PROJECT 2: ARAN SAMPLER

This sampler will explain how to combine different patterns into a single project chart. This chart happens to use patterns for cables and twists, but the method holds for combining any types of patterns across the width of a project, even if you just want to use the same pattern more than once.

Suppose you want to make an Aran sampler with several different kinds of cables and twists. The finished piece could be used as a hot pad, or it could be used as a basis for designing your very own Aran sweater. (Yes, you are quite capable of designing **and** making an Aran sweater.)

You've looked in your pattern books (you have a good selection of pattern books, right?) and have selected the following patterns based on their pictures:[1]

Braid	Cable 3/3 Right	Wavy Cable	Hugs and Kisses
photo	photo	photo	photo
Fishbone			
photo			

You realize just from looking at the pictures that they appear to do their cabling at different intervals, with lots of rows between the Cable 3/3 Right and not many at all in the Braid. And that Wavy Cable hardly seems to be a cable at all, but just knit stitches somehow meandering back and forth across reverse stockinette. The Hugs and Kisses Cable, which looks like a column of Xs and Os, is pretty tall compared to the other patterns.

If we put all the patterns on one chart, all the difficulties and uncertainties of working these five very different patterns simultaneously will be eliminated.

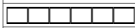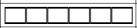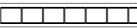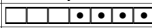## Putting the Pattern Charts All Together
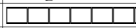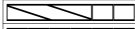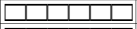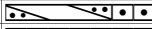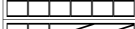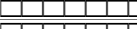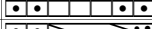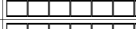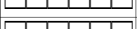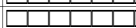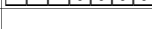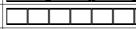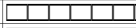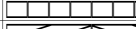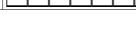
When we combine these five patterns in a single project chart, we see just what we expected from looking at the photos and reading the written-out instructions. The patterns are all different heights, and the rows that are cabled vary from pattern to pattern.

In the combined chart below, the individual patterns are in their own columns. We also

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[1] What a coincidence that these patterns happen to be the ones charted in chapter 5! ☺

have columns to show each pattern's public-side row numbers, but we omit the private-side row numbers to save space. There is also an empty column between patterns to help keep each pattern's row numbers together with its chart rows.

The dark lines above the foundation rows of Braid and Wavy Cable are there to remind us that we only work those rows one time. (I just changed the top border of their table cells to a much thicker line.)

Braid		Cable 3/3 R		Fishbone		Wavy Cable		Hugs and Kisses	
									15
	3		5		3		7		13
	1		3		1		5		11
			1				3		9
							1		7
									5
									3
									1

Working from the Project Chart
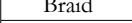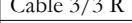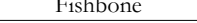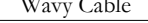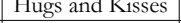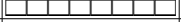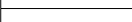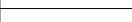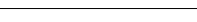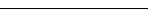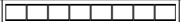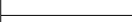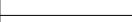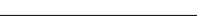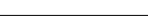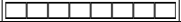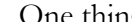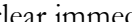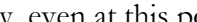
Imagine trying to make a sampler with this very uneven chart. Two of the four (Braid and Wavy Cable) need a foundation row, made on the private side. That means that for two of our patterns, the first row will be a private-side row; but for the other three patterns, the first row is a public-side row. So two (or three) of our patterns are off from the get-go.

All five patterns cable on their row three, but Braid and Wavy Cable cable on **every** public-side row. But we have to remember to **not** count the foundation rows as row one on Braid and Wavy Cable. The Hugs and Kisses Cable cables only on **every other** public-side row.

The bottom line is, this version of the chart doesn't help **at all**. What we need is a chart with no gaps, no blank areas. We need a chart that shows us which pattern row to do when, no matter what row another pattern happens to be on. How can we make a chart that works for us?

Step 1: Ignore Foundation Rows
As a first step, let's eliminate the foundation rows of Braid and Wavy Cable. (We'll deal with the foundation rows later.)
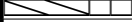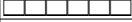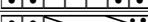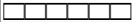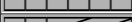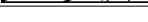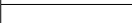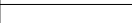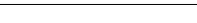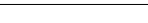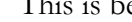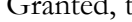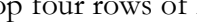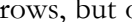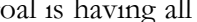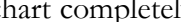
Braid			Cable 3/3 R			Fishbone			Wavy Cable			Hugs and Kisses	
														15
		3			5			3			7			13
		1			3			1			5			11
											3			
					1									9
											1			7
														5
														3
														1

One thing is clear immediately, even at this point.

Have you noticed that Braid and Fishbone are exactly half as tall as Wavy Cable? Wavy Cable has eight rows, and Braid and Fishbone both have four rows. And Wavy Cable is exactly half as tall as the sixteen rows of the Hugs and Kisses Cable.

Step 2: Start Duplicating Pattern Rows to Fill In the Gaps

Let's duplicate the rows in Braid and Fishbone so that three of our patterns have the same number of rows in the chart. (The cells I selected and copied have a dark border around them.) The duplicated rows of Braid and Fishbone are shaded for clarity, and we've also copied each pattern's public-side row numbers, just to help us keep everything straight.
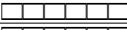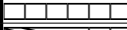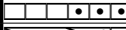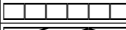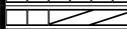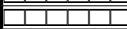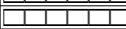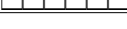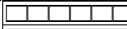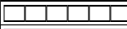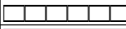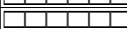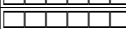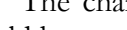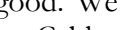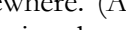
Braid			Cable 3/3 R			Fishbone			Wavy Cable			Hugs and Kisses	
		3			5			3			7			15
		1			3			1			5			13
		3			1			3			3			11
		1						1			1			9
														7
														5
														3
														1

This is better. Granted, the top four rows of Braid and Fishbone are exactly the same as their bottom four rows, but our goal is having all of our patterns in a chart completely filled up so that it shows us each pattern's rows relative to the other patterns' rows.

Step 3: Keep Duplicating to Fill In More Gaps

Three of the patterns, two of them already with duplicated rows, are now exactly half as tall as the Hugs and Kisses Cable.

If we make copies of the rows for those three patterns, then four of the five patterns will have the same number of rows. (Again, the cells I selected and copied have a dark box around them.)

The chart is looking pretty good. We are definitely getting somewhere. (And yes, we could have selected Fishbone, Wavy Cable, and the blank column separating them as a single block to copy and paste, instead of doing the two patterns individually.)

Now we just have to make some copies of the six-row Cable 3/3 Right to fill in the last gap.

Step 4: Keep Duplicating ALL Patterns

Cable 3/3 Right has six rows. If we double that to twelve rows, does that match up with the sixteen rows of the Hugs and Kisses Cable? No, it doesn't.

Let's add another repeat of the six-row cable. That gives us eighteen rows, which is now bigger than the number of rows we're trying to match up. So what do we do?

