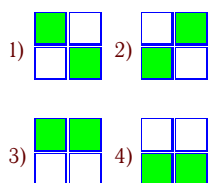
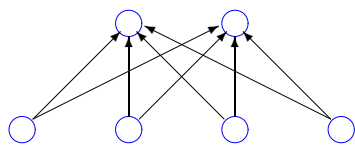


## Сеть Кохонена

Для обучения сети SOFM, имеющей четыре входных элемента и два кластерных, используются четыре образца, закодированные 1 (закрашенный квадрат) и 0 (пустой квадрат) слева направо, сверху вниз. Даны начальные весовые значения  $W_{i,j}$  и норма обучения  $\eta$ . Используя евклидову метрику, определить принадлежность образцов кластерным элементам и вычислить весовые значения после первого цикла обработки данных.

### Задача 9.1

$$\eta = 0.7$$

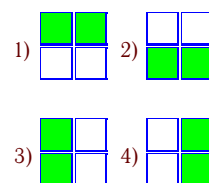
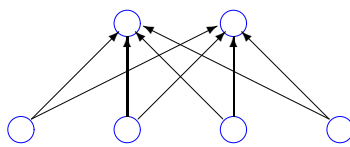


$$W = \begin{vmatrix} 0 & 0.3 & 0.1 & 0.9 \\ 0.1 & 0.5 & 0.9 & 0.1 \end{vmatrix}$$

9.1

### Задача 9.2

$$\eta = 0.8$$

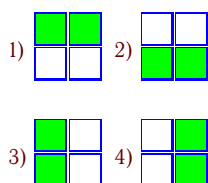
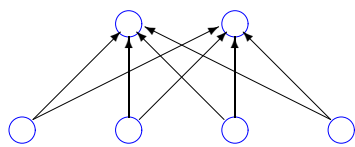


$$W = \begin{vmatrix} 0.4 & 0.4 & 0.6 & 0.9 \\ 0.2 & 0.2 & 0.7 & 0.5 \end{vmatrix}$$

9.1

### Задача 9.3

$$\eta = 0.4$$

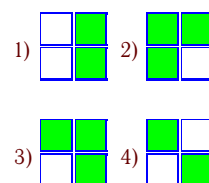
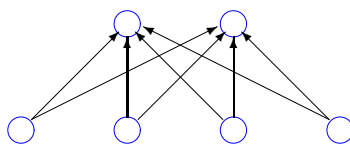


$$W = \begin{vmatrix} 0.3 & 0.1 & 0.3 & 0.7 \\ 0.4 & 0.4 & 0.6 & 0.4 \end{vmatrix}$$

9.1

### Задача 9.4

$$\eta = 0.4$$

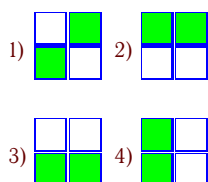
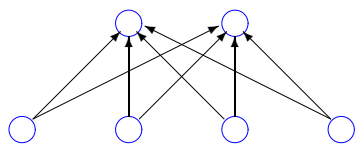


$$W = \begin{vmatrix} 0.9 & 0.1 & 0.1 & 0.6 \\ 0.4 & 1 & 0.1 & 1 \end{vmatrix}$$

9.1

### Задача 9.5

$$\eta = 0.5$$

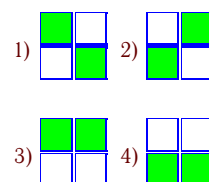
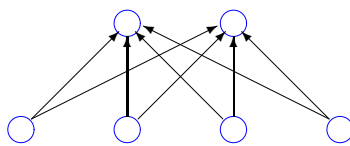


$$W = \begin{vmatrix} 0.1 & 0.7 & 0.2 & 0.6 \\ 0.3 & 0.2 & 0.7 & 0.2 \end{vmatrix}$$

