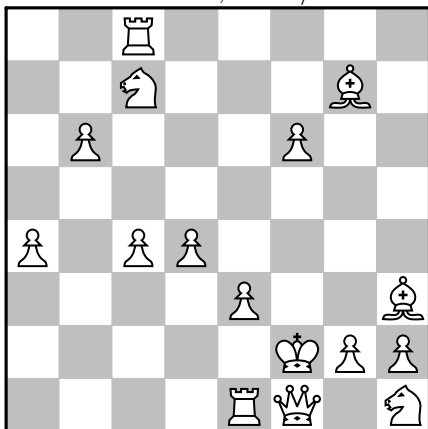


(4) Filip Bondarenko

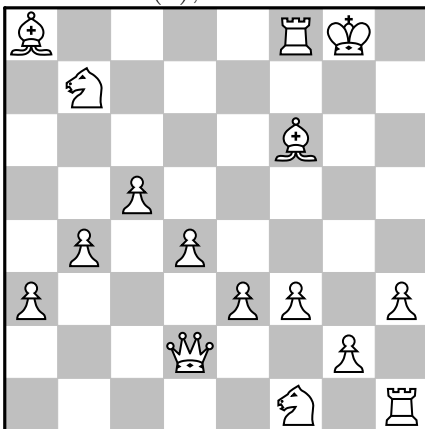
The Problemist, 1985/11



Add all black units for a legal position with no unit attacking an enemy unit. C+

(5) Filip Bondarenko

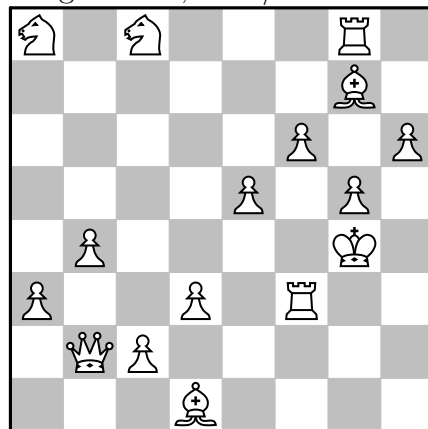
Theme 64 (v), 1986



Add all black units for a legal position with no unit attacking an enemy unit. C+

(6) Filip Bondarenko

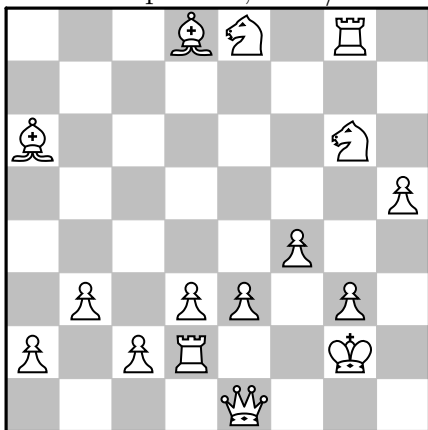
Diagrammes, 1986/05



Add all black units for a legal position with no unit attacking an enemy unit. C+

(7) Filip Bondarenko

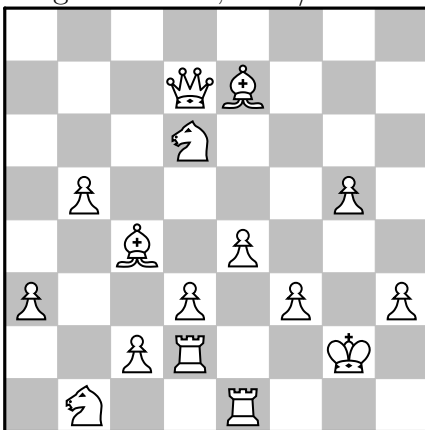
Rex Multiplex 20, 1986/10



Add all black units for a legal position with no unit attacking an enemy unit. C+

(8) Filip Bondarenko

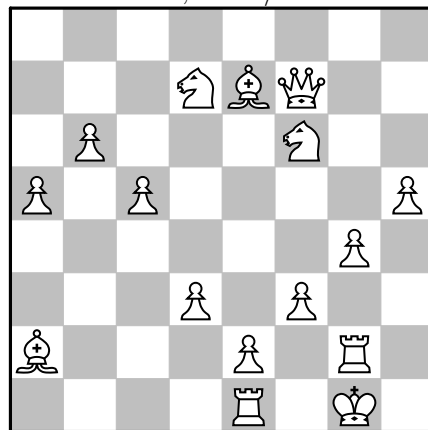
Diagrammes 87, 1987/10



Add all black units for a legal position with no unit attacking an enemy unit. C+

(9) Filip Bondarenko

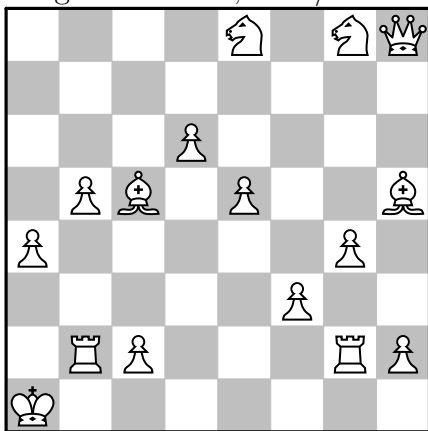
DieSchwalbe, 1987/12



Add all black units for a legal position with no unit attacking an enemy unit. C+

(10) Alain Brobecker

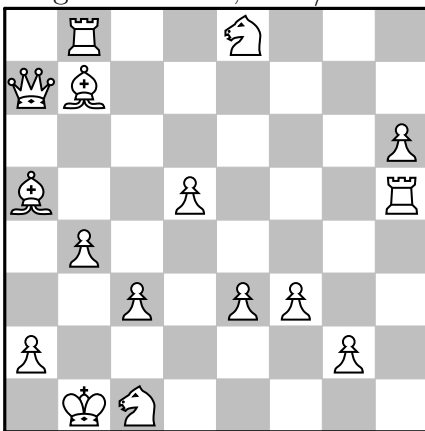
Diagrammes 159, 2006/10



Add all black units for a legal position with no unit attacking an enemy unit. C+

(11) Alain Brobecker

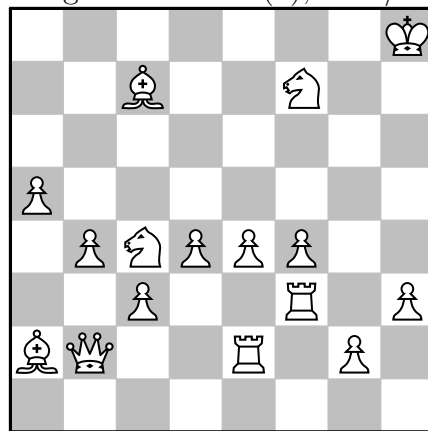
Diagrammes 160, 2007/01



Add all black units for a legal position with no unit attacking an enemy unit. C+

(12) Alain Brobecker

Tangente Jeux 23 (v), 2007/01



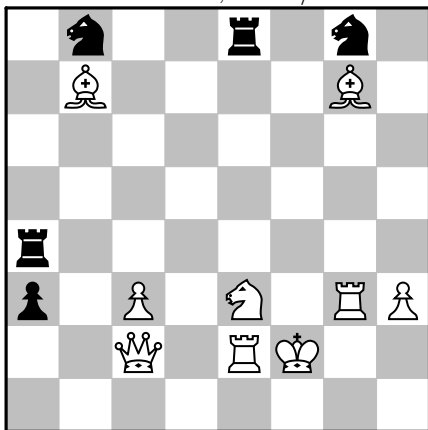
Add all black units for a legal position with no unit attacking an enemy unit. C+

At the time I spoke about this kind of problems to Cedric Lytton who was editor of *The Problemist*. He quickly composed **(13)** which is more original since it asks for pieces of both colours, and at last requires a small retro-analysis. This made it a more interesting fill-up problem. Cedric was kind enough to credit me as co-author when I was only a cook-finder (and a bad one since I discovered another cook after publication).

In 2021 I wrote a new program that was trying to solve fill-up problems, but this time allowing to have missing units in both side. And I undertook the task of searching the minimal amount of pieces that will allow to force all other ones with this constraints. I quickly got down to 8 pieces, thought it would be hard to decrease. But after some research I went down to 7 and really thought it couldn't be decreased and sent it to *The Problemist* magazine. Not so long after I succeeded in going down to 6 pieces **(16)**, and really this time I was sure, this was the absolute minimum! You can always expect fellow problemists to push the limit, and thus one year after, in july 2023 I received problem **(17)** by Dmitriy Baibikov showing 5 pieces! Knowing it's possible to search further is half the work, so I searched with the help of my program and found some problems with 4 pieces of which **(18)** is an example. I mentionned that this one was not meant for human solving, but Mu-Tsun Tsai proved me wrong as you can see in the solutions.

