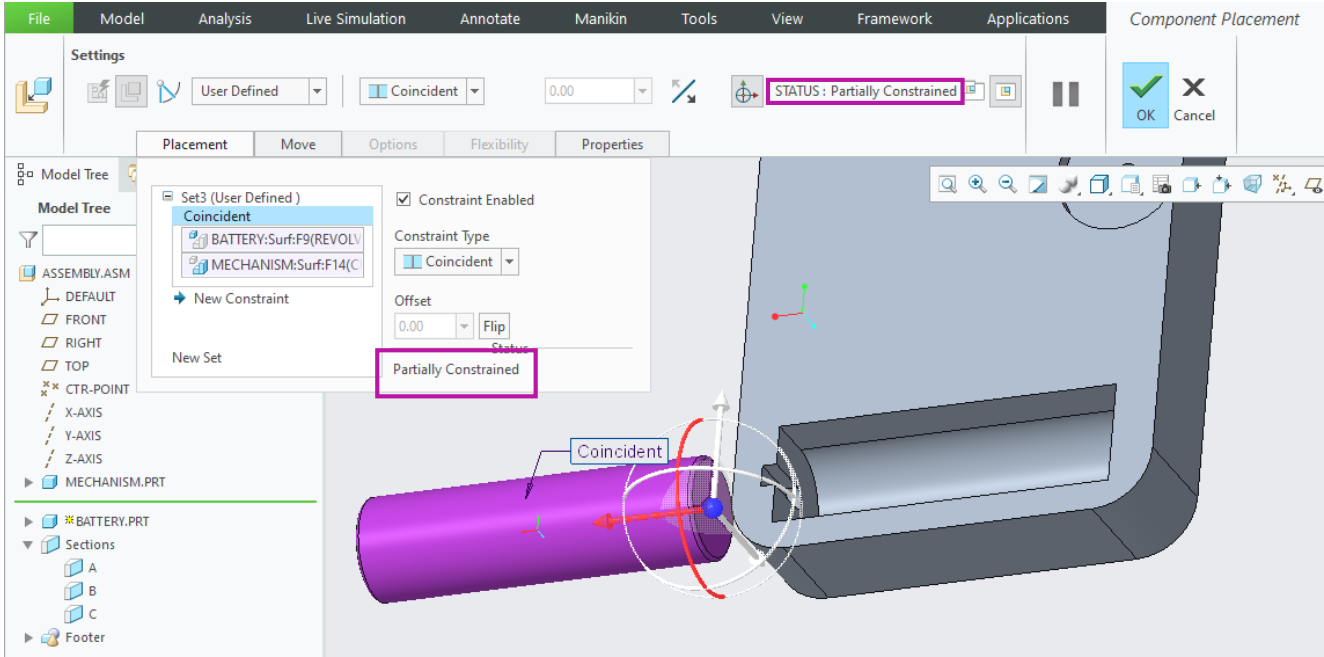
- Partially constraint



Partially Constrained

Notice the two (red) degrees of freedom

- Move and rotation along battery's center axis



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Markings in Model Tree

White Box

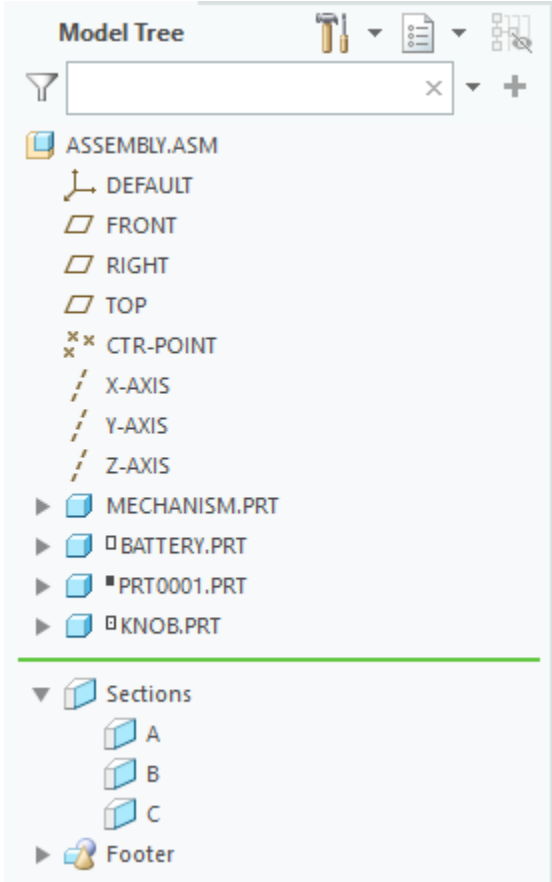
- Component has degree(s) of freedom

Black Box

- Suppressed component

Box with Point

- Mechanism connection
- Part can move



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