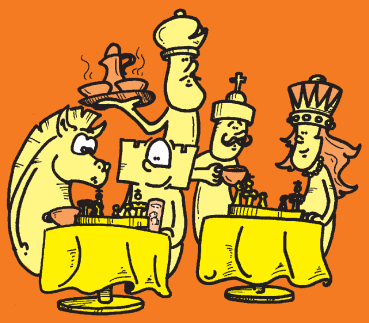


THE PUZZLING SIDE OF CHESS

Jeff Coakley

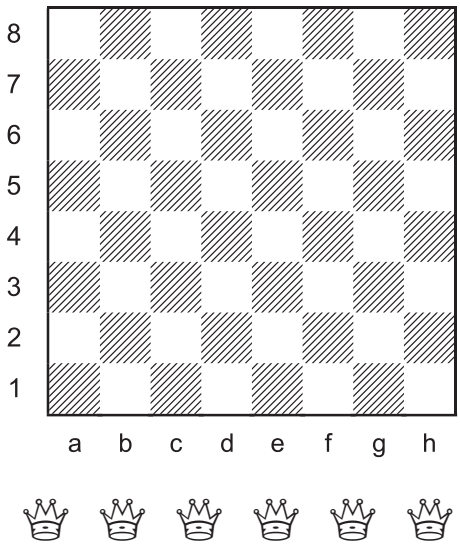
QUEENFEST VI: PEACEFUL COEXISTENCE

number 93 April 24, 2015

Queenfest returns once again. As usual, the puzzles involve multiple queens. The task is to arrange the queens on the board to achieve certain goals.

The first puzzle is an example of *independent domination*. “Independent” because the queens do not protect each other. “Domination” because all vacant squares are under their control.

Queenfest 19 (six queens)

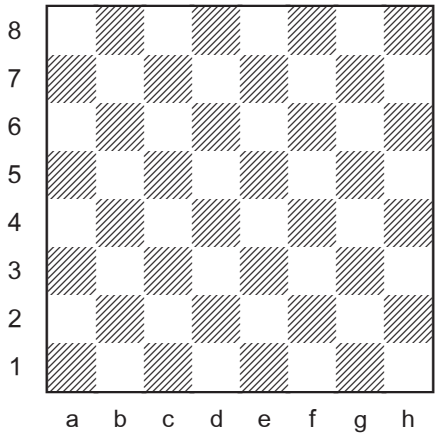


Place six queens on the board so that no queen is defended and every empty square is attacked.

Earlier *Queenfests* are in the archives: columns 59, 60, 63, 87, 90.

The next puzzle uses an equal number of white and black queens. Parts A and B were first presented in a 1999 article by Robert Bosch entitled *Peaceably Coexisting Armies of Queens*. Part C adds a pair of kings.

Queenfest 20 (no captures)



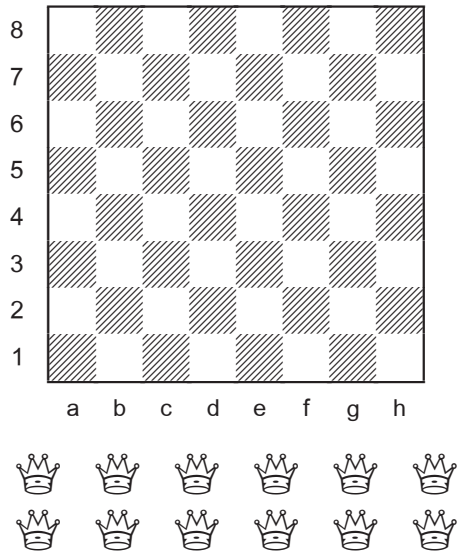
20a. Place eight white queens and eight black queens on the board so that no captures are possible.

20b. Place nine white queens and nine black queens on the board so that no captures are possible.

20c. Place one white king, nine white queens, one black king, and nine black queens on the board so that neither king is in check and no captures are possible.

In previous columns, there were puzzles with up to eleven queens in which the task was to attack the fewest squares. We move on now to twelve queens.

