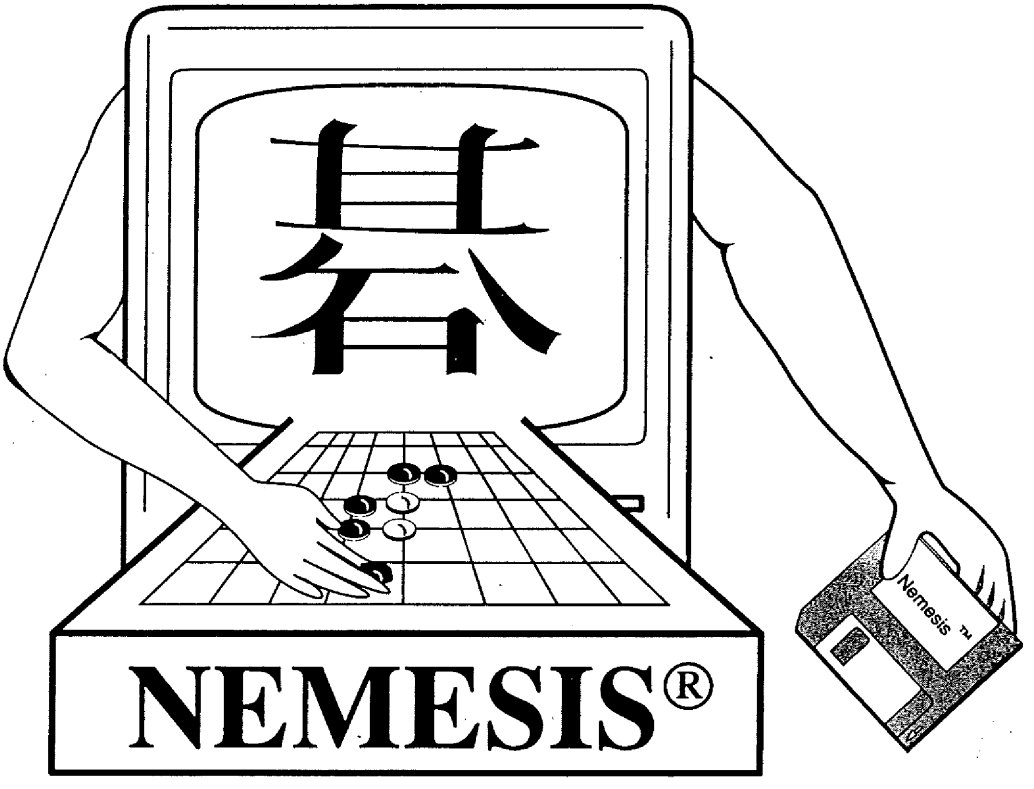
NEMESIS®

Go Master®
Joseki Genius™
Tactical Wizard™



Macintosh Version 4

Welcome to NEMESIS®

Those who are concerned in the computer business know very well that it is only a fantastic dream to make the computer play Go in its own way in place of human beings.
An Introduction to Go by the Japan Go Association, 1972

After over 15 years of research, Bruce Wilcox, author of Instant Go™, succeeded in creating NEMESIS, a computer program that realizes the fantastic dream — a program which emulates human play.

NEMESIS plays like no other game program in the world. Instead of using tree searches (the technique used in master chess programs), she assesses the board situation and selects a strategy. In examining a typical game, it is often impossible to guess which player is the computer.

About NEMESIS

This manual is designed for use with NEMESIS Go Master, NEMESIS Joseki Genius, NEMESIS Tactical Wizard, and NEMESIS Go Master Deluxe.

Professional Game Records Accompanying NEMESIS: Professional games are works of art, and are copyrighted. We have taken ten (10) pro games from the ancient masters (their copyright has expired along with them) and included them on your disk. These games are commented in the book Appreciating Famous Games by Shuzo Ohira.

Multiple NEMESIS products should not reside on the hard disk together.

Do not simply copy them to your hard drive!

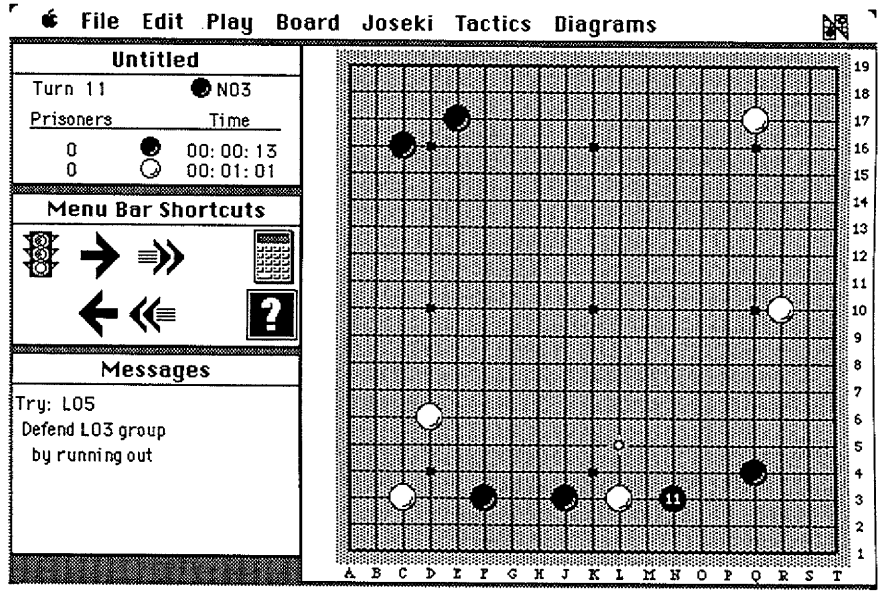
Read your READ.ME files!

At this point you should read *each* of the **read.me** files found on your NEMESIS disks to understand how to integrate multiple NEMESIS products and install them on your hard drive.

Table of Contents

Screen Windows

This section is a quick overview of the NEMESIS screen display.



The above screen shot shows the five parts of the NEMESIS screen: the menu bar, the **Status Window** (labelled *Untitled* - i.e. the file name), the **Icon (Menu Bar Shortcuts) Window,** the **Messages Window**, and the **Game Board.**

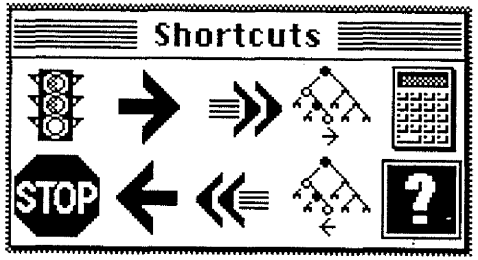
The **Status Window** shows the document name, turn number, who last played and where, the time spent for each player, and the number of stones captured by each side. The **Icon Window** contains mouse sensitive buttons duplicating common menu bar commands. The **Messages Window** displays hints and motives for the moves made by NEMESIS and other system messages. The **Game Board** shows the go board.

Command Entry

File Edit Play Board Joseki Tactics Diagrams

The following sections describe each of the menus and the items found within them. In some cases, you will see that a menu item is grayed. This means that the function is not presently available. The menu item's **Icon** (if any) is also not shown. If all items in a menu are unavailable then the menu name in the menu bar is grayed. Any available option can be utilized even when you have a watch cursor (NEMESIS is thinking).

Icons (Shortcuts) are mouse-sensitive pictures, which directly invoke common commands available from the menu bar.



The Icons (in corresponding position in the window to the right are:

Play	**Replay Move**	**Instant Replay**	**Next Sequence**	**Score**
Stop	**Unplay Move**	**Delete all Moves**	**Prior Sequence**	**Hint**

Game Board Dragging: Any region off the board can be used to drag the Go Board window, since the conventional title bar has been omitted.

Keyboard Move Entry: In addition to the mouse, you can also enter moves from the keyboard. Just type the coordinate name (column letter followed by row number, e.g., D4) and then press **RETURN** or **ENTER**.

Command Key Equivalents: Many menu items have command key equivalents. These appear after the menu name, e.g. New ⌘N. Hold down the ⌘ key and press N. Command keys autorepeat when held down.

Command Key Listing

⌘A Alternating Stones
⌘B Black Stones
⌘D Delete all Moves
⌘E Empty Intersections
⌘F Follow Record
⌘G Guess
⌘H Hint
⌘I Instant Replay
⌘J Joseki Corner
⌘L Last Game
⌘M Moves
⌘N New
⌘O Open
⌘P Play
⌘Q Quit
⌘R Replay Move
⌘S Save
⌘T Tactics Target
⌘U Unplay Move
⌘W White Stones
⌘. Stop!
⌘] Next Sequence
⌘[Prior Sequence
⌘- Pass
⌘= Score

Menu Name Listing

⌘A Alternating Stones
⌘B Black Stones
⌘D Delete all Moves
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⌘H Hint
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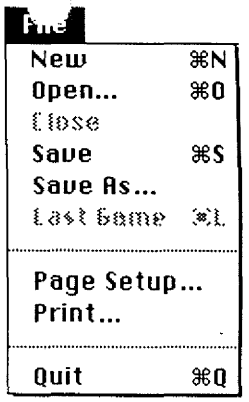
⌘N New
⌘] Next Sequence
⌘O Open
⌘- Pass
⌘P Play
⌘[Prior Sequence
⌘Q Quit
⌘R Replay Move
⌘S Save
⌘= Score
⌘. Stop!
⌘T Tactics Target
⌘U Unplay Move
⌘W White Stones

File Menu



Most of the menu items operate in the familiar Macintosh fashion though there are some subtle differences. The **Close** command is disabled because NEMESIS always has an open Go board. **Last Game** is a command analogous to a sophisticated undo.

New

New clears the board to start a new game *and* initiates **Play**. If you are using Japanese rules, the handicap stones (if any) remain on the game board, but all other stones are removed. If it is your turn, enter your move. If it is NEMESIS' turn, she will move.

Open

Open allows you to restore a game record previously saved to disk.

Save & Save As

When you save a game, all of the settings associated with the game are also saved. A saved game is kept exactly as it appeared at the time of the save. If you unplayed moves, the game is restored with those moves still unplayed (and replayable).

After you experiment with NEMESIS and determine the settings you most often wish to start with, we suggest you save a game with these settings for starting NEMESIS in the future. You may wish to have more than one of these start up games, for example a 13x13 board and a 19x19 board.

Last Game

NEMESIS can keep track of two *significant* games simultaneously. The **Last Game** command restores the last significant game record, thus recovering valuable game records that might have been accidentally destroyed. Its most dramatic use can be demonstrated by playing *two* games simultaneously. If the game is significant (i.e. more than four (4) white moves have been played) and you destroy that game in any manner, then that game can be accessed using **Last Game**. Ways to destroy a game include starting a new game, restoring a game, using **Last Game**, changing the board size or handicap, keeping moves after **Altering the Board**, or by unplaying any number of moves and then playing a variation.

You cannot use **Last Game** after **Quit**, since NEMESIS keeps the games in RAM, *not* on disk. **Last Game** should not be used in place of the **Save** command. If a game record matters and you are about to explore some variations, save the game first.

The most practical use of the **Last Game** is figuring out *what went wrong* when you've lost some territory. To do this, simply back the game up to the appropriate point and then try again. When you are finished exploring this new line use **Last Game**. You will return to the point in the first game where you deviated. Try another variation or replay your moves and continue with your game.

Page Setup

Page Setup prepares your page for printing. For standard Imagewrier printout, select the Tall Adjusted option for best results.

Print

The **Print** command prints the **Messages, Board** and **Game** windows.

You can also print the 19x19 Go board larger than your screen may be able to display by selecting **Large size** under **Setup Everything** in the board size pop-up menu. Depending on the hardware you own you can experiment with these sizes to come up with your own preferences.

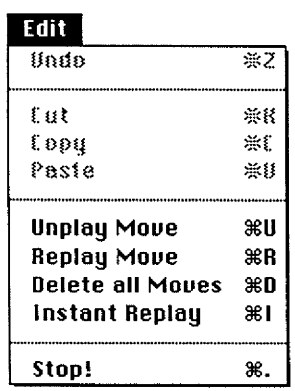
The Go board prints those moves showing on the Go board. Even if you can't see the entire board on the screen, the whole Go board will be printed. If you back up to some mid point in your game and then select **Print**, only the game record up to that point will print.

Game diagrams can be made using the functions found in the **Diagrams Menu**, and then printed or captured using a screen capture tool.

Quit

To exit NEMESIS, select **Quit**.

Edit Menu



Unplay Move

To unplay a single move, select **Unplay Move**. **Unplay** takes back the last move played. Repeating this command backs you up to any prior game position. In **Altering the Board, Exploring Joseki**, and **Exploring Tactics** modes, **Unplay Move** only unplays hypothetical moves.

Changing Your Move: Now you can prove the famous lament *I would have won if ....* If you misplace a stone, or realize an earlier move was a mistake, you can go back and place a different move. First, save your original game if you want to keep it, because you may not be able to recover it later. Next, use **Unplay Move** until your offending move and all subsequent play are gone. Then enter your new move, and continue with this new game to discover the *truth*. (See **Last Game** in the **File Menu** for how to flip between your original game and this new variation.)

Changing NEMESIS' Move: You can change NEMESIS' moves. Select **Unplay Move** to delete one or more of her moves. Then select **Play.** NEMESIS will add the previously played move (the one now pending replay) onto her **reject list**, and consequently select a different move. If her move was bad before, the new move may be better, since you have forced NEMESIS to change her focus of attention. This can be done again and again. If you do this to a different turn, NEMESIS will flush the old turn's reject list

Resetting the Reject List: If you want NEMESIS to play (or hint or tactical sequence) as she originally did, back up *before* the turn you want to reset and select **Replay Move** to replay that turn. (Replaying moves clears her reject list.)

Replay Move

To replay a move taken back either with **Unplay Move** or **Delete all Moves**, select **Replay Move**. Each time you select this function, the game replays a single move.

Delete all Moves

To back up to the beginning of the game, select **Delete all Moves**. All stones except Black's handicap will be cleared. Handicap stones will be cleared under **Chinese Rules** only. You can interrupt NEMESIS when she is clearing the board by selecting **Stop!**. This is a fast way to reach a particular turn. When the **Altering the Board, Exploring Joseki**, or **Exploring Tactics** modes, **Delete all Moves** will clear your hypothetical moves only.

Instant Replay

Instant Replay allows you to automatically replay moves which have been backed up. To replay an entire game, select **Delete all Moves** and then select **Instant Replay**. **Instant Replay** allows selection of the speed (in seconds) that the moves are replayed; see **Setup Everything** in the **Play Menu**. You can also interrupt **Instant Replay** part way through by selecting **Stop!**, and later reselect **Instant Replay** to continue.

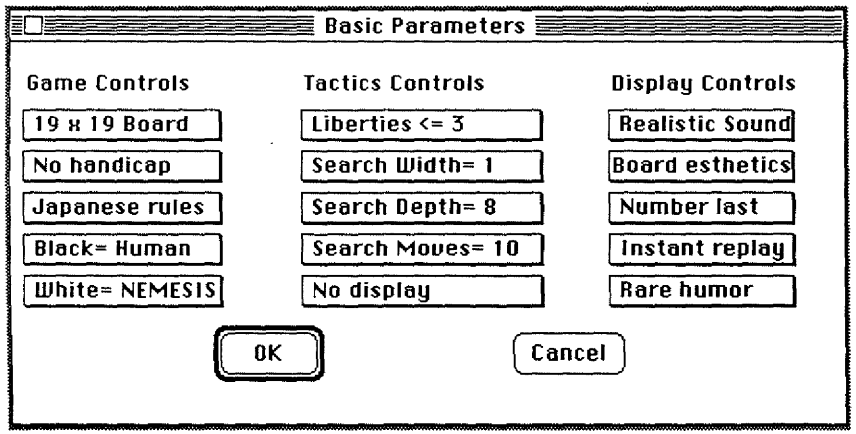
S. .p!

