

# THE PUZZLING SIDE OF CHESS

Jeff Coakley

## LOOPOLOGY IX

### Multi-Piece Single Loops, Part 2

number 170

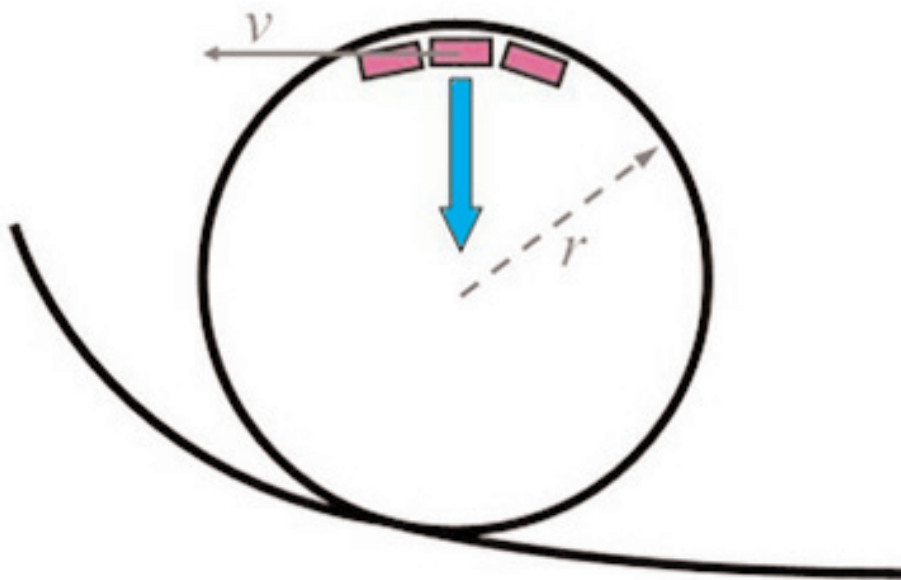
September 29, 2018

This penultimate column in the ten-part Loopology series covers all single loops with four or more pieces that include pawns.

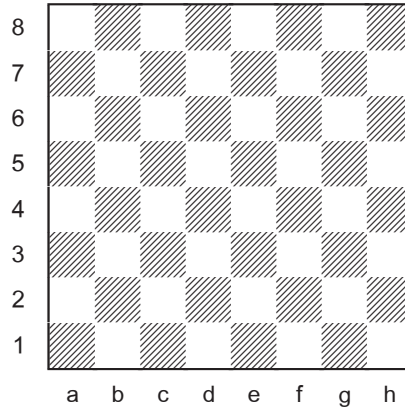
Perhaps it goes without saying, but in these tasks, pawns may not be placed on the 1st rank.

The following groups are unloopable because they contain a queen but no knight: KQRP, KQBP, QRBP, KQRBP. Any other combination works fine.








As usual, thanks to François Labelle for providing optimal solutions. An updated table showing the maximum piece count for single loops is given at the end.

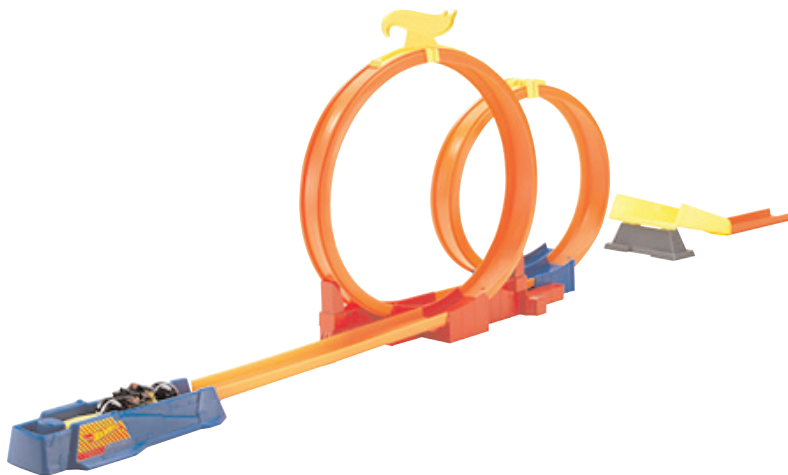


## Single Four Piece Loops with Pawns



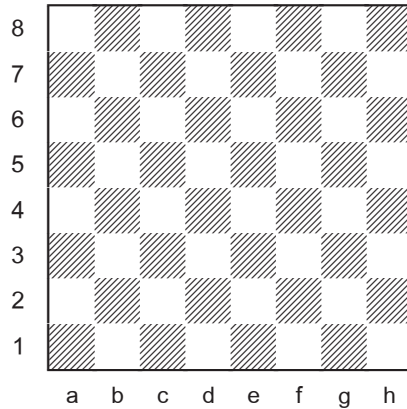
Place an equal number of each piece so that every piece is defended exactly once and every piece defends exactly one other. The chain of defence must form a continuous loop. A repeating sequence of pieces is not necessary. Can you match the record for maximum pieces (shown in parentheses)?

- A.  (24)
- B.  (20)
- C.  (20)
- D.  (16)
- E.  (12)
- F.  (12)
- G.  (12)



*Hot Wheels, Cool Loops*

## Single Five Piece Loops with Pawns



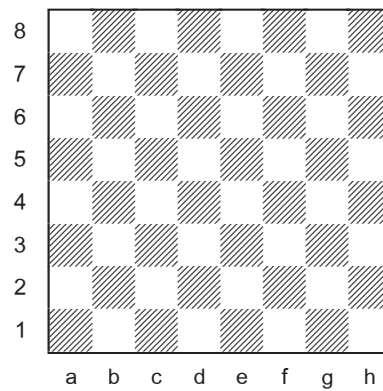
Place an equal number of each piece so that every piece is defended exactly once and every piece defends exactly one other. The chain of defence must form a continuous loop. A repeating sequence of pieces is not necessary. Can you match the record for maximum pieces (shown in parentheses)?

- A.  (20)
- B.  (15)
- C.  (15)
- D.  (15)



*Life-size Loops*

## Single Six Piece Loop



Place two of each piece (KQRBNP) so that every piece is defended exactly once and every piece defends exactly one other. The chain of defence must form a continuous loop. A repeating sequence of pieces is not necessary.



*Please Fasten Your Seat Belt*

## SOLUTIONS

**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.

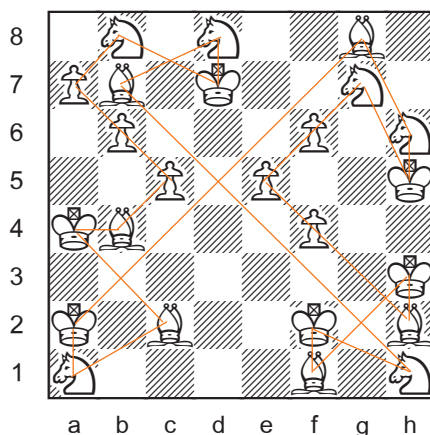
**Archives.** Past columns and a detailed index of problem-types and composers are available in the *Puzzling Side of Chess* archives.

### FOUR PIECES

#### A. Single KBNP Loop

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24 pieces, 6 each

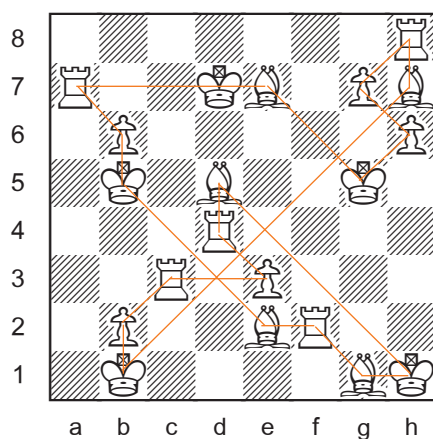
There are 803 solutions, none symmetrical. This total does not include positions with the same pattern that are reflections or rotations of a previously counted solution, a convention used for all problems.



## **B. Single KRBP Loop**

François Labelle 2018

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20 pieces, 5 each

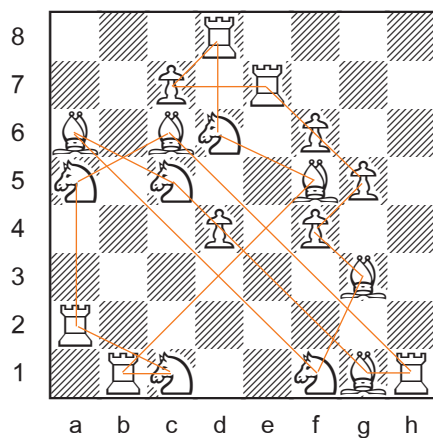
Only 2 solutions, neither symmetrical.

The second solution is: Re1 Kh1 Bh2 Pg3 Ph4 Pg5 Rh6 Bh5 Rf7 Kd7  
Pc7 Rb8 Bb7 Kd5 Bd4 Kb2 Pb3 Ra4 Bb4 Kd2

## **C. Single RBNP Loop**

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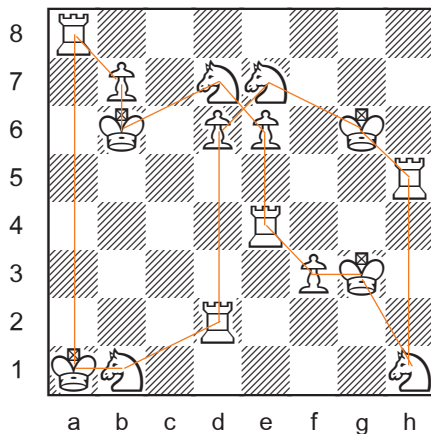


20 pieces, 5 each

87 solutions, none symmetrical.

### **D. Single KRNP Loop**

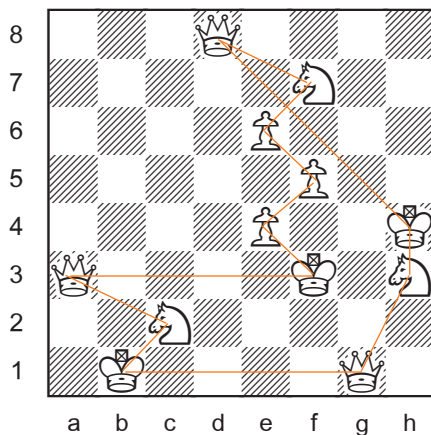
François Labelle 2018  
*Puzzling Side of Chess*



16 pieces, 4 each  
22,192 solutions, none symmetrical.

### **E. Single KQNP Loop**

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12 pieces, 3 each  
154 solutions, none symmetrical.

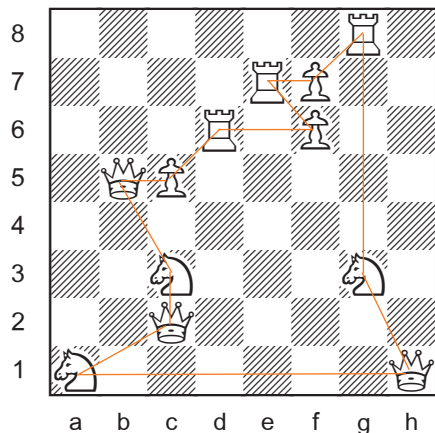


*Phoenix Beltway*

## **F. Single QRNP Loop**

François Labelle 2018

*Puzzling Side of Chess*



12 pieces, 3 each

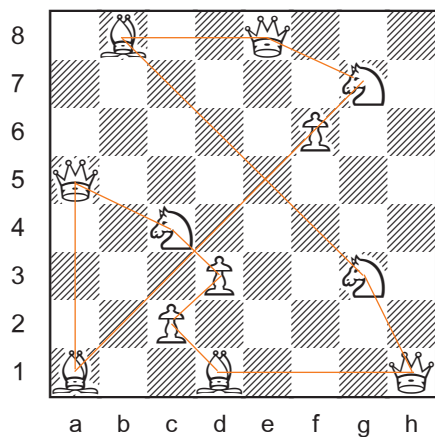
366 solutions, none symmetrical.



## **G. Single QBNP Loop**

François Labelle 2018

*Puzzling Side of Chess*



12 pieces, 3 each

231 solutions, none symmetrical.

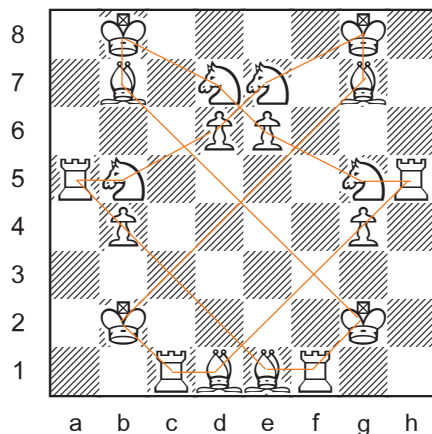


## FIVE PIECES

### **A. Single KRBNP Loop**

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*Puzzling Side of Chess*



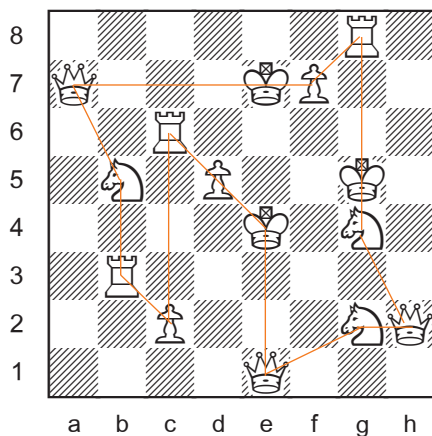
20 pieces, 4 each

10,125 solutions, with one symmetrical! Shown above.

### **B. Single KQRNP Loop**

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*Puzzling Side of Chess*



15 pieces, 3 each

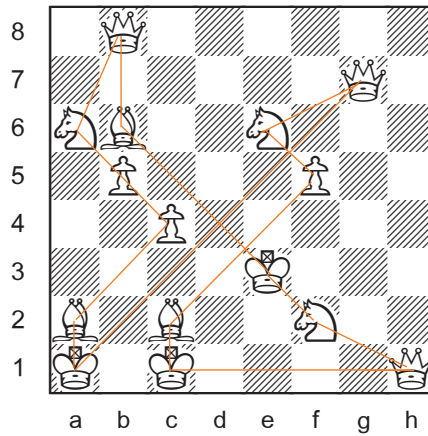
Only 2 solutions, neither symmetrical.

The second solution is almost identical to the diagrammed position. The only difference is that Pc2 and Ke4 switch places.

### C. Single KQBNP Loop

François Labelle 2018

*Puzzling Side of Chess*



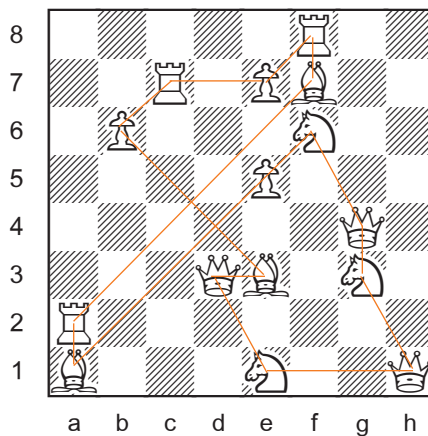
15 pieces, 3 each

296 solutions, none symmetrical.

### D. Single QRBNP Loop

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*Puzzling Side of Chess*



15 pieces, 3 each

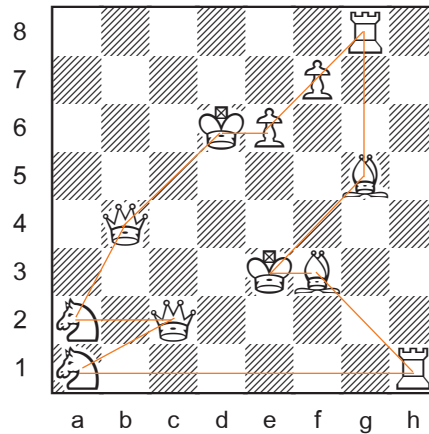
95 solutions, none symmetrical.



## Single Six Piece Loop

François Labelle 2018

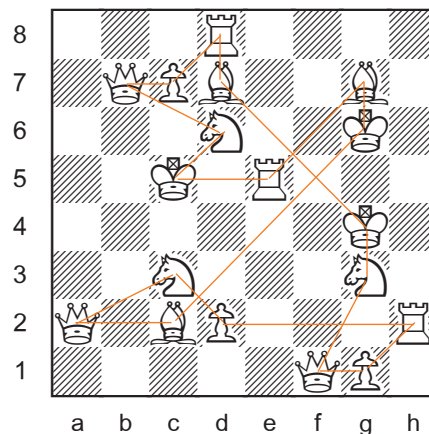
*Puzzling Side of Chess*



12 pieces, 2 each

193,162 solutions, none symmetrical.

The maximum number of pieces for this task, with an equal number of each piece and no pawns on the 1st rank, is 12. However, if pawns are allowed on the 1st rank, 18 pieces are possible.



18 pieces, 3 each

Unique solution!



## Maximum Pieces in Single Loop

Equal Number of Each Piece

BN	20	KBN	21	BNP	24	KRBN	20	KQRBN	15
KB	20	RBN	18	KNP	21	QRBN	12		
KN	20	KRB	15	RNP	18	KQRN	12	KRBNP	20
RN	16	KRN	15	QNP	15	KQBN	12	KQRNP	15
RB	14	KQN	12	RBP	15			KQBNP	15
QN	12	QBN	12	KRP	12	KBNP	24	QRBNP	15
KR	12	QRN	9			KRBP	20		
						RBNP	20	KQRBNP	12
RP	10					KRNP	16		
NP	8					KQNP	12		
						QRNP	12		
						QBNP	12		



*Hot Wheels Double Loop  
X Games, Los Angeles 2012  
loop height: 20 metres (66 feet)*

Until next time!

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