

# SHAPE CHESS

日出 (2010)

Play on a  $12 \times 12$  or larger square board with sufficiently many black and white stones.

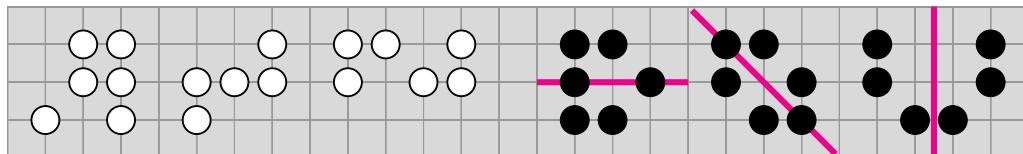
A **shape** is a stone together with all same-coloured stones that can be reached from the stone by orthogonal or diagonal steps. A shape is **symmetric** if it is preserved by reflection along a line.

Black begins. A turn is either a Drop, a Jump or a Push:

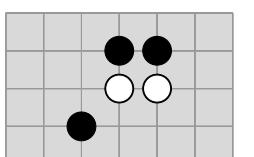
- **Drop** an own-stone on an empty point.
- **Jump** an own-stone from its current point to an empty point, anywhere on the board.
- **Push** an opposing stone to an adjacent empty point and place an own-stone at the origin.

If after your turn there are symmetric shapes of six or more own-stones then (1) remove these shapes from the board, (2) score  $n - 5$  points for a shape of  $n \geq 6$  stones, (3) you take another turn.

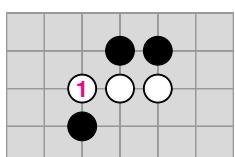
The first player to reach four points wins.



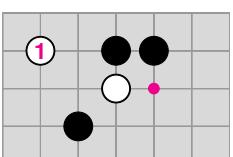
Three non-symmetric white shapes and three symmetric black shapes.



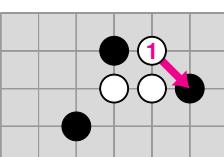
White's turn



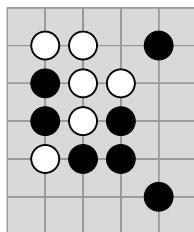
Drop



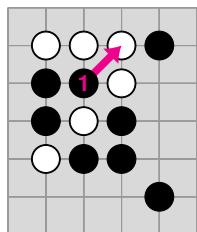
Jump



Push



Black to play and  
score



This push creates a symmetric shape of seven black stones which are removed and score  $7 - 5 = 2$  points for Black. Afterwards Black gets to make another turn.

**Basic scoring strategy.** Each scoring action comes with a drawback: the loss of stones, making it easier for the opponent to build symmetric shapes and harder for oneself to rake more points:

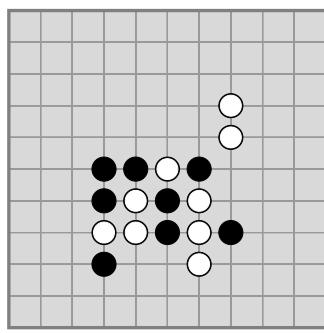
points scored:	1+1+1+1	1+1+2	1+3	2+2	4
stones discarded:	20	15	10	10	5

This is why it is usually better to aim for one's first symmetric shape size at least seven. On the other hand, after having two points, it can be worthwhile to score a 6-shape. With a score of three, every future threat towards any symmetric shape is absolutely forcing.

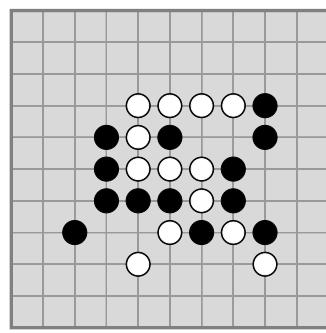
### Symmetric shapes

This game asks players to anticipate mirror-symmetric patterns. This is an unusual task but your eye can train to visualise such shapes.

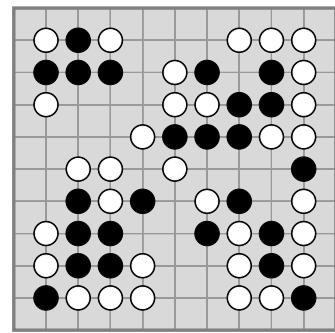
**Spotted shapes.** In each problem, find the move making most points for either side!



Problem 1.



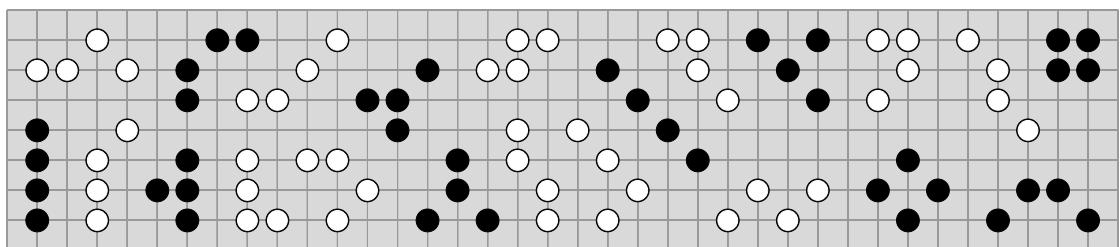
Problem 2.



Problem 3.

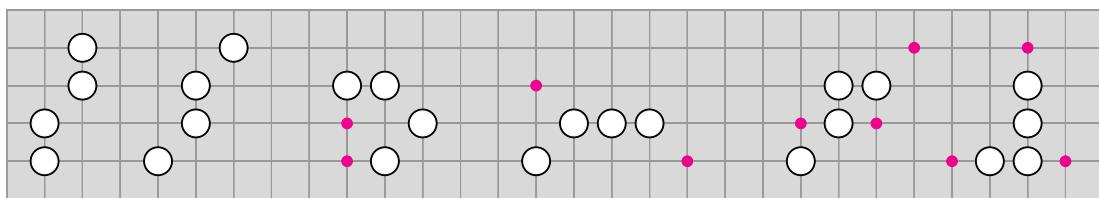
As shapes get larger, their number explodes and a shape is less likely to be symmetric. Counting patterns is a hard combinatorial problem but can be done for small sizes by computer programs.

	shape size:	2	3	4	5	6	7
number of symmetric shapes:		2	4	10	23	57	131
number of all shapes:		2	5	22	94	524	3031
ratio of symmetric shapes:		1.0	0.8	0.45	0.24	0.11	0.04



The 22 shapes of size 4, among them 10 symmetric ones.

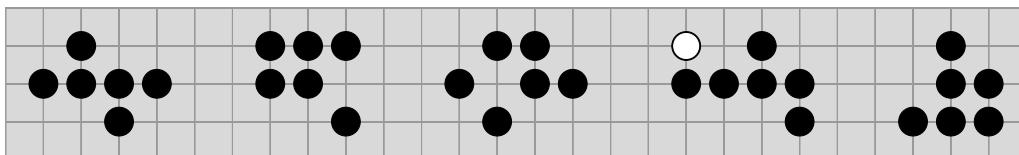
Of the 12 asymmetric 4-shapes, all but two are symmetrised by a drop, and the remaining two by a jump. However, the shapes differ in how many drops achieve symmetry, i.e. how close to symmetry they are:



All possible drops to create a symmetric 5-shape.

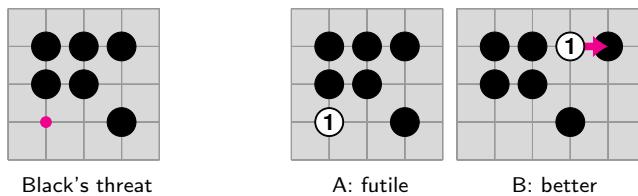
For gameplay, small symmetric shapes are useless — just the final scoring shape should be symmetric. Therefore, of use are patterns that can be symmetrised in many ways. For example, symmetry along grid lines and diagonals is easier to make and to extend than symmetry along half-grid lines (for example the bottom right shape in the diagram with all 22 shapes of size 4).

An asymmetric shape of size six or larger is called **secure** if the opponent cannot prevent it from becoming symmetric in a single turn. Here are some secure shapes:



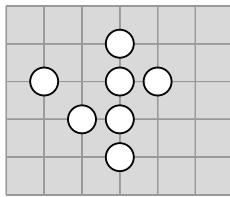
Secure 6-stone patterns: White has no move to prevent Black making a symmetric shape in the next turn.

While all secure, these shapes are not equal: as one instance, White can use a push to split the fourth shape (the one with the extra white stone) into shapes of sizes 2 and 4. Moreover, two of the shapes can be turned into symmetric 7-shapes with a black drop; in the other three, Black can —in a single turn— only jump for a symmetric 6-shape. As mentioned before, there is a crucial difference between scoring two points or just one. Let's look at one of the 2-point threats and see what White can do about it:

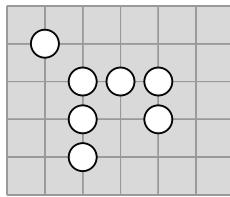


In reply A, White drops a stone but to no avail: Black can push away ① and get a black stone at that position, gaining two points. In reply B, White pushes one black stone off the shape. Next, Black can drop or jump for a symmetric 6-shape but that scores just one point, an improvement for White over doing nothing or the previous attempt. Depending on the actual position, another push may be more efficient.

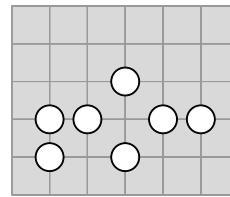
**Secure shapes.** For each of the following shapes, find White's threat and Black's best counter.



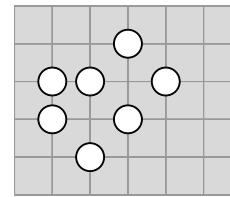
Problem 4.



Problem 5.



Problem 6.

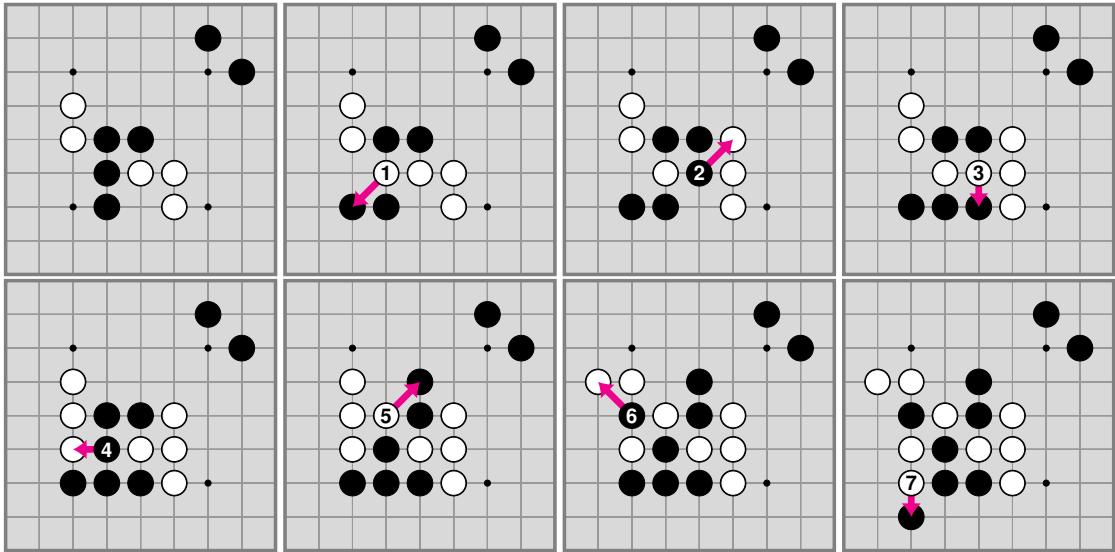


Problem 7.

### The three actions: push, jump, drop

On each turn, a player has to choose the type of move. Drops and pushes add an own-stone to the board which is generally desirable. Jumps allow to split shapes. Often, drops and jumps have no strong impact on the opponent's position because the other player can push the stone away — unless that stone has no liberties. The push is the standard kind of move because it is interactive: making the opponent's shapes less symmetric and often more connected.

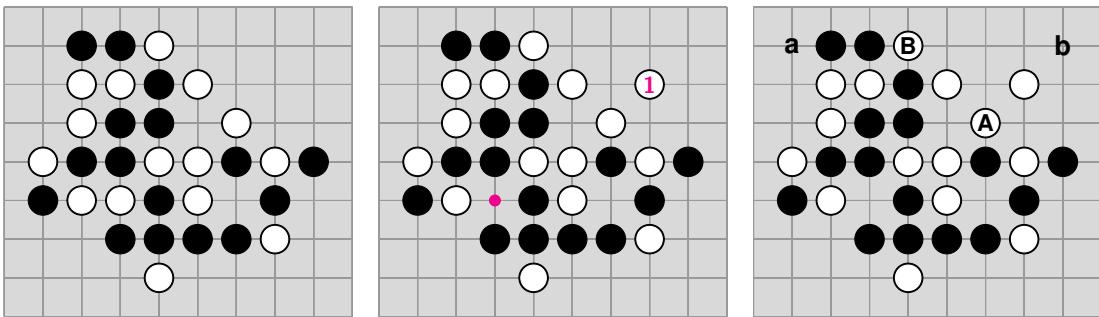
**A pushing battle.** Here is a push sequence during the initial stage of a real game:



This kind of sprawling growth is typical for the opening. Each move ①, ②, ③ is a 1-point threat and ④ is a 2-point threat. Afterwards, the shapes are too large and twisted for immediate threats. Again, this is common and once this stage is reached, jumps become attractive.

White's ③ has no liberties and is therefore fixed for the time being, and exactly the same holds for ④. Pushes have one limitation in being short-ranged but they are also sensitive to the position of opposing stones. This means that when there is no need to react to a threat one is often better off with a drop or jump.

**Jumps.** These can connect or dissect shapes, a great source of flexibility. The double threats so typical for pattern games arise in SHAPE CHESS mostly from jumps. In the following position, White's ring-like formation is too large. A clever jump removes one degree of connection and sets up a double threat, as next jumping either Ⓐ to *a* or Ⓑ to *b* will score three points:

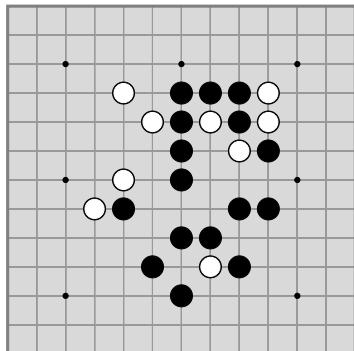


White to move but has no threats.

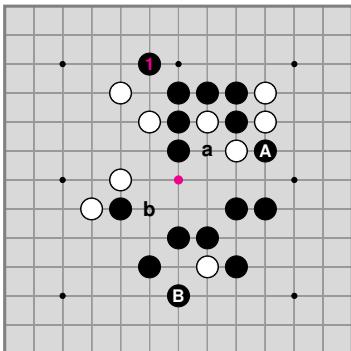
White jumps and...

...sets up two 3-point threats.

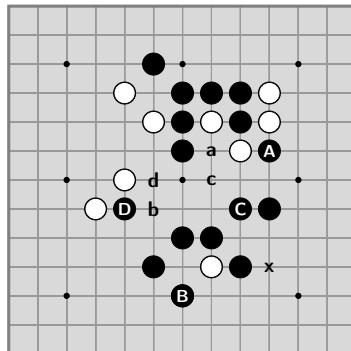
In the left-hand position below, Black is behind on points and has two shapes of reasonable size. Because White has just scored, there are no immediate threats and Black aims to build 2-point shapes. As it happens, there is a winning jump:



Black to play. Black 2, White 3.



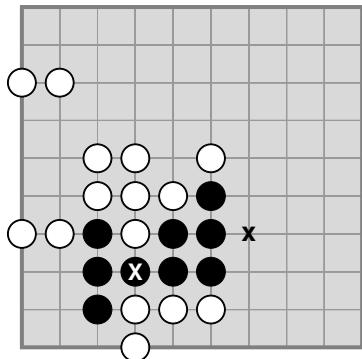
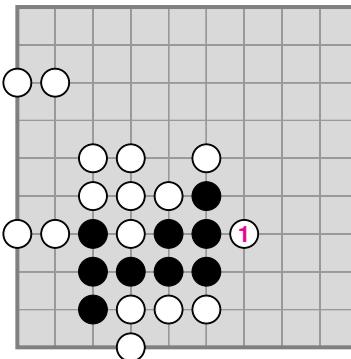
Winning move: jump



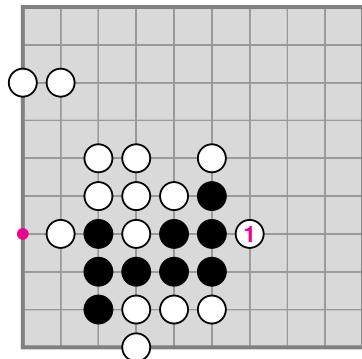
Refuting White's attacks

The middle diagram shows the jump and the double threat: Black can next score three points by either jumping **A** to *a* or by jumping **B** to *b*. Note how Black's jump keeps the two shapes separated. White's best bet is to enlarge the upper black shape by pushing a nearby black piece next to it. That's often good defence but in this position, Black can refute all these attempts. Pushing **C** to *c* is the weaker resistance: Black jumps **C** to the bottom, scoring a 6-shape and finally jumps **A** to *a*. If White resists more strongly by pushing **D** to *d* then Black keeps up the double threat by jumping **D** to *x*.

And here is a position with a defensive jump. Black is about to make a symmetric 6-shape with the indicated jump. White can defend by getting a stone on that point first. Both drop and jump work but the latter has the advantage of simultaneously establishing a threat.

White to defend against Black's jump  
x to x.

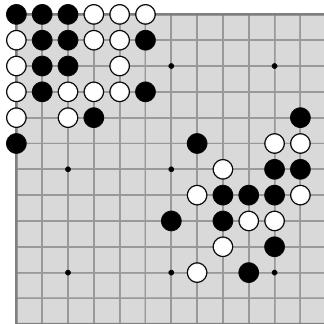
Drop: White defends but has no immediate threat.



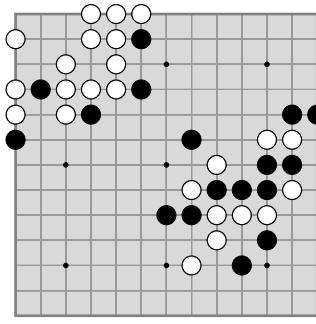
Jump: White defends and threatens to score three points.

**Drops.** This remaining action is just an ordinary placement. In SHAPE CHESS, it is used when you need to add a stone at a place without an opposing stone, so that a push isn't available — this is often the execution of a symmetric shape. More rarely, a push would be an option but is less desirable. As the previous diagram shows, even if you want to get a stone at a particular point, it is likely that jumping it from somewhere else improves the position. This is why drops are the rarest kind of action.

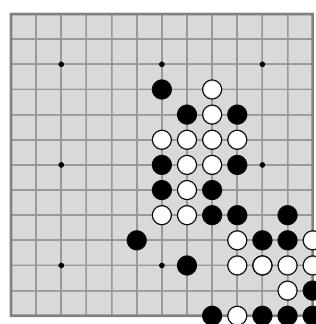
**Make three points in two turns!**



Problem 8. Black to play



Problem 9. White to play

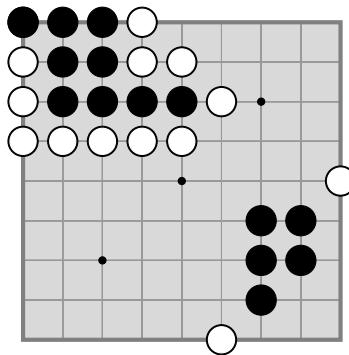


Problem 10. White to play

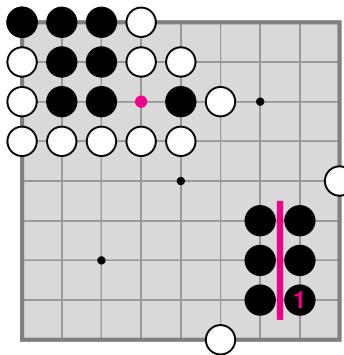
### Advanced concepts

SHAPE CHESS is a new game and this guide can only scratch at the heuristic surface. However, there are some more remarks to be made even at this stage.

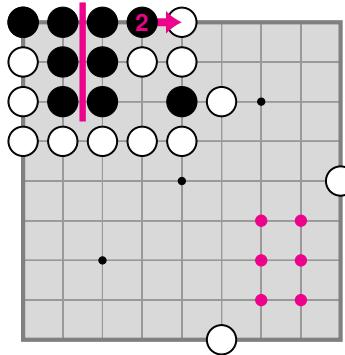
**Six-shape threats as a strategic subgoal.** We started with the observation that a 6-shape is an inefficient first scoring action, as it loses six stones for just one point. There is another reason to leave a symmetrisable 5-shape on the board: it may provide the opportunity to perform two actions somewhere later, often enabling a big turn. Here is a barebone position showing this principle:



Black to play and win.



Jump for a 6-shape...

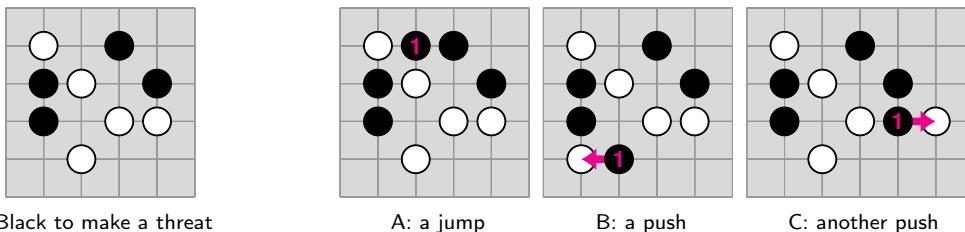


...then push for an 8-shape!

In other words: scoring a 6-shape immediately may lead to an almost wasted bonus action — a better opportunity may present itself. Go players know this as ‘aji keshi’, the unnecessary loss of potential.

It may well happen that your opponent spends a turn removing the 1-point scoring opportunity you intentionally left on the board. But you may consider that as a defensive action: your opponent did not do something else with the turn.

**Shapes that can be scored by a jump are preferable.** We have just discussed the power of such double actions: two local moves to create large symmetric shapes. Such maneuvers rely on auxiliary shapes that can be symmetrised by a jump. Here is an example for how debris can be turned into a one-point threat in various ways:



Black to make a threat

A: a jump

B: a push

C: another push

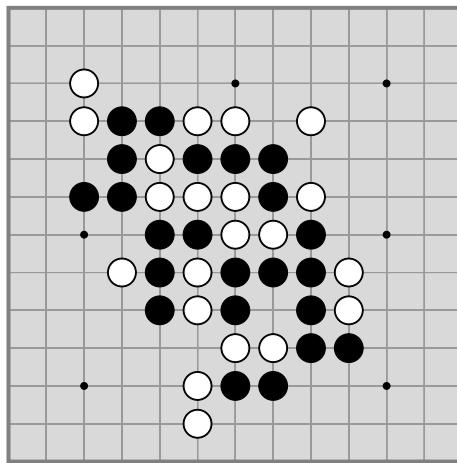
The jump could also be a placement but almost always some jump will be beneficial. Jumping is an advantage in itself —it improved the area where the jumped stone came from— but has a drawback in the shown position: the five-shape can be symmetrised only by a push.

By contrast, the two push moves have the advantage that the threat can be executed by a jump —enabling the double action maneuver just discussed. Moreover, they affect the white stones. Obviously, the destination of the push may vary, depending on the overall position. The drawback here is that Black had to spend a move in a non-urgent area.

Summarising, there are three ways to deal with a shape that can be turned into a symmetric 6-shape:

1. Score it immediately for one point. Do so if there is an urgent bonus action right away.
2. Enlarge the threat, enabling a move scoring two or more points. This may force a reaction.
3. Leave the shape for later, especially if the shape can be scored by a jump.

**Overconnectivity.** If neither side scores early then the midgame sees big, intertwined black and white groups. In such a situation, thinner connections are preferable. This can be measured by how many jumps are needed to split the blob into several chunks, where minuscule splinters of three or less stones don't matter (too small to score soon). The following position occurred after 41 moves and there have been no captures so far:

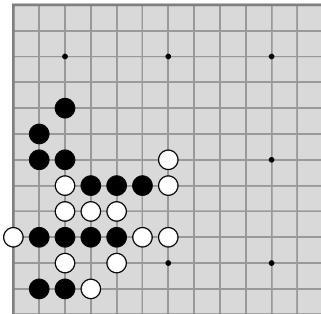
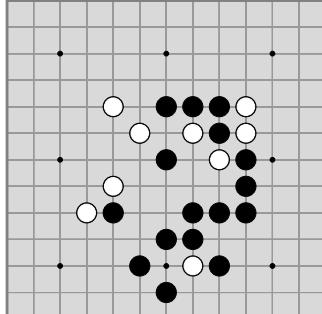
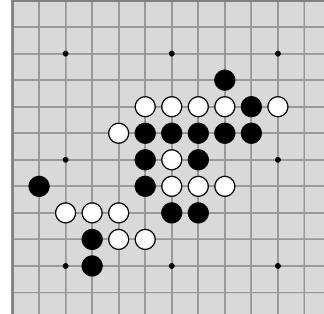


Black's ring is a strategic handicap.

Not only are all of Black's stones in a single connected group, it is impossible to split this group with a single jump. This ring shape is dangerous because it may spoil all future scoring! By contrast, the white stones form one big group and a few smaller ones and, importantly, the big group can be split with a single jump. In fact, White has a winning move. Can you find it?

This leads to another rule of thumb: if in doubt between connecting or separating your shapes, err on the side of less connectivity. *The enemy will link your shapes.*

**Opening analysis.**  $15 \times 15$ : best to play close to the edges, not in the centre — a bit like Go!

**Mate in 3 Black to play**Problem 11. Black to mate in 3.  
Score 3:3.Problem 12. Black to mate in 3.  
Score 2:3.Problem 13. Black to mate in 2.  
Score 2:3.**About the design**

The game's Chinese name is 形棋, Romanised as Xingqi. The first incarnation was from 2010, already with the goal of scoring symmetric shapes. The movement rules changed throughout and previous versions had various kinds of toggle capture. The rules given here are from 2022 and have no such toggling. The game is conveniently playable with standard equipment, such as WEIQI (Go) board and stones. Keeping track of scores is easy: when removing the stones from a symmetric pattern, discard five stones of them (back into the bowl) and put the remaining ones aside as your score.

Mention that **SHAPE CHESS** is played locally (in China) on the  $15 \times 15$  board, like **RENJU**?

**SHAPE CHESS** is a scoring game whose points come from certain patterns. It shares this property with **YINSH** (Kris Burm, 2003) where lines-of-five are scored. In both games, scoring shapes are removed (self-capture) — a natural mechanism creating tension between scoring and weakened board position. Moreover, both games have the same end condition: a game is over if a certain score threshold is reached (four in **SHAPE CHESS**, three in **YINSH**).

To my knowledge, **SHAPE CHESS** is unique in the kind of patterns it asks for. The classical pattern games aim for fixed patterns, i.e. shapes up to translation, rotation, reflection, such as lines in **CONNECT4**, **RENJU**, **CONNECT6**, one of line, triangle, ring in **HEXADE**, **SANQI**, **SIX**. A few games, mostly those about making squares, also allow scaling. **MANALATH** defines its winning patterns as groups of size five. By contrast, the scoring patterns of **SHAPE CHESS** can be arbitrarily large — and therefore more or less valuable, another distinction from **YINSH**.

Also unusual are the three very different types of actions. Each type is simple and two others — drop and jump — are standard fare. The last one, pushing is more complicated but still easy to visualise: movement of an opposing stone is limited to a king-like step.

As with most point-scoring games, players of different skill can introduce a handicap by letting the weaker player start with one or two points. Because **SHAPE CHESS** games end on reaching a point threshold, players can also agree to use a limit other than four for a longer or shorter match.

**Solutions to the problems**

Notation: **d5** is a drop; **e2-g8** is a jump; **f6:e5** a push. Points scored are indicated by (2).

1. Black's best push **e4-e3** (3) is much better than the jump **d5-h6** (1). White can only score by jumping: better than **d4-e3** (2) is **g4-g7** (3).
2. The key idea is to jump a stone, cutting a large shape into smaller pieces, one of which is symmetric. Another trick is to aim for a push over a jump, making a larger symmetric shape in the second turn.  
White's connection is best split at **f6**. Doing this immediately creates a symmetric 6-shape at the bottom. White can enlarge it by **f6-g3** (2). With the bonus action, White could jump again, **h8-d9** (1) for altogether three points. However, White can do better,

- gaining four points with **f6-d9 (1), e5-e4 (3)**. There are other ways to score four points, such as **f6-e9 (1), e10 (3)**. Black's pivotal connection rests at **g4**. For example, the jump **g4-b3 (2)** scores but Black cannot create another symmetric shape right away. Better is **g4-j7 (1), g6-g7 (3)**.
3. This is a puzzle: each side can sweep the board. White: **h10-d8 (1), h3-g2 (1), c9:c8 (10), e2-e4 (1)** for 13 points. Black: **f7-g3 (1), c5-e8 (1), d8 (1), j6-f2 (1)** for 4 points. Actually, a higher score is achieved by **i10:i11 (3), b4:a4 (3)** but I find the other solution more satisfying.
  4. White threatens three points with the drop **c4 (3)**. Black cannot prevent White from scoring in the next turn but can reduce that to a single black point by an appropriate push, such as **c3-b2 or b4-b5**. In fact, any white stone other than **d3** or **d4** can be pushed in such a way that Black can only score a single point with one action. This basic structure applies to the next three problems too.
  5. White threatens **d2 (3)** and most black pushes reduce to one point.
  6. White threatens **b4 (3)** and **f2 (3)**. Black's **e3-f4** is the only move to reduce to one point.
  7. White threatens **d2 (3)** and **c5 (3)**. Black can reduce to one point with e.g. **d5-d6** or **e4-f5**.
  8. The top left shape becomes symmetric with **a10** black and **c13** gone; the long chain in the lower right becomes symmetric with a black stone on **m9** and if **n8** was black. The jump **c13-m9** threatens **a10:b9 (3)** and **n8:m8 (3)**.
  9. Continuing the previous problem, symmetric shapes can arise again in the upper left or the lower right. One of these requires a double action. The jump **d12-i2** threatens **k5-l4 (3)** and **d10-b9 (1), a12-a11 (2)**.
  10. The smaller lower right shape is easily made symmetric but White's upper shape is too big. However, it can be reduced sufficiently: the jump **h6-k2** threatens **j10:k10 (4)** and **j1-a1 (3)**.
  11. The push **f4:g5** is a clever move. The white stone must go to **g5** as any other destination lets White win. Afterwards, Black threatens to score a line of six by pushing one of the white stones at either end. White's only option is to push, turning black's line into a larger shape. Most of these pushes are refuted in a single turn by Black. For example, **b2:a3; c2-a5** or **e5:d4; d2:d1** or **c4:b5; c7-f5**. Some White replies require Black to make an unstoppable double threat, for example **e4:f5; c7-d3** or **b4:b5; c7-a9** (threatening **b6** and **c4-f5**).
  12. This is from the game discussed on page ???. The jump **j6-g8** works.
  13. Black can make a point immediately, and that is indeed the solution: **g8-i5 (1), h9:h10**. The bonus action doesn't score at once but the resulting shape is secure is indeed the correct move.

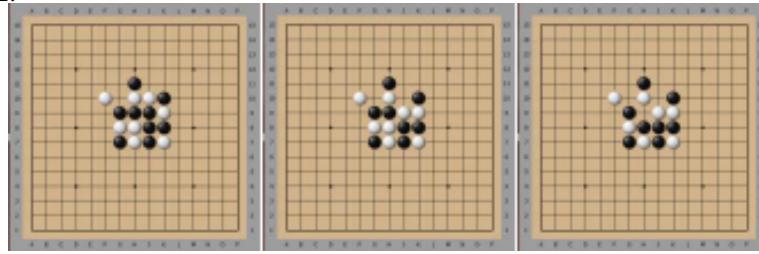


## Todo and discussion

Perhaps mention:

1. A position with two symmetric shapes (both are scored, only one extra move) vs. repeated symmetric shapes (an extra move each time).
2. At least one more problem needed, ideally a really hard one! :)
3. Perhaps a heuristic: fat clusters are bad — hard to symmetrise, and impossible to split into smaller chunks. Ideal are thinly connected formations because then jumps can enable threats. Vice versa: use pushes such that the opposing pieces end up in thick clumps.
4. lingo: ‘check’ for threatening a symmetric shape; ‘mate’ for reaching four points?

This is a test match between me and Tian. In order to preempt J9 (without the i coordinate), Tian (black) created a shape that must lead to scoring (the first picture) Meanwhile, the second picture is a mate in 2.



\* \* \*

### Email exchange with MY Tian, 3/2024:

- David: This is something that occurred to me: it is a bad idea to make a large, thick cluster of one own's stones. Such clusters are hard to make symmetric but also hard to disconnect – so that's inefficient.
- Tian: This is true. Actually, when your opponent have many stones on the board, a commonly-used strategy is to push their stones into a large (irregular) ring.

Besides, as you mentioned, scoring a 1-point (6 stones) could cause a big disadvantage in stone-amount. So in the beginning or midgame, some players may not care whether they give the opponent a "get 1 point in 1 turn", if the move is good in other aspects.

There are 2 main ways to threat:

1. Make one single shape a "score in X turns". (Like tsume-shogi problems, there can't be spare moves!)
2. Create 2 score-in-1 shapes at the same time. (Usually by jumping, similiar to what you did in Problem 01)

I prefer the second one, because the first requires the ability to look forward several steps, which it's hard for me. The second one requires some "creativity", maybe.