A Font and a Style for Typesetting Chess using LaTeX or TeX

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The Berkeley Font Catalogue[2] demonstrates how a chessfont in combination with troff can be used to typeset chessdiagrams. This article has inspired me to build a chessfont with METAFONT from the nice font, see diagram 1, I once bought from Schaakhuis De Haan (Arnhem, The Netherlands).

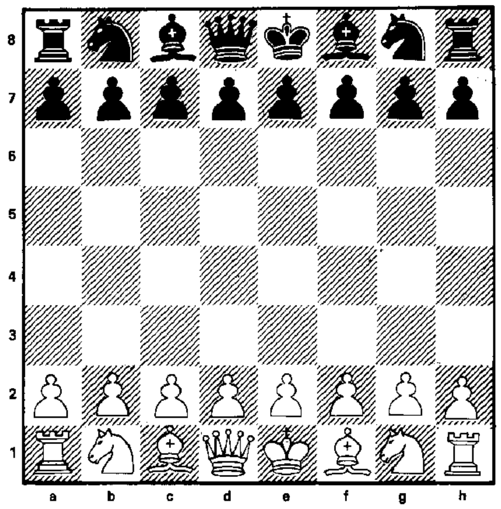


Diagram 1: Original rastered font
(original size of board 9×9 cm)

This 'font' consists of a set of chessboards and separate sets of chesspieces. The pieces have to be pasted on the board after pulling them from a sheet of paper. Nowadays this is still common practice for publishers. Before I used METAFONT I made enlargements of the pieces on graph-paper using my stereo microscope, for which I have a drawing prism. This graph-paper facilitates reading the coordinates of points that need to be given to METAFONT. For the development of the font I have used AmigaMETAFONT which has graphical support. The design of the chess style has been done with AmigaTeX. Both programs run comfortably on my private AMIGA1000 with 2.5 Megabyte of internal memory.

A chess font consists of 26 characters. One for the light and one for the dark square. For each chesspiece (Pawn, kNight, Bishop, Rook, Queen, King) there are four characters to represent it (White, Black) on both squares (light, dark). The troff chessfont also has extra characters for the border of the board. These borders are generated by the chess diagram macros as horizontal and vertical rules in my approach. Table 1 shows all characters from font `chess10` (the size of a square being 10 points).

P	♙	O	♙	p	♟	o	♟	0	□
N	♘	M	♘	n	♞	m	♞	Z	▨
B	♗	A	♗	b	♝	a	♝		
R	♖	S	♖	r	♜	s	♜		
Q	♕	L	♕	q	♛	l	♛		
K	♔	J	♔	k	♚	j	♚		

Table 1: Character encodings of `chess10`

There is an extra font `chessf10` that contains only the so called chess figurines (King, Queen, Rook, Bishop, kNight). With this font the move 25. N5 ×g3, in short algebraic notation, can be typeset as 25. ♘5×g3. Next to `chess10` there are `chess20` and `chess30`. The 20 points version is used in the chess style because the diagrams made with it fit nicely in a twocolumn A4 page. But it would be easy to make another size font by changing only one parameter.

The king has given me the biggest trouble to METAfy. I will not go into any implementation details here. If you compare the original font with my METAimitation, you will see a few differences. The chessboard has no labels for rows and lines. These can be added to the diagram macros if desired. The pieces in the original font use shadings to get a better contrast with the dark squares. The rest of the differences have to be ascribed to my insufficient knowledge of METAFONT.

I have hesitated long to publish my METAcopies of the chessfont in TUGboat. I have seriously tried to find the designer or owner of the original font. According to the Dutch firm who has taken over Schaakhuis De Haan I could safely publish them because the fonts are not sold anymore. I hope this article will help in finding the designer of this very nice chessfont, and that he is not upset with my METAcopy of it.

Having a nice set of chessfonts is one thing, typesetting chess using them is another thing. When I accepted the editorship of our 'Schaakmaatje' so my chessclub 'Schaakclub Geldrop' calls its chess-magazine I used TeX and some macros to typeset chessdiagrams. After giving the LaTeX course at our Computer Center, I definitely wanted to move to this macroset. Especially the many available styles, and the need to have a simple macro for typesetting tables, make LaTeX a lot simpler to use.

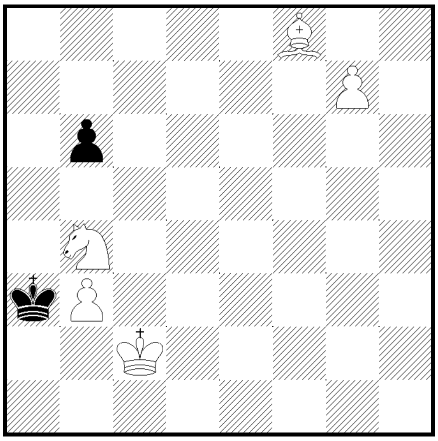


Diagram 2: White mates in three moves

When in TUGboat[1] appeared some macros to play chess in TeX, I used the exposed ideas to make my own chess style. As a typical example of an annotated chessgame I have used a part of the game Fisher played against Tal during the Candidates Tournament of 1959. In the preface from Larry Evans[4] of this game we read: "This is one of the four games that Fisher lost to Tal who, in winning this tournament, earned the right to meet and trounce Botvinnik for the world championship". The game itself is annotated by Fisher. Both the input and the output is included on page 45 of this article.

To typeset the main line with automatically updating the chess position, `chess.sty` has the macro `\newgame` which starts a new game and the environment `position`, to set up a position other than the initial one. The chess position after the 25th move in the game Fisher–Tal (see diagram 3 on page 45) is defined with:

```
\begin{position}
\White(Kh1,Qe6,Re1,a2,b2,c2,g2,h2)
\Black(Kf8,Qb8,Rd7,Rg8,Be7,a6,b4,h7)
\global\Whitetrue\global\movecount=25
\end{position}
```

`\Whitetrue` gives the turn to White (`\Whitefalse` to Black). Setting the movecounter is achieved with `\movecount=25`. The `\global` is needed because both commands are used inside an environment.

There exists another macro `\board` for defining a chess position in case automatically updating is not wanted. This macro is used for the mate in three problem (see diagram 2):

```
\board{ * * B *}
      {* * * P }
      { p * * *}
      {* * * * }
      { N * * *}
      {kP* * * }
      { *K* * *}
      {* * * * }
```

Notice that the user of `chess.sty` does not need to know the character encodings from table 1! He only needs to know the abbreviations of pieces (uppercase for White and lowercase for Black) and that empty squares are represented by a ` ` (light) or a `*` (dark).

To show the board in either case, one needs to call the macro `\showboard` or `$$\showboard$$` if the board should be centered.

To automatically update a position defined by the `position` environment there are two macros: `\ply` and `\move`. If Whites move is not followed by some analysis, the macro `\move` can be used. Otherwise the move has to be broken down into two plies (half moves) with `\ply`. The argument(s) of `\ply` and `\move` contains the from square followed by the to square of the moving piece, or the King in case of castling. A square is presented as a line `[a-h]` followed by the row `[1-8]`. In correspondence chess a similar notation is used except for the lines which are also denoted as decimals `[1-8]`. I think that using letters for lines is less confusing and reflects the way, at least in Europe, chess players think.

If a pawn arrives at its final destination, it becomes a Queen, Rook, Bishop or kNight `{Q|R|B|N}`. If the promotion piece is omitted a default Queen is taken. Moves can also be commented with things like `!` for good moves, `??` for exceptional bad moves, and so on. So the syntax, in a free style of Extended Backus Naur Form, of an argument for both `\ply` and `\move` can be described as:

`[a-h1-8][a-h1-8]{{Q|R|B|N}comment}`

The translation of this move representation to long algebraic notation is carried out by the 'invisible' macro `\@ply`. For example: `\@ply g1f3` will result in ♘g1–f3 in case square f3 is empty or ♘g1×f3 in case of a capture, `\@ply e1c1` will result in 0–0–0.

