

## Chapter 16

# LONG INSTRUCTION LINES

The swatches and projects in part one weren't very complicated. That relative simplicity allowed us to gloss over some issues. As we chart longer and more-complicated instruction rows, we can organize our charts by recognizing that each instruction line is one of three types.

### Type 1: Repeating Groups

In this type of instruction, the entire row consists of two or more stitches (or other knitting operations) that are repeated over and over across the full width of the project. The stitches/knitting operations will be enclosed in or set off with some kind of punctuation mark—an asterisk, a pair of asterisks, or a set of parentheses or square brackets—followed by the number of times we repeat the group.

Five of our basic fabrics fall into this category:

☉ 1x1 ribbing

☉ seed stitch

☉ moss stitch

☉ 2x2 ribbing

☉ alternate moss stitch

For the first three fabrics above, the instructions on each row were either

*\* K1, P1 \*, rpt btw \* across*

or

*\* P1, K1 \*, rpt btw \* across*

In this way, a pair of stitches was repeated over and over all the way across the row, and no “leftover” stitches on the row had to be worked according to other instructions.

The last two fabrics above had as their sole instructions on each row repeating groups of either

*\* K2, P2 \*, rpt btw \* across*

or

*\* P2, K2 \*, rpt btw \* across*

Each row in 2x2 ribbing and alternate moss stitch was worked entirely with one or the

other of those repeating groups, and no “leftover” stitches had to be worked with different instructions.

## Type 2: Non-Repeating Sequences

A non-repeating sequence consists of any number of stitches/knitting operations that cannot be simplified to a set of operations enclosed in, say, parentheses and followed by the number of times we repeat the group.<sup>1</sup>

Every row in the Aran sampler is a non-repeating sequence. In the charts just before the heading “Is This Chart Good Enough?,” row three would be written out as

Row 3: P1, C4L, C4R, P2, T3R, P4, CR, K1, CL, P2, C6R, P2, K2, C4F, P1.

when we use the same abbreviations from the chapter “Cables and Twists.”

There’s no group of repeated operations that could be enclosed in parentheses and followed with the number of times to work that group.

All rows in the three lace projects are also non-repeating sequences.

## Type 3: Combination of Type 1 and Type 2

The last type of instruction line simply combines both type one and type two in a single row. Every row in the purl diamond project is type three.

Each motif row, public side and private side, begins and ends

(K1, P1) *twice* ... (P1, K1) *twice*

Between these repeating groups, there’s a non-repeating sequence of stitches. For example, row nine’s non-repeating sequence is

K6, P1, K3, P1, K6

We do not work those stitches a second time on row nine; the entire set is only worked once. Nor can we use parentheses and a repetition phrase to group parts of the sequence, then specify how many times we work it.

The top and bottom border rows contain the repeating group

\* K1, P1 \*, *rpt btw* \* *across*

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<sup>1</sup> Note that this does **not** mean that every row in a stitch pattern or project is unique. Every public-side row may be the same, and/or every private-side row may be the same. It is only within the row itself that there is no repetition.

Since the rows all have an odd number of stitches, the repeating group is followed by the non-repeating sequence

K1

to work the lone stitch that can't be part of the repeating group. A non-repeating sequence can consist of only one stitch/knitting operation, so the top and bottom border rows all combine a repeating group and a non-repeating sequence.

## Charting Just the Pattern Repeat

In “Basic Knitted Fabrics,” we charted 1x1 ribbing, seed stitch, and moss stitch as though the instructions for row one all said

Row 1 (RS): K1, P1, K1, P1, K1, P1, K1, P1, K1, P1.

In the same way, we charted 2x2 ribbing and alternate moss stitch as though their row one instructions were

Row 1 (RS): K2, P2, K2, P2, K2, P2, K2, P2, K2, P2.

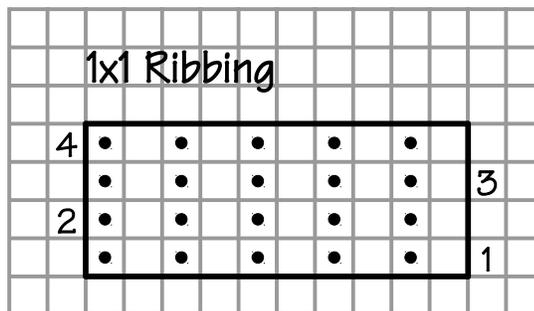
That explicit conversion made the charts either ten or twenty stitches wide. But a stitch dictionary would not use so much space to show charts of these patterns. They will instead have much smaller charts because they'll show only the pattern repeats. Let's see what those small charts would look like.

