Build guide

Spark v.0.5

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As a private individual, you can make and sell these chairs as handicrafts or pre-owned items without any additional license.

As a legal entity (company/business) you will need to subscribe to my Patreon account in order to sell the chairs.

Sharing, selling, or listing any of the included files is strictly prohibited and protected by the US copyright law.

Please go to https://make.better.furniture/spark/guide to download the latest version of this guide. There might me some additions and correction included in it.

Chair dimensions

19.24in [488.58mm]

15in [380.89mm]

31.72in [805.76mm]

18.24in [463.39mm]
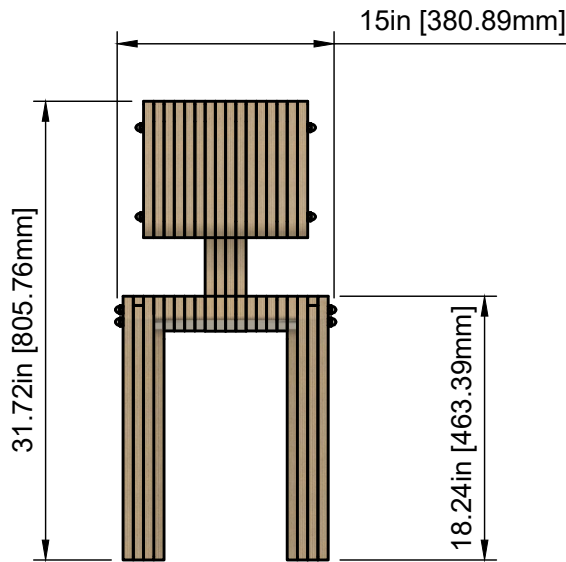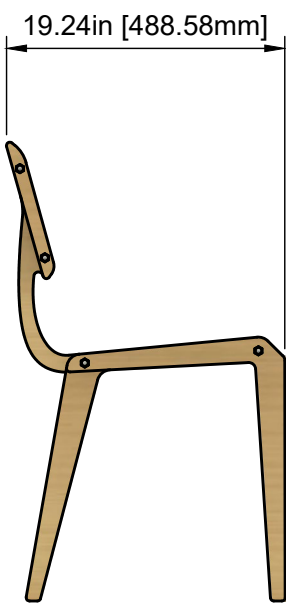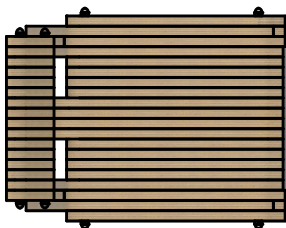
Required materials and tools

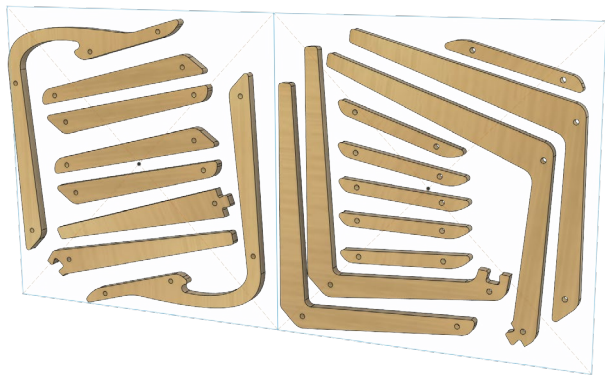| Item	Quantity	Notes
3/4" (18mm) Plywood	Half sheet 4 by 4 ft (122x122 cm)	Marine plywood with as many layers as possible.
5/16" (8mm) Full–thread rod	6 ft (2m)	You will need to cut it with a hack saw or angle grinder into smaller pieces
5/16" (8mm) Cap nuts and washers	8 sets	Definitely go for stainless

You will need as well:

- Sand paper
- Wood filler/putty
- Wood primer/sanding sealer
- Lacquer/varnish/paint
- Thinner
- Brushes/rollers/cloth

- Hacksaw or angle grinder for cutting the threaded rods
- Some ordinary 5/16" (8mm) nuts for temporary tightening.
- At least two wrenches for the nuts

Choosing the right files

The file archive includes two alternative layouts: 16"x32" and 24"x24".

