



THE PUZZLING SIDE OF CHESS

Jeff Coakley

QUEENFEST IV: BREAKING FREE

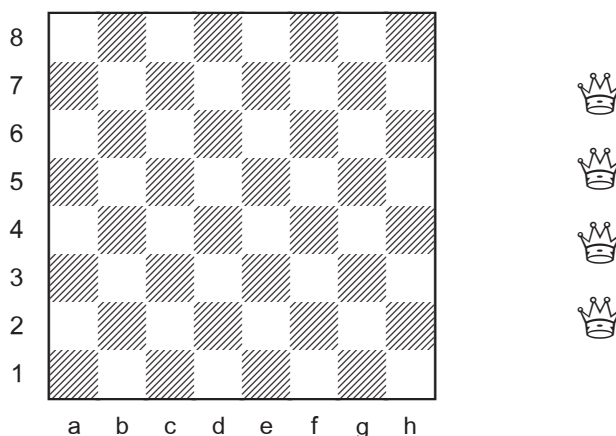
number 87

March 27, 2015

Continuing from past columns, we present several new puzzles involving multiple queens. The task is to arrange the queens on the board to achieve certain goals.

For the first puzzle, an 'edge square' is defined as any square along the side of the board (a- or h-file, 1st or 8th rank).

Queenfest 11 (four queens)



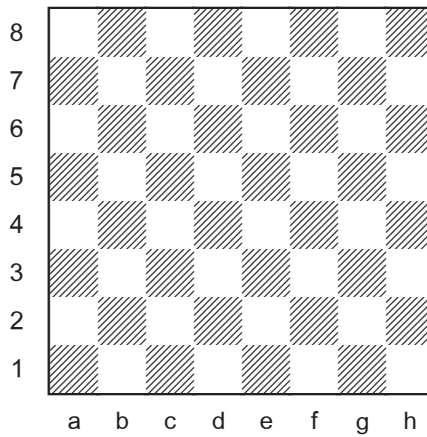
Place four queens on the board so that ...

- 11a. all edge squares are attacked except the four corners.
- 11b. the most edge squares are attacked, without placing any queen on the edge.
- 11c. all squares on both long diagonals are attacked, without placing any queen on a long diagonal.

Earlier *Queenfests* can be found in the archives: [A Royal Heyday](#) (59), [Second to None](#) (60), [We Will Rock You](#) (63).

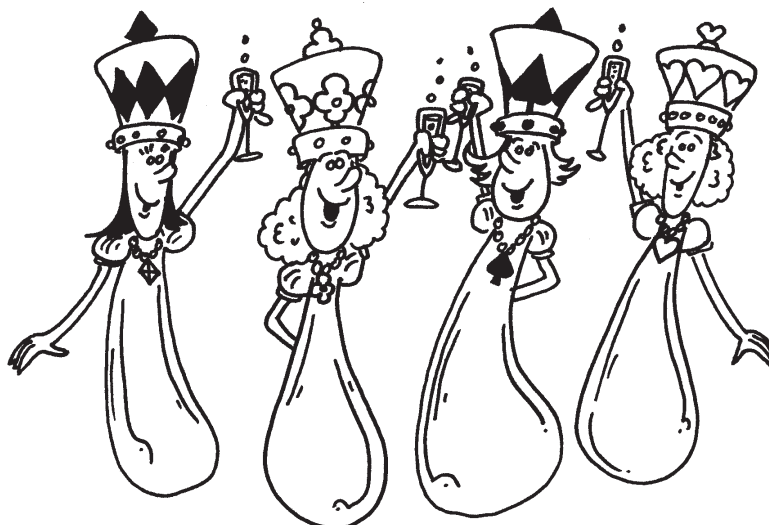
The next puzzle explores the limits of queen mobility.