### *1x1 Ribbing*

We worked the same row four times.

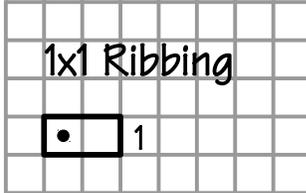
Row 1 (RS): \* K1, P1 \*, rpt btw \* across.

Since we had cast on ten stitches, we had exactly five pairs of repeating groups.

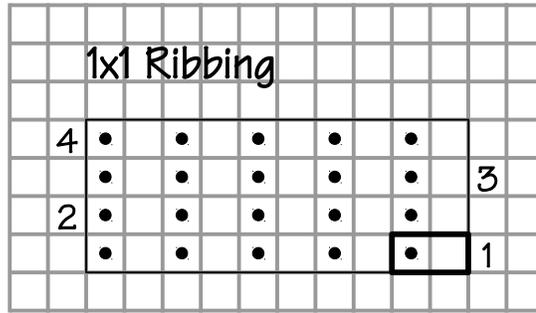


But the most compact way to chart a repeating pair of stitches like this is to draw just

the repeated symbols in the usual way, then draw in the chart itself marks that are the equivalent of the printed asterisks. A simple boundary box works well.



Some books might have a larger chart like the one we had originally, then use special boundary lines around the stitches and rows that we must repeat across the width and up the length of the project.



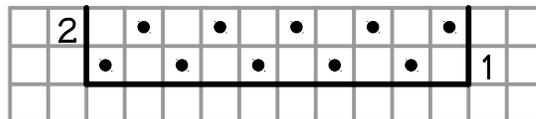
## Seed Stitch

Seed stitch starts the same way as 1x1 ribbing, but its second row is different.

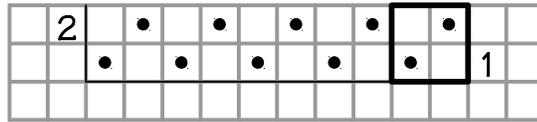
Row 1 (RS): \* K1, P1 \*, rpt btw \* across.

Row 2 (WS): \* P1, K1 \*, rpt btw \* across.

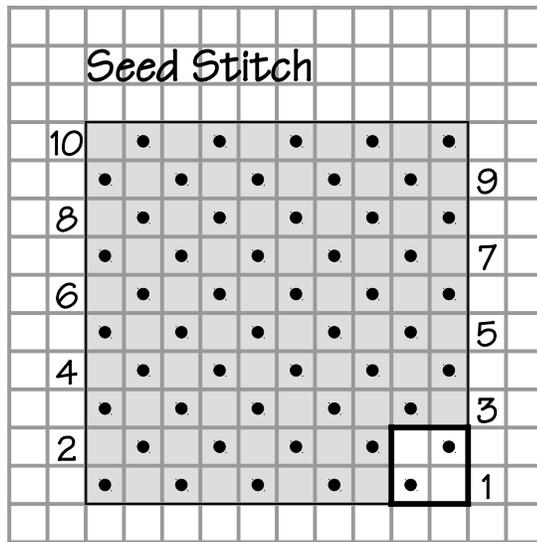
Both rows alternate knits and purls, but row two moves the stitches over by one stitch. That shift sets up the checkerboard.



Since the rest of the ten-row swatch just repeated these two rows over and over again, we know our boundary box for seed stitch must be two rows tall. And because on each row we repeat a pair of stitches over and over again, our box needs to be two stitches wide.

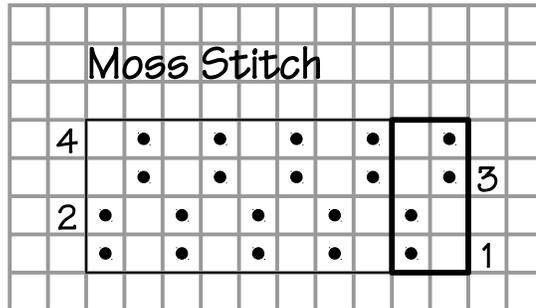


If we copy that square of symbols from side to side and bottom to top, we get the original chart. The extra copies of the pattern repeat give us an idea of what the fabric would look like, and a light gray background distinguishes them from the pattern repeat.



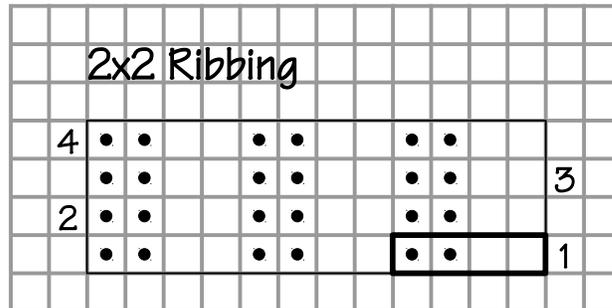
### *Moss Stitch*

Moss stitch is 1x1 ribbing that moves over by one stitch every two rows instead of every row. Its boundary box will be four rows tall, because it takes four rows to complete the pattern vertically. The box needs to be two stitches wide, because on each row we repeat a pair of knitting operations all the way across.



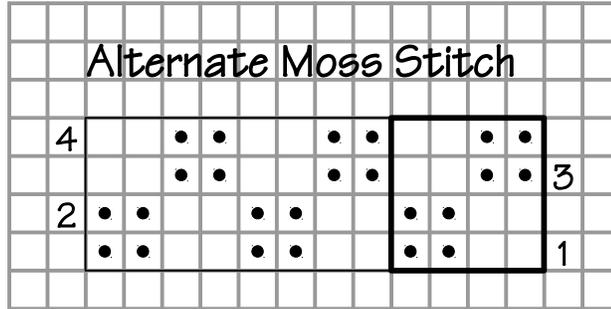
### *2x2 Ribbing*

Since we work 2x2 ribbing by repeating the same four stitches over and over again across the row, the pattern repeat boundary will be four stitches wide. Every row puts the same four stitches in the same place, so the box only needs to be one row tall.



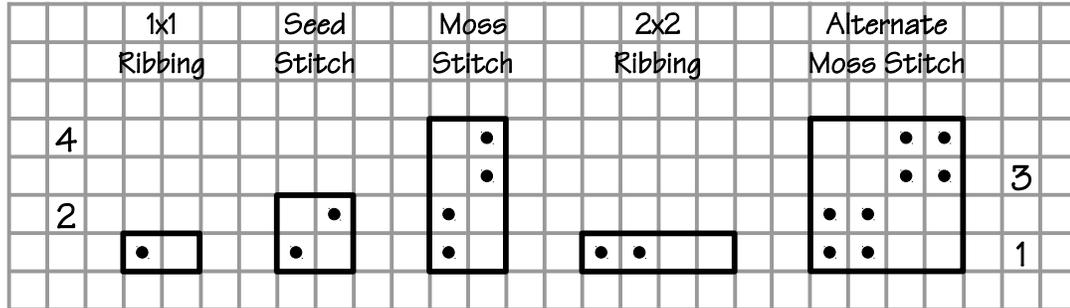
### *Alternate Moss Stitch*

Alternate moss stitch does to 2x2 ribbing the same thing that moss stitch did to 1x1 ribbing. We work two rows of 2x2 ribbing, then move the stitches over by two for two rows. We repeat those four rows for the entire length of the piece. Our box must be four rows high, and to include both pairs of stitches, it must be four stitches wide.

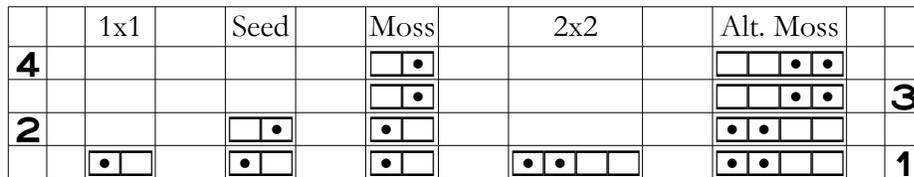


**Pattern Repeats for These Five Fabrics**

Since the basic fabrics have so much repetition, we can shrink their charts quite a bit. We show the minimum number of stitches and rows that we work over and over again, which lets us use bigger grid cells on paper or a bigger font size in the computer.



The computer charts look quite similar to the paper charts.



**Parents and Children**

It probably seems like all this nit-picky detail about how various stitches/knitting operations are or are not repeated in written-out instructions is belaboring the point and that, in fact, the point is obvious in the first place.