To update and enquire the chess board, represented by 64 macros (`\a1`, `\a2`,... `\h8`), `\@ply` uses the private macros `\@set` and `\@get`. The value of a square can either be empty (letter `E`), a White piece (`Q`, `R`, `B`, `N`, `P`) or a Black piece (`q`, `r`, `b`, `n`, `p`). To update the chess position `\@ply g1f3` does a `\@set[g1](E)` to make the square g1 empty and a `\@set[f3](N)` to move the kNight to f3. The macro `\@ply` handles castling and the special pawn moves en passant capture and promotion. Because of its length the macro `\@ply` is not included. Basically, it is just a set of nested conditionals to cover all cases. Instead the macros `\@set` and `\@get`, that might be of interest to other TeX applications, are included here, together with `\@showchar` (the macro that maps a square value to the correct character encoding using `\@get`) and `\@emptyboard` (a macro for clearing the chess board using `\@set`).

```
\def\@set[#1#2](#3){
  %arguments: [a-h1-8](<letter>)
  \expandafter
  \xdef\csname#1#2\endcsname{#3}}

\def\@get#1[#2#3]{%arguments:\cs[a-h1-8]
  \edef#1{\csname#2#3\endcsname}}

\font\Chess=chess20

\newcount\@c   % column
\newcount\@r   % row
\newcount\@sum % row+column

\def\@col{\ifcase\@c\or a\or b\or c\or
  d\or e\or f\or g\or h\fi}
\def\@showchar{
  \@get\piece[\@col\the\@r]
  \if\piece E \ifodd\@sum 0\else Z\fi\else
  \if\piece P \ifodd\@sum P\else O\fi\else
  \if\piece p \ifodd\@sum p\else o\fi\else
  \if\piece R \ifodd\@sum R\else S\fi\else
  \if\piece B \ifodd\@sum B\else A\fi\else
  \if\piece N \ifodd\@sum N\else M\fi\else
  \if\piece r \ifodd\@sum r\else s\fi\else
  \if\piece b \ifodd\@sum b\else a\fi\else
  \if\piece n \ifodd\@sum n\else m\fi\else
  \if\piece K \ifodd\@sum K\else J\fi\else
  \if\piece Q \ifodd\@sum Q\else L\fi\else
  \if\piece k \ifodd\@sum k\else j\fi\else
  \if\piece q \ifodd\@sum q\else l\fi\else
  \fi\fi\fi\fi\fi\fi\fi\fi\fi\fi\fi\fi\fi}

% inner loop needs extra { ... }

\def\@emptyboard{
   \@r=1
   \loop
      {\@c=1
       \loop
         \@set[\@col\the\@r](E)
         \ifnum\@c<8 \advance\@c by1
       \repeat}
       \ifnum\@r<8 \advance\@r by 1
   \repeat
}
```

In the analysis mode, when annotating moves from the main line or a variation, the chess board is not updated. This means that we can not automatically derive which piece is moving or capturing another piece. In fact we have to provide all this information ourselves. To make the typesetting nevertheless easy and compact, I have introduced a pair of |...| to activate the algebraic notation. Unfortunately this character pair can not be used within arguments of macros. But you can of course use the pair outside the macro like `|\centerline{25. Kf8!}|`. Or if you prefer you can use the `chess`-environment instead. Because LaTeX uses the | character in the `tabular` environment to draw vertical rules I have made an environment `nochess` that can be used to prevent that the | character will activate the analysing mode. Within the `nochess` environment you can use the environment `chess` to get analysis mode again. Here follow some examples to show how short and long algebraic notation can be generated in analysing mode:

input	**output**
`|21. Nf3-e5??, 0-0!|`	21. ♘f3–e5??, 0–0!
`|21.: Ke8*f8|`	21. . . ., ♔e8×f8
`|21. Nfe5, K*f8|`	21. ♘fe5, ♔×f8
`|21.: f8Q+|`	21. . . ., f8♕+

In the analysing mode some characters have a special meaning. The '`*`' becomes a '×' to denote a capture, the '`-`' is mapped to '–' and the '`:`' is used as an abbreviation for '. . .,' as needed if the analysis starts with a Black move.

The chess macros have also support for different languages thanks to the possibilities of the babel package from Johannes Braams. This package can be used within plain TeX and LaTeX in TeX3.0 or in older versions. The names of the chess pieces can be choosen according to their Dutch abbreviations by specifying the language `dutch` before the `chess` style:

`\documentstyle[dutch,chess]{...}`

In Dutch the letters K ('koning'), D ('dame'), T ('toren'), L ('loper') and P ('paard') are used to denote the king, queen, rook, bishop and knight respectivally. These letters are used in the macros `\move` and `\ply`, only if you provide a promotion piece, within the analysis mode and in the `position` environment. In the `\board` macro we use the same letters to denote the White pieces and the corresponding lowercase letters to indicate the Black piece. In this macro we need also a letter to represent the pawn. Because both 'pion' (pawn) and 'paard' (knight) start with a 'p' I have choosen the letter 'I' for the 'pIon'.

Hopefully the examples above and the extract of the game Fisher–Tal on page 45 are self explaining.

Using plain TeX

To use `chess.sty` in plain TeX you need the following line for including the chess macros:

`\input chess.sty`

The `nochess` and `position` environments from `chess.sty` should be replaced by `\nochess ...\endnochess` and `\position ...\endposition` pairs.

Further wishes

Although the chessfont and the chess style form a good basis to publish about chess, there are still some wishes to make the writing really enjoyable. My first wish would be a program with a chessboard interface on which I can set up a position, play a variation and add text to the computer-generated chess moves, go back to the main line, play another variation, and so on. I have seen a X11 based chess interface using hyperbuttons which provides a good starting point to make such a program!

Surely the chess style can be improved and other style conventions added. If anybody does so, please let me know.