(13) Cedric Lytton, AB

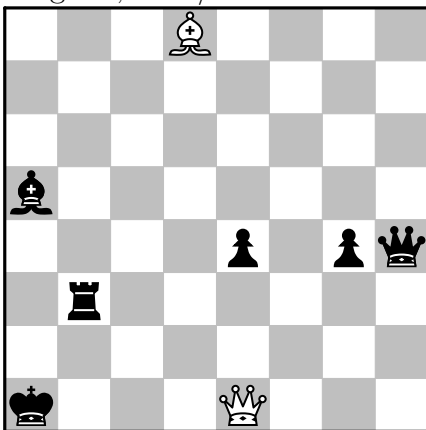
The Problemist, 2007/01



Add all remaining units for a legal position with no unit attacking an enemy unit. C+

(14) Alain Brobecker

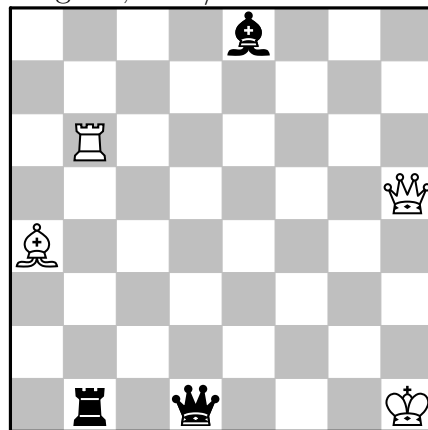
Original, 2021/08



Add all remaining units for a legal position with no unit attacking an enemy unit. C+

(15) Alain Brobecker

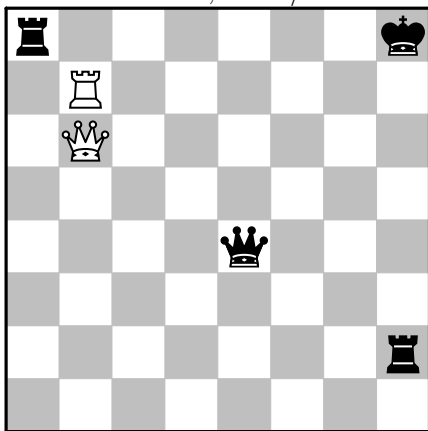
Original, 2021/09



Add all remaining units for a legal position with no unit attacking an enemy unit. C+

(16) Alain Brobecker

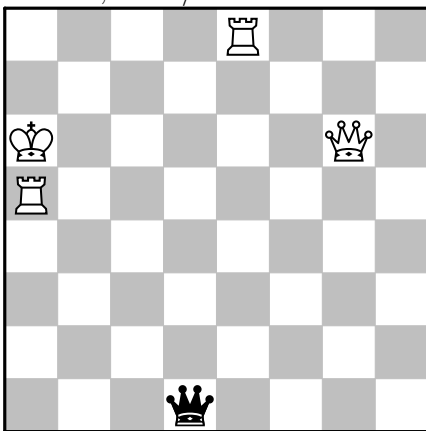
TheProblemist, 2022/03



Add all remaining units for a legal position with no unit attacking an enemy unit. C+

(17) Dmitriy Baibikov

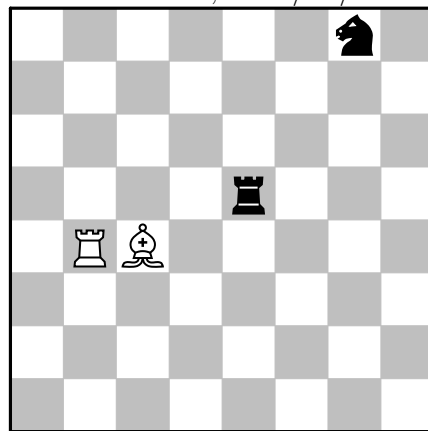
Phénix, 2023/12



Add all remaining units for a legal position with no unit attacking an enemy unit. C+

(18) Alain Brobecker

Discord CP&S, 2024/04/07

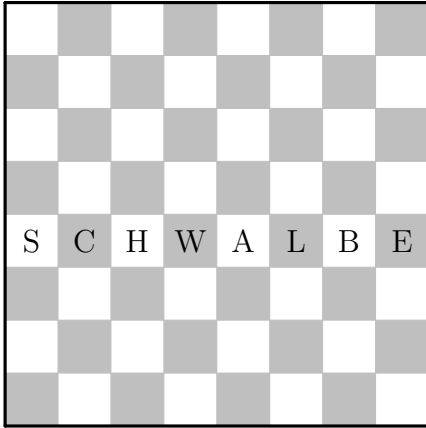


Add all remaining units for a legal position with no unit attacking an enemy unit. C+

Being a bit consistent in my errors, it's only a few weeks later that I made more extensive search with 3 pieces and then found 4 problems with 3 pieces only **(22)** to **(25)**. While at it I also checked for 2 pieces, but this time my program found no valid problems with so few pieces.

(19) Alain Brobecker

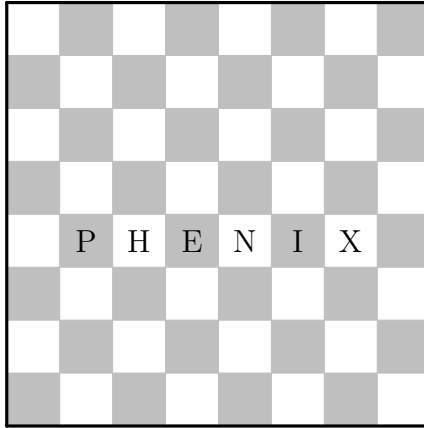
Dedicated to Dmitrij Baibikov
Die Schwalbe, 2024/04/07



Add all remaining units for a legal position with no unit attacking an enemy unit. C+

(20) Alain Brobecker

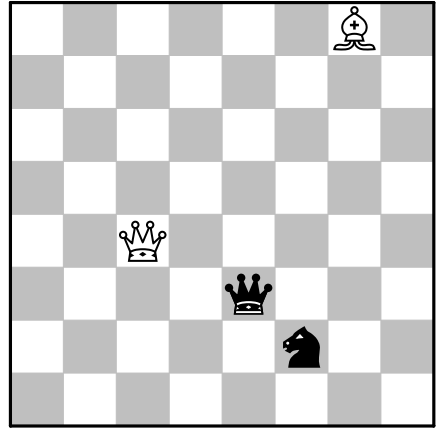
Phénix, 2024/04/07



Add all remaining units for a legal position with no unit attacking an enemy unit. C+

(21) Alain Brobecker

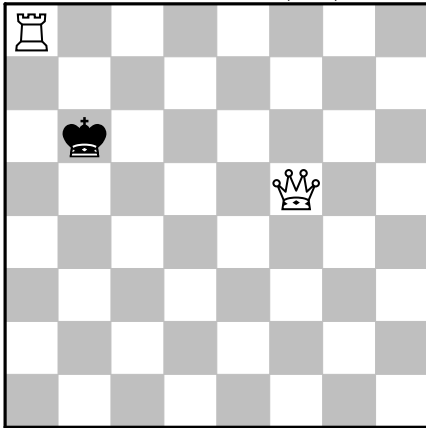
Original, 2024/04/07



Add all remaining units for a legal position with no unit attacking an enemy unit. C+

(22) Alain Brobecker

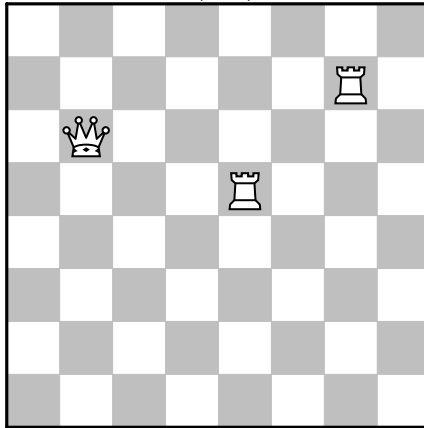
Discord CP&S, 2024/05/22



Add all remaining units for a legal position with no unit attacking an enemy unit. C+

(23) Alain Brobecker

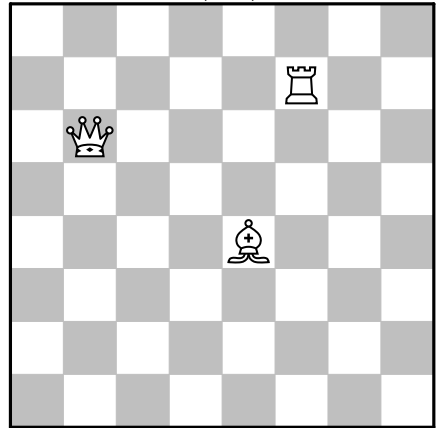
Original, 2024/06/05



Add all remaining units for a legal position with no unit attacking an enemy unit. C+

(24) Alain Brobecker

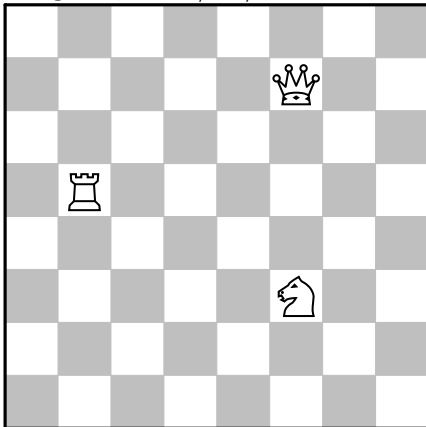
Original, 2024/06/05



Add all remaining units for a legal position with no unit attacking an enemy unit. C+

(25) Alain Brobecker

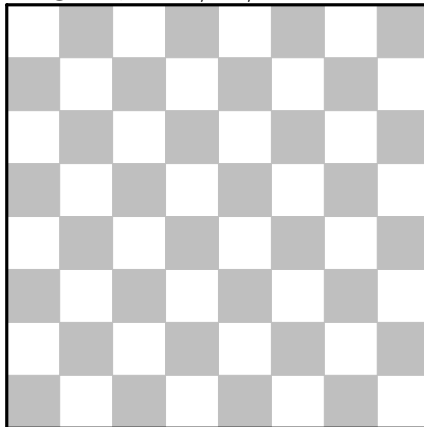
Original, 2024/06/05



Add all remaining units for a legal position with no unit attacking an enemy unit. C+

(26) Alain Brobecker

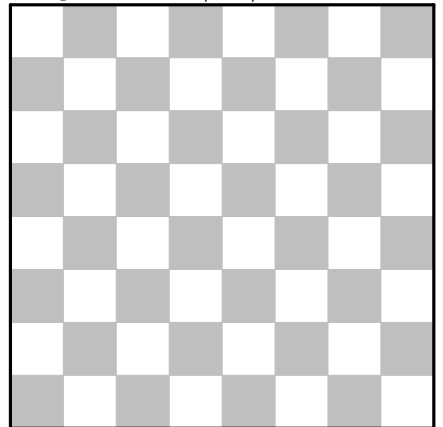
Original, 2024/06/06



Add all remaining units for a legal position with no unit attacking an enemy unit. C+

(27) Alain Brobecker

Original, 2024/06/06



Add all remaining units for a legal position with no unit attacking an enemy unit. C+

(13) by Cedric Lytton being the problem containing the most retro-analysis, I also made some variant chess problems to try to have more interesting retrograde analysis, (15) is an example of those.

Chess960:

Shrink Chess: An edge file or rank disappears if unoccupied (Joseph Boyer, 1954).

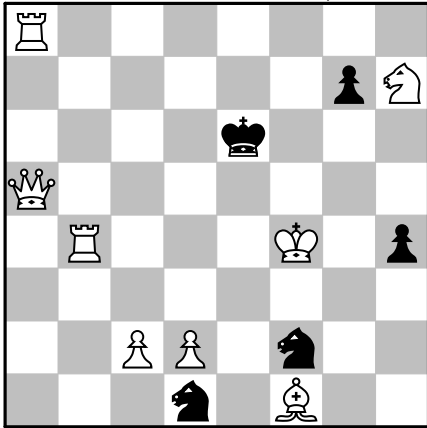
Vertical Cylinder Chess:

Nightrider Chess:

(28) Alain Brobecker

Dedicated to Per Olin

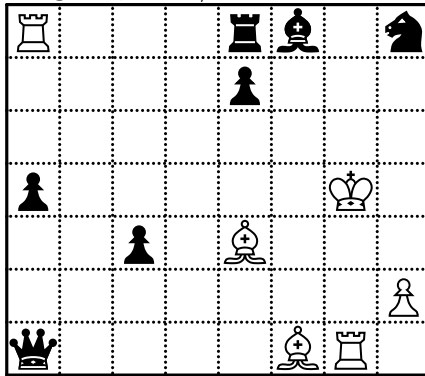
Die Schwalbe 315, 2022/06



Add all remaining units for a legal position with no unit attacking an enemy unit. Chess960
What was the start position?

(29) Alain Brobecker

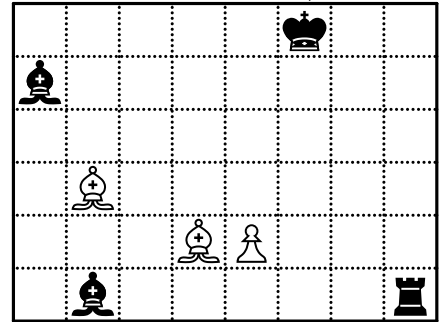
Original, 2021/11



Add all remaining units for a legal position with no unit attacking an enemy unit. Shrink Chess
Which rank was discarded?

(30) Alain Brobecker

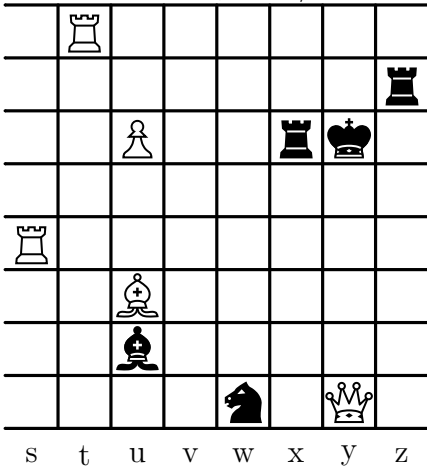
The Problemist, 2022/07



Add all remaining units for a legal position with no unit attacking an enemy unit. Shrink Chess
Which ranks were discarded?

(31) Alain Brobecker

The Problemist, 2023/01

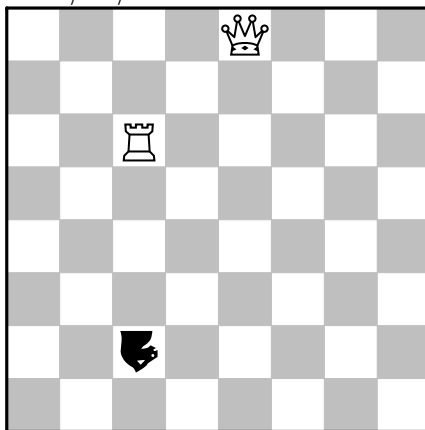


Add all remaining units for a legal position with no unit attacking an enemy unit. The vertical cylinder board has been shifted sideways. Which is the a-file?

(32) Alain Brobecker

Discord CP&S

Dedicated to Dmitri Turevski, 2024/06/07

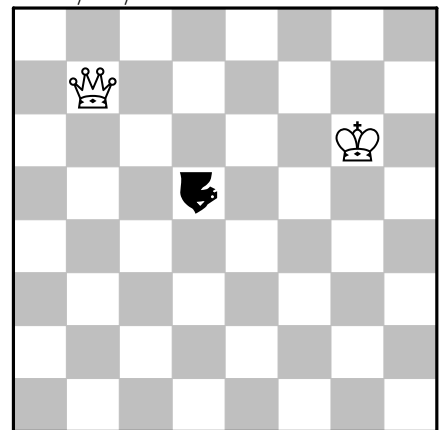


Add all remaining units for a legal position with no unit attacking an enemy unit. Nightriders instead of kNights

(33) Alain Brobecker

Original

Dedicated to Dmitri Turevski, 2024/06/07

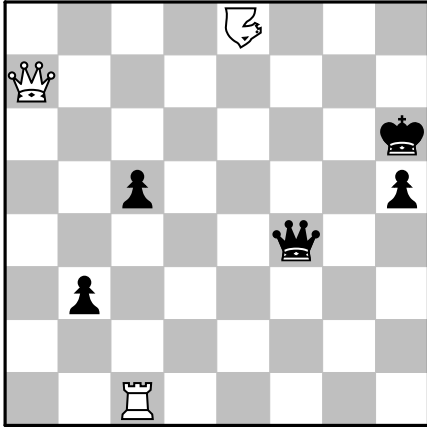


Add all remaining units for a legal position with no unit attacking an enemy unit. Nightriders instead of kNights

(34) Alain Brobecker

Discord CP&S

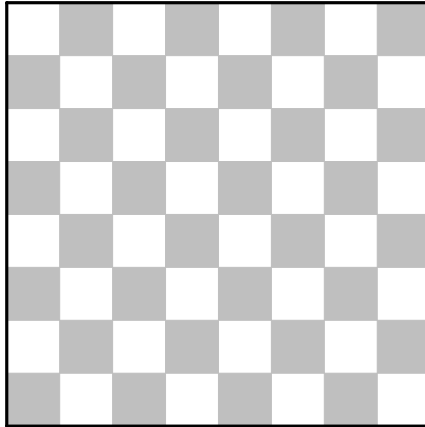
Dedicated to Dmitri Turevski,
2024/06/19



Add all remaining units for a legal position with no unit attacking an enemy unit. Nightriders instead of knights