Stop! interrupts NEMESIS, no matter what she is doing. When NEMESIS is computing her move, **Stop!** stops her. If it is your turn, **Stop!** freezes the game clock. If NEMESIS is scoring, this command stops the scoring process. **Stop!** also cancels **Altering the Board**, **Exploring Joseki**, **Exploring Tactics** modes as well as **Diagramming** and **Scoring**. *If NEMESIS is deep in meditation, she may take a moment to rouse. She thanks you for your patience.*

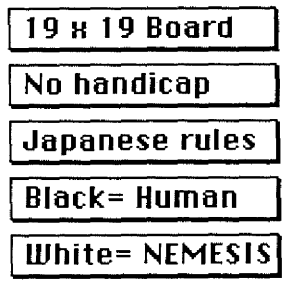
Play Menu

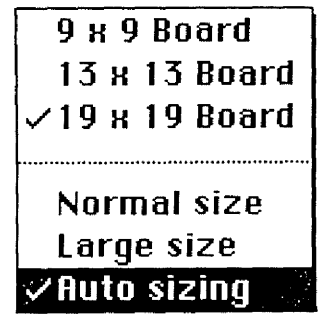
Setup Everything

Items in **Setup Everything** allow you to change the *Basic Parameters* of your Go game. When selected, the dialog box shown below appears. The current value of each parameter is shown in the rectangular buttons. Each parameter is part of a Pop-up Menu which will appear when you click on its button. The current value in the Pop-up Menu is preceded by a check mark. To change a parameter's value, click on its button, drag the mouse until the desired item is highlighted, then release the mouse (this procedure is identical to selecting an item from a menu). The button is now labelled with the new value. Repeat this procedure for each of the parameters you wish to change, then select **OK** to activate these changes or **CANCEL** to discard them.



Game Controls:



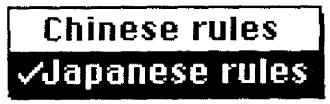


The board pop-up menu allows you to select between three different board sizes: **9x9 Board**, **13x13 Board**, **19x19 Board** and between three display sizes: **Normal**, **Large**, and **AutoSizing.**

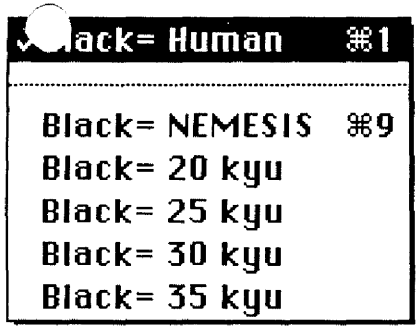
A standard game of Go is played on a **19x19 Board**. We suggest that raw beginners take Black with a 4-stone handicap on the **9x9 Board** to learn the basics of Go. For more experienced Go players, a **9x9 Board** is useful for very quick games. A **13x13 board** is the next step for beginners. Study Go on this size to learn faster, since you can play a lot more games and because the strategy is simpler. **Normal** is designed for a Mac Plus or SE screen; **Large** is for a MAC II; **AutoSizing** is for 19 inch screens but scales to whatever screen size you have. Large size is also nice for bigger printing.

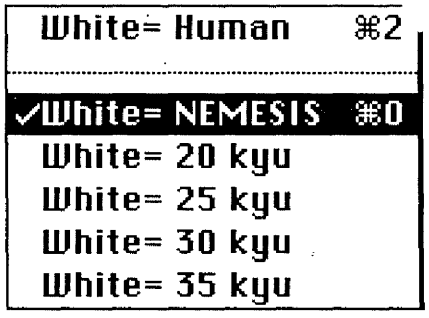
The Handicap pop-up menu allows you to set Black's handicap from an even game with **No Handicap** to a **9 Stone Handicap**. **Black Moves** in the **Board Menu** can be used to create even higher handicaps or arbitrarily placed handicaps.

Note: A player stronger than NEMESIS can improve handicapping further by choosing Chinese rules, allowing NEMESIS to pick her own placement.



The Rules Pop-up menu lets you select either **Japanese rules** or **Chinese rules**. See the Instant Go Starter Kit Appendix on the rules.

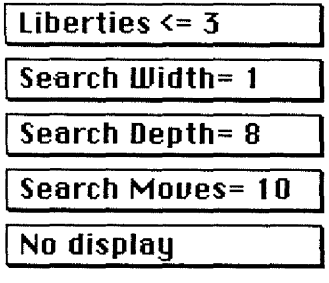




With the Black and White popup menus you can independently set who plays Black and White. Selecting **Human** sets **Black** or **White** to a human player (i.e. entering moves manually). You can play against a friend by selecting both human. **NEMESIS** is your strongest computerized opponent. By selecting **NEMESIS** as both players, you can watch a demonstration game. You may also set **Black** or **White** to weaker computerized players: **20 kyu**, **25 kyu**, **30 kyu**, or the almost totally random **35 kyu**.

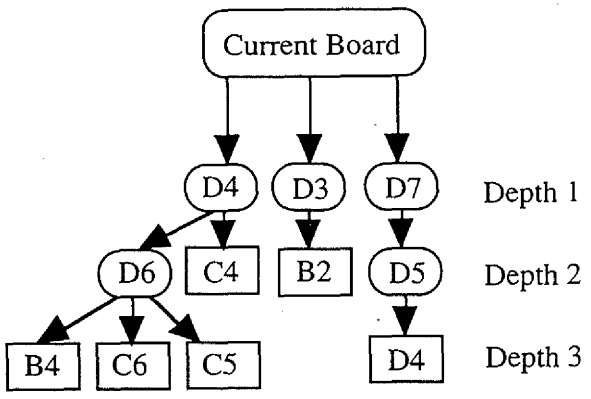
Note: you will learn the most by setting NEMESIS to her strongest setting and choosing an appropriate handicap and/or using smaller board sizes. *Choice of player is available in Go Master only. The Joseki Tutor and Tactical Wizard allow only human - human play.*

Tactics Controls



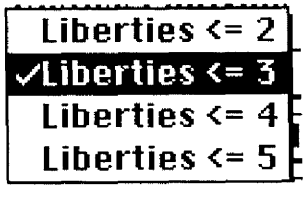
The first four items under **Tactics Controls** *can be altered in Go Master only.* The last item *can be altered in either Go Master or Tactical Wizard.*

During play, NEMESIS performs goal-oriented tactical searches. That is, she analyzes the situation for a particular outcome: to try to kill or save a string, to try to cut or defend a connection, to try to kill or save a group. Within each search, NEMESIS imagines what might happen as a result of various move sequences. This imagining takes the form of an upside-down tree of choices. Page 11 has a simple example of such a tree. The top of the diagram, the root of the tree, is your current board position. The nodes of the tree are possible moves for the players. Nodes which have no moves connected beneath are the *leaves*, the end of a completed sequence. *Leaves* are indicated by square boxes. A possible sequence of moves is connected with arrowed lines.

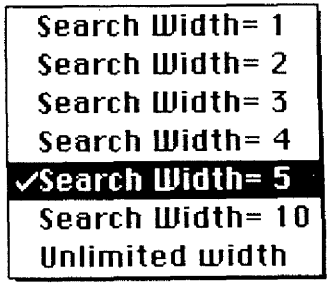


Tactical Tree

Such trees may be small or big, depending upon the complexity of the problem. The bigger the tree explored, the more time NEMESIS takes. You can limit how much of this tree NEMESIS explores per search with the four parameters: **Liberties, Search Width, Search Depth,** and **Search Moves**. The higher you set these parameters the better NEMESIS might play - of course more slowly. Depending on the power of your machine this may or may not be noticeable.

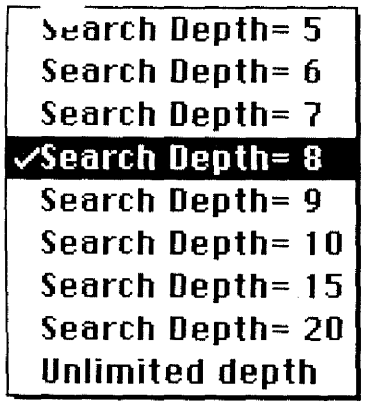


Liberties controls which strings will be tactically analyzed for string capture. Strings with liberties less than or equal to LIBERTIES will be analyzed for string capture (see Tactics).



Search Width controls how many variations (sequences leading to final positions) NEMESIS examines per search per player, i.e. how many *leaves* in a tree are generated. The tree above has six (6) *leaves*. If NEMESIS exhausts the width limit for a particular player, NEMESIS will not explore the tree further. Instead she will assume that player cannot win the search.

Search Width = 1 means NEMESIS should try one variation line and use that as the basis of deciding the result. This may seem insufficient for making any intelligent decision, but NEMESIS explores what she thinks is the best line first, and she may get the correct answer this way. Most problems at NEMESIS' level should have no more than three to five (3-5) interesting variation lines.

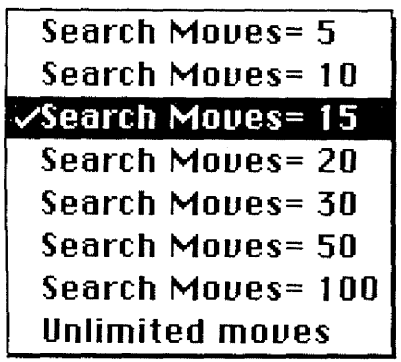


Search Depth controls how many moves into the search the defender needs to keep his stones alive before the attacker abandons the search as too hard, i.e., it controls how many levels down the tree NEMESIS can go.

For the tree of page 11 the **Search Depth** is three (3). If NEMESIS reaches the depth limit, NEMESIS will assume the defender succeeds along this variation in the tree.

Most problems which are reasonable for a player of NEMESIS' strength, should be solvable within a depth of seven to nine (7-9).

Selecting a large search width and small search depth tells NEMESIS not to overlook the obvious simple tactics. Selecting a small search width with a large search depth allows NEMESIS to explore briefly complex sequences beyond her normal abilities.



Search Moves controls how many moves are generated in the tree before exploration must stop. When NEMESIS reaches the move limit, she completes whatever line she is working on (finishes the variation in progress), and then stops searching further. (Thus she may actually spend more moves than you specified, but only to make the current line meaningful.)

The tree on page 11 requires eleven (11) search moves to be completed.

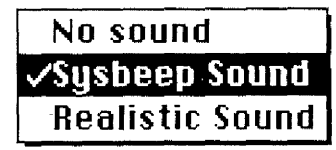
Most problems shouldn't spend more than fifteen to twenty (15-20) moves in searching, or the problem is probably too complex, or being analyzed poorly.

This Pop-up Menu controls if NEMESIS displays her tactical thinking or not. **No Display** turns off the display of tactics.

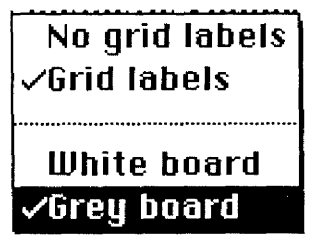
When you select **Continuous Display**, NEMESIS' tactical thinking will be displayed. This *flashy* feature can be entertaining and instructive, but it will slow down the game. Note when **Exploring Tactics** with this feature on, you will see NEMESIS' thinking.

Display Controls

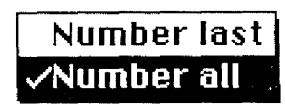
When **Sysbeep Sound** is on, NEMESIS beeps when she plays a move and when she displays an alert messge.



You can control the volume and the beep sound itself through the **Control Panel** in the Apple Menu. You can also turn sound off by selecting **No Sound**. With **Realistic Sound**, NEMESIS makes a proper stone *plunk* when stones are placed, and announces *Atari* when NEMESIS' move causes your stones have one liberty remaining. *Systems prior to 6.02 do not always correctly implement* ***Realistic Sound****. If your machine crashes when it tries to make a move, either use Sysbeep or obtain a more recent system. If you are running 6.02 or greater, NEMESIS defaults to Realistic Sound automatically.*

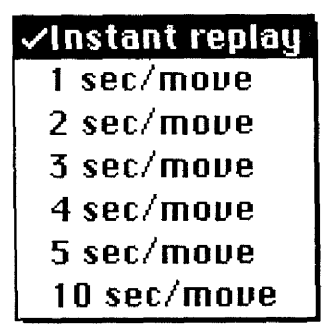


Within Board Esthetics, **Grid Labels** on means the coordinate grid is shown around the board and the mouse location is shown off the left edge. **No grid labels** removes these displays. You can also select a White or Grey board.

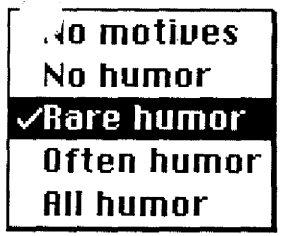


Number All numbers all stones with their turn number. When **Number Last** is chosen, the turn number appears only on the last stone placed.

Whenever NEMESIS is displaying hypothetical moves in **Exploring Joseki** and **Altering the Board**, all real game moves are temporarily unnumbered, and only hypothetical moves entered in these modes are numbered, starting with one (1). When you return to the game, the board is renumbered as it was.



The items in this Pop-up menu control the speed of **Edit Menu's Instant Replay**. **Instant Replay** is the fastest, **10 sec/move** is the slowest.



Items in this last Pop-up menu govern NEMESIS' display of the motives for her moves and hints. Sometimes during her play she displays a perverse sense of humor and substitutes a humorous motive for the real one. You can control the frequency of this substitution, with **No Humor** to **All Humor**. You may also turn off all commentary by selecting **No Motives**. *This option is used in Go Master only.*

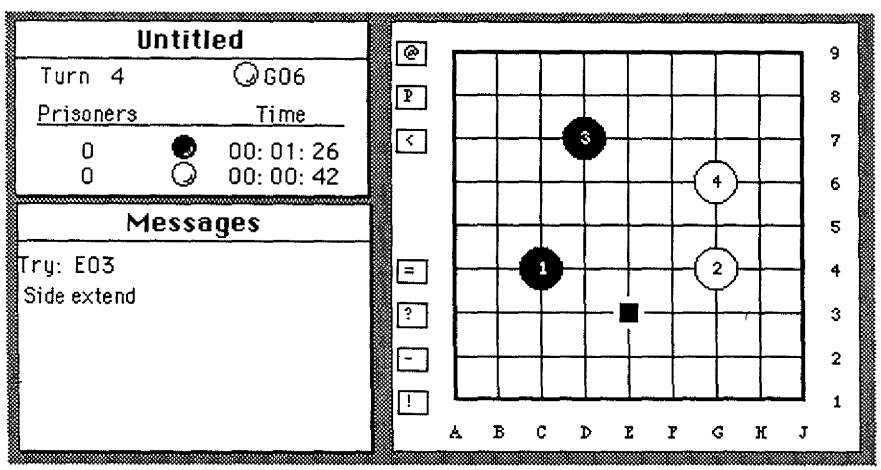
Play

When you first start NEMESIS, play is stopped. Selecting **Play** starts the clock running. On NEMESIS' turn, she will start thinking and then place her move.

If you are in any of NEMESIS' hypothetical modes, **Exploring Joseki**, **Altering the Board**, **Exploring Tactics**, or if you are **Scoring** or **Diagramming**, you must select **Stop!** before you can resume playing. Once stopped, select **Play** or either click on the intersection where you want to move if it is your turn, or double-click anywhere on the board if it is NEMESIS'.

You can also use **Play** to resolve scoring disputes after two passes, although if you are stronger than NEMESIS, you may just wish to tell NEMESIS what the correct life and death status is directly during scoring. Alternatively, you can resume the game in scoring resolution mode by selecting **Play**. You would do this if you disagree with NEMESIS about which stones are dead and would like to find out who is correct. During scoring resolution, the objective of both players is to resolve disagreements about which stones are alive and which are dead. This is done by playing out the moves to capture or save the disputed stones. Scoring resolution is fully described under **Rules** Appendix in **Instant Go Starter Kit**

Hint



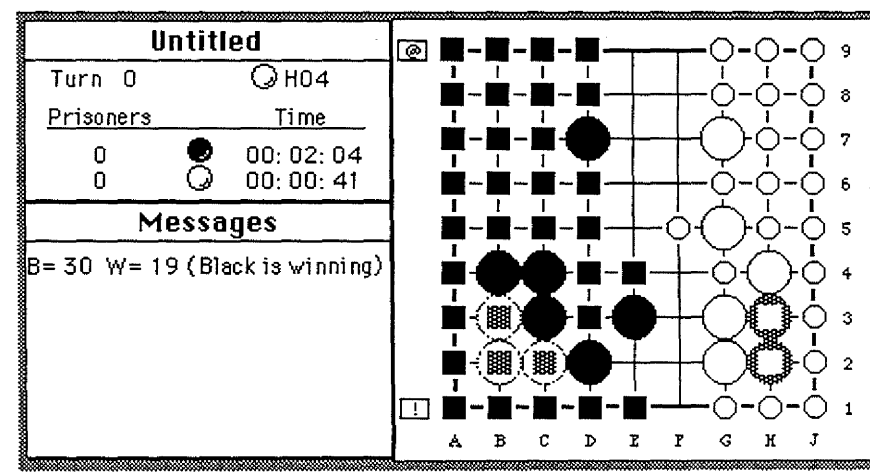
Example of a Hint for Black

During play, **Hint** allows you to ask NEMESIS to suggest the next move for you. The hint will be displayed on the board as a square for Black and a circle for White on the intersection suggested, and in the **Messages Window** as the alphanumeric coordinates with the reason for her suggestion (see figure on page14). To make the suggested move, just click on the intersection or press **Return** or **Enter**. Use **Hint** again and again for alternate suggestions. If you want her to return to the start of this sequence of hints, take back one (1) move and then **Replay** it. This resets NEMESIS.

