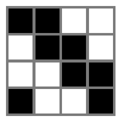
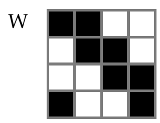
Drafting Problem Patterns, Part 2: Thread Colors

As described in the previous article in this series [1], the first step toward getting a sound draft for a problem pattern is to assign colors to its warp and weft threads.

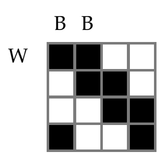
Consider this simple twill:



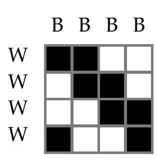
To start, a color needs to be assigned to some thread. Suppose the first weft thread is white:



This choice has immediate implications. To satisfy the pattern, the first and second warp threads must be black: These colors are *forced*:



The black warp threads in turn force the rest of the weft threads to be white, and these force the rest of the warp threads to be black:



The important point is that the choice of a color for one thread forces the colors for all the rest of the threads and produces a standard coloring from which a sound standard draft can be made.

If the first weft thread had been assigned black, the result would have been all weft threads black and all warp threads white: a complementary coloring. Any other choice for any thread would have produced one of these two; there are no others. The draft for this pattern is unique up to complementation.

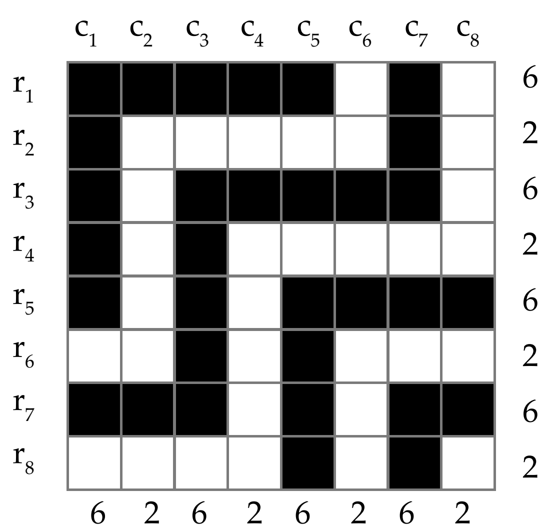
This is not true of all patterns; some can be assigned thread colors in many ways. If this is the case for a problem pattern, there may be a sound draft for it. (By definition, the standard draft for a problem pattern is not sound.)

The way to find thread colorings for problem patterns is the same as for the twill: Pick a color for one thread and see what colors are forced as a result. If they are all forced, there is not a sound draft. But if all the colors are not forced, there may be a sound one, and the process continues by picking a color for some thread that is not already assigned a color.

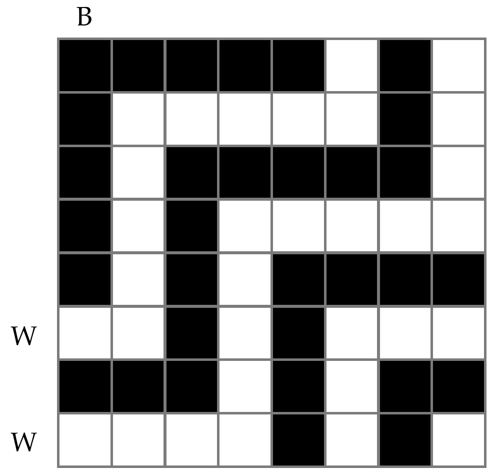
Although any thread and color could be used to start, it is reasonable to starting with a "promising" thread and color. For example if one row or column is predominantly one color, it is reasonable to pick that thread and color accordingly.

The procedure can be made systematic by ranking rows and columns by the number of black cells they have.

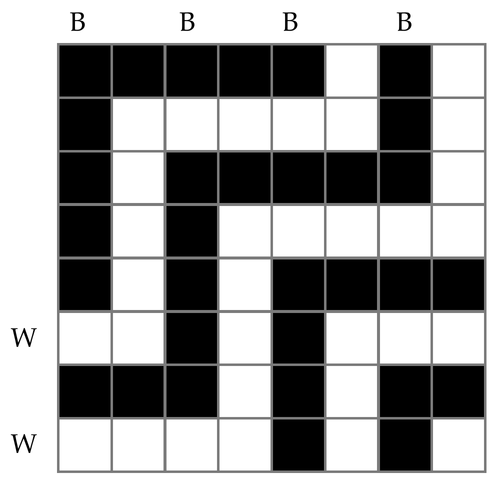
The example in the first article in this series [2] illustrates the process:



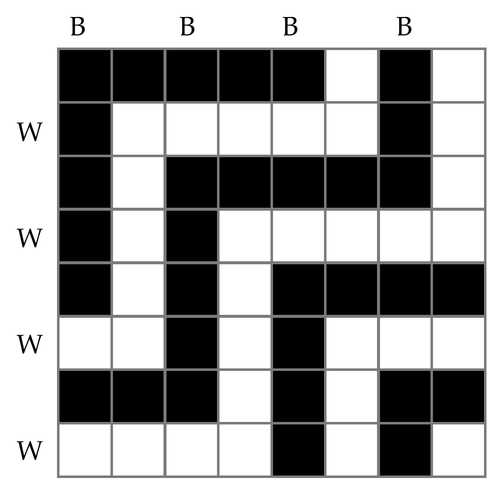
Starting with one of the highest ranking columns, the first, and assigning black to its warp color, the result after forcing for this column is



The forced weft threads in turn force three warp threads:

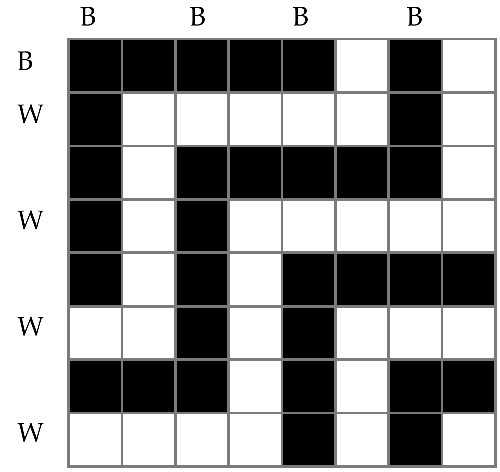


And these force two more weft threads:

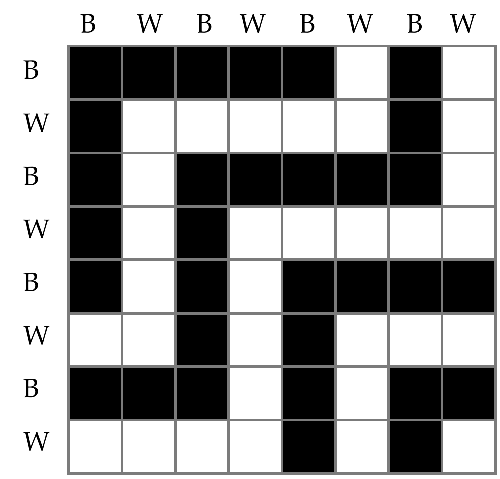


At this point, all the forcing from the initial choice has been done and eight threads remain to be assigned colors.

The first row is predominantly black, so the next choice is black for the first weft thread:



This results in forcing the remaining colors:



The next article in this series will show how to make a sound draft from this and other non-standard colorings.

References

1. *Problem Patterns, Part 1: Introduction*, Ralph E. Griswold, 2004:
http://www.cs.arizona.edu/patterns/weaving/webdocs/gre_pp1.pdf

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

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