Because this chair is symmetrical, each layout only contains half of the chair parts and has to be **cut twice**.

For larger machines, you can copy-paste the layout multiple times to fill the available work space.
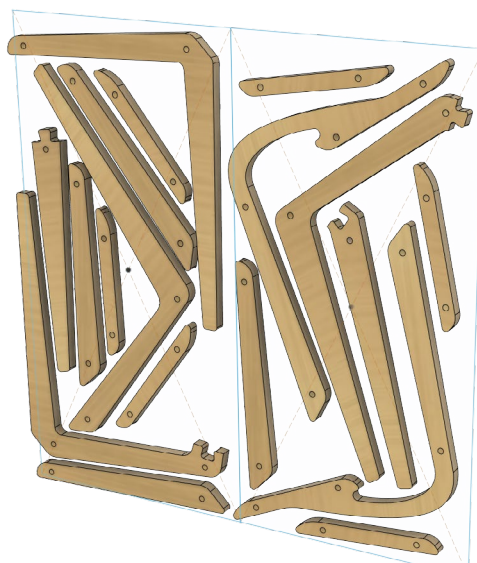
Spark 16x32

Designed for machines that have 16x32, 32x32 larger workspaces, such as Shapeoko and Onefinity.

Spark 24x24

Designed for machines that have 24x24, 24x48, 48x48 and larger workspaces.

Cutting tips

Paths

After you chose the right file, you will need to create paths for your CNC machine in the software of your preference. Use the *.stp files for Fusion 360 and svg/dxf files for other software.

- All paths in this design should be cut-through.
- The puzzle joints already include the neccessary 0.3mm clearance.
- It is recommended to use tabs to hold the parts.

Endmill choice, feed and spinlde RPM

The design layout supports 1/8" (3.175mm), 4mm, or 1/4" (6mm) endmills. For smaller less rigid machines, go with a thinner endmill.
If you are not sure about cutting settings, you will need to experiment because there are no universal settings for all machines.

You can use the following settings as a starting point for your experiments:

For less rigid machines:
1/8" (3.175 mm) 2-flute carbide compression endmill
1/8" (3.175 mm) depth of cut | 14000 RPM | 120 ipm feed (3000 mm/min)
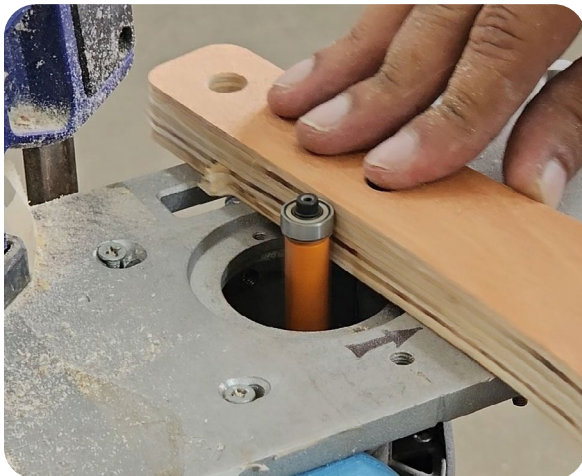
For more rigid machines:
4 mm 2-flute carbide compression endmill
4-8 mm depth of cut | 18000 RPM | 200 ipm feed (5000 mm/min)

For heavy industrial machines: You probably know what to do ;)