Hint also displays next move(s) when you are **Exploring Joseki**, **Exploring Tactics**, or using **Follow Record**.

Score

Select **Score** to get an estimate of the score at any time during a game or within the **Board Menu**. NEMESIS will compute who controls what territory and which stones are alive or dead. Black territory is marked with solid black squares on the captured intersections, and White's is marked with circles. Note that marked intersections merely indicate control; they do not correlate directly with the points shown in the alert box on the screen during scoring, unless the game is over. Dead stones are also marked; Black's dead are faded with a white square inside, White's stones dead are faded with a solid black square inside. The score will be displayed in the **Messages Window** (see below).



Scoring Midgame

Scoring allows you to change the life/death assessments NEMESIS has made. When you click on a stone while the scoring display is still showing, the corresponding group's life status changes, from alive to dead, or dead to alive. However, only that one group will change. If that implies changes to other groups, you will have to click on them also. The score will be recomputed with a new shading map. This allows you to fix errors or to see what the score would be like if you succeeded in killing or saving some group.

When you are done with **Score**, select **Stop!**. This returns you to where you were before you asked for the score.

P s

Select **Pass** from the **Play Menu** on a turn if there are no more useful moves. When both players pass consecutively, the game ends. If you disagree about the life or death of any group, resolve the dispute by continued play.

Stronger players might pass in the middle of the game to suggest politely that their opponent is so far behind that he should resign. Resigning also ends the game. Resigning when you are hopelessly behind is respectful to your opponent and allows you to play many more games (with him in particular). NEMESIS offers resignation when she feels it appropriate, which you can accept or decline.

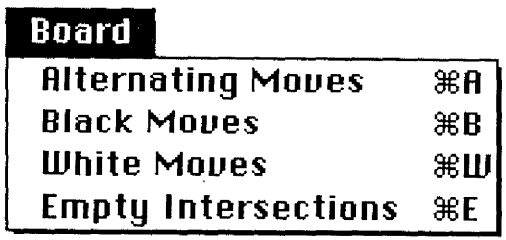
Follow Record

Follow Record restricts you to moves recorded in the game record. To follow the moves played in your game, select **Delete all Moves**, **Follow Record** and then **Play.** NEMESIS will only allow you to place a stone on the move that was played during the game. If you attempt to play elsewhere, NEMESIS will beep. **Hint** will show you where the move belongs. **Follow Record** turns itself off automatically when you reach the end of the recorded game moves.

Follow Record is useful for playing *Guess the Next Move*, something popular in problem books in Japan. In these, you are presented with a board diagram and asked to guess the next move. Now you can go beyond these books. You can put yourself completely in the role of a professional player and try to guess his next move throughout the entire game.

To do this, **Open** one of the professional game records supplied with NEMESIS and select **Delete all Moves**. Assign NEMESIS to **Black** or **White** and yourself to the other color. Select **Follow Record** and then **Play.** You are now playing the role of a pro, trying to figure out his move. If you succeed, NEMESIS responds automatically, and it's your turn again to guess the following move. If you can't find the next move, use **Hint.**

Board Menu



The **Board Menu** is used for **Altering the Board** which allows you to change the content of any board intersection, regardless of whether it is already occupied in the game. This menu is useful for setting up arbitrary handicaps, for setting up problems, or for a little cheating when all else fails — just add a few moves to your side or take some away from NEMESIS!

When **Altering the Board** NEMESIS tries to keep the order of es the same as that in the existing game (before editing), but can only keep moves that show on the board. Thus, pass moves and captured stones disappear from your game record. Also when **Altering the Board,** a legal board image is maintained. This means that if you add moves that result in the capture or suicide of stones, those stones are removed.

When you exit **Altering the Board**, by selecting **Stop!**, a dialogue box appears asking you whether you would like to incorporate your edits as part of your game. If you would, select **Yes.**

Using **Score** while **Altering the Board** is a convenient way to ask: "Suppose I played this and he played that... would this be good for me?" and have NEMESIS answer.

Black Moves

Select **Black Moves** to add black stones anywhere on the Go board. After selecting this option, click the mouse on each intersection where you want to place a black stone. Note: you can not place a black stone anywhere which would result in an illegal board position (i.e. by suiciding a single stone), but you can overwrite white stones.

White Moves

Select **White Moves** to add white stones anywhere on the Go board. After selecting this option, click the mouse on each intersection where you want to place a white stone. Note: you can not place a white stone anywhere which would result in an illegal board position (i.e. by suiciding a single stone), but you can overwrite black stones.

Alternating Moves

Select **Alternating Moves** to add black and white stones anywhere on the Go board. Then, just click the mouse on each intersection where you want to place a stone. The first stone will be black if White played the last move, or white if Black just played. Note: you can not place a stone anywhere which would result in an illegal board position (i.e. by suiciding a single stone), but you can overwrite stones of the opposite color.

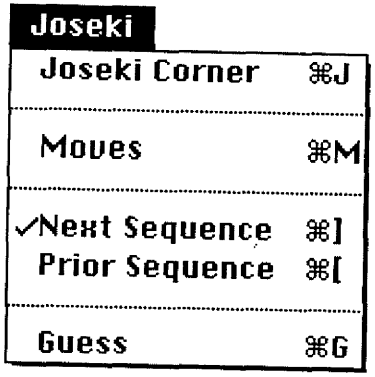
Alternating Moves is *not* designed to be used for recording games. You should set both players to **Human** and play out the game to allow NEMESIS to track captured stones.

Exploring a Variation: If you want to visualize what might have happened, **Alternating Stones** lets you lay out a variant set of moves without interfering with your game. Back up the game to the situation to be explored and select **Alternating Stones**. Enter moves for both sides until you have seen what happens. Then press **Stop!** and discard the edits. You will be back in your game as before and can **Replay** or **Instant Replay** to return to where you interrupted your game.

Empty Intersections

Select **Empty Intersections** to remove stones anywhere on the Go board. After selecting this option, click the mouse on each intersection where you want to remove a stone.

Joseki Menu



If you have just purchased the Joseki Genius, be sure to read your ***read.me*** *file found on your disk so that you properly install this program.*

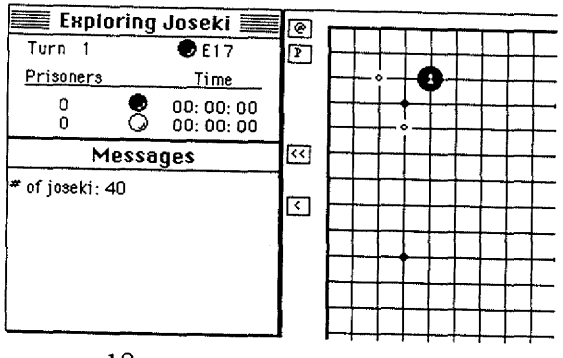
Joseki are sequences of moves considered to be equitable for both players, usually involving the opening play in a corner. These sequences have been developed over centuries through study and analysis by professional players. Joseki are usually studied by those players who have a solid grasp of Go fundamentals. When you can beat NEMESIS regularly (in an even game - at her strongest setting! - *without cheating!*), you are ready for our Joseki Genius. Go Master, by itself, comes with a sample of only 40 joseki which work primarily on empty corners.

Joseki exist only on a 19x19 board, and are the lazy man's shortcut to *perfect* play. Unlike a chess opening, which covers the entire board, a joseki covers only part of the board. While any joseki is *locally* equitable by definition, judging its appropriateness requires analysis of the situation on the board as a whole. To assist you in this analysis, NEMESIS' **Joseki Genius™** has 1300 joseki and is designed to let you explore them in the context of your games.

Joseki Corner

Choose **Joseki Corner** to begin your exploration and click in any corner. This automatically selects the **Moves** option. You may switch corners anytime by choosing **Joseki Corner** again. When you select a corner, you will see various marks on the board.

Hint *[in the Play Menu]*
Moves



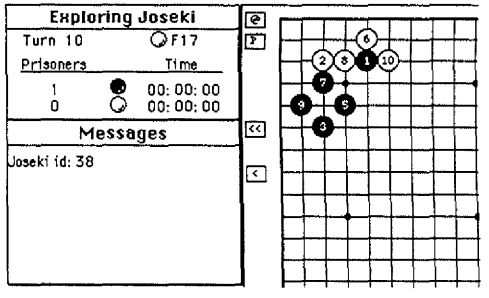
Once you begin **Exploring Joseki** you are allowed to place hypothetical moves anywhere on the board. You may move on any marked intersection or on some other board location (not usually done unless you hope to find additional joseki), or pass.

Display Modes: There are 4 modes: Moves (the default), Sequences, Guess, and off. Whenever you retract moves via **UNPLAY** or **DELETE ALL MOVES**, the mode is set off and you will need to reselect an appropriate mode when you are ready.

Hint: When you select **Hint** you will be shown all available joseki moves for the player whose turn is next (they appear as boxes for Black's choices or circles for White's). The **Messages Window** will display the number of joseki sequences left. Just press **RETURN** or **ENTER** and NEMESIS will play one of the indicated moves. If you wish to pick your own choice, click on any intersection. If you have selected a non-joseki move, then the next time you ask for information via **Hint**, **Next Sequence** or by turning on **Moves**, NEMESIS may tell you *No more joseki moves* if there are none left.

Moves: Each time you make a move you can use **Hint** for a suggestion. Or, if you turn on **Moves**, NEMESIS automatically computes the next joseki suggestions each time you place a move. Select **Moves** again to turn off these automatic suggestions. When you select **Joseki Corner, Moves** is automatically turned on.

Next Sequence
Prior Sequence



Choose **Next Sequence** or **Prior Sequence** to leaf through completed joseki. Each time you do, NEMESIS will display all the moves of the joseki line and will show the joseki number in the Messages Window.

This is like turning the pages of a joseki dictionary, with one joseki per page. When you reach the end of the *book* in some direction, NEMESIS will beep and redisplay the current sequence. However, if the corner is symmetric, NEMESIS will automatically switch orientation (once) and continue from the opposite end of the *book*..

Examining completed sequences is ideal for determining the best joseki in game context. Sequencing from part-way into a joseki limits the lines to continuations from that position.

It is not enough to find a line you like. You must also verify that your opponent cannot redirect the line into an unfavorable variation. You may check for unfavorable variations by using Unplay to retract all but the first move of the sequence, and then leaf through all remaining sequences. If you locate an unfavorable joseki, repeat this process to see if you could redirect this line into another favorable line. The message displays the number of each joseki line for easier identification. All joseki will not be displayed in any one exploration of an empty board. Some only appear in specific board situations.

If you like a particular joseki and wish to incorporate it into your game, leave it completely played out on the board and select Play. A dialog box will appear and give you the option to keep or discard the hypothetical joseki moves as part of your game. (In this context answer **Yes**.)

To explore different joseki lines, use Unplay or Delete all Moves to back up to some earlier position, then select Hint, turn on Moves, Guess, or play a move.

Guess

Guess mode tests two things: your ability to recreate the sequence currently on the board, and the continuations from that sequence.

Press GUESS at the end of a sequence to test your knowledge. NEMESIS takes back all of the joseki moves. You must now recreate the line by playing moves for both sides. NEMESIS will only allow the moves from the sequence. If you need help, HINT will show all possible joseki choices, and REPLAY MOVE will place the next stone in the current line being guessed.

Press GUESS anywhere in a sequence to test your knowledge of its family. As before, NEMESIS takes back all the moves. You must recreate them or press INSTANT REPLAY to fast forward past this first test.

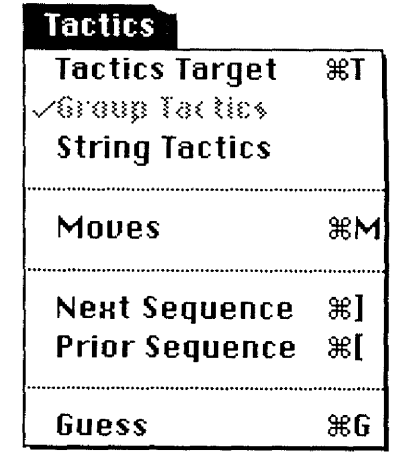
In either case, NEMESIS begins the second phase of the test by taking the side of the player whose move is next, and randomly selecting one of the continuing joseki moves. NEMESIS doesn't reveal your joseki responses. You may only play a valid joseki response. If you need help, press HINT. If there are no choices, NEMESIS displays a PASS.

Selecting MOVES, NEXT SEQUENCE, UNPLAY MOVE or DELETE ALL MOVES will turn off GUESS mode.

Changing side to move: If it is *your turn* when you enter Joseki Exploration, you will see *your* next moves in the corner selected. To see your opponent's next moves, just move elsewhere on the board. If NEMESIS says *No more joseki moves left.*, there are no joseki allowing you to play elsewhere. You can retract your move with **Unplay Move** or play another move elsewhere.

Remember: whenever you take back moves while Exploring Joseki, either via Unplay or Delete all Moves, NEMESIS turns off the current display option. When you have reached your desired position, you must reselect a display option using Moves, Guess, or Next Sequence (i.e. you no longer in any of these options).

Tactics Menu



If you have just purchased the Tactical Wizard, be sure to read your ***read.me*** *file found on your disk so that you properly install this program.*

During a game of Go you are constantly faced with problems involving the potential life and death of stones, both yours and your opponent's. TACTICS can help you analyze whether your stones could survive an attack, or if you could successfully kill opponent stones.

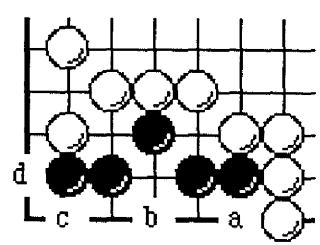
Note: of various tactical parameters under Setup Everything, only No/Continuous Display has any effect in Tactics mode. This allows you to watch NEMESIS think as she analyzes your problem. It must be set before selecting TACTICS.

Read the appendix called Killing Groups in the Instant Go Starter Kit for details on mastering life and death. Also see Recognizing Dead Groups and Recognizing Life Groups.

Go Master is equipped with a sample Tactical Wizard. While Exploring Tactics with this sample, the Search Width is restricted to 1. If the problem is not resolved using this single tactical line, NEMESIS will display the message Uncertain Outcome. A problem is considered resolved when the target is either killed or saved and NEMESIS cannot see an alternative line worth further exploration. The sample tutor restricts you to only viewing this first line. Given a simple problem, however, even her limited capacity is adequate. If you have purchased Tactical Wizard, NEMESIS will use her full capacity of unlimited Search Width to solve a problem.

Tactics Target

Choose **Tactics Target** to begin **Exploring Tactics** and click on a stone to designate the target you would like to kill or save. Whenever you have selected a black target and it is Black's turn NEMESIS will assume you want to save it; if it is White's turn she will assume you want to kill it. You may switch targets anytime by choosing **Tactics Target** again. Once you have selected a target, NEMESIS starts analyzing it in Sequence mode, displaying the first, most obvious line of attack or defense (if any).



At left is a sample problem to be solved under **Group Tactics**. White wants to kill the group of Black stones. Moves *a, b, c, d* are a few reasonable first moves to select among.

Group Tactics

This menu item is only available if you have previously changed to string tactics.

Group Tactics, when selected, means the target is a group. If you don't understand groups, you should read the Instant Go Starter manual. A Group is a set of strings of the same color connected by linkages. NEMESIS tries to make/prevent the formation of two eyes (permanent life).

This life & death analysis is the classic "Tsume-Go" in Japanese problem books. In these, the group is always already tightly surrounded, and the task is to kill or save the group, depending upon whose move it is. Thus NEMESIS will decline to analyze targets which are not enclosed.

String Tactics

When selected, **String Tactics** means the target will use simple capture/save techniques (temporary life) in which the target tries to gain enough liberties (currently 5) or counter-attack and capture surrounding stones while the attacker tries to surround the target and reduce its liberties. If already in string tactics mode, the menu choice is not available.

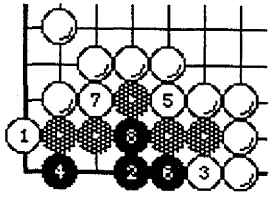
Display Modes

There are 4 modes: Sequences (the default), Moves, Quiz, and off. Whenever you Unplay Move or Delete all moves, the mode is turned off and you will need to reselect an appropriate mode when you are ready.

Next Sequence Prior Sequence Last Sequence

During her analysis, NEMESIS generates completed sequences of moves (lines). Whoever failed on the first line will try to improve his play on the second, and so on. Eventually you reach the final line, the result of the search. Intermediate lines are often as helpful as final ones. If the final result is that Black cannot kill White's group, there may be intermediate "trap" lines where White makes a subtle mistake and Black lives.