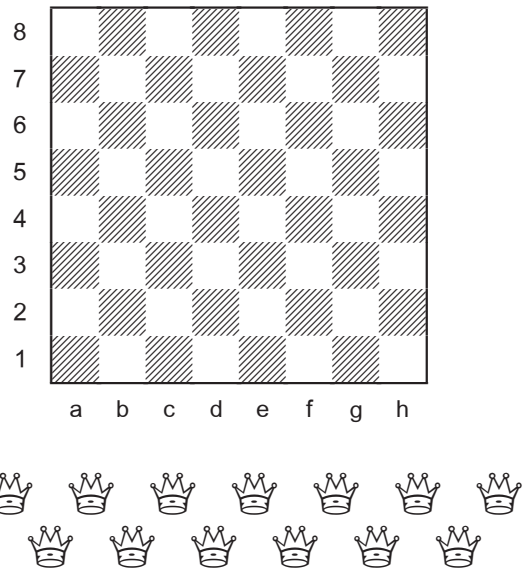
Queenfest 21 (fewest attacked squares)



Place twelve queens on the board so that the fewest squares are attacked.

Our final puzzle, with thirteen queens, has a unique solution.

Queenfest 22 (fewest attacked squares)



Place thirteen queens on the board so that seven squares are not attacked.

The same task in different words: “Place thirteen queens on the board so that the fewest squares are attacked.”

Next month, *Queenfest VII*.

Mariya Muzychuk
2015 World Women's Chess Champion

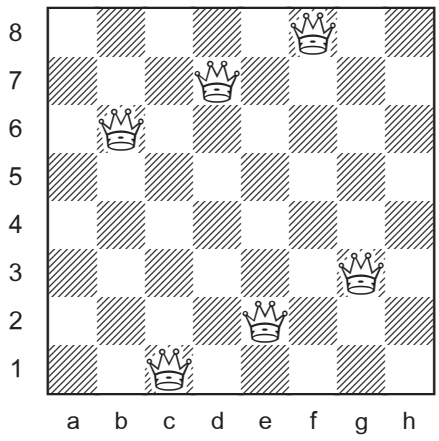
SOLUTIONS

Puzzles 19, 20c, 21, 22 are by J. Coakley. 20c is from *Winning Chess Puzzles For Kids Volume 2* (2010), the others *ChessCafe.com* (2015). Solutions for 19, 21, 22 were generated and/or verified with Caisay 4.1.

PDF hyperlinks. You can advance to the solution of any puzzle by clicking on the underlined title above the diagram. To return to the puzzle, click on the title above the solution diagram.

Queenfest 19

(six queens, independent domination)



No queen is defended. Every empty square is attacked.

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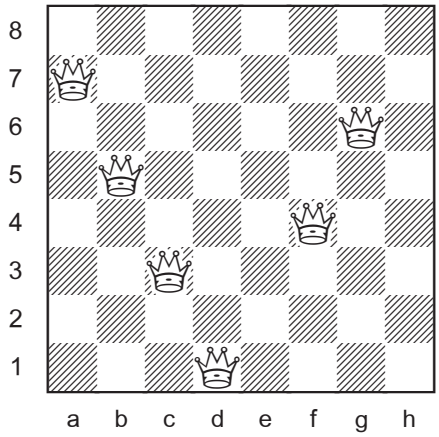
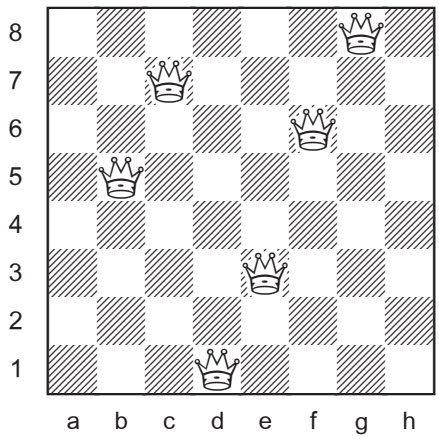
There are 871 patterns. All have a queen on the edge of the board. Thirteen patterns are symmetrical (as in the diagram above). Two non-symmetrical positions are given below.





The thirteen symmetrical patterns.
Qa3 Qb1 Qc7 Qf2 Qg8 Qh6
Qa3 Qb1 Qd7 Qe2 Qg8 Qh6
Qa4 Qb1 Qd6 Qe3 Qg8 Qh5
Qa4 Qb1 Qc7 Qf2 Qg8 Qh5
Qa4 Qb1 Qd2 Qe7 Qg8 Qh5
Qa5 Qb1 Qd7 Qe2 Qg8 Qh4
Qa5 Qb1 Qd6 Qe3 Qg8 Qh4
Qa6 Qb1 Qd2 Qe7 Qg8 Qh3
Qa6 Qb1 Qc7 Qf2 Qg8 Qh3
Qb1 Qc5 Qd7 Qe2 Qf4 Qg8
Qa4 Qb6 Qc1 Qf8 Qg3 Qh5
Qb6 Qc1 Qd7 Qe2 Qf8 Qg3 (first diagram)
Qb6 Qc4 Qd1 Qe8 Qf5 Qg3

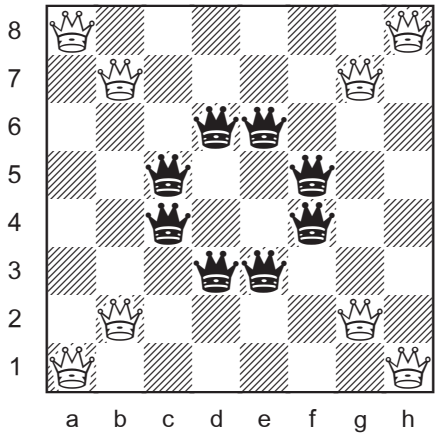
For a tougher challenge, try the same task with five queens. The solution, published by Carl Jaenish in 1863, can be found in column 6.

Queenfest 20 (no captures)

20a

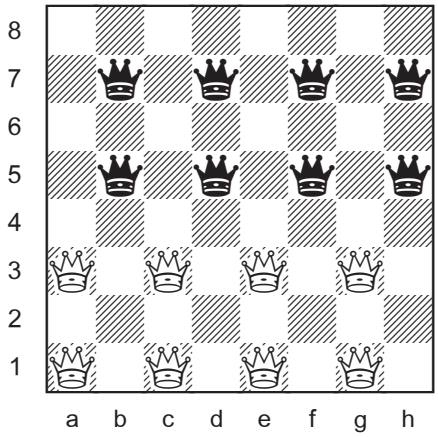
Robert Bosch 1999

Optima



Eight queens of each colour, no possible captures.

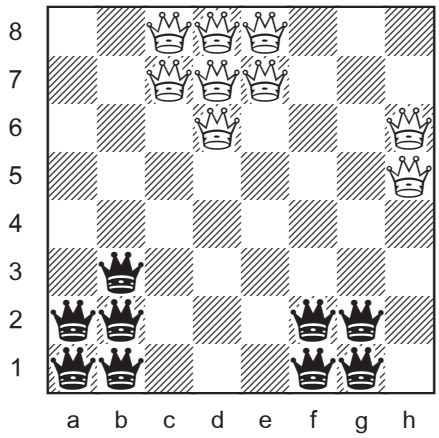
There are many solutions. The following diagram is from *Winning Chess Puzzles For Kids Volume 2* (2010).



20b

Frank Plastria 1999

Optima

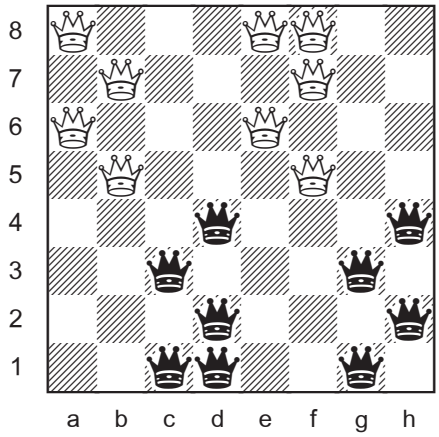


Nine queens of each colour, no possible captures.

There are many solutions. The one given below has an unusual symmetry.

Robert Bosch 1999

Optima

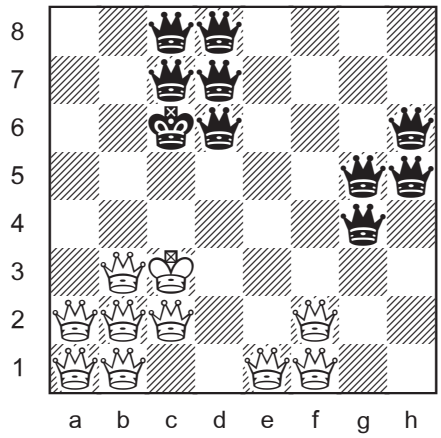


Nine queens of each colour, no possible captures.

The original source for “Peaceably Coexisting Armies of Queens” is *Optima*, the bulletin of the *Mathematical Programming Society* at the University of Florida.

The same task with ten queens of each colour is impossible.

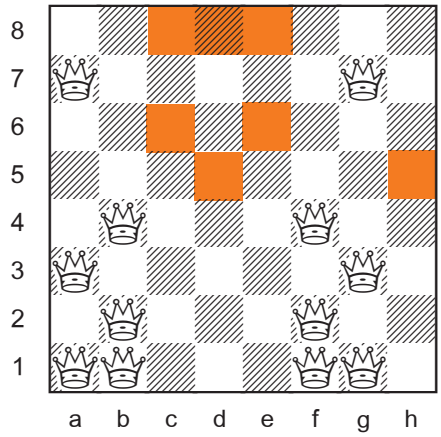
20c



Nine queens and one king of each colour,
with neither king in check and no possible captures.

There are many solutions.

Queenfest 21 (fewest attacked squares)



Twelve queens, 57 squares attacked.

The seven squares marked in orange are not attacked.

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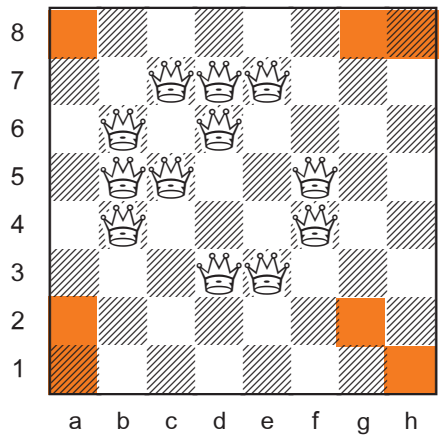
There are thirty-three patterns. Twenty are listed here. The other thirteen are generated by removing any piece from the thirteen queen pattern in *queenfest 22*. Asterisks indicate symmetry.

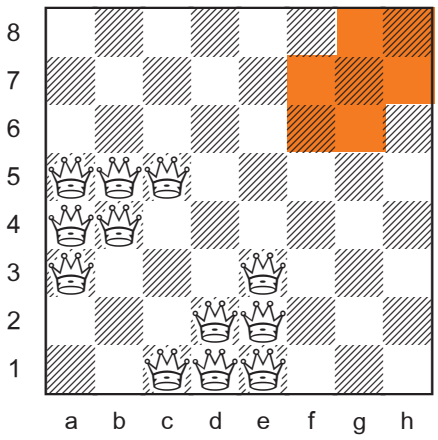
Qa1 Qa3 Qa7 Qb1 Qb2 Qb4 Qf1 Qf2 Qf4 Qg1 Qg3 Qg7
(first diagram)

Qa2 Qa5 Qa7 Qb1 Qb3 Qb7 Qc2 Qd1 Qd3 Qd5 Qg1 Qg2
Qa2 Qa4 Qa7 Qb1 Qb5 Qb7 Qc2 Qc4 Qe1 Qe2 Qe4 Qg1
Qb4 Qb5 Qb6 Qc5 Qc7 Qd3 Qd6 Qd7 Qe3 Qe7 Qf4 Qf5 *
(second diagram)

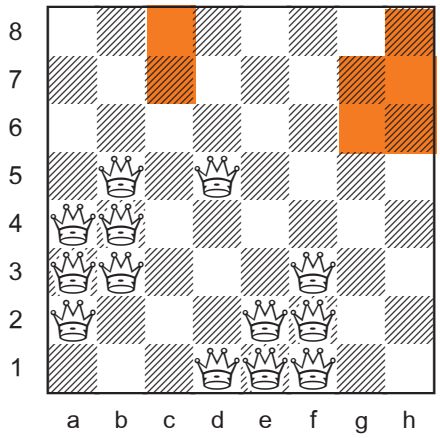
Qa3 Qa4 Qb1 Qb4 Qd1 Qd3 Qe1 Qe2 Qe4 Qf1 Qf2 Qf3
Qa3 Qa4 Qb4 Qb5 Qd1 Qd2 Qe1 Qe2 Qe4 Qf1 Qf2 Qf3
Qa3 Qa4 Qa5 Qc1 Qc5 Qd1 Qd2 Qe1 Qe2 Qe3 Qf1 Qf2
Qa1 Qa3 Qa7 Qb1 Qb2 Qb7 Qc2 Qc3 Qc7 Qd3 Qf1 Qf2
Qa3 Qa4 Qb1 Qb4 Qb5 Qd1 Qd2 Qd3 Qe1 Qe2 Qe3 Qe4
Qa2 Qa3 Qa4 Qb3 Qb4 Qb5 Qd1 Qd2 Qd5 Qe1 Qe2 Qe3
Qa2 Qa3 Qa4 Qd1 Qd2 Qd5 Qe1 Qe2 Qe3 Qf1 Qf2 Qf3
Qa3 Qa4 Qa5 Qc1 Qc2 Qc5 Qd1 Qd2 Qd3 Qe1 Qe2 Qe3
Qa3 Qa4 Qa5 Qb4 Qb5 Qc1 Qc5 Qd1 Qd2 Qe1 Qe2 Qe3 *
(third diagram)

