EP1000

Computer Controlled Cutting 2

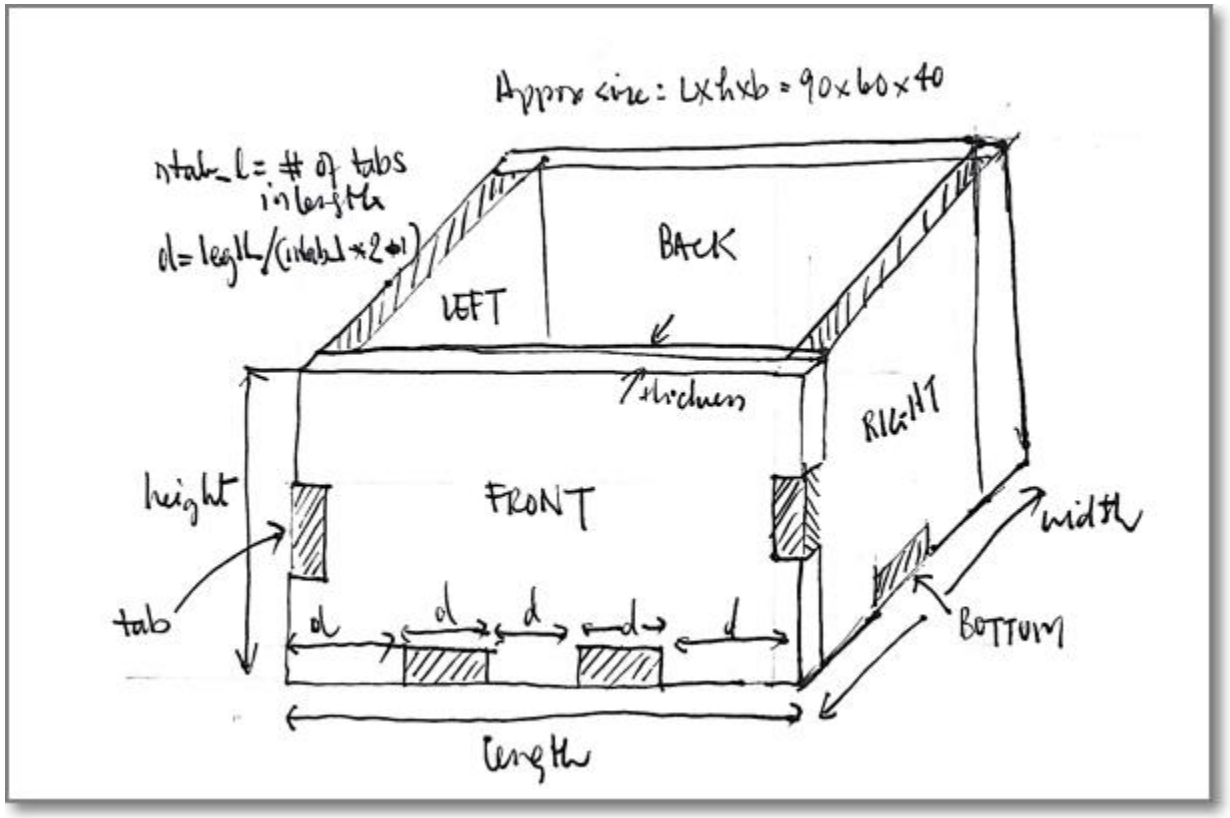
Assignment

Lasercut Parametric Box

- Boxes are useful in all projects as they provide housing or containment.
- Making the box parametric allows changes, accommodating for boxes of different sizes, types.
- A practical example that can be used for other projects.

Start with a sketch

- Sketch on paper how your box looks like and the approximate dimensions.



