Assignment 16 ✓

The rule has a silent state, if a dead cell is has no neighbours. I wouldn't characterize it as totalistic, without having specified some kind of binary value to the neighbouring cells. It is symmetric though, since the 23/3 rule doesn't depend on the position of the neighbours. So each symmetric configuration will lead to the same result. It is legal, since it is symmetric and shows a silent state. It is not peripheral, since the outcome is in any case dependent on whether the cell os dead or alive.

   In shot:

   - silent state ✓

   - totalistic ×

   - symmetric ✓

   - peripheral ×

   - legal ✓

∎

Assignment 17 ✓

That it is possibly to create a Game of Life pattern that can grow infinitely. ∎

Assignment 18 ✓

Class IV. It's evolution leads to complex structures, even releasing a glider at some point of it's evolution, and the *r-pentomino* is long lived. ∎
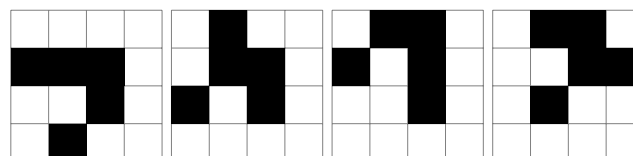
Assignment 19   Exam relevant!

Was asked in each exam in the past!!! Just lern the pattern by heart.

Figure 1: Possible solution

∎

Assignment 20

A cellular d-graph automaton $\mathcal{M}$ is a triple (Γ, M, H), where

Γ is a d-graph, (N, A, f, g) on the label set L

M is a finite-state automaton (Q, δ), where
Q is a finite nonempty set of states such that $L \subseteq Q$
δ is a transition function from $Q \times Z_d^d \times Q^d$ into subsets of Q which maps any triple whose first term is $\#$ into $\#$

H is a mapping from N into Z_d^d; the image $H(n) = (t_1 \ldots t_d) \in Z_d^d$ called the neighbor vector of n

If the range of δ is the singleton subsets of Q, then it is called a deter- ministic cellular d-graph automaton and δ may be considered as a function from $QZ_d^dZ_d^d$ into Q.[1] ∎

Assignment 22

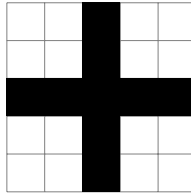overcroweding $\rightarrow$ at least 4

not birth $\rightarrow$ 4 cells or more

Figure 2: Possible solution

∎

Assignment 23

∎

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[1]http://www.sciencedirect.com/science/article/pii/S0019995879902882