If the Numbers Still Don't Work…

Since we couldn't get any multiple of six rows to fit perfectly within sixteen rows, we now need to add another copy of Hugs and Kisses. That means we are trying to match up some multiple of six rows of Cable 3/3 Right to the thirty-two total rows of the doubled-up Hugs and Kisses.

We know right off the top of our heads that the six rows of Cable 3/3 Right will not fit perfectly into the thirty-two rows of the now-duplicated Hugs and Kisses. Five copies of Ca-

ble 3/3 Right will be only thirty rows tall, which is two rows too short. If we add a sixth copy, we'll be up to thirty-six rows, which is four rows too tall.

Add Another Copy of the Tallest Pattern, and Try Again
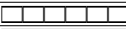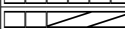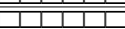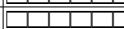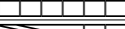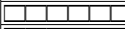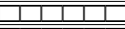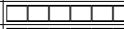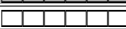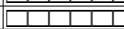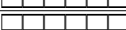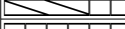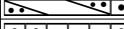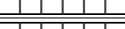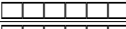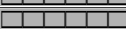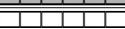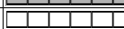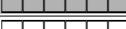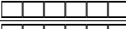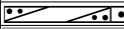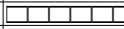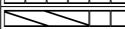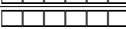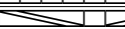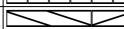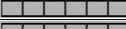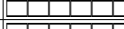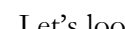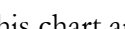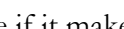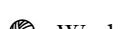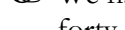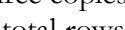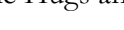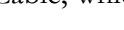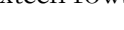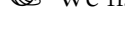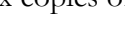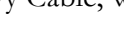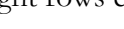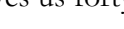
So let's add a third copy of Hugs and Kisses. That gives us a total of forty-eight rows in Hugs and Kisses. Ah ha! The six rows of Cable 3/3 Right will fit exactly eight times into three copies of Hugs and Kisses.

And we already had Braid, Fishbone, and Wavy Cable matched up to the original single copy of Hugs and Kisses, so we just keep duplicating those three to match up with the forty-eight rows we now know we need to make the complete project chart.

The Chart So Far

Let's put all the duplicates of all the patterns into the chart, so we can see that we do now have forty-eight total rows, with each pattern repeated as many times as necessary until the whole chart is completely filled in, with no gaps in any of the patterns.

Braid		Cable 3/3 R		Fishbone		Wavy Cable		Hugs and Kisses	
	3		5		3		7		15
	1		3		1		5		13
	3		1		3		3		11
	1		5		1		1		9
	3		3		3		7		7
	1		1		1		5		5
	3		5		3		3		3
	1		3		1		1		1
	3		1		3		7		15
	1		5		1		5		13
	3		3		3		3		11
	1		1		1		1		9
	3		5		3		7		7
	1		3		1		5		5
	3		1		3		3		3
	1		5		1		1		1
	3		3		3		7		15
	1		1		1		5		13
	3		5		3		3		11
	1		3		1		1		9
	3		1		3		7		7
	1		5		1		5		5
	3		3		3		3		3
	1		1		1		1		1

Let's look at this chart and see if it makes sense.

- We have three copies of the Hugs and Kisses Cable, which at sixteen rows each gives forty-eight total rows.
- We have six copies of Wavy Cable, which at eight rows each gives us forty-eight total rows.

- Both Braid and Fishbone are four rows each, so we need twelve copies of them to make forty-eight rows. Check, we have twelve copies of both Braid and Fishbone.

- And we have eight copies of Cable 3/3 Right, which at six rows each also matches the forty-eight rows we have of the other patterns.

Lessons Learned: Combining Pattern Charts in One Project Chart

Let's review what we did to get to this point.

- We picked patterns we like, not worrying a bit that they didn't all have the same number of rows.

- We constructed individual charts for each pattern, then we put them in their own columns to start the project chart.

- We removed (temporarily) the foundation rows from the patterns that had them.

- We looked at each pattern to see if its number of rows was an exact multiple of another pattern's number of rows.

  o The Wavy Cable was exactly twice as tall as Braid and Fishbone, and the Hugs and Kisses Cable was exactly twice as tall as the Wavy Cable.

  o If we had had a pattern that was twelve rows tall, it would have been exactly twice as tall as the Cable 3/3 Right.

- We started duplicating the shortest patterns, adding enough copies to make them tall enough to fit perfectly into the taller patterns. When we had matched up multiples of the shortest patterns as far as we could, we had to start adding multiples of the taller patterns. We kept duplicating the tallest pattern until we could fit complete copies of all the other patterns exactly into the copies of the tallest pattern. Eventually, we had enough copies of each pattern to make the total number of rows of each pattern be the same.

What we had to do was find some multiple of the smallest number of rows to pair with some other multiple of the biggest number of rows. In this sample, we had already paired up the four- and eight-row patterns to the sixteen-row pattern. So that left us with trying to find some multiple of six that was the same as some other multiple of sixteen. Eight groups of six gave us the same number of rows as three groups of sixteen.

Work the Other Direction

It's probably easier to start with the pattern with the most rows. And yes, we're still ignoring foundation rows that any pattern might have. Patience!

We keep adding copies of that pattern until full copies of every other pattern (whose foundation rows, if any, we are likewise ignoring) will fit into the total rows of the tallest pattern.[2]

Another Example

Suppose we pick patterns that are six, ten, fourteen, and twenty-two rows tall (still ignoring foundation rows). How many times will we have to duplicate each pattern, and how many rows will the final chart have? Find the numbers, and check out the Answers for additional information about combining patterns in a project chart.

Adding Designer Details

Let's make the Aran-sampler project chart a bit friendlier.

First, let's eliminate the patterns' row numbers. Now that we have enough copies of every pattern to make a full project chart with no gaps, we need just a single set of project-chart row numbers. Since we'll save some space by removing the columns of the patterns' row numbers, we'll be able to include the private-side row numbers on the left edge of the chart, though we could always omit those if we choose to.

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[2] The total number of rows we need is called the *lowest common multiple* or the *least common multiple*. Search the Internet for either of those terms to find sites where you can enter the number of rows in each pattern (**don't** include the foundation rows, if any patterns have them) and get back the smallest number of rows that those patterns will all fit into evenly.

Now we have a unified chart, with full copies of every pattern and complete with all project row numbers. We are also still, at this point, ignoring the foundation rows of both Braid and Wavy Cable. (Hang on! We'll get there.)

With each pattern in its own column, it's very easy to rearrange the patterns, to add copies of any of them, and to delete any of them without disturbing the rest of the chart. Just add a blank column, select a pattern, then either copy and paste it in the blank column or just drag it to the blank column. Such rearrangement, while possible with the pattern rows

on ordinary lines, is possible, but there will be a lot of hair-pulling in the process because we can select only a single row of a single pattern at a time and drag it to the new position.