Define the parameters

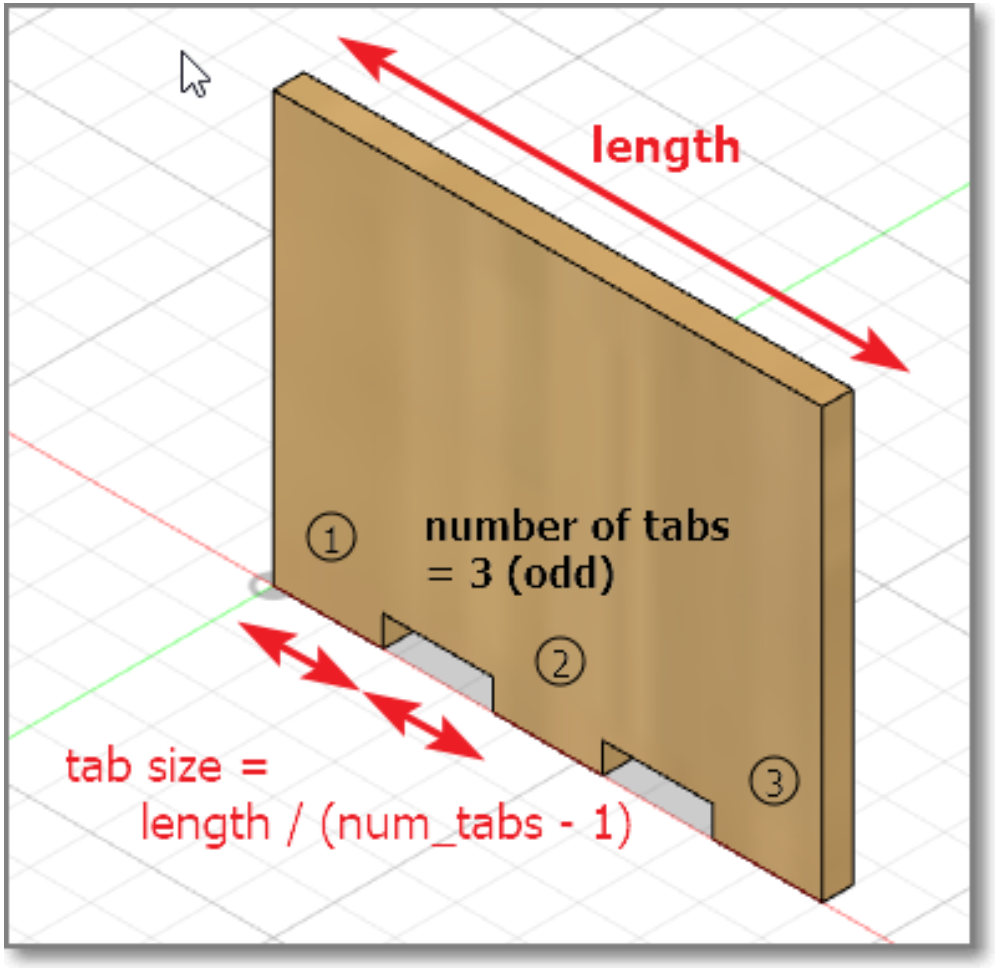
Parameters

Parameter	Name	Unit	Expression	Value	Comments
Favorites					
User Parameters					
User Parameter	length	mm	100 mm	100.00	length of box
User Parameter	width	mm	60 mm	60.00	Width of box
User Parameter	height	mm	50 mm	50.00	height of box
User Parameter	thickness	mm	2.7 mm	2.70	Material thickness
User Parameter	ntabs_l		5	5	Number of tabs along length
User Parameter	ntabs_w		5	5	Number of tabs along width
User Parameter	ntabs_height		5	5	Number of tabs along height
Model Parameters					

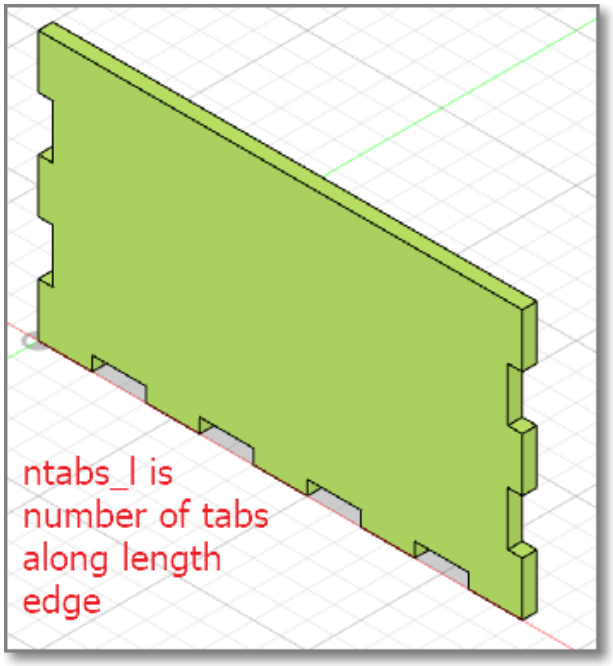
OK

Basic Calculations

- Odd number of tabs
- Tabs and spacers have same size
- Do NOT use the sketch > rectangular pattern to duplicate.
- You CAN use the 3D create > pattern to duplicate the feature.

