WinChess!

Welcome to the WinChess help system!   Click on a topic for help, or just use the Help arrow keys to browse among the many topics here.

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The History of Chess

<u>Origins of Chess</u>

Man has played board games throughout recorded history.   As an example, a <u>bas-relief</u> from the tomb of Nefertari shows the Eqyptian queen playing a game with pieces very similar   to modern chess pieces.

Most experts agree, however,   that chess originated in India from a game called Chaturanga sometime in the sixth century.   An Indian legend has it that a philospher invented the game for his king ("Shah", from which we get "chess"), as a rival to backgammon.   The pieces were supposed to accurately represent the various forces in an army: the King (king), the Minister (bishop), the Elephant (queen), the Horse (knight), the Chariot (rook) and the Foot Soldier (pawn).   "Chaturanga" means "four-limbed," in reference to the four arms of the army.

During the next 500 years, chess spread to China and Japan (where it was later transformed into the Japanese board game "<u>Shogi</u>").

Around 1500 A.D., the rules of chess were changed to speed up the game.   The Queen and the Bishop were made more powerful, and new move rules including <u>en passant</u> pawn capture and <u>castling</u> were introduced.   By 1650, chess had evolved to the game as we know and play it today.

Strange variations of chess have come into existance in this century.   Once of them is <u>hexagonal chess</u>, which allows 3 players to play on a 3 colored board.

<u>History of Computer Chess</u>

The first chess machinewas called the <u>"Turk"</u> and was built in 1770 by Baron Von Kepelen. The machine played good chess because it was large enough to house <u>a small man inside</u> who was a chess expert.   The expert would manipulate the Turk's hands to move the pieces.

In 1890, Leonardo Torres Y Quevedo built the first mechanical machine that could truly play chess of a sort, being able to could solve King/Rook mate puzzles.

In 1950, Dr. C. Shannon published the seminal article *Programming a Computer for Playing Chess* in Philosophical Magazine.   The famous computer scientist Alan Turing wrote the first computer algorithms for playing chess in 1951.   Unfortunately, no computers existed at the time that could handle his "complex" equations.   These two individuals were the start of computer chess.   WinChess uses the piece values assigned by Dr. Shannon in his original article (see <u>Strategy</u>).

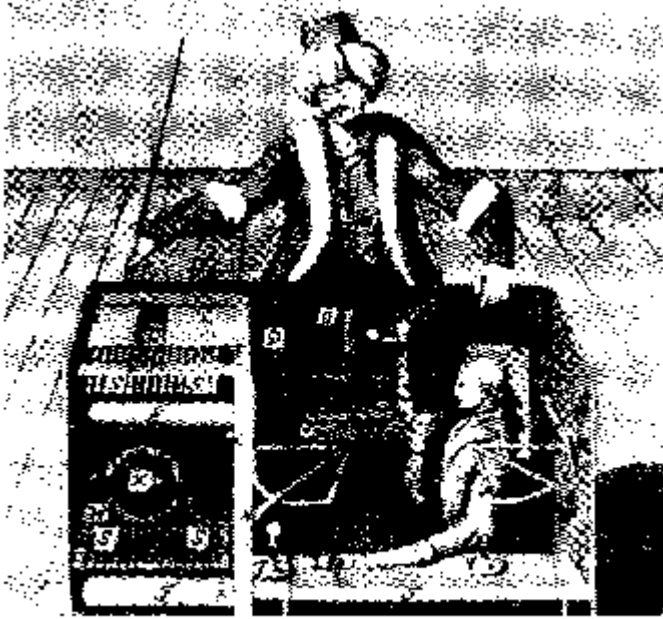The first computer chess tournament was held in 1970 at the ACM conference.   The winner was Chess 3.0.