But here’s why we’re belaboring the point: **within their boundaries, repeating groups may have any of the three types of instructions.** Since none of the stitch patterns or projects so far shows this situation, we’ll cover them in depth here.

A repeating group containing repeating groups and/or non-repeating sequences can be thought of as a “parent” group that is treated as though it were the entirety of the row’s written-out instructions. Each “child” group within a parent group would also be charted and worked as if it were the only instructions for a row.

## ***An Example***

Let’s create a reasonably complicated long instruction line.

C4L: sl 2 sts to cn and hold to front, K2, K2 from cn.

C4R: sl 2 sts to cn and hold to back, K2, K2 from cn.

Row 1 (RS): (K1, P1) twice, \* K4, P1, C4R, K1, (yo, K2tog) 4 times, K1, C4L, P1, rpt from \* 3 times, K4, (P1, K1) twice.

As we glance across this row, we see it’s type three, containing both repeating groups and non-repeating sequences.

### **First Section**

The first part of the instruction line is a repeating group.

(K1, P1) twice

Since the parentheses and the repetition phrase are self-contained, meaning that they could themselves make up a row’s entire instructions, we would chart and work them as a four-stitch group.

### **Second Section**

Having found the end of the first section at its repetition phrase, we next see an asterisk, which represents the start of a new repeating group. We scan ahead to see where the repetition phrase is, and we find that this repeating group is fairly long.

\* K4, P1, C4R, K1, (yo, K2tog) 4 times, K1, C4L, P1, rpt from \* 3 times

Since this repeating group contains a repeating group along with other knitting operations, it’s a parent group. Within a parent group, we must determine where each child group begins and ends, because we would chart and work each child group as though it made up the row’s entire instructions.

The first operations we see come before the opening parenthesis of a child repeating group. The opening parenthesis indicates the end of the group before it, and that group is a non-repeating sequence.

K4, P1, C4R, K1

We would chart and work these four operations in the usual way. What follows the child non-repeating sequence is the child repeating group

*(yo, K2tog) 4 times*

which is a unit unto itself, as though it were a row's entire instructions. We would chart and work these eight operations before we moved on to what followed the repetition phrase.

After the repetition phrase for the child repeating group, another child non-repeating sequence begins. It ends with the repetition phrase for the parent group.

K1, C4L, P1

This non-repeating sequence would be charted and worked as three individual operations.

Now we come to the parent group's repetition phrase, which indicates the end of the parent (repeating) group.

*rpt from \* 3 times*

The parent repeating group is long, so we'll show only one repeat in the chart, enclosed in a pair of our preferred stitch repeat indicators.

### Third Section

The repetition phrase that signals the end of the parent group also signals the beginning of the next section. The third section ends at the opening parenthesis of the repeating group that follows it. The entire third section is, therefore, just one operation.

K4

A non-repeating sequence, which can contain any number of stitches/knitting operations, here happens to contain a single instruction that results in four stitches. We would chart and work these four stitches before moving on to the next part of the instructions.

### Fourth Section

The last section in the row's instructions is a repeating group. It starts with its opening parenthesis and ends with its repetition phrase.

*(P1, K1) twice*

As with the other repeating groups, we would chart and work this group as though it made up an entire instruction line.

## ***Alternate Punctuation***

There are other ways that written-out instructions show repeating groups and how many times they're repeated. We would chart and work these alternatives exactly the same way we're about to chart the original version.

If a child repeating group is bounded with an asterisk, then its parent repeating group may be bounded with two asterisks.

Row 1 (RS): (K1, P1) *twice*, \*\* K4, P1, C4R, K1, \* yo, K2tog, rpt from \* 4 times, K1, C4L, P1, rpt from \*\* 3 times, K4, (P1, K1) *twice*.

Parent repeating groups may be bounded by square brackets when they contain one or more child repeating groups. The repetition phrase may be slightly different but equally clear.

Row 1 (RS): (K1, P1) *twice*, [K4, P1, C4R, K1, (yo, K2tog) 4 times, K1, C4L, P1] 3 times, K4, (P1, K1) *twice*.

## **Charting Strategies**

There are two approaches for charting instructions containing repeating groups, whether we're charting on paper or in the computer.

