

Recognising Geometric Patterns - Example 16

Peter Fletcher, 3rd November 2009.

The problem

Figure 1 shows an image containing an Hnest. An Hnest consists of three lines (forming an 'H' shape) and two smaller Hnests nested within it (except in the case of the smallest Hnests).

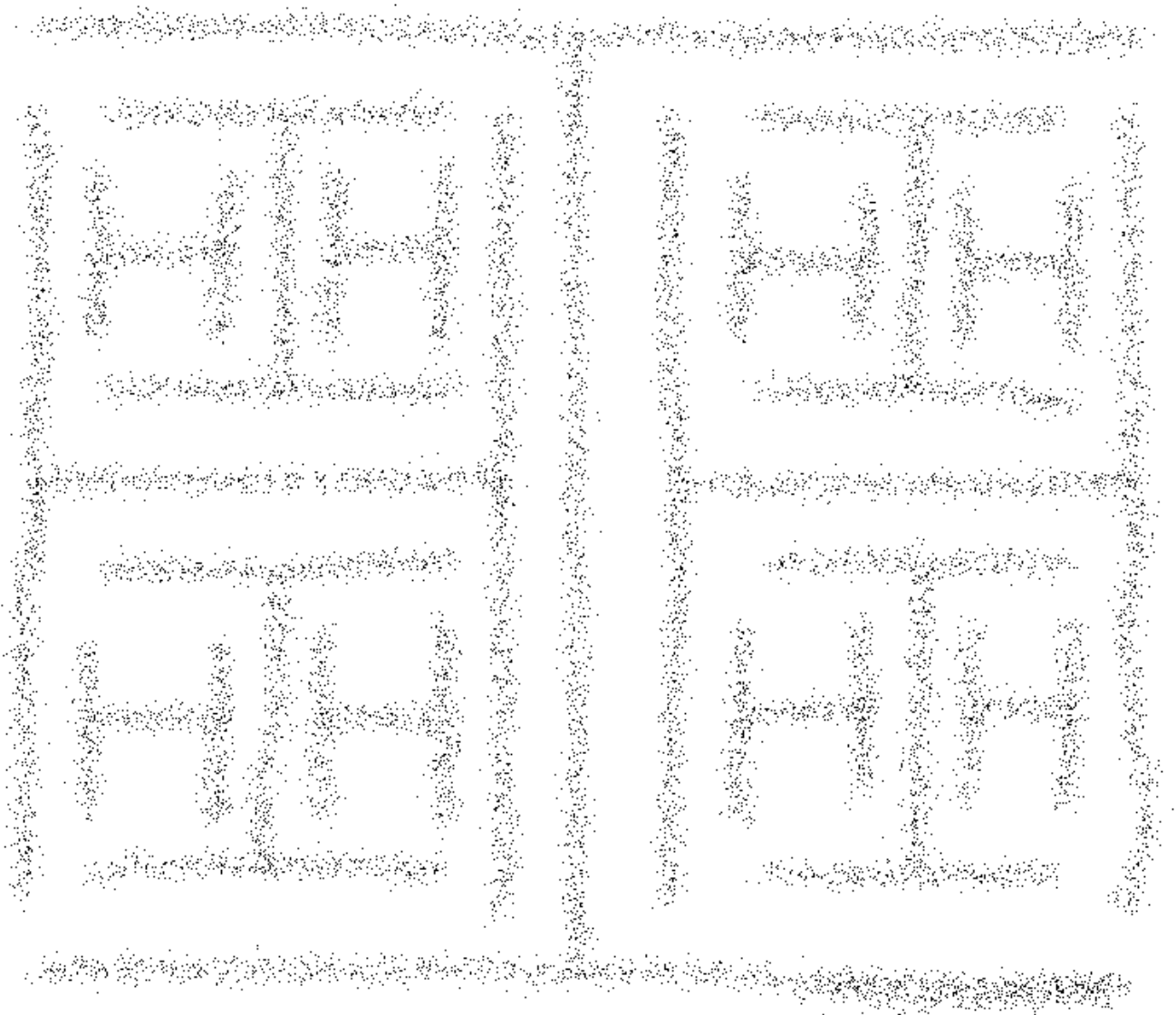


Figure 1: the original image.