In 1978, Dan and Kathe Spracklen wrote Sargon, one of the first microcomputer chess programs.   In March of that year it took first place in the first microcomputer chess tournament held during the West Coast Computer Faire.   Sargon has been continually improved and is still sold today as Sargon4.
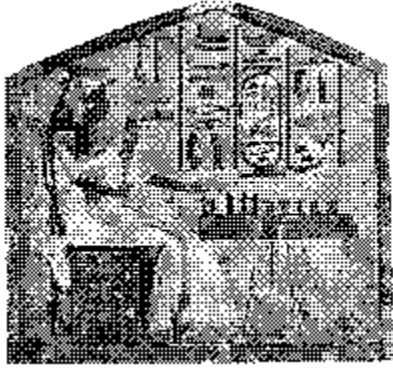
Ken Thompson (from Bell Labs and creator of UNIX) wrote the Belle chess program in 1980. Belle is actually customized chess hardware with a computer.
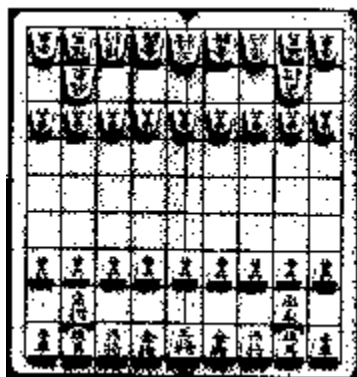
The current World Computer chess champ is "Deep Thought" by Feng-hsiung Hsu and a team of graduate students at Carnegie-Mellon University.   Deep Thought 0.02 beat out Hans
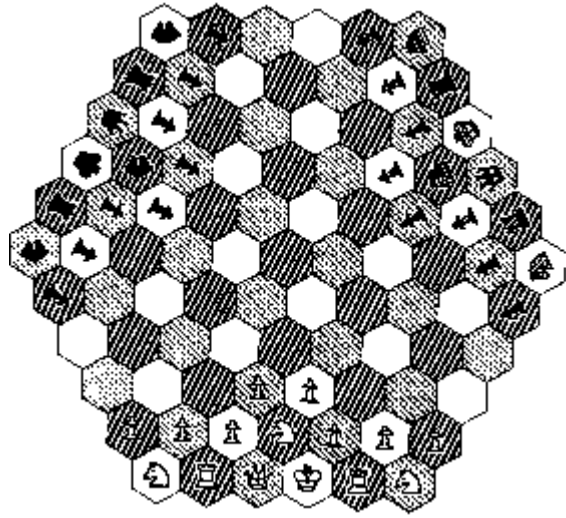
Berliner's "Hitech" in the 1989 World Computer Chess championship.   It is a customized VLSI design whose algorithms are written in C and assembler, capable of evaluating one million nodes per second.   This is about 300 times faster than WinChess running on a 33 Mhz 80386 machine.

How to Play Chess

How Play Proceeds

White always moves first, and then each player takes turns moving only one piece per move (castling is an exception).   Only one piece is allowed on a   square.

To capture an enemy piece, simply remove the enemy piece from the board and replace it with your own piece (en passant is an exception).

The Pieces and How They Move

 The King

 The Queen

 The Rook

 The Bishop

 The Knight

 The Pawn

Special Moves

The King

The King is the most important piece on the board.   When the King becomes trapped, the game is lost.

The King can move one square in any direction (eight possible moves).   An exception is castling.   The King may never move into check.

Example: How the King moves

[The Queen](#)

The Queen is the most powerful piece on the board.   She can move any number of squares in a straight line in any direction: horizontal, vertical, or diagonal (if she is not blocked by another piece).   The Queen has the powers of a Rook and a Bishop combined.

Example: How the Queen moves

The Rook

The Rook is the second most powerful piece.   It can move any number of squares in a straight line either horizontally or vertically, as long as it is not blocked.

Example: How the Rook moves

[The Bishop](#)

The Bishop can move any number of squares in a straight diagonal line if it is not blocked by another piece.   Since each player has two bishops and each starts on a different colored square, each bishop stays on its own color squares for the duration of the game. Sometimes they are called white and black bishops based on their square color, regardless of the color of the piece.

Example: How the Bishop moves

The Knight

The Knight has a very special move.   It moves two squares either horizontally or vertically and then makes a right angle turn and moves one more square.   Unlike other pieces, the Knight is the only piece that can jump over other pieces between its old and new squares.

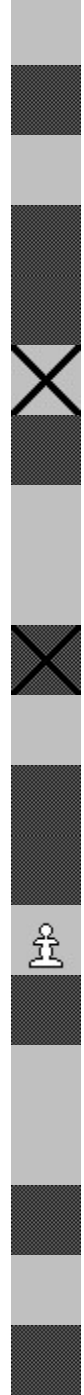Example: The White Knight can capture all of these pieces!
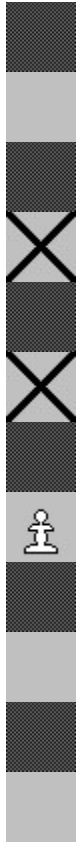
The Pawn

The Pawn is the weakest piece on the board.   It moves straight ahead and can never move backward.   However, it captures diagonally.   It can only move one square at a time, but on its first move it has the option of moving forward one or two squares.

