The program is written to handle the N-queen problem using RNN. But the energy function needs to change according to N.Click “save” bottom to save the result.

The energy function of the Four Queen Problem:

$$E(x_{ij}) = \sum_{i=1}^{4} \left(\sum_{j=1}^{4} x_{ij} - 1 \right)^2 + \sum_{j=1}^{4} \left(\sum_{i=1}^{4} x_{ij} - 1 \right)^2$$

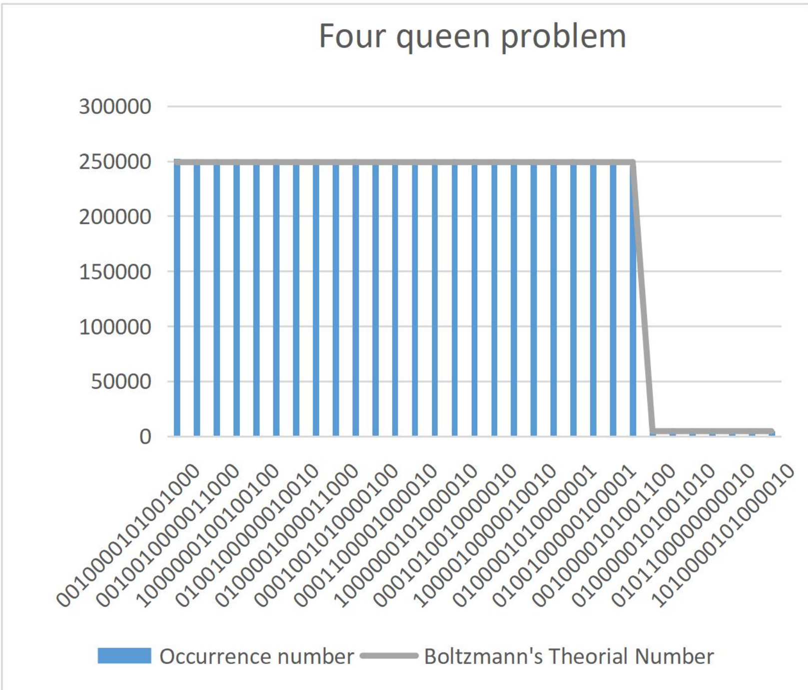
There are 16 positions on the chessboard, and each position is set with a neuron(x_{11}~x_{44}). There are 17 neurons in total, including a dummy neuron(x_{00}).

The calculated weights are:

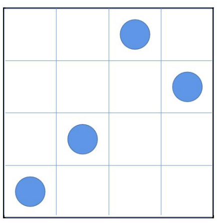
	x00	x11	x12	x13	x14	x21	x22	x23	x24	x31	x32	x33	x34	x41	x42	x43	x44
x00	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
x11	2	0	-2	-2	-2	-2	0	0	0	-2	0	0	0	-2	0	0	0
x12	2	-2	0	-2	-2	0	-2	0	0	0	-2	0	0	0	-2	0	0
x13	2	-2	-2	0	-2	0	0	-2	0	0	0	-2	0	0	0	-2	0
x14	2	-2	-2	-2	0	0	0	0	-2	0	0	0	-2	0	0	0	-2
x21	2	-2	0	0	0	0	-2	-2	-2	-2	0	0	0	-2	0	0	0
x22	2	0	-2	0	0	-2	0	-2	-2	0	-2	0	0	0	-2	0	0
x23	2	0	0	-2	0	-2	-2	0	-2	0	0	-2	0	0	0	-2	0
x24	2	0	0	0	-2	-2	-2	-2	0	0	0	0	-2	0	0	0	-2
x31	2	-2	0	0	0	-2	0	0	0	0	-2	-2	-2	-2	0	0	0
x32	2	0	-2	0	0	0	-2	0	0	-2	0	-2	-2	0	-2	0	0
x33	2	0	0	-2	0	0	0	-2	0	-2	-2	0	-2	0	0	-2	0
x34	2	0	0	0	-2	0	0	0	-2	-2	-2	-2	0	0	0	0	-2
x41	2	-2	0	0	0	-2	0	0	0	-2	0	0	0	0	-2	-2	-2
x42	2	0	-2	0	0	0	-2	0	0	0	-2	0	0	-2	0	-2	-2
x43	2	0	0	-2	0	0	0	-2	0	0	0	-2	0	-2	-2	0	-2
x44	2	0	0	0	-2	0	0	0	-2	0	0	0	-2	-2	-2	-2	0

In one cycle, 16 neurons are updated. Then 10000000 updates of cycles are repeated. The result is shown in the table.

State	Occurrence number	Energy	Boltzmann's Theorial
0010000101001000	252265	0	249024.0078
0010000110000100	251059	0	249024.0078
0010010000011000	250653	0	249024.0078
0001010000101000	250314	0	249024.0078
1000000100100100	250288	0	249024.0078
1000001000010100	250175	0	249024.0078
0100100000010010	249720	0	249024.0078
0010100001000001	249377	0	249024.0078
0100001000011000	249204	0	249024.0078
0001001001001000	249194	0	249024.0078
0001001010000100	249128	0	249024.0078
0010100000010100	249080	0	249024.0078
0001100001000010	248772	0	249024.0078
1000010000100001	248722	0	249024.0078
1000000101000010	248714	0	249024.0078
0100000110000010	248524	0	249024.0078
0001010010000010	248313	0	249024.0078
0100000100101000	248162	0	249024.0078
1000010000010010	247985	0	249024.0078
0010010010000001	247824	0	249024.0078
0100001010000001	247574	0	249024.0078
0001100000100100	247550	0	249024.0078
0100100000100001	247185	0	249024.0078
1000001001000001	245472	0	249024.0078
0010000101001100	4839	2	4561.033801
0001011000011000	4782	2	4561.033801
0100000101001010	4781	2	4561.033801
0000000101001010	4777	2	4561.033801
0101100000000010	4768	2	4561.033801
0011000010000100	4746	2	4561.033801
1010000101000010	4743	2	4561.033801
1001010010000010	4732	2	4561.033801
0100000010000011	4720	2	4561.033801
1000001000010010	4719	2	4561.033801
0100001101001000	4710	2	4561.033801
0001000100101000	4708	2	4561.033801
1000000100000100	4708	2	4561.033801
0100010000111000	4705	2	4561.033801
0101100000100000	4705	2	4561.033801



We can see from the table and figure. The number of occurrences is very close to the calculated Boltzmann's theoretical number. There are 24 states that their energy is 0, which means it's the solution to the problem. The state “0010000101001000” means:



The energy function of 8 Queen Problem should be:

$$E(x_{ij}) = \sum_{i=1}^{4}\Big(\sum_{j=1}^{4} x_{ij} - 1\Big)^2 + \sum_{j=1}^{4}\Big(\sum_{i=1}^{4} x_{ij} - 1\Big)^2 + \sum_{i=1}^{7}\Big(\sum_{j=1}^{9-i} x_{j\ \ i+j-1} - 1\Big)^2 + \sum_{i=2}^{7}\Big(\sum_{j=1}^{9-i} x_{i+j-1\ \ j} - 1\Big)^2$$

$$+ \sum_{i=1}^{7}\Big(\sum_{j=1}^{9-i} x_{10-i-j\ \ j} - 1\Big)^2 + \sum_{i=2}^{7}\Big(\sum_{j=1}^{9-i} x_{9-j\ \ i+j-1} - 1\Big)^2$$

The calculated weights are shown in the table(stored in 8QueenWeight.xlsx):

	x00	x11	x12	x13	x14	x15	x16	x17	x18	x21	x22	x23	x24	x25	x26	x27	x28	x31	x32	x33	x34	x35	x36	x37	x38	x41	x42	x43	x44	x45	x46	x47	x48
x00	0	3	4	4	4	4	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
x11	3	0	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	2	0	2	0	0	0	0	0	2	0	0	2	0	0	0	0
x12	4	2	0	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	2	0	2	0	0	0	0	0	2	0	0	2	0	0	0
x13	4	2	2	0	2	2	2	2	2	0	2	2	2	0	0	0	0	2	0	2	0	2	0	0	0	0	0	2	0	0	2	0	0
x14	4	2	2	2	0	2	2	2	2	0	0	2	2	2	0	0	0	0	2	0	2	0	2	0	0	2	0	0	2	0	0	2	0
x15	4	2	2	2	2	0	2	2	2	0	0	0	2	2	2	0	0	0	0	2	0	2	0	2	0	0	2	0	0	2	0	0	2
x16	4	2	2	2	2	2	0	2	2	0	0	0	0	2	2	2	0	0	0	0	2	0	2	0	2	0	0	2	0	0	2	0	0
x17	4	2	2	2	2	2	2	0	2	0	0	0	0	0	2	2	2	0	0	0	0	2	0	2	0	0	0	0	2	0	0	2	0
x18	3	2	2	2	2	2	2	2	0	0	0	0	0	0	0	2	2	0	0	0	0	0	2	0	2	0	0	0	0	2	0	0	2
x21	4	2	2	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	2	0	2	0	0	0	0	0
x22	4	2	2	2	0	0	0	0	0	2	0	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	2	0	2	0	0	0	0
x23	4	0	2	2	2	0	0	0	0	2	2	0	2	2	2	2	2	0	2	2	2	0	0	0	0	2	0	2	0	2	0	0	0
x24	4	0	0	2	2	2	0	0	0	2	2	2	0	2	2	2	2	0	0	2	2	2	0	0	0	0	2	0	2	0	2	0	0
x25	4	0	0	0	2	2	2	0	0	2	2	2	2	0	2	2	2	0	0	0	2	2	2	0	0	0	0	2	0	2	0	2	0
x26	4	0	0	0	0	2	2	2	0	2	2	2	2	2	0	2	2	0	0	0	0	2	2	2	0	0	0	0	2	0	2	0	2
x27	4	0	0	0	0	0	2	2	2	2	2	2	2	2	2	0	2	0	0	0	0	0	2	2	2	0	0	0	0	2	0	2	0
x28	4	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0	2	2	0	0	0	0	0	2	0	2
x31	4	2	0	2	0	0	0	0	0	2	2	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
x32	4	0	2	0	2	0	0	0	0	2	2	2	0	0	0	0	0	2	0	2	2	2	2	2	2	2	2	2	0	0	0	0	0
x33	4	2	0	2	0	2	0	0	0	0	2	2	2	0	0	0	0	2	2	0	2	2	2	2	2	0	2	2	2	0	0	0	0
x34	4	0	2	0	2	0	2	0	0	0	0	2	2	2	0	0	0	2	2	2	0	2	2	2	2	0	0	2	2	2	0	0	0
x35	4	0	0	2	0	2	0	2	0	0	0	0	2	2	2	0	0	2	2	2	2	0	2	2	2	0	0	0	2	2	2	0	0
x36	4	0	0	0	2	0	2	0	2	0	0	0	0	2	2	2	0	2	2	2	2	2	0	2	2	0	0	0	0	2	2	2	0
x37	4	0	0	0	0	2	0	2	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	0	2	0	0	0	0	0	2	2	2
x38	4	0	0	0	0	0	2	0	2	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0	2	2
x41	4	2	0	0	2	0	0	0	0	2	0	2	0	0	0	0	0	2	2	0	0	0	0	0	0	0	2	2	2	2	2	2	2
x42	4	0	2	0	0	2	0	0	0	0	2	0	2	0	0	0	0	2	2	2	0	0	0	0	0	2	0	2	2	2	2	2	2
x43	4	0	0	2	0	0	2	0	0	2	0	2	0	2	0	0	0	0	2	2	2	0	0	0	0	2	2	0	2	2	2	2	2
x44	4	2	0	0	2	0	0	2	0	0	2	0	2	0	2	0	0	0	0	2	2	2	0	0	0	2	2	2	0	2	2	2	2
x45	4	0	2	0	0	2	0	0	2	0	0	2	0	2	0	2	0	0	0	0	2	2	2	0	0	2	2	2	2	0	2	2	2
x46	4	0	0	2	0	0	2	0	0	0	0	0	2	0	2	0	2	0	0	0	0	2	2	2	0	2	2	2	2	2	0	2	2
x47	4	0	0	0	2	0	0	2	0	0	0	0	0	2	0	2	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	0	2
x48	4	0	0	0	0	2	0	0	2	0	0	0	0	0	2	0	2	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	0
x51	4	2	0	0	0	2	0	0	0	2	0	0	2	0	0	0	0	2	0	2	0	0	0	0	0	2	2	0	0	0	0	0	0
x52	4	0	2	0	0	0	2	0	0	0	2	0	0	2	0	0	0	0	2	0	2	0	0	0	0	2	2	2	0	0	0	0	0
x53	4	0	0	2	0	0	0	2	0	0	0	2	0	0	2	0	0	2	0	2	0	2	0	0	0	0	2	2	2	0	0	0	0
x54	4	0	0	0	2	0	0	0	2	2	0	0	2	0	0	2	0	0	2	0	2	0	2	0	0	0	0	2	2	2	0	0	0
x55	4	2	0	0	0	2	0	0	0	0	2	0	0	2	0	0	2	0	0	2	0	2	0	2	0	0	0	0	2	2	2	0	0
x56	4	0	2	0	0	0	2	0	0	0	0	2	0	0	2	0	0	0	0	0	2	0	2	0	2	0	0	0	0	2	2	2	0
x57	4	0	0	2	0	0	0	2	0	0	0	0	2	0	0	2	0	0	0	0	0	2	0	2	0	0	0	0	0	0	2	2	2
x58	4	0	0	0	2	0	0	0	2	0	0	0	0	2	0	0	2	0	0	0	0	0	2	0	2	0	0	0	0	0	0	2	2
x61	4	2	0	0	0	0	2	0	0	2	0	0	0	2	0	0	0	2	0	0	2	0	0	0	0	2	0	2	0	0	0	0	0
x62	4	0	2	0	0	0	0	2	0	0	2	0	0	0	2	0	0	0	2	0	0	2	0	0	0	0	2	0	2	0	0	0	0
x63	4	0	0	2	0	0	0	0	2	0	0	2	0	0	0	2	0	0	0	2	0	0	2	0	0	2	0	2	0	2	0	0	0
x64	4	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	2	2	0	0	2	0	0	2	0	0	2	0	2	0	2	0	0
x65	4	0	0	0	0	2	0	0	0	2	0	0	0	2	0	0	0	0	2	0	0	2	0	0	2	0	0	2	0	2	0	2	0
x66	4	2	0	0	0	0	2	0	0	0	2	0	0	0	2	0	0	0	0	2	0	0	2	0	0	0	0	0	2	0	2	0	2
x67	4	0	2	0	0	0	0	2	0	0	0	2	0	0	0	2	0	0	0	0	2	0	0	2	0	0	0	0	0	2	0	2	0
x68	4	0	0	2	0	0	0	0	2	0	0	0	2	0	0	0	2	0	0	0	0	2	0	0	2	0	0	0	0	0	2	0	2
x71	4	2	0	0	0	0	0	2	0	2	0	0	0	0	2	0	0	2	0	0	0	2	0	0	0	2	0	0	2	0	0	0	0
x72	4	0	2	0	0	0	0	0	2	0	2	0	0	0	0	2	0	0	2	0	0	0	2	0	0	0	2	0	0	2	0	0	0
x73	4	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	2	0	0	0	2	0	0	0	2	0	0	2	0	0
x74	4	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	2	2	0	0	2	0	0	2	0
x75	4	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	2	0	0	0	0	2	0	0	2	0	0	2
x76	4	0	0	0	0	0	2	0	0	2	0	0	0	0	2	0	0	0	2	0	0	0	2	0	0	0	0	2	0	0	2	0	0
x77	4	2	0	0	0	0	0	2	0	0	2	0	0	0	0	2	0	0	0	2	0	0	0	2	0	0	0	0	2	0	0	2	0
x78	4	0	2	0	0	0	0	0	2	0	0	2	0	0	0	0	2	0	0	0	2	0	0	0	2	0	0	0	0	2	0	0	2
x81	3	2	0	0	0	0	0	0	2	2	0	0	0	0	0	2	0	2	0	0	0	0	2	0	0	2	0	0	0	2	0	0	0
x82	4	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0	2	0	0	0	0	2	0	0	2	0	0	0	2	0	0
x83	4	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	2	0	0	2	0	0	0	2	0
x84	4	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	2
x85	4	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	2	0	0	0	2	0	0	0
x86	4	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	2	0	0	0	2	0	0	0	2	0	0
x87	4	0	0	0	0	0	0	2	0	2	0	0	0	0	0	2	0	0	2	0	0	0	0	2	0	0	0	2	0	0	0	2	0
x88	3	2	0	0	0	0	0	0	2	0	2	0	0	0	0	0	2	0	0	2	0	0	0	0	2	0	0	0	2	0	0	0	2