Availability

This article, the chessfonts and the corresponding style file with the complete game of Fisher against Tal and other data can be retrieved (files `chess.tar.Z` and `chess.README`) from the file server `sol.cs.ruu.nl (131.211.80.5)` via anonymous ftp from the directory `TEX`.

Acknowledgements

I would like to thank Victor Eijkhout for his help and criticism he gave me to improve both the chess style and the readability of this article. My thanks go also to Hugo van der Wolf for polishing my English, and to the `UseNet` users who have sent me bugreports and have reported inconveniences present in version 1.0. Most of them are solved and will be made available in version 1.2.

References

[1] *Typesetting Chess*, by Wolfgang Appelt in: TUGboat, Volume 9, Number 3, pp. 284–287. Dec. 1988.

[2] *Berkeley Font Catalogue*, in: Ultrix–32 Supplementary Documents, Volume 1 (General Users), page 6–32. Digital Equipment Corporation, Merrimack, New Hamshire, 1984. Order No. AA–BG66A–TE.

[3] *Babel, a multilingual style-option system for use with LaTeX's standard document styles*, by Johannes Braams; TUGboat, Vol. 2, Number 2, June 1991.

[4] *My 60 Memorable Games*, by Bobby Fischer; Faber and Faber, London. 1969. ISBN 0 571 09312 4

Example of the LaTeX-input and output of an annotated chess game using chess.sty

```
\begin{position}
\White(Kh1,Qe6,Re1,a2,b2,c2,g2,h2)
\Black(Kf8,Qb8,Rd7,Rg8,Be7,a6,b4,h7)
\global\Whitetrue\global\movecount=25
\end{position}
\begin{figure}
\centerline{Diagram~3: Fisher--Tal
 after 25.~\ldots, {\Fig K}f8!}
$$\showboard$$
\end{figure}

\ply  e6d7
Not |26. Rf1+, Kg7; 27. Rf7+, Kh8;
and if 28. Q*d7, Rd8; 29. Qg4, Qe5|
wins.

\ply       b8d6
\move d7b7 g8g6
Within a handful of moves the game
has changed its complexion. Now it
is White who must fight for a draw!

\ply  c2c3!
Black's extra piece means less with
each pawn that's exchanged.

\ply       a6a5
On |28.: b*c3; 29. Qc8+, Bd8;
30. Q*c3|=.

\ply  b7c8+
On the wrong track. Right is
|29. c*b4!, Q*b4 (if 29.: a*b4;
30. a3!, b*a3; 31. b*a3, Q*a3 draws);
30. Qf3+, Kg7; 31. Qe2| draws, since
Black can't possibly build up a
winning K-side attack and his own
king is to exposed.

\ply       f8g7
\move c8c4 e7d8
\move c3b4 a5b4
On |31.: Q*b4; 32. Qe2| White should
draw with best play.
$$\showboard$$
```

(See diagram 3.)

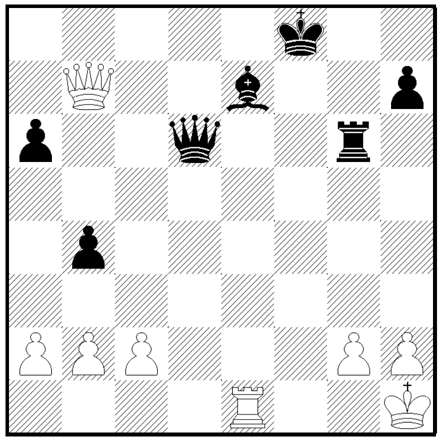
26. ♕e6×d7

Not 26. ♖f1+, ♔g7; 27. ♖f7+, ♔h8; and if 28. ♕×d7, ♖d8; 29. ♕g4, ♕e5 wins.

26. . . . ♕b8–d6
27. ♕d7–b7 ♖g8–g6

Within a handful of moves the game has changed its complexion. Now it is White who must fight for a draw!

Diagram 3: Fisher–Tal after 25. . . . , ♔f8!



28. c2–c3!

Black's extra piece means less with each pawn that's exchanged.

28. . . . a6–a5

On 28. . . ., b×c3; 29. ♕c8+, ♗d8; 30. ♕×c3=.

29. ♕b7–c8+

On the wrong track. Right is 29. c×b4!, ♕×b4 (if 29. . . ., a×b4; 30. a3!, b×a3; 31. b×a3, ♕×a3 draws); 30. ♕f3+, ♔g7; 31. ♕e2 draws, since Black can't possibly build up a winning K-side attack and his own king is to exposed.

29. . . . ♔f8–g7
30. ♕c8–c4 ♗e7–d8
31. c3×b4 a5×b4

On 31. . . ., ♕×b4; 32. ♕e2 White should draw with best play.