BobbinWork

Bobbin lace Working diagrams

Draw pair diagrams and get thread diagrams.

Teach the BobbinWork Viewer the art of bobbin lace making
and it shows you how the threads run through your lace.

User guide

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1 Introduction

When comparing working diagrams with web pages, the BobbinWork Viewer is merely a browser and the BobbinWork Editor a tool for the webmaster. The current implementation of the BobbinWork Viewer already performs some of the task to be developed BobbinWork Editor.

Let us elaborate the comparison: Web-pages do have some dynamics, but a browser is limited in what it can do with web pages. Using a plain text editor you can construct web pages from scratch, but that requires quite some technical knowledge. About the same applies to the BobbinWork Viewer/Editor. You can construct drawings with a plain text/XML editor, but the BobbinWork Editor would make it a lot easier, as do publishing tools for web pages. Like a browser, the BobbinWork Viewer allows some interaction: you can change the colour or widths of threads and change or delete drawn stitches. You can print these changes, but not store them.

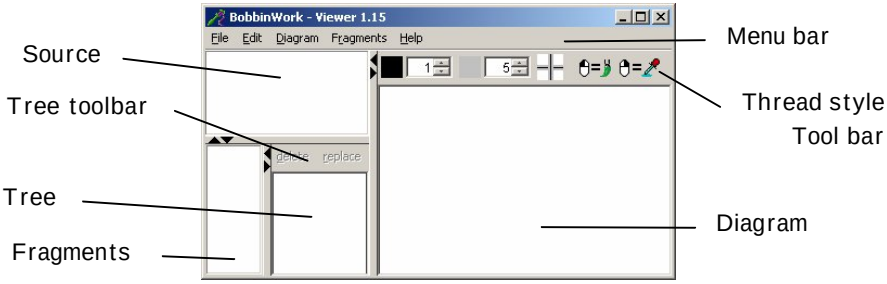
Reading suggestions

Section 2 introduces the screen components and terminology. After section 2.1 you may want to try the exercises suggested by the quick tour in section 3. Section 4 explains in more detail how to construct the diagrams. Examples are given around various themes and from different points of view.

Basic computer knowledge is assumed, so not every mouse movement and key stroke is explained in detail.

2 Screen Components and Terminology

2.1 Main Screen

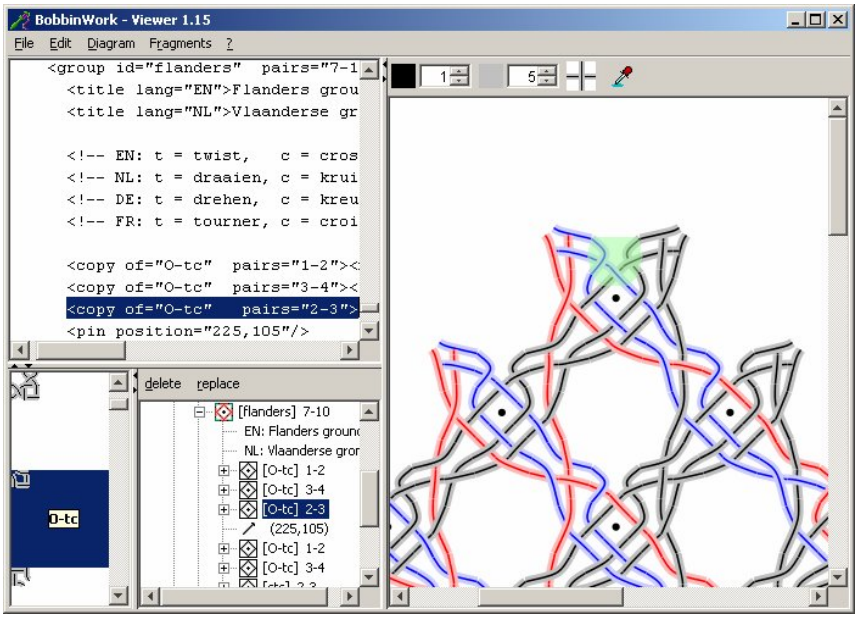


You can use the mouse (or F8, see section 2.2) to drag the splitter bars between the panels to divide the space according to your preferences. With the little arrows on the splitter bars you can close or open a panel completely.