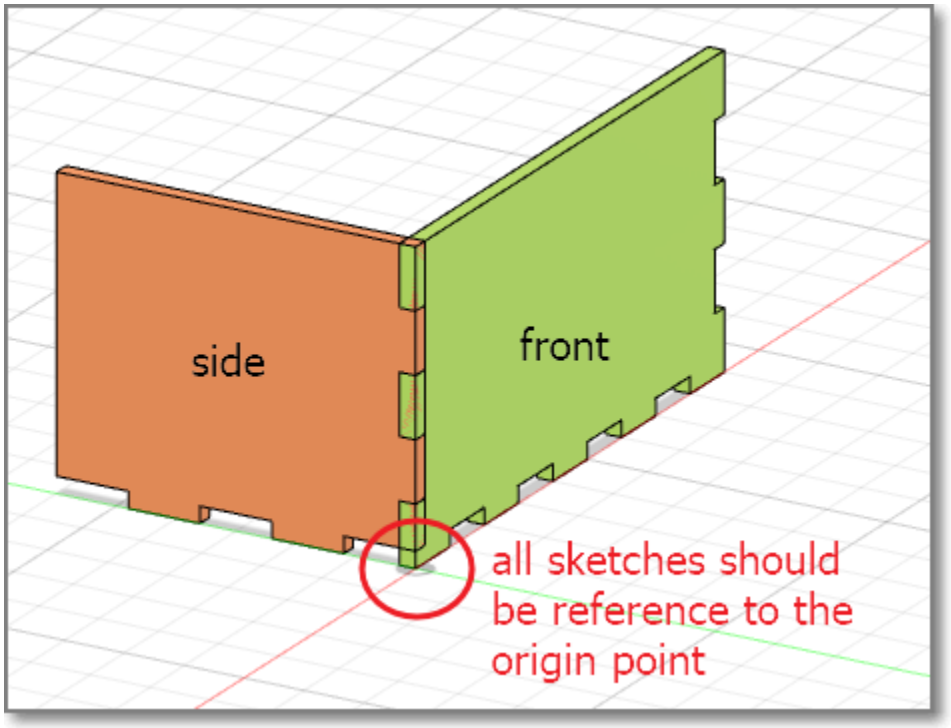


Create the front face



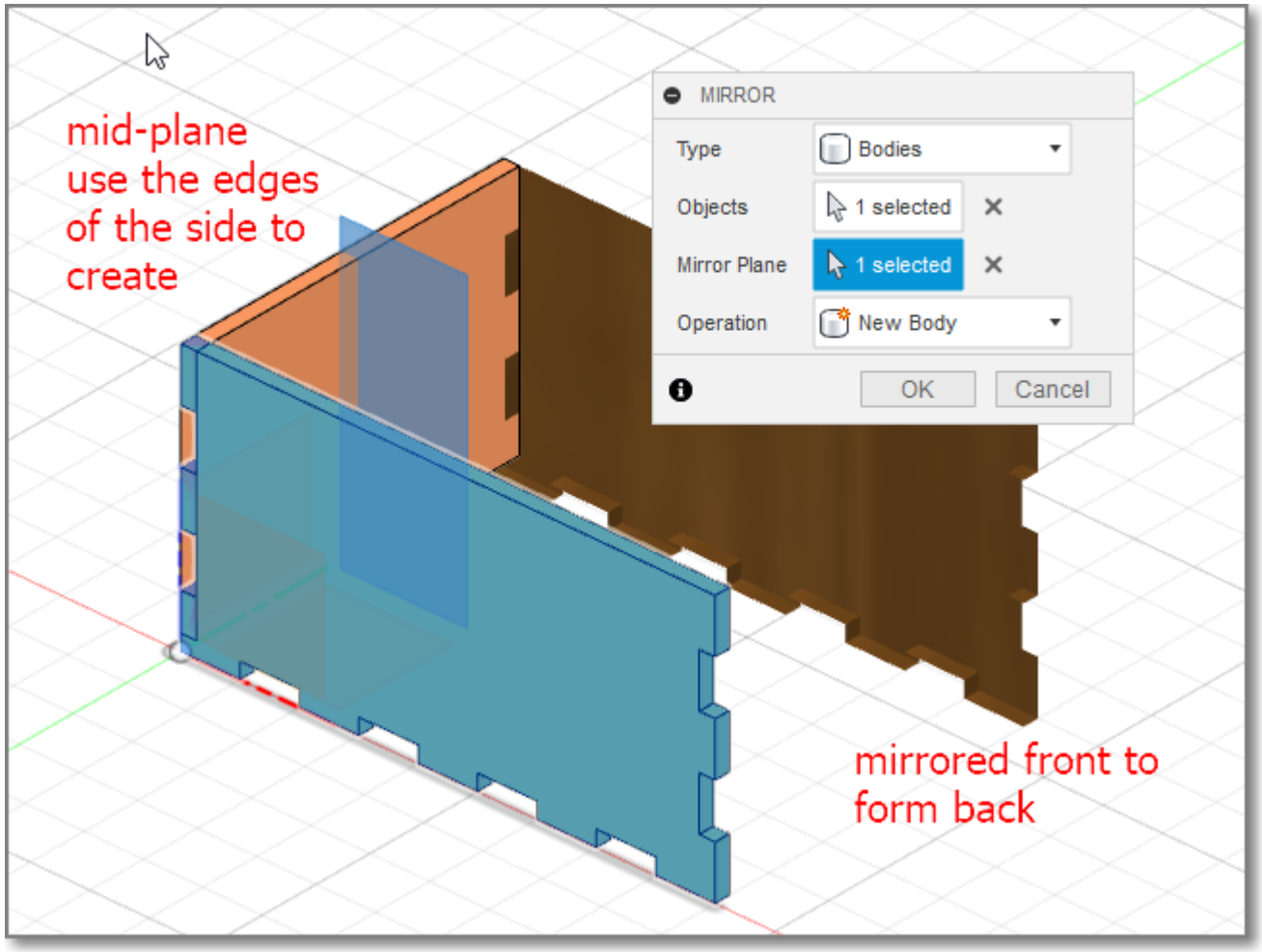
- Make a new component
- Sketch the face
  - Add the tabs
  - tabLength = length/(ntabs_1*2-1)
- Extrude

Add the side component



- New component
- Create sketch
  - Start for ORIGIN
  - Choose **EDGE** face of front tab
  - Constrain sketch to the front component
  - Draw the tabs
- Extrude