Add "Little" Patterns

Projects with cables and twists often have purl stitches between the patterns, because they make the patterns really stand out. So let's add two purl stitches between the patterns. First, we add two purl stitches to the top pattern row of one of the blank columns between the patterns. (The first forty chart rows have been deleted to save space.)

Now we select the two purl stitches and copy them. Then try this experiment with your word processor. Select **all** the empty table cells below the stitches just copied (which in the full chart would be row forty-seven to row one), and paste. The cells selected have the dark border in the next chart (and again, we'd select all the way to row one).

My word processor pasted two purl stitches into every selected cell. Did yours?

If your word processor works this way, it will be even easier to make knitting charts.

Since we want two purl stitches between the other patterns, all we do now is select the

entire column of just-created reverse stockinette, which can be done in several ways, copy the column, select each blank column in turn, and paste.

Here's the full chart with the shading removed, since we now have consecutive row numbers.

Keep Each Pattern in Its Own Column

Note that we did not add two purl stitches to one end of each of the patterns. Why?

The main answer is that that's the hard way to do it. What if we laboriously add two purls to each pattern row, then decide that we only want one or that we actually want three?

If we altered the cable and twist patterns themselves, then we have to alter all of them all over again. But if the reverse-stockinette "patterns" are all in their own columns, then we can work with one column in its isolation, get it fixed it, then just copy and paste it elsewhere.

Add a Border, If Desired

There is no border shown on this chart. Should we have a border? Let's say we haven't decided yet. But if we do add a border, it will bump up against the two patterns currently at the left and right edges. The border will also touch all of the patterns at top and bottom, but let's decide that we don't care about that. After all, Aran sweaters have ribbing against the patterns around the bottom edge and at the neck.[3]

Let's add just one purl stitch before the first pattern and after the last pattern so the left and right borders won't touch our cable patterns. We can add them the same way that we added the columns with two purl stitches.

---

[3] Of course, we could consider that an Aran sweater is just ribbing with fancy, instead of plain, stockinette columns. It's quite possible to start the patterns right at the very bottom of the sweater without doing a "normal" 1x1 or 2x2 ribbing first.

Is This Chart Good Enough?

The current form of the chart may actually be good enough.

What?!

I can hear you thinking, or maybe yelling, *But what about the foundation rows of Braid and Wavy Cable?!*

There are several solutions.

Option 1: Is There a Bottom Edging?

If our project will have some kind of bottom border, like garter stitch, seed stitch, or ribbing, then we may not have to do the patterns' foundation rows at all.

Foundation rows are put on some patterns because, most of the time, the piece looks better if there is at least one row between the cast-on edge and the first actual pattern row. Working something like a cable or a decrease on the very first row after casting on might look messy.

If, however, we will have some kind of border below any pattern with one or more foundation rows, that border will in all likelihood supply the necessary fabric before that pattern's row one.[4]

If this project were a hat, we may well want ribbing around the bottom. If that's the case, the ribbing will substitute just fine for the foundation rows of both Braid and Wavy Cable.

If this project were going to wind up as a hot pad, we probably want some kind of border that would prevent the edges from curling, like seed stitch. In that case, again, the bottom border would substitute handily for the omitted foundation rows.

Option 2: Change Which Pattern Row Is Row One

There are two ways to change which pattern row is row one.

Method A: Restack the Rows

In this method we move rows one at a time from the bottom of the pattern to the top of the pattern.

For example, in Braid as originally written, we purl across a private-side foundation row, then we cable on row one. If we simply omit that private-side row as shown in the big chart, and if there is no lower border, we wind up cabling the cast-on. That might look messy. But notice that foundation row A is the same as rows two and four.

So let's eliminate the foundation row.

_____

[4] To be absolutely sure our patterns will work without their foundation rows, it's always a good idea to make up a swatch with the bottom border we plan to use on the project, then work pattern-row one immediately.

Now move row one to the top of the stack of pattern rows, to be on top of row four (as, indeed, it will be when we finish the four rows of the pattern and begin working Braid the second time).
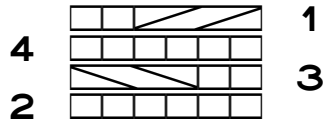
Renumber the rows to the usual convention.
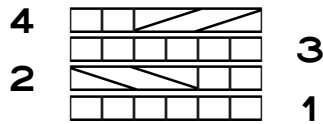
Now let's compare the original chart with this one.

As Written   Rows Restacked
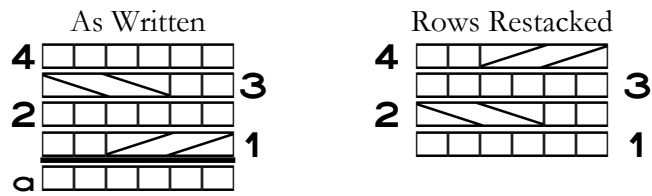
Method B: Renumber the Rows

There's actually an easier way to do what we just did. From the original version of the pattern, we would get nearly the same result if we simply say foundation row A is now row one and renumber the rest of the rows in the usual way.
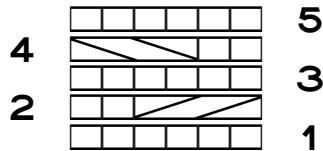
Since the pattern itself has a four-row repeat (the instructions tell us to repeat rows one through four), that means we eliminate the new, and now superfluous, row five.
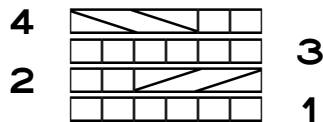
So here is the original version of Braid side by side with this second method.

As Written   Rows Renumbered
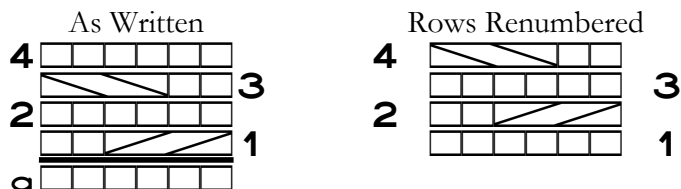
Compare the Two Methods

Let's compare the chart where we actually moved row one to the top of the repeat to the one where we just renumbered the rows.

Rows Restacked   Rows Renumbered
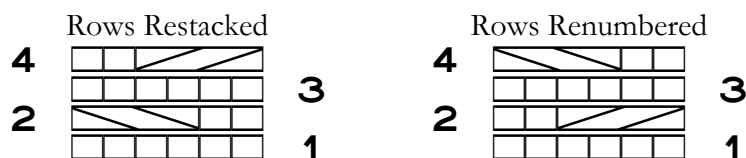
What is different in these two rewritten versions? See how the cables cross in the opposite direction on rows two and four?

It won't really make much difference which version of Braid we do, unless there are other patterns similar to Braid and we want them to cross the same direction at the same time.

The Big Surprise: You CAN Cable on Private-Side Rows

There is one other little wrinkle in either altered version of Braid. Whether we restack or renumber the pattern rows, **we will now cable on the private side**.

Most knitters have never heard of cabling on private-side rows. But if we were working this project in the round, there wouldn't be any private-side rows (well, rounds) at all, so theoretically, there would be no issue about whether the rounds we might happen to cable on were, well, odd- or even-numbered.