Menu bar:	Selection of functions and options.
Thread Style Tool bar:	Not visible in pair view. Get or set a thread style with mouse clicks.
Source:	A simple editor for the XML file with instructions when to cross and twist which bobbins. Sample files provide a lot of basics that can be reused.
Diagram:	The instructions of the source translated into a diagram.
Tree:	Same instructions as in the source, just another presentation. Click ⊟ to see less, ⊞ to see more and right click to change.
Fragments:	List with fragments of the diagram that can be reused.

Source and tree are compared in further detail in section 2.8. Changes made through the tree or diagram can't be saved with the Viewer version.

The following screenshot shows the same half stitch highlighted in the four main sections of the window.



Note that stitches have a direction. Most stitches can be rotated to use in most situations, but not rotated from open to closed[1] or vice versa. For the best visual effects, the open half stitch has three forms:

 for grounds if rotated by 45°

 to weave from left to right

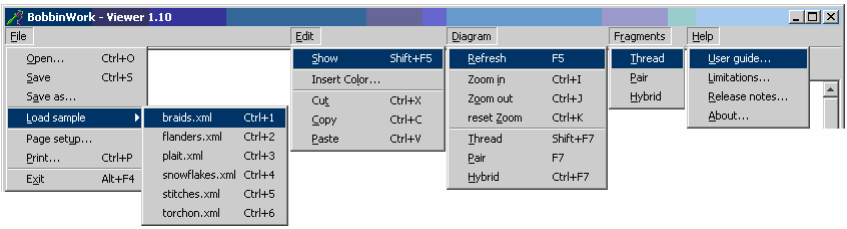
 to weave from right to left

When carefully comparing the stitches in the list with the stitches in the diagram, you will see they adapt, but not always enough. The same applies to the closed half stitches.

Whenever the program becomes capable of tensioning, these half stitch variants won't be necessary anymore and the individual stitches wouldn't need to look so weird.

[1] Open stitches: last action is cross, closed: first action is cross.

2.2 Menu bar and hot keys



Three methods let you activate a menu function or option. Let us for example zoom out the diagram:

- Use the mouse to find the menu item and click it.
- Note the underlined characters and use the keyboard. Hit the left-alt key, hit the d of “diagram”, hit the o of “Zoom out”.
- Note the key-combinations listed at the right of the menu lists. Press the Ctrl key and hold it down, hit the j, release the Ctrl key after releasing the j.

F8 activates the dividers between the panels, use the arrow keys to reposition them, the tab key to return to normal display.

File / Edit / Diagram / Fragments

File and Edit functions apply to the source panel, see section 2.4. Note that no undo is available. The diagram functions and options apply to the diagram section and the Fragments options apply to the list of reusable fragments. Embedded in a web-page the functions open, save, save-as and exit are not available, copy and paste content between another editor instead.

File > Page setup / print

Only a single page can be printed. If the diagram panel is bigger than the selected paper size minus margins, a grey area shows the unprintable section.

Edit > Show

Show the changes made in the source panel. Highlights get lost, as do changes made through the tree or diagram

Diagram > Refresh

Redraw the diagram to get rid of persistent highlights or recover from rendering problem. Changes in the source are preserved but not shown in the tree or diagram.

2.3 Thread Style Tool Bar

When in pair view or hybrid view, a tool bar for thread styles is visible and active. See sections 3.1 and 4.2 for details.

2.4 Source panel

A source file contains the instructions how to make a piece of lace. The source is not only readable by computers but a bobbin lace maker can also recognise lace making instructions. The structure and terminology used in the source file are introduced in section 2.8 and elaborated in more detail in section 4.