1. We can “unpack” the repeating groups into their explicit sequences of stitches/knitting operations. We charted all the swatches in “Basic Knitted Fabrics” this way so we could gloss over some of the details we're looking at here. Depending on the number and lengths of the repeating groups and non-repeating sequences, we might be forced to chart with grid cells or font symbols too small to be practical.
2. We can chart the symbols of the repeating groups just once and enclose them with any of the stitch repeat boundaries we saw in “Working a Pattern Repeat.”

We'll chart our example row both ways, by unpacking the smaller repeating groups completely and by showing only one repeat of each. We'll also see several versions of the charted row in both paper and computer charts.

We'll read the instructions in the normal left-to-right direction, and since it's a public-side row, we must add the symbols to the chart from right to left according to the charting rule of reversal.

MIKs must remember to chart the written-out instructions according to the unwritten assumption that public-side rows will be worked right to left. A “K2tog” in the instructions, therefore, must be charted as a right-leaning decrease and an “SSK” (or “SKP” or similar) as left-leaning.

### *Fitting the Full Row on One Page*

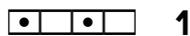
The larger the project we need to chart, the more we need to conserve space, whether we chart on paper or in the computer. If we like to work from paper charts, we're going to be happiest if we only need to keep up with one sheet of paper, whether a hand-drawn chart or computer printout, while we work each row. If we need extra pages because there are lots of rows, that's not too big a deal. We finish page one, put it away, and start on page two.

But who of us wants to juggle more than one sheet of paper on **every** row? If we have a really wide project, we're going to want to do everything we possibly can to make the chart narrower in the hope that, fingers crossed, each row fits on just one page.

If we're working from a chart in a device, we're going to want to minimize the number of times we have to let go of a needle to slide the next bit of the chart into view.

### **Strategy 1: Unpack the Repeating Groups**

The first section in our example instruction line is the repeating group "(K1, P1) twice." In earlier chapters we charted repeating groups as though they were completely written out, which in this case would be "K1, P1, K1, P1." That's what we'll do here, so we add those stitches to the chart from right to left and to the left of the row number.



The next thing we see is an asterisk, which indicates that a repeating group is about to begin. We use our preferred method at this point to represent the asterisk and the beginning of the repeating group. Here we're using a thick line, which works for both paper and computer charts.



The instructions after the parent group's starting point are "K4, P1, C4R, K1," followed by an opening parenthesis, which indicates the beginning of a child repeating group and the end of the child non-repeating sequence. Since the "C4R" will slant to the right for traditional knitters, that's how all of us, even mirror-image knitters, must show it in the chart. We chart the entire sequence from right to left in the usual way.



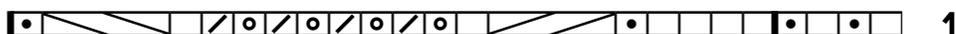
Now we have the child repeating group that marked the end of the child non-repeating sequence: "(yo, K2tog) 4 times." This repeating group is a child group within the parent group. We have not yet come to the end of the parent group.

We will unpack the "yo, K2tog" group to its equivalent "yo, K2tog, yo, K2tog, yo, K2tog,

yo, K2tog,” adding the symbols from right to left. Each “K2tog” must be shown as a right-slanting decrease, because of the unwritten assumption that public-side rows are worked right to left.



Beyond the repetition phrase of the child repeating group, we see “K1, C4L, P1,” which forms a second child non-repeating sequence. What follows those three knitting operations is the repetition phrase marking the end of the parent repeating group, so the parent’s repetition phrase also marks the end of its second child non-repeating sequence. We chart the non-repeating sequence as usual, showing the “C4L” as left-slanting, then use our preferred method to indicate the end of the parent repeating group.

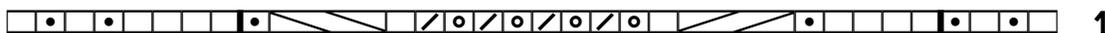


We could now unpack the entire parent repeating group by adding two more copies of the entire set of symbols between the thick lines (which would then allow us to remove those lines). We will not do so here, as we’re already close to the page’s margins.

Now we have just a few operations to do at the end of the row. First we have a “K4,” which forms a complete non-repeating sequence because what follows it is the opening parenthesis of another repeating group. We chart the non-repeating sequence by adding its symbols to the left end of the chart row.



The very last instructions in the row are the repeating group “(P1, K1) twice.” We unpack it as “P1, K1, P1, K1” and place the symbols in that order from right to left at the end of row one.