Next Sequence, Prior Sequence, Last Sequence: move forth and back among the lines in sequence mode. Studying the progression of sequences will show you how NEMESIS refines the line. The sequence number of each line appears along with the result in the message line. If a sequence results in the death of the target, the target stones are marked as dead. When there are no more sequences, NEMESIS beeps and repeats the last sequence. The last sequence always shows the correct result.



At right NEMESIS shows a sample solution sequence for the problem shown on page 21.

Fixing a sequence: If you see a bad move by NEMESIS in a sequence, back up until it is gone and press SEQUENCE again. NEMESIS must try to fix it by disallowing the previous next move. This can be repeated.

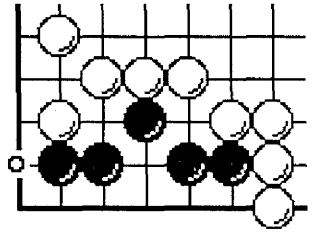
To leave Sequences mode, use **Unplay, Delete all moves,** or enter a new move. Then select a display mode again. If you like a particular tactical result and wish to incorporate it into your game, select STOP and a dialog box will appear giving you the option of keeping or discarding the hypothetical moves as part of your game. (In this context answer **Yes**).

Moves

Moves: If you want a hint each time you play, but don't want to press HINT again and again, select **Moves** to get suggestions automatically. Each time you make a play, NEMESIS automatically suggests the next move. Select **Moves** again to turn off automatic move suggestion.

Hint: When you select **Hint**, NEMESIS will analyze the situation and recommend the next move for whomever's turn it is. The suggested move appears as a solid black box if it is Black's turn or a circle if it is White's. If the suggestion results in the death of the target, the stones are shown faded (as they appear in the scoring mode). If the move leads to the life of the target, the stones retain their normal vitality. The **Messages Window** will also inform you what the final outcome is. To make the suggested move, just click on the intersection or press **Return** or **Enter**. If you wish to try your own move click on another intersection.

The figure at right shows a sample solution hint for the problem of page 21. Since it is White's turn, the suggestion shown is White's.



Select **Hint** again and again to compute a different choice. Eventually NEMESIS will run out of reasonable choices and say: *All Choices Rejected* . She will start over in the future.

Making your own moves: Tactical Wizard is designed to interactively assist you in analyzing problems. You may speed up analysis or confine the analysis to particular variations by placing the moves you are sure of and asking NEMESIS for help for those moves you need assistance with. Alternatively you can find out why your move doesn't work by placing it and letting NEMESIS analyze the situation from there.

G[illegible]s

Guess mode tests two things: your ability to recreate the sequence currently on the board, and the continuations from that sequence.

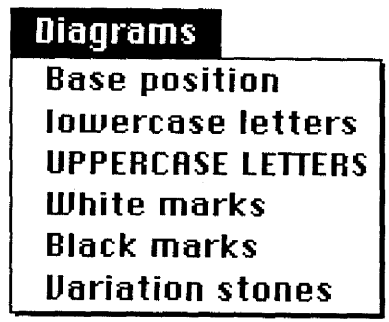
When you press GUESS, NEMESIS takes back all tactical moves played, from either a partial or complete sequence. You must now recreate the line, playing both sides, or you may skip this phase by pressing INSTANT REPLAY. NEMESIS will not allow any move but those from the sequence. If you need help, HINT will show you the next move or REPLAY MOVE will place it.

When the line previously on the board has been replayed, NEMESIS begins the second phase of the test by taking the side of the player whose move is next and playing her best response whenever it is her turn. You may play any move you want or use HINT. NEMESIS will pass, if she can't win or has already won.

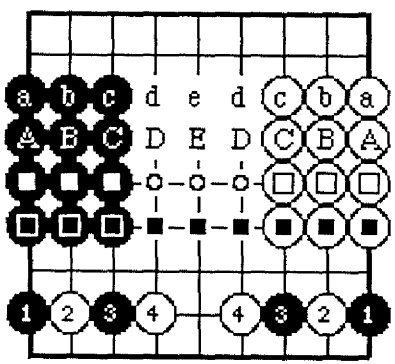
Changing side to play: If it is *your turn* when you enter Tactical Wizard, then it is *your* next move for the target selected. Playing a move elsewhere on the board will change whose turn it is, so that it will be *your opponent's* next move instead.

Remember: Whenever you take back moves during Exploring Tactics, either by Unplay or Delete all Moves, Nemesis turns off any current display option . When you have reached your desired position, you must reselect a display option.

Diagrams Menu



Selecting any item in the **Diagrams Menu** switches you into **Diagramming** mode. **Diagramming** allows you to create a variety of Go diagrams, including variations, game records, and Go problems. All of the Go diagrams in our user manual were made with NEMESIS' **Diagramming** and a screen capture program. Higher resolution can be achieved via a high quality printer.

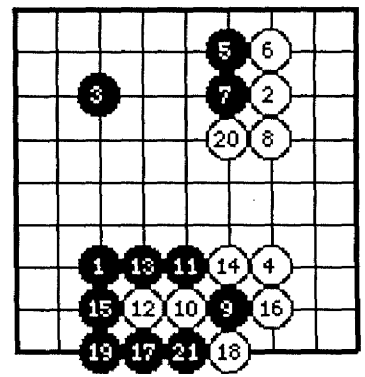


At left are the various markings supported by **Diagramming** as they appear on each color stone and empty intersection. These markings were made with **lowercase letters, UPPERCASE LETTERS, White marks, Black marks, and Variation stones.**

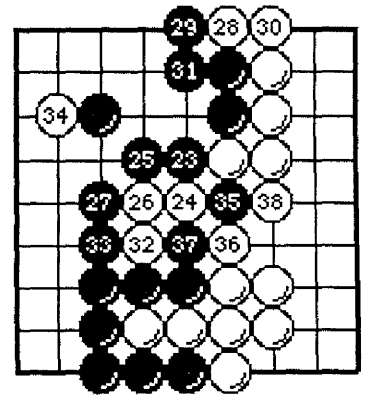
Markings are associated with a specific turn and are automatically r[illegible]oved if you back up or go forward in your game record. You can erase any individual mark by clicking on the intersection again. This has no effect on your position in the current marking sequence selected.

Game records are typically displayed in a series of diagrams. The first diagram shows the initial part of the game with all moves numbered. Since reading a diagram with many numbered moves on it is hard, later diagrams continue the record by showing the earlier moves all unnumbered, and all subsequent moves numbered.

Beloware two diagrams which depict an entire game record.



22@9 **(1-22)**



39@24 **(23-39)**

The left diragram contains the first 22 moves of the game. Move 22 occurs on the intersection previously occupied by move 9 and is shown below the Go board as 22@9. Captured stones are not removed from this diagram. To create this diagram first select **Base position**, second **Delete all Moves**, finally **Replay Move** until you replay 22 moves (or use **Instant Replay** and press **Stop!** when you reach move 22). At this point you should **Print** or capture the screen image. *Saving the game will not save any **Diagramming**.*

The right diagram starts with move 23 and continues to move 39. Move 39 occurs on the intersection previously occupied by move 24 and is shown below the Go board as 39@24. To create this diagram select **Base Position** again at move 22. This unnumbers the first twenty-two stones, then removes all captured stones, and clears the list of repeated moves on occupied intersections below the board. Next, select **Instant Replay** and you are done.

Base position

Base position unnumbers all the stones on the board and displays the actual appearance of the board. In the right diagram **Base position** was selected at turn twenty-two. All captured stones of the left diagram were removed and all remaining stones were unnumbered. The remaining moves were then Replayed, all numbered.

Base position is initially set to turn zero until you reset it with this command. All move placed hereafter by **Replay Move** or **Instant Replay** will be numbered with their correct turn numbers. If you have replayed some moves and select **Base position** again, the board is reset to the new base. If you **Unplay** a move placed prior to the **Base position**, the **Base position** resets back to the turn number before that unplayed move. If you then **Replay** that move, it will be numbered (i. e., not a part of the new **Base position**). Selecting **Variation stones** automatically resets the **Base Position** to the current turn.

Stones replayed after the **Base position** stay on the board even if they are captured. If a stone played occurs on an already occupied intersection, it is shown below the board .

lowercase letters
UPPERCASE LETTERS

Select either **lowercase letters** or **UPPERCASE LETTERS** and click on any intersection or stone to add the letter *a* or *A* to it. Select another board intersection to place *b* or *B*. Each time you select an unmarked intersection the next letter of the alphabet will be displayed. If you select an intersection that is already marked, the first time you click, the marking will be removed; the second time you click, the next letter in sequence will be displayed. Reselecting these options restarts the lettering at *a* or *A*.

Black marks

After selecting **Black marks,** click on any unmarked intersection and a solid black square will be placed there. On a black stone this mark appears outlined in white. In the figure on page 24, the sixth line from the top has all **Black marks**.

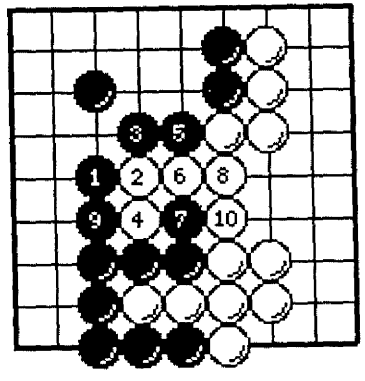
White marks

After selecting **White marks,** click on an empty intersection and a white circle will be placed there. Click on an unmarked black stone and a solid white square will be placed there; click on an unmarked white stone and a black outlined white square will be shown. In the figure on page 24, the fifth line from the top has all **White marks**.

Variation stones

Selecting **Variation stones** is analogous to **lowercase letters**. The difference is that you are adding alternating black and white stones numbered in sequence starting with the number one (1). The first stone is the color of the player whose turn it is when you select **Variation stones**. Variations don't ever start by skipping the current player's turn (you can of course get around this restriction by passing in your game and then selecting **Variation stones**). You cannot place a variation stone on an occupied intersection.

Variation stones are *not* real moves and cannot be unplayed. To remove a variation stone click on it again in this mode (this would be equivalent to passing or playing elsewhere). Each time you select **Variation stones**, the numbering restarts at one, providing multiple sequences on the board with the same numbers. In the figure on page 24 the bottom row of stones depicts two variation sequences. Each sequence starts with a black stone because it was Black's turn in the game when we selected **Variation stones**.



A Variation

Here is a variation diagram for the game showed on page 25. To create this diagram play out the moves thru turn 22, then select Base Position. Then select **Variation stones** and place the variation stones.

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NEMESIS® Products

NEMESIS® Go Junior™ is our inexpensive starter kit for learning Go. It contains a no-frills weaker version of the Go Master product.

NEMESIS® Go Master® is our richly-featured Go program. It contains:

1. Strongest possible Go playing opponent (upgradeable over time)
2. Board editor to create arbitrary situations, handicaps or drastic cheating
3. Speed-controlled automatic replay
4. Diagramming mode to create publishable game commentary
5. Optional humor motives and/or motive suppression
6. Controls over tactical searching effort (to take advantage of faster machines)
7. Useful sample Tactical Wizard (can install full Tactical Wizard)
8. Sample Joseki Genius (can install full Joseki Genius)
9. Ability to recover recent game or play game and variation simultaneously
10. Follow Record mode to let you compare your play to a pro's
11. Many joseki (standard corner openings) to play
12. 10 professional game records
13. Adjustable scoring - clicking on a stone inverts group's life status

Go Master is designed to be enhanced by other NEMESIS products. If you purchase any of these extensions you should be sure to install them into **Go Master** so that their features are available during your Go play.

NEMESIS® Joseki Genius™ (formerly Joseki Tutor) is our tutorial for corner openings. It operates independently but should be installed into Go Master if you own both. From a database of 1300 corner openings, NEMESIS can tell you which moves remain available in a corner, let you leaf thru completed sequences or test your memorization of the sequences.

NEMESIS® Tactical Wizard™ is a life & death tutor. It operates independently but should be installed into Go Master if you own both. It can solve many book problems, but it is not limited to book problems. During your game it can help you solve life and death issues as they arise by showing you the next move, the variations involved, and testing you.

NEMESIS® Go Master Deluxe™ is our complete Go playing and tutorial program, with both **Joseki Genius™** and **Tactical Wizard™** already installed into **Go Master®** at a discount price.

All of our products are fully desribed in our flyers, call or write if you need another.

The Game of Go

Flavorful Description

Go is an ancient board game that takes the simplest of elements — line and circle, black and white, stone and wood — uses simple rules, and yet generates subtleties of play that have enthralled players for thousands of years.

Go is easy to learn. Its few rules can be demonstrated quickly and grasped easily, and it can be played enjoyably by people with a wide range of skills. Moreover, a unique and reliable handicapping system affords players an enjoyable contest, even between those of greatly differing skill.

Beyond being merely a game, Go takes on other meanings for its devotees: an analogy for life, an intense meditation, a mirror of one's personality, an exercise in abstract reasoning, a mental "workout," or an art form in which black and white dance across the board in delicate balance. Most importantly, Go is challenging and fun for all players. (adapted from American Go Journal)

Origins

Go is among the oldest games, originating in China over 4000 years ago. In the fifth century A.D. the game was carried to Japan where it flourished to such an extent that today Go is Japan's national game. In Japan, there are over 400 professional players who compete in tournaments sponsored by major newspapers and television stations. Go is so well integrated into Japanese society that even women's magazines have Go columns, and major corporations pay professionals to teach at company Go clubs.

Though Go has been played and respected in the Orient for centuries, it was not until 1911 that Dr. Edward Lasker, a famous chess master, brought Go to the United States. While Go is still relatively unknown here, there are Go clubs in many cities and local and national tournaments, as well as two native professional players trained in Japan, and one trained in Korea.

American Go Association

The American Go Association publishes a journal, coordinates a network of clubs throughout the US, sanctions and promotes rated tournaments, distributes a list of clubs and members, and engages in various activities to promote Go. Membership (1990) is $25, write to:

AGA Box 397 Old Chelsea Station NY, NY 10113

Handicaps & Ratings

One advantage Go has over other strategic games is its handicapping method. Since Go involves successively adding stones to the board, the weaker player takes Black and starts with extra initial moves. The wider the disparity of strength between the players, the greater the number of handicap stones Black is given. The handicap between the strongest and weakest players in the world, if given, would be about 45 stones! For those who want to compare the complexity of Go with that of chess, the difference between strongest and weakest players in chess is only 26 stones (measured using an equivalent rating system).

The rating system is tied to handicapping, with one rank difference equal to one handicap stone. A beginner who has just learned the rules is rated at 35 kyu (class). As he gets stronger, he works his way to 1 kyu. Since each level corresponds to a handicap stone, a 30 kyu player takes a 7 stone handicap from a 23 kyu player. After 1 kyu, ratings are measured in dan (black belt rank), with higher dan numbers signifying a stronger rating. A five (5) dan would give nine (9) stones to a five (5) kyu. The top US amateurs are seven (7) dan. Professional players are even stronger.

Black's first move consists of placing his handicap stones. Evenly matched players should set Black's handicap to **No handicap** and either alternate sides in a series of games or give White four to eight (4-8) points per game to compensate for the disadvantage of starting second. One (1) stone handicap is the same as a **No handicap** where the weaker player always takes **Black**, and **White** receives no compensation.

Under **Japanese** rules, NEMESIS places the handicap stones according to fixed positions. These stones will remain on the board even when the board is cleared.

In contrast, **Chinese** rules allow **Black** to place handicap stones anywhere. Since the placement of these stones is **Black's** choice, the handicap stones do not stay on the board when cleared.

Table of Contents

How to Play Go

Board: Go is played with black and white stones on a grid, usually of 19x19 lines. The figure on page 5 shows a 13x13 board.

Moves: Players alternately place black and white stones on the grid's intersections. Black always goes first. Each player places one stone per turn. She can place his stone on any vacant intersection, including along the edge and in the corners. A player may pass instead of placing a stone if she finds no move of value. The game ends when both players pass in succession.

Objective: Players attempt to surround regions of empty intersections with walls of their stones. The player who has surrounded the most empty intersections at the end of the game wins.