But we're working in the flat. Even so, we would still get Braid done properly while cabling on the private side **if**

🧶 we hold the stitches on the cable needle still to the front for a left-leaning cable or to the back for a right-leaning cable, **and**

🧶 we work all the stitches as purls instead of knits

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Why Does Cabling on the Private Side Work?

Why does cabling Braid, or any other cable pattern, on the private side still work, as long as we hold the cable needle to the front or back as usual and purl all the stitches?

We have to purl all the stitches, because from the public side, a cable's stitches are all knitted. That means that if they're worked on the private side, we still have swap purls for knits in the normal way. So much for the second point... Now for the first.

This is one of those situations where it may be easier to just prove it yourself with yarn and needles rather than to read in words why it works. But I'll try to explain it anyway.

When you cross a cable to the right from the public side, the stitches **closest to you**, naturally enough, slant to the right; that's what a right-slanting cable is, by definition. And how do you achieve this slant? By holding the cable needle to the back of the work. Which way do the stitches **farthest from you** slant when you've finished the cable? The only way they can: to the left.

When you turn the work to the private side, look at the stitches of the two parts of the cable. The stitches **closest to you** slant in which direction? To the right. And the stitches **farthest from you**, which way do they slant? To the left.

So when you turned the work, what from the public side slanted to the right now slants to the left, and vice versa. But the cable stitches **closest to you still slant to the right**, and the stitches farthest from you still slant to the left. That means that **on the private side, you would have still had to put the cable needle to the back**.

To get the stitches **closest to you** to slant to the right, you **always** have to put the cable needle on the side away from you, period. That's why you get a **right-slanting cable when you hold the cable needle away from you**, whether you're cabling on the public or private side.

An Incredibly Important Distinction

Note something very important in the terminology here. Some instructions will define a right-slanting cable as one made when you put the cable needle on the **private side** of the work. So they will also say that left-slanting cables are made by holding the cable needle to the **public side** of the work. What's the unwritten assumption in these directions? That you're working the cable crossing on a **public-side** row.

Now you know that it doesn't matter which side you work the cable on. For a right slant, hold the cable needle to the back, period. For a left slant, hold the cable needle to the front, period.

Work a Two-Cable Swatch

Make this little swatch yourself, casting on eighteen stitches with some ordinary yarn and a

reasonably sized needle. Note that we're going to use Cable 3/3 Right instead of Braid, because it's a simpler cable that crosses once every six rows, compared to Braid's crossing every other row.
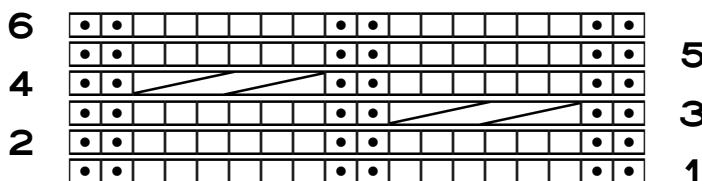
After you purl the first two stitches on row three, put the next three stitches on the cable needle, and put the cable needle to the back. From the public side, it's clear that the cable, that is, the cable's **front stitches**, will slant to the right.

Now, having put the cable needle to the back, turn the work around so you're looking at the private side. If you could watch from the private side as you make the cable on row three, you would see your public-side self purling three stitches from that self's left-hand needle, then purling the stitches on the cable needle. And which way will those last three purl stitches be slanting? **To the right**.[5]

Don't believe me? Turn the work back to the public side and just slip the three stitches from the left needle to the right needle purlwise. Then turn back to the private side.

When you watch your other self complete the cable by what looks from the private side like purling the three stitches from the cable needle, which way will those three stitches slant, as you look at them from the wrong side? **To the right**.

Should I add photos????

Still don't believe me? Then work the cable in pieces, turning to look at the work from the private side several times:

1. Turn the work to the public side, and put the three slipped stitches back on the left needle. Knit the first stitch from the left needle. Turn to the private side. What's happened? You've purled the first stitch from the, er, left needle, which your private-side self is currently holding in your right hand.

2. Turn back to the public side and knit the next two stitches. Turn to the private side. You've just purled the first three stitches of the cable. Pull the cable needle to the right, which is where your public-side self will have to pull it to work its stitches. Which way are those last three cable-needle stitches going to slant? To the right.

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[5] <mark>Please don't try this experiment by looking in a mirror. The mirror image will be reversed. If you don't have a knitting buddy who can work the cable while you watch from the private side, shoot video of yourself from the private side as you make the cable on the public side, then watch the playback. {I still need to check this. Can a mirror-image knitter chime in here?}</mark>

3. Turn back to the public side and knit the first stitch from the cable needle. Turn to the private side. You've just purled the first stitch of the second half of the cable.

4. Turn back to the public side, then complete the cable and the row. Turn to the private side. You've got three purl stitches crossed over three purl stitches, slanting to the right. You may need to stretch the fabric sideways a little to make the slant clear.

Now you're going to do the amazing: you will successfully work a cable crossing on the private side!

Cabling on the Private Side

From the private side, work the first two stitches of row four.

1. Put the next three stitches on a cable needle and put it to the back, to make the cable slant which way? To the right. Notice that "to the back" means "the side away from you," **not** "the private side of the work."

2. Purl three stitches from the left needle (the left needle as you're looking at the private side). Turn the work to the public side. The cable needle is hanging on the public side. Which way will its stitches lean when you complete the cable? To the right.

3. Turn back to the private side, and purl the stitches on the cable needle.

4. Turn to the public side. Does the cable lean the correct direction?

5. Turn to the private side and complete the row.

Turn the work around, and look at the cable from the public side. It's exactly the same as if we had worked it from the public side. Granted, the cable is done one row later, compared to the other cable, since it was worked on the private side.

But the point is, the cable still slanted the correct direction. You cannot tell the difference between a cable worked from the public side and one worked from the private side (except that the crossings naturally won't be positioned on the same row).

Complete rows five and six, then work all six rows again and bind off. Challenge your knitting friends to explain why the cables look **almost** the same, even though the cable crossings are clearly not on the same row!

Work a Twist on the Private Side

If we try this same experiment on Wavy Cable, everything is exactly the same, but when we work across the stitches on the private side, we can't simply purl them all. We have to work the stitches as they present themselves: knitting the knits and purling the purls.
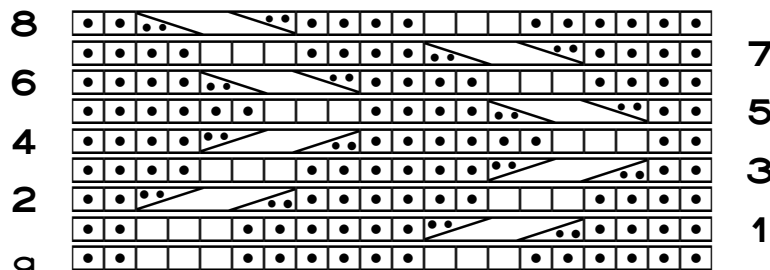
Here, the hard part is getting the correct group of stitches on the cable needle. For this particular twist, we have to think in terms of a group of two, the background purl stitches, and a group of three, the knit stitches that move across the purls.

