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Tree Fort Plans

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Photos of The Build

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Recommended Tools

-Tape measure
-Level
-Speed square
-Hammer
-Drill and driver combo
-Chalk line
-Hand saw
-Laser Level (or water level)
-Circular saw
-Driver bits
-Drill bits
-Wrench
-Auger bit

IMPORTANT: Note that this tool list is flexible and the above models are only suggestions. Read through the full build guide before buying anything!

At a bare minimum you need a level to make sure things won't topple over. You'll also need a tape measure, a saw to cut wood, and you need a way to fasten things. A drill or impact driver will work for framing screws and roofing screws. A hammer can be used if you're driving nails.

Power tools can speed up the job, but will cost more. For example, a handsaw will (slowly) manage, but I enjoy a cordless circular saw and using a speed square as a guide, as a cost effective way to make quick and accurate cuts. However, with a project of this scale, a miter saw will make even quicker work of those cuts. Same goes for framing nails and a framing nail gun over using a hammer.

In short, there are tradeoffs and many tools that'll work. Think through all steps of the build and consider which tools feel like the right fit for you and this project. Feel free to ask me questions.

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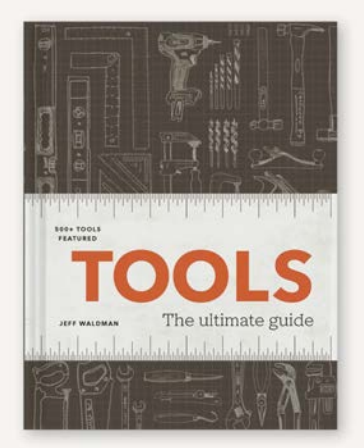
Recommended Reading

Book

If you're new to building, or would like to know more about tools and their use, don't worry, I wrote a book!



It's the perfect guide for any DIY builder, home owner, or those curious about these storied objects. With over 280 pages of illustrations, how-to, safety, trivia, and history, you're sure to learn something new. It's a handsomely packaged celebration of 500+ tools and makes a great gift.

You can see more here, or buy a copy on Amazon, or support an independent local bookstore.

Newsletter

I write a newsletter that answers all the most common questions that I get about project planning, building permits, tool tips, etc. It also covers the other questions frequently sent my way about community and skills building, design, and a variety of other related topics.

Explore previous posts and subscribe if you like. New posts every two weeks. (Be sure to check out the collection on Tools and Project Planning.)

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Notes on Materials

- You're welcome to choose your own wood, but we mostly used untreated doug fir which would not be the longest lasting solution without paint or some other kind of sealant. A better route would be redwood, cedar, or pressure treated wood. But being off the ground it'll still last a while just as plain fir if you want to go the cheaper route. Figure 10 years for untreated fir, 20+ years for redwood or cedar, and if you paint or seal either of these you can add decades more to their life. We used pressure treated for the pieces touching the tree and regular doug fir for the rest.
- The tree's girth will need to be taken into account when adjusting the dimensions of the build.
- You'll want two people for this. Though having some spare 2x4s around to prop things up can help. You can also temporarily screw blocks to the tree to support the beams from underneath while you do the drilling and screwing.
- This is a VERY basic build. The most rudimentary materials and lag bolts into the tree. This will scar the tree after several years as the tree grows around the beams. A better solution would be to use Treehouse Attachment Bolts (TABs) which stand the supports out from the tree, but these will be costly and are likely overkill for most backyard tree fort builds.
- Ideally buy ¾" lag bolts online. But 10" long ½" lag bolts from your local hardware store if you aren't planning on much weight will be just fine. You'll need a large drill and an auger drill bit to drill the hole and install the bolts. (Size your drill bit for your lag bolts. The linked one is good for ¾" bolts in softer woods.)
- When putting up the rim joist framing around the tree you'll want it to be square. One way to ensure this is to build 3 sides on the ground with two temporary braces across the corners to hold the 3 sides in a square. Then raise it up, sit it on the beams, and slide it around the tree. Then add in the 4th side. Fill in the joists inside the frame and attach them to the beams with galvanized hurricane ties. Or you can just use a framing square at the corners. It will be less exact, but not a huge problem.
- Regarding hardware: GRK 3 ⅛" framing screws or similarly sized framing nails. These you'll use for putting all the framing together. I love GRK screws. They're far superior to anything else. Much stronger. Less likely to strip. And unlike nails it is a lot easier to undo your work and move things around if need be. You will find that 4" (or even 5") GRK screws are a better length for screwing the diagonal braces into the underside of the framing. Simpson 1 ½" screws. These are for your Simpson hurricane ties. Deck screws. These will do for your decking. Or anything similar to them in whatever color you prefer. (There are a few companies selling them in a few colors.) You can use shorter GRK screws if you like, but I suggest deck screws here just to keep the cost down, as the higher quality GRKs aren't as necessary.

Materials List

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IMPORTANT: You must read the full build guide before buying materials. The materials list is not exact and will be affected by a few choices you make in the build process as far as tool availability, your skills and comfort level, and material availability and budget.

Read it all, ask questions if need be, then go buy your materials!

Wood

(2) 2x10 @ 8'
(33) 2x6 @ 8'
(6) 2x6 @ 10'
(9) 4x4 @ 8'
(12) 2x4 @ 8'

Hardware

(8) Galvanized lag bolts ¾" x 10" or ½" x 10" (read about options in the guide)
(8) Galvanized hurricane ties
(2) gate hinges (optional)
(1) Gate latch (optional
(5) pounds deck screws
(5) pounds of framing nails or framing screws (A small box of GRK 3 ⅛" is what I recommend.)
(1) small box GRK 4" framing screws
(100) joist nails or simpson screws for hurricane ties
(18) Thrulok, or 6" ½" galvanized carriage bolts with nuts and washers (for railing posts)

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Step-by-Step Build Guide

Important: Over the course of this how-to I'm going to reference alternative methods to make this structure. I'm doing this in order to accommodate various levels of capability and tool ownership, because there are several ways to do this build with a few basic tools, and there are also other ways to make an improved version of it with more capable tools and know-how. Keep that in mind as we press on.

The Tree

You'll need a tree that's healthy, not in danger of toppling over, and is 18" thick at about head height. Can you get away with a smaller tree? Sure. But your bolts might hit each other in the tree.

You also might plan to adapt these plans to be partially supported in the tree and to have posts coming down to the ground. Nothing wrong with that! This can allow for a smaller or less ideal tree.

Height wise you can put this as high as you want in the tree. Our build (and the plans and materials list) are designed around a deck that is about 8 feet off the ground. Keep in mind the adjustments to diagonal knee braces, ladder, etc, if your height is changing.

Be sure you can work in and around the tree. Remove any problematic branches.

Size

Our 8' build has roughly a 2' tree coming through the center of it. Bigger trees are fine, but make for less deck space. You can size up, or down, the deck size. Here's a family that built a 10' version.

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I wouldn't go much larger than 10', given the size of the 2x6 joists. But anywhere between 6 and 11 feet across would be a reasonable size for this design and lumber size.

As built, and planned in this guide and the blueprints, it's an 8' across size. I'll describe it using that size, but keep in mind that there's no reason you have to abide by those sizes. Adjust things up or down a little as needed and shop for your materials accordingly!

Building In Trees: some important notes

Do yourself a favor and read some stuff I've written about building in the trees.

Because this is a low weight, low budget build, and presumably you're new to this, I'm going to describe a means of building this tree fort that uses simpler hardware and more commonly available tools. The main difference being that I'll be recommending lag bolts, rather than Treehouse Attachment Bolts (TABs).

TABs will stand further off the tree and allow for decades of unimpeded growth. They're pro-grade and the "right" way to build any treehouse. However, they also cost quite a bit, require more special tools, and are trickier to install. But if you want to go that route, do it! Feel free to email me with questions.

Lag bolting your beams directly to the tree won't hurt the tree, but it will scar it a bit more, as the tree will grow around the beams. This will reduce the lifespan of the beams and the build and you may find yourself wanting to remove it in 15 years or so. Depends on the tree.

You can extend the life expectancy of the build by creating wooden spacers and I'll cover that next.

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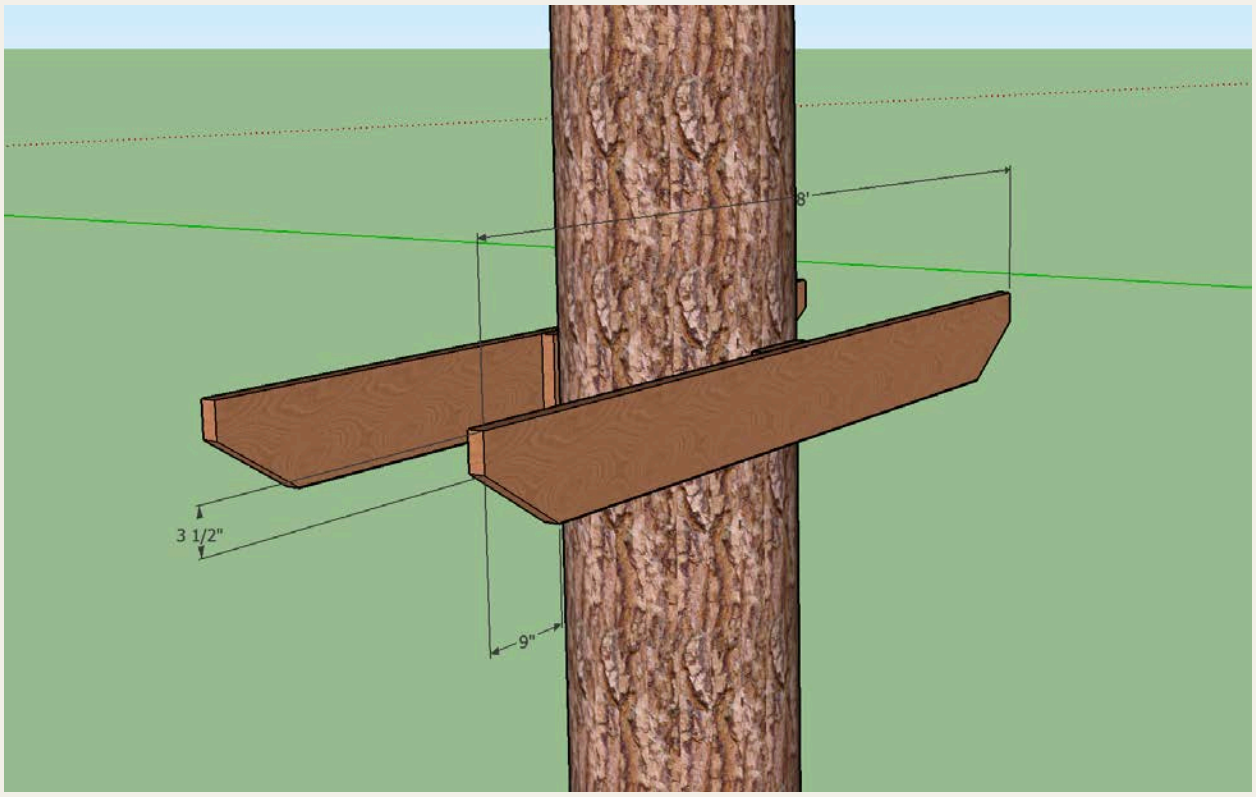
Attaching Your Beams

Cut two 2x10 beams to 8' long. If they're a little longer it's fine, so if you bought them at 8' and don't want to cut them, great.

We cut a taper on the end of ours for aesthetics. You can do the same. Doesn't have to be exact.



Find the area on your tree where attaching the beams will put the deck height where you want it. You'll have 2x6 joists and decking, so the top of the beam plus 7 inches is your final deck height.

You may find the need to chip away a little bark to create a good surface for the beam to press against to keep it plumb (vertical) once attached. Don't get too carried away.

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As mentioned in the previous section, you might attach these with TABs. Or you might choose to do as we did and create some wooden spacers. Use pressure treated wood if you can. Or cedar or redwood. Both will hold up against insects and rot.

(While on wood, we used pressure treated for the 4x4s, spacers and 2x10 beams that are more in contact with the tree and regular untreated wood for the rest.)

The spacer will keep the tree growth a little further away from the decking and the beams and give a little more life to the structure. It won't do much for scars on the tree as the bark grows around the spacers.

Now, a note about spacers and trees and bark.

You want a good 6+ inches of bolt penetration going into the wood of the tree. Not the bark... but the actual wood. If you've got a big fluffy redwood with thick bark you'll need longer bolts. An oak tree with fairly thin bark, shorter bolts are fine. No spacer, shorter bolts. Spacer, longer bolts. You get the idea.

10" lag bolts are going to be fine for a tree with reasonably thin bark and a spacer. When in doubt, go bigger. Boltdepot.com or similar sell galvanized lag bolts in all the sizes you need. ¾" thick would be

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ideal, but if you want to grab the largest size at the local store or Home Depot, which is usually ½", that'll do.
So, you've got beams cut, spacers made (maybe), lag bolts in hand, and a spot on the tree to put them.

If using spacers, attach them to the center of the beams with some wood screws just to hold them in place.

Put your first beam up on the tree. You can hold it in place with clamps, if you've got them. Or you can screw a block into the tree just under the beam and rest the beam on it. Or you can use some longer wood screws through the beam and into the tree to hold it in place.

Get a level. 4' long would be good. Level your beam. Pin it in place with a screw or wedges. Check that it's fairly plumb. Adjust bark if need be. Or you can even put some wedges back there.

Once you're satisfied, drill a hole with an auger bit. What size auger bit? Glad you asked.

For ¾" bolts, if your tree is softer wood (redwood, pine, others) use a 5/8" bit. If it's really hard wood, like oak, use an 11/16" bit.

You'll need a very strong cordless drill to spin these large auger bits. Or a decent corded drill. A large stud and joist drill like a Milwaukee Hole-Hawg will really get it done. But those are more costly.

Drill to an appropriate depth and clear the hold of saw dust. Then install one bolt and washer with a socket and wrench. Doesn't have to be super tight yet.

Check that you're still level and drill and install the other bolt.

Now the hard part. Getting your other beam level and square to the first.

You can use a water level to check both sides of the tree and match them (a clear tube with water in it. The water will be level on both sides. Or you can use a laser level perpendicular to the beams.

Once you find level, temporarily put up the beam and use a framing square and some scrap wood to check that they are square to one another.

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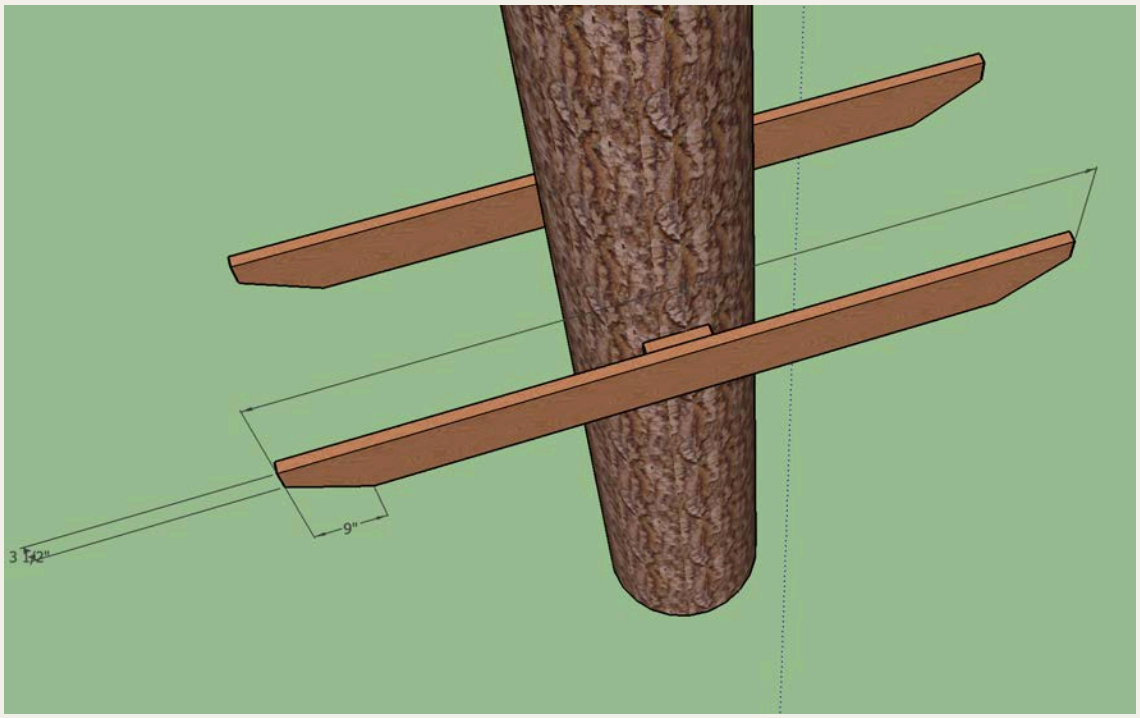
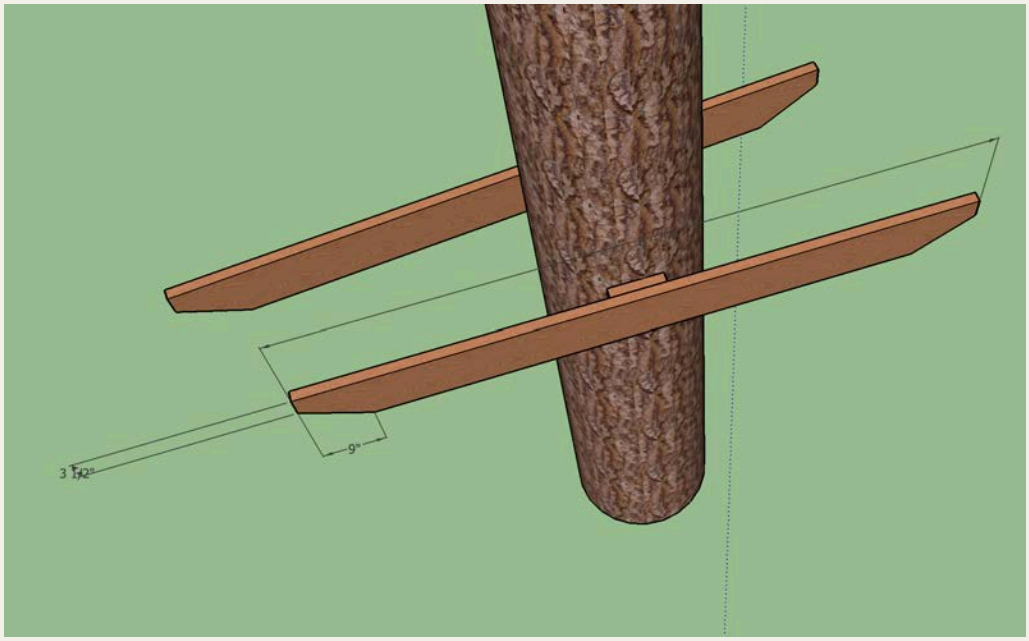
We want this:



Not this:



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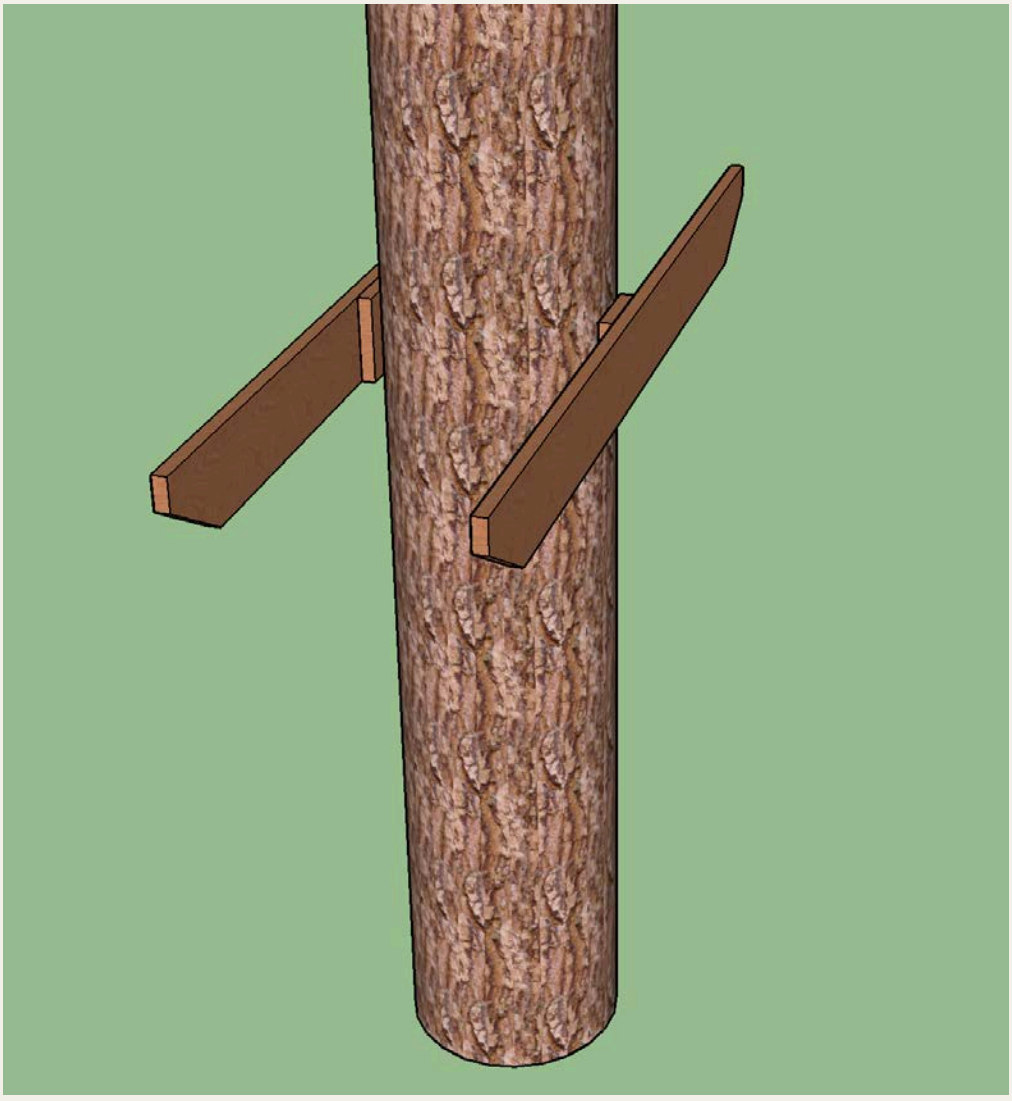
Be real careful about getting this right. You don't want to poke extra holes in the tree right next to each other.

Once you're satisfied that both are level to one another and that they're centered on the tree you can move on to attachment. If they are a little bit unparallel– meaning that they're level, and the front and backs are lined up, but there is a little bit of a taper/widening between them, that's okay. Also keep in mind you'll have some flex.

