

Constructing Compound Weave Structures Using ArahWeave

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Jacquard Study Group

In late October 2015, Tien Chiu invited me to come to her house to work on her new TC-2 Jacquard-type loom. I was eager for the experience of designing and weaving a Jacquard textile although I hadn't yet had any classes on preparing Jacquard drafts, but had joined the CW Jacquard Group after reading Julie Holyoke's *Digital Jacquard Design* and studying *The Woven Pixel* by Alice Schlein and Bhakti Ziek.

Tien's initial warp was 1,760 ends of 10/2 cotton, 880 ends black and 880 white, on two warp beams threaded in a 1:1 ratio at 60 ends per inch total. I decided to weave samples in interchanging double weave using a consistent satin on the back layer, which wouldn't be seen, and various twills and other structures to define designs on the top layer. When they were finished I made three of my samples into pillow case tops, each about 27 inches wide (*Figures 1, 2 and 3*).

Creating the Lotus sample

After experimenting with a free demo of ArahWeave, a sophisticated CAD/CAM program for dobby and Jacquard running on Linux, I decided to purchase a personal version. For the lotus pillow sample I used a cartoon from an ArahWeave damask demo, changing the structures to double weave, weaving the magenta flowers on the black warp and a lattice background on the white warp.



Figure 1. Lotus pillow

The lotus flowers were woven using three compatible structures: a granite weave, an eight-end satin, and Bronson lace. I used the Edit Decomposed window of ArahWeave to expand the structures from 8x8 to 16x16 to accommodate double weave. Figure 4 shows three open ArahWeave windows for double granite with weave simulation on the left, the 16x16 double weave structure in the middle, and Edit Decomposed on the right. This 'decomposed' view shows that where granite is woven with the magenta weft on the black warp on the top layer, the green weft is weaving 7/1 satin on the back layer with the white warp. Figure 5 shows that where 1/7 satin weaves on the top layer with the magenta weft and black warp, the bottom layer is weaving 7/1 satin with the green weft on the white warp. Figure 6 shows double Bronson lace weaving with magenta on black while the green weft weaves satin on the backside.



Figure 2. Peony pillow



Figure 3. Autumn Leaves pillow

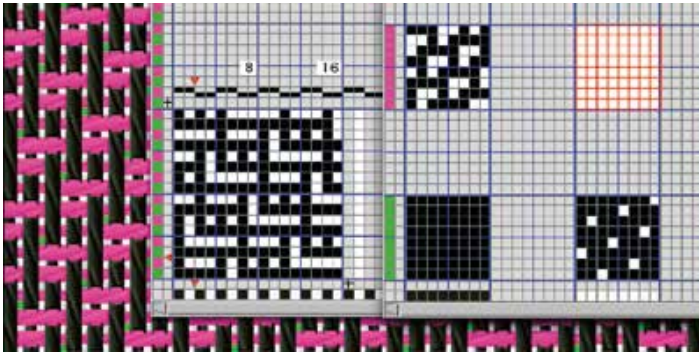


Figure 4. Double granite

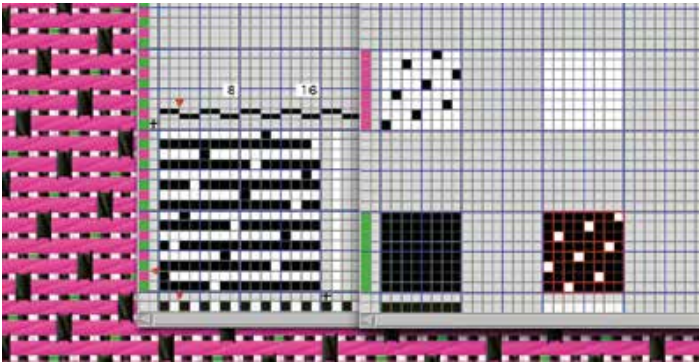


Figure 5. Double satin

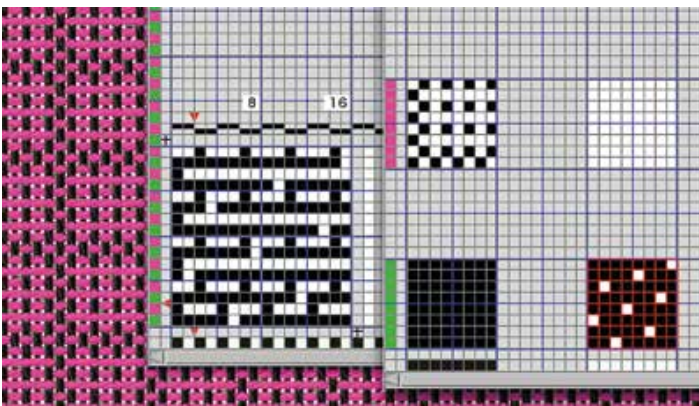


Figure 6. Double Bronson lace

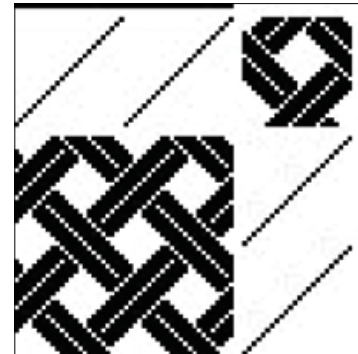


Figure 7. Lattice 24 x 24

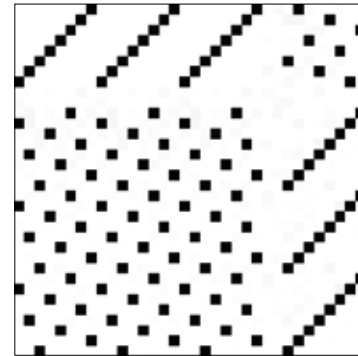


Figure 8. Satin 1/7 fill

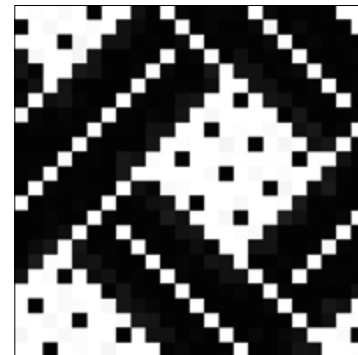


Figure 9. Lattice filled with satin weave

For the background of the *Lotus* pillow I designed a warp-faced lattice of 24x24 pixels and filled the white areas between the diagonals with 1/7 satin, as shown in Figures 7 through 9.

In ArahWeave, I made the 24x24 lattice structure into a 48x48 double weave with the green weft and white warp on the top layer, and the magenta weft tacked to the black warp underneath in 7/1 satin. To secure the two layers together, I chose two places in each repeat to stitch them invisibly. Figure 10 shows three ArahWeave windows opened simultaneously while I chose

a place for two hidden stitchers, here marked with two red dots and circled in red for visibility. These stitchers drop magenta wefts over white warp ends, securing the layer on the white warp to the layer on the black warp. The simulation window on the left shows where these stitchers will be covered by floats of the green wefts.

When all structures were completed they were entered with the lotus cartoon into the Jacquard Conversion window in ArahWeave (Figure 11), which immediately converted the design into a simulation view and structure for the entire textile. It was then



Figure 10. Lattice with hidden stitchers circled in red

Note: To best see the detail in this and other large screen-shot images, visit the Gallery for this issue on the CW website



Figure 11. Lotus Jacquard conversion

checked for floats and exported into the format used by the loom.

The Peony and Autumn Leaves samples

The next two pillow covers were constructed similarly but designed with a larger lattice background, initially 48x48 with weft centers of 1/4 broken twill. These were woven as double weave with three wefts so the structure was expanded to 96x144 in ArahWeave's Edit Decomposed window. Figure 12 shows three wefts — gray, red, and gold — with the lattice woven with the gray weft on the white warp, while the other two wefts on the black warp are tacked in 15/1 satin on the back, making long hidden floats. Again, two places were chosen in each repeat to place hidden weft stitchers, here using a gold weft, to secure the two layers together. Figure 12 shows three ArahWeave windows with stitchers which I marked with green dots in the structure window and circled in red.

Figure 13 shows the Jacquard conversion window with a simulation of a section of the entire textile showing in the background.

For the background for *Autumn Leaves* I used the

same lattice design, by using the left arrow tool in the weave editor toolbar to shift the structure one end to the left, which weaves the gray lattice on the black warp. Figure 14 shows the ArahWeave windows with the left arrow in the toolbar circled and the simulation in the background on the left now showing gray lattice on black warp with the stitchers again circled in red.

Conclusions

I find it is efficient to design compound structures using ArahWeave's decomposed view. The immediate feedback in the simulation view gives confidence that the structures are being built correctly. Other views are also available in ArahWeave, including an integer view, which is much like what our various hand weaving programs give, a cross-section view, a backside view, and a structure view for float counts over the entire textile.

For doobby as well as Jacquard weavers I recommend taking a look at the demo version of ArahWeave even if you don't think you want to purchase a copy. With a free demo version you can practice constructing compound weaves with two or more layers and multiple wefts and immediately get a good weave simulation of

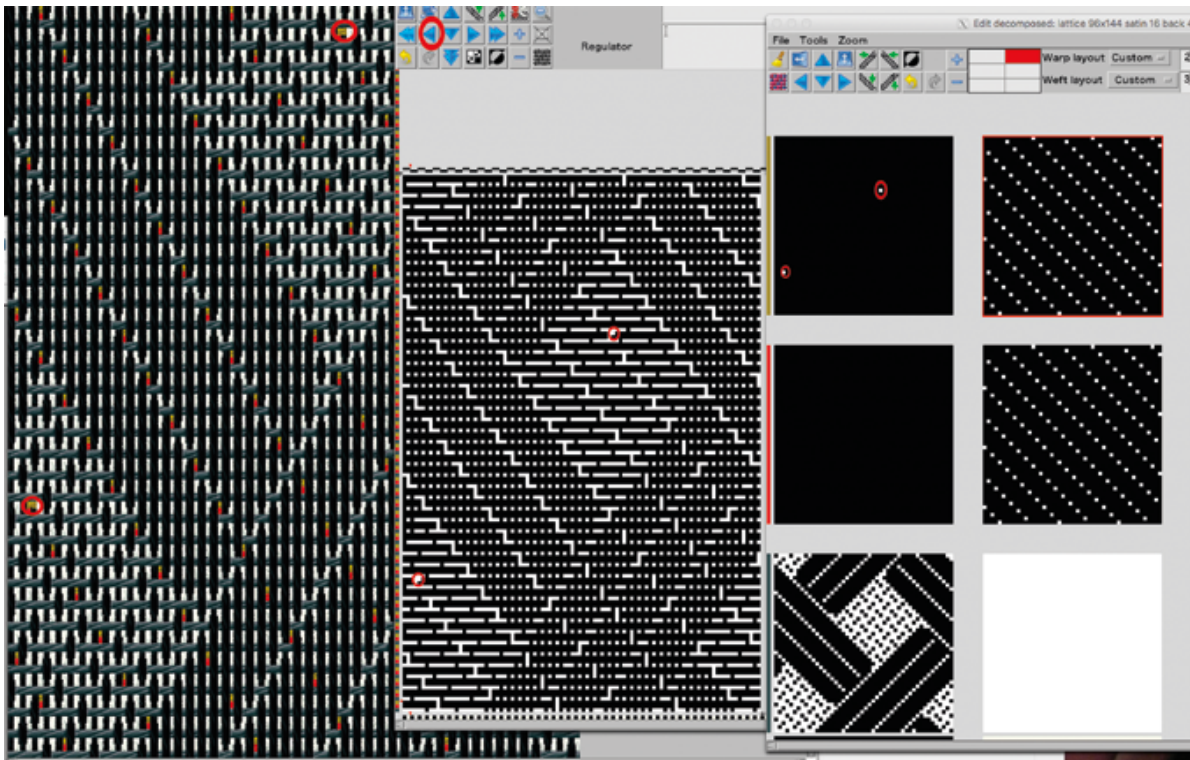


Figure 14. *Autumn Leaves* lattice on black with stitchers circled

the resulting structure. You would not be able to export the results as WIF or other files unless you purchased the program, but I think the insights gained on how these structures are constructed would still be valuable.

Resource

Information on free download for both Mac and Windows users is available here:

<http://www.arahne.si/download/software-demo.html>



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