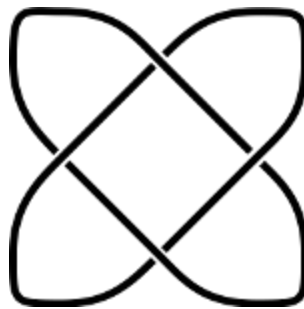


Two basic celtic knots for knot beginners

Requirements: *Some patience! And you may also want to use the grid of guides script:* [grid of guides.scm](http://gridofguides.scm)

This tutorial will teach you to make two of the simplest and most basic knots used in the design of Celtic knotwork. I didn't want to just write a gimp tutorial, but i also aimed to include some principles of knotwork construction, so you can go on and construct some knots of your own after following this tutorial. I did also include a simple gimp trick, though, a very simple way of making a nice 3d effect to your knots.

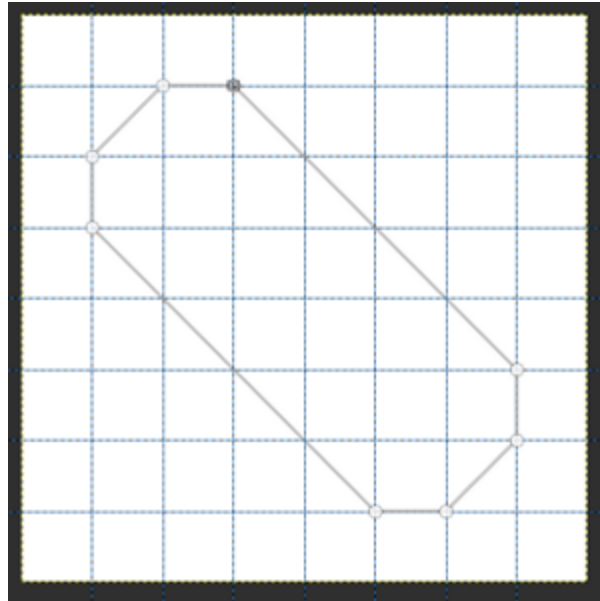
Part1: Solomon's knot



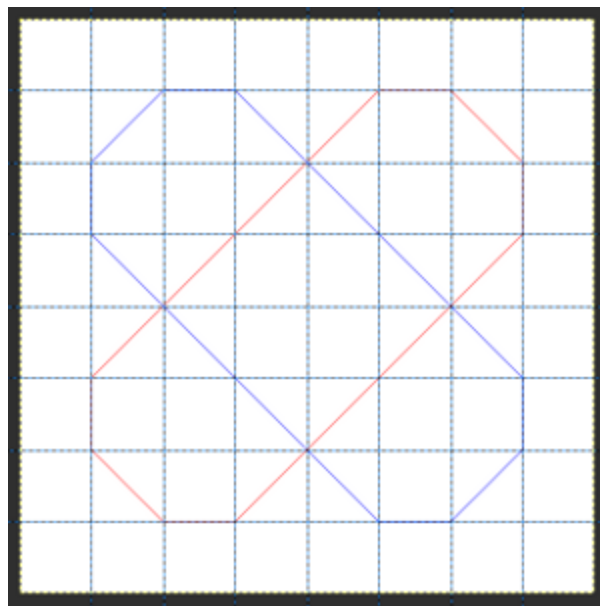
This is the layout of Solomon's knot. Strictly speaking it isn't a knot, it's two ribbons interlaced, but it's been called Solomon's knot traditionally, so that's what we'll call it. Solomon's knot is a very good thing to start with if you want to start constructing celtic knotwork, because it gives you a small and easily managed knot to practice your interlacing on.

Step1: open a new gimp image of a suitable size. i used 600X600 and think that's a very comfortable size to work with. Use a white background, that will make it easier to see what you're doing. Make a guide grid 6X6 and make sure "snap to guides" is checked.

Step2: pick the path tool and trace this path on your grid:



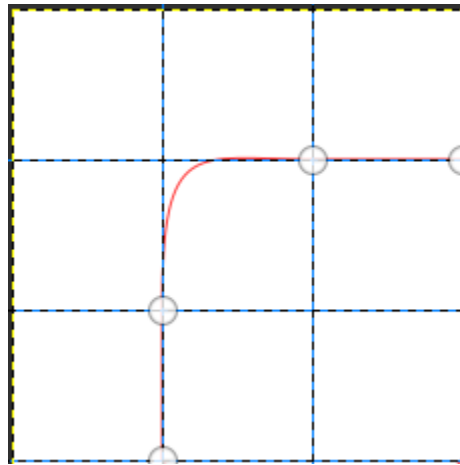
Step 3: duplicate the path and pick the flip tool. go to tool potions and check path. click the path copy. you'll get this:



Step4: We're going to give the knot a bit of shape now. First, merge the two visible paths together.