	x51	x52	x53	x54	x55	x56	x57	x58	x61	x62	x63	x64	x65	x66	x67	x68	x71	x72	x73	x74	x75	x76	x77	x78	x81	x82	x83	x84	x85	x86	x87	x88
x00	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	4	4	4	4	4	4	3
x11	2	0	0	0	2	0	0	0	2	0	0	0	0	2	0	0	2	0	0	0	0	0	2	0	2	0	0	0	0	0	0	2
x12	0	2	0	0	0	2	0	0	0	2	0	0	0	0	2	0	0	2	0	0	0	0	0	2	0	2	0	0	0	0	0	0
x13	0	0	2	0	0	0	2	0	0	0	2	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0
x14	0	0	0	2	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0
x15	2	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0
x16	0	2	0	0	0	2	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0
x17	0	0	2	0	0	0	2	0	0	2	0	0	0	0	2	0	2	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0
x18	0	0	0	2	0	0	0	2	0	0	2	0	0	0	0	2	0	2	0	0	0	0	0	2	2	0	0	0	0	0	0	2
x21	2	0	0	2	0	0	0	0	2	0	0	0	2	0	0	0	2	0	0	0	0	2	0	0	2	0	0	0	0	0	2	0
x22	0	2	0	0	2	0	0	0	0	2	0	0	0	2	0	0	0	2	0	0	0	0	2	0	0	2	0	0	0	0	0	2
x23	0	0	2	0	0	2	0	0	0	0	2	0	0	0	2	0	0	0	2	0	0	0	0	2	0	0	2	0	0	0	0	0
x24	2	0	0	2	0	0	2	0	0	0	0	2	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0
x25	0	2	0	0	2	0	0	2	2	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0
x26	0	0	2	0	0	2	0	0	0	2	0	0	0	2	0	0	2	0	0	0	0	2	0	0	0	0	0	0	0	2	0	0
x27	0	0	0	2	0	0	2	0	0	0	2	0	0	0	2	0	0	2	0	0	0	0	2	0	2	0	0	0	0	0	2	0
x28	0	0	0	0	2	0	0	2	0	0	0	2	0	0	0	2	0	0	2	0	0	0	0	2	0	2	0	0	0	0	0	2
x31	2	0	2	0	0	0	0	0	2	0	0	2	0	0	0	0	2	0	0	0	2	0	0	0	2	0	0	0	0	2	0	0
x32	0	2	0	2	0	0	0	0	0	2	0	0	2	0	0	0	0	2	0	0	0	2	0	0	0	2	0	0	0	0	2	0
x33	2	0	2	0	2	0	0	0	0	0	2	0	0	2	0	0	0	0	2	0	0	0	2	0	0	0	2	0	0	0	0	2
x34	0	2	0	2	0	2	0	0	2	0	0	2	0	0	2	0	0	0	0	2	0	0	0	2	0	0	0	2	0	0	0	0
x35	0	0	2	0	2	0	2	0	0	2	0	0	2	0	0	2	2	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0
x36	0	0	0	2	0	2	0	2	0	0	2	0	0	2	0	0	0	2	0	0	0	2	0	0	2	0	0	0	0	2	0	0
x37	0	0	0	0	2	0	2	0	0	0	0	2	0	0	2	0	0	0	2	0	0	0	2	0	0	2	0	0	0	0	2	0
x38	0	0	0	0	0	2	0	2	0	0	0	0	2	0	0	2	0	0	0	2	0	0	0	2	0	0	2	0	0	0	0	2
x41	2	2	0	0	0	0	0	0	2	0	2	0	0	0	0	0	2	0	0	2	0	0	0	0	2	0	0	0	2	0	0	0
x42	2	2	2	0	0	0	0	0	0	2	0	2	0	0	0	0	0	2	0	0	2	0	0	0	0	2	0	0	0	2	0	0
x43	0	2	2	2	0	0	0	0	2	0	2	0	2	0	0	0	0	0	2	0	0	2	0	0	0	0	2	0	0	0	2	0
x44	0	0	2	2	2	0	0	0	0	2	0	2	0	2	0	0	2	0	0	2	0	0	2	0	0	0	0	2	0	0	0	2
x45	0	0	0	2	2	2	0	0	0	0	2	0	2	0	2	0	0	2	0	0	2	0	0	2	2	0	0	0	2	0	0	0
x46	0	0	0	0	2	2	2	0	0	0	0	2	0	2	0	2	0	0	2	0	0	2	0	0	0	2	0	0	0	2	0	0
x47	0	0	0	0	0	2	2	2	0	0	0	0	2	0	2	0	0	0	0	2	0	0	2	0	0	0	2	0	0	0	2	0