9.1

### Задача 9.6

$$\eta = 0.7$$

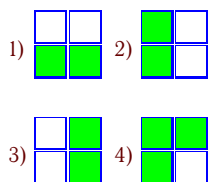
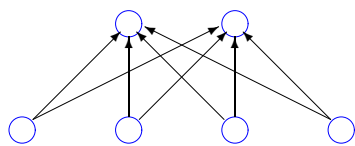


$$W = \begin{vmatrix} 0 & 0.3 & 1 & 0.3 \\ 1 & 0.6 & 0.4 & 0.1 \end{vmatrix}$$

9.1

### Задача 9.7

$$\eta = 0.5$$

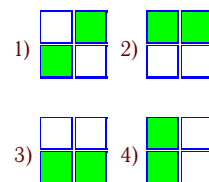
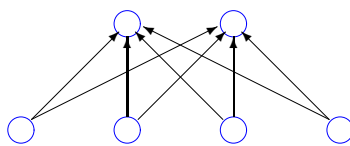


$$W = \begin{vmatrix} 0.5 & 0.8 & 0.8 & 0.5 \\ 0.9 & 0.5 & 0.9 & 0.6 \end{vmatrix}$$

9.1

### Задача 9.8

$$\eta = 0.4$$

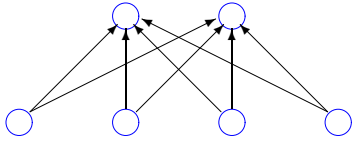


$$W = \begin{vmatrix} 0.2 & 0.1 & 0.7 & 0.5 \\ 0.3 & 0.6 & 0.6 & 0.3 \end{vmatrix}$$

9.1

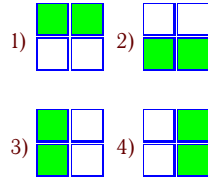
**Задача 9.9**

$\eta = 0.5$



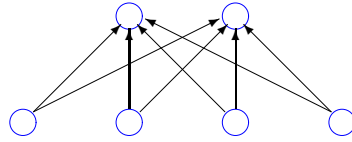
$$W = \begin{vmatrix} 0.4 & 0.7 & 0.2 & 0.3 \\ 0.1 & 0.2 & 0.9 & 0.5 \end{vmatrix}$$

9.1



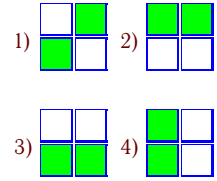
**Задача 9.10**

$\eta = 0.5$



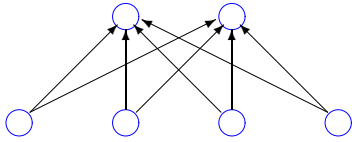
$$W = \begin{vmatrix} 0.2 & 0.9 & 0.3 & 0.4 \\ 0.4 & 0.9 & 0.4 & 0.3 \end{vmatrix}$$

9.1



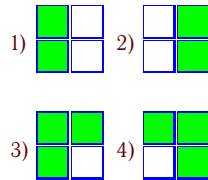
**Задача 9.11**

$\eta = 0.6$



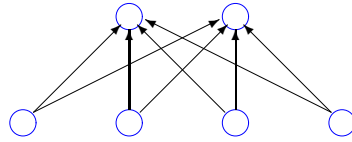
$$W = \begin{vmatrix} 0.8 & 0.2 & 0.3 & 0.7 \\ 0.4 & 0.3 & 0.5 & 0.9 \end{vmatrix}$$

9.1



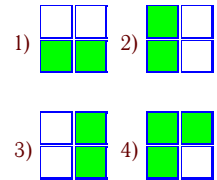
**Задача 9.12**

$\eta = 0.5$



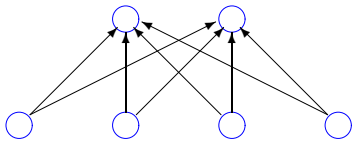
$$W = \begin{vmatrix} 0.6 & 1 & 0.8 & 0.1 \\ 0.1 & 0.5 & 0.1 & 0.7 \end{vmatrix}$$

