When used with the 'thin' option, bwmorph uses the following algorithm (References [3]):

1. Divide the image into two distinct subfields in a checkerboard pattern.
2. In the first subiteration, delete pixel *p* from the first subfield if and only if the conditions G_1, G_2, and G_3 are all satisfied.
3. In the second subiteration, delete pixel *p* from the second subfield if and only if the conditions G_1, G_2, and G_3' are all satisfied.

Condition G1:

$$X_H(p) = 1$$

where

$$X_H(p) = \sum_{i=1}^{4} b_i$$

$$b_i = \begin{cases} 1, \text{ if } x_{2i-1} = 0 \text{ and } (x_{2i} = 1 \text{ or } x_{2i+1} = 1) \\ 0, \text{otherwise} \end{cases}$$

x_1, x_2, ..., x_8 are the values of the eight neighbors of *p*, starting with the east neighbor and numbered in counter-clockwise order.

Condition G2:

$$2 \le \min\{n_1(p), n_2(p)\} \le 3$$

where

$$n_1(p) = \sum_{k=1}^{4} x_{2k-1} \vee x_{2k}$$

$$n_2(p) = \sum_{k=1}^{4} x_{2k} \vee x_{2k+1}$$

Condition G3:

$$(x_2 \vee x_3 \vee \bar{x}_8) \wedge x_1 = 0$$

Condition G3':

$$(x_6 \vee x_7 \vee \bar{x}_4) \wedge x_5 = 0$$

The two subiterations together make up one iteration of the thinning algorithm. When the user specifies an infinite number of iterations (n=Inf), the iterations are repeated until the image stops changing. The conditions are all tested using applylut with precomputed lookup tables.