Drill and bolt the second beam. Congrats. You are here:



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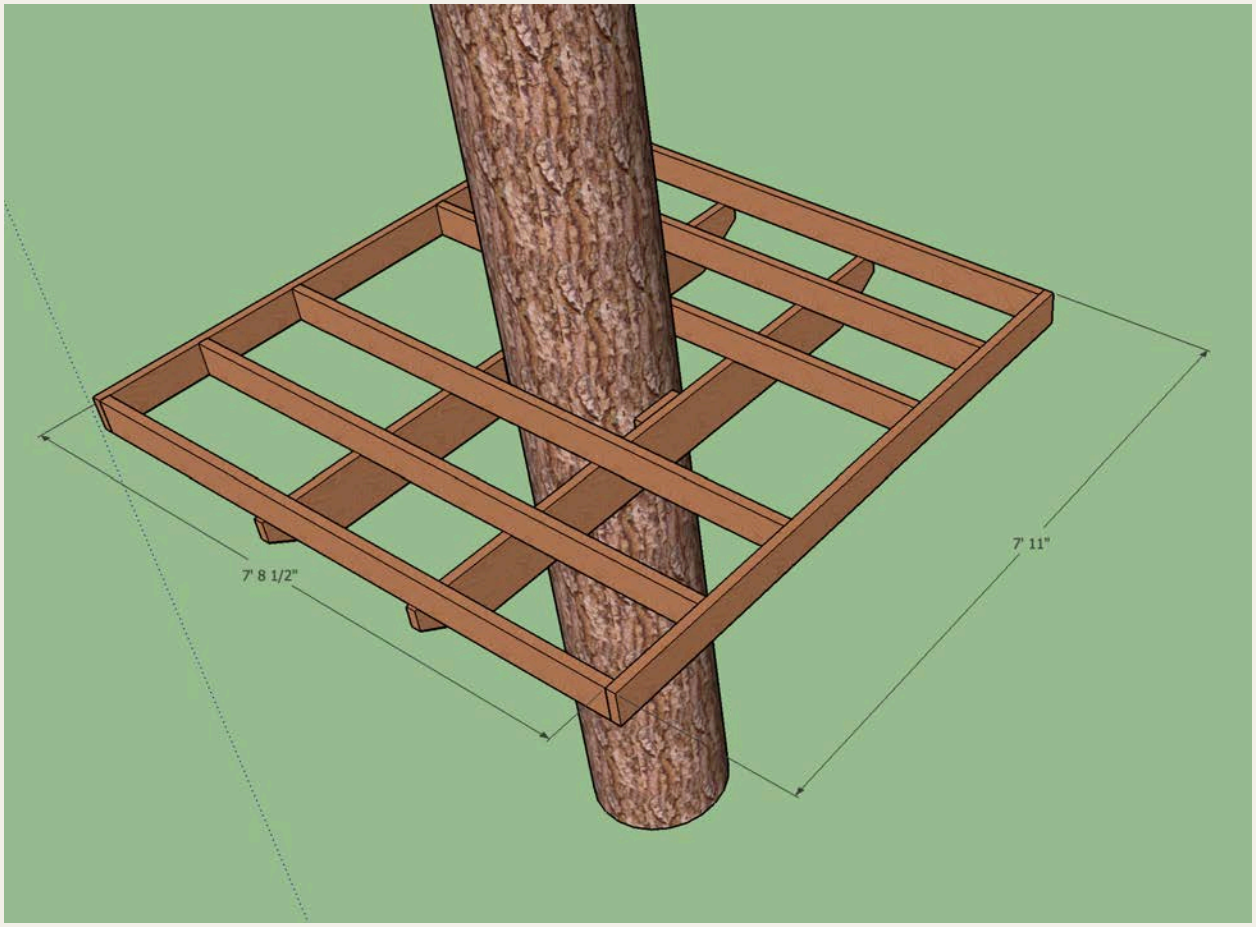
Floor Joists

You're going to cut your floor joists from 2x6. This gets a little tricky, because this isn't a shed... it's a tree fort. And all trees are different. So, apologies that I can't give a straightforward cut list. I just can't.



For an 8' platform around a tree that's about 18" you'll want 6 floor joists at 7' 8 ½" and two rim joists at 7' 11". The general idea is pictured above.

You can space these however you like, but don't space them any further than 24" apart. (Ours are spaced about every 16".) You may need to add some blocking around the tree trunk, but to give your decking something to land on (that's what we did), or to have a joist going down the center, if your tree is thick and you need a floor joist where the trunk is.

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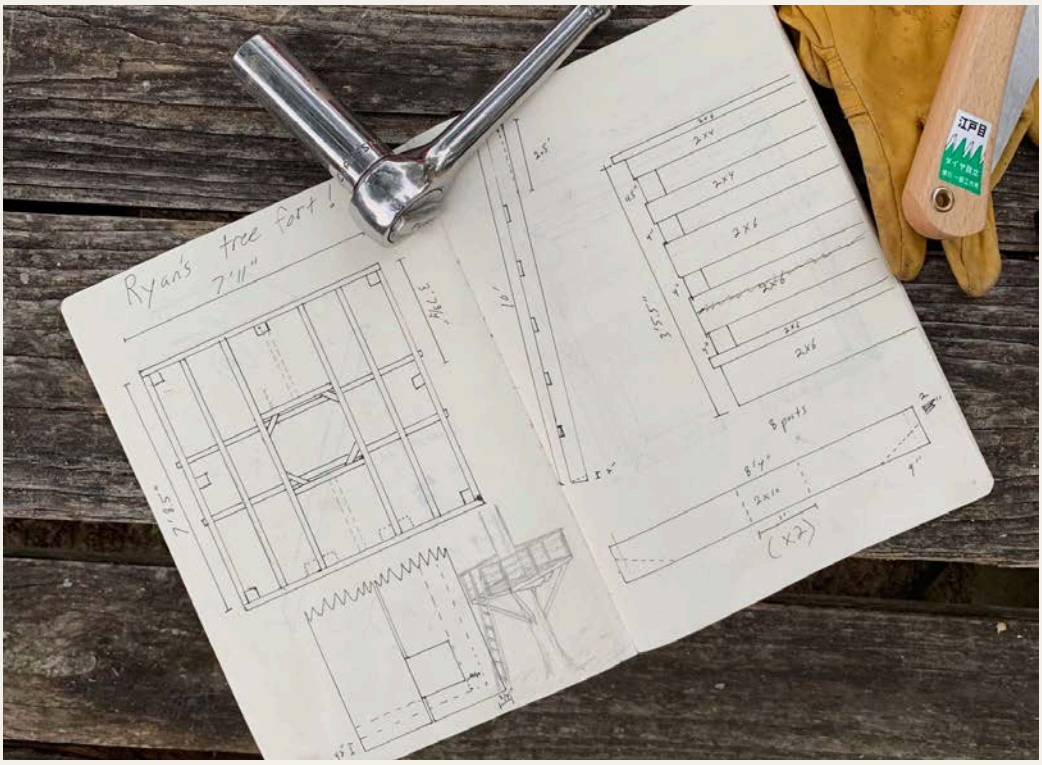
On our build I ended up adding roughly 2' long blocks on either side of the tree trunk and another short joist on each side, just for good measure. I did not end up doing the cute little 45 degree corner blocks that you see in this drawing:



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Cut your pieces to size. Get a sense of how you'll space them, mock it up on the ground, then get ready to put it up in the tree.

It will help to have a friend. Start assembling the box of the floor joists using 3 framing nails or framing screws at each connection. It will likely be pretty floppy, not square, and flimsy. That's fine.

You don't have to do all the blocking around the tree trunk, but you do need to have the 4 sides of the box made and some joists in place for the next step.

You'll now go about squaring it up, getting it level, and attaching it to the beams.

Use a framing square to check your corners and square up the frame. Once you have it square, temporarily screw some 2x4s across the corners, diagonally. Because triangles will hold the shape.

Check that it's level all the way around and centered on the tree and the beams. Put temporary 2x4 braces along the edges (not the corners) to hold it in place and level. Check and recheck level and square and it being centered until you're absolutely sure you like how its sitting.

Now attach the joists to the beams with hurricane ties and either nails or screws made by Simpson for those hurricane ties.

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For the outer joists I just toenailed a couple of screws into the joist to pin it in place. No hurricane ties. (Place screws and hurricane ties where they'll be less visible.)

Knee Braces

TIme to do the diagonal knee braces. I'm not going to lie... this part is hard.

So your floor joists are up. They're square (and temporarily braced that way with some diagonal 2x4s screwed across the top. They're level. And this is all helped to stay that way by way of some temp 2x4 posts screwed into the edges of the square. Time to put permanent braces into the corners.

You can cut 45 degree braces from 4x4 posts and attach them as is. However, I opted to give my post a little bit more of a flat surface to land on. I made a small 45 degree corner piece from scrap 2x6 and even gave it a cute little nub to notch against.

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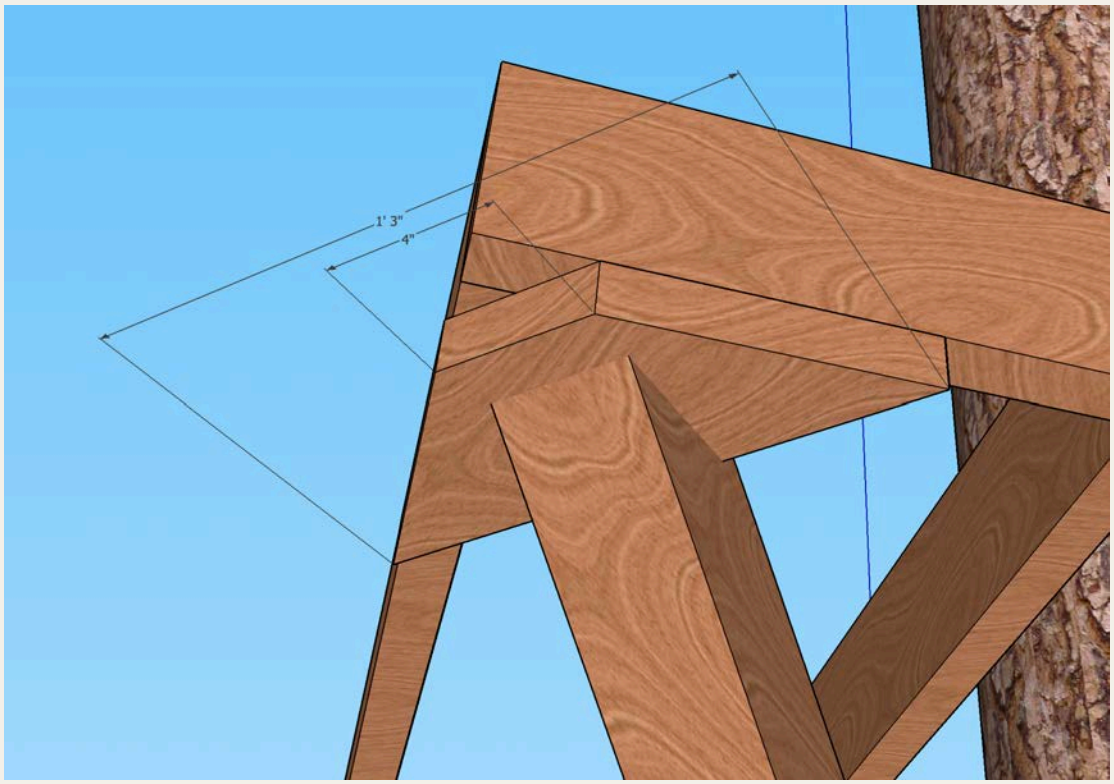

You can do this. But you also have other options.