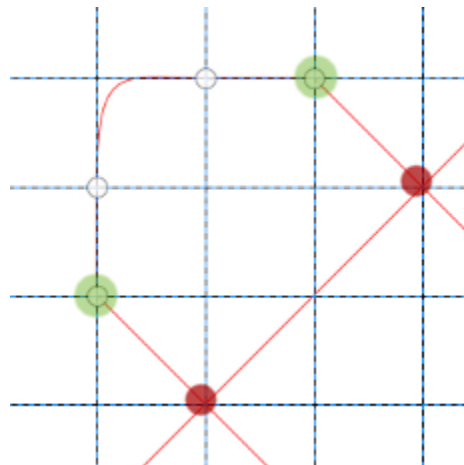
A tip here: I usually export the paths for every major change. this saves me a lot of time and trouble if i make mistakes in the process.

Now, let's start the tweaking. This will be easier if you first uncheck "snap to guide" and then zoom in 400X or more. You will want to see the exact position of the anchor points. With your path zoomed in, click the leftmost anchor point in the topmost grid row and pull the left handle out all the way to the first crossing point in that row. Then click the leftmost anchor point in the second grid row and pull the upper handle upwards to the same grid crossing. the result should look something like this:



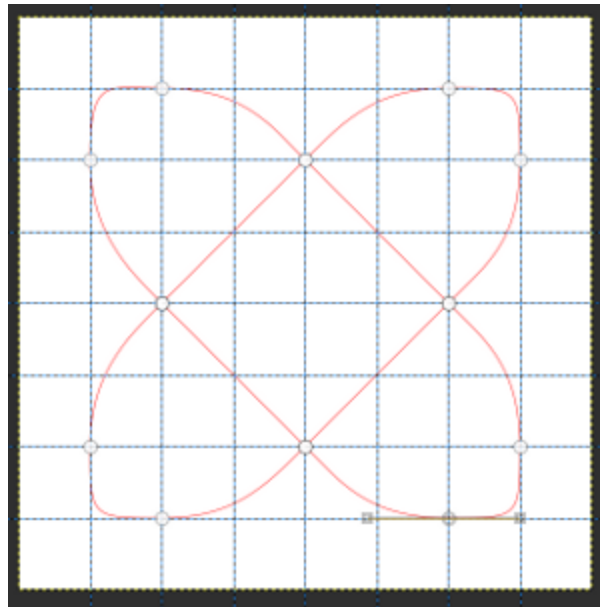
Do the same thing to all four corners of the knot.

Step 5:

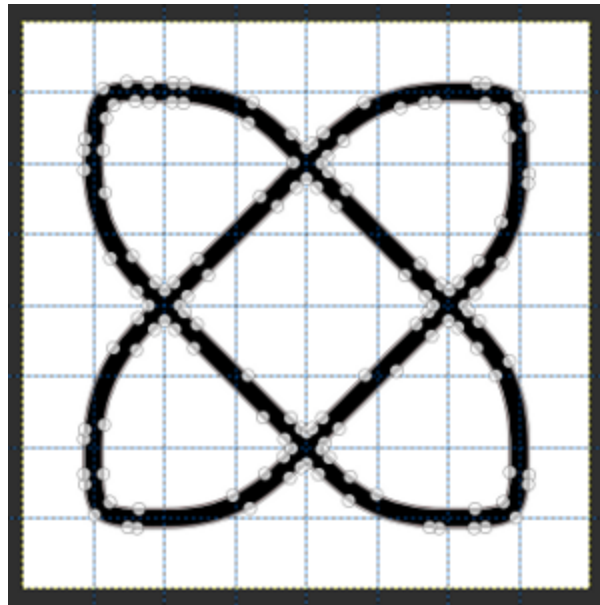


Make new anchor points on the path in the places marked with red. Then remove the anchor points marked with green. Now use the right handle of