Assembly

1. If you used tabs, cut them off using an oscillating tool, hand saw, paper knife or a chisel.
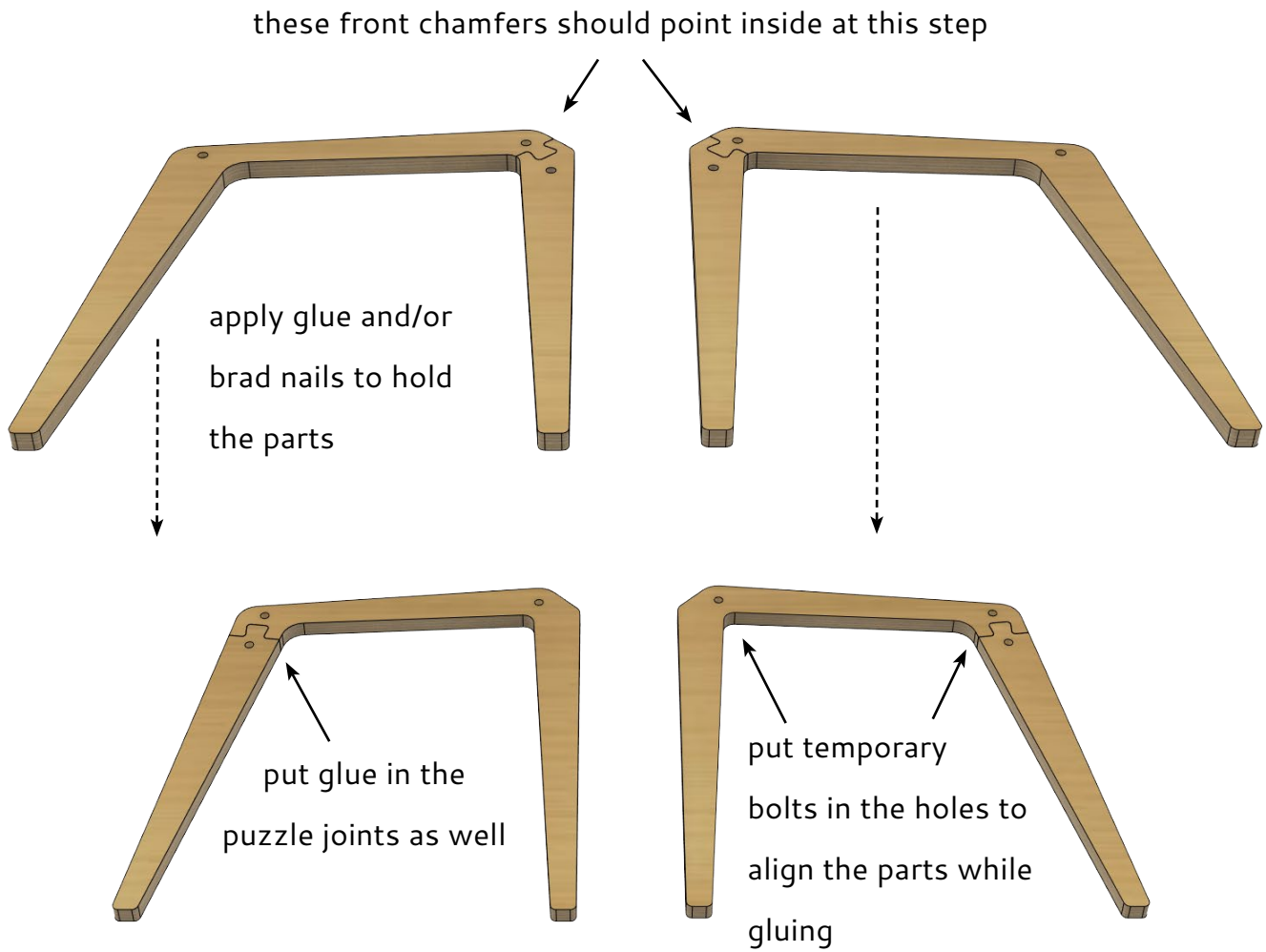

2. Clean the tabs off. The fastest way to do this is to use a router table with a flush trim bit that has a bearing.

There is no need to use a template for this, just make sure the bearing travels on the top edge of the part.