## *We Can Combine Sequences*

Unpacking repeating groups allows us to combine them with non-repeating sequences before and/or after them, which simplifies the chart.

### **On Paper**

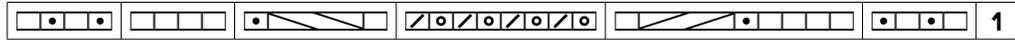
We may prefer to skip a grid cell to indicate the stitch repeat boundaries, especially if the cells are fairly small. The smaller the cells are, the harder it is to thicken a cell border without adding an inadvertent mark to or obscuring a required mark in an adjacent cell.



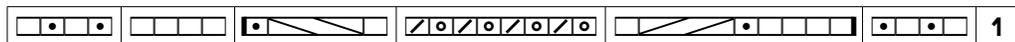
### In the Computer

If we use a multi-column table, we might put each repeating group and non-repeating sequence in its own column.

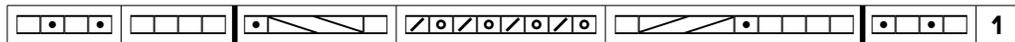
This first version of the chart shows all the repeating groups unpacked, except for the totality of the parent repeating group. There is no indication, though, of the boundaries of the parent repeating group.



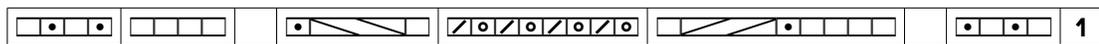
We could add the knitting font’s stitch repeat boundary symbol at the appropriate points



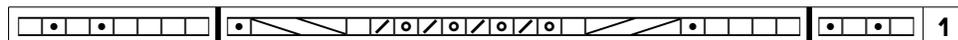
make thicker the appropriate table cell borders



or use blank columns to separate the parent group from what’s before and after it.



Since we unpacked the child repeating group, we can safely combine it with the child non-repeating sequences before and after it, which lets us put the entire parent group in a single cell. We can also combine the non-repeating sequence “K4” with the unpacked final repeating group “(P1, K1) twice.” The table is now down to just three columns.



### *Unpack, or Use Several Pairs of Repeat Boundary Symbols?*

In the example instruction line, the knitting operations within each pair of parentheses were unpacked and charted as individual symbols, with the first and last repeating groups being worked twice and the child repeating group worked four times. Because the row instructions are fairly short, the charted version using unpacked repeating groups fit on grid paper with fairly wide cells and allowed the computer chart to use a reasonable font size.

If we have longer rows, though, we might need to use the second strategy: leave all the repeating groups packed, then indicate their boundaries in our preferred way.

## Strategy 2: Minimum-Width Charting

We’ve repacked all the repeating groups, then added thick lines to show their boundaries.



Now, suppose we start working this project immediately. We'll probably remember which stitch groups are repeated and which aren't. But if life, or other projects, delay or interrupt our work on this project, are we going to remember exactly how these stitch repeat boundaries should be paired when we finally come back to this project?

### *Interpreting the Chart*

We can tell that stitches A and B are repeated, but what about the repeat boundaries around stitches M and N? Do we repeat stitches C through L several times, and if so, how many times?

If we work stitches M and N once, then we must need to do some number of repeats of stitches O through T, but again, how many?

Or do the repeat boundaries pair the other way: we repeat stitches M and N at least twice, but only twice? Or several times? That would imply stitches C through T are a parent repeating group.

But maybe we repeat stitches U through X a few times, and if so, how often?

We know stitches Y and Z are a repeating group, but how many times do we work them?

Are stitches A through Z one huge parent group?

For this particular instruction row, repacking the repeating groups makes the chart less clear. What we can do to eliminate the ambiguities?

### *On Paper*

Spaces can help indicate which boundary symbols are paired. We'll first add spaces to isolate the repeating groups at both ends of the row, along with a space to isolate the final non-repeating sequence from the parent group.



Note that when we split off stitches A and B as their own group, we had to put a stitch repeat boundary on **both** sides of the gap between stitches B and C, to make it completely clear there are repeating groups on both sides of that space. That usage contrasts with stitches U through X, which doesn't have a stitch repeat boundary on either side. We therefore know that stitches U through X are a non-repeating sequence.

Since we didn't put spaces around stitches M and N, that indicates they're a child repeating group in the parent repeating group in stitches C through T.