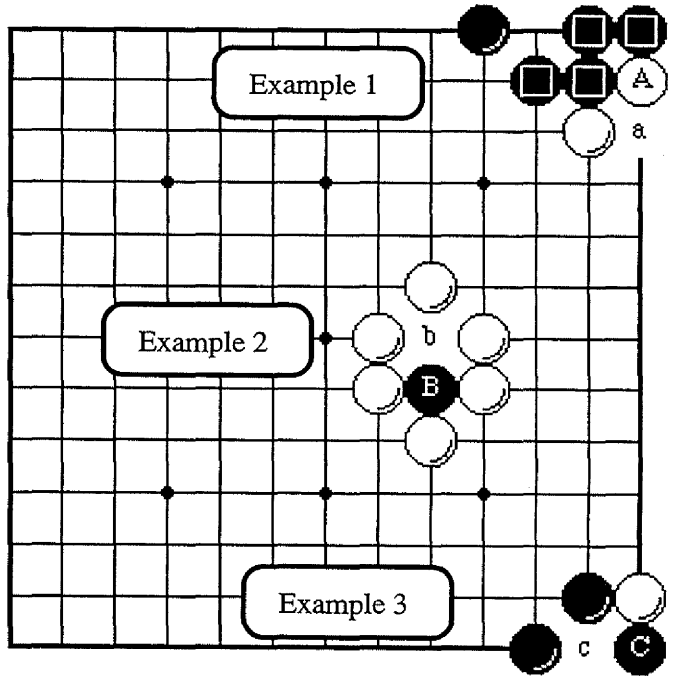
Strings: Stones of the same color that are immediately adjacent along the horizontal and vertical lines of the grid form a string. A single isolated stone is the smallest string. Two single stones diagonal to each other are not part of the same string. Strings are the fundamental units of capture. In the figure on page 5 there are six black strings. (Stones marked with a square form one string, while all other black stones are single-stone strings.)

Liberties: Vacant intersections horizontally or vertically adjacent to a string are called liberties (diagonals don't count). In example 1 in the figure on page 5, there are two black strings each having 3 liberties. (Can you find them?) The black string B, in example 2, has one liberty, marked with the letter b.

Capture: A string is captured (removed from the board) when all its liberties are filled in by stones of the opposite color. Any of your stones your opponent has captured are added to his score and visa versa. On page 5 in example 3, White's single stone string has one liberty, its other two adjacent intersections are occupied by Black stones. If Black filled in the last liberty, he would capture White's stone.

Suicide: A player may not commit suicide by playing a stone at an intersection such that its string has no liberties. A Black play at b in example 2 on page 5 would be suicide. However, such a play is not suicide and is permitted if it creates liberties by simultaneously capturing enemy stones. I.e., White may play c in example 3 since that captures Black's stone C.

Repetition: Repeating a board configuration is illegal. This means that the entire board cannot look the same as it did on any prior turn. Because you are adding stones on each turn, this only happens under special kinds of capture situations. Unlike chess, which ends in a draw if the board repeats often enough, Go requires that you not repeat.



Example 1: White's stone A can be captured by a Black stone played at a. A White stone at a would save White A by creating a 3-stone string with 3 liberties.

Example 2: White's play at b captures Black's stone B. Black cannot play at b, since it would be suicide for both Black stones.

Example 3: This is a ko, a situation involing the potentially infinite capture of each other's stones. If White captures Black at c, Black could respond by capturing White's move, and so on, ad infinitum. This repetition is not permitted because the board image would be repeated. If White captures Black, Black must play elsewhere before he can respond to the ko by capturing White's stone. Playing elsewhere changes the board image so that no repetition occurs.

How to Play Better Go

Introduction

Most Go games have three phases: the opening, the midgame, and the endgame.

In the opening, the players sketch out the regions they hope to control.

In the midgame, the players try to strengthen and extend their territories, while simultaneously attacking their opponent's weak points and defending themselves against attack.

In the endgame, the players argue over the few remaining spaces and fill in the neutral points.

The following material, extracted from Bruce Wilcox's *Instant Go*, will help you play a better game of Go immediately. Even if you're experienced Go player, you'll find insights that will help you better understand what you have already learned.

About Bruce Wilcox: *Father of Computer Go*

Bruce Wilcox, the creator of NEMESIS, began his study of computer Go almost 20 years ago. A programmer in Artificial Intelligence (AI), Wilcox became intrigued by the *game that couldn't be programmed.* He brought to the game an unusual vision, an elegant simplicity in strategic thinking that gave birth to computer Go and may eventually revolutionize the game itself.

Using his own techniques, Bruce has become a 6 Dan, one of the top rated players in the U.S. He has devoted his life to making a program that can play at a professional level and has already made inroads into AI theory. Bruce lectures widely on his theories in the U.S., Europe, and Asia. A best-selling book on the history of Go, published in 1986 in Japan, devoted one chapter largely to his landmark programs. A complete book on his unique Instant Go theory is expected to release this century.

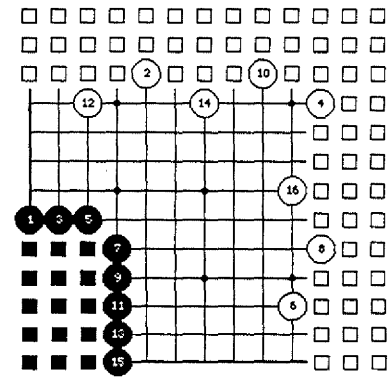
Special thanks to William Sommerwerck for his editing assistance. Also thanks to Kian Wilcox (age 6) for the cover figures. The opening game depicted on the cover is an example of *The Great Wall Opening*, by Bruce Wilcox.

Opening: Laying the Foundations

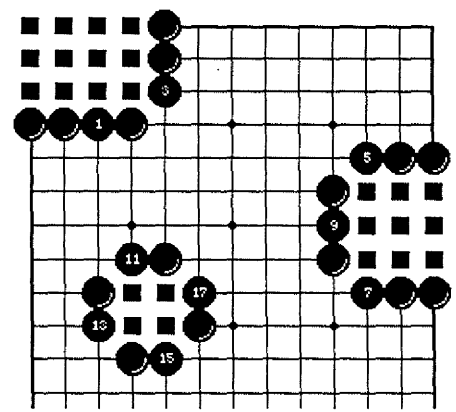
In the game's opening, players stake their claims to empty regions on the board.

Sketching: A novice might begin by placing her stones in a line to build a wall, then build successive walls to enclose territory. This is a sure way to lose. Instead, distribute your stones broadly at first, then link them later (sketching.)

In the 13x13 example to the right, Black has absolutely tied down 15 points. White cannot invade and live. But by placing her stones more loosely, White controls 65 points. White will have little trouble surrounding and cutting off Black if Black invades. Even if Black reduces White's territory by half, White is still ahead.



A sketched-in territory, with its incomplete boundary, is inherently open to attack at any time. When to reinforce your territory to ward off an attack is a matter of delicate timing. If you defend too soon, you miss opportunities for expansion elsewhere. If you wait too long, your opponent might destroy your position at little cost to herself.



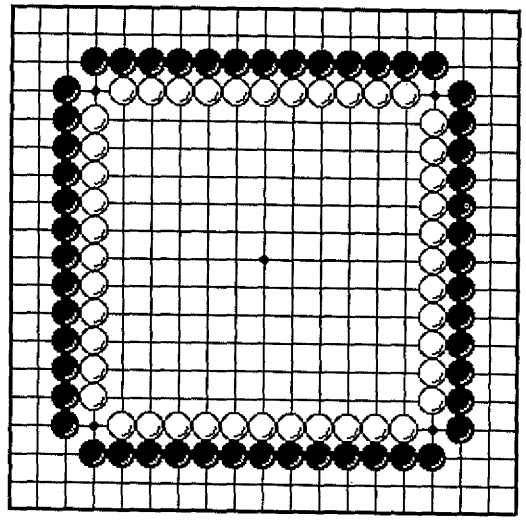
The Edge: The board edge automatically forms a boundary for an adjacent territory. The edge lets you sketch a larger territory with fewer stones.

In the example to the left, a 12-point corner is sketched in 2 moves and completed in 7. A 9-point side is sketched in 3 moves and completed in 9. A 4-point center is sketched in 4 moves and completed in 8.

Corner territory creates the most area for the least investment of stones, which is why players almost always make their first moves in the corners.

3rd and 4th Lines: To take advantage of the edge, you should begin sketching in the corners, then expand to the sides. But where should you play? It turns out that the 3rd and 4th lines from the edge represent the most efficient play.

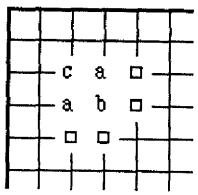
The diagram to the right suggests why this is so.



Black uses 52 stones on the 3rd line to control the outer 140 points. That's about 2.7 points per stone.

White uses 44 stones on the 4th line to surround the inner 121 points. That's exactly 2.75 points per stone. The point/stone ratios are higher on the 3rd and 4th lines than on any other.

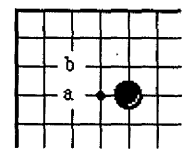
Corner Moves (Joseki): Go, like chess, has evolved a large number of standard opening sequences that start both players off on roughly equal footing. These moves are called joseki. You don't have to master any joseki right now; the following approach will work for your next hundred games or so:

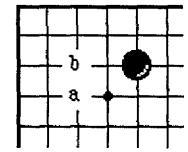


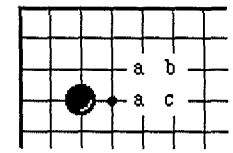
Opening play is usually on a, b, or c, or one of the highlighted intersections. Players choosing a boxed intersection are aiming for more control of the corresponding side and less control of the corner.

With an opening move on a symmetrically positioned intersection (b or c) it is not urgent to further attack or defend the corner.

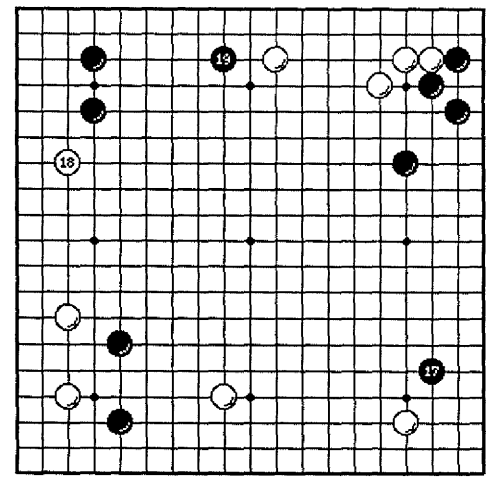
If your first corner move is not on a symmetrically positioned intersection (not on b or c), your opponent will usually quickly respond. In the drawings below, either player would like to take one of the indicated points, usually in the order shown.







Extending along the Edge: When sketching along the edges, look for the widest unclaimed area between your stone and an opponent's stone. Don't play in this area unless it is at least 3 points wide. (To measure the width, count the lines between the stones which are perpendicular to the edge.)



The first 16 moves at left were joseki. The players then began staking out the open edges. B17 claimed the largest open edge (9 lines wide prior to B17). W18 took the next largest (7 lines). B19 took the remaining edge (6 lines). All remaining edge areas are now less than 3 lines wide.

These 19 stones complete the opening. All corners and big edge areas have been claimed.

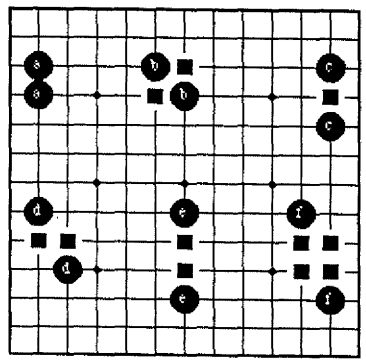
Perception: Visualizing The Board

The non-Go player looks at the board and sees only vague patterns of black and white stones. The experienced Go player sees the strategic and tactical relationships among both stones and empty intersections. Here is what they see.

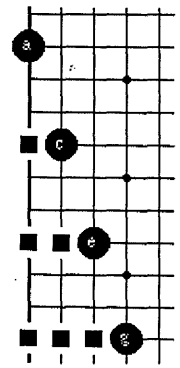
Linkage: The key to visualizing relationships is linkages. A linkage is a connection between close friendly stones (stone linkage) or a stone and an edge (edge linkage). The stones forming the linkage are called endpoints. (The endpoints may or may not be part of a longer string.) Edge linkages have only one "real" endpoint; the edge of the board acts as the other endpoint.

Linkages form barriers that opposing stones cannot easily connect across. If two stones (or a stone and the edge) are not related via one of the patterns shown in the diagram below, they do not form a linkage. They are too-widely separated and thus their barrier is easily breached. Short linkages are stronger than longer ones. The linkages, from shortest to longest, are:

a in-line
b diagonal
c single-skip
d small knight
e double-skip
f large knight
g triple-skip



Stone Linkages



Edge Linkages

The bold-boxed intersections are *linkage path points* which can be filled to join the linkage endpoints into a solid wall (string), or points which the enemy might occupy to disconnect your stones, to prevent them from forming a single string.

Now that you know linkages, you can analyze the board like a strong Go player. You have been introduced to strings and linkages. The remaining perceptions you need to master are: groups, enclosed territories, sector lines, potential territories, positions, and neutral regions.

Group: A group is a collection of strings connected by linkages. The group is the fundamental unit of analysis in the midgame. The strings of the group engage in a cooperative defenseand may bound territory to use as a resevoir of protected liberties. If the joint defense fails, the whole group is said to be dead. Eventually all strings of a dead group can be captured. The ability to recognize a group as alive or dead is essential.

Enclosed Territory: An enclosed territory is a contiguous blob of empty points surrounded on all adjacent horizontal and vertical intersections by one player's group. At the end of the game, whoever has more enclosed vacant points wins.

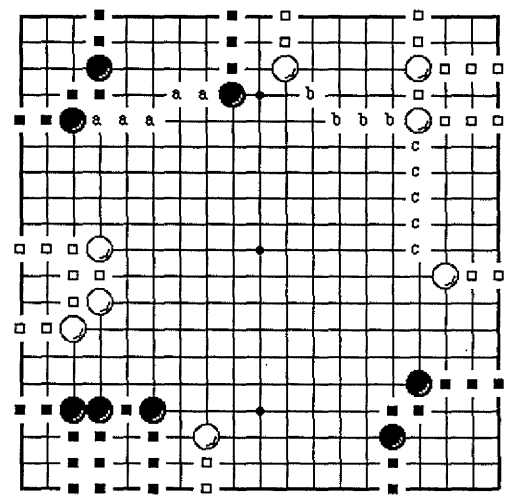
Sector Line: A linkage is a barrier formed by close-range stones. A sector line is a potential barrier formed by an imaginary line between more distant stones of one color, providing this line is not broken (crossed) by any other stones or linkages. Sector lines are the key to analyzing attack and defense in the midgame. They disappear by the endgame (because everything is too close.)

Potential Territory: A potential territory is a contiguous blob of empty points between one player's adjacent groups. Unlike an enclosed territory, a potential territory is not completely bound by linkages; instead, sector lines between the groups form the remaining boundaries.

Position: A position is a collection of contiguous groups and potential territories of one color with no intervening opponent groups. The entire area of a position appears to be controlled by either Black or White. Positions are opening and midgame perceptions involving groups and their potential territory, which degenerate by the endgame into single groups.

Neutral Region: The neutral region is the set of empty points not covered by any of the above. Like the name implies, neither player has any claim over these vacant intersections.

Example perceptions are shown below. The (#/#) after each definition shows how many Black and White (Black/White) units of that type are on the board below. Try to find all of them.



String: adjacent stones (7/8)
Linkages: short-range connections and barriers (12/12)
Groups: linked strings (4/5)
Enclosed territories: vacant intersections bounded by a single group (3/2)
Sector Lines: potential barriers (12/20)
Potential Territories: vacant intersections bounded by groups and sector lines (1/2)
Positions: contiguous groups and territories (3/3)

All linkage path points above are shown in boxes. Important sector lines bounding potential territories are shown as letters. In this example, the neutral region is the center of the board and space between opposing stones along the edges of the board.

Each player strives to protect his own positions, restrict or destroy enemy positions, and carve out more territory from the neutral region.

Midgame: Attack and Defense

"The battle is joined" in the midgame. Both players have to strengthen or expand their positions, create new territories, attack their opponent's positions, and defend against attacks — all at the same time!

The midgame normally begins when all opening moves are exhausted (all corner and edge areas are claimed). However, if a player concludes she is falling behind during the opening, she must declare war. She must invade the enemy's open areas before they become secure. Thus the midgame can start even before the opening is complete.

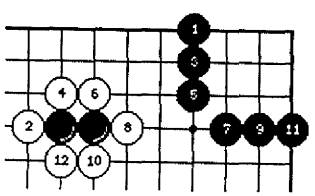
Midgame Strategy

At each turn in the midgame you must decide whether to strengthen your own positions or attack your opponent's. If your opponent attacks vigorously you may have no choice but to defend yourself, but for most midgame moves you may choose between attacking enemy positions and enhancing your own.

Some general principles to guide your moves are described below.