(35) Alain Brobecker

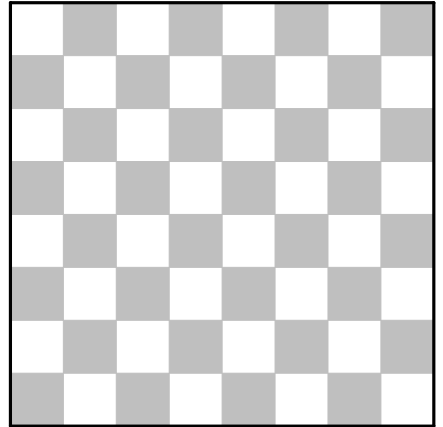
Original, 2024/06/06



Add all remaining units for a legal position with no unit attacking an enemy unit. C+

(36) Alain Brobecker

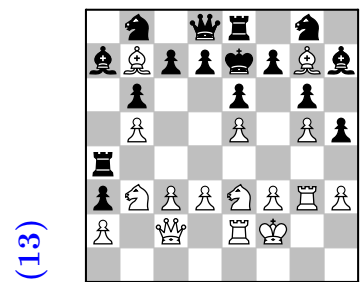
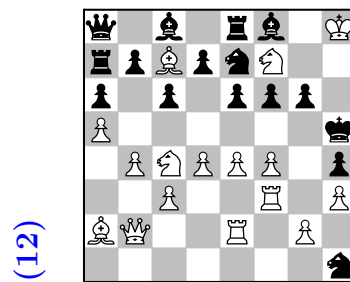
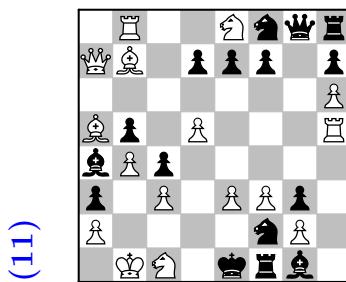
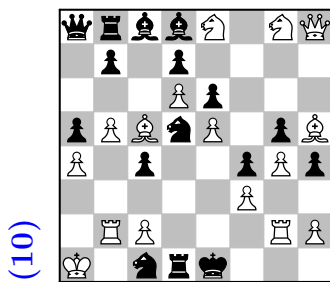
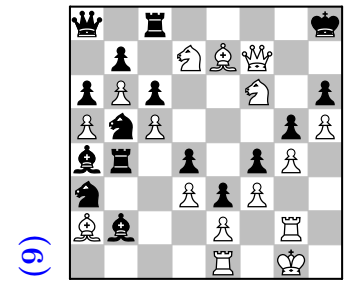
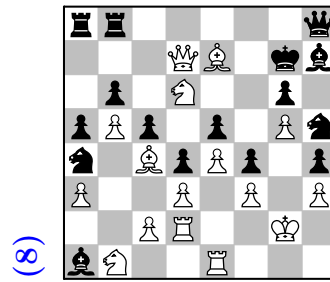
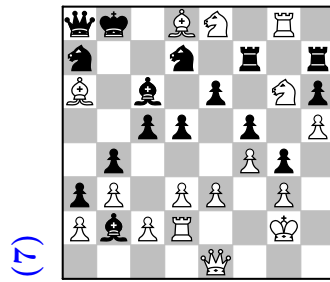
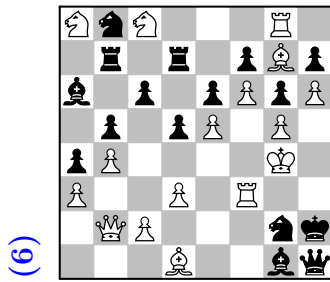
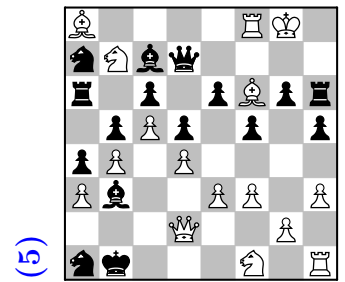
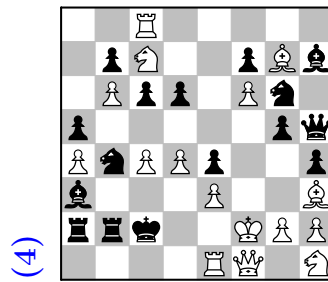
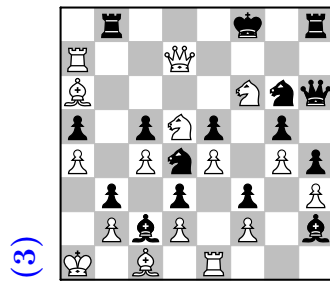
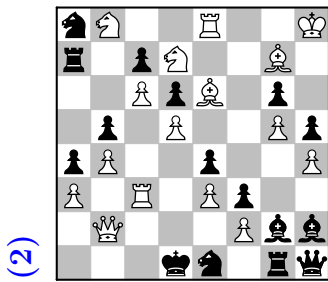
Original, 2024/06/06



Add all remaining units for a legal position with no unit attacking an enemy unit. C+

Solutions:

- (1) 1.Qd8+ Rd6 2.Qb7+ Rcc6 3.Qa5+ R4c5 4.Qb3+ Rdc4 5.Qd2+ Red4 6.Qf3+ Ree4 7.Qg5+ e5 8.Qf7+ Re6 9.Qd8+ Rcd6 10.Qb7+ Rcc6 11.Qa5+ R4c5 12.Qb3+ Rdc4 13.Qd2+ Red4 14.Qf3+ e4 15.Qg5+ Re5 16.Qf7+ Rde6 17.Qd8+ Rcd6 18.Qb7+ Rcc6 19.Qa5+ R4c5 20.Qb3+ Rdc4 21.Qd2#



(13) The pieces can be found in the following order: WPa2, WNb3, BPC7, BPf7. Then we must note that the whole 4th line is empty because the squares are attacked by both a W piece and the BRa4, or no remaining piece would fit. After this we have: WPb5, BPb6, BPb6, Wpg5, Bpg6, WPe5. Then Wpd3 (to block WQ attack on Bpg6), Bpd7, BQd8 (only square), BBh7 (only square), BPh5 and BBa7 (only square). Let's now suppose we have BPe7, then BKh1 but the position is illegal because after the first BB has moved after b7-b6 or g7-g6, the other one can't reach the diagram position. So we have BPe6 and Bke7.

(14) We must have one WP and one BP per column, the BPs being above the WPs since no capture occurred.

Immediately we know that we have Wpg2 and WPb5.

A black shield is needed on b4 to prevent the attack from BRb3, and only Bnb4 fits (please note that it also prevents the Bba5 to attack the Wqe1). From this we deduce Wpa4 and Bpa7 (a).

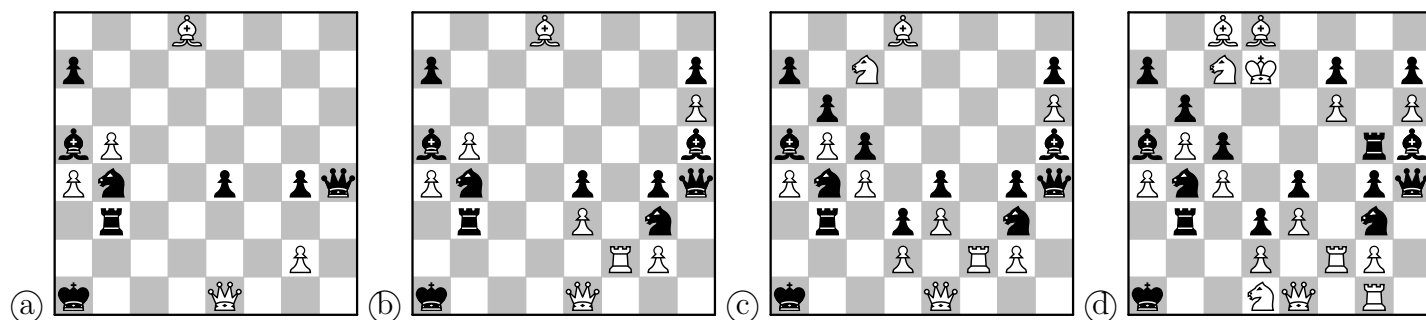
We cannot have Wph2 because it would attack the square g3 which must contain a black unit to serve as a shield between the two queens. We deduce from this impossibility that we have Wph6 and Bph7.

So on g3 and f2 we must respectively put a black and white units to serve as shields between the two queens. The only possibility is Bng3 and Wrf2. From this we deduce Wpe3. Since both BNs are now placed, only BBh5 can protect Wph6 from Bqh4. (b).

Between the two bishops we'll also have a black and white units On b6 only BPb6 is suitable. Then we deduce that we have Wpc4, all other squares being attacked on this column, and Bpc5. Since c6 cannot contain a piece (it is attacked by WPb5 and Bnb4) then the white shield on c7 cannot be a rook, so we have Wnc7. We need a black unit on d3 to protect Wpe3 from BRb3, and Bpd3 is possible, and this leads to Wpd2 (c).