9.1



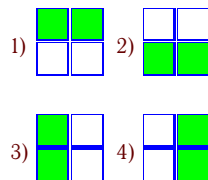
**Задача 9.13**

$\eta = 0.6$



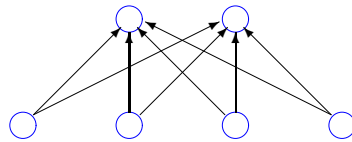
$$W = \begin{vmatrix} 0.3 & 0.2 & 0.8 & 0.5 \\ 0.1 & 1 & 1 & 0.4 \end{vmatrix}$$

9.1



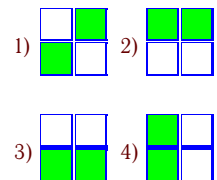
**Задача 9.14**

$\eta = 0.5$



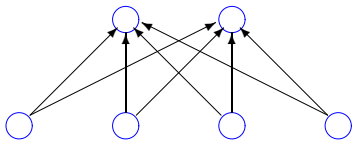
$$W = \begin{vmatrix} 0.1 & 0.9 & 0.2 & 0.3 \\ 0.1 & 0.3 & 0.3 & 0.2 \end{vmatrix}$$

9.1



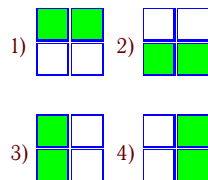
**Задача 9.15**

$\eta = 0.5$



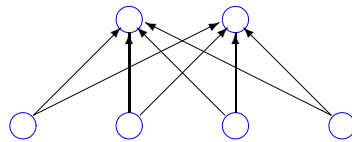
$$W = \begin{vmatrix} 0.4 & 0.6 & 0.1 & 0.1 \\ 0.6 & 0.4 & 0.2 & 0.5 \end{vmatrix}$$

9.1



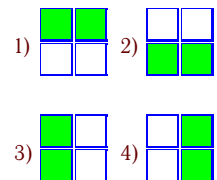
**Задача 9.16**

$\eta = 0.5$



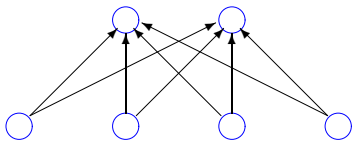
$$W = \begin{vmatrix} 0.4 & 0.5 & 0.8 & 0.3 \\ 0.6 & 0.9 & 0.2 & 0.5 \end{vmatrix}$$

9.1



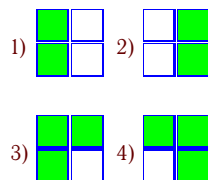
**Задача 9.17**

$\eta = 0.5$



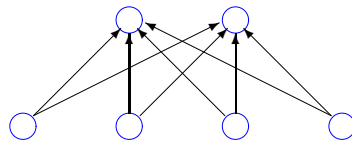
$$W = \begin{vmatrix} 0.7 & 0.5 & 0.1 & 0.3 \\ 0.9 & 0.9 & 0.6 & 0.8 \end{vmatrix}$$

9.1



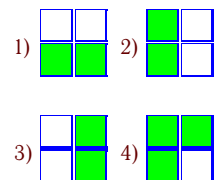
**Задача 9.18**

$\eta = 0.5$



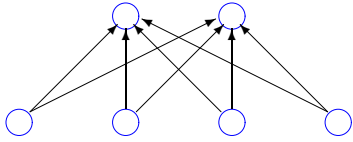
$$W = \begin{vmatrix} 0.5 & 1 & 0.2 & 0.7 \\ 0.9 & 0.6 & 0.3 & 0.6 \end{vmatrix}$$