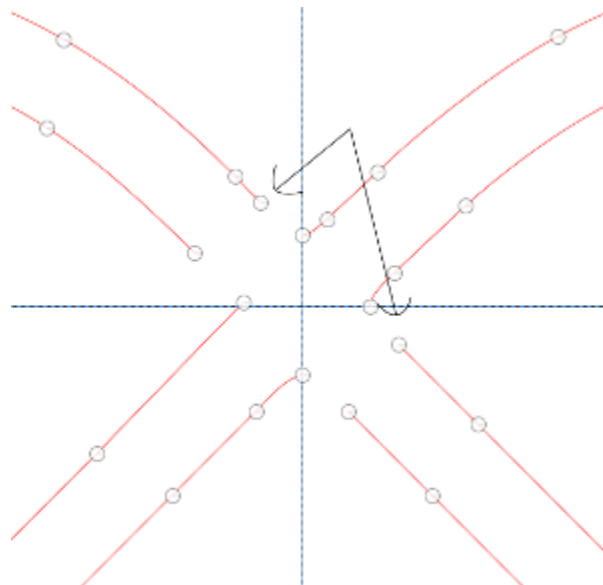
the leftmost anchor point in the top row and one of the handles on the first new anchor point and pull them til you get an even curve between the two points. Do the same with the other two anchor points on this corner, then repeat the procedure on the remaining three corners. The result should be something like this:



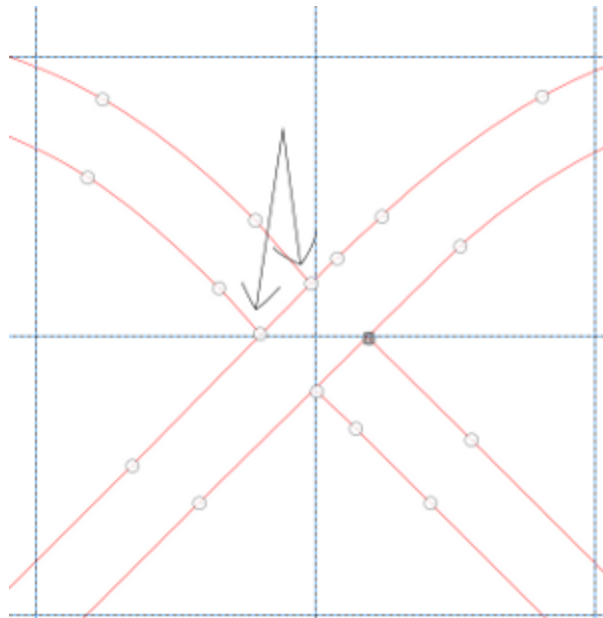
Step 6: make a new transparent layer (you could name it "stroke path 1" for clarity) and run stroke to path. On this widely spaced knot we can use a thick stroke, i set mine to 20 px. Click on "alpha to selection" and then choose "selection to path". This should give you something like this:



Step 7: Now we have an outline of our knot and we're going to do the over-under interlacing. At this point i usually turn off the layer with the stroked path, but that's a matter of what you think is easiest. Keep the zoom level at 400X or bigger and start working on the first intersection of the two ribbons. You need to do something like this:

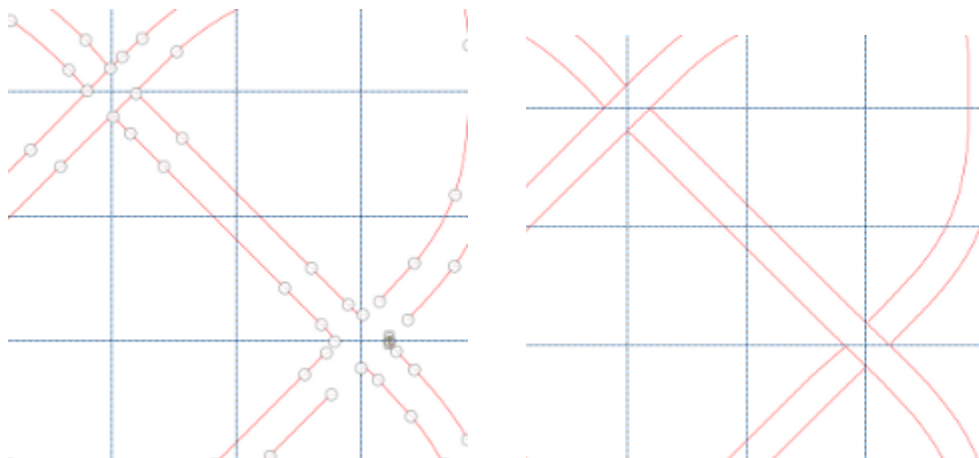


Break the path by first making four new anchor points fairly close to the intersection and then deleting it in between them.