The following pages show the results of the program.

The results of the program

The program successfully finds all the Hnests.

Figure 2 shows the result of the program. The long narrow red and blue rectangles show all the lines identified by the program. The green rectangles show the central regions of the Hnests.

The parts of the top-level Hnest are highlighted in the figure by black arrows. There are five parts: three lines (forming an 'H' shape), and two smaller Hnests (the downward arrows). The black dots indicate the connections between the parts. The structure of the two component Hnests is shown in figures 3 and 4.

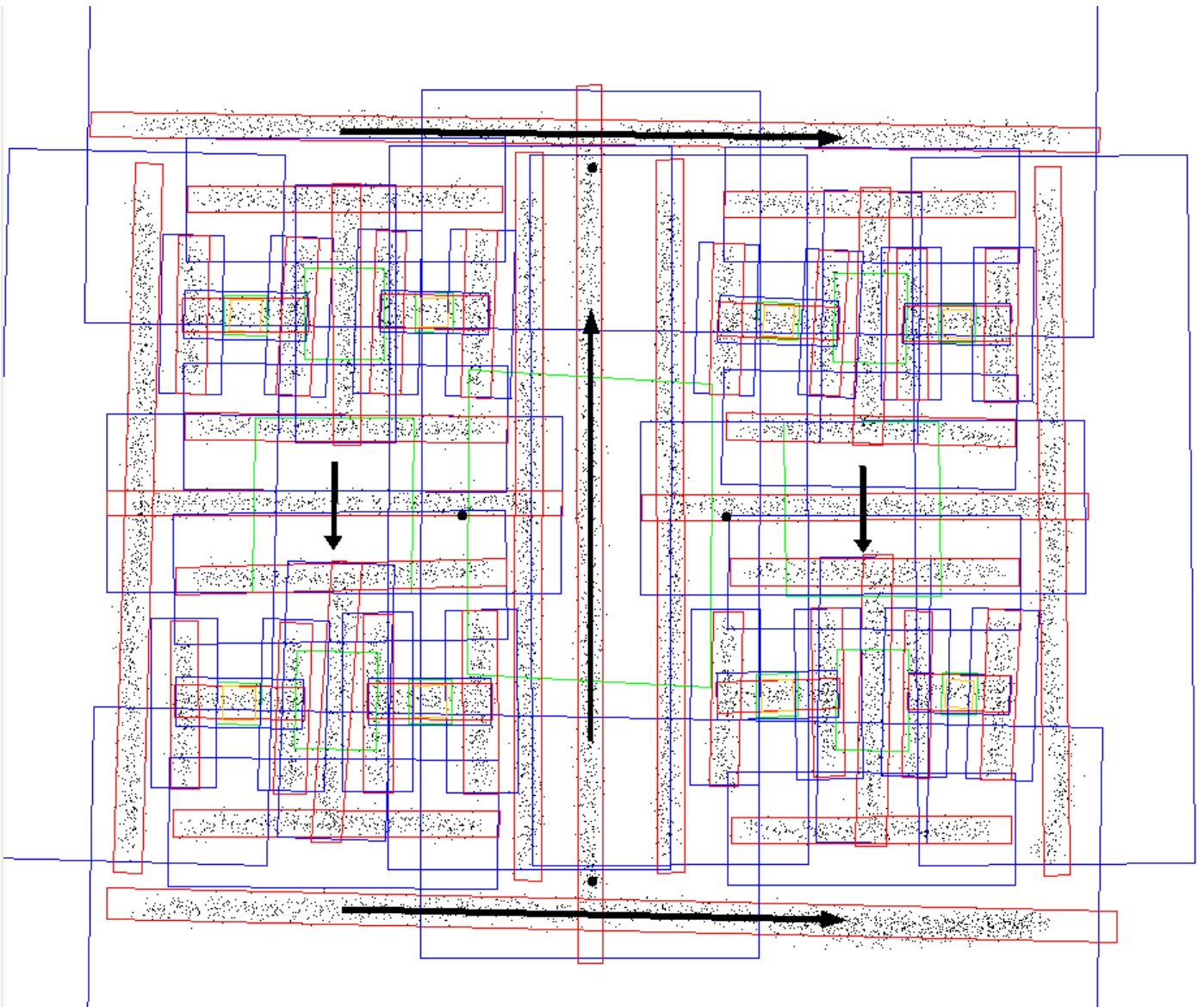


Figure 2: The top-level Hnest found.