Once we get to the five stitches that we need to cross, we can tell which stitches to put on the cable needle. The next two stitches will be knits (the public-side purls), or the next three stitches will be purls (the public-side knits).

We put the run of the same stitches on the cable needle. Which way are we supposed to be crossing the stitches on the current row? If the chart shows to the left, we put the cable needle to the front (*left* and *front*). But if it crosses to the right, we put the cable needle to the back (*right* and *rear*).
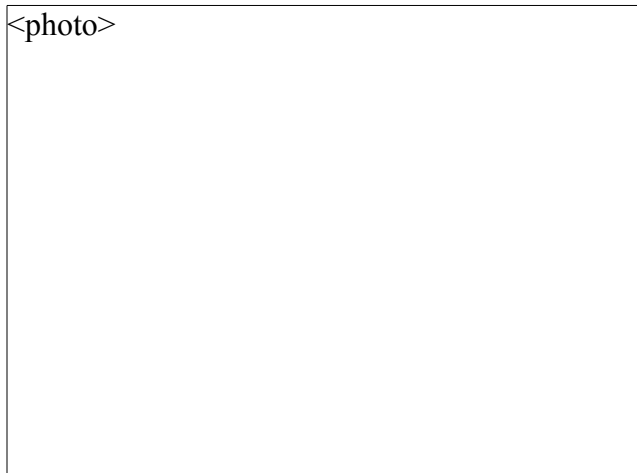
Work each group of the twist's stitches as they present themselves, knitting the knits and purling the purls.

Work the chart a second time and bind off. Once again you can amaze your knitting friends when you explain why the twists are *almost* the same.

Dealing with Foundation Rows Exactly

There are two exact solutions for including the foundation rows, so that we work each pattern exactly as written in the original instructions.

We'll work this exercise omitting the Hugs and Kisses Cable. The technique is the same, but omitting the sixteen-row pattern will make the charts smaller as we work through the steps. Since we now have four-, six-, and eight-row patterns, the chart will need twenty-four rows to be a complete project chart with no gaps (twenty-four is the smallest number that four, six, and eight will divide into evenly).

The foundation rows for Braid and Wavy Cable are back in the chart, with the heavy line on their table cells' top borders to remind us they aren't included when the pattern rows start to repeat. The patterns' public- and private-side row numbers have been added to make discussion easier.

Option 3 for Dealing with Foundation Rows

Let's pretend for a moment that we've figured out what to do about the missing rows for Cable 3/3 Right and Fishbone at the bottom of the project chart in the project chart's foundation row A. As we've been working our way up the chart, what have we been doing in each pattern?

Working Up the Chart

In the column of Braid, we worked the foundation row only once, then we worked the four pattern rows over and over, like this:

A–1–2–3–4–1–2–3–4–1–2–3–4…

Cable 3/3 Right doesn't have a foundation row, and it has six pattern rows, so we worked rows

1–2–3–4–5–6–1–2–3–4–5–6–1–2–3–4–5–6...

over and over.

In Fishbone, we also worked four rows over and over, but unlike Braid, it didn't start with a foundation row, so our sequence from the beginning was just

1–2–3–4–1–2–3–4–1–2–3–4...

Wavy Cable had a foundation row and an eight-row repeat, so we worked its rows as

A–1–2–3–4–5–6–7–8–1–2–3–4–5–6–7–8–1–2–3–4–5–6–7–8...

(And even though it's not on the current chart, we know that for the Hugs and Kisses Cable, we would have cycled through its sixteen pattern rows, following row sixteen with row one as we started it over again.)

What Row Precedes Row One?

Now, having established the row sequence through each pattern, let's go back to the bottom of the chart, where we don't have any stitches for Cable 3/3 Right and Fishbone in the chart's foundation row A.

Cable 3/3 Right

Since it's a six-row pattern, what row comes after row six? Row one. That's how we work patterns. We finish the last row of the pattern and start over with (usually) row one. So here, we finish row six, then work row one.

Now let's ask the question the other way. After we've worked through Cable 3/3 Right's rows a few times, what row did we work right before we started over with row one?

Well, we worked row six, of course.

Which pattern row of Cable 3/3 Right is in row one of the project chart? Pattern-row one. So what pattern row do we work before row one when we've completed a few cycles? Row six.

Therefore, we put row six below row one at the bottom of the project chart in the column for Cable 3/3 Right.

Fishbone

After we cycled through the pattern rows of Fishbone several times, what pattern row did we work before we worked row one?

After we worked pattern-row four, we started over again with pattern-row one.

Asking in the other direction, before we worked pattern-row one, we worked which pattern row? Row four. So what should come before Fishbone's pattern-row one in the project chart's foundation row A should be…Fishbone's pattern-row four.

The Filled-In Chart

Here's the chart with Cable 3/3 Right's row six and Fishbone's row four added to foundation row A of the project chart.

		Braid		Cable 3/3 R			Fishbone			Wavy Cable		
24	4		6		5	4		3	8		7	23
22	2		4		3	2		1	6		5	21
20	4		2		1	4		3	4		3	19
18	2		6		5	2		1	2		1	17
16	4		4		3	4		3	8		7	15
14	2		2		1	2		1	6		5	13
12	4		6		5	4		3	4		3	11
10	2		4		3	2		1	2		1	9
8	4		2		1	4		3	8		7	7
6	2		6		5	2		1	6		5	5
4	4		4		3	4		3	4		3	3
2	2		2		1	2		1	2		1	1
a	a		6			4			a			

The dark border outlines where we added each pattern's last row as well as their private-side row numbers.

Option 3 Summary

Let's review the steps for option three.

- We started with a project chart that ignored any pattern's foundation rows and had all the gaps filled in by duplicating each pattern over and over, until the chart had enough rows to fit in each pattern perfectly.

- Then we added the foundation row to the chart and restored the foundation rows of the patterns that had them.

- Working with each pattern individually, we then put the last pattern row into the empty area of the project's foundation row. So for Cable 3/3 Right, we added pat-

tern-row six below its pattern-row one in the project chart's foundation row A. For Fishbone, we put pattern-row four in the project's foundation row A.

What If a Pattern Has More Than One Foundation Row?

The sample patterns both had only one easy foundation row, since they were just public-side knits. But some patterns may have more than one foundation row, or the foundation rows may be more complicated than the ones here.

The procedure should be the same. Establish the project chart with as many rows as needed to accommodate complete repeats of each pattern, ignoring all the foundation rows any pattern may have. Add the foundation rows at the bottom of the project chart for those patterns that need them. Then fill in gaps with the last few rows for all the patterns that don't have foundation rows.

Option 4 for Dealing with Foundation Rows
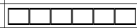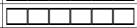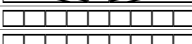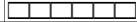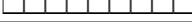
When we first put all the patterns into a single chart, we put all the patterns to the **top** of the project chart. The particular row of the project chart that each pattern's row one (or foundation row) wound up on depended on how many rows each pattern had.

What happens if we put the patterns to the **bottom** of the project chart, including the foundation rows of the patterns that have them?