Now only the squares c8, d7 and e6 are possible for the light squared WB (on e8 we would need BRg6 to serve as a shield but it would attack WPh6, the whole line a8-d5 is forbidden to the remaining white pieces so to a shield, and other squares are more easily dealt with). If WBe6 we wouldn't be able to put a white unit on f5 as a shield (BNg3 attacks f5). If Wbd7 only WKe6 could serve as shield, but then there's no space for BP on the f column (f3 and f4 are attacked by WPg2 and WPe3, f5 to f7 are attacked by WK). Thus we have Wbc8! A shield is needed on d7 to prevent this bishop attacking BPg4 (we have just seen that the square e6 is not suitable for white pieces). Only WKd7 is possible (WN would attack Bpc5 and WR would attack Bpd3 without another WP being able to intercept). Since we need a shield between WQ and BK, now only WNd1 fits.

Now let's investigate the white shield between Wbd8 and Bqh4. If it were WRe7 it would attack Bpe4. If it were WRf6 then it would be impossible to have a BP on the f column. The only remaining option is Wpf6 and this leads to Bpf7. Now only a WR and BR remains, we have BRg5 to protect Wpf6 from Bqh5. Last WRg1 is the only remaining possibility ④.



- (15) • On column b the only possibility for pawns is WPb3+BPb4.
- On column c the only possibility for pawns is Wpc4+Bpc5.
 - On column h the only possibility for pawns is Wph2+Bph3 (because Bph7 would attack the white shield that is needed on g6).
 - We need to have a shield between BRb1 and WPb2, the only possibility is BBb2.
 - We need to have a shield between Bqd1 and WPb3, it cannot be a BR (because this would need a Bnc3 which would attack Wba4) hence we have Bnc2.
 - This gives the pawns on column a: Wpa2+Bpa5.
 - The only possible shield between WRb6 and BPb4 is Wnb5.
 - On column g we now know that we have Bpg7.
 - On column d we know that we have Bpd7 (Bpd3 would force Wpd2 which would be attacked by BQ).
 - On column e we have Wpe4, the other squares are either directly attacked by an adjacent black piece, or for square e5 no black shield (only R or N remaining) can be placed to protect from BBb2.
 - On g6 the only possible white shield is Wng6. From this we deduce Bpe6 and then Wpd6 is the only possible white shield between Bpe6 and WRb6. Also the only available shield to protect Bph3 from WQ is WBh4.
 - On f7 we need a black shield to protect Wng6 from Bbe8, this shield is either a BR or BN. But if it were a BN, then no white piece could be placed to serve as a shield between WQ and Bpc5, hence we know we have BRf7.
 - We have Bpf3 and Wpf2 because the BP can go on no other square on this column (on f6 it would attack the shield needed on g5 to protect it from WBh4).
 - We need two white shields on g4 and g5 to protect Bpf3 and Bpc5 from WQ. The only possibility is Wpg5+WRg4 (WRg5 would attack Bpc5).
 - We need two black shields between BQ and Wpd6 and WKh1. The only possibility is Bne1+Bkd2.

(16) Solution by Mario Richter:

We must have one WP and one BP per column, the BPs being above the WPs since no capture occurred. On the c column the WP cannot be on c2 and BP cannot be on c7 to c5, thus we have Wpc3 and Bpc4. This implies that on column b we have BPb3 and WPb2, then due to BPb3 the only possibility on column a is Bpa3 and Wpa4.

Now let us look at the shield needed to protect WRb7 from the attack of BQ e4: a black piece on c6 is not possible, so we must have a black piece on d5. It cannot be a BN which would attack WQb6 or a BB which still would attack WRb7, and the BK and BRs already are elsewhere, so we have BPd5. We then deduce that we have WPd2, and this forces WBc1 which has not moved from the game.

We need another shield to protect BPb3 from the attack of WQb6. Now that WBb4 is no more possible since this bishop is still home, the only possibility is WNb5. (a)

We cannot have a black piece on e3, hence no white piece on e2 and from this we deduce that we have WPd6 and BPd7. The only possible shield to protect WPe6 from the attack of BQe4 is BNe5 (BBe5 would attack WPC3). Now we also need a shield on c7 to protect BPd7 from the attack of WRb7, and the only possibility is WKc7.

On the f column we have WPf2 which is the only possibility. (b)

More difficult to see, the only possibility for light squared WB is WBh5. To see this we must acknowledge that g2 will contain a black piece as a shield and that other squares are attacked and no shield will help: WBb1 is not possible because no shield can be put inbetween it and BQe4, and WBe8 is not possible since no B piece can be placed in b8-d8 as a shield.

Let's suppose that we have WPh4, then two black shields are needed on on g2 and h3 to protects WPf2 and WPh4 from BRh2, but one of this shield would be the light squared BB and the other one would be the remaining BN which would attack on of the WPs. Thus our hypothesis is wrong, and we have WPh6 then BPh7.

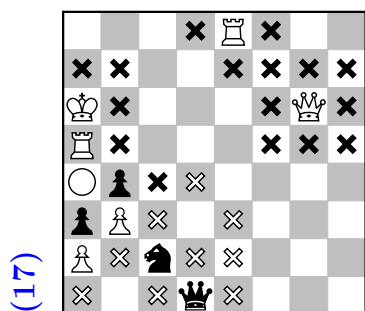
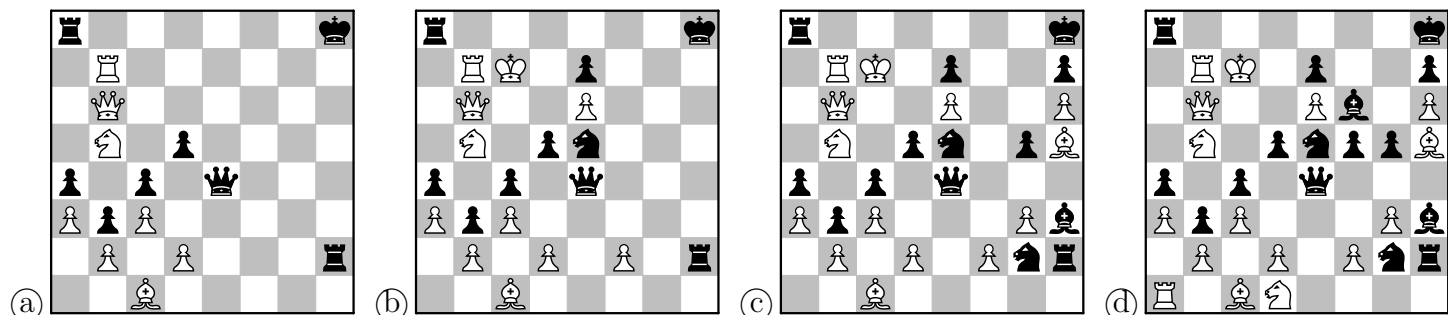
We deduce then that we have BPg5 then WPg3.

What we said about the black shields on g2 and h3 (to protect WBh5 this time) still holds, but this time we have a possibility which is BNg2 and BBh3. (c)

BBf6 is the only possible square for dark squared BB. Thus we have BPf5.

WNd1 is the only possible square for the remaining WN.

Last we have two possibilities for the remaining WR, namely a1 and f1. But since WPa3, WPb2, WPd2, WBc1 forms a well know retro-analytical cage from which the WR cannot have escaped, we know that we have WRa1. (d)



(18) Solution by Mu-Tsun Tsai:

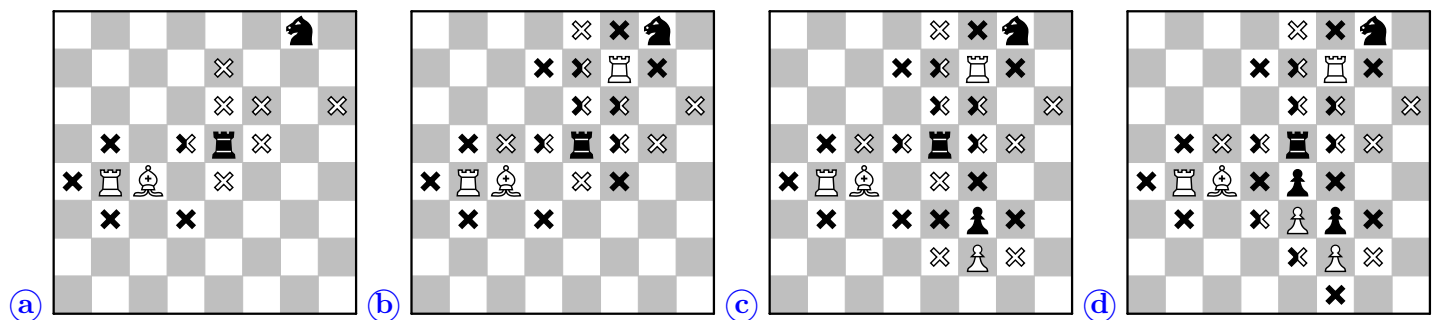
First we can be certain that immediately attacked squares cannot have pieces of opposite color, which we mark with Xs of the forbidden color as in (a). Note that black and white X means no piece can be on that square (in other words the square is empty).

Since d5 is empty, it follows that c5 must not be white, or BRe5 will be attacking it. We will be using this logic quite often, so let's call it the **long distance rule (LDR): For a long distance unit, the square immediately after a series of bicolor Xs must be an X of at least the opposite color.**

By applying this rule to WBc4, we can see that e6 also cannot be black, so we upgrade the X to bicolor. It then follows that there must be a white unit at f7 to block BNg8 from WBc4. It cannot be a king, queen or pawn (as those will still be attacking BNg8), and it also cannot be a knight (attacking BRe5), so it can only be a rook. By applying LDR a few times, we get (b).

Since all units will be on the board and the position is legal, none of the pawns had made any capturing, so each file has exactly a pair of black and white pawns somewhere from the 2nd rank to the 7th rank. For the f-file it leaves only one possibility as shown in (c).

Then the e-file pawns are also determined (after applying LDR to WBc4) as shown in (d).

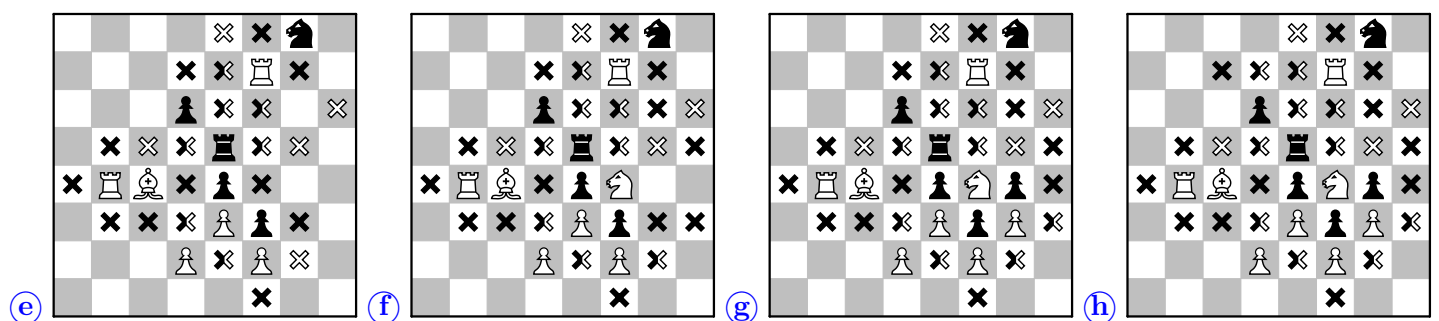


That also fixed the d-file pawns, as shown in (e).

Now we need a white unit at f4 to block BPf3 from WRf7. The only possible unit is a knight, see (f).

Therefore the g-file pawns are also fixed, as shown in (g).

The next step is a bit tricky to spot. But pay attention to d7. We know it cannot be black, but can it be white? It cannot be king, queen or rook (attacking BPd6), the light squared bishop or the d-file pawn (already on the board), so in fact it also cannot be white. Therefore LDR works again with WRf7 and leads to (h).

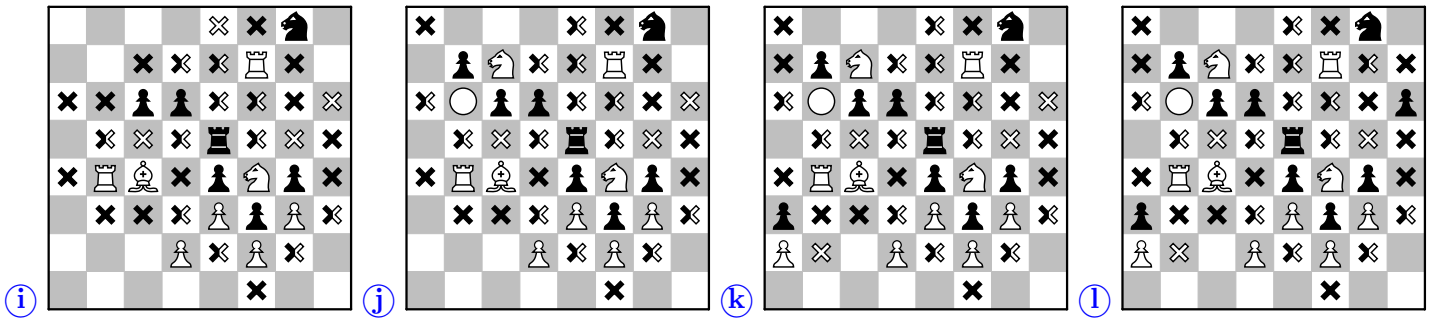


And thus the black c-pawn can only be at c6. After LDR with WRb4 and WBc4 we have (i).

So we must have BPb7, and there must be a white unit at c7 to block WRg7. Clearly it can only be a knight. We also need a white unit at b6 to block WRb4, but we don't know what it is yet, as indicated in (j) by the white circle.

Although we don't know what exactly b6 is, by elimination it can only be a bishop or a pawn. In either case we can put a black X at a7, and that fixes the a-pawns as shown in (k).

Now consider the square h7. If there's a black unit there, then there needs to be a white unit at g7 to block WRf7, but elimination shows that no white unit can be there. So h7 is not black and we must have BPh6, see (l).

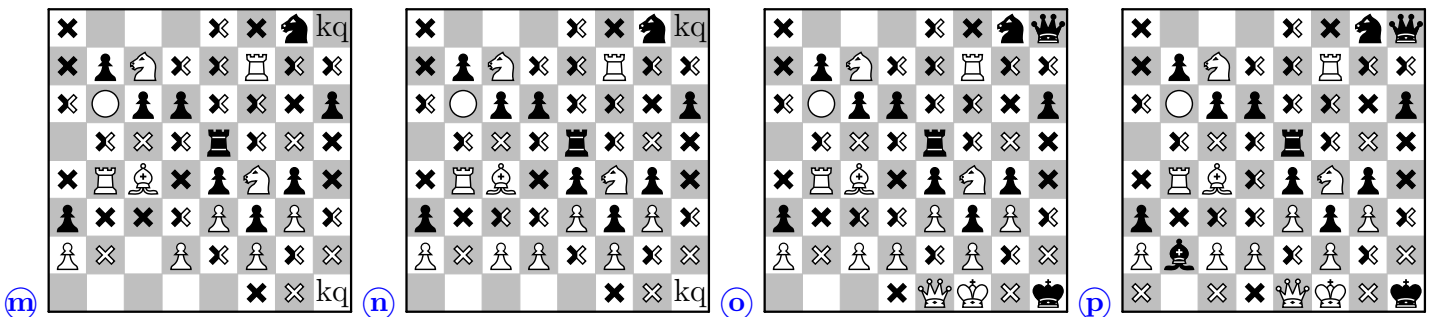


The next step is also a tricky one. Consider this question: where can the black king and the black queen be? If we look at all the remaining square or squares with only a white X, we can see that the only possible squares for them to be is h1 and h8. That means those two squares must be reserved for them and for nothing else (this is a common technique in Sudoku), they are containing the letters kq in [m](#).

Now we consider the black dark square bishop. It can only be at a1 or b2. If it's at b2, then c3 cannot be white. If it's at a1, then c3 also cannot be white because no black unit can be put at b2 to block. So c3 is not white and we must have WPC2, leading to [n](#).

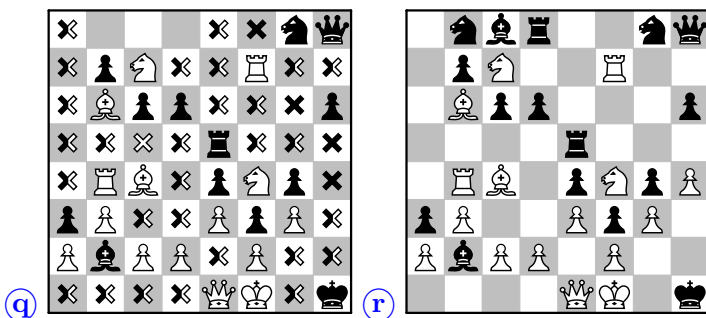
Consider the white queen. Most of the remaining squares or black Xs are clearly not possible for it. We also know it's not at a1 or b1 because we know the black bishop is somewhere around there. Also c1 is not possible because it will either attack a black unit at b2 or BPa3. Similarly, a5 is not possible because it will either attack BRe5 or a black unit at c5. Same reasoning show that it's not at f1, as it will either attack h1 or g1. In the end, it turns out there is ONLY ONE square where it can be: e1. Then we need a white unite at f1 to block, and only the white king can be there. As a result, h1 must be the black king and BQh8, all summarised in [o](#).

If the black dark square bishop is at a1, then there needs to be at least one white unit between it and the white queen, which can only be the white dark squared bishop at c1, but it would attack BPa3. So we must have BBb2 as shown in [p](#).

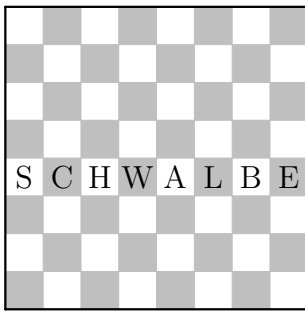


Now we need a white unit to block at b3, which can only be the pawn. And that also implies WBb6. The only remaining white unit is the h-pawn. It cannot be at h5 since no black unit can be at g5 to block BRe5. So WPh4 and all white units are settled, thus all Xs are upgraded to bicolor in [q](#).

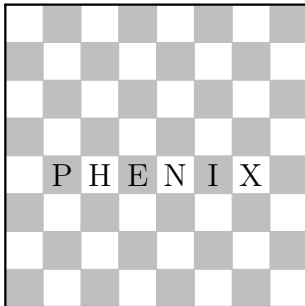
The black light square bishop can now only be at c8. The remaining black knight can only be at b8. Finally, the remaining black rook can only be at d8 which gives the solution [r](#).



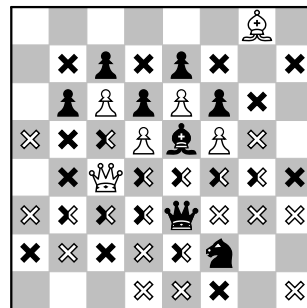
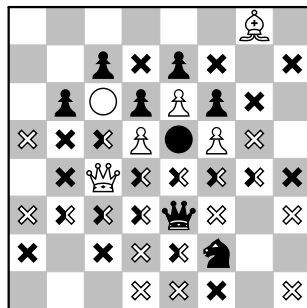
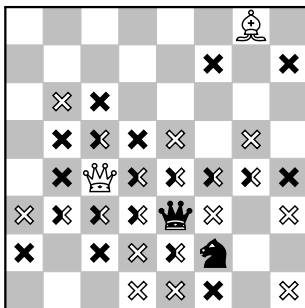
(19)



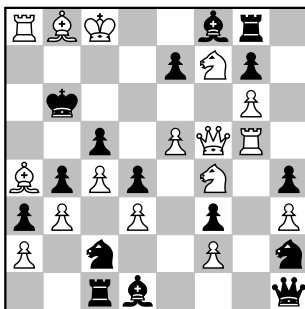
(20)



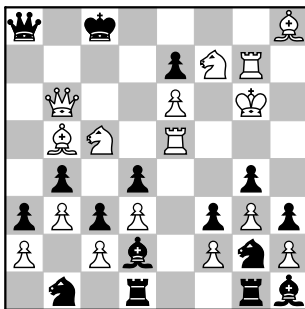
(21)



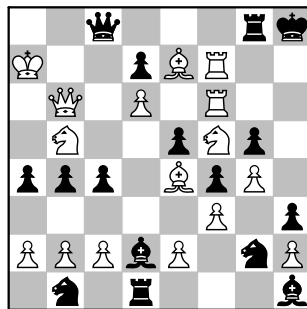
(22)



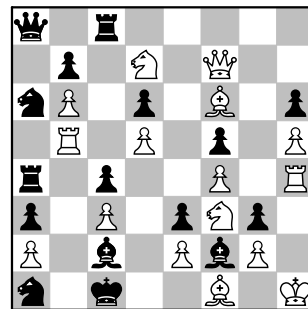
(23)



(24)



(25)



(26) Solution written with help of Mario Richter:

We must have one WP and one BP per column, the BPs being above the WPs since no capture occurred. From this fact we immediately deduce WPh2, BPf7, WPf3, BPe7, WPe2, BPb7, BPa3 and WPa2.

Now we need a white piece to protect BPa3 from the attack of WQa5, only WNa4 fits. **(a)**

Let's suppose that we have BPc7, then no white piece could go on b6 to protect it from WQa5, hence this hypothesis is wrong and we have BPc6. From this we deduce that we have WPb6 to protect BPb7 from the attack of WRb4 (Wbb6 is not possible since it would attack BNf2). **(b)**

Now let's consider the initial column of light squared WB and dark squared BB. It cannot be column b or column d otherwise light squared WB couldn't have reached f1, and it cannot be column f since BB

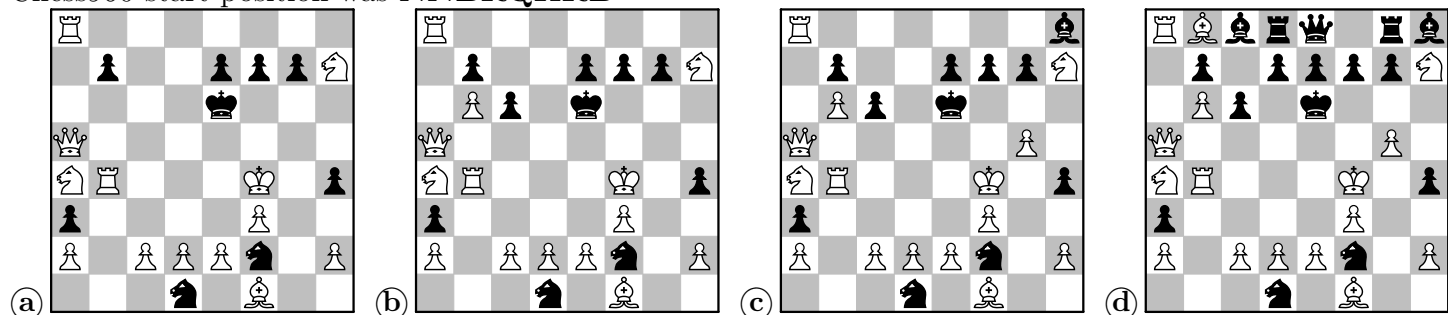
would still be trapped there but f8 is attacked by WNh7. So the initial column of light squared WB and dark squared BB is column h and from this we deduce that we have BBh8 and also WPg5 (because WPg2 would trap light squared WB on h1). (c)

We need a white shield to protect BBh8 (or any other black piece on 8th rank) from WRa8, and the only possible shield is Wb8 (on other squares it would attack BPs). This implies that we have Bpd7.

The remaining black pieces (BQ, BRs and BB) must be on 8th rank, anywhere else they would attack or be attacked. So they are on c8,d8,e8 and g8. We must have Bbc8 since the other pieces would attack Wb8 (this also says that c is the initial column for dark squared WB and for light squared BB), and also we have Bqe8 since on the remaining squares BQ would attack a white piece. Then we have BRd8 and BRg8. (d)

According to Chess960 rules the BK must have been between the two BRs. The only possible explanation is that the Chess960 start position was **NNBRQKRB** and black made a "right side" castling in which Bkf8 and BRg8 exchanged place to land on the usual BRf8+Bkg8 castling positions.

Chess960 start position was **NNBRQKRB**



(27) Since we don't know if white or black's last rank has been removed with the Shrink Chess condition, let us start by numbering the ranks 11 to 17 for clarity. Also we must keep in mind that some pawns could be on rank 11 or 17.

We must have one WP and one BP per column, the BPs being above the WPs since no capture occurred. From this we deduce that we have Bpf6, BPh6 nad WPa13.

We need a black shield to protect WPa13 from the BQa11, only a BNa12 can do, since the BB of correct colour is on f17. Since BNa12 attacks c11, we also deduce that we have Wpc12. (a)

We need a white shield on f14 to protect BPh16 from the BBe13. It cannot be a WN which would attack BPe16, it cannot be a WR or WQ which would attack Bpf16 without the possibility of a white shield on f15. Thus we have Wpf14.

We need a black shield to protect Wbf11 from the BQa11. The remaining BR cannot serve as a shield (although it could be inbetween the BQ and the shield), the BK would attack one of the WP, so only a BB can do, and it will be on c11 or e11 to be on the right square colour. But on c11 it would attack Wbe13 without possibility of shield protection, thus we have Bbe11.

From this we deduce that we have Wpg12.

On the b file, all squares b11 to b14 are attacked by black pieces, and on b16 a WP would force BPb17 which would be directly attacked by WRa17. Thus we have Wpb15 and BPb16.

We need a white shield to protect Bpa14 from WRa17, only Wna16 can do.

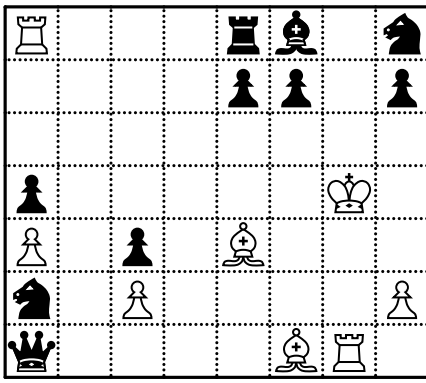
We need a white shield to protect Bre17 from WRa17, only Wnb17 can do.

We need a white shield to protect Bpb16 from Wbe13, only Wpd14 can do. (b)

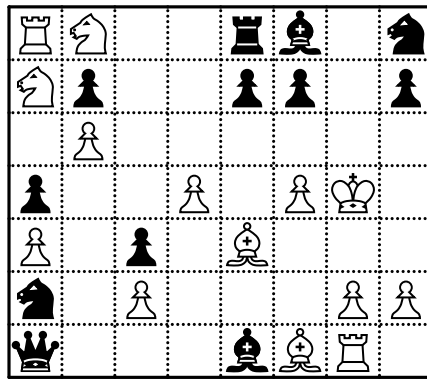
Let's look for possible positions of remaining BR. Trying BRb11 we see that we don't have a possible shield to protect Wpb15 from it. Same kind of impossibility on d17. The only possibility is BRg17 and Bpg16 to shield WRg14 from its attack.

Now the BK has only one possible square, thus BKd17 (it also shields Wnb17 from the attack of Bre17). We deduce from this that we have Bpd17.

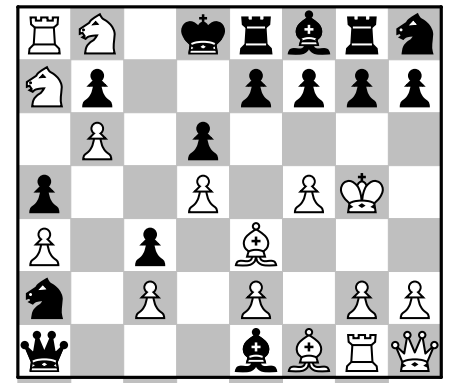
The last deductions now are easy, we have Wpe12 and Wqh1. But the WQ can only have reached this spot if Wbf11, WRg11, WPs e12, g12, h12 no more on the 1st rank. Thus we know that 1st rank was discarded! (c)



(a)



(b)



(c)

(28) Since we don't know what ranks have been removed with the Shrink Chess condition, let us start by numbering the ranks 11 to 16 for clarity. We must keep in mind that some pawns could be on rank 11 or 16, and we have one WP and one BP per column, the BPs being above the WPs since no capture occurred. We need a white shield on c13 and a black shield on b14 to protect WBd12 and BBA15 from mutual attack. Due to possible attacks on WBb13 and BBb11, only WRc13 and BNb14 can do.

On the d-file the only possible position for BP is BPd16.

On the c-file the BP is on c15 or c16, but in both case we need a white shield to protect it from WRc13. The only possible shield is WPC14, and this implies BPb16.

From all this we deduce that **the 7th and 8th ranks were removed**, because with only the 8th rank removed the BPs on file b and d would have prevented BBc8 to get out. (a)

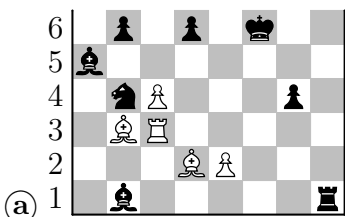
Knowing that the remaining ranks are 1st to 6th, we immediately have WPa4 and BPa6, and from this we deduce we have WPb2. We have WPd4 and this implies BPC6. We also have WPG3 because this pawn has moved to let the WBf1 out, and from this we deduce BPF5. (b)

On the h-file we know we'll have a black shield between WP (on h4 or h5) and BRh1. Only BNh2 is suitable (because BNh3 would attack the WP from f-file which must stand on f2 or f4). We don't have any more shield available for BRh1, hence we know that no white pieces can stand on squares c1 to g1.

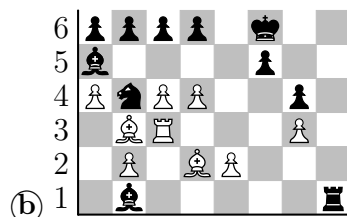
Let's look at the possibilities for WQ. Only two squares are possible: e3 and f2. But on e3 we would need a white shield to protect BPe from its attack, but no shield can go on e4 or e5. So we have WQf2 which implies WPF4, and also WNg2 as a shield to protect BNh2 from WQ's attack.

Then only e3 is possible for WK and this implies BPe6. (c)

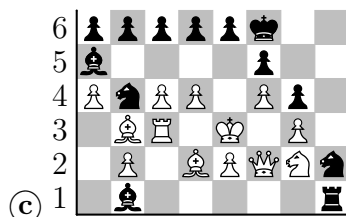
We also have very small space for the remaining pieces. Only g6 and h6 are possible for BQ and BR, and not to attack WPF4 we have BQg6, BRh6, BPh5 and WPh4. Last, only a1 and a3 are available for the two remaining pieces, and so we finish by WNa1 and WRa3. (d)



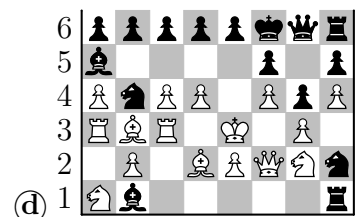
(a)



(b)



(c)



(d)

Note: BPG14 was not needed by my homebrew verification program to solve the problem, but adding it allowed more human-like reasonings.

(29) Let's name the files s to z for the moment. We must have one WP and one BP per column, the BPs being above the WPs since no capture occurred. The first conclusion is that we have BPU7.

We need a black shield on t3 to protect WRs4 from the attack of BBU2 and a white shield on v2 to protect BNw1 from the attack of WBU3. Only BPT3 is possible (a BN would attack the white shield on v2) and this also gives WPT2. For the same kind of reason we have WPV2.

Let's suppose that we have BPz6 then we would need a white shield on t4 to protect BPz6 from WBU3, but such a shield is not possible (WNT4 would attack BBU2), so our hypothesis is wrong and we have BPz3 and WPz2.

Since WBU3 has moved we know that WPx can not be on x2, thus we have WPx4. (a)

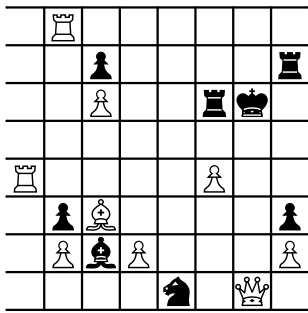
We need a white shield on x1 to protect BNw1 from the attack of WQy1. Only WNx1 is possible (WBx1 would attack BPz3).

We cannot have WPy4 (it would attack the black shield needed on x5) thus we have WPy3. We cannot have BPy4 because it would be attacked by BRs4 and no white shield can go on z4. Thus we have BPy7. We need a shield to protect BRx6 from the attack of WBU3. This shield cannot be on w5, so it is WKv4. From this we deduce that we have BPv6. We also need a shield to protect BPy7 from WBU3, we already saw it won't be on t4 and it will neither be on z6, thus the shield is WPs5. We need a shield on x5 to protect WPx4 from the attack of BRx6, and only BPx5 is possible. (b)

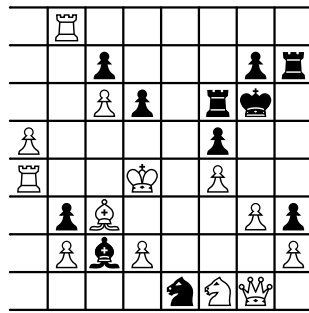
We need a white shield on t5 or t7 to protect BPt3 from the attack of WRt8. On t5 no available piece is possible (a WB would attack BRz7 since no white shield is possible on s6). So the shield is on t7, and it must be WBT7 (WNT7 would attack BPv6). We deduce from this that we have BPs7.

We only have one WN to act as a shield on 8th rank, but with vertical cylinder no black piece is on 8th rank since WRt8 attacks both ways. So the other black bishop has only one available square: BBw7. This implies BPw6. Also due to a lack of space, the only possible square for black queen is BQx7. (c)

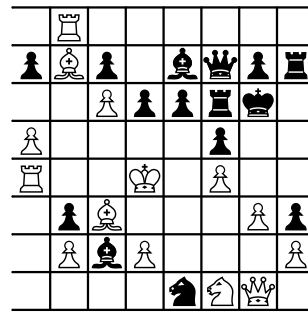
The remaining black knight cannot be on s2 or s1 because this would need WNs3 to shield it from the attack of WRs4, but then WNs3 would attack BBu2. Thus the only remaining possibility is BNU1. This implies WPw3. Last, we need to place the remaining white knight to protect BNU1 from the attack of WQy1, and the only possibility is WNz1. (d)



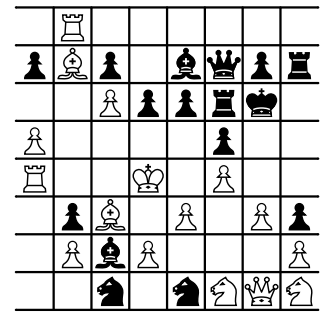
(a) s t u v w x y z



(b) s t u v w x y z



(c) s t u v w x y z



(d) s t u v w x y z

Now we know that all bishops have moved from their start position, so let's look at the position of the pawns on 2nd and 7th ranks. Of all the shifts of those pawns, summarised below, only the one with BPs b7,f7,h7 and WPs a2,c2,g2 can let all 4 bishops out. Thus t-file is a-file.