9.1



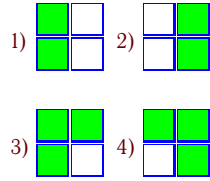
**Задача 9.19**

$\eta = 0.7$



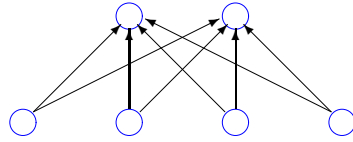
$$W = \begin{vmatrix} 0.7 & 0.3 & 0.2 & 0.1 \\ 0.7 & 0.9 & 0.4 & 0.8 \end{vmatrix}$$

9.1



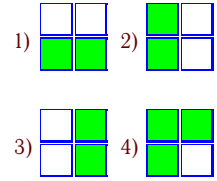
**Задача 9.20**

$\eta = 0.7$



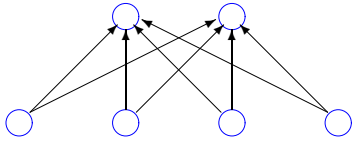
$$W = \begin{vmatrix} 0.6 & 0.3 & 0.1 & 0.5 \\ 0.5 & 0.2 & 0.5 & 0.7 \end{vmatrix}$$

9.1



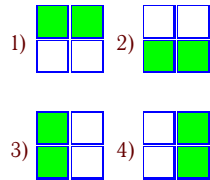
**Задача 9.21**

$\eta = 0.5$



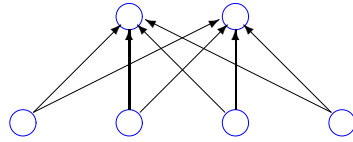
$$W = \begin{vmatrix} 0.3 & 0.8 & 0.8 & 1 \\ 0.7 & 0.2 & 1 & 0.4 \end{vmatrix}$$

9.1



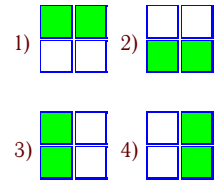
**Задача 9.22**

$\eta = 0.5$



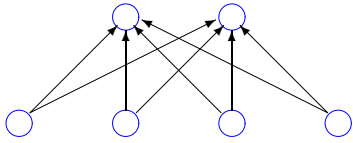
$$W = \begin{vmatrix} 0.4 & 0.6 & 0.7 & 0.2 \\ 0.7 & 0.3 & 0.9 & 0.5 \end{vmatrix}$$

9.1



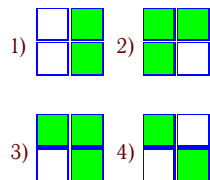
**Задача 9.23**

$\eta = 0.4$



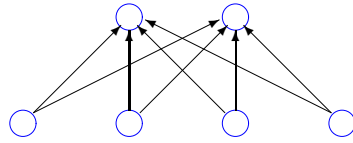
$$W = \begin{vmatrix} 1 & 0.1 & 0.4 & 1 \\ 0.9 & 0.1 & 1 & 1.1 \end{vmatrix}$$

9.1



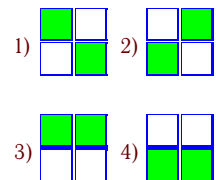
**Задача 9.24**

$\eta = 0.5$



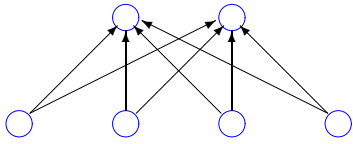
$$W = \begin{vmatrix} 0 & 0.6 & 0.6 & 0.5 \\ 0.6 & 0.5 & 1 & 0.1 \end{vmatrix}$$

9.1



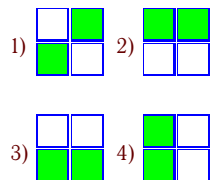
**Задача 9.25**

$\eta = 0.8$



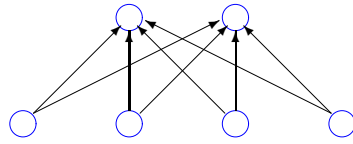
$$W = \begin{vmatrix} 0.1 & 0.4 & 1 & 0.4 \\ 0.6 & 0.5 & 0.5 & 0.2 \end{vmatrix}$$