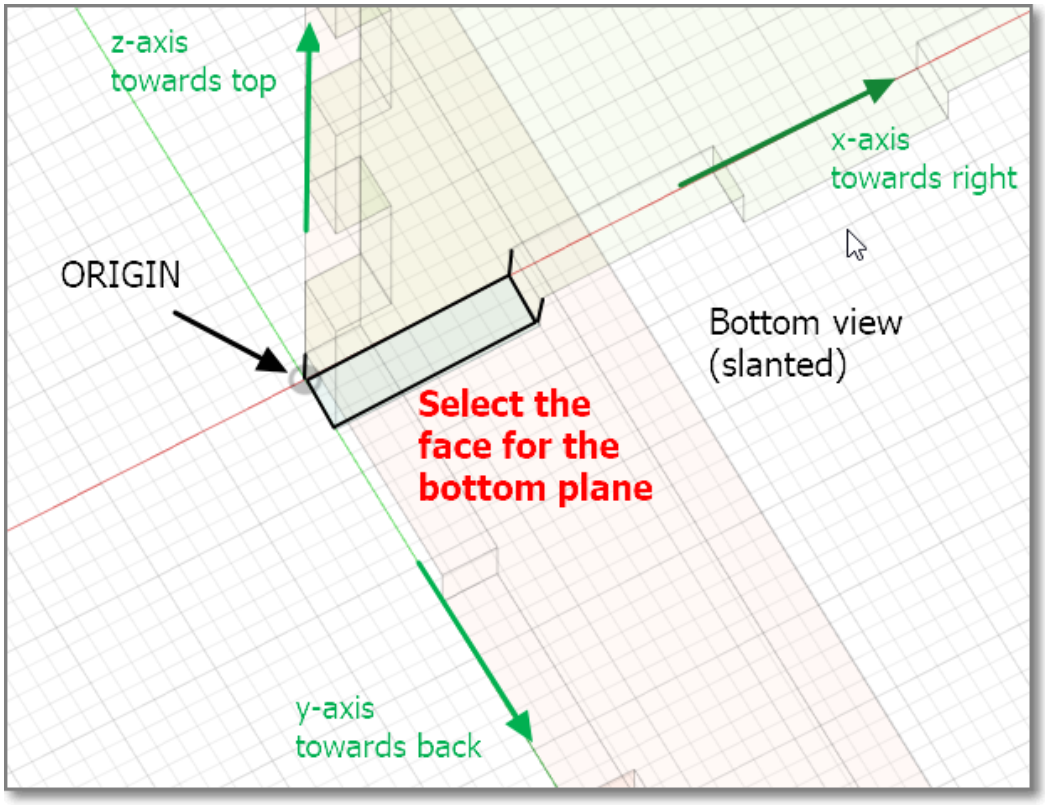
Mirror front to form back



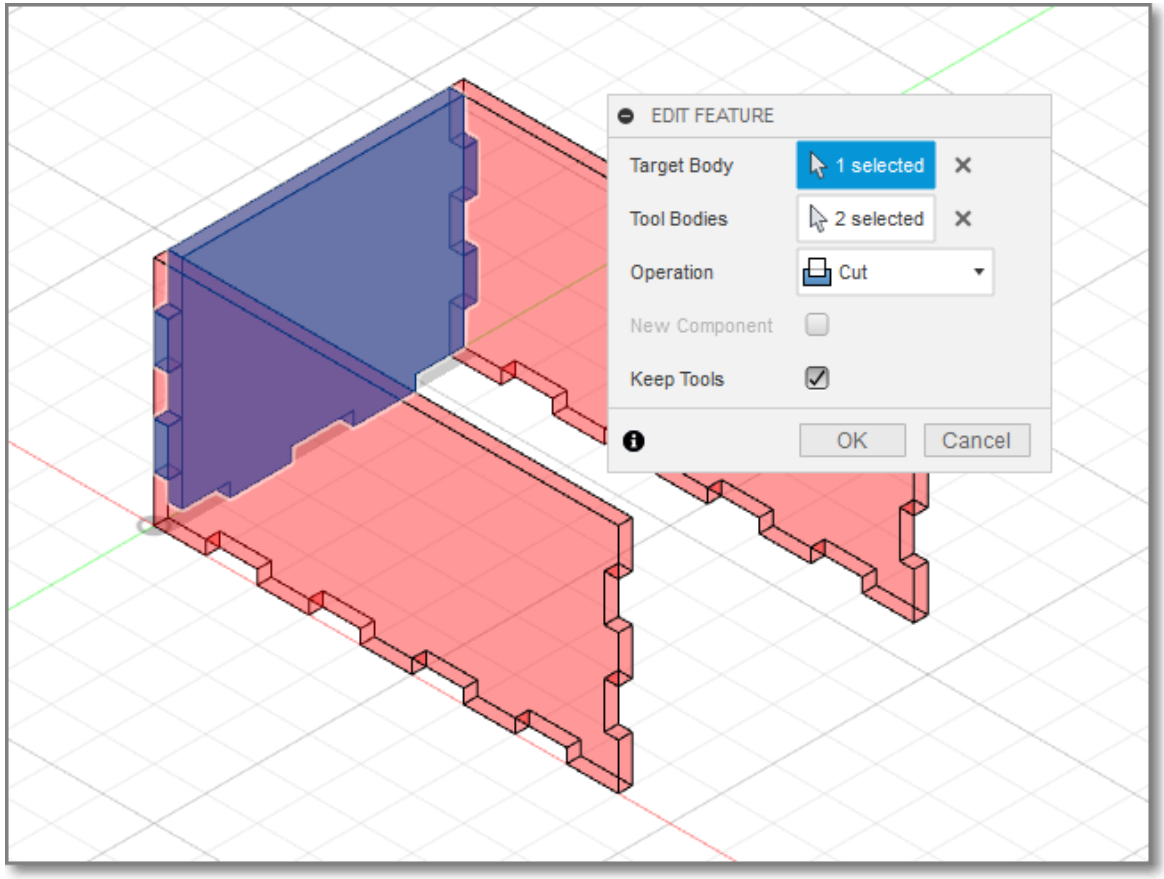
- Create a mid-plane
  - Switch off visibility of front body to help
  - Choose front and rear edges of side
- Mirror the front using the mid-plane
- Repeat for left and right sides