x48	0	0	0	0	0	0	2	2	0	0	0	0	0	2	0	2	0	0	0	0	2	0	0	2	0	0	0	2	0	0	0	2
x51	0	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	2	0	2	0	0	0	0	0	2	0	0	2	0	0	0	0
x52	2	0	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	2	0	2	0	0	0	0	0	2	0	0	2	0	0	0
x53	2	2	0	2	2	2	2	2	0	2	2	2	0	0	0	0	2	0	2	0	2	0	0	0	0	0	2	0	0	2	0	0
x54	2	2	2	0	2	2	2	2	0	0	2	2	2	0	0	0	0	2	0	2	0	2	0	0	2	0	0	2	0	0	2	0
x55	2	2	2	2	0	2	2	2	0	0	0	2	2	2	0	0	0	0	2	0	2	0	2	0	0	2	0	0	2	0	0	2
x56	2	2	2	2	2	0	2	2	0	0	0	0	2	2	2	0	0	0	0	2	0	2	0	2	0	0	2	0	0	2	0	0
x57	2	2	2	2	2	2	0	2	0	0	0	0	0	2	2	2	0	0	0	0	2	0	2	0	0	0	0	2	0	0	2	0
x58	2	2	2	2	2	2	2	0	0	0	0	0	0	0	2	2	0	0	0	0	0	2	0	2	0	0	0	0	2	0	0	2
x61	2	2	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	2	0	2	0	0	0	0	0
x62	2	2	2	0	0	0	0	0	2	0	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	2	0	2	0	0	0	0
x63	0	2	2	2	0	0	0	0	2	2	0	2	2	2	2	2	0	2	2	2	0	0	0	0	2	0	2	0	2	0	0	0
x64	0	0	2	2	2	0	0	0	2	2	2	0	2	2	2	2	0	0	2	2	2	0	0	0	0	2	0	2	0	2	0	0
x65	0	0	0	2	2	2	0	0	2	2	2	2	0	2	2	2	0	0	0	2	2	2	0	0	0	0	2	0	2	0	2	0
x66	0	0	0	0	2	2	2	0	2	2	2	2	2	0	2	2	0	0	0	0	2	2	2	0	0	0	0	2	0	2	0	2
x67	0	0	0	0	0	2	2	2	2	2	2	2	2	2	0	2	0	0	0	0	0	2	2	2	0	0	0	0	2	0	2	0
x68	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0	2	2	0	0	0	0	0	2	0	2
x71	2	0	2	0	0	0	0	0	2	2	0	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0
x72	0	2	0	2	0	0	0	0	2	2	2	0	0	0	0	0	2	0	2	2	2	2	2	2	2	2	2	0	0	0	0	0
x73	2	0	2	0	2	0	0	0	0	2	2	2	0	0	0	0	2	2	0	2	2	2	2	2	0	2	2	2	0	0	0	0
x74	0	2	0	2	0	2	0	0	0	0	2	2	2	0	0	0	2	2	2	0	2	2	2	2	0	0	2	2	2	0	0	0
x75	0	0	2	0	2	0	2	0	0	0	0	2	2	2	0	0	2	2	2	2	0	2	2	2	0	0	0	2	2	2	0	0
x76	0	0	0	2	0	2	0	2	0	0	0	0	2	2	2	0	2	2	2	2	2	0	2	2	0	0	0	0	2	2	2	0
x77	0	0	0	0	2	0	2	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	0	2	0	0	0	0	0	2	2	2
x78	0	0	0	0	0	2	0	2	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	0	0	0	0	0	0	0	2	2
x81	2	0	0	2	0	0	0	0	2	0	2	0	0	0	0	0	2	2	0	0	0	0	0	0	0	2	2	2	2	2	2	2
x82	0	2	0	0	2	0	0	0	0	2	0	2	0	0	0	0	2	2	2	0	0	0	0	0	2	0	2	2	2	2	2	2
x83	0	0	2	0	0	2	0	0	2	0	2	0	2	0	0	0	0	2	2	2	0	0	0	0	2	2	0	2	2	2	2	2
x84	2	0	0	2	0	0	2	0	0	2	0	2	0	2	0	0	0	0	2	2	2	0	0	0	2	2	2	0	2	2	2	2
x85	0	2	0	0	2	0	0	2	0	0	2	0	2	0	2	0	0	0	0	2	2	2	0	0	2	2	2	2	0	2	2	2
x86	0	0	2	0	0	2	0	0	0	0	0	2	0	2	0	2	0	0	0	0	2	2	2	0	2	2	2	2	2	0	2	2
x87	0	0	0	2	0	0	2	0	0	0	0	0	2	0	2	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	0	2
x88	0	0	0	0	2	0	0	2	0	0	0	0	0	2	0	2	0	0	0	0	0	0	2	2	2	2	2	2	2	2	2	0