Flixel

The game of Flixel is a solitaire game played on an $m \times n$ grid of light bulbs:

Each bulb is either red or green. When a player touches a bulb, it changes color, and so do all adjacent bulbs. The figures below show the results of touching several of the bulbs in the game above.

You can play the game of Flixel at this website:

http://www.unixpapa.com/flixel/

Some questions that might be asked:

1. Is it always possible, for any size board, to change the colors from all red to all green? If so, how?

2. Is it possible to get any desired pattern? If so, how? If not, count and characterize those patterns which are unreachable.

Then consider some generalizations. Some possibilities:

1. What if we glue the left side of the board to the right, and the top to the bottom, so that we are playing on a torus?

2. What if some bulbs are visible but too hot to touch? How does that affect what patterns are reachable?