Editing hints

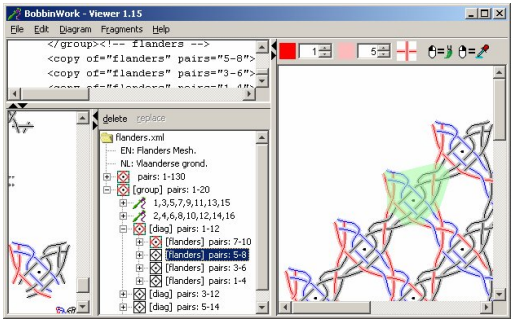
- Make small changes at a time and use SHIFT-F5 frequently to show the result.
- No undo available so save regularly, maybe even with incremental names. Or use any editor you like as long as you save your work as a plain text file, in the application version re-open to see the result, in the applet version copy, paste and SHIFT-F5.
- Start with a copy of a sample to avoid the elaborate work of teaching the program the basic stitches.
- Note that a computer is a very stupid lace maker and reacts on your mistakes and omissions with garbage or a "huh?". Don't get scared now, just try again. A computer is also a very patient lace maker. No threads to wear and tear because of too much undoing.

- Easily made mistakes: miscount pairs or bobbins or misspell ids.

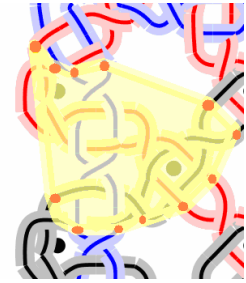
2.5 Tree Panel

The tree panel shows the same information as the source panel in a dynamic graphical way. It hides the English bound keywords of the XML language. Titles and ids however are bound to the langue(s) used by the designer of a diagram.

When a row in the tree is selected the corresponding part is highlighted. Use diagram > Refresh (or F5) to get rid of highlights when in sticky-mode.



The marked area follows the end-points of stitches, so some parts may not be covered completely as shown beside.



Try also the arrow keys, page up, page down, home and end to walk through the tree. But have patience or switch on sticky highlights in the diagram menu.

2.6 Diagram panel

From the “diagram” menu you can choose between

- a thread diagram showing pins and threads
- a pair diagram showing pins and single lines per pair of threads
- a hybrid diagram showing both pairs and threads

To export a diagram for another document, use the print screen key of your keyboard. You can paste the result into an image processor and cut out the part you want.

2.7 Fragments panel

Each stitch or group of stitches that has an ID, is show in a list. They are fragments that can be used again in the diagram. If necessary the size of the fragment is reduced to fit the height of a cell. To see everything of large wide fragment, move the splitter bar.

2.8 Tree/Source: Symbols and terminology

To teach a program how to make lace, a formal language is required. XML (Extensible Markup Language) is chosen as the basis for this language. The remainder of this section introduces the basic features of XML as used in the BobinWork Viewer.

2.8.1 Introduction to XML

General XML basics

XML files in general contain 'brackets' like:

```
<bladibla> … </bladibla>
```

The opening 'bracket' can contain some additional information, for example an id which allows you to refer to an earlier defined construction:

```
<bladibla id="…">
```

Ids should be unique. Forward references are not possible as explained under restrictions in section 4.1.

When nothing goes between the 'brackets', you can use a shorthand:

```
<bladibla … />
```

A pair of brackets with everything between it, is called an element.

BobbinWork XML or BWML files

The XML elements can be nested. In a BobbinWork xml file, a lace maker can recognise for example:

```
<stitch>
   …
   <cross> …</cross>
   <twist> … </twist>
</stitch>
<pin/>
```

2.8.2 Comparing the tree view with the source

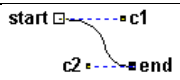
The tree panel and source panel show the same information in a different way. So let's compare them with brief explanations.