9.1



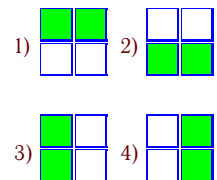
**Задача 9.26**

$\eta = 0.8$



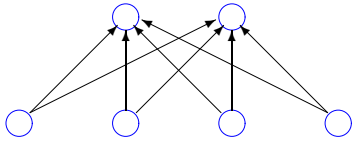
$$W = \begin{vmatrix} 0.4 & 0.4 & 0.6 & 0.4 \\ 0.5 & 0.1 & 0.1 & 0.5 \end{vmatrix}$$

9.1



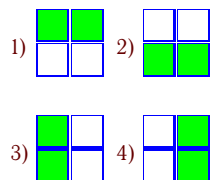
**Задача 9.27**

$\eta = 0.6$



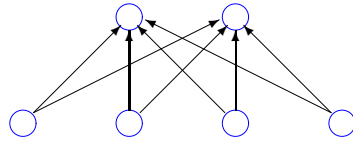
$$W = \begin{vmatrix} 0.4 & 0.2 & 0.7 & 0.1 \\ 0.1 & 0.8 & 0.1 & 0.5 \end{vmatrix}$$

9.1



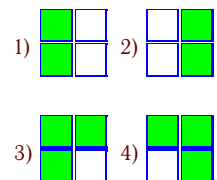
**Задача 9.28**

$\eta = 0.5$



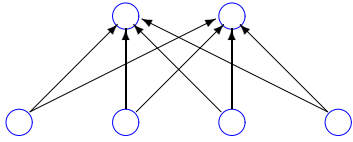
$$W = \begin{vmatrix} 0.8 & 0.9 & 0.5 & 0.4 \\ 0.4 & 0.9 & 0.5 & 0.9 \end{vmatrix}$$

9.1



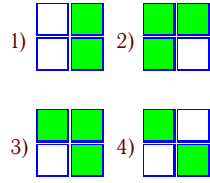
**Задача 9.29**

$\eta = 0.5$



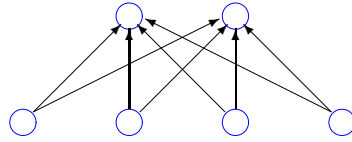
$$W = \begin{vmatrix} 1 & 1 & 0.6 & 0.5 \\ 0.1 & 0.2 & 1 & 1.1 \end{vmatrix}$$

9.1



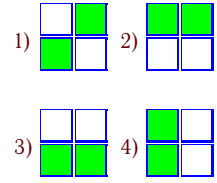
**Задача 9.30**

$\eta = 0.5$



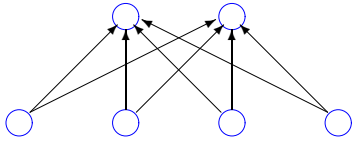
$$W = \begin{vmatrix} 0.2 & 0.6 & 0.4 & 0.6 \\ 0.1 & 0.4 & 1 & 0.3 \end{vmatrix}$$

9.1



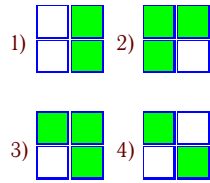
**Задача 9.31**

$\eta = 0.5$



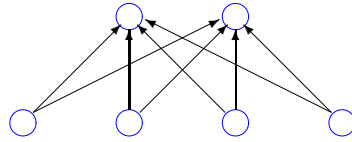
$$W = \begin{vmatrix} 0.9 & 0.5 & 0.7 & 0.3 \\ 0.6 & 1 & 0.3 & 1 \end{vmatrix}$$