Capture vs Territory: You can gain points by capturing stones or by enclosing territory. Beginners are often overcome by blood lust, and most players enjoy the thrill of the hunt. However, capture is not the objective of the game — surrounding the most intersections is. Capture is used primarily to defend your claims. Your capturing moves are usually better spent making territory.

In the figure to the right, Black takes 6 moves to make 9 points of territory. White takes 6 moves to make 4 points by capture (2 points of territory and 2 prisoners).



Principles of Defense:

The tactical rule is: *Defend linkages.*
Otherwise the positionss you have carefully built in the opening will disintegrate under your opponent's attack.

The strategic rule is: *Avoid enclosure.*
Otherwise your groups run a high risk of being captured, and your other positions are implicitly weakened, because they have one less group to connect to.

Principles of Offense:

The tactical rule is: *Attack from a safe base.*
Keep yourself linked to an existing group to ward off counterattack and to minimize the number of groups you have to defend.

The strategic rule is: *Keep your opponent divided.*
The more groups she has, the harder it is for her to manage them simultaneously.

Multi-purpose moves: The wealth of ideas to be carried out in the midgame is enormous, and you only get one move per turn.

A move that works toward only one goal is a wasted move.

Whenever possible, a move should do *two* or more of the following:

1. Defend your groups
2. Attack her groups
3. Enhance your territory
4. Reduce her territory
5. Set up a follow-up move enabling one of the above.

Linkage Tactics

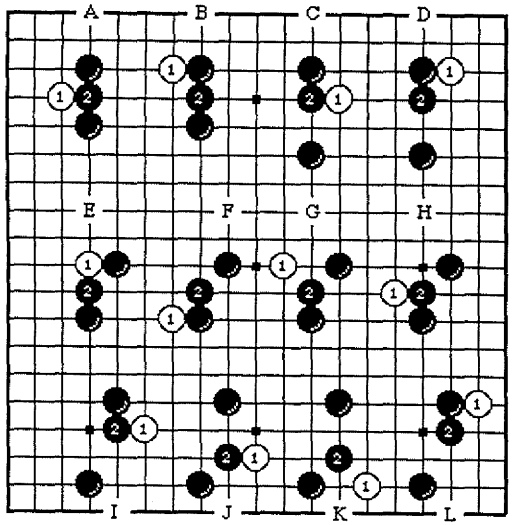
Linkages can be threatened or attacked. Threats and attacks must be answered promptly.

Threatened linkages: An enemy stone adjacent or diagonal to a path point threatens a linkage. A threatened linkage must be immediately secured from further attack by playing on the path point closest to the enemy stone. In-line and diagonal linkages cannot be threatened.

Attacked linkages: An enemy stone placed directly on a path point attacks a linkage. Always defend the linkage even if you cannot reconnect the endpoints. This will help you attack your opponent's stones later.

The move defending an attacked linkage attempts to go around the opponent's stone to rejoin the endpoints. This move creates two shorter linkages, one from each endpoint to the defending stone. These will become the focus of further attack if your opponent is insistent about separating your stones.

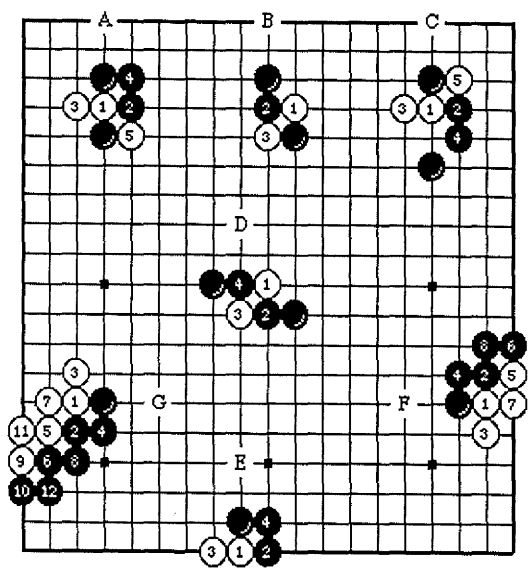
Below are threats against stone linkages (W1) and correct defenses (B2). Edge linkages are handled in the same fashion as A through D below.



In response to White's W1 threats, which are always adjacent or diagonal to a linkage path point, Black responds with B2 on the threatened path point.

The diagram below shows White attacks (W1) against Black linkages and correct Black responses (B2). Each response forms two shorter linkages which become the focus of continued attack and defense. Your opponent can break many linkages when she attacks. Even so, a broken linkage remains a barrier preventing the enemy stones from connecting.

In response to White's W1 attacks , which are always on a linkage path point, Black responds with B2, attempting to rejoin the endpoints by linking around the attacking stone.



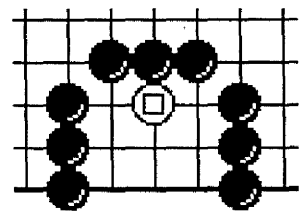
String Tactics

Strings are the fundamental unit of capture.

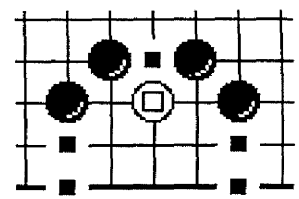
String Capture: There are two steps in capturing strings:

1. Enclose the target
2. Fill its liberties

1. Enclosing the Target: To enclose stones you must build a wall around them. Otherwise, they can expand (add stones to gain liberties) and become harder to kill. The stones in the enclosing wall must be joined by linkages.

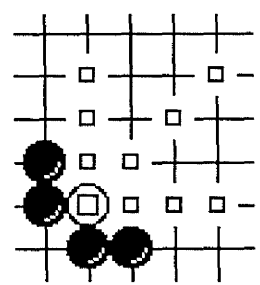


Solid walls (in-line linkages) are inefficient. The enemy won't wait for you to complete the wall, and will easily escape. You can complete enclosure more quickly and with the same effect using other linkages.



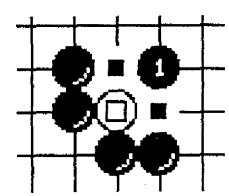
Once a wall is created (see figure at righ)t, if White tries to escape by attacking the linkages, Black simply defends them to keep her enclosed.

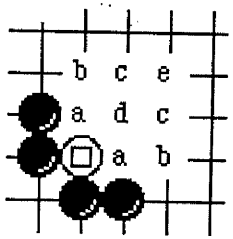
To enclose stones, locate where they have open access to the rest of the board, then make a move which creates two linkages closing off the open access. An enclosing move always creates *at least* two linkages, and always results in the target becoming surrounded by a continuous ring of stones, path points, and possibly the edge.



In the example to the left, White's stone can expand in the directions shown in white boxes.

If Black plays at B1 (shown at the left), he creates two single-skip linkages in order to contain White's stone. White is now enclosed; there is no more open access.





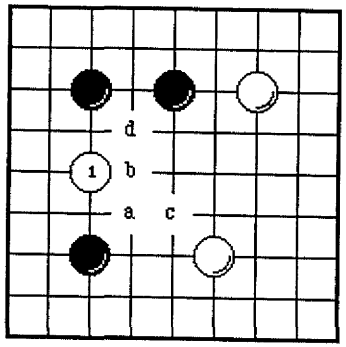
All possible enclosing moves are shown to the left. Symmetrically equivalent moves have the same letter.

To select among the possible choices, apply the following rules in order:

1. Discard moves creating linkages under attack (threatened ones are ok.)
2. Among the remaining linkages, select only the shortest pairs.
3. If you still have to choose, pick the move with the most liberties.

In the diagram above, a and b form linkages already under attack (ie, linkages which have an enemy stone on one of their path points), and must be rejected. c, d, and e are acceptable. Though c and e have more liberties, d creates the shortest linkage pairs and is therefore best.

In the problem to the right, W1 has just invaded Black's position. If Black wants to kill W1, he must first enclose it with a, b, c, or d. Applying the rules: 1. d is discarded, since it forms a large-knight linkage already under attack. 2. c is discarded, since a and b produce shorter linkages. 3. a and b are similar (though a has one shorter diagonal linkage it also has one longer large-knight's linkage; b has two small-knight linkages). a is correct, since it creates more liberties than b.



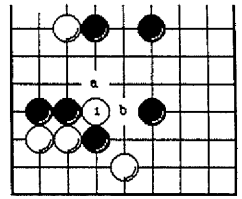
2. Filling Liberties

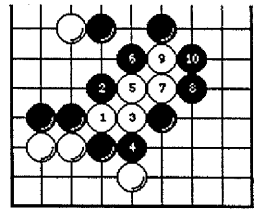
You can only fill one liberty per turn, so it's important to pick the right one. To select among the possible choices, apply the following rules in order:

1. *Attack from a safe base*
   Play only liberty-filling moves that are adjacent to or diagonal from your existing stones.

2. *Fill your opponent's best liberty first*
   Play the one that would gain him the most liberties if he played there.

In the diagram to the right, W1 is already enclosed, with liberties at a & b. If Black played at either a or b he would be attacking from a safe base. The best liberty is a. If White played there her stones would have 4 liberties. If White played at b, she would have only 3 liberties. Black should play at a.

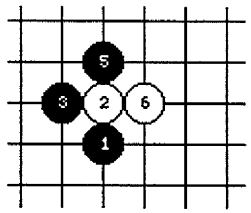




If Black applies the liberty-filling rules at each move, he will succeed in capturing W1 as shown in the diagram to the left.

Saving Strings: There are two way to save strings threatened with capture:

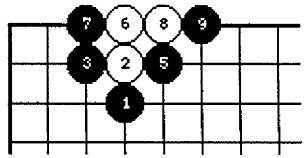
1. Put another stone adjacent to the string to be saved (extend)
2. Capture an adjacent stone



In the diagram to the left, Black threatens W2 with B5. White saves her stone by extending with W6. Black now has to fill three more liberties in order to capture White.

Extending usually doesn't help when you're already enclosed.

Consider the example on your right. When White extends with W6, Black persists with B7. Even when White now plays at W8, Black kills the White string W2-W6-W8. W2-W6-W8 are then removed from the board.



It was a total waste for White to play at W6 and W8, since escape was impossible. White only increased her loss. White should have played elsewhere.

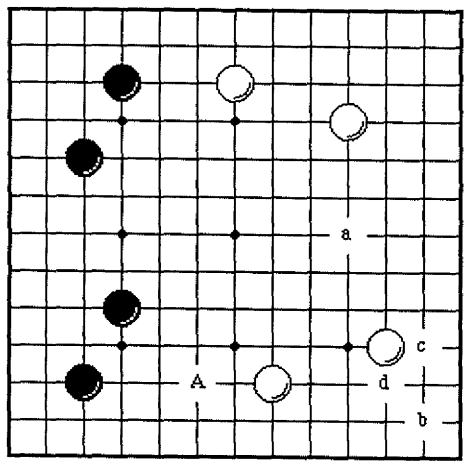
Open Area Tactics

The opening game sketching process creates open areas.

Attack Open Areas by Invading: Invading (placing a stone in the enemy's territory) creates a weak group that is easily attacked. Weak groups will eat up most of your plays defending them — plays that could have been used to create or extend territory elsewhere. Invasions should therefore be reserved for those times you're losing and have no alternative. Choose a large open area if you must invade. You'll have room to make life locally or run to safety.

If there is no large open area, draw the enemy into a contact fight (a fight in which rival stones touch). Contact localizes the fight to a few stones — the rest of the stones dominating the open area do not contribute to the battle. Don't hesitate to sacrifice a few worthless stones so that others can live.

In the figure to the right, White's claims are twice Black's (70 to 35). It would be foolish for Black to continue the opening with A, since he is losing.



Black should invade the open area near a. Invading at b is a mistake; the area is not open. If Black must invade near here, he should engage in a contact fight at c or d.

If White plays first, a is a good defense.

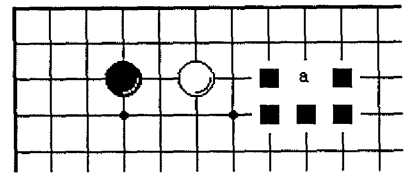
Defend Open Areas by Linking Up: Defense of open areas is easy. Just keep adding stones until all your strings are linked up. Then secure all your linkages.

Group Tactics

The attack and defense of groups is the single most important topic in Go. *Most games will be won or lost by how you handle groups in the midgame.*

Attack Groups by Squeezing: Rarely can you kill what you attack. Even so, attacking is the key to victory. Unlike defensive moves, attacks can — and should — combine a threat with a territorial move. Never just attack.

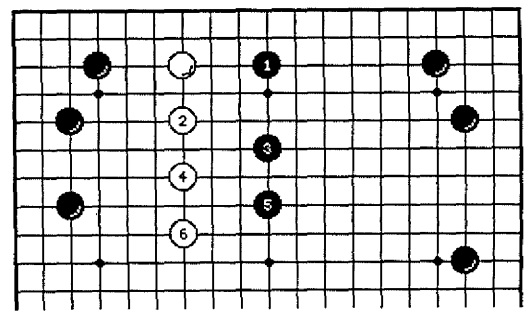
Begin attacks with an edge squeeze play (on the 3rd or 4th line at a distance of 2 to 4 lines away from your opponent's stones). This prevents the target from immediately securing life-giving territory by extending along the edge.



In the diagram to the left, Black should make an edge squeeze play at a (the default) or on a boxed intersection. This keeps White from extending along the edge to gain territory.

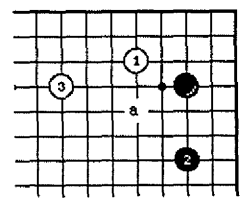
Once you've kept your opponent from easy life, continue squeezing by threatening to enclose her. Continued squeezing forces her to run, while you build a wall to enclose territory. If she fails to run, enclose her.

Black squeezes at the edge with B1, then continues to threaten enclosure. Black is building a large potential territory while attacking!



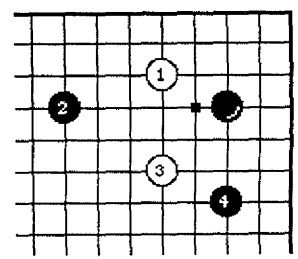
Note how after B1, all attacking moves are linked to preceding stones (safe base.)

Defending Groups by Extending: A group under attack is such a severe liability that preventing an attack is a high priority. The easiest defense is to extend along the edge to gain territory. This is so valuable that players often suspend their initial sketching to do this. Another defense is to extend towards the center (running). Use this technique if you can't expand along the edge.



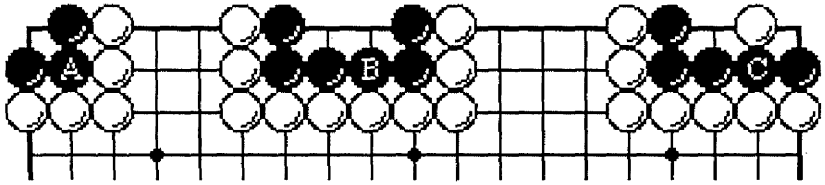
In the figure at left, White squeezes Black's corner with W1. Not wanting to be squeezed again, Black extends along the edge with B2. Then White does likewise with W3, warding off a serious squeeze attack.

In the figure at right, instead of defending when W1 squeezed, Black went on the attack himself. B2 is an edge squeeze against W1. White could only extend into the center (W2). This threatened Black's corner, so he extended with B3. Which of these two diagrams is better for Black depends upon the rest of the board.



Recognizing Dead Groups: Stones without liberties are removed from the board immediately. Stones with liberties can be either alive or dead. Dead stones are hostages on the board. They can be captured at anytime. At the end of the game, dead stones are captured (removed as prisoners) without actually filling in their liberties and they are added to the score.

In the diagram below left, White can play to kill Black A at any time. Unless White is foolish (allowing Black to take six turns and fill in all of White's liberties), Black's position is hopeless. Normally these stones will remain uncaptured until the end of the game. At that time, both sides will acknowledge that Black's stones cannot avoid capture, and White will take them prisoner. This is death. The body remains on the board until Judgement hour, hoping vainly for resurrection. Be aware, however, that sometimes hostages are freed.



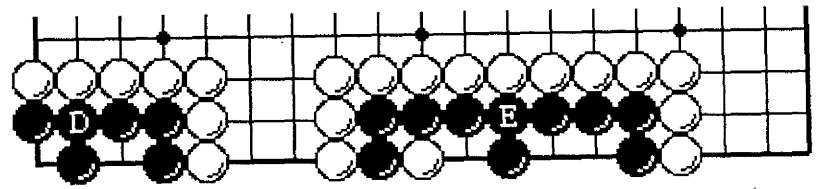
In the diagram above, Black's other strings B and C are also dead. They cannot escape eventual capture. White need only fill in Black's liberties. In B, White will capture Black in two moves, even if Black captures White's first move. In C, White will capture Black in two or three moves depending on whether Black tries to capture White's first move. (Try it if you are not sure)

The essentials of making groups die are covered in detail in the appendix on Killing Groups, which consists of explaining the following poem:

Split him, eat him, make him fill.
Those are all the ways to kill.
Stunt his growth and keep him in,
Never let him join to kin.
Master dead shapes, and the rules,
Then you'll have your basic tools.