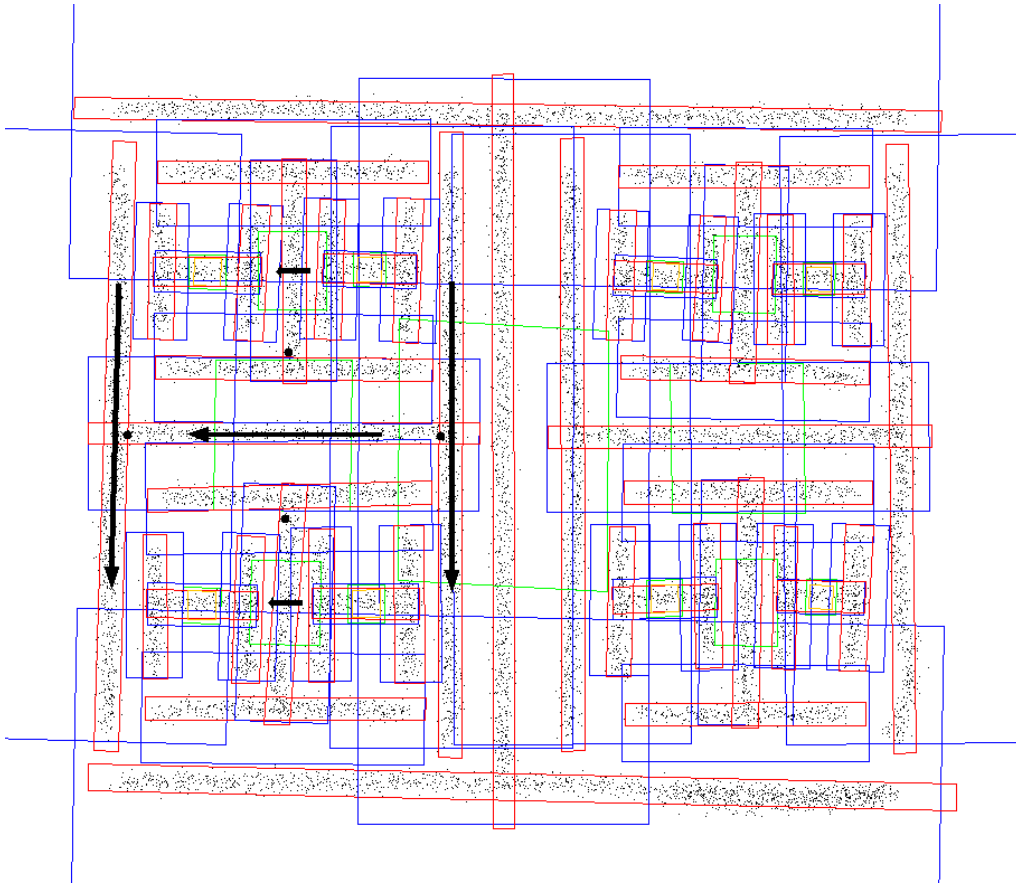


Figure 3: A second-level Hnest.