Example: How the Pawn moves

Example: How the Pawn captures

Special Moves

In addition to the regular moves of each piece already described, there are three special kinds of moves you should know about.   Many beginners are often confused and upset when one of these moves are used by a more experienced opponent; especially en passant.

Castling - Protect your King and activate a Rook in one move!
En Passant - A special way that pawns capture other pawns.
Pawn Promotion - What happens when a pawn reaches the last rank?

Castling

Each player can "castle" once during the game if and only if:

       1) Neither the King or the Rook may have moved before;
       2) The King cannot be in check, or castle into or through check;
       3) The spaces between the King and Rook must be clear.

You can castle using either Rook.   To castle, move the King two spaces to the left or right, and then move the Rook to the opposite side of the King toward the center of the board.

Example: Before Castling (Kingside):

After Castling:

En Passant

This is a French term that means "in passing."   When one player moves a pawn two squares forward, the opponent can capture the pawn just as if it had moved only one square forward. Note that the opportunity for capturing such a pawn is lost if it is not taken immediately.

Example:

Before En Passant: After En Passant:

Pawn Promotion

If a Pawn advances all the way to the opposite end of the board, it is immediately promoted to another piece.   Usually this is a Queen, but the player may also select a Rook, Bishop or Knight (it is illegal to have more than one King, and silly to leave the pawn where it is!)

Winning the Game

To win the game you must <u>checkmate</u> your opponent's King.   It is not necessary to actually capture and remove the King from the board.   A King is checkmated when he is being attacked by an opponent's piece ("check") and has no way to get out of it.

You can never move into check, either directly (by moving the King into an attacking square of an opponent's piece) or indirectly (by moving one of your pieces that exposes your King to attack by an opponent's piece).

If you are in check, you must get out of check immediately.   You can either move your King out of range, capture the attacking piece, or place another one of your own pieces in-between your King and the attacking piece (this last method will not work if the attacking piece is a Knight.)   If you cannot do any of these things, then you are checkmated and have lost the game.

Another situation is when a King is not in check but has no legal move.   This situation is called <u>stalemate</u> and results in a tie.

Checkmate

The King is in "checkmate" when he is being attacked by an opponent's piece and has no way to get out of it.

Example: The white Knight administers checkmate.   The King cannot get out of check.

Stalemate

The King is in "stalemate" when he is not in check, but has no legal move.   The game is a draw, or tie.

Example: The black King is in stalemate; he cannot move.

Chess Notation

There are two major forms of chess notation in use today; descriptive and algebraic. In descriptive notation, a move is written using a letter for the piece followed by the destination square.   The piece letters used are the first letters of the piece name, except for the Knight, which uses 'N' to distinguish it from the King ('K').   For example, a common first move is to move the pawn directly in front of the King forward two squares.   Thiis would be represented as "P-K4", implying a pawn has moved to the fourth rank of the King's file.

WinChess uses algebraic notation, which is more accurate than descriptive notation. This is because it gives exact start and end squares, where descriptive notation may be ambiguous.   The board is numbered by rank (1-8)and alphabetized by file (A-H).   In the above example, "P-K4" would be represented as "E2-E4".   Sometimes a shorthand version of algebraic notation is used for pawns, so that only the destination square is given when it is clear which pawn is moving: "e4".

Chess abbreviations

In the above examples, a dash '-' is used to indicate movement from one square to another.   There are other abbreviations:

x	captures (for example, e4xd5)
O-O	King side castle
O-O-O	Queen side castle
ep	captures en passant (for example, e5xd6 ep)
+	check
!	good move
!!	excellent move
?	bad move
??	blunder

[Chess Strategy](#)

Every chess game can be divided into three main phases: the opening, the middle game, and the end game.

The opening game lasts until around the 10th move.   The goal of the opening game is to organize your pieces around a particular attack or defense.   In the opening, you should try to memorize at least one or two standard opening lines (your opening "book") and use them when you play.   Castle early if you can, and develop bishops and knights before your Queen and Rooks.