Bottom-Align the Patterns

Here is the project chart, including the patterns' private-side row numbers and both sets of row numbers for the project chart, but with all the patterns starting in the bottom row of the project chart.

The foundation rows for Braid and Wavy Cable are set off with dark lines (by manipulating the top border of their table cells), and they are placed in the same project row as the other patterns' row one. (We're again working with smaller project charts by omitting the Hugs and Kisses Cable, but we would do all the same steps if we included it.)

			Braid			Cable 3/3 R			Fishbone			Wavy Cable			
															1 5
1 4															
															1 3
1 2															
															1 1
1 0															
															9
8												**8**			
														7	**7**
6												**6**			
					6									**5**	**5**
4	**4**							**5**				**4**			
				3		**4**			**4**					**3**	**3**
2	**2**							**3**				**2**			
				1	**2**				**2**					**1**	**1**
a	**a**							**1**			**1**				

Let's look at this chart before we start duplicating pattern rows to fill in the gaps.

The Initial Chart

A couple things are obvious right away. The biggest one is that some patterns will cable on public-side rows while others cable on private-side rows. We've already looked at cabling on private-side rows, and if we pay just a little bit more attention to what we're doing, it's not a problem.

Sub-Option A: Do We Care If We Cable on Every Row?

If we don't mind cabling on basically every row, public side and private side, then all we have to do is fill in the gaps in the way we already know. Of course, we paste the pattern rows **above** the existing rows instead of below them, as we did when we ignored the foundation rows. But still, we just need to make enough copies of each pattern to fill up the chart.[6]

Sub-Option B: If We Want the Private-Side Rows Easy

But sometimes we just don't want to have to pay that much attention on **every** single row. If all the patterns in our project chart only ever cable on public-side rows, then we get that "Ahhh" moment of just working back on the private-side rows (or just working around if we're working circularly).

Can we fiddle this chart to get all the patterns to cable only on public-side rows? Of course.
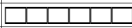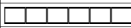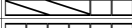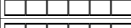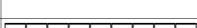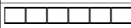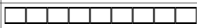
Moving Patterns Up and Down

When we have two copies of Braid aligned with one copy of Wavy Cable, then Braid and Wavy Cable do their cabling on the same rows. Cable 3/3 Right and Fishbone also do their

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[6] And the project chart will need more than fifteen rows, but we don't need a tall project chart with a bunch of blank rows to talk about the techniques.

cabling on the same row, but unfortunately, as shown in the project chart, that row is not the same as the one for Braid and Wavy Cable.

So let's move the Cable 3/3 Right and Fishbone pattern rows down one row in the project chart. The following chart shows the result (with their pattern row numbers moved also).

		Braid			Cable 3/3 R			Fishbone			Wavy Cable			
														15
14														
														13
12														
														11
10														
														9
8										8				
												7		7
6										6				
												5		5
4	4			6						4				
			3			5						3		3
2	2			4			4			2				
			1			3			3			1		1
a	a			2			2							
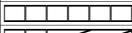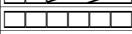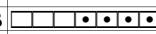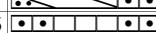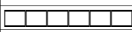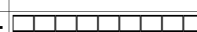
This result is pretty good. Yes, the row numbers are all messy, but we've achieved our goal of having all four patterns cable on the same row, row one, of the project chart.

What's the next step? Same as before: we have to fill in the empty areas of the chart with copies of each pattern until the entire project chart is filled in.
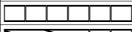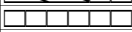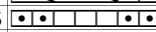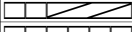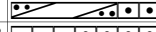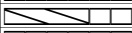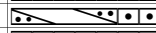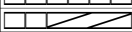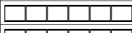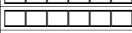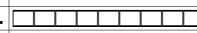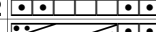
Start Adding Copies of Each Pattern

For Braid, we only copy its numbered pattern rows. We don't make copies of its foundation row A, because we only work a pattern's foundation rows at the very beginning. So here is the chart with two copies of Braid.[7]

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[7] Since the tables include public- and private-side row numbers for each pattern, we won't put the highlighting on every other copy of each pattern, as we did earlier.

		Braid			Cable 3/3 R			Fishbone			Wavy Cable		
1 5													
1 4													
1 3													
1 2	4											1 1	
			3										
1 0	2											9	
			1										
8	4									8			
			3								7	7	
6	2									6			
			1								5	5	
4	4			6						4			
			3			5					3	3	
2	2			4			4			2			
			1			3			3		1	1	
o	o			2			2						

The chart does not have enough rows to add a copy of Wavy Cable, so we need to add one blank row below below the heading to fit in all eight of the pattern rows (just like with Braid, we don't copy Wavy Cable's foundation row). Since that extra row to fit in Wavy Cable will give us four rows above the top row of Braid, we'll add another copy of Braid at the same time.

		Braid			Cable 3/3 R			Fishbone			Wavy Cable		
1 6	4									8			
			3								7	1 5	
1 4	2									6			
			1								5	1 3	
1 2	4									4			
			3								3	1 1	
1 0	2									2			
			1								1	9	
8	4									8			
			3								7	7	
6	2									6			
			1								5	5	
4	4			6						4			
			3			5					3	3	
2	2			4			4			2			
			1			3			3		1	1	
o	o			2			2						

Definitely looking good.

Let's add a copy of both Cable 3/3 Right and Fishbone.

Braid	Cable 3/3 R	Fishbone	Wavy Cable

(Knitting chart with four named pattern panels — Braid, Cable 3/3 R, Fishbone, and Wavy Cable — showing rows labeled with numbers. Row numbers on the far left read 16, 14, 12, 10, 8, 6, 4, 2, o. The Braid panel rows are labeled 4, 3, 2, 1, 4, 3, 2, 1, 4, 3, 2, 1, 4, 3, 2, 1, o. The Cable 3/3 R panel rows are labeled 6, 5, 4, 3, 2, 6, 5, 4, 3, 2. The Fishbone panel rows are labeled 4, 3, 2, 4, 3, 2. The Wavy Cable panel rows are labeled 8, 6, 4, 2, 8, 6, 4, 2, with a second set of numbers on the right reading 7, 5, 3, 1, 7, 5, 3, 1 and an outer column reading 15, 13, 11, 9, 7, 5, 3, 1.)

Whoa. Wait a minute. Now we're doing those two patterns' second cabling rows on the private side, which is exactly what we're trying to avoid.

What happened?!
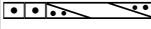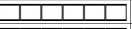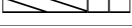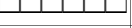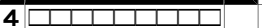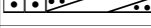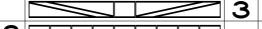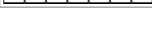
Take a look at both patterns again. Notice something missing? It's one of those things that's so obvious we may not see it right away.

Neither Cable 3/3 Right nor Fishbone has a row one. Where did row one of each pattern go?

When we pushed those two patterns down, their first rows got pushed out of the project chart. Go back and look at that chart. Row one of both patterns just disappeared.