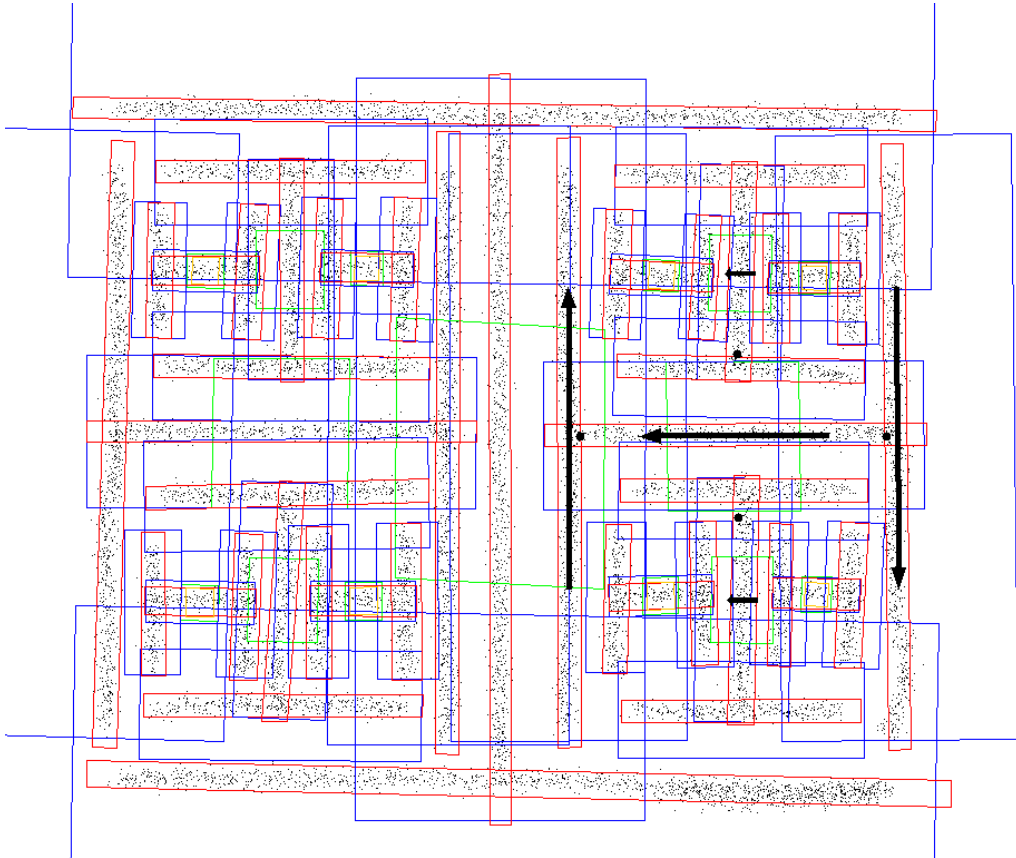


Figure 4: The other second-level Hnest.

Figures 5 and 6 show the two Hnests that are parts of the Hnest in figure 3.

