Simulated annealing

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Binary map optimization

How energy function is defined?

Our goal is to minimise global energy. Each cell has defined energy by kernel. The green cells around blue cell (centre) shows which neighbour cells adds (subtract) energy.

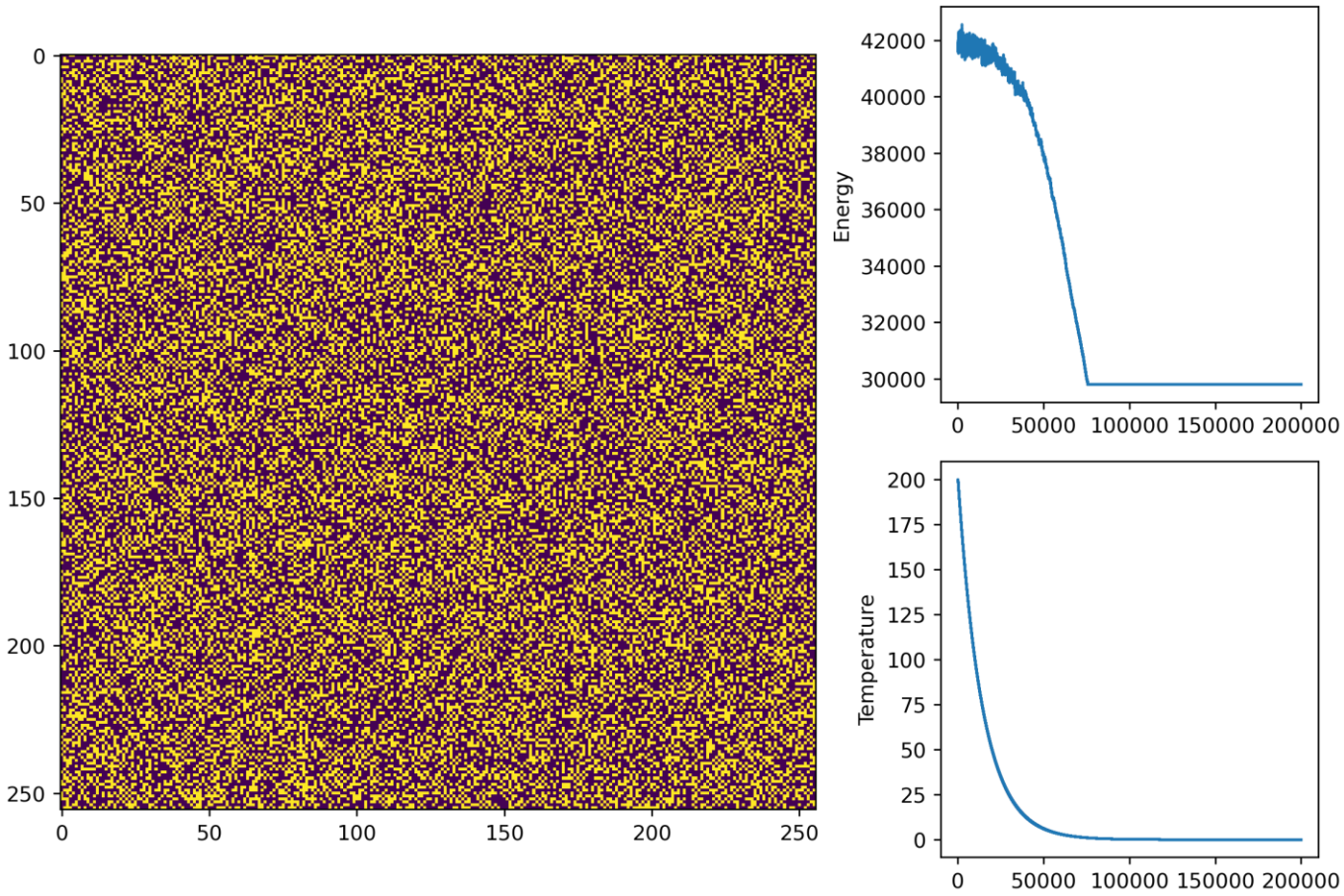
Simple energy function, p=0.4

Each point does not want the closest neighbours (because we want to minimise global energy).

Energy function:

0	**1**	0
1	0	**1**
0	**1**	0

Result:



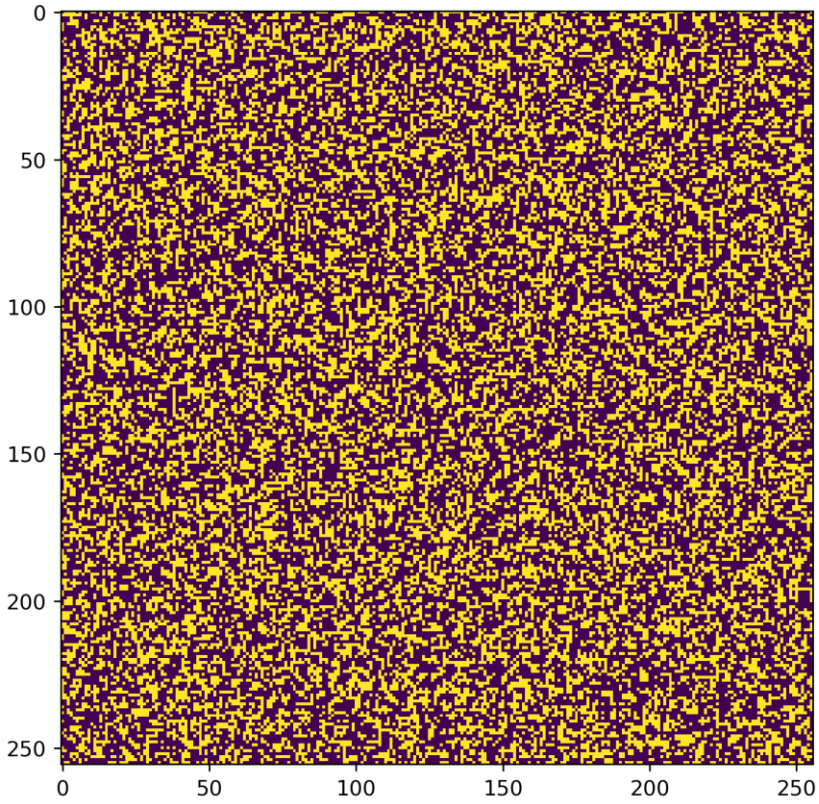
Simple energy function, p=0.4

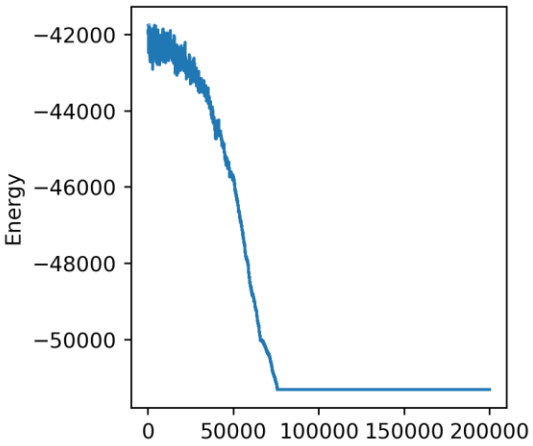
Points should be grouped.

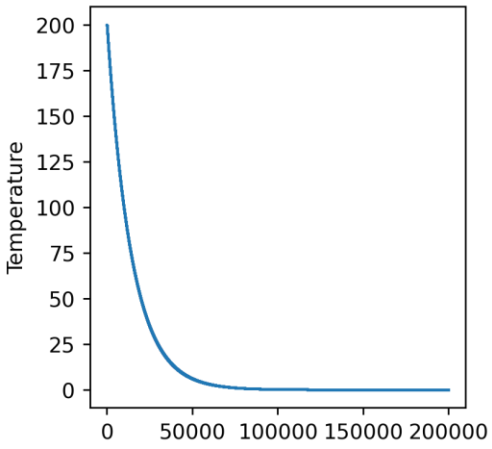
Energy function:

0	**-1**	0
-1	0	**-1**
0	**-1**	0

Result:







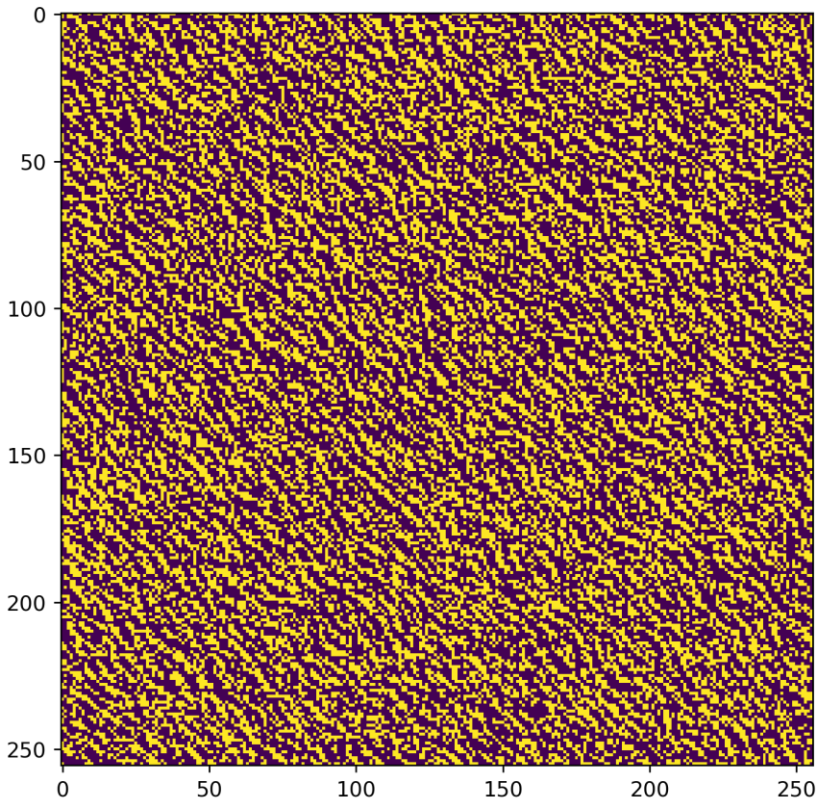
Diagonal 5x5, p=0.4

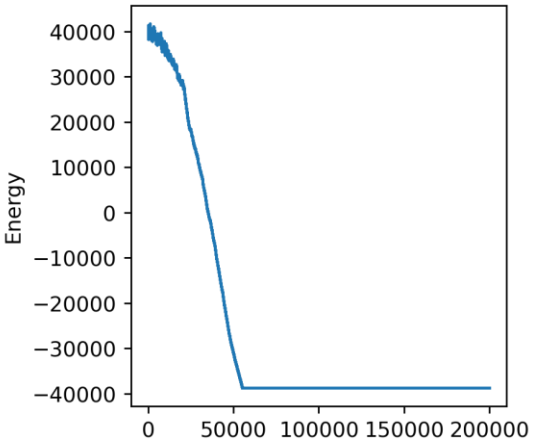
Points should be positioned diagonally.

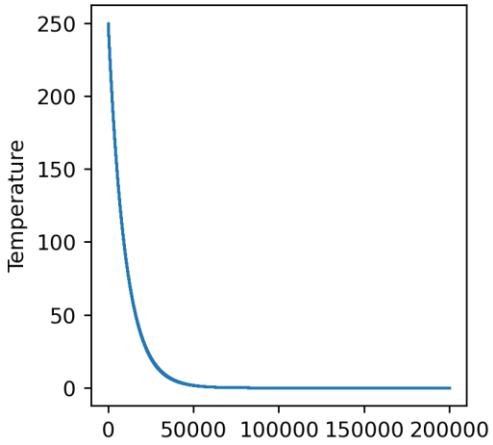
Energy function:

-2	1	-1	-2	-3
1	-2	1	-1	-2
-1	1	0	1	-1
-2	-1	1	-2	1
-3	-2	-1	1	-2

Result:







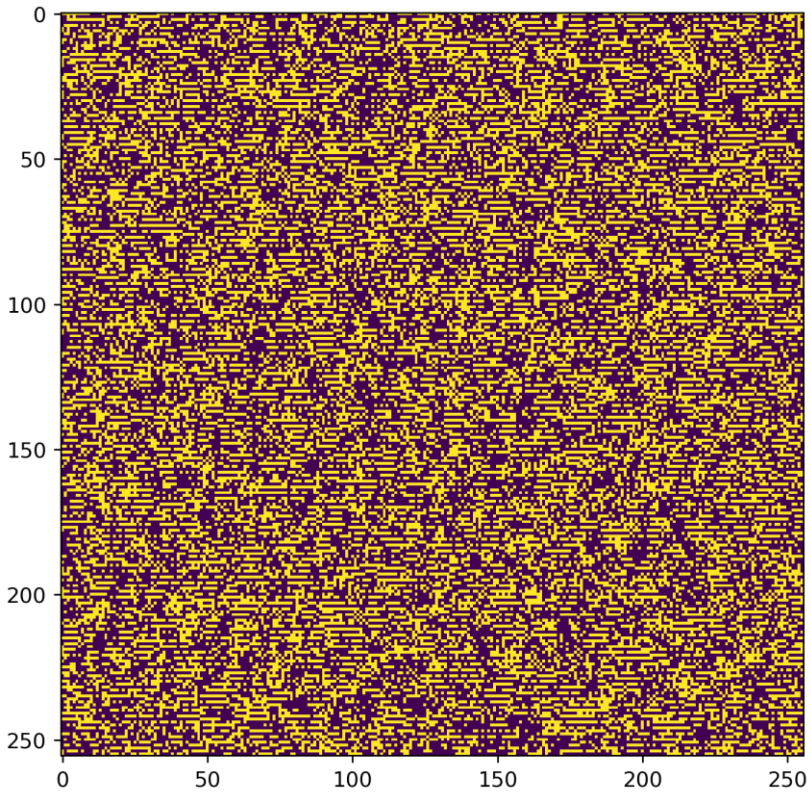
Linear 5x5, p=0.3

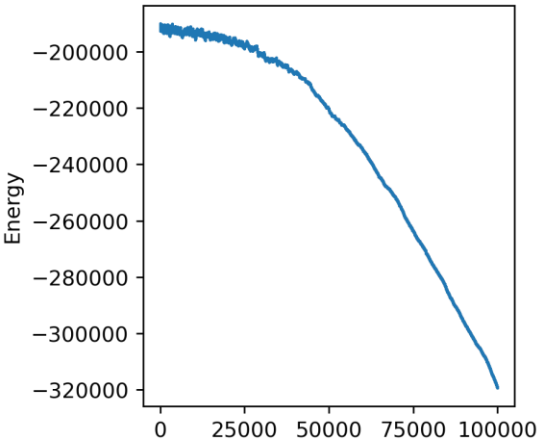
Points should be positioned horizontally.