You can just butt the 4x4 brace to the underside of the joists in the corner. However, you may notice that the 4x4 doesn't contact much. See:

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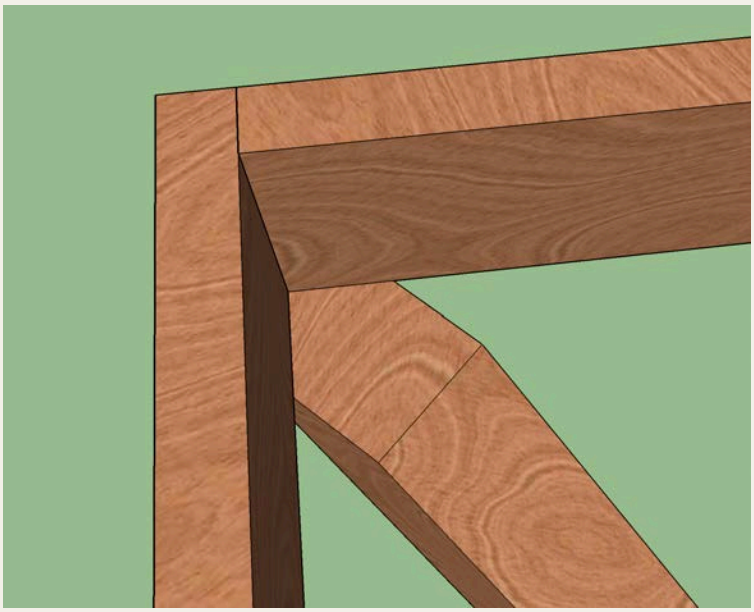

So, you might opt to take some 2x4 or 4x4 and cut a 5” long block and screw it into the corner, through the floor joists, from both sides. Flush along the underside with the joists. This way the post has more contact and offers better support. **Read a section ahead on POSTS though. As your railing posts might fill this role!**

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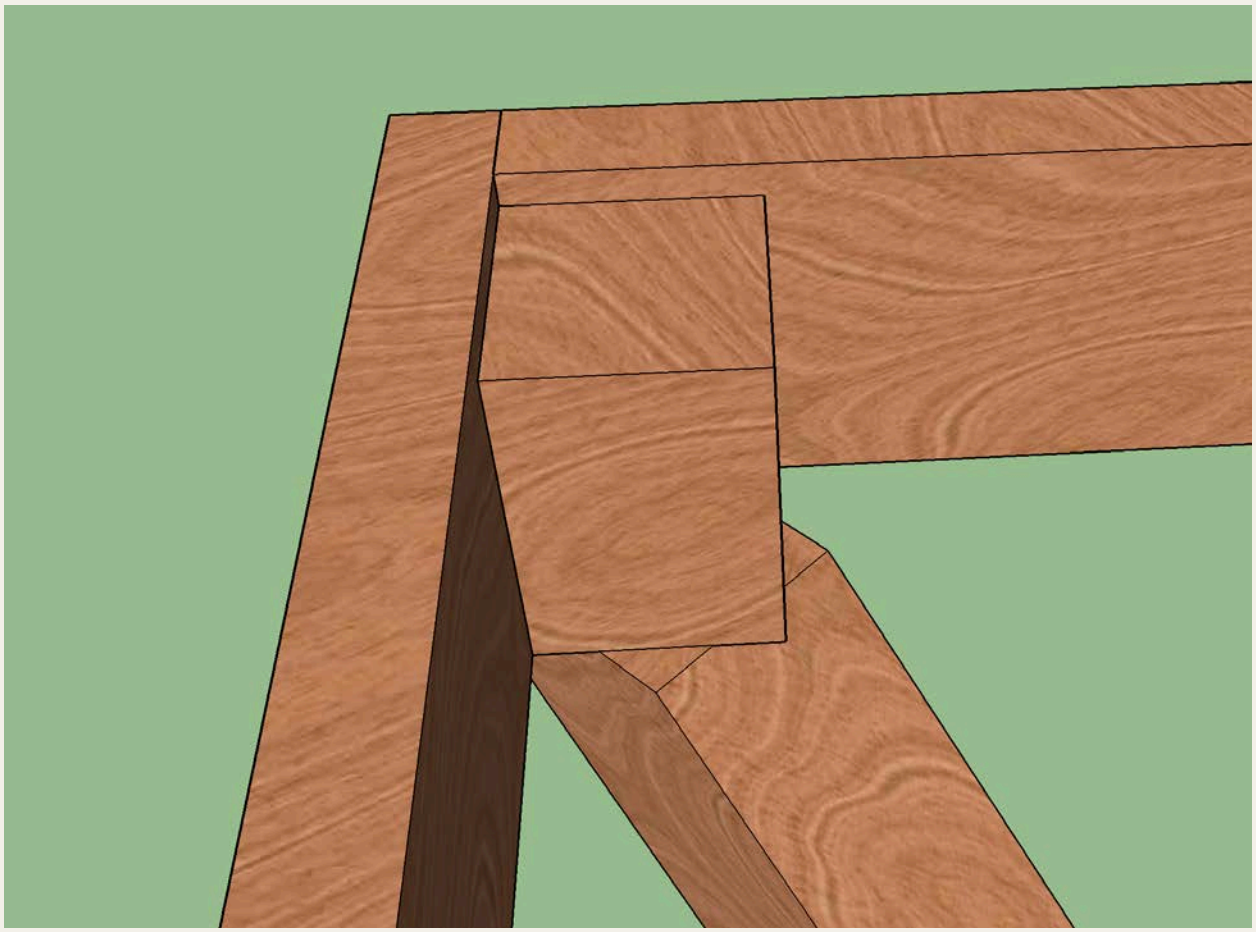

In any case, choose your method and prepare your corners.

Now for the fun part. On an 8' wide platform, with 45 degree knee braces, and a tree that's perhaps 2' thick near the bottom, your knee braces will be about 6' 2" long. However, they won't be *exactly* that long. Thickness of the tree will change that. And in fact, because of the shape of the tree, each brace will be different. Sucks, I know.

So, you're going to use a saw (miter saw, or hand saw and a digital bevel gauge, or a speed square.) and cut a knee brace that's intentionally too long. It will have 45 degree cuts on each side.

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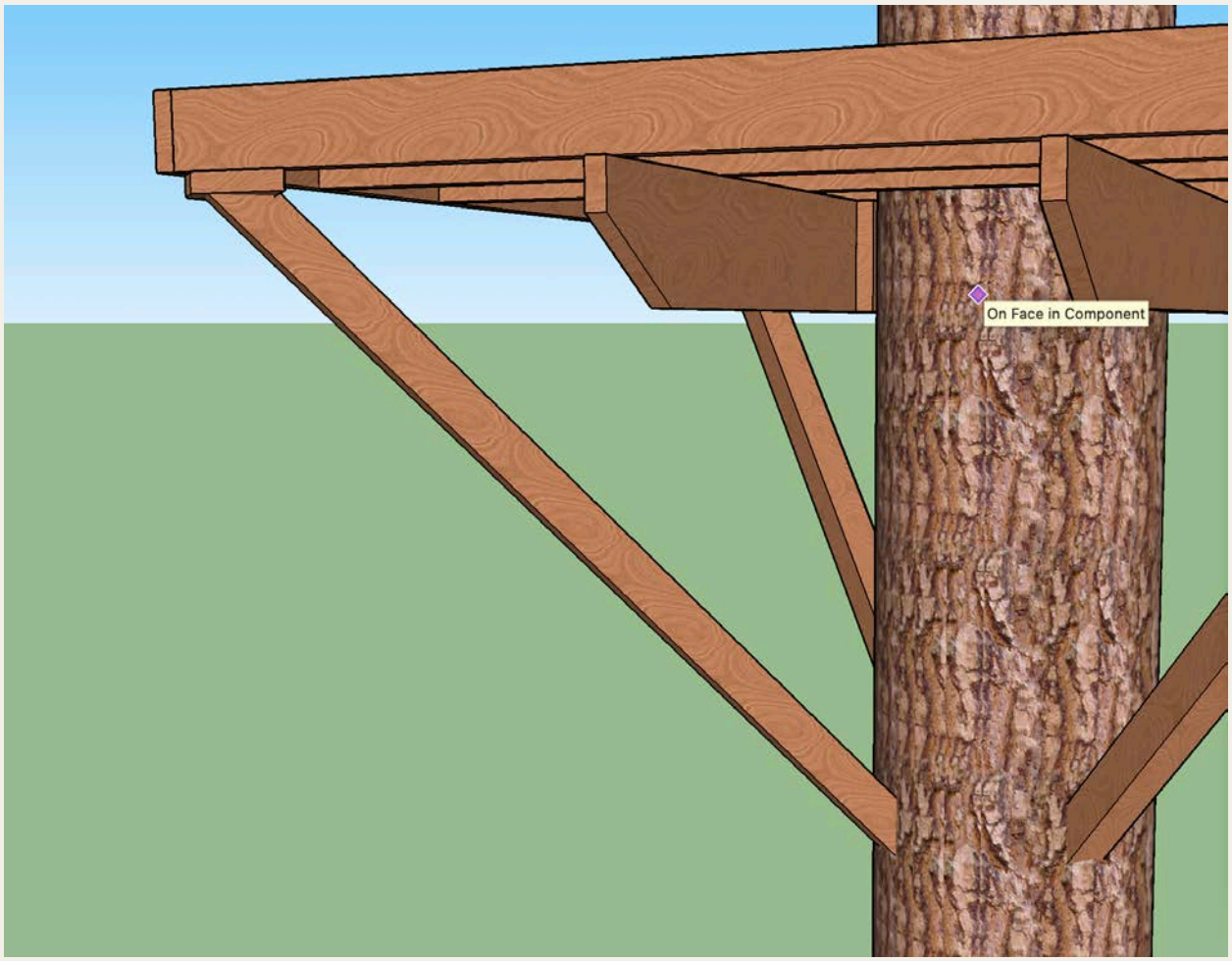

Use a friend and a tape measure and make some measurements first about what you guess the length is, then add to it. Add a few inches if you're super confident. Add a full foot or more if you're not at all.

Once cut, take that brace and fit it in a corner. Try it in all the corners. Make sure the angle is correct. How's the length? Too long I hope? By how much.

Note where it (probably) hits the tree. Need to trim any bark there? Do it before committing to a length of a brace.

Shave the brace down by a few inches maybe and check again. Do this until it fits snug into one corner.

If you're feeling confident you can use this brace as a measurement device for the other three corners. Hold it up. Note if it's a little long or short and take some measurements and log where that piece will

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go. And remember... long is better than short. You can always shorten it. But if you go too short, you're driving to the lumber yard for a new piece of wood.

Once all 4 braces are cut you can install them. A friend helps. You can also temporarily screw a block onto the tree just under where the brace sits, to support it while you work on it.

The top of the 4x4 gets a few 4" long GRK screws into it and into the floor joists. The bottom gets lag bolted to the tree.

For this ¾" galvanized lag bolts are good. ½" one will work as well. If you want to use ⅜" GRK RSS structural screws, those would also work. (I love those screws.) Length wise, 10" is a good bet. The thickness of the bark comes into play, as does the angle. You'll notice in our build the screws are more or less perpendicular to the face of the wood on the brace. This works, but it requires a longer screw because of the steep angle going up into the tree, in order to get good penetration into the tree.

A better method would be to take a 1 ½" forstner bit, or a spade bit, and create a small pocket for the lag bolt to sit in, pointing more directly into the tree. Not my tree fort, but here's an example of what that countersunk recess would look like (ignore that it's two bolts... you'd have one single bolt):

Drill your pilot holes with the appropriate auger bit for your bolts (and for the hardness of your tree's wood) and then install the bolt and washer.

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Do that 4 times and you've got your knee braces in. You can remove your temp 2x4 posts that were supporting the joists.

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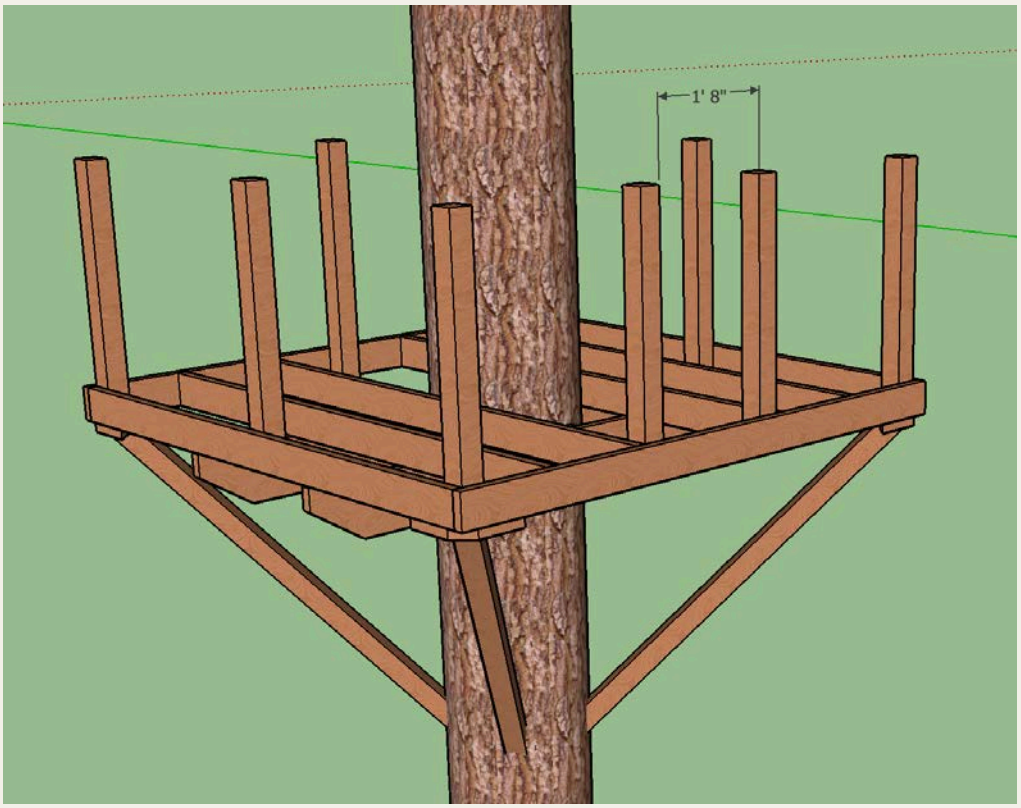
Posts

The railing is optional of course. But if you're doing one, this might be where you decide to put up some posts.