Rejoin the path by connecting the loose ends on one ribbon, then drag the loose ends of the other ribbon close up to the first.

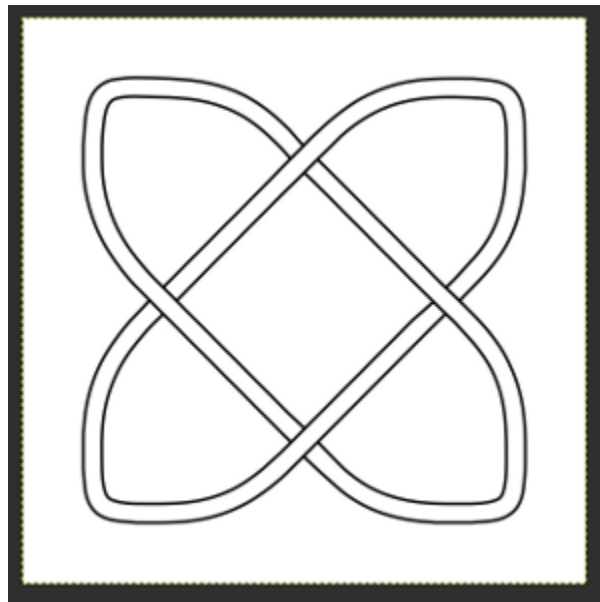
Now follow one of the ribbons to the next intersection and repeat the steps, but keep in mind that if the ribbon you followed crossed **under** the last time, it should now cross **over**:



Repeat this procedure on all four intersections.

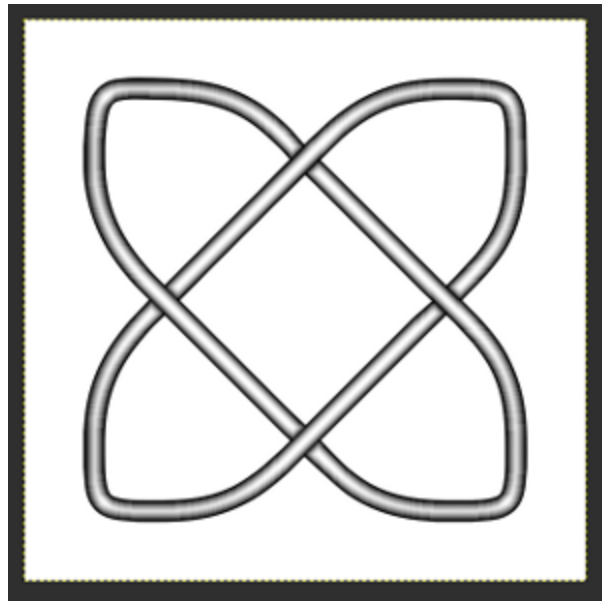
Step 10: Now make a new transparent layer (again, for clarity you could name it "stroke path 2") and use stroke path again. This time choose a

rather thin stroke, I set mine to 3 px. You will get something like this:



Step 11: Now go back and select your first stroke path layer, the one we used alpha to selection on. Do another alpha to selection and then add whatever colour/pattern fill you want on it. I use a pattern on this one.

Step 12: Select your second stroke path layer again, the layer where you have the interlaced outline of the knot. Pick the fuzzy select tool. In the tool settings dialogue, check "Add to current selection". Click somewhere inside one of the ribbons and continue with the next partition of the same ribbon and so on til all four partitions are selected. Grow selection by 1px. Now pick the gradient tool and the FG to BG gradient. Your Fg should be set to white and your BG to black. In the tool settings dialogue, choose form fill (spherical). Fill your knot with this gradient, it will get you something like this:



Very likely the gradient will look a bit jagged. You can select your first stroke path layer again and do an alpha to selection, then go back and select the second stroke path layer again. Run a gaussian blur set to 2 on the layer. turn the selection off.

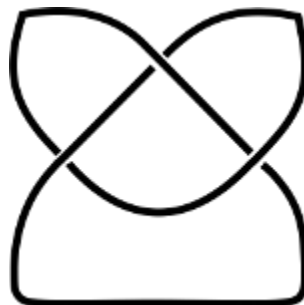
Step 13: Set this layer to multiply and lower the opacity (i have it set to around 40). Duplicate layer and set the layer copy to overlay. This last step will give you a finished knot with a 3d effect, like this:



Solomon's knot, finished

That's part one of the tutorial done! If you take a break here, save the xcf with all the paths, you will be needing it for part 2.