We could also put both spaces **and** repeat marks around stitches M and N



to make it absolutely clear that stitches C through T are a parent repeating group and that stitches M and N are a child repeating group. Stitches C through L and O through T are child non-repeating sequences since there aren't thick stitch repeat boundaries at stitches L and O.

Even though the boundaries of all the repeating groups are now clear, we still don't know how many times we work each repeating group.

### Indicating Alternate Meanings

If we saw spaces around stitches M and N and repeat boundaries next to stitches L and O



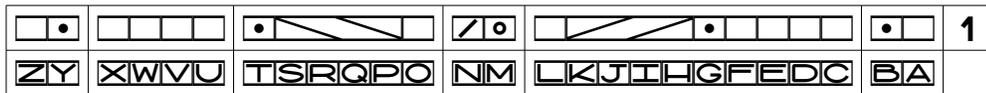
then we know stitches C through L and O through T are repeating groups and that stitches M and N are a non-repeating sequence.

### *In the Computer*

We have similar flexibility in the computer. Let's look at just a few of the options.

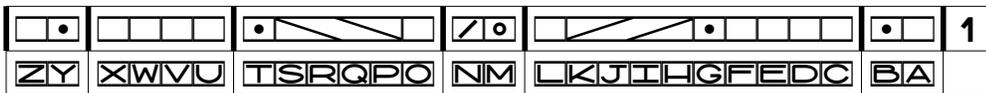
#### Use a Table

We could start with each section of the written-out instructions in its own table column.



But this version doesn't show us which columns repeat or how many times they do so.

Let's use thick cell borders to indicate which columns contain repeating groups.



This first attempt doesn't help the situation at all. We could combine the parent group's child groups in one column, which would help a little bit.

						<b>1</b>
ZY	XWVU	TSRQPONMLKJIHGFEDC	BA			

We had to add a couple of the knitting font’s stitch repeat boundary symbols to mark the child repeating group’s stitches M and N. And actually, using that symbol around all the repeating groups instead of the thick cell borders would make the chart much less ambiguous.

						<b>1</b>
ZY	XWVU	TSRQPONMLKJIHGFEDC	BA			

Since each part of the instructions is in its own table column, it’s clear that we have three repeating groups: stitches A and B, the entire group from C through T including its child repeating group in stitches M and N, and stitches Y and Z. We know we don’t repeat stitches U through X since that table cell has no stitch repeat boundary symbols.

We could optionally add spaces around the child repeating group if we thought there was any chance we’d be confused.

						<b>1</b>
ZY	XWVU	TSRQPO	NM	LKJIHGFEDC	BA	

What we still don’t know is how many times we repeat each of those four groups.

### Indicating Alternate Meanings

If stitches C through L and O through T had been repeating groups instead of child non-repeating sequences, we would keep them in their own cells and put stitch repeat boundaries on both ends of both groups.

						<b>1</b>
ZY	XWVU	TSRQPO	NM	LKJIHGFEDC	BA	

If stitches M and N don’t have boundary symbols around them, then we know they’re a non-repeating sequence between two repeating groups.

						<b>1</b>
ZY	XWVU	TSRQPO	NM	LKJIHGFEDC	BA	

### Squish the Symbols

We have one more trick that’s very easy to do—and undo—in the computer.

Both word processors I use have the ability to make the symbols narrower. In the Font or Character dialog box, we change the “Scale” or “Scale width” percentage. Here are various percentages of squish, compared to the row’s natural width at 100%.

100	
75	
67	
50	
33	
25	

Even at 50%, which makes the line half the natural width, the symbols are still quite legible. This trick might be just what we need to make our chart rows fit on one page, whether we work from a printed computer chart or an electronic “page” in a device.

### Use Color

If the chart is so wide that we must save as much space as possible to fit complete rows on one page at a reasonable symbol size (whether drawn on paper or typed in the computer), we might not be able to unpack **any** of the repeating groups.

In that case, we could color each group with a color whose name is the same length as the number of times we repeat the group. So red would mean we work a group three times, blue would mean four times, and green would mean five times. Non-repeating sequences would have no color since they’re worked only once.

What color can we use for repeating groups worked just twice, since there’s no color name that’s two letters long? Gray would be easy, or we could use a color whose name is longer than the number of repeats we do for any group, like yellow or turquoise.