It would be easier to just deck the whole thing and install posts on the outside of the floor joists, but I was trying to keep the build efficient and to use as much 8' lumber as possible. Posts on the inside mean that my railing material can be 8' long. Posts on the outside mean you'll need to work from 10' long material. Up to you!

To do railing posts as we made ours you'll need 9 4x4 posts cut at 3'6". Check that you like that height though. You might prefer it a little taller or shorter for your use.

The post bottoms will be flush to the bottom of the joists. (These might be something that your knee braces are landing on. See the Knee Brace section above.) You'll want to install them plumb. Use a level and a clamp. One in each corner, and one centered between them, but assuming you're doing a ladder on one side to enter, one side will have two posts. You can space them as wide as you want. We did ours with a 1'8" gap between the posts.



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To attach them to the joists you can either through-bolt them with ½" thick, 6" long galvanized carriage bolts. Two per post. Or you can use a through bolt replacement, such as Thrulok. These are available in boxes at Home Depot and similar. That's what we used.

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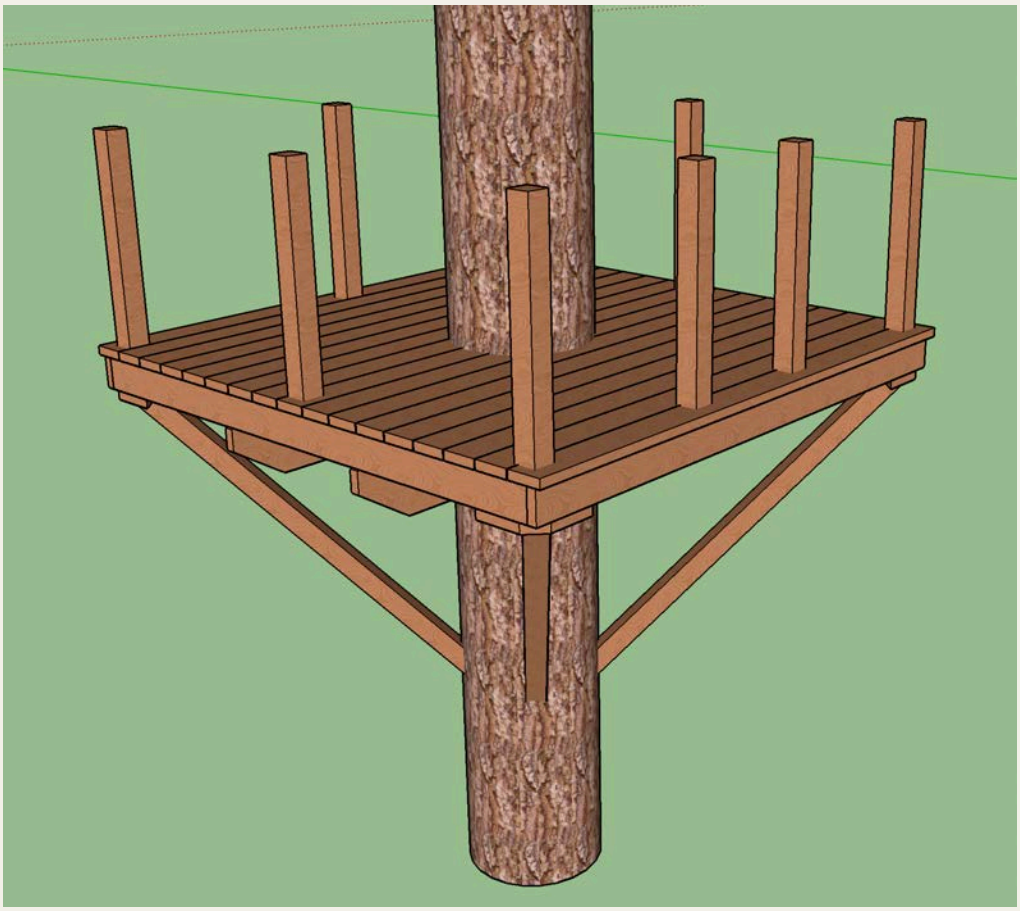
Decking

You can start to remove your diagonal cross bracing that was keeping the square shape of the joists. But do yourself a solid and remove it only a little, as necessary. Or at least check and see what happens as you remove it. The decking will help a fair bit to keep the shape, so you'll be swapping one for another.

Assuming your decking is 2x6 and your posts are inside, as ours are, you are likely going to find a few instances where your deck boards don't have something to land on. Either they butt up against the post or they wrap around it with a notch, and they're just kind of hanging in space. You might also find this around the tree trunk.

If you encounter a spot where the ends of deck boards are overhanging a joist and unsupported for more than 6", add a block for them to land on. Just take a piece of 2x4, cut it 5" long, and use screws to attach it to the post or to the joists, so that you have a surface to land the edge of the deck board on.



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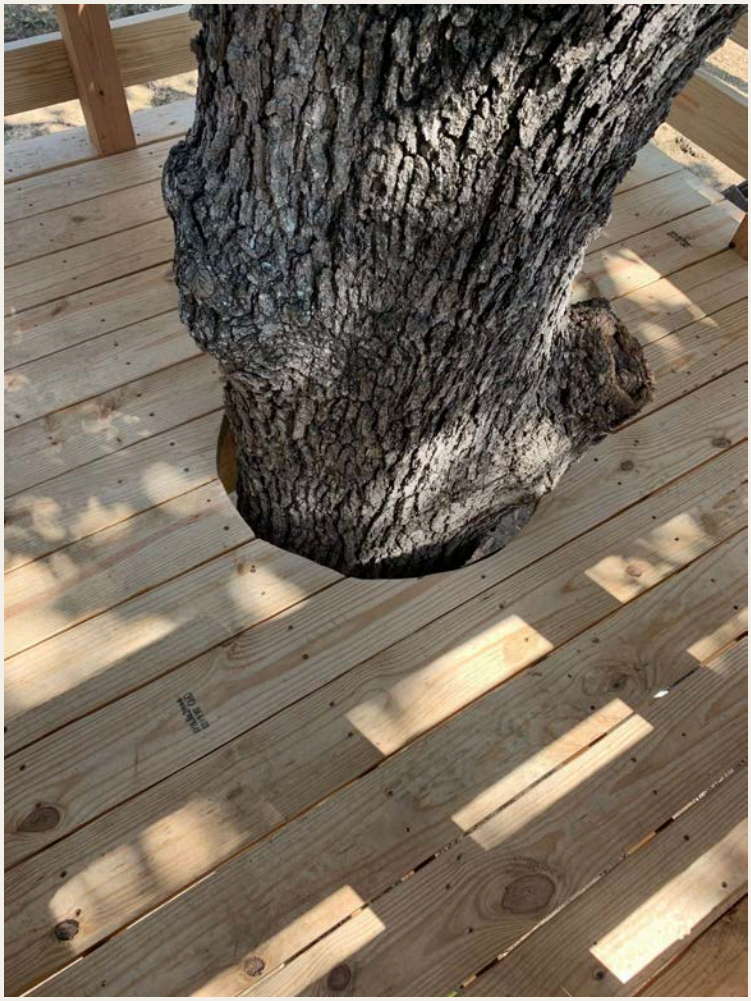
Your decking will overhang the joist edges by about ½". You can space about ¼" between the boards. And you can use a hand saw to notch out around the posts. You'll attach the boards with two nails or screws at each joist. If you bought 8' long boards they are probably about a ½" longer than that. Great news! I designed this with that in mind. Don't cut them if you don't feel like it. Overhang them evenly and attach!

When cutting around the tree you want to leave about 3" for growth. You can mock up each board and cut with a hand saw or a jigsaw to the shape around the tree and test fit it and remove a bit more if necessary.

Be sure before and as you attach these deck boards that the floor is square. It will have some flex in it and be able to twist around the axis of the tree. The boards will stop that so be sure you're locking it in place in the right spot!



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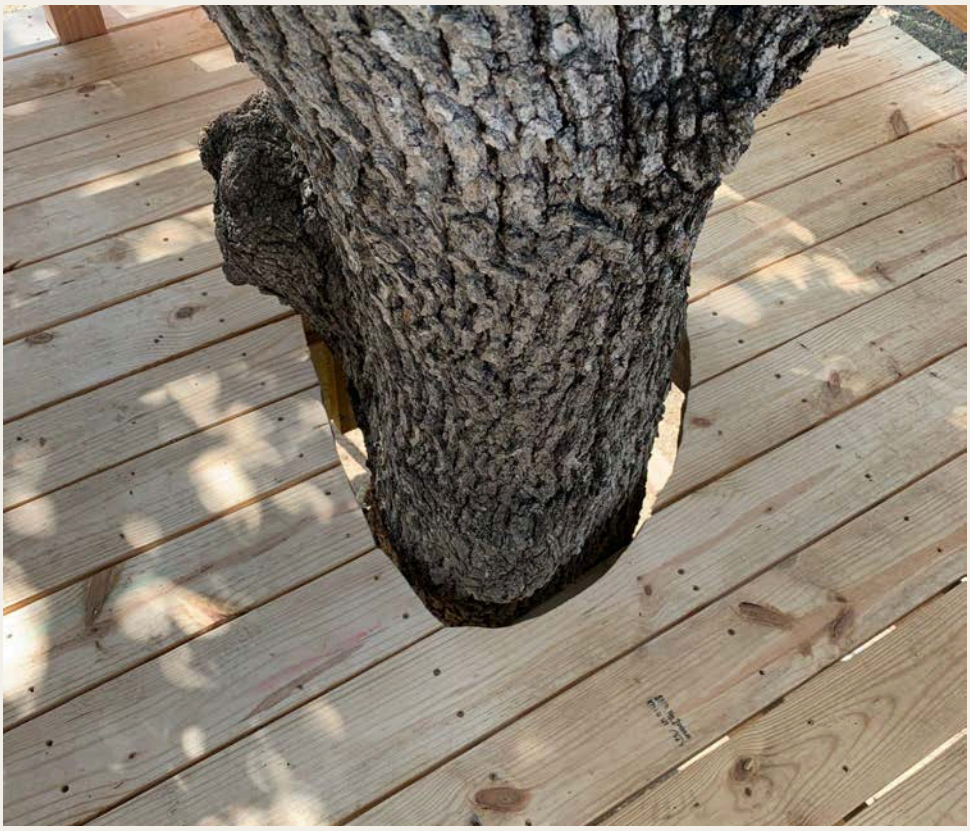

