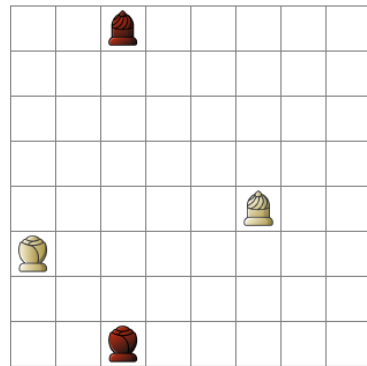
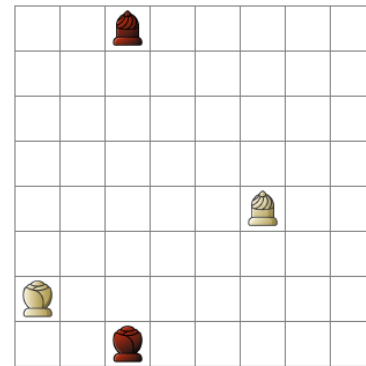


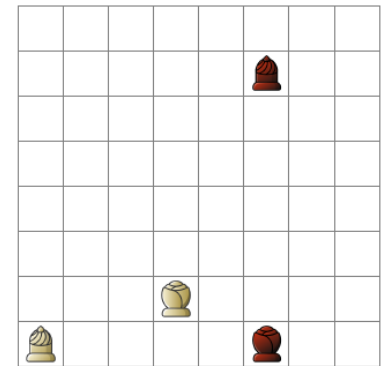
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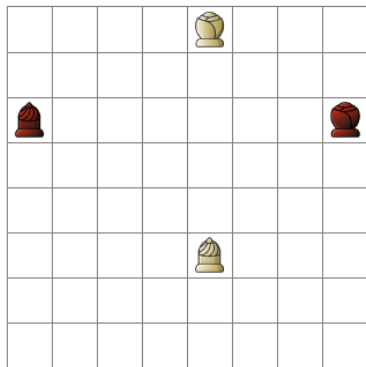
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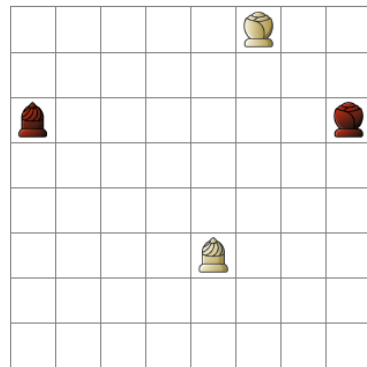
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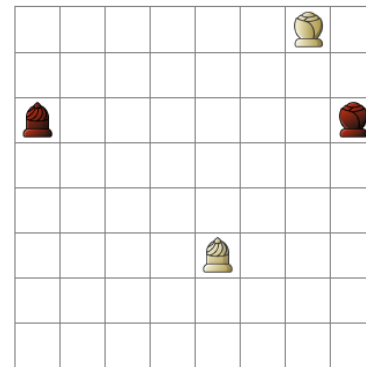
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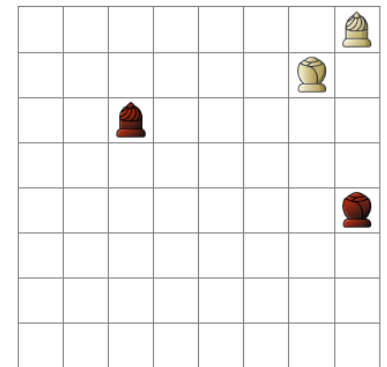
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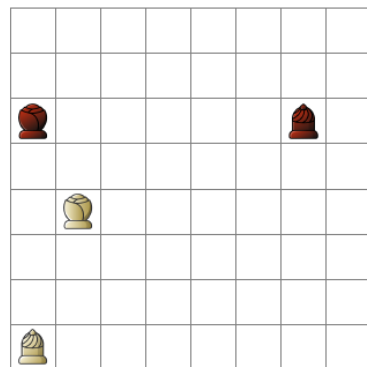
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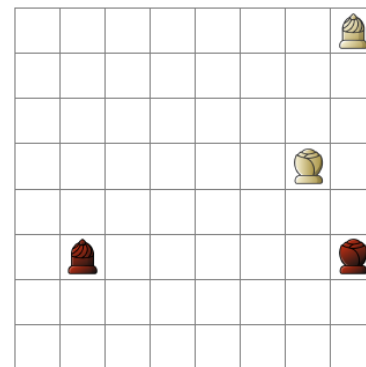
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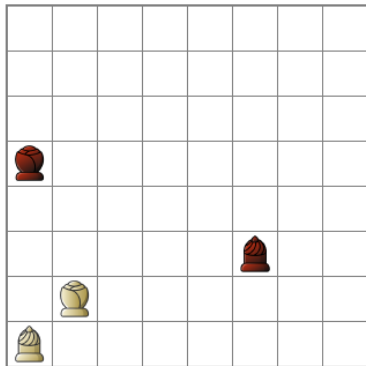
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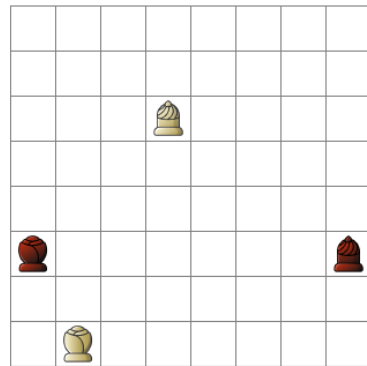
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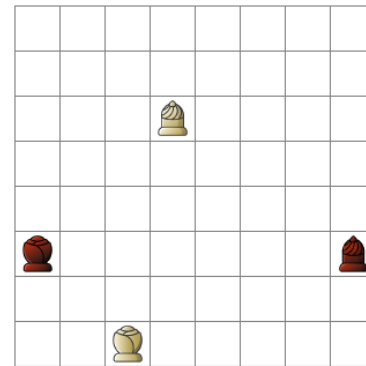
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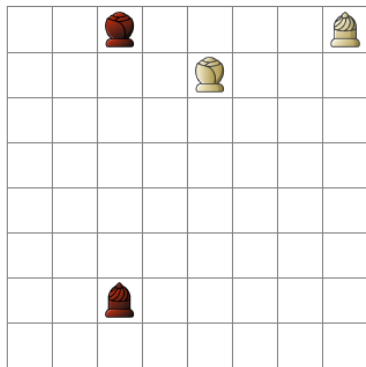
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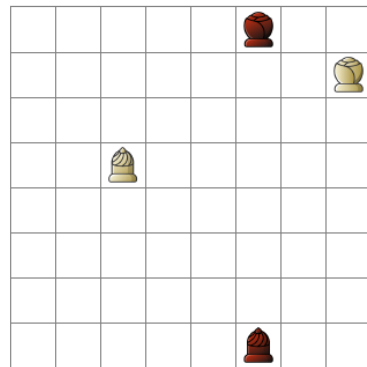
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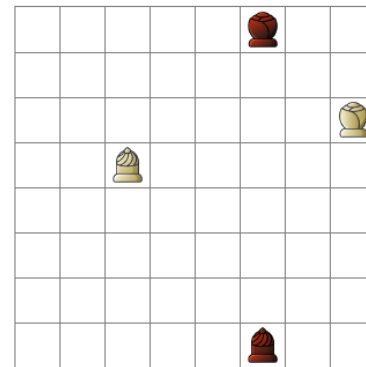
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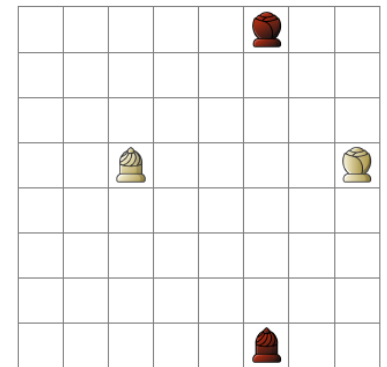
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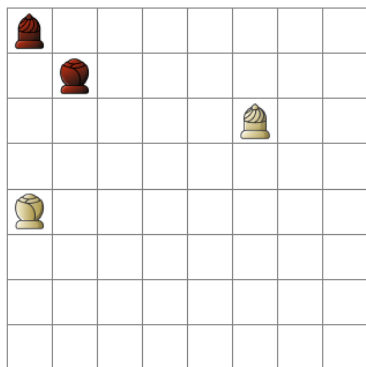
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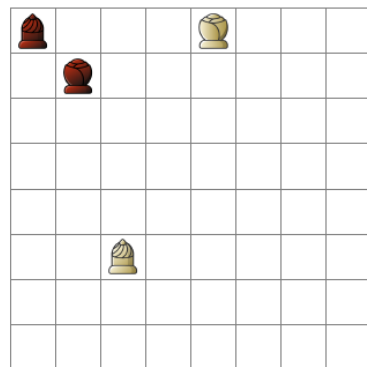
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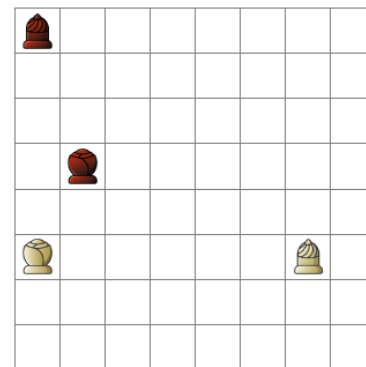
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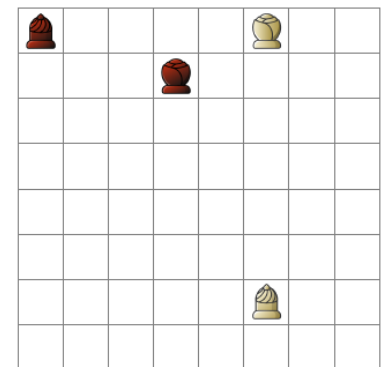
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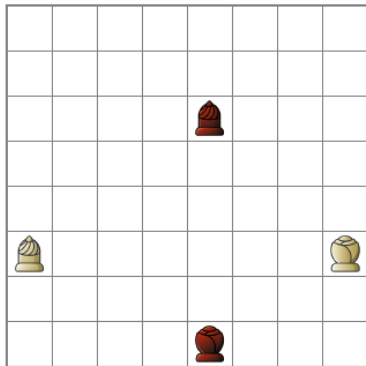
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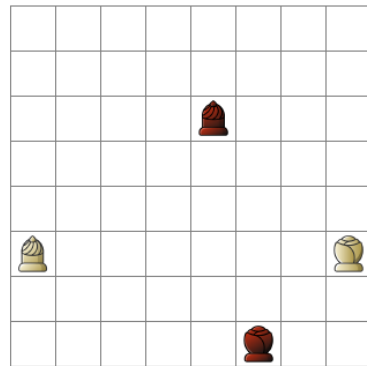
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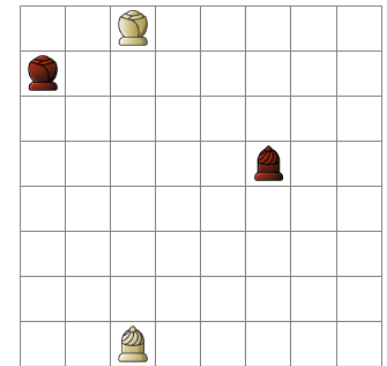
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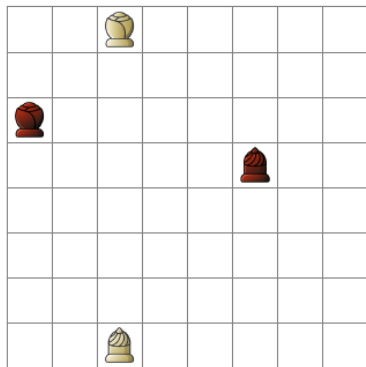
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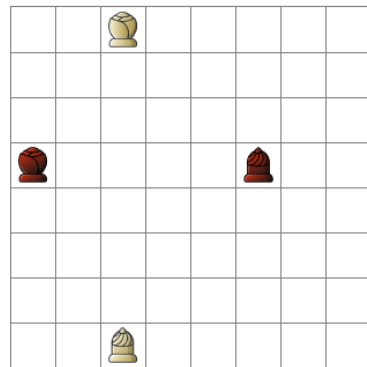
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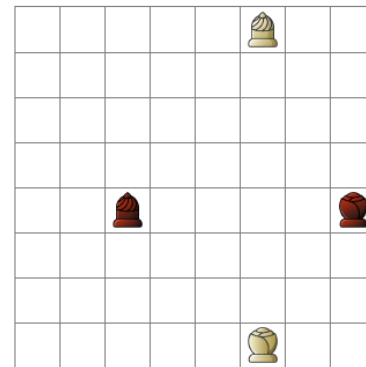
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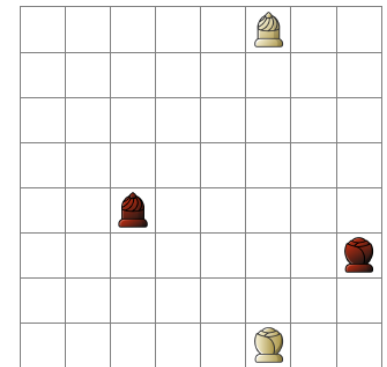
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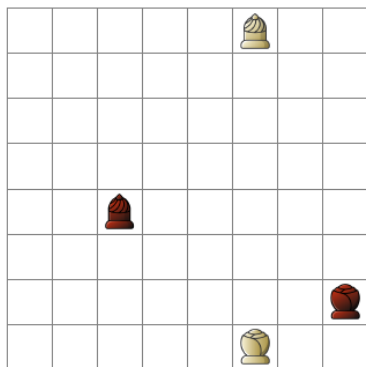
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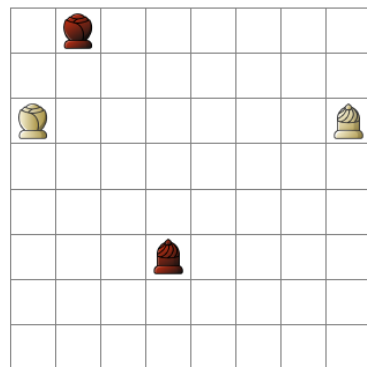
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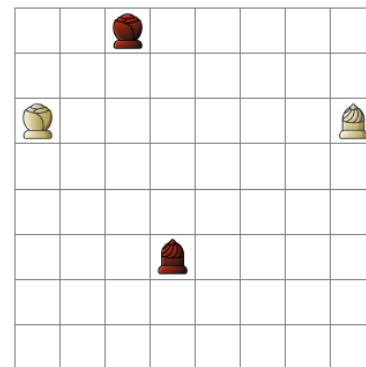
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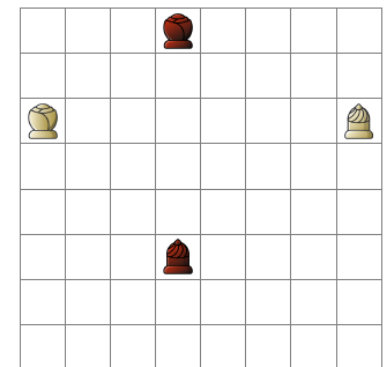
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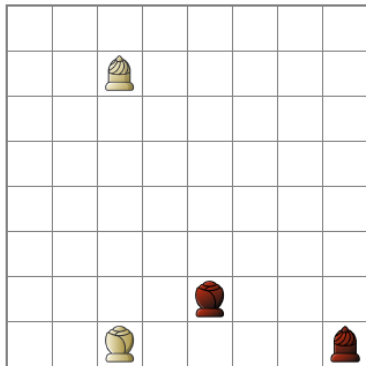
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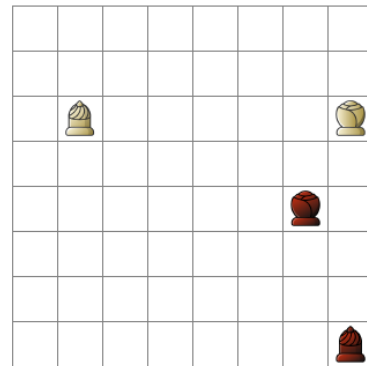
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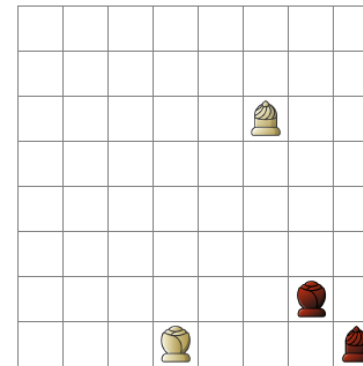
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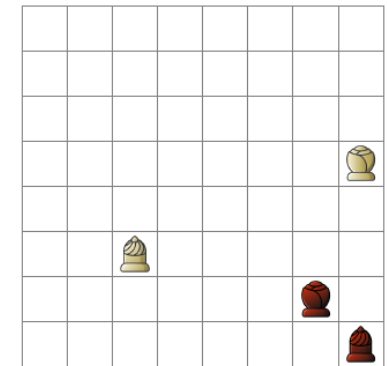
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FEN: 8/2Q5/8/8/8/4k3/2K4q b - - 0 1



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FEN: 8/8/1Q5K/8/6k1/8/8/7q b - - 0 1



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FEN: 8/8/5Q2/8/8/6k1/3K3q b - - 0 1

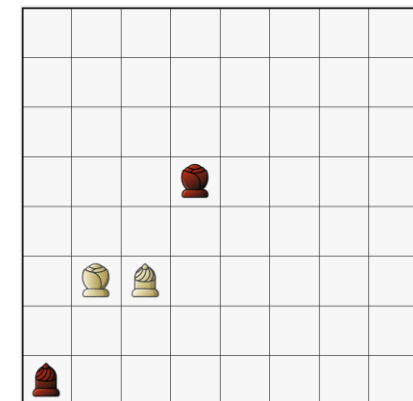


#40 dist_to_win=-63
FEN: 8/8/8/7K/8/2Q5/6k1/7q b - - 0 1

Background and story on Suli's Diamond Reverse-Ferz Problems

The 40 reverse-ferz problems above are similar, in terms of both the number and type of pieces, to the Suli's Diamond problem that appears in Kitab ash-Shatranj, the world's first chess strategy book written during the Golden Age of Islamic Science, in which one of the earliest and most famous chess masters, as-Suli, gave the correct first move, several partial solutions and presented the problem's difficulty as a timeless challenge. In canonical Suli's Diamond, (FEN: 8/8/8/3k4/8/1KQ5/8/q7 w - - 0 1), the puzzle is an endgame study with shah and ferz pieces on both sides. The shah piece kept its original movement in modern chess and moves like the modern king. The ferz piece, meaning vizier or advisor, moves and attacks like a checkers piece, diagonally only one square. In canonical Suli's diamond, the ferz pieces move on the same diagonals so they can attack and capture each other.

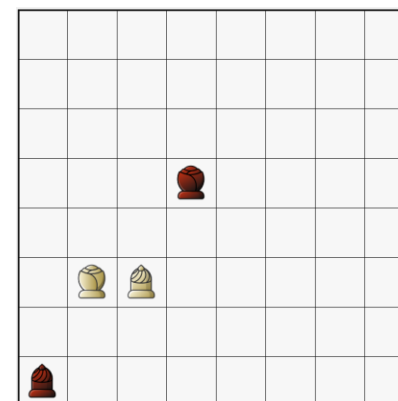
Many languages continue to refer to old and new forms of chess with the same word. In shatranj, the historical form of chess, a player normally wins by capturing all of the opponent's pieces. An exception applies when the side reduced to a lone king can, on the next move, capture the opponent's last remaining non-king piece; in that case, the result is a draw. Suli's Diamond puzzle asks if White can capture Black's ferz cornered on a1 square, without losing his own ferz by a counterattack by the black king.



Suli's Diamond
8/8/8/3k4/8/1KQ5/8/q7 w

For historical consistency reasons with Kitab ash-Shatranj and the terminology of shatranj, I will use S letter for Shah and F letter for Ferz piece in the analysis below. Feel free to swap them yourself with K for King and Q for queen. I will also use lowercase letters for black moves, to make tracking easier with computer FEN analysis. Full solution to Suli's diamonds in 39 plies:

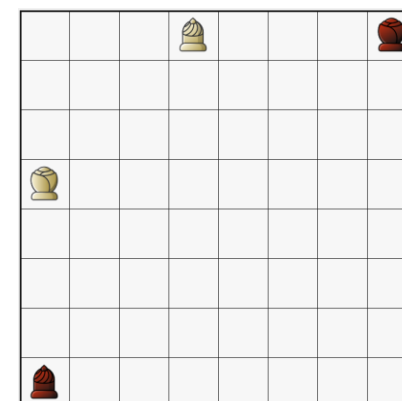
1. Sb4 sd6 2. Sc4 se6 3. Sd4 sf6 4. Sd5 sf7 5. Se5 sg7 6. Se6 sf8! 7. Sd6 se8 8. Sc6 sd8 9. Sb6 sc8 10. Sc5 sd7 11. Sb5 se6 (11. ... sc7 12. Sc4! sd6 12. Sb4! sd5 14. Sb3! and white wins!; 11. ... sc7 12. Sc4! sd6 13. Sb4! sc6 14. Fd2 sd5 15. Sc3! se4 16. Sb3 sd3 17. Fc1 se2 18. Sa2 sd1 19. Sb1! se2 20. Sxa1 and white wins) 11. Sb5 se6 12. Sa4! sd6 13. Sb4 se5 14. Sa3 sd5 15. Sb3 sc5 16. Fd2 sd4 17. Sc2 se4 18. Sb1 sd3 19. Fc1 se2 20. Sxa1 and white wins.



Suli's Diamond

8/8/8/3k4/8/1KQ5/8/q7 w

Although many chess masters over the centuries attempted and failed to solve the thousand-year-old Suli's Diamond problem, the correct first move and essential parts of the winning method were already demonstrated by as-Suli in Kitab ash-Shatranj. Later, the ending was partially reconstructed and analyzed by the endgame expert and Soviet Chess Federation president Yuri Averbakh. Many online sources present Averbakh as the first solver of Suli's Diamond; however, the main solution line associated with him had in fact already been recorded by as-Suli. It is therefore plausible that Averbakh was unaware of the contents within Kitab ash-Shatranj and independently rediscovered the solution or the solution he shared online isn't the full solution he found, in which case he may still be credited with the first modern rediscovery after as-Suli. At the same time, both versions are slightly incomplete, because a stronger defense was later shown to exist with 6...Kf8 instead of 6...Kg8. It should also be noted that after 6...Kg8, the move 7.Ke7 wins in 29 plies faster, whereas the line shown in Kitab ash-Shatranj and by Averbakh 7.Kf6 Kh8 8.Kf7 requires 31 plies to win.



As-Suli's Rough Diamond

3Q3k/8/8/K7/8/8/8/q7 w

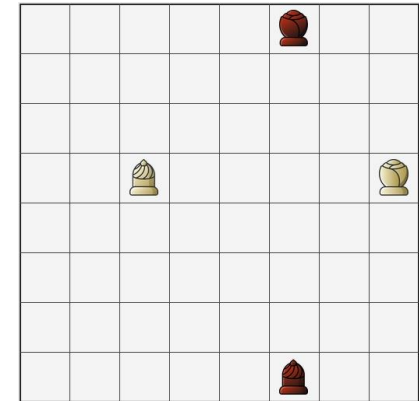
Previously, harder versions of Suli's Diamond puzzles were discovered for same diagonal ferz version, extending the solution length from 39 to 53 moves. The discoverer, John Tromp, named one puzzle from this harder puzzle category as `as-Suli's rough diamond.` (FEN: 3Q3k/8/8/K7/8/8/8/q7 w - - 0 1)

The AI-assisted confirmation and explanation of the full coding solution to both Suli's Diamond and Suli's Rough Diamond was carried out within the Erasmus+ Shatranj.ai project coordinated by FSMVU. Lesson 16 of the curriculum is devoted to solving Suli's Diamond and to developing the dynamic-programming-based AI code that solves it. The lesson materials are openly accessible after a free registration at: <https://lms.shatranj.ai>

In the reverse-ferz problem category, because the two ferz pieces move on different diagonal complexes, they cannot attack or capture one another. For this reason, their solutions differ in strategy from that of the original Suli’s Diamond and require a much longer winning sequence: 63 moves instead of 39.

Thus, these positions are not only about 50% longer in solution length, but also substantially more difficult in their underlying complexity. This puzzle category evaded human discovery for the longest time. Here is a full solution to a particular one, shaped like a diamond quadrilateral, which is also explained further in the shatranj.ai curriculum.

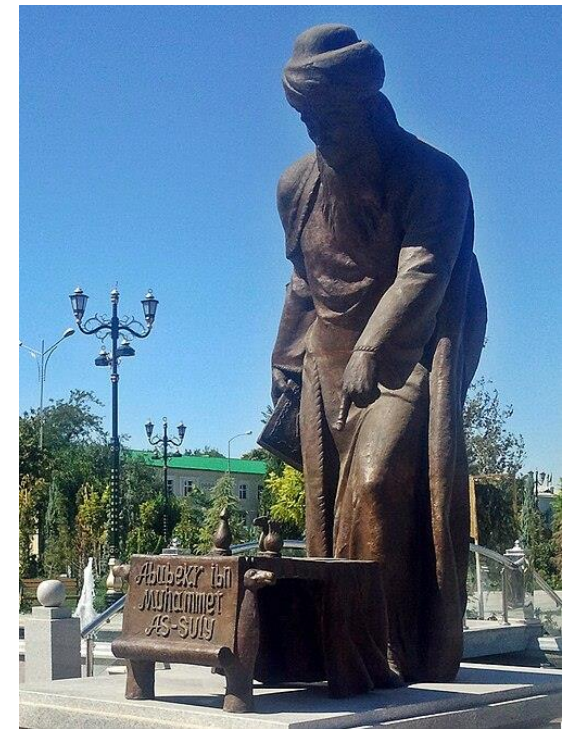
1.Sg6 2.se7 3.Sf5 4.sd7 5.Se4 6.sc6 7.Fd4 8.sb5 9.Sd3 10.sc6 11.Se3 12.sd5 13.Fc3 14.fg2 15.Fd2 16.fh3
 17.Sf4 18.sd4 19.Sf3 20.sd3 21.Fe1 22.sc2 23.Se2 24.fg4 25.Ff2 26.ff5 27.Se3 28.fe6 29.Sd4 30.sd2
 31.Se4 32.se2 33.Fg3 34.sf1 35.Sf3 36.sg1 37.Ff4 38.sh2 39.Fe3 40.ff7 41.Sf4 42.sg2 43.Fd4 44.sf2
 45.Fe5 46.fe8 47.Fd6 48.se2 49.Se5 50.sd3 51.Fc7 52.sc4 53.Sd6 54.sb5 55.Fd8 56.ff7 57.Se7 58.fg8
 59.Sf8 60.fh7 61.Sg7 62.sa6 63.Sxh7



Suli-Karatekin Diamond
 5k2/8/8/2Q4K/8/8/8/5q2 w

According to the TDV Encyclopedia of Islam, Abu Bakr al-Suli was born in Baghdad between 255–257 AH (869–871 CE). In addition to the nisba “Baghdadi,” he was known as “Shatranji” because he was the strongest chess player of his time, and as “Suli” because he was descended from Sul-Tegin, the Turkish ruler of Jurjan during the early Islamic conquests. Sul-Tegin’s son, Abu Umara Muhammad, was one of the leading propagandists of the Abbasid revolution. As-Suli was an editor-poet, chronicler, and the strongest chess player of his era. https://en.wikipedia.org/wiki/Abu_Bakr_bin_Yahya_al-Suli

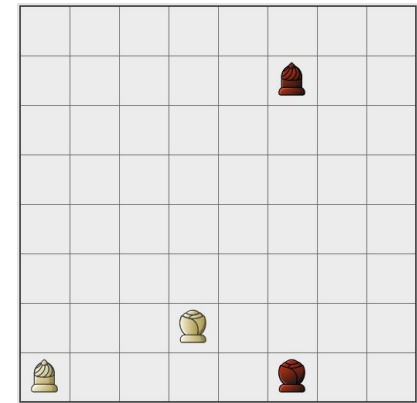
“Tegin” (or “tigin”) is one of the old Turkish political titles and, in its most basic sense, means “prince,” that is, a male dynastic member belonging to a ruling house; indeed, reliable sources explain this title directly as “prince.” Over time, however, its range of use expanded, and in some periods it could refer not only to a biological dynastic member but also to military-political elites from the dynastic circle and to lords who exercised actual governing authority. Therefore, the safest way to understand the element “-tegin” in historical names in Turkish is as “prince,” or depending on context as “a dynastic lord/governor”; for example, the name “Sul-Tegin” most likely carries layers of meaning such as “a prince of the Sul dynasty” or “a dynastic ruler associated with the Sul principality.”



As-Suli statue, Ashgabat, Turkmenistan

This reverse-ferz “King+Vizier vs. king+vizier” problem group related to Suli’s Diamond endgame study was first discovered and composed by Turkish National Chess Champion Tamer Karatekin during the lesson-preparation stage on “Suli’s Diamond” for the Erasmus+ Shatranj.ai curriculum project. Kitab ash-Shatranj contains a reverse-ferz king+vizier vs. king+vizier problem, but that position is a relatively simple example that ends in a draw. As a result, the mistaken assumption that reverse-ferz problems in historical chess would generally end in a draw—much like opposite-colored bishop endings in modern chess—was never seriously questioned for more than a thousand years, possibly partly because of the influence of that easier example in Kitab ash-Shatranj.

Since the surname Karatekin is derived from tegin, and since tegin denotes princely or dynastic affiliation, while al-Suli’s grandfather and family are associated with the name Sul-Tegin, we therefore refer to this harder family of related problems as the “Suli-Karatekin Diamonds.” The 40 reverse-ferz problems can be categorized into two geometrical piece motifs. In 24 of the puzzles, the geometry of the pieces evokes a diamond-shaped quadrilateral. For this reason, a particular puzzle from this group was the “Suli-Karatekin Diamond.” The FEN is: 5k2/8/8/2Q4K/8/8/8/5q2 w - - 0 1 and its solution can be found in the shatranj.ai curriculum documents and whitepapers.



Suli-Karatekin Diamond
Second geometry type example
White wins in 63-depth
8/5q2/8/8/8/8/3K4/Q4k2

To play shatranj yourself or against AI and setup these puzzles with FEN, you can use the play and study tool at the shatranj.ai project: <https://play.shatranj.ai>

The chess fonts used in this presentation and throughout the shatranj.ai project are also freely available to use in your personal and commercial projects: <https://github.com/TamerKaratekin/shahi-chess-shatranj-font> The shah/king’s top design in these fonts was also partially inspired from the headwraps of early chess masters such as As-Suli and Stamma. Ferz/vizier/queen top design is inspired by a military helmet.