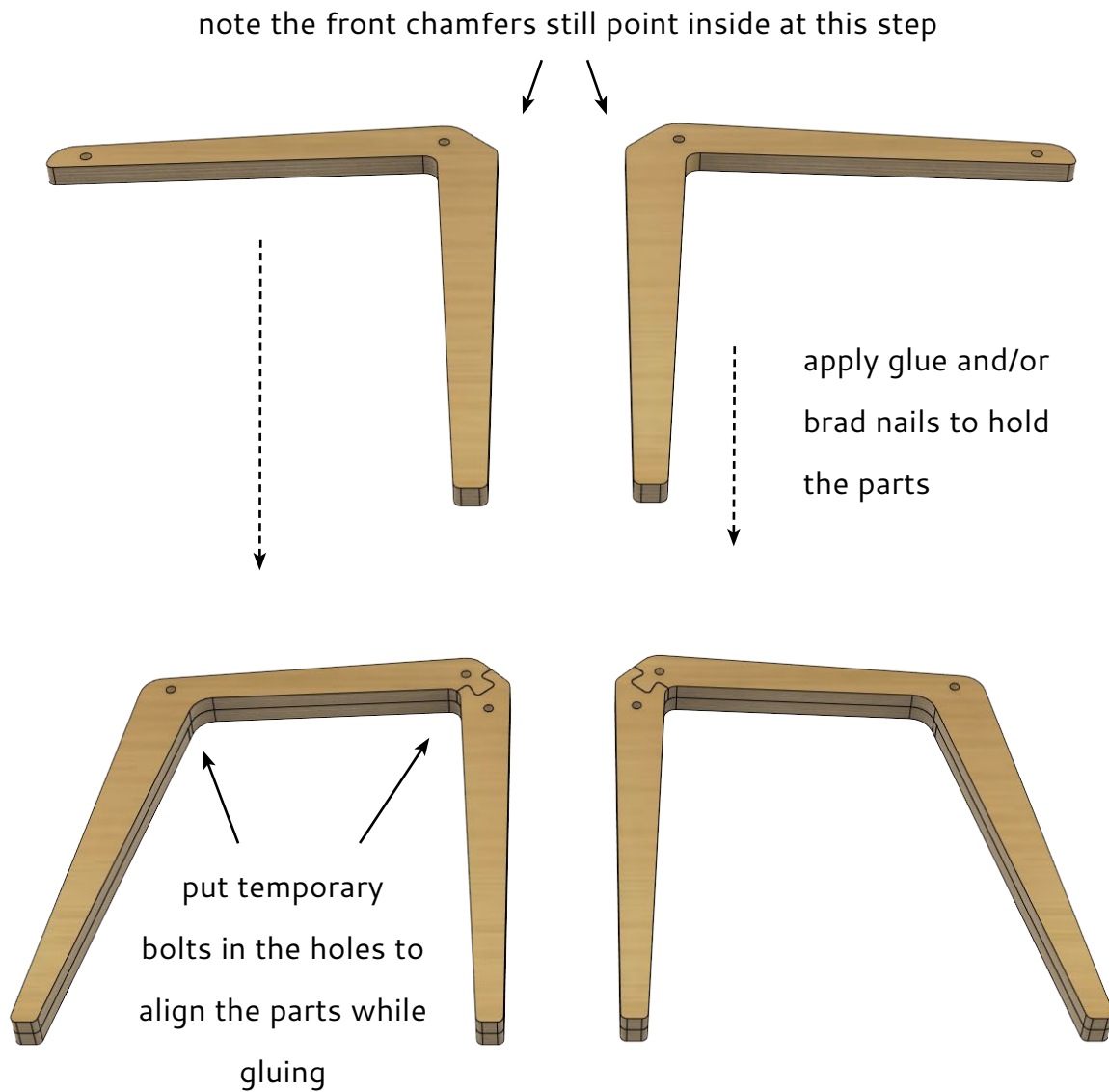Alternatively, you can sand the tabs off on an oscillating sander.