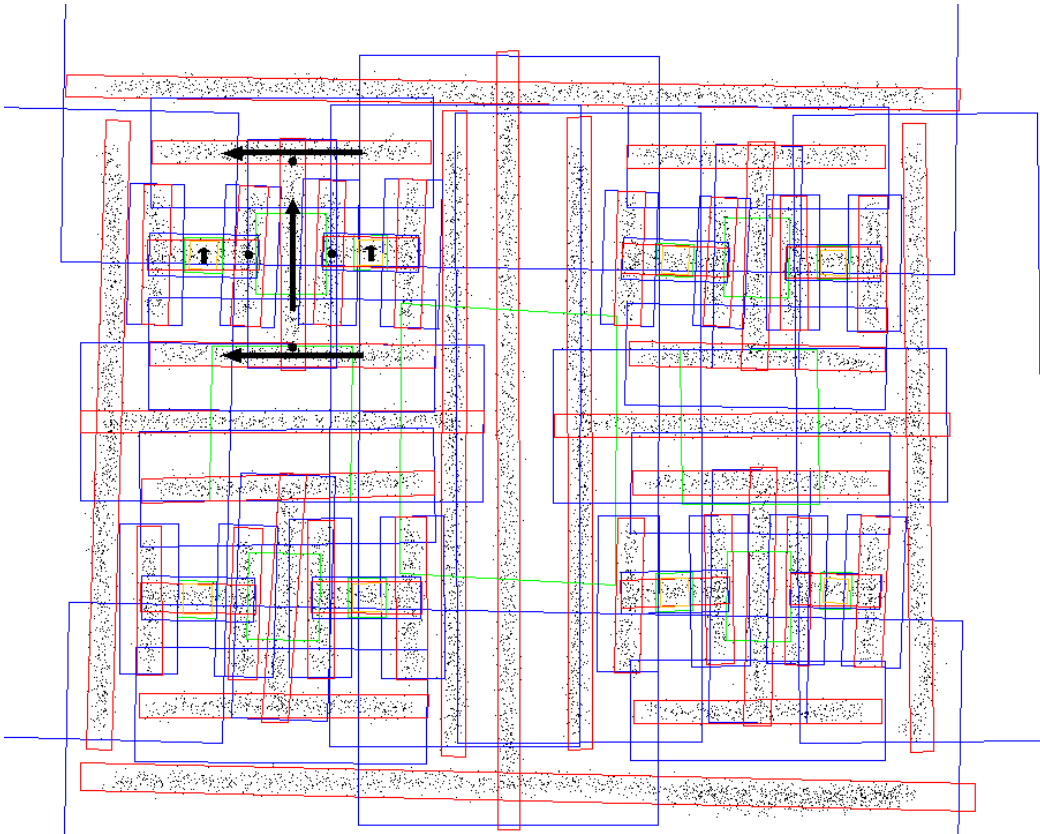


Figure 5: a third-level Hnest.

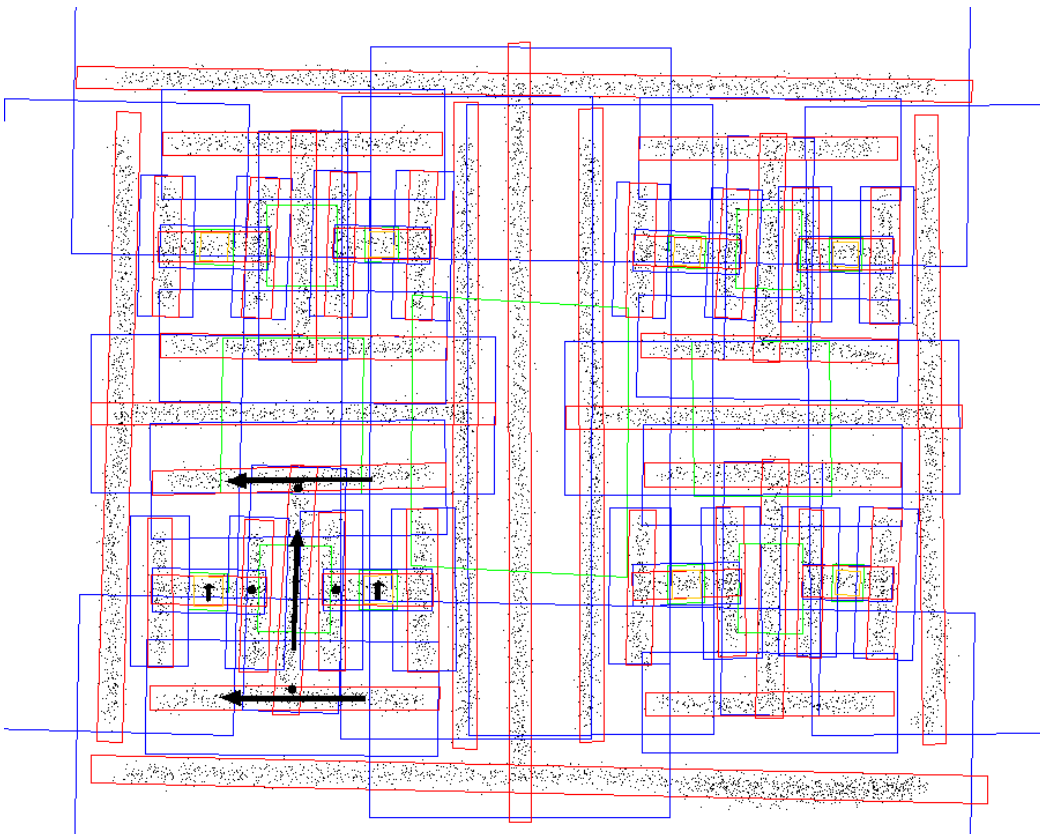


Figure 6: another third-level Hnest.