Tree icon	XML element	remark	section
		Name of the XML source file. Hover with your mouse for more details.	
	<!– … -->	Single or multi line comment. Skipped by the program.	
	<title>	More informative than just a file name or id.	
	<new_bobbins>	Thread style, reflects the source, not changes made in the diagram	
	<stitch>	Contains a few crosses and twists with the same (usually 2) pairs.	4.3

Tree icon	XML element	remark	section
	<cross>	Usually the 2nd bobbin going over the 3rd	
	<twist>	Usually the 2nd and 4th bobbin over the 1st respective 3rd	
	<back>	The bobbin that stays on the pillow, or the thread that lies behind.	
	<front>	The bobbin that goes over the other one, or the thread that lies above.	
	<pair>		
	<style>	For pairs or threads/bobbins	4.2
	<shadow>	For threads/bobbins only, not for pairs.	4.2
	<group>	A group of stitches.	
	<pin>		
	<copy>	A group of stitches, made and laid out like another group defined before.	
	<move>	Where to place a copy.	
	<rotate>	How to place a copy.	

May be in the future the title directly at the top will be printed in the header or footer of a diagram, other titles may appear as tool tips.

Tree icon	Tree label	Attributes and content of XML element
	filename.xml	-
	NL: blabla	<title lang="*NL*">*blabla*</title>
	1,2,3,4	<new_bobbins nrs="*1,2,3,4*">
	[xyz]	<… id="*xyz*">
	[xyz]	<copy of="*xyz*">
	[XYZ xyz]	<copy of="*xyz*" id="*XYZ*">
	[…] 1-2	<… pairs="*1-2*">

Tree icon	Tree label	Attributes and content of XML element
	[…] 2-3	<cross bobbins="2-3">
	[…] 1-2	<twist bobbins="1-2">
	[…] 1-2	<twist bobbins="1-2" mark="">
	(x1,y1) … (x4,y4)	<… start="x1,y1" c1="x2,y2" c2="x3,y3" end="x4,y4">  See 4.4
	…	<pair … mark="9">[2]
	1	<style color="red" width="1">
	(x,y)	<pin position="x,y"/>
	(x,y)	<move x="x" y="y"/>
	(x,y) a	<rotate centre="x,y" angle="a"/>

X and Y are coordinates relative to the left upper part of the diagram.

(2,3) = 

Negative coordinates are possible but lines through or up to negative coordinates won't be visible.

To complete illustrating the terminology of the source file let us also examine the thread style toolbar.


```
<new_bobbins nrs="5,6,7,8">
  <style color="red" width="1">
    <shadow color="#FFBBBB" width="5"/>
  </style>
</new_bobbins>
```

[2] The "mark" attribute is intended for loose twists. The default length for a twist mark is 9.

3 Quick tour

This section gives some basic exercises guiding you through the most important functions of the BobbinWork Viewer.

3.1 Thread styles

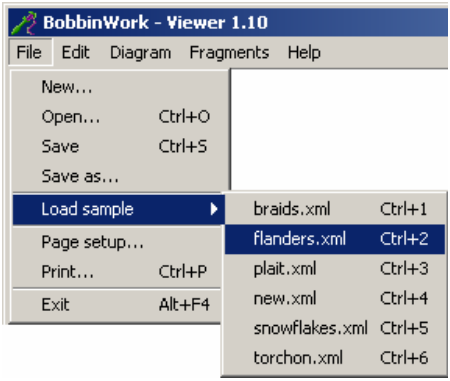
Start the program and right click on a coloured thread where it lies on top of another thread.
The toolbar will change accordingly.

Now left click a black/grey thread where it lies on top of another thread: it will get the selected colour.