3. Pick the parts that have puzzle joints, sand the joints so they fit well, then arrange the parts this way in front of you:

these front chamfers should point inside at this step

apply glue and/or
brad nails to hold
the parts

put glue in the
puzzle joints as well

put temporary
bolts in the holes to
align the parts while
gluing

4. Find the 90 degree leg parts that don't have puzzle joints and glue them on top:

note the front chamfers still point inside at this step

apply glue and/or brad nails to hold the parts
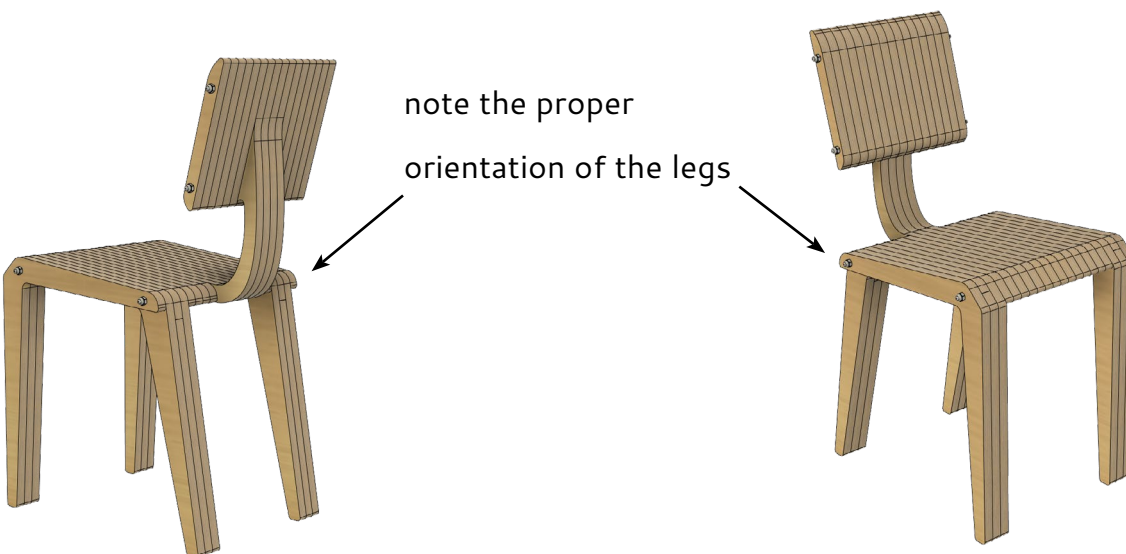
put temporary bolts in the holes to align the parts while gluing
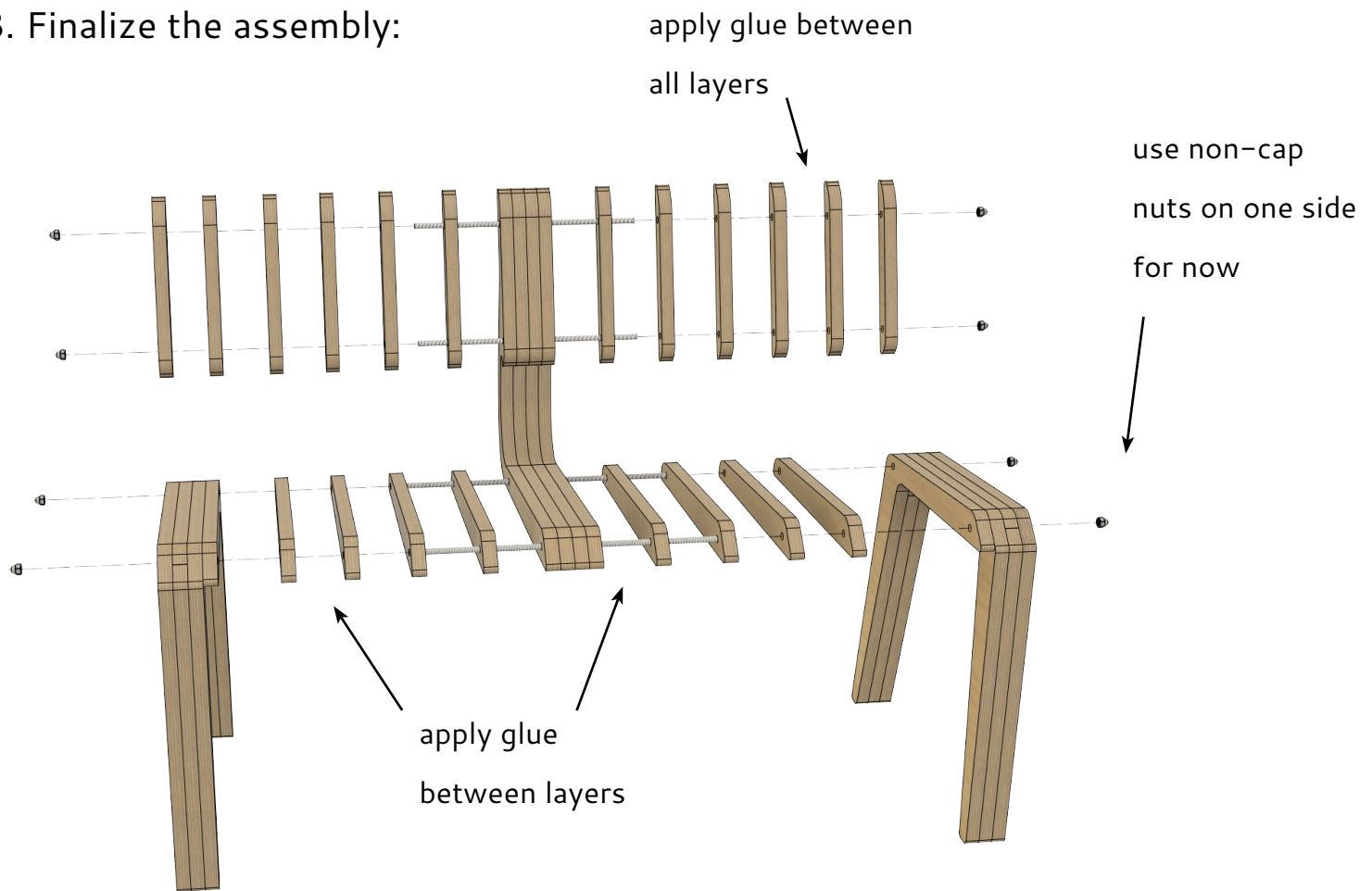
5. **Important step!** Flip the glued parts so the chamfers point outside and then glue the last leg parts on top of them:

The chamfers point **outside** at this step because we flipped the parts

apply glue and/or brad nails to hold the parts

support these overhanging parts by some scrap plywood pieces
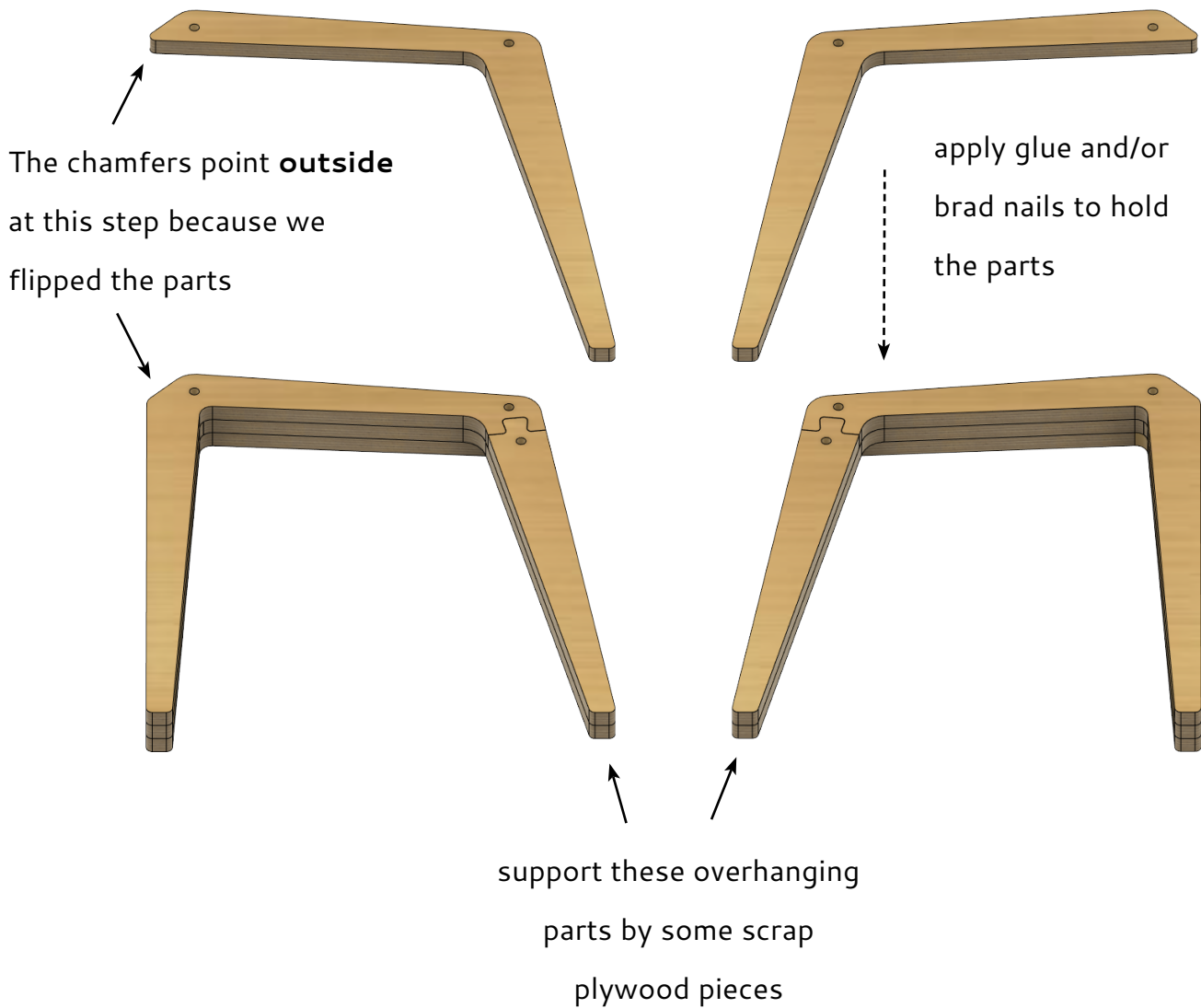
7. Cut four 20" (50 cm) pieces of threaded rod so they are longer than needed.

8. Finalize the assembly:

apply glue between all layers

use non-cap nuts on one side for now

apply glue between layers

note the proper orientation of the legs

9. Adjust all layers to align well and create flat surfaces (as much as possible), then tighten the chair and let the glue dry.

10. Mark the final length of the rods with a marker or masking tape,
11. Take the rods out and cut them to final length.

Finishing

1. Sand the whole chair with 100–150 grit sand paper.
2. Fill up any holes and voids with wood filler and let it dry.
3. Sand the whole chair with 180–240 grit sand paper.
4. Apply a layer of wood primer or sanding sealer and let it dry.
5. Sand slightly with 240+ grit.
5. Apply 2–3 coats of paint or varnish, sanding between layers if needed.
6. Let the chair dry at least overnight before the final 400+ grit sanding.
7. Apply wax and buff the chair.
8. (Optional) Put some epoxy resin or rubber/soft pads on the feet of the chair.
10. Once everything is dry, you can install the full–thread rods back
and tighten the cap nuts slightly. Avoid overtightening the nuts as it can

Please leave a review

Well done, you have completed the Spark chair assembly!

Please consider leaving a review about your experience here:
https://make.better.furniture/spark

★ ★ ★ ★ ★

Credits

Thank you for buying the Spark chair files and showing your support! Without your contribution I wouldn't be able to make this design real.

I truly appreciate any feedback, suggestions, photos of the chair, and commercial partnership ideas.

Please send all of those to my personal email ajay@better.furniture.

– Ajay Verma, 2024

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