The middle game follows the opening, and generally is a series of positional moves combined with piece trades to create an advantage when entering the end game.   Try to trade pieces when you are ahead, and find combinations that will win exhanges of pieces.

The end game is where there are few pieces left on the board, and often the King takes an active role in an attempt to Queen a Pawn.   Put Rooks behind "passed" pawns (pawns that have passed enemy pawns).

Assign the following point values to the chess pieces:
> Queen 9
> Rook   5
> Bishop 3
> Knight 3
> Pawn   1

When exchanging pieces, keep in mind the relative value of each piece.   For example, you usually do not want to trade your Rook for an opponents Bishop.

Here are some general guidelines to use when playing chess:

1)   In the opening and mid-game, try to control the center of the board.

2)   Castle early in the game; preferably in the first 10 moves.   This offers extra protection for your King and activates a Rook.

3)   Don't be too anxious to move your Queen and Rooks out too early.   The Rooks especially are more endgame pieces, and the Queen is easily chased around the board by the opponents bishops and knights.   Move your Knights and Bishops out first.

4)   "A Knight on the rim is dim" - try not to place a Knight on the edge of the board.

5)   If you are ahead, exchange pieces of equal value.

6)   "When all else fails, push a pawn."   This is actually terrible advice, but I swear by it.

7)   Learn an "opening book" of moves.   This is especially important if you want to play in tournaments; having a repertoire of opening moves at your fingertips speeds up the opening game and offers more time to think about moves later.   Sometimes it has the additional effect of disturbing the opponent.

8)   Practice, practice, practice!

9) Watch out for Knight forks and pinned pieces!

Playing WinChess

Basically, you use the mouse to pick up pieces and move them.   To move a piece, point the mouse cursor at a piece and press the left mouse button to "grab" the piece.   Drag the piece using the mouse to the desired square and let go of the mouse button.   If the move is valid, the piece will be plopped on that square (any captured piece being removed first!) and WinChess will start thinking about its move.   You can tell WinChess is thinking because the mouse cursor turns into a white and black rook with little arrows.   If your move is invalid, the piece is placed back where it started and you must make another move.

Menu Commands

WinChess has five main menus:

File - save and load boards and edit positions
Game - controls how the game is played
Level - determine how WInChess thinks about its moves
Options - goodies you get to tweak
Help - here you are!

File Menu

Save Game As - This command saves the current board setup to a disk file.

Load Game - This command loads a previously saved board.

Edit - This command puts you in edit mode, where pieces can be shuffled about.   For more information on edit mode, see Editing the Board.

Game Menu

New Game - Abandons the current game and starts a new game.

Backup - Cheater!   Was your last move a blunder?   Use this option.

Move - If WinChess is expecting a human to make a move, this command forces it to "take over" and make the move for the player.   In effect, it switches sides; so if you want to play black, use the New Game command and then this command.

Hint - Stuck?   Let WinChess help you out.

Resign - This command doesn't really do anything except display a dialog box accepting your resignation.   Better to power cycle the machine!

Backup - In Player vs. Player mode, backs up one half-move; in Player vs. Computer, backs up two half-moves.

Offer a Draw - Offer WinChess a draw.   Maybe it will take it, maybe it won't.

To Play - Allows you to change the current player from White to Black, or vice versa.

Computer vs. Computer - WinChess will play itself.   You have to start the game using the Move command.

Player vs. Computer - WinChess will play you.   You have to use the Move command if you want WinChess to play White.

Player vs. Player - You can play another player.   WinChess will keep track of moves and check them for validity.

Level Menu

This menu controls how much time WinChess uses to make its move.   Generally, the more time it has, the better move it will make.

Time - Sets the amount of time per move.   You can pick between 5 seconds per move, 15 seconds per move, 1 minute per move, and 5 minutes per move.

Ply Depth - Sets how deep WinChess searches for a move.   For example, a two-ply search will examine all of the computers moves and all of your possible responses to those moves.

Infinite - The computer thinks forever.   "Hog CPU" cannot be on in this mode.

Find Mate - In this mode, WinChess will assume the board has a "mate puzzle" and will attempt to find the shortest set of moves to effect a checkmate.

Options Menu

These are options you can adjust to suit your own tastes.   A check mark will appear next to the option name when it is selected.   Your preferences are saved in the WINCHESS.INI file, so you don't have to reset them every time you run WinChess.