Figures 7 and 8 show the two Hnests that are parts of the Hnest in figure 4.

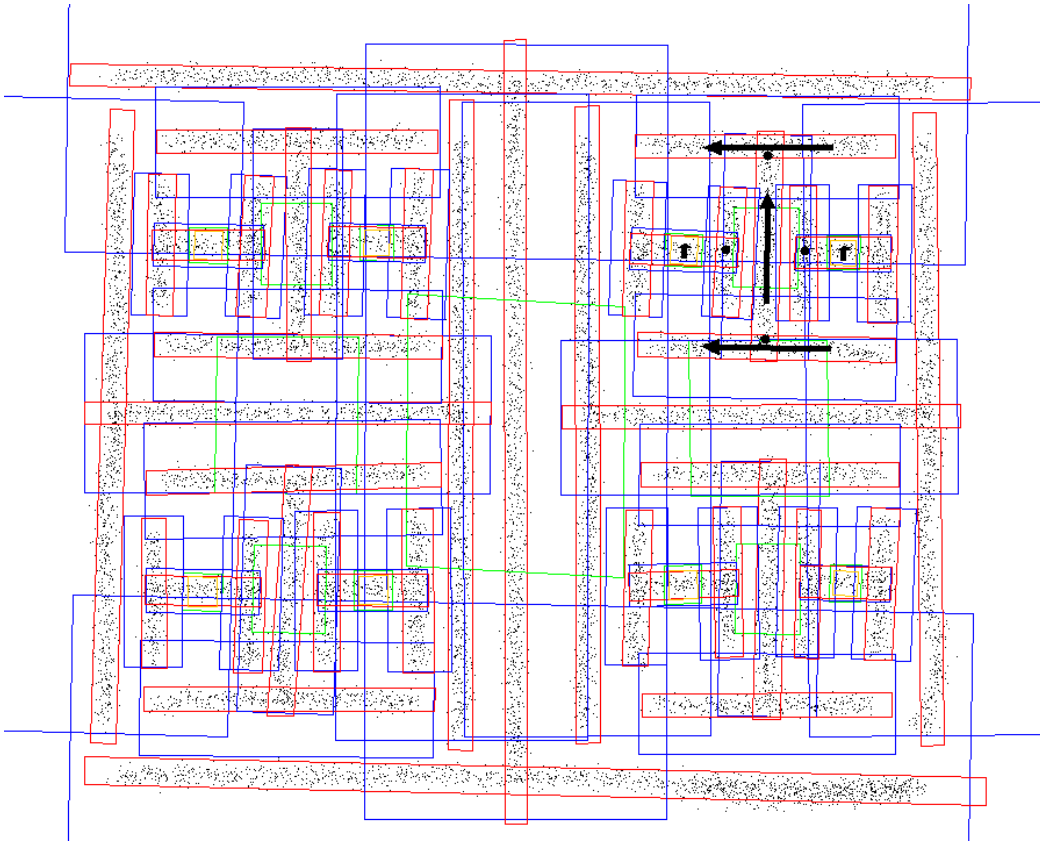


Figure 7: another third-level Hnest.