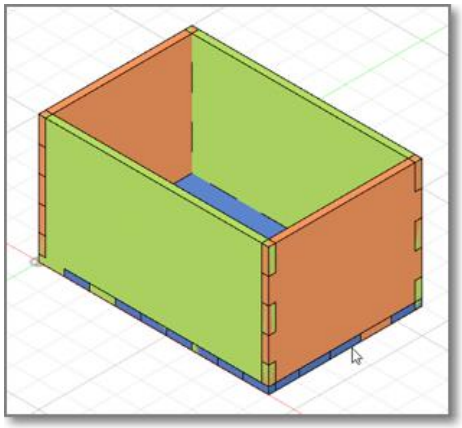
Create the base

- Rotate the object to bottom view
- Create new component
  - Create sketch
  - Start from ORIGIN
  - Sketch the base
  - Constraint to edges
  - Extrude



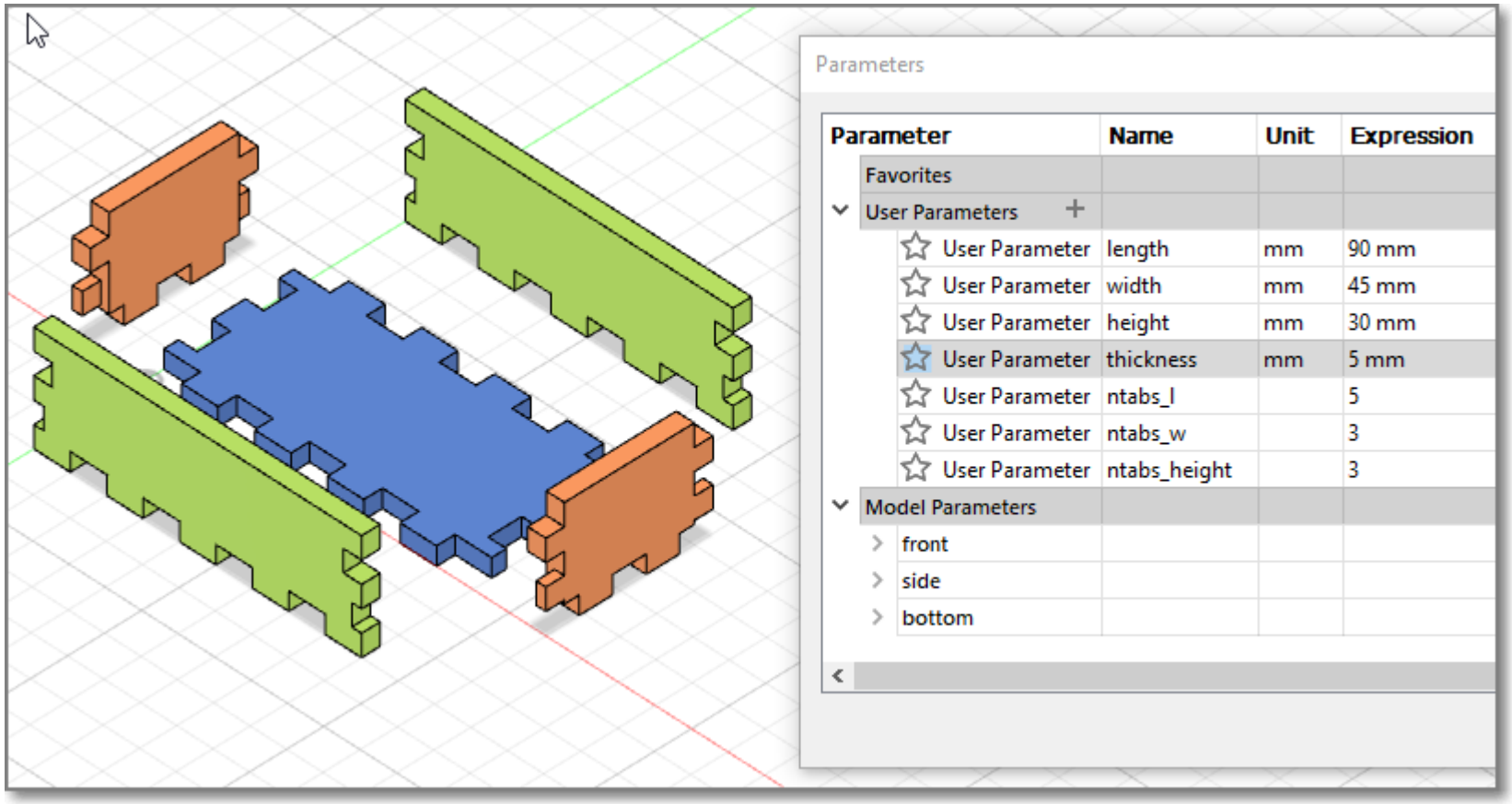
Combine





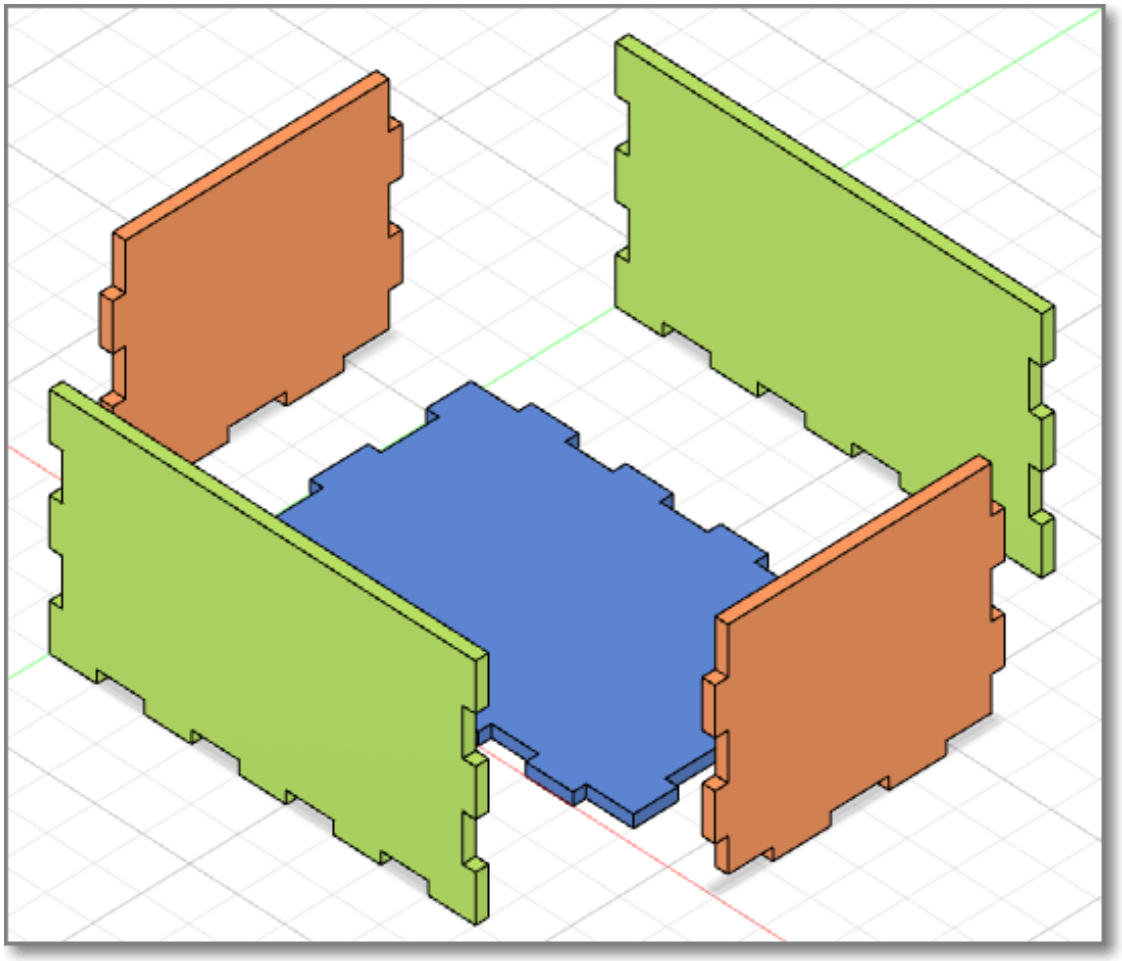
- Use the combine tool to create the tabs.
- Turn OFF components that are not used to improve visibility