Use Opening Book - When checked, WinChess will search for the file OPENING.BOK which contains its list of possible opening moves and their names.   The name of the opening will appear in the title bar of WinChess until the line in the opening book runs out.

Invert Board - Turns the board around, so you are looking at Black's view.

Sound - WinChess will issue a "beep" upon completion of its move and on some other occasions such as placing a King in check.   This option enables and disables the beeping.

Hog CPU - Windows is normally a multi-tasking system, where many applications can be running simultaneously.   If you want WinChess to be user-friendly, leave Hog CPU off; you can the use other applications while WinChess is thinking about its move.   If you will only be playing WinChess, or will be using WinChess in a tournament, turn Hog CPU on so that all of the microcomputers time will be spent analyzing moves.   WARNING: If Hog CPU is on and you have selected a deep ply search, your computer will be "stuck" analyzing moves until WinChess is finished making its move!

Display Opening Name - When checked, WinChess will display the name of the opening line in the title bar; for example, "Ruy Lopez."   When WinChess leaves the opening book it will replace the title bar with just "WinChess."

Evaluation Parameters - Presents a dialog box which allows you to adjust most of the evaluation parameters used in the WinChess evaluation algorithm.

Evaluation Parameters

WinChess has dozens of different evaluation parameters that you can adjust to make it play a different (and hopefully better) game of chess.   You can feel free to manipulate these in any way you wish; using the "Default" button restores the original values (but wipes out your old settings!).

Queen-Pawn value - the value of each of the pieces.   The default values follow standard conventions; i.e. a Bishop = 3 Pawns, A Rook = 5 Pawns, etc.
Exchange bonus when ahead - bonus awarded for exchanging pieces when ahead by at least one pawn.
Structure bonus - bonus awarded for each piece protecting another piece.
Kingside castling bonus - bonus for castling Kingside.
Queenside castling bonus - bonus for castling Queenside.
Rook on an open file -
Doubled Rook bonus -
Queen on an open file -
Attack value of the center 4 squares - Since controlling the center is important, this value is awarded for controlling the center squares in the early midgame.
Distance multiplier penalty away from center - Attack value of squares other than the center squares is the center value minus the distance away from the center times this multipler
Attack value around opponents King - attack value of the 8 squares around the opponents king in the midgame.
Randomness - random value between 0 and this number added to the evaluation.   A sufficiently high number will make WinChess start making stupid mistakes; too low a number will make it play too rigidly.
Bishop blocks King/Queen pawn penalty - special penalty if a bishop is moved out in front of   either the King's or Queen's Pawn, preventing it (the pawn) from moving.
Rook behind passed Pawn bonus - points awarded for having a Rook protecting a passed Pawn.
Pawn chain bonus - Bonus for pawn chains.
Doubled pawn penalty - penalty when two pawns are on the same file.
Bonus for a pawn having another pawn on the side - since two adjacent pawns control the 4 squares in front of them, this bonus is added for this situation.
Penalty for isolated pawns - penalty for pawns not part of a pawn structure.
Bonus for a pawn protected by a pawn
Bonus for a pawn on file 1-8 - The bonus added for pawns on these files.   The center files should have a higher value than the outside files.
Bonus for pawns on ranks 2-7 - The bonus added for pawns on these ranks.
Bonus for passed pawns on ranks 2-7 - bonus for passed pawns on these ranks.
Attack value of ranks 1-8 - attack value of these ranks in the early midgame.

For More Information
The U.S. Chess Federation is the official sanctioning body for chess in the United States.   For more information,   you can contact them at:

U.S. Chess Federation
186 Route 9W
New Windsor, NY   12550

or call them at (914) 562-3555.   A six month trial membership in the USCF is only $9 and entitles you to monthly copies of Chess Life magazine, a membership card enabling you to play in national tournaments and earn a national rating, a U.S. Chess catalog, information about playing chess by mail and other goodies.   It's a good deal and they're a non-profit organization.

If you want to learn more about Chess, try one of these books:

Fischer, B.   *Bobby Fischer Teaches Chess*
Horowitz, I. A. *Chess for Beginners*
Horowitz, I. A. *Chess Openings: Theory and Practice*
Korn, Walter   *Modern Chess Openings*
Pandolfini, B. *Chess Openings: Traps and Zaps*
Wilson, F.   *A Picture History of Chess*

The Implementation of WinChess

There are many ways to implement a chess algorithm.   Most of the existing computer chess work was in some part based on the work by Dr. Shannon in the '50s.