Part 2: Foundation knot



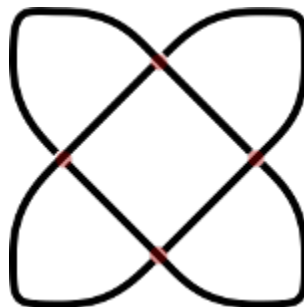
This is the layout of the foundation knot. The foundation knot is a real knot, as opposed to Solomon's knot, and like Solomon's knot it's a good place to start when you're learning to construct knotwork, because it's the smallest possible unit where you can practise another knotwork

principle: breaks.

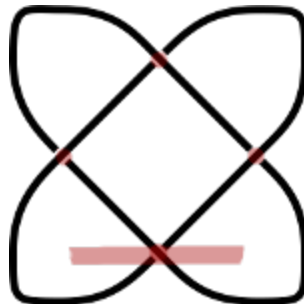
If you look at a Solomon's knot, you can see it's built up of four crossings. those four crossings make a crossings grid and crossings grids are useful to work with when you construct knotwork and interlace. I said before that

Solomon's knot isn't strictly speaking a knot and that's because in knotwork terms you only get a knot when you introduce a break in the crossings grid - if there's no break it's called interlace. Interlace too is part of Celtic design and it can be very decorative, but the really interesting patterns are the ones where the grid breaks, the knots.

Here's the solomon's knot again, I've marked the grid with red dots:

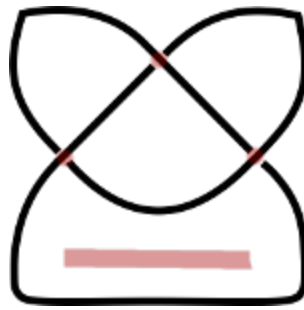


And now I put in a break over one of the grid points:



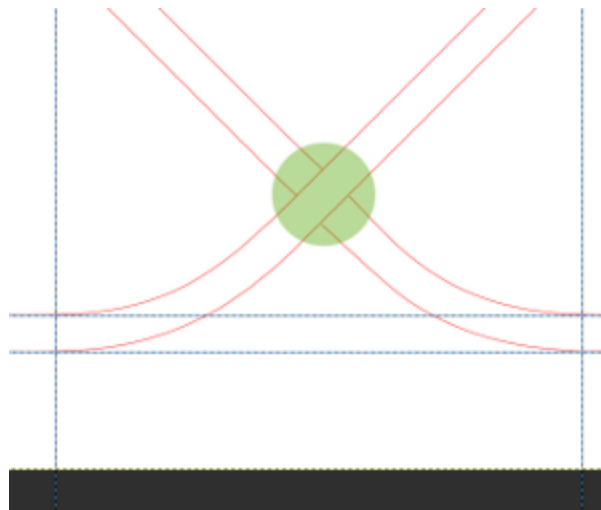
The break means the ribbons can't cross at that point and we need to break the ribbon and rejoin the loose ends with their closest neighbours.

In this case, what we get is:



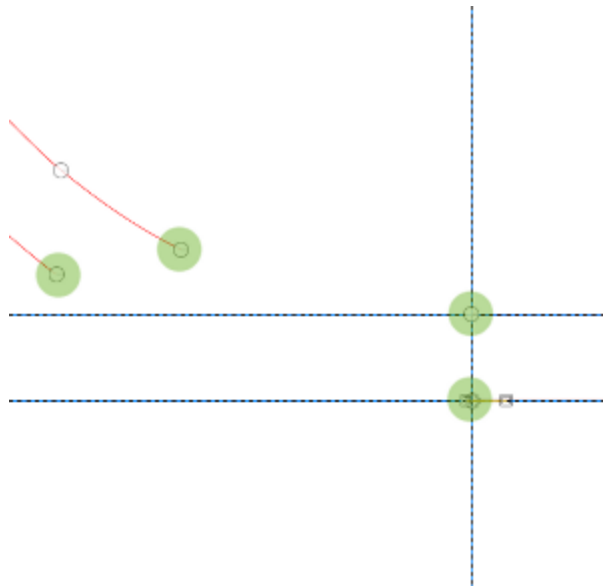
-Ta-taa! The foundation knot. Now, let's make a foundation knot from the paths we used for the Solomon's knot.