9.1



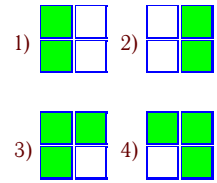
**Задача 9.32**

$\eta = 0.5$



$$W = \begin{vmatrix} 0.8 & 0.5 & 0.9 & 0.7 \\ 0.9 & 0.3 & 0.5 & 0.9 \end{vmatrix}$$

9.1



**Сеть Кохонена**

№	W								
1	1, 2, 1, 2	0.910	0.727	0.009	0.291	0.009	0.255	0.991	0.709
2	1, 2, 1, 2	0.976	0.176	0.824	0.036	0.008	0.808	0.188	0.980
3	2, 1, 2, 1	0.108	0.436	0.348	0.892	0.784	0.384	0.616	0.144
4	2, 1, 2, 1	0.964	0.276	0.276	0.616	0.544	1.000	0.036	1.000
5	2, 1, 2, 2	0.550	0.850	0.100	0.300	0.538	0.150	0.963	0.275
6	2, 1, 2, 1	0.000	0.237	1.000	0.727	1.000	0.754	0.036	0.219
7	1, 2, 1, 2	0.125	0.700	0.450	0.875	0.975	0.625	0.975	0.150
8	2, 2, 1, 2	0.120	0.060	0.820	0.700	0.705	0.514	0.674	0.065
9	1, 2, 2, 1	0.350	0.925	0.050	0.575	0.525	0.050	0.975	0.375
10	2, 1, 2, 2	0.600	0.950	0.150	0.200	0.550	0.237	0.925	0.287
11	1, 2, 1, 2	0.968	0.632	0.888	0.112	0.664	0.888	0.080	0.984
12	2, 1, 2, 1	0.900	0.750	0.950	0.025	0.025	0.625	0.275	0.925
13	2, 1, 1, 2	0.648	0.032	0.968	0.320	0.256	1.000	0.160	0.664
14	1, 1, 2, 2	0.525	0.975	0.300	0.075	0.525	0.075	0.825	0.300
15	1, 2, 2, 1	0.350	0.900	0.025	0.525	0.650	0.100	0.800	0.375
16	2, 1, 1, 2	0.600	0.125	0.950	0.325	0.400	0.975	0.050	0.625
17	1, 2, 1, 2	0.925	0.625	0.775	0.075	0.725	0.975	0.150	0.950
18	2, 2, 1, 2	0.250	1.000	0.100	0.850	0.863	0.575	0.913	0.200
19	1, 2, 1, 2	0.973	0.727	0.928	0.009	0.763	0.991	0.036	0.982
20	2, 1, 2, 1	0.964	0.727	0.919	0.045	0.045	0.718	0.255	0.973
21	2, 1, 2, 1	0.075	0.700	0.450	1.000	0.925	0.300	0.750	0.100
22	1, 2, 2, 1	0.350	0.900	0.175	0.550	0.675	0.075	0.975	0.375
23	1, 1, 1, 1	0.914	0.483	0.196	0.856	0.900	0.100	1.000	1.100
24	1, 2, 1, 2	0.750	0.650	0.150	0.375	0.150	0.375	1.000	0.525
25	1, 2, 1, 2	0.004	0.176	1.000	0.816	0.984	0.180	0.820	0.008
26	1, 2, 1, 2	0.976	0.176	0.824	0.016	0.020	0.804	0.164	0.980
27	2, 1, 1, 2	0.664	0.032	0.952	0.256	0.256	0.968	0.016	0.680
28	1, 2, 1, 2	0.950	0.725	0.875	0.100	0.600	0.975	0.125	0.975
29	1, 1, 1, 1	0.938	0.500	0.163	0.844	0.100	0.200	1.000	1.100
30	2, 1, 2, 2	0.600	0.800	0.200	0.300	0.512	0.175	1.000	0.287
31	2, 1, 2, 2	0.950	0.750	0.850	0.150	0.825	0.500	0.038	1.000
32	1, 2, 1, 2	0.950	0.625	0.975	0.175	0.725	0.825	0.125	0.975