Drafting Problem Patterns, Part 1: Introduction

An earlier article addressed the issue of patterns that do not produce sound drafts when drawn up in the conventional fashion with black warp threads and white weft threads [1].

The difficulty with such *problem patterns* is that it is not possible to produce a sound interlacement, one that "hangs together" and at the same time produces the pattern, with black warp threads and white weft threads.
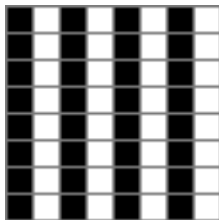
In many cases, a sound interlacement can be found if the warp and weft threads are allowed to be both black and white. This is familiar from color-and-weave effects [2], although the motivation here is different.

Be aware that there are patterns for which no sound drafts exist. Here's one:

But in most cases, there are sound interlacements for problem patterns.

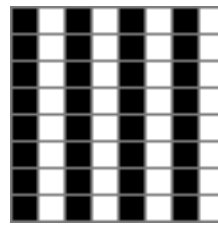An extreme example, stripes, illustrates how such interlacements can be found:

pattern

If this pattern is drawn up in the standard fashion, its interlacement obviously would not hang together; there is nothing to hold down the warp threads.

In this example, the solution is obvious: Select colors for the warp threads that match the colors of the stripes:
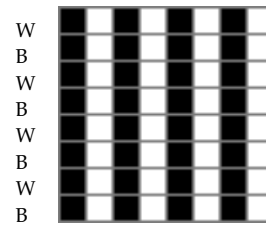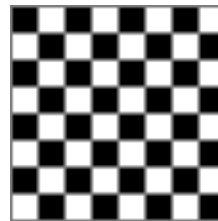
B W B W B W B W

pattern

The weft thread colors can be chosen in a variety of ways, keeping in mind that they need to interlace with the warp threads. One way is
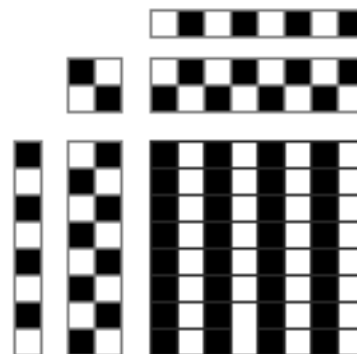
B W B W B W B W

pattern

The next step is to decide on the interlacement. Plain-weave interlacement clearly works:
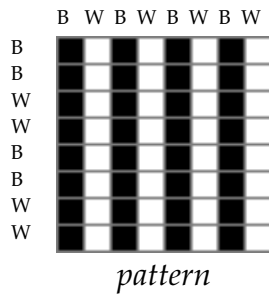
interlacement

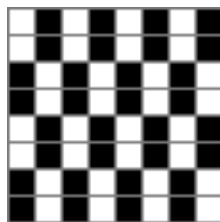The draft, with the thread colors shown in bars at the top and left, is

draft

September 4, 2004; last revised September 11, 2004

Although the colors chosen above for the weft obviously work, there are other choices that do also. One is

B W B W B W B W

pattern

An interlacement is

interlacement

This version has floats of length two.

This example illustrates the aspects of the general problem:

1. The first step is to find warp and weft colors that "satisfy" the pattern. (If it is a problem pattern, by definition all-black warp and all-white weft will not work.) There may be more than one choice.

2. The next step is to produce an interlacement. Again, there may be more than one choice.

3. Finally, the interlacement must be tested for soundness. If it is not sound, it is necessary to retreat to Step 2 or even Step 1.

There is no simple, general method of solving the problem. A naive approach would be to try all possible warp and weft colors and all possible subsequent interlacements. For all but trivially small patterns, this will not work: There simply are too many possibilities.

What's Next?

The next article in this series will look more closely at efficient ways of finding warp and weft colors that satisfy a pattern.

References

1. *When a Fabric Hangs Together (Or Doesn't)*, Ralph E. Griswold, 2004:
http://www.cs.arizona.edu/patterns/weaving/webdocs/gre_hng1.pdf

2. *Color-and Weave II*, Margaret B. Windeknecht, self published, 1994.

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September 4, 2004; last revised September 11, 2004