Restoring the Rows That Got Deleted

Instead of just throwing away the first rows of those two patterns, we should have **put them on top of the last row** of their patterns. Before we started copying pattern rows to fill in the gaps on the project chart, we should have started with the following chart, where the dark boxes show how row one of those two patterns were moved to be above each pattern's last row:

		Braid			Cable 3/3 R			Fishbone			Wavy Cable		
													15
14													
													13
12													
													11
10													
													9
8									**8**				
											7	**7**	
6									**6**				
						1					**5**	**5**	
4	**4**			**6**					**4**				
		3			**5**		**1**			**3**	**3**		
2	**2**			**4**			**4**		**2**				
		1			**3**		**3**			**1**	**1**		
o	**o**			**2**			**2**						

Remember the row sequences that we figured out for all the patterns? For Cable 3/3 Right it was

1–2–3–4–5–6–1–2–3–4–5–6–1–2–3–4–5–6–…

That's why row one now needs to be on top of row six.

In Fishbone, our sequence was

1–2–3–4–1–2–3–4–1–2–3–4…

Its row one now needs to be on top of its row four.

The chart above shows row one of both Cable 3/3 Right and Fishbone on top of each pattern's last pattern row.

We have simply restacked those patterns' rows.

Now We're Ready to Fill the Gaps

Let's restore the copies of Braid and Wavy Cable, then add one copy of both Cable 3/3 Right and Fishbone.

	Braid	Cable 3/3 R	Fishbone	Wavy Cable	
16	**4**			**8**	
	3			**7**	**15**
14	**2**			**6**	
	1			**5**	**13**
12	**4**			**4**	
	3	**1**		**3**	**11**
10	**2**	**6**		**2**	
	1	**5**		**1**	**9**
8	**4**	**4**		**8**	
	3	**3**	**1**	**7**	**7**
6	**2**	**2**	**4**	**6**	
	1	**1**	**3**	**5**	**5**
4	**4**	**6**	**2**	**4**	
	3	**5**	**1**	**3**	**3**
2	**2**	**4**	**4**	**2**	
	1	**3**	**3**	**1**	**1**
o	**o**	**2**	**2**		

Notice that Cable 3/3 Right's row numbers cycle through as

2–3–4–5–6–1–2–3–4–5–6–1…

and Fishbone's cycle through as

2–3–4–1–2–3–4–1…

These sequences are perfectly correct; they just both happen to start on row two instead of row one. But each pattern's sequence has row one following its last row. We just chose to start each pattern in a different place than normal.

We still have some gaps to fill, which means we need to put some blank rows at the top of the table, then add some complete copies of each pattern.

Row	Braid	Cable 3/3 R	Fishbone	Wavy Cable	Row
24	4			8	
	3	1	1	7	23
22	2	6		6	
	1	5	3	5	21
20	4	4	2	4	
	3	3	1	3	19
18	2	2	4	2	
	1	1	3	1	17
16	4	6	2	8	
	3	5	1	7	15
14	2	4	4	6	
	1	3	3	5	13
12	4	2	2	4	
	3	1	1	3	11
10	2	6	4	2	
	1	5	3	1	9
8	4	4	2	8	
	3	3	1	7	7
6	2	2	4	6	
	1	1	3	5	5
4	4	6	2	4	
	3	5	1	3	3
2	2	4	4	2	
	1	3	3	1	1
a	a	2	2		

This chart is very similar to the one that we had when we ignored the foundation rows of Braid and Wavy Cable. That chart was exactly twenty-four rows high, there were no blank areas anywhere in the chart, and all the patterns fit in perfectly, since twenty-four can be evenly divided by four, six, and eight.

So why does this project chart have two blank pattern rows on chart-row twenty-four for Cable 3/3 Right and Fishbone?

Let's double-check each pattern's row numbers, just to make sure we haven't miscopied or lost a pattern row somewhere. We need to start at the bottom of the chart and work our way upward through each pattern.

Are All Pattern Rows Present and Accounted For?

In Braid, we have the correct sequence

A–1–2–3–4–1–2–3–4–1–2–3–4…

Cable 3/3 Right didn't have a foundation row, and it started with row two, but even so, we have

2–3–4–5–6–1–2–3–4–5–6–1–2–3–4–5–6–1–…

all the way up.

In Fishbone, we also start with row two, so our sequence ought to be, and is,

2–3–4–1–2–3–4–1–2–3–4–1…

Wavy Cable had a foundation row and an eight-row repeat, so its rows count off as

A–1–2–3–4–5–6–7–8–1–2–3–4–5–6–7–8–1–2–3–4–5–6–7–8…

So Why Are Two Patterns Still a Row Short?

It's nice to know we didn't make an error copying and pasting the groups of rows for each pattern.

So why is there still that gap at the top of the project chart for two of the patterns?!

Think about it this way: How many copies of the six-row Cable 3/3 Right fit into the twenty-four rows of the project chart? Four, and they fit exactly.

How many copies of the four-row Fishbone fit into the twenty-four rows of the project chart? Six, and they also fit exactly.

Now for the tricky question: **How tall is the project chart?**

Twenty-four rows? No, it's twenty-*five* rows tall.

The Chart Is One Row Taller Than Before

We have six repeats of Braid and three repeats of Wavy Cable, both of which fit exactly in twenty-four rows, but **we also have the foundation rows of Braid and Wavy Cable**, so our project chart is twenty-*five* rows tall.

So What Do We Do About the Gap in the Project Chart?

Cable 3/3 Right and Fishbone both end with row one at the top of the project chart, on project row twenty-four.

According to the sequence of rows we repeat for each pattern, what row would follow in each pattern? Well, duh, row two, of course.

So let's add each pattern's row two to completely fill in the project chart.

Proj.	Braid	Cable 3/3 R	Fishbone	Wavy Cable	Proj.
24	4	2	2	8	
	3	1	1	7	23
22	2	6	4	6	
	1	5	3	5	21
20	4	4	2	4	
	3	3	1	3	19
18	2	2	4	2	
	1	1	3	1	17
16	4	6	2	8	
	3	5	1	7	15
14	2	4	4	6	
	1	3	3	5	13
12	4	2	2	4	
	3	1	1	3	11
10	2	6	4	2	
	1	5	3	1	9
8	4	4	2	8	
	3	3	1	7	7
6	2	2	4	6	
	1	1	3	5	5
4	4	6	2	4	
	3	5	1	3	3
2	2	4	4	2	
	1	3	3	1	1
a	a	2	2		

Let's look this chart over.

The (Mostly) Final Project Chart

This chart is only mostly final because we omitted the Hugs and Kisses Cable so the charts could all be shorter as we worked through the procedure. And compared to the final project chart from when we ignored the foundation rows altogether, we don't have the columns of reverse stockinette around all the patterns.

But even so, this chart achieves what we wanted.

🧶 We have all the cabling done on only public-side rows, so we can relax a bit when we work back on the private side, working the stitches as they present themselves (knitting the knits and purling the purls).

🧶 Each pattern that has a foundation row includes that row in the proper way.

🧶 We correctly cycle through each pattern's rows as we work our way up the project chart.

🧶 There are no gaps in the patterns, so we know exactly what to do on every stitch of every row.