Qa3 Qa4 Qa5 Qb1 Qb4 Qb5 Qc1 Qc5 Qd1 Qd3 Qe1 Qe3
Qa2 Qa3 Qa4 Qb3 Qb4 Qb5 Qe1 Qe2 Qe3 Qf1 Qf2 Qf3
Qa2 Qa3 Qa4 Qb1 Qb3 Qb4 Qe1 Qe2 Qe4 Qf1 Qf2 Qf3
Qa1 Qa3 Qa4 Qb2 Qb4 Qd1 Qd4 Qe1 Qe2 Qf1 Qf2 Qf3
Qa1 Qa2 Qa3 Qb2 Qb3 Qb4 Qd1 Qd4 Qe1 Qe2 Qf1 Qf2
Qa1 Qa2 Qb1 Qb2 Qb3 Qc2 Qc3 Qc4 Qf1 Qf2 Qg1 Qg2
Qa1 Qa2 Qa3 Qa4 Qb2 Qb3 Qb4 Qe1 Qe2 Qf1 Qf2 Qf3





Queenfest 22 (fewest attacked squares)



Thirteen queens, 57 squares attacked.
Seven squares are not attacked (marked in orange).

This unique pattern exactly corresponds to the unique pattern for **seven** queens with **thirteen** unattacked squares. See *queenfest 08* in column 63.

[A similar problem by Danish composer Vilhelm Ropke (1892-1978), published in Skakbladet in 1944, had this stipulation:

"Place 13 white queens and 7 black queens on the board so that no queen is attacked by a queen of the opposite colour."

The solution is the same, with black queens placed on the orange squares.]

An updated Queenfest chart is given on the next page. Asterisks indicate unique patterns.

Values for most and fewest moves with twelve and thirteen queens have been included. Each of these four tasks has a unique solution. They are also the only values in the chart which have not been verified by computer. Computation time is several months!?

I believe my findings are accurate. But cook me if you can!

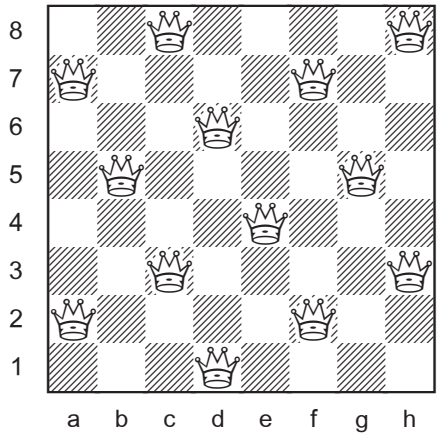
Twelve queens, 236 moves.
Qa5 Qb2 Qb7 Qc4 Qd1 Qd6 Qe3 Qe8 Qf5 Qg2 Qg7 Qh4
All queens are a knight-jump apart. The pattern is symmetrical.

Twelve queens, 68 moves.
Qa1 Qa2 Qa3 Qb1 Qb2 Qb3 Qc1 Qc2 Qc3 Qd1 Qd2 Qd3
The pattern is symmetrical.

Thirteen queens, 243 moves.

Qa2 Qa7 Qb5 Qc3 Qc8 Qd1 Qd6
Qe4 Qf2 Qf7 Qg5 Qh3 Qh8 (diagram)

All queens are a knight-jump apart. Though not symmetrical, the pattern does have a pleasing appearance.



Thirteen queens, 67 moves.

Qa1 Qa2 Qa3 Qb1 Qb2 Qb3 Qb4
Qc1 Qc2 Qc3 Qc4 Qd2 Qd3

The pattern is symmetrical.

Paradoxically, the fewest moves for thirteen queens is less than for twelve queens.

♕	MOVES		SQUARES ATTACKED			
number of queens	most	fewest	most	most *Qs unguarded*	fewest	fewest *Qs unguarded*
1	27*	21	27*	27*	21	21
2	52	34	44*	42	33	34
3	77*	41*	54*	52	39	43
4	100	44*	61	58	40*	48
5	123	51*	64	59	47	52*
6	144	54*		58	49	54
7	163	57*		57	51*	56
8	182	59*		56	53	56
9	201	61*			54	
10	214*	64*			55	
11	225*	66			56	
12	236*	68*			57	
13	243*	67*			57*	

Until next time!