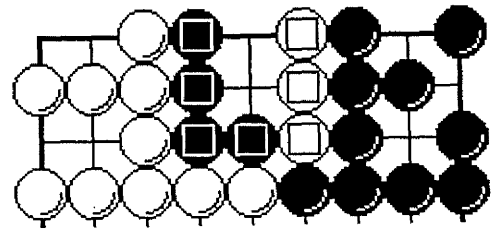
Recognizing Living Groups: Life is the ability of stones to avoid capture permanently. Such ability rests on being able to secure two eyes. An eye is an empty intersection totally surrounded by your stones.

In the diagram below, we see Black stones with two eyes. For White to kill Black D, White would have to fill in each eye. But as soon as White occupies one of them, her stone is removed because it has no liberties and does not capture anything. *Never, ever, place stones inside your eyes.* You will kill yourself.



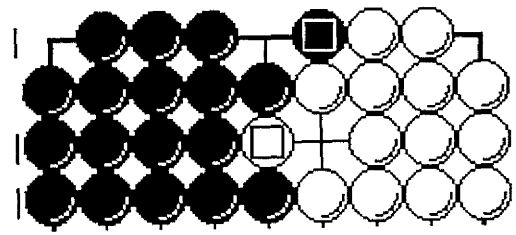
Two-eyed groups are alive. More generally, groups with two separated territories are alive, because they can be filled in to create two eyes. In diagram E above, Black's group cannot be killed. No matter how White attacks, she cannot fill in all of Black's liberties. Black can make two eyes whenever he wishes. Since he cannot be prevented from doing so, Black is alive. He never actually has to make the eyes. At the end of the game, both players will agree he cannot be killed, so his string lives and the territory points are his.

Generally, your groups with two territories cannot be killed since you can add stones to each territory to form an eye. Also, your group with one large territory is usually alive, since you can divide it into two territories.



Here is an unusual example where two opposing groups live, and neither has eyes. Neither player can attack on either liberty of the marked stones without also making it possible for her opponent to kill her stones.

This is a seki (stalemate). The two shared liberties belong to neither player, and are not counted in the final score.



On the left is another unusual form of eyeless life, a double ko. Whenever one player captures a stone, the other player captures the other stone. No one can be killed. Both must eventually pass to avoid repetition.

Endgame: Last-Minute Quibbling

The battles of the midgame are eventually resolved — all areas are well-defined and all groups are alive or dead. The final phase finds the players haggling over boundary placement until no profitable moves are left.

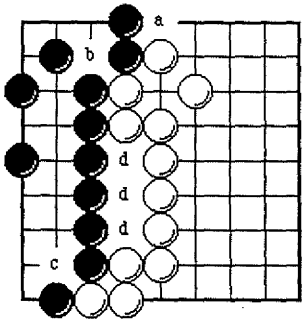
The endgame may be nothing more than quibbling, but it's prolonged. The opening typically lasts 40 - 60 moves, with the midgame adding another 60 - 100. The endgame drags on for an additional 150 - 200 moves, and you must remain vigilant, because the points you need to win can be gained or lost.

During the endgame, territories must be secured against two weaknesses: gaps and defects. Then, both players should occupy any remaining neutral points. (This does not affect the score.) Finally, each player passes.

Gaps and Defects

A gap is a vacant linkage boundary path point. Your enemy can march through a gap, destroying territory.

A defect is a point where two boundary stones are only joined diagonally. Your enemy can play on the defect to keep the stones from joining, and might capture one of them. If a defect is threatened, you must play to secure it.



In the diagram to the left, Black can break into White's territory through the gap at a.

b & c are defects. If White plays at b her stone can be captured immediately, so Black need only defend if White plays there. If White plays at c, White can kill the Black stone below her with one more move; Black is powerless to stop her. c is a dangerous defect, which Black should play first.

The three d points are neutral. They can never be territory, and should be played only when all other points have been resolved.

Passing

Players pass when they see no way to gain more points. Never play inside your own territory (except to attack or defend); it only reduces your score. Playing within your opponent's territory usually leads to a quick death. If all gaps and defects have been taken care of and all the neutral space has been occupied, the only thing left to do is to pass.

Appendix A: Chinese vs Japanese Rules

The rules in Go are so simple; there should be no need for different rules. But... Japanese rules are used everywhere except in China. On the other hand, there are an awful lot of Chinese.

Handicapping: Japanese rules provide fixed patterns for the placement of handicap stones. Chinese rules give Black the first n moves to place anywhere.

Turn Numbering: Under Japanese rules, the stones of the handicap do not count toward the turn number. Thus, in a handicap game, White's first move is considered Turn 1. Under Chinese rules, White passes during Black's handicap moves, so the turn number of White's first stone is twice the number of the handicap. For example, against a 2-stone handicap, White's first move is labeled Turn 4.

Suicide: Japanese rules forbid placing a stone on an intersection with no liberties if it does not capture enemy stones (i. e. suicide). Chinese rules allow suicide of two or more stones. Suicide is not particularly useful.

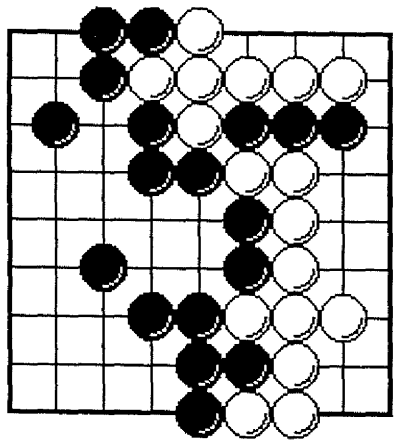
Repetition: Chinese rules use a universal no board repetition rule. A player cannot repeat an entire board image. Japanese rules have special rulings for specific repeated board positions that rarely happen in normal games. In a Japanese professional tournament game this century, a new repetition pattern arose. The ruling was that the game was canceled; a new game was played.

Ending the game: In both Japanese and Chinese rules, the game ends when there are two successive passes.

Dead stones: At the game's end, when both players have passed in succession, stones which both players agree cannot avoid capture are removed and handed over as prisoners. It is not necessary to fill up their remaining liberties when both players are in agreement. These are called dead stones. In Japanese rules these dead stones are added to the score. In Chinese rules they are not. The net effect is the same.

Play inside your own territory: Japanese scoring rules penalize you one point for each move you play inside your territory (since only empty intersections are scored). Under Chinese rules you can make extra defensive moves without cost (other than loss of your turn), since occupied intersections are also scored.

ing: Under Japanese rules a player's score is a count of territory (intersections enclosed but not occupied) and of enemy stones captured. Under Chinese rules a player's score is a count of intersections enclosed and occupied. The difference between the players' scores is usually the same, except that it can vary by a point if Black moves last and varies by n - 1 points in the event of an n- stone handicap. Note: under Chinese rules, the sum of both sides scores totals the intersections of the board.



This game has just ended, and White is about to remove 3 dead Black stones (do you see them?). Under Japanese rules, Black surrounds 29 empty intersections, and White 20 with 3 prisoners. Black wins by 6 points. Under Chinese rules, Black surrounds 29 and occupies 15, for a total of 44. White surrounds 20 and occupies 17, for a total of 37. Black wins by 7 points.

Mechanics of Counting: At the end of the game, in either rules, players first remove the dead stones and hand them to their captor. Then:

In Chinese rules, White stones from anywhere off the board are used to fill in White's territory. Similarly this is done for Black's territory. Then each player counts the number of stones they have on the board. The player with more stones wins.

In Japanese rules, each player takes the prisoners she has captured and uses them to fill in the opponent's territory. Then each player counts her empty intersections remaining. Whoever has more wins.

In either case, the score is reported as the margin between the players. E.g., Black wins by 6 points. If White concedes before both pass, Black is said to win by resignation.

Appendix 2: Killing Groups

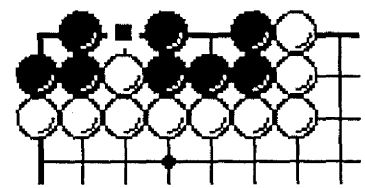
Split him, eat him, make him fill.
Those are all the ways to kill.
Stunt his growth and keep him in,
Never let him join to kin.
Master dead shapes, and the rules,
Then you'll have your basic tools.

Fundamentals of Killing: Killing means preventing the formation of two eyes. While many moves may be involved, the fundamental killing techniques were summarized in the poem above.

Split him. Separate him into two one-eyed groups.
Eat him. Eat away potential eyes by playing adjacent to them
Make him fill. Threaten to capture his strings, thus forcing him to join.
Those are all the ways to kill. But he must not live, so...
Stunt his growth. Don't let him expand and acquire more territory.
Keep him in. Don't let him escape containment.
Never let him join to kin. Don't let him join to other groups of his.
Master dead shapes. Standard killable shapes shortcut complex analyses.
And the rules. Priority rules help you pick the next best move to try.
Then you'll have your basic tools. The rest is just experience and study.

1. Split him

It doesn't matter if he has two eyes so long as they aren't connected to each other.

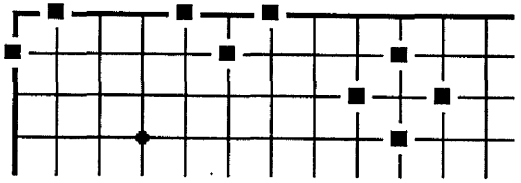


The marked intersection, in the diagram to the left, is the essential point. Black can live and White can kill, depending upon who plays first. This is an easy example. Usually splitting him is not possible.

2. Eat him

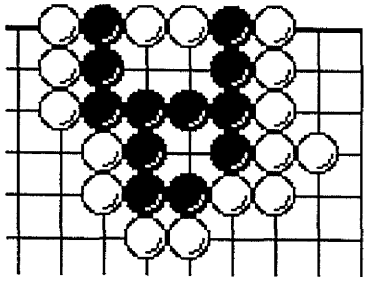
To make an eye shape, the defender must occupy all adjacent intersections to the eye. Eating an eye is simple. Play an attacking stone next to the eye. Then that potential eye can never be finished. Instead the defender will have to capture the eating stone, which means filling in the potential eye with a liberty-filling move.

In the diagram at right, the three kinds of eyes (corner, side, center) have their adjacent intersections marked with a black box.



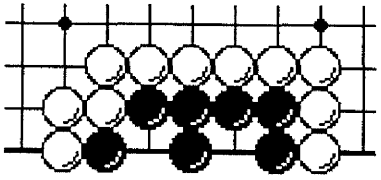
In the diagram at left, if White plays the black boxed intersection, she eats the potential eyes at a and b, leaving her stone as the only possible eye. Black dies.

However, stones don't eat each other. In the diagram at right, White's two stones inside Black eat the other two empty points. But each stone remains a potential eye. Black lives.



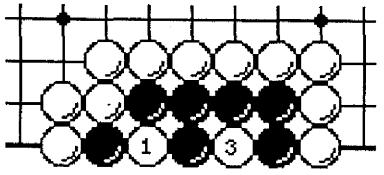
3. Make him fill (False eyes)

Usually territory is not bounded by a solid wall of defender stones. There are often multiple strings bounding the territory. If you can threaten to capture one of them, the defender may be forced to join them together by playing an interior connecting move. This would fill in one point of his own territory.



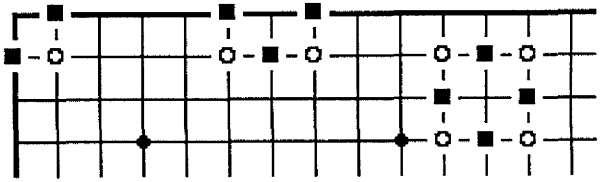
In the diagram at left, Black seems to have two eyes. But one of them is false, based on a connection defect that Black will have to fill in. Black has a stone with only 1 liberty, and if White captures it ...

At right, W1 captures the single Black stone. The false eye disappears, and all of Black's remaining stones are threatened with capture. After W3, Blacks stones are all removed.

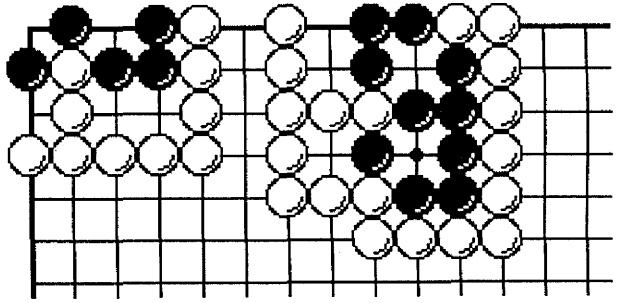


Black cannot stop this by connecting at 1 instead, since he will have filled in his second eye. Black is dead.

An eye requires control over the four adjacent points (black marks in the diagram below). A real eye (not false) requires sufficient control over the four diagonal points (white marks) as well. Control over a point means occupying it, or preventing your opponent from safely occupying it. For an eye on the edge, the defender must control all diagonal point from the eye. For an eye in the center, the defender must control three of four diagonals. Thus, the place for the attacker to play to force the defender to fill in his own eye is not adjacent to an eye, but diagonal from it.



All eyes right are false, and their Black groups dead. White could fill all other liberties and force Black to fill in his false eyes or face capture.



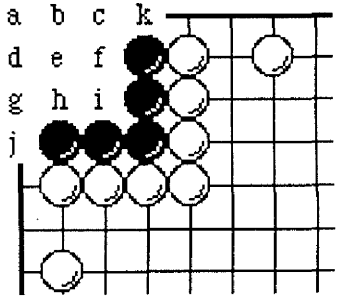
In a nutshell, that's what you need to do to him to kill:

Split him, Eat him, Make him Fill.

And to prevent him from improving his position:

Stunt his growth and Keep him in, Never let him join to kin.

But if that's all you know, solving problems will be an extremely slow process of trial and error. A problem like the diagram to the right has millions of sequences that could be played. While many of them lead to the same position, there are over 100,000 resulting positions to reach.



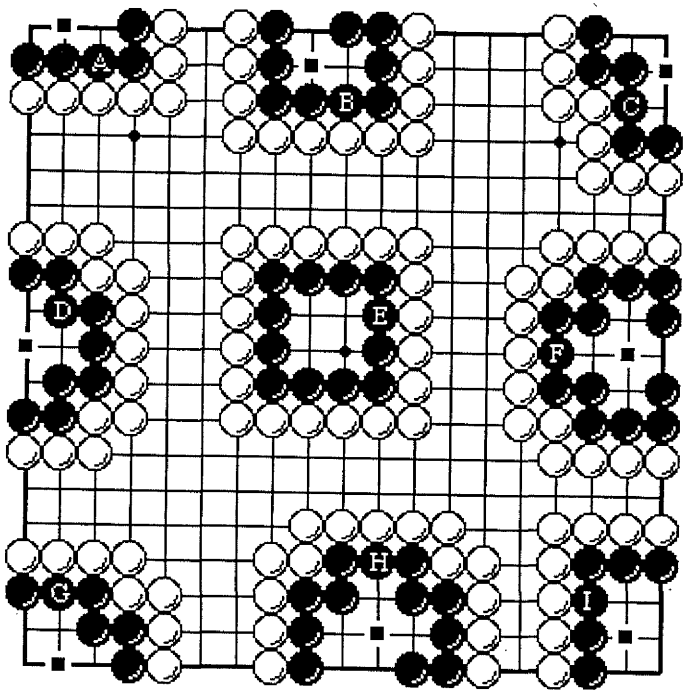
Master Dead Shapes and the Rules

A strong Go player can tell you the result of the previous example in an instant (*The Carpenter's Square is ko*), and he knows the first move is e. That is, he has a knowledge of the results of play against standard named shapes, and he knows priority rules for how to pick among many choices. With priority rules you know which moves to try first. With memorized shapes, you can stop partway through a sequence and know the results of all possible sequences from there. Let's consider a few rules and the basic shapes.

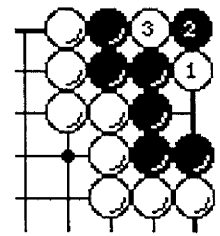
Rule 1: Eat his heart out

You naturally want to eat as many potential eyes as possible with one blow. This means finding a point next to as many potential eyes as possible. Such a place is found in the center of his territory.

