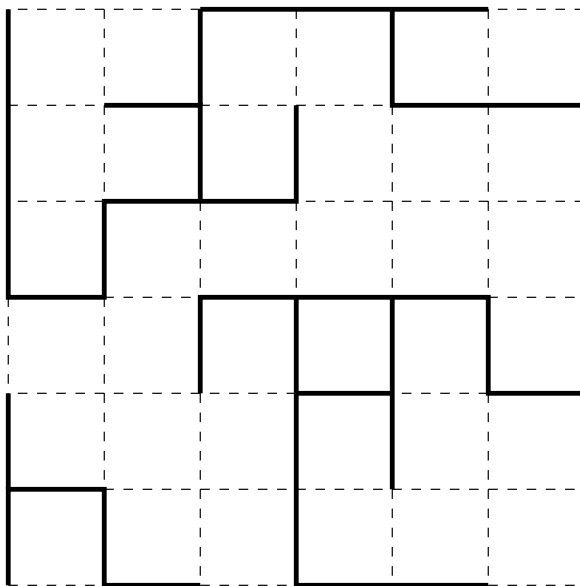


## Spin Glass

Consider the  $7 \times 7$  grid drawn below, where each edge has been made thick (solid) or thin (dashed). Given an assignment of signs (+ or -) to the vertices of this grid, a thick edge is *violated* if the endpoints have two different signs. A thin edge is violated if the endpoints have identical signs. The goal is to find an assignment of signs which minimize the total number of violations in the grid.



Violations if

+		-
-		+
+		+
-		-

As you'll probably realize, although finding a "good" assignment of signs might not be that difficult, providing a proof that your solution is optimal is in fact much more challenging (and a short proof exists for any instance).