Completed Model



- Change your parameters, the box should change without problems
- Some parameters do not work that well (which ones, why?)

Check Model



- Export and check the DXF of each of the components. Align them for laser cutting
- **Q**:
  Does the thickness of the material affect the DXF output for laser cutting?

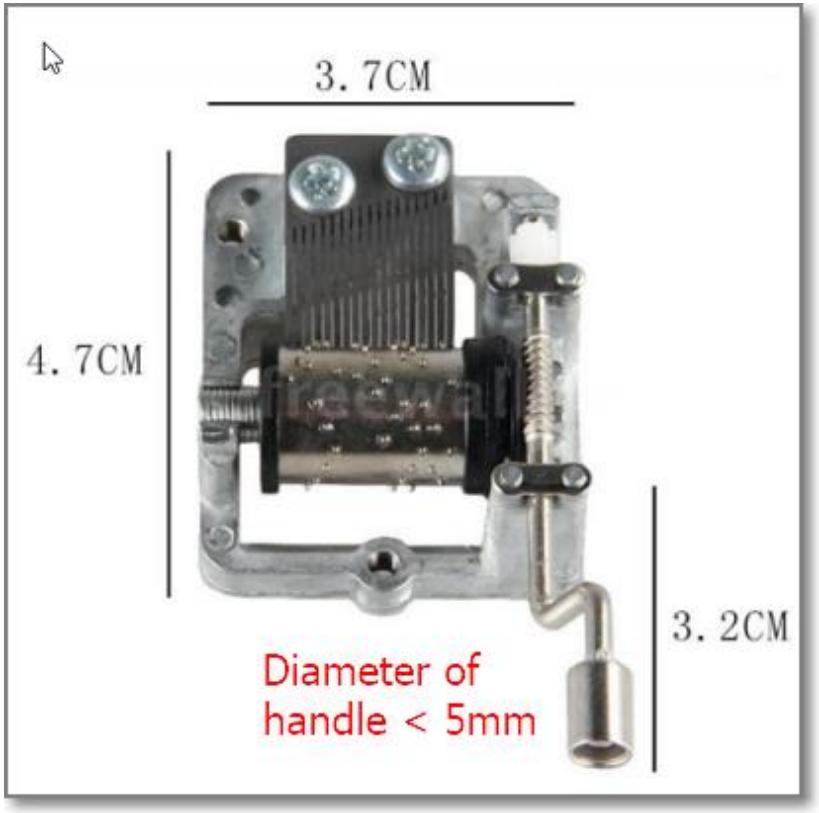
Assignment: Musical Box

- You are to create a closed box with a movable lid, specifications are as follows:
  - Must have a movable lid
  - Must be lasercut (wood 2.5~3.6mm)
  - Must be able to accommodate “mechanical hand-cranked music box movement”
  - Drawn and modelled in Fusion 360
  - Can be glued together (no nails, hinges etc)
  - Must be “decorated” in some manner

Example: Music Box

- Search:
  Musical Box Mechanical Hand Crank

DIY Music Box



- Hand Crank Musical Mechanism Craft DIY Music Box
- Must accommodate musical hand crank
- Measurements are approximate
- You can omit the hole for the crank until the box is assembled.

Marking Scheme

Item	Description	Score
1	Fusion 360 • Box design (.f3d included) – 25% • Lid – 25%	50%
2	Laser cut box fitting	20%
3	Write-up (how-to)	20%
4	Fitting, Enhancements	10%

Deadline for submission: Friday, Week 2 Term 2 (tentative)

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Computer Controlled Cutting

End