

# **Checkers for Windows 95 v1.0**

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## Rules of the Game

The players take turns in making their move, with black playing first. In the beginning of the game, each player has 12 stones, which can move diagonally forward. A capture is possible, if there is an enemy stone in diagonally before a stone and the field behind the enemy stone is empty. In a similar way, multiple captures are possible. If you are able to capture a stone, you must do so. Once a stone reaches the other side of the board, it promotes to a king. Kings can move and capture forward and backward. The game is over when one of the players cannot move anymore. In that case, he loses the game.

The game belongs to the two-person full information class of board games (other examples include tic-tac-toe, connect four and chess), which means that, assuming both players will play perfectly, the outcome of the game is already decided. In the case of checkers, the outcome of the game has not yet been calculated, due to the enormous amount of possible moves. Efforts to solve the game are under way however, the computer program chinook already being stronger than all human players.

## **Making your move**

You make a move by clicking on the field where your move starts and clicking again on the field where your move ends. If the move is not possible, nothing will happen, and you have to enter a legal move. Remember that you must take if you can. If you made a mistake and would like to take back your move, press **t** twice when it's your move again.

## Technical information

This program uses some standard techniques of game playing software:

- alpha-beta algorithm
- quiescence search
- killer move prediction
- hashtable

The hashtable has a fixed size of about 4 MByte, which corresponds to 100'000 positions.

This program does not use any kind of deep knowledge of the game of checkers, most importantly, it does not use any endgame databases. Commercial programs often know the best moves possible, as soon as there are six or less stones left on the board. As many simple endings (like e.g. the first position) require lots of moves to win, you will never see this program play an endgame well. The strong points of the program lie in tactical positions, where it outcalculates most humans easily.

# The menu commands

## The **File** Menu

**Quit** quits.

## The **Command** Menu

In this menu you will find commands related to the game. **New Game** starts a new game. **Play** forces the computer to make the next move, or, if the computer is calculating, to make its move instantly. With **forward** and **backward** you move in the game.

## The **Options** Menu

In the **Search** options you can enable or disable features like the hashtable, quiescence search and killer move prediction (note that killer move prediction only works with hashtable on!), and you can change the nature of the search from pure Shannon-A-type with quiescence search (Select off) to a more Shannon-B-type like search by enabling **Select** parameter. I don't recommend this, as it can lead to oversights. However, in tactical positions, a higher **Select** value may increase search speed.

In the **Display** options you can show or hide board numbers and invert the board. The **Level** options let you change the time the program will typically spend on one move.

Finally, you can change the play mode from **normal** to **analysis** which means that the computer will not automatically answer on your move.

## The **Setup** Menu

In this menu you will find the commands to edit or setup a position. With **Clear Board** you take all stones from the board. With the commands **Black/White Moves** you can specify which side is going to move next. With the **Setup Mode** command you enter/exit the setup mode. Once you have entered the setup mode you can edit the position with the mouse: clicking with the left mouse button turns an empty square or a square occupied with anything else than a black stone into a square occupied by a black stone. Clicking on a black stone turns the stone into a king. Another click on the king makes the square empty again. The right mousebutton has the same function for white stones.

## The status bar

In the status bar you will find the following information (from left to right):

While calculating, you see the move the program is planning to make, afterwards the move the program has played.

The number of nodes and the number of positions searched and evaluated.

The search depth in the format  $d1/d2$ , where  $d1$  is the depth up to which the game tree has been exhaustively searched,  $d2$  is the maximum depth reached in forced variations.

The value of the position, which is positive if the program believes the position to be good for itself. A stone has a value of 100. Values of about 5000 indicate that the program has seen a forced win.

The time the program took to calculate its move.

Information on the hashtable:  $n1\ n2\ n3$ , where  $n1$   $n2$  and  $n3$  are the number of positions stored in the hashtable, the number of searches in the hashtable, and the number of successful searches in the hashtable respectively.

# About Checkers for Windows 95 v1.0

Written by Martin Fierz 1996/97

My thanks to Bernhard Seybold for helpful discussions.

This is probably the final version of Checkers for Windows 95.

If I find the time, I might continue developing this program, anyway, the newest version of this program is available on the internet:

*<http://ourworld.compuserve.com/homepages/fierz/checkers.htm>*

If you have any comments, suggestions, bug reports or questions concerning checkers, write to

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I appreciate feedback of any kind, but I would be especially thankful to suggestions on how to improve the playing strength of this program. I am not a checkers player, so I dont really know the weaknesses of my program. And of course, I also take postcards, money, marriage proposals etc.





