

Re: adjusting an image

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 - *Date:* Fri, 3 Mar 2006 19:02:27 +0000 (UTC)
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David Epstein <dbae@xxxxxxxxxxxxxxxxxxxx> wrote:

Let A be a matrix of zeros and ones. We imagine A to be extended in all directions by zeros, so we don't need to worry about edge effects. For each entry x of A, we look at a 3x3 window centred at x, see whether zeros or ones predominate, and replace x by whichever entry predominates.

I'm assuming that the replacement is done simultaneously for all points; otherwise the result depends on the order in which the changes are made.

Since the situation is finite, the procedure must terminate in a finite cycle. My question is: does it always terminate in a cycle of length one (that is, no change)?

No. It can result in a cycle of length 2:

```
.oo..... .oo.....
oooo..... oooo.....
oooo..... oooo.....
.ooo..... .oooo....
...ooo... <--> ...o....
....ooo. ....oooo.
....oooo ....oooo
....oooo ....oooo
.....oo. ....oo.
```

(Here 'o'=1 and '.'=0.)

I don't know if other periods are possible.

Meta questions: is this sort of question more appropriate to some specialized mathematical newsgroup?

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Try `comp.theory.cell-automata`. You're asking about periodic patterns in the cellular automaton with the Conway neighborhood and the totalistic rule B5678/S45678.

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