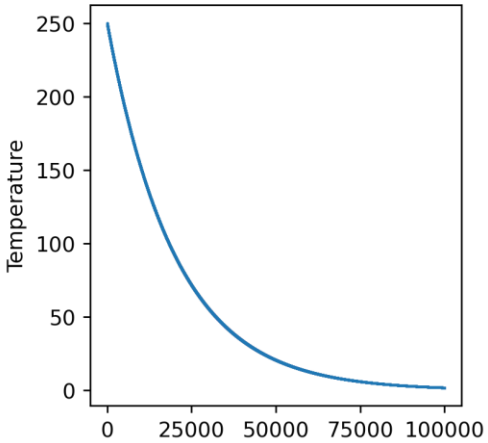
Energy function:

2	2	2	2	2
-1	-1	-1	-1	-1
2	2	0	2	2
-1	-1	-1	-1	-1
2	2	2	2	2

Result:





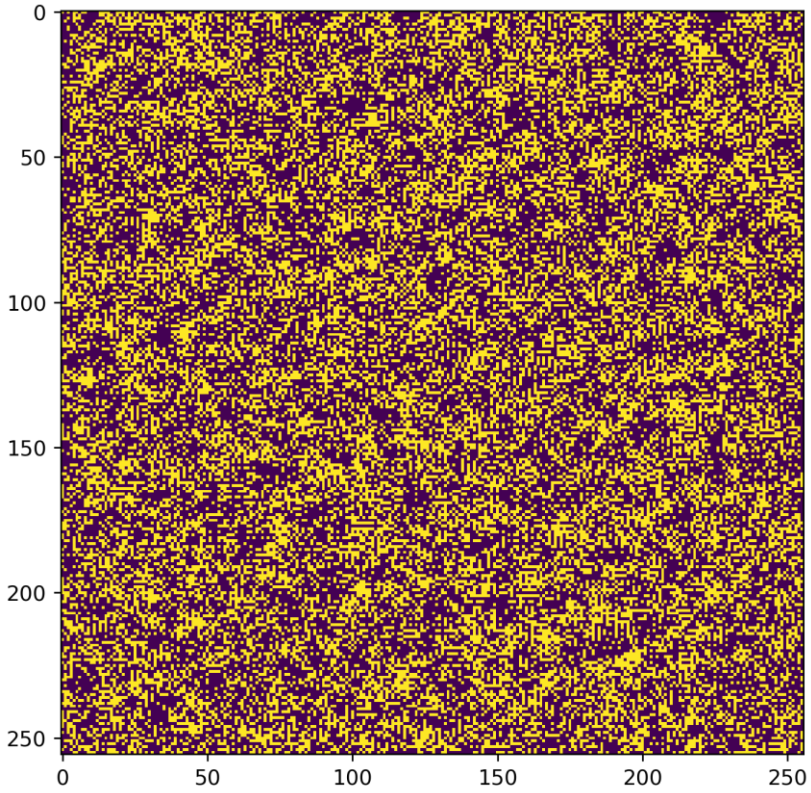


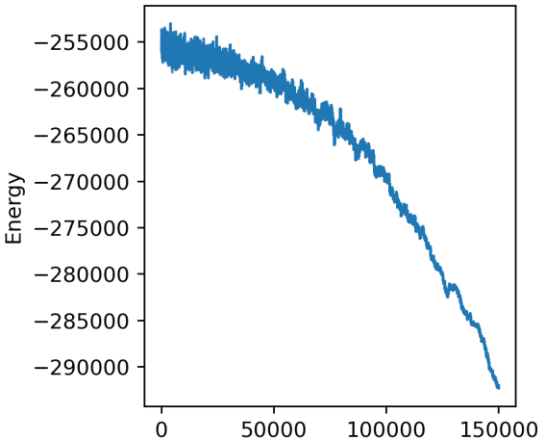
Inner 5x5, p=0.4

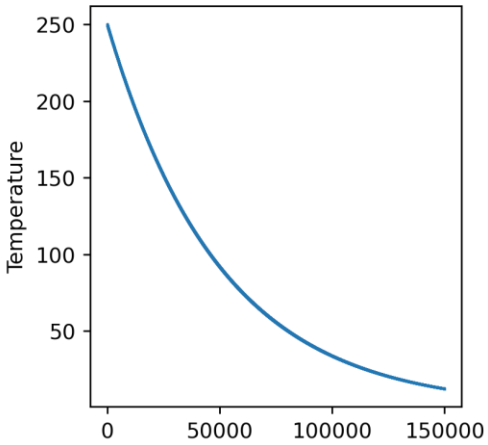
Energy function:

-2	-2	-2	-2	-2
-2	1	1	1	-2
-2	1	0	1	-2
-2	1	1	1	-2
-2	-2	-2	-2	-2

Result:





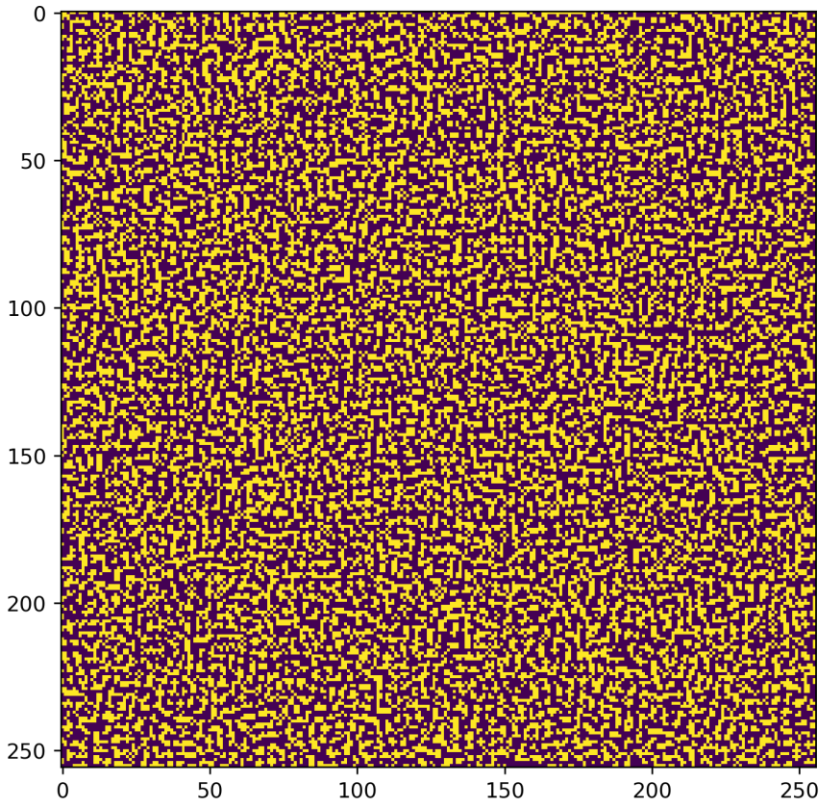


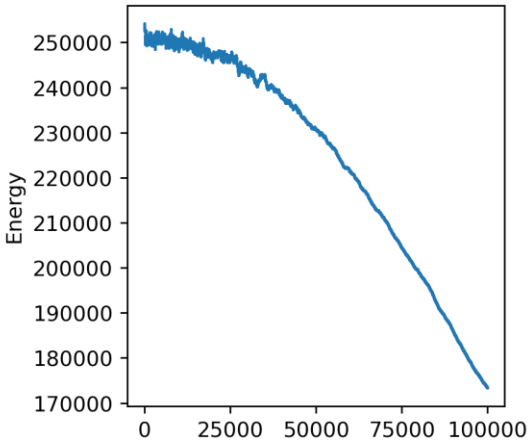
Outer 5x5, p=0.4

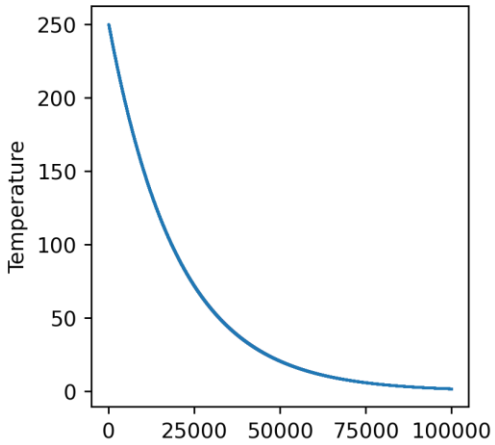
Energy function:

2	2	2	2	2
2	-1	-1	-1	2
2	-1	0	-1	2
2	-1	-1	-1	2
2	2	2	-2	2

Result:





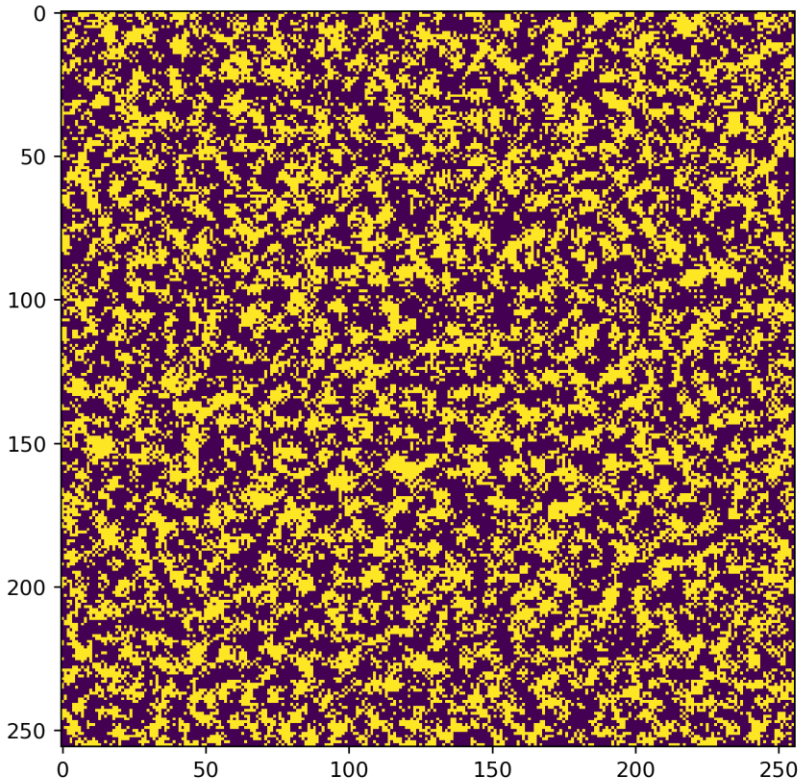


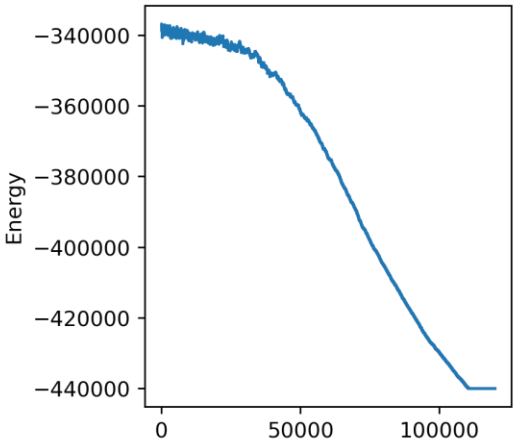
Gravity 5x5, p=0.4

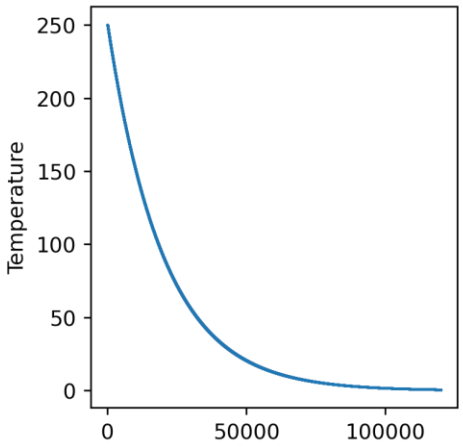
Energy function:

-1	-1	-1	-1	-1
-1	-2	-2	-2	-1
-1	-2	0	-2	-1
-1	-2	-2	-2	-1
-1	-1	-1	-1	-1

Result:





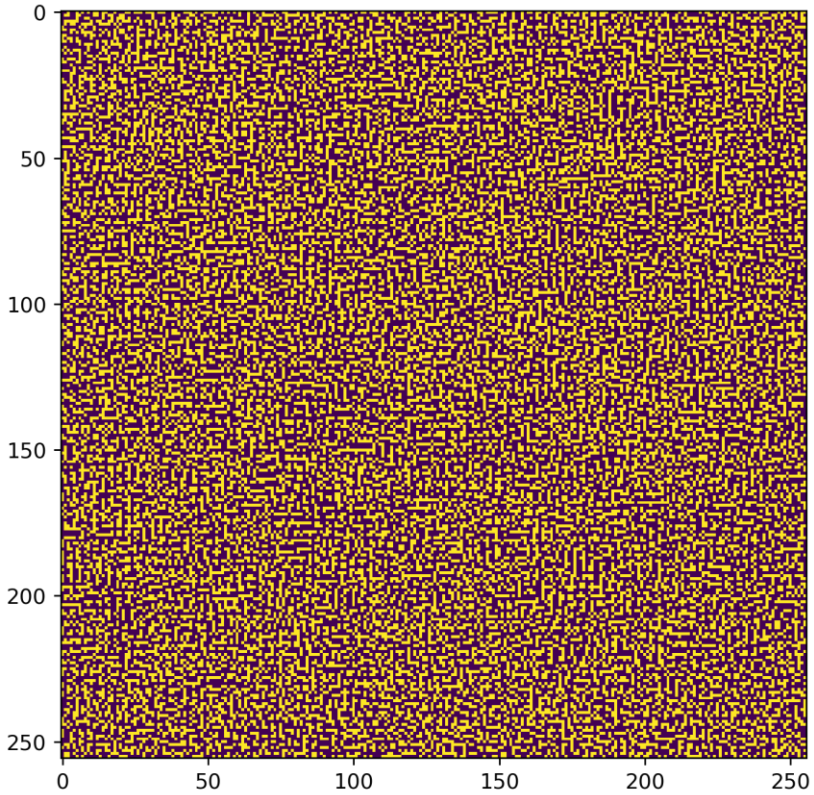


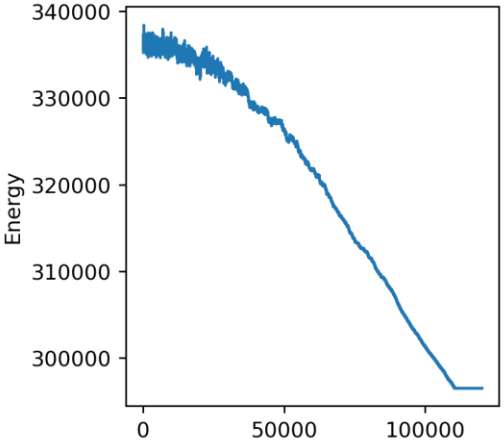
Antigravity 5x5, p=0.4

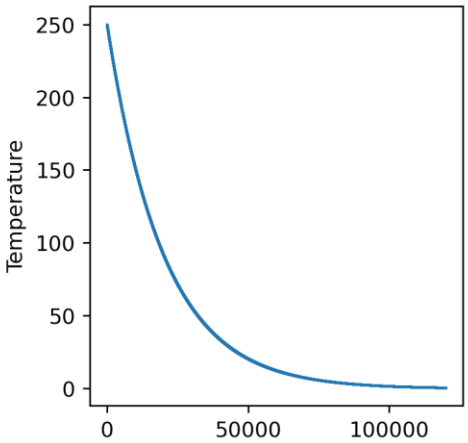
Energy function:

1	1	1	1	1
1	2	2	2	1
1	2	0	2	1
1	2	2	2	1
1	1	1	1	1

Result:





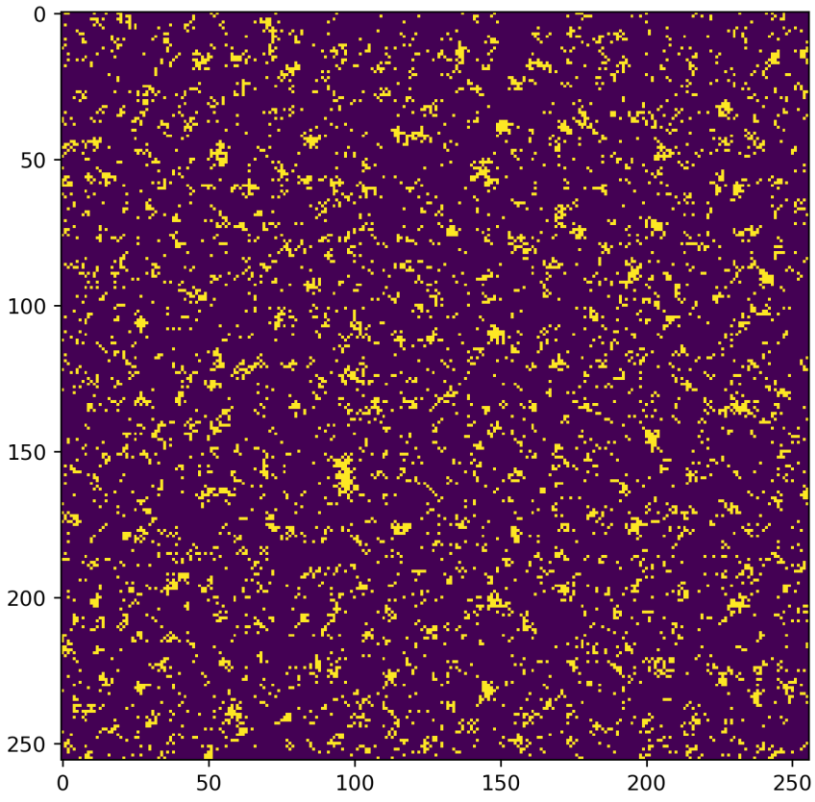


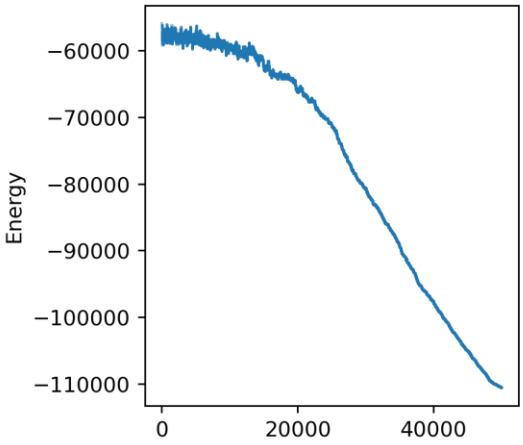
Long gravity 7x7, p=0.1

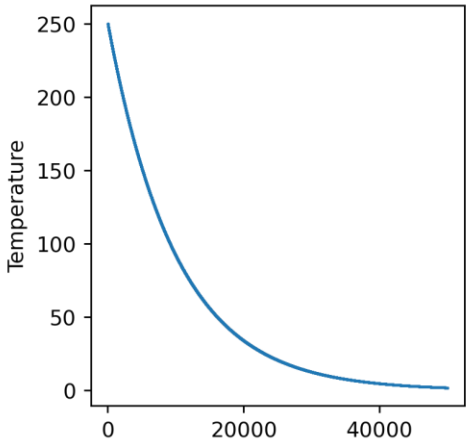
Energy function:

-1	-1	-1	-1	-1	-1	-1
-1	-2	-2	-2	-2	-2	-1
-1	-2	-4	-4	-4	-2	-1
-1	-2	-4	0	-4	-2	-1
-1	-2	-4	-4	-4	-2	-1
-1	-2	-2	-2	-2	-2	-1
-1	-1	-1	-1	-1	-1	-1

Result:





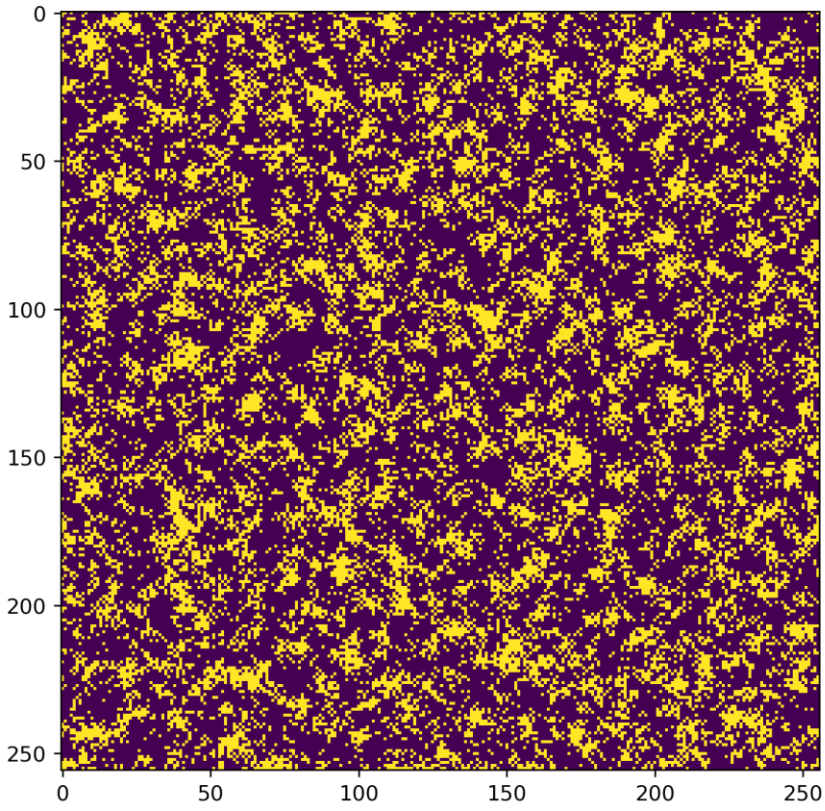


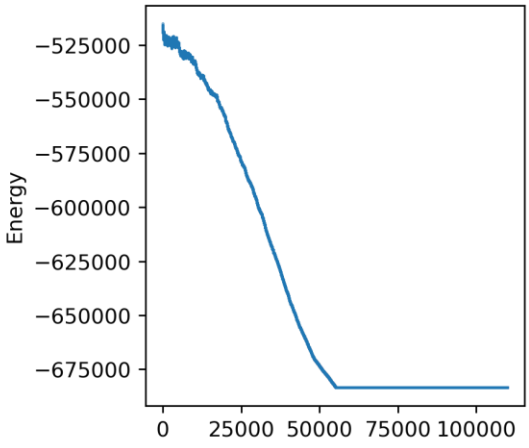
Long gravity 7x7, p=0.3

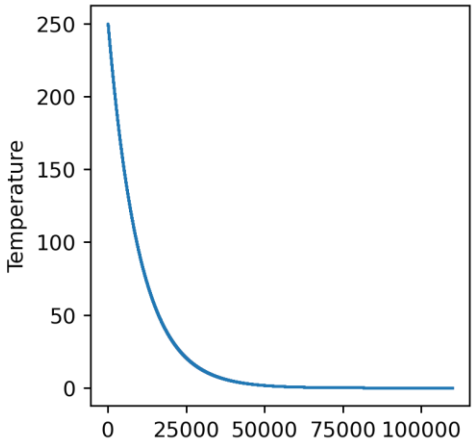
Energy function:

-1	-1	-1	-1	-1	-1	-1
-1	-2	-2	-2	-2	-2	-1
-1	-2	-4	-4	-4	-2	-1
-1	-2	-4	0	-4	-2	-1
-1	-2	-4	-4	-4	-2	-1
-1	-2	-2	-2	-2	-2	-1
-1	-1	-1	-1	-1	-1	-1

Result:







Long gravity 7x7, p=0.4

Energy function:

-1	-1	-1	-1	-1	-1	-1
-1	-2	-2	-2	-2	-2	-1
-1	-2	-4	-4	-4	-2	-1
-1	-2	-4	0	-4	-2	-1
-1	-2	-4	-4	-4	-2	-1
-1	-2	-2	-2	-2	-2	-1
-1	-1	-1	-1	-1	-1	-1

Result: