

Margo

Basics

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Margo Basics

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Cover photo of Margo Samurai set

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Sandra Snan for proofreading, analysis and excellent editorial suggestions.

Helen Gilbert for meticulous proofreading.

Margo

*The roots seek freedom
but the soil is hard and rare.
Not enough for both.*



Introduction

Margo is an abstract board game in which balls stack upwards to surround enemy groups and capture them. It was inspired by the famous territorial game Go, but involves a number of subtleties that make it distinct and open up new paths to explore. For example, balls pinned down by enemy balls survive capture, to remain alive in the game as zombies that can have a serious bite if you're not careful.

Groups die when they're surrounded on the board level. Since Margo is played on a relatively small board, this means that competition is fierce for the available board points, and play is pushed into higher levels as groups struggle to survive and cut enemy groups. It combines life-and-death analysis with 3D spatial planning to produce a truly complex game.

Margo is the deepest game that I've invented, and I believe the best. Sparring partner Richard Reilly and I have played it hundreds of times, continuously, since its creation in 2006, and feel that we've only scratched its strategic surface.

1 | Introduction

Most games produce regular surprises, which is a pleasing indication that there's still a lot to learn.

This book is intended to introduce Margo to new players, gently but without hiding its depth. The discussion is limited to what we know for certain about the game so far, and puts names to common plays and patterns that we've seen emerge; deeper strategic and positional analysis will take more years to develop properly. I hope that *Margo Basics* will encourage new players to take up the game, and help explore its mysteries.

Structure

The book is structured as follows:

Part I describes some useful tactical plays.

Part II provides strategic advice for the various stages of a game.

Part III presents annotated sample games and puzzles, at various board sizes.

Appendices include supplemental material and technical detail behind the game.

Tips

Summaries and key take-away points are highlighted in text boxes such as this one.

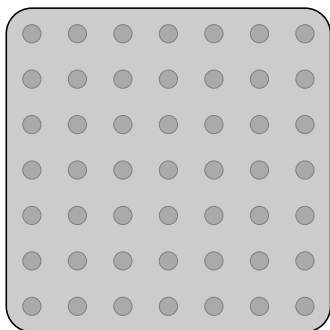


Rules

This chapter describes the standard rules of Margo. There are quite a few rules for an abstract board game, but each is really quite simple and should become second nature after a few plays.

Equipment

The standard board is a 7×7 square grid of holes.



Standard board (7×7).

Each player, White and Black, has at least 49 balls of their colour, or enough to cover the board.

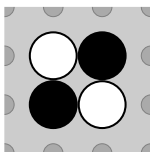
Play

The board starts empty. White plays first.

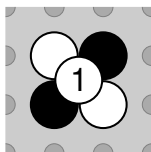
Players take turns placing a ball of their colour, on either:

- 1) an empty board hole, or
- 2) a square 2×2 *platform* of balls.

The following example shows a stacking move.



Platform.



Stacking move.

Freedom

The ball being placed must have *freedom* after the move. That is, it must be either:

- 1) adjacent to at least one empty board hole, or
- 2) visibly connected to at least one empty board hole by a chain of touching friendly balls.

Note that *only board holes are freedoms*.

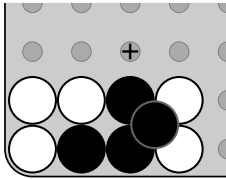
Groups

Balls that touch (adjacent to or resting upon each other) are *connected*. A *group* is a connected set of same-coloured balls. Single balls are groups.

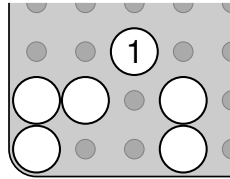
Capture

After each ball is placed, any groups without freedom (that do not contain that ball) are captured and removed.¹

For example, the black group below has a single freedom (adjacent empty board hole) marked (+). White move 1 removes that freedom to capture the entire group.



Black group.



White 1 captures it.

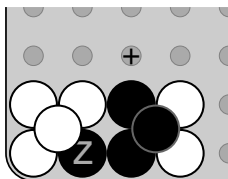
A group under immediate threat of capture is said to be *in atari*.

Zombies

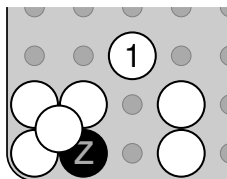
Balls that are *pinned* in place by one or more enemy balls, directly or indirectly above, survive capture and remain active in the game as *zombies*. For example, the black ball (z) pinned by a white ball (below) is a zombie, and survives capture following move 1.

¹ See Appendix B *Revealed Captures* for more details.

2 | Rules



Black group in atari.



Zombies survive capture.

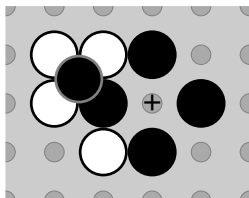
A ball is *buried* if there's another ball straight above it, hiding it from view.

Constraints

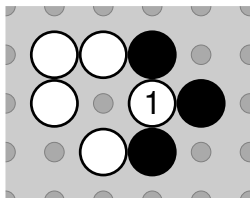
No Passing: Players may not pass.

No Repetition: Players may not make a move that would repeat any previous board position with the same player to move.¹

No Suicide: It is not allowed to place a ball that would have no freedom after the move. Note that balls are allowed to create their own freedom, such as White move 1 below.



White to play.

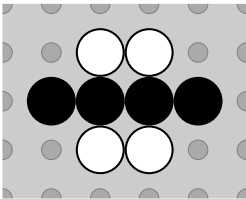


1 creates freedom.

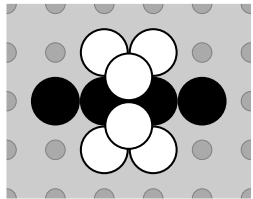
¹ Go players might recognise this rule as *situational superko*.

Overpasses Cut Underpasses

Only visible connections count (viewed from above), hence higher-level connections cut lower-level connections that they cross over. For example, the black group below (left) is cut into two separate groups by a white *overpass* (right).



One black group.



Two black groups.

Overpasses may themselves be cut by even higher level overpasses.

Aim

The game ends when the current mover has no legal moves. It is won by the player with the most balls in play (including zombies).

If both players have an equal number of balls in play, then the game is a draw.

Beginner's Game

Beginners wishing a shorter game may instead win by making the first capture.

Swap Rule

The game may optionally be played with the following *swap rule*:

In reply to the opening move, the second player may elect to swap colours in lieu of moving.

This effectively steals the opening move, and discourages the first player from making too strong an opening move. It is recommended that evenly matched opponents – especially experienced players – use the swap rule.

Scoring

Counting captured balls can be easier than counting balls in play.

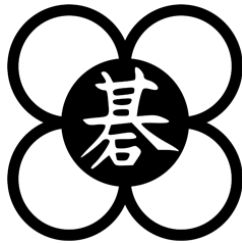
Rules in a Nutshell

Place a ball at any playable point.
Capture enemy groups with no freedom.
Pinned balls (zombies) survive capture.
No passing. No repetition. No suicide.

Only board holes are freedoms!

PART I

Tactics





Groups

Margo is all about groups, or connected sets of same-coloured balls. This chapter discusses points related to group formation and group safety.

Points

A *point* is anywhere that a ball can potentially be placed, which includes board holes and higher level stacking points. Points can exist in the following states:

Playable: A point is *playable* if a player can legally move there. Points can be playable to one player but not the other.

Dead: A point is *dead* if neither player can legally move there.

Safe: A point is *safe* if a player can move there without putting a friendly group in *atari*.

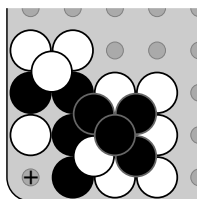
Owned: A point is *owned* by a player if it is safe to them and unplayable to the enemy.

Basics

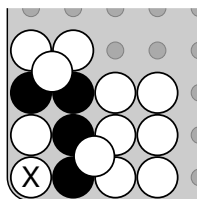
Group Safety

A group is *safe* if it has at least one freedom that is not playable to the enemy. This will typically happen if zombies protect that freedom.

For example, the following position (left) shows a safe black group, with a single freedom (+). White move X would capture several black balls (right), but would have no freedom itself after the move; White can't play here due to the No Suicide rule.

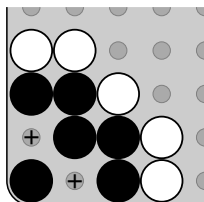


Safe black group.

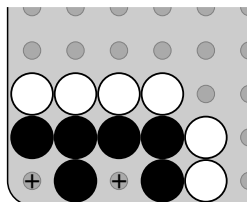


White can't play X.

Groups don't need zombies to be safe. The following black groups are also safe, as they each have two freedoms (+) that White can't play at.



Safe black group.



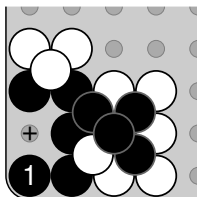
Safe black group.

A group with a single playable freedom, in danger of immediate capture, is said to be *in atari*.

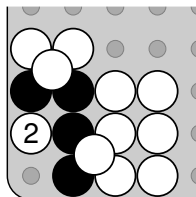
A group with at least one freedom
(unplayable to the enemy) is safe.

Safety is Relative

The black group in the first example above is safe because White can't play at its last single freedom. However, Black can make make this group unsafe again by playing there, as shown below. Black move 1 makes the group's last freedom playable to White (left), and White plays move 2 there to capture most of the group (right).



Unsafe black group.



White captures.

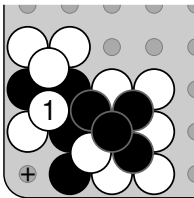
It may seem absurd for Black to make such a move, but they may eventually be forced to do so, when the board fills up and there are no safe moves remaining.

Safety is not absolute in games with no passing.

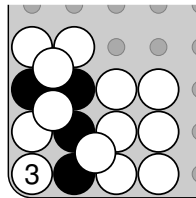
Basics

Group Invasion

Another reason that safety is not absolute is that groups can be *invaded*. Returning to our original example, White move 1 (below) invades the black group to make it decidedly unsafe. White can capture this group next turn with move 3 (right).



Unsafe black group.



White captures.

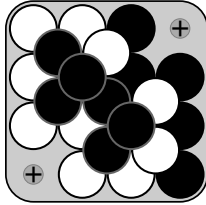
Groups with smaller internal territories are harder to invade.

Dead Safe

Group safety can be more permanent, if at least one adjacent freedom is a dead point that neither player can move at. This can occur if enemy groups overlap to mutually support each other, as shown below.

3 | Groups

Both the white and black groups in this 4×4 game are safe, as each is adjacent to a dead freedom point (+). This game has ended as there are no legal moves for either player.



Dead points give safety.

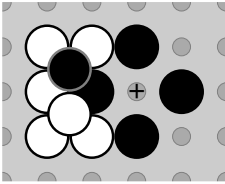
Note that such cases of permanent safety are rare, as dead points can usually be made playable again later in the game.

An adjacent dead freedom makes a group safer.

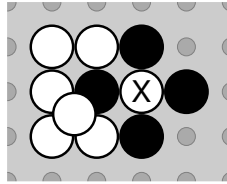
Virtual Groups

A *virtual group* is a set of groups that share at least one common freedom and are safe from immediate capture. For example, the following position shows a virtual black group (left). White can't make capturing move X (right) as that ball would have no freedom after the move.

Basics

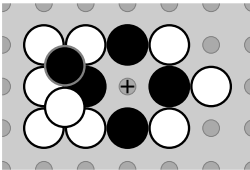


Virtual group.

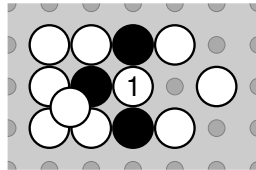


White can't capture.

White can break this virtual group by making one (or more) of its constituent members unsafe, as shown below (left). White can now play capturing move 1 (right).

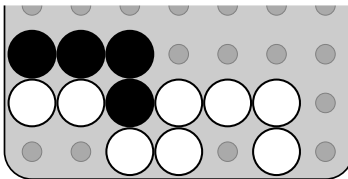


Unsafe groups.



White can capture.

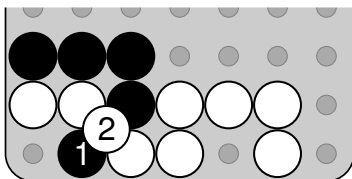
The following example shows a virtual white group, of a different form. In this case, the group's freedoms are surrounded by the constituent member group rather than external to them, making the group easier to defend.



Virtual group.

3 | Groups

If Black plays cutting move 1 (below), then White can bridge over to complete the connection with move 2 and guarantee the group's safety.



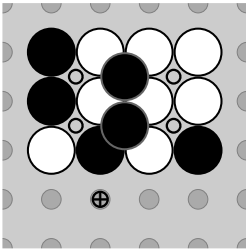
Black can't cut.

Internal freedoms are easier to defend.

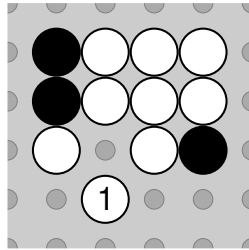
Groups Grow from the Board

Many players have trouble remembering the rule that *only board holes are freedoms*. For example, the central black group shown below has five *growth points* (circled), but only one of these \oplus is actually a freedom. White move 1 removes this single freedom to kill the group. The other four growth points are not freedoms, as they're not board holes but higher level stacking points on 2x2 platforms.

Basics



Five growth points...



...but only one freedom.

It helps some players to visualise each group as a tree with roots on the board. If the roots cannot grow then the tree dies (thanks to Daniel Schulz for this analogy).

Another way to remember this rule is to think of Go. In both games, Margo and Go, freedoms only exist in the 2D plane on the board level.

Every group must start on the board level, and grow from there.

Freedoms only exist on the board level.

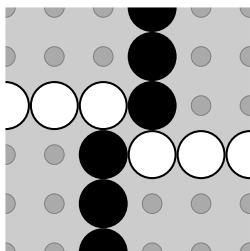


Bridges

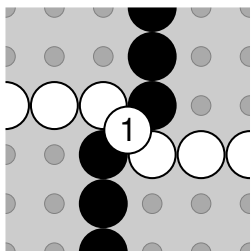
Bridges are fundamental to Margo and make up much of its unique 3D character. They allow groups to escape capture and allow players to cut enemy groups in two. This chapter describes the key bridge plays.

Bridges

A *bridge* is any connection built on existing balls. For example, the next player to move in the following situation (White in this case) can play a bridge to connect their groups.



White to play.



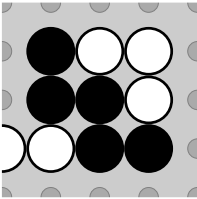
Bridge move 1.

Tactics

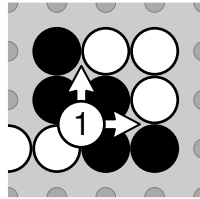
A bridge is an *overpass* if it cuts a connection (*underpass*) crossing underneath it.

Bridge Fork

A *bridge fork* guarantees connection between two groups by establishing two bridge threats with a single move. Consider the following situation, in which White move 1 poses two connection threats, and Black can only block one next turn.

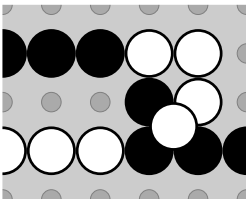


White to play.

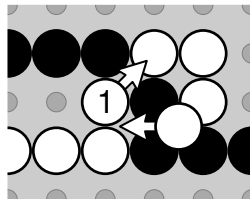


Bridge fork.

The following figure shows a variation, in which White move 1 establishes two disjoint bridge threats between the two white groups, guaranteeing their connection (right).



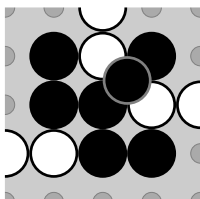
White to play.



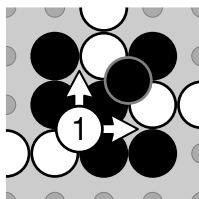
Bridge fork.

4 | Bridges

The following example shows a different type of bridge fork, in which one white group threatens to connect to two others with move 1. Black must decide which connection to block.



White to play.

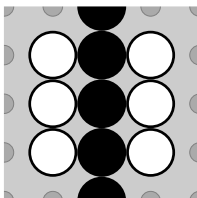


Bridge fork.

Bridge forks guarantee a connection.

Cross-Bridge

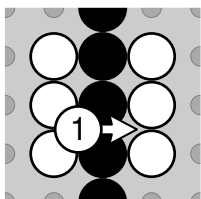
The *cross-bridge* is a move sequence that allows a player to force a connection across an intervening wall of enemy balls. For example, consider the following situation, with White to play.



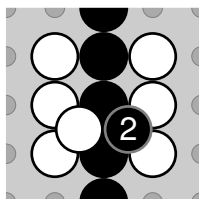
White to play.

Tactics

White threatens to bridge across with move 1, forcing Black to block with move 2.

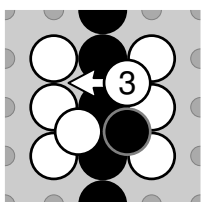


Threat to the right.

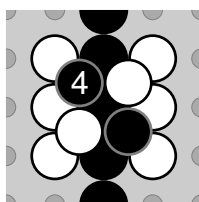


Block.

White then threatens to bridge across in the opposite direction with move 3, forcing Black to block with move 4, thus creating a 2x2 platform.

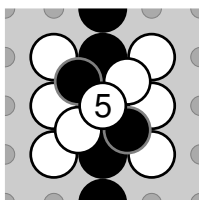


Threat to the left.



Block.

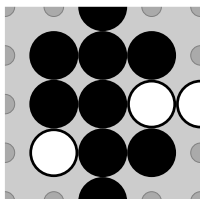
White can now play on this platform, to complete the connection with crowning move 5.



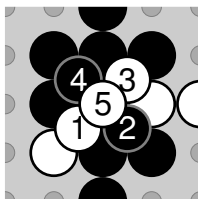
Crowning move.

4 | Bridges

Cross-bridges can be forced from a single ball, as shown below with moves 1–5.



Single ball on left.



Success.

The initial move 1 was made from the ball with the fewest stacking points. The destination ball must have two stacking points or the connection can be blocked; this cross-bridge would not have worked going in the other direction.

Note that even though Black played the cross-bridge sequence to completion in these examples, they would not normally do so in practice. If Black knows that move 2 will not succeed in blocking White's connection, they should abandon this battle and play move 2 somewhere more useful. Even better, players should prevent such positions from occurring in the first place.

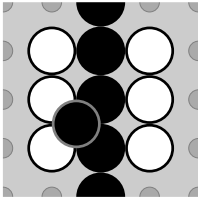
Cross-bridges connect two groups.
Abandon lost cross-bridges.

Tactics

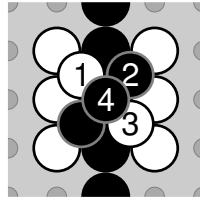
Initiative

The following example shows a similar position, but with an additional black ball in the cross-bridge path (left). Black has the *initiative* in this case, even though it's White's turn to play.

White must attack from the left side with move 1, as the white ball on that side only has a single stacking point.



White to play.



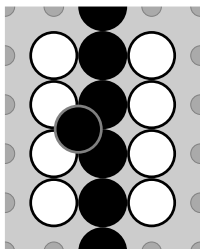
Black defends.

This cross-bridge fails for White (right) as Black is one move ahead in this bridge building race, and gets to place the crowning ball 4 instead of White. Move order is critical.

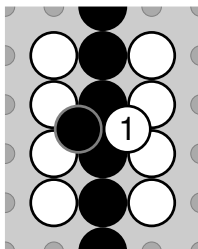
Don't start a cross-bridge
without the initiative.

Cross-Bridge Fork

The situation is different if the attacker has an additional avenue of attack, as shown below. White move 1 to establishes a *cross-bridge fork*.

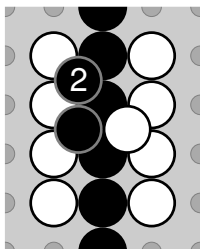


White to play.

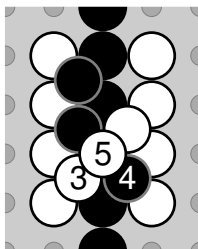


Cross-bridge fork.

If Black defends one avenue with move 2 (left), then White uses the other avenue to secure the connection (right), and vice versa.



Black defends.



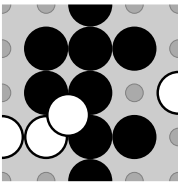
White takes other side.

Fork defenders to either side.

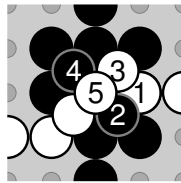
Tactics

Revealed Cross-Bridge

The following example shows a *revealed cross-bridge*. The rightmost white group hasn't reached the wall yet, but the leftmost white group has a stacked ball that will give it the initiative in the cross-bridge sequence. White can play move 1 to force the cross-bridge as shown.

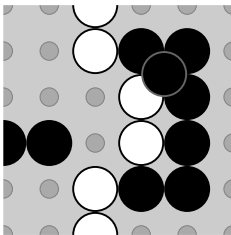


White to play.

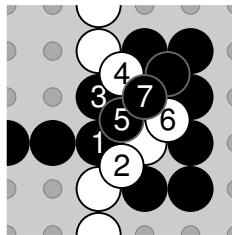


Revealed cross-bridge.

The following example shows a more complex case. Moves 1 and 3 force blocking replies 2 and 4, then move 5 sets up the cross-bridge for Black.



Black to move.

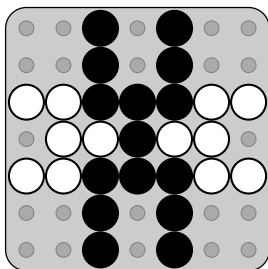


Success.

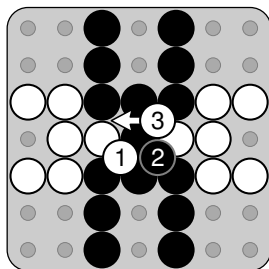
Revealed attacks have the element of surprise.

Counter-Cross-Bridge

The following situation shows an apparently safe black group and two vulnerable white groups (left). White can threaten to join their groups, and cut the black group, with a cross-bridge (right).

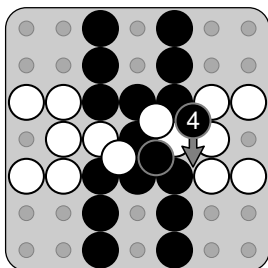


White to play.

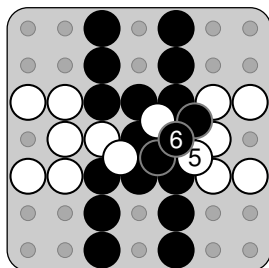


White cross-bridge.

However, Black can reconnect with *counter-cross-bridge* move 4 perpendicular to it (below).



Black counter-cross-bridge.



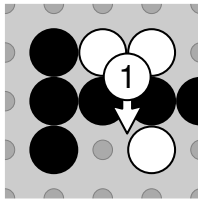
Black prevails.

When crossing, beware of counter-crossings.

Tactics

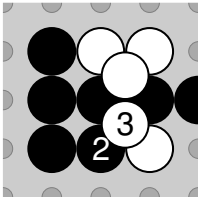
Virtual Bridges

A *virtual bridge* is an implied bridge connection that doesn't yet exist but can't be blocked, regardless of who moves next. For example, the following position shows white ball 1 with an implied bridge to the single white ball below.

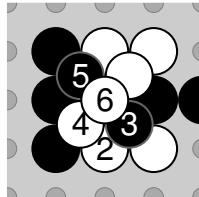


Virtual bridge.

If Black makes move 2 (left), then White can complete the connection with bridge move 3. If White makes move 2 (right) then they can force a cross-bridge.



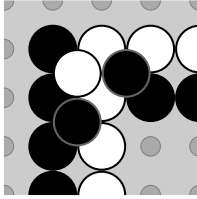
Bridge if Black 2.



Cross-bridge if White 2.

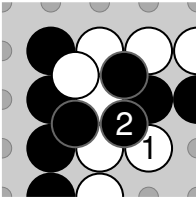
Similarly, the following example shows a position in which the two black groups are virtually connected.

4 | Bridges

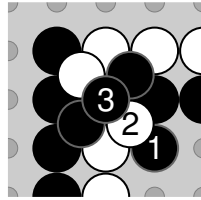


Virtual black connection.

If White makes move 1 (left), then Black can complete the connection with move 2. And if Black makes move 1 (right) then they can force a cross-bridge crowned with move 3.



Bridge if Black 2.



Cross-bridge if White 2.

Virtual bridges guarantee connection.

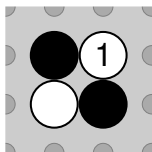


Zombies

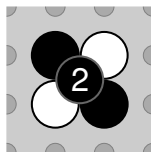
Zombies can strongly influence play and often decide games. In general, it is best to create as few zombies as possible, and to have more zombies than your opponent. The conflicting urges to build upwards but to not create zombies give a fundamental balance to Margo. This chapter describes some of the key plays for creating and exploiting zombies.

Making Zombies

The classic move for creating a zombie is the *cross-cut* move 1, shown below. This invites the opponent to connect their balls with bridging move 2, at the expense of creating two enemy zombies (right). This is called a *zombie invitation*.



Invitation to stack.



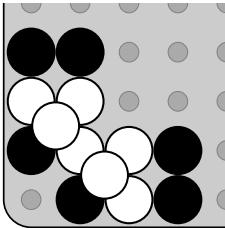
Two new zombies.

Tactics

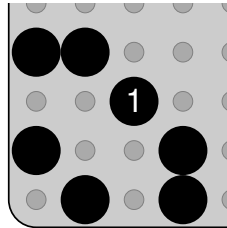
Balls at higher levels are generally more powerful, but the easiest way to build upwards is usually over enemy balls. The conflicting urges to build upwards, but not create zombies, mean that most stacking moves are something of a double-edge sword that require careful thought.

Releasing Zombies

It is possible to release zombies by capturing the balls that pin them. For example, the two black zombies in the following example can be released by capturing the pinning white group with move 1 (below). The freed zombies are now just regular balls again.



Two black zombies...



...released by capture.

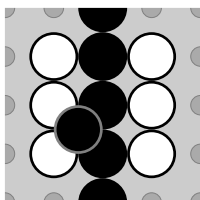
Note that several balls (at least three) must be captured to release zombies. Such releases typically require mass captures to occur.

Most zombies do not get released.

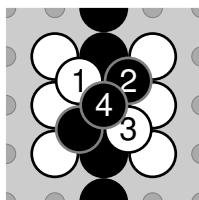
Zombie Factories

Connection threats can be used to make the enemy create zombies. Sometimes they can be used to make the enemy create *lots* of zombies.

Consider the *Move Order* example from the previous chapter, shown below. White move 1 initiates a cross-bridge that is doomed to fail.

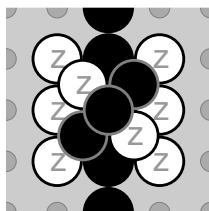


White to move.



Black wins the battle.

Black wins this battle with crowning move 4, but in the process creates an additional six white zombies (below). White now has two strong bases from which to attack, one on each side, and an almost certain 8 points added to their score. Black may have won the battle, but White has possibly come out ahead.



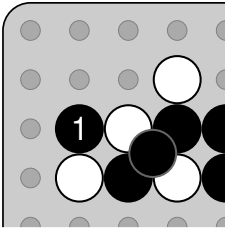
Lots of zombies.

The battle may not be worth the zombies it creates.

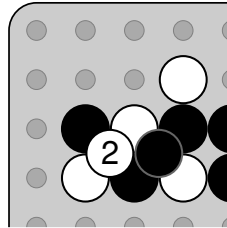
Tactics

Avoiding Zombies

Black move 1 (below) intrudes into enemy territory. White move 2 (right) is the obvious response, but that would create a threatening zombie in home territory.

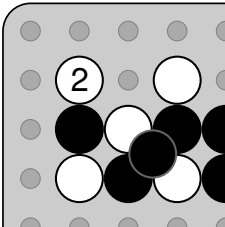


Black 1 intrudes.

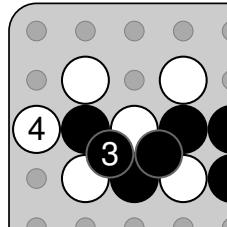


2 makes a zombie.

Instead, a better defense is to attack the intruding ball with move 2 (below). If Black bridges across with move 3 (right), then White can play 4 to establish a strong defensive position.



A better defense.

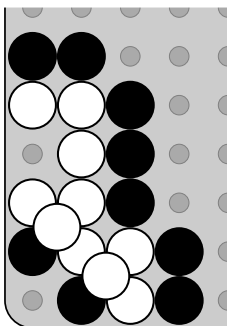


White dominates.

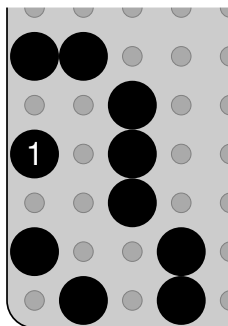
Avoid making zombies in home territory.

Zombie Foundations

Enemy zombies are dangerous to create and dangerous to build on. For example, the white group below may appear to have two freedoms (left), but the two black zombies cut the corner point off. This group only has one freedom, which Black can occupy with move 1 to capture (right).

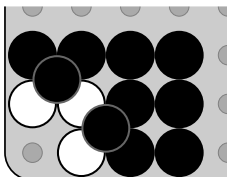


One white freedom.

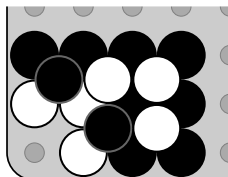


1 kills the group.

On the other hand, friendly zombies can be good to build on, as they offer a relatively permanent base. Consider the following example.



One white freedom.



Safe white group.

Tactics

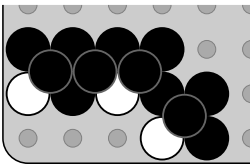
The white group (left) is firmly pinned in place and safe from capture. White can use this base to safely extend the group (right).

Enemy zombies make bad foundations.
Friendly zombies make good foundations.

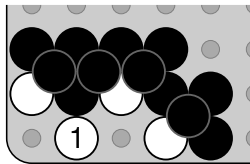
Zombie Support Groups

Most zombies, once created, remain fixed for the remainder of the game. This can make them more reliable support bases than unpinned balls, which are subject to capture.

For example, the position below shows a black group apparently dominating the corner (left). However, White can intrude with move 1 to establish a safe virtual group and steal the corner.



Black corner?

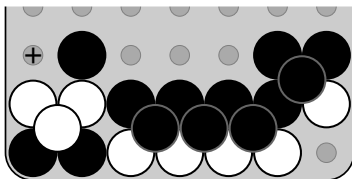


White steals it.

Friendly zombies offer support.

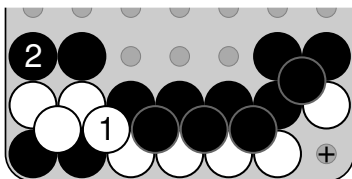
Zombies on the Edge

In addition to being relatively permanent, zombies along the board edge can't be cut. For example, the following position shows a white group in *atari* (left), with White to play.



White, in *atari*, to move.

White move 1 bridges to the nearby line of zombies, which act as a *conduit* to freedom (+).



Safe single-freedom group.

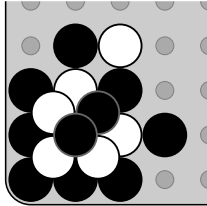
Even if Black plays move 2 to contain the group, this unplayable freedom makes the group safe. Black can't cut this freedom from the group, as the connecting zombies are along the board edge.

Connections along the board edge can't be cut.

Tactics

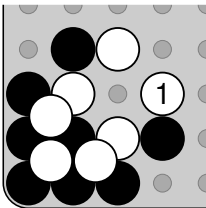
Zombie Sandwich

Zombies may be interleaved in multiple layers, as shown below. Such cases require both players to perform captures to release the most deeply pinned zombies.

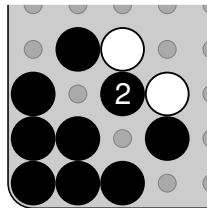


Layered zombies.

For example, White move 1 removes the top layer of black zombies, freeing the five white balls (left). Black move 2 then removes those five white balls to release the black zombies underneath.



One layer removed.



Another layer removed.

Note that such cases are rare, and that both players would have to cooperate to achieve such a zombie release. The even rarer case of revealed captures is discussed in Appendix B.



Territory

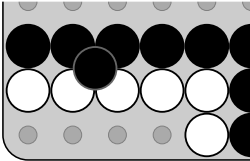
Territory is a scarce and valuable resource in Margo, as the only freedoms are board holes and the board is relatively small. While territory may seem a secondary consideration in the early game, it's importance becomes more obvious as a game progresses, and it's ultimately the deciding factor of almost every game. Plan to secure as much territory as possible from the start. This chapter describes some of the key ways to maximise your territory and minimise your opponent's.

Invasion

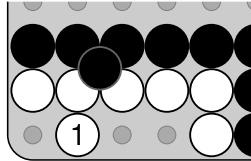
The relatively small size of the Margo board means that players' territories tend to be small, and typically contain no more than a few board points each. This means that invading groups usually do not have enough room to make themselves safe, so must rely on support from nearby friendly groups.

Tactics

Consider the situation shown below. White can make their group safe with move 1 or the point to the right of it.

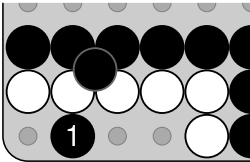


White dominates.

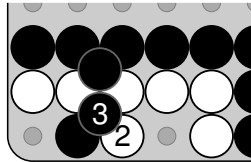


1 makes the group safe.

However, Black can invade if they have the move instead (below, left). White doesn't want to make the obvious reply 2 (right), otherwise Black can bridge over with 3 to cut the white group in two.



Black 1 invades.



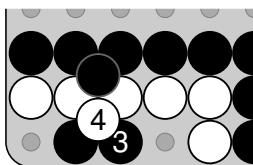
White can't defend.

Nor does White want to play to the left of the black invader, as that would allow Black to reduce the white group to a single freedom. White has no good immediate defense against this invasion.

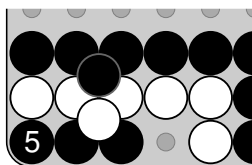
Use bridge threats to invade.

Bridgeheads

Continuing this example, Black can play move 3 (below) to force reply 4 from White. This creates a *bridgehead* for Black, which is a strong group established in enemy territory, usually made up of zombies. Black can then play sacrificial move 5 to put the white group in *atari* (right).

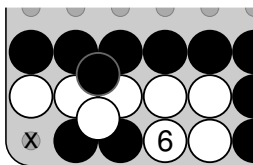


3 forces two zombies.

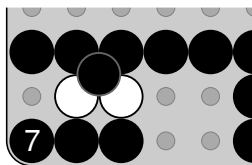


5 is a sacrifice.

White can capture one invader with move 6, but the bridgehead remains and Black can kill the white group with move 7. Such a capture leading to a bigger capture is called a *snapback*.



White captures...



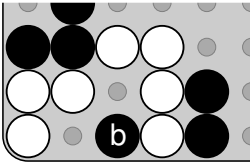
...but Black snaps back.

Engineer zombies in enemy territory.
Don't create enemy zombies in your territory.

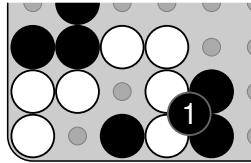
Tactics

Escalades

The elevated black ball in the examples above is an *escalade*, which is a move that scales an enemy wall to overlook the other side. For example, the invading black ball *b* (left) is supported by escalade move 1 (right).

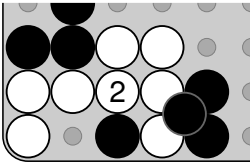


Invading ball *b*.

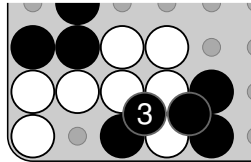


Escalade move 1.

White's obvious defensive move 2 (below) fails, as that would allow Black to bridge across with move 3 (right) to consolidate the invasion.



White 2 attacks...

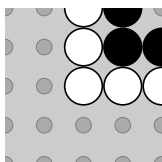


...but Black 3 defends.

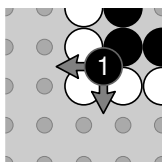
Escalades support isolated balls.
Escalades create bridgeheads.
Escalades deter enemy placements.
Use escalades to invade!

Double Escalade

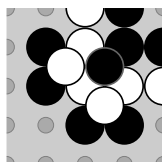
A *double escalade* occurs when a ball climbs an enemy wall to overlook two sides at once. Move 1 (below) is a double escalade. The continuation shown on the right demonstrates the power of the double escalade. Black can engineer two bridgeheads for a strong invasion.



Black to play.

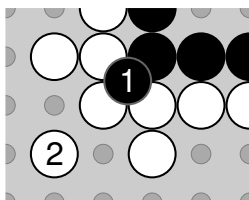


Double escalade.

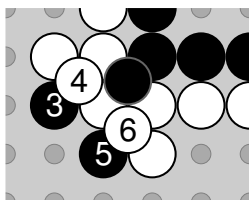


Continuation.

The following example shows a variation on this position. White would be wise to reply to double escalade 1 with defensive move 2 (left), otherwise Black can engineer an invading zombie pair.



White should defend...



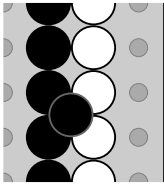
...or Black can invade.

Double escalades can be strong moves.

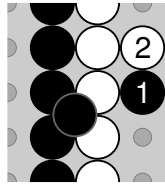
Tactics

Escalade Fronts

Escalade *fronts* of more than one ball are generally more powerful than single balls. The following position shows an escalade with a single-ball front, with Black to play. If Black makes intruding move 1 (right), then White can put it in *atari* with 2 and capture it next turn.

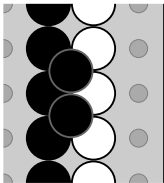


Single front.

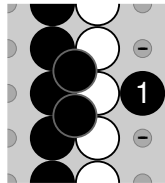


Black 1 dies.

However, if the escalade has a two-ball front (below), then intruding move 1 is safe from capture (right). White does not want to play at either adjacent point – for fear of a bridge.



Double front.



Black 1 is safe.

Broader escalade fronts are stronger.



Cycles

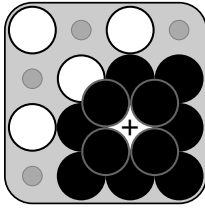
Cycles, although rare, can legitimately occur in Margo, and can be devastating if one player can cycle a local position while the opponent is forced to fill in territory. This chapter involves more advanced concepts, and is best read only if you are familiar with the rules of the game and the concept of point ownership.

Differential Cycles

A *differential cycle* occurs when both players repeat a local cycle, but one player is forced to play a move elsewhere – outside the cycle – per iteration. The cycle is described as “local” since the global board state changes each turn, due to the “elsewhere” ball played per iteration.

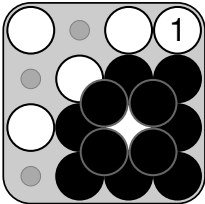
Consider the following position, with White to play. A 4×4 example is used for simplicity. This position was taken from an actual game, annotated in full in Chapter 11 *4×4 Game*. Note that Black owns one point (+).

Tactics

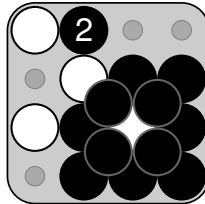


White to play.

Move 1 (below) puts the black group in *atari*, forcing Black to capture with reply 2 (right).

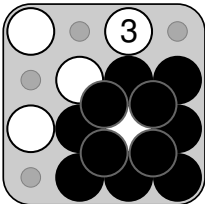


1 creates *atari*.

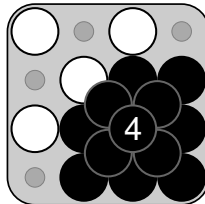


Forced reply 2.

White recaptures with move 3 (below) to complete the local cycle. Black plays the “elsewhere” move 4 at the only point they own (right).



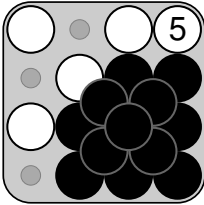
3 completes the cycle.



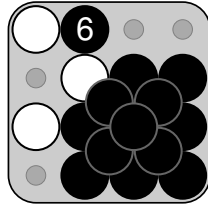
“Elsewhere” move 4.

7 | Cycles

Move 5 (below) again puts the black group in *atari*, forcing Black to capture with reply 6 (right).

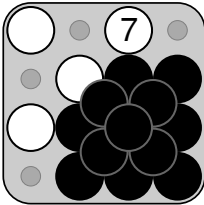


5 creates *atari*.

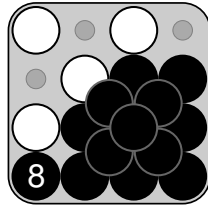


Forced reply 6.

White again recaptures with move 7 (below) to complete the local cycle. Black doesn't own any more safe points, so must play the "elsewhere" move at an unsafe point (right).



7 completes the cycle.

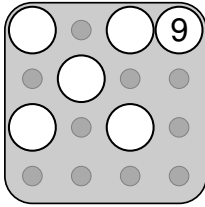


"Elsewhere" move 8.

Move 9 (below) performs a mass capture that clears the board of black balls. Captures don't get much more decisive than this.

This cycle has a differential ratio of 2:1, as White loses two balls per iteration while Black loses one. Such cycles can be devastating in the territory-filling stage of the end game, where every ball added is another step towards defeat.

Tactics



Mass capture.

The fact that the cycle is local means that the No Repetition rule was not violated, as the global board state changed with each move.

The differential cycle sequence is summarised below.

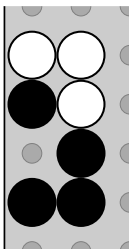
Differential Cycle

1. A puts B in *atari*.
2. B captures two balls (including 1).
3. A captures 2.
4. B must play play elsewhere.

Don't perpetuate a local cycle if the opponent's "elsewhere" moves hurt you.

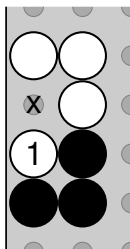
Blocking Cycles

The following example shows a similar cycle about to be initiated by White.

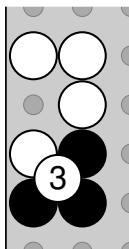


White to play.

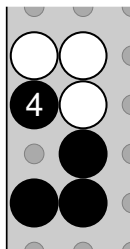
White move 1 captures the threatened black ball, forcing Black to play move 2 elsewhere due to the No Repetition rule. White plays 3, then Black captures both with move 4 to complete the cycle.



1 captures.



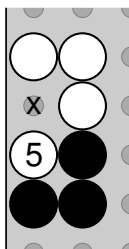
3 delays.



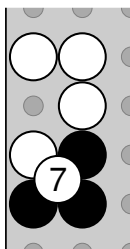
4 captures.

The cycle is repeated below with moves 5–8. This is another local cycle with a differential ratio of 2:1, in which Black plays a ball elsewhere per iteration.

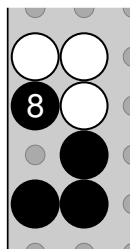
Tactics



5 captures.

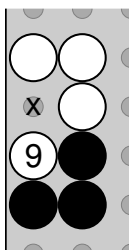


7 delays.

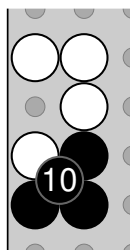


8 captures.

However, Black has an easy solution in this case; to shut the cycle down by occupying White's buffer point with move 10, as shown below.



9 captures.

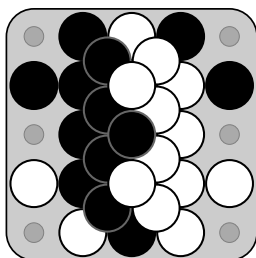


10 blocks.

Block differential cycles if possible.

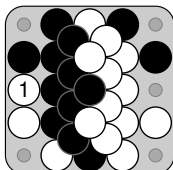
Mutual Cycles

It is possible for two differential cycles to mutually feed each other, if the “elsewhere” move for each cycle is used to initiate another differential cycle, with colours reversed, on another part of the board. For example, consider the following situation with White to play.

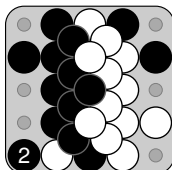


White to play.

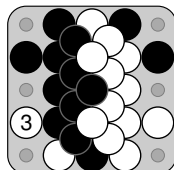
White move 1 (below) initiates a differential cycle by putting the main black group in *atari*. Move 2 captures, then move 3 recaptures to return the cycle to its initial state, but with Black to play.



1 creates *atari*.



2 captures.

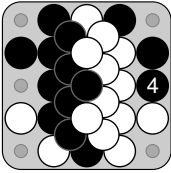


3 recaptures.

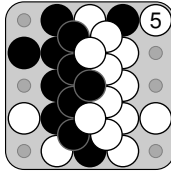
Black’s “elsewhere” move 4 (below) then initiates a separate differential cycle by putting the main

Tactics

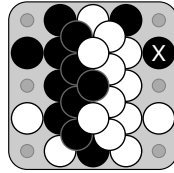
white group in *atari*, and is obliged to capture the threatening balls with move 5 (middle).



4 creates *atari*.



5 captures.



X is illegal.

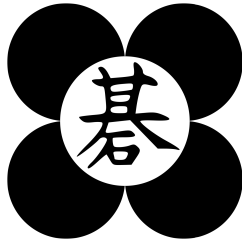
Black would now like to play move X, but this is forbidden by the No Repetition rule; this move would repeat the board state from six moves ago with the same player (White) to move.

Occurrence

Players should not be too concerned about mutual cycles. They will be extremely rare, and no cases have been seen in actual play to date.

It's not necessary to remember every previous move of every game to enforce the No Repetition rule, and for most cases it will be sufficient to remember the board position of the last turn only. If players notice that a mutual cycle has developed, then it's a relatively straightforward task to work out which move initiated the cycle, and to stop the cycle before that position is repeated on the next iteration.

Strategy





Stages

Games of Margo, like many board games, can be divided into distinct stages. Each stage has its own character, which can require players to adjust their tactics and strategies over the course of a game.

Stages of Play

Games played on the standard 7×7 board tend to last between 50 and 100 moves before the game ends, typically with a player resigning. Most games can be divided into three broad stages, as follows:

1. Opening

First ten or so moves.

The opening stage of a game generally occurs on the board level, as players fight for the key control points, and loosely stake out as much territory as possible as quickly as possible. Play tends to be subtle and developmental, although the confined

Strategy

board space means that overt aggression is never far away. Tactics and strategies specific to the opening stage are discussed in the next chapter.

Opening

Secure the centre and/or corner control points.
Stake out territory.

2. Middle Game

Approximately first half of game (after opening).

The game then enters a more aggressive middle stage, in which territorial boundaries push against each other, and players probe enemy defenses for weakness. This is the stage for players to secure their own groups and wreak havoc on the enemy's. The middle game is typically characterised by upper level bridge play in disputed regions and full-scale invasions into enemy territory. Players should seek to maximise their territory and potential for point ownership.

Middle Game

Invade enemy territory!
Join your groups and cut your enemy's.
Expand your borders, contract your enemy's.
Prepare territory and own points.

3. End Game

Approximately last half of game.

The end game is all about the management of territory and own points. Players' territories are established by now, and invasions are aimed at eating away enemy territory rather than overrunning it. Players focus on reinforcing their borders, maximising their territory, and owning as many points as possible.

Most games eventually enter a *cold war*, in which the only moves available to players are moves that fill in their own territory. These are *cold* moves that players don't want to make, but are forced to because they can't pass. The key to such *territory-filling races* is to pack your territory efficiently, and maintain ownership of as many points as possible.

Once a player's safe points run out, they are forced to make unsafe moves that place their own groups in *atari*. This is usually a losing proposition for the first player to do so.

Generally, the aim in the end game is to make your opponent fill their territory more quickly than you fill your own.

Strategy

End Game

Invade enemy territory!
Connect to your invaders if possible.
Otherwise do not be afraid to sacrifice them.
Consume more enemy territory than your own.

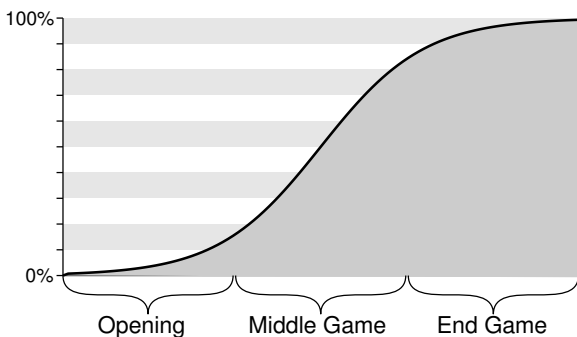
Territory

Any game of Margo ultimately comes down to territory; how much players are able to claim, and how well they manage it through the end game. Even though territory may seem a secondary concern in the early stages of play, players should always bear it in mind when planning any move. If two moves are otherwise equal, choose the one with the greatest potential to gain territory.

Sacrifice

The following graph shows how willing players should be to sacrifice balls, over the course of a game.

8 | Stages



Willingness to sacrifice.

Players should generally be reluctant to sacrifice balls at the start of the game, as every ball in the opening stage is vital in staking out territory. Sacrifice becomes more worthwhile in the middle game, when minor skirmishes can be lost for positional gain. Players should not be scared to sacrifice balls in the end game, especially if this makes the enemy consume their own territory.

Every ball sacrificed is one less ball to fill the player's own territory in the territory-filling race. However, this is balanced out by the fact every ball sacrificed is one less point for the owner's score.

Several small sacrifices may be worthwhile if they ultimately lead to a mass enemy capture, and harassing the enemy with suicidal incursions into their territory can deplete their own points and push them towards a fatal freedom-filling move.

Strategy

The value of any sacrifice must be gauged on a case-by-case basis.



Opening

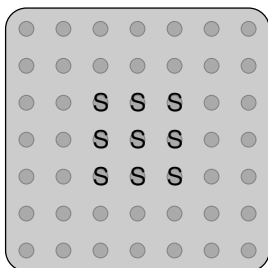
The opening stage covers the early moves of a game, in which players tend to vie for position and stake out potential territory rather than making overt attacks. Any threats at this stage are generally intended to force weak replies or engineer zombies.

To Swap or Not to Swap

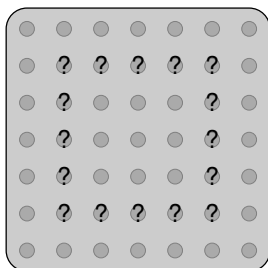
Recall that if the swap rule is used, then Black has the option of swapping colours on the second move, effectively stealing the opening move. White should therefore attempt to make the strongest opening move that Black will not swap.

Points marked S in following figure are strong moves that Black is likely to swap (central points are generally stronger). Points marked ? are borderline moves that are reasonably safe to open with. Points on the outer edge are too weak to make good openings.

Strategy

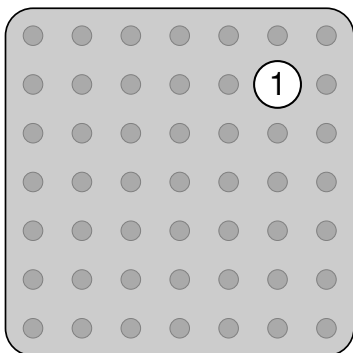


Strong openings to swap.



Borderline openings.

It is therefore recommended that White opens with a borderline move, such as move 1 (below). Black is less likely to swap such a move.



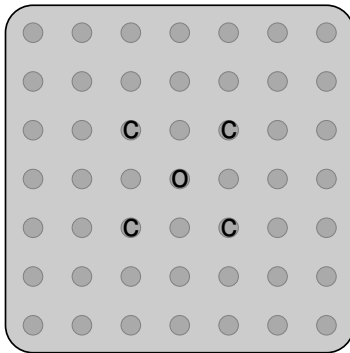
Borderline opening move 1.

Make the strongest opening that the opponent won't swap.

Control Points

Following the opening, the next few moves of a game typically involve a grab for the board's main control points, as these influence the most territory most strongly.

The points marked *c* (below) are *corner control points*.¹ These give the player occupying them a strong advantage in controlling the nearby corner. The *central point* ² (*o*) is another strong point that offers maximum connective potential to all sides of the board, and can allow a player to dominate the board from a strong central position.

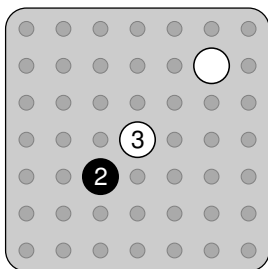


Key control points.

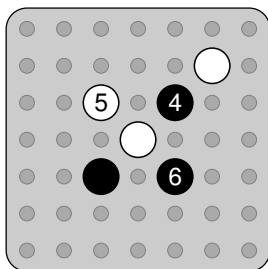
The following example shows a typical opening sequence. Black takes the far corner control point with move 2 and White takes the central point with 3 (left).

^{1,2} These are called *san-san* and *tengen* in Go, respectively.

Strategy



Moves 2 and 3.



Control points taken.

Black move 4 splits the white balls and claims another corner control point (right). Moves 5 and 6 take the remaining corner control points.

Grab the control points.

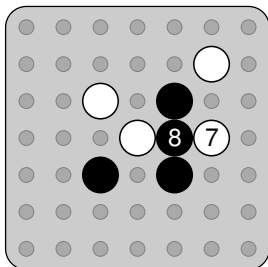
Stake Your Claim

Black now owns three corner control points and dominates the lower part of the board. White must now attempt to stake out their own loosely defined territory, before Black consolidates control over most of the board.

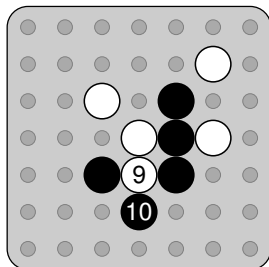
White move 7 (below) encroaches into the vertical corridor down the right side of the board, and forces reply 8 from Black. White move 9 threatens to push through Black's line towards the

9 | Opening

bottom part of the board, and forces reply 10 (right).



White probes right.



White probes down.

The territorial boundaries of each player are now getting defined more clearly – White dominates the two upper corners while Black dominates the two lower corners – and the positional framework for the rest of the game has been laid.

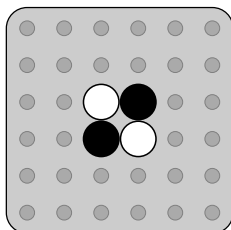
Note that the opposing forces have already engaged in the battle for territory, and that there's already friction as the players' territorial boundaries push against each other. Freedoms are scarce on the relatively small Margo board, and the battle to claim them is fierce right from the start.

Stake out your territory quickly.

Strategy

Even Boards

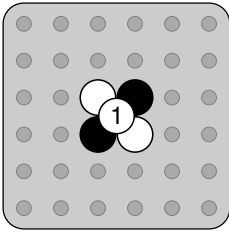
Even-sided boards, such as the 6×6 board shown below, do not have a single central point. In these cases, the following pattern will often occur in the opening stage as players vie for control of the centre. Note that the four occupied points are the four corner control points on this smaller board.



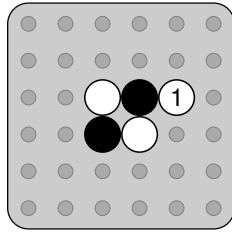
Opening cluster (6×6).

White might stack in this situation as shown below (left), to connect their two balls into a single central group, but this would create two black zombies very early in the game. Instead, White can directly threaten one of the black balls, to expand their territory and force an immediate reply (right). White's choice will depend on whether they wish to pursue an inner game (stack) or outer game (threaten).

9 | Opening

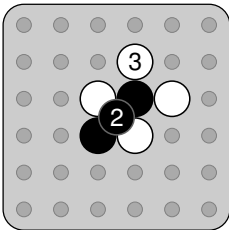


1 makes zombies.

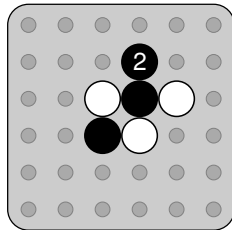


1 attacks.

If threatened, Black may choose to stack themselves, with move 2 (left). However, this creates two white zombies and allows White to continue the attack with move 3.



2 makes zombies.



2 defends.

A better option for Black is probably to simply defend their threatened group with move 2 (right).

Note how much more intimate and aggressive the game can be on even a slightly smaller board, from the very first moves.

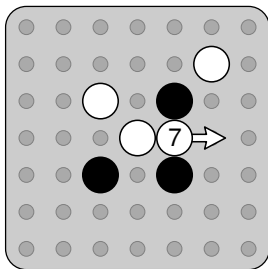


Middle Game

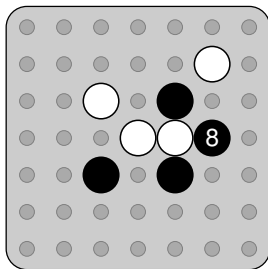
The middle game is characterised by players defending their borders and probing the enemy's for weaknesses, as the loose territorial boundaries staked out in the opening stage are solidified. This chapter describes some relevant points of strategy.

Inner and Outer Games

The following example shows a different continuation of the opening sequence presented in the previous chapter. White pushes right with move 7, prompting reply 8 from Black (below).



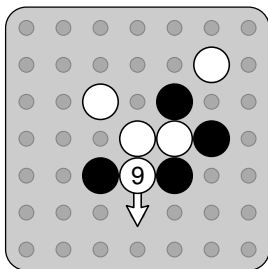
White pushes right...



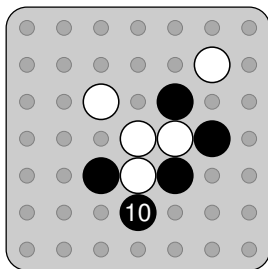
...Black responds.

Strategy

White then push down with move 9, prompting reply 10 from Black (below).



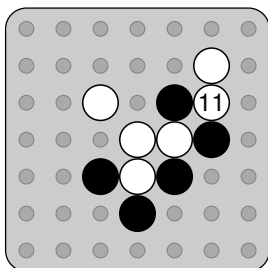
White pushes down...



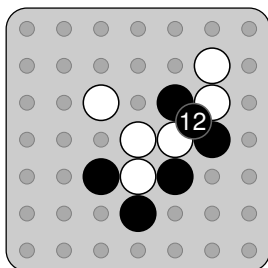
...Black responds.

Black has opted for an *outer game*, in which a player controls the corners and establishes territory around the edges. White is playing an *inner game*, in which a player seeks to control the board from a strong central group.

White move 11 threatens an escape, forcing Black to create a zombie with blocking move 12.



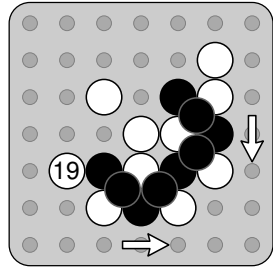
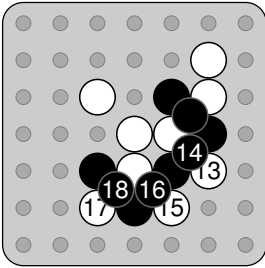
White threatens...



...Black blocks.

10 | Middle Game

White makes similar threats with 13–17, and Black creates more zombies with replies 14–18. Richard Reilly calls the alternating up-down sequence formed by the black balls an *inchworm*.



White controls the outer.

Strong attacks to corner.

White has turned the tables, and now controls both the inner *and* outer games. Black's single group has few freedoms, while White's position is more fluid, with many groups and many freedoms. The two arrows show strong dual attacks by White into the corner region.

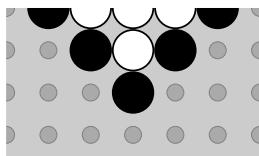
Not every game will start this way, but this example demonstrates the inner and outer games, and how zombies can quickly swing a game.

Don't let the opponent contain you.

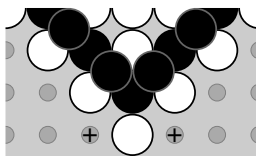
Strategy

Ramps

The following figure (left) shows diagonal lines of non-touching black balls holding back a central white group. These lines constitute diagonal *ramps*.



Black ramps.



White ramps.

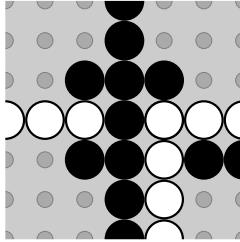
The black ramps (left) are exposed and really quite weak. White is able to engineer a surrounding wall of zombies, so that the black balls are now the ones being contained (right).

White's ramps are now stronger than Black's ramps were. Firstly, the white ramps meet the edge to form two acute corner points (+) called *mouths*, which Black cannot attack without some preparation. Secondly, the white ramps are made up of zombies and hence more resistant to attack.

Ramp from the board edge to form mouths.

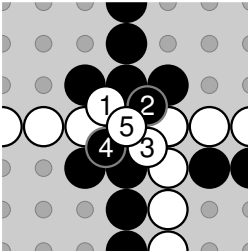
Play to the Context

Consider the following example (White to play).

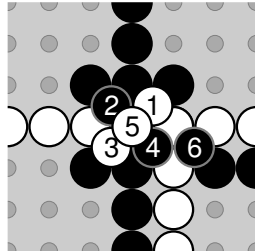


White to play.

White has two ways to force a cross-bridge here, as shown below. However, note that the second option (right) provides a conduit 4 through which Black can connect their two groups with move 6. White should play the first option.



Good choice.



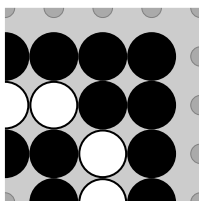
Bad choice.

Play to suit the surrounding context.

Strategy

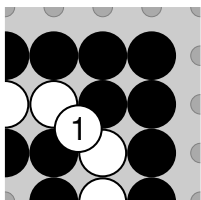
Make Moves Matter

Try to make moves achieve more than one goal. For example, the following position shows two white groups that White wants to connect.

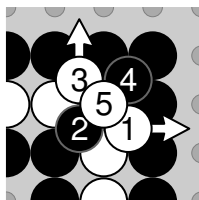


White to play.

White could play the obvious bridging move 1 (left). However, alternative move 1 (right) still connects the two groups by forcing a cross-bridge, but also results in a double escalate.



Connection.



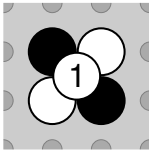
Connection + attacks.

Black should have given this battle up and played move 2 elsewhere.

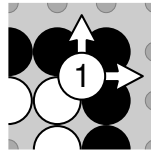
Make moves achieve more than one goal.

To Build or Not to Build?

The fact that overpasses cut underpasses means that balls are generally more powerful the higher they are. For example, the higher white ball 1 on the left facilitates connection, and the higher white ball 1 on the right facilitates invasion.



Bridge.



Escalade.

On the other hand, stacking a ball generally creates enemy zombies, and enemy zombies are dangerous. The conflicting urges to build upwards but not create zombies add balance and tension to the game. The decision to pin or not can be a difficult one, and depends on:

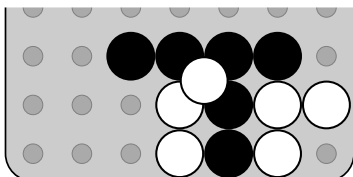
- ▶ the context,
- ▶ the benefit of stacking that ball,
- ▶ the chance of capturing any balls about to be pinned, and
- ▶ the danger that those balls will pose as zombies.

Higher is better, but zombies are dangerous.

Strategy

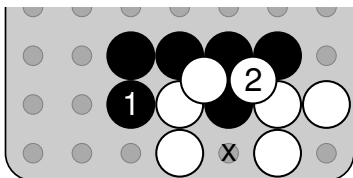
Time Your Attacks

The timing of attacks can be critical. For example, consider the situation below, with Black to move.



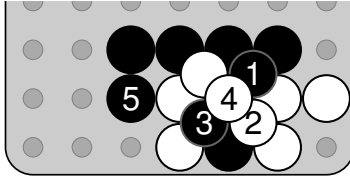
Black to play.

If Black attacks the group prematurely with move 1 (below), then White can bridge across with move 2, capturing a black ball to create a safe group.



Premature attack 1 fails.

However, if Black delays the attack and instead plays blocking move 1 (below), then White must complete a cross-bridge to connect the two groups, as shown. This pins the black balls and robs the white group of a potential freedom.



Delayed attack 5 succeeds.

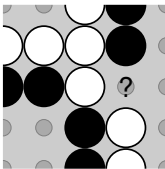
Black can now attack this group with move 5, and capture it at their leisure.

Prepare before attacking.

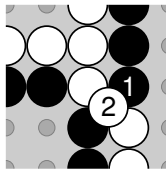
Cold Points

A *cold point* is a point that a player can legally move at but doesn't want to. For example, point ? in the following position is available to both players, but neither wants to play there.

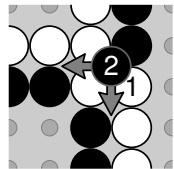
If Black plays move 1 there (left), then White can bridge over it to complete their connection. If White plays there (right), then Black can build on that ball to mount a strong forking attack.



Cold point.



Black 1 is bad.

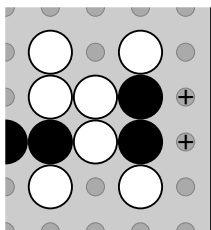


White 1 is bad.

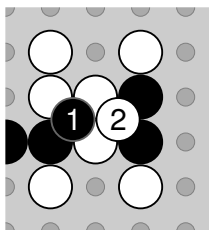
Strategy

Save or Pin

If you can't save stranded balls, then engineer to have them pinned. The following example (left) shows a stranded black group with two freedoms (+). This pair can't be saved, even if Black moves next. However, Black move 1 forces reply 2 from White, which pins the stranded balls in place to zombieify them.



Black to move.



White must pin.

There are several advantages to forcing the enemy to pin isolated balls. For example, the two zombies shown above:

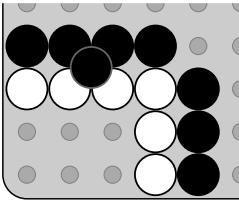
- ▶ intrude into a potential enemy territory,
- ▶ reduce White's potential to own points,
- ▶ count 2 points towards Black's score, and
- ▶ provide a bridgehead for future invasion.

What you can't save, get pinned.

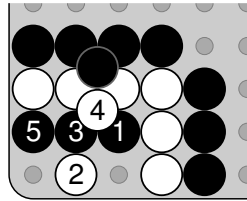
Smaller Can Be Safer

The ability to build over walls means that there are many ways to invade enemy territory, even if that territory appears to be safe. Escalades can interfere fatally with the defense of a group.

For example, the following white group (left) might appear defendable, but is in fact not safe.



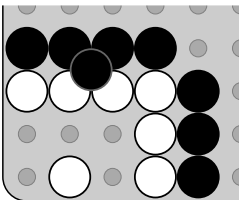
Black to play.



White group is dead.

Move 1 invades, move 2 defends, then move 3 forces the pinning move 4 to establish a strong bridgehead. White can't save this group after move 5.

However, if the group was smaller, then it would be easier to defend. An additional white ball, as shown below, would make this group safe.



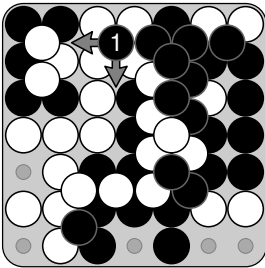
Safe white group.

Smaller territories
are more defendable.

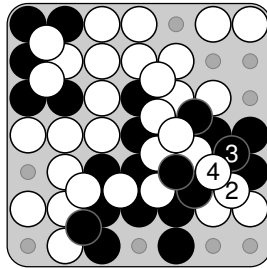
Strategy

Cut Attacks Off at the Source

When defending against an attack, consider the entire situation and not just the sharp end. For example, Black move 1 (below) intrudes into White's territory, and threatens to gain traction there through a bridge fork.



Black 1 invades.



White kills the attack.

White can't block both forks on their next move, but can go one better and kill the entire attack with move 2 (right). This initiates a cross-bridge at a vulnerable point, cutting the attack off at its source and capturing most of the black force. White is now in a winning position.

Cut attacks off at the source.



End Game

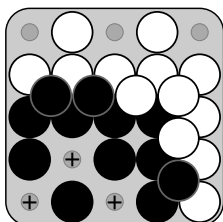
The end game occurs when players' territories are well defined, and they are forced to start filling these in. The emphasis is on efficient use of the available space, the management of point ownership, and forcing the opponent to play more balls in their territory than you play in yours. This chapter contains relevant points of strategy.

Point Ownership

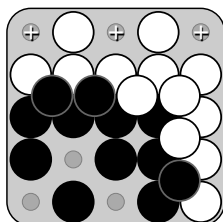
Recall that a player *owns* those points that are playable and safe to them but not playable to the opponent. The following example shows the points owned by each player points in a 5×5 game at the territory-filling stage, with Black to move.

Both players appear to own three points, but each only really owns one. This is because playing at any of these points would reduce its group to two freedoms, neither of which would then be safe to play in.

Strategy

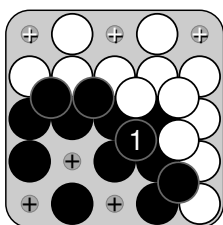


Owned by Black.

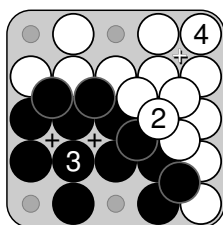


Owned by White.

Move 1 (below) is the best move for Black here. This move stops White intruding into Black's territory and does not lose ownership of any points. After moves 2–4 (right), Black now owns two points to White's one, which is a good position to be in.



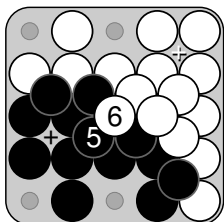
1 blocks intrusion.



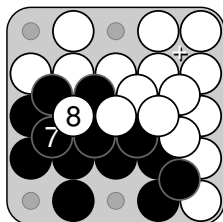
3 creates safe points.

However, Black must still be careful, as move 5 (below) would allow White to bridge over with move 6, forcing reply 7, to leave Black owning no points and facing a losing position.

11 | End Game

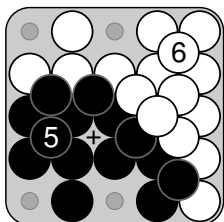


Wrong move 5.

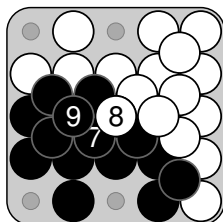


White succeeds.

Instead, Black should play move 5 (below), which forces White to consume their last remaining owned point with move 6 (left). Black can then dictate play with moves 7 and 9 (right), leaving White to play but with no safe points to play at.



Correct move 5.



White fails.

White is now forced to fill one of their own freedoms to put themselves in *atari*, and Black will capture this group to win. This example shows how careful management of point ownership can decide a game.

Point ownership become increasingly important as the game approaches its conclusion. Each owned point is like an extra life that delays the fatal freedom-filling move by one more turn. Most

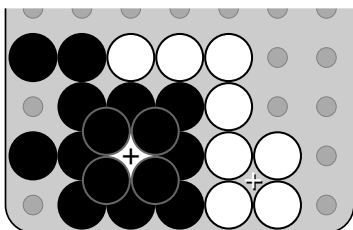
Strategy

games between players of similar skill will be decided by one or two owned points either way.

Point ownership decide games.
Placement order is critical.

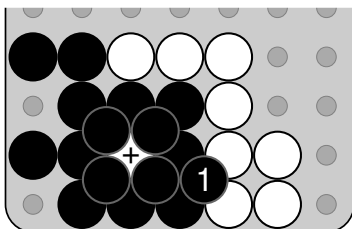
Platform Ownership

Creating 2x2 platforms of your colour can be an efficient way to own points. The following example shows two such platforms: a black one that owns a point for Black (left) and a white one that owns a point for White (right).



Points owned by Black and White.

Black can encroach into White's platform with move 1 (below) to compromise the ownership of that point.



Point owned by Black.

However, White can't encroach into Black's platform without considerable effort, despite the fact that it's largely surrounded by white balls. This is because the black platform is elevated above the white balls, and will require White to build upwards to invade it.

Higher is generally better.

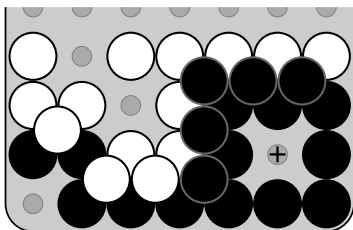
Single Freedoms Can Be Safe

Reducing groups to a single freedom can be safe, if that freedom is unplayable to the opponent. This will occur if the opponent has created zombies that guard it, in which case the player has control over whether those zombies get released or not.

For example, the following position shows a black group that owns safe point (+). Black is safe to fill

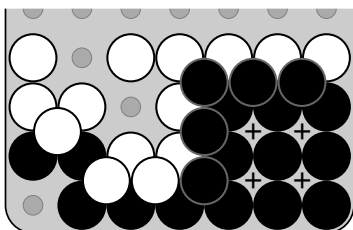
Strategy

that point, as the group's other freedom on the left is unplayable to White.



Black owns one point.

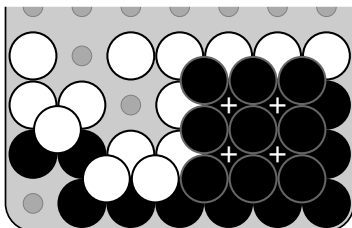
Filling this point creates four more safe points owned by Black, as follows.



Black owns four more points.

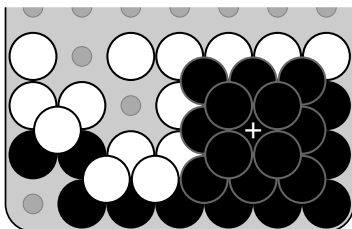
Filling these four points creates four more safe points owned by Black, as follows.

11 | End Game



Black owns four more points.

Filling these four points creates one more safe point owned by Black, as follows.



Black owns one more point.

This group therefore contains a total of 10 potential safe points owned by Black – a useful resource – if Black reduces it to a single freedom.

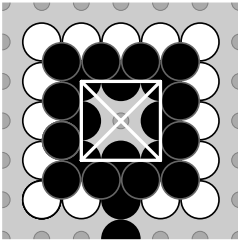
Don't be afraid to reduce
to a single safe freedom.

Strategy

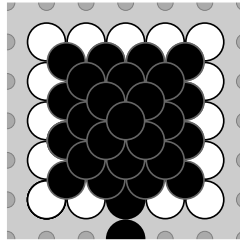
Freedoms Constrain Stacking

The above example demonstrates that every freedom, being a board hole, severely limits the capacity for balls to stack in its vicinity.

One way to visualise this is that every empty board hole is the tip of an inverted pyramid that defines a “can’t stack” volume. For example, the position on the left shows the “can’t stack” volume created by a freedom owned by Black.



“Can’t stack” volume.



Stacked.

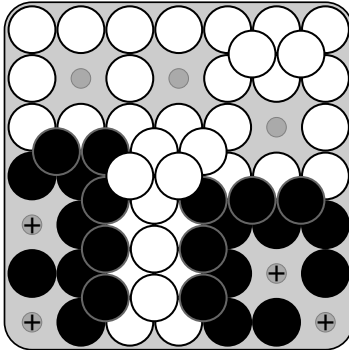
If Black is willing to fill this freedom, they can stack an additional 19 balls in this volume (right).

Fill freedoms according to their potential for point ownership.

Group Tax

The previous example leads to the notion of *group tax*, suggested by Sandra Snan. This is the idea that players are penalised for having more groups, as each group requires freedoms to survive, and each freedom represents adjacent points that the player can't fill in safely.

An extreme case is demonstrated below, with Black to play. Note that Black has two groups, each with two freedoms, and that Black requires all four freedoms to remain safe.

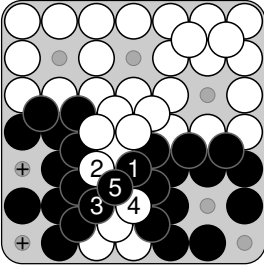


Black needs all four freedoms.

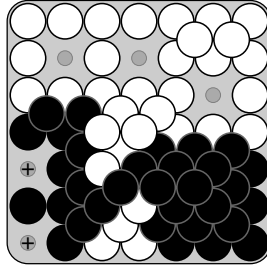
However, if Black consolidates their two groups into a single group with cross-bridge moves 1–5 (left), then only two of these four freedoms are now required. Black can now safely fill the other two freedoms, and the volume constrained by them, to add an additional 12 balls and therefore

Strategy

12 points to their score (right). This will also allow Black to outlast White in a territory-filling race, to eventually win the game outright by a considerable margin.



Two freedoms needed...



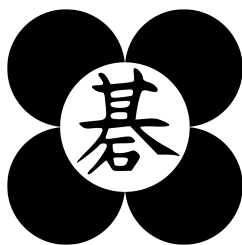
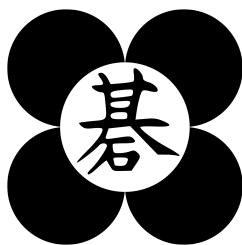
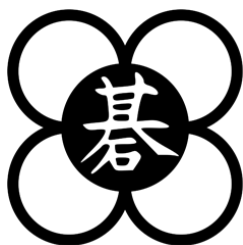
...12 balls added.

The point is that the extra number of freedoms required to maintain a larger number of groups restricts a player's ability to pack their own territory efficiently. Note that White would have won this game if it was their turn to play, by blocking the potential cross-bridge and keeping Black's two groups separated.

Group tax is a side-effect of Margo's ball count scoring system. This is in direct contrast to Go, where empty points in a player's territory reward rather than punish them.

Consolidate groups to minimise group tax.

Games & Puzzles

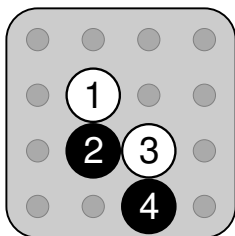




4×4 Game

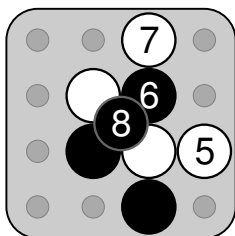
The following annotated sample game was played on the gamerz.net server in 2011. It shows the deadly nature of the game on the small 4×4 board, and includes a differential cycle.

Game #254 ○ S. Tavener ● C. Browne



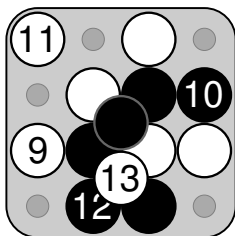
Opening

Moves 1–3 are typical opening moves, occupying corner control points. Move 4 does not claim the fourth one, for fear of a White bridge.



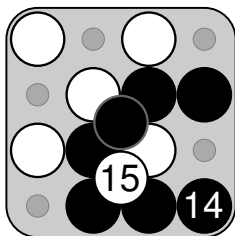
Move 5 stakes out territory, move 6 intrudes, move 7 attacks, and move 8 bridges over to defend. This concludes the opening stage.

Games & Puzzles

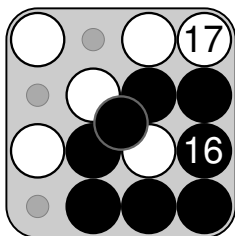


Middle Game

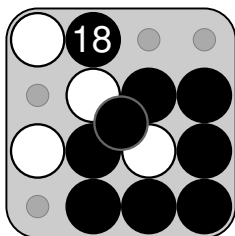
Moves 9–12 consolidate the borders of each player's territory. 13 is the first cold move; White has run out of safe options.



Move 14 captures and move 15 repeats the cold move. Note that White is burning cold moves while Black fills their own territory.



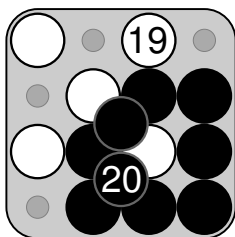
Move 16 is the turning point of the game. Black fails to notice what is about to happen and recaptures. Black could have had an easy win by moving at 17 instead.



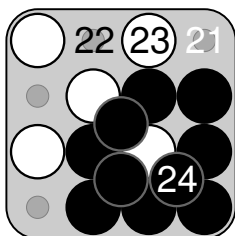
End Game

Move 17 puts the Black group in *atari*, so Black is obliged to capture with move 18.

12 | 4x4 Game

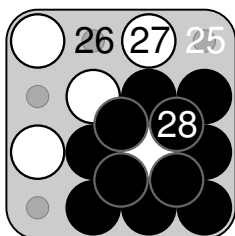


White captures ball 18 with move 19. Black cannot immediately recapture due to the No Repetition rule, but must instead fill an own point with move 20.



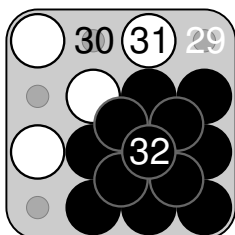
White repeats the differential cycle with moves 21–24...

Black resigns at this point.



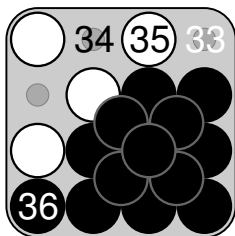
The game would play out as follows.

White repeats the cycle with moves 25–28...

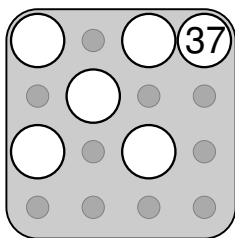


...and repeats the cycle again with moves 29–32. Move 32 was Black's last safe point.

Games & Puzzles



White repeats the cycle a final time with moves 33–35, and Black is forced to make unsafe move 36 to put their own group in *atari*.



White 37 performs a mass capture to clear the board of black balls, a position that Black would not recover from.

Black resigned at 24.

Summary

This example highlights the rather tactical and brutal nature of the game at this size. The opening and middle stages are short, as the few available freedoms are quickly consumed and there is little room to grow, and capture is always imminent. However, games can be surprisingly complex and last much longer than the 4×4 grid might suggest, due to capture and recapture.

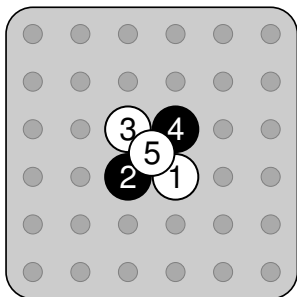
This example also demonstrates the danger of differential cycles, and the importance of closing out games when you get the chance.



6×6 Game

The following annotated 6×6 sample game was played on the gamerz.net server in 2011. This game involves a long end game full of sacrifices made for positional gain, and shows the danger of resigning prematurely.

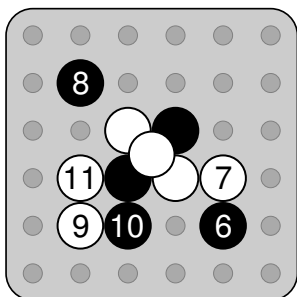
Game #274 ○ C. Browne ● R. Reilly



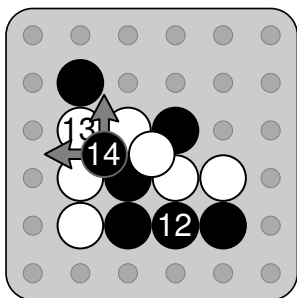
Opening

White move 1 is a strong opening and it's a surprise that Black did not swap. Perhaps Black was anticipating move 5, which creates two black zombies.

Games & Puzzles

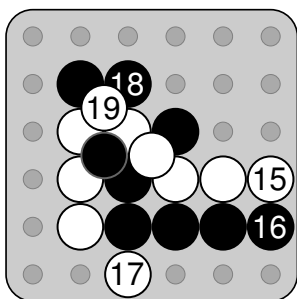


Players loosely stake out their territory with moves 6–11.



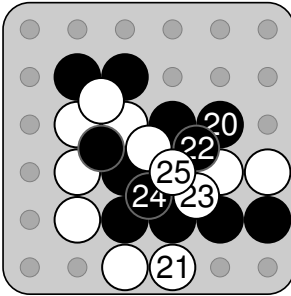
Middle Game

White 13 is a poor move that allows Black to play double escalate 14, which threatens to support invasions to the left and above.



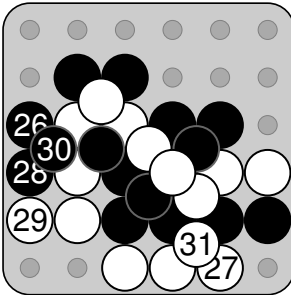
Move 18 launches an invasion into the top left corner, supported by the central black zombie. White is forced to pin the invading balls with move 19, resulting in a strong Black bridgehead (8 + 18).

13 | 6×6 Game

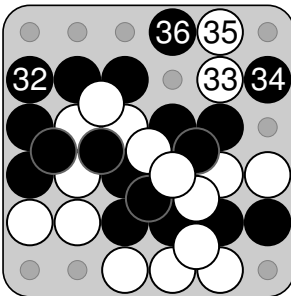


Black consolidates the invasion by forcing a cross-bridge, crowned by White move 25.

White now controls the centre while Black controls the upper board.



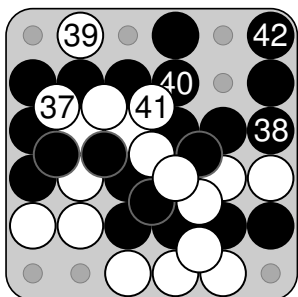
Black slips down the left side to connect to their threatened central group with move 30, while White cuts the tail off the rescued group with move 31.



Black moves 32–36 are consolidating moves that defend Black territory.

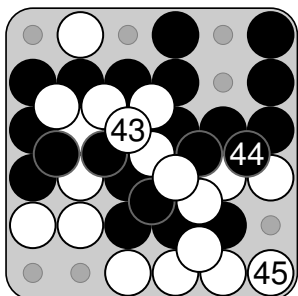
White moves 33–35 are a suicidal invasion force, that fill key points that Black would want.

Games & Puzzles



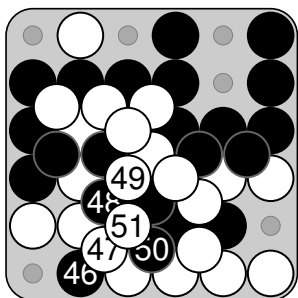
White moves 37 and 39 are an escalate/invasion pair, which Black cannot safely reply to. Black move 42 performs the first capture, to clear the two white invaders.

Black leads by 2.



End Game

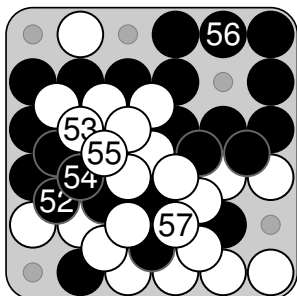
Moves 43–45 are consolidating moves that push territorial borders and threaten to intrude. The end game has been reached.



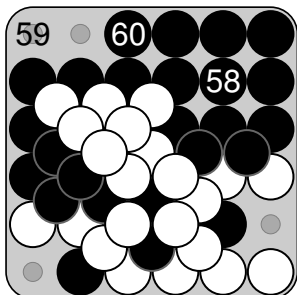
Black move 46 constitutes a minor invasion which forces White to pin it with moves 47 and ultimately 51.

Black is eating away at White's territory.

13 | 6×6 Game

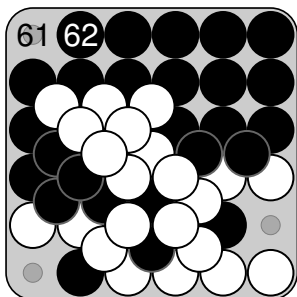


The game has now entered the territory-filling stage. Both players seek to squeeze the enemy and establish own points with moves 52-57. Platform 57 owns another point.



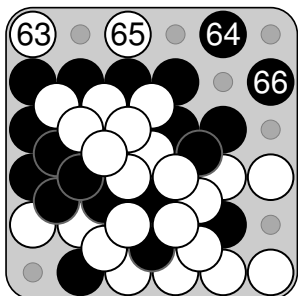
Black fills a freedom with move 58, White puts the group in *atari* with 59, and Black defends with capturing move 60.

Black now leads by 3 balls (29 to 26).



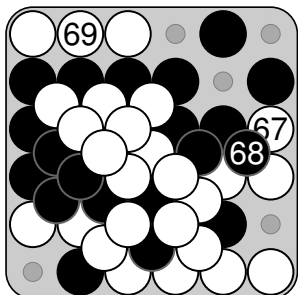
White move 61 puts the main black group in *atari* again, and Black move 62 defends it again. However, the defending move 62 now puts the group in *atari* itself.

Games & Puzzles



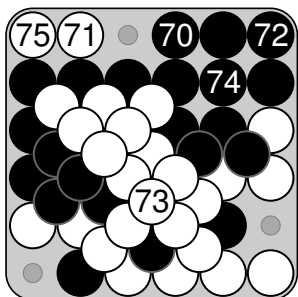
White performs a mass capture with move 63, clearing the upper board.

Players stake their claims in the newly cleared region with Moves 64–66.



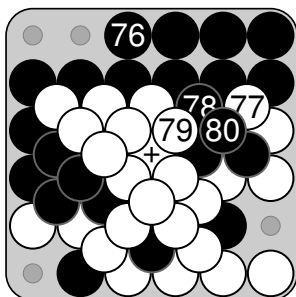
Moves 67 and 68 probe enemy borders.

White move 69 invites another suicide for positional gain, this time sacrificing three balls.



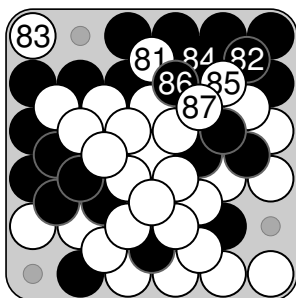
Black move 70 kills the sacrificial group, then the players populate the cleared region again...

13 | 6x6 Game

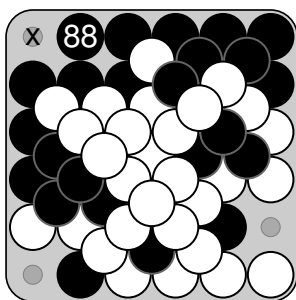


Black move 76 again kills the sacrificial group. White moves 77–79 intrude into Black’s territory, and owns point (+).

Scores are now tied.



White pins the remaining black balls, culminating in a cross-bridge crowned with 87.



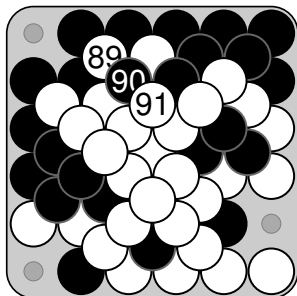
Move 88 puts Black one ball ahead, and can’t be retaken due to repetition. However, Black decides that the battle is lost.

Black resigns.

Summary

This game involved a long filling-in phase. Note White's willingness to sacrifice balls for positional gain, with repeated suicide invasions that ate away at Black's territory. Eventually, White lost patience with this and just pinned the remaining black balls to end the game.

However, this could have proved costly. Black was actually ahead on score when White won by resignation, 34 to 33. If Black had continued playing for one more move, and White had not been careful, then Black could easily have stolen a draw. White has several non-winning lines here, such as the continuation shown below.



Black steals a draw.

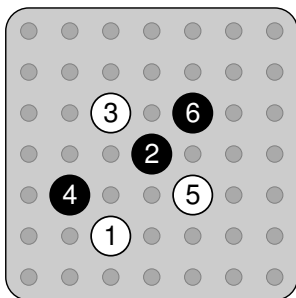
Don't resign prematurely.



7×7 Game

The following annotated 7×7 sample game was played on the gamerz.net server in 2012. It highlights the importance of defending territorial boundaries and maximising point ownership for the end game, and the fact that players should not pursue minor victories at the cost of overall failure.

Game #311 ○ C. Browne ● R. Reilly



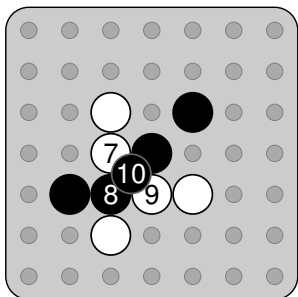
Opening

White opens with borderline move 1.

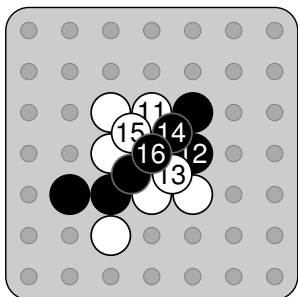
Black declines the swap.

Players grab the main control points with moves 2–6.

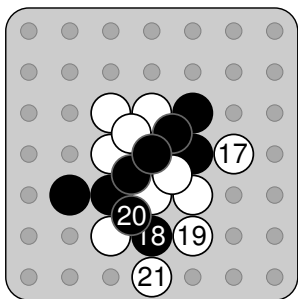
Games & Puzzles



White pushes to connect through the centre with moves 7 and 9, forcing Black to block with move 10 and create two white zombies.



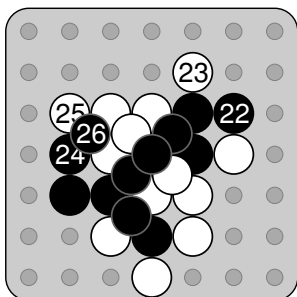
White initiates a cross-bridge, but ball 10 puts Black one ahead in the stacking race and Black crowns the pile. This creates even more white zombies; not a bad result for White.



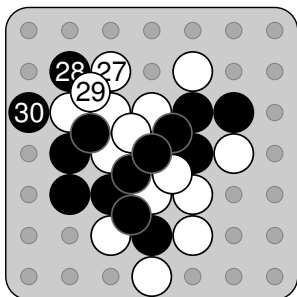
Middle Game

Black intrudes gently into White's territory with move 18 and is able to connect it safely with 20, but move 21 establishes strong white ramps.

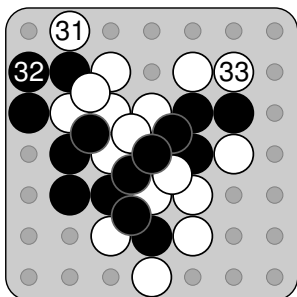
14 | 7×7 Game



Players solidify their territorial boundaries with moves 22–25. Move 26 is an escalate that hints at an invasion into the corner area above it.

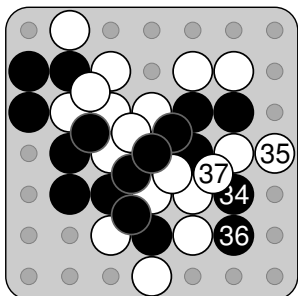


Move 27 is a poor response that allows Black to force a pin with move 28 and secure a bridgehead. Move 30 dominates the left side, giving Black secure passage into the top left corner.

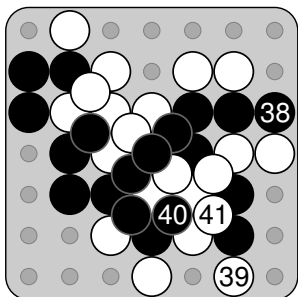


Moves 31–33 are positional moves that defend weak points on the players' territorial boundaries.

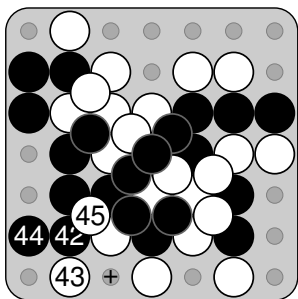
Games & Puzzles



Black launches another invasion with moves 34 and 36, forcing White to pin with move 37.



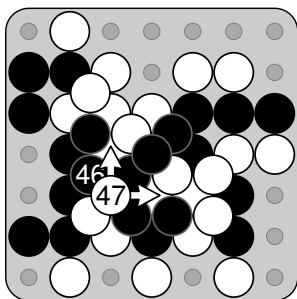
Move 39 threatens the pair of intruding balls. However, escalate move 40 forces White to pin both with move 41, creating a strong bridgehead in that corner.



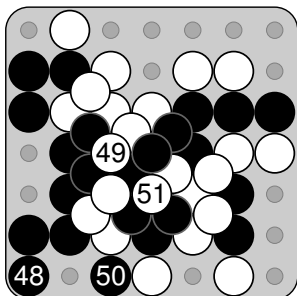
Black pressures White with move 42. Move 43 may seem inconsequential, but sets up a devastating play. Black ignores the danger and defends with 44, allowing White to play setup move 45.

14 | 7×7 Game

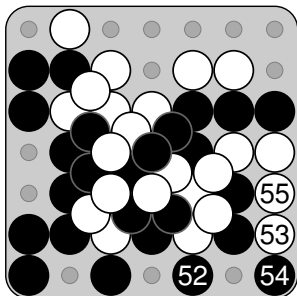
Black should have played 44 at 45 to prevent this.



Black can't capture 45 due to the No Suicide rule, so blocks the immediate threat with move 46 instead. This allows White to play the killer bridge fork 47.



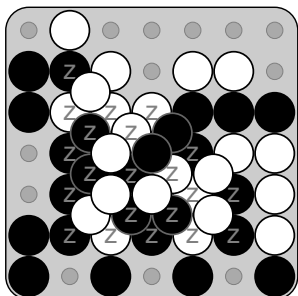
Black ignores the threat and continues to pursue White with moves 48 and 50, allowing White to connect almost all of their balls into a single strong group.



End Game

Black succeeds in their pursuit of the White balls along the bottom edge with moves 52 and 54, but by then it's too late. White now dominates the board.

Games & Puzzles



White controls a large amount of territory while Black has almost none. The board has many zombies (z) and further White capture is unlikely.

Black resigns.

Summary

This game is unusual in that White won without making a single capture, and was in fact two balls behind (25 to 27) when Black resigned. The first capture did not occur until move 50, and the game ended before reaching the usual filling-in stage, as White was so far ahead on territory.

Black made two fatal mistakes in this game. Firstly, move 44 should have been played at point 45 to block the setup. Secondly, even after the bridge fork 47 had been played, Black still had a chance to salvage the game by playing move 48 at point 49, to create their own dominant group across the board. However, their relentless pursuit of the vulnerable balls along the bottom allowed White to consolidate their forces into a strong group to dominate the game. Black won the skirmish but lost the campaign.

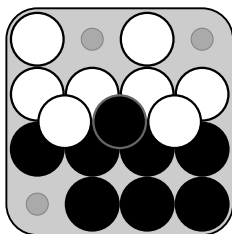


Puzzles

This chapter contains a number of puzzles that demonstrate the principles described in this book. Many are based on positions from actual games. The puzzles range in size from 4×4 to larger boards, but even the smaller ones can be surprisingly tricky.

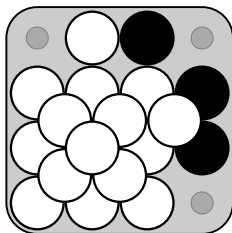
Puzzle #1

Where should White play?



Puzzle #2

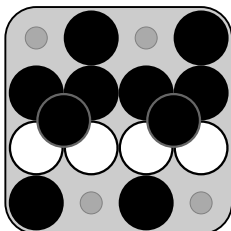
Who will win this game?



Games & Puzzles

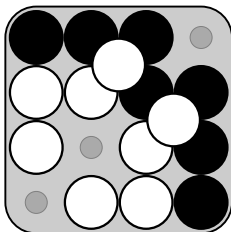
Puzzle #3

What is White's best play?



Puzzle #4

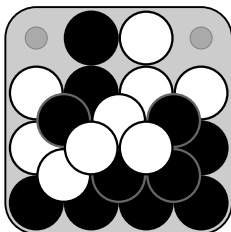
Who will win this game?



Puzzle #5

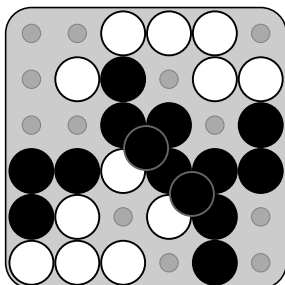
White to play.

Who will win?



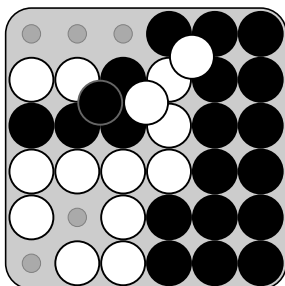
Puzzle #6

What is White's killer move?



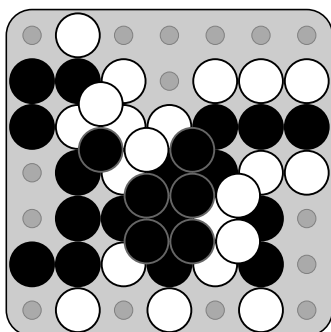
Puzzle #7

What is Black's best move?



Puzzle #8

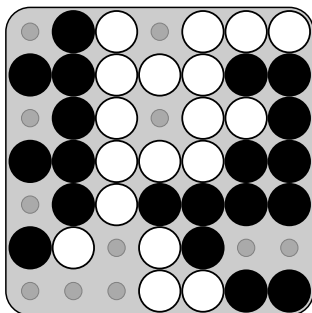
What is White's best move?



Games & Puzzles

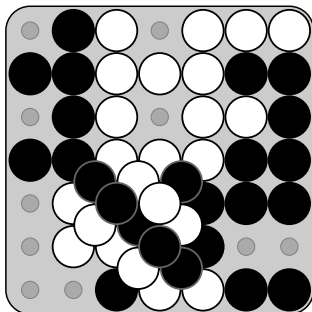
Puzzle #9

What is Black's best move?



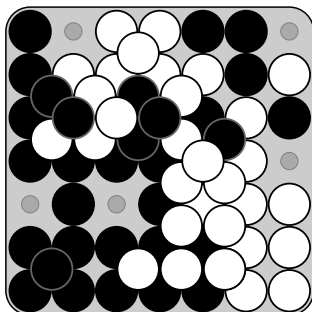
Puzzle #10

What is White's best move?



Puzzle #11

What is Black's best move?



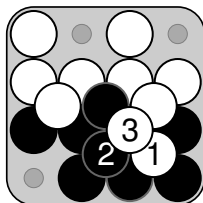


Solutions

This chapter contains solutions to the puzzles presented in Chapter 14.

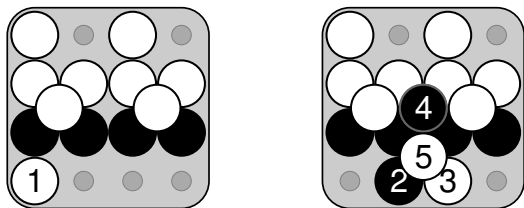
Solution #1

White should make move 1 shown below, and pin the black balls rather than capturing them. Black would have no legal moves after move 3, hence the game would end, and White would win by 9 balls to 8.

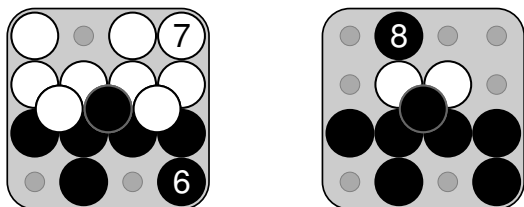


If White instead captures the black balls, as shown below (left), then Black can recapture to establish a safe two-freedom group, and defend it until White runs out of moves. A typical extension of play is shown in moves 2–5 (right).

Games & Puzzles



White is eventually forced to fill one of their own freedoms (7), allowing Black to perform a mass capture and establish a winning position (8).



Note that the mass capture by Black was more devastating than the mass capture by White, because it cleared more balls and only left two zombies rather than four.

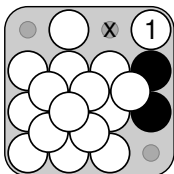
Solution #2

The player whose turn it is to play will win this game. The possible options for each player are shown below.

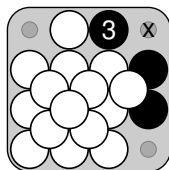
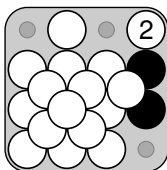
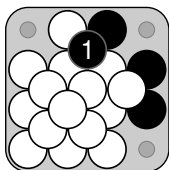
White to Move: White move 1 (below) wins the game immediately. Black can't reply at the point marked x due to repetition, so has no legal

16 | Solutions

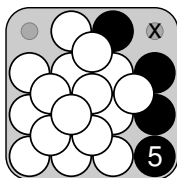
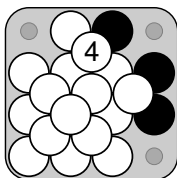
moves. The game ends with White winning by 17 balls to 2.



Black to Move: Black move 1 (below) is a sacrifice that forces reply 2, allowing Black to play at 3. White cannot now play in the corner marked x due to repetition. This is the first iteration of a differential cycle.

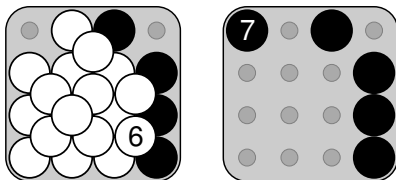


White move 4 (below) allows reply 5, which makes the corner marked x a dead point that neither player can occupy, due to the two zombies.

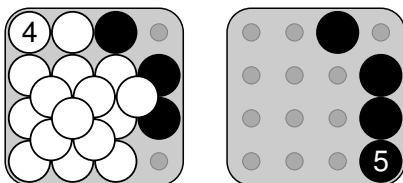


Games & Puzzles

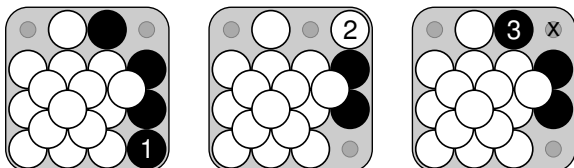
White must move at 6, allowing Black to make a mass capture with 7 to set up a winning position.



Alternatively, White move 4 (below) allows Black to perform another mass capture as shown.



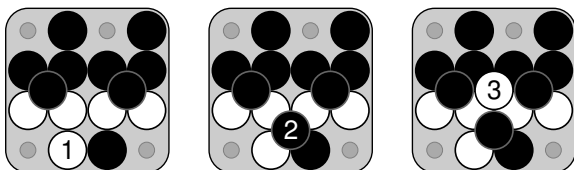
Black also has another winning play for this puzzle, using a similar approach. Move 1 (below) is a sacrifice that forces reply 2, allowing Black to play move 3. The board is now in the same state as shown above and Black can force a victory.



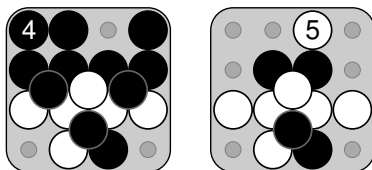
In both cases, Black exploits the No Repetition rule to stop White playing at the only point that would save them.

Solution #3

White can force a win from this position with move 1. Black's best reply is 2, then move 3 leaves Black to play with no safe points.



Black is forced to fill in one of their own freedoms with move 4, allowing White to make a mass capture with 5.



White should win from this position, although it may involve several more iterations of capture and recapture.

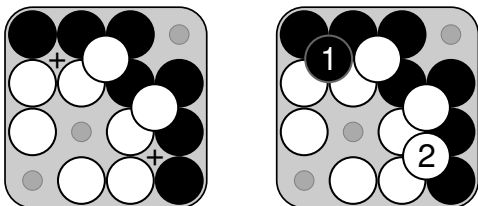
For a more thorough proof of this solution, see:

http://www.cameronius.com/games/spargo/puzzle_1/

Solution #4

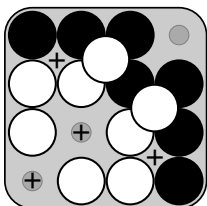
The player whose turn it is to play will *lose* this game (assuming optimal play). The possible options for each player are shown below.

Black to Move: Black has two playable points (left). Playing at either of these points allows White to play in the other (right), which ends the game as Black then has no legal moves.



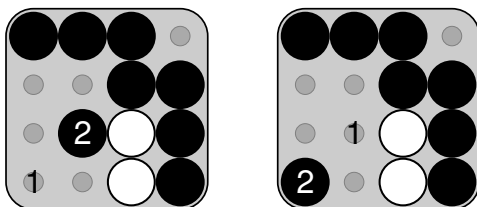
White would win such a game by 9 balls to 8.

White to Move: White has four playable points.

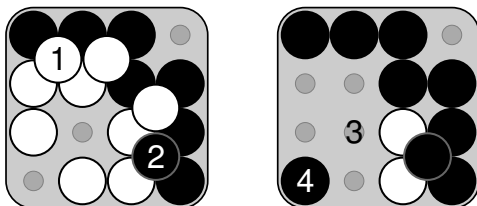


However, they will not play in either freedom as such a move would be disastrous, as shown below.

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Instead, White will play at one of the other playable points with move 1, forcing Black to take the other with move 2 (left). White is then forced to fill one of their own freedoms with move 3, allowing Black to make a mass capture with move 4 (right).



White can still fight from this position using their two surviving zombies, but Black should win from here with careful play.

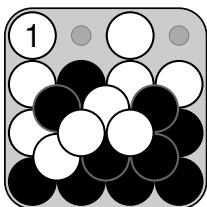
For a more thorough analysis of this puzzle, see:

http://www.cameronius.com/games/spargo/puzzle_2/

Solution #5

The answer is: it depends on the colour of the two buried balls.

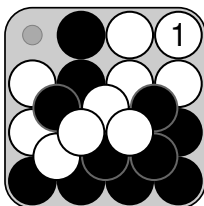
White + White: If both buried balls are white, then White can win with move 1 below. Black would then have no legal moves, so the game ends with 10 visible balls of each colour, giving White a 12 to 10 victory (counting the buried balls).



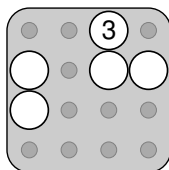
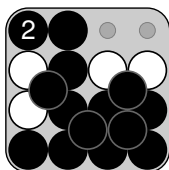
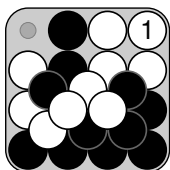
White + Black: If the buried balls are one of each colour, then White can use the same move to force an 11 to 11 draw.

Black + Black: If both buried balls are black then White faces a losing proposition. In this case, White's best option is to play move 1 (below) which at first looks suicidal, but actually hides a devastating trap.

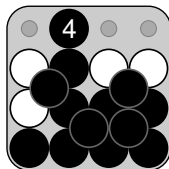
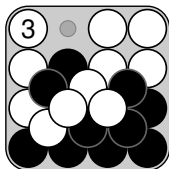
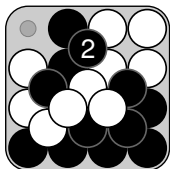
16 | Solutions



If Black falls for the trap and captures the offered sacrifice with move 2 below, then White can play move 3 to perform a *snapback* mass capture and clear the board of black balls.

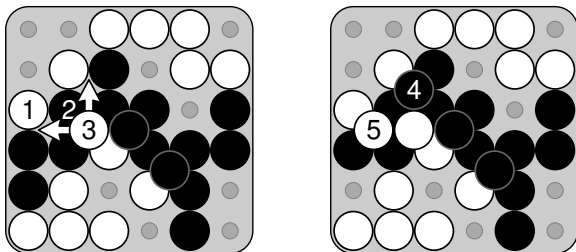


Instead, Black should play move 2 below to guarantee victory. Even if White captures with move 3, then Black can play a *snapback* capture with move 4 to decimate White and set up a win.



Solution #6

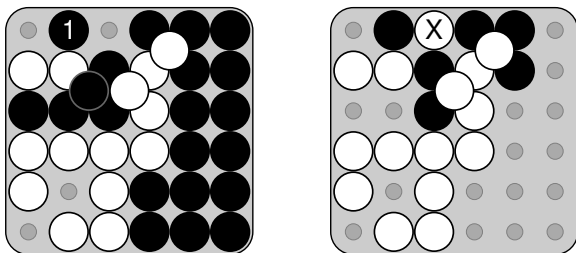
White's killer play is move 1 (left). This forces reply 2, allowing a bridge fork with move 3.



Black's best option is to block with move 4 (right). However, this still allows White to cut the black group with 5 to capture a ball and establish an unassailable position.

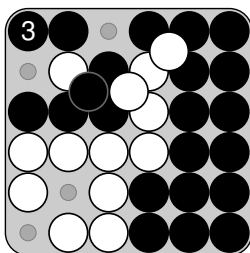
Solution #7

Black can save this game with move 1 (below).



This move saves the threatened black groups, by creating an unplayable freedom guarded by two zombies. White reply X (right) is illegal, as that ball would have no freedom after the move.

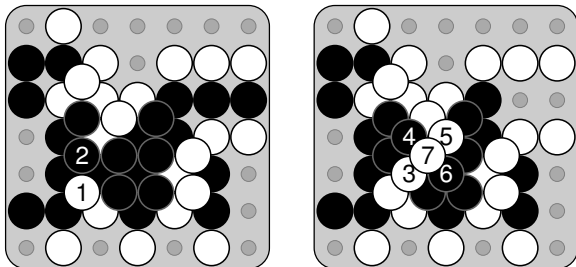
Black can then capture the vulnerable white ball next turn to establish a winning position (move 3).



This puzzle is based on game 176 played on the gamerz.net server.

Solution #8

White can engineer a win from this position, with key move 1 shown below (left). Black can't capture this ball as its freedom is guarded by a zombie.

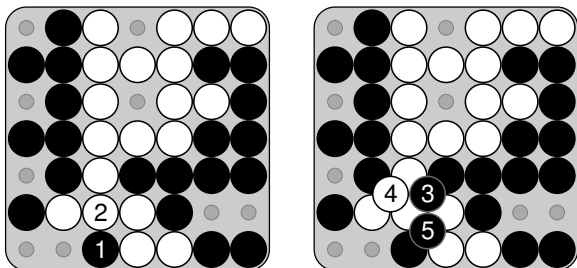


Instead, Black must defend with move 2 to avoid immediate capture, setting up a cross-bridge which White crowns with move 7.

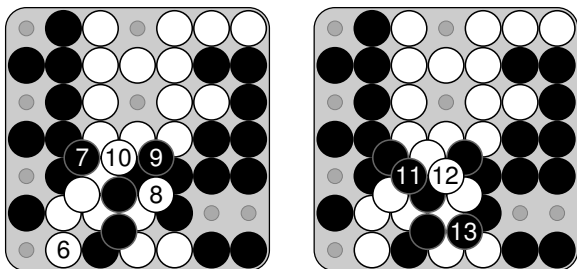
This puzzle is based on game 311 played on the gamerz.net server.

Solution #9

Black's best play from this position is as follows. Move 1 puts the white group in *atari* to force reply 2 (left), which allows a make bridge fork attack with move 3 (right). White's best move is to block to the left with 4 allowing Black to connect downwards with move 5.



Even if White tries to contain the black group with move 6 (below), then Black can threaten a cross-bridge with move 7, forcing White to complete a counter cross-bridge with moves 8–10. Black eventually wins this exchange with moves 11–13.

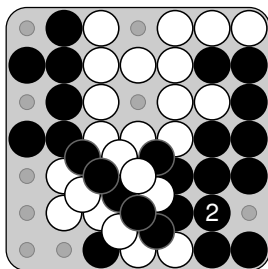
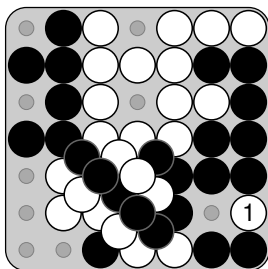


This gives Black a strong position, with a commanding group spanning most of the board.

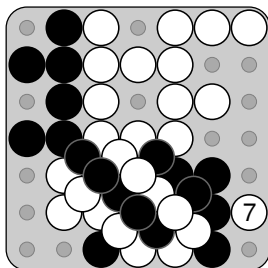
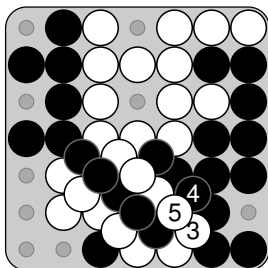
This puzzle was derived from game 157 played on the gamerz.net server. This game was unusual in that no stacking had occurred until this point.

Solution #10

White's best play is move 1 (left), which threatens to capture the two black balls in the lower right corner. Black's obvious reply is capturing move 2, which removes this threat (right).

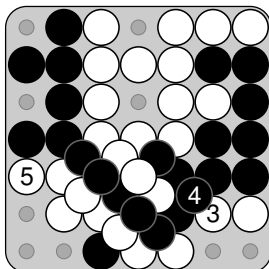


However, this allows White to play a cross-bridge with moves 3–5 (left). The black group has now been cut in two, and White can perform a mass capture on their next move 7 (right).



If Black plays move 2 elsewhere, then White can capture the two threatened black stones with move 3 (below), forcing pin 4. White move 5 then

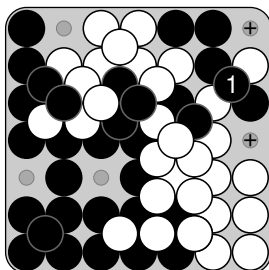
makes the white sub-groups containing balls 3 and 5 a safe virtual group that is easily defended.



White is now in a dominant position.

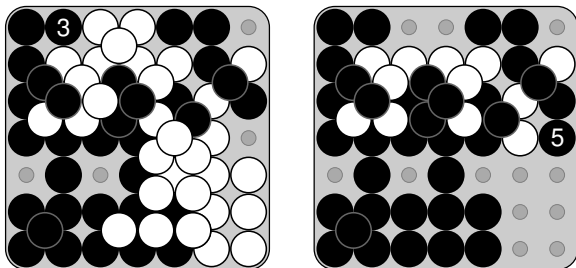
Solution #11

Black's killer move 1 is shown below. This move merges the two threatened black groups into a single group with two freedoms (+). White can't play in the corner point, and taking the other freedom would put the main white group in *atari*. White must move elsewhere.



Games & Puzzles

However, wherever White moves, Black is able to put the main white group in *atari* with move 3 next turn, then make a mass capture with move 5 on the following turn, as shown below.



This puzzle was based on a position that arose in game 312 played on the gamerz.net server.



Conclusion

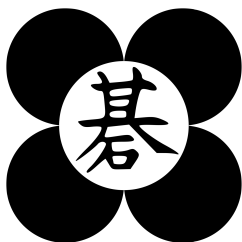
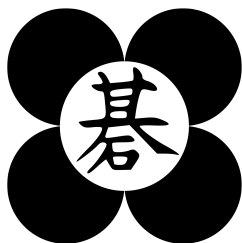
I hope that this book has explained Margo clearly enough to give you an appreciation of its subtlety and depth. The combination of Go-like play with 3D stacking can be daunting for new players, but the rules are actually quite simple once learnt, and normally click into place after a few games. I believe that the effort is well worth it.

This book represents the first steps in documenting what we currently know about Margo, and formalising the key concepts involved. For a book on “basics” it contains some reasonably advanced material, but that’s just the nature of this deep and mysterious game.

Margo continues to fascinate me after years of play, and I hope that the analysis provided here conveys this enthusiasm. I look forward to exploring Margo further in the upcoming years, and hope to play many of you soon.

*Cameron Browne
London, UK
August 2012*

Appendices



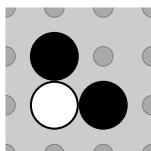


Margo and Go

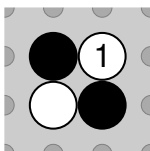
Although Margo had its genesis in Go, it is more than just another Go variant with some bells and whistles added. The most obvious difference between Margo and Go is the 3D aspect of stacking. However, the rules combine in more subtle ways to produce a game with its own distinct character. This appendix describes some of the key differences between Margo and Go.

Cross-Cuts Don't

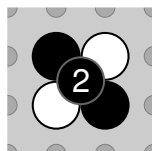
The following move 1, called a *cross-cut*, is used to keep enemy pieces separated in Go. However, the opponent can simply bridge over to connect their balls in Margo (move 2).



White to play.



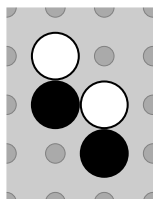
Cross-cut.



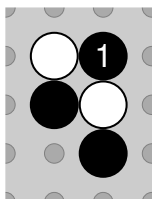
Bridge.

Appendix

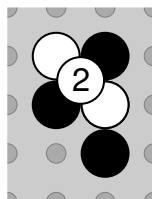
Similarly, the following move 1 would threaten the white ball to extend to the right, whereas bridging offers an alternative escape route in Margo (move 2).



White to play.



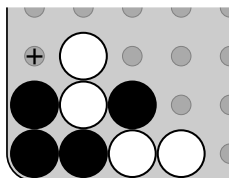
Threat.



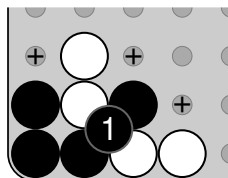
Bridge.

Jumping the Wall

Some groups that would be doomed in Go, such as the black group in the corner below, can “jump the wall” to escape. In this case, Black jumps the wall with bridging move 1, creating a combined group with three freedoms that is now safe from immediate capture.



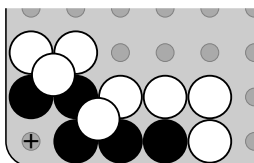
Black group in *atari*...



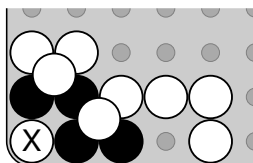
...bridges to safety.

One Freedom May Be Safe

Unlike Go, groups with a single freedom can be safe, if zombies protect it. For example, the following black group is safe from capture even though it only has one freedom. White can't make move X.



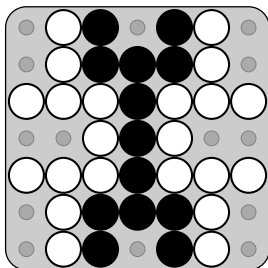
One freedom.



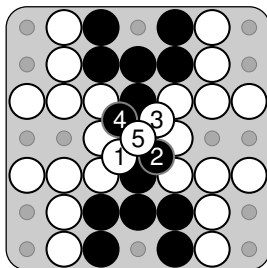
Safe from capture.

Two Freedoms May Not be Safe

The following black group has two freedoms but is not safe. White can force a cross-bridge between their left and right groups as shown, to cut the black group into two vulnerable single-freedom groups.



Safe black group.



Unsafe black group.

Appendix

Zombies

Zombies constitute a major difference between the two games. In Go, stones can be in one of two states: alive or dead. In Margo, balls can be in one of three states: alive, dead or pinned (zombified). The unkillable status of zombies makes them very dangerous.

Less Freedom

The smaller board size means that Margo has fewer freedoms. The competition for freedoms is more fierce, and they tend to be claimed quite early in the game, forcing the battle upwards into the higher levels. Margo may be thought of as a freedom battle on the board level combined with a connection battle in the higher levels.

The smaller board size makes Margo more tactical, as opposing forces collide from the opening moves. If Go is an *aikido* match in which opponents warily circle to size each other up before engaging, then Margo is a cage fight in which players immediately slam into each other.

Richard Reilly observes that Margo gets “more Go-like” on larger board sizes. Players spread out more on the board level to maximise their territory, hence games tend to be flatter rather than building upwards. Group tax is also a major difference between the two games.

Cold Wars

The fact that passing is not allowed may not appear that important at first, but is actually the deciding factor in most games. Players *must* move on their turn, so as the board fills up players will be forced to fill in their own territory even if they don't want to. This makes territory increasingly critical and capture inevitable.

Complexity

Both games are of similar complexity. Margo is played on a smaller board, but the ability to stack brings additional balls into play. Margo also has the further complications of:

- ▶ 3D bridge play.
- ▶ Zombies survive capture.
- ▶ No passing means that group safety is not necessarily permanent.

Depth

Mark Thompson¹ defines *depth* as the capacity for a game to be played at different levels of expertise, and states that *depth gives a game lasting interest because the player continues to learn how to improve his play for a long time.*

¹ M. Thompson (2000) "Defining the Abstract", *The Games Journal*, July.

Appendix

This is certainly true of Go, and in my experience is also true of Margo, as I seem to learn something new about Margo almost every time I play it.

Clarity

Players differ in their understanding of what *clarity* means in a game. Robert Abbott¹ defines clarity as how easy it is to plan ahead, based on how confusing the rules are, or *how far you can see down the strategy tree*. Others understand it to mean the ease with which a player can see whether a move is good or not.

By either definition, Margo is less clear than Go. More rules and factors must be considered with each move, due to the 3D element and presence of zombies, and the No Passing rule means that having more balls on the board is not always a good thing.

Margo is like Othello in this respect; it can be difficult to accurately predict who will win from a given position. It's a game for players who like to be surprised.

¹ R. Abbott (1975) "Under the Strategy Tree", *Games & Puzzles*, 36, May.



Revealed Captures

This appendix describes the unusual case of *revealed captures*, which are freedom-less groups revealed when a group of the opposing colour is captured and removed. This is extremely rare – no cases have yet been observed in actual play – but the capture rule should be clarified to handle such cases unambiguously, should they occur.

Revealed Captures

The capture rules states that:

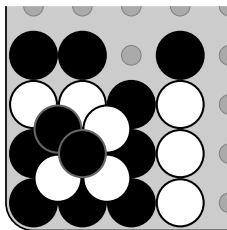
After each ball is placed, any groups without freedom (that do not contain that ball) are captured and removed.

In most practical cases this will refer to freedom-less enemy groups. However, it's possible that removing enemy groups can reveal freedom-less friendly groups, which are then also captured. Removing these could in turn reveal further freedom-less enemy groups which are captured and removed, and so on.

Appendix

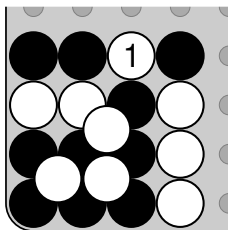
Example

Consider the following position, with White to play.

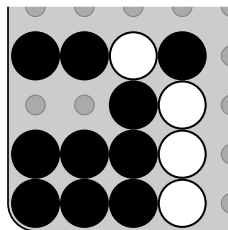


White to move.

White move 1 (below) captures two black balls, to reveal a freedom-less white group (left). This group is also captured as part of the move (right).



Freedom-less group...



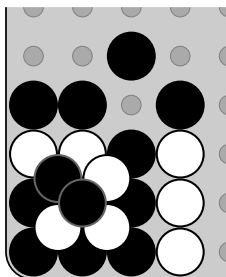
...also captured.

The move is now complete, after having captured both a black group *and* a white group.

Note that capture cycles will start with enemy groups, then alternate colour with each iteration: *enemy, friend, enemy, friend, ...*

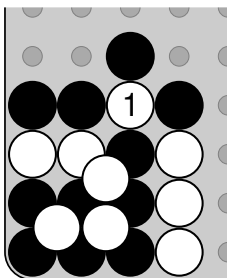
No Suicide Still Applies

Consider the slightly different position shown below, again with White to play.

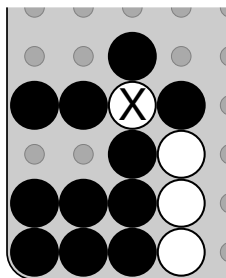


White to move.

If White plays the same move 1, then the same two black balls would be captured on the first cycle (left), and the same white group would be captured on the second cycle (right).



Freedom-less group...



...not a legal move.

However, the ball would have no freedom after the move, hence this move can't be made.

Appendix

Occurrence

Such revealed captures are unlikely to occur in actual play, but the capture rule has been carefully worded to handle them, just in case. If you see a revealed capture during standard play in an actual game, please let me know.

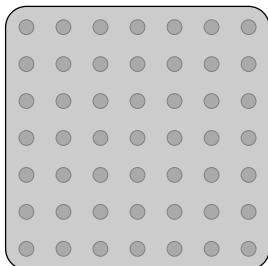


Board Geometry

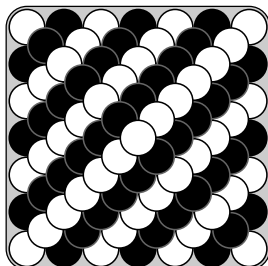
This appendix contains information related to the geometry behind the game, and notes on the recommended board sizes.

Square Pyramidal Stacking

The Margo board produces a *square pyramidal stacking* when fully packed. The following figure shows a 7×7 board packed to form a pyramid of 140 balls.



7×7 board.



Fully packed.

The *square pyramidal number* P_n of an $n \times n$ square board is given by: $P_n = n(n + 1)(2n + 1)/6$.

Appendix

Such complete stackings will not occur in actual games, as no group would have any freedom. Instead, games typically end with the board 1/2 to 2/3 full. Each player should have at least n^2 balls for an $n \times n$ game, enough to cover the board level. This number should be enough for most games.

The following table shows the number of balls required for complete stackings for a range of board sizes, and a rough indication of how many balls are actually needed for a game at each size.

Table A-1. *Ball counts for various board sizes.*

Board	Freedoms	Pyramid	Needed
4×4	16	30	~15–20
5×5	25	55	~25–40
6×6	36	91	~45–70
7×7	49	140	~70–100
8×8	64	204	~100–140
9×9	81	285	~140–190
10×10	100	385	~190–250
11×11	121	506	~250–325
12×12	144	650	~325–400
13×13	169	819	~400–500
14×14	196	1,015	~500–600
15×15	225	1,240	~600–750
16×16	256	1,496	~750–900
17×17	289	1,785	~900–1,050
18×18	324	2,109	~1,050–1,250
19×19	361	2,470	~1,250–1,650

Note that capture is a large part of Margo, hence the number of moves in a game can be much greater than the required number of balls.

Board Size

Margo scales well to different board sizes, and the nature of the game changes noticeably between smaller and larger boards. The choice of size comes down to a balance between strategic depth and game length.

Larger boards offer greater scope for strategy, but can also be subject to long cold wars, in which neither player wants to make any of the available moves. This can reduce the tension and is usually the least interesting part of the game. Games below 7×7 tend to build to a crisis then reach a resolution, while 7×7 and above allows games of true complexity with multiple crisis points.

Margo was originally devised on the 9×9 board, but this size was revised downwards with experience, as games played on such large boards tend to involve long passages of cold filling-in play. 19×19 games would require over a thousand balls and last for over a thousand moves, and sets of this size would be expensive and heavy.

The game actually works surprisingly well on small boards. For example, the miniature 4×4 game is so interesting and distinct that it's been given its own name: Spargo.

Appendix

Table A-2 lists the recommended board sizes. All sizes are available from **nestorgames**, on request.

Table A-2. *Recommended board sizes.*

Size Name	Characteristics
4×4 Spargo	Games are more tactical and less forgiving, and capture is always imminent. Games can be surprisingly tricky.
6×6 Beginner	The easiest size to learn on, and the default sold by nestorgames . Allows sufficiently deep games.
7×7 Standard	Recommended for most games. Offers the optimal balance of strategic depth and game length.
8×8 Large	For longer games with deeper strategy.
9×9 Huge	For serious games between serious players. Allows very deep games, but can involve long filling-in phases.
10×10+ Extreme	Very deep but increasingly impractical. Games can take a very long time and a lot of balls.



Tournament Play

This appendix provides recommended guidelines for tournament play and other official games.

Rules

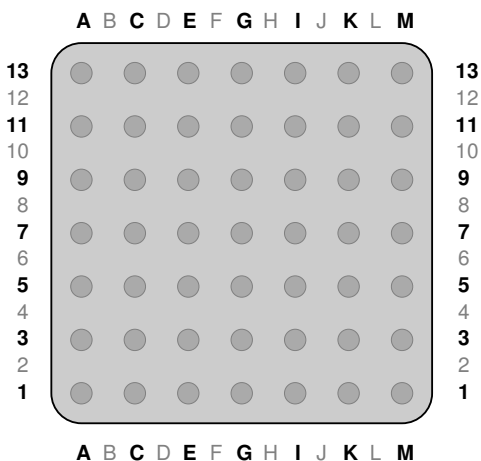
The standard rules described in Chapter 2 should be used, including the swap rule. In the unlikely event of revealed captures, these should be handled as described in Appendix B.

Players are not allowed to unpack balls to see what's buried underneath. It should be possible to at least glimpse the colour of most buried balls from different angles.

Board Size

The standard 7×7 board is suitable for tournament play. The system for labelling board coordinates is shown below.

Appendix



Coordinate system.

Scoring

The recommended tournament scoring is:

- ▶ 3 points for a win.
- ▶ 1 point for a draw.
- ▶ 0 points for a loss.

Alternative scoring methods based on ball count (e.g. a player's score is their final ball count minus the opponent's final ball count, totalled over all games) are not recommended. These could have the undesirable effect of encouraging players to play defensively and minimise sacrifices, which would change the nature of the game.

Game Records

Game records should show the board size, the coordinates for each move, and the final ball count for each player. White is listed on the left.

An asterisk after the opening move denotes that the second player elected to swap.

The following listing shows a typical game record for a short (and imaginary) game.

Listing D-1. *Typical game record.*

Game #7 (7×7)

Stockholm Invitational, 5/8/1432

○ **A. Block**

● **G. Reaper**

1 C5*	2 E5
3 G7	4 I9
5 E7	6 I5
7 I7	8 K7
9 K5	10 J6
11 G5	12 E3
13 G3	14 H6
15 F6	16 E9
17 G9	18 F8
19 K9	20 J8
21 C9	22 E11
23 C11	24 A7
25 E13	26 C7
27 G11	28 D6
29 H4	30 G1
31 J4	32 Resign
= 14	= 13



History

Margo was invented in 2006, based on my earlier ball-stacking game Akron. The name *Margo* is a contraction of *marbles* + *Go*.

The Margo logo (right) shows the Japanese kanji for *Go* superimposed on a 2x2 pyramid of balls.



I'd wanted to devise a workable 3D Go variant for years. The biggest challenge was to find a way to reduce 3D freedom, so that groups can't perpetually escape capture, without stifling ball placement. Limiting freedoms to the board level made this problem simply go away.

The pinned capture rule that creates zombies was originally added to avoid ambiguities with revealed connections and falling balls, but was found to add an interesting balance to the game. The constant urge to build upwards is tempered by the fact that zombies are dangerous, and

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players must think carefully before stacking on enemy balls.

Margo scoring is simpler than Go scoring. Complex Go positions can confuse even expert players and require considerable analysis, whereas Margo positions can be scored quickly by anyone who can count a pile of balls. Ball count scoring encourages higher play, as the board is small and players must stack upwards cleverly to maximise the number of balls they can pack in, giving an implied 3D territory count. It also introduces the notion of group tax, encouraging players to form fewer and larger groups.

Online Play

Margo can be played online at Richard Rognlie's gamerz.net server. This is an excellent service that provides an archive of previously played games, with an attractive graphical interface that lets players step through the moves of each game:

<http://www.gamerz.net/pbmserv/List.php?Margo>

Challenge me (*camp*) to a game there any time.

Physical Sets

Margo was first published by Pancerola in 2010, then by **nestorgames** in 2012.

nestorgames sells the game in two editions:

Ninja: Foam board and plastic balls.
Smaller, cheaper and more portable.

http://www.nestorgames.com/#margoninja_detail

Samurai: Strong acrylic board in “ice” finish.
1” phenolic resin (i.e. snooker) balls.
More expensive but exquisite.

http://www.nestorgames.com/#margosamurai_detail

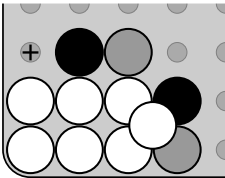
The Samurai set is more expensive, but is made of high quality components that add up to an unparalleled playing experience, and a beautiful coffee-table piece. This is how the game was meant to be played.

nestorgames provides the Beginner’s 6×6 board by default, but can provide the Standard 7×7 board and other board sizes on request.

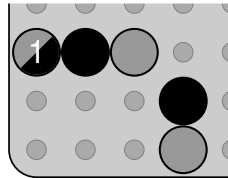
Appendix

Three Players

Margo can also be played by three players (White, Black and Grey) using the standard rules and another set of balls. The following example shows a white group with a single freedom (+), which can be captured by either Black or Grey with move 1.



White group in *atari*.



Captured by Black/Grey.

Additional balls in different colours are available separately from **nestorgames**.

Glossary

This glossary explains the meanings for key terms. Words in italics are traditional Go terms.

- Atari*** Group with a single playable freedom, under threat of capture.
- Bridge** Connection above the board level.
- Bridge fork** Forking move that threatens two bridge connections at once.
- Bridgehead** Group that establishes a strong hold in enemy territory.
- Buried** Ball with another ball straight above it, hiding it from view.
- Cold move** Move neither player wants to make.
- Cold war** Sequence of cold moves.
- Conduit** Intermediate group that transmits a connection.
- Corner control point** Point that dominates a corner (three points diagonally in).
- Counter-cross-bridge** Cross-bridge connection formed perpendicular to an existing cross-bridge.

Glossary

- Cross-bridge** Connection formed by two bridges crossing in opposite directions.
- Crown** Apex move that completes a bridge.
- Dead point** Point at which neither player can legally play.
- Differential cycle** Local capture cycle in which one player loses more balls than the other per iteration.
- Enemy** Ball or group not of the player's colour.
- Escalade** Ball that threatens to climb over an enemy wall.
- Foundation** Board level balls on which a group is built.
- Freedom** Empty board hole adjacent to a group.
- Freedom-filling race** Cold war in which players are forced to fill in their own freedoms.
- Friend** Ball or group of the player's colour.
- Group** Ball or set of touching balls of the same colour.
- Inner game** Game based on establishing a strong central group.
- Invasion** Playing in the opponent's territory.
- Lead zombie** Zombie at the leading point of an attack.

Glossary

- Mass capture** Capture of a significant number of balls (say six or more).
- Mouth** Acute corner where a ramp meets a board edge.
- Outer game** Game based on controlling the corners and edges.
- Overpass** Connection passing perpendicularly over a connection directly below.
- Owned point** Safe point that the opponent cannot play at.
- Pinned** Ball that supports an enemy ball above it, directly or indirectly.
- Platform** 2x2 square of balls.
- Playable point** Point at which a ball can legally be played.
- Point** Location that supports a ball, i.e. a board hole or 2x2 platform.
- Ramp** Non-touching diagonal line of balls.
- Revealed capture** Freedom-less group revealed by removing a group of the other colour.
- Sacrifice** To give up a small number of balls for positional gain.
- Safe group** Group with at least one freedom that is unplayable to the opponent.
- Safe point** Point a player can move at without putting a friendly group in *atari*.
- Snapback** Large capture that results from a smaller capture.

Glossary

- Suicide*** Move that would have no freedom after captures are performed.
- Swap** Second player swaps colours to steal the opening move.
- Tension** Importance of each move.
- Territory*** Playable points under a player's control.
- Territory-filling race** Cold war in which players must fill in their own territory.
- Underpass** Connection passing perpendicularly under a connection directly above.
- Virtual bridge** Implied bridge connection, guaranteed to succeed if threatened.
- Virtual group** Group formed by a virtual bridge.
- Zombie** Ball pinned by one or more enemy balls.

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