Let's clean up the chart by deleting all the pattern row numbers, adding the reverse stockinette between the patterns, and putting the Hugs and Kisses Cable back in.

The Final Chart with Foundation Rows

Since the final chart shows lots of changes compared to the previous one, it may be hard to see what happened. But if you concentrate on only one pattern at a time, you will be able to figure out what changed.

Pop quiz: which Hugs and Kisses pattern row is in foundation row A of the project chart?[8]

Changing Which Pattern Row Is Row One, Just Because We Want To

In the Aran sampler, two of the five patterns had a foundation row, so one option was to push the other patterns' rows down one row in the project chart.

But we can push pattern rows down for another reason too. Suppose we want to make a hot pad with just the Hugs and Kisses Cable. We've also decided on five pattern repeats.

If we type up the first sixteen rows of the project, the chart will be

Rows three through seven contain

X–X–X–X–X

and rows eleven through fifteen contain

O–O–O–O–O

Now this will work just fine. But wouldn't it be more interesting if the Xs and Os alternated across each row instead of being the same all the way across the row?

In other words, in every other column we want to push down the Hugs and Kisses Cable pattern by eight rows, like this:

---

[8] Row two.

If we look at rows three through seven, we now have alternating motifs:

X–O–X–O–X

That's what we want, because it will make the hot pad more interesting than having only Xs or only Os going across.

But what do we do with the blank areas in the chart? We move the eight rows that are now sticking out at the bottom of two of the columns up into the blank areas at the tops of those two columns.

After we move the eight rows in the second and fourth columns, the first sixteen rows for this project that's just Hugs and Kisses will be

So rows three through seven are

X–O–X–O–X

and rows eleven through fifteen are

O–X–O–X–O

Let's add a second set of the sixteen pattern rows, just to get an idea of what the item will look like.

If we move from top to bottom in the first, third, and fifth columns, we have

O–X–O–X

and in the second and fourth columns we have

X–O–X–O

We have created a checkerboard of Xs and Os, just by changing some of our pattern re-
peats from the original

16
14
12
10
8
6
4
2

15
13
11
9
7
5
3
1

to the restacked

8
6
4
2
16
14
12
10

7
5
3
1
15
13
11
9
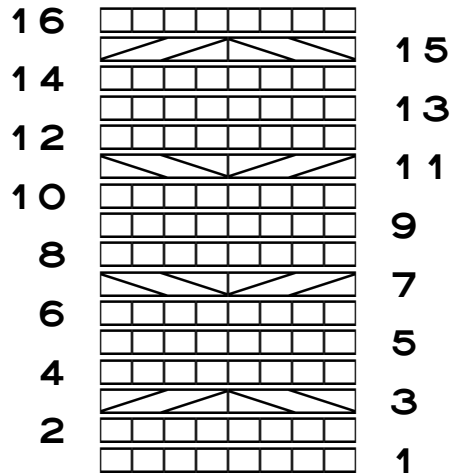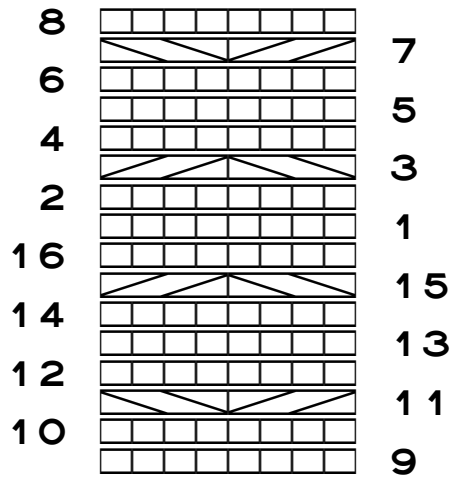
Let's look at these two versions side by side.

Original:
Hugs and Kisses

Restacked:
Kisses and Hugs?
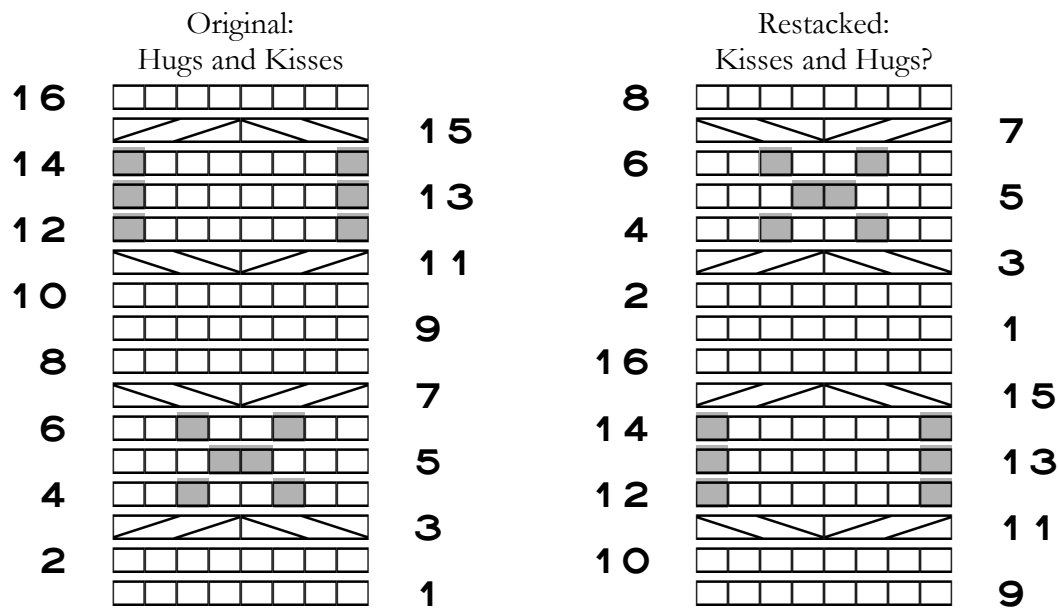
In the restacked version, we took rows one through eight as an entire group and put them on top of rows nine through sixteen.

Why Does This Restacking Work?

When we were fitting the five cable and twist patterns into a single project chart, one of the things we did was figure out the sequence of rows for each pattern. We didn't do so for the Hugs and Kisses Cable, because we had omitted it so that the charts we were working with would be smaller.

But naturally, the Hugs and Kisses rows would count from one through sixteen, then start over again:

1–2–3–4–5–6–7–8–9–10–11–12–13–14–15–16–1–2–3–4–5–6–7–8–9–10–11–12–13–14–15–16…

When we moved rows one through eight to follow row sixteen in the restacking, what we effectively did was start the row count from a different place:

9–10–11–12–13–14–15–16–1–2–3–4–5–6–7–8–9–10–11–12–13–14–15–16–1–2–3–4–5–6–7–8…

We just skipped the first eight rows of the pattern, then worked the normal row sequence.

We can do this for virtually any pattern.[9]

If you're not sure if your pattern would work this way, then the answer is what it so often is in knitting: make a swatch. (Sorry! I hate swatching too.)

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[9] Okay, I add the weasel word *virtually* just in case there's some pattern out there that won't allow starting from somewhere other than the designed row one. Special bottom edgings almost certainly could not be restacked.