WinChess was implemented using an alpha-beta search tree method.   Its evaluation function is a simple first-order evaluation, which means that it relies mainly on the depth of the search to play chess well.   For example, it takes a 3 ply search to discover a knight fork, and it requires a 5 ply search to discover the threat of a fork.

There are three main parts to a chess program: the structure, the search tree, and the evaluation (the evaluation is the most important of the three).   The structure is all of the code and data that is required for "housekeeping" chores; the board array, move lists, user interface, and so on.   The search tree is the code that creates and traverses a game tree of moves, much as a player might create in his mind: (knight takes bishop, pawn takes knight, pawn takes pawn, etc.)   The evaluation is the part that decides, at each move (or node in the search tree), how good the move is for the computer.

The most important factor in the evaluation is material.   Obviously two moves that trade a Queen for a Pawn are poor, since the relative material has gone down by the value of a Queen and up only by the value of a Pawn.   After material, other factors control the evaluation, such as pawn structure, piece mobility, and so on.

I started with Turbo Chess as an example of a reasonable chess program.   Their manual describes the alpha-beta search mechanism in an abstract form, along with some additional improvements and a good number of evaluation parameters.   I use a completely different opening book strategy than does Turbo Chess, where a separate utility is used to enter moves.   This unfortunately has the side effect of entering bad moves into the opening book as the utility does not check the moves for validity.   WinChess will issue a book error when it finds such moves, and will continue to play by leaving the book (please let me know about these errors if you find them).   The book allows the opening move "tree" to connect various branches where the set of opening moves are different but the ending board setup is the same; i.e. P-K4/P-K4/N-QB3 and N-QB3/P-K4/P-K4.

WinChess is written entirely in C, using the Microsoft C compiler.

Credits

WinChess is not free software.   It is shareware, which means that it is supported solely through the donations of people like you.   Your donation will encourage me to write more Windows games and improve existing ones.

If you like WinChess, please send $15 (you can send more if you want) to:

> David Norris
> 17911 NE 101st Ct.
> Redmond WA   98052

Thanks to:
> Melodie for her encouragement through a difficult year (and for some help on the artwork);
> Fellow bogusites Hans and Ferg;
> My sons Michael and Christopher, just because.

The Wish List

Here's a list of features I may yet implement in WinChess.   Feel free to forward any suggestions you may have for additions or improvements I could make.

Better board editing, with maybe a piece tool box.
Board and move list printing.
Tournament time controls (i.e., 40/90 SD/30)
Highlight squares pieces can move to using right mouse button click as a teaching tool.
Recognize stalemates due to insufficient material.
A captured pieces box.
Have the evaluation window run in Player vs. Player mode.   This would be useful for game analysis.
Network play.
Blind chess (hide white, hide black, hide both)
Game analysis and printout.
Toggle to prohibit Winchess from resigning.
Player rating estimation.
Show algebraic coordinates.
Idle thinking (thinks on users time).
Ability to edit the opening book using the board, and merge opening books together.
Automatic adjustment of evaluation weights based on a series of known (Grandmaster) games.
Save evaluation parameters in a "style" file.
Accept draw offers using a more refined metric.
User-definable piece bitmaps.
Save size and position of the various windows in the INI file.
Pawn promotion to pieces other than queen

Known Bugs

It crashes sometimes.
Piece sliding doesn't always work.
The move list gets trashed on move backup.
Options aren't properly checked on startup.
It sometimes takes a couple of tries before it starts up.
Double rook thinking cursor is "stuck" on until you click the mouse once.

Version History

Here's a list of releases, starting with the latest release and working back to version 1.0.

Version 1.1 -
- Opening Book:
  - Sicilian
  - corrections
- Some commands now work while the computer is thinking:
  - New Game
  - Close
- Updated help.

Version 1.0 - 11 Oct 90
- First release.

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Discovery -

Fork - When a single piece attacks two (or more) of the opponents pieces.

Opening Book - A body of chess knowledge encompassing standard opening moves in chess.

Ply - A half move (one players' move).

Pin - When a piece cannot move because it was cause a discovered check or endanger a piece of higher value.