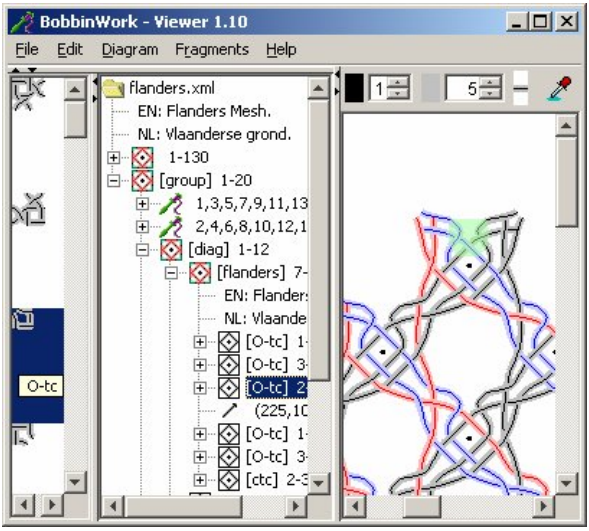
More possibilities are explained in section 4.2.

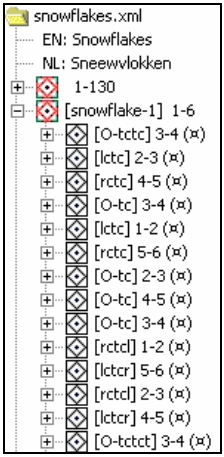
3.2 Select stitches

Open the snowflakes or Flanders sample.



Click a ⊞ in the tree to open the groups as shown in the following figures, click on ⊟ to see less. Click (still with the left mouse button) on the right side of these symbols and the line will get highlighted; the corresponding part in the diagram also gets highlighted.





Step from top to bottom through all the rows of a completely opened tree (keep the first ⊠ closed as explained below); then you follow the process of making the piece of lace. Reaching the bottom you'll notice how quick the program can learn, as the steps get repeated in less detail. See for example the figures in section 4.3 and in "sticky highlights" in section 2.2

When you select the first group (⊠), you will see some query highlights in the left upper corner of the diagram. Well, this is an invisible group of stitches. The group serves as a library or a cheat sheet, or more accurately, a pile of transparent snippets of cheat sheets. The cheat sheet contains the first lessons of bobbin lace making taught to the BobbinWork Viewer[3]. It should know these lessons by heart just as a living lace maker, so the cheat sheet is hidden for the eye to see. But the knowledge stays ready at hand to be used again and again. As far as the stitches in the first group have an ID (they would be useless without) they will appear at the start of the list of fragments.

[3] You may wonder about the number 1-130. For each stitch taught to the application, a new set of pairs is used. Otherwise the stitches in the cheat sheet would have been drawn connected, giving weird results when reused. The BobbinWork Viewer doesn't yet know by far as much as 65 stitches, but there will be more in the future.

3.3 Replace stitches

When experimenting with selecting stitches or groups of stitches, you might also try to change some. The selected fragment and a ⚄, if they use the same number of threads, the replace button will come available. Compare the fragment and highlighted section in the diagram to check if that really is the change you want to make.

We are now reaching the limits of what has been developed yet. The road is getting bumpy now. Some choices of alternative stitches may seem logical but will be placed in the wrong position or direction and give weird results. But don't be afraid to make the wrong choice, you can try your luck with another choice. You can't damage anything, even in the worst case you can always start all over again.

Conventions

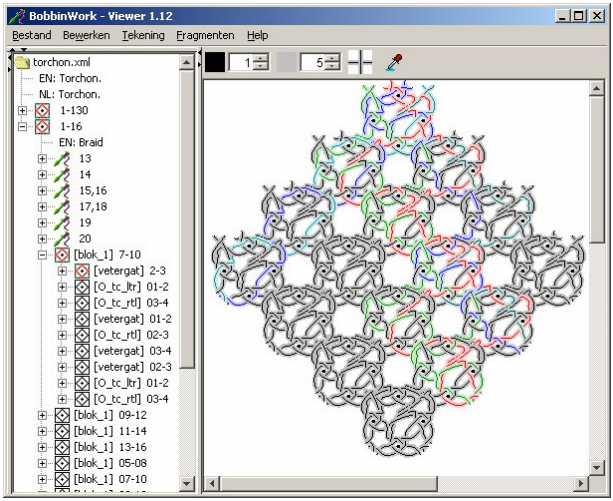
When you hesitate with your mouse in the list of fragments, the id of the stitch appears as a yellow label. It is the same id as between [ ] in the tree view. The samples use the following conventions for id's:

t = twist
c = cross
l = twist left pair
r = twist right pair

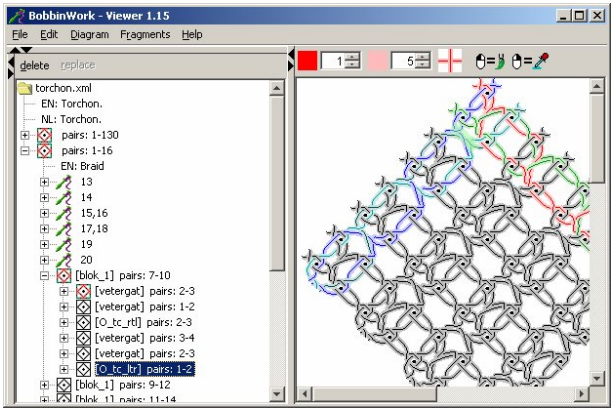
An O-tctct is an open tctct, in a pair drawing additional twists are marked at the end of the stitch. A C-tctct is a closed tctct, in a pair drawing additional twists are marked at the start of the stitch.

3.4 Delete stitches

The Torchon sample has many ground variations in it. You only need to delete some stitches to get them. The diagram is ugly as it is too crowded and the program doesn't know how to tension, but I hope you can see through that and discover the power.



Delete all “O_CT_...” stitches of “blok_1” and you get the basic Torchon ground. The following screenshot shows the same diagram with already some half stitches deleted and a right click on the next to delete.



Delete also the bottom “vetergat” to get a roseground. Play with selective deleting stitches to get all kinds of variations. Don’t delete the top “vetergat” it causes an error[4] and you would need to start over again.

The sample needs some extensions to enable exchanging half stitches for cloth stitches and additional switches.

[4] The program should be improved to prevent you from deleting stitches that are still in use further down the project. But for now you’ll have to live with it.

4 Teaching the program

Before you can teach the program how bobbin lace is made, you first have to make yourself familiar how you can instruct the program. You could start experimenting with a copy of a sample and try some changes as suggested in this section.

The basic terminology is shown in section 2.8. The quick tour section shows some changes you can make to an existing drawing. These changes however can't be stored with the viewer version of the BobbinWorker. As the editor is not yet developed, you'll have to change the source to make permanent changes.

4.1 Replace stitches

You can change the drawing in two ways:

- right click on a row in the tree view as explained in the quick tour section
- replace the (bold typed) value of the id in:
  `<copy of="**O-tc**">`.

⛝ is a copy of some original, either ⛶ (a group of stitches) or ✕ (a single stitch).

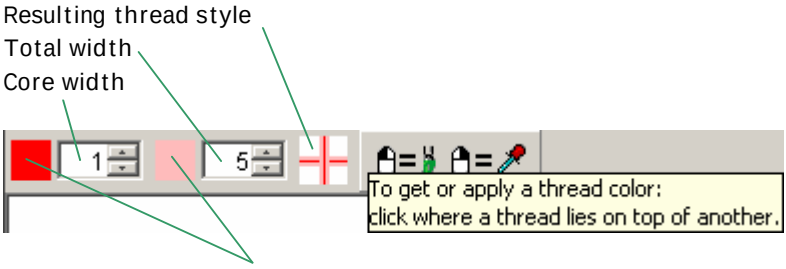
Restrictions

- Use originals defined before the copy. As you can't instruct a lace maker to apply a stitch (s)he never learnt before, you neither can't do so with the BobbinWork Viewer
- Original and copy should have the same number of pairs.
- Location and orientation of old and new original should be the same, unless you also change the move ✣ and rotate ↻ instructions or add them.

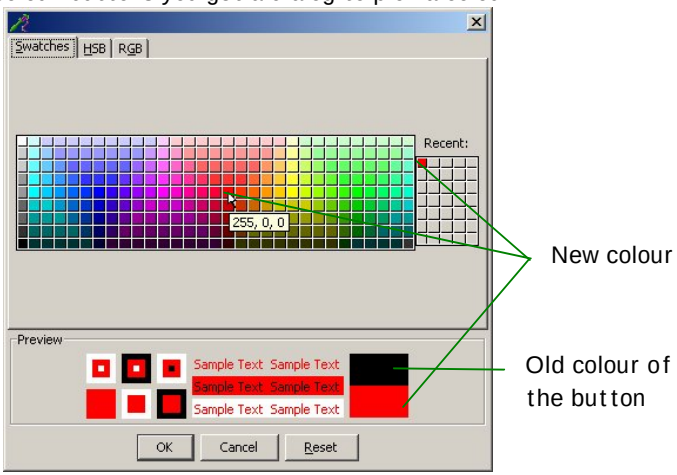
```
<copy of="O-tc" pairs="3-4">
    <rotate centre="15,15" angle="-45"/>
    <move x="380" y="110"/>
</copy>
```

4.2 Thread style (colour and width)

For threads/bobbins you can define the style once per thread.



By clicking the colour buttons you get a dialog to pick a colour:



Define a new style

By default the second colour gets a brighter version of the colour you pick for the core. Whenever you set the second colour to white (saves ink), it will stay white when you pick another colour for the core. Pick a non-white colour to restore the default behaviour.

Copy a style from one thread to another

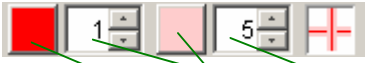
Right click a thread that has the desired colour. Left click the thread you want to change. Be sure to click the threads where they lie on top of the other.

Change the source

Changes made as described above can't be saved by the viewer. To save the change permanently, change the source.

Look in the source for something like shown below and

- Copy / delete the group of lines
- change the bold parts




```
<new_bobbins nrs="5,6,7,8">
  <style color="red" width="1">
    <shadow color="#FFBBBB" width="5"/>
  </style>
</new_bobbins>
```

As shown in the example you can specify colours with names or codes. Few names however are valid: black, blue, cyan, dark_gray, gray, green, light_gray, magenta, orange, pink, red, white, yellow. For more colours pick one from a dialog through the menu edit > insert-color. When using an alternative editor the following websites may be useful:

- http://www.php-specialists.nl/resources/colorchart.htm
- http://html-color-codes.com/
- http://webmonkey.wired.com/webmonkey/reference/color_codes/

Pairs / shadows

For pairs the style is defined stitch by stitch. It can only be specified through the source.

Only <new_bobbins> elements can have a <shadow> element in their <style> element, <pair> elements can't have <shadow> elements in the <style>

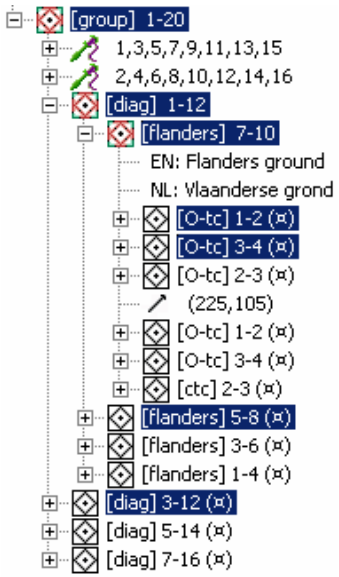
element. If a <shadow> is omitted within <new_bobbins>, it defaults to a brighter colour than chosen for the <style> element.

Try a white shadow ("#FFFFFF" or "white") to save ink.

