

Moshe Sipper's Cellular Programming Algorithm

```
for each cell  $i$  in CA do in parallel
  initialize rule table of cell  $i$ 
   $f_i = 0$  { fitness value }
end parallel for
 $c = 0$  { initial configurations counter }
while not done do
  generate a random initial configuration
  run CA on initial configuration for  $M$  time steps
  for each cell  $i$  do in parallel
    if cell  $i$  is in the correct final state then
       $f_i = f_i + 1$ 
    end if
  end parallel for
   $c = c + 1$ 
  if  $c \bmod C = 0$  then { evolve every  $C$  configurations}
    for each cell  $i$  do in parallel
      compute  $nf_i(c)$  { number of fitter neighbors }
      if  $nf_i(c) = 0$  then rule  $i$  is left unchanged
      else if  $nf_i(c) = 1$  then replace rule  $i$  with the fitter neighboring rule,
        followed by mutation
      else if  $nf_i(c) = 2$  then replace rule  $i$  with the crossover of the two fitter
        neighboring rules, followed by mutation
      else if  $nf_i(c) > 2$  then replace rule  $i$  with the crossover of two randomly
        chosen fitter neighboring rules, followed by mutation
    end if
     $f_i = 0$ 
  end parallel for
  end if
end while
```