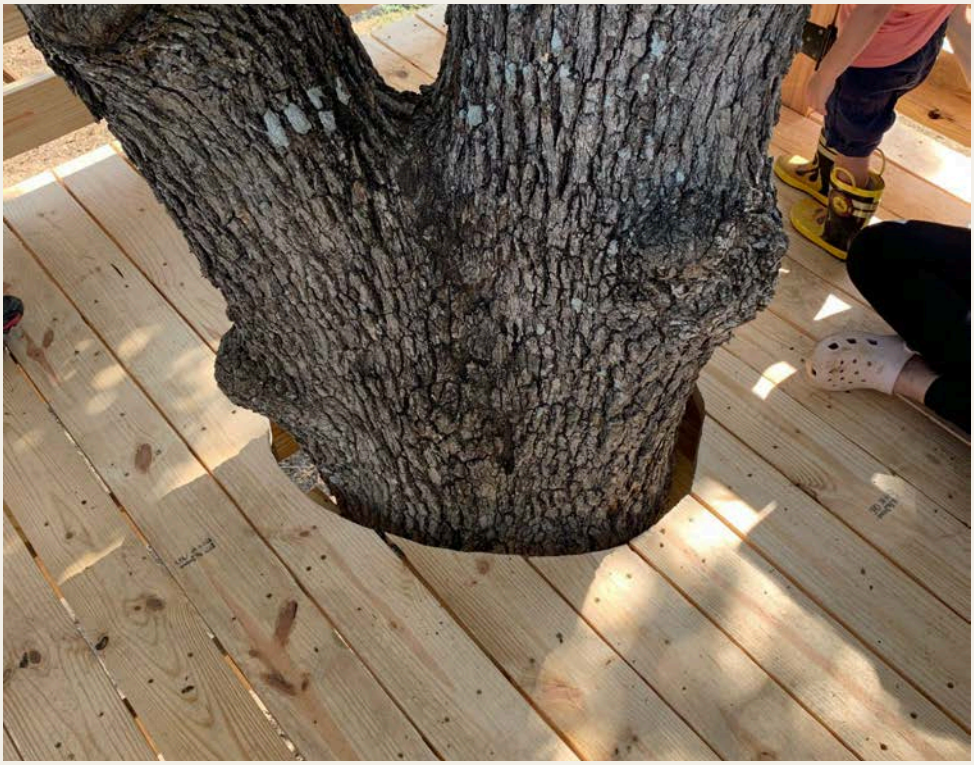

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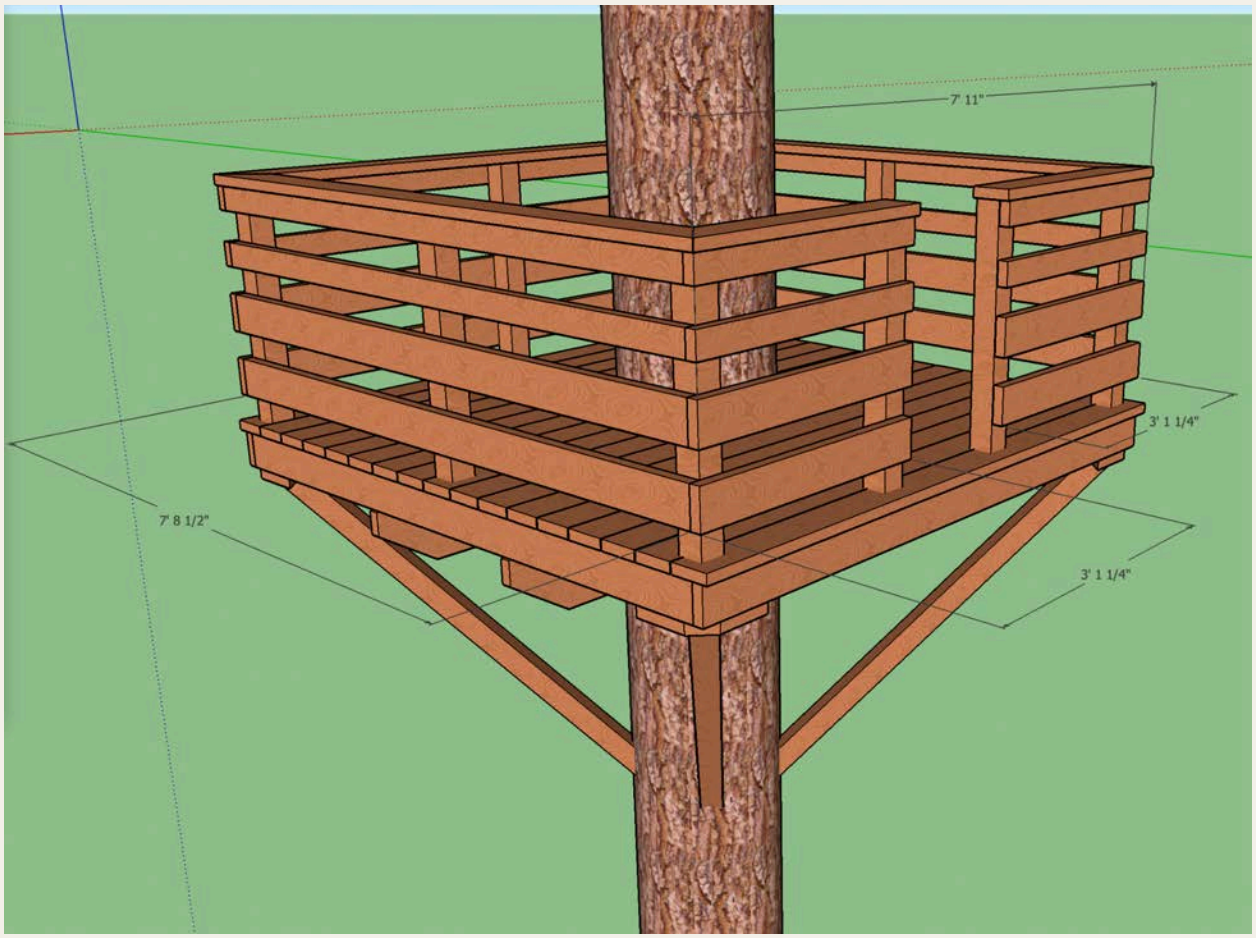
Railing

Assuming you opted for a railing and installed the posts as we did, here's how you do the railing. Make sure you read about ladders and gates first though, as your decision to include a gate will affect your railing installation.

I'll give a cut list for the side railings here, but you really should measure your posts. Because the cut list is based on a magical 3D model and your posts are, well, wherever your posts are.

(4) 2x6 @ 7' 8 ½"
(2) 2x6 @ 7' 11"
(4) 2x4 @ 7' 8 ½"
(2) 2x4 @ 7' 11"
(4) 2x6 @ 3' 1 ¼"
(4) 2x4 @ 3' 1 ¼"



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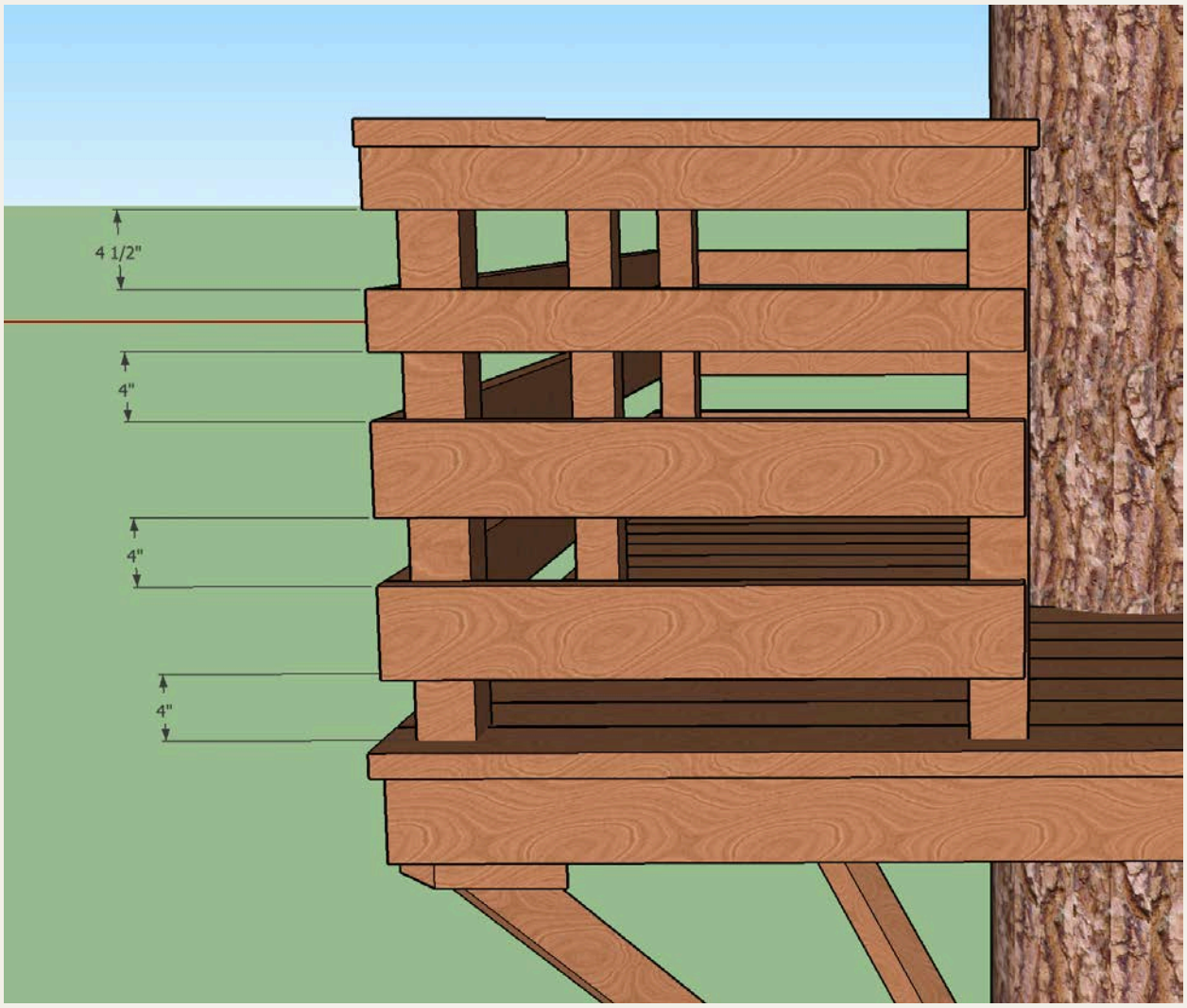
The railing pieces are attached with screws at each post. Here's the spacing we used:



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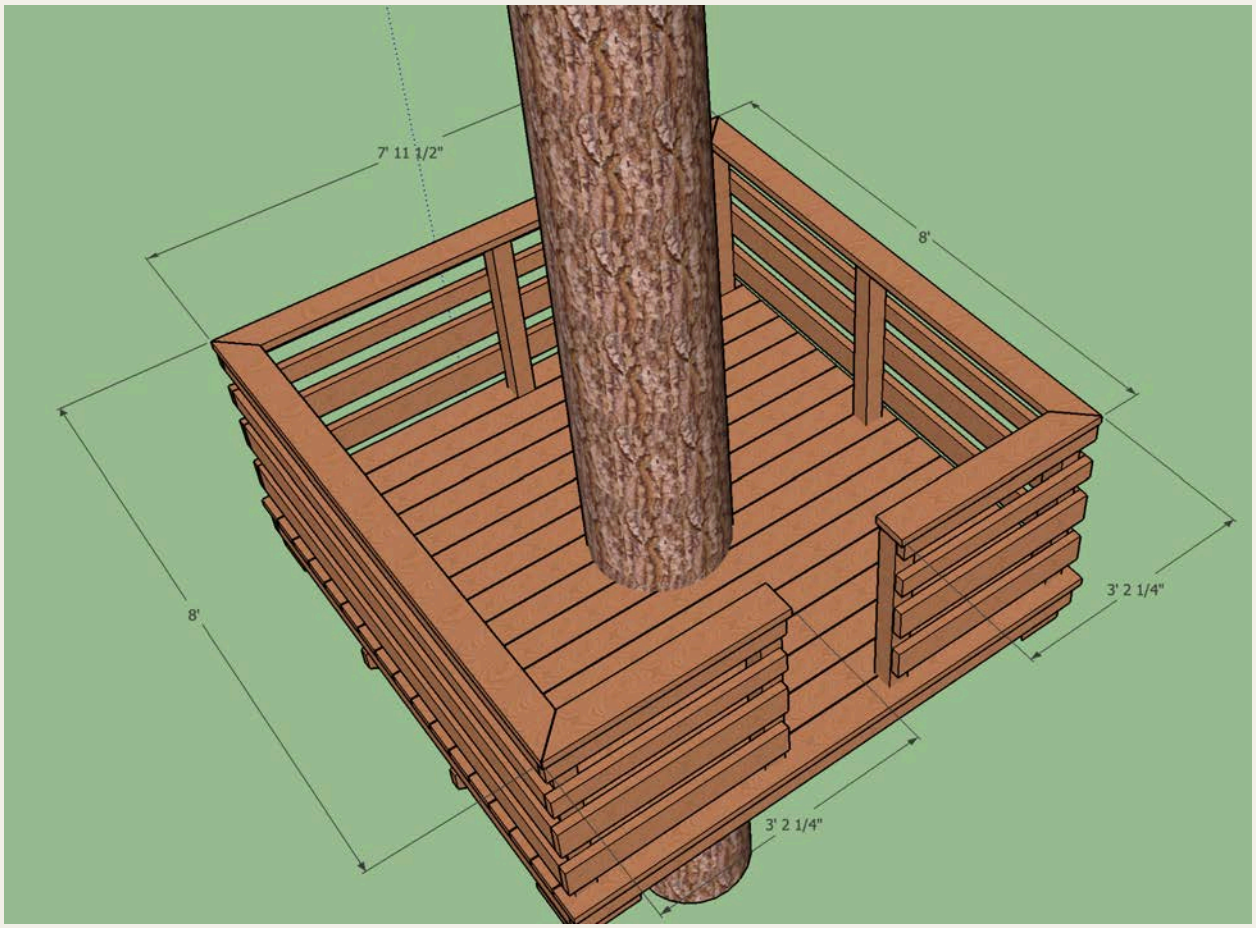
For your railing top cap you can do it as we designed, with 2x6. Or you can do your own thing (or skip a top cap.)

Here's ours. But measure your posts before cutting the lengths you see on ours.



Screw down through the top cap, into the posts and top railing. Every 16" or so is fine.

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Gate

I didn't originally design this with a gate in mind. But my buddy wanted to add one. So we had to make some adjustments. Want a gate? Here's how you do that.

First, your ladder will not sit inside the posts as is shown in the Sketchup diagram.

It will sit ON the posts. We opted to attach the ladder right to the post and to set back the railing a bit around it. You can do that. Or your ladder can sit on the railing if you prefer.

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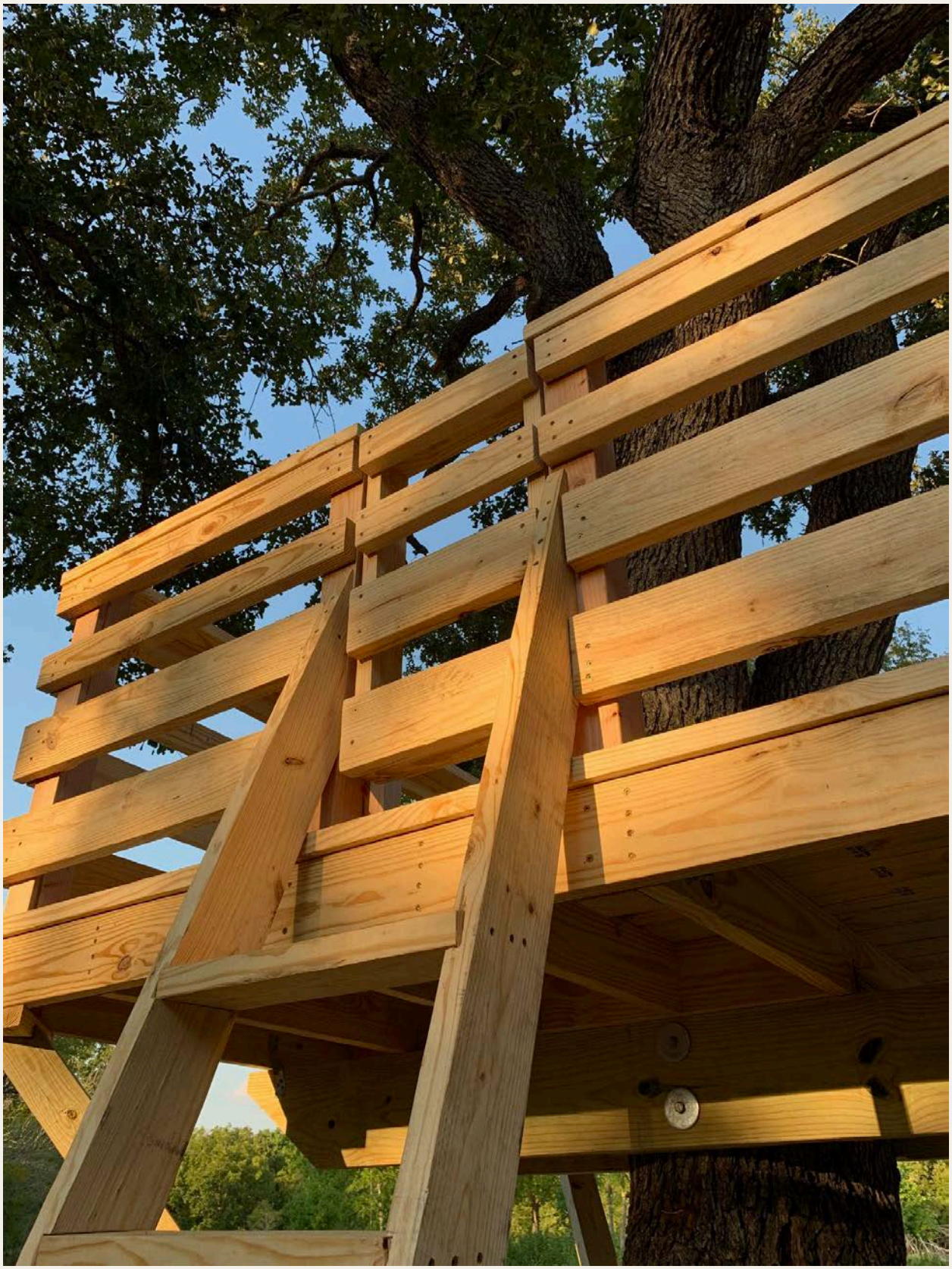

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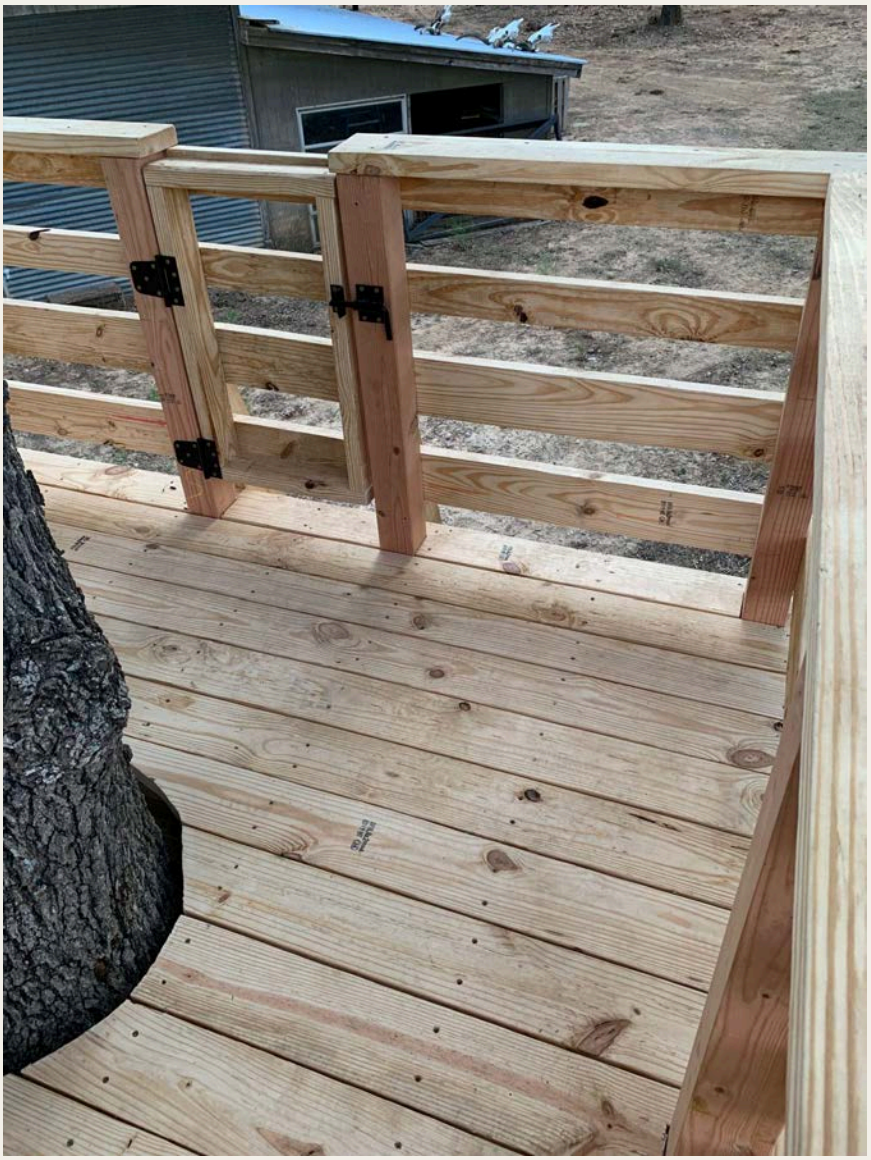
Your gate is a 2x4 box with 2x4s and 2x6s going across it to mimic the same pattern as the railing. It should be 1" less wide than the gap between your posts and a few inches shorter.

Build it flat on the deck. Make sure it's square, and screw it all together. You'll install it with hinges and latch on the inside, so that it opens inward (assuming the tree doesn't get in the way.) This is safer. Keeps kids from falling out of a gate that swings outward.

Install it pretty tight to the hinge side, leaving roughly a ¾" gap on the latch side. This will give the gate room to swing open and keep it from getting stuck on the post.