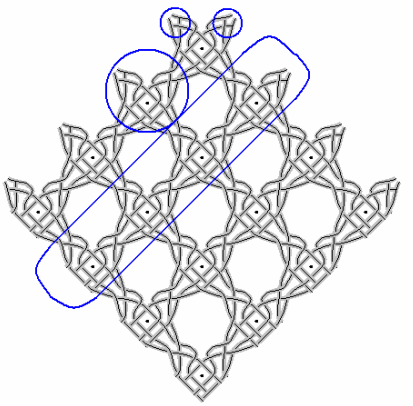
4.3 Counting threads

To instruct a lace maker you count pairs or bobbins. The program needs this information too, to be able to connect the stitches and paint whole threads in a single colour.

Pairs and bobbins are counted from left to right and relative within the enclosing group. For example:




```
<group id="group" pairs="1-20">
  …
  <group id="diag" pairs="1-12">
    <group id="…" pairs="7-10">
      …
      <copy of="tc" pairs="1-2">
      …
      </copy>
      <copy of="tc" pairs="3-4">
      …
      </copy>
      …
    </group>
    <copy of="…" pairs="5-8">
    …
    </copy>
    …
  </group>
  <copy of="diag" pairs="3-12">
    …
  </copy>
  …
</group>
```



The whole ground as drawn requires 20 pairs. The first diagonal is worked with the pairs 1-12. The top pin is worked with the 7th to 10th pair of the first diagonal, which makes 4 pairs. From these 4 pairs we use pair 1 and 2 to make our first stitch. For the second pin we use the 5th to 8th pair of the first diagonal. It is worked the same way as the first pin so the instructions are not repeated in all details, we only need to tell the program where to place the copy of the drawing for the first pin. Finally the second diagonal with pairs 3-12 is worked the same way as the first diagonal, again we have less details to specify.

4.4 Lines

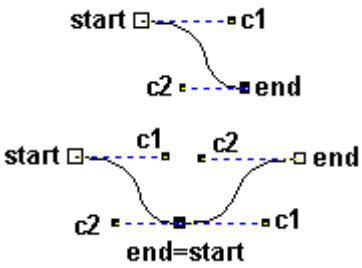
You can skip this section if you are satisfied with the basic stitches supplied by the samples. If you are not satisfied and neither can't grasp the subject, send me a sketch of the stitch you need. You can find my e-mail on my website: www.xs4all.nl/falkink/lace

Bezier curves

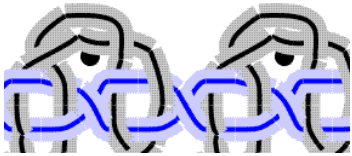
The pairs and threads may appear as continuous lines. In fact each stitch, cross and twist specifies a short section of at least two of these lines.

Each line section is defined by two to four points as shown beside. When c1 and c2 are omitted, the line becomes straight.

For a fluent connection of two segments c2-end-start-c1 of two sections should lie on a straight line.



Fluent lines are not yet supported automatically. When the BobbinWork Viewer has to join stitches, just the end and start are moved to a single point. This results in small gaps.



Drawing the curves

To be able to connect the line sections we don't only need the points as explained for Bezier curves, also *pairs* and *bobbins* are needed to know which sections should be connected. Thus we get for example:

```
<stitch id="tc" pairs="1-2">
  …
  <pair start="8,15" end="22,15" />
  <pair start="15,8" end="15,22" />
  <twist bobbins="1-2">
    <back start="12,20" end="15,20" />
    <front start="8,12" c1="10,15" c2="10,15" end="10,22" />
  </twist>
  <twist bobbins="3-4">
    <back start="12,8" c1="15,10" c2="15,10" end="22,10" />
    <front start="20,12" end="20,15" />
  </twist>
  <cross bobbins="2-3">
    <back start="20,15" end="20,22" />
    <front start="15,20" end="22,20" />
  </cross>
</stitch>
```