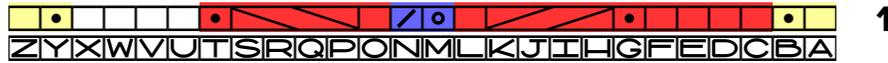
We’ll also have to experiment to find colors that don’t look like one another even if we give the chart just a quick glance.

### On Paper

Once we’ve charted the row, we use colored pencils or markers to shade in each group of symbols.

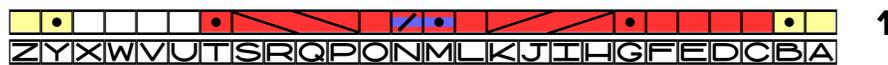
Since the child group “yo, K2tog” is worked four times while its parent group is worked three times, the parent group has been colored red, and its child repeating group has been colored blue.

The repeating groups at the beginning and end of the row, both of which are worked twice, have been colored yellow, since there’s no group we repeat six times.



There's a chance that when we come back to this project after it's been in timeout for months or even years, we might think we need to work stitches C through L three times, stitches M and N four times, then stitches O through T three times, when we should actually work the complete group of stitches C through T three times while working stitches M and N four times in each of those three repeats.

One solution would be to have red at the top and bottom of the child repeating group, then use blue just through its center.



A fine-tip marker with opaque white ink would give us the most flexibility in this situation, because we could draw **white** symbols on darker background colors.

We could also draw the symbols themselves with colored pencils or markers.



Yellow may not show up well, so we might need to use a different color for groups that are repeated twice. Purple might work, as long as it's quite different from the blue we're using for a group that's worked four times.



If we use too dark a purple, it will look different from the blue, but it might look the same as the black knit symbols from U through X. (They look the same on my printout.)

If we have to use very small grid cells in our quest to get the entire row to fit on one sheet of paper, it will be even harder to tell what color we used to draw some of the symbols.



## In the Computer

We have more options if we chart in the computer, one of the main ones being that we can much more easily use a different font color for the symbols themselves.

The two word processors I use distinguish between a table cell's fill color (called "shading" in Microsoft Word and "background" in LibreOffice) compared to the font's "highlight" color. The shading/background color goes all the way to the table cell's borders,

whether or not it contains any symbols. The font highlight color is used only around the symbols themselves; it does not extend all the way to the cell borders, and an empty table cell would not show any of the font highlight color.

Let's keep using the same color scheme, which means we set the parent group's table cell background to red and use blue highlighting on the symbols in its child repeating group. All the symbols of the parent group are also in a single table column so that it's clear all three segments form one large group. The groups at both ends of the row, which are worked twice, have been made yellow, since there's no group we repeat six times.



When we come back to this project two weeks—or two years—from now, it will be clear that the entire group of symbols in red is worked three times with the blue ones worked four times in each of those three repeats. That's because the red cell background is visible above and below the blue highlight on the child repeating group.

In the next version, the repeating groups at both ends of the row have a medium background color with the symbols' font color changed to white. Changing the font color of the child repeating group to white makes it easier to read its symbols (on my printout, at least).



Depending on how dark the various cell background and font highlight colors are, we might change all the symbols' font color to white, especially if we have to use a small font size.



We can set the table cells' left and right internal margins to zero to help make the chart as narrow as possible. If we leave larger top and bottom cell margins, we can still see the cell's background color above and below a symbol's highlight color. We can also make the font symbols bold, especially when they're small.



## Review: Long Instruction Lines

As we're charting written-out instructions, we have several options.

- ☞ We see how long the repeating groups are. We might be able to unpack some of them, then combine them with adjacent non-repeating sequences. For the groups we

can't unpack, we chart only one repeat and enclose it with our preferred stitch repeat boundary.

- ☉ We can use color to help indicate which group of stitches is which type of instruction, either a repeating group or a non-repeating sequence. Different colors can indicate how many times we work the repeating groups we couldn't unpack.

### ***For Large Projects***

We may need to chart the project's entire instructions by unpacking all of its repeating groups, because the locations and widths of the repeating groups and non-repeating sequences may vary from row to row, in exactly the same way that the written-out instructions for the purl diamond, lace diamond, and basket-weave hot pad projects mingled the border, motif, pattern repeat, and plus stitches.

Once we see the full chart, we might be able to split the chart into repeating groups and non-repeating sequences whose boundaries are the same on all rows. At that point we start applying the various strategies to use the largest grid cell or font size possible while keeping each chart row on one sheet of paper.