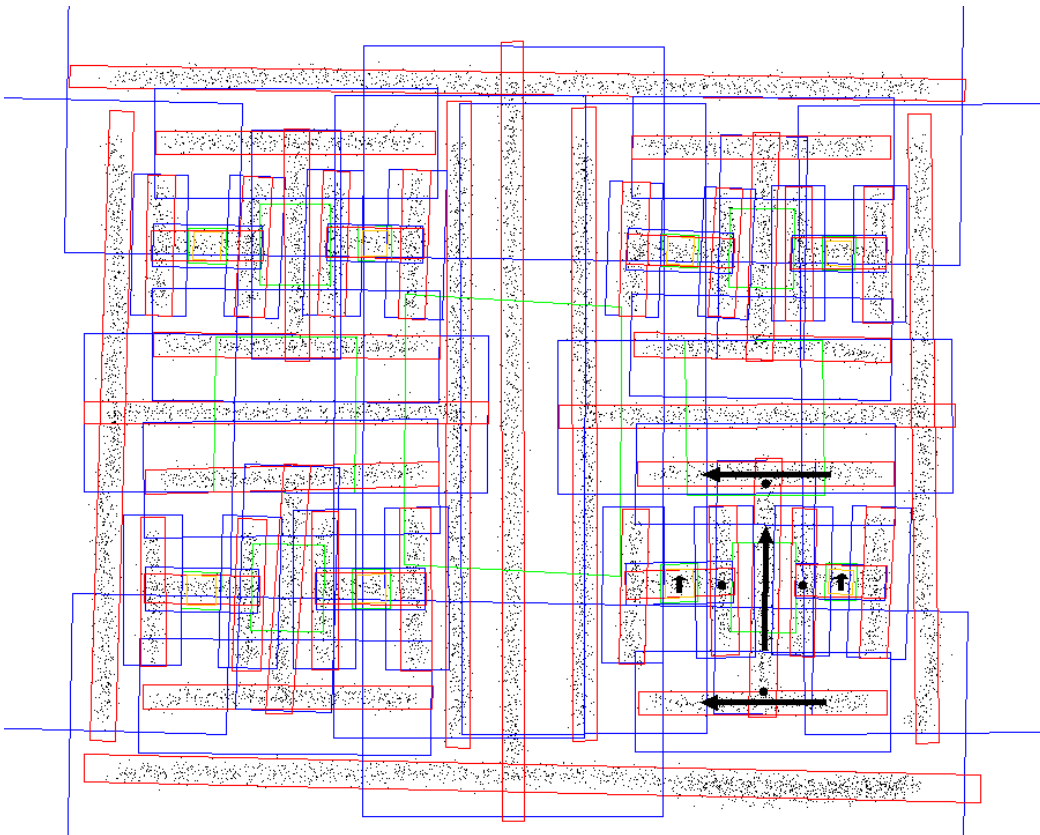


Figure 8: another third-level Hnest.

Figures 9 and 10 show the two Hnests that are parts of the Hnest in figure 5.