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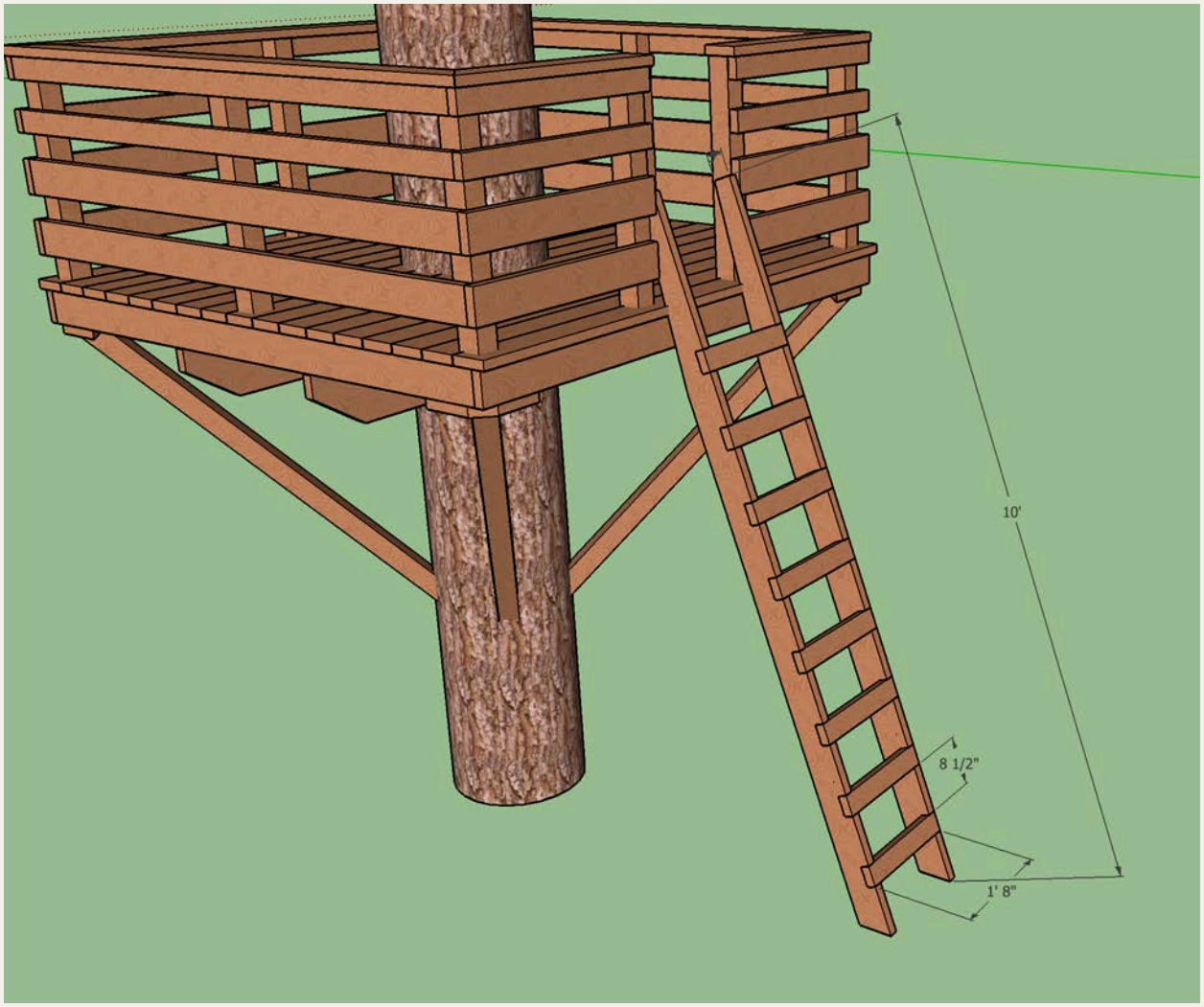
Ladder

I assume you want a ladder. Maybe not though. You might opt for a rope, or a bridge, or whatever. But if you want a ladder, here you go!

This ladder assumes an 8' high deck. Yours will likely vary a bit. There's also a few ways to make the steps.

You can do them per the sketchup model. It's a bit more ladder-like.



You can do the steps how we did our build. More of a ship's ladder, which is a cross between a ladder and stairs, with flat treads.

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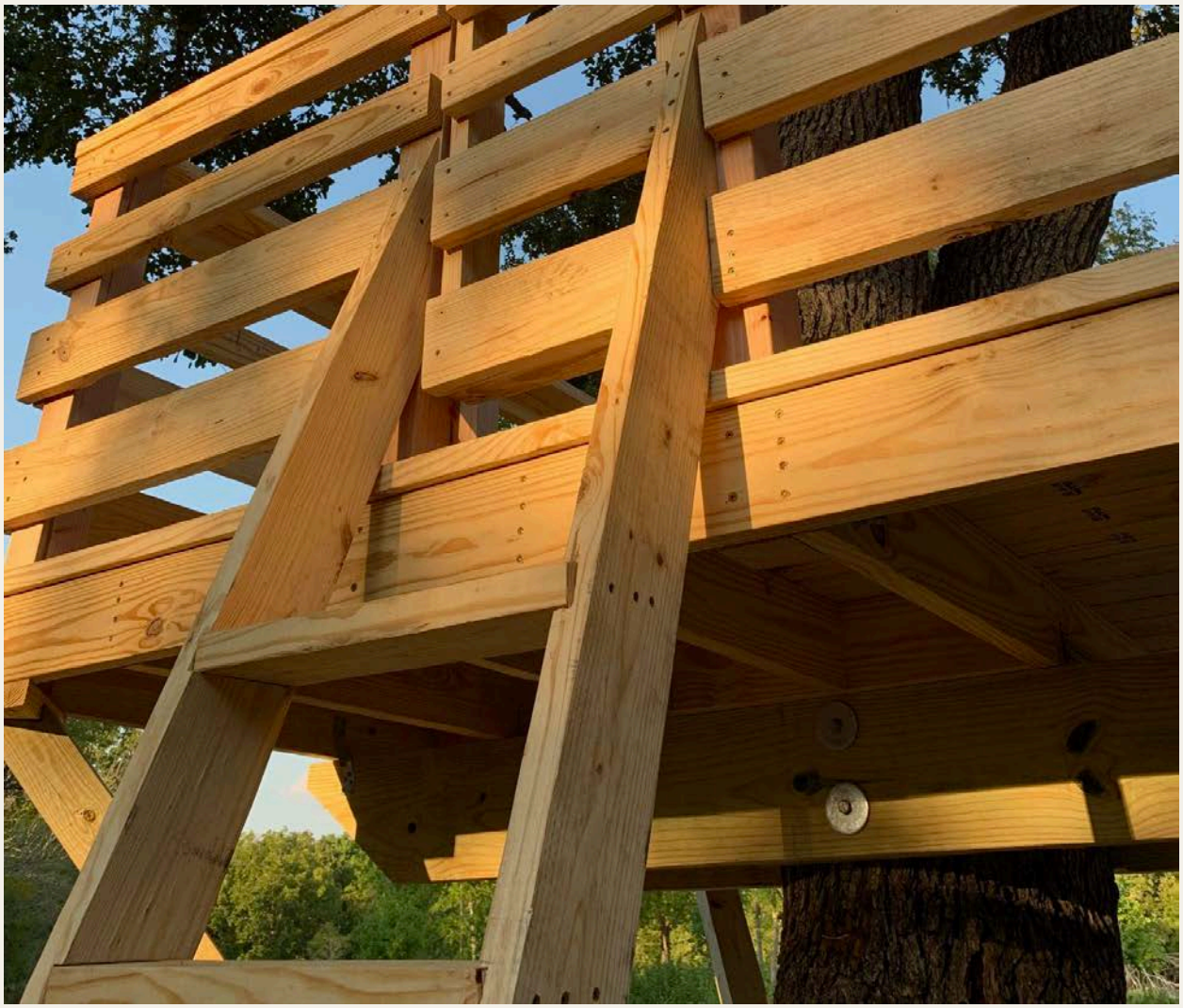

Both of these require some sawing and chiseling to cut out recesses for the steps. If you want to avoid that you have two choices.

You can do a ship's ladder with no recesses, where all the weight is taken by the screws. This is not ideal. But hey, you can do it. Or you can make a jobsite ladder where blocking is added in between the steps.

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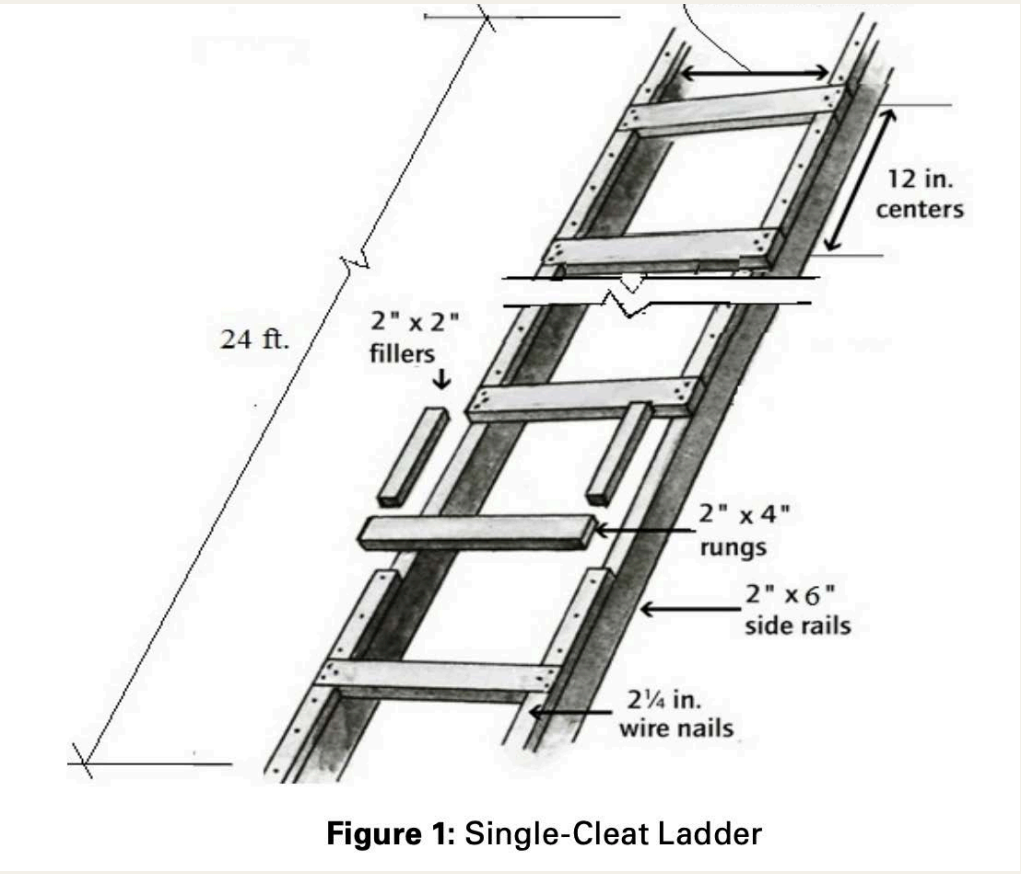

Figure 1: Single-Cleat Ladder

If your ladder isn't meeting a gate you can make it exactly as wide as your posts are, and it'll attach to the posts. If it's meeting a gate it will need to be wide enough to land *on* the posts, not in them.

For our ladder (either as built, or in the Sketchup figures) you'll saw a bunch of notches, then knock out the pieces with a chisel and hammer. Slot the steps in and screw them in place.

Notice that I have a taper in the 2x6 ladder side rail in the Sketchup illustrations? You may want that. It depends on your angle of ladder and how it sits on the tree fort. Mock all this up with a single 2x6 ahead of time. Try different angles. Examine step spacing. See what feels right for your setup. And if you can, land your ladder feet on something other than plain dirt. It'll keep the wood from rotting.

Whatever ladder you go with, make sure you attach it with solid screws or nails to the railings. We want a stable entry and exit.

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Finishing

That about does it!

Your ladder is built and screwed into the platform. It's stable on the ground. Feels good. Your railing is secure. Things don't seem to wiggle. What's left?

Some sanding would be good. Just 120 grit to knock down the rough edges and splinters, if nothing else. Check that all your screws and nails are flush or sunk in a bit. Give it a once over and make sure you've got fasteners wherever they should be. Feel free to add a few more into the braces where they meet your railing posts, if you added those in later and never screwed them together.

You can paint it. Or stain it. Or oil it. That'll help it last in the elements some. Look up various oils and finishes for decks and you'll find plenty of options. You can also just let it weather. No wrong answers.

Jump up and down on it. You've got a tree fort!

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Opening and Using The Sketchup File

The .skp file you downloaded is a 3D model of the build which you can explore, modify, and take measurements from. It's not necessary to complete the build, but you may enjoy tinkering with it.

Sketchup offers a free browser based web app. Go to: https://app.sketchup.com/app and from there you can open the .skp Sketchup file that you downloaded.

You may want to do one of their built-in tutorials or find some online if you're unfamiliar with the program.

In the Sketchup file you'll find a model that has all of the detailed components. Explore and modify as you see fit. Take measurements. Print screenshots. Click on the tags icon to hide various layers of the model. If modifying and saving it, be sure to keep an unmodified version of the original just in case you want to go back to it.

There are more premium versions of Sketchup programs available for paid download. Some of these also have free trial periods to test out the software. Feel free to give them a go. The file you downloaded will work with any of them.

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