The 9 Dead Shapes: In the diagram below, all Black groups can be killed by playing the black mark in the center of Black's territory. It eats away at all other potential eyes directly or then allows one of two moves to eat any remaining eyes by extending from the first eating move (eating indirectly). After White plays the marked center, Black is dead. He gets one eye from the eating move, but no others. Conversely, if Black plays on the marked intersections first, his stones live.



C is unusual. It has two centers. If White plays the marked center with W1 (right), the best Black can do is take the other with B2. But the unique property of the corner makes Black's move have only one liberty, so White captures it with W3. Now all of Black's stones are threatened and he must fight ko to live.

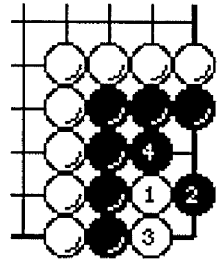


This shape is only dangerous in the corner, and only when Black has no more than one outside liberty. Otherwise he turns around and catches both White stones by playing 4 below W1. They would be unable to connect.

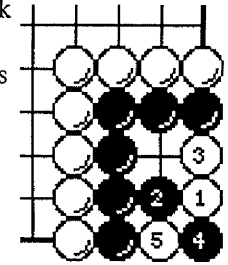
Black's E string has no center. It is so bad off, it is dead already. Any Black move creates the territory shape of Black B, and White then responds on the center point to keep Black dead.

In G & H, once White takes the center, White can expand out from it to eat any remaining potential eyes and cannot be stopped from doing so.

With I, again there are two centers. White could take either of them to kill.



In the diagram at left, after W1, Black takes the other center, and White continue with W3. B4, however, gets only 1 liberty. If Black had one more liberty, he could have played B4 safely. Then White would attack as shown in the diagram at right, getting ko. If Black has two or more outside liberties, there is no kill.

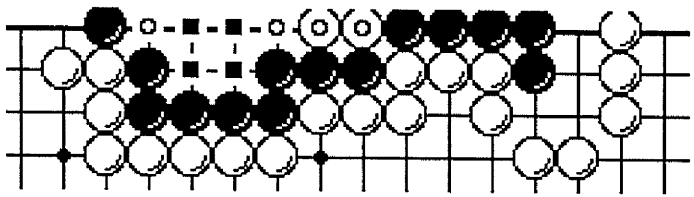


The key to fast analysis of problems is the memorization of the shapes of empty territory (see the diagram on page 28). These are ALL the dead shapes of solidly bounded space. Many other shapes can be killed, but they depend on gaps or defects in the boundary around the territory. Whenever the defender captures stones in one of these dead shapes, you know that the attacker can play back onto the key point, and the result is only worth one eye. Conversely, if the defender captures stones that are not in one of these shapes, he can make two eyes out of the territory he gets from the capture. These shapes must be memorized. The names of the shapes are:

A. Straight 3	D. Pyramid 4	G. Bulky 5
B. Bent 3	E. Block 4	H. Rabbitty 6
C. Bent 4 in Corner	F. Star 5	I. Block 6 in Corner

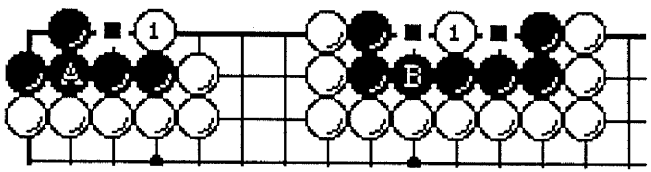
Focus only on real eyes.
Examine his territory and locate all places where a real eye could be formed. Then you can focus on what move to play first to split, eat or fill. You don't want to waste effort on false eyes or eyes that have been eaten already.

In the diagram below, all marked intersections are Black's territory, including the two White stones. But there is no point in considering the white-marked intersections. They are either false eyes, or points which have been eaten already by an adjacent White stone. Stones cannot eat each other. But a stone on a false eye point can eat an adjacent stone. If there had been three White stones (e.g., one on the empty adjacent White mark) then the third would still have been a potential eye.



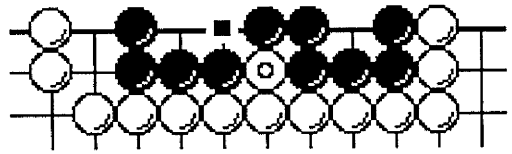
Rule 2: Eat outside
Whenever his territory is not completely sealed, you have an opportunity to eat from outside. Eating outside of his territory is almost always preferable to eating from within his territory. An outside move cannot be a possible eye for him, but an inside move can be. Also, outside moves are profitable to you, even if you don't kill him. Inside moves that fail are often profitable to your opponent.

In diagram A below, Black had a potential eye at the black box, but W1 was played from outside next to it and now Black has no place to build two eyes.

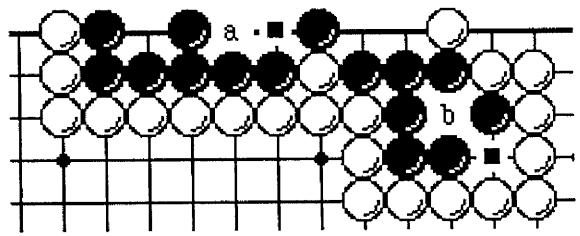


In diagram B above, Black had three places he could build an eye. W1 was played inside to destroy two of them. It does not destroy itself, so Black could try to capture it to make an eye. But one eye is not enough to live. If you imagine that each of the two Black groups had a second eye somewhere else, then in A, W1 would have cost Black one point of territory even while failing to kill. In B, however, W1 would become a prisoner of Black's, a gift of one point.

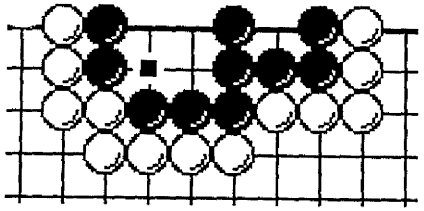
Rule 3: Attack the Crack
Black has two territories in the diagram below. The two-point territory is bounded by two strings, with the connection point marked with a black box. The two-point territory contains one potential real eye, and one already false eye (made false by White's marked stone). If White plays on the black mark, he eats the potential eye, but pays no price, since the best Black can get in return is a false eye. In this simple case, it's not a question of choice; it's the only eating move.



In the problem below, Black has one eye already, and two potential eyes (a, b). White is considering play on the two boxed intersections. b is destroyed via *Make him fill.*. a is destroyed by *Attack the Crack.* Attacking the a potential eye first is correct because the move to do so, in the crack between two black strings, threatens to capture one of them. If Black does not reply, he is captured and split apart. Crack moves which threaten immediate capture are such a strong reflex among experienced players that many play them immediately, *even when the group cannot be killed!*



Rule 4: Eat the wall
If the territory is bounded by multiple strings, maybe you can capture one of them. This removes an entire wall from around his territory, and is devastating. Obviously, to succeed, you will have to play any connection points quickly, lest he connect himself to his other strings. Eating his wall makes the inside become outside. This is great, because even if you don't kill the group you get something significant anyway. Needless to say, it's usually hard to succeed.



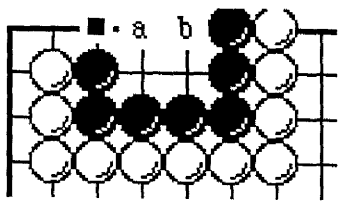
In the diagram at left, Black has two territories and two strings. The connection point is marked with a black box. If Black plays there, he loses one point of territory, but has easy life.

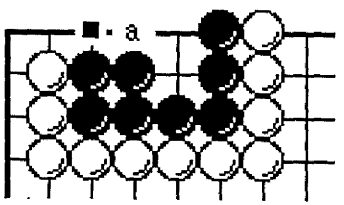
Somehow he failed to do so, leaving a huge opportunity for White in the diagram above. If White plays there, he will capture two Black stones, and eat four points of territory, leaving Black with one eye and a dead group.

Rule 5: Eat and run

Another neat trick is to eat from inside, and yet escape outside through an open door, a single-skip linkage boundary between a stone and the edge.

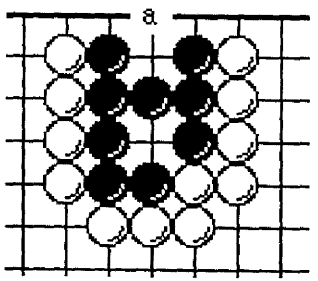
In the diagram on the left below, the door is a black mark. White will consider plays at a or b, intending to escape by playing her next move on the door if Black fails to close it. This would link her first move outside, keeping it safe.





The diagram on the right above has two doors (the box and a). If White went farther in than a,, Black could close either door to seal, and so need not rush.

Threatening a door is meaningless by itself, since the defender can just close the door. It is always used in conjunction with something else. In the diagram on the right, White can play a as a dual door threat, and thus Eat and Run with impunity.



Conflict?

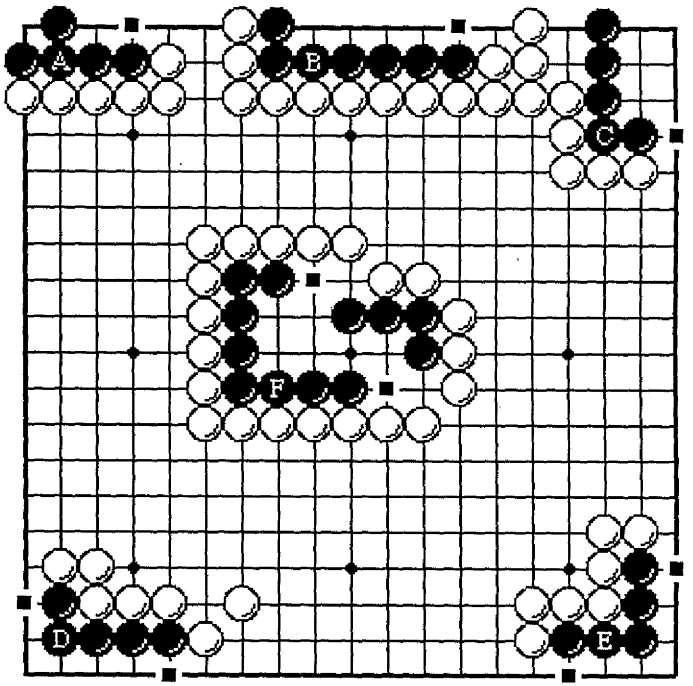
If you are sharp, you will realize there is potential for conflict between Eat outside and Eat his heart out. When his territory is not solidly bounded, you might be able to do both. Which do you do first? Almost always Eat outside first. But that's what the ability to look ahead is for. If you haven't the ability yet, stick with Eat outside and just play it.

Complexities of Life and Death

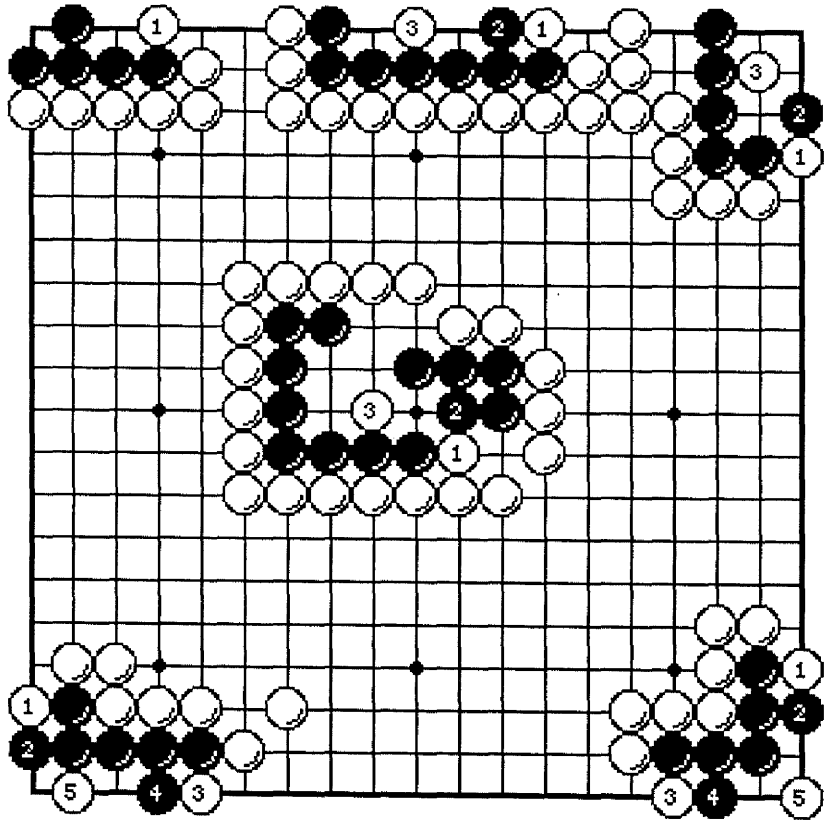
Typical life and death problems take a series of moves and require using more than one technique. They involve either using one technique and then another, or threatening two techniques simultaneously. Solving complex problems is best done by having a repertoire of standardized plans and being able to assess their results because you have memorized the basic resulting shapes.

Plan 1: Eat Out then In

This is the usual plan for simple problems. This plan combines two rules: *Rule 2: Eat Outside*, and *Rule 1: Eat his Heart Out.* You Eat Outside first, and then Eat his heart out as soon as you get to one of the dead shapes. Obviously, to use this plan, his territory must have gaps in the boundary, allowing you to eat out first.



Each Black group (above) has gaps in its territory (marked with black boxes). If Black occupied them he would be alive. If White takes one or more of them, Black loses one or two points of territory and dies.

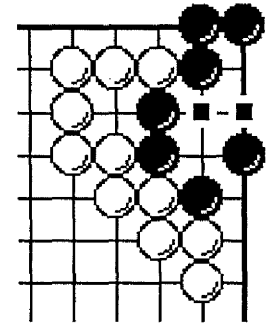


In A, Black loses all of the second territory (his second eye) to W1. In B, Black almost has secured Straight 4, a living shape. But after W1, B2, all he has is Straight 3, and W3 takes the key point. In C, W1 reduces Black to Bulky 5, after which it's all over for Black. He must play B2 to prevent further erosion of his territory, but W3 deals the deadly blow. In D, Black has two gaps to seal. If he got to either one first, he would live. Try it. But White's attacking first is fatal. Similarly for E. And F is just another case of reduction to Bulky 5 and kill on the key point. (White must attack the correct gap or Black lives!)

The only concern White might have is for the fate of stones threatened with capture, like W1 in D. White should not be too concerned. Black's capture of such a stone generates only a false eye (White controls a diagonal offset from the new edge-based eye). So long as White does not let Black escape out, everything is all right.

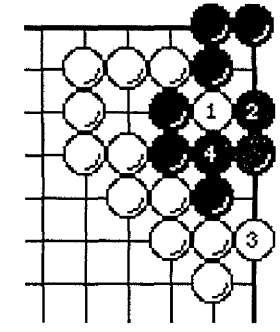
Plan 2: Eat your Fill

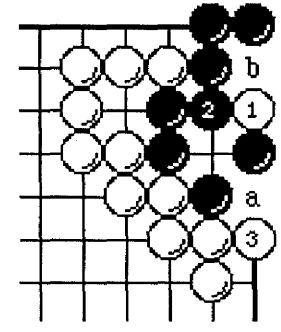
Actually, it's eat and fill, but it doesn't sound as good. This plan combines: *Rule 1: Eat his Heart Out*, and *Item 3: Make Him Fill (Fundamentals of Killing)*. Your job is to place a combined eating and filling move.



The diagram at left is an interesting example. Black has a bent four shape (but not in a corner), so if the boundary were solid, he would be alive. But the boundary has defects, so there's hope. Since Black has one large territory with no gaps, the first idea to consider is *Eat his heart out.*. White must play in the territory's center on one of the two black boxes. We know that merely trying *Eat his heart out* alone is doomed to failure, since the territory is not a dead shape. Perhaps some combination plan is suitable.

At right, if White picks *Rule 4: Eat the wall*, White takes the cutting point with W1 as in the diagram at right. Black take the other point, and White's plan to kill a boundary quickly runs out of steam. Black can easily capture White's cutting stone to stay connected.





Next White considers *Plan 2: Eat your fill.* That will require controling enough diagonal offsets to make an eye false. Playing W1 in the diagram at left is just the ticket, being the eating point diagonal from a potential eye where we already control one diagonal and can aim to secure another. Black, of course, plays B2 to prevent White from eating his only other eye. Then W3 goes after the other diagonal point of the new eye. Black would love to play B4 at a, but the presence of W1 makes such a play unsafe. If Black goes back to capture W1 with a play at b, White gets to play a. Black's second eye becomes false. Black is dead and gives up hope.

Conclusion

There are lots of other tricks to learn, but they all boil down to being variations on the same theme: *Split him, Eat him, Make him fill.*

Glossary

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