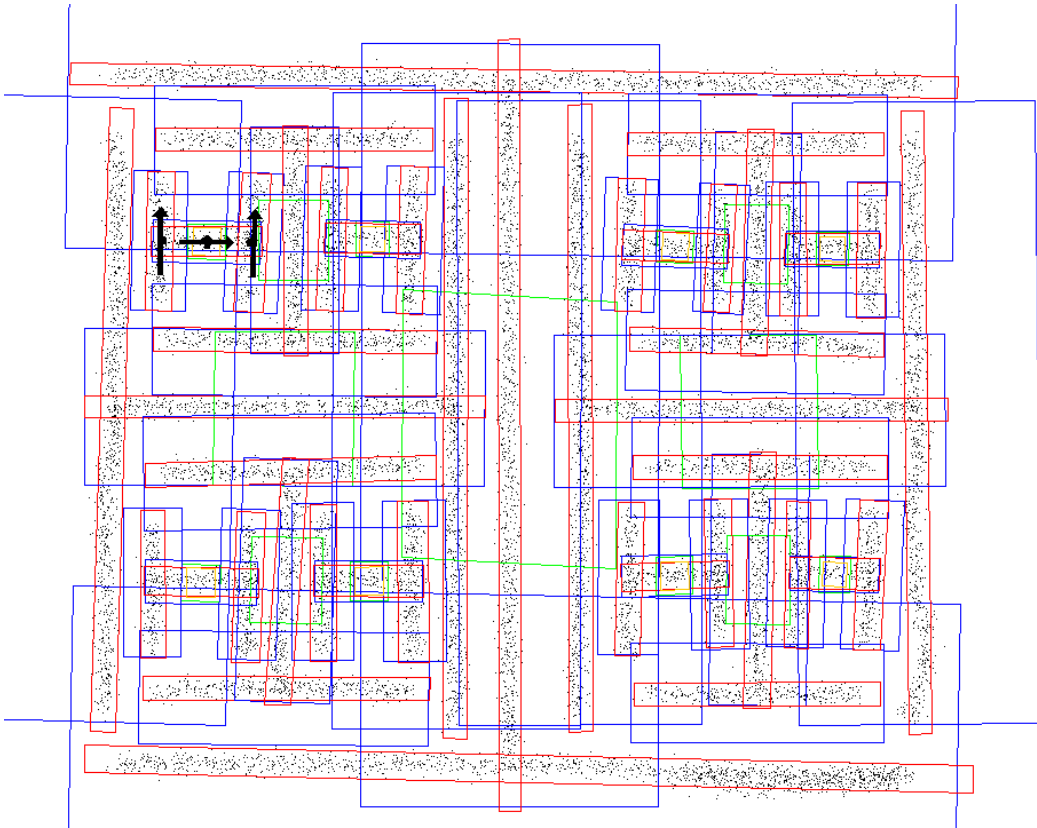


Figure 9: a fourth-level Hnest.

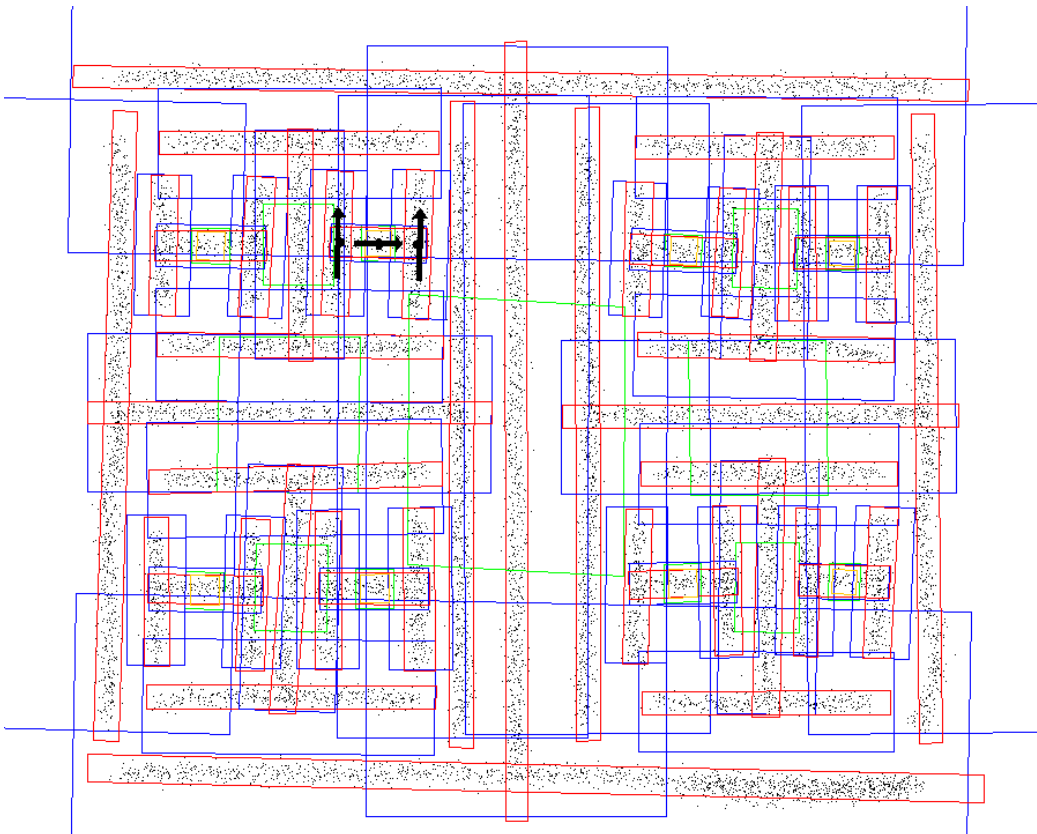


Figure 10: another fourth-level Hnest.

The fourth-level Hnests shown in figures 9 and 10 have only four parts: three lines (forming an 'H') and a 'dummy' symbol (marked by an orange rectangle), taking the place of the two component Hnests that would normally be present.

There are six other fourth-level Hnests, components of the Hnest in figures 6–8.