Queenfest 12 (most moves)



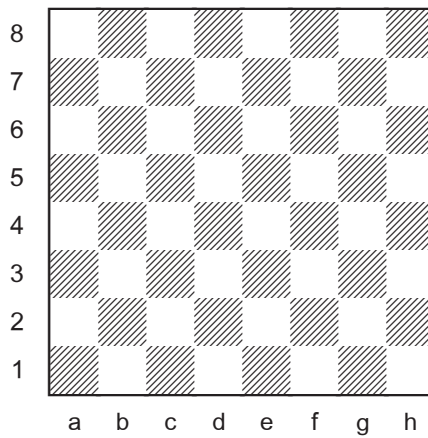
Place the specified number of queens on the board so that they have the most total moves.

- 12a. two queens 
- 12b. three queens 
- 12c. four queens 
- 12d. five queens 
- 12e. six queens 
- 12f. seven queens 
- 12g. eight queens 
- 12h. nine queens 
- 12i. ten queens 



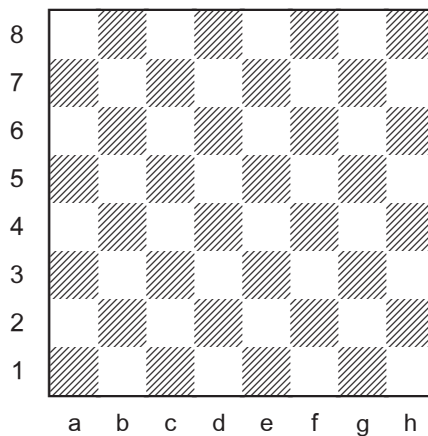
A toast to springtime!

Queenfest 13 (maximum moves)



Place any number of queens on the board so that the total number of possible moves is the maximum.

Queenfest 14 (five pair defence)



Place ten queens on the board so that every queen is defended exactly once.

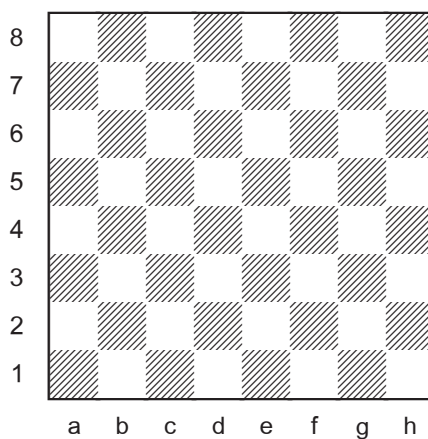
This is not a defensive loop problem. The queens will not (cannot) form a continuous chain of defence.

In previous columns, there were puzzles with up to nine queens where the task was to attack the fewest squares. Let's move on to ten.



Judit Polgar, the reigning queen of chess.

Queenfest 15 (fewest attacked squares)



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

Next month, Queenfest V.

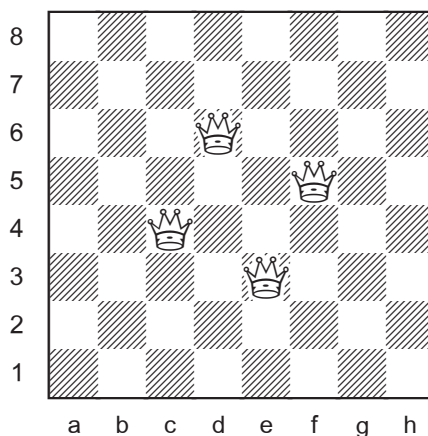
SOLUTIONS

Except for problems 13 and 14, all puzzles are by J. Coakley, *ChessCafe.com* (2015). Solutions for problems 12, 14, and 15 were verified or determined with the wizardry of Caisay 4.1, a computer program written by Adrian Storisteanu of Toronto.

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 11 (four queens)

11a



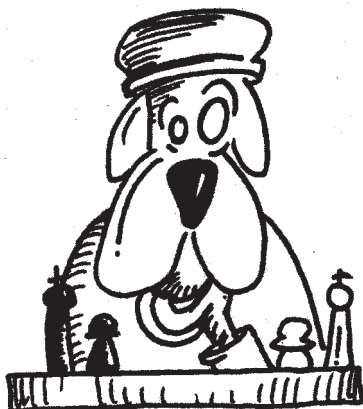
All edge squares are attacked except the four corners.

There are also two other solutions:

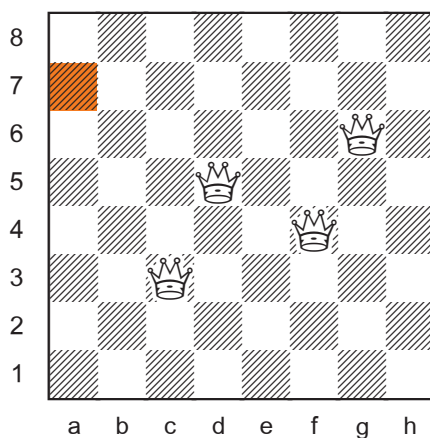
Qb3 Qc7 Qf2 Qg6

Qb4 Qd7 Qe2 Qg5

Compare with *queenfest 4e*, column 60.



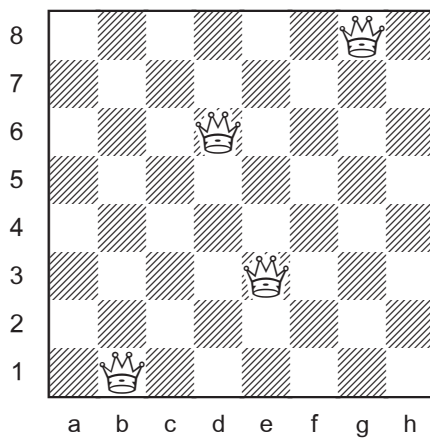
11b



All edge squares are attacked except a7.

Based on my analysis, this pattern is unique.

11c



All squares on both long diagonals are attacked.

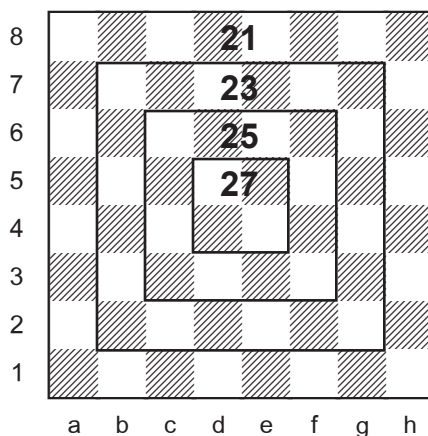
There are many solutions. Here are two others:

Qa5 Qc7 Qf2 Qh4

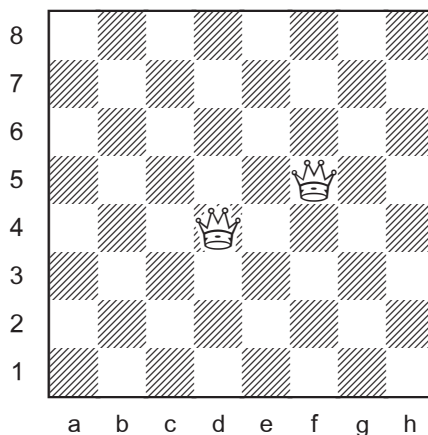
Qa5 Qd7 Qe2 Qh4

Queenfest 12 (most moves)

The number of possible moves for an unobstructed queen varies according to which “frame” she stands on.



12a



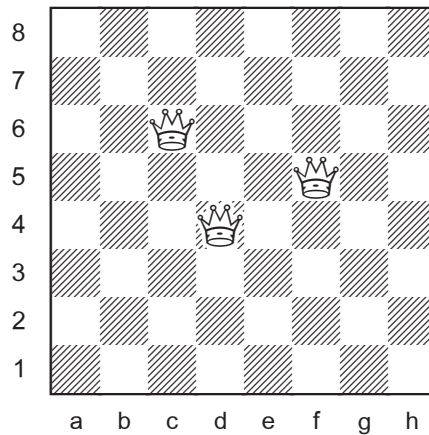
Two queens: 52 moves
(27 + 25)

There are two patterns, rotatable and reflectible.

Qd4 Qf5 (diagram)

Qd4 Qc6

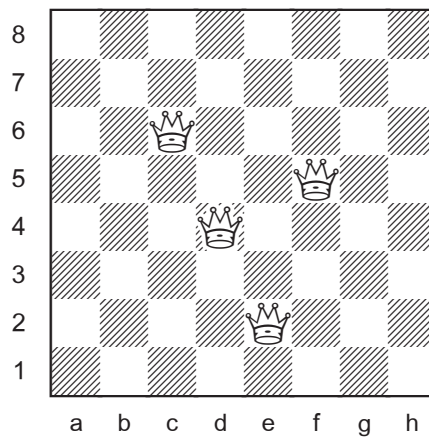
12b



Three queens: 77 moves
(25 + 27 + 25)

Unique pattern, rotatable and reflectible.

12c



Four queens: 100 moves
(25 + 27 + 23 + 25)

There are five patterns:

Qc6 Qd4 Qe2 Qf5 (diagram)

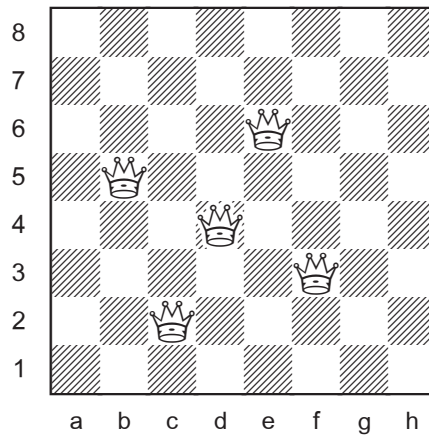
Qb3 Qc6 Qd4 Qf5

Qc6 Qd4 Qe7 Qf5

Qc6 Qd4 Qf5 Qg3

Qc4 Qd6 Qe3 Qf5 (same position as diagram 11a).

12d



Five queens: 123 moves
(23 + 23 + 27 + 25 + 25)

There are five patterns:

Qb5 Qc2 Qd4 Qe6 Qf3 (diagram)

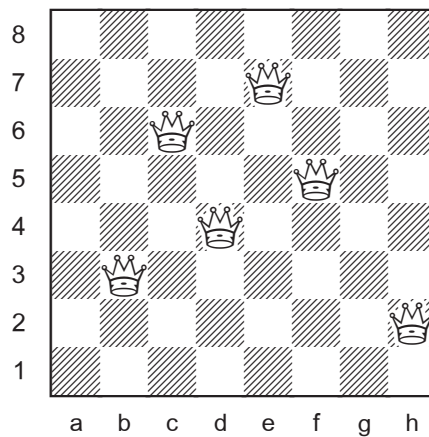
Qc6 Qd4 Qe2 Qf5 Qg3

Qc6 Qd4 Qe7 Qf5 Qg3

Qc2 Qd4 Qe6 Qf3 Qg5

Qb2 Qc5 Qd3 Qe6 Qf4 (no central queen)

12e



Six queens: 144 moves
(23 + 25 + 27 + 23 + 25 + 21)

There are four patterns:

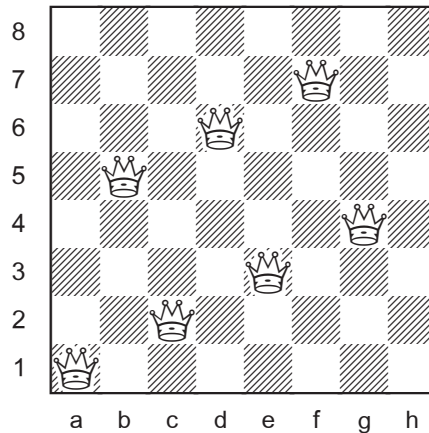
Qb3 Qc6 Qd4 Qe7 Qf5 Qh2 (diagram)

Qa2 Qc6 Qd4 Qe7 Qf5 Qg3

Qb2 Qc5 Qd3 Qe6 Qf4 Qh1

Qa1 Qc5 Qd3 Qe6 Qf4 Qg2

12f



Seven queens: 163 moves
 (21 + 23 + 23 + 25 + 25 + 23 + 23)

There are twenty patterns.

Qa1 Qb5 Qc2 Qd6 Qe3 Qf7 Qg4 (diagram)

Qa1 Qb6 Qc2 Qd5 Qe7 Qf4 Qh3

Qa1 Qb6 Qc4 Qd2 Qe7 Qf5 Qg3

Qa1 Qb7 Qc5 Qd3 Qe6 Qf4 Qg2

Qa1 Qc5 Qd3 Qe6 Qf4 Qg2 Qh8

Qa3 Qb1 Qc6 Qd2 Qe5 Qf7 Qg4

Qa4 Qb1 Qc5 Qd2 Qe6 Qf3 Qg7

Qb1 Qc5 Qd2 Qe6 Qf3 Qg7 Qh4

Qa3 Qb1 Qc6 Qd4 Qe2 Qf7 Qg5

Qa5 Qb1 Qc6 Qd4 Qe2 Qf7 Qg3

Qb1 Qc6 Qd4 Qe2 Qf7 Qg5 Qh3

Qa6 Qb1 Qc3 Qd5 Qe7 Qf2 Qg4

Qb1 Qc3 Qd5 Qe7 Qf2 Qg4 Qh6

Qa5 Qb1 Qc4 Qd7 Qe3 Qf6 Qg2

Qb1 Qc4 Qd7 Qe3 Qf6 Qg2 Qh5

Qa5 Qb3 Qc1 Qd6 Qe4 Qf2 Qg7

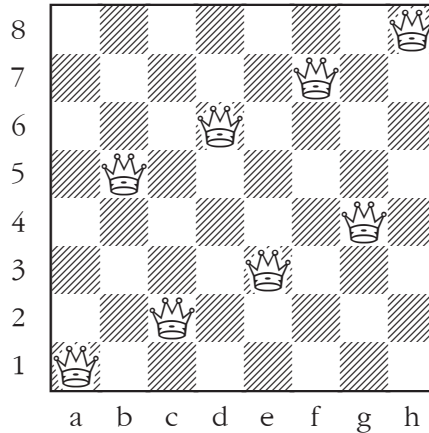
Qb3 Qc1 Qd6 Qe4 Qf2 Qg7 Qh5

Qb5 Qc1 Qd6 Qe4 Qf2 Qg7 Qh3

Qa4 Qb6 Qc1 Qd3 Qe5 Qf7 Qg2

Qb6 Qc1 Qd3 Qe5 Qf7 Qg2 Qh4

12g



Eight queens: 182 moves
 (20 + 23 + 23 + 25 + 25 + 23 + 23 + 20)

There are twenty patterns.

Qa1 Qb5 Qc2 Qd6 Qe3 Qf7 Qg4 Qh8 (diagram)

Qa1 Qb5 Qc2 Qd6 Qe3 Qf7 Qg4 Qh1

Qa1 Qb6 Qc4 Qd2 Qe7 Qf5 Qg3 Qh1

Qa1 Qb6 Qc4 Qd2 Qe7 Qf5 Qg3 Qh8

Qa1 Qb7 Qc5 Qd3 Qe6 Qf4 Qg2 Qh8

Qa4 Qb1 Qc5 Qd2 Qe6 Qf3 Qg7 Qh4

Qa4 Qb1 Qb8 Qc5 Qd2 Qe6 Qf3 Qg7

Qb1 Qb8 Qc5 Qd2 Qe6 Qf3 Qg7 Qh4

Qa3 Qb1 Qc6 Qd4 Qe2 Qf7 Qg5 Qh3

Qa3 Qb1 Qb8 Qc6 Qd4 Qe2 Qf7 Qg5

Qb1 Qb8 Qc6 Qd4 Qe2 Qf7 Qg5 Qh3

Qa6 Qb1 Qc3 Qd5 Qe7 Qf2 Qg4 Qh6

Qa5 Qb1 Qc4 Qd7 Qe3 Qf6 Qg2 Qh5

Qa5 Qb3 Qc1 Qd6 Qe4 Qf2 Qg7 Qh5

Qa5 Qb3 Qc1 Qc8 Qd6 Qe4 Qf2 Qg7

Qb3 Qc1 Qc8 Qd6 Qe4 Qf2 Qg7 Qh5

Qa4 Qb6 Qc1 Qd3 Qe5 Qf7 Qg2 Qh4

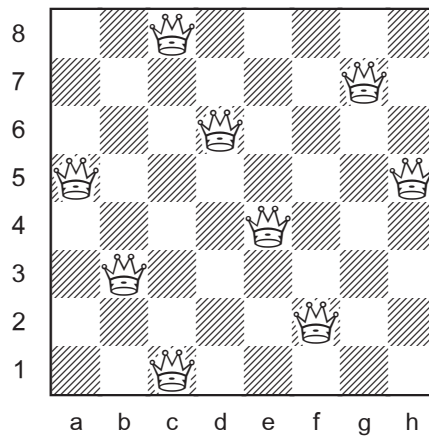
Qa7 Qb1 Qc3 Qd8 Qe6 Qf4 Qg2 Qh5 *

Qa1 Qb7 Qc5 Qd8 Qe2 Qf4 Qg6 Qh3 *

Qa1 Qb7 Qc4 Qd6 Qe8 Qf2 Qg5 Qh3 *

*The last three patterns are also solutions for the classic eight queen puzzle (no queen attacked).

12h



Nine queens: 201 moves
(20 + 23 + 23 + 25 + 25 + 23 + 23 + 20)

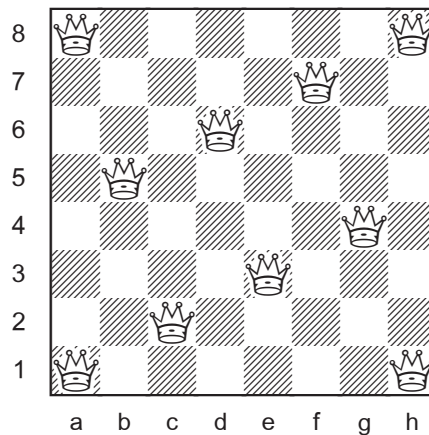
There are three patterns.

Qa5 Qb3 Qc1 Qc8 Qd6 Qe4 Qf2 Qg7 Qh5 (diagram)

Qa4 Qb1 Qb8 Qc5 Qd2 Qe6 Qf3 Qg7 Qh4

Qa3 Qb1 Qb8 Qc6 Qd4 Qe2 Qf7 Qg5 Qh3

12i



Ten queens: 214 moves
(18 + 18 + 23 + 23 + 25 + 25 + 23 + 23 + 18 + 18)

A unique symmetrical pattern. It can be reflected left to right and rotated 90° for a total of four “different” solutions.

Qa1 Qa8 Qb5 Qc2 Qd6 Qe3 Qf7 Qg4 Qh1 Qh8

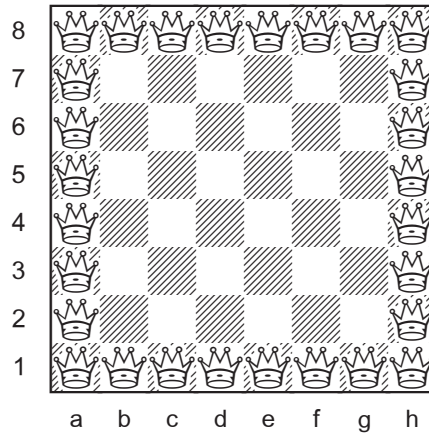
Compare with *queenfest 6c*, column 60.

Queenfest 13 (maximum moves)

Nenad Petrovic 1946

Fairy Chess Review

version by J. Coakley 2015



Twenty-eight queens: 288 moves
(24 x 11) + (4 x 6)

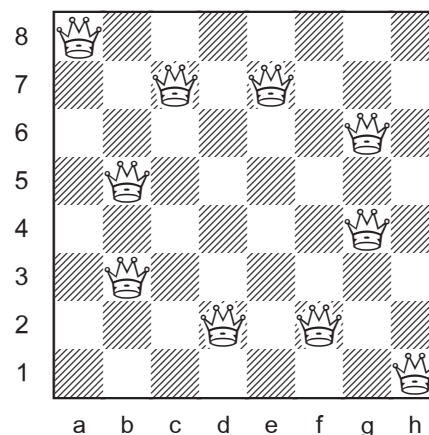
The maximum total moves for any number of queens (of one colour).
A very unique pattern!

The original Petrovic position had bishops in the four corners with the same number of moves (288), a record for any pieces of one colour in an illegal position.

Queenfest 14 (five pair defence)

B. Barwell 1981

Journal of Recreational Mathematics



Ten queens, each defended once.

The queens on a8 and h1 could be in any corner.

continued next page

There are forty-nine patterns. Selected examples:

Qa8 Qb3 Qb5 Qc7 Qd2 Qe7 Qf2 Qg4 Qg6 Qh1* (diagram)

Qa1 Qb3 Qb4 Qc7 Qd7 Qe2 Qf2 Qg5 Qg6 Qh8*

Qa5 Qb2 Qc4 Qd1 Qd6 Qe3 Qe8 Qf5 Qg7 Qh4*

Qa1 Qb2 Qc5 Qc7 Qd3 Qe8 Qf3 Qg8 Qh4 Qh6*

Qa1 Qb6 Qc4 Qd2 Qd7 Qe5 Qf3 Qf8 Qg6 Qh4*

Qa5 Qb2 Qc5 Qd1 Qd3 Qe6 Qe8 Qf4 Qg7 Qh4*

Qa1 Qa2 Qb4 Qb5 Qc8 Qd8 Qf3 Qg3 Qh6 Qh7

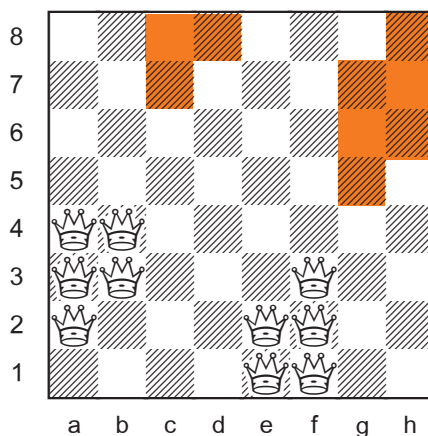
Qa1 Qb3 Qc8 Qd2 Qd6 Qe8 Qf3 Qg1 Qh4 Qh7

Qa4 Qa6 Qb1 Qb8 Qd2 Qe7 Qf2 Qg7 Qh3 Qh5

Qa5 Qb2 Qc5 Qd1 Qd3 Qe6 Qe8 Qf4 Qg2 Qh4

Asterisks indicate symmetrical arrangements. The task is impossible with six pairs of queens.

Queenfest 15 (fewest attacked squares)



Ten queens, 55 squares attacked

The nine squares marked in orange are not attacked.

There are three patterns.


Qa2 Qa3 Qa4 Qb3 Qb4 Qe1 Qe2 Qf1 Qf2 Qf3 (diagram)

Qa3 Qa4 Qa5 Qc1 Qc5 Qd1 Qd2 Qe1 Qe2 Qe3

Qa1 Qa2 Qa3 Qb2 Qb3 Qb4 Qe1 Qe2 Qf1 Qf2

These positions (**ten** queens, **nine** unattacked squares) exactly correspond to the three patterns for **nine** queens with **ten** unattacked squares. See *queenfest 10*, column 63. Just place queens on the unattacked squares. Cosmic.

Here is an updated version of the chart given in Queenfest III that adds “most moves” and includes values for ten queens. Asterisks indicate unique patterns.

	MOVES	SQUARES ATTACKED			
number of queens	most	most	most Qs <i>unguarded</i>	fewest	fewest Qs <i>unguarded</i>
1	27*	27*	27*	21	21
2	52	44	42	33	34
3	77*	54	52	39	43
4	100	61	58	40*	48
5	123	64	59	47	52*
6	144			49	54
7	163			51*	56
8	182			53	56
9	201			54	
10	214*			55	

Until next time!

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