Step1: Turn off all the layers except the background. Clear away all the old guides and make four new ones: the two horizontal guides should run between the two downmost corners of the knot and in some points go right on top of the ribbon. The two vertical guides should be placed roughly at the points where the ribbons start curving upwards towards the crossing. It sounds very complicated when I try to explain it, but it's supposed to look like this :



The green dot marks the downmost crossing in the grid.

Step 2: Now we will break up the ribbons at the points where the guides intersect. Zoom in at 400X or bigger again if you haven't already. Place out new anchor points where the guides intersect and some way further up the ribbons and delete the path between the points, like this:



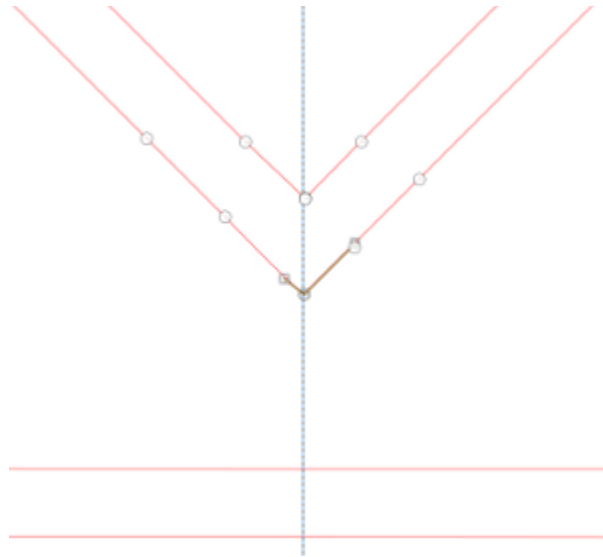
The green dots mark the new anchor points.
 Do this at both points where the guides intersect.

Step 3: Join the loose ends with each other so the new path runs along the two horizontal guides. It will look something like this:

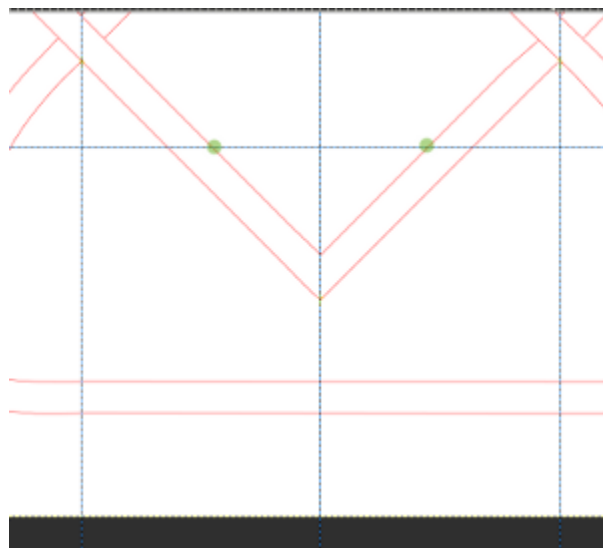


Step 4: Now break the paths by the downmost crossing, just like we did in step 7 on the Solomon's knot. rejoin the loose ends so you get one

ribbon. Clear away any loose pieces of path. This step gives you something like this:



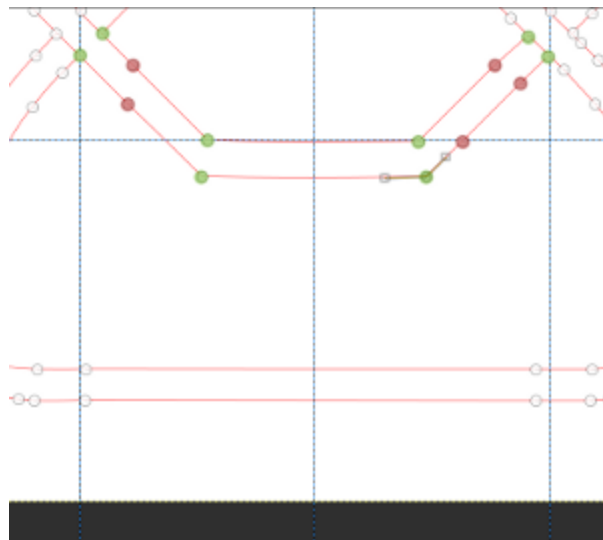
Step 5: Make a new horizontal guide and place it about halfway between the two side crossings and the crossing you just deleted. Place new anchor points where the inner path meets the new guide.



The green dots mark out where the new anchor points should be.

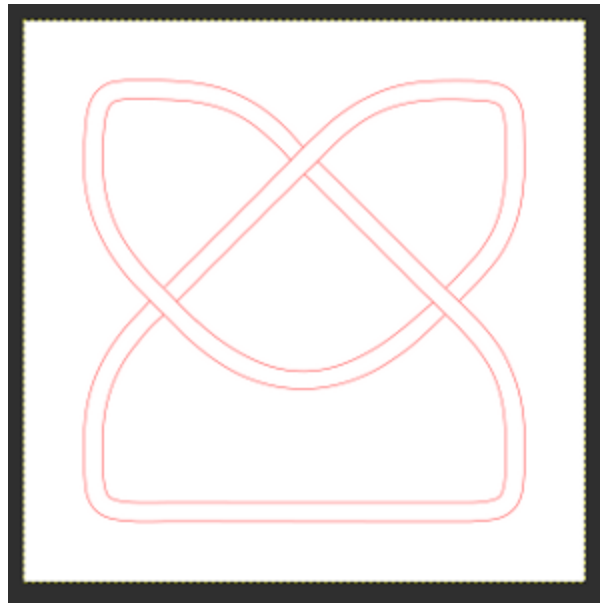
Remove any anchor points between these new anchor points, the inner path should now be straight. Do the same to the outer path.

Step 6: Your path should look a bit like this picture:



The red dots mark anchor points that you won't need and they should be removed. Only save the anchor points just by the crossings and the new anchor points you made in step 5 - the ones marked with green dots in the picture.

Step 7: Shape the path into a smooth curve by pulling the handles of your saved anchor points. The shape is a matter of taste - sometimes I draw the curve down to a rounded point (like the corners of the knot), sometimes I make it round. In this case I made it round and the result looks like this:



Step 8: We're going to fill and outline our foundation knot now, but we can't use the same technique we did for the Solomon's knot - for that knot we started by making a single path that we later stroked, this time we started with a double path. We can either take the long way and make a new single path between the two we already have, or we can cheat a bit. I like saving my time, energy and patience, so I choose cheating. We start by making a new transparent layer and stroking our path with a thin stroke (I used 3 px). You could name the layer "outline" for clarity.

Step 9: Pick the fuzzy select tool, set it to "add to current selection" and click inside the ribbon, click all the three parts. Grow your selection by 1 px (this is the same thing we did with the Solomon's knot in step 12, part 1).

Step 10: Make a new transparent layer and fill the selection but don't turn it off. Move the layer down under the outline layer.

From here you can just follow the last steps on part 1 of this tutorial, they're exactly the same and the outcome is very similar:

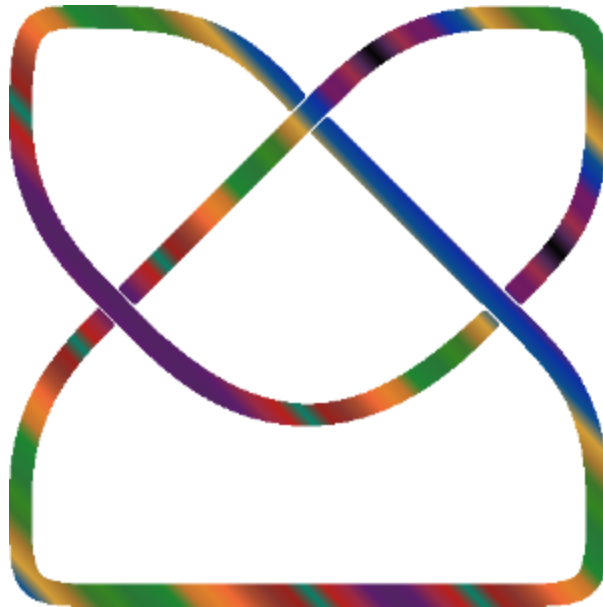


The differences between cheating by using the fuzzy select tool and making a new single path to stroke are these:
To begin with, we don't get a whole ribbon, just a ribbon in three parts.
Depending on how you want to fill the ribbon, this may or may not be something you want. And when we don't have a single path to stroke we can't do this:



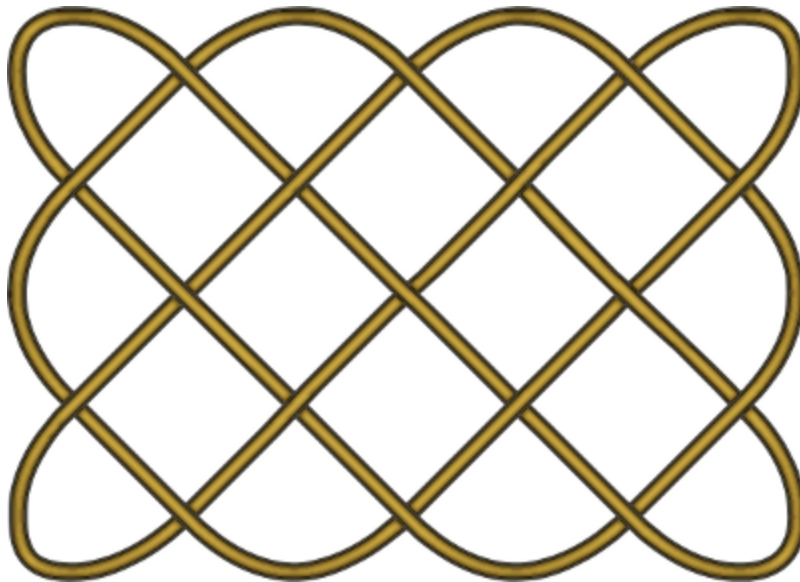
Path stroke with linear gradient on repeat

We can of course fill the ribbon with a linear gradient on repeat, but that will only give us this:

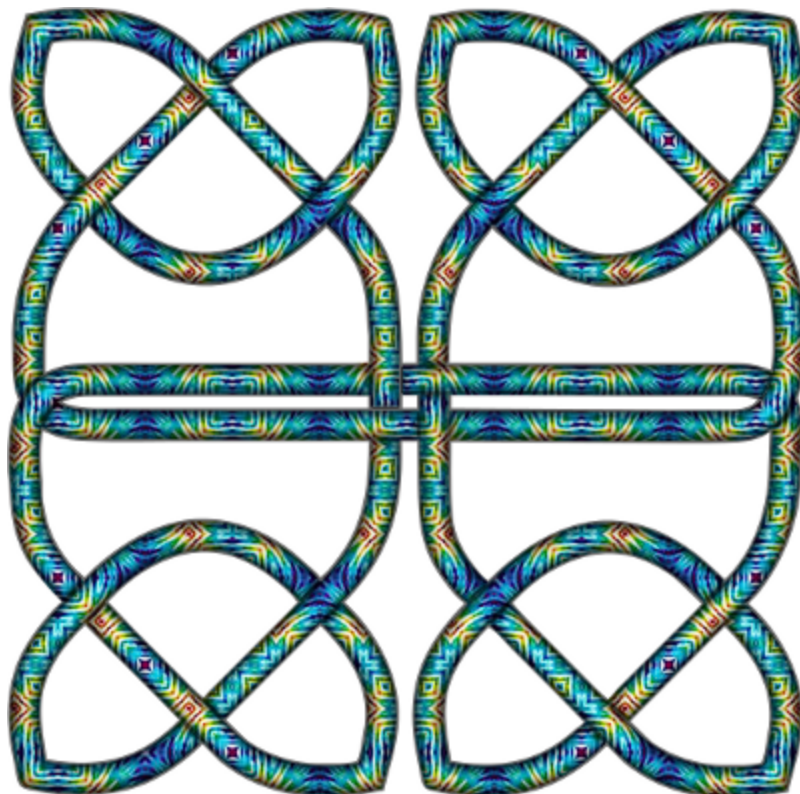


Note the jagged edges too - the outline layer covers those, but if we want to use the ribbon without the outline we will have a lot of ugly jaggies to fix. Cheating is after all only cheating, and sometimes even lazy people like me will choose to make a new single path instead :).

Since you now know how to make the Solomon's knot and the foundation knot, you can go on to combining them. For example, here's a small interlace panel that I made by duplicating a Solomon's knot three times and joining the paths into one:



And here's four foundation knots put together the same way:



If you keep your eyes open, you will see that lots of Celtic knotwork

design is actually built up by combining foundation knots or by making interlace panels that you break here and there by putting in a knot - very often a foundation knot. So, in a way you know most of what you need to know about Celtic knotwork design now that you can construct these two layouts and know how to go about putting them together!

If this tutorial was clear enough to follow, interesting enough for people to bother trying it out, and helpful to someone wanting to learn knotwork construction, I will go on to make more tutorials of the kind. One thing I plan to do in that case is a tutorial on knots based on three, like the typical triquetra, triskit or trinity knot and also a tutorial on spiral based knots. I will also try to vary